STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-3186/B-5898	1	18

REFERENCE: B-3186/B-5898

PROJECT: 38332/48030

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY HAYWOOD

PROJECT DESCRIPTION US 23/US 74/US 19 (GREAT SMOKY MOUNTAIN HWY) FROM WEST OF NC 209 (BRABTREE RD.) TO EAST OF RUSS AVE.

SITE DESCRIPTION RETAINING WALL #5 FROM -YIRT- STA. 15+25.00 TO 26+12.97

CONTENTS

CAUTION NOTICE

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

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

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

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

PERSONNEL

R. DUGGER

N. YACOBI

C. SWAFFORD

GEOTECHNOLOGY, INC.

INVESTIGATED BY C. SWAFFORD

DRAWN BY T. LYNN

CHECKED BY K. BUSSEY

SUBMITTED BY HDR

DATE NOVEMBER 2021

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NORTH CAROLINA PROFESSIONAL SEAL 038206 ENGINEER KENNETH R. BUSSEY, JR.

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
B-3186/B-5898	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
- [ ] CME-55
- [X] CME-550X
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [X] CME-75
- [ ] _____

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

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

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

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [ ] HAND AUGER
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] _____

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.
ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:

WEATHERED ROCK (WR)	NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.
CRYSTALLINE ROCK (CR)	FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
NON-CRYSTALLINE ROCK (NCR)	FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CP)	COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF*
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.

ROCK HARDNESS

VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
SOFT	CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FOOT
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

TERMS AND DEFINITIONS

ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.

AQUIFER - A WATER BEARING FORMATION OR STRATA.

ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.

ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.

ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.

CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.

COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.

CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.

DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.

DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.

FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.

FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.

FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.

FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.

FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.

JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.

LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.

LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.

MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.

PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.

RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.

SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.

SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.

STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.

STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: N/A

ELEVATION: FEET

NOTES:

BORING ELEVATIONS OBTAINED USING b3186_br0022_r4047_Merged_1-12-21.tin

SITE 2 BORING ELEVATIONS OBTAINED FROM TRIMBLE R12 CNSS RECEIVER CERTIFIED WITH FCC PART 15 (CLASS B DEVICE), 24, 32; RCM; PTCRB; BT SIG

FIAD - FILLED IMMEDIATELY AFTER DRILLING

DATE: 8-15-14

PROJECT REFERENCE NO.	SHEET NO.
B-3186/B-5898	3

SITE PLAN

0 50 100
FEET

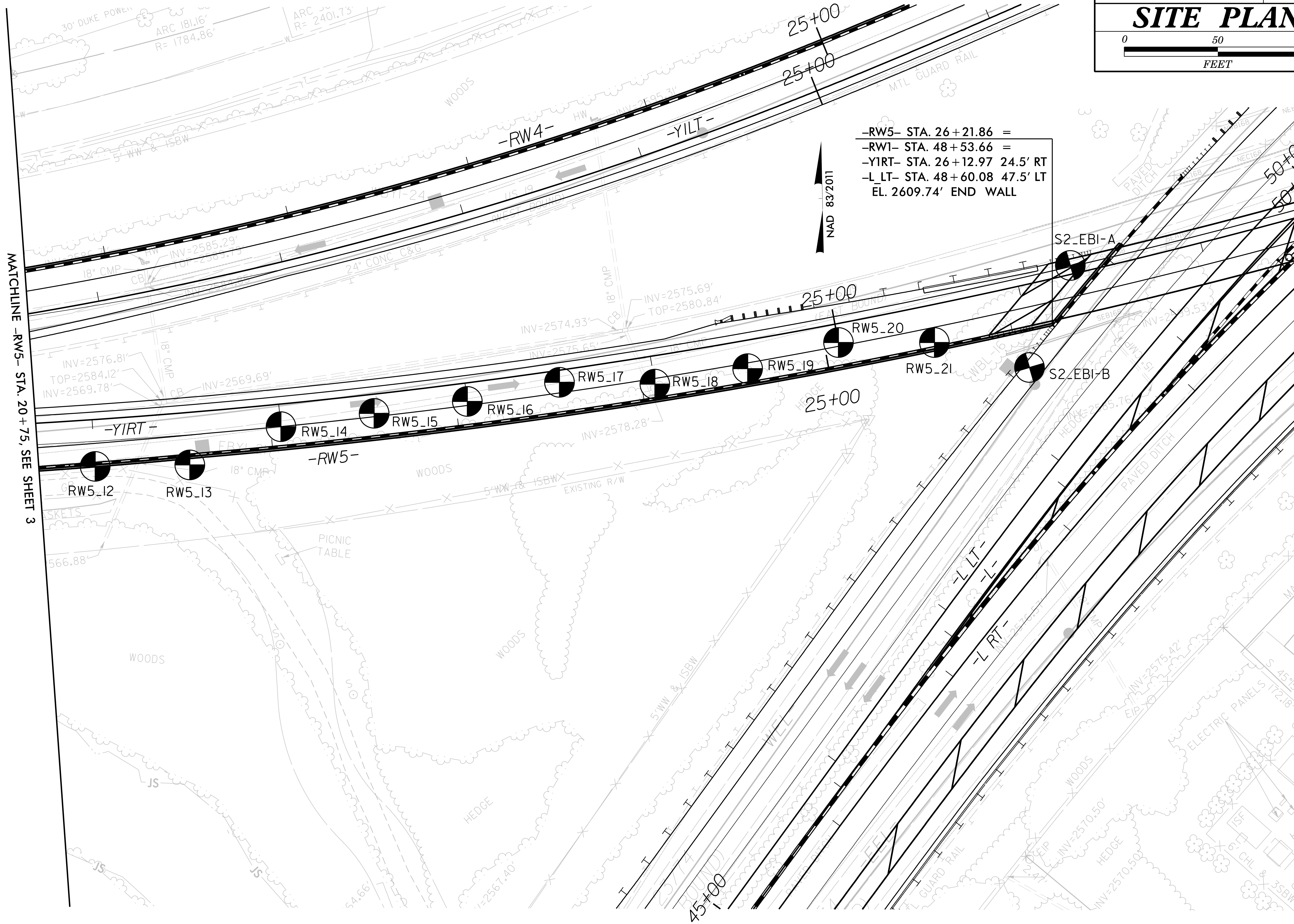
NAD 83/2011

WOODS
GREENHOUSE
ARC 5.93'
ARC 148.35'
R= 1784.86'
N 06°44'17" W 17.97'
INV=2586.66'
50' DUKE POWER CO. EASEMENT
ARC 98.76'
ARC 39.13'
ARC 66.52'
ARC 102.57'
ARC 116.98'
R= 1784.86'
16' BST
HIKORY HILL ROAD
PRIVATE ROAD
EXISTING R/W
CONC R/W MON
TOP=2577.20'
INV=2574.60'
INV=2575.77'
INV=2574.19'
TOP=2578.62'
26" CONC C & G
15+00
US 19
(WEST BOUND)
US 19
(EAST BOUND)
18" CMP
15" CMP
CB
INV=2571.11' EXISTING R/W
TOP=2573.54'
INV=2569.87'
18" CMP
INV=2571.07'
INV=2567.32'
LT
BOLLARD
INV=2566.00'
INV=2565.70'
24" DI
TOP=2579.20'
INV=2565.86'
INV=2566.01'
TOP=2571.61'
CONC ABUTMENT ABANDONED
CONC PIERS ABANDONED
SS TRESTLE
24" DI
JS
SS
-RW4-
-Y1LT-
-Y1RT-
-RW5-
20+00
MTL GAURD RAIL
TOP=2584.35'
INV=2580.14'
WBYL 23
RW5_1
RW5_2
RW5_3
RW5_4
RW5_5
RW5_6
RW5_7
RW5_8
RW5_9
RW5_10
RW5_11
JB
GABION BASKETS
INV=2572.79'
5' WD SLIT RAIL
4'WL
ISBW
4'CHL
CONC
WD DK
RICHLAND CREEK
APPROXIMATE LOCATION OF SEWER LINE PER HAND DRAWN REFFERENCE FROM CITTY OF WAYNESVILLE
EXISTING R/W
MATCHLINE -RW5- STA. 20+75, SEE SHEET 4

-RW5- STA. 16+51.22 =
-Y1RT- STA. 16+50.00 30.68' RT
EL. 2585.39'
BEGIN WALL

PROJECT REFERENCE NO.	SHEET NO.
B-3186/B-5898	4

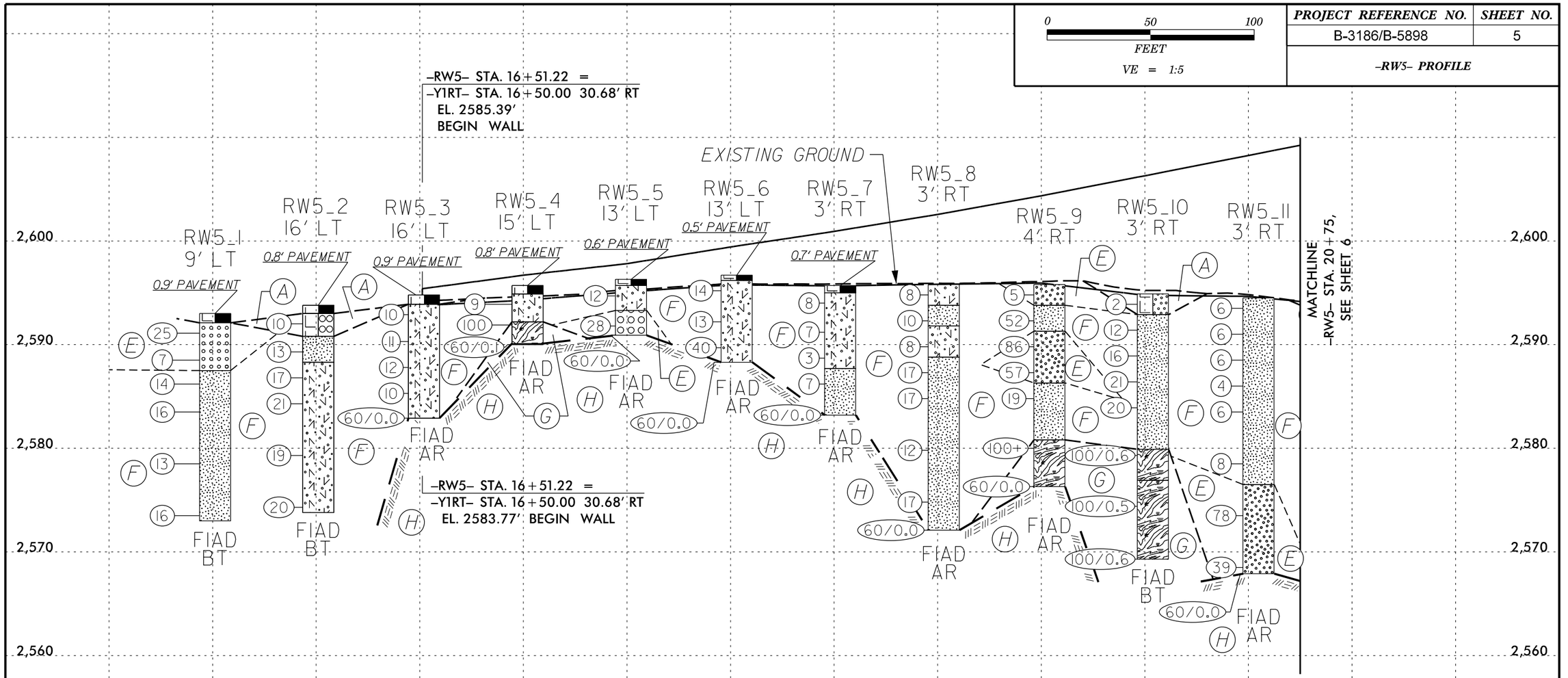
SITE PLAN



PROJECT REFERENCE NO.	SHEET NO.
B-3186/B-5898	5

–RW5– PROFILE

0 50 100
FEET
VE = 1:5



(A) **ROADWAY EMBANKMENT:** Loose to medium dense, red, gray, and brown, silty SAND and GRAVEL (A-1-b), dry

(E) **RESIDUAL:** Very loose to very dense, brown, gray, red, and white, fine to coarse silty SAND, SAND (A-2-4, A-3), and SAND and GRAVEL (A-1-b), contains trace to little rock fragments, saprolitic, dry to moist

(F) **RESIDUAL:** Soft to hard, brown, tan, red, gray, black, white, and orange, SILT and clayey SILT (A-4, A-5), with trace fine to coarse sand, contains trace to some rock fragments, micaceous, saprolitic, dry to moist

(G) **WEATHERED ROCK:** Gray, black, white, red, orange and tan, GNEISS, GRANITE, and Quartz fragments

(H) **CRYSTALLINE ROCK:** Gray and white, GNEISS

–RW5–

17+00 18+00 19+00 20+00

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	% BY WEIGHT F.SAND	% BY WEIGHT SILT	% BY WEIGHT CLAY	% PASSING (SIEVES) 10	% PASSING (SIEVES) 40	% PASSING (SIEVES) 200	% MOISTURE	% ORGANIC
SS-315	3' RT	21+55	2.5' - 4.0'	A-4 (1)	38	8	28.5	29.9	34.3	7.3	94.2	75.9	45.9	21	-
SS-339	15' LT	23+07	2.5' - 4.0'	A-7-6 (5)	45	16	12.2	49.5	29.5	8.8	100.0	95.7	49.2	25	-
SS-347	19' LT	23+57	5.0' - 6.5'	A-2-4	34	8	39.8	31.4	18.9	9.9	96.5	70.5	33.6	11	-
SS-3009	44' RT	25+96	38.9' - 40.4	A-4	37	8	26.8	36.0	25.4	11.8	86.6	72.3	36.7	43	-
SS-513	5' LT	26+29	10.0' - 11.5'	A-5 (9)	48	10	4.1	32.5	49.9	13.5	100.0	98.0	74.1	51	-
ST-4	5' LT	26+29	15.0' - 17.0'	A-2-4	27	6	41.2	30.8	7.0	21.0	94.4	66.3	31.2	28	-
SS-339	15' LT	23+07	2.5' - 4.0'	A-7-6 (5)	45	16	12.2	49.5	29.5	8.8	100.0	95.7	49.2	25	-

0 50 100
FEET
VE = 1:5

PROJECT REFERENCE NO.	SHEET NO.
B-3186/B-5898	6

–RW5– PROFILE

–RW5– STA. 26+21.86 =
–RW1– STA. 48+53.66 =
–Y1RT– STA. 26+12.97 24.5' RT
–L_LT– STA. 48+60.08 47.5' LT
EL. 2609.74' END WALL

–RW5– STA. 26+21.86 =
–RW1– STA. 48+53.66 =
–Y1RT– STA. 26+12.97 24.5' RT
–L_LT– STA. 48+60.08 47.5' LT
EL. 2592.97' END WALL

MATCHLINE –RW5– STA. 20+75, SEE SHEET 5

RW5_12 1' RT
RW5_13 4' RT SS–315
RW5_14 13' LT
RW5_15 15' LT
RW5_16 15' LT SS–339
RW5_17 19' LT SS–347
RW5_18 10' LT
RW5_19 10' LT
RW5_20 15' LT
RW5_21 5' LT
S2_EBI-A 14' LT SS–513 ST–4
S2_EBI-B 4' RT SS–3009

EXISTING GROUND

Ⓐ ROADWAY EMBANKMENT: Very loose to medium dense, red, gray, brown, and white, f-c silty SAND, and SAND and GRAVEL (A-2-4, A-1-b), dry to moist

Ⓑ ROADWAY EMBANKMENT: Soft to very stiff, gray, brown, red, and orange with white, SILT and clayey SILT (A-4, A-5), with trace clay, trace f-c sand, and trace to some gravel, micaceous, dry to moist

Ⓒ ALLUVIAL: Very soft to medium stiff, gray, brown, and tan, clayey SILT, fine sandy CLAY, and CLAY (A-5, A-6, A-7-6), contains trace root fragments, and trace to little organic matter, mottled, moist to wet

Ⓓ ALLUVIAL: Loose to very dense, gray, brown, and white, fine SAND and SAND and GRAVEL (A-2-4, A-1-b), moist to wet

Ⓔ RESIDUAL: Loose to very dense, brown, gray, and white, fine to coarse silty SAND and SAND (A-2-4, A-3), contains trace to little rock fragments, saprolitic, dry to moist

Ⓕ RESIDUAL: Stiff to hard, brown, tan, red, gray, black, and orange, SILT and clayey SILT (A-4, A-5) and CLAY (A-7-6)(5) with trace fine to coarse sand, contains trace to some rock fragments, micaceous, saprolitic, dry to moist

Ⓖ WEATHERED ROCK: Gray, black, white, red, orange and tan, GNEISS, QUARTZ, AMPHIBOLITE, and Quartz fragments

Ⓗ CRYSTALLINE ROCK: Gray and white, GNEISS

2,620 2,610 2,600 2,590 2,580 2,570 2,560 2,550 2,540

21+00 22+00 23+00 24+00 25+00 26+00

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 38332.1.FS1	**TIP** B-3186 / B-5898	**COUNTY** HAYWOOD	**GEOLOGIST** C. Swafford	
SITE DESCRIPTION Retaining Wall No. 5 from -Y1RT- STA 15+25 to 26+13				**GROUND WTR (ft)**
BORING NO. RW5_1	**STATION** 15+52	**OFFSET** 9 ft LT	**ALIGNMENT** -RW5-	**0 HR.** Dry
COLLAR ELEV. 2,583.0 ft	**TOTAL DEPTH** 20.0 ft	**NORTHING** 666,845	**EASTING** 818,199	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE GTC CME 75 183277		**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic
DRILLER K. Boone	**START DATE** 02/25/21	**COMP. DATE** 02/25/21	**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)
2585											
										2,583.0 GROUND SURFACE	0.0
	2,582.1	0.9	8	16	9	25		M		2,582.1 0.9' PAVEMENT	0.9
2580	2,579.5	3.5	6	4	3	7		M		**RESIDUAL** Loose to medium dense, brown, f-c SAND (A-3), contains trace rock fragments	
	2,577.2	5.8	6	7	7	14		M		2,577.5	5.5
2575	2,574.5	8.5	6	8	8	16		M		Stiff to very stiff, brown, tan, and orange, SILT (A-4), micaceous	
2570	2,569.5	13.5	3	5	8	13		M			
2565	2,564.5	18.5	4	7	9	16		M		2,563.0	20.0
										Boring Terminated at Elevation 2,563.0 ft in SILT	

WBS 38332.1.FS1	**TIP** B-3186 / B-5898	**COUNTY** HAYWOOD	**GEOLOGIST** N. Yacobi	
SITE DESCRIPTION Retaining Wall No. 5 from -Y1RT- STA 15+25 to 26+13				**GROUND WTR (ft)**
BORING NO. RW5_2	**STATION** 16+54	**OFFSET** 16 ft LT	**ALIGNMENT** -RW5-	**0 HR.** Dry
COLLAR ELEV. 2,583.8 ft	**TOTAL DEPTH** 20.0 ft	**NORTHING** 666,847	**EASTING** 818,249	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE GTC CME 75 183277		**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic
DRILLER K. Boone	**START DATE** 02/13/21	**COMP. DATE** 02/13/21	**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
2585										
	2,583.0	0.8	2	4	6	10		D		2,583.8 GROUND SURFACE 0.0
2580	2,580.3	3.5	5	6	7	13		D		2,583.0 0.8' Pavement 0.8
	2,577.8	6.0	4	7	10	17		D		**ROADWAY EMBANKMENT**
2575	2,575.3	8.5	3	8	13	21		D		2,580.8 Loose to medium dense, red and brown, silty GRAVEL (A-1-b) 3.0
2570	2,570.3	13.5	3	8	11	19		M		**RESIDUAL**
2565	2,565.3	18.5	4	8	12	20		M		2,578.3 Stiff, red and brown, SILT (A-4), micaceous 5.5
										Very stiff, gray, clayey SILT (A-5), micaceous, saprolitic
										2,563.8 20.0
										Boring Terminated at Elevation 2,563.8 ft in SILT

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 38332.1.FS1	**TIP** B-3186 / B-5898	**COUNTY** HAYWOOD	**GEOLOGIST** N. Yacobi	
SITE DESCRIPTION Retaining Wall No. 5 from -Y1RT- STA 15+25 to 26+13				**GROUND WTR (ft)**
BORING NO. RW5_3	**STATION** 16+52	**OFFSET** 16 ft LT	**ALIGNMENT** -RW5-	**0 HR.** Dry
COLLAR ELEV. 2,584.8 ft	**TOTAL DEPTH** 11.9 ft	**NORTHING** 666,842	**EASTING** 818,299	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE GTC CME 75 183277		**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic
DRILLER K. Boone	**START DATE** 02/13/21	**COMP. DATE** 02/13/21	**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
2585										2,584.8 GROUND SURFACE 0.0
	2,583.9	0.9	2	4	6	10		D		2,583.9 0.9' PAVEMENT 0.9
	2,581.3	3.5								**RESIDUAL** Stiff, red and brown, clayey SILT (A-5), contains trace rock fragments, micaceous, saprolitic
2580			3	4	7	11		D		
	2,578.8	6.0	5	6	6	12		D		
	2,576.3	8.5								
2575			3	4	6	10		D		
	2,572.9	11.9	60/0.0			60/0.0				2,572.9 11.9 Boring Terminated with Standard Penetration Test Refusal at Elevation 2,572.9 ft on Crystalline Rock (GNEISS). A.R. at a depth of 11.9'.

WBS 38332.1.FS1	**TIP** B-3186 / B-5898	**COUNTY** HAYWOOD	**GEOLOGIST** N. Yacobi	
SITE DESCRIPTION Retaining Wall No. 5 from -Y1RT- STA 15+25 to 26+13				**GROUND WTR (ft)**
BORING NO. RW5_4	**STATION** 17+02	**OFFSET** 15 ft LT	**ALIGNMENT** -RW5-	**0 HR.** Dry
COLLAR ELEV. 2,585.7 ft	**TOTAL DEPTH** 5.7 ft	**NORTHING** 666,837	**EASTING** 818,349	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE GTC CME 75 183277		**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic
DRILLER K. Boone	**START DATE** 02/13/21	**COMP. DATE** 02/13/21	**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
2590										2,585.7 GROUND SURFACE 0.0
2585	2,584.9	0.8	3	4	5	9		D		2,584.9 0.8' Pavement 0.8
	2,582.2	3.5	60/0.3			100				**RESIDUAL** Stiff, red and gray, clayey SILT (A-5), contains trace rock fragments, micaceous 3.5
2580	2,580.1	5.6	60/0.1			60/0.1				2,582.2 **WEATHERED ROCK** Gray and white, GNEISS 5.6
										2,580.0 **CRYSTALLINE ROCK** Gray and white, GNEISS 5.7 Boring Terminated with Standard Penetration Test Refusal at Elevation 2,580.0 ft in Crystalline Rock (GNEISS). A.R. at a depth of 5.6'.

GEOTECHNICAL BORING REPORT
BORE LOG

WBS	TIP	COUNTY	GEOLOGIST
38332.1.FS1	B-3186 / B-5898	HAYWOOD	N. Yacobi

SITE DESCRIPTION Retaining Wall No. 5 from -Y1RT- STA 15+25 to 26+13

GROUND WTR (ft)

BORING NO.	STATION	OFFSET	ALIGNMENT	0 HR.	24 HR.
RW5_5	17+52	14 ft LT	-RW5-	Dry	FIAD

COLLAR ELEV.	TOTAL DEPTH	NORTHING	EASTING
2,586.3 ft	5.4 ft	666,834	818,399

DRILL RIG/HAMMER EFF./DATE	DRILL METHOD	HAMMER TYPE
GTC3277 CME-75 83%(09/15/2020)	H.S. Augers	Automatic

DRILLER	START DATE	COMP. DATE	SURFACE WATER DEPTH
K. Boone	02/13/21	02/14/21	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))
2590										
2585	2,585.7	0.6	7	5	7	12	D			2,586.3 / 0.0 GROUND SURFACE
										2,585.7 / 0.6 0.6' PAVEMENT
										RESIDUAL
	2,582.8	3.5	5	11	17	28	D			2,583.3 / 3.0 Stiff, red and brown, clayey SILT (A-5), with trace gravel (quartz)
	2,580.9	5.4	60/0.0			60/0.0	D			2,580.9 / 5.4 Medium dense, red, gray, and white, f-c SAND and GRAVEL (A-1-b), with some silt
										Boring Terminated with Standard Penetration Test Refusal at Elevation 2,580.9 ft on Crystalline Rock (GNEISS). A.R. at a depth of 5.4'.

WBS	TIP	COUNTY	GEOLOGIST
38332.1.FS1	B-3186 / B-5898	HAYWOOD	N. Yacobi

SITE DESCRIPTION Retaining Wall No. 5 from -Y1RT- STA 15+25 to 26+13

GROUND WTR (ft)

BORING NO.	STATION	OFFSET	ALIGNMENT	0 HR.	24 HR.
RW5_6	18+03	14 ft LT	-RW5-	Dry	FIAD

COLLAR ELEV.	TOTAL DEPTH	NORTHING	EASTING
2,586.7 ft	8.4 ft	666,831	818,450

DRILL RIG/HAMMER EFF./DATE	DRILL METHOD	HAMMER TYPE
GTC3277 CME-75 83%(09/15/2020)	H.S. Augers	Automatic

DRILLER	START DATE	COMP. DATE	SURFACE WATER DEPTH
K. Boone	02/14/21	02/14/21	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))
2590										
2585	2,586.2	0.5	5	4	10	14	D			2,586.7 / 0.0 GROUND SURFACE
										2,586.2 / 0.5 0.5' PAVEMENT
										RESIDUAL
	2,583.2	3.5	5	4	9	13	D			Stiff to hard, red, brown, and gray, clayey SILT (A-5), with trace f-c sand and rock fragments (quartz), micaceous, saprolitic
2580	2,580.7	6.0	4	11	29	40	D			
	2,578.3	8.4	60/0.0			60/0.0				2,578.3 / 8.4 Boring Terminated with Standard Penetration Test Refusal at Elevation 2,578.3 ft on Crystalline Rock (GNEISS). A.R. at a depth of 8.4'.

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 38332.1.FS1	**TIP** B-3186 / B-5898	**COUNTY** HAYWOOD	**GEOLOGIST** N. Yacobi	
SITE DESCRIPTION Retaining Wall No. 5 from -Y1RT- STA 15+25 to 26+13				**GROUND WTR (ft)**
BORING NO. RW5_7	**STATION** 18+53	**OFFSET** 2 ft RT	**ALIGNMENT** -RW5-	**0 HR.** Dry
COLLAR ELEV. 2,585.7 ft	**TOTAL DEPTH** 12.5 ft	**NORTHING** 666,814	**EASTING** 818,499	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE GTC3277 CME-75 83%(09/15/2020)		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER K. Boone	**START DATE** 02/14/21	**COMP. DATE** 02/14/21	**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)
2590											
2585	2,585.0	0.7	2	4	4	8		D		2,585.7 GROUND SURFACE	0.0
										2,585.0 0.7' PAVEMENT	0.7
	2,582.2	3.5	3	4	3	7		D		**RESIDUAL** Soft to stiff, red and brown, clayey SILT (A-5), with trace gravel (quartz)	
2580	2,579.7	6.0	2	1	2	3		D		No recovery	
	2,577.2	8.5	4	4	3	7		D		2,577.7 Medium stiff, red and brown with white, SILT (A-4), with few gravel (well-rounded quartz)	8.0
2575	2,573.2	12.5	60/0.0			60/0.0				2,573.2 Boring Terminated with Standard Penetration Test Refusal at Elevation 2,573.2 ft on Crystalline Rock (GNEISS). A.R. at a depth of 12.5'.	12.5

WBS 38332.1.FS1	**TIP** B-3186 / B-5898	**COUNTY** HAYWOOD	**GEOLOGIST** N. Yacobi	
SITE DESCRIPTION Retaining Wall No. 5 from -Y1RT- STA 15+25 to 26+13				**GROUND WTR (ft)**
BORING NO. RW5_8	**STATION** 19+03	**OFFSET** 2 ft RT	**ALIGNMENT** -RW5-	**0 HR.** Dry
COLLAR ELEV. 2,585.8 ft	**TOTAL DEPTH** 23.7 ft	**NORTHING** 666,813	**EASTING** 818,550	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE GTC3277 CME-75 83%(09/15/2020)		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER K. Boone	**START DATE** 02/15/21	**COMP. DATE** 02/15/21	**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	
2590											
2585	2,585.8	0.0	7	5	3	8		M		2,585.8 GROUND SURFACE	0.0
										RESIDUAL	
	2,583.3	2.5	6	4	6	10		D		2,583.8 Stiff, brown, clayey SILT (A-5), micaceous	2.0
2580	2,580.8	5.0	5	3	5	8		M		2,581.8 Medium stiff to stiff, brown and black, SILT (A-4)	4.0
	2,578.3	7.5	7	7	10	17		D		Stiff, red and brown, clayey SILT (A-5)	
2575	2,575.8	10.0	5	8	9	17		D		2,578.8 Stiff, red, brown, and tan, SILT (A-4), micaceous, saprolitic	7.0
2570	2,570.8	15.0	3	5	7	12		D			
2565	2,565.8	20.0	5	7	10	17		D			
	2,562.1	23.7	60/0.0			60/0.0				2,562.1 Boring Terminated with Standard Penetration Test Refusal at Elevation 2,562.1 ft on Crystalline Rock (GNEISS). A.R. at a depth of 23.7'.	23.7

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 38332.1.FS1	**TIP** B-3186 / B-5898	**COUNTY** HAYWOOD	**GEOLOGIST** N. Yacobi	
SITE DESCRIPTION Retaining Wall No. 5 from -Y1RT- STA 15+25 to 26+13				**GROUND WTR (ft)**
BORING NO. RW5_9	**STATION** 19+54	**OFFSET** 3 ft RT	**ALIGNMENT** -RW5-	**0 HR.** Dry
COLLAR ELEV. 2,585.8 ft	**TOTAL DEPTH** 19.5 ft	**NORTHING** 666,813	**EASTING** 818,600	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE GTC8255 CME-55 93%(11/24/2020)		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER L. Wansrath	**START DATE** 03/14/21	**COMP. DATE** 03/14/21	**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)
2590												
2585	2,585.8	0.0	5	2	3	5		D		GROUND SURFACE	2,585.8	0.0
	2,583.3	2.5	4	23	29	52		D		**RESIDUAL** Loose, brown, silty SAND (A-2-4), with some gravel	2,583.8	2.0
2580	2,580.8	5.0	33	44	42	86		D		Very stiff, brown and red, SILT (A-4), contains some rock fragments	2,581.3	4.5
	2,578.3	7.5	28	28	29	57		D		Very dense, brown and black, f-c silty SAND (A-2-4), contains trace rock fragments, saprolitic		
2575	2,575.8	10.0	16	10	9	19		D		Very stiff, brown, SILT (A-4), with trace f sand	2,576.3	9.5
2570	2,570.8	15.0	62	90	47	100+				**WEATHERED ROCK** White and tan, GRANITE and quartz fragments	2,570.8	15.0
	2,566.3	19.5	60/0.0			60/0.0				Boring Terminated with Standard Penetration Test Refusal at Elevation 2,566.3 ft on Crystalline Rock (GNEISS). A.R. at a depth of 19.5'.	2,566.3	19.5

WBS 38332.1.FS1	**TIP** B-3186 / B-5898	**COUNTY** HAYWOOD	**GEOLOGIST** N. Yacobi	
SITE DESCRIPTION Retaining Wall No. 5 from -Y1RT- STA 15+25 to 26+13				**GROUND WTR (ft)**
BORING NO. RW5_10	**STATION** 20+04	**OFFSET** 2 ft RT	**ALIGNMENT** -RW5-	**0 HR.** Dry
COLLAR ELEV. 2,584.9 ft	**TOTAL DEPTH** 25.6 ft	**NORTHING** 666,815	**EASTING** 818,651	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE GTC8255 CME-55 93%(11/24/2020)		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER L. Wansrath	**START DATE** 03/16/21	**COMP. DATE** 03/16/21	**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)
2585												
	2,584.9	0.0	3	1	1	2		D		GROUND SURFACE	2,584.9	0.0
	2,582.4	2.5	4	5	7	12		D		**ROADWAY EMBANKMENT** Very loose, brown, silty SAND (A-2-4)	2,582.9	2.0
2580	2,579.9	5.0	8	8	8	16		D		**RESIDUAL** Stiff to very stiff, brown, black and red, SILT (A-4), with trace f-c sand, micaceous, saprolitic		
	2,577.4	7.5	8	9	12	21		D				
2575	2,574.9	10.0	11	8	12	20		D				
2570	2,569.9	15.0	71	39/0.1		100/0.6				**WEATHERED ROCK** Light tan and white, GRANITE and quartz fragments	2,569.9	15.0
2565	2,564.9	20.0	100/0.5			100/0.5				Dark brown, black, and red, GNEISS	2,566.9	18.0
2560	2,559.9	25.0	69	31/0.1		100/0.6				Boring Terminated at Elevation 2,559.3 ft in Weathered Rock (GNEISS)	2,559.3	25.6

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 38332.1.FS1	**TIP** B-3186 / B-5898	**COUNTY** HAYWOOD	**GEOLOGIST** N. Yacobi	
SITE DESCRIPTION Retaining Wall No. 5 from -Y1RT- STA 15+25 to 26+13				**GROUND WTR (ft)**
BORING NO. RW5_11	**STATION** 20+55	**OFFSET** 2 ft RT	**ALIGNMENT** -RW5-	**0 HR.** Dry
COLLAR ELEV. 2,584.5 ft	**TOTAL DEPTH** 26.6 ft	**NORTHING** 666,816	**EASTING** 818,701	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE GTC8255 CME-55 93%(11/24/2020)		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER L. Wansrath	**START DATE** 03/16/21	**COMP. DATE** 03/16/21	**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)
2585											
	2,584.5	0.0	4	2	4	6		D		2,584.5 GROUND SURFACE	0.0
	2,582.0	2.5	5	3	3	6		D		**RESIDUAL** Medium stiff to stiff, red, brown, and gray, SILT (A-4), with trace f-c sand and clay, micaceous	
2580	2,579.5	5.0	3	3	3	6		M			
	2,577.0	7.5	2	2	2	4		D			
2575	2,574.5	10.0	3	3	3	6		D			
2570	2,569.5	15.0	3	4	4	8		D			
2565	2,564.5	20.0	30	35	43	78		D		2,566.5 Very dense, gray and brown, f silty SAND (A-2-4)	18.0
2560	2,559.5	25.0	10	14	25	39		D			
	2,557.9	26.6	60/0.0			60/0.0				2,557.9 Boring Terminated with Standard Penetration Test Refusal at Elevation 2,557.9 ft on Crystalline Rock (GNEISS). A.R. at a depth of 26.6'.	26.6

WBS 38332.1.FS1	**TIP** B-3186 / B-5898	**COUNTY** HAYWOOD	**GEOLOGIST** N. Yacobi	
SITE DESCRIPTION Retaining Wall No. 5 from -Y1RT- STA 15+25 to 26+13				**GROUND WTR (ft)**
BORING NO. RW5_12	**STATION** 21+05	**OFFSET** CL	**ALIGNMENT** -RW5-	**0 HR.** 18.0
COLLAR ELEV. 2,583.9 ft	**TOTAL DEPTH** 28.0 ft	**NORTHING** 666,821	**EASTING** 818,751	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE GTC8255 CME-55 93%(11/24/2020)		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER L. Wansrath	**START DATE** 03/15/21	**COMP. DATE** 03/16/21	**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	
2585											
	2,583.9	0.0	4	3	4	7		D		2,583.9 GROUND SURFACE	0.0
	2,581.4	2.5	3	2	4	6		M		2,581.9 **ROADWAY EMBANKMENT** Loose, gray and brown, clayey SAND (A-2-6), with trace gravel	2.0
2580	2,578.9	5.0	6	4	3	7		M		Medium stiff, brown, SILT (A-4), with trace clay, micaceous	
	2,576.4	7.5	2	3	2	5		M		2,574.4	9.5
2575	2,573.9	10.0	2	1	2	3		M		**ALLUVIAL** Soft, tan and light grayish brown, clayey SILT (A-5), contains trace root fragments, mottled	
2570	2,568.9	15.0	1	1	2	3		M		2,570.9 Very soft, dark gray and brown, silty CLAY (A-7-6), contains trace root fragments, mottled	13.0
2565	2,563.9	20.0	1	1	1	2		W			
2560	2,558.9	25.0	11	50	50/0.2	100/0.7				2,560.9 Very dense, brown and white, SAND and GRAVEL (A-1-b)	23.0
	2,555.9	28.0	60/0.0			60/0.0				2,558.4 **WEATHERED ROCK** Red and brown, GNEISS	25.5
										2,555.9 Boring Terminated with Standard Penetration Test Refusal at Elevation 2,555.9 ft on Crystalline Rock (GNEISS). A.R. at a depth of 28.0'.	28.0

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 38332.1.FS1	**TIP** B-3186 / B-5898	**COUNTY** HAYWOOD	**GEOLOGIST** R. Dugger	
SITE DESCRIPTION Retaining Wall No. 5 from -Y1RT- STA 15+25 to 26+13				**GROUND WTR (ft)**
BORING NO. RW5_13	**STATION** 21+55	**OFFSET** 3 ft RT	**ALIGNMENT** -RW5-	**0 HR.** Dry
COLLAR ELEV. 2,582.6 ft	**TOTAL DEPTH** 34.0 ft	**NORTHING** 666,821	**EASTING** 818,802	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE GTC9083 CME-550X 80% (11/24/2020)		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER L. Wanstrath	**START DATE** 02/13/21	**COMP. DATE** 02/13/21	**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)
2585											
	2,582.6	0.0								2,582.6 GROUND SURFACE	0.0
			2	4	4	8		M		**ROADWAY EMBANKMENT** Medium stiff to stiff, brown and orange, SILT (A-4), with some f-c sand and trace gravel (quartz), micaceous	
2580	2,580.1	2.5	4	3	4	7	SS-315	21%			
	2,577.6	5.0	2	3	3	6		D			
2575	2,575.1	7.5	1	2	3	5		D		2,575.6 Medium stiff, brown and orange, clayey SILT (A-5), contains little rock fragments (quartz), micaceous	7.0
	2,572.6	10.0	2	2	3	5		M		2,573.6 **ALLUVIAL** Medium stiff, brown, black, and gray, CLAY (A-7-6), with trace rock fragments, contains little organic matter	9.0
2570										No recovery	
	2,567.6	15.0	1	2	4	6		M			
2565										2,564.6 **RESIDUAL** Very stiff, brown, tan, orange, and white, SILT (A-4), saprolitic	18.0
	2,562.6	20.0	3	5	22	27		D		2,561.2 Medium dense, brown and tan, f-c silty SAND (A-2-4), contains little rock fragments, saprolitic	21.4
2560	2,557.6	25.0	100/0.2			100/0.2				2,557.6 **WEATHERED ROCK** Brown and tan, GNEISS	25.0
2555											
	2,552.6	30.0	60/0.3			100+					
2550	2,548.6	34.0	60/0.0			60/0.0				2,548.6 Boring Terminated by Auger Refusal at Elevation 2,548.6 ft in Crystalline Rock (GNEISS). A.R. at a depth of 34.0'.	34.0

NOTES
Split spoons at 15.0' and 30.0' resulted in no recovery

WBS 38332.1.FS1	**TIP** B-3186 / B-5898	**COUNTY** HAYWOOD	**GEOLOGIST** R. Dugger	
SITE DESCRIPTION Retaining Wall No. 5 from -Y1RT- STA 15+25 to 26+13				**GROUND WTR (ft)**
BORING NO. RW5_14	**STATION** 22+06	**OFFSET** 13 ft LT	**ALIGNMENT** -RW5-	**0 HR.** Dry
COLLAR ELEV. 2,584.3 ft	**TOTAL DEPTH** 23.0 ft	**NORTHING** 666,840	**EASTING** 818,851	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE GTC9083 CME-550X 80% (11/24/2020)		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER L. Wanstrath	**START DATE** 02/13/21	**COMP. DATE** 02/13/21	**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)
2585											
	2,584.3	0.0								2,584.3 GROUND SURFACE	0.0
			5	3	5	8		D		**ROADWAY EMBANKMENT** Loose to medium dense, brown, orange, and tan, SAND and GRAVEL (A-1-b)	
	2,581.8	2.5	8	10	17	27		D		2,579.8 **RESIDUAL** Hard, brown, tan, orange, and white, SILT (A-4), with trace f sand and clay, saprolitic	4.5
2580	2,579.3	5.0	13	23	27	50		D			
	2,576.8	7.5	8	13	20	33		D			
2575	2,574.3	10.0	40	27	22	49		D			
										2,568.8 **WEATHERED ROCK** Brown, tan and orange, GNEISS	15.5
2570	2,569.3	15.0	13	29	71/0.3	100/0.8					
	2,564.3	20.0	100/0.4			100/0.4					
2565	2,561.3	23.0	60/0.0			60/0.0				2,561.3 Boring Terminated with Standard Penetration Test Refusal at Elevation 2,561.3 ft on Crystalline Rock (GNEISS). A.R. at a depth of 23.0'.	23.0

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 38332.1.FS1	**TIP** B-3186 / B-5898	**COUNTY** HAYWOOD	**GEOLOGIST** R. Dugger	
SITE DESCRIPTION Retaining Wall No. 5 from -Y1RT- STA 15+25 to 26+13				**GROUND WTR (ft)**
BORING NO. RW5_15	**STATION** 22+56	**OFFSET** 15 ft LT	**ALIGNMENT** -RW5-	**0 HR.** Dry
COLLAR ELEV. 2,583.4 ft	**TOTAL DEPTH** 30.4 ft	**NORTHING** 666,846	**EASTING** 818,901	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE GTC9083 CME-550X 80% (11/24/2020)		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER L. Wanstrath	**START DATE** 02/13/21	**COMP. DATE** 02/13/21	**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)
2585											
	2,583.4	0.0	4	6	4	10		D		2,583.4 GROUND SURFACE	0.0
	2,580.9	2.5								**ROADWAY EMBANKMENT**	
2580			2	2	6	8		D		2,581.4 Loose to medium dense, brown, black, and orange, SAND and GRAVEL (A-1-b)	2.0
	2,578.4	5.0								**RESIDUAL**	
			12	12	14	26		D		Medium dense to very dense, gray and white, f-c silty SAND (A-2-4), saprolitic	
	2,575.9	7.5									
2575			6	15	25	40		D			
	2,573.4	10.0									
			29	33	45	78		D			
2570											
	2,568.4	15.0	8	14	17	31		D			
2565											
	2,563.4	20.0	100/0.3			100/0.3				2,563.4 **WEATHERED ROCK** Tan and white, QUARTZ	20.0
2560										2,560.4 Gray and white with brown, AMPHIBOLITE	23.0
	2,558.4	25.0	100/0.5			100/0.5					
2555											
	2,553.4	30.0	100/0.4			100/0.4				2,553.0 Boring Terminated at Elevation 2,553.0 ft in Weathered Rock (AMPHIBOLITE)	30.4

WBS 38332.1.FS1	**TIP** B-3186 / B-5898	**COUNTY** HAYWOOD	**GEOLOGIST** R. Dugger	
SITE DESCRIPTION Retaining Wall No. 5 from -Y1RT- STA 15+25 to 26+13				**GROUND WTR (ft)**
BORING NO. RW5_16	**STATION** 23+07	**OFFSET** 15 ft LT	**ALIGNMENT** -RW5-	**0 HR.** Dry
COLLAR ELEV. 2,582.6 ft	**TOTAL DEPTH** 20.7 ft	**NORTHING** 666,852	**EASTING** 818,951	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE GTC9083 CME-550X 80% (11/24/2020)		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER L. Wanstrath	**START DATE** 02/13/21	**COMP. DATE** 02/13/21	**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
2585										
	2,582.6	0.0	4	6	6	12		D		2,582.6 GROUND SURFACE 0.0
	2,580.1	2.5	5	5	5					**ROADWAY EMBANKMENT**
2580						10	SS-339	25%		2,580.6 Medium dense, brown, black, and orange, SAND and GRAVEL (A-1-b) 2.0
	2,577.6	5.0	3	4	5					**RESIDUAL**
						9		D		Stiff, brown and orange, f sandy, silty CLAY (A-7-6)(5), highly micaceous, saprolitic (gneiss)
	2,575.1	7.5								2,575.1 7.5
2575			11	48	52/0.3					**WEATHERED ROCK**
	2,572.6	10.0				100/0.8				Brown and orange, GNEISS with some quartz fragments
			100/0.4			100/0.4				
2570										
	2,569.6	13.0	11	37	63/0.5	100/1.0				
2565										
	2,562.6	20.0	53	47/0.2		100/0.7				2,561.9 Boring Terminated at Elevation 2,561.9 ft in Weathered Rock (GNEISS) 20.7

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 38332.1.FS1	**TIP** B-3186 / B-5898	**COUNTY** HAYWOOD	**GEOLOGIST** R. Dugger	
SITE DESCRIPTION Retaining Wall No. 5 from -Y1RT- STA 15+25 to 26+13				**GROUND WTR (ft)**
BORING NO. RW5_17	**STATION** 23+57	**OFFSET** 19 ft LT	**ALIGNMENT** -RW5-	**0 HR.** Dry
COLLAR ELEV. 2,582.5 ft	**TOTAL DEPTH** 15.2 ft	**NORTHING** 666,861	**EASTING** 819,000	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE GTC CME550X 9083		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER L. Wanstrath	**START DATE** 02/13/21	**COMP. DATE** 02/13/21	**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)
2585											
	2,582.5	0.0	4	6	8	14		D		2,582.5 GROUND SURFACE	0.0
2580	2,580.0	2.5	11	13	16	29		D		**ROADWAY EMBANKMENT** Medium dense, brown and orange, SAND and GRAVEL (A-1-b) 2,580.5	2.0
	2,577.5	5.0	27	27	28	55	SS-347	11%		**RESIDUAL** Medium dense to very dense, brown, tan and white, f-c silty SAND (A-2-4), with trace clay, micaceous	
2575	2,575.0	7.5	36	64/0.1		100/0.6				2,575.0 **WEATHERED ROCK** Brown, tan, and white, GNEISS	7.5
	2,572.5	10.0	100/0.2			100/0.2					
2570											
	2,567.5	15.0	100/0.2			100/0.2				2,567.3 Boring Terminated at Elevation 2,567.3 ft in Weathered Rock (GNEISS)	15.2

WBS 38332.1.FS1	**TIP** B-3186 / B-5898	**COUNTY** HAYWOOD	**GEOLOGIST** N. Yacobi	
SITE DESCRIPTION Retaining Wall No. 5 from -Y1RT- STA 15+25 to 26+13				**GROUND WTR (ft)**
BORING NO. RW5_18	**STATION** 24+07	**OFFSET** 10 ft LT	**ALIGNMENT** -RW5-	**0 HR.** Dry
COLLAR ELEV. 2,581.1 ft	**TOTAL DEPTH** 9.1 ft	**NORTHING** 666,859	**EASTING** 819,051	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE GTC CME 550X 9083		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER K. Boone	**START DATE** 02/15/21	**COMP. DATE** 02/15/21	**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
2585										
	2,581.1	0.0	2	5	6	11		M		2,581.1 GROUND SURFACE 0.0
2580	2,578.6	2.5	4	5	7	12		M		**RESIDUAL** Stiff, brown, clayey SILT (A-5), micaceous, contains trace rock fragments
	2,576.1	5.0	26	27	37	64		D		2,576.6 4.5 Hard, brown, SILT (A-4), saprolitic
2575	2,573.6	7.5	4/0.3	60/0.0		100+				2,573.6 7.5
	2,572.0	9.1	60/0.0			60/0.0				2,572.0 **WEATHERED ROCK** Brown, GNEISS 9.1 Boring Terminated with Standard Penetration Test Refusal at Elevation 2,572.0 ft in Crystalline Rock (GNEISS). A.R. at a depth of 9.1'.

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 38332.1.FS1	**TIP** B-3186 / B-5898	**COUNTY** HAYWOOD	**GEOLOGIST** N. Yacobi	
SITE DESCRIPTION Retaining Wall No. 5 from -Y1RT- STA 15+25 to 26+13				**GROUND WTR (ft)**
BORING NO. RW5_19	**STATION** 24+58	**OFFSET** 10 ft LT	**ALIGNMENT** -RW5-	**0 HR.** Dry
COLLAR ELEV. 2,580.8 ft	**TOTAL DEPTH** 16.2 ft	**NORTHING** 666,866	**EASTING** 819,101	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE GTC CME 550X 9083		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER K. Boone	**START DATE** 02/15/21	**COMP. DATE** 02/15/21	**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)
2585										
	2,580.8	0.0	2	3	3	6 7		M		2,580.8 0.0 GROUND SURFACE **RESIDUAL** Medium stiff to stiff, brown, tan, and white, clayey SILT (A-5), contains trace rock fragments, micaceous, saprolitic
2580	2,578.3	2.5	1	2	5	11		M		
	2,575.8	5.0	3	4	7	11		M		
2575	2,573.3	7.5	2	5	6	7		M		
	2,570.8	10.0	1	3	4			M		
2570										
	2,565.8	15.0	1	9	60/0.2	100+				2,564.8 16.0 2,564.6 16.2 **WEATHERED ROCK** Brown, white, and tan, GNEISS Boring Terminated with Standard Penetration Test Refusal at Elevation 2,564.6 ft in Weathered Rock (GNEISS)
2565										

WBS 38332.1.FS1	**TIP** B-3186 / B-5898	**COUNTY** HAYWOOD	**GEOLOGIST** N. Yacobi	
SITE DESCRIPTION Retaining Wall No. 5 from -Y1RT- STA 15+25 to 26+13				**GROUND WTR (ft)**
BORING NO. RW5_20	**STATION** 25+08	**OFFSET** 15 ft LT	**ALIGNMENT** -RW5-	**0 HR.** Dry
COLLAR ELEV. 2,581.6 ft	**TOTAL DEPTH** 18.8 ft	**NORTHING** 666,879	**EASTING** 819,149	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE GTC CME 550X 9083		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER K. Boone	**START DATE** 02/14/21	**COMP. DATE** 02/14/21	**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
2585										
	2,581.6	0.0	1	2	3	5		M		2,581.6 0.0 GROUND SURFACE **RESIDUAL** Medium stiff to stiff, brown, tan, and orange, clayey SILT (A-5), micaceous
2580	2,579.1	2.5	4	3	5	8		M		
	2,576.6	5.0	3	4	7	11		M		2,574.6 7.0 Very stiff to hard, tan, white, and brown, silty CLAY (A-7-6), highly micaceous, saprolitic
2575	2,574.1	7.5	4	6	10	16		M		
	2,571.6	10.0	5	7	12	19		M		
2570										
	2,566.6	15.0	7	13	18	31				
2565	2,563.5	18.1								2,563.5 18.1 2,562.8 18.8 **WEATHERED ROCK** Brown, white, and tan, GNEISS Boring Terminated with Standard Penetration Test Refusal at Elevation 2,562.8 ft on Crystalline Rock (GNEISS). A.R. at a depth of 18.8'.
	2,562.8	18.8	35 60/0.0	65/0.2		100/0.7 60/0.0				

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 38332.1.FS1	**TIP** B-3186 / B-5898	**COUNTY** HAYWOOD	**GEOLOGIST** N. Yacobi	
SITE DESCRIPTION Retaining Wall No. 5 from -Y1RT- STA 15+25 to 26+13				**GROUND WTR (ft)**
BORING NO. RW5_21	**STATION** 25+58	**OFFSET** 5 ft LT	**ALIGNMENT** -RW5-	**0 HR.** 14.5
COLLAR ELEV. 2,582.4 ft	**TOTAL DEPTH** 32.5 ft	**NORTHING** 666,877	**EASTING** 819,201	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE GTC CME 550X 9083		**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic
DRILLER K. Boone	**START DATE** 02/14/21	**COMP. DATE** 02/14/21	**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)
2585											
	2,582.4	0.0								2,582.4 GROUND SURFACE	0.0
2580			3	2	4	6		M		**ALLUVIAL** Medium stiff, brown, clayey SILT (A-5), with trace sand, micaceous	
	2,577.4	5.0								2,578.4	4.0
			3	2	3	5		M		Medium stiff, gray, sandy CLAY (A-6)	
2575	2,574.9	7.5								2,576.1	6.3
			2	1	2	3		M		2,575.4 Loose, gray, fine SAND (A-2-4)	7.0
	2,572.4	10.0								Soft to stiff, gray, CLAY (A-7-6), with few f-c sand lenses, contains little organic matter	
2570			2	3	2	5		M			
	2,567.4	15.0						▽			
			7	6	6	12		Sat.			
2565										2,564.4	18.0
	2,562.4	20.0								**RESIDUAL** Very stiff to hard, gray, brown, white, and red, clayey SILT (A-5), saprolitic	
			3	5	15	20		Sat.			
2560											
	2,557.4	25.0									
			14	18	43	61					
2555											
	2,552.4	30.0								2,551.9	30.5
			18	35	65/0.5	100/1.0				**WEATHERED ROCK**	
2550	2,549.9	32.5	60/0.0			60/0.0				2,549.9 Brown, tan, orange, and white, GNEISS	32.5
										Boring Terminated with Standard Penetration Test Refusal at Elevation 2,549.9 ft on Crystalline Rock (GNEISS). A.R. at a depth of 32.5'.	

NCDOT BORE DOUBLE B3186_GEO_SPT.GPJ NC_DOT.GDT 7/8/21

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 38332.1.FS1	**TIP** B-3186 / B-5898	**COUNTY** HAYWOOD	**GEOLOGIST** C. Swafford	
SITE DESCRIPTION US 23/ US 74 (Great Smoky Mountain Highway)				**GROUND WTR (ft)**
BORING NO. S2_EB1-B	**STATION** 25+96	**OFFSET** 44 ft RT	**ALIGNMENT** -Y1RT-	**0 HR.** 22.0
COLLAR ELEV. 2,600.4 ft	**TOTAL DEPTH** 60.4 ft	**NORTHING** 666,863	**EASTING** 819,251	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE GTC3277 CME-75 83%(09/15/2020)		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER K. Boone	**START DATE** 02/27/21	**COMP. DATE** 02/27/21	**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))
2605										
2600	2,599.4	1.0	11	20	16	36		M		2,600.4 / 0.0 GROUND SURFACE
	2,596.5	3.9	6	4	4	8		M		2,599.4 / 1.0 **ROADWAY EMBANKMENT** 1.0' PAVEMENT
2595	2,594.6	5.8	6	3	3	6		M		2,596.9 / 3.5 **ROADWAY EMBANKMENT** Dense, brown, GRAVEL (A-1-b) Medium stiff, orange and brown with black, clayey SILT (A-5), with trace sand
	2,591.5	8.9	4	3	4	7		M		
2590	2,586.5	13.9	3	2	3	5		M		
2585	2,581.5	18.9	3	3	4	7		M		
2580	2,576.5	23.9	4	4	5	9		W		2,578.4 / 22.0 **ALLUVIAL** Very loose to loose, gray, SAND (A-3), micaceous
2575	2,571.5	28.9	3	3	1	4		W		2,573.4 / 27.0 Soft to medium stiff, gray, sandy SILT (A-4), contains trace wood fragments, micaceous, organic odor
2570	2,566.5	33.9	1	3	3	6		W		
2565	2,561.5	38.9	WOH	1	2	3	SS-3009	43%		
2560	2,556.5	43.9	18	27	33	60		W		2,558.4 / 42.0 **RESIDUAL** Hard, tan and brown, sandy CLAY (A-7), contains trace rock fragments, micaceous, saprolitic
2555	2,551.5	48.9	32	68/0.3		100/0.8				2,551.5 / 48.9 **WEATHERED ROCK** Brown, GNEISS, micaceous
2550	2,546.5	53.9	86	14/0.0		100/0.5				
2545	2,541.5	58.9	79	21/0.0		100/0.5				
2540										2,540.0 / 60.4 Boring Terminated at Elevation 2,540.0 ft in Weathered Rock (GNEISS)

WBS 38332.1.FS1	**TIP** B-3186 / B-5898	**COUNTY** HAYWOOD	**GEOLOGIST** C. Swafford	
SITE DESCRIPTION US 23/ US 74 (Great Smoky Mountain Highway)				**GROUND WTR (ft)**
BORING NO. S2_EB1-A	**STATION** 26+29	**OFFSET** 5 ft LT	**ALIGNMENT** -Y1RT-	**0 HR.** 13.0
COLLAR ELEV. 2,584.6 ft	**TOTAL DEPTH** 34.5 ft	**NORTHING** 666,917	**EASTING** 819,274	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE GTC9083 CME-550X 80%(11/24/2020)		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER L. Wanstrath	**START DATE** 02/25/21	**COMP. DATE** 02/25/21	**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
2585										
	2,584.6	0.0	5	7	4	11		M		2,584.6 / 0.0 GROUND SURFACE
	2,582.1	2.5	3	4	4	8		M		2,583.6 / 1.0 **ROADWAY EMBANKMENT** Medium dense, brown, f SAND (A-2-4), with trace gravel
2580	2,579.6	5.0	6	5	6	11		M		2,580.1 / 4.5 Soft, brown and orange, CLAY (A-7) Loose to medium dense, gray, f-c SAND (A-2-4)
	2,577.1	7.5	3	3	3	6		Sat.		
2575	2,574.6	10.0	3	2	2	4	SS-513	51%		2,574.6 / 10.0 **ALLUVIAL** Soft, gray, SILT (A-5)(9), micaceous
2570	2,569.6	15.0	1	WOH	1	1		W		2,571.6 / 13.0 Very loose, gray, f silty SAND (A-2-4), micaceous
	2,564.6	20.0	1	1	2	3		28%		2,566.6 / 18.0 Soft, gray, f sandy SILT (A-4), micaceous
2565	2,559.6	25.0	4	7	11	18		W		2,561.6 / 23.0 **RESIDUAL** Very stiff, brown and orange, f sandy SILT (A-4), micaceous, saprolitic
2560	2,554.6	30.0	90	10/0.1		100/0.6		W		2,554.6 / 30.0 **WEATHERED ROCK** Brown, orange, and white, GNEISS
2555	2,550.1	34.5	60/0.0			60/0.0				2,550.1 / 34.5 Boring Terminated with Standard Penetration Test Refusal at Elevation 2,550.1 ft on Crystalline Rock (GNEISS)

Other Samples:
ST-4 (15.0 - 17.0)