

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.	U-5839	1	49

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:
- 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.
 - 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

P. PATTON

A. VERDICCHIO

S. GOWAN

T. MILLER

A. MORGAN

L. GREENE

INVESTIGATED BY S&ME, INC.

DRAWN BY M. HARTMAN

H. CAMP

CHECKED BY J. DAILY

SUBMITTED BY S. LANEY

DATE SEPTEMBER 2019

CONTENTS

LINE	STATION	PLAN	PROFILE
-L-	10+00 TO 14+50	4	25
-L-	14+50 TO 19+25	5	25
-L-	19+25 TO 24+50	6	25 TO 26
-L-	24+50 TO 30+00	7	26
-L-	30+00 TO 34+75	8	26
-L-	34+75 TO 40+20	9	26 TO 27
-L-	40+20 TO 45+90	10	27
-L-	45+90 TO 51+50	11	27
-L-	51+50 TO 57+10	12	27
-L-	57+10 TO 62+40	13	27
-L-	62+40 TO 67+50	14	27 TO 28
-L-	67+50 TO 72+70	15	28
-L-	72+70 TO 73+20	16	28
-Y1-	12+88 TO 18+22	4	
-Y2-	10+00 TO 13+30	5	28
-Y2A-	10+00 TO 14+50	17	28
-Y2A-	14+50 TO 15+27	5	28
-Y3-	13+46 TO 14+91	17	
-Y3-	14+91 TO 16+87	5	29
-Y4-	10+00 TO 12+63	6	29
-Y5-	10+00 TO 12+89	6	29
-Y7-	13+52 TO 16+37	9	29
-Y8-	10+00 TO 10+50	9	29
-Y8-	10+50 TO 11+04	18	29
-Y9-	10+00 TO 14+50	19	29
-Y9-	14+50 TO 16+75	10	29
-Y10-	10+00 TO 11+50	10	30
-Y10-	11+50 TO 15+72	20	30
-Y11-	10+00 TO 12+14	11	30
-Y12-	10+00 TO 13+38	11	
-Y13-	10+00 TO 11+40	11	30
-Y13-	11+40 TO 14+52	21	30
-Y14-	10+00 TO 12+70	22	30
-Y14-	12+70 TO 14+07	12	30
-Y14A-	10+00 TO 12+28	12	30
-Y15-	10+00 TO 12+99	13	30
-Y15-	14+91 TO 17+88	23	
-Y16-	10+00 TO 14+26	24	
-Y16-	14+26 TO 18+04	15	31
-Y17-	10+00 TO 11+59	7	31
-Y18-	10+00 TO 12+35	9	31
-Y18-	12+35 TO 16+22	18	
-Y20-	10+58 TO 12+52	12	31
-Y21-	13+96 TO 18+57	14	
-Y21RPA-	12+88 TO 15+02	14	31
-Y21RPB-	10+00 TO 15+50	23	31
-Y21RPB-	15+50 TO 16+91	14	31
-Y21LPB-	10+00 TO 11+03	14	
-Y21LPB-	12+43 TO 18+50	23	31
-Y21LPB-	18+50 TO 19+97	14	31
-Y21RPD-	10+00 TO 15+24	24	32
-Y21RPD-	15+24 TO 17+88	15	32

ROADWAY
SUBSURFACE INVESTIGATION

COUNTY HAYWOOD

PROJECT DESCRIPTION RUSS AVE - US 276 FROM
US 23 /74 (GREAT SMOKY MOUNTAINS EXPWY)
TO US 23 BUS (N MAIN ST)

INVENTORY

LINE	STATION	PLAN	PROFILE
-Y21LPD-	10+00 TO 11+36	14	32
-Y21LPD-	13+56 TO 17+80	24	32
-Y21LPD-	17+80 TO 20+28	15	32

CROSS SECTIONS

LINE	STATION	SHEETS
-L-	10+50 TO 12+00	33 TO 34
-L-	25+50 TO 27+00	35 TO 36
-L-	28+00 TO 29+00	37 TO 38
-L-	30+00 TO 31+00	39 TO 40
-L-	32+00 TO 33+00	41 TO 42
-L-	47+00 TO 50+00	43 TO 45
-Y2-	10+50 TO 11+50	46
-Y2A-	14+00 TO 15+00	47

APPENDIX

TITLE	SHEETS
SOIL TEST RESULTS	48 TO 49

REFERENCE: U-5839

PROJECT: 50230

Prepared in the Office of:



3201 SPRING FOREST ROAD
RALEIGH, NC 27616
(919) 872-2660



DocuSigned by:

Stewart Laney

75BB4AB1AB3B4CB...

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

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			
	A-1	A-3	A-2	A-2-4	A-2-5	A-2-6	A-2-7	A-4	A-5	A-6	A-7	A-1, A-2	A-3	A-4, A-5	A-6, A-7			
GROUP CLASS.	A-1-a	A-1-b	A-2-4	A-2-5	A-2-6	A-2-7		A-4	A-5	A-6	A-7	A-1, A-2	A-3	A-4, A-5	A-6, A-7			
SYMBOL																		
% PASSING #10 #40 #200	50 MX 30 MX 15 MX	50 MX 25 MX	51 MN 35 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	36 MN	36 MN					
MATERIAL PASSING #40 LL PI	-	-	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 11 MN	41 MN 11 MN	40 MX 11 MN	41 MN 11 MN								
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	UNSATURABLE					

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 RESISTANCE (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 OPENING (MM)	4	10	40	60	200	270
	4.75	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.)						

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
LL - LIQUID LIMIT	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
PL - PLASTIC LIMIT	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
OM - OPTIMUM MOISTURE SHRINKAGE LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
SL - SHRINKAGE LIMIT	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

NON PLASTIC	PLASTICITY INDEX (PI)	DRY STRENGTH
SLIGHTLY PLASTIC	0-5	VERY LOW
MODERATELY PLASTIC	6-15	SLIGHT
HIGHLY PLASTIC	16-25	MEDIUM
	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
- 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
- DIP & DIP DIRECTION OF ROCK STRUCTURES
- TEST BORING
- AUGER BORING
- CORE BORING
- 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 - COANE 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
- UNIT WEIGHT
- DRY UNIT WEIGHT
- SAMPLE ABBREVIATIONS
- S - BULK
- SS - SPLIT SPOON
- ST - SHELBY TUBE
- RS - ROCK
- RT - RECOMPACTED TRIAXIAL
- CBR - CALIFORNIA BEARING RATIO

EQUIPMENT USED ON SUBJECT PROJECT

- DRILL UNITS:
 - CME-45C
 - CME-55
 - CME-550
 - VANE SHEAR TEST
 - PORTABLE HOIST
 - CME-750
- ADVANCING TOOLS:
 - CLAY BITS
 - 6" CONTINUOUS FLIGHT AUGER
 - 8" HOLLOW AUGERS
 - HARD FACED FINGER BITS
 - TUNG-CARBIDE INSERTS
 - CASING W/ ADVANCER
 - TRICONE * STEEL TEETH
 - TRICONE * TUNG-CARB.
 - CORE BIT
 - 3 1/4" HOLLOW AUGERS
- HAMMER TYPE:
 - AUTOMATIC MANUAL
- CORE SIZE:
 - B -H
 - N -Q
- HAND TOOLS:
 - POST HOLE DIGGER
 - HAND AUGER
 - SOUNDING ROD
 - VANE SHEAR TEST

ROCK DESCRIPTION

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

- WEATHERED ROCK (WR)
NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.
- CRYSTALLINE ROCK (CR)
FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
- NON-CRYSTALLINE ROCK (NCR)
FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD 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 (IV 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 (IV 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 GROUDED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
- SOFT** - CAN BE GROUDED 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 FINGER NAIL.

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

- 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 DISLOADED 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.
- SLICKENISE** - 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.

BENCH MARK: ELEVATIONS TAKEN FROM TIN FILE "u5839_Is_tin.tin", DATED 03/19/2019

ELEVATION: N/A FEET

NOTES:

FIAD - FILLED IMMEDIATELY AFTER DRILLING

09/20/19

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

HAYWOOD COUNTY

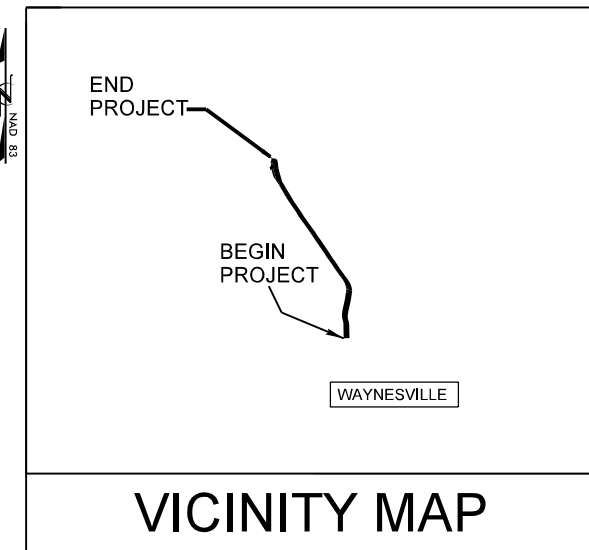
LOCATION: RUSS AVE - US 276 FROM US 23/74 (GREAT SMOKY MOUNTAINS EXPWY) TO US 23 BUS (N MAIN ST)

TYPE OF WORK: GRADING, DRAINAGE, PAVING, SIGNALS, STRUCTURES, AND CULVERT

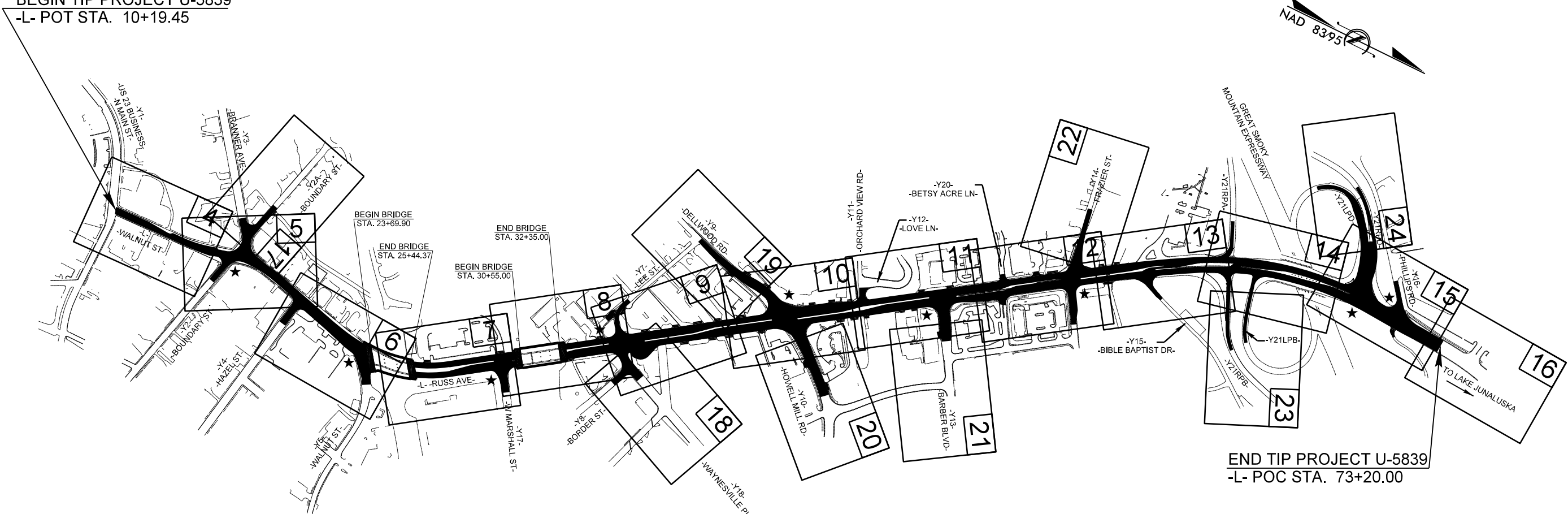
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5839	3	49
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
50230.1.1		P.E.	
50230.2.1		RW, UTL.	

★ UPGRADE EXISTING SIGNAL

TIP PROJECT: U-5839



BEGIN TIP PROJECT U-5839
-L- POT STA. 10+19.45

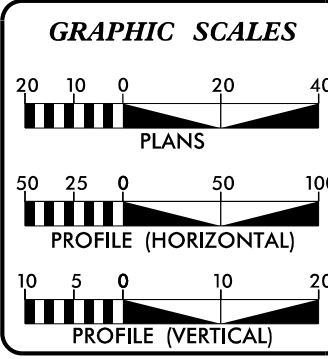


END TIP PROJECT U-5839
-L- POC STA. 73+20.00

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF THE TOWN OF WAYNESVILLE. THERE IS NO CONTROL OF ACCESS ON THIS PROJECT EXCEPT INTERCHANGES & U-TURN BULBS HAVE FULL CONTROL OF ACCESS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CONTRACT:



DESIGN DATA

ADT 2021 =	26,650
ADT 2041 =	30,150
K =	8 %
D =	55 %
T =	4 % *
V =	40 MPH
* TTST = 1% DUAL 3%	
FUNC CLASS =	URBAN ARTERIAL
STATEWIDE TIER	

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-5839	1.126 Miles
LENGTH STRUCTURE TIP PROJECT U-5839	0.067 Miles
TOTAL LENGTH TIP PROJECT U-5839	1.193 Miles

Prepared In the Office of:

CALYX
ENGINEERS + CONSULTANTS NC License # F-1333

FOR THE NORTH CAROLINA DEPT. OF TRANSPORTATION
2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JUNE 3, 2019

LETTING DATE:
MAY 18, 2021

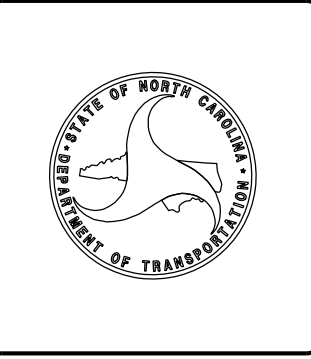
NCDOT CONTACT:
JOSH DEYTON, PE
DIVISION PROJECT ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: _____ P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: _____ P.E.



19-AUG-2019 16:00
C:\Projects\2016\Trans\1305-16-028 - NCDOT - Russ Avenue (U-5839)\U5839_GEO_RDWY\CADD_GEO\TECH\Plan\Prof\U-5839_RDY_TSH_INV.dgn
\$\$\$\$\$USERNAME\$\$\$\$



September 20, 2019

STATE PROJECT: 50230.1.1 (U-5839)
FEDERAL PROJECT: N/A
COUNTY: Haywood
DESCRIPTION: Russ Ave – US 276 from US 23/74 (Great Smoky Mountains Expwy) to US 23 BUS (N Main St)
SUBJECT: Geotechnical Report – Inventory

S&ME, Inc. has completed a reconnaissance and subsurface investigation for the above roadway project and presents the following inventory:

◆ **Project Description**

The project will widen approximately 1.2 miles of US 276/Russ Avenue (-L-) in the Town of Waynesville, as well as adding bicycle lanes and sidewalks. The type of work being performed includes grading, drainage, paving, signals, structures, and culvert. Some of the major Y-alignments along this project include Boundary Street (-Y2- and -Y2A-), Dellwood Road (-Y9-), Howell Mill Road (-Y10-), Frazier Street (-Y14- and -Y14A-), and loops and ramps associated with the interchange of -L- and US 23/74/Great Smoky Mountains Expressway (-Y21-). Many of the other Y-alignments are minor side streets and driveways with minimal construction and were not investigated extensively due to their nature. Nearby information from surrounding borings was used to infer the stratigraphy for some of the Y-alignments included in this report.

The geotechnical field investigation was conducted in May and June of 2019. All Standard Penetration Test borings during this investigation were performed using a truck-mounted CME-55 drilling machine equipped with an automatic hammer. Representative soil samples were collected for visual classification in the field and selected samples were submitted for laboratory analysis by the S&ME soils lab. Soil test results are referenced back to the original alignment to which the boring was assigned during layout and drilling.

The following alignments, totaling approximately 1.6 miles, were investigated. Subsurface profiles and selected cross-sections of the following alignments are included in this report:

<u>Alignment</u>	<u>Station(s)</u>
-L-	10+19 to 73+20
-Y2-	10+12 to 11+50
-Y2A-	14+00 to 15+11

<u>Alignment</u>	<u>Station(s)</u>
-Y3-	15+00 to 16+75
-Y4-	10+14 to 11+00
-Y5-	10+45 to 12+05
-Y7-	14+20 to 16+01
-Y8-	10+20 to 10+75
-Y9-	11+30 to 16+37
-Y10-	10+38 to 13+84
-Y11-	11+20 to 11+78
-Y12-	10+76 to 13+31
-Y13-	10+36 to 12+00
-Y14-	10+72 to 13+66
-Y14A-	10+36 to 12+06
-Y15-	10+43 to 11+74
-Y16-	15+95 to 17+62
-Y17-	10+36 to 11+42
-Y18-	10+36 to 11+86
-Y20-	11+88 to 12+16
-Y21RPA-	13+04 to 14+66
-Y21RPB-	13+05 to 16+55
-Y21LPB-	16+50 to 19+61
-Y21RPD-	12+52 to 17+52
-Y21LPD-	13+75 to 19+92

◆ **Areas of Special Geotechnical Interest**

- 1. Soft cohesive soils:** Soft (N<5), cohesive soils were encountered at the following borehole locations:

<u>Alignment</u>	<u>Station</u>	<u>Offset</u>
-L-	11+00	8' LT
-L-	15+00	20' LT
-L-	22+60	6' RT
-L-	23+84	55' RT
-L-	25+81	17' LT
-L-	29+20	60' LT
-L-	47+00	60' LT
-L-	49+20	55' LT
-L-	49+33	50' RT
-L-	49+90	53' LT
-L-	56+50	90' LT
-L-	65+00	45' LT

<u>Alignment</u>	<u>Station</u>	<u>Offset</u>
-L-	70+00	30' RT
-Y2A-	14+00	10' LT
-Y5-	11+25	40' RT
-Y9-	12+00	41' RT
-Y9-	13+60	56' RT
-Y9-	14+15	73' RT
-Y10-	11+00	67' RT
-Y10-	12+00	72' RT
-Y14-	11+00	25' LT
-Y14A-	11+30	9' LT
-Y21RPD-	17+00	15' RT

2. Loose sands: Loose (N<11) sandy soils were encountered at the following borehole locations:

<u>Alignment</u>	<u>Station</u>	<u>Offset</u>
-L-	15+00	20' LT
-L-	23+84	55' RT
-L-	25+81	17' LT
-L-	25+82	21' RT
-L-	26+60	60' LT
-L-	28+50	90' RT
-L-	30+42	42' RT
-L-	30+49	22' LT
-L-	31+75	20' RT
-L-	32+50	9' RT
-L-	42+00	22' RT
-L-	52+20	57' RT
-Y2-	11+00	12' LT
-Y7-	15+50	15' LT
-Y9-	13+60	56' RT
-Y9-	14+15	73' RT
-Y13-	11+50	35' LT
-Y14-	13+70	30' RT
-Y21RPB-	15+00	42' LT

3. Highly plastic clays: Highly plastic (P.I.>25) clay was encountered at the following borehole locations:

<u>Alignment</u>	<u>Station</u>	<u>Offset</u>
-L-	11+00	8' LT
-Y2A-	14+00	10' LT

4. Artificial Fill: Artificial Fill soils were encountered in the following areas:

<u>Alignment</u>	<u>Station</u>	<u>Offset</u>
-L-	26+60 to 30+00	LT

◆ Physiography and Geology

The project corridor is located in western North Carolina, in the Blue Ridge Physiographic Province. The project corridor is urban and is generally surrounded by homes and businesses. The project is within the city limits of Waynesville, with the city's center being due south from the project corridor. Topography along the project corridor is sloping. Elevations along the project range from 2,625± to 2,735± feet above sea level.

Surficial soils in the project area are classified as Roadway Embankment, Artificial Fill, Alluvial, or Residual soil. The rock underlying these surficial soils consists of biotite gneiss and amphibolite. Geologically, the project is located within the Blue Ridge Belt, which contains the oldest rocks in North Carolina. The Blue Ridge Belt consists of igneous, sedimentary, and metamorphic rocks that have been repeatedly fractured, folded, and faulted throughout geologic time. These rocks are Cambrian to Proterozoic in age.

◆ Water Bodies

1. Streams: Richland Creek flows northeast across the vicinity of the project. The stream flows across -L- underneath a bridge located at station 31+45.

◆ Soil Properties

Soils encountered during this investigation are separated into four categories: Roadway Embankment, Artificial Fill, Alluvial, and Residual soils.

Roadway Embankment soils consist of loose to very dense, brown, gray, tan, and red gravelly sand, silty sand, and clayey sand, and soft to very stiff, brown, red and gray sandy silt, clayey silt, and moderately plastic silty clay.

Artificial Fill soils consist of medium dense, tan and brown silty sand and medium stiff to stiff, brown sandy silt.

Alluvial sediments consist of loose to medium dense, gray, red, and brown silty sand and soft to medium stiff, gray, tan, and brown sandy silt and sandy clay.

Residual soils consist of very loose to very dense, gray, brown, white, orange, and tan gravelly sand, silty sand, and clayey sand, and soft to hard, gray, white, orange, red, tan, pink, and brown sandy silt, clayey silt, slightly plastic sandy clay, and moderately to highly plastic silty clay.

◆ **Rock Properties**

Rock encountered during this investigation is separated into two categories: Weathered Rock and Crystalline rock. Weathered Rock was first encountered at depths ranging from 3.0 to 53.5 feet below the existing ground surface, and Crystalline Rock was first encountered at depths ranging from 10.0 to 68.5 feet below the existing ground surface. The crystalline rock encountered during this investigation is classified as medium hard to hard, slightly to moderately weathered biotite gneiss with close fracture spacing. The average core recovery achieved is 85.6%, and the average Rock Quality Designation is 26.6%. These figures are taken from core borings performed as part of the bridge investigation for this project.

◆ **Groundwater Properties**

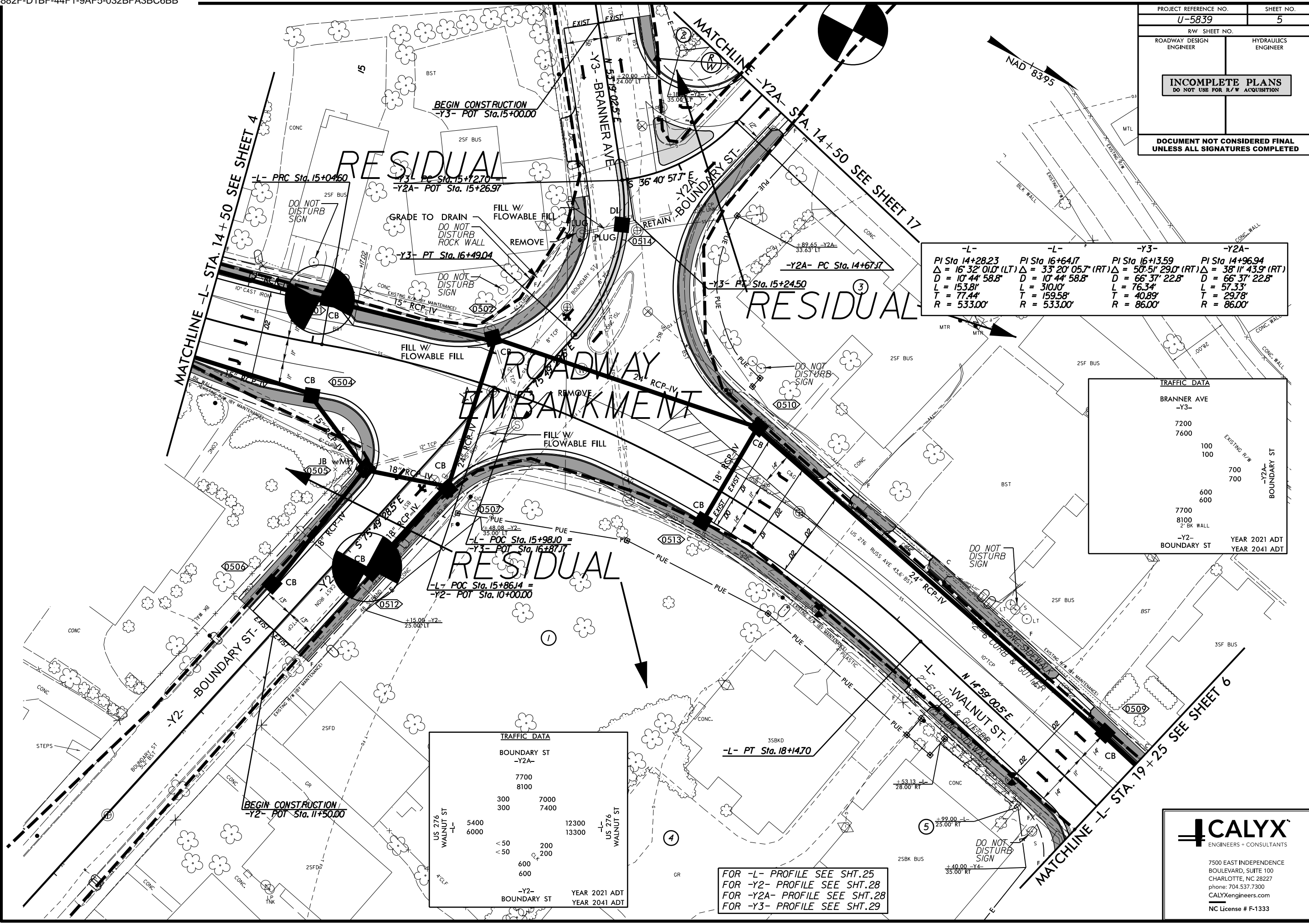
All borings were backfilled immediately upon completion of drilling, due to being drilled through the existing roadway. Groundwater was encountered at depths ranging from 7.0' to 26.9' at the time of drilling.

Respectfully Submitted,



Matthew L. Hartman, GIT
Geotechnical Staff Professional

PROJECT REFERENCE NO.	SHEET NO.
U-5839	5
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



-L-	-L-	-Y3-	-Y2A-
PI Sta 14+28.23	PI Sta 16+64.77	PI Sta 16+13.59	PI Sta 14+96.94
$\Delta = 16^{\circ} 32' 01.0''$ (LT)	$\Delta = 33^{\circ} 20' 05.7''$ (RT)	$\Delta = 50^{\circ} 51' 29.0''$ (RT)	$\Delta = 38^{\circ} 11' 43.9''$ (RT)
D = 10' 44' 58.8"	D = 10' 44' 58.8"	D = 66' 37' 22.8"	D = 66' 37' 22.8"
L = 153.81'	L = 310.10'	L = 76.34'	L = 57.33'
T = 77.44'	T = 159.58'	T = 40.89'	T = 29.78'
R = 533.00'	R = 533.00'	R = 86.00'	R = 86.00'

TRAFFIC DATA	
BRANNER AVE -Y3-	
7200	EXISTING R/W
7600	
100	-Y2A- BOUNDARY ST
100	
700	-Y2- BOUNDARY ST
700	
600	YEAR 2021 ADT
600	
7700	YEAR 2041 ADT
8100	
2' BK WALL	

TRAFFIC DATA	
BOUNDARY ST -Y2A-	
7700	US 276 WALNUT ST
8100	
300	-Y2- BOUNDARY ST
300	
7000	YEAR 2021 ADT
7400	
12300	YEAR 2041 ADT
13300	
< 50	US 276 WALNUT ST
< 50	
200	YEAR 2021 ADT
200	
600	YEAR 2041 ADT
600	

FOR -L- PROFILE SEE SHT.25
 FOR -Y2- PROFILE SEE SHT.28
 FOR -Y2A- PROFILE SEE SHT.28
 FOR -Y3- PROFILE SEE SHT.29

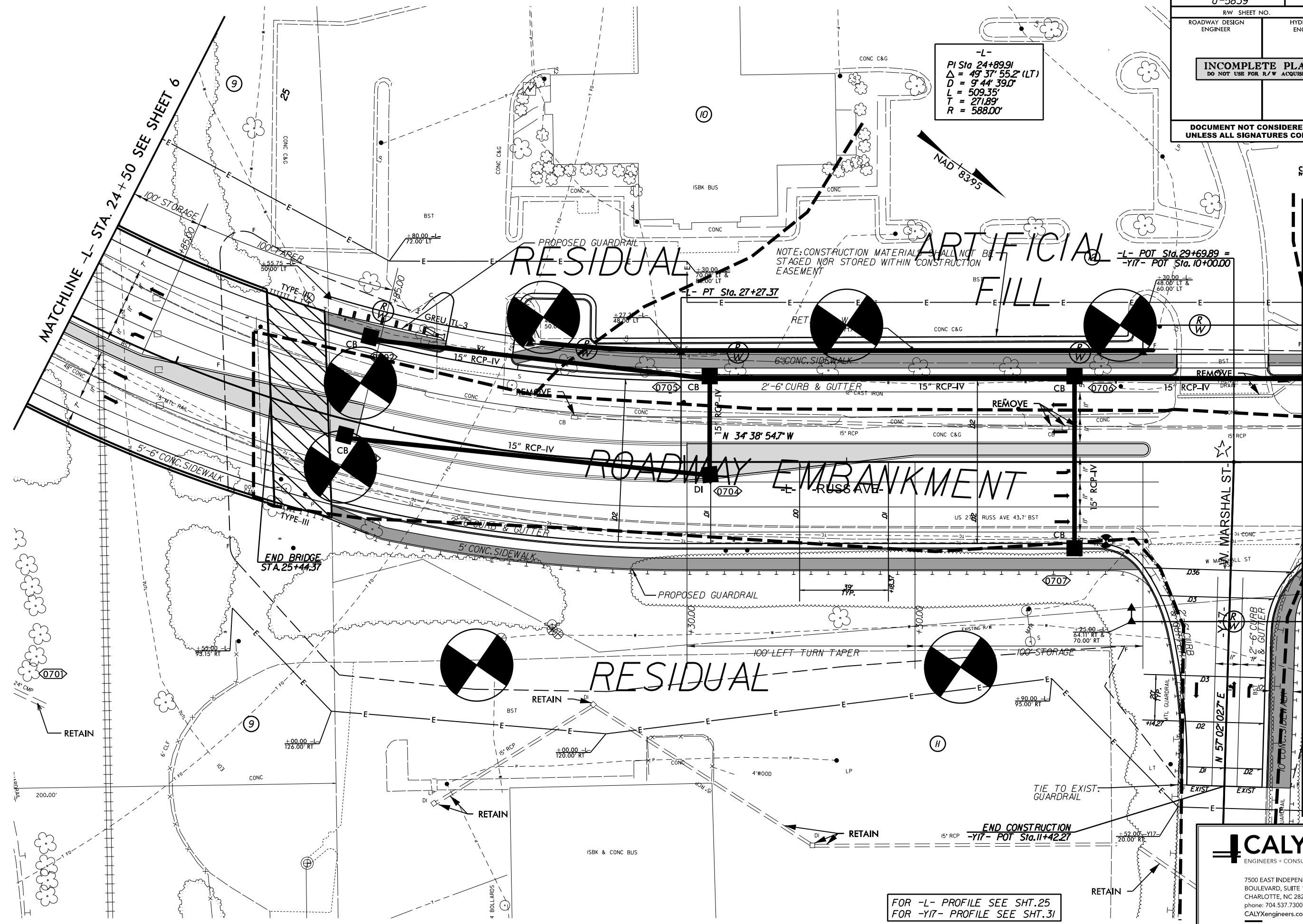
CALYX
 ENGINEERS + CONSULTANTS

7500 EAST INDEPENDENCE BOULEVARD, SUITE 100
 CHARLOTTE, NC 28227
 phone: 704.537.7300
 CALYXengineers.com
 NC License # F-1333

8/17/19
 14-AUG-2019 09:51
 Z:\Projects\2016\Trans\1305-16-028 - NCDOT - Russ Avenue (U-5839)\U5839_GEO_RDWY\CADD_GEO\TECH\Plan\Prof\U5839_RDY_PSH_05.dgn
 3:53:51 PM
 8/17/19

8/17/19
14-AUG-2019 09:51
Z:\Projects\1305-16-028 - NCDOT - Russ Avenue (U-5839)\U5839_GEO_RDWY\CADD_GEO\TECH\Plan\Prof\U5839_RDY_PSH_07.dgn

PROJECT REFERENCE NO. U-5839	SHEET NO. 7
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



-L-
 PI Sta 24+89.91
 $\Delta = 49^\circ 37' 55.2''$ (LT)
 $D = 9' 44'' 39.0''$
 $L = 509.35'$
 $T = 271.89'$
 $R = 588.00'$

FOR -L- PROFILE SEE SHT. 25
 FOR -Y17- PROFILE SEE SHT. 31

CALYX
 ENGINEERS + CONSULTANTS

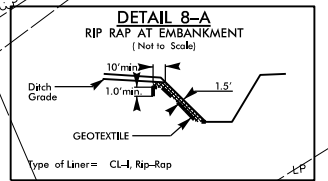
7500 EAST INDEPENDENCE BOULEVARD, SUITE 100
 CHARLOTTE, NC 28227
 phone: 704.537.7300
 CALYXengineers.com
 NC License # F-1333

MATCHLINE -L- STA. 24+50 SEE SHEET 6

MATCHLINE -L- STA. 30+00 SEE SHEET 8

PROJECT REFERENCE NO. U-5839	SHEET NO. 8
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

TRAFFIC DATA			
BUSINESS DRIVEWAY			
	100	100	
	< 50	< 50	
	< 50	< 50	
US 276 RUSS AVE	14500	15200	US 276 RUSS AVE
	17000	17700	
	2200	2900	
	2300	3000	
	5200	5400	
-Y18- WAYNESVILLE PL		YEAR 2021 ADT YEAR 2041 ADT	

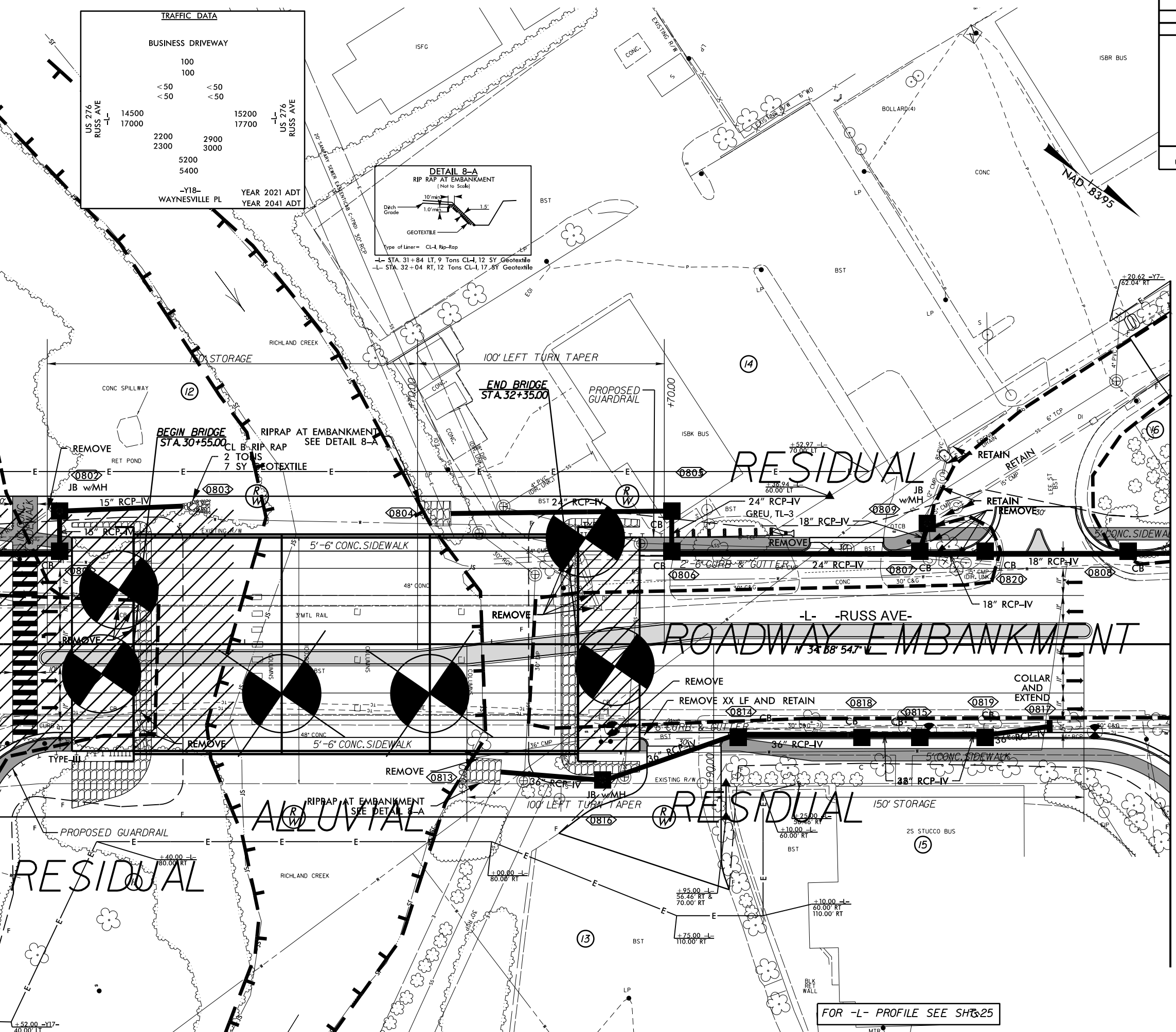


-L- STA. 31+84 LT, 9 Tons CL-1, 12 SY Geotextile
-L- STA. 32+04 RT, 12 Tons CL-1, 17 SY Geotextile

MATCHLINE -L- STA. 30+00 SEE SHEET 7

MATCHLINE -L- STA. 34+75 SEE SHEET 9

14-AUG-2019 09:51
Z:\Projects\2016\Trans\1305-16-028 - NCDOT - Russ Avenue (U-5839)\U5839_GEO_RDWY\CADD_GEO\TECH\Plan\Prof\U5839_RDWY_PSH_08.dgn
8/17/19



FOR -L- PROFILE SEE SH 25

CALYX
ENGINEERS + CONSULTANTS

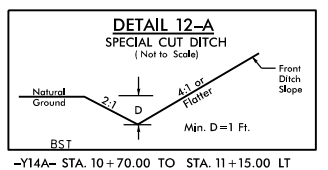
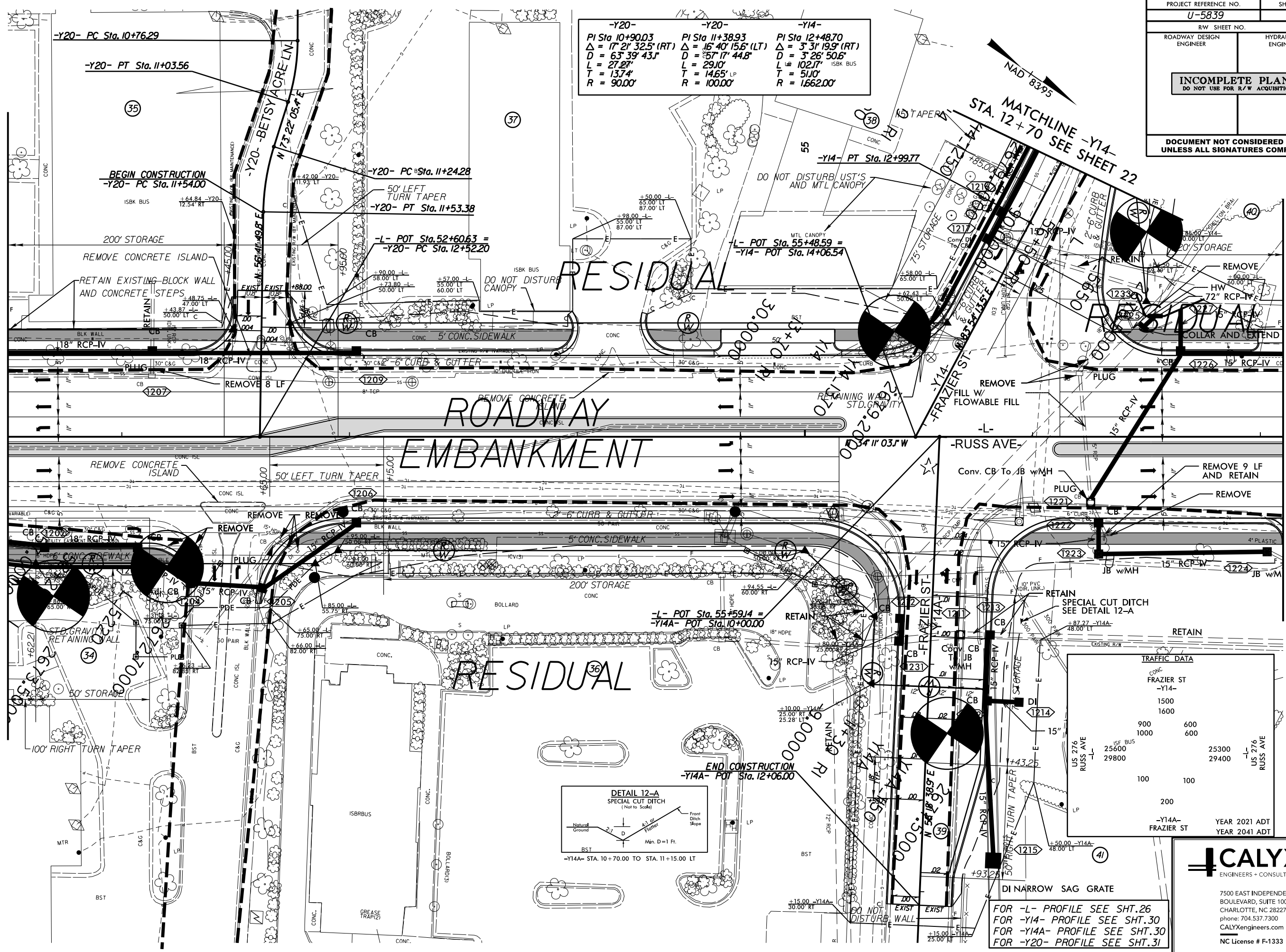
7500 EAST INDEPENDENCE BOULEVARD, SUITE 100
CHARLOTTE, NC 28227
phone: 704.537.7300
CALYXengineers.com
NC License # F-1333

PROJECT REFERENCE NO. U-5839	SHEET NO. 12
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

-Y20-	-Y20-	-Y14-
PI Sta 10+90.03	PI Sta 11+38.93	PI Sta 12+48.70
$\Delta = 17' 2" 32.5' (RT)$	$\Delta = 16' 40" 15.6' (LT)$	$\Delta = 3' 31" 19.9' (RT)$
$D = 63' 39" 43'$	$D = 57' 17" 44.8'$	$D = 3' 26" 50.6'$
$L = 27.27'$	$L = 29.10'$	$L = 102.17'$ ISBK BUS
$T = 13.74'$	$T = 14.65'$ LP	$T = 51.10'$
$R = 90.00'$	$R = 100.00'$	$R = 1662.00'$

MATCHLINE -L- STA. 51 + 50 SEE SHEET 11

MATCHLINE -L- STA. 57 + 10 SEE SHEET 13



TRAFFIC DATA			
CONC.	FRAZIER ST -Y14-	1500	1600
900	1000	600	600
25600	29800	25300	29400
100	100		
200			
-Y14A-	FRAZIER ST	YEAR 2021 ADT	YEAR 2041 ADT

FOR -L- PROFILE SEE SHT.26
FOR -Y14- PROFILE SEE SHT.30
FOR -Y14A- PROFILE SEE SHT.30
FOR -Y20- PROFILE SEE SHT.31

CALYX
ENGINEERS + CONSULTANTS

7500 EAST INDEPENDENCE BOULEVARD, SUITE 100
CHARLOTTE, NC 28227
phone: 704.537.7300
CALYXengineers.com
NC License # F-1333

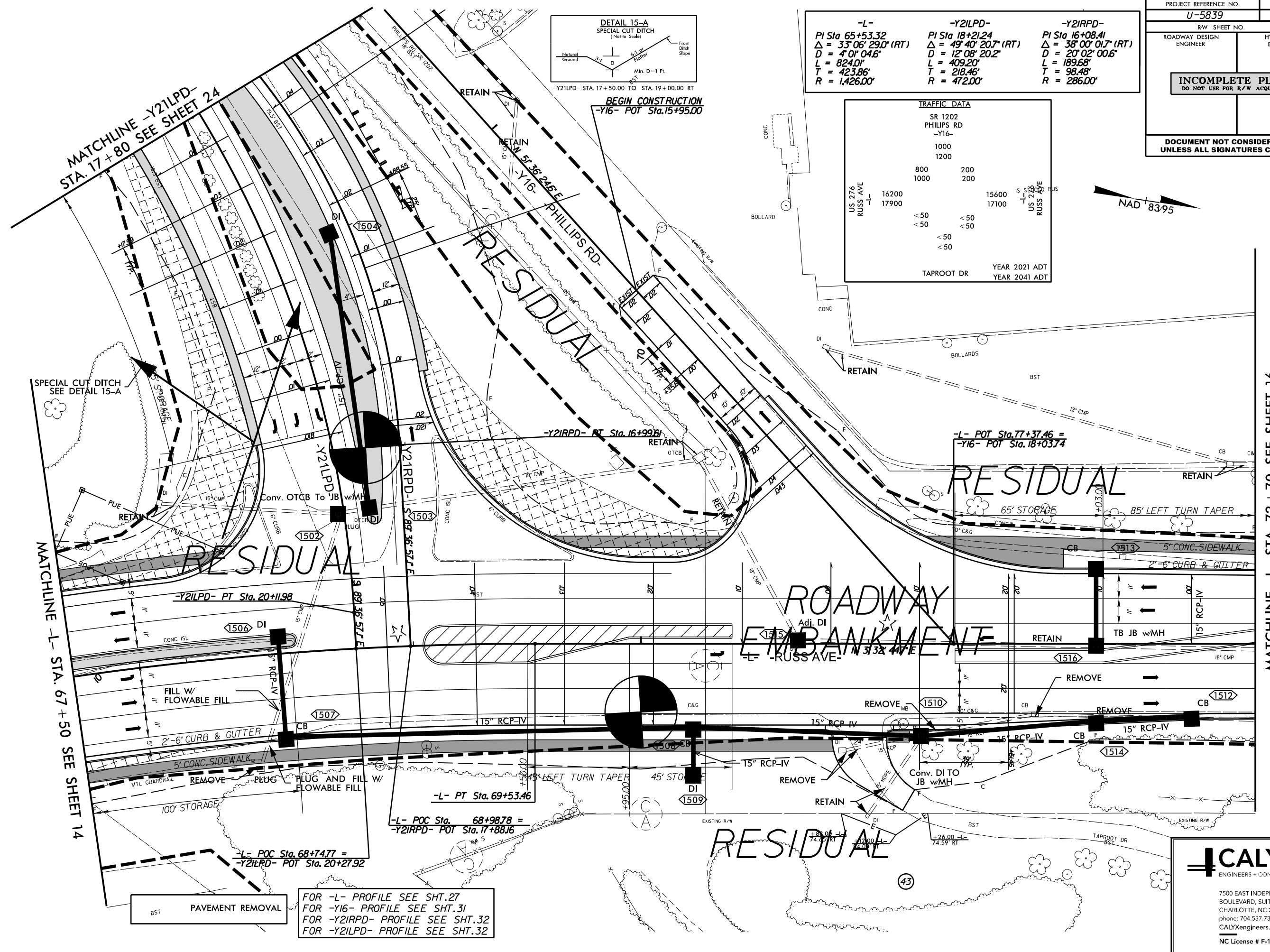
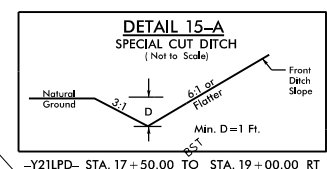
14-AUG-2019 09:51
Z:\Projects\2016\Trans\1305-16-028 - NCDDOT - Russ Avenue (U-5839)\U5839_GEO_RDWY\CADD_GEO\RDWY_Plan\U5839_RDWY_PSH_12.dgn
8/17/19

8/17/19
14-AUG-2019 09:51
Z:\Projects\2016\Trans\1305-16-028 - NCDOT - Russ Avenue (U-5839)\U5839_GEO-RDWAY\CADD_GEO\RDWAY\CADD_GEO\TECH\Plan\Prof\U5839_RDY_PSH_15.dgn

PROJECT REFERENCE NO. U-5839	SHEET NO. 15
R/W SHEET NO.	HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

-L- PI Sta 65+53.32 Δ = 33°06'29.0" (RT) D = 4°01'04.6" L = 824.0' T = 423.86' R = 1,426.00'	-Y2ILPD- PI Sta 18+21.24 Δ = 49°40'20.7" (RT) D = 12°08'20.2" L = 409.20' T = 218.46' R = 472.00'	-Y2IRPD- PI Sta 16+08.41 Δ = 38°00'01.7" (RT) D = 20°02'00.6" L = 189.68' T = 98.48' R = 286.00'
---	--	---

TRAFFIC DATA	
SR 1202 PHILLIPS RD -Y16-	
1000	200
1200	200
US 276 RUSS AVE	US 276 RUSS AVE
16200	15600
17900	17100
< 50	< 50
< 50	< 50
< 50	< 50
TAPROOT DR	YEAR 2021 ADT
	YEAR 2041 ADT



MATCHLINE -Y21LPD- STA. 17+80 SEE SHEET 24

MATCHLINE -L- STA. 67+50 SEE SHEET 14

MATCHLINE -L- STA. 72+70 SEE SHEET 16

FOR -L- PROFILE SEE SHT.27
 FOR -Y16- PROFILE SEE SHT.31
 FOR -Y2IRPD- PROFILE SEE SHT.32
 FOR -Y2ILPD- PROFILE SEE SHT.32

CALYX
ENGINEERS + CONSULTANTS

7500 EAST INDEPENDENCE
BOULEVARD, SUITE 100
CHARLOTTE, NC 28227
phone: 704.537.7300
CALYXengineers.com
NC License # F-1333

8/17/99

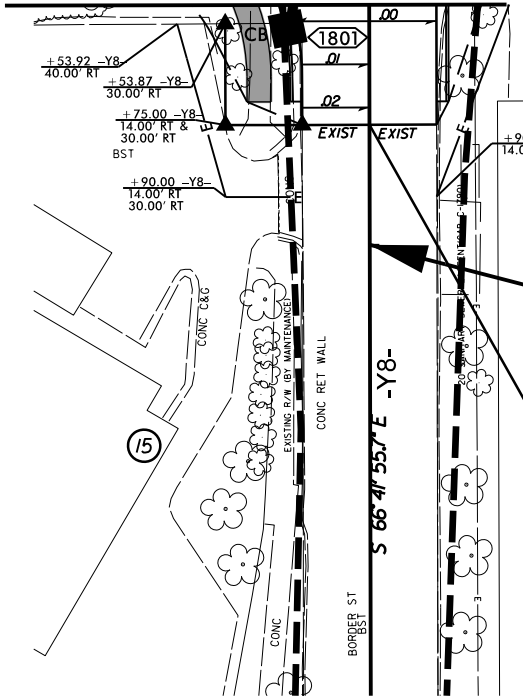
PROJECT REFERENCE NO. U-5839		SHEET NO. 18	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION			
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			

-Y18-
 PI Sta 10+63.21
 $\Delta = 37^{\circ}34'26.1"$ (LT)
 $D = 37^{\circ}12'18.2"$
 $L = 84.86'$
 $T = 43.54'$
 $R = 154.00'$



RESIDUAL

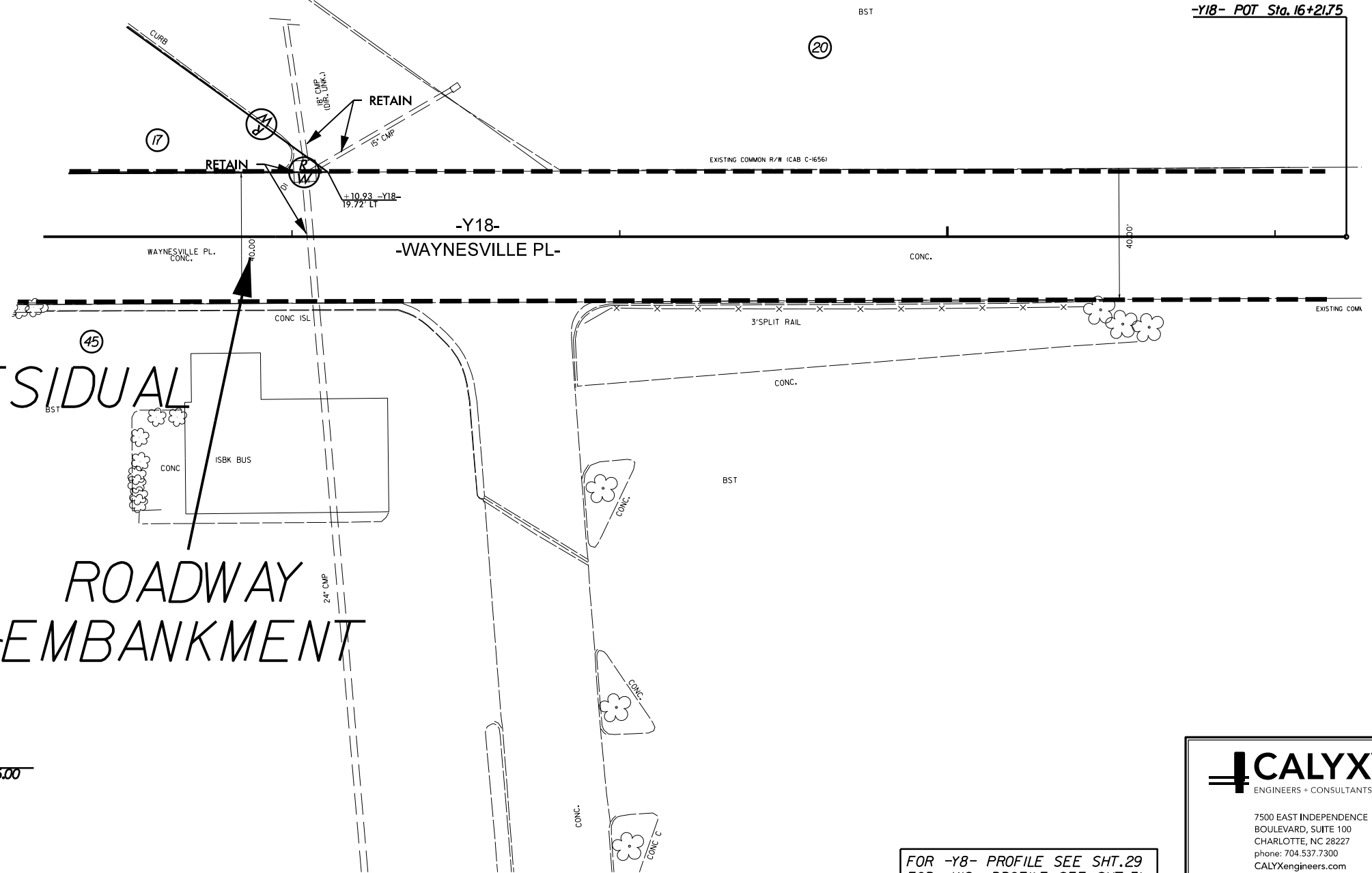
MATCHLINE -Y8- STA. 10+50
SEE SHEET 9



END CONSTRUCTION
 -Y8- POT Sta. 10+75.00

RESIDUAL

ROADWAY EMBANKMENT



FOR -Y8- PROFILE SEE SHT. 29
 FOR -Y18- PROFILE SEE SHT. 31

CALYX
 ENGINEERS + CONSULTANTS

7500 EAST INDEPENDENCE BOULEVARD, SUITE 100
 CHARLOTTE, NC 28227
 phone: 704.537.7300
 CALYXengineers.com
 NC License # F-1333

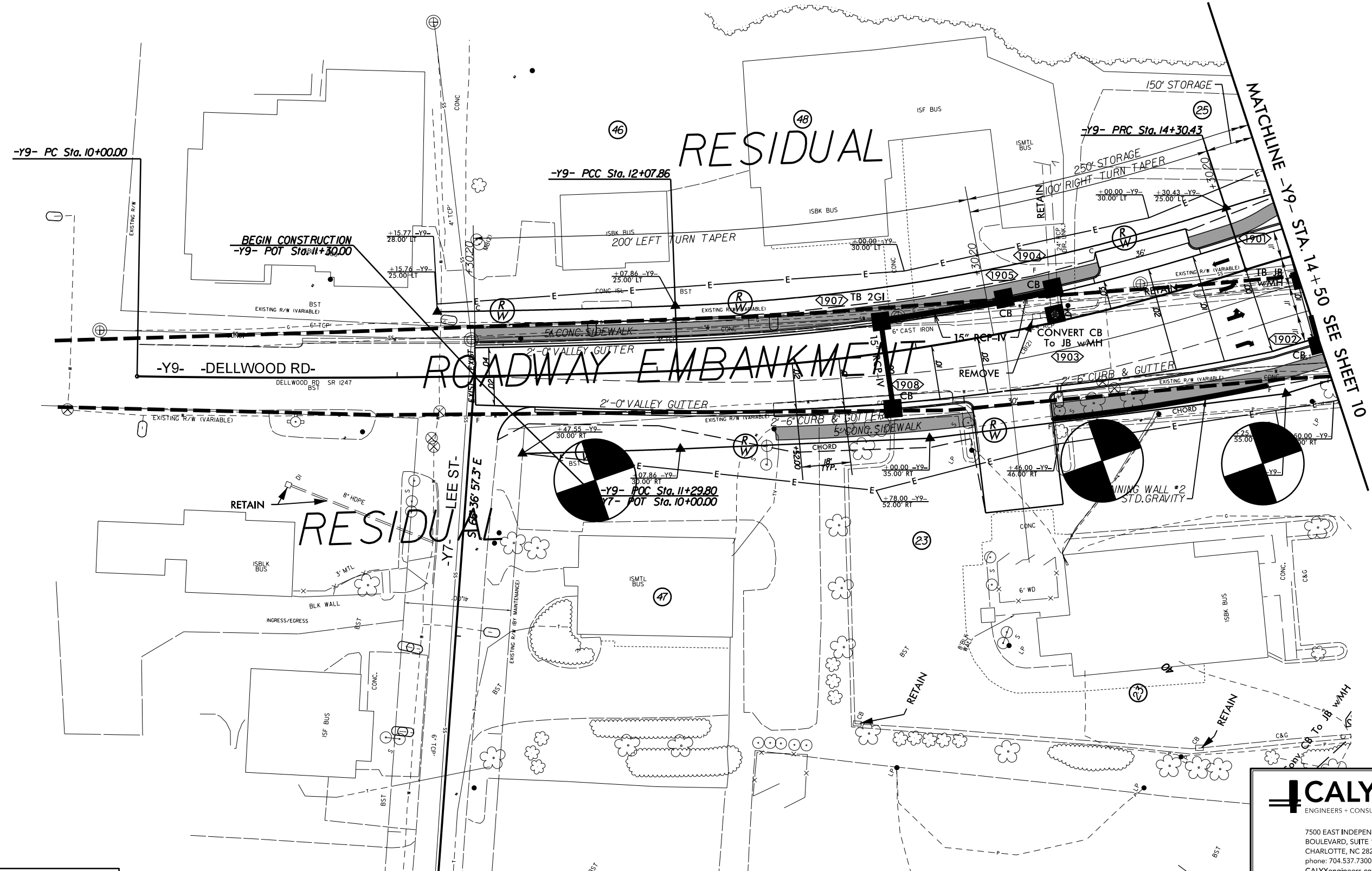
14-AUG-2019 09:51
 Z:\Projects\2016\Trans\1305-16-028 - NCDDOT - Russ Avenue (U-5839)\U5839_GEO_RDWY\CADD_GEO\TECH\PlanProf\U5839_RDY_PSH_18.dgn
 8/17/99

8/17/19

-Y9-	-Y9-	-Y9-
PI Sta 11+03.95	PI Sta 13+19.87	PI Sta 15+48.02
$\Delta = 3^{\circ} 04' 15.7" (LT)$	$\Delta = 15^{\circ} 56' 26.3" (LT)$	$\Delta = 35^{\circ} 10' 22.8" (RT)$
$D = 128' 38.8"$	$D = 709' 43.1"$	$D = 1526' 37.0"$
$L = 207.86'$	$L = 222.57'$	$L = 227.75'$
$T = 103.95'$	$T = 112.01'$	$T = 117.59'$
$R = 3878.00'$	$R = 800.00'$	$R = 371.00'$



PROJECT REFERENCE NO. U-5839	SHEET NO. 19
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



FOR -Y9- PROFILE SEE SHT. 29

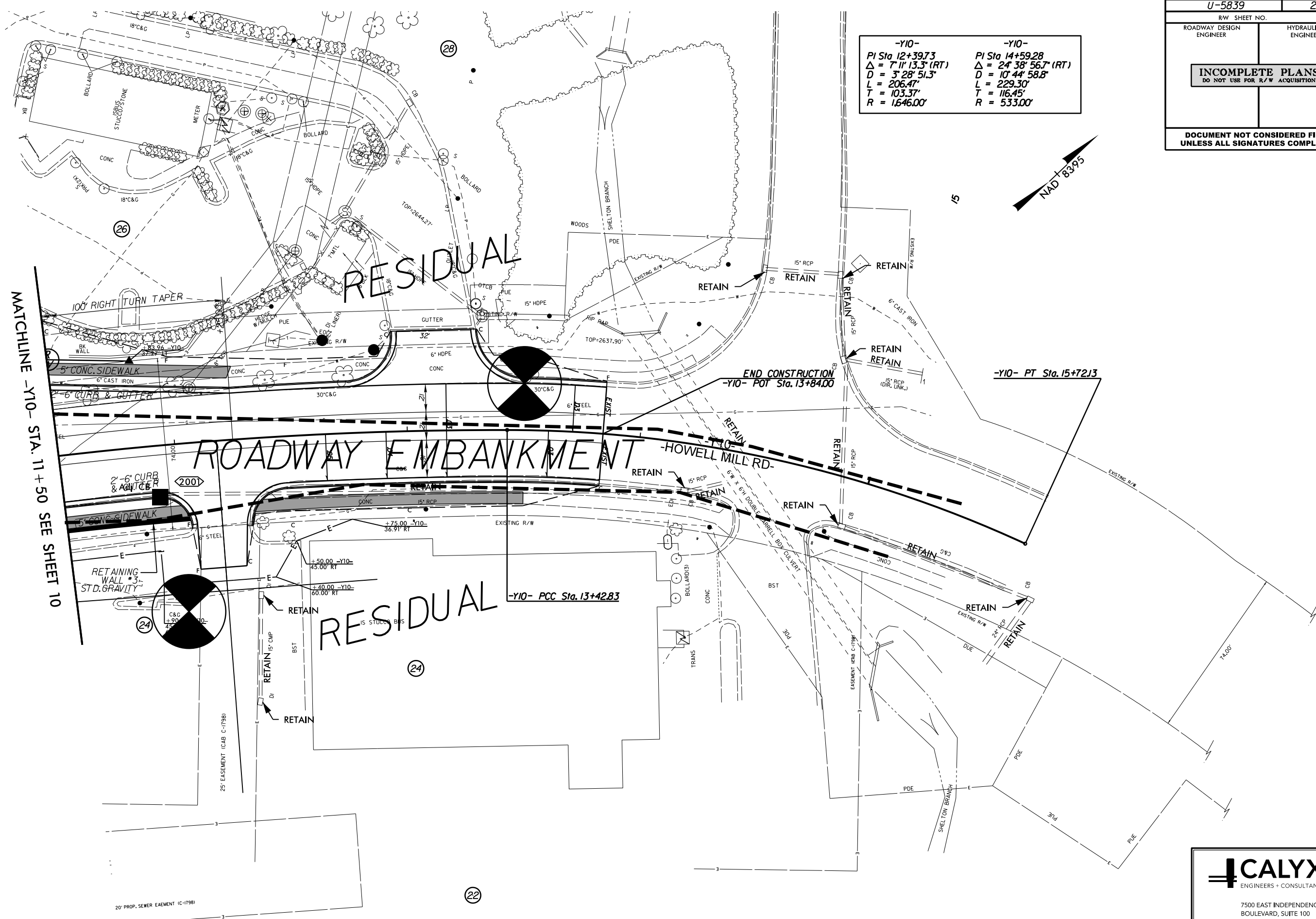
CALYX
ENGINEERS + CONSULTANTS

7500 EAST INDEPENDENCE
BOULEVARD, SUITE 100
CHARLOTTE, NC 28227
phone: 704.537.7300
CALYXengineers.com
NC License # F-1333

14-AUG-2019 09:52
 Z:\Projects\2016\Trans\1305-16-028 - NCDOT - Russ Avenue (U-5839)\U5839_GEO_RDWY\CADD_GEO\RDWY\Plan\U5839_RDY_PSH_19.dgn
 8/17/19

8/17/19
14-AUG-2019 09:52
Z:\Projects\1305-16-028 - NCCDOT - Russ Avenue (U-5839)\U5839_GEO_RDWY\CADD_GEO\TECH\Plan\Prof\U5839_RDWY_PSH_20.dgn
U5839_PSH_20.dgn

PROJECT REFERENCE NO. U-5839	SHEET NO. 20
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



-Y10- PI Sta 12+39.73 Δ = 7' 11" 13.3" (RT) D = 3' 28" 51.3" L = 206.47' T = 103.37' R = 1646.00'	-Y10- PI Sta 14+59.28 Δ = 24' 38" 56.7" (RT) D = 10' 44" 58.8" L = 229.30' T = 116.45' R = 533.00'
---	--

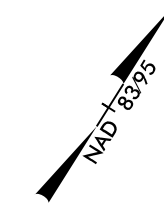
FOR -Y10- PROFILE SEE SHT.30

CALYX
ENGINEERS + CONSULTANTS

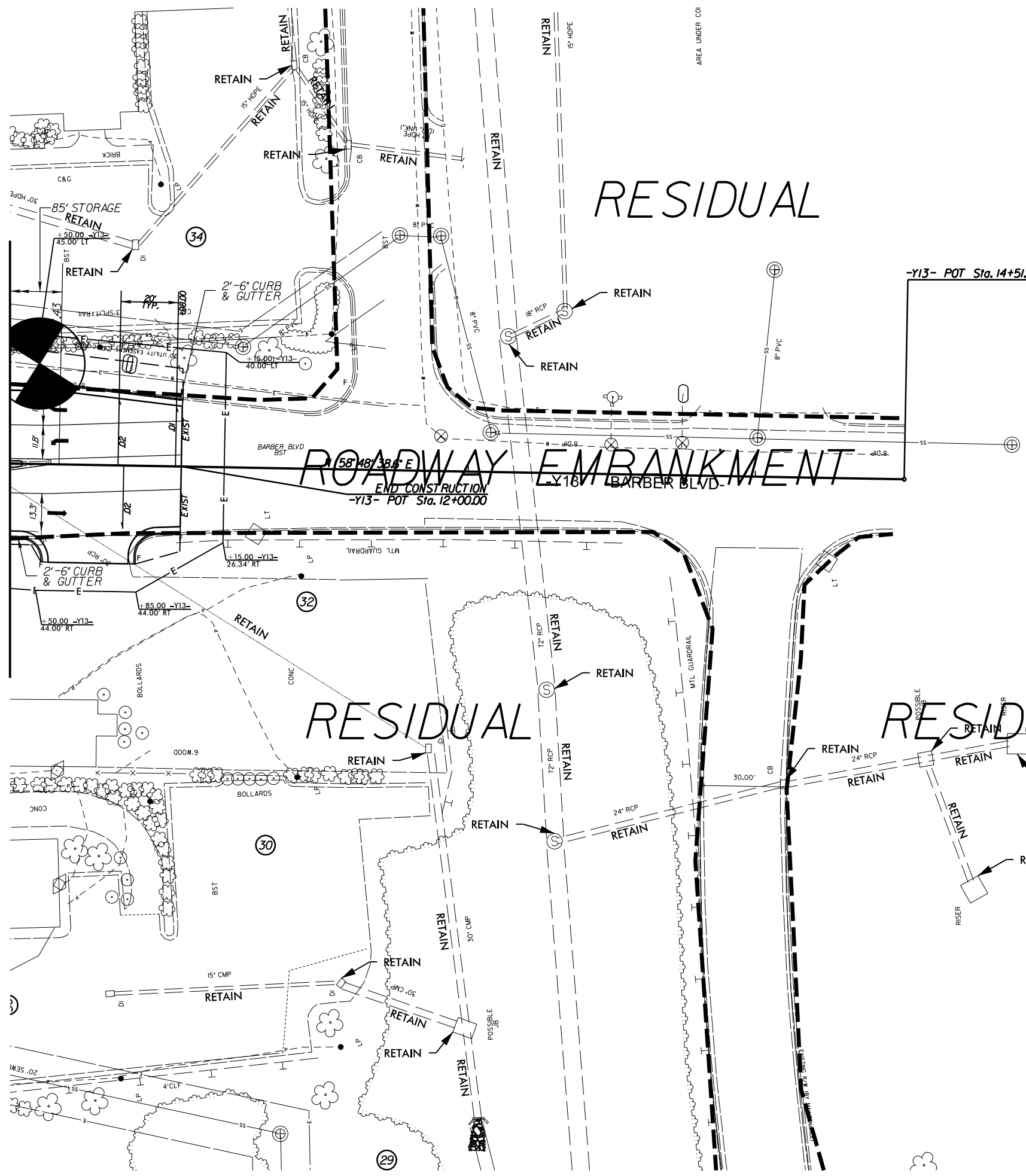
7500 EAST INDEPENDENCE
BOULEVARD, SUITE 100
CHARLOTTE, NC 28227
phone: 704.537.7300
CALYXengineers.com
NC License # F-1333

8/17/19

PROJECT REFERENCE NO. U-5839	SHEET NO. 21
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



MATCHLINE -Y13- STA. 11 + 40 SEE SHEET 11



ROADWAY EMBANKMENT
 END CONSTRUCTION
 -Y13- POT Sta. 12+00.00

-Y13- POT Sta. 14+51.90

RESIDUAL

RESIDUAL

14-AUG-2019 09:52
 Z:\Projects\2016\Trans\1305-16-028 - NCDDOT - Russ Avenue (U-5839)\U5839_GEO_RDWY\CADD_GEO\TECH\Plan\Prof\U5839_RDWY_PSH_21.dgn
 8/17/19

FOR -Y13- PROFILE SEE SHT. 30

CALYX
 ENGINEERS + CONSULTANTS

7500 EAST INDEPENDENCE
 BOULEVARD, SUITE 100
 CHARLOTTE, NC 28227
 phone: 704.537.7300
 CALYXengineers.com
 NC License # F-1333

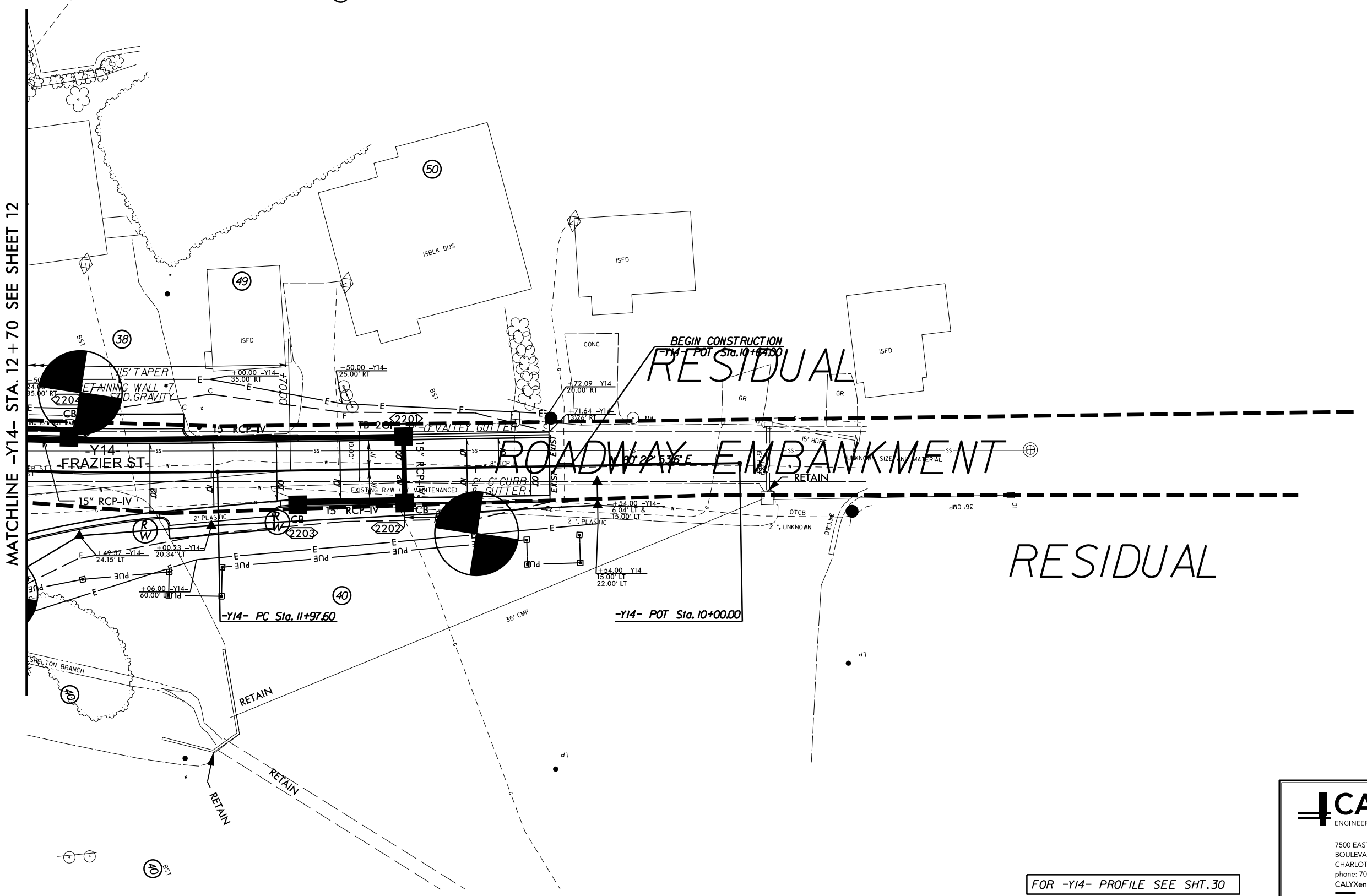
8/17/99

PROJECT REFERENCE NO. U-5839	SHEET NO. 22
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

-Y14-
 PI Sta 12+48.70
 $\Delta = 3' 31' 19.9" (RT)$
 $D = 3' 26' 50.6"$
 $L = 102.17'$
 $T = 51.0'$
 $R = 1,662.00'$



MATCHLINE -Y14- STA. 12 + 70 SEE SHEET 12



RESIDUAL

FOR -Y14- PROFILE SEE SHT. 30

CALYX
 ENGINEERS + CONSULTANTS

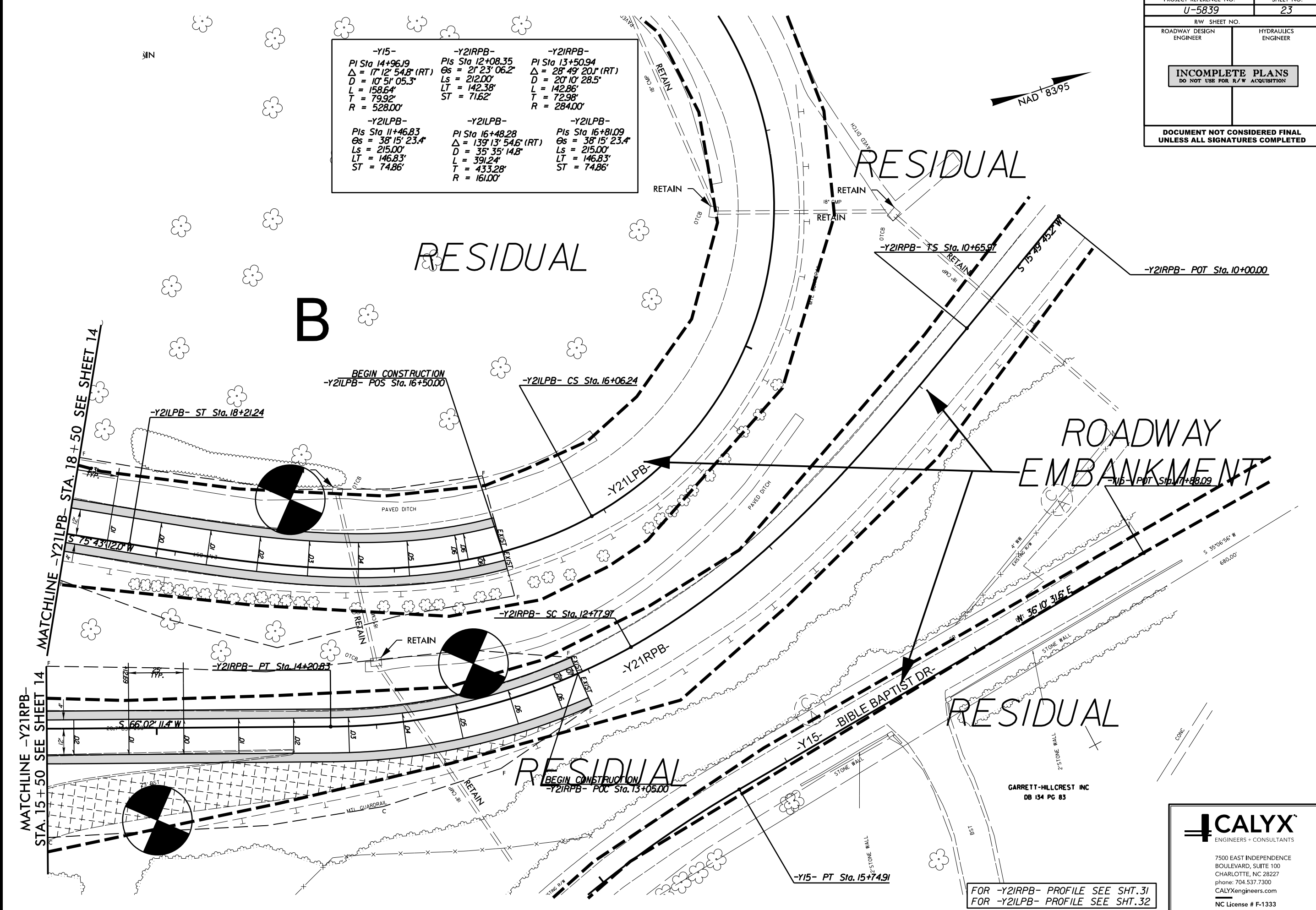
7500 EAST INDEPENDENCE
 BOULEVARD, SUITE 100
 CHARLOTTE, NC 28227
 phone: 704.537.7300
 CALYXengineers.com
 NC License # F-1333

14-AUG-2019 09:52
 Z:\Projects\2016\Trans\1305-16-028 - NCDDOT - Russ Avenue (U-5839)\U5839_GEO_RDWY\CADD_GEO\TECH\Plan\Prof\U5839_RDWY_PSH_22.dgn
 \$\$\$\$

8/17/19

PROJECT REFERENCE NO. U-5839	SHEET NO. 23
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

-Y15- PI Sta 14+96.19 $\Delta = 17^{\circ} 12' 54.8" (RT)$ D = 10' 51' 05.3" L = 158.64' T = 79.92' R = 528.00'	-Y2IRPB- PIs Sta 12+08.35 $\Theta_s = 21^{\circ} 23' 06.2"$ Ls = 212.00' LT = 142.38' ST = 71.62'	-Y2IRPB- PI Sta 13+50.94 $\Delta = 28^{\circ} 49' 20.1" (RT)$ D = 20' 10' 28.5" L = 142.86' T = 72.98' R = 284.00'
-Y2ILPB- PIs Sta 11+46.83 $\Theta_s = 38^{\circ} 15' 23.4"$ Ls = 215.00' LT = 146.83' ST = 74.86'	-Y2ILPB- PI Sta 16+48.28 $\Delta = 139^{\circ} 13' 54.6" (RT)$ D = 35' 35' 14.8" L = 391.24' LT = 433.28' R = 161.00'	-Y2ILPB- PIs Sta 16+81.09 $\Theta_s = 38^{\circ} 15' 23.4"$ Ls = 215.00' LT = 146.83' ST = 74.86'



14-AUG-2019 09:52
Z:\Projects\2016\Trans\1305-16-028 - NCDOT - Russ Avenue (U-5839)\U5839_GEO_RDWY\CADD_GEO\TECH\Plan\Prof\U5839_RDW_PSH_23.dgn

MATCHLINE -Y21RPB- STA. 15+50 SEE SHEET 14

MATCHLINE -Y21LPB- STA. 18+50 SEE SHEET 14

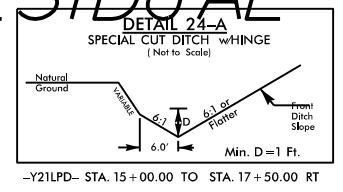
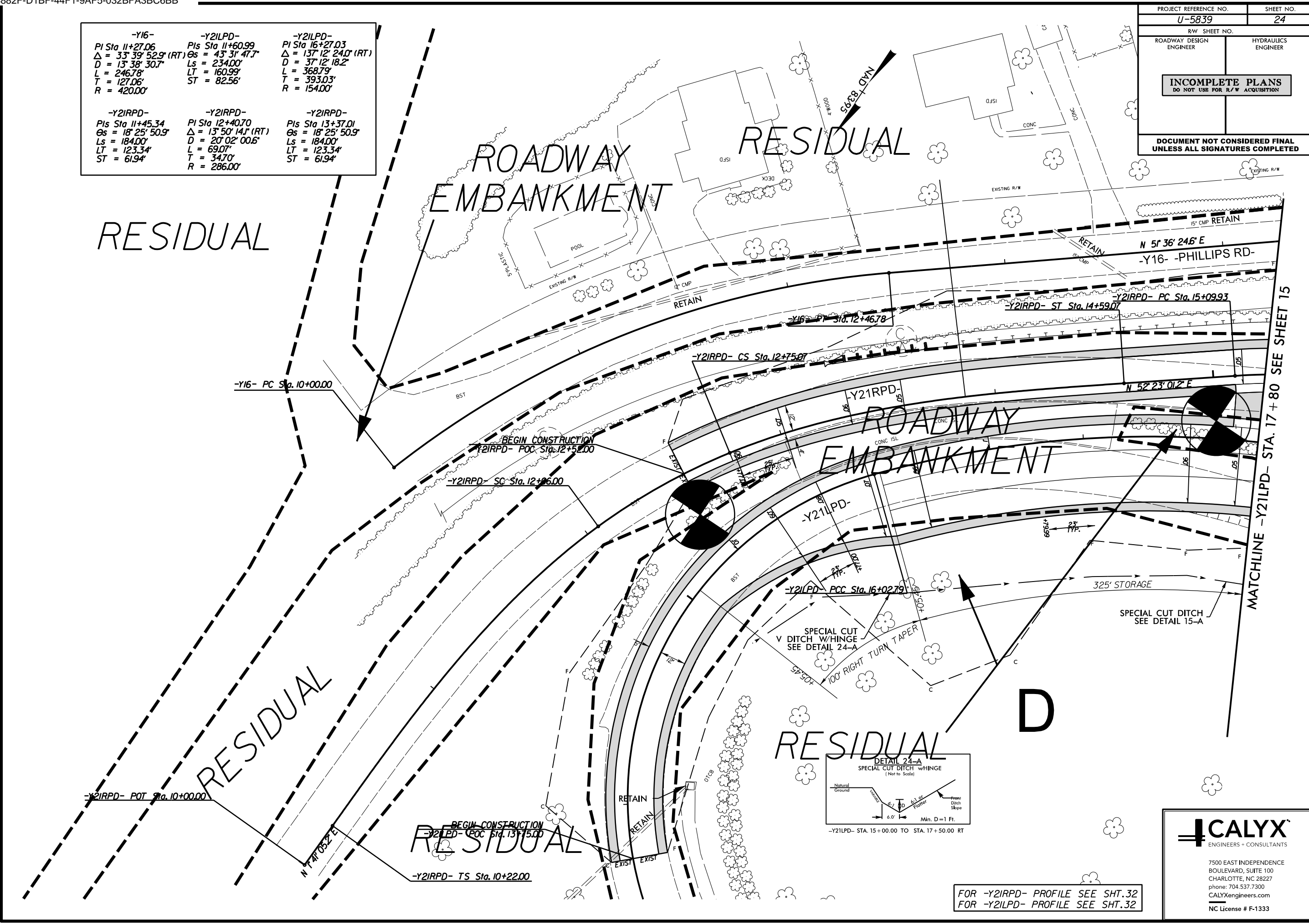
FOR -Y2IRPB- PROFILE SEE SHT. 31
FOR -Y2ILPB- PROFILE SEE SHT. 32

CALYX
ENGINEERS + CONSULTANTS

7500 EAST INDEPENDENCE BOULEVARD, SUITE 100
CHARLOTTE, NC 28227
phone: 704.537.7300
CALYXengineers.com
NC License # F-1333

PROJECT REFERENCE NO. U-5839	SHEET NO. 24
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

-Y16- PI Sta 11+27.06 $\Delta = 33^\circ 39' 52.9''$ (RT) Os = 43' 31' 47.7" D = 13' 38' 30.7" L = 246.78' T = 127.06' R = 420.00'	-Y21LPD- PIs Sta 11+60.99 $\Delta = 43^\circ 31' 47.7''$ Ls = 234.00' LT = 160.99' ST = 82.56'	-Y21LPD- PI Sta 16+27.03 $\Delta = 137^\circ 12' 24.0''$ (RT) D = 37' 12' 18.2" L = 368.79' T = 393.03' R = 154.00'
-Y2IRPD- PIs Sta 11+45.34 Os = 18' 25' 50.9" Ls = 184.00' LT = 123.34' ST = 61.94'	-Y2IRPD- PI Sta 12+40.70 $\Delta = 13^\circ 50' 14.1''$ (RT) D = 20' 02' 00.6" L = 69.07' T = 34.70' R = 286.00'	-Y2IRPD- PIs Sta 13+37.01 Os = 18' 25' 50.9" Ls = 184.00' LT = 123.34' ST = 61.94'



FOR -Y2IRPD- PROFILE SEE SHT. 32
FOR -Y21LPD- PROFILE SEE SHT. 32

CALYX
ENGINEERS + CONSULTANTS

7500 EAST INDEPENDENCE BOULEVARD, SUITE 100
CHARLOTTE, NC 28227
phone: 704.537.7300
CALYXengineers.com
NC License # F-1333

14-AUG-2019 09:52
 2: Proc\666666\2016_Trams\1305-16-028 - NCCDOT - Russ Avenue (U-5839)\U5839_GEO_RDWY\CADD_GEO\TECH\Plan\Prof\U5839_RDY_PSH_24.dgn
 8/17/19

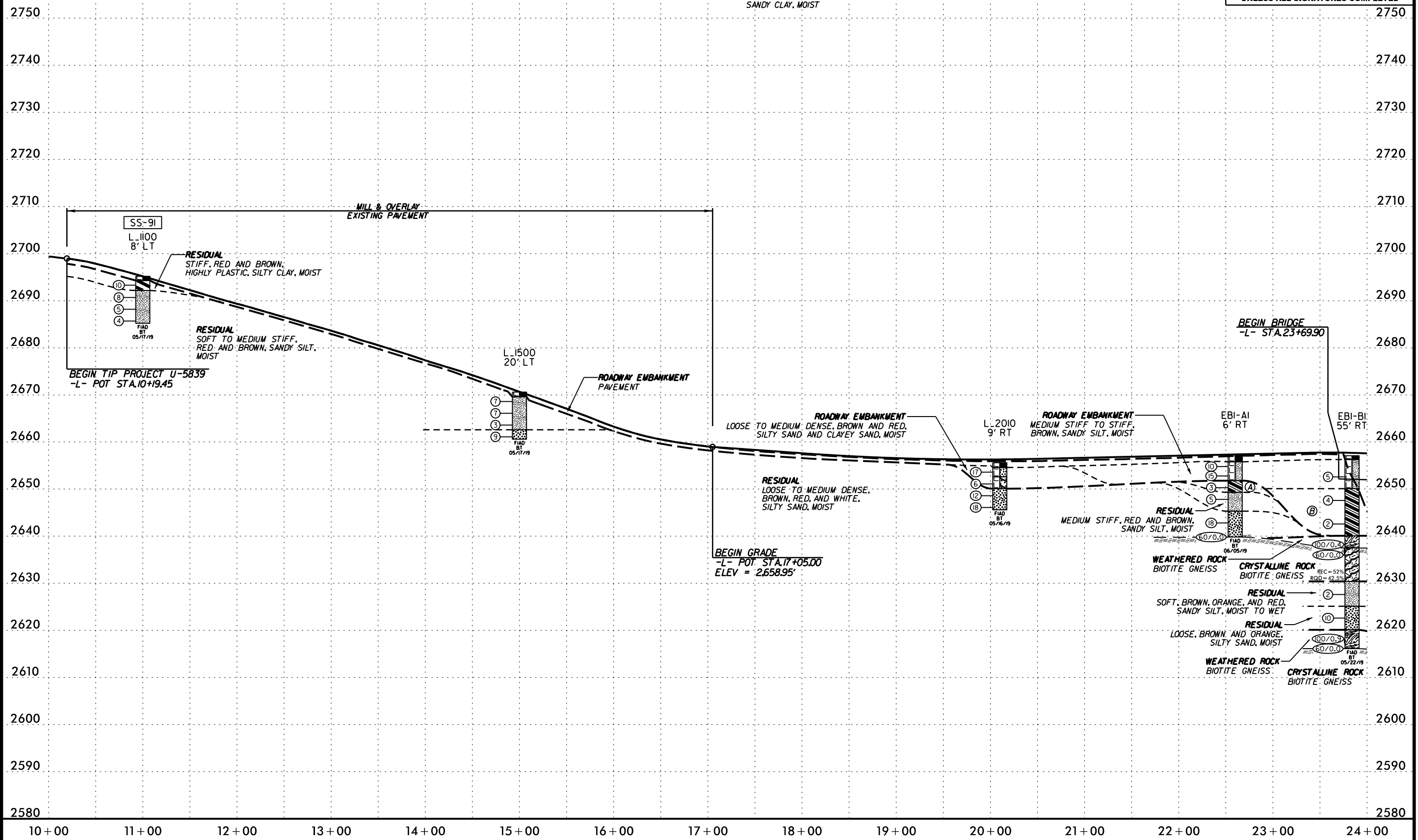
5/14/19
 20-SEP-2019 16:14
 Z:\Projects\2016\Trans\1305-16-028 - NCDOT - Russ Avenue (U-5839)\U5839_GEO_RDWY_CADD_GEO TECH\Plan\Prof\U5839_GEO_RDWY_PFL_25.dgn
 \$\$\$\$
 \$\$\$\$

-L-

PROJECT REFERENCE NO. U-5839	SHEET NO. 25
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

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-91	8' LT	11+00	0.9-2.4	A-7-5	83	46	7	10	17	66	100	96	85.8	45.2	-

- Ⓐ RESIDUAL
SOFT, RED AND BROWN,
SANDY CLAY, MOIST
- Ⓑ ROADWAY EMBANKMENT
SOFT, RED AND BROWN,
SANDY CLAY, MOIST



SS-91
L_1100
8' LT

RESIDUAL
STIFF, RED AND BROWN,
HIGHLY PLASTIC, SILTY CLAY, MOIST

RESIDUAL
SOFT TO MEDIUM STIFF,
RED AND BROWN, SANDY SILT,
MOIST

**MILL & OVERLAY
EXISTING PAVEMENT**

**BEGIN TIP PROJECT U-5839
-L- POT STA.10+19.45**

L_1500
20' LT

**ROADWAY EMBANKMENT
PAVEMENT**

ROADWAY EMBANKMENT
LOOSE TO MEDIUM DENSE, BROWN AND RED,
SILTY SAND AND CLAYEY SAND, MOIST

RESIDUAL
LOOSE TO MEDIUM DENSE,
BROWN, RED, AND WHITE,
SILTY SAND, MOIST

ROADWAY EMBANKMENT
L_2010
9' RT

ROADWAY EMBANKMENT
MEDIUM STIFF TO STIFF,
BROWN, SANDY SILT, MOIST

RESIDUAL
MEDIUM STIFF, RED AND BROWN,
SANDY SILT, MOIST

WEATHERED ROCK
BIOTITE GNEISS

CRYSTALLINE ROCK
BIOTITE GNEISS
REC = 52%
ROD = 42.3%

RESIDUAL
SOFT, BROWN, ORANGE, AND RED,
SANDY SILT, MOIST TO WET

RESIDUAL
LOOSE, BROWN AND ORANGE,
SILTY SAND, MOIST

WEATHERED ROCK
BIOTITE GNEISS

CRYSTALLINE ROCK
BIOTITE GNEISS

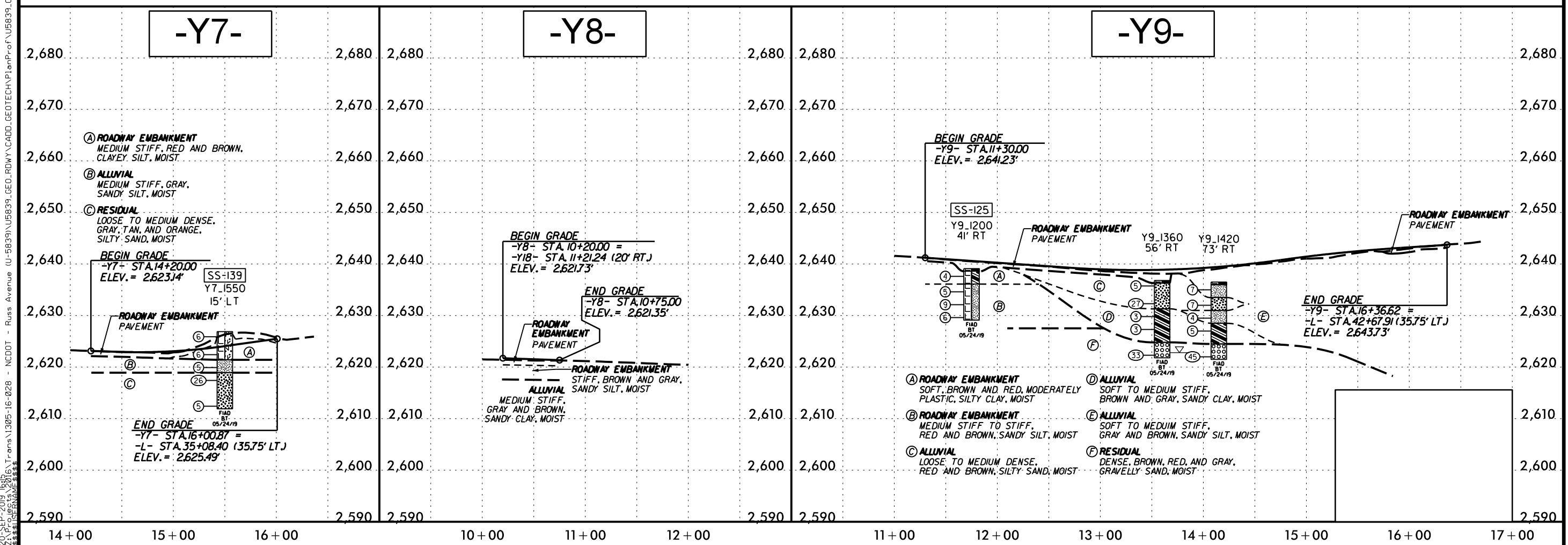
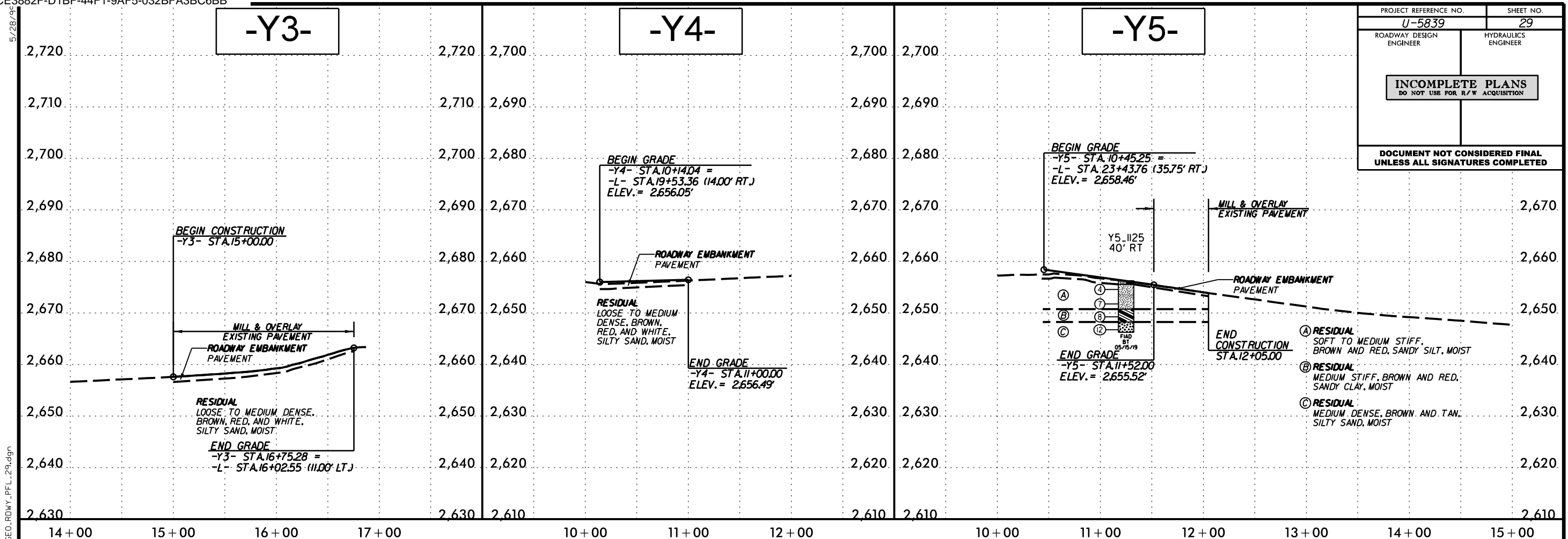
**BEGIN BRIDGE
-L- STA.23+69.90**

EBI-AI
6' RT

EBI-BI
55' RT

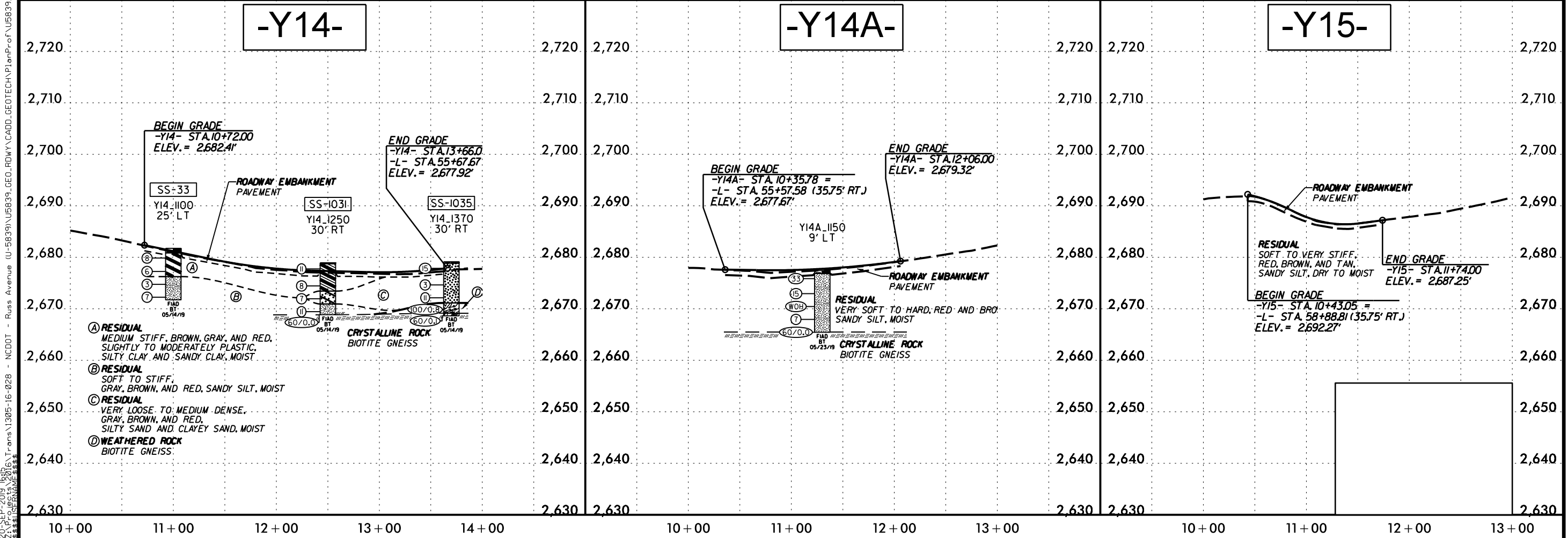
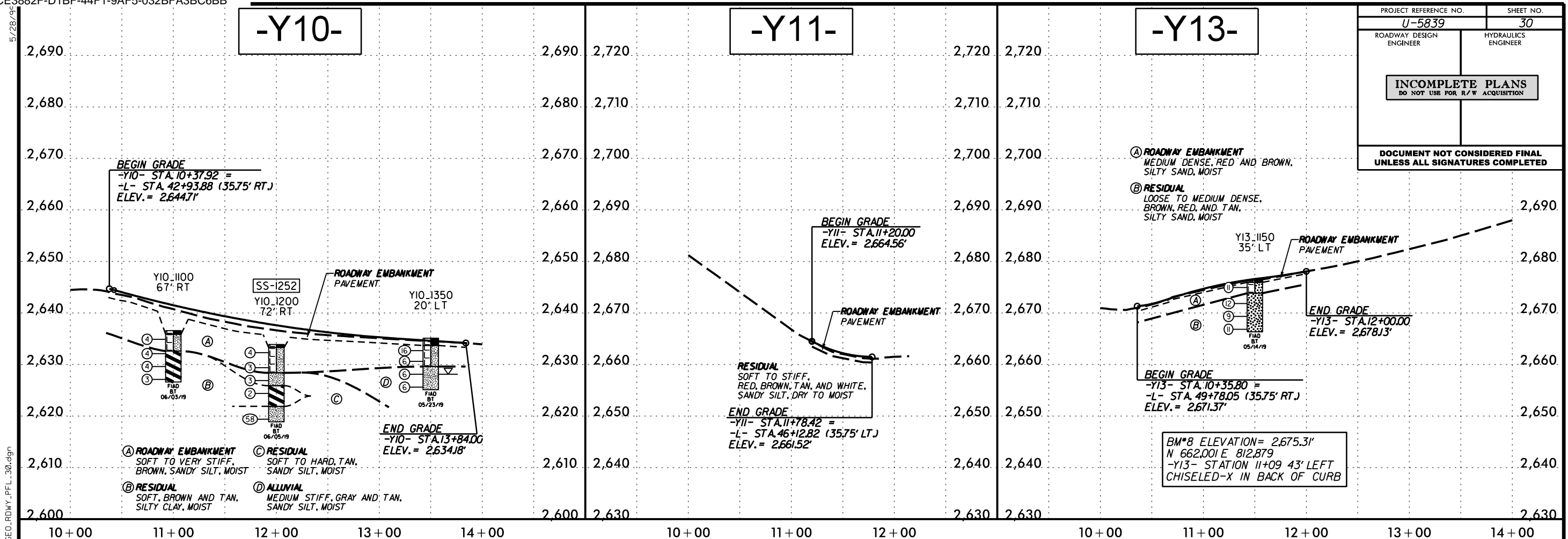
**BEGIN GRADE
-L- POT STA.17+05.00
ELEV = 2,658.95'**

PROJECT REFERENCE NO. U-5839	SHEET NO. 29
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



5/28/2016
 20-SEP-2019 16:15
 Z:\P\05645\2016\Trans\1305-16-028 - NCDOT - Russ Avenue (U-5839)\U5839_GED_RDWY\CADD_GED\TECH\Plan\Prof\U5839_GED_RDWY_PFL_29.dgn
 5/28/2016 10:58 AM
 20-SEP-2019 16:15
 Z:\P\05645\2016\Trans\1305-16-028 - NCDOT - Russ Avenue (U-5839)\U5839_GED_RDWY\CADD_GED\TECH\Plan\Prof\U5839_GED_RDWY_PFL_29.dgn

PROJECT REFERENCE NO. U-5839	SHEET NO. 30
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

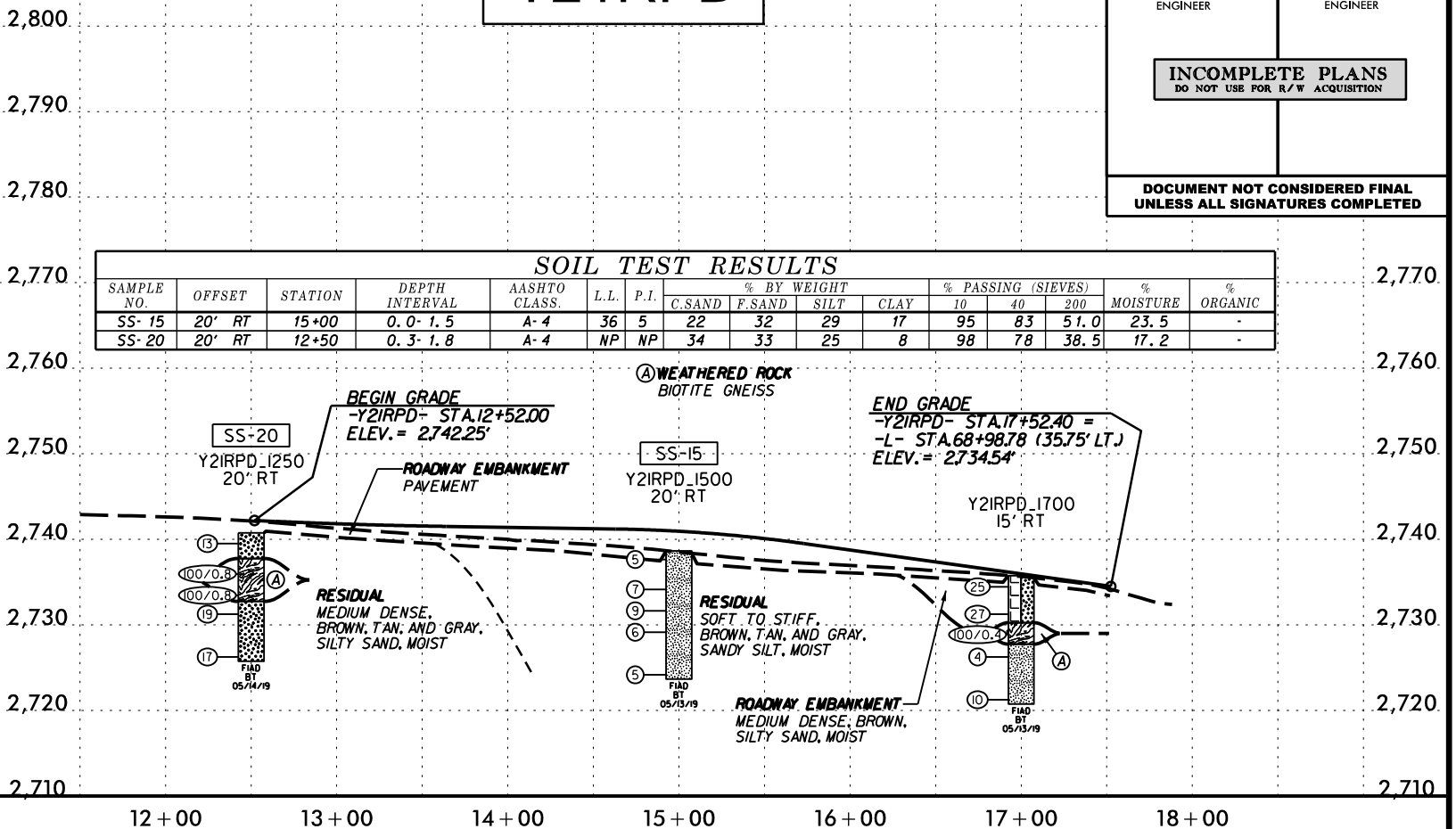
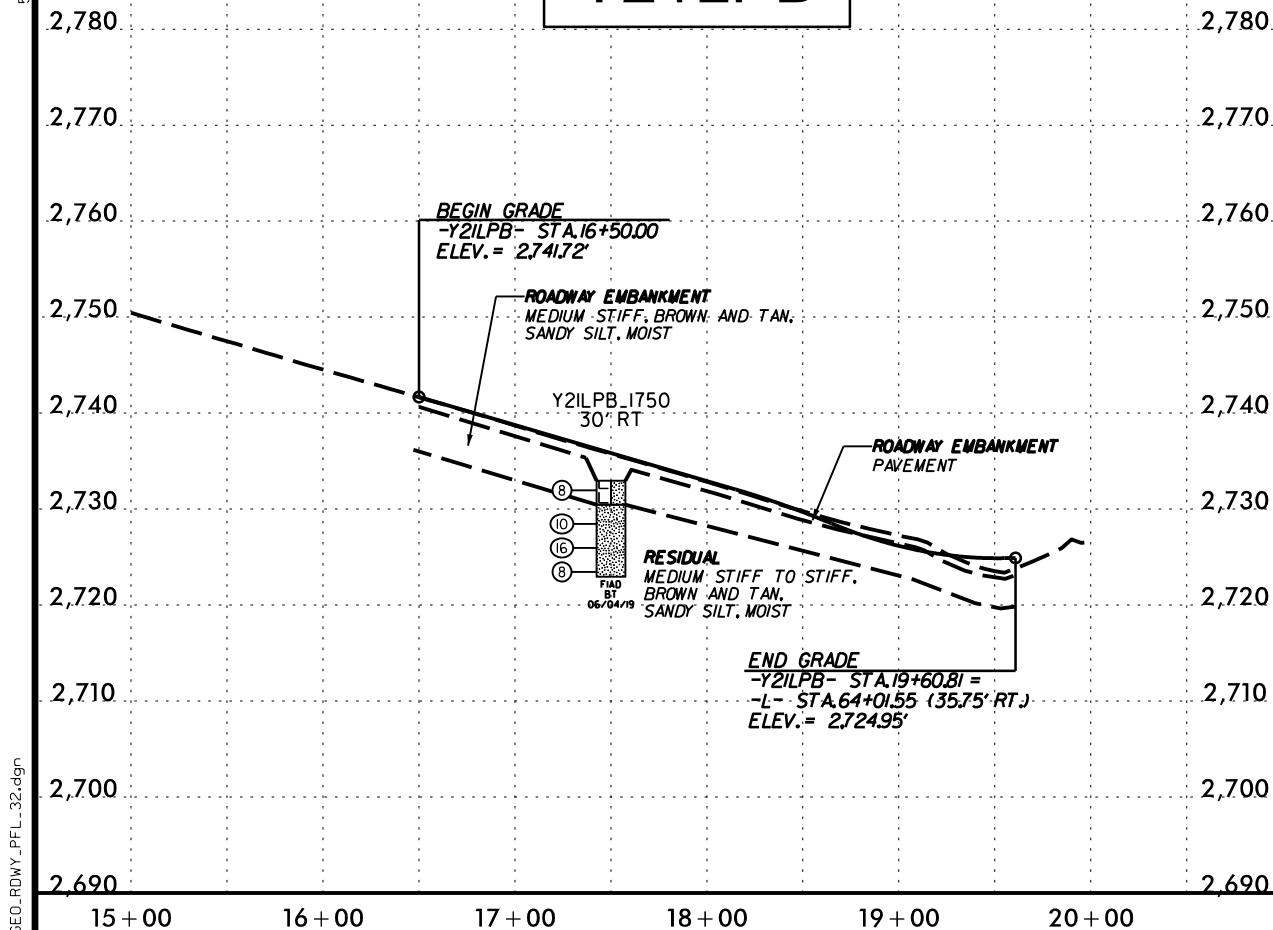


20-SEP-2019 16:15
 Z:\P\050516\2016\Trans\1305-16-028 - NCDOT - Russ Avenue (U-5839)\U5839_GEO_RDWY\CADD_GEO\TECH\Plan\Prof\U5839_GEO_RDWY_PFL_30.dgn
 5/28/2019

PROJECT REFERENCE NO. U-5839	SHEET NO. 32
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

-Y21LPB-

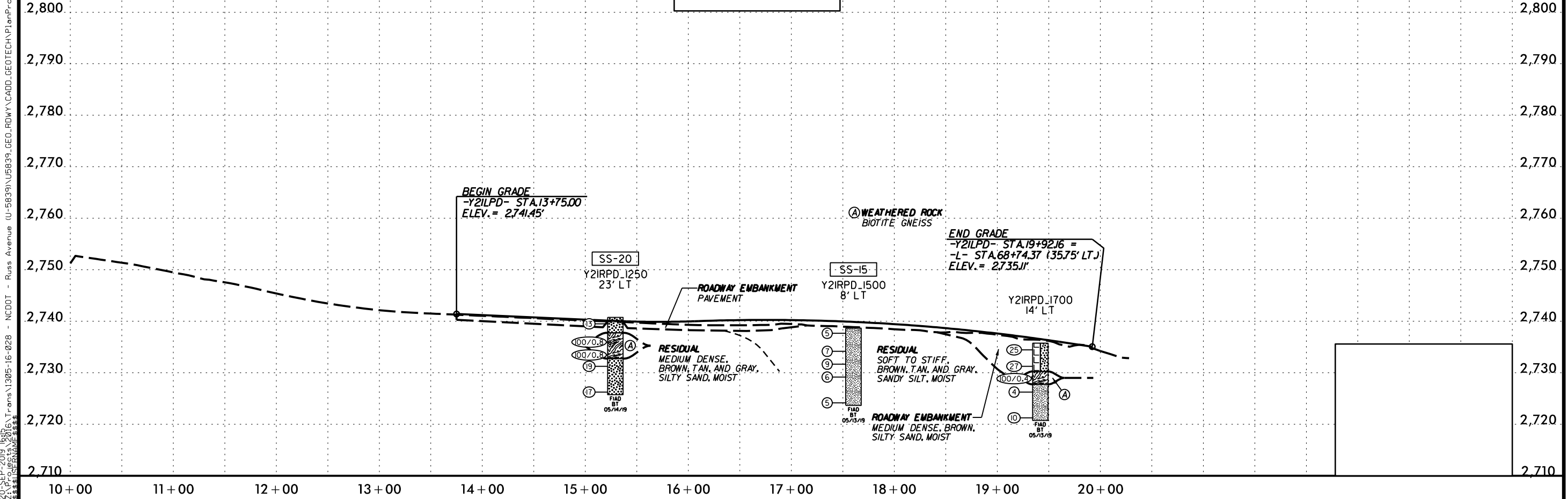
-Y21RPD-



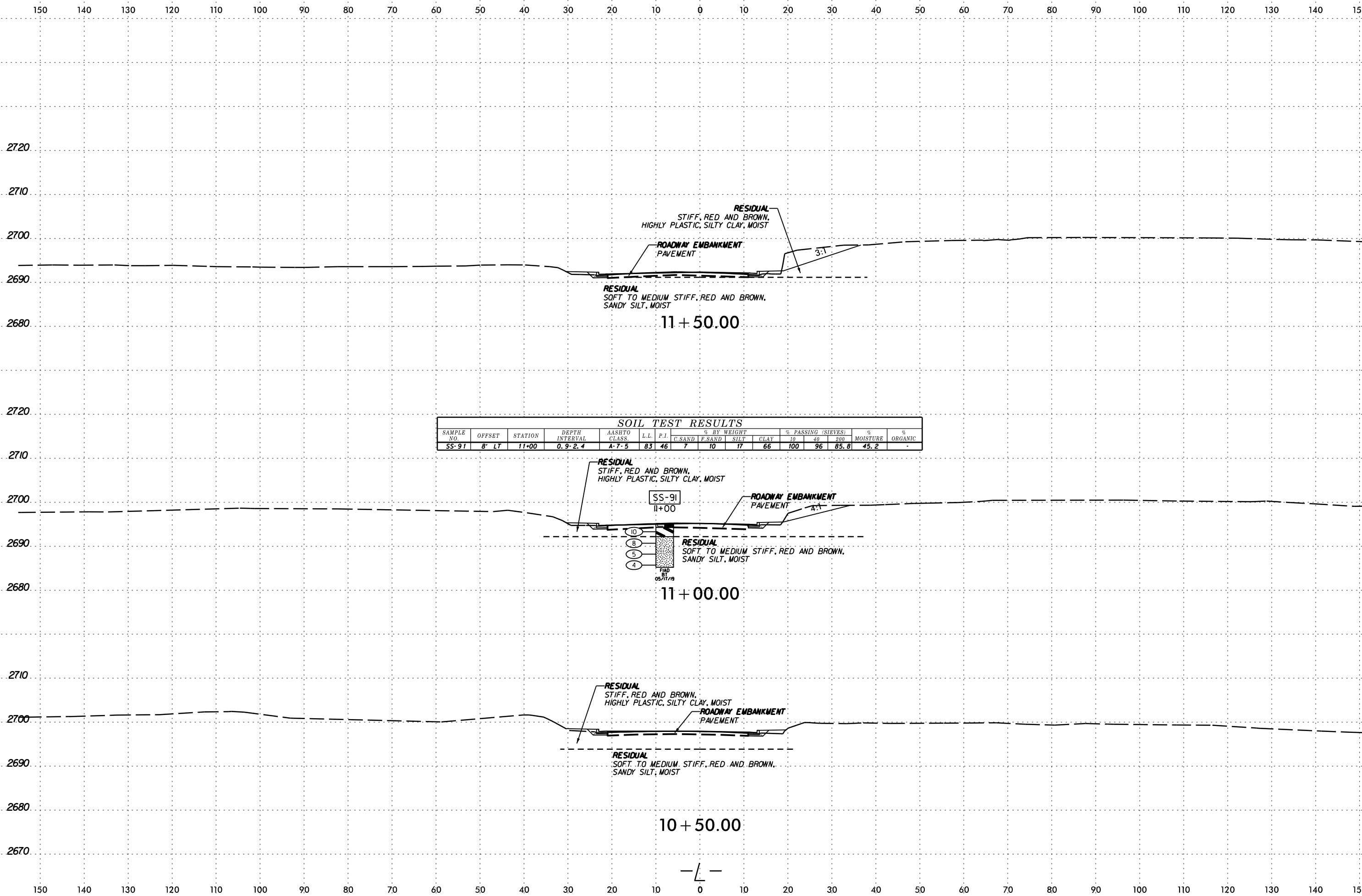
SOIL TEST RESULTS

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-15	20' RT	15+00	0.0-1.5	A-4	36	5	22	32	29	17	95	83	51.0	23.5	-
SS-20	20' RT	12+50	0.3-1.8	A-4	NP	NP	34	33	25	8	98	78	38.5	17.2	-

-Y21LPD-



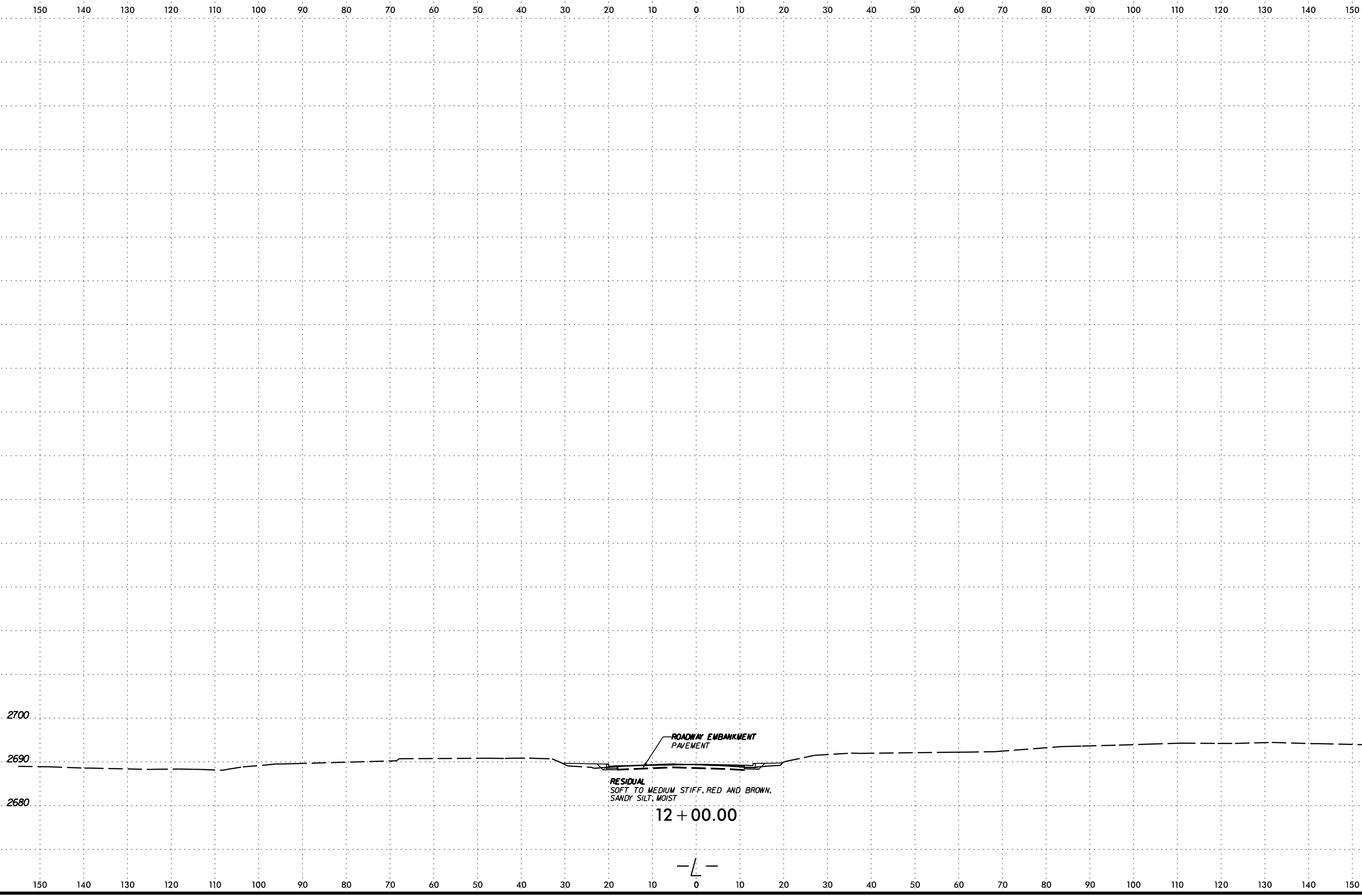
20-SEP-2019 16:15
 Z:\Projects\2016\Trans\1305-16-028 - NCDOT - Russ Avenue (U-5839)\U5839_GEO_RDWY\CADD_GEO\TECH\Plan\Prof\U5839_GEO_RDWY_PFL_32.dgn
 5/28/2019



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-91	8' LT	11+00	0.9-2.4	A-7-5	83	46	7	10	17	66	100	96	85.8	45.2	-

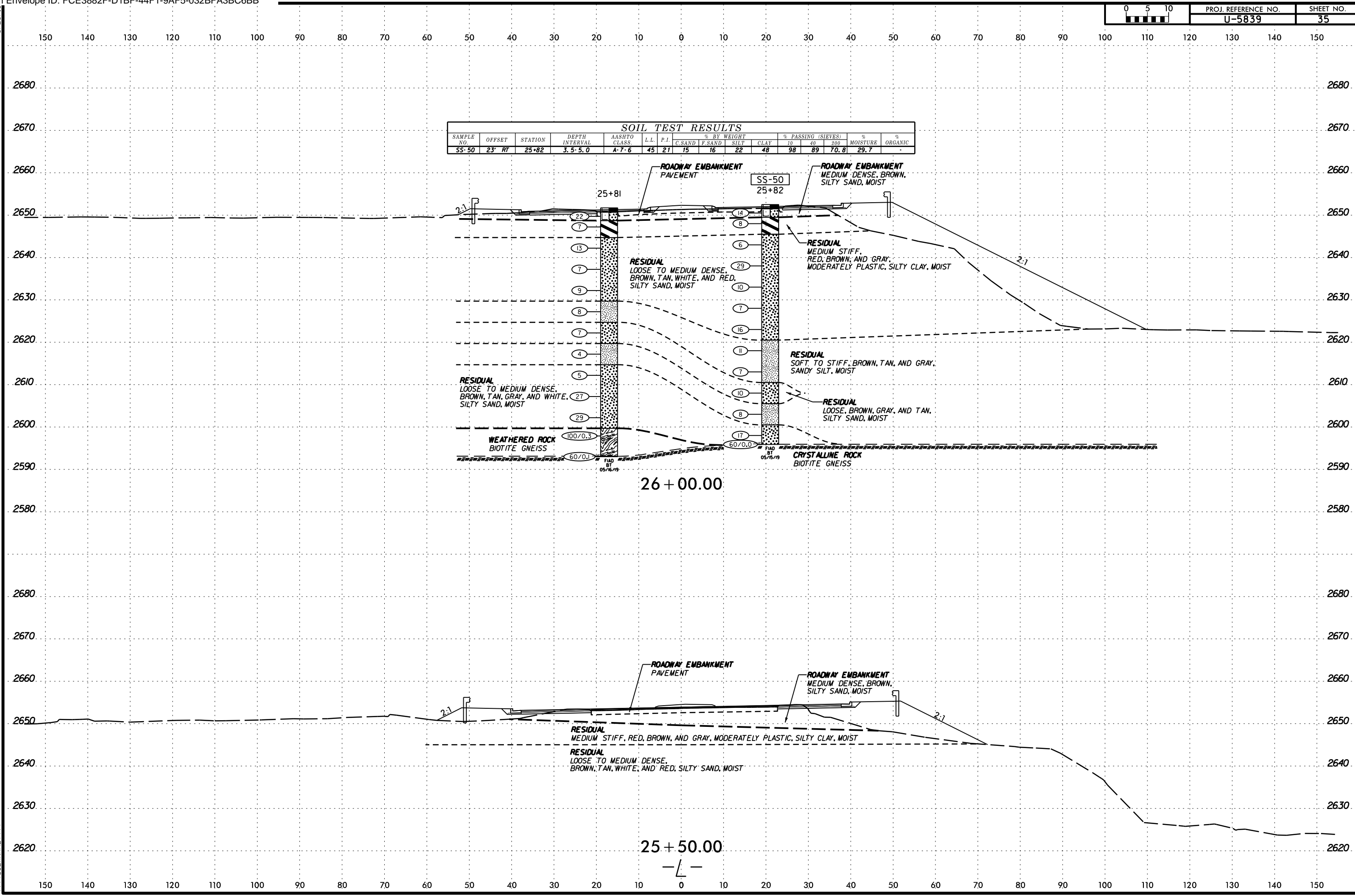
19-AUG-2019 14:38
 Z:\Projects\2016\Trans\1305-16-028 - NCDOT - Russ Avenue (U-5839)\U5839_GEO\RDWY\CADD_GEO\RDWY_XS1.dgn
 \$\$\$USERNAME\$\$\$



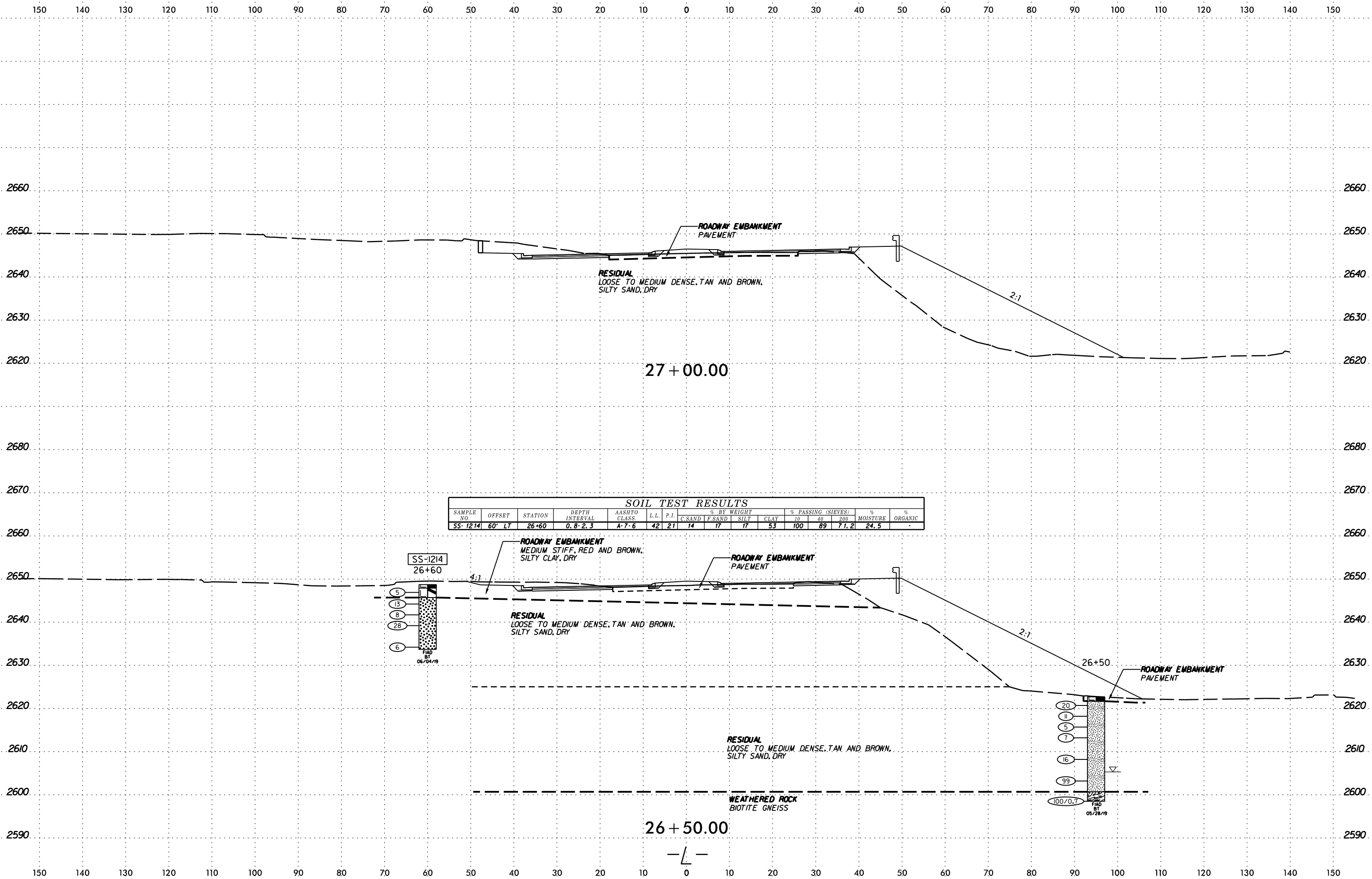
I:\AUG-2019\1438
 7:\PROJECTS\2016\Trans\1305-16-028 - NCDOT - Russ Avenue (U-5839)\U5839_GEO.RODWAY\CADD.GEOTECH\ssc\U5839_GEO.RODWAY_XSI.dgn
 \$\$\$SURFNAME\$\$\$

6/23/16

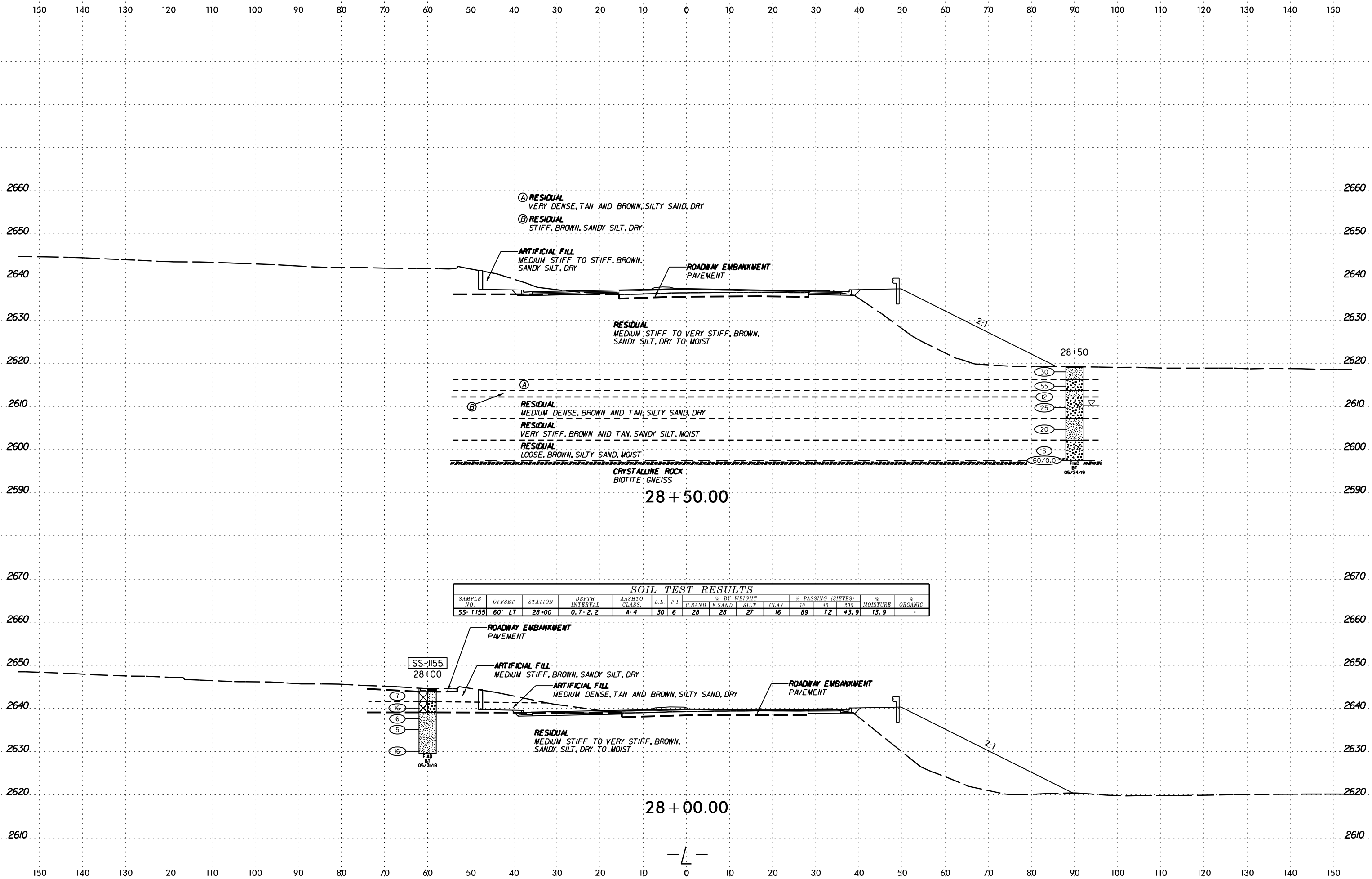
SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			MOISTURE	ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-50	23' RT	25+82	3.5-5.0	A-7-6	45	21	15	16	22	48	98	89	70.8	29.7	-



19-AUG-2019 14:38
 Z:\Projects\2016\Trans\1305-16-028 - NCDOT - Russ Avenue (U-5839)\U5839_GEO_ROWY\CADD_GEO\TECH\sec\U5839_GEO_ROWY_XS1.dgn
 \$\$\$USERNAME\$\$\$



19-AUG-2019 14:38
 Z:\Projects\2016\Trans\1305-16-028 - NCDOT - Russ Avenue (U-5839)\U5839_GEO_ROWY\CADD_GEO\RDWY_XSI.dgn
 \$\$\$USERNAME\$\$\$



(A) RESIDUAL
 VERY DENSE, TAN AND BROWN, SILTY SAND, DRY
 (B) RESIDUAL
 STIFF, BROWN, SANDY SILT, DRY

ARTIFICIAL FILL
 MEDIUM STIFF TO STIFF, BROWN,
 SANDY SILT, DRY
 ROADWAY EMBANKMENT
 PAVEMENT

RESIDUAL
 MEDIUM STIFF TO VERY STIFF, BROWN,
 SANDY SILT, DRY TO MOIST

(A) RESIDUAL
 MEDIUM DENSE, BROWN AND TAN, SILTY SAND, DRY
 (B) RESIDUAL
 VERY STIFF, BROWN AND TAN, SANDY SILT, MOIST
 RESIDUAL
 LOOSE, BROWN, SILTY SAND, MOIST

CRYSTALLINE ROCK
 BIOTITE GNEISS

28 + 50.00

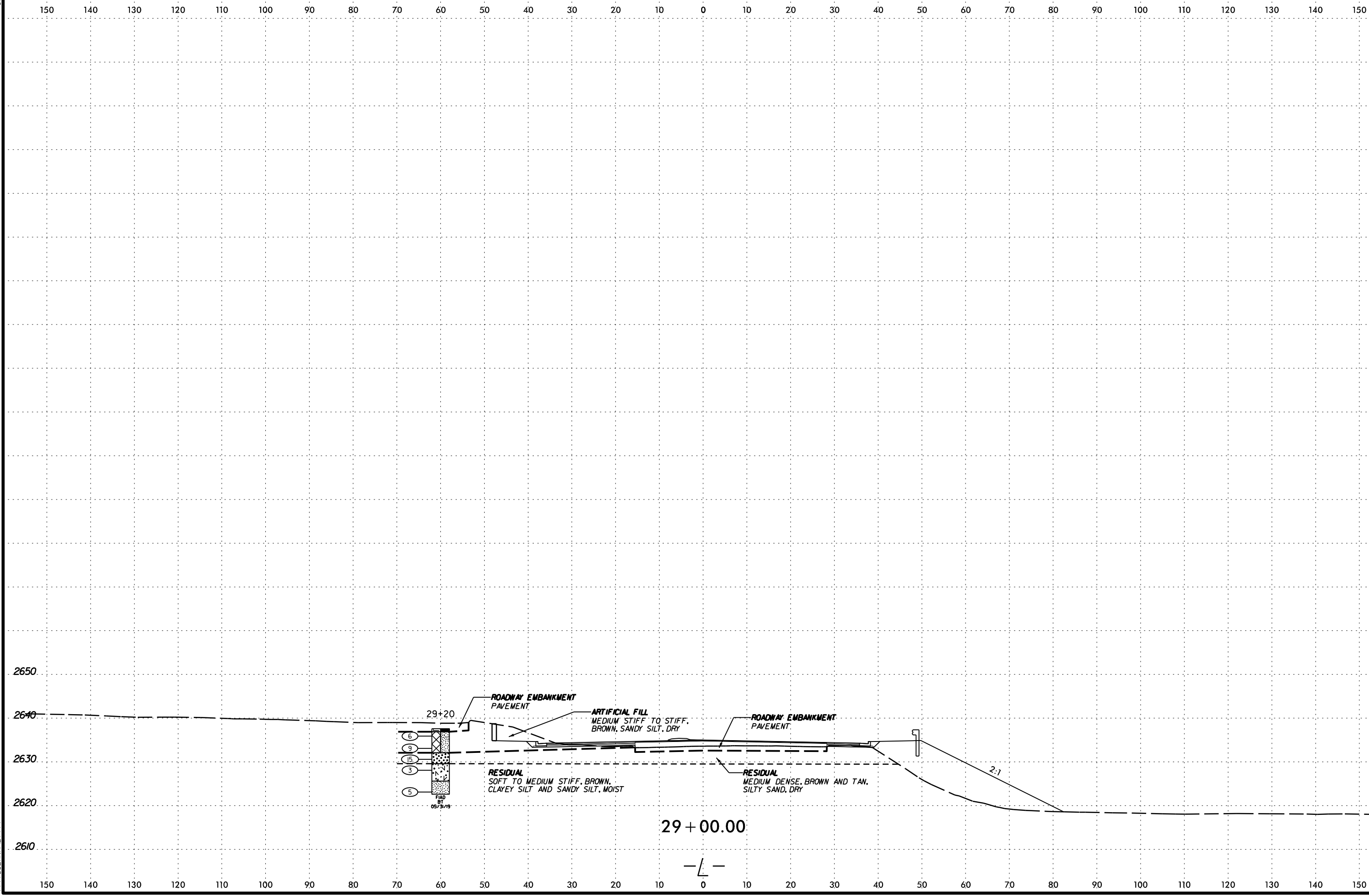
SOIL TEST RESULTS

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	200			
SS-1155	60' LT	28+00	0.7-2.2	A-4	30	6	28	28	27	16	89	72	43.9	13.9	-

ROADWAY EMBANKMENT
 PAVEMENT
 SS-1155
 28+00
 ARTIFICIAL FILL
 MEDIUM STIFF, BROWN, SANDY SILT, DRY
 ARTIFICIAL FILL
 MEDIUM DENSE, TAN AND BROWN, SILTY SAND, DRY
 ROADWAY EMBANKMENT
 PAVEMENT
 RESIDUAL
 MEDIUM STIFF TO VERY STIFF, BROWN,
 SANDY SILT, DRY TO MOIST

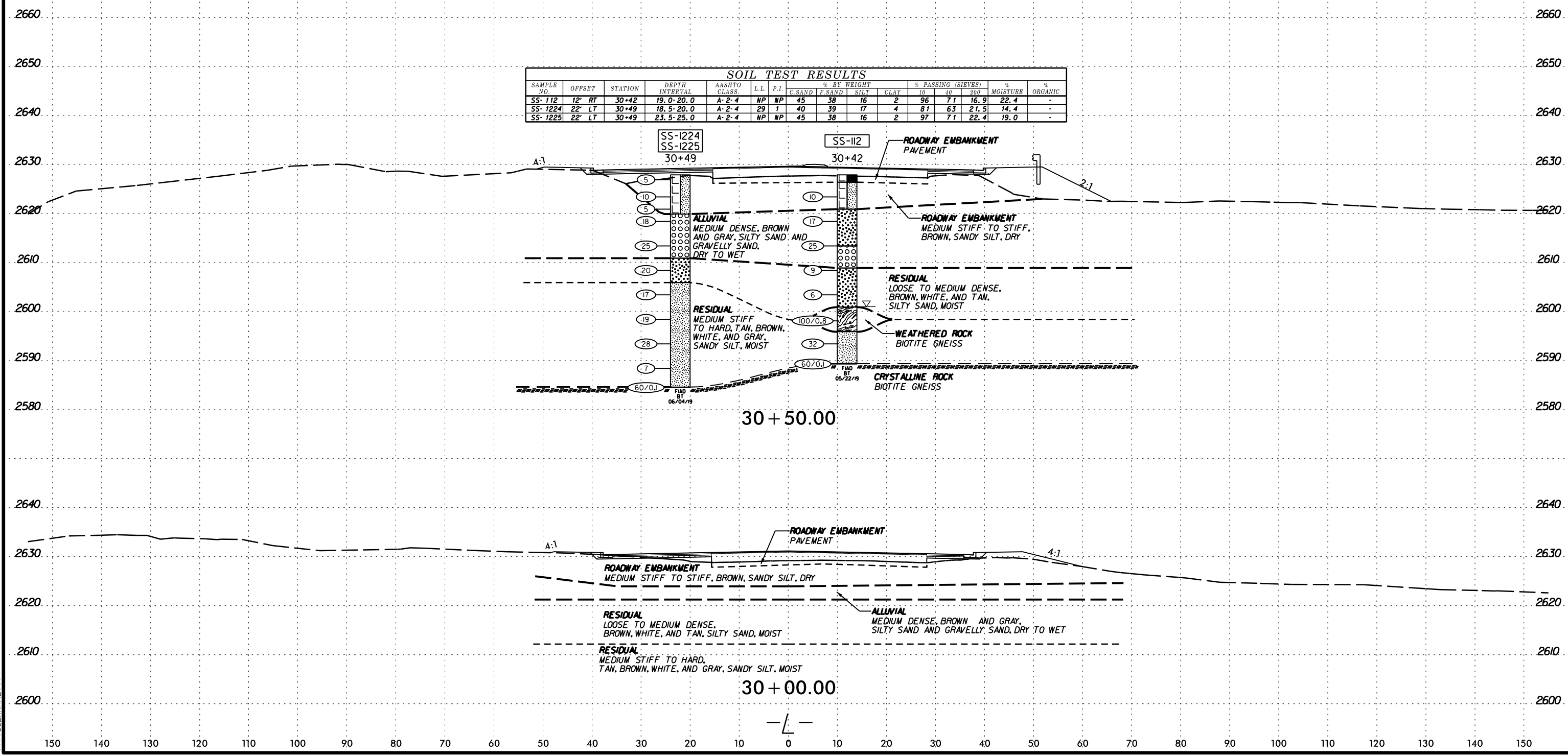
28 + 00.00

19-AUG-2019 14:38
 Z:\Projects\2016\Trans\1305-16-028 - NCDOT - Russ Avenue (U-5839)\U5839_GEO_RDWY\CADD_GEO\RDWY_XSI.dgn
 \$\$\$\$SURNAME\$\$\$\$

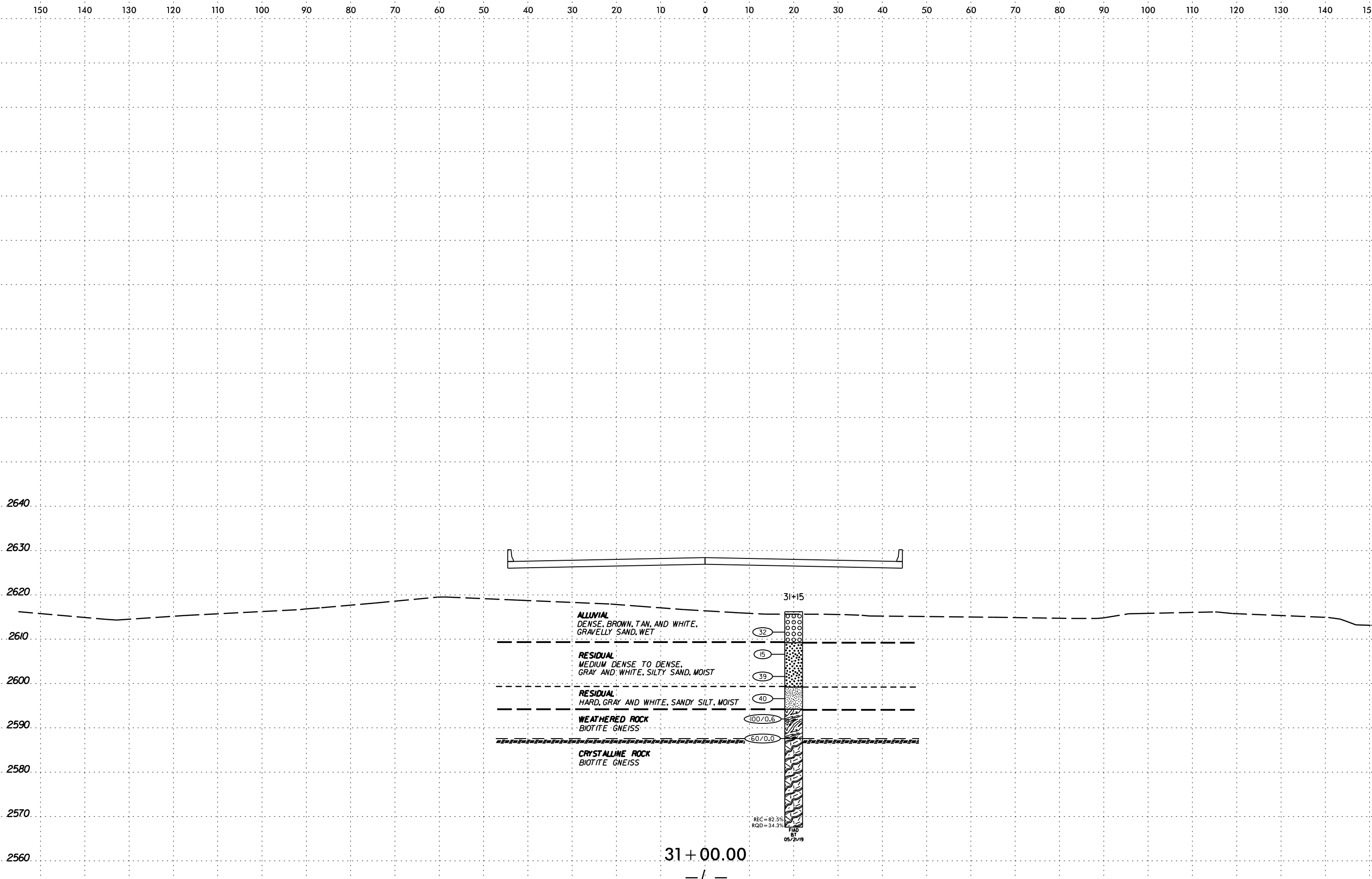


19-AUG-2019 14:38
 Z:\Projects\2016\Trans\1305-16-028 - NCDOT - Russ Avenue (U-5839)\U5839_GEO_RDWY\CADD_GEO\RDWY_XSI.dgn
 \$\$\$USERNAME\$\$\$

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-112	12' RT	30+42	19.0-20.0	A-2-4	NP	NP	45	38	16	2	96	71	16.9	22.4	-
SS-1224	22' LT	30+49	18.5-20.0	A-2-4	29	1	40	39	17	4	81	63	21.5	14.4	-
SS-1225	22' LT	30+49	23.5-25.0	A-2-4	NP	NP	45	38	16	2	97	71	22.4	19.0	-



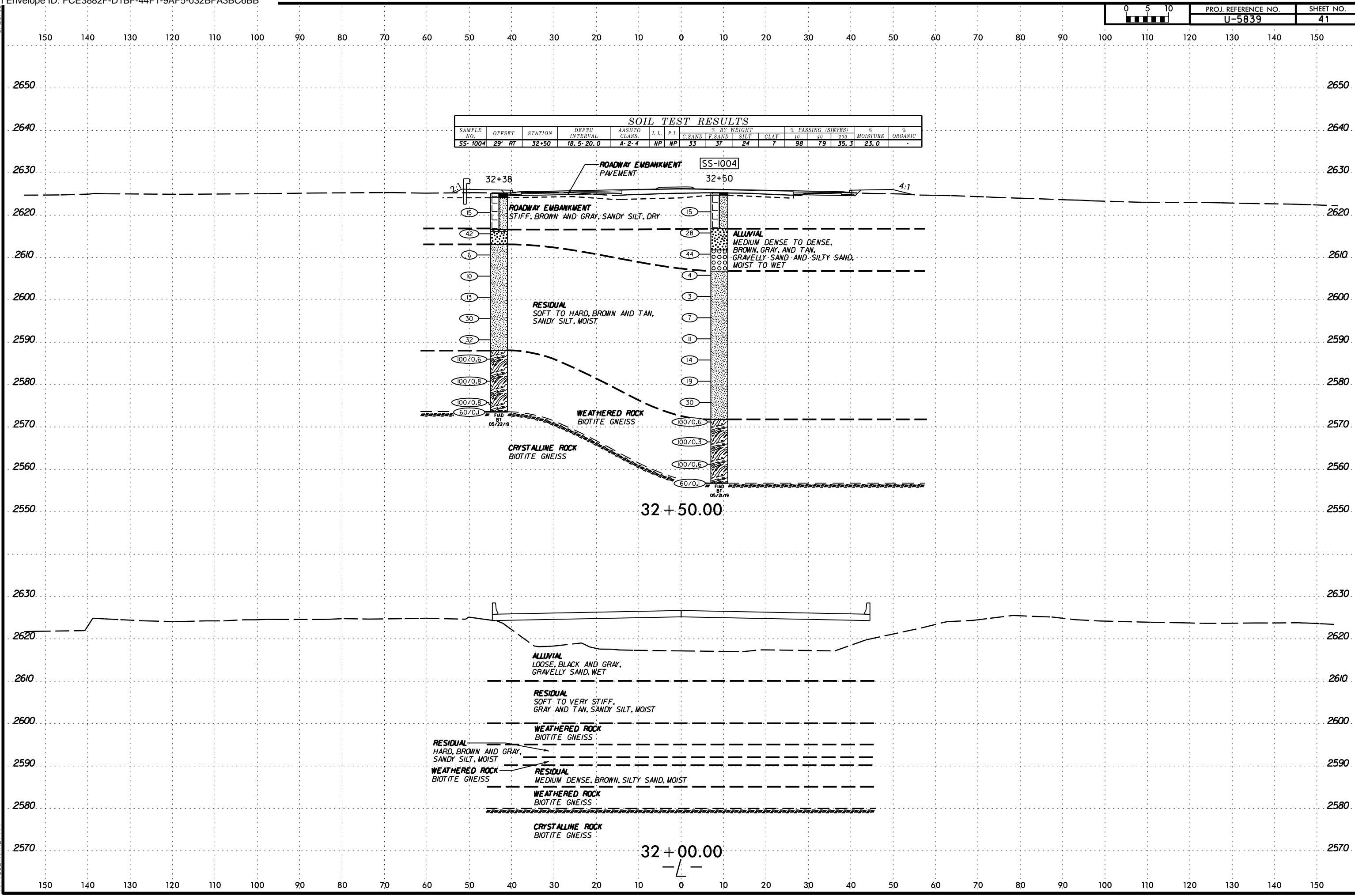
19-AUG-2019 14:38
 Z:\Projects\2016\Trans\1305-16-028 - NCDOT - Russ Avenue (U-5839)\U5839_GEO_ROWY_CADD_GEO\TECH\ssc\U5839_GEO_ROWY_XSI.dgn
 \$\$\$\$SURNAME\$\$\$\$



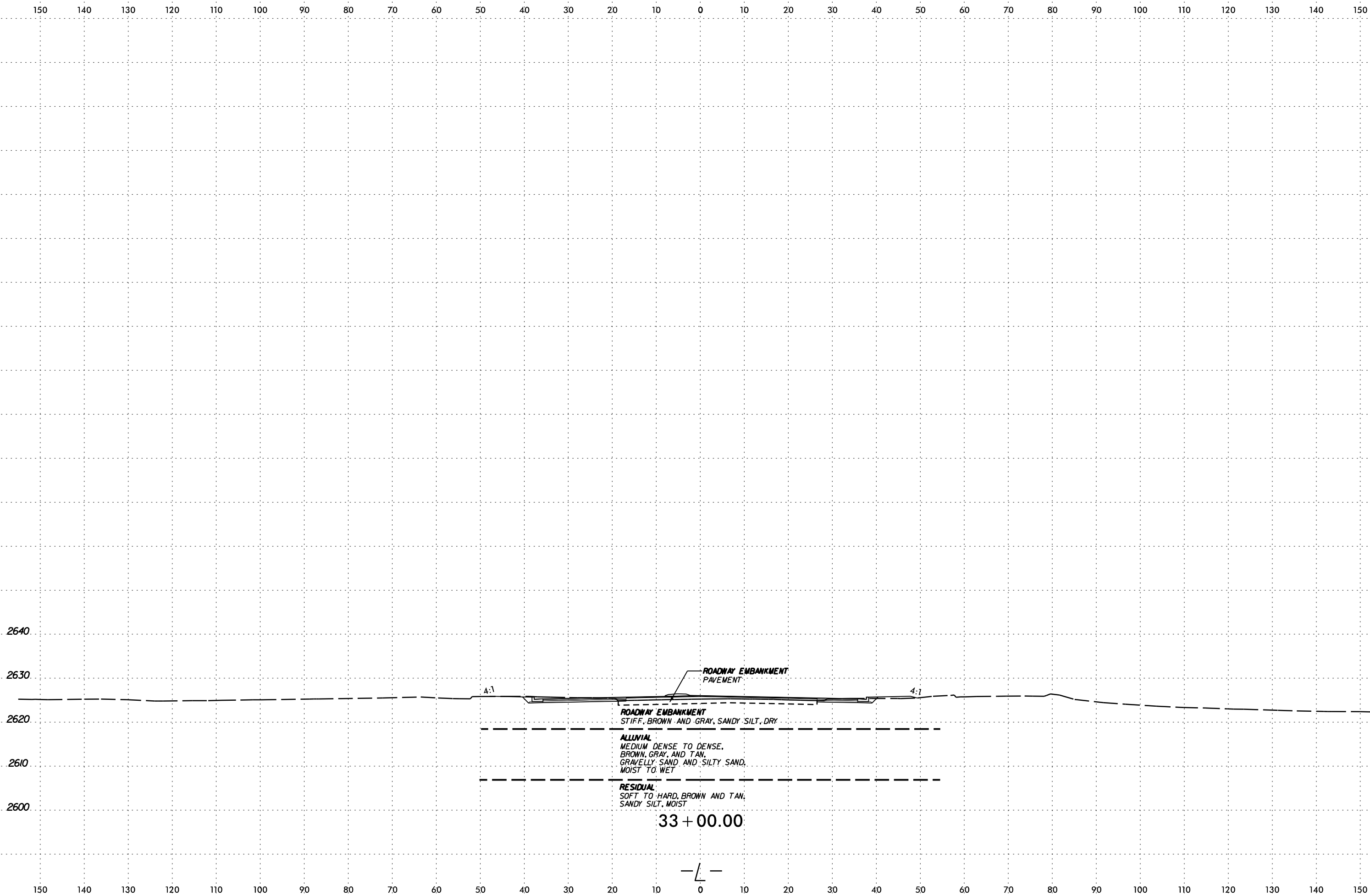
19-AUG-2019 14:38
Z:\Projects\2016\Trans\1305-16-028 - NCDOT - Russ Avenue (U-5839)\U5839_GEO_RDWY\CADD_GEO\TECH\sec\U5839_GEO_RDWY_XSI.dgn
\$\$\$\$\$USERNAME\$\$\$\$\$

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		
SS-1004	29' RT	32+50	18.5-20.0	A-2-4	NP	NP	33	37	24	7	98	79	35.3	23.0



19-AUG-2019 14:38
 Z:\Projects\2016\Trans\1305-16-028 - NCDOT - Russ Avenue (U-5839)\U5839_GEO_ROWY\CADD_GEO\TECH\SSC\U5839_GEO_ROWY_XS1.dgn
 \$\$\$USERNAME\$\$\$



2640

2640

2630

2630

2620

2620

2610

2610

2600

2600

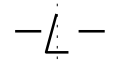
ROADWAY EMBANKMENT
PAVEMENT

ROADWAY EMBANKMENT
STIFF, BROWN AND GRAY SANDY SILT, DRY

ALLUVIAL
MEDIUM DENSE TO DENSE,
BROWN, GRAY, AND TAN,
GRAVELLY SAND AND SILTY SAND,
MOIST TO WET

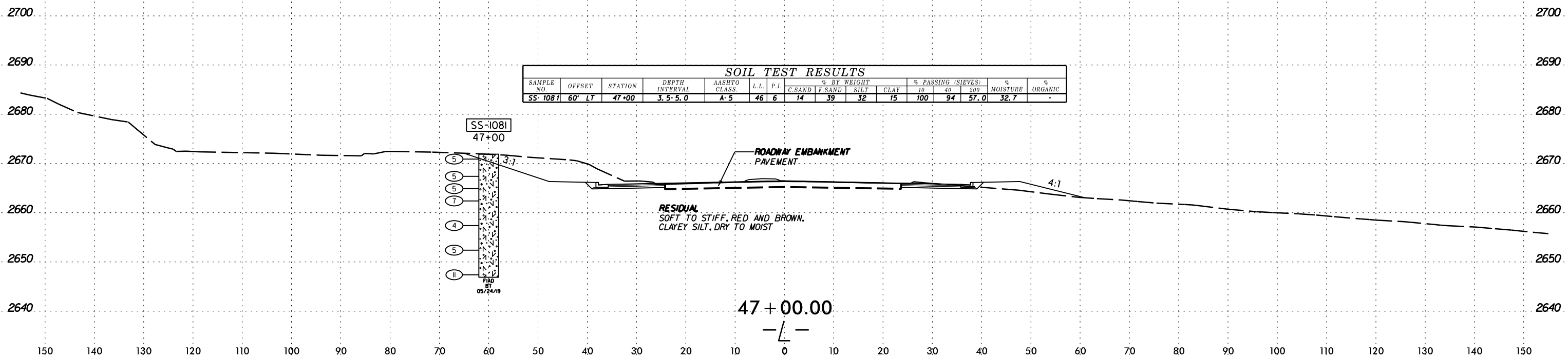
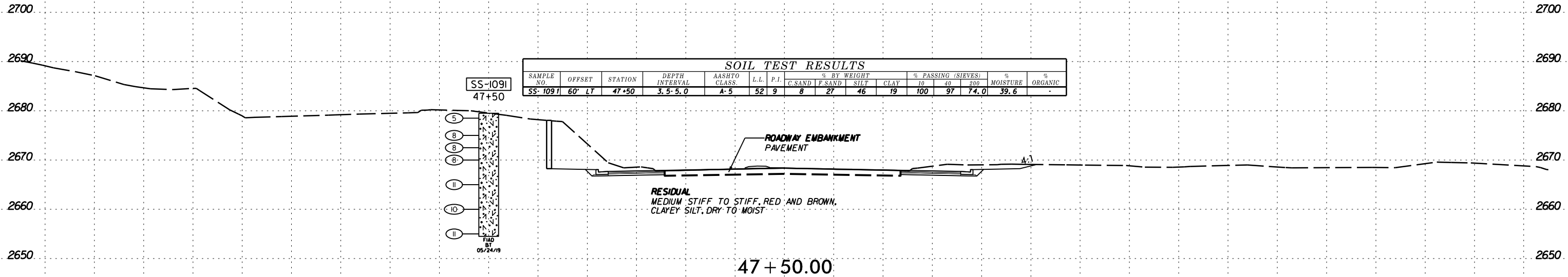
RESIDUAL
SOFT TO HARD, BROWN AND TAN,
SANDY SILT, MOIST

33 + 00.00

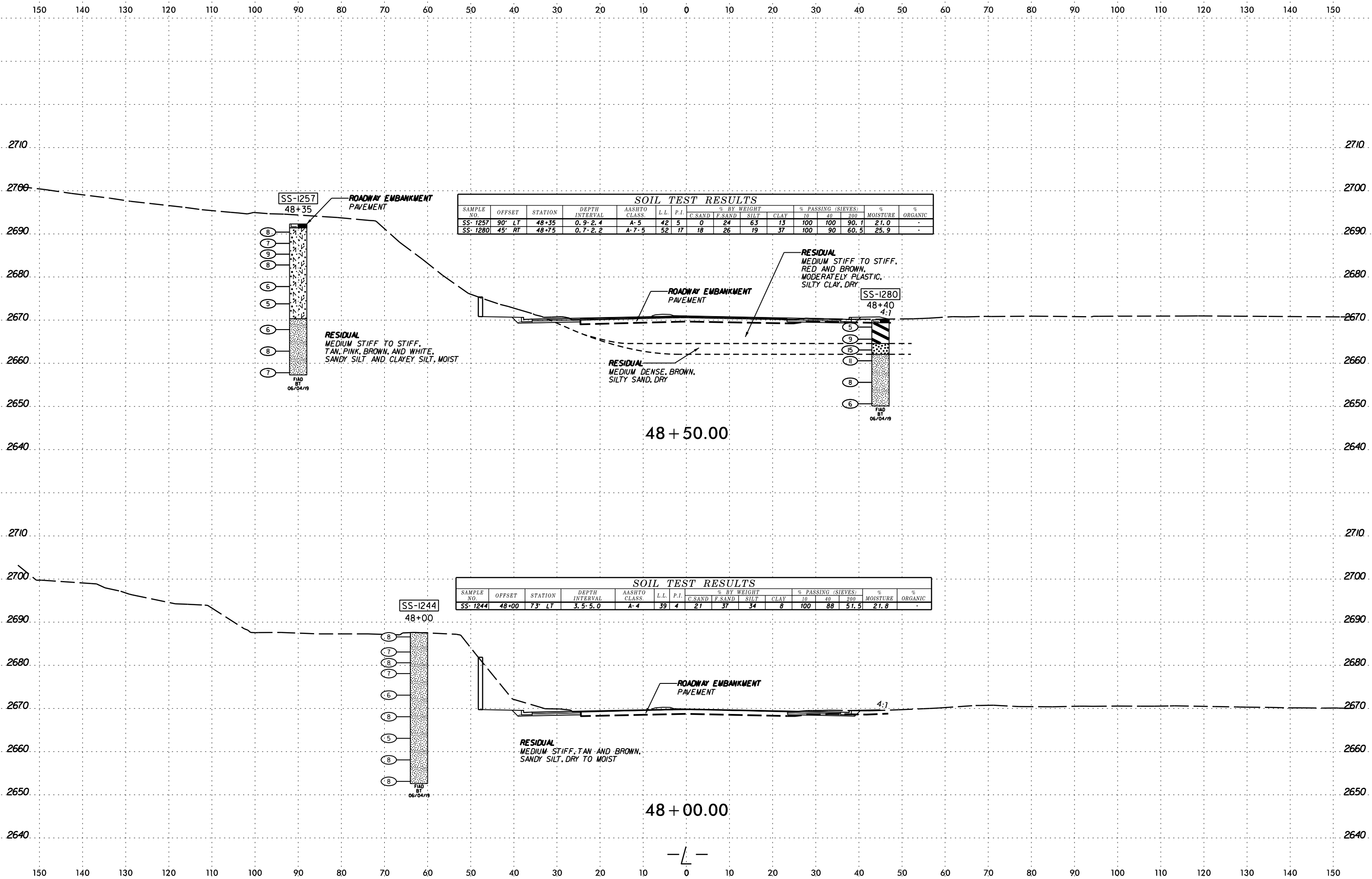


I:\AUG-2019\1438
7\PROJECTS\2016\TRANS\1305-16-028 - NCDOT - Russ Avenue (U-5839)\U5839_GEO_ROWY\CADD_GEO\TECH\SEC\U5839_GEO_ROWY_XSI.dgn
6/23/16

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



19-AUG-2019 14:38
 Z:\Projects\2016\Trans\1305-16-028 - NCDOT - Russ Avenue (U-5839)\U5839_GEO_ROWY\CADD_GEO\TECH\ssc\U5839_GEO_ROWY_XSI.dgn
 \$\$\$\$SURNAME\$\$\$\$



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-1257	90' LT	48+35	0.9-2.4	A-5	42	5	0	24	63	13	100	100	90.1	21.0	-
SS-1280	45' RT	48+75	0.7-2.2	A-7.5	52	17	18	26	19	37	100	90	60.5	25.9	-

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-1244	48+00	73' LT	3.5-5.0	A-4	39	4	21	37	34	8	100	88	51.5	21.8	-

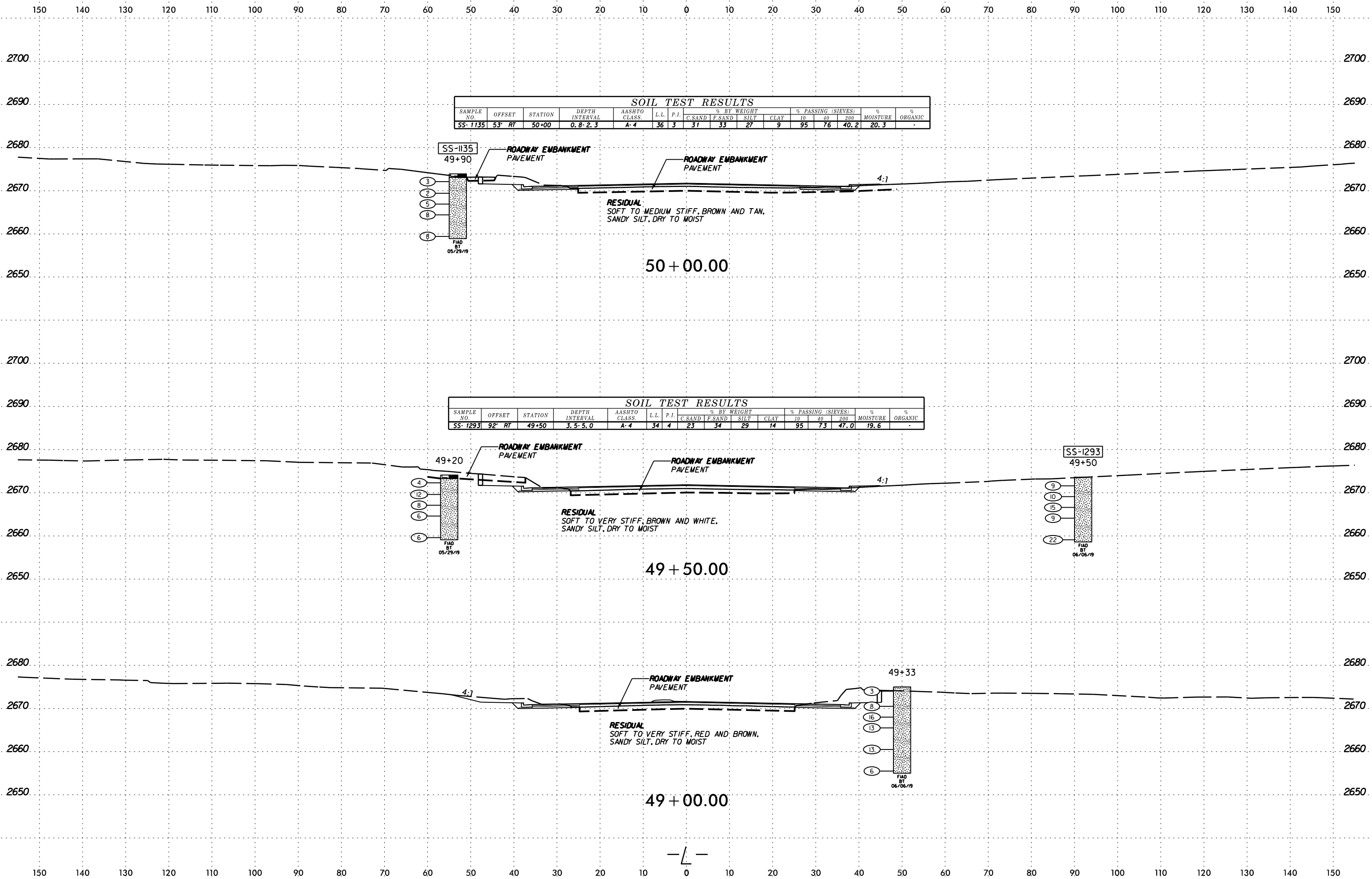
RESIDUAL
 MEDIUM STIFF TO STIFF,
 TAN, PINK, BROWN, AND WHITE,
 SANDY SILT AND CLAYEY SILT, MOIST

RESIDUAL
 MEDIUM STIFF TO STIFF,
 RED AND BROWN,
 MODERATELY PLASTIC,
 SILTY CLAY, DRY

RESIDUAL
 MEDIUM DENSE, BROWN,
 SILTY SAND, DRY

RESIDUAL
 MEDIUM STIFF, TAN AND BROWN,
 SANDY SILT, DRY TO MOIST

19-AUG-2019 14:38
 Z:\Projects\2016\Trans\1305-16-028 - NCDOT - Russ Avenue (U-5839)\U5839_GEO_RDWY\CADD_GEO\RDWY_XSI.dgn
 \$\$\$\$SURNAME\$\$\$\$



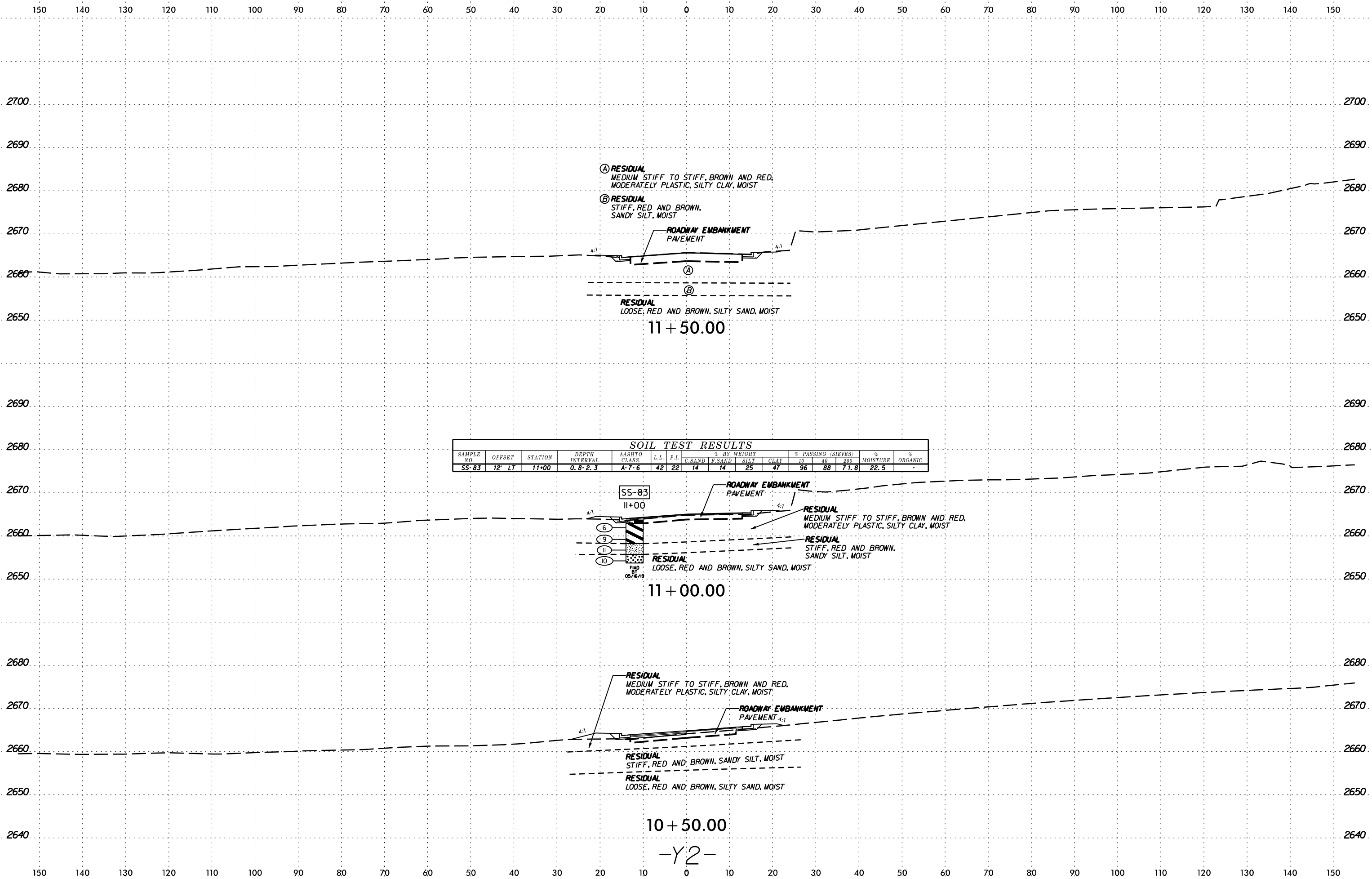
SOIL TEST RESULTS

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-1135	53' RT	50+00	0.8-2.3	A-4	36	3	31	33	27	9	95	76	40.2	20.3	-

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-1293	92' RT	49+50	3.5-5.0	A-4	34	4	23	34	29	14	95	73	47.0	19.6	-

6/23/16
 19-AUG-2019 14:38
 Z:\Projects\2016\Trans\1305-16-028 - NCDOT - Russ Avenue (U-5839)\U5839_GEO_ROWY_CADD_GEO_ROWY_XSI.dgn
 \$\$\$USERNAME\$\$\$



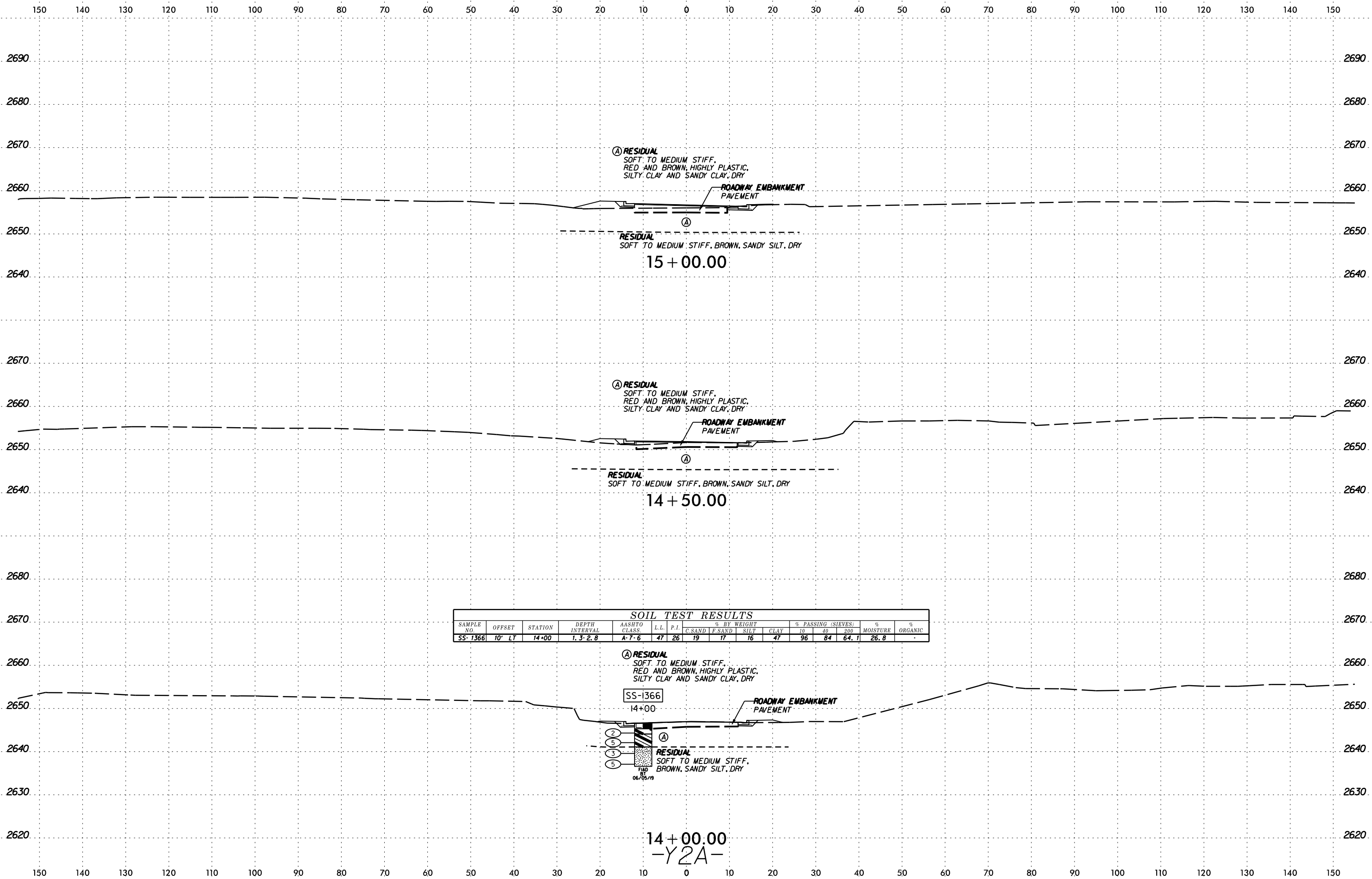
SOIL TEST RESULTS

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-83	12' LT	11+00	0.8-2.3	A-7-6	42	22	14	14	25	47	96	88	71.8	22.5	-

10+50.00

-Y2-

19-AUG-2019 14:38
 Z:\Projects\2016\Trans\1305-16-028 - NCDOT - Russ Avenue (U-5839)\U5839_GEO\RDWY_XSI.dgn
 \$\$\$\$SURNAME\$\$\$\$



6/23/16
 I:\AUG-2019\1438
 7\PROJECTS\2016\Trans\1305-16-028 - NCDOT - Russ Avenue (U-5839)\U5839_GEO_ROWY\CADD_GEO\TECH\SEC\U5839_GEO_ROWY_XS1.dgn
 \$\$\$USERNAME\$\$\$



SUMMARY OF LABORATORY TEST DATA
Soil Classification and Gradation

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
S&ME Project #:	1305-16-028	Date Report:	8/6/2019
State Project No.:	50230.1.1	County:	Haywood
Federal ID No.:		TIP No.:	U-5839
Project Name: Russ Avenue US 276 from US 23/74 to US 23 Business			
Client Name: CALYX		Client Address: Cary, NC	

Sample No.	Station	Offset	Alignment	Sample Depth (ft)	AASHTO Classification	Total % Passing Sieve #				Total Mortar Fraction (%)				LL	PL	PI	Moist. %
						10	40	60	200	Coarse Sand	Fine Sand	Silt	Clay				
SS-6	70+00	30 RT	-L-	3.5-5.0	A-4 (1)	94	77	69	49.1	27	27	29	17	32	25	7	20.6
SS-15	15+00	20 RT	Y21RPD	0-1.5	A-4 (1)	95	83	74	51.0	22	32	29	17	36	31	5	23.5
SS-20	12+50	20 RT	Y21RPD	0.25-1.75	A-4 (0)	98	78	65	38.5	34	33	25	8	NP	NP	NP	17.2
SS-25	13+50	25 LT	Y21RPA	1.3-2.8	A-4 (0)	99	87	75	45.7	24	38	31	7	32	30	2	17.0
SS-33	11+00	25 LT	Y14	0.9-2.4	A-7-6 (11)	100	88	81	65.6	18	21	25	37	44	25	19	22.0
SS-50	25+82	23 RT	-L-	3.5-5.0	A-7-6 (14)	98	89	83	70.8	15	16	22	48	45	24	21	29.7
SS-83	11+00	12 LT	Y2	0.8-2.3	A-7-6 (15)	96	88	83	71.8	14	14	25	47	42	20	22	22.5
SS-91	11+00	8 LT	-L-	0.9-2.4	A-7-5 (47)	100	96	93	85.8	7	10	17	66	83	37	46	45.2
SS-96	31+75	20 RT	-L-	8.5-10.0	A-2-4 (0)	98	70	58	33.1	41	31	21	7	34	31	3	31.1
SS-112	30+42	29 RT	-L-	19.0-20.0	A-2-4 (0)	96	71	53	16.9	45	38	16	2	NP	NP	NP	22.4
SS-125	11+75	41 RT	Y9	0.5-2.0	A-7-6 (6)	91	74	67	52.1	26	20	20	34	41	25	16	26.8
SS-139	15+50	CL	Y7	0-1.5	A-5 (2)	93	82	72	49.8	23	29	24	25	44	38	6	21.0
SS-1004	32+50	29 RT	-L-	18.5-20.0	A-2-4 (0)	98	79	66	35.3	33	37	24	7	NP	NP	NP	23.0
SS-1031	12+50	30 RT	Y14	0.2-1.7	A-6 (3)	76	64	59	45.8	23	22	25	31	36	22	14	16.8
SS-1035	13+70	30 RT	Y14	0.3-1.8	A-2-4 (0)	67	51	44	28.5	35	28	20	17	30	24	6	10.7
SS-1044	52+20	57 RT	-L-	0-1.5	A-2-4 (0)	69	56	49	30.2	29	33	23	14	32	28	4	34.7
SS-1081	47+00	60 LT	-L-	3.5-5.0	A-5 (3)	100	94	86	57.0	14	39	32	15	46	40	6	32.7
SS-1091	47+50	60 LT	-L-	3.5-5.0	A-5 (9)	100	97	92	74.0	8	27	46	19	52	43	9	39.6

References / Comments / Deviations: ND=Not Determined. NP=Non-Plastic.

AASHTO T88: Particle Size Analysis of Soils as Modified by the NCDOT

AASHTO T89: Determining the Liquid Limit of Soils

AASHTO T90: Determining the Plastic Limit & Plasticity Index of Soils

AASHTO T265: Laboratory Determination of Moisture Content of Soils

AASHTO M145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Karen Warner

Technician Name:

VCDOT 118-06-030!

Signature

Certification #

Joey Daily, P.E.

Technical Responsibility:

Project Manager

Position

This report shall not be reproduced, except in full, without the written approval of S&ME, Inc.



SUMMARY OF LABORATORY TEST DATA
Soil Classification and Gradation

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
S&ME Project #:	1305-16-028	Date Report:	8/6/2019
State Project No.:	50230.1.1	County:	Haywood
Federal ID No.:		TIP No.:	U-5839
Project Name: Russ Avenue US 276 from US 23/74 to US 23 Business			
Client Name: CALYX		Client Address: Cary, NC	

Sample No.	Station	Offset	Alignment	Sample Depth (ft)	AASHTO Classification	Total % Passing Sieve #				Total Mortar Fraction (%)				LL	PL	PI	Moist. %
						10	40	60	200	Coarse Sand	Fine Sand	Silt	Clay				
SS-1135	49+90	53 LT	-L-	0.8-2.3	A-4(0)	95	76	65	40.2	31	33	27	9	36	33	3	20.3
SS-1155	28+00	60 LT	-L-	0.7-2.2	A-4(0)	89	72	55	43.9	28	28	27	16	30	24	6	13.9
SS-1204	51+70	70 RT	-L-	0.8-2.3	A-5(5)	97	90	84	61.8	14	30	36	20	41	33	8	24.0
SS-1214	26+60	60 LT	-L-	0.8-2.3	A-7-6(14)	100	89	84	71.2	14	17	17	53	42	21	21	24.5
SS-1224	30+49	22 LT	-L-	18.5-20.0	A-2-4(0)	81	63	49	21.5	40	39	17	4	29	28	1	14.4
SS-1225	30+49	22 LT	-L-	23.5-25.0	A-2-4(0)	97	71	54	22.4	45	38	16	2	NP	NP	NP	19.0
SS-1231	15+00	42 LT	Y21RPB	3.5-5.0	A-2-4(0)	77	57	46	25.2	40	32	22	6	35	34	1	14.4
SS-1244	48+00	73 LT	-L-	3.5-5.0	A-4(1)	100	88	79	51.5	21	37	34	8	39	35	4	21.8
SS-1252	12+00	72 RT	Y10	0.6-2.1	A-4(0)	95	76	65	41.3	31	31	24	13	29	27	2	21.9
SS-1257	48+35	90 LT	-L-	0.9-2.4	A-5(8)	100	100	100	90.1	0	24	63	13	42	37	5	21.0
SS-1280	48+40	45 RT	-L-	0.7-2.2	A-7-5(10)	100	90	82	60.5	18	26	19	37	52	35	17	25.9
SS-1293	49+50	92 RT	-L-	3.5-5.0	A-4(0)	95	82	73	47.0	23	34	29	14	34	30	4	19.6
SS-1366	14+00	10 LT	Y2A	1.3-2.8	A-7-6(15)	96	84	78	64.1	19	17	16	47	47	21	26	26.8

References / Comments / Deviations: ND=Not Determined. NP=Non-Plastic.

AASHTO T88: Particle Size Analysis of Soils as Modified by the NCDOT

AASHTO T89: Determining the Liquid Limit of Soils

AASHTO T90: Determining the Plastic Limit & Plasticity Index of Soils

AASHTO T265: Laboratory Determination of Moisture Content of Soils

AASHTO M145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Karen Warner

Technician Name:

VCDOT 118-06-030

Signature

Certification #

Joey Daily, P.E.

Technical Responsibility:

Project Manager

Position

This report shall not be reproduced, except in full, without the written approval of S&ME, Inc.