

SEE SHEET 3 FOR PLAN SHEET LAYOUT
AT TIME OF INVESTIGATION

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4407	1	9

CONTENTS

LINE	STATION	PLAN	PROFILE
-L-	11+50 - 45+65	4 - 6	7 - 8

SAMPLE RESULTS :
SHEET 9

**ROADWAY
SUBSURFACE INVESTIGATION**

COUNTY ANSON /STANLY
PROJECT DESCRIPTION REPLACE BRIDGE NO. 030070
OVER ROCKY RIVER ON US-52

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 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

JAY STICKNEY

CHAD SMITH

GREG THILL

INVESTIGATED BY J.E. BEVERLY

DRAWN BY J.E. BEVERLY

CHECKED BY K.B. MILLER

SUBMITTED BY K.B. MILLER

DATE JANUARY 2019

REFERENCE: B-4407

PROJECT: 38356



Documented by:

[Signature]

957A789AED704CB
1/15/2019

SIGNATURE

DATE

**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

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

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

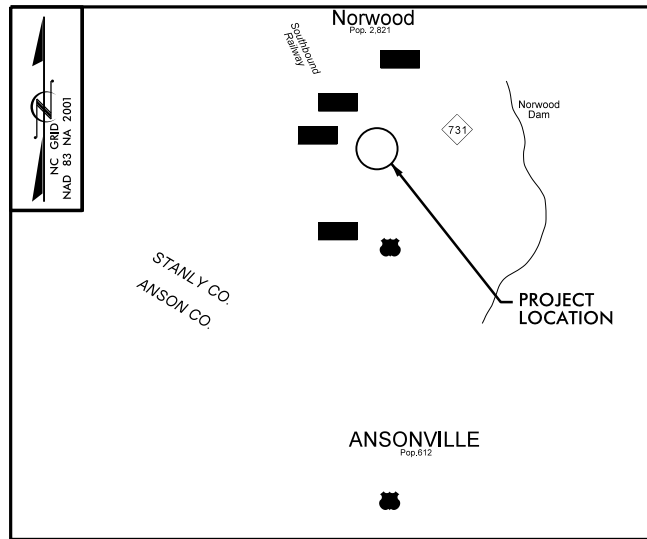
SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS																																																																																																																																												
<p>SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED 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 (ASTM 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, <i>VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i></p>										<p>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.</p>										<p>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:</p>										<p>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 DISLOGGED 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 (ROD) - 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 (SROD) - 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.</p>																																																																																																																																												
<p style="text-align: center;">SOIL LEGEND AND AASHTO CLASSIFICATION</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">GENERAL CLASS.</th> <th colspan="5">GRANULAR MATERIALS (≤ 35% PASSING #200)</th> <th colspan="5">SILT-CLAY MATERIALS (> 35% PASSING #200)</th> <th colspan="5">ORGANIC MATERIALS</th> </tr> <tr> <th>A-1</th> <th>A-1-b</th> <th>A-2</th> <th>A-2-4</th> <th>A-2-5</th> <th>A-2-6</th> <th>A-2-7</th> <th>A-4</th> <th>A-5</th> <th>A-6</th> <th>A-7</th> <th>A-1, A-2</th> <th>A-3</th> <th>A-4, A-5</th> <th>A-6, A-7</th> </tr> </thead> <tbody> <tr> <td>GROUP CLASS.</td> <td>A-1-a</td> <td>A-1-b</td> <td>A-2-4</td> <td>A-2-5</td> <td>A-2-6</td> <td>A-2-7</td> <td>A-4</td> <td>A-5</td> <td>A-6</td> <td>A-7</td> <td>A-1, A-2</td> <td>A-3</td> <td>A-4, A-5</td> <td>A-6, A-7</td> <td></td> </tr> <tr> <td>SYMBOL</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>% PASSING #10 #40 #200</td> <td>50 MX 30 MX 15 MX</td> <td>50 MX 25 MX</td> <td>51 MN 35 MX 35 MX</td> <td>40 MX 35 MX</td> <td>41 MN 40 MX 35 MX</td> <td>41 MN 40 MX 35 MX</td> <td>40 MX 36 MN 36 MN</td> <td>41 MN 36 MN 36 MN</td> <td>40 MX 36 MN 36 MN</td> <td>41 MN 36 MN 36 MN</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>MATERIAL PASSING #40 LL PI</td> <td>-</td> <td>-</td> <td>40 MX 41 MN NP</td> <td>40 MX 41 MN 11 MN</td> <td>40 MX 41 MN 11 MN</td> <td>40 MX 41 MN 11 MN</td> <td>40 MX 41 MN 11 MN</td> <td>40 MX 41 MN 11 MN</td> <td>40 MX 41 MN 11 MN</td> <td>40 MX 41 MN 11 MN</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>GROUP INDEX</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>4 MX</td> <td>8 MX</td> <td>12 MX</td> <td>16 MX</td> <td>NO MX</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>USUAL TYPES OF MAJOR MATERIALS</td> <td>STONE FRAGS. 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ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.</p>										<p style="text-align: center;">WEATHERING</p> <p>FRESH: ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i></p> <p>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. <i>IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF</i></p> <p>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. <i>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</i></p> <p>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.</p>									
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<p style="text-align: center;">NOTES:</p> <p>FIAD - FILLED IMMEDIATELY AFTER DRILLING</p>										<p style="text-align: center;">BENCH MARK: BORING ELEVATIONS DERIVED FROM ROADWAY TIN FILE</p> <p>"B4407 LS TNL.TIN" DATED 12-3-18</p> <p style="text-align: right;">ELEVATION: FEET</p>																																																																																																																																																																

07-JAN-2019 10:08 S:\PRO\Harrisburg_Investigation\TIP\B4407_GEO_RDWY_ANSON\CADD_GEO\TECH\PlanProf\B4407_rdy_tsh.dgn \$\$\$USERNAME\$\$\$

TIP PROJECT: B-4407

CONTRACT:

See Sheet 1A For Index of Sheets



VICINITY MAP (N.T.S.)

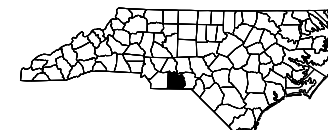
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

ANSON /STANLY COUNTIES

**LOCATION: REPLACE BRIDGE NO. 030070 OVER
ROCKY RIVER ON US-52**

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4407	3	9
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
38356.1.2	NA	PE	
38356.1.2	NA	RW & UTILITIES	
38356.1.2	NA	CONST.	

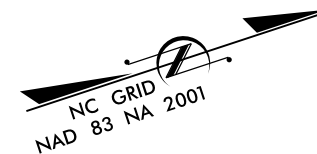


V&M
Vaughn & Melton
Consulting Engineers

Asheville, North Carolina
828-253-2796

Charlotte, North Carolina 704-357-0488
Tri-Cities, Tennessee 423-687-9400
Knoxville, Tennessee 865-546-9800
Middlesboro, Kentucky 606-249-4600
Spartanburg, South Carolina 864-574-4775

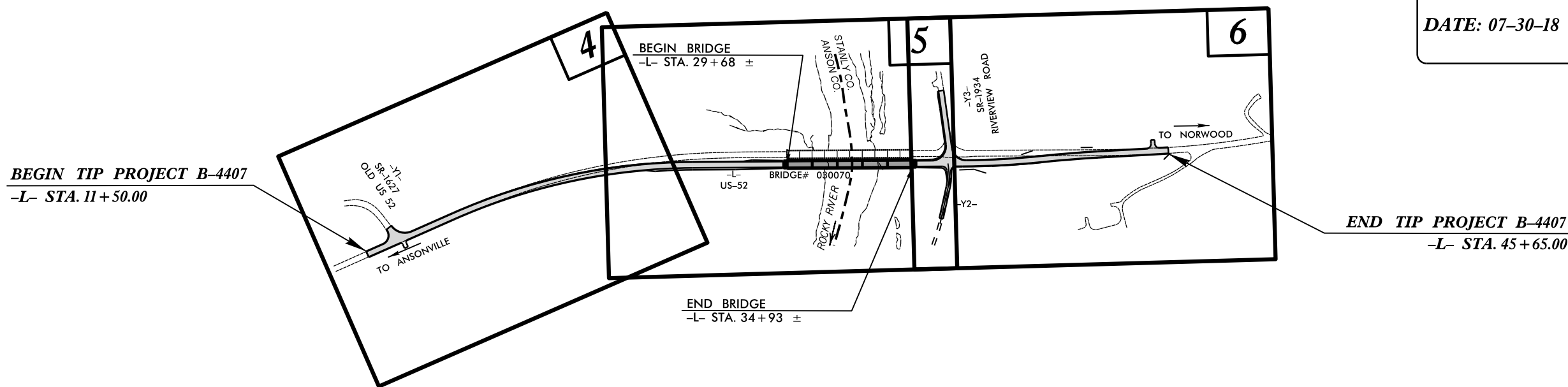
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SUBMITTAL: SOIR

**REVISED 25%
ROADWAY PLANS**

DATE: 07-30-18



DESIGN EXCEPTION REQUIRED FOR MAXIMUM VERTICAL GRADE -L- STA. 34+35.00 TO 43+75.00

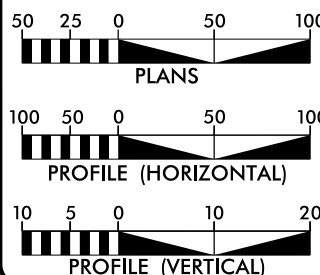
THERE IS NO CONTROL OF ACCESS ON THIS PROJECT. THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES



DESIGN DATA

ADT 2015 = 3900
ADT 2040 = 4900
D = 60%
K = 9%
T = 22%
*TTST = 8% DUAL = 14%
FUNCT. CLASS =
PRINCIPAL ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4407 = 0.548 MI
LENGTH STRUCTURE TIP PROJECT B-4407 = 0.099 MI
TOTAL LENGTH OF TIP PROJECT B-4407 = 0.647 MI

Prepared in the Office of:
VAUGHN & MELTON
1318-F PATTON AVE.
ASHEVILLE NC, 28806
FOR THE NORTH CAROLINA DIVISION OF HIGHWAYS

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
MAY XX, 2017

LETTING DATE:
MAY XX, 2020

REECE SCHULER, PE, PLS
PROJECT ENGINEER

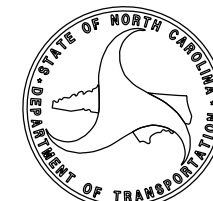
JOHN LANSFORD, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: _____ P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: _____ P.E.





STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

JAMES H. TROGDON, III
SECRETARY

January 14, 2018

STATE PROJECT: 38356.1.2 (B-4407)
COUNTY: Anson / Stanly
DESCRIPTION: Replace Bridge No. 70 over Rocky River on US 52
SUBJECT: Geotechnical Inventory Report

Project Description:

This report presents the findings for proposed construction of the roadway approaches associated with Bridge No. 70 over Rocky River on US 52 at the Anson / Stanly County line. Proposed bridge relocation to the east will result in realignment with improvements to US 52. Total length of proposed roadway is 0.647 miles.

The geotechnical field investigation was conducted in November of 2018. An ATV mounted CME 550 drill machine with automatic drop hammer was utilized to perform 10 borings along the project corridor. No borings were performed in the first 1,200 feet due to the fact that the property contains artifacts with historical significance.

Areas of Special Geotechnical Interest:

- 1) *Groundwater:*
No groundwater was encountered close to proposed grade in any boring location. Groundwater however, is within 1-2 feet of natural ground in portions of the floodplain adjacent to Rocky River.
- 2) *Non-Crystalline Rock:*
Rock was encountered in two of our boring locations but is well below proposed grade.
- 3) *High Plasticity Soils: (PI's 26 and greater)*
No high PI clays were encountered during the course of this investigation.
- 4) *Alluvial Soils:*
Alluvial soils are prevalent in the floodplain adjacent to Rocky River. These soils tend to be soft and wet near the ground surface and consist of sandy clayey silt (A-4) and sandy silty clay (A-6, A-7-6). Coarser sandy soils are sometimes found deeper in the stratigraphic sequence.

5) *Debris / Construction Waste:*

A surficial area of debris consisting of concrete, glass, metal, cans, and bottles lies between -L- station 37+90 and 38+10. Extent of the pile is 40 feet across at station 38+00 and approximately 12 feet high.

Physiography and Geology:

Geologically the project area lies along the southern border of the Carolina Slate Belt bisecting the Anson – Stanly County line. Underlying parental rock types are likely Cenozoic age meta-mudstone and meta-argillite. The US geologic map also indicates underlying rock types on the Anson side of the bridge could be Triassic age silt and sandstone.

Topography in the project vicinity is gently rolling and surrounded by woodlands and open farmland. The main watercourse / drainage feature is Rocky River. A substantial floodplain lies adjacent to the river. Elevation ranges from a low of 185 feet at the river to close to 280 feet by project end.

Soil Properties:

1) *Residual Soils:*

These soils are derived from in place weathering of parent materials. They occur in a variety of consistencies, classifications, and stratigraphic sequences. Residual soils are further subdivided into clays, silts, and sands.

Clay soils consist of soft to very stiff sandy silty clay (A-7-5, A-7-6). Plasticity ranges between 11 and 25. Clay is found near surface and at depth.

Silts consist of medium stiff to hard clayey silt (A-4, A-5). Silts occur in all depth ranges.

Sand is comprised of loose to dense silty clayey sand (A-2-6, A-2-7). Sand was encountered at depth in the subsoil profile.

2) *Alluvial Soils:*

Alluvial soils originate from water transportation and deposition in a floodplain environment. Alluvial deposits along the project corridor are the direct product of the Rocky River. Alluvial soils adjacent to the

river were noted to extend as deep as 19.4 feet below ground surface. Alluvial soil types have a tendency to be soft at the surface and increase in stiffness and density with depth. Alluvium is comprised of sandy clayey silt (A-4), silty sandy clay (A-6), and silty coarse sand with gravel (A-1-b).

3) *Fill Soils:*

Roadway embankment fill soils are present beneath existing US 52 and its connectors. Roadway fill soils were not sampled during this investigation but are likely comprised of local parent soils which consist of clayey silts and silty clays.

Prepared by: J.E. Beverly,
Project Geological Engineer

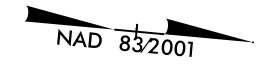
8/17/99

-L- CURVE DATA

PI Sta 20+65.38
Δ = 23° 31' 00.6" (RT)
D = 2' 17" 30.6"
L = 1,026.12'
T = 520.38'
R = 2,500.00'
SE = .05
Ds = 60 mph

-YI- CURVE DATA

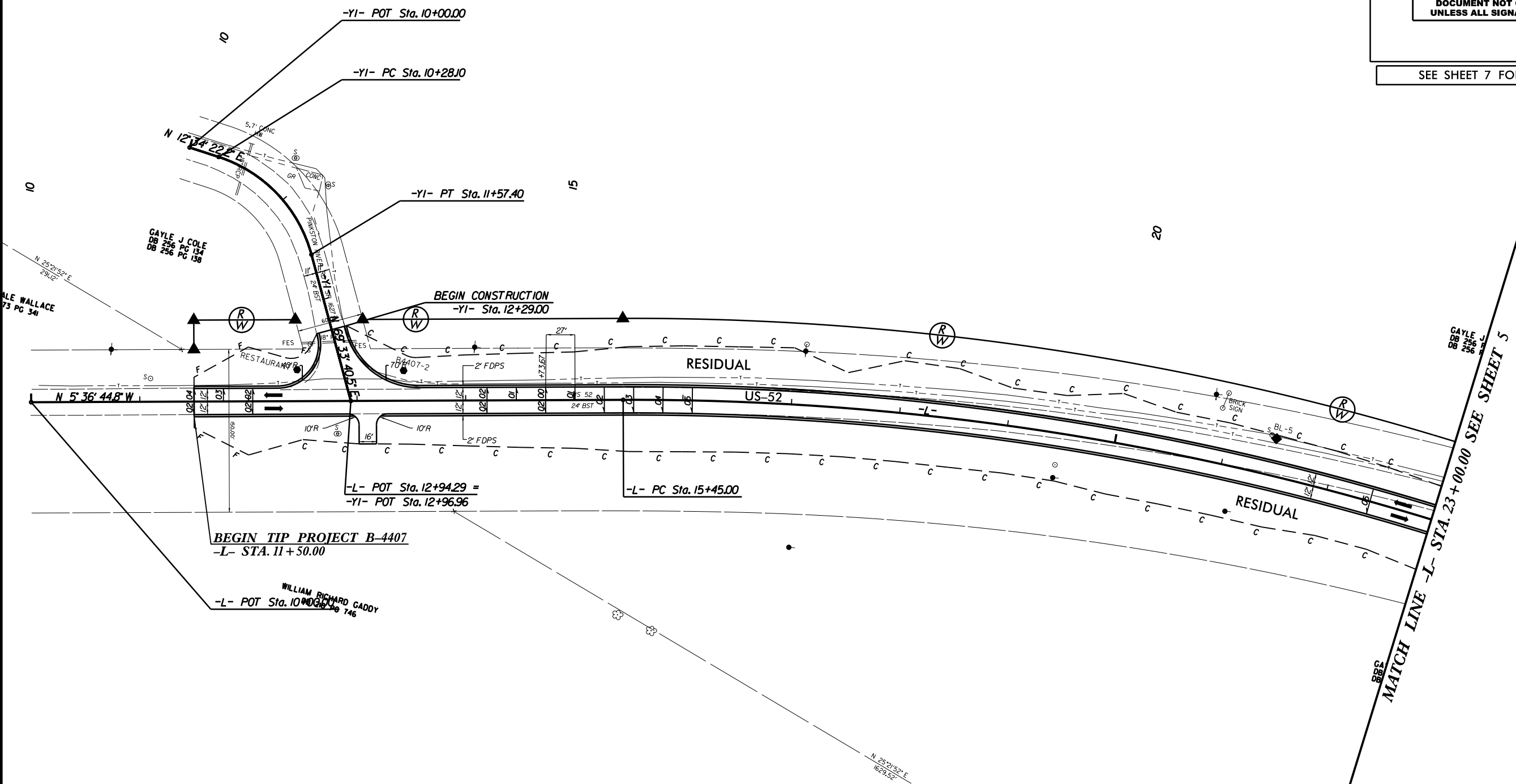
PI Sta 10+98.66
Δ = 56° 59' 18.3" (RT)
D = 44' 04" 25.2"
L = 129.30'
T = 70.57'
R = 130.00'



PROJECT REFERENCE NO. B-4407	SHEET NO. 4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

SEE SHEET 7 FOR PROFILE

REVISIONS



MATCH LINE -L- STA. 23+00.00 SEE SHEET 5

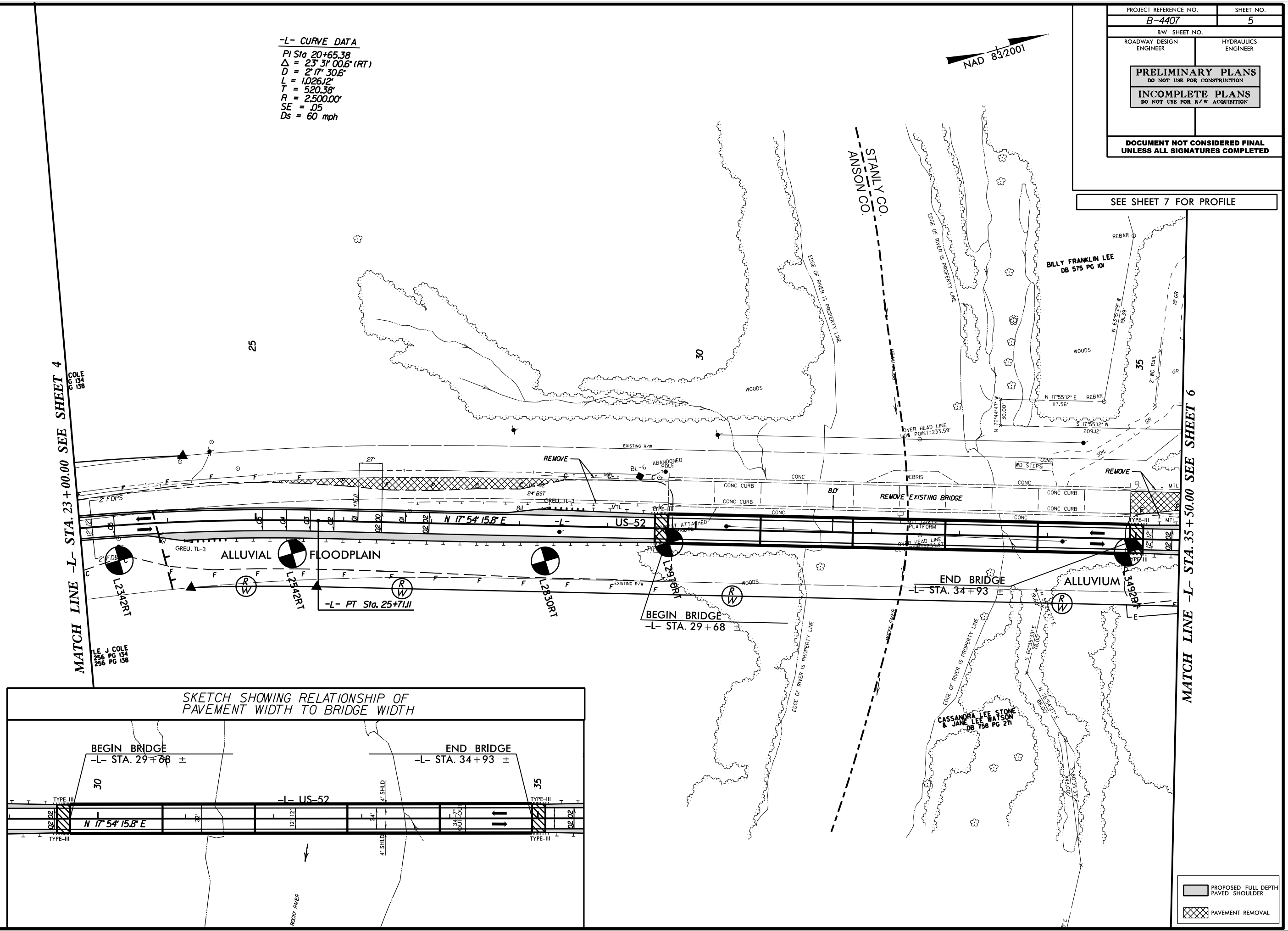
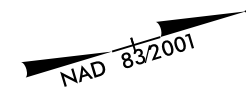
	PROPOSED FULL DEPTH PAVED SHOULDER
	PAVEMENT REMOVAL

Q:\JAN-2019 09:55 ST. WINDY HARRISBURG Investigation\TIP\B4407_GEO\RDWY_ANSON\CADD_GEO\TECH\Plan\Prof\B4407_GEO_psh_04.dgn

PROJECT REFERENCE NO.	SHEET NO.
B-4407	5
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

SEE SHEET 7 FOR PROFILE

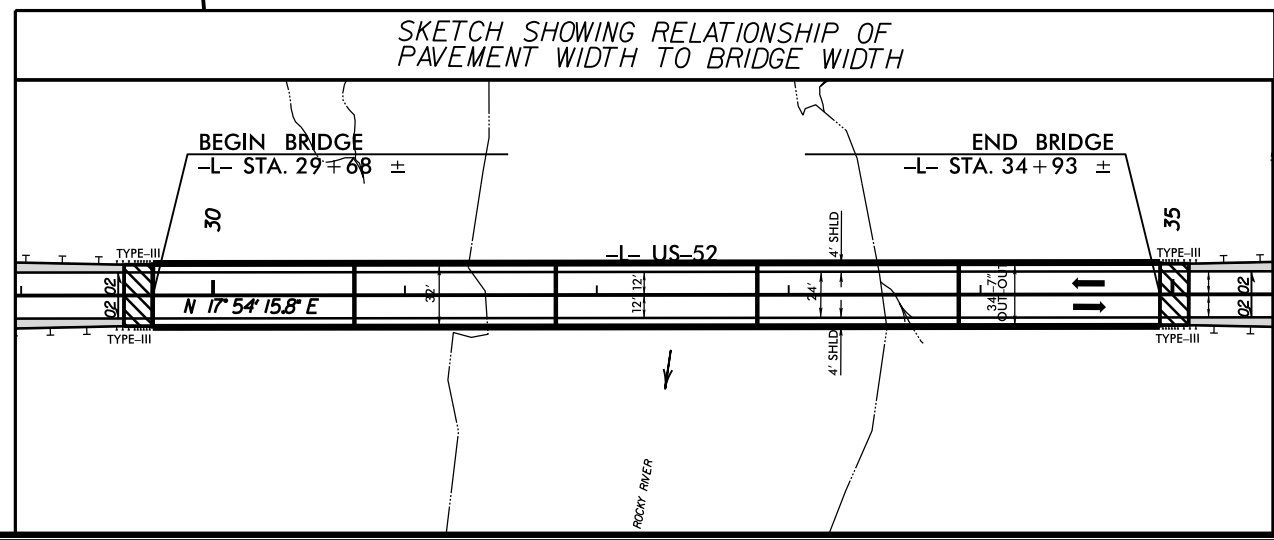
-L- CURVE DATA
 PI Sta 20+65.38
 $\Delta = 23^\circ 31' 00.6" (RT)$
 $D = 2' 17" 30.6"$
 $L = 1026.12'$
 $T = 520.38'$
 $R = 2,500.00'$
 $SE = .05$
 $Ds = 60 \text{ mph}$



MATCH LINE -L- STA. 23+00.00 SEE SHEET 4

MATCH LINE -L- STA. 35+50.00 SEE SHEET 6

SKETCH SHOWING RELATIONSHIP OF PAVEMENT WIDTH TO BRIDGE WIDTH



	PROPOSED FULL DEPTH PAVED SHOULDER
	PAVEMENT REMOVAL

8/17/99
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 ST. WINDYBOROUGH
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 3/31/2019 11:58:33 AM

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-1	60	41+00	4.3-5.8	A-5(7)	41	4	2.4	8.5	60.8	28.3	100	99	94	-	-
SS-2	40	23+42	0.0-1.5	A-7-6(16)	45	22	11.9	15.5	16.0	56.5	100	96	75	-	-
SS-3	40	23+42	3.7-5.2	A-7-6(14)	48	25	17.2	22.0	20.5	40.4	100	97	63	-	-
SS-4	40	23+42	8.7-10.2	A-2-7(1)	41	17	51.9	12.9	15.0	20.2	77	43	30	-	-
SS-5	38	25+42	0.0-1.5	A-4(3)	24	9	18.8	22.0	31.0	28.3	100	92	63	-	-
SS-6	38	25+42	3.6-5.1	A-6(10)	35	17	12.1	15.7	29.8	42.4	95	89	72	-	-
SS-7	38	25+42	8.6-10.1	A-7-6(12)	43	17	15.9	12.1	29.6	42.4	96	86	72	-	-
SS-8	40	28+30	7.9-10.4	A-6(1)	26	13	37.3	22.4	16.0	24.2	92	70	40	-	-
SS-9	40	28+30	13.9-15.4	A-1-b(0)		NP	73.7	12.5	5.8	8.1	87	43	14	-	-
SS-10	16	29+70	3.5-5.0	A-6(10)	33	14	6.3	16.5	36.8	40.4	100	98	81	-	-
SS-11	15	34+92	9.1-10.6	A-6(11)	34	14	1.4	23.6	36.6	38.3	100	99	84	-	-
SS-12	15	34+92	17.1-20.6	A-2-6(0)	33	14	30.1	21.8	17.9	30.3	44	34	23	-	-
SS-13	28	45+36	0.0-1.5	A-7-5(8)	41	11	19.6	3.4	44.7	32.3	89	74	69	-	-
SS-14	28	45+36	3.8-5.3	A-4(7)	38	7	11.9	1.8	52.0	34.3	98	88	85	-	-