STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5921	1	35

REFERENCE: R-5921

PROJECT: 48470

SEE SHEET 3 FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

CONTENTS

LINE	STATION	PLAN
-L-	10+00 - 294+33	4-26
-Y-	10+00 - 26+00	4-5

APPENDICES

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

ROADWAY SUBSURFACE INVESTIGATION

COUNTY *HAYWOOD*

PROJECT DESCRIPTION *US 276 (JONATHAN CREEK RD) FROM US 19 TO 0.5 MILES SOUTH OF I-40*

INVENTORY

CAUTION NOTICE

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

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

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

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

PERSONNEL

M. BREWER

P. TOMASIC

INVESTIGATED BY *CG2, PLLC.*

DRAWN BY *T. WENNER, P.G.*

CHECKED BY *M. BREWER, P.E.*

SUBMITTED BY *CG2, PLLC.*

DATE *JULY 2023*

Prepared in the Office of:

CAROLINAS GEOTECHNICAL GROUP

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NORTH CAROLINA PROFESSIONAL SEAL 041986 ENGINEER D. MATTHEW BREWER

DocuSigned by:
D. Matthew Brewer
386129C0A4C1462...
SIGNATURE

7/24/2023
DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
R-5921	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] MOBILE B29
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [X] 2.25" HOLLOW STEM AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [ ] CASING [ ] W/ ADVANCER
- [ ] TRICONE _____" STEEL TEETH
- [ ] TRICONE _____" TUNG.-CARB.
- [ ] CORE BIT (4-INCH DIAMETER)
- [ ] _____

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:

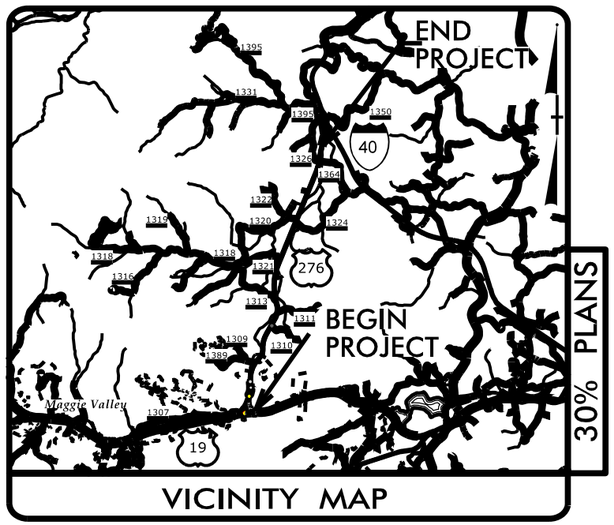
ROADWAY DESIGN FILES DATED 8/10/22 PROVIDED BY TGS

ELEVATIONS OBTAINED USING THE PROVIDED .TIN FILE.

DATE: 8-15-14

CONTRACT: **TIP PROJECT: R-5921**

See Sheet 1A For Index of Sheets



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

HAYWOOD COUNTY

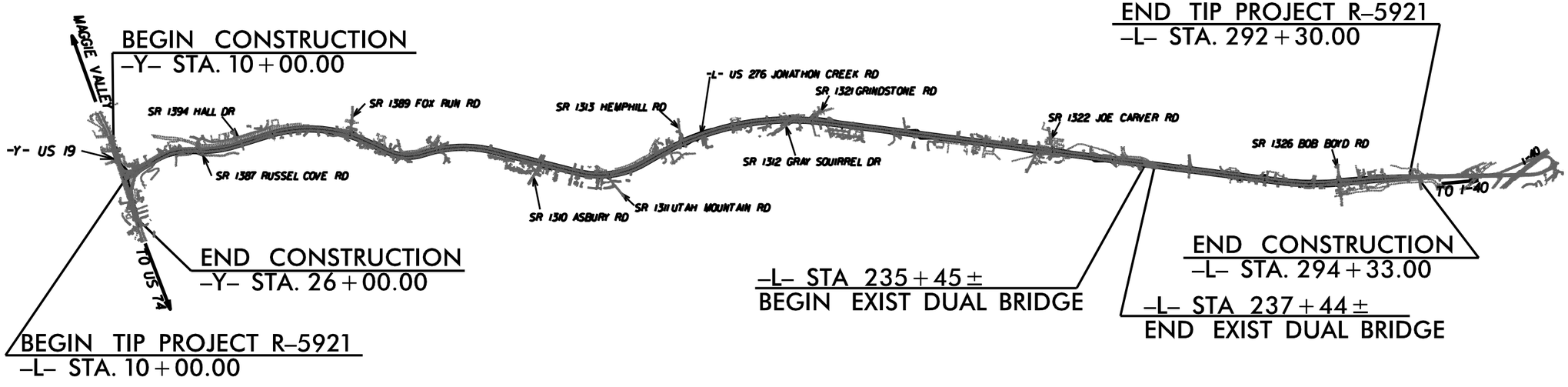
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5921	3	35

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
48470.1.1	0276019	PE

LOCATION: *US 276 (JONATHAN CREEK RD) FROM US 19 TO 0.5 MILES SOUTH OF I-40*

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

NAD 83/2011



CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.
A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF THE TOWN OF MAGGIE VALLEY

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

PLANS: 50 25 0 50 100
PROFILE (HORIZONTAL): 50 25 0 50 100
PROFILE (VERTICAL): 10 5 0 10 20

DESIGN DATA

ADT 2023 = 5,400 – 13,600
ADT 2045 = 7,000 – 17,500
K = 9 %
D = 55 %
T = 7 % *
V = 60 MPH
* TTST = 3% DUAL = 4%
FUNC CLASS = MINOR RURAL ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-5921 = 5.347 MILES
TOTAL LENGTH TIP PROJECT R-5921 = 5.347 MILES

NCDOT CONTACT: JEANETTE WHITE, PE

PLANS PREPARED BY:
TGS ENGINEERS
2012 MARION ST
SHELBY, NC 28150
PH: (704) 476-0003
CORP. LICENSE NO. C-0275

PLANS PREPARED FOR:
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION 14
252 GOVERNOR RD
SYLVA, NC 28779

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: JANUARY 9, 2023

LETTING DATE: SEPTEMBER 17, 2024

JIMMY TERRY, PE
PROJECT ENGINEER

AUSTIN R. TURNER, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION

7/24/2023

STATE PROJECT: 48470.1.1
TIP NO.: R-5921
COUNTY: Haywood
DESCRIPTION: US 276 (Jonathan Creek Rd) from US 19 to 0.5 miles south of I-40

SUBJECT: Geotechnical Roadway Inventory Report

PROJECT DESCRIPTION

Based on a review of the plans provided to us by TGS, we understand this project consists of improvements to US 276 between US 19 in Maggie Valley and approximately 0.5 miles south of the interchange with I-40. The project is approximately 5.347 miles in length, measured along -L- (US 276) from Station 10+00 to 294+33. The work on US 276 includes the addition of a roundabout at the intersection with US 19 as well as the addition of U-turn bulbs and protected left turn lanes, roadway improvements, and associated drainage.

The vast majority of the project footprint stays within the existing roadway alignment, which is why this project was investigated primarily as a pavement investigation project. As such, only borelogs are included in this report; cross sections were not generated. In select areas, cuts and fills on the order of 5 to 10 feet will be utilized to install U-turn bulbs.

The following alignments are included as part of this investigation:

Alignment	Stations
-L- (US 276)	10+00 to 294+33
-Y- (US 19)	10+00 to 26+00

The geotechnical field investigation was conducted by CG2 during the period of November 2022 and March 2023. A subcontracted drilling crew was used to drill and sample each of the twelve (12) borings included in this report. The drill rigs utilized were a truck-mounted Mobile B-29 and an ATV-mounted CME 550X both equipped with an automatic hammer. Standard Penetration Tests (SPT) were performed at selected depths within each boring. Representative soil samples were collected for visual-manual classification in the field and evaluated in the office by a staff geologist under the supervision of a licensed engineer or geologist. Selected soil samples were submitted for laboratory analysis by an approved NCDOT M&T testing facility.

PHYSIOGRAGHY AND GEOLOGY

The project corridor is located within the Blue Ridge Physiographic Province of North Carolina. The Blue Ridge Physiographic Province generally consists of hills and ridges which are intertwined with an established system of draws, streams, and valleys. The bedrock at the project location is geologically in the Coweeta Group (ZYbn). Bedrock generally consists of migmatitic Biotite Gneiss interlayered and gradational with biotite-garnet gneiss and amphibolite, with intrusive metamorphosed gabbro and diorite.

Within the project alignment, much of the bedrock is overlain by near-surface material consisting of residual and alluvial soils. Residual soils are derived from in situ chemical and physical weathering of the rock in the area and vary in thickness. The residual soils in this region are typically finer grained with a higher clay content near the surface due to advanced weathering, and typically become coarser grained with increasing depth as the degree of weathering decreases. As the degree of weathering decreases, the residual soils generally retain the overall appearance and fabric of the parent rock (sometimes referred to as “saprolite”). The boundary between soil and rock is not always sharply defined. A transitional zone termed “weathered rock” is often found overlying the parent bedrock. Weathered rock is defined as material requiring 100 blows with less than one foot of penetration from the SPT hammer.

Alluvial soils are transported and deposited by water and are naturally variable in character, consistency/density, and often contain organic materials. Alluvial soil deposits of varying age were observed within the project alignment in low lying areas adjacent to Jonathan Creek and were encountered within borings performed for the roadway investigation. These alluvial materials contain variable amounts of rounded gravels, cobbles, and boulders, typical of older stream terrace deposits.

Soil Properties

Given the limited nature of this subsurface exploration, a generalized description of the soil and rock encountered is included below. Soils and rock encountered during the roadway investigation include roadway embankment, artificial fill, alluvial soils, residual soils, weathered rock, and crystalline rock.

Roadway Embankment soils are similar in nature to residual soils and may be derived from nearby sources. Roadway embankment soils were encountered in Boring B-06 during the roadway investigation due to the presence of state-maintained roadways. This material generally consists of hard, sandy clay (A-6), with trace amounts of mica gravel and wood fragments.

Artificial Fill soils are materials that have been moved and/or placed by man or mechanical means. Artificial fill soils were encountered in Boring B-09. The artificial fill soils generally consist of very stiff to hard, sandy silt, with trace amounts of mica and gravel.

Alluvial soils were observed in proximity to Jonathan Creek and were encountered in Borings B-02 to B-05, B-07, B-09 to B-12. The alluvial soils generally consist of medium stiff to very stiff, sandy silt (A-4) and sandy clay (A-6), and loose to very dense, silty sand (A-2-4), and sandy gravel (A-1-a). Variable amounts of gravel and mica were encountered within the alluvial soils.

Residual soils were encountered in Borings B-01, B-02, B-04, B-06, and B-08 through B-11. The residual soils generally consist of medium stiff to hard, silty clay (A-7-5) and sandy silt (A-4), and loose to very dense silty sand (A-2-4). Trace mica and rock fragments were encountered intermittently within the residual soils.

Weathered rock was encountered along the project corridor within Borings B-01 and B-03. The weathered rock consisted of Biotite Gneiss. The weathered rock was encountered at depths ranging from approximately 3.5 to 6.0 feet below existing grades at the boring locations.

Crystalline rock was encountered along the project corridor within Borings B-01, B-03, and B-05. The crystalline rock consisted of Biotite Gneiss. The crystalline rock was encountered at depths ranging from approximately 6.0 to 9.0 feet below existing grades at the boring locations.

Groundwater

Groundwater measurements were taken during November 2022 and March 2023. Groundwater measurements were attempted at the completion of drilling in each boring, at which time groundwater was encountered in Borings B-02, B-05, through B-10, and B-12 at depths ranging from approximately 4.2 to 14.3 feet below the existing grades. Subsequent groundwater measurements were attempted after at least 24 hours following the completion of drilling in Borings B-02, B-07 through B-09, and B-12. At the time of subsequent water level measurements, groundwater was encountered at depths ranging from 3.3 to 12.3 feet below existing grades. The remaining borings were either recorded as dry or filled in after drilling due to our demobilization from the project site. The soils encountered were generally described as moist to wet above and below groundwater elevation.

Water Wells: There are several residences near the project site which could indicate that water wells may be present. Water wells were not observed within the proposed construction corridor. However, wells may be encountered that were not observed during our field services.

Areas of Special Geotechnical Interest

The borings did not encounter very soft to soft or very loose to loose soils on the project.

Highly Plastic Clays: Highly plastic soils (PI > 25) were not encountered in borings of the project.

Shallow groundwater was not encountered within 3 feet of the existing ground. In addition, shallow groundwater was encountered within 6 feet of proposed subgrade at the following locations.

Alignment	Stations	Offsets (ft)
-L-	112+62	61 LT
-L-	185+87	82 LT
-L-	210+09	71 RT
-L-	282+95	71 LT

Crystalline rock was encountered above or within 6 feet of proposed grade at the following locations.

Alignment	Stations	Offsets (ft)
-L-	60+22	82 RT
-L-	134+73	72 RT
-L-	138+85	66 LT

Rock Outcrops: Rock outcrops were exposed within the proposed project corridor and generally consist of Biotite Gneiss at the following locations:

Alignment	Stations	Offsets
-L-	11+81 to 43+88	RT
-L-	49+25 to 55+60	RT
-L-	71+30 to 73+51	RT
-L-	76+96 to 81+21	RT
-L-	122+10 to 129+67	RT
-L-	267+56 to 275+80	LT

Geotechnical Testing

Four bulk samples were selected for laboratory testing including Atterberg limits, grain size distribution analysis with hydrometer, and natural moisture. No thin-wall Shelby tube samples were collected during the investigation.

Sincerely,
Carolinas Geotechnical Group, PLLC

DocuSigned by:
D. Matthew Brewer
386129C0A4C1462...
D. Matthew Brewer, PE
Senior Project Engineer

DocuSigned by:
Robert E Kral
8AD703B2A8484F4...
Robert E. Kral, PE
Senior Project Engineer

NOTE:
SEE DETAIL SHEET 2B– FOR ROUNDABOUT LAYOUT

PROP MONOLITHIC CONC ISLAND – SURFACE MOUNTED
PROP 7" MONOLITHIC CONC TRUCK APRON
PROP CONC SIDEWALK
PAVEMENT REMOVAL

PROJECT REFERENCE NO.	SHEET NO.
R-5921	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST STE 200
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

MATCH LINE STA –L– 14+00.00
MATCH TO SHEET NO. 6

MATCH LINE STA –Y– 21+00.00
MATCH TO SHEET NO. 5

–Y– STA. 10+00.00
BEGIN CONSTRUCTION

–L– STA. 10+00.00
BEGIN TIP PROJECT R-5921

–Y– POT 10+00.00
–Y– PC 11+55.35
–L– PRC 12+56.10
–Y– PRC 15+05.80
–Y– PCC 15+73.99
–L– PC 10+00.00 =
–Y– POC 17+01.52
–Y– PRC 17+49.86
–Y– PRC 18+86.10
–Y– PT 20+86.92

–L– CURVE DATA

PI Sta 11+29.84	PI Sta 13+55.16
Δ = 23° 17' 29.4" (LT)	Δ = 9° 26' 16.3" (RT)
D = 9° 05' 40.4"	D = 4° 46' 28.7"
L = 256.10'	L = 197.67'
T = 129.84'	T = 99.06'
R = 630.00'	R = 1,200.00'
SE = 0.02	SE = 0.02
DS = 35 MPH	DS = 35 MPH

–Y– CURVE DATA

PI Sta 13+32.39	PI Sta 15+40.09	PI Sta 16+62.68	PI Sta 18+18.41	PI Sta 19+86.78
Δ = 20° 04' 46.7" (LT)	Δ = 15° 01' 32.3" (RT)	Δ = 18° 19' 17.7" (RT)	Δ = 15° 36' 41.9" (LT)	Δ = 10° 19' 09.4" (RT)
D = 5° 43' 46.5"	D = 22° 02' 12.6"	D = 10° 25' 02.7"	D = 11° 27' 33.0"	D = 5° 08' 19.1"
L = 350.46'	L = 68.18'	L = 175.87'	L = 136.24'	L = 200.82'
T = 177.04'	T = 34.29'	T = 88.69'	T = 68.54'	T = 100.68'
R = 1,000.00'	R = 260.00'	R = 550.00'	R = 500.00'	R = 1,115.00'
SE = 0.04	SE = -0.02	SE = -0.02	SE = 0.02	SE = -0.02
DS = 50 MPH	DS = 25 MPH	DS = 35 MPH	DS = 35 MPH	DS = 35 MPH

FOR –L– PROFILE, SEE SHEET NO. 27
FOR –Y– PROFILE, SEE SHEET NO. 29

GULF HIGHWAY LAND CORPORATION
BK 647 PG 20
CAB B SLOT 53 (MCD

REVISIONS

8/17/99

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PROJECT REFERENCE NO.	SHEET NO.
R-5921	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST STE 200
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

REVISIONS

8/17/99

MATCH LINE STA -Y- 21+00.00
MATCH TO SHEET NO. 4

-Y- PC 22+13.25

-Y- PT 25+40.35

-Y- POT 28+11.36

S 85°09'05.7" E

N 86°52'23.5" E

US19/SOCO RD/DELLWOOD RD 60' BST

YAHNETA TRIBUTARY

NOT FOUND
APPROXIMATE LOCATION
PER MAGGIE VALLEY

GR 375' LT LN TAPER

-Y- CURVE DATA

PI Sta 23+77.07
Δ = 1° 58' 30.8" (LT)
D = 2° 26' 17.2"
L = 327.11'
T = 163.82'
R = 2,350.00'
SE = 0.02
DS = 45 MPH

PROP MONOLITHIC CONC ISLAND - SURFACE MOUNTED

PAVEMENT REMOVAL

FOR -Y- PROFILE, SEE SHEET NO. 29

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PROJECT REFERENCE NO.	SHEET NO.
R-5921	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST STE 200
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

REVISIONS

8/17/99

MATCH LINE STA -L- 14+00.00
MATCH TO SHEET NO. 4

MATCH LINE STA -L- 25+00.00
MATCH TO SHEET NO. 7

JONATHANS CREEK

UNNAMED TRIBUTARY

PROP. DRIVE

REM. EXIST. GUARDRAIL

IMTLBUS

ISFBUS

WOODLINE

MTL GATE

CONC

GR

ISFD

BEGIN 2'-9" C&G
-L- 17+90, LT

50' PROP. TRANSITION
1'-6" C&G TO 2'-9" C&G

24" HDPE

36" DR

ELEV: 2666.5'

US 276 JONATHAN CREEK RD BST

ROCK OUTCROP

EXPRESSWAY GUTTER
-L- STA 20+00 TO 24+60±, RT

330' TAPER

200' TAPER

-L- PC 17+89.68

-L- BT 14+53.77

-L- PT 24+22.33

-L- CURVE DATA

PI Sta 13+55.16	PI Sta 21+13.54
Δ = 9° 26' 16.3" (RT)	Δ = 30° 12' 23.5" (RT)
D = 4° 46' 28.7"	D = 4° 46' 28.7"
L = 197.67'	L = 632.64'
T = 99.06'	T = 323.86'
R = 1,200.00'	R = 1,200.00'
SE = NC	SE = 0.04
DS = 45 MPH	DS = 55 MPH

PROP MONOLITHIC CONC ISLAND - SURFACE MOUNTED

FOR -L- PROFILE, SEE SHEET NO. 27

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PROJECT REFERENCE NO.	SHEET NO.
R-5921	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST STE 200
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

REVISIONS

8/17/99

MATCH LINE STA -L- 25+00.00
MATCH TO SHEET NO. 6

MATCH LINE STA -L- 39+00.00
MATCH TO SHEET NO. 8

-L- PT 34+48.37

-L- PC 27+49.29

SEE DETAIL SHT 28-
FOR ISLAND LAYOUT

SR 1394 HALL DR 21' BST

SR 1394 HALL DR BST

LOW HANGING WIRE
ELEV: 2739.0'

LOW HANGING WIRE
ELEV: 2748.5'

LOW HANGING WIRE
ELEV: 2751.2'

PIPE BURIED

BM #3
HEAD WALL
CORNER

CONC BRIDGE

24' GABION BASKET WALL

ROCK OUTCROP

WOODLINE

ROCK OUTCROP

WOODLINE

BY3-47

BY3-48

BY4-49

BY4-50

BY4-51

SR 1387 RUSSELL BOWERS RD 17' BST

US 276/JONATHAN CREEK RD 24' BST

US 276/JONATHAN CREEK RD 24' BST

JONATHANS CREEK

UNNAMED TRIBUTARY

ISFD

ID BILLBOARD

200' TAPER

200' TAPER

465' TAPER

END 2'-9" C&G
-L- 35+00, RT

50' PROP. TRANSITION
2'-9"C&G TO 1'-6"C&G

53' TYP

36' TYP

N 2°27'40.2" W

30+00

-L- CURVE DATA
PI Sta 31+01.50
Δ = 17° 15' 52.4" (LT)
D = 2° 28' 10.7"
L = 699.07'
T = 352.20'
R = 2,320.00'
SE = 0.04
DS = 50 MPH

PROP MONOLITHIC CONC ISLAND - SURFACE MOUNTED

FOR -L- PROFILE, SEE SHEET NO. 28

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PROJECT REFERENCE NO.	SHEET NO.
R-5921	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST STE 200
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

REVISIONS 8/17/99

MATCH LINE STA -L- 39+00.00
MATCH TO SHEET NO. 7

MATCH LINE STA -L- 53+00.00
MATCH TO SHEET NO. 9

SEE DETAIL SHT 2B- FOR ISLAND LAYOUT

BEGIN 2'-9" C&G -L- 41+50, LT

50' PROP. TRANSITION 1'-6"C&G TO 2'9"C&G

1'-6"C&G

2'-9" C&G

US 276 JONATHAN CREEK RD BST

JONATHANS CREEK

ROCK OUTCROP

100' TRANS TO EXIST

PROP. DRIVE

ISFD

2SFD

DIRECTION ONLY LEAD NOT FOUND

UNABLE TO FIND MH APPROXIMATE LOCATION PER MAGGIE VALLEY

-L- PC 42+37.75

-L- CURVE DATA
PI Sta 53+45.54
Δ = 41° 56' 43.6" (RT)
D = 1° 58' 57.2"
L = 2,115.73'
T = 1,107.79'
R = 2,890.00'
SE = 0.05
DS = 65 MPH

PROP MONOLITHIC CONC ISLAND – SURFACE MOUNTED

FOR -L- PROFILE, SEE SHEET NO. 28

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$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-5921	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST STE 200
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

REVISIONS

8/17/99

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MATCH LINE STA -L- 53+00.00
MATCH TO SHEET NO. 8

MATCH LINE STA -L- 67+00.00
MATCH TO SHEET NO. 10

-L- CURVE DATA
PI Sta 53+45.54
Δ = 41° 56' 43.6" (RT)
D = 1° 58' 57.2"
L = 2,115.73'
T = 1,107.79'
R = 2,890.00'
SE = 0.05
DS = 55 MPH

-L- PT 63+53.48

SEE DETAIL SHT 28- FOR ISLAND LAYOUT

DO NOT DISTURB ROCK WALL

DO NOT DISTURB BRICK WALL

EXPRESSWAY GUTTER -L- STA 65+66± TO 67+60±, LT

PLACE PAVEMENT TO TIE EXIST. PARKING LOT TO CURB

200' TAPER

B-01

BL-9

N: 39 29' 03.4" E

55+00

60+00

65+00

SR 1589 FOX RUN RD 23' BST

US 276 JONATHAN CREEK RD BST

US 276/JONATHAN CREEK RD 24' BST

JONATHANS CREEK

PROP. DRIVE

ISFBUS

ISFMTLBUS

ISFBKAPT

2SFBKAPT

2SBKAPT

ISLOGD

IS BUS

2SFD

U/C

PROJECT REFERENCE NO.	SHEET NO.
R-5921	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST STE 200
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

Point	North	East	Elev
NEGI	675911.7559	1082300.0211	2580.00
NWGI	675934.7568	1082298.2281	
SEGI	675741.8565	1082215.3574	
SWGI	675761.8571	1082188.4744	

MATCH LINE STA -L- 67+00.00
MATCH TO SHEET NO. 9

MATCH LINE STA -L- 81+00.00
MATCH TO SHEET NO. 11

-L- PG 69+08.06

-L- PT 76+21.08

-L- PC 78+47.99

N 39°29'03.4" E

N 0°34'04.5" W

PLACE PAVEMENT TO TIE EXIST. PARKING LOT TO CURB

EXPRESSWAY GUTTER -L- STA 65+66± TO 67+60±, LT

DO NOT DISTURB BRICK WALL

PROP. DRIVE

TIE TO SECOND JOINT OF EXISTING GUARDRAIL

WOODLINE SHOP CURVE GUARDRAIL R=20' BL-2

US 276 JONATHAN CREEK RD BST

JONATHANS CREEK

LOW HANGING WIRE

ROCK OUTCROP

200' TAPER

ROCK SLOPE

MTL GATE

CONC HEAD WALL

GPS-103

-L- CURVE DATA

PI Sta 72+79.83	PI Sta 85+36.74
Δ = 40°03'07.9" (LT)	Δ = 29°47'02.2" (RT)
D = 5°37'02.0"	D = 2°12'43.9"
L = 713.02'	L = 1,346.35'
T = 371.78'	T = 688.76'
R = 1,020.00'	R = 2,590.00'
SE = EXIST.	SE = EXIST.
DS = 55 MPH	DS = 60 MPH

REVISIONS 8/17/99

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$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-5921	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST STE 200
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

REVISIONS

8/17/99

MATCH LINE STA -L- 81+00.00
MATCH TO SHEET NO. 10

MATCH LINE STA -L- 95+00.00
MATCH TO SHEET NO. 12

200' TAPER

85+00

90+00

US 276 JONATHAN CREEK RD BST

N 29°06'17.5" E

BARN

SILO

-L- CURVE DATA

PI Sta 85+36.74
Δ = 29° 47' 02.2" (RT)
D = 2° 12' 43.9"
L = 1,346.35'
T = 688.76'
R = 2,590.00'
SE = EXIST.
DS = 60 MPH

-L- PT Sta 94+94.34

24-JUL-2023 18:42
C:\Users\mbrewer\OneDrive - Carolinas Geotechnical Group, PLLC\Projects\0142 - R-5921 - US 276 from US 19 to I-40.TGS\CADD_GEOTECH\PlanProf\R-5921_Rdy_psh_11.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-5921	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST STE 200
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

REVISIONS

8/17/99

MATCH LINE STA –L– 95+00.00
MATCH TO SHEET NO. 11

MATCH LINE STA –L– 109+00.00
MATCH TO SHEET NO. 13

105

100+00

N 29° 06' 17.5" E

US 276 JONATHAN CREEK RD BST

US 276/JONATHAN CREEK RD 24' BST

200' TAPER

LOW HANGING WIRE ELEV: 2672.9'

LOW HANGING WIRE ELEV: 2670.6'

INV=2647.94'

36" RCP

24" RCP

18" CMP

15" CMP

6" PVC

12" PVC

UNABLE TO OPEN

PROP. DRIVE

CONC HEADWALL

BOLLARDS

F/O SPLICE BOX

72" CHL & 35BW

MTL GATE

GUY POLE

BM #9

ISBKBUS

ISMTLBUS

2SFAPT

CAR PORT

ISMD

CONC

GR

BST

5'FDPS

4'FDPS

SEE DETAIL SHT 28– FOR ISLAND LAYOUT

24-JUL-2023 18:43
C:\Users\mbrewer\OneDrive - Carolinas Geotechnical Group, PLLC\Projects\0142 - R-5921 - US 276 from US 19 to I-40.TGS\CADD_GEOTECH\PlanProf\R-5921_Rdy_psh_12.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-5921	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST STE 200
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

REVISIONS

8/17/99

MATCH LINE STA -L- 109+00.00
MATCH TO SHEET NO.12

MATCH LINE STA -L- 121+00.00
MATCH TO SHEET NO. 14

-L- PC 110+59.81

JONATHAN CREEK

B-02

200' TAPER

200' TAPER

N 29°06'17"E

BM #10

PROP. DRIVE

NOT FOUND APPROXIMATE LOCATION PER MAGGIE VALLEY

LANDSCAPE W 12" STONE WALL

LANDSCAPE

2SFD

CONC

WD SIGN

200 GAL PROP TANK

MTL GATE

PRIVATE BRIDGE FOUNDATION

UNABLE TO OPEN

SR 1311 (OLD MOUNTAIN RD) (SR)

ISFD

ISMD

PORCH

STAIRS

GUY POLE

CMP

RCP

HANGING WIRE

-L- CURVE DATA
PI Sta 118+36.05
Δ = 43° 55' 21.7" (LT)
D = 2° 58' 35.1"
L = 1,475.70'
T = 776.24'
R = 1,925.00'
SE = EXIST.
DS = 70 MPH

24-JUL-2023 18:43
C:\Users\mbrewer\OneDrive - Carolinas Geotechnical Group, PLLC\Projects\0142 - R-5921 - US 276 from US 19 to I-40_TGS\CADD_GEOTECH\PlanProf\R-5921_Rdy_psh_13.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-5921	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST STE 200
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

REVISIONS

8/17/99

MATCH LINE STA -L- 121+00.00
MATCH TO SHEET NO. 13

MATCH LINE STA -L- 134+00.00
MATCH TO SHEET NO. 15

-L- PT 125+35.50

-L- PC 129+07.86

JONATHAN CREEK

200' TAPER

UNABLE TO OPEN

US 276 JONATHAN CREEK RD.
BST

48" CONC BLOCK WALL

MTL CARPOORT

ISFWD BUS

PROP. DRIVE

MTL GATE

CONC BLOCK WALL

ISMD

MTL CP

48" WD FENCE

12" BVC

15" CMP

24" CMP END NO. FOUND

ROCK OUTCROP
WOODLINE

ISBKD

36" WW FENCE

36" WD FENCE

DO NOT DISTURB UTILITY VAULT

BM #11
MTLS

WDS

ISFD

45BW

N 14°49'04.2" W

125+00

130+00

LOW HANGING WIRE
ELEV. 2038.3

36' TYP.

5'FDPS

4'FDPS

8' STEEL

-L- CURVE DATA

PI Sta 118+36.05	PI Sta 148+21.29
Δ = 43° 55' 21.7" (LT)	Δ = 37° 06' 45.9" (RT)
D = 2° 58' 35.1"	D = 1° 00' 18.7"
L = 1,475.70'	L = 3,692.12'
T = 776.24'	T = 1,913.43'
R = 1,925.00'	R = 5,700.00'
SE = EXIST.	SE = EXIST.
DS = 70 MPH	DS = 60 MPH

24-JUL-2023 18:43
C:\Users\mbruner\OneDrive - Carolinas Geotechnical Group, PLLC\Projects\0142 - R-5921 - US 276 from US 19 to I-40.TGS\CADD_GEOTECH\PlanProf\R-5921_Rdy_psh_14.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-5921	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST STE 200
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

REVISIONS

8/17/99

MATCH LINE STA -L- 134+00.00
MATCH TO SHEET NO. 14

MATCH LINE STA -L- 148+00.00
MATCH TO SHEET NO. 16

SR 1193 HEMPHILL RD 40' BST

MTL GATE

48" WW W/ ISBW

48" 4SBW

ISFD

60' R

BL-2

135+00

LOW HANGING WIRE
ELEV: 2658.9'

4'FDPS

5'FDPS

12" CMP

18" CHL

B-03

B-04

PROP. DRIVE

18" WW W/ ISBW

18" RCP

TOP=2620.00'

VCP END NOT FOUND

48" WW W/ ISBW

SEE DETAIL SHT 2B– FOR U–TURN BULB LAYOUT

JARRETT CREEK

140

200 ' TAPER

+00

B-05

PZO SPLICE BOX

12" PVC

US 276 JONATHAN CREEK RD
BST

TOP=2620.27'

24" RCP

+50

ISBKD

CONC

WDS

48" WD FENCE

PROP. DRIVE

B-06

SEE DETAIL SHT 2B– FOR ISLAND LAYOUT

TOP=2615.47'

24" WD FENCE

15" RCP

20' R

PROP. DRIVE

LP

BILLBOARD

36" WD

35' R

145+00

GPS-1051

LOW HANGING WIRE
ELEV: 2635.9'

TOP=2614.37'

END NOT FOUND

TOP=2613.66'

70' CHL & 3SBW

CHL GATE

ISMTLBUS

-L- CURVE DATA
PI Sta 148+21.29
Δ = 37° 06' 45.9" (RT)
D = 1° 00' 18.7"
L = 3,692.12'
T = 1,913.43'
R = 5,700.00'
SE = EXIST.
DS = 60 MPH

PROP MONOLITHIC CONC ISLAND – SURFACE MOUNTED

24-JUL-2023 18:43
C:\Users\mbrewer\OneDrive - Carolinas Geotechnical Group, PLLC\Projects\0142 - R-5921 - US 276 from US 19 to I-40_TGS\CADD_GEOTECH\PlanProf\R-5921_Rdy_psh_15.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-5921	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST STE 200
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

MATCH LINE STA -L- 148+00.00
MATCH TO SHEET NO. 15

MATCH LINE STA -L- 162+00.00
MATCH TO SHEET NO. 17

-L- CURVE DATA
PI Sta 148+21.29
Δ = 37° 06' 45.9" (RT)
D = 1° 00' 18.7"
L = 3,692.12'
T = 1,913.43'
R = 5,700.00'
SE = EXIST.
DS = 60 MPH

REVISIONS

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-5921	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST STE 200
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

REVISIONS

8/17/99

MATCH LINE STA -L- 162+00.00
MATCH TO SHEET NO.16

MATCH LINE STA -L- 176+00.00
MATCH TO SHEET NO.18

BYIO-57

SR 1321/GRINDSTONE RD 18' BST

VALLEY BROOK LANE CMP

60" CMP

44" ASELEC

60" WD FENCE

ISSN

ISFD

DO NOT DISTURB EQUIPMENT SITE

PROP. DRIVE

200' TAPER

200' TAPER

DO NOT DISTURB TRANSMISSION POLE

DO NOT DISTURB FENCE

48" WD FENCE

MTL GATE

45 ELECTRIC

SP-LEE 60' R

CONC. GR. 6" CURB

LOW HANGING WIRE ELEV= 2630.4'±

165+00

170+00

N 22° 17' 41.7" E

4' FDPS

5' FDPS

18" RCP

24" RCP

15" RCP

15" CMP

8" DI

12" PVC

US 276/JONATHAN CREEK RD 23' BST

72" BLK WALL

ISFBUS

LANDSCAPE BLK

SUMNER PLACE DR 28' BST

BM #14

70" TSBW

ELEC GATE

MOUNTAINVIEW RD 18' BST

42" 25ELEC

SEE DETAIL SHT 2B- FOR ISLAND LAYOUT

ISBRKD

-L- RT 165+99.97

-L- CURVE DATA
PI Sta 148+21.29
Δ = 37° 06' 45.9" (RT)
D = 1° 00' 18.7"
L = 3,692.12'
T = 1,913.43'
R = 5,700.00'
SE = EXIST.
DS = 60 MPH

PROP MONOLITHIC CONC ISLAND - SURFACE MOUNTED

24-JUL-2023 18:43
C:\Users\mbrewer\OneDrive - Carolinas Geotechnical Group, PLLC\Projects\0142 - R-5921 - US 276 from US 19 to I-40.TGS\CADD_GEOTECH\PlanProf\R-5921_Rdy_psh_17.dgn
ss4v1ESENMF$$$

PROJECT REFERENCE NO.	SHEET NO.
R-5921	18
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST STE 200
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

REVISIONS

8/17/99

MATCH LINE STA –L– 176+00.00
MATCH TO SHEET NO. 17

MATCH LINE STA –L– 190+00.00
MATCH TO SHEET NO. 19

DO NOT DISTURB FENCE

SEE DETAIL SHT 2B– FOR ISLAND AND U–TURN BULB LAYOUT

B-07

B-08

BM #15

PROP. DRIVE

MTL GATE

200' TAPER

BLIND JB w/ A TOP OPENING COVERED BY WOOD.

24" RCP END NOT FOUND

18" RCP

15" RCP

LOW HANGING WIRE ELEV. 2609.8'

WOODLINE

US 276/JONATHAN CREEK RD 23.5' BST

5' FDPS

4' FDPS

PROP MONOLITHIC CONC ISLAND – SURFACE MOUNTED

24-JUL-2023 18:43
C:\Users\mbrewer\OneDrive - Carolinas Geotechnical Group, PLLC\Projects\0142 - R-5921 - US 276 from US 19 to I-40_TGS\CADD_GEOTECH\PlanProf\R-5921_Rdy_psh_18.dgn
$$$$ICFNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-5921	19
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST STE 200
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

REVISIONS

8/17/99

MATCH LINE STA –L– 190+00.00
MATCH TO SHEET NO. 18

MATCH LINE STA –L– 204+00.00
MATCH TO SHEET NO. 20

200' TAPER

BL-26

BL-27

195+00

200+00

N 22° 17' 41.7" E

US 276 JONATHAN CREEK RD.

LOW TUNNEL AXLE
ELEV: 2600.8'

PROP. DRIVE

ISFBUS

ISELKBUS

ISMTLBUS

TRI LAKES DR

JARBRO LANE

BILLBOARD

PLANTER

ALL STORM DRAIN IN THIS AREA FLOWS AWAY FROM THE PROJECT

MTL SHED

ISMTL&WDBUS

SAWDUST DUMP

OPEN SIDED MTLBUS

MTL GATE

BM #16

60" WD RAIL

5' FDPS

4' FDPS

18" RCP

15" RCP

12" PVC

12" CMP

15" CMP

18" CMP

8" STEEL 15" RCP

GR

BST

CONC

CONC SW

24-JUL-2023 18:43
C:\Users\mbrewer\OneDrive - Carolinas Geotechnical Group,PLLC\Projects\0142 - R-5921 - US 276 from US 19 to I-40,TGS\CAD\GEOTECH\PlanProf\R-5921_Rdy_psh_19.dgn
$$$$USERNAME$$$$

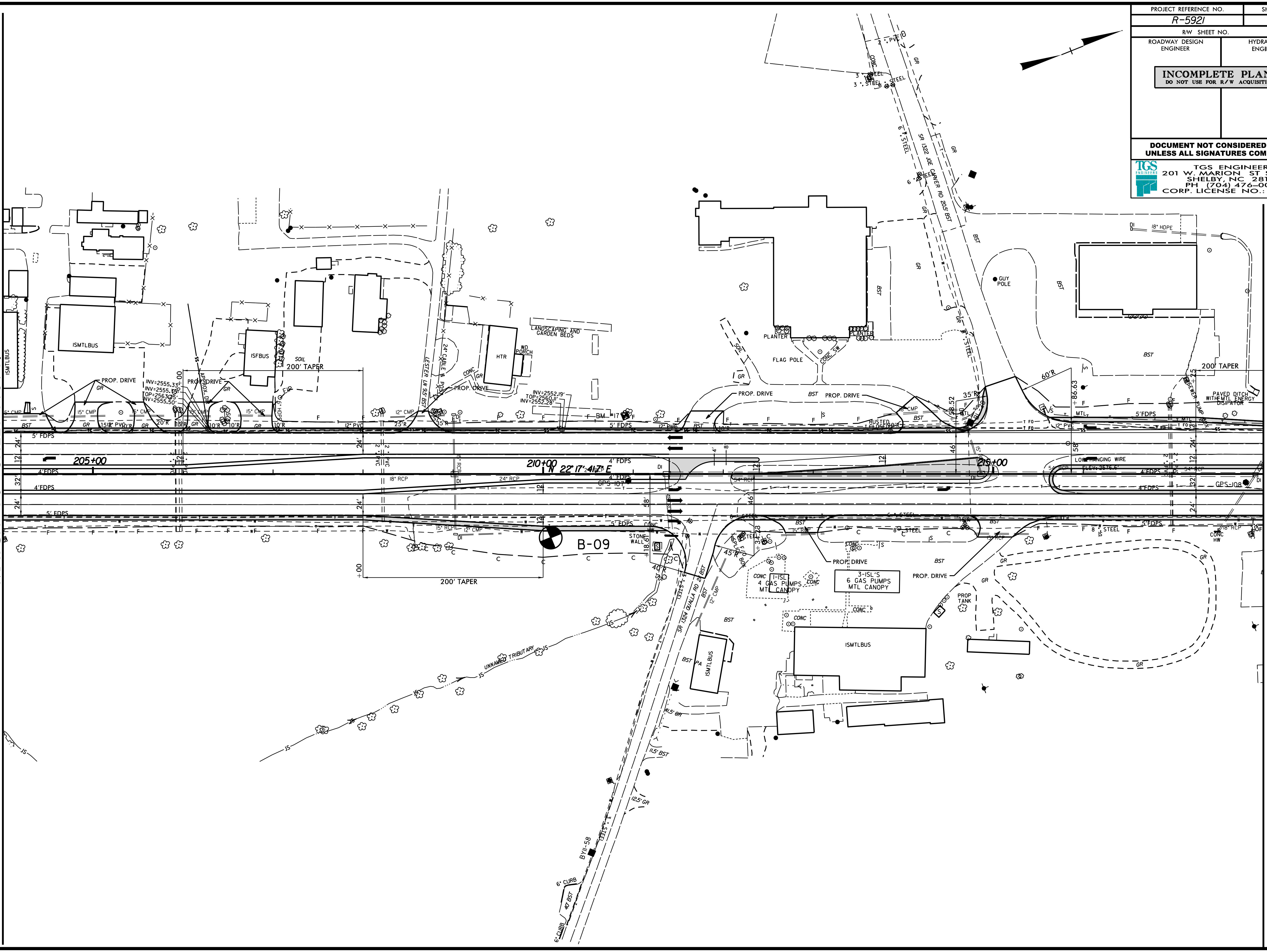
PROJECT REFERENCE NO.	SHEET NO.
R-5921	20
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST STE 200
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

MATCH LINE STA -L- 204+00.00
MATCH TO SHEET NO. 19



MATCH LINE STA -L- 218+00.00
MATCH TO SHEET NO. 21

REVISIONS

8/17/99

24-JUL-2023 18:43
C:\Users\mbrewer\OneDrive - Carolinas Geotechnical Group, PLLC\Projects\0142 - R-5921 - US 276 from US 19 to I-40_TGS\CADD_GEOTECH\PlanProf\R-5921_Rdy_psh_20.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-5921	21
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST STE 200
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

REVISIONS

8/17/99

MATCH LINE STA –L– 218+00.00
MATCH TO SHEET NO. 20

MATCH LINE STA –L– 232+00.00
MATCH TO SHEET NO. 22

US 276 JONATHAN CREEK RD.

UNNAMED TRIBUTARY

200' TAPER

48" WW W/ ISBW

ISBKD

CONC

TANK

GR

WD BARN

SILOS

WATER PUMP

PROP. DRIVE

MTL GATE

15" PVC CARRYING SPRING FLOW FROM 15" CMP (PIPE BROKEN IN MULTIPLE SPOTS)

WOODLINE

60" CMP

BM #18

220+00

225+00

230+00

N 22°17'41.7" E

LOW HANGING WIRE ELEV. 2567'

15" RCP

5' FDPS

4' FDPS

6" STEEL

SEE DETAIL SHT 2B– FOR ISLAND AND U–TURN BULB LAYOUTS

B-10

SPLICE BOX

BLK WALL

MTL SHED

MTLBUS

PROP MONOLITHIC CONC ISLAND – SURFACE MOUNTED

24-JUL-2023 18:43
C:\Users\mbrewer\OneDrive - Carolinas Geotechnical Group, PLLC\Projects\0142 - R-5921 - US 276 from US 19 to I-40_TGS\CADD_GEOTECH\PlanProf\R-5921_Rdy_psh_21.dgn
$$$$ISEANGLE$$$

PROJECT REFERENCE NO.	SHEET NO.
R-5921	22
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST STE 200
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

REVISIONS

8/17/99

MATCH LINE STA –L– 232+00.00
MATCH TO SHEET NO. 21

MATCH LINE STA –L– 246+00.00
MATCH TO SHEET NO. 23

MILL & RESURFACE EXISTING BRIDGE

SEE DETAIL SHT 2B– FOR ISLAND LAYOUT

JONATHAN CREEK

US 276 JONATHAN CREEK RD.

N 22° 17' 41.7" E

235+00

240+00

245+00

BM #19

EL. 3

CONC BRIDGE

GREU TL-3

15" RCP

MTL TYPE III

8" STEEL

WOODLINE

PROP. DRIVE

MTL GATE

SPLICE BOX

WD SHED

ISFSHED WORKSHOP

200' TAPER

ISMD

LP

MTL SHED

ISFBUS

CONC

GR

JS

DI

12" PVC

18" CMP

6" WD STEEL

8" HDPE

SIGN WITH STONE COLUMNS

WITH LIGHT

DO NOT DISTURB SIGN

PROP. DRIVE

PUMP AREA

PUTT PUTT GOLF AREA

LOW HANGING

PROP. DI

B113-60

3" STEEL

35R

35RR

35R 125+76 EROSION RD

55.70

51.74

7' RD SIGN

BST

5' FDPS

4' FDPS

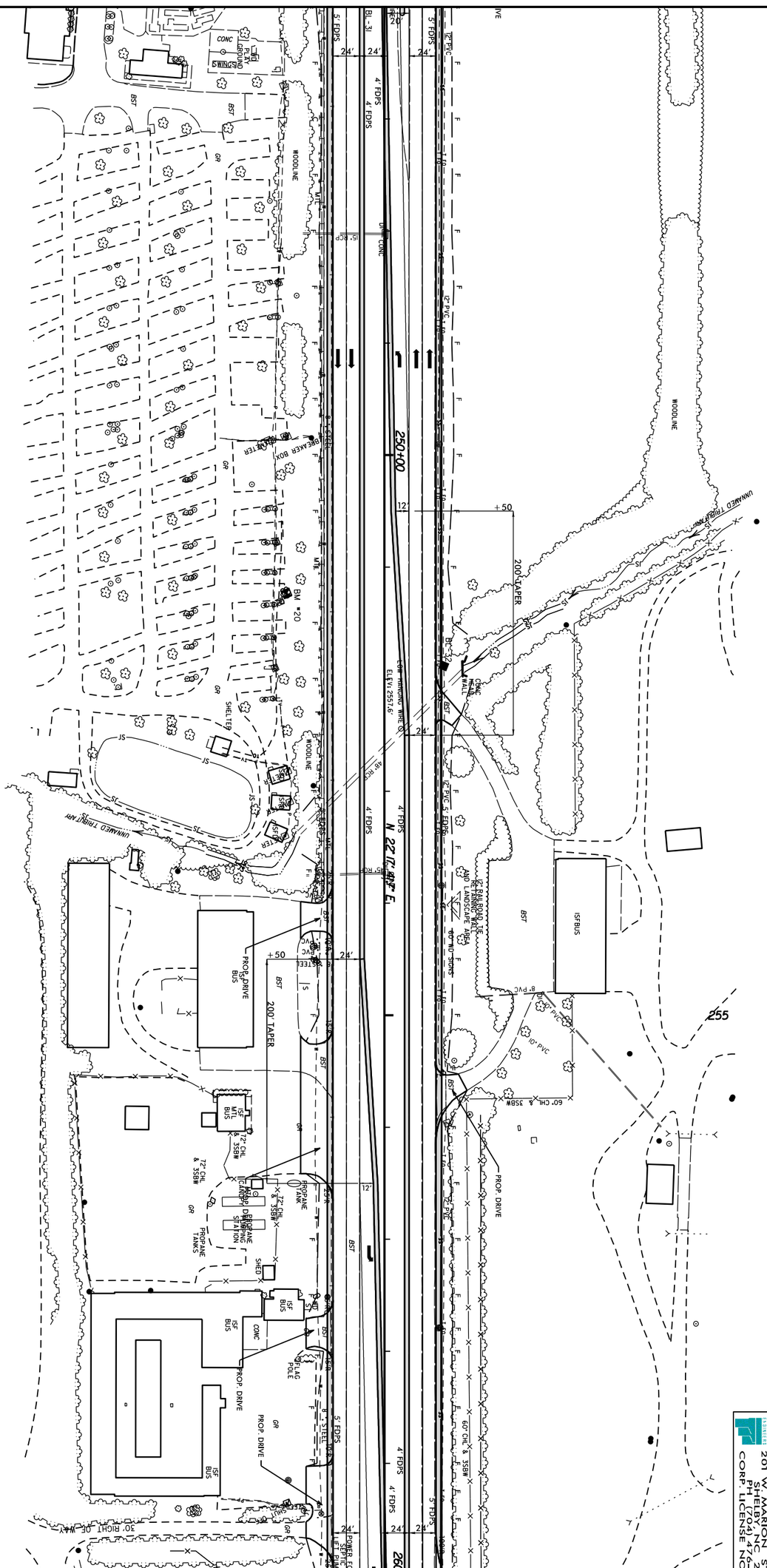
PROP MONOLITHIC CONC ISLAND – SURFACE MOUNTED

24-JUL-2023 18:43
C:\Users\mbrewer\OneDrive - Carolinas Geotechnical Group, PLLC\Projects\0142 - R-5921 - US 276 from US 19 to I-40\TGS\CADD_GEOTECH\PlanProf\R-5921_Rdy_psh_22.dgn
$$$$ITEMNUMBER$$$$

REVISIONS

24-JUL-2023 18:43
C:\Users\mbrewer\OneDrive - Carolinas Geotechnical Group, PLLC\Projects\0142 - R-5921 - US 276 from US 19 to I-40_TGS\CADD_GEOTECH\PlanProf\R-5921_Rdy_psh_23.dgn
$$$$USERNAME$$$$ 8/17/99

MATCH LINE STA –L– 246+00.00
MATCH TO SHEET NO. 22



MATCH LINE STA –L– 260+00.00
MATCH TO SHEET NO. 24

TGS ENGINEERS
201 W. MARION ST STE 200
SHELBY, NC 28150
CORP. LICENSE NO. C-0275

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER

PROJECT REFERENCE NO. R-5921
R/W SHEET NO.
SHEET NO. 23

PROJECT REFERENCE NO.	SHEET NO.
R-5921	24
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST STE 200
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

REVISIONS

8/17/99

MATCH LINE STA -L- 260+00.00
MATCH TO SHEET NO. 23

MATCH LINE STA -L- 274+00.00
MATCH TO SHEET NO. 25

-L- PC 264+27.92

200' TAPER

ROCK OUTCROP

UNNAMED TRIBUTARY

US 276 JONATHAN CREEK RD.

JONATHAN CREEK

UTILITY BUILDING FOR POND

PROP. DRIVE

SEE DETAIL SHT 28 FOR ISLAND LAYOUT

WEIR IN POND FOR POND

EXPRESSWAY GUTTER -L- STA 267+50.00 TO 271+33.00

UNABLE TO OPEN

FLAG POLE

WD SIGN IN LANDSCAPED AREA

MTL GARAGE

ISMTL BUS

18" RAILROAD TIE

LIGHT POLE

SERVICE POLE WITH METER

TRLR

MTL RAIL

MTL GATE

CONC HW

ADVENTURE PARK

BM #21

CMTL

ELEV: 2554.0'

BL-33

MBREU-3

CAT-1

-L- CURVE DATA
PI Sta 270+32.42
Δ = 12° 00' 10.8" (LT)
D = 0° 59' 47.2"
L = 1,204.58'
T = 604.50'
R = 5,750.00'
SE = EXIST.
DS = 60 MPH

PROP MONOLITHIC CONC ISLAND – SURFACE MOUNTED

24-JUL-2023 18:43
C:\Users\mbrewer\OneDrive - Carolinas Geotechnical Group, PLLC\Projects\0142 - R-5921 - US 276 from US 19 to I-40.TGS\CADD_GEOTECH\PlanProf\R-5921_Rdy_psh_24.dgn
$$$$ICENAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-5921	25
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST STE 200
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

REVISIONS

8/17/99

MATCH LINE STA -L- 274+00.00
MATCH TO SHEET NO. 24

MATCH LINE STA -L- 288+00.00
MATCH TO SHEET NO. 26

-L- PT 276+32.50

-L- PC 287+10.38

B-11

B-12

BM #22

BM #24

BY14-61

BY15-62

BY15-63

275+00

280+00

285+00

50'R

45'R

200' TAPER

100' TAPER

500' TAPER TO EXIST.

PROP. DRIVE

ISMTL BUS

ISBARN

KEROSENE TANK

FILL & VENT CAPS

MTL CANOPY

3" PVC ROOF DRAIN

PROP. 8"X12" CURB SIGN W/ CONC BASE

BOLLARDS

DO NOT DISTURB FENCE

PROP TANK

MTL BOLLARDS

SATALITE DISHES ON CONCRETE PAD

PROP. PAD FOR CHARGING

ABANDONED POLE

PLACE PAVEMENT TO TIE EXIST. PARKING LOT TO CURB

EXPRESSWAY GUTTER -L- STA 285+70 TO 286+47 ±, LT

EXPRESSWAY GUTTER -L- STA 281+88 TO 285+13 ±, LT STATION

US 276 JONATHAN CREEK RD

JONATHAN CREEK

WINDSWEPT WAY

OLD COLEMAN MOUNTAIN RD

BST BRIDGE

LOW HANGING WIRE ELEV: 2531.7'

LOW HANGING WIRE ELEV: 2529.6'

LOW HANGING WIRE ELEV: 2529.2'

N 10°07' 50.9" E

TOP=2515.57'

INV=2505.56'
TOP=2511.30'
INV=2505.7'

TOP=2509.27'

-L- CURVE DATA

PI Sta 270+32.42	PI Sta 291+79.81
Δ = 12° 00' 10.8" (LT)	Δ = 3° 35' 06.0" (RT)
D = 0° 59' 47.2"	D = 0° 22' 55.1"
L = 1,204.58'	L = 938.55'
T = 604.50'	T = 469.43'
R = 5,750.00'	R = 15,000.00'
SE = EXIST.	SE = EXIST.
DS = 60 MPH	DS = 60 MPH

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$$$$ICENAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-5921	26
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST STE 200
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

REVISIONS

8/17/99

MATCH LINE STA -L- 288+00.00
MATCH TO SHEET NO. 25

-L- STA. 292+30.00
END TIP PROJECT R-5921

-L- STA. 294+33.00
END CONSTRUCTION

UNNAMED TRIBUTARY

500' TAPER TO EXIST.

430' TAPER TO EXIST.

290+00

295+00

300+00

N 13° 52' 36.9" E

-L- RT. 296+48.93'

JONATHAN CREEK

UNABLE TO FIND APPROXIMATE LOCATION PER MAGGIE VALLEY

US 276/JONATHAN CREEK RD 24' BST

-L- CURVE DATA
PI Sta 291+79.81
Δ = 3° 35' 06.0" (RT)
D = 0° 22' 55.1"
L = 938.55'
T = 469.43'
R = 15,000.00'
SE = EXIST.
DS = 60 MPH

24-JUL-2023 18:43
C:\Users\mbrewer\OneDrive - Carolinas Geotechnical Group, PLLC\Projects\0142 - R-5921 - US 276 from US 19 to I-40_TGS\CADD_GEOTECH\PlanProf\R-5921_Rdy_psh_26.dgn
$$$$ICENAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R–5921	27

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

APPENDIX A
BORELOGS

REFERENCE: R–5921

PROJECT: 48470

Prepared in the Office of:
CAROLINAS GEOTECHNICAL GROUP
2400 CROWNPOINT EXECUTIVE DRIVE
SUITE 800
CHARLOTTE, NC 28227
(980) 339-8684

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 48470.1.1	**TIP** R-5921	**COUNTY** HAYWOOD	**GEOLOGIST** P. Tomasic, G.I.T.	
SITE DESCRIPTION US 276 (Jonathan Creek Rd) from US 19 to 0.5 miles south of I-40				**GROUND WTR (ft)**
BORING NO. B-01	**STATION** 60+22	**OFFSET** 82 ft RT	**ALIGNMENT** L	**0 HR.** Dry
COLLAR ELEV. 2,706.3 ft	**TOTAL DEPTH** 9.0 ft	**NORTHING** 674,077	**EASTING** 802,174	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CG29022 Mobile B-29 86% 04/08/2022		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER M. Brewer	**START DATE** 11/22/22	**COMP. DATE** 11/22/22	**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))
2710										
										2,706.3 / 0.0 — TOPSOIL (0.5 FEET)
2705	2,705.3	1.0	21	42	48	90		10%		**RESIDUAL** Hard, Gray-Tan, Fine to Coarse Sandy SILT (A-4(0))
	2,702.8	3.5	35	36	64/0.4					2,702.8 / 3.5 — **WEATHERED ROCK** Orange-Gray-Tan (Biotite Gniess)
2700	2,700.3	6.0	30	70		100/0.9				
	2,698.0	8.3								
	2,697.3	9.0	100/0.3			100/0.3				2,697.3 / 9.0 — Boring Terminated with Standard Penetration Test Refusal at Elevation 2,697.3 ft On Crystalline Rock (Biotite Gniess)
			60/0.0			60/0.0				Other Samples: BULK-1 (0.0 - 5.0)

WBS 48470.1.1	**TIP** R-5921	**COUNTY** HAYWOOD	**GEOLOGIST** P. Tomasic, G.I.T.	
SITE DESCRIPTION US 276 (Jonathan Creek Rd) from US 19 to 0.5 miles south of I-40				**GROUND WTR (ft)**
BORING NO. B-02	**STATION** 112+62	**OFFSET** 61 ft LT	**ALIGNMENT** L	**0 HR.** 4.9
COLLAR ELEV. 2,645.5 ft	**TOTAL DEPTH** 15.0 ft	**NORTHING** 678,827	**EASTING** 804,167	**24 HR.** 4.0
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 74% 04/08/2022		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER D. Demby	**START DATE** 03/09/23	**COMP. DATE** 03/09/23	**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))
2650										
										2,645.5 / 0.0 — TOPSOIL (0.5 FEET)
2645	2,644.5	1.0	3	4	4	8		M 10%		**ALLUVIAL** Loose to Dense, Tan-Black-Gray, Silty Fine to Coarse SAND (A-2-4), with trace mica and gravel
	2,642.0	3.5	13	19	29	48		W		
2640	2,639.5	6.0	14	22	22	44		W		2,637.5 / 8.0 — **RESIDUAL** Loose, Tan-White-Gray, Silty Fine SAND (A-2-4), with trace mica and gravel-sized rock fragments
	2,637.0	8.5	4	3	3	6		W		
2635	2,632.0	13.5	4	4	6	10		W		2,630.5 / 15.0 — Boring Terminated at Elevation 2,630.5 ft In Residual Silty SAND (A-2-4)
										Notes: Boulders encountered at approximately 4 feet
										Other Samples: BULK-2 (1.0 - 3.0)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 48470.1.1	**TIP** R-5921	**COUNTY** HAYWOOD	**GEOLOGIST** P. Tomasic, G.I.T.	
SITE DESCRIPTION US 276 (Jonathan Creek Rd) from US 19 to 0.5 miles south of I-40				**GROUND WTR (ft)**
BORING NO. B-03	**STATION** 134+73	**OFFSET** 72 ft RT	**ALIGNMENT** L	**0 HR.** Dry
COLLAR ELEV. 2,624.2 ft	**TOTAL DEPTH** 7.6 ft	**NORTHING** 680,975	**EASTING** 804,171	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CG29022 Mobile B-29 86% 04/08/2022		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER M. Brewer	**START DATE** 11/22/22	**COMP. DATE** 11/22/22	**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))
2625										2,624.2 / 0.0 TOPSOIL (0.4 FEET)
	2,623.2	1.0	1	3	5	8		M		**ALLUVIAL** Medium Stiff, Orange-Tan, Fine Sandy SILT (A-4), with trace mica
2620	2,620.7	3.5	16	18	15	33		M		2,621.2 / 3.0 Dense, White-Brown, Silty Fine to Coarse SAND (A-2-4), with trace gravel
	2,618.2	6.0	19	81/0.4		100/0.9				2,618.2 / 6.0 **WEATHERED ROCK**
	2,616.6	7.6	60/0.0			60/0.0				2,616.6 / 7.6 Orange-Gray-Tan, (Biotite Gniess)

Boring Terminated with Standard Penetration Test Refusal at Elevation 2,616.6 ft On Crystalline Rock (Biotite Gniess)

WBS 48470.1.1	**TIP** R-5921	**COUNTY** HAYWOOD	**GEOLOGIST** P. Tomasic, G.I.T.	
SITE DESCRIPTION US 276 (Jonathan Creek Rd) from US 19 to 0.5 miles south of I-40				**GROUND WTR (ft)**
BORING NO. B-04	**STATION** 137+22	**OFFSET** 80 ft RT	**ALIGNMENT** L	**0 HR.** Dry
COLLAR ELEV. 2,620.4 ft	**TOTAL DEPTH** 10.0 ft	**NORTHING** 681,219	**EASTING** 804,145	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CG29022 Mobile B-29 86% 04/08/2022		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER M. Brewer	**START DATE** 11/22/22	**COMP. DATE** 11/22/22	**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))
2625										
	2,619.4	1.0	4	12	11	23		M		2,620.4 / 0.0 TOPSOIL (0.4 FEET)
2620	2,616.9	3.5	11	11	17	28		M		**ALLUVIAL** Very Stiff, Gray-Brown, Fine Sandy SILT (A-4), with trace gravel
	2,614.4	6.0	21	17	14	31		M		2,617.4 / 3.0 Medium Dense, Orange-Gray-Brown, Silty Fine to Coarse SAND (A-2-4)
2615	2,611.9	8.5	6	7	13	20		M		2,614.9 / 5.5 Dense, Orange-Gray-Brown, Silty, Fine to Coarse Sandy GRAVEL (A-1-a)
										2,612.4 / 8.0 **RESIDUAL**
										2,610.4 / 10.0 Medium Dense, Orange-Tan-Brown, Silty Fine to Coarse SAND (A-2-4)

Boring Terminated at Elevation 2,610.4 ft In Residual Silty SAND (A-2-4)

Notes:

Rounded cobbles and boulders encountered at approximately 3.5-7.0 feet

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 48470.1.1	**TIP** R-5921	**COUNTY** HAYWOOD	**GEOLOGIST** P. Tomasic, G.I.T.	
SITE DESCRIPTION US 276 (Jonathan Creek Rd) from US 19 to 0.5 miles south of I-40				**GROUND WTR (ft)**
BORING NO. B-05	**STATION** 138+85	**OFFSET** 66 ft LT	**ALIGNMENT** N/A	**0 HR.** 5.6
COLLAR ELEV. 2,619.7 ft	**TOTAL DEPTH** 8.3 ft	**NORTHING** 681,366	**EASTING** 803,983	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 74% 04/08/2022		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER D. Demby	**START DATE** 03/10/23	**COMP. DATE** 03/10/23	**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)
2620											
										2,619.7	
	2,618.7	1.0	10	14	16	30		M		TOPSOIL (0.2 FEET)	0.0
	2,616.2	3.5								**ALLUVIAL** Medium Dense to Dense, Tan-Brown, Silty Fine to Coarse SAND (A-2-4), with trace mica and trace to little gravel	
2615			18	20	14	34		M			
	2,613.7	6.0	60/0.1			60/0.1				2,613.7	6.0
	2,611.4	8.3								**CRYSTALLINE ROCK** White-Black (Biotite Gniess)	
			60/0.0			60/0.0				2,611.4	8.3

Boring Terminated with Standard Penetration Test Refusal at Elevation 2,611.4 ft In Crystalline Rock (Biotite Gniess)

Notes:

Boulders at approximately 3 ft

WBS 48470.1.1	**TIP** R-5921	**COUNTY** HAYWOOD	**GEOLOGIST** P. Tomasic, G.I.T.	
SITE DESCRIPTION US 276 (Jonathan Creek Rd) from US 19 to 0.5 miles south of I-40				**GROUND WTR (ft)**
BORING NO. B-06	**STATION** 143+89	**OFFSET** 79 ft LT	**ALIGNMENT** L	**0 HR.** 6.5
COLLAR ELEV. 2,616.9 ft	**TOTAL DEPTH** 10.0 ft	**NORTHING** 681,775	**EASTING** 803,949	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 74% 04/08/2022		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER D. Demby	**START DATE** 03/10/23	**COMP. DATE** 03/10/23	**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	
2620											
										2,616.9 TOPSOIL (0.5 FEET)	0.0
	2,615.9	1.0	21	14	18	32		M		**ROADWAY EMBANKMENT** Hard, Orange-Brown, Fine to Coarse Sandy CLAY (A-6), with trace mica, gravel, and wood fragments	
2615										2,613.9	3.0
	2,613.4	3.5	8	4	3	7		M		**RESIDUAL** Loose to Very Dense, Gray-Brown-Black, Silty Fine to Coarse SAND (A-2-4), with trace mica and trace to little gravel-sized rock fragments	
	2,610.9	6.0	9	12	21	33		M			
2610											
	2,608.4	8.5	18	21	29	50		W		2,606.9	10.0

Boring Terminated at Elevation 2,606.9 ft In Residual Silty SAND (A-2-4)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 48470.1.1	**TIP** R-5921	**COUNTY** HAYWOOD	**GEOLOGIST** P. Tomasic, G.I.T.	
SITE DESCRIPTION US 276 (Jonathan Creek Rd) from US 19 to 0.5 miles south of I-40				**GROUND WTR (ft)**
BORING NO. B-07	**STATION** 185+87	**OFFSET** 82 ft LT	**ALIGNMENT** L	**0 HR.** 4.2
COLLAR ELEV. 2,579.6 ft	**TOTAL DEPTH** 10.0 ft	**NORTHING** 685,900	**EASTING** 805,132	**24 HR.** 3.3
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 74% 04/08/2022		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER D. Demby	**START DATE** 03/09/23	**COMP. DATE** 03/09/23	**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)
2580										2,579.6 TOPSOIL (0.5 FEET) 0.0
	2,578.6	1.0	4	11	16	27		M		**ALLUVIAL** Very Stiff, Gray-Brown, Fine to Coarse Sandy CLAY (A-6), with trace mica and gravel 2,576.6 3.0
2575	2,576.1	3.5	18	16	14	30		M		Loose to Medium Dense, Gray-Tan-Brown, Silty Fine to Coarse SAND (A-2-4), with trace mica and little gravel
	2,573.6	6.0	6	5	16	21		M		
2570	2,571.1	8.5	2	3	7	10		W		2,569.6 10.0
										Boring Terminated at Elevation 2,569.6 ft In Alluvial Silty SAND (A-2-4)

Notes:

Boulders encountered at approximately 2 feet, and large boulders at approximately 3 feet

WBS 48470.1.1	**TIP** R-5921	**COUNTY** HAYWOOD	**GEOLOGIST** P. Tomasic, G.I.T.	
SITE DESCRIPTION US 276 (Jonathan Creek Rd) from US 19 to 0.5 miles south of I-40				**GROUND WTR (ft)**
BORING NO. B-08	**STATION** 186+72	**OFFSET** 80 ft RT	**ALIGNMENT** L	**0 HR.** 14.3
COLLAR ELEV. 2,589.0 ft	**TOTAL DEPTH** 20.0 ft	**NORTHING** 685,918	**EASTING** 805,314	**24 HR.** 12.3
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 74% 04/08/2022		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER D. Demby	**START DATE** 03/09/23	**COMP. DATE** 03/09/23	**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										2,589.0 TOPSOIL (0.5 FEET) 0.0
	2,588.0	1.0	4	4	6	10		M		**RESIDUAL** Medium Stiff to Stiff, Black-Brown-Tan, Silty CLAY (A-7-5(5)), with trace mica
2585	2,585.5	3.5	3	4	5	9		M		
	2,583.0	6.0	3	3	4	7		26% M		
2580	2,580.5	8.5	3	2	4	6		M		
	2,575.5	13.5	2	3	5	8		W		2,576.5 12.5 Loose to Very Dense, Gray-Orange-Brown, Silty Fine to Coarse SAND (A-2-4), with trace mica and gravel-sized rock fragments
2570	2,570.5	18.5	19	34	30	64		W		2,569.0 20.0
										Boring Terminated at Elevation 2,569.0 ft In Resdiual Silty SAND (A-2-4)

Other Samples:
BULK-3 (1.0 - 8.0)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 48470.1.1	**TIP** R-5921	**COUNTY** HAYWOOD	**GEOLOGIST** P. Tomasic, G.I.T.	
SITE DESCRIPTION US 276 (Jonathan Creek Rd) from US 19 to 0.5 miles south of I-40				**GROUND WTR (ft)**
BORING NO. B-09	**STATION** 210+09	**OFFSET** 71 ft RT	**ALIGNMENT** L	**0 HR.** 4.7
COLLAR ELEV. 2,559.0 ft	**TOTAL DEPTH** 15.0 ft	**NORTHING** 688,083	**EASTING** 806,191	**24 HR.** 4.0
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 74% 04/08/2022		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER D. Demby	**START DATE** 03/09/23	**COMP. DATE** 03/09/23	**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)
2560										
										2,559.0 TOPSOIL (0.5 FEET) 0.0
	2,558.0	1.0	5	9	9	18		M		**ARTIFICIAL FILL** Very Stiff to Hard, Brown-Black, Fine Sandy SILT (A-4), with trace mica and gravel
2555	2,555.5	3.5	13	28	17	45		M		
	2,553.0	6.0	23	23	30	53		M		2,553.5 5.5 **ALLUVIAL** Medium Dense to Very Dense, Black-Brown-Gray, Silty Fine to Coarse SAND (A-2-4), with trace mica and gravel
2550	2,550.5	8.5	10	16	12	28		W		
	2,545.5	13.5	3	4	8	12		W		2,546.5 12.5 **RESIDUAL** Stiff, White-Black-Gray, Fine Sandy SILT (A-4), with trace mica
2545										2,544.0 15.0 Boring Terminated at Elevation 2,544.0 ft In Residual Sandy SILT (A-4)

WBS 48470.1.1	**TIP** R-5921	**COUNTY** HAYWOOD	**GEOLOGIST** P. Tomasic, G.I.T.	
SITE DESCRIPTION US 276 (Jonathan Creek Rd) from US 19 to 0.5 miles south of I-40				**GROUND WTR (ft)**
BORING NO. B-10	**STATION** 224+60	**OFFSET** 89 ft RT	**ALIGNMENT** L	**0 HR.** 4.6
COLLAR ELEV. 2,543.6 ft	**TOTAL DEPTH** 10.0 ft	**NORTHING** 689,419	**EASTING** 806,759	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 74% 04/08/2022		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER D. Demby	**START DATE** 03/10/23	**COMP. DATE** 03/10/23	**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
2545										
										2,543.6 TOPSOIL (0.2 FEET) 0.0
	2,542.6	1.0	5	4	7	11		M		**ALLUVIAL** Medium Stiff, Brown-Black, Fine Sandy SILT (A-4), with trace mica and gravel
2540	2,540.1	3.5	15	16	24	40		M		2,540.6 3.0 Dense, Tan-Brown-Black, Silty Fine to Coarse SAND (A-2-4), with trace mica and gravel
	2,537.6	6.0	10	15	21	36		M		2,538.1 5.5 **RESIDUAL** Dense, White-Black, Silty Fine SAND (A-2-4), with trace mica and gravel-sized rock fragments
2535	2,535.1	8.5	12	20	20	40		M		2,533.6 10.0 Boring Terminated at Elevation 2,533.6 ft In Residual Silty SAND (A-2-4)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 48470.1.1	**TIP** R-5921	**COUNTY** HAYWOOD	**GEOLOGIST** P. Tomasic, G.I.T.	
SITE DESCRIPTION US 276 (Jonathan Creek Rd) from US 19 to 0.5 miles south of I-40				**GROUND WTR (ft)**
BORING NO. B-11	**STATION** 275+15	**OFFSET** 72 ft RT	**ALIGNMENT** L	**0 HR.** Dry
COLLAR ELEV. 2,515.8 ft	**TOTAL DEPTH** 10.0 ft	**NORTHING** 694,148	**EASTING** 808,568	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 74% 04/08/2022		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER D. Demby	**START DATE** 03/10/23	**COMP. DATE** 03/10/23	**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))
2520										
2515	2,515.8	0.0								2,515.8 TOPSOIL (0.2 FEET) 0.0
	2,514.8	1.0	3	4	5	9 10		M		**ALLUVIAL** Stiff, Brown-Tan, Clayey, Fine Sandy SILT (A-4), with trace mica
	2,512.3	3.5	2	4	6			M		
2510	2,509.8	6.0	15	42	28	70		M		2,510.3 5.5 **RESIDUAL** Medium Dense to Very Dense, Orange-Brown-Tan, Silty Fine SAND (A-2-4), with trace mica and trace to little gravel-sized rock fragments
	2,507.3	8.5	14	9	7	16		M		2,505.8 10.0 Boring Terminated at Elevation 2,505.8 ft In Residual Silty SAND (A-2-4)

WBS 48470.1.1	**TIP** R-5921	**COUNTY** HAYWOOD	**GEOLOGIST** P. Tomasic, G.I.T.	
SITE DESCRIPTION US 276 (Jonathan Creek Rd) from US 19 to 0.5 miles south of I-40				**GROUND WTR (ft)**
BORING NO. B-12	**STATION** 282+95	**OFFSET** 71 ft LT	**ALIGNMENT** L	**0 HR.** 5.9
COLLAR ELEV. 2,509.9 ft	**TOTAL DEPTH** 10.0 ft	**NORTHING** 694,943	**EASTING** 808,568	**24 HR.** 4.6
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 74% 04/08/2022		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER D. Demby	**START DATE** 03/09/23	**COMP. DATE** 03/09/23	**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
2510										
	2,509.9	0.0								TOPSOIL (0.5 FEET) 0.0
	2,508.9	1.0	3	4	4	8		M 18%		**ALLUVIAL** Medium Stiff to Stiff, Orange-Brown-Tan, Fine Sandy CLAY (A-6(3)), with trace mica and gravel
2505	2,506.4	3.5	3	5	8	13				
	2,503.9	6.0	18	25	28	53		W		2,504.4 5.5 Very Dense, Brown-Gray, Silty Fine to Coarse SAND (A-2-4), with little gravel
2500	2,501.4	8.5	24	35	23	58		W		2,499.9 10.0 Boring Terminated at Elevation 2,499.9 ft In Alluvial Silty SAND (A-2-4)

Notes:

Boulders at approximately 4 feet

Other Samples:
BULK-4 (1.0 - 3.0)

PROJECT REFERENCE NO.	SHEET NO.
R–5921	34

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

APPENDIX B
LABORATORY TEST RESULTS

REFERENCE: R–5921

PROJECT: 48470

Prepared in the Office of:

F&ME CONSULTANTS, INC.
1825 BLANDING STREET
COLUMBIA, SC 29201

F&ME CONSULTANTS, INC.
211 BUSINESS PARK BOULVEARD, COLUMBIA SC 29203
(CERT No.: 130-0212)

Project US 276 (Jonathan Creek Rd) from US 19 to 0.5-miles South of I-40 **T.I.P. No.** R-5921 **County** Haywood **F&ME Job No.** C8806 - Task 00023

Date Received 3/17/2023 **Date Reported** 4/24/2023 **Tested By** F&ME **CERT No.:** 130-0212

SOIL TEST RESULTS

SAMPLE NO.	*ALIGNMENT*	*STATION*	*OFFSET (ft.)*	*DEPTH INTERVAL (ft.)*	*AASHTO CLASS*	*L.L.*	*P.I.*	*% BY WEIGHT*				*% PASSING (SIEVES)*			*%*	*%*
								C. SAND	*F. SAND*	*SILT*	*CLAY*	*10*	*40*	*200*	*MOISTURE*	*ORGANIC*
Bulk-1	-L-	60+22	82 RT	0.0 - 5.0	A-4(0)	31	6	26.2%	33.8%	25.9%	14.1%	76.5%	64.4%	35.9%	9.7%	ND
Bulk-2	-L-	112+62	61 LT	1.0 - 3.0	A-2-4	35	7	27.9%	28.7%	21.2%	22.2%	67.8%	55.6%	32.9%	9.9%	ND
Bulk-3	-L-	186+72	80 RT	1.0 - 8.0	A-7-5(5)	44	11	23.3%	23.9%	20.5%	32.3%	98.7%	85.1%	56.0%	25.9%	ND
Bulk-4	-L-	282+95	71 LT	1.0 - 3.0	A-6(3)	39	12	23.5%	22.7%	21.5%	32.3%	84.0%	71.3%	48.7%	17.9%	ND