STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BR-0041	1	29

REFERENCE: BR-0041

PROJECT: 67041

CONTENTS

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY *ROCKINGHAM*

PROJECT DESCRIPTION *BRIDGE 780001 ON SR 2817 (BARNES STREET) OVER US 29*

SITE DESCRIPTION *BRIDGE 780001 AT -L- STA. 34+73.00 RETAINING WALL NO. 1 AT -Y- STA. 18+74.46 TO 20+98.18 RETAINING WALL NO. 2 AT -Y- STA. 20+26.72 TO 18+17.73*

CAUTION NOTICE

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

SOIL AND ROCK BOUNDARIES WITHIN A BOREHOLE ARE BASED ON GEOTECHNICAL INTERPRETATION UNLESS ENCOUNTERED IN A SAMPLE. INTERPRETED BOUNDARIES MAY NOT NECESSARILY REFLECT ACTUAL SUBSURFACE CONDITIONS BETWEEN SAMPLED STRATA AND BOREHOLE INFORMATION MAY NOT NECESSARILY REFLECT ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

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NOTES:
1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
2. BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

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01847D3739AD49C...
SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
BR-0041	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:
- [ ] CME-45C
- [X] CME-55
- [ ] CME-550
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [X] DIEDRICH D-50
- [ ] _____

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

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

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

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: BY-18: N 937820.2655 E 1810379.3141

ELEVATION: 791.39 FEET

NOTES:

F.I.A.D = FILLED IMMEDIATELY AFTER DRILLING

DATE: 8-15-14

PROJECT REFERENCE NO.	SHEET NO.
BR-0041	2A

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

AASHTO LRFD Figure 10.4.6.4-1 — Determination of GSI for Jointed Rock Mass (Marinos and Hoek, 2000)

GEOLOGICAL STRENGTH INDEX (GSI) FOR JOINTED ROCKS (Hoek and Marinos, 2000)

From the lithology, structure and surface conditions of the discontinuities, estimate the average value of GSI. Do not try to be too precise. Quoting a range from 33 to 37 is more realistic than stating that GSI = 35. Note that the table does not apply to structurally controlled failures. Where weak planar structural planes are present in an unfavorable orientation with respect to the excavation face, these will dominate the rock mass behaviour. The shear strength of surfaces in rocks that are prone to deterioration as a result of changes in moisture content will be reduced if water is present. When working with rocks in the fair to very poor categories, a shift to the right may be made for wet conditions. Water pressure is dealt with by effective stress analysis.

STRUCTURE

- INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities
- BLOCKY - well interlocked undisturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets
- VERY BLOCKY - interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets
- BLOCKY/DISTURBED/SEAMY - folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity
- DISINTEGRATED - poorly interlocked, heavily broken rock mass with mixture of angular and rounded rock pieces
- LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes

DECREASING INTERLOCKING OF ROCK PIECES ⇩

SURFACE CONDITIONS

VERY GOOD	GOOD	FAIR	POOR	VERY POOR
Very rough, fresh unweathered surfaces	Rough, slightly weathered, iron stained surfaces	Smooth, moderately weathered and altered surfaces	Slickensided, highly weathered surfaces with compact coatings or fillings or angular fragments	Slickensided, highly weathered surfaces with soft clay coatings or fillings

DECREASING SURFACE QUALITY ⇨

90			N/A	N/A
80				
70				
60				
50				
40				
30				
20				
10				
N/A	N/A			

AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for Tectonically Deformed Heterogeneous Rock Masses (Marinos and Hoek, 2000)

GSI FOR HETEROGENEOUS ROCK MASSES SUCH AS FLYSCH (Marinos. P and Hoek E., 2000)

From a description of the lithology, structure and surface conditions (particularly of the bedding planes), choose a box in the chart. Locate the position in the box that corresponds to the condition of the discontinuities and estimate the average value of GSI from the contours. Do not attempt to be too precise. Quoting a range from 33 to 37 is more realistic than giving GSI = 35. Note that the Hoek-Brown criterion does not apply to structurally controlled failures. Where unfavourably oriented continuous weak planar discontinuities are present, these will dominate the behaviour of the rock mass. The strength of some rock masses is reduced by the presence of groundwater and this can be allowed for by a slight shift to the right in the columns for fair, poor and very poor conditions. Water pressure does not change the value of GSI and it is dealt with by using effective stress analysis.

COMPOSITION AND STRUCTURE

- **A.** *Thick bedded, very blocky sandstone The effect of pelitic coatings on the bedding planes is minimized by the confinement of the rock mass. In shallow tunnels or slopes these bedding planes may cause structurally controlled instability.*
- **B.** *Sandstone with thin interlayers of siltstone*
- **C.** *Sandstone and siltstone in similar amounts*
- **D.** *Siltstone or silty shale with sandstone layers*
- **E.** *Weak siltstone or clayey shale with sandstone layers*
- **C, D, E,** and **G** - may be more or less folded than illustrated but this does not change the strength. Tectonic deformation, faulting and loss of continuity moves these categories to **F** and **H.**
- **F.** *Tectonically deformed, intensively folded/faulted, sheared clayey shale or siltstone with broken and deformed sandstone layers forming an almost chaotic structure*
- **G.** *Undisturbed silty or clayey shale with or without a few very thin sandstone layers* → **H.** ***Tectonically deformed silty or clayey shale forming a chaotic structure with pockets of clay. Thin layers of sandstone are transformed into small rock pieces.***

→ Means deformation after tectonic disturbance

SURFACE CONDITIONS OF DISCONTINUITIES (Predominantly bedding planes)

VERY GOOD	GOOD	FAIR	POOR	VERY POOR
Very Rough, fresh unweathered surfaces	Rough, slightly weathered surfaces	Smooth, moderately weathered and altered surfaces	Very smooth, occasionally slickensided surfaces with compact coatings or fillings with angular fragments	Very smooth, slickensided or highly weathered surfaces with soft clay coatings or fillings

70	A			
60				
50		B	C	D E
40				
30				F
20				
10			G	H

DATE: 8-19-16

PROJECT REFERENCE NO.	SHEET NO.
BR-0041	3

SITE PLAN

0 40 80
FEET

SR 2817 BARNES ST 26.5' BST

TO REIDSVILLE

TO NC 87

SR 2817 BARNES ST 38' BST

TO WATLINGTON INDUSTRIAL DR

TO SR 3103

SKEW = 68°13'11"

179'-0" TOTAL LENGTH OF BRIDGE (FILL FACE AT END BENT 1 TO FILL FACE AT END BENT 2)

89'-6" SPAN A

89'-6" SPAN B

PRECAST REINFORCED CONCRETE BARRIER, SINGLE FACED (ROADWAY DETAIL & PAY ITEM(TYP.)

RW1-3

RW1-2

RW2-1

EBI-A

EBI-A1

BI-A4

BI-A3

BI-A5

BI-A1

BI-A2

BI-A

EB2-A

BENT 1 CONTROL LINE

OUTSIDE EDGE OF DECK

FILL FACE @ END BENT 2

W.P. 3 @ END BENT 2

FILL FACE STA. 35+62.50 -L-

TEMPORARY WALL (MSE) (TYP.)

W.P. 1 @ END BENT 1

FILL FACE STA. 33+83.50 -L-

BEGIN APPROACH SLAB STA. 33+59.40 -L-

I.D. STATION & W.P. 2 @ BENT 1 -L- STA. 34+73.00 -Y- STA. 19+50.99

STAGE JOINT

DECK STAGE JOINT

END APPROACH SLAB STA. 35+86.60 -L-

33+00

34+00

35+00

36+00

S 52° 38' 40.5"E

68°19'25" (TAN TO CURVE AT W.P.1) (TYP.)

FILL FACE @ END BENT 1 (TYP.)

EXISTING STRUCTURE (TYP.)

EBI-C

BI-C

EBI-B

BI-B

EB2-B

POINT OF MIN. VERT. CL. STA 19+18.88 -Y-, 23.00' LT EL. 793.03

POINT OF MIN. VERT. CL. STA 18+86.72 -Y-, 59.00' RT EL. 794.55

℄ GDR. 1

℄ GDR.

3'-4 5/8" MIN. BERM (LEVEL) EL. 808.10

3'-8 1/8" MIN. BERM (LEVEL) EL. 808.52

MSE WALL NO.1 (SEE WALL PLANS)

MSE WALL NO.2 (SEE WALL PLANS)

4" THICK CONCRETE DITCH BEHIND WALL (TYP.)

TEMPORARY SHORING (TYP.)

PGL LEFT LANE (Y_LT)

PGL RIGHT LANE (Y_RT)

TO NC87

TO NC14

SC Sta. 18+67.73

BEGIN CONSTRUCTION -RPB- POT STA. 15+00.00

-RPB-

RW1-1

RW2-2

A

B

C

01

02

15

20

35

0	20	40

FEET

VE = 1.0

PROJECT REFERENCE NO.	SHEET NO.
BR-0041	4

BRIDGE PROFILE ALONG -L-
OFFSET 40.5' LEFT
SKEW = 68°13'11"

END BENT 1

FILL FACE @ END BENT 1
STA. 33+67.40 -L-

BENT 1

BENT 1
-L- STA. 34+56.82
-Y- STA. 19+94.61

END BENT 2

FILL FACE @ END BENT 2
STA. 35+46.40 -L-

EBI-AI
33+94
49'LT

BI-A5
34+47
49'LT

BI-A
34+60
40'LT

EB2-A
35+20
50'LT

820
810
800
790
780
770
760
750
740
730
720
710

RESIDUAL: Red, Brown, Orange, Gray, and White, Stiff, Clayey Silt (A-5),

RESIDUAL: Brown, Orange, and White, Medium Stiff, Silty CLAY (A-7-5), Trace Mica, Moist

Trace Mica, Moist

Trace Mica, Moist

CRYSTALLINE ROCK: White, Black, and Gray, Very Slightly Weathered to Fresh, GRANITIC ROCK and BIOTITE Wide Fracture Spacing,

Hard to Very Hard, GNEISS with Moderately Close to Very GSI = 80-100

60/0.0

REC=99%
ROD=96%

REC=100%
ROD=100%

100/0.6

BT
FIAD
2/22

02/22

Ⓐ RESIDUAL: Gray, Very Dense, Silty Coarse to Fine SAND (A-2-4) with Rock Fragments, Moist

Ⓑ WEATHERED ROCK: BIOTITE GNEISS

-L-

- PROFILE TAKEN FROM "br0041_ls_tin.tin" FILE PROVIDED BY NCDOT ON 02/15/22
- INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE BRIDGE PROFILE

33+50 34+00 34+50 35+00 35+50

PROJECT REFERENCE NO.	SHEET NO.
BR-0041	5

BRIDGE PROFILE ALONG -L- CENTERLINE
SKEW = 68°13'11"

0 20 40
FEET
VE = 1.0

END BENT 1

BENT 1

END BENT 2

FILL FACE @ END BENT 1
STA.33+83.50 -L-
GRADE POINT EL. 818.19

PROPOSED MSE RETAINING WALL (TYP.)

EBI-C
33+82
5'RT

BENT 1
-L- STA. 34+73.00
-Y- STA. 19+50.99

BI-C
34+64
3'RT

PROPOSED MSE RETAINING WALL (TYP.)

FILL FACE @ END BENT 2
STA.35+62.50 -L-
GRADE POINT EL. 818.31

820
810
800
790
780
770
760
750
740
730
720
710

RESIDUAL: Reddish Brown, Brown, Red, Orange, Tan, and Gray with Black and White, Medium Stiff to Very Stiff, Clayey SILT (A-5), Moist to Wet

RESIDUAL: Orange, Brown, Red, and Gray with Black and White, Medium Stiff to Very Stiff, Silty CLAY (A-7-5) Trace Mica to Micaceous, Moist to Wet

6
10
10
14
45
60/0.0
BT
FIAD
2/22

8
100/0.2
60/0.0
BT
FIAD
2/22

CRYSTALLINE ROCK: GRANITIC ROCK AND BIOTITE GNEISS

Ⓐ RESIDUAL: Brown, Orange, Tan, and Gray with Black and White, Dense, Silty Coarse to Fine SAND (A-2-4), Trace Mica, Moist

Ⓑ WEATHERED ROCK: BIOTITE GNEISS

-L-

- PROFILE TAKEN FROM "401_001_BR-0041_SMU_PGD_S1-01_780001.dgn" FILE PROVIDED BY NCDOT ON 02/15/22
- INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE BRIDGE PROFILE

33+50 34+00 34+50 35+00 35+50 36+00

PROJECT REFERENCE NO.	SHEET NO.
BR-0041	6

BRIDGE PROFILE ALONG -L-
OFFSET 40.5' RIGHT
SKEW = 68°13'11"

0 20 40
FEET
VE = 1.0

END BENT 1

BENT 1

END BENT 2

FILL FACE @ END BENT 1
STA. 33+99.60 -L-

SS-1
EB1-B
34+14
47'RT

BENT 1
-L- STA. 34+89.10
-Y- STA. 19+07.44

BI-B
34+89
48'RT

SS-2
EB2-B
35+44
43'RT

FILL FACE @ END BENT 2
STA. 35+78.60 -L-

820
810
800
790
780
770
760
750
740
730
720
710

02/22

8 10 9 8 12 23 60/0.0 100/0.1 BT

3 7 7 6 12 48 100/0.5 100/0.2 100/0.9 100/0.7 BT DRY 2/22

7 7 6 6 7 12 17 27 33 100/0.2 60/0.1 BT FIAD 2/22

RESIDUAL: Red, Brown, Orange, Gray, and Black, Soft to Very Stiff, Clayey SILT (A-5)

RESIDUAL: Brown, Orange, White, and Black, Dense, Silty Coarse and Coarse to Fine Sandy SILT (A-4)

WEATHERED ROCK: BIOTITE GNEISS

CRYSTALLINE ROCK: BIOTITE GNEISS

RESIDUAL: Red to Orange to Gray with Black, Medium Stiff, Silty CLAY (A-7-5), Micaceous, Moist

with Isolated Rock Fragments, Micaceous, Moist

to Fine SAND (A-2-4), Dry to Moist

WEATHERED ROCK: BIOTITE GNEISS

CRYSTALLINE ROCK: BIOTITE GNEISS

Ⓒ ROADWAY EMBANKMENT: Red-Brown to Brown, Very Stiff, Silty CLAY (A-7-5), Moist

- PROFILE TAKEN FROM "br0041_ls_tin.tin" FILE PROVIDED BY NCDOT ON 02/15/22
- INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE BRIDGE PROFILE

-L-

33+50 34+00 34+50 35+00 35+50

PROJECT REFERENCE NO.	SHEET NO.
BR-0041	7

CROSS SECTION AT END BENT 1
-L- STA. 33+83.50
SKEW = 68°13'11"

0 20 40
FEET
VE = 1.0

-L- STA. 33+83.50

℄

RWI-3 33+65 119'LT
RWI-2 33+82 76'LT
EBI-A EBI-A1 33+91 33+94 54'LT 49'LT
EBI-C 33+82 5'RT
SS-1
EBI-B 34+14 47'RT
SS-3
RWI-1 34+41 106'RT

820 810 800 790 780 770 760 750 740 730 720 710

RESIDUAL: Reddish Brown, Brown, Orange, Red, and Tan with Black and White, Very Soft to Very Stiff, Coarse to Fine Sandy SILT (A-4) and Clayey SILT (A-5) with Isolated Rock Fragments, Moist to Saturated

RESIDUAL: Red to Brown to Orange with Black, Medium Stiff, Silty CLAY (A-7-5), Micaceous, Moist

BT FIAD 2/22
BT FIAD 2/22
BT FIAD 2/22
BT FIAD 3/22
BT 02/22
BT 02/22
BT

REC=99%
ROD=96%

CRYSTALLINE ROCK: White, Black, and Gray, Very Slightly Weathered to Fresh, Hard to Very Hard, BIOTITE GNEISS with Wide Fracture Spacing
GSI = 80-90

Ⓐ RESIDUAL: Gray, Brown, and Tan with Black and White, Dense to Very Dense, Silty Coarse to Fine SAND (A-2-4) with Rock Fragments, Moist

Ⓑ WEATHERED ROCK: BIOTITE GNEISS

- PROFILE TAKEN FROM "br0041_ls_tin.tin" FILE PROVIDED BY NCDOT ON 02/15/22
- INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS-SECTION

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

PROJECT REFERENCE NO.	SHEET NO.
BR-0041	8

CROSS SECTION AT BENT 1
-L- STA. 34+73.00
SKEW = 68°13'11"

0 20 40
FEET
VE = 1.0

-L- STA. 34+73.00

℄

BI-A4 34+44 57'LT
BI-A5 34+47 49'LT
BI-A 34+60 40'LT
BI-C 34+64 3'RT
BI-B 34+89 48'RT

820 810 800 790 780 770 760 750 740 730 720 710

RESIDUAL: Reddish Brown, and Gray with Black and White, Soft to Stiff, Clayey SILT (A-5), Trace Mica to Micaceous, Moist

WEATHERED ROCK.

BIOTITE GNEISS

CRYSTALLINE ROCK: White, Black, and Gray, to Fresh, Hard to Very Hard, GRANITIC ROCK and BIOTITE GNEISS with Moderately Close to Very Wide Fracture Spacing
GSI = 80-100

Very Slightly Weathered

BT FIAD 2/22
BT FIAD 2/22
BT FIAD 3/22
BT FIAD 2/22
BT DRY 2/22

60/0.0
KT-2 2/22
REC=100% ROD=100%
100/0.5
100/0.2
100/0.9
100/0.7

Ⓐ RESIDUAL: Brown, Black, and White, Dense, Silty Coarse to Fine SAND (A-2-4), Dry

- PROFILE TAKEN FROM "br0041_ls_tin.tin" FILE PROVIDED BY NCDOT ON 02/15/22
- INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS-SECTION

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

0	20	40

FEET

VE = 1.0

PROJECT REFERENCE NO.	SHEET NO.
BR-0041	9

CROSS SECTION AT END BENT 2
-L- STA. 35+62.50
SKEW = 68°13'11"

-L- STA. 35+62.50

RW2-1
36+97
99'LT

EB2-A
35+20
50'LT

SS-2
EB2-B
35+44
43'RT

SS-4
RW2-2
35+82
107'RT

820
810
800
790
780
770
760
750
740
730
720
710

RESIDUAL: Orange, Brown, Red, and Gray with Black and White, Medium Stiff to Very Stiff, Silty CLAY (A-7-5), Trace Mica to Micaceous, Moist to Wet

RESIDUAL: Red-Brown, Brown, Orange, Gray, and White with Black, Medium Stiff to Very Stiff, Clayey SILT (A-5), Trace Mica to Micaceous, Moist to Wet

CRYSTALLINE ROCK: BIOTITE GNEISS

CRYSTALLINE ROCK: BIOTITE GNEISS

BT
DRY
2/22

BT
02/22

BT

BT
FIAD
2/22

BT
02/22

Ⓐ RESIDUAL: Orange, White, and Black, Dense, Silty Coarse to Fine SAND (A-2-4), Trace Mica, Moist

Ⓑ WEATHERED ROCK: BIOTITE GNEISS

- PROFILE TAKEN FROM "br0041_ls_tin.tin" FILE PROVIDED BY NCDOT ON 02/15/22
- INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS-SECTION

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

PROJECT REFERENCE NO.	SHEET NO.
BR-0041	10

RETAINING WALL NO. 1
-Y- STA. 18+74.46 TO 20+98.18

0 20 40
FEET
VE = 1:1

BEGIN WALL #1
-Y- STA. 18+74.46
-W1- 00+00.00
EL. 791.14

END WALL #1
-Y- STA. 20+98.18
-W1- 02+22.33
EL. 788.21

(LOOKING AT FRONT FACE OF WALL)

SS-3
RWI-1
-Y-18+64
69'LT

SS-1
EBI-B
-Y-19+29
72'LT

EBI-C
-Y-19+80
86'LT

EBI-A1
-Y-20+26
55'LT

RWI-2
-Y-20+56
56'LT

RWI-3
-Y-21+02
56'LT

-W1- 01+13.11
EL. 808.06

TOP OF WALL

EXISTING GRADE

TOP OF LEVELING PAD

840 830 820 810 800 790 780 770 760 750 740 730 720 710 700 690

RESIDUAL: Reddish Brown, Brown, to Very Stiff, Coarse to Fine Sandy with Isolated Rock Fragments, Moist to

Orange, Red, and Tan with Black and SILT (A-4) and Clayey SILT (A-5) Saturated

White, Very Soft

REC=99%
RQD=96%

BT
BT
FIAD 3/22
BT
FIAD 2/22
BT
FIAD 2/22
BT
FIAD 2/22

CRYSTALLINE ROCK: White, Black, and Gray, Very Slightly Weathered to Fresh, Hard to Very Hard, BIOTITE GNEISS with Wide Fracture Spacing
GSI = 80-90

Ⓐ RESIDUAL: Gray, Brown, and Tan with Black and White, Dense to Very Dense, Silty Coarse to Fine SAND (A-2-4) with Rock Fragments, Moist

Ⓑ WEATHERED ROCK: BIOTITE GNEISS

Ⓒ RESIDUAL: Red to Brown to Orange with Black, Medium Stiff, Silty CLAY (A-7-5), Micaceous, Moist

-W1-

- PROFILE TAKEN FROM "401_004_BR-0041_SMU_WALL_S1-06_780001.dgn" FILE PROVIDED BY NCDOT ON 02/15/22
- INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE RETAINING WALL PROFILE

0+00 0+50 1+00 1+50 2+00

PROJECT REFERENCE NO.	SHEET NO.
BR-0041	11

RETAINING WALL NO. 2
-Y- STA. 20+26.72 TO 18+17.73

0 20 40
FEET
VE = 1:1

(LOOKING AT FRONT FACE OF WALL)

RW2-1
-Y-20+34
59'RT

EB2-A
-Y-19+80
62'RT

SS-2
EB2-B
-Y-18+85
52'RT

SS-4
RW2-2
-Y-18+12
63'RT

BEGIN WALL #2
-Y- STA. 20+26.72
-W2- 00+00.00
EL. 791.22

-W2- 01+05.15
EL. 809.02

TOP OF WALL

END WALL #2
-Y- STA. 18+17.73
-W2- 02+10.17
EL. 793.57

TOP OF LEVELING PAD

EXISTING GRADE

RESIDUAL: Orange, Brown, Red, and Gray with Black and White, Medium Stiff to Very Stiff, Silty CLAY (A-7-5), Trace Mica to Micaceous, Moist to Wet

BT DRY 2/22

02/22

BT

RESIDUAL: Red-Brown, Brown, Orange, Gray, and White with Black, Medium Stiff to Very Stiff, Clayey SILT (A-5), Trace Mica to Micaceous, Moist to Wet

CRYSTALLINE ROCK: BIOTITE GNEISS

BT FIAD 2/22

CRYSTALLINE ROCK: BIOTITE GNEISS

Ⓐ RESIDUAL: Orange, White, and Black, Dense, Silty Coarse to Fine SAND (A-2-4), Trace Mica, Moist

Ⓑ WEATHERED ROCK: BIOTITE GNEISS

-W2-

- PROFILE TAKEN FROM "401_004_BR-0041_SMU_WALL_S1-06_780001.dgn" FILE PROVIDED BY NCDOT ON 02/15/22
- INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE RETAINING WALL PROFILE

840 830 820 810 800 790 780 770 760 750 740 730 720 710 700 690

0+00 0+50 1+00 1+50 2+00

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 67041.1.1	**TIP** BR-0041	**COUNTY** ROCKINGHAM	**GEOLOGIST** Roseman, A. E.	
SITE DESCRIPTION Bridge No. 780001 on SR 2817 (Barnes Street) over US 29				**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 33+91	**OFFSET** 54 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 790.1 ft	**TOTAL DEPTH** 5.2 ft	**NORTHING** 938,696	**EASTING** 1,810,510	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 77% 04/23/2021		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Toothman, R	**START DATE** 02/09/22	**COMP. DATE** 02/09/22	**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)
795												
790										GROUND SURFACE	790.1	0.0
	789.1	1.0	1	3	3	6		M		**RESIDUAL** Red, Clayey SILT, Micaceous	788.1	2.0
	786.6	3.5	36	46	24	70		M		Gray, Silty Coarse to Fine SAND with Rock Fragments	784.9	5.2
785	784.9	5.2	60/0.0			60/0.0				Boring Terminated with Standard Penetration Test Refusal at Elevation 784.9 ft on Crystalline Rock: BIOTITE GNEISS		

WBS 67041.1.1	**TIP** BR-0041	**COUNTY** ROCKINGHAM	**GEOLOGIST** Weaver, P.M.	
SITE DESCRIPTION Bridge No. 780001 on SR 2817 (Barnes Street) over US 29				**GROUND WTR (ft)**
BORING NO. EB1-A1	**STATION** 33+94	**OFFSET** 49 ft LT	**ALIGNMENT** -L-	**0 HR.** 5.1
COLLAR ELEV. 790.1 ft	**TOTAL DEPTH** 25.9 ft	**NORTHING** 938,690	**EASTING** 1,810,509	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 77% 04/23/2021		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic	
DRILLER Toothman, R	**START DATE** 02/10/22	**COMP. DATE** 02/10/22	**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)
795												
790										GROUND SURFACE	790.1	0.0
										RESIDUAL Red, Clayey SILT, Micaceous	787.6	2.5
										Gray, Silty Coarse to Fine SAND with Rock Fragments	785.7	4.4
785	785.7	4.4	60/0.0			60/0.0				**CRYSTALLINE ROCK** White, Black, and Gray, Very Slightly Weathered to Fresh, Hard to Very Hard, BIOTITE GNEISS, with Wide Fracture Spacing		
780												
775												
770												
765											764.2	25.9
										Boring Terminated at Elevation 764.2 ft in Crystalline Rock: BIOTITE GNEISS		

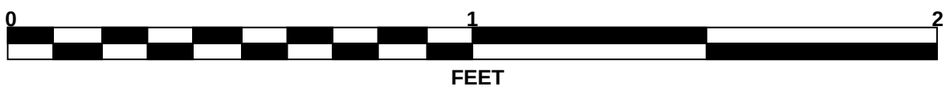
GEOTECHNICAL BORING REPORT
CORE LOG

WBS 67041.1.1	**TIP** BR-0041	**COUNTY** ROCKINGHAM	**GEOLOGIST** Weaver, P.M.	
SITE DESCRIPTION Bridge No. 780001 on SR 2817 (Barnes Street) over US 29				**GROUND WTR (ft)**
BORING NO. EB1-A1	**STATION** 33+94	**OFFSET** 49 ft LT	**ALIGNMENT** -L-	**0 HR.** 5.1
COLLAR ELEV. 790.1 ft	**TOTAL DEPTH** 25.9 ft	**NORTHING** 938,690	**EASTING** 1,810,509	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 77% 04/23/2021		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic	
DRILLER Toothman, R	**START DATE** 02/10/22	**COMP. DATE** 02/10/22	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 21.5 ft			

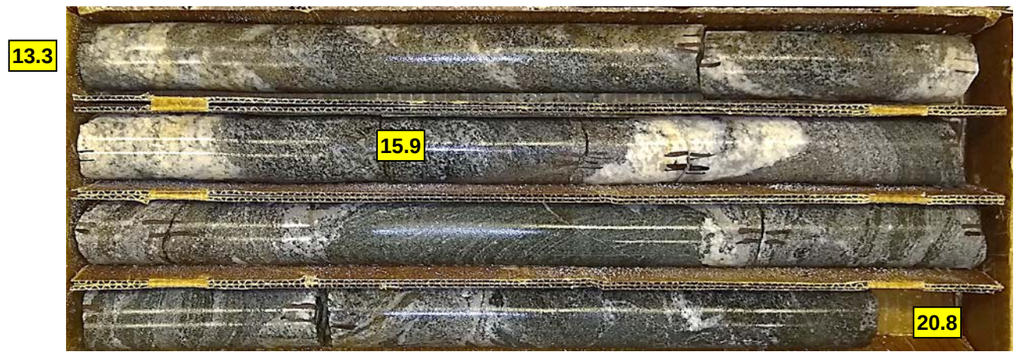
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS
785.7											Begin Coring @ 4.4 ft
785	785.7	4.4	1.5	2:49/0.5 5:33/1.0	(1.3) 87%	(0.7) 47%		(21.3) 99%	(20.7) 96%		ELEV. 785.7 DEPTH 4.4 **CRYSTALLINE ROCK** White, Black, and Gray, Very Slightly Weathered to Fresh, Hard to Very Hard, BIOTITE GNEISS, with Wide Fracture Spacing Intermittent foliation Three natural fractures at 10 degrees to 30 degrees GSI=80 to 100
	784.2	5.9	5.0	4:29/1.0 3:53/1.0 4:03/1.0 4:28/1.0 4:22/1.0	(5.0) 100%	(5.0) 100%					
780	779.2	10.9	5.0	6:06/1.0 5:20/1.0 5:23/1.0 4:44/1.0 6:13/1.0	(5.0) 100%	(5.0) 100%					
775	774.2	15.9	5.0	5:19/1.0 2:52/1.0 4:20/1.0 4:14/1.0 3:27/1.0	(5.0) 100%	(5.0) 100%					
770	769.2	20.9	5.0	5:18/1.0 3:48/1.0 3:49/1.0 4:09/1.0 2:42/1.0	(5.0) 100%	(5.0) 100%					
765	764.2	25.9									ELEV. 764.2 DEPTH 25.9 Boring Terminated at Elevation 764.2 ft in Crystalline Rock: BIOTITE GNEISS

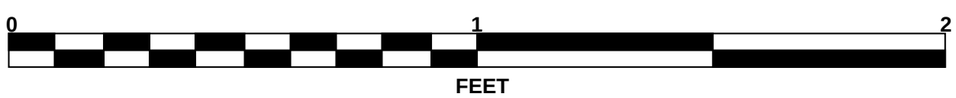
CORE PHOTOGRAPHS

EB1-A1
BOX 1: 4.4 - 13.3 FEET



EB1-A1
BOX 2: 13.3 - 20.8 FEET

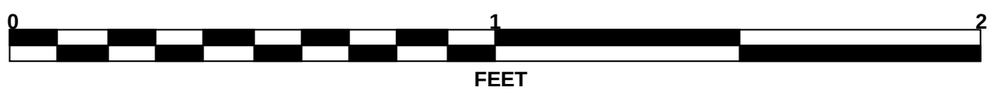




CORE PHOTOGRAPHS

EB1-A1

BOX 3: 20.8 - 25.9 FEET



GEOTECHNICAL BORING REPORT
BORE LOG

WBS 67041.1.1	**TIP** BR-0041	**COUNTY** ROCKINGHAM	**GEOLOGIST** Weaver, P.M.	
SITE DESCRIPTION Bridge No. 780001 on SR 2817 (Barnes Street) over US 29				**GROUND WTR (ft)**
BORING NO. EB1-C	**STATION** 33+82	**OFFSET** 5 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 798.6 ft	**TOTAL DEPTH** 28.6 ft	**NORTHING** 938,594	**EASTING** 1,810,546	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE CG20446 Diedrich D50 76% 06/14/2021		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Odom, C.	**START DATE** 03/14/22	**COMP. DATE** 03/15/22	**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)
800										798.6	
										GROUND SURFACE	0.0
										RESIDUAL Orange, Red, and Tan with Black and White, Clayey SILT	
795	792.6	6.0	2	3	3	6		M			
790	787.6	11.0	2	4	6	10		M			
785	782.6	16.0	2	4	6	10		M			
780	777.6	21.0	2	6	8	14		M			
775	772.6	26.0	10	16	29	45		M		774.3	24.3
770	770.0	28.6	60/0.0			60/0.0				Brown and Tan with Black and White, Silty Coarse to Fine SAND	
										770.0	28.6
										Boring Terminated at Elevation 770.0 ft on Crystalline Rock: BIOTITE GNEISS	

Note: 4 Inches of Concrete Covering Embankment Slope Was Removed Prior to Boring. Top of Boring on Log Is At Bottom of Concrete.

WBS 67041.1.1	**TIP** BR-0041	**COUNTY** ROCKINGHAM	**GEOLOGIST** Roseman, A. E.	
SITE DESCRIPTION Bridge No. 780001 on SR 2817 (Barnes Street) over US 29				**GROUND WTR (ft)**
BORING NO. EB1-B	**STATION** 34+14	**OFFSET** 47 ft RT	**ALIGNMENT** -L-	**0 HR.** 12.5
COLLAR ELEV. 789.6 ft	**TOTAL DEPTH** 29.9 ft	**NORTHING** 938,602	**EASTING** 1,810,467	**24 HR.** 0.0
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 77% 04/23/2021		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Toothman, R	**START DATE** 02/02/22	**COMP. DATE** 02/02/22	**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)
790										789.6	
										GROUND SURFACE	0.0
										788.1	1.5
	786.1	3.5	3	3	5	8		M		**RESIDUAL** Red, Brown, Orange, and Black, ClayeySILT, Micaceous	
785	783.6	6.0	3	4	6	10	SS-1	30%		787.6	2.0
	781.1	8.5	3	4	5	9		M		NOTE: 1.5' - 2.0' encountered boulder	
780											
	776.1	13.5	3	3	5	8		M		776.5	13.1
775										Red, Orange, Gray, Whiteand Black, Coarse to Fine Sandy SILT with Rock Fragments, Micaceous	
	771.1	18.5	4	5	7	12		M			
770											
	766.1	23.5	7	9	14	23		Sat.			
765										763.2	26.4
	761.1	28.5	55	45/0.2						**WEATHERED ROCK** BIOTITE GNEISS	
760	759.7	29.9	60/0.0			100/0.7 60/0.0				759.7	29.9
										Boring Terminated with Standard Penetration Test Refusal at Elevation 759.7 ft on Crystalline Rock: BIOTITE GNEISS	

Note: SPT test terminated at 1.0' sample depth due to being a potential utility

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 67041.1.1	**TIP** BR-0041	**COUNTY** ROCKINGHAM	**GEOLOGIST** Roseman, A. E.	
SITE DESCRIPTION Bridge No. 780001 on SR 2817 (Barnes Street) over US 29				**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 34+60	**OFFSET** 40 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 789.8 ft	**TOTAL DEPTH** 3.5 ft	**NORTHING** 938,643	**EASTING** 1,810,556	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 77% 04/23/2021		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Toothman, R	**START DATE** 02/02/22	**COMP. DATE** 02/02/22	**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)
790										789.8 GROUND SURFACE 0.0
	788.8	1.0	3	4	5	9		M		**RESIDUAL** Brown to Gray, Clayey SILT, Trace Mica
	786.3	3.5	60/0.0			60/0.0				786.3 3.5 Boring Terminated with Standard Penetration Test Refusal at Elevation 786.3 ft on Crystalline Rock: GRANITIC ROCK

WBS 67041.1.1	**TIP** BR-0041	**COUNTY** ROCKINGHAM	**GEOLOGIST** Roseman, A. E.	
SITE DESCRIPTION Bridge No. 780001 on SR 2817 (Barnes Street) over US 29				**GROUND WTR (ft)**
BORING NO. B1-A1	**STATION** 34+62	**OFFSET** 47 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 789.8 ft	**TOTAL DEPTH** 4.5 ft	**NORTHING** 938,647	**EASTING** 1,810,562	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 77% 04/23/2021		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Toothman, R	**START DATE** 02/02/22	**COMP. DATE** 02/02/22	**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
790										789.8 GROUND SURFACE 0.0
	786.3	3.5	6	6	60/0.0	60/0.0				**RESIDUAL** Brown to Gray, Clayey SILT, Trace Mica
										785.3 4.5 Boring Terminated with Standard Penetration Test Refusal at Elevation 785.3 ft on Crystalline Rock: GRANITIC ROCK

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 67041.1.1	**TIP** BR-0041	**COUNTY** ROCKINGHAM	**GEOLOGIST** Roseman, A. E.	
SITE DESCRIPTION Bridge No. 780001 on SR 2817 (Barnes Street) over US 29				**GROUND WTR (ft)**
BORING NO. B1-A2	**STATION** 34+48	**OFFSET** 44 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 789.8 ft	**TOTAL DEPTH** 4.0 ft	**NORTHING** 938,654	**EASTING** 1,810,549	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 77% 04/23/2021		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Toothman, R	**START DATE** 02/02/22	**COMP. DATE** 02/02/22	**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	DEPTH (ft)
790										ELEV. (ft) 789.8 GROUND SURFACE	0.0
										RESIDUAL Brown to Gray, Clayey SILT, Trace Mica	
	785.8	4.0	60/0.0			60/0.0				785.8	4.0
										Boring Terminated with Standard Penetration Test Refusal at Elevation 785.8 ft on Crystalline Rock: GRANITIC ROCK	

WBS 67041.1.1	**TIP** BR-0041	**COUNTY** ROCKINGHAM	**GEOLOGIST** Roseman, A. E.	
SITE DESCRIPTION Bridge No. 780001 on SR 2817 (Barnes Street) over US 29				**GROUND WTR (ft)**
BORING NO. B1-A3	**STATION** 34+44	**OFFSET** 51 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 789.8 ft	**TOTAL DEPTH** 2.3 ft	**NORTHING** 938,662	**EASTING** 1,810,550	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 77% 04/23/2021		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Toothman, R	**START DATE** 02/02/22	**COMP. DATE** 02/02/22	**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	DEPTH (ft)
790										ELEV. (ft) 789.8 GROUND SURFACE	0.0
										RESIDUAL	
	787.5	2.3	60/0.0			60/0.0				787.5 Brown to Gray, Clayey SILT, Trace Mica	2.3
										Boring Terminated with Standard Penetration Test Refusal at Elevation 787.5 ft on Crystalline Rock: GRANITIC ROCK	

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 67041.1.1	**TIP** BR-0041	**COUNTY** ROCKINGHAM	**GEOLOGIST** Roseman, A. E.	
SITE DESCRIPTION Bridge No. 780001 on SR 2817 (Barnes Street) over US 29				**GROUND WTR (ft)**
BORING NO. B1-A4	**STATION** 34+44	**OFFSET** 57 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 789.8 ft	**TOTAL DEPTH** 2.1 ft	**NORTHING** 938,666	**EASTING** 1,810,554	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 77% 04/23/2021		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Toothman, R	**START DATE** 02/02/22	**COMP. DATE** 02/02/22	**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	DEPTH (ft)
790										ELEV. (ft) 789.8 GROUND SURFACE	0.0
	787.7	2.1	60/0.0			60/0.0				**RESIDUAL** 787.7 Brown to Gray, Clayey SILT, Trace Mica	2.1
										Boring Terminated with Standard Penetration Test Refusal at Elevation 787.7 ft on Crystalline Rock: GRANITIC ROCK	

WBS 67041.1.1	**TIP** BR-0041	**COUNTY** ROCKINGHAM	**GEOLOGIST** Roseman, A. E.	
SITE DESCRIPTION Bridge No. 780001 on SR 2817 (Barnes Street) over US 29				**GROUND WTR (ft)**
BORING NO. B1-A5	**STATION** 34+47	**OFFSET** 49 ft LT	**ALIGNMENT** -L-	**0 HR.** 5.8
COLLAR ELEV. 789.8 ft	**TOTAL DEPTH** 26.2 ft	**NORTHING** 938,658	**EASTING** 1,810,551	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 77% 04/23/2021		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic	
DRILLER Toothman, R	**START DATE** 02/11/22	**COMP. DATE** 02/11/22	**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	DEPTH (ft)
790										ELEV. (ft) 789.8 GROUND SURFACE	0.0
										RESIDUAL Brown to Gray, Clayey SILT, Trace Mica	
	786.4	3.4	60/0.0			60/0.0				786.4	3.4
785										**CRYSTALLINE ROCK** Gray and White, Very Slightly Weathered to Fresh, Hard to Very Hard, GRANITIC ROCK with Moderately Close Fracture Spacing	
780										780.3	9.5
										White, Black, and Gray, Very Slightly Weathered to Fresh, Hard to Very Hard, BIOTITE GNEISS with Very Wide Fracture Spacing	
775											
770											
765										763.6	26.2
										Boring Terminated at Elevation 763.6 ft in Crystalline Rock: GRANITIC ROCK	

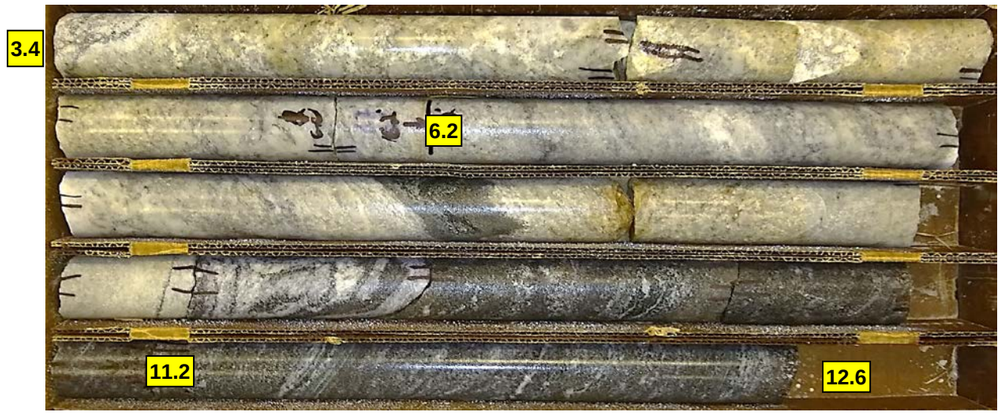
GEOTECHNICAL BORING REPORT
CORE LOG

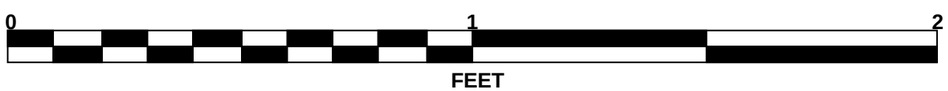
WBS 67041.1.1	**TIP** BR-0041	**COUNTY** ROCKINGHAM	**GEOLOGIST** Roseman, A. E.	
SITE DESCRIPTION Bridge No. 780001 on SR 2817 (Barnes Street) over US 29				**GROUND WTR (ft)**
BORING NO. B1-A5	**STATION** 34+47	**OFFSET** 49 ft LT	**ALIGNMENT** -L-	**0 HR.** 5.8
COLLAR ELEV. 789.8 ft	**TOTAL DEPTH** 26.2 ft	**NORTHING** 938,658	**EASTING** 1,810,551	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 77% 04/23/2021		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic	
DRILLER Toothman, R	**START DATE** 02/11/22	**COMP. DATE** 02/11/22	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 22.8 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
786.4											Begin Coring @ 3.4 ft
785	786.4	3.4	2.8	5:01/0.8 6:18/1.0 5:52/1.0	(2.8) 100%	(2.8) 100%		(6.1) 100%	(6.1) 100%		**CRYSTALLINE ROCK** (786.4 / 3.4) Gray and White, Very Slightly Weathered to Fresh, Hard to Very Hard, GRANITIC ROCK with Moderately Close Fracture Spacing 1 fracture at 80 degrees and 1 fracture at 0 degrees GSI = 80-100
	783.6	6.2									
			5.0	5:43/1.0 6:21/1.0 5:12/1.0 4:52/1.0 3:25/1.0	(5.0) 100%	(5.0) 100%					
780	778.6	11.2									(780.3 / 9.5)
			5.0	3:26/1.0 3:17/1.0 3:55/1.0 4:08/1.0 3:45/1.0	(5.0) 100%	(5.0) 100%		(16.7) 100%	(16.7) 100%		White, Black, and Gray, Very Slightly Weathered to Fresh, Hard to Very Hard, BIOTITE GNEISS with Very Wide Fracture Spacing 1 fracture at 10 degrees GSI = 80-90
775	773.6	16.2									
			5.0	3:22/1.0 3:36/1.0 5:03/1.0 4:49/1.0 5:02/1.0	(5.0) 100%	(5.0) 100%					
770	768.6	21.2									
			5.0	4:02/1.0 4:22/1.0 5:09/1.0 3:27/1.0 6:31/1.0	(5.0) 100%	(5.0) 100%					
765	763.6	26.2									(763.6 / 26.2)
											Boring Terminated at Elevation 763.6 ft in Crystalline Rock: GRANITIC ROCK

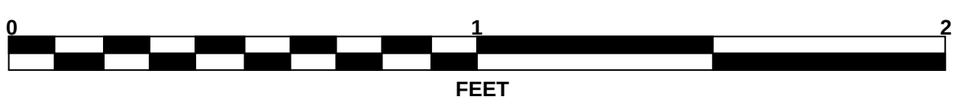
CORE PHOTOGRAPHS

B1-A5
BOX 1: 3.4 - 12.6 FEET





B1-A5
BOX 2: 12.6 - 21.1 FEET



CORE PHOTOGRAPHS

B1-A5

BOX 3: 21.1 - 26.2 FEET

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 67041.1.1	**TIP** BR-0041	**COUNTY** ROCKINGHAM	**GEOLOGIST** Weaver, P.M.	
SITE DESCRIPTION Bridge No. 780001 on SR 2817 (Barnes Street) over US 29				**GROUND WTR (ft)**
BORING NO. B1-C	**STATION** 34+64	**OFFSET** 3 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 791.0 ft	**TOTAL DEPTH** 8.0 ft	**NORTHING** 938,606	**EASTING** 1,810,533	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE CG20446 Diedrich D50 76% 06/14/2021		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Odom, C.	**START DATE** 03/14/22	**COMP. DATE** 03/15/22	**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)
795										
	791.0	0.0								791.0 GROUND SURFACE 0.0
790			2	3	5	8		M		**RESIDUAL** Reddish Brown with Black, Clayey SILT (A-5), Trace Mica
785	784.3	6.7								784.4 6.6
	783.0	8.0	100/0.2			100/0.2				**WEATHERED ROCK** GRANITIC ROCK 783.0 8.0
			60/0.0			60/0.0				Boring Terminated at Elevation 783.0 ft on Crystalline Rock: GRANTIC ROCK

WBS 67041.1.1	**TIP** BR-0041	**COUNTY** ROCKINGHAM	**GEOLOGIST** Roseman, A. E.	
SITE DESCRIPTION Bridge No. 780001 on SR 2817 (Barnes Street) over US 29				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 34+89	**OFFSET** 48 ft RT	**ALIGNMENT** -L-	**0 HR.** 9.1
COLLAR ELEV. 790.0 ft	**TOTAL DEPTH** 38.9 ft	**NORTHING** 938,556	**EASTING** 1,810,526	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 77% 04/23/2021		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Toothman, R	**START DATE** 02/01/22	**COMP. DATE** 02/01/22	**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
790										790.0 GROUND SURFACE 0.0
	789.0	1.0	2	2	1	3		M		**RESIDUAL** Brown and Gray-Brown with White, Clayey SILT, Micaceous Note: Hard layer from 16.2' to 17.6'
785	786.4	3.6	1	4	3	7		M		
	784.0	6.0	2	3	4	7		M		
780	781.4	8.6	2	2	4	6		M		
	776.8	13.2	5	5	7	12		M		
775	771.8	18.2	10	22	26	48		D		771.4 18.6 Brown, Black, and White, Silty Coarse to Fine SAND
770	766.8	23.2	19	41	59/0.4	100/0.9				766.3 23.7 **WEATHERED ROCK** BIOTITE GNEISS
765	761.8	28.2	100/0.2			100/0.2				
760	756.8	33.2		41	59/0.4	100/0.9				
755	751.8	38.2		46	54/0.2	100/0.7				751.1 38.9 Boring Terminated at Elevation 751.1 ft in Weathered Rock: BIOTITE GNEISS

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 67041.1.1	**TIP** BR-0041	**COUNTY** ROCKINGHAM	**GEOLOGIST** Roseman, A. E.	
SITE DESCRIPTION Bridge No. 780001 on SR 2817 (Barnes Street) over US 29				**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 35+20	**OFFSET** 50 ft LT	**ALIGNMENT** -L-	**0 HR.** 7.9
COLLAR ELEV. 790.5 ft	**TOTAL DEPTH** 24.7 ft	**NORTHING** 938,615	**EASTING** 1,810,610	**24 HR.** 6.8
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 77% 04/23/2021		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Toothman, R	**START DATE** 02/01/22	**COMP. DATE** 02/02/22	**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)
795											
										790.5	0.0
										GROUND SURFACE	
790	789.5	1.0	2	3	3	6		M		**RESIDUAL** Brown, Orange, and White, Silty CLAY, Trace Mica	
	787.0	3.5	2	2	3	5		M			
785	784.5	6.0	2	2	4	6		M			
	782.2	8.3	2	2	3	5		M			
780										778.5	12.0
	777.2	13.3	2	4	6	10		M		Brown, Orange and White, Clayey SILT, Trace Mica	
775											
	772.2	18.3	3	4	5	9		M			
770											
	767.2	23.3	15	60	40/0.1	100/0.6		M		766.7	23.8
	765.8	24.7	60/0.0			60/0.0				765.8	24.7
										WEATHERED ROCK Weathered Rock: BIOTITE GNEISS Boring Terminated with Standard Penetration Test Refusal at Elevation 765.8 ft on Crystalline Rock: BIOTITE GNEISS	

WBS 67041.1.1	**TIP** BR-0041	**COUNTY** ROCKINGHAM	**GEOLOGIST** Roseman, A. E.	
SITE DESCRIPTION Bridge No. 780001 on SR 2817 (Barnes Street) over US 29				**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 35+44	**OFFSET** 43 ft RT	**ALIGNMENT** -L-	**0 HR.** 11.2
COLLAR ELEV. 792.6 ft	**TOTAL DEPTH** 43.6 ft	**NORTHING** 938,526	**EASTING** 1,810,572	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 77% 04/23/2021		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Toothman, R	**START DATE** 02/08/22	**COMP. DATE** 02/08/22	**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
795										
										792.6 GROUND SURFACE 0.0
	791.6	1.0	3	3	4	7	SS-2	25%		**RESIDUAL** Red to Orange to Gray with Black, Silty CLAY, Micaceous,
790	789.1	3.5	3	3	4	7		M		
	786.6	6.0	4	2	4	6		M		
785	784.1	8.5	2	3	3	6		M		
	779.1	13.5	2	3	4	7		W		
780										775.6 17.0
	774.1	18.5	3	5	7	12		W		Orange and Gray with Black and White, Clayey SILT, Micaceous, Isolated Rock Fragments
775										
	769.1	23.5	6	7	10	17		W		
770										
	764.1	28.5	6	11	16	27		W		
765										
	759.1	33.5	9	14	19	33		M		760.8 31.8
760										Orange, White, and Black, Silty Coarse to Fine SAND, Trace Mica
	754.1	38.5	100/0.2			100/0.2				755.2 37.4
755										**WEATHERED ROCK** BIOTITE GNEISS
	749.1	43.5	60/0.1			60/0.1				749.1 43.5 / 749.0 43.6
750										**CRYSTALLINE ROCK** BIOTITE GNEISS Boring Terminated with Standard Penetration Test Refusal at Elevation 749.0 ft in Crystalline Rock: BIOTITE GNEISS

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 67041.1.1	**TIP** BR-0041	**COUNTY** ROCKINGHAM	**GEOLOGIST** Roseman, A. E.	
SITE DESCRIPTION Bridge No. 780001 on SR 2817 (Barnes Street) over US 29				**GROUND WTR (ft)**
BORING NO. RW1-1	**STATION** 18+64	**OFFSET** 69 ft LT	**ALIGNMENT** -Y-	**0 HR.** 13.4
COLLAR ELEV. 790.7 ft	**TOTAL DEPTH** 20.0 ft	**NORTHING** 938,539	**EASTING** 1,810,452	**24 HR.** 9.8
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 77% 04/23/2021		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Toothman, R	**START DATE** 02/09/22	**COMP. DATE** 02/09/22	**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)
795											
790	789.7	1.0								790.7 GROUND SURFACE	0.0
			2	2	3	5	SS-3	40%		**RESIDUAL** Red to Brown to Orange with Black, Silty	
	787.2	3.5								787.5 CLAY, Micaceous	3.2
			3	3	5	8		M		Red to Brown to Orange with Black and White, Clayey SILT, Micaceous	
785	784.7	6.0									
			2	3	3	6		M			
	782.2	8.5									
			WOH	1	0	1					
780											
	777.2	13.5						W			
			4	8	13	21					
775											
	772.2	18.5									
			2	4	6	10		W		770.7 Boring Terminated at Elevation 770.7 ft in Residual Soil: Clayey SILT	20.0

WBS 67041.1.1	**TIP** BR-0041	**COUNTY** ROCKINGHAM	**GEOLOGIST** Roseman, A. E.	
SITE DESCRIPTION Bridge No. 780001 on SR 2817 (Barnes Street) over US 29				**GROUND WTR (ft)**
BORING NO. RW1-2	**STATION** 20+56	**OFFSET** 56 ft LT	**ALIGNMENT** -Y-	**0 HR.** Dry
COLLAR ELEV. 789.7 ft	**TOTAL DEPTH** 4.4 ft	**NORTHING** 938,719	**EASTING** 1,810,516	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 77% 04/23/2021		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Toothman, R	**START DATE** 02/09/22	**COMP. DATE** 02/09/22	**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
790										
	788.7	1.0								789.7 GROUND SURFACE 0.0
			1	1	16	17		M		**RESIDUAL** Red, Clayey Silt with Lenses of Gray, Coarse to Fine SAND
	786.2	3.5								785.7 4.0
	785.3	4.4	17	100/0.2		100/0.2				785.3 **WEATHERED ROCK** 4.4
			60/0.0			60/0.0				BIOTITE GNEISS
										Boring Terminated at Elevation 785.3 ft on Crystalline Rock: BIOTITE GNEISS

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 67041.1.1	**TIP** BR-0041	**COUNTY** ROCKINGHAM	**GEOLOGIST** Roseman, A. E.	
SITE DESCRIPTION Bridge No. 780001 on SR 2817 (Barnes Street) over US 29				**GROUND WTR (ft)**
BORING NO. RW1-3	**STATION** 21+02	**OFFSET** 56 ft LT	**ALIGNMENT** -Y-	**0 HR.** Dry
COLLAR ELEV. 788.9 ft	**TOTAL DEPTH** 10.0 ft	**NORTHING** 938,763	**EASTING** 1,810,528	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 77% 04/23/2021		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Toothman, R	**START DATE** 02/09/22	**COMP. DATE** 02/09/22	**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)
790										788.9 GROUND SURFACE 0.0
	787.9	1.0								**RESIDUAL**
			5	5	5	10		M		Red to Orange to Brown with Black, Clayey SILT with Lenses of White, Coarse SAND, Micaceous
785	785.4	3.5	7	8	8	16		M		
	782.9	6.0	4	4	6	10		M		
780	780.4	8.5	3	3	6	9		W		778.9 10.0
										Boring Terminated at Elevation 778.9 ft in Residual Soil: Clayey SILT

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 67041.1.1	**TIP** BR-0041	**COUNTY** ROCKINGHAM	**GEOLOGIST** Roseman, A. E.	
SITE DESCRIPTION Bridge No. 780001 on SR 2817 (Barnes Street) over US 29				**GROUND WTR (ft)**
BORING NO. RW2-1	**STATION** 20+34	**OFFSET** 59 ft RT	**ALIGNMENT** -Y-	**0 HR.** Dry
COLLAR ELEV. 790.0 ft	**TOTAL DEPTH** 10.0 ft	**NORTHING** 938,668	**EASTING** 1,810,621	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 77% 04/23/2021		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Toothman, R	**START DATE** 02/08/22	**COMP. DATE** 02/08/22	**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
790										ELEV. (ft) DEPTH (ft)
	789.0	1.0								790.0 GROUND SURFACE 0.0
			3	4	6	10		M		**RESIDUAL**
	786.5	3.5								Orange to Red to Gray with Black and White,
785			6	7	8	15		M		Silty CLAY, Micaceous
	784.0	6.0								
			3	3	6	9		M		
	781.5	8.5								
780			3	2	4	6		M		780.0 10.0
										Boring Terminated at Elevation 780.0 ft in Residual Soil: Silty CLAY

WBS 67041.1.1	**TIP** BR-0041	**COUNTY** ROCKINGHAM	**GEOLOGIST** Roseman, A. E.	
SITE DESCRIPTION Bridge No. 780001 on SR 2817 (Barnes Street) over US 29				**GROUND WTR (ft)**
BORING NO. RW2-2	**STATION** 18+12	**OFFSET** 63 ft RT	**ALIGNMENT** -Y-	**0 HR.** Dry
COLLAR ELEV. 791.5 ft	**TOTAL DEPTH** 10.0 ft	**NORTHING** 938,452	**EASTING** 1,810,564	**24 HR.** 8.8
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 77% 04/23/2021		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Toothman, R	**START DATE** 02/01/22	**COMP. DATE** 02/01/22	**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
795										ELEV. (ft) DEPTH (ft)
										791.5 GROUND SURFACE 0.0
790	790.5	1.0								**RESIDUAL**
			3	3	4	7	SS-4	37%		Red-Brown to Gray-Brown with Tan, Clayey
	788.0	3.5								SILT, Trace Mica
			1	3	4	7		M		
785	785.5	6.0								
			2	2	4	6		M		
	783.0	8.5								
			2	3	5	8		M		781.5 10.0
										Boring Terminated at Elevation 781.5 ft in Residual Soil: Clayey SILT
										Other Samples: ST-1 (3.4 - 5.6)

SOILS LABORATORY TESTS RESULTS

WBS NO.: 67041.1.1

TIP NO.: BR-0041

COUNTY: Rockingham

SITE DESCRIPTION: Bridge No. 780001 on SR 2817 (Barnes Street) Over US 29

BORING NO.	SAMPLE NO.	BORING LOCATION	DEPTH INTERVAL (FT)	AASHTO CLASS	N	L.L	P.I.	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
								CSE. SAND	F. SAND	SILT	CLAY	10	40	200		
EB1_B	SS-1	-L- STA. 34+14, 47' RT	3.5-5.0	A-5 (2)	8	45	7	19	43	18	20	99	89	46	30.1	-
EB2_B	SS-2	-L- STA. 35+44, 43' RT	1.0-2.5	A-7-5 (5)	7	52	11	20	31	18	31	96	85	52	24.7	-
RW1_1	SS-3	-Y- STA. 18+64, 69' LT	1.0-2.5	A-7-5 (10)	5	56	14	17	22	20	41	95	86	63	40.0	-
RW2_2	SS-4	-Y- STA. 18+12, 63' RT	1.0-2.5	A-5 (9)	7	53	8	10	26	36	28	99	93	74	36.9	-

Certification No. 144-02-0718

SITE PHOTOGRAPHS

Bridge No.780001 on SR 2817 (Barnes Street) over US 29

View Along Bridge 0001 Looking Upstation

View of Bridge 0001 From North (Downstation along -Y-)

View of Along Bridge 0001 Looking Downstation

View of Bridge 0001 From South (Upstation Along -Y-)