

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-2729	1	19

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.

ROADWAY
SUBSURFACE INVESTIGATION

COUNTY FORSYTH
PROJECT DESCRIPTION SR 1672 (HANES MILL ROAD)
FROM MUSEUM DRIVE TO NC 66
(UNIVERSITY PARKWAY) IN WINSTON-SALEM
INVENTORY

CONTENTS

LINE	STATION	PLAN	PROFILE
-L-	12+00 - 52+50	4-6	7-8
-Y1A-	10+00 - 12+39	4	8
-Y1B-	10+31 - 11+32	4	8
-Y2-	11+34 - 12+29	5	9
-LPA-	13+50 - 18+60	5	9
-LPB-	15+50 - 20+15	5	10
-RPA-	17+50 - 22+52	5	10
-RPB-	23+50 - 27+40	5	11
-Y5-	10+35 - 11+76	6	11
-Y6A-	11+80 - 18+08	6	12
-Y6B-	10+00 - 13+30	6	12
-RDBT-	10+00 - 13+71	4	12

CROSS SECTIONS

LINE	STATION	SHEETS
-L-	32+50	13
-L-	34+00	13
-L-	35+00	14
-L-	36+50	14
-L-	38+00 - 41+00	15-16
-Y6A-	15+00 - 18+00	17-18
SUMMARY OF LAB TEST RESULTS		19

REFERENCE: U-2729

PROJECT: 34853

PERSONNEL

M. LEAR

C. TREMBLAY

L. GONZALEZ-CASTILLO

INVESTIGATED BY WOOD E&S, INC.

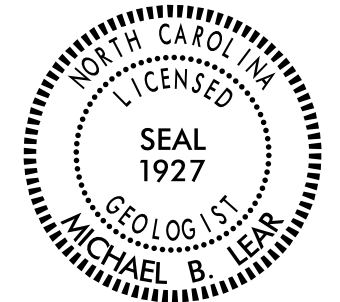
DRAWN BY R. RAHIE

CHECKED BY S. JOHNSON

SUBMITTED BY M. LEAR

DATE DECEMBER, 2018

NC Engineering F-1253 NC Geology C-247

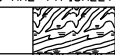

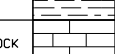
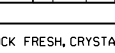


DocuSigned by:
Michael B. Lear 12/14/2018

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

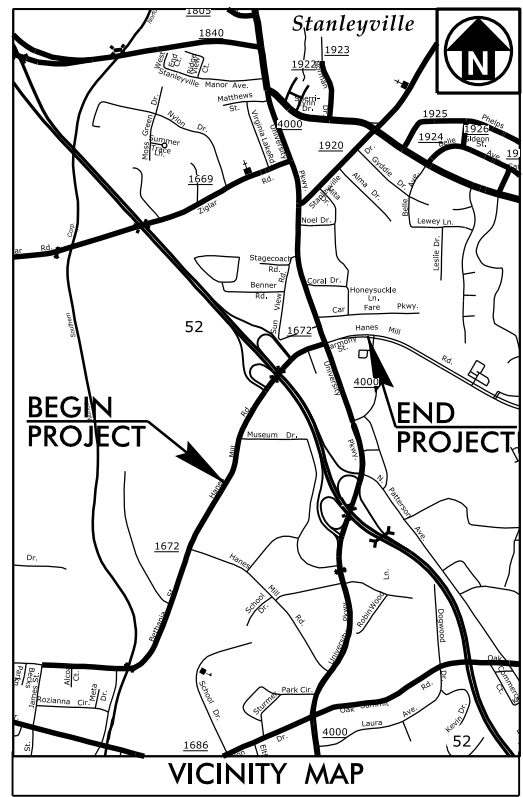
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION										GRADATION				ROCK DESCRIPTION				TERMS AND DEFINITIONS																																																																																																
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS LIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 208; 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>										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.				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:  NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.  FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.  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 SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.				ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (ROQ) - 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 (SROQ) - 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.																																																																																																
SOIL LEGEND AND AASHTO CLASSIFICATION										ANGULARITY OF GRAINS				WEATHERING																																																																																																				
<table border="1"> <thead> <tr> <th>GENERAL CLASS.</th> <th colspan="4">GRANULAR MATERIALS (≤ 35% PASSING #200)</th> <th colspan="4">SILT-CLAY MATERIALS (> 35% PASSING #200)</th> <th colspan="2">ORGANIC MATERIALS</th> </tr> <tr> <th>GROUP CLASS.</th> <th>A-1</th> <th>A-3</th> <th>A-2</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> <tr> <th>SYMBOL</th> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <th>% PASSING #10 #40 #200</th> <td>50 MX 30 MX 15 MX</td> <td>50 MX 25 MX 10 MX</td> <td>51 MN 35 MX 35 MX</td> <td>35 MX 35 MX 35 MX</td> <td>36 MN 36 MN</td> <td>36 MN 36 MN</td> <td>36 MN 36 MN</td> <td>GRANULAR SOILS</td> <td>SILT-CLAY SOILS</td> <td>MUCK, PEAT</td> <td></td> </tr> <tr> <th>MATERIAL PASSING #40 LL PI</th> <td>- 6 MX</td> <td>- NP</td> <td>40 MX 41 MN 10 MX 11 MN</td> <td>40 MX 41 MN 10 MX 11 MN</td> <td>40 MX 41 MN 10 MX 11 MN</td> <td>40 MX 41 MN 10 MX 11 MN</td> <td>SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</td> <td colspan="2">HIGHLY ORGANIC SOILS</td> <td></td> <td></td> </tr> <tr> <th>GROUP INDEX</th> <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> </tr> <tr> <th>USUAL TYPES OF MAJOR MATERIALS</th> <td colspan="2">STONE FRAGS. GRAVEL, AND SAND</td> <td>FINE SAND</td> <td colspan="2">SILTY OR CLAYEY GRAVEL AND SAND</td> <td>SILTY SOILS</td> <td>CLAYEY SOILS</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <th>GEN. RATING AS SUBGRADE</th> <td colspan="4">EXCELLENT TO GOOD</td> <td colspan="2">FAIR TO POOR</td> <td>FAIR TO POOR</td> <td>POOR</td> <td>UNSATURABLE</td> <td></td> <td></td> </tr> </thead> </table>										GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)				SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		GROUP CLASS.	A-1	A-3	A-2	A-4	A-5	A-6	A-7	A-1, A-2	A-3	A-4, A-5	A-6, A-7	SYMBOL												% PASSING #10 #40 #200	50 MX 30 MX 15 MX	50 MX 25 MX 10 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	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT		MATERIAL PASSING #40 LL PI	- 6 MX	- NP	40 MX 41 MN 10 MX 11 MN	40 MX 41 MN 10 MX 11 MN	40 MX 41 MN 10 MX 11 MN	40 MX 41 MN 10 MX 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER	HIGHLY ORGANIC SOILS				GROUP INDEX	0	0	0	4 MX	8 MX	12 MX	16 MX	NO MX				USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND		SILTY SOILS	CLAYEY SOILS					GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD				FAIR TO POOR		FAIR TO POOR	POOR	UNSATURABLE			THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.				FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE. VERY SLIGHT (V.SL.) 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 (SL.) ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. MODERATE (MOD.) SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK. MODERATELY SEVERE (MOD. SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. IF TESTED, WOULD YIELD SPT REFUSAL. SEVERE (SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF. VERY SEVERE (V. SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF. COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. FABRIC MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.					
GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)				SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS																																																																																																									
GROUP CLASS.	A-1	A-3	A-2	A-4	A-5	A-6	A-7	A-1, A-2	A-3	A-4, A-5	A-6, A-7																																																																																																							
SYMBOL																																																																																																																		
% PASSING #10 #40 #200	50 MX 30 MX 15 MX	50 MX 25 MX 10 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	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT																																																																																																								
MATERIAL PASSING #40 LL PI	- 6 MX	- NP	40 MX 41 MN 10 MX 11 MN	40 MX 41 MN 10 MX 11 MN	40 MX 41 MN 10 MX 11 MN	40 MX 41 MN 10 MX 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER	HIGHLY ORGANIC SOILS																																																																																																										
GROUP INDEX	0	0	0	4 MX	8 MX	12 MX	16 MX	NO MX																																																																																																										
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND		SILTY SOILS	CLAYEY SOILS																																																																																																											
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD				FAIR TO POOR		FAIR TO POOR	POOR	UNSATURABLE																																																																																																									
CONSISTENCY OR DENSENESS										MINERALOGICAL COMPOSITION				GROUND WATER																																																																																																				
<table border="1"> <thead> <tr> <th>PRIMARY SOIL TYPE</th> <th>COMPACTNESS OR CONSISTENCY</th> <th>RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)</th> <th>RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT²)</th> </tr> </thead> <tbody> <tr> <td>GENERALLY GRANULAR MATERIAL (NON-COHESIVE)</td> <td>VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE</td> <td>< 4 4 TO 10 10 TO 30 30 TO 50 > 50</td> <td>N/A</td> </tr> <tr> <td>GENERALLY SILT-CLAY MATERIAL (COHESIVE)</td> <td>VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD</td> <td>< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30</td> <td>< 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4</td> </tr> </tbody> </table>										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	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.				<table border="1"> <thead> <tr> <th>ORGANIC MATERIAL</th> <th>GRANULAR SOILS</th> <th>SILT - CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> </thead> <tbody> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>TRACE 1 - 10%</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE 10 - 20%</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME 20 - 35%</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>> 10%</td> <td>> 20%</td> <td>HIGHLY 35% AND ABOVE</td> </tr> </tbody> </table>				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	<table border="1"> <thead> <tr> <th>SYMBOL</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td></td> <td>WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING</td> </tr> <tr> <td></td> <td>STATIC WATER LEVEL AFTER 24 HOURS</td> </tr> <tr> <td></td> <td>PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA</td> </tr> <tr> <td></td> <td>SPRING OR SEEP</td> </tr> </tbody> </table>				SYMBOL	DESCRIPTION		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																																																			
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																																																																																																															
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																																																																																																															
SYMBOL	DESCRIPTION																																																																																																																	
	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																																																																																																																	
TEXTURE OR GRAIN SIZE										MISCELLANEOUS SYMBOLS				ROCK HARDNESS																																																																																																				
<table border="1"> <thead> <tr> <th>U.S. STD. SIEVE SIZE (OPENING (MM))</th> <th>4</th> <th>10</th> <th>40</th> <th>60</th> <th>200</th> <th>270</th> </tr> <tr> <th></th> <th>4.75</th> <th>2.00</th> <th>0.42</th> <th>0.25</th> <th>0.075</th> <th>0.053</th> </tr> <tr> <th>BOULDER (BLDR.)</th> <th>COBBLE (COB.)</th> <th>GRAVEL (GR.)</th> <th>COARSE SAND (CSE. SD.)</th> <th>FINE SAND (F. SD.)</th> <th>SILT (SL.)</th> <th>CLAY (CL.)</th> </tr> </thead> <tbody> <tr> <td>GRAIN SIZE</td> <td>MM 305 IN. 12</td> <td>75</td> <td>2.0</td> <td>0.25</td> <td>0.05</td> <td>0.005</td> </tr> </tbody> </table>										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.)	GRAIN SIZE	MM 305 IN. 12	75	2.0	0.25	0.05	0.005	<table border="1"> <thead> <tr> <th>SYMBOL</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td></td> <td>ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION</td> </tr> <tr> <td></td> <td>SOIL SYMBOL</td> </tr> <tr> <td></td> <td>ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT</td> </tr> <tr> <td></td> <td>INFERRED SOIL BOUNDARY</td> </tr> <tr> <td></td> <td>INFERRED ROCK LINE</td> </tr> <tr> <td></td> <td>ALLUVIAL SOIL BOUNDARY</td> </tr> <tr> <td></td> <td>DIP & DIP DIRECTION OF ROCK STRUCTURES</td> </tr> <tr> <td></td> <td>SPT TEST BORING</td> </tr> <tr> <td></td> <td>AUGER BORING</td> </tr> <tr> <td></td> <td>CORE BORING</td> </tr> <tr> <td></td> <td>MONITORING WELL</td> </tr> <tr> <td></td> <td>PIEZOMETER INSTALLATION</td> </tr> <tr> <td></td> <td>SLOPE INDICATOR INSTALLATION</td> </tr> <tr> <td></td> <td>CONE PENETROMETER TEST</td> </tr> <tr> <td></td> <td>SOUNDING ROD</td> </tr> <tr> <td></td> <td>TEST BORING WITH CORE</td> </tr> <tr> <td></td> <td>SPT N-VALUE</td> </tr> </tbody> </table>				SYMBOL	DESCRIPTION		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		SPT 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	<table border="1"> <thead> <tr> <th>SYMBOL</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td></td> <td>UNDERCUT</td> </tr> <tr> <td></td> <td>SHALLOW UNDERCUT</td> </tr> <tr> <td></td> <td>UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE</td> </tr> <tr> <td></td> <td>UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK</td> </tr> <tr> <td></td> <td>UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL</td> </tr> </tbody> </table>				SYMBOL	DESCRIPTION		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																					
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.)																																																																																																												
GRAIN SIZE	MM 305 IN. 12	75	2.0	0.25	0.05	0.005																																																																																																												
SYMBOL	DESCRIPTION																																																																																																																	
	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																																																																																																																	
	SPT 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																																																																																																																	
SYMBOL	DESCRIPTION																																																																																																																	
	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																																																																																																																	
SOIL MOISTURE - CORRELATION OF TERMS										RECOMMENDATION SYMBOLS				ABBREVIATIONS																																																																																																				
<table border="1"> <thead> <tr> <th>SOIL MOISTURE SCALE (ATTERBERG LIMITS)</th> <th>FIELD MOISTURE DESCRIPTION</th> <th>GUIDE FOR FIELD MOISTURE DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>LL</td> <td rowspan="2">- SATURATED - (SAT.)</td> <td rowspan="2">USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE</td> </tr> <tr> <td>PL</td> </tr> <tr> <td>PLASTIC RANGE (PI)</td> <td>- WET - (W)</td> <td>SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE</td> </tr> <tr> <td>OM</td> <td>- MOIST - (M)</td> <td>SOLID; AT OR NEAR OPTIMUM MOISTURE</td> </tr> <tr> <td>SL</td> <td>- DRY - (D)</td> <td>REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE</td> </tr> </tbody> </table>										SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION	LL	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE	PL	PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE	OM	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE	SL	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	<table border="1"> <thead> <tr> <th>SYMBOL</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td></td> <td>CME-45C</td> </tr> <tr> <td><input type="checkbox"/> CME-55</td> <td>CME-55</td> </tr> <tr> <td><input checked="" type="checkbox"/> CME-550</td> <td>CME-550</td> </tr> <tr> <td><input type="checkbox"/> VANE SHEAR TEST</td> <td>VANE SHEAR TEST</td> </tr> <tr> <td><input type="checkbox"/> PORTABLE HOIST</td> <td>PORTABLE HOIST</td> </tr> <tr> <td><input checked="" type="checkbox"/> CME-550X</td> <td>CME-550X</td> </tr> <tr> <td><input type="checkbox"/> _____</td> <td>_____</td> </tr> </tbody> </table>				SYMBOL	DESCRIPTION		CME-45C	<input type="checkbox"/> CME-55	CME-55	<input checked="" type="checkbox"/> CME-550	CME-550	<input type="checkbox"/> VANE SHEAR TEST	VANE SHEAR TEST	<input type="checkbox"/> PORTABLE HOIST	PORTABLE HOIST	<input checked="" type="checkbox"/> CME-550X	CME-550X	<input type="checkbox"/> _____	_____	<table border="1"> <thead> <tr> <th>AR</th> <th>BT</th> <th>CL</th> <th>CPT</th> <th>CSE</th> <th>DPT</th> <th>e</th> <th>F</th> <th>FOSS.</th> <th>FRAC.</th> <th>FRAGS.</th> <th>HI.</th> <th>MED.</th> <th>MICA</th> <th>MOD.</th> <th>NP</th> <th>ORG.</th> <th>PMT</th> <th>SAP.</th> <th>SD.</th> <th>SL.</th> <th>SLI.</th> <th>TCR</th> <th>w</th> <th>V</th> <th>VST</th> <th>WEA.</th> <th>UNIT WEIGHT</th> <th>DRY UNIT WEIGHT</th> <th>SAMPLE ABBREVIATIONS</th> </tr> </thead> <tbody> <tr> <td>AR - AUGER REFUSAL</td> <td>BT - BORING TERMINATED</td> <td>CL - CLAY</td> <td>CPT - CONE PENETRATION TEST</td> <td>CSE - COARSE</td> <td>DPT - DILATOMETER TEST</td> <td>e - VOID RATIO</td> <td>F - FINE</td> <td>FOSS. - FOSSILIFEROUS</td> <td>FRAC. - FRACTURED, FRACTURES</td> <td>FRAGS. - FRAGMENTS</td> <td>HI. - HIGHLY</td> <td>MED. - MEDIUM</td> <td>MICA - MICACEOUS</td> <td>MOD. - MODERATELY</td> <td>NP - NON PLASTIC</td> <td>ORG. - ORGANIC</td> <td>PMT - PRESSUREMETER TEST</td> <td>SAP. - SAPROLITIC</td> <td>SD. - SAND, SANDY</td> <td>SL. - SILT, SILTY</td> <td>SLI. - SLIGHTLY</td> <td>TCR - TRICONE REFUSAL</td> <td>w - MOISTURE CONTENT</td> <td>V - VERY</td> <td>VST - VANE SHEAR TEST</td> <td>WEA. - WEATHERED</td> <td>UNIT WEIGHT</td> <td>DRY UNIT WEIGHT</td> <td>S - BULK</td> <td>SS - SPLIT SPOON</td> <td>ST - SHELBY TUBE</td> <td>RS - ROCK</td> <td>RT - RECOMPACTED TRIAXIAL</td> <td>CBR - CALIFORNIA BEARING RATIO</td> </tr> </tbody> </table>				AR	BT	CL	CPT	CSE	DPT	e	F	FOSS.	FRAC.	FRAGS.	HI.	MED.	MICA	MOD.	NP	ORG.	PMT	SAP.	SD.	SL.	SLI.	TCR	w	V	VST	WEA.	UNIT WEIGHT	DRY UNIT WEIGHT	SAMPLE ABBREVIATIONS	AR - AUGER REFUSAL	BT - BORING TERMINATED	CL - CLAY	CPT - CONE PENETRATION TEST	CSE - COARSE	DPT - DILATOMETER 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	S - BULK	SS - SPLIT SPOON	ST - SHELBY TUBE	RS - ROCK	RT - RECOMPACTED TRIAXIAL	CBR - CALIFORNIA BEARING RATIO
SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION																																																																																																																
LL	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE																																																																																																																
PL																																																																																																																		
PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE																																																																																																																
OM	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE																																																																																																																
SL	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE																																																																																																																
SYMBOL	DESCRIPTION																																																																																																																	
	CME-45C																																																																																																																	
<input type="checkbox"/> CME-55	CME-55																																																																																																																	
<input checked="" type="checkbox"/> CME-550	CME-550																																																																																																																	
<input type="checkbox"/> VANE SHEAR TEST	VANE SHEAR TEST																																																																																																																	
<input type="checkbox"/> PORTABLE HOIST	PORTABLE HOIST																																																																																																																	
<input checked="" type="checkbox"/> CME-550X	CME-550X																																																																																																																	
<input type="checkbox"/> _____	_____																																																																																																																	
AR	BT	CL	CPT	CSE	DPT	e	F	FOSS.	FRAC.	FRAGS.	HI.	MED.	MICA	MOD.	NP	ORG.	PMT	SAP.	SD.	SL.	SLI.	TCR	w	V	VST	WEA.	UNIT WEIGHT	DRY UNIT WEIGHT	SAMPLE ABBREVIATIONS																																																																																					
AR - AUGER REFUSAL	BT - BORING TERMINATED	CL - CLAY	CPT - CONE PENETRATION TEST	CSE - COARSE	DPT - DILATOMETER 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	S - BULK	SS - SPLIT SPOON	ST - SHELBY TUBE	RS - ROCK	RT - RECOMPACTED TRIAXIAL	CBR - CALIFORNIA BEARING RATIO																																																																																
PLASTICITY										EQUIPMENT USED ON SUBJECT PROJECT				FRACTURE SPACING																																																																																																				
<table border="1"> <thead> <tr> <th>NON PLASTIC</th> <th>SLIGHTLY PLASTIC</th> <th>MODERATELY PLASTIC</th> <th>HIGHLY PLASTIC</th> <th>PLASTICITY INDEX (PI)</th> <th>DRY STRENGTH</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td>0-5</td> <td>VERY LOW</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>6-15</td> <td>SLIGHT</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>16-25</td> <td>MEDIUM</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>26 OR MORE</td> <td>HIGH</td> </tr> </tbody> </table>										NON PLASTIC	SLIGHTLY PLASTIC	MODERATELY PLASTIC	HIGHLY PLASTIC	PLASTICITY INDEX (PI)	DRY STRENGTH					0-5	VERY LOW					6-15	SLIGHT					16-25	MEDIUM					26 OR MORE	HIGH	<table border="1"> <thead> <tr> <th>DRILL UNITS:</th> <th>ADVANCING TOOLS:</th> <th>HAMMER TYPE:</th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/> CME-45C</td> <td><input type="checkbox"/> CLAY BITS</td> <td><input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL</td> </tr> <tr> <td><input type="checkbox"/> CME-55</td> <td><input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER</td> <td>CORE SIZE:</td> </tr> <tr> <td><input checked="" type="checkbox"/> CME-550</td> <td><input checked="" type="checkbox"/> 8" HOLLOW AUGERS</td> <td><input type="checkbox"/> -B _____ <input type="checkbox"/> -H _____</td> </tr> <tr> <td><input type="checkbox"/> VANE SHEAR TEST</td> <td><input type="checkbox"/> HARD FACED FINGER BITS</td> <td><input type="checkbox"/> -N _____</td> </tr> <tr> <td><input type="checkbox"/> PORTABLE HOIST</td> <td><input type="checkbox"/> TUNG-CARBIDE INSERTS</td> <td>HAND TOOLS:</td> </tr> <tr> <td><input checked="" type="checkbox"/> CME-550X</td> <td><input type="checkbox"/> CASING _____ w/ ADVANCER</td> <td><input type="checkbox"/> POST HOLE DIGGER</td> </tr> <tr> <td><input type="checkbox"/> _____</td> <td><input type="checkbox"/> TRICONE _____ *STEEL TEETH</td> <td><input type="checkbox"/> HAND AUGER</td> </tr> <tr> <td><input type="checkbox"/> _____</td> <td><input type="checkbox"/> TRICONE _____ *TUNG-CARB.</td> <td><input type="checkbox"/> SOUNDING ROD</td> </tr> <tr> <td><input type="checkbox"/> _____</td> <td><input type="checkbox"/> CORE BIT</td> <td><input type="checkbox"/> VANE SHEAR TEST</td> </tr> <tr> <td><input type="checkbox"/> _____</td> <td><input checked="" type="checkbox"/> NW CASING</td> <td></td> </tr> </tbody> </table>				DRILL UNITS:	ADVANCING TOOLS:	HAMMER TYPE:	<input type="checkbox"/> CME-45C	<input type="checkbox"/> CLAY BITS	<input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL	<input type="checkbox"/> CME-55	<input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER	CORE SIZE:	<input checked="" type="checkbox"/> CME-550	<input checked="" type="checkbox"/> 8" HOLLOW AUGERS	<input type="checkbox"/> -B _____ <input type="checkbox"/> -H _____	<input type="checkbox"/> VANE SHEAR TEST	<input type="checkbox"/> HARD FACED FINGER BITS	<input type="checkbox"/> -N _____	<input type="checkbox"/> PORTABLE HOIST	<input type="checkbox"/> TUNG-CARBIDE INSERTS	HAND TOOLS:	<input checked="" type="checkbox"/> CME-550X	<input type="checkbox"/> CASING _____ w/ ADVANCER	<input type="checkbox"/> POST HOLE DIGGER	<input type="checkbox"/> _____	<input type="checkbox"/> TRICONE _____ *STEEL TEETH	<input type="checkbox"/> HAND AUGER	<input type="checkbox"/> _____	<input type="checkbox"/> TRICONE _____ *TUNG-CARB.	<input type="checkbox"/> SOUNDING ROD	<input type="checkbox"/> _____	<input type="checkbox"/> CORE BIT	<input type="checkbox"/> VANE SHEAR TEST	<input type="checkbox"/> _____	<input checked="" type="checkbox"/> NW CASING		<table border="1"> <thead> <tr> <th>TERM</th> <th>SPACING</th> <th>TERM</th> <th>THICKNESS</th> </tr> </thead> <tbody> <tr> <td>VERY WIDE</td> <td>MORE THAN 10 FEET</td> <td>VERY THICKLY BEDDED</td> <td>4 FEET</td> </tr> <tr> <td>WIDE</td> <td>3 TO 10 FEET</td> <td>THICKLY BEDDED</td> <td>1.5 - 4 FEET</td> </tr> <tr> <td>MODERATELY CLOSE</td> <td>1 TO 3 FEET</td> <td>THINLY BEDDED</td> <td>0.16 - 1.5 FEET</td> </tr> <tr> <td>CLOSE</td> <td>0.16 TO 1 FOOT</td> <td>VERY THINLY BEDDED</td> <td>0.03 - 0.16 FEET</td> </tr> <tr> <td>VERY CLOSE</td> <td>LESS THAN 0.16 FEET</td> <td>THICKLY LAMINATED</td> <td>0.008 - 0.03 FEET</td> </tr> <tr> <td></td> <td></td> <td>THINLY LAMINATED</td> <td>< 0.008 FEET</td> </tr> </tbody> </table>				TERM	SPACING	TERM	THICKNESS	VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED	4 FEET	WIDE	3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET	MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5 FEET	CLOSE	0.16 TO 1 FOOT	VERY THINLY BEDDED	0.03 - 0.16 FEET	VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET			THINLY LAMINATED	< 0.008 FEET						
NON PLASTIC	SLIGHTLY PLASTIC	MODERATELY PLASTIC	HIGHLY PLASTIC	PLASTICITY INDEX (PI)	DRY STRENGTH																																																																																																													
				0-5	VERY LOW																																																																																																													
				6-15	SLIGHT																																																																																																													
				16-25	MEDIUM																																																																																																													
				26 OR MORE	HIGH																																																																																																													
DRILL UNITS:	ADVANCING TOOLS:	HAMMER TYPE:																																																																																																																
<input type="checkbox"/> CME-45C	<input type="checkbox"/> CLAY BITS	<input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL																																																																																																																
<input type="checkbox"/> CME-55	<input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER	CORE SIZE:																																																																																																																
<input checked="" type="checkbox"/> CME-550	<input checked="" type="checkbox"/> 8" HOLLOW AUGERS	<input type="checkbox"/> -B _____ <input type="checkbox"/> -H _____																																																																																																																
<input type="checkbox"/> VANE SHEAR TEST	<input type="checkbox"/> HARD FACED FINGER BITS	<input type="checkbox"/> -N _____																																																																																																																
<input type="checkbox"/> PORTABLE HOIST	<input type="checkbox"/> TUNG-CARBIDE INSERTS	HAND TOOLS:																																																																																																																
<input checked="" type="checkbox"/> CME-550X	<input type="checkbox"/> CASING _____ w/ ADVANCER	<input type="checkbox"/> POST HOLE DIGGER																																																																																																																
<input type="checkbox"/> _____	<input type="checkbox"/> TRICONE _____ *STEEL TEETH	<input type="checkbox"/> HAND AUGER																																																																																																																
<input type="checkbox"/> _____	<input type="checkbox"/> TRICONE _____ *TUNG-CARB.	<input type="checkbox"/> SOUNDING ROD																																																																																																																
<input type="checkbox"/> _____	<input type="checkbox"/> CORE BIT	<input type="checkbox"/> VANE SHEAR TEST																																																																																																																
<input type="checkbox"/> _____	<input checked="" type="checkbox"/> NW CASING																																																																																																																	
TERM	SPACING	TERM	THICKNESS																																																																																																															
VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED	4 FEET																																																																																																															
WIDE	3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET																																																																																																															
MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5 FEET																																																																																																															
CLOSE	0.16 TO 1 FOOT	VERY THINLY BEDDED	0.03 - 0.16 FEET																																																																																																															
VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET																																																																																																															
		THINLY LAMINATED	< 0.008 FEET																																																																																																															
COLOR										BEDDING				INDURATION																																																																																																				
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-BROWN). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.										<table border="1"> <thead> <tr> <th>TERM</th> <th>THICKNESS</th> </tr> </thead> <tbody> <tr> <td>VERY THICKLY BEDDED</td> <td>4 FEET</td> </tr> <tr> <td>THICKLY BEDDED</td> <td>1.5 - 4 FEET</td> </tr> <tr> <td>THINLY BEDDED</td> <td>0.16 - 1.5 FEET</td> </tr> <tr> <td>VERY THINLY BEDDED</td> <td>0.03 - 0.16 FEET</td> </tr> <tr> <td>THICKLY LAMINATED</td> <td>0.008 - 0.03 FEET</td> </tr> <tr> <td>THINLY LAMINATED</td> <td>< 0.008 FEET</td> </tr> </tbody> </table>				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	<table border="1"> <thead> <tr> <th>TERM</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>FRIABLE</td> <td>RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.</td> </tr> <tr> <td>MODERATELY INDURATED</td> <td>GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.</td> </tr> <tr> <td>INDURATED</td> <td>GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</td> </tr> <tr> <td>EXTREMELY INDURATED</td> <td>SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</td> </tr> </tbody> </table>				TERM	DESCRIPTION	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.																																																																									
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																																																																																																																	
TERM	DESCRIPTION																																																																																																																	
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.																																																																																																																	
BENCH MARK: BORING ELEVATIONS OBTAINED FROM TIN FILE PROVIDED BY NCDOT, U2729_ls_tin.tin.										ELEVATION: N/A FEET				NOTES:																																																																																																				
														FIAD - FILLED IMMEDIATELY AFTER DRILLING																																																																																																				

14-DEC-2018 08:07 P:\Transportation\Projects\Road\DOT\2018\646888106 U-2729 Hanes Mill Road\6.0 Deliverables\U2729_GEO_RDWY\CADD_GEO\TECH\PlanProf\U2729_rdy_tsh_GEO_INV.dgn \$\$\$USERNAME\$\$\$

TIP PROJECT: U-2729

CONTRACT:



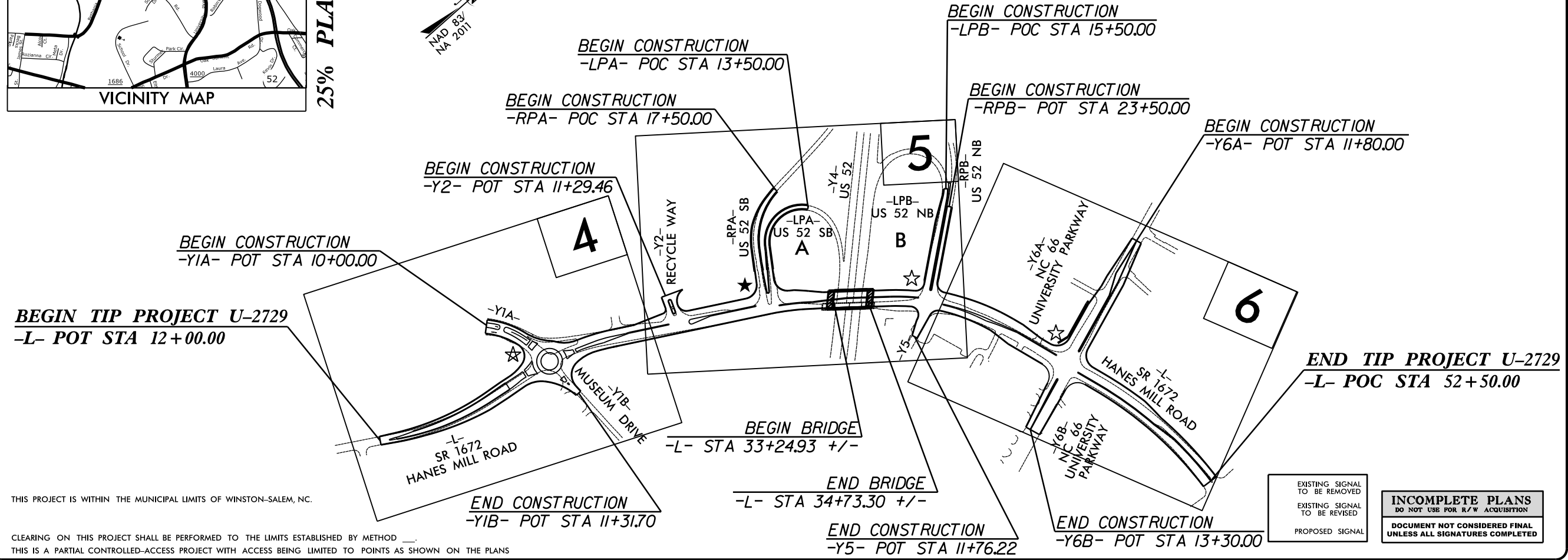
25% PLANS

STATE OF NORTH CAROLINA
 DIVISION OF HIGHWAYS
FORSYTH COUNTY

**LOCATION: SR 1672 (HANES MILL ROAD) FROM MUSEUM DRIVE TO
 NC 66 (UNIVERSITY PARKWAY) IN WINSTON-SALEM**

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2729	3	19
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34853.1.2		PE	

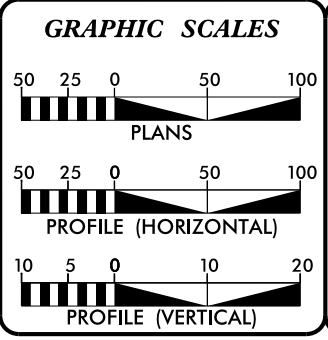


THIS PROJECT IS WITHIN THE MUNICIPAL LIMITS OF WINSTON-SALEM, NC.

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD ____.
 THIS IS A PARTIAL CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS AS SHOWN ON THE PLANS

EXISTING SIGNAL TO BE REMOVED
 EXISTING SIGNAL TO BE REVISED
 PROPOSED SIGNAL

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



DESIGN DATA

ADT 2016 =	17,700
ADT 2040 =	22,700
K =	8 %
D =	60 %
T =	5 % *
V =	50 MPH
* (TTST 1% + DUAL 4%)	
FUNC CLASS =	MAJOR COLLECTOR
REGIONAL TIER	

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-2729 =	0.739 MILES
LENGTH STRUCTURE TIP PROJECT U-2729 =	0.028 MILES
TOTAL LENGTH OF TIP PROJECT U-2729 =	0.767 MILES

TOTAL PROJECT LENGTH BASED ON -L- STATIONS.

PLANS PREPARED FOR THE NCDOT BY:

M	PO Box 700 Fayetteville, NC 27526 (919) 552-2253
M	(919) 552-2254 (Fax) www.motmac.com/motmac
MOTT	LICENSE NO. F-9669

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
FEBRUARY 27, 2019

LETTING DATE:
MAY 19, 2020

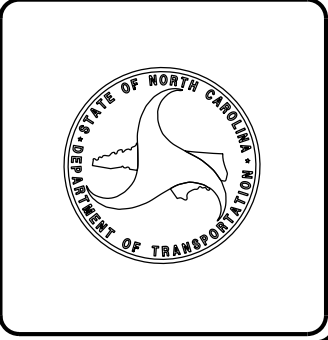
DAVID C. WALLER, PE PROJECT ENGINEER PEF ENGINEER
JEFFREY R. COOKE PROJECT DESIGN ENGINEER PEF ENGINEER
CONNIE JAMES, PE NCDOT DIVISION PROJECT ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: _____ P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: _____ P.E.



December 10, 2018

WBS Number: 34853.1.2
 TIP Number: U-2729
 COUNTY: Forsyth
 DESCRIPTION: SR 1672 (Hanes Mill Road) from Museum Drive to NC 66 (University Parkway) in Winston-Salem
 WOOD E&IS Number: 6468188106
 SUBJECT: Geotechnical Inventory Report

Project Description

The project consists of proposed roadway widening of Hanes Mill Road (-L-) from just south of Museum Drive (-Y1B-) to just east of University Parkway (-Y6A- and -Y6B-), located approximately 7 miles north of downtown Winston-Salem in Forsyth County. The proposed roadway widening will accommodate two travel lanes in both directions as well as median and outside turning lanes, a new roundabout (-RDBT-) at the intersection of Hanes Mill Road and Museum Drive, and widening of intersecting roads, ramps, and loops (-Y1A-, -Y2-, -RPA-, -LPA-, -LPB-, -RPB-, and -Y5-). The project includes construction of a new bridge to carry Hanes Mill Road over US 52, which will replace the existing structure at the current location.

The geotechnical field investigation for the roadway portion of the project was conducted during October 2018. A CME-550X ATV drill rig equipped with an automatic hammer was used during the investigation. Hollow-stem auger drilling procedures were used to advance borings to the required depths. Standard Penetration Tests (SPT) were performed at approximately 2.5-foot to 5.0-foot intervals to termination in selected borings. A hand auger boring was performed to complete a boring that was abandoned due to site utility issues at that location. The hand auger boring was advanced to a depth of six feet. Representative soil samples were collected for visual classification in the field and selected samples were submitted for laboratory analysis.

The following alignments, totalling approximately 1.5 miles, were explored. Subsurface profiles and/or cross sections of these alignments are included in this report.

<u>Alignment</u>	<u>Station (±)</u>
-L-	12+00 to 52+50
-Y1A-	10+00 to 12+39
-Y1B-	10+31 to 11+32
-Y2-	11+34 to 12+29
-LPA-	13+50 to 18+60
-LPB-	15+50 to 20+15
-RPA-	17+50 to 22+52
-RPB-	23+50 to 27+40
-Y5-	10+35 to 11+76
-Y6A-	11+80 to 18+08
-Y6B-	10+00 to 13+30
-RDBT-	10+00 to 13+71

Areas of Special Geotechnical Interest

1) Highly Plastic Clays: Highly plastic clays (PI>25) were encountered on the project at the following section.

<u>Line</u>	<u>Stations (±)</u>	<u>Offsets (ft.)</u>
-L-	38+00 to 41+00	LT to RT

2) Soft Fine Grained Soils: The following sections contain soft, fine grained/cohesive soils which have the potential to cause embankment/subgrade and/or slope stability problems during construction.

<u>Line</u>	<u>Stations (±)</u>	<u>Offsets (ft.)</u>
-L-	37+75 to 38+75	LT to RT
-Y5-	10+34 to 11+76	LT to RT
-Y6A-	16+25 to 17+70	RT
-RDBT-	10+00 to 13+70	LT to RT

3) Artificial Fill: Artificial fill was encountered at the following locations:

<u>Line</u>	<u>Stations (±)</u>	<u>Offsets (ft.)</u>
-L-	39+50 to 41+20	LT
-L-	41+20 to 41+75	LT and RT
-L-	41+75 to 43+86	LT
-L-	44+78 to 49+26	LT
-L-	50+30 to 52+50	LT
-Y6A-	16+25 to 17+70	LT and RT

Several smaller areas of artificial fill are present throughout the project corridor and are related to gravel and soil driveways or previous infrastructure construction.

4) Wells: Four existing residential water supply wells or ground water monitoring wells were observed on or within close proximity to the right of way on this project at the following locations:

<u>Line</u>	<u>Station (±)</u>	<u>Offset (ft.)</u>
-L-	39+39	126 LT
-L-	41+57	49 LT
-Y6B-	13+82	121 LT
-Y6B-	14+91	124 LT

5) Ponds: One pond is located within close proximity to the right of way on this project at the following location:

<u>Line</u>	<u>Station (±)</u>	<u>Offset (ft.)</u>
-L-	48+88 to 49+68	175 LT to 292 LT

Physiography and Geology

The project site is located within the Piedmont Physiographic Province. The topography along the project is mostly gently rolling hills and long low ridges. Elevations along the project alignments range from a low of 865± feet at the start of the project to a high of 915± feet in the middle of the project. A mixture of mostly commercial properties, few residential properties, and small areas of woods occur along the project corridor.

Geologically, the project is located within the Milton Belt. Residual soils within the Milton Belt are derived from in-situ weathering of the underlying gneiss, schist and metamorphosed intrusive rocks. Rocks in this belt are generally foliated, and trend in a northeasterly direction.

Soil Properties

Soils encountered during this investigation have been divided into three categories based on origin, including roadway embankment, artificial fill, and residual soils.

Roadway embankment soils are present along portions of existing Hanes Mill Road (-L-) and intersecting ramps, loops, and -Y- lines and consist of reddish brown, brown, and tan, soft to very stiff, dry to moist, sandy and silty clay (A-6, A-7-5, A-7-6) and sandy and clayey silt (A-4), typically slightly micaceous and locally with trace gravel. These soils exhibit low to moderate plasticity with plastic indices from 8 to 25.

Artificial fill soils are present throughout the eastern portion of the project corridor. These areas are listed in "Areas of Special Geotechnical Interest." Artificial fill is soil fill material placed outside the roadway embankment by entities other than the NCDOT, typically for commercial infrastructure or construction purposes. The artificial fill, where encountered, consists of brown, gray, and reddish brown, soft to stiff, moist, sandy and silty clay (A-6, A-7-6) and sandy silt (A-4), typically slightly micaceous and locally with trace gravel. These soils exhibit low to moderate plasticity with plastic indices from 14 to 25.

Residual soils are derived from the weathering of the underlying gneiss, schist, and metamorphosed intrusive rocks. These soils consist of reddish brown, orange, brown, tan, pink, white, and black, soft to hard, dry to wet, slightly micaceous, sandy and silty clay (A-6, A-7-5, A-7-6) and sandy silt (A-4, A-5), locally with relic quartz vein rock fragments. The surficial residual silty clays exhibit low to high plasticity with plastic indices from 7 to 37. Samples of these soils typically exhibit saprolitic structure.

Groundwater

Groundwater was not encountered in any of the completed roadway borings. In deeper borings completed for the associated bridge on Hanes Mill Road (-L-) over US 52, groundwater was encountered at depths ranging from 41 to 52 feet below existing grades, which correspond to groundwater elevations ranging from 860.7 to 861.8 feet in the central portion of the project site. Groundwater levels may fluctuate with seasonal precipitation.

Ponds

One pond was found on or near the project right of way. This pond is listed by alignment, station, and offset in the "Areas of Special Geotechnical Interest". This pond was found to not cross any of the project alignments.

Prepared By,

DocuSigned by:
Michael B. Lear
080B6C28A029442...
Michael B. Lear, PG
Senior Geologist

8/17/18

14-DEC-2018 08:07 P:\projects\Road\NC-DOT\2018\646818106 U-2729 Hanes Mill Road.dwg

-L-

PI Sta 15+02.37
 $\Delta = 21^{\circ} 58' 17.1''$ (LT)
 $D = 447' 40.7''$
 $L = 458.25'$
 $T = 231.98'$
 $R = 1,195.00'$
 $SE = 0.04$
 $RO = 192'$
 $TR = 96'$

PI Sta 21+43.26
 $\Delta = 21^{\circ} 17' 09.8''$ (RT)
 $D = 547' 14.8''$
 $L = 367.80'$
 $T = 186.04'$
 $R = 990.00'$
 $SE = 0.04$
 $RO = 192'$
 $TR = 96'$

-Y1A-

PI Sta 11+18.20
 $\Delta = 32^{\circ} 06' 40.0''$ (RT)
 $D = 1602' 57.3''$
 $L = 200.08'$
 $T = 102.74'$
 $R = 357.00'$

PI Sta 12+84.47
 $\Delta = 7^{\circ} 53' 15.9''$ (RT)
 $D = 543' 46.5''$
 $L = 137.67'$
 $T = 68.94'$
 $R = 1,000.00'$

-RDBT-

PI Sta 10+73.09
 $\Delta = 102^{\circ} 10' 45.6''$ (LT)
 $D = 9706' 41.4''$
 $L = 105.22'$
 $T = 73.09'$
 $R = 59.00'$

PI Sta 11+50.01
 $\Delta = 74^{\circ} 24' 20.1''$ (LT)
 $D = 9706' 41.4''$
 $L = 76.62'$
 $T = 44.79'$
 $R = 59.00'$

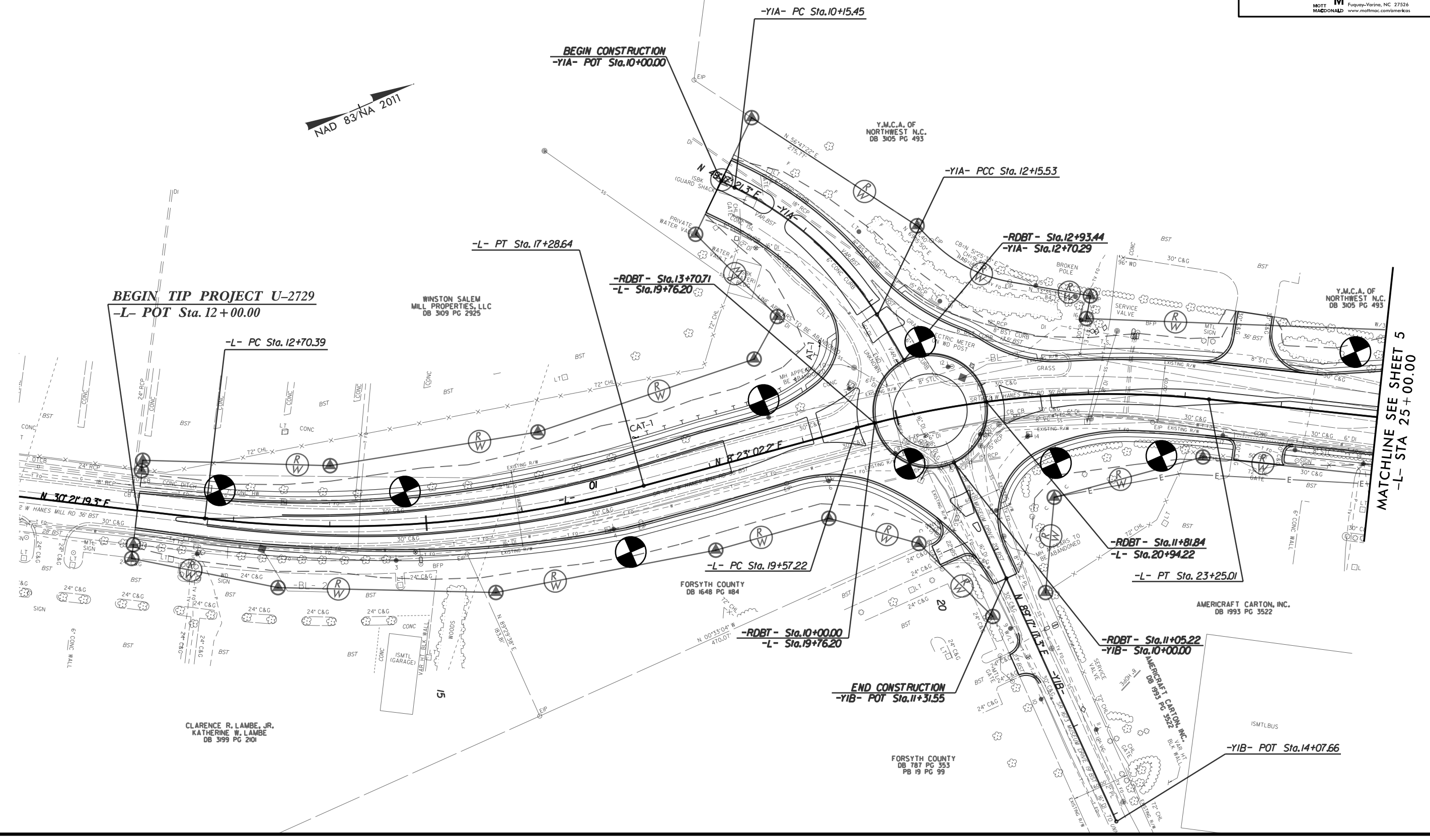
PI Sta 12+63.61
 $\Delta = 108^{\circ} 22' 36.7''$ (LT)
 $D = 9706' 41.4''$
 $L = 111.60'$
 $T = 81.77'$
 $R = 59.00'$

PI Sta 13+38.74
 $\Delta = 75^{\circ} 02' 08.0''$ (LT)
 $D = 9706' 41.4''$
 $L = 77.27'$
 $T = 45.30'$
 $R = 59.00'$

SEE SHEET 2B-1 FOR INTERSECTION DETAILS
 SEE SHEET 2B-5 THRU 2B-8 FOR ISLAND DETAILS

-L- SEE PROFILE SHEET 7
 -Y1A- SEE PROFILE SHEET 8
 -Y1AB- SEE PROFILE SHEET 8
 -RDBT- SEE PROFILE SHEET 12

PROJECT REFERENCE NO. U-2729	SHEET NO. 4
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
Prepared in the Office of:	M MOTT MACDONALD PO Box 700 Fuquay-Varina, NC 27526 www.mottmac.com/bmterkas



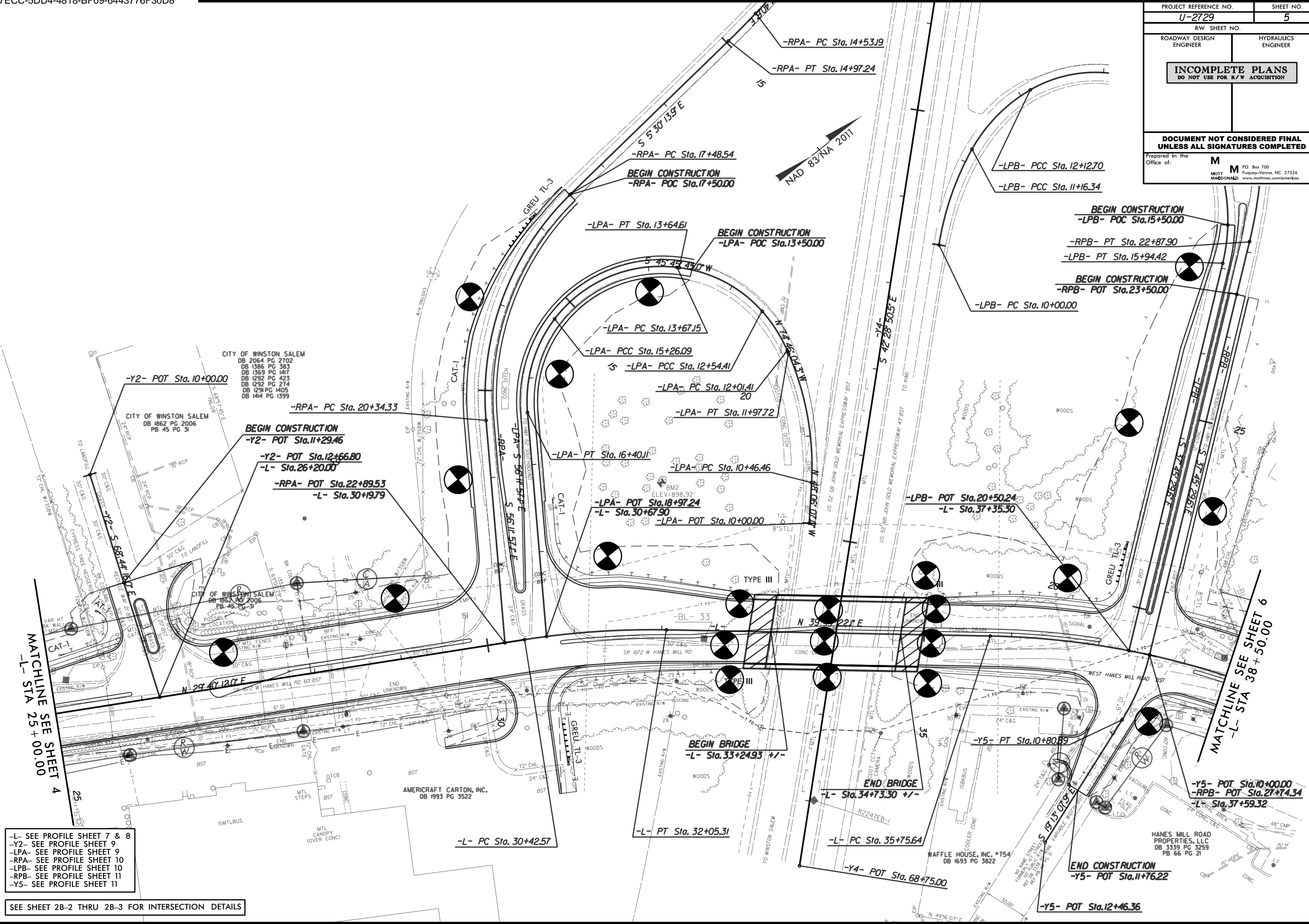
CLARENCE R. LAMBE, JR.
 KATHERINE W. LAMBE
 DB 3199 PG 201

FORSYTH COUNTY
 DB 787 PG 353
 PB 19 PG 99

AMERICRAFT CARTON, INC.
 DB 1993 PG 3522

MATCHLINE SEE SHEET 5
 -L- STA 25+00.00

PROJECT REFERENCE NO. U-2729		SHEET NO. 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			
Prepared in the Office of:		M MOTT MACDONALD	
		PO Box 700 Fayetteville, NC 27536 www.mottmac.com/mktas	



- L- SEE PROFILE SHEET 7 & 8
- Y2- SEE PROFILE SHEET 9
- LPA- SEE PROFILE SHEET 9
- RPA- SEE PROFILE SHEET 10
- LPB- SEE PROFILE SHEET 10
- RPB- SEE PROFILE SHEET 11
- Y5- SEE PROFILE SHEET 11

SEE SHEET 2B-2 THRU 2B-3 FOR INTERSECTION DETAILS

14-DEC-2018 08:07
 P:\Projects\Road\2018\646818106 U-2729 Hanes Mill Road\6.0 Deliverables\U2729_GEO_ROW\YCADDD_GEO\RDWY\Plan\U2729_GEO_psh05.dgn

MATCHLINE SEE SHEET 4
 -L- STA 25 + 00.00

MATCHLINE SEE SHEET 6
 -L- STA 38 + 50.00

CITY OF WINSTON SALEM
 DB 2064 PG 2702
 DB 1386 PG 383
 DB 1369 PG 1417
 DB 1292 PG 423
 DB 1292 PG 274
 DB 1291 PG 1405
 DB 1414 PG 1399

CITY OF WINSTON SALEM
 DB 1862 PG 2006
 PB 45 PG 31

CITY OF WINSTON SALEM
 DB 1862 PG 2006
 PB 45 PG 31

AMERICRAFT CARTON, INC.
 DB 1993 PG 3522

WAFFLE HOUSE, INC. #754
 DB 1693 PG 3822

HANES MILL ROAD
 PROPERTIES, LLC
 DB 3339 PG 3259
 PB 66 PG 21

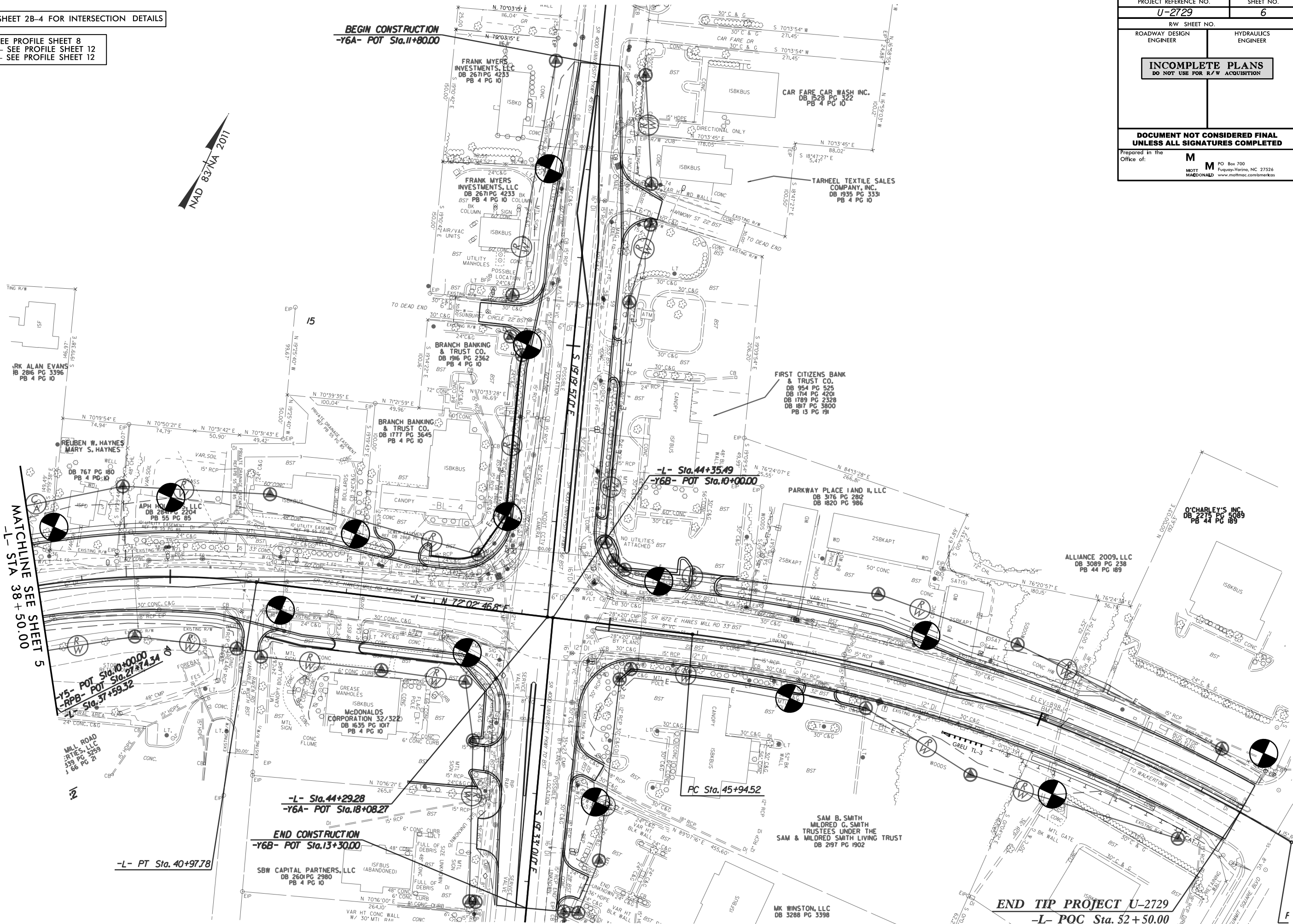
8/17/09

SEE SHEET 2B-4 FOR INTERSECTION DETAILS

- L- SEE PROFILE SHEET 8
- Y6A- SEE PROFILE SHEET 12
- Y6B- SEE PROFILE SHEET 12



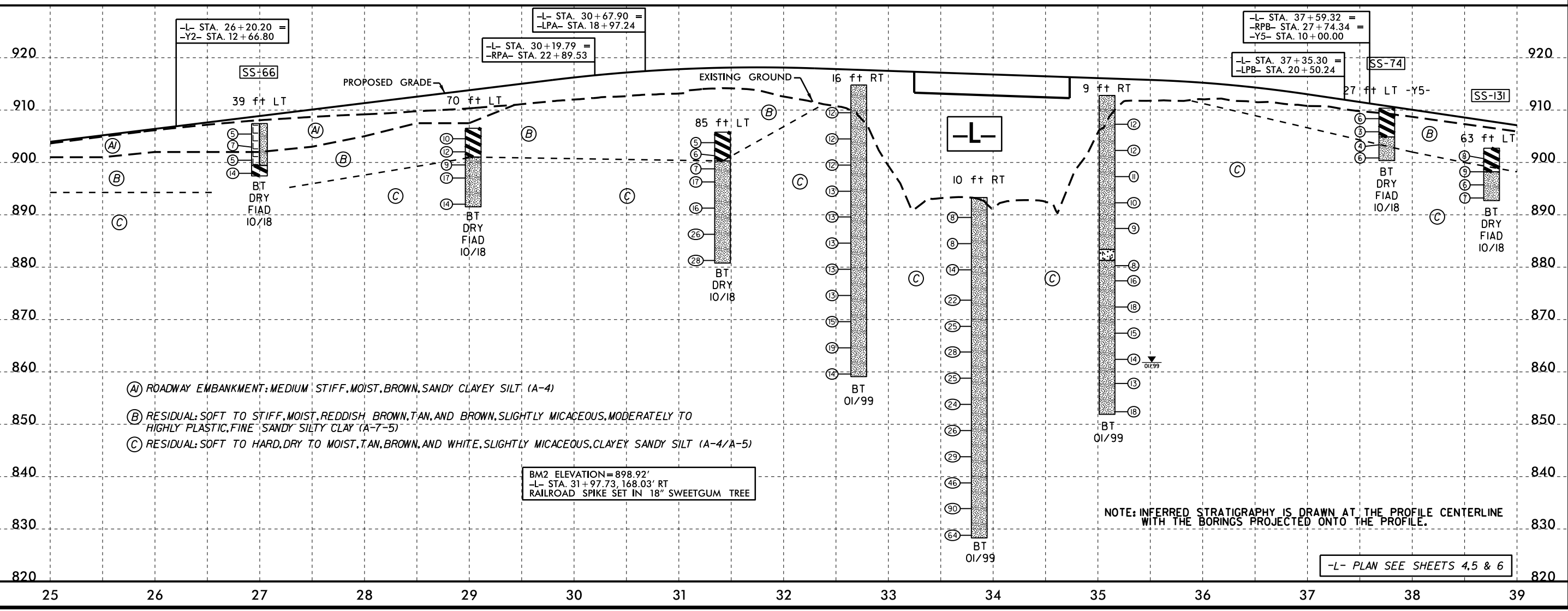
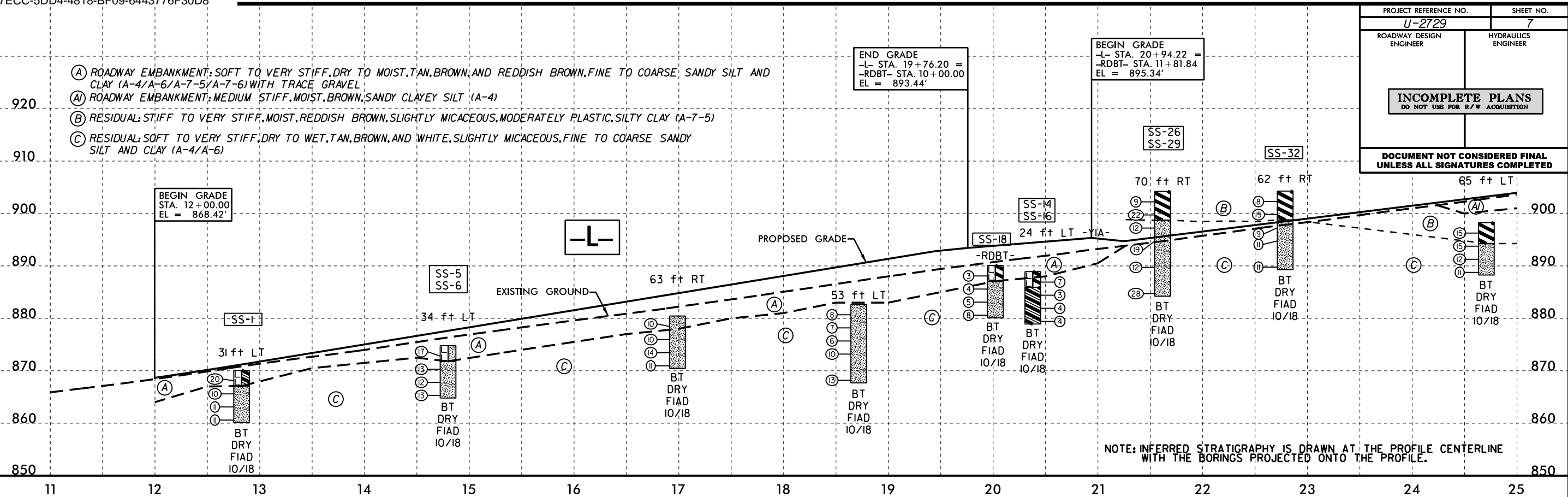
14-DEC-2018 08:07
 P:\projects\101\on\Projects\Road\NC-DOT\2018\646818106 U-2729 Hanes Mill Road\6.0 Deliverables\U2729_GEO_RDWY\CADD_GEO\TECHN\Plan\U2729_GEO_psh06.dgn
 8:33:51 USER:RMS



PROJECT REFERENCE NO. U-2729		SHEET NO. 6	
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			
Prepared in the Office of:		M PO Box 700 Fuquay-Varina, NC 27526 MOTT MACDONALD www.mottmac.com/mrketas	

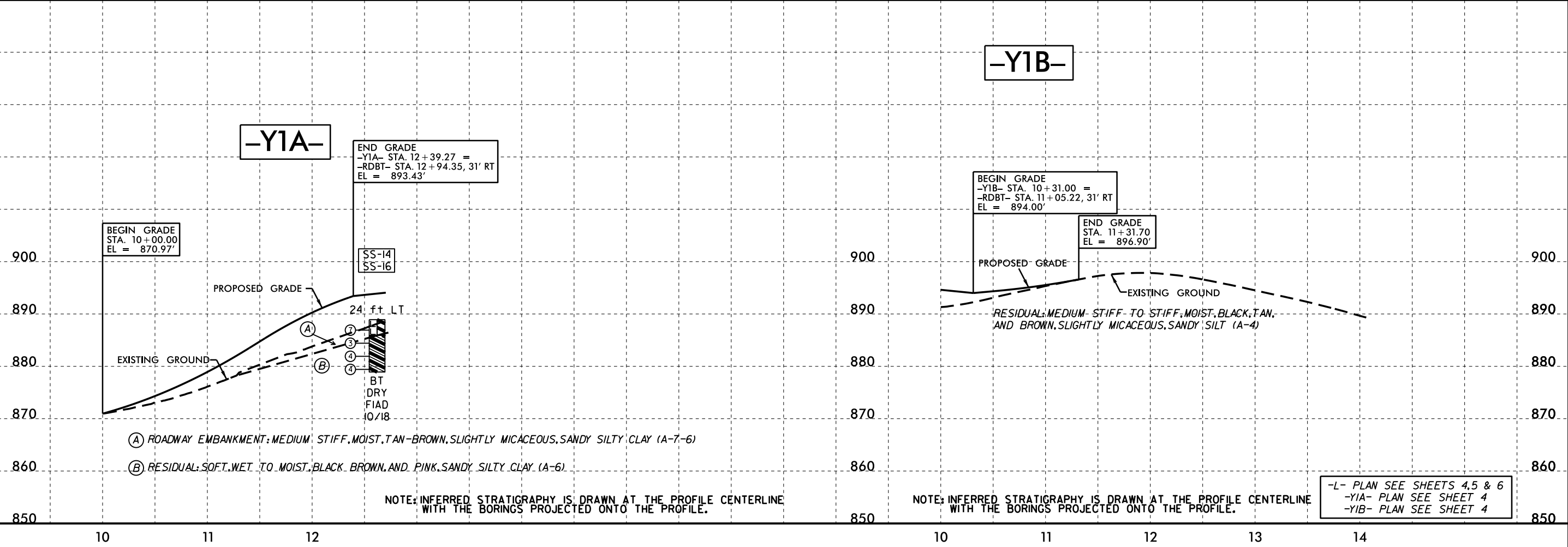
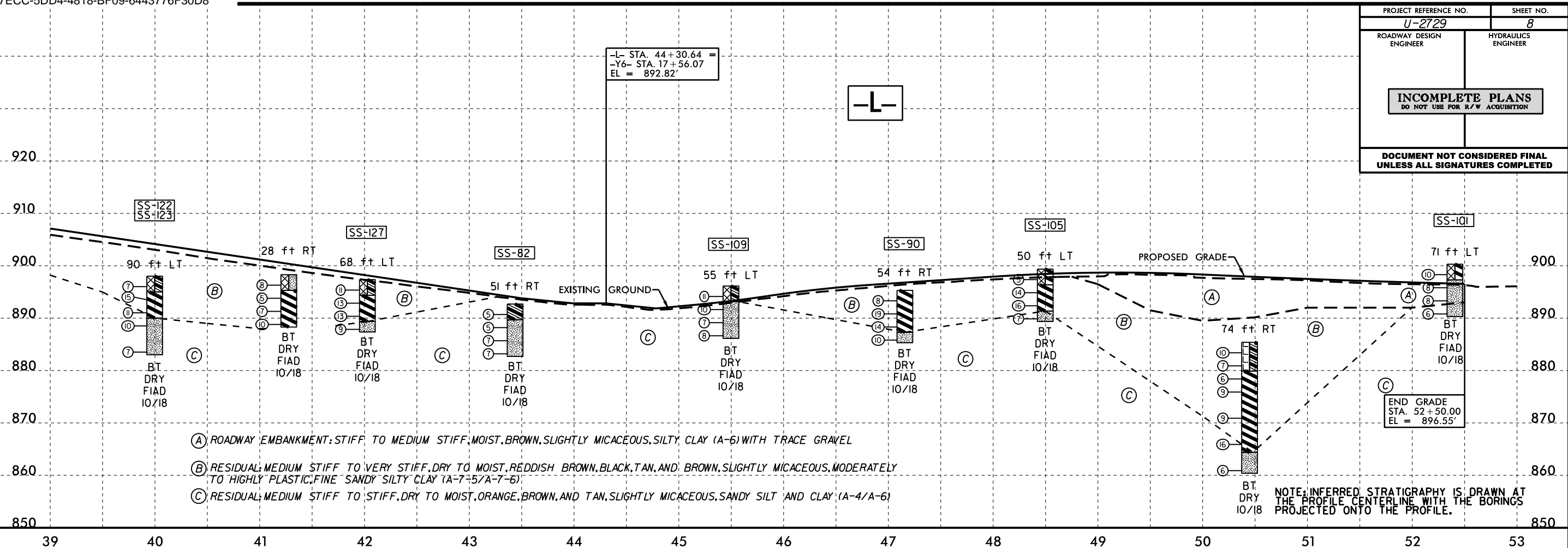
END TIP PROJECT U-2729
-L- POC Sta. 52+50.00

PROJECT REFERENCE NO. U-2729	SHEET NO. 7
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



5/14/99
 H:\DEC-2018 08:07
 M:\Projects\Road\NC-DOT\2018\6468188106 U-2729 Henes Mill Road\6.0 Deliverables\U2729_GEO_RDW\CADD_GEO\TECH\Plan\U2729_GEO.plt.psh.dgn

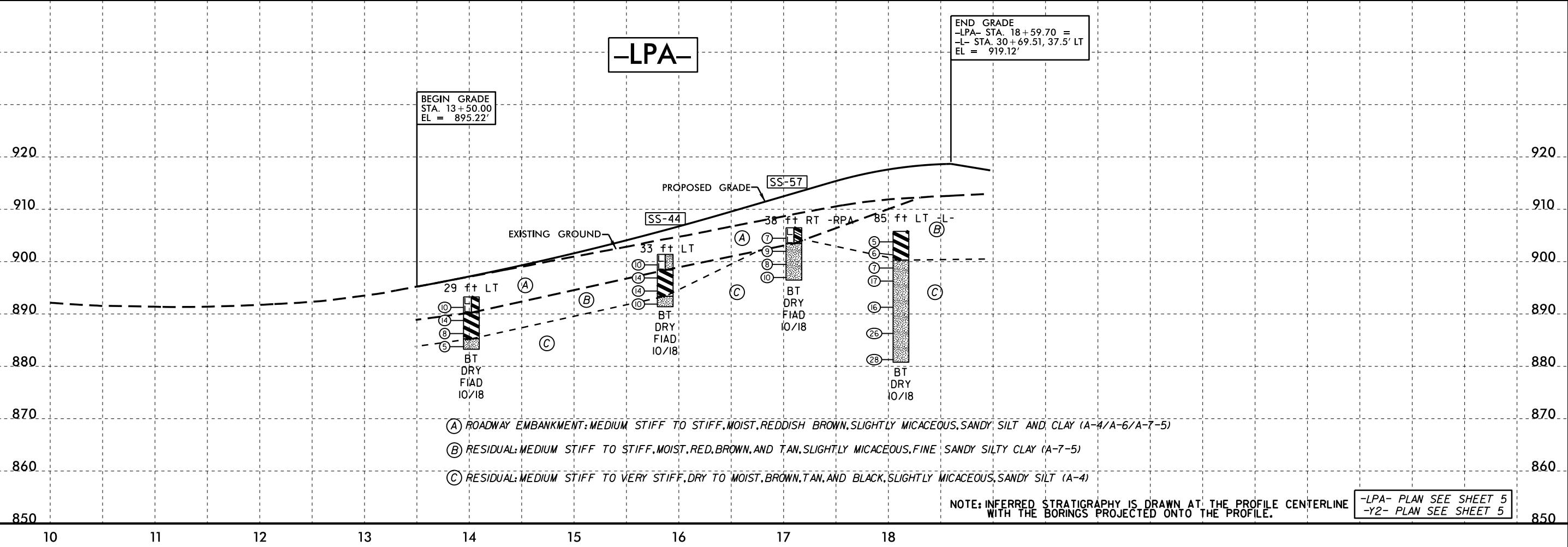
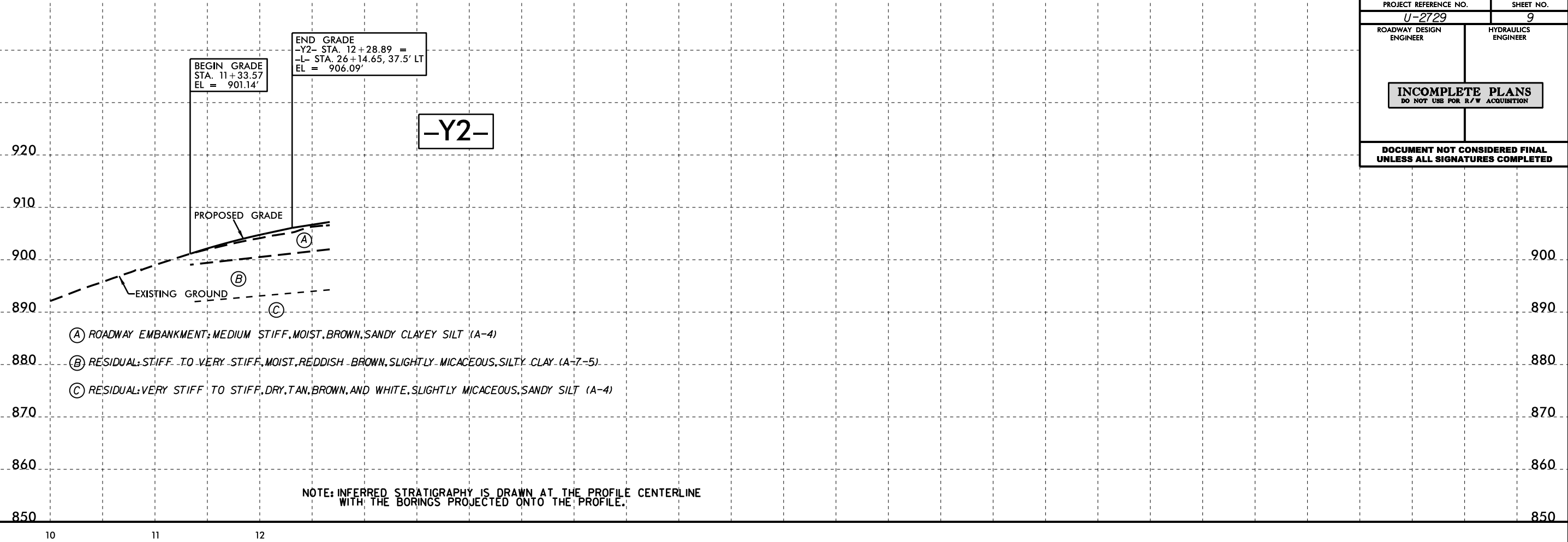
PROJECT REFERENCE NO. U-2729	SHEET NO. 8
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



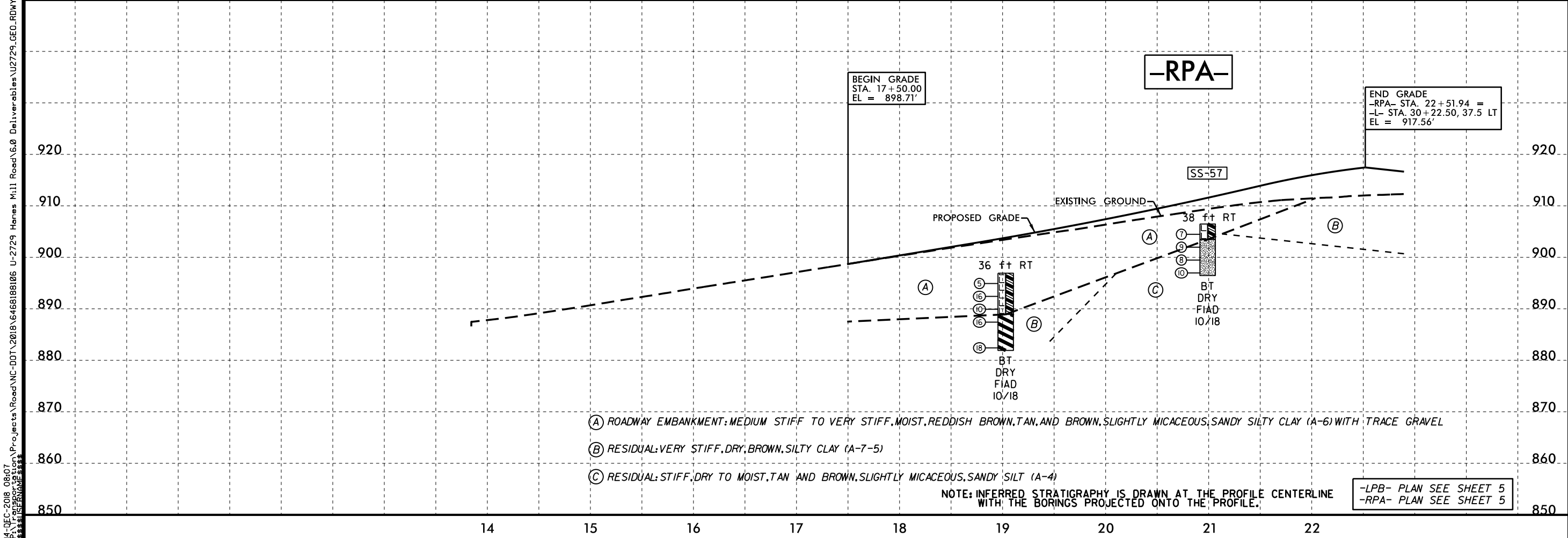
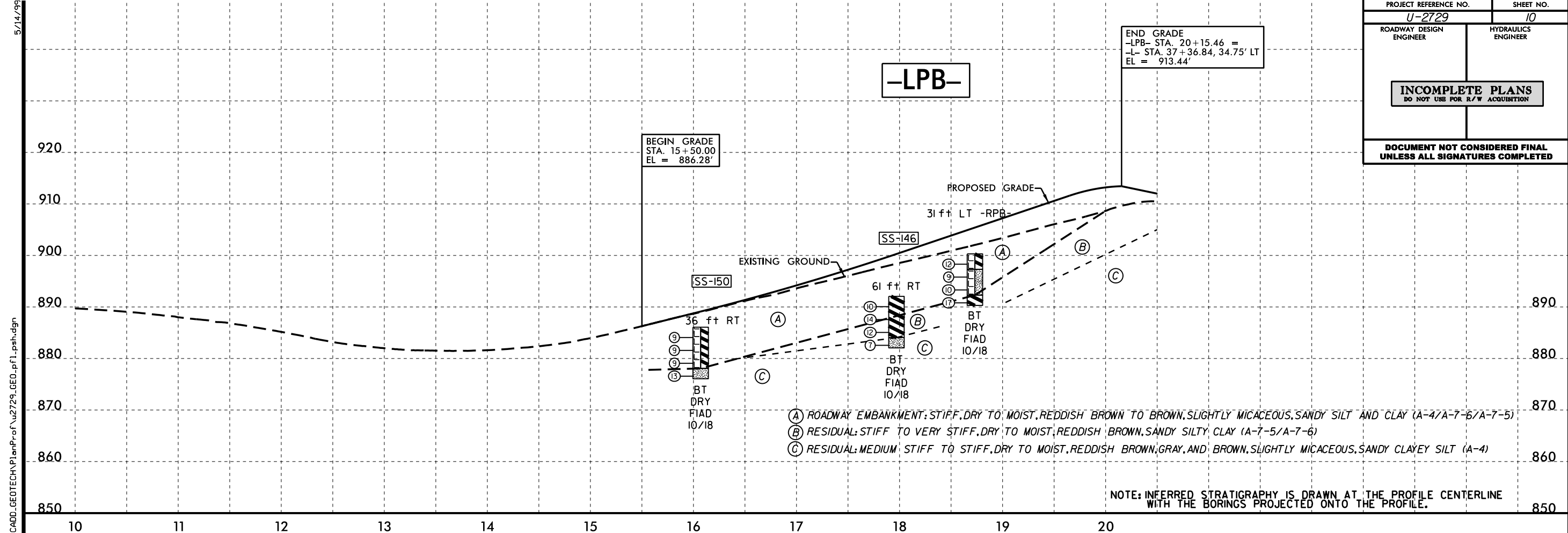
5/14/99
 H:\DEC-2018_08407
 H:\Projects\Road\NC-DOT\2018\6468188106 U-2729 Hanes Mill Road\6.0 Deliverables\U2729_GEO_RDW\CADD_GEO\TECH\Plan\U2729_CEO.plt.psh.dgn

PROJECT REFERENCE NO. U-2729	SHEET NO. 9
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

5/14/99
M:\DEC-2018 08407\Projects\Road\NC-DOT\2018\6468188106 U-2729 Hanes Mill Road\6.0 Deliverables\U2729_GEO_RDW\CADD_GEO\GEO\Plan\Profile\U2729_GEO.pfl.psh.dgn



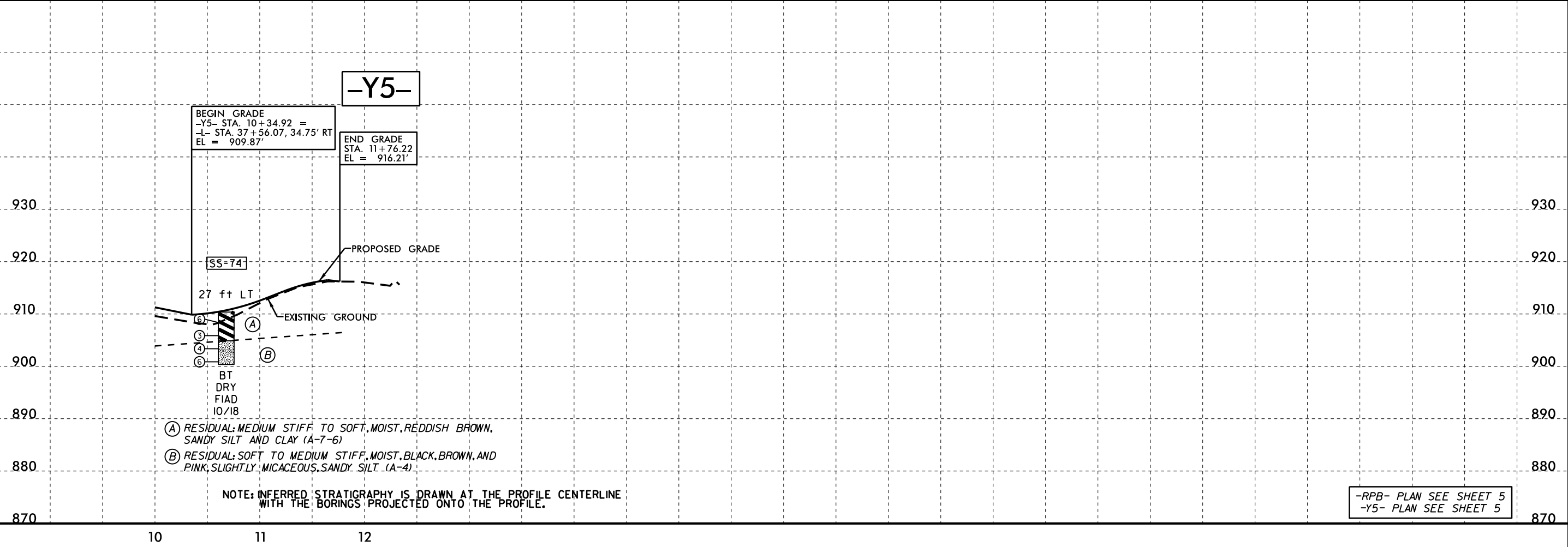
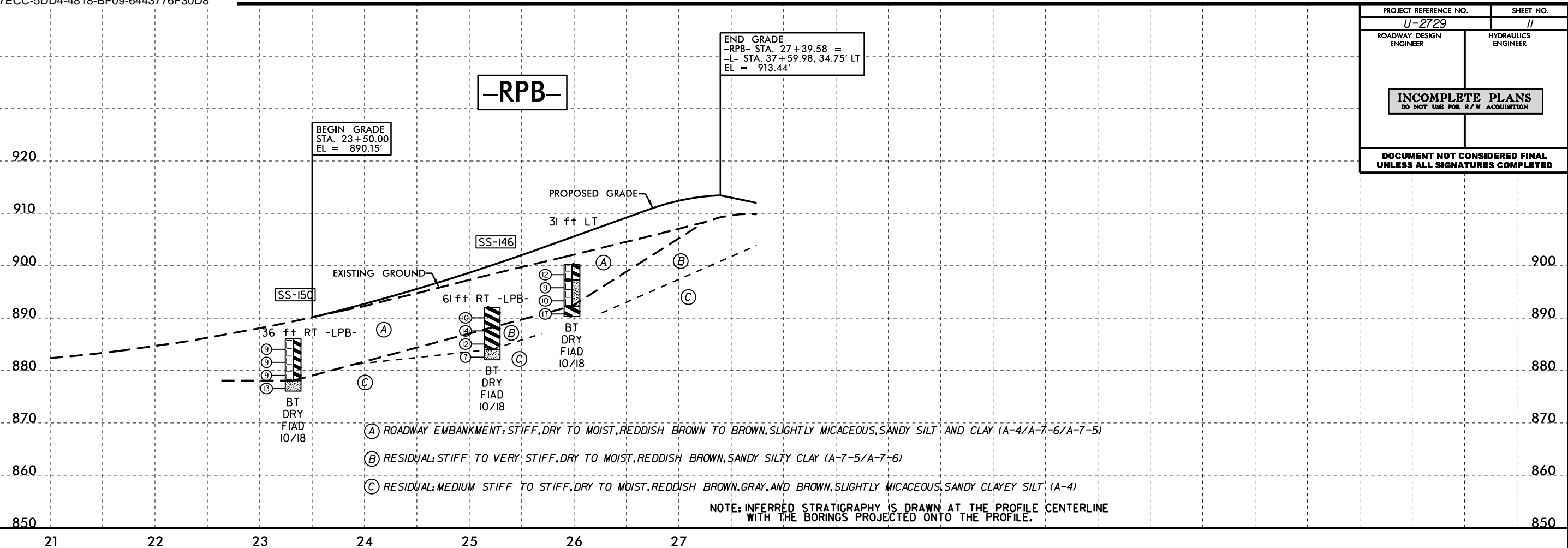
PROJECT REFERENCE NO. <i>U-2729</i>	SHEET NO. <i>10</i>
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



M:\DEC-2018 08407\Projects\Road\NC-DOT\2018\6468188106 U-2729 Henes Mill Road\6.0 Deliverables\U2729_GEO_RDW\CADD_GEO\RDW\CADD_GEO\TECH\Plan\Profile\U2729_GEO.pfl.psh.dgn
 5/14/99

-LPB- PLAN SEE SHEET 5
-RPA- PLAN SEE SHEET 5

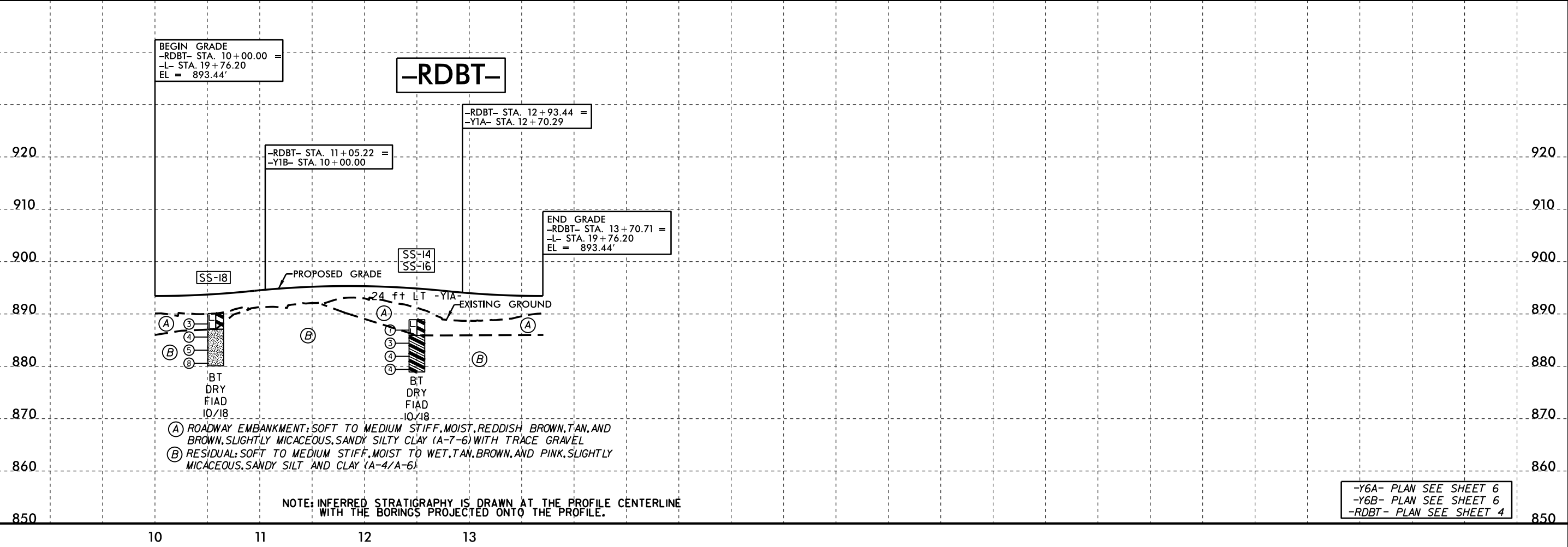
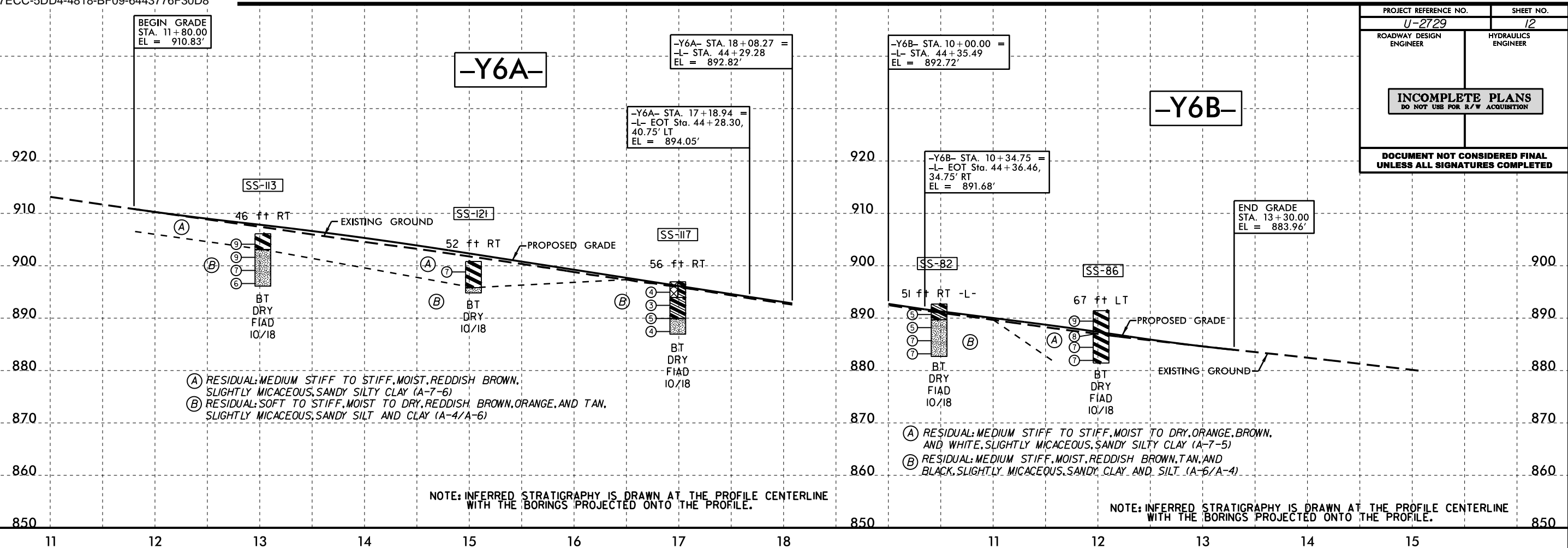
PROJECT REFERENCE NO. U-2729	SHEET NO. 11
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



-RPB- PLAN SEE SHEET 5
-Y5- PLAN SEE SHEET 5

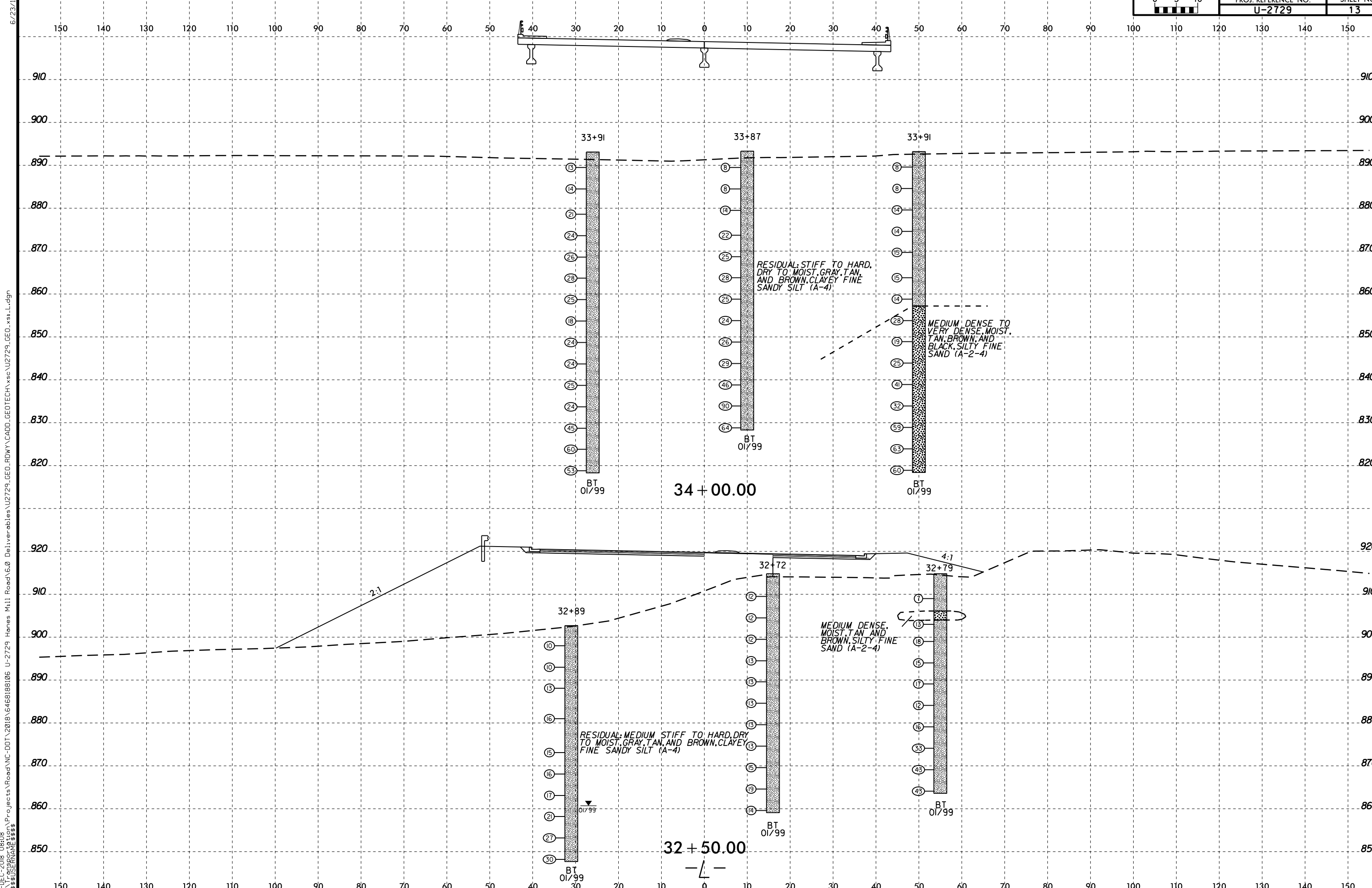
5/14/99
 H:\DEC-2018 08-08
 H:\Projects\Road\NC-DOT\2018\6468188106 U-2729 Hanes Mill Road\6.0 Deliverables\U2729_GEO_RDW\CADD_GEO\RDW\CADD_GEO\Plan\Profile\U2729_GEO.pfl.psh.dgn

PROJECT REFERENCE NO. U-2729	SHEET NO. 12
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

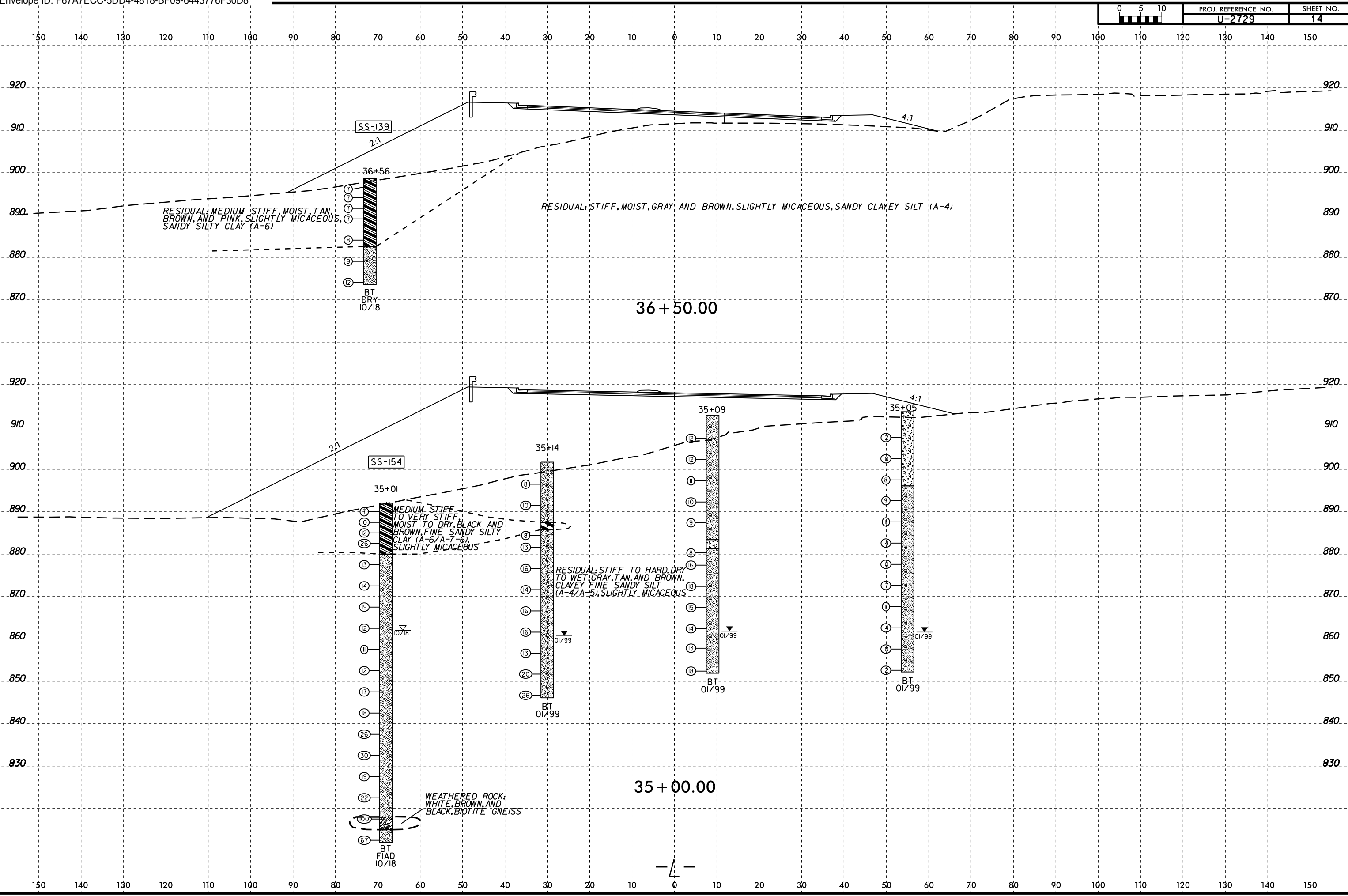


-Y6A- PLAN SEE SHEET 6
 -Y6B- PLAN SEE SHEET 6
 -RDBT- PLAN SEE SHEET 4

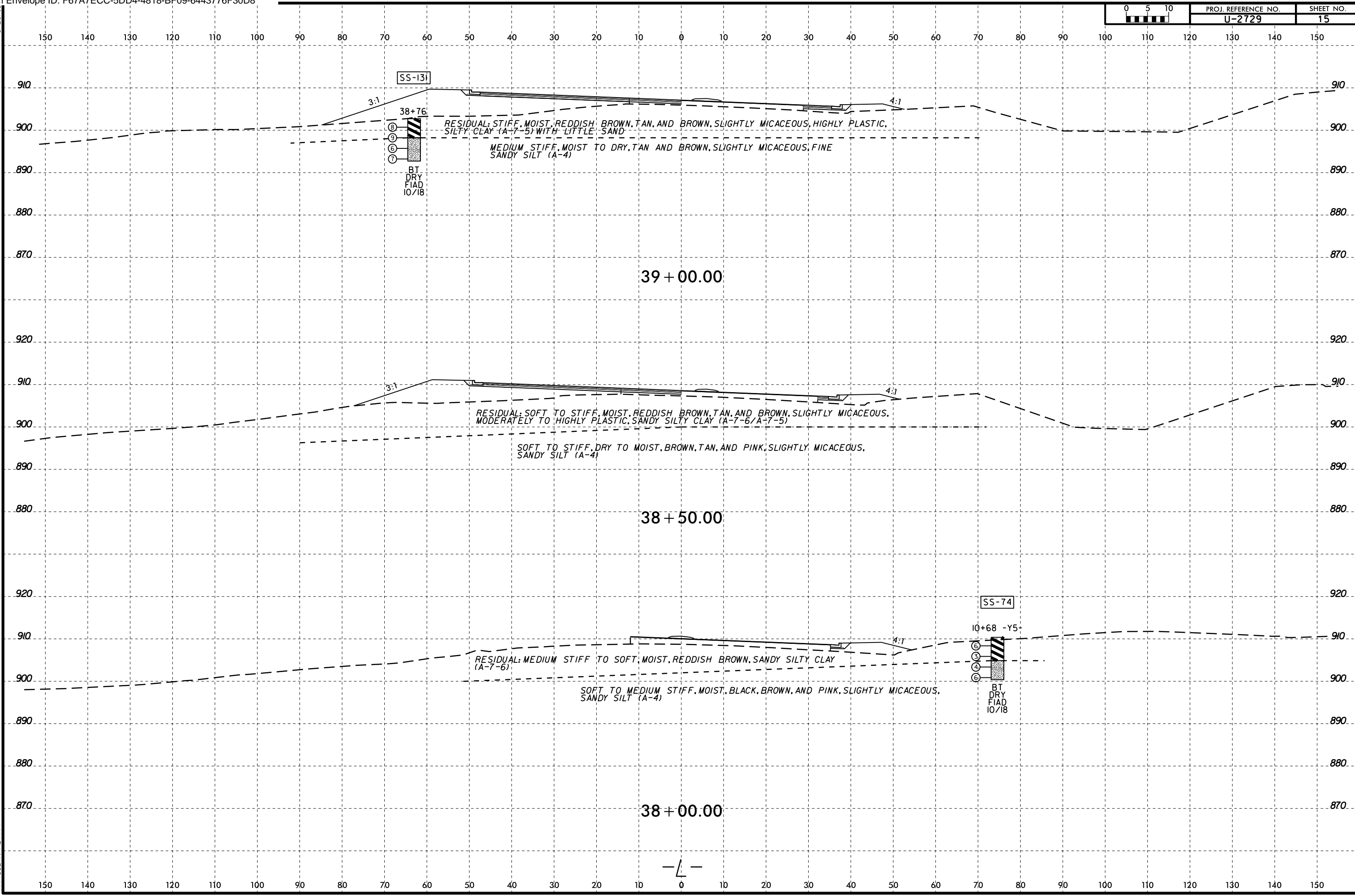
5/14/99
 H:\DEC-2018 08-08
 H:\Projects\Road\NC-DOT\2018\6468188106 U-2729 Hennes Mill Road\6.0 Deliverables\U2729_GEO_RDW\CADD_GEO\TECH\Plan\U2729_GEO.plt.psh.dgn



14-DEC-2018 08:08
 P:\PROJECTS\2018\6468188106 U-2729 Hanes Mill Road\6.0 Deliverables\U2729_GEO_RDWY\CADD_GEO\TECH\XSC\U2729_GEO.XST.L.dgn
 \$\$\$\$SURNAME\$\$\$\$

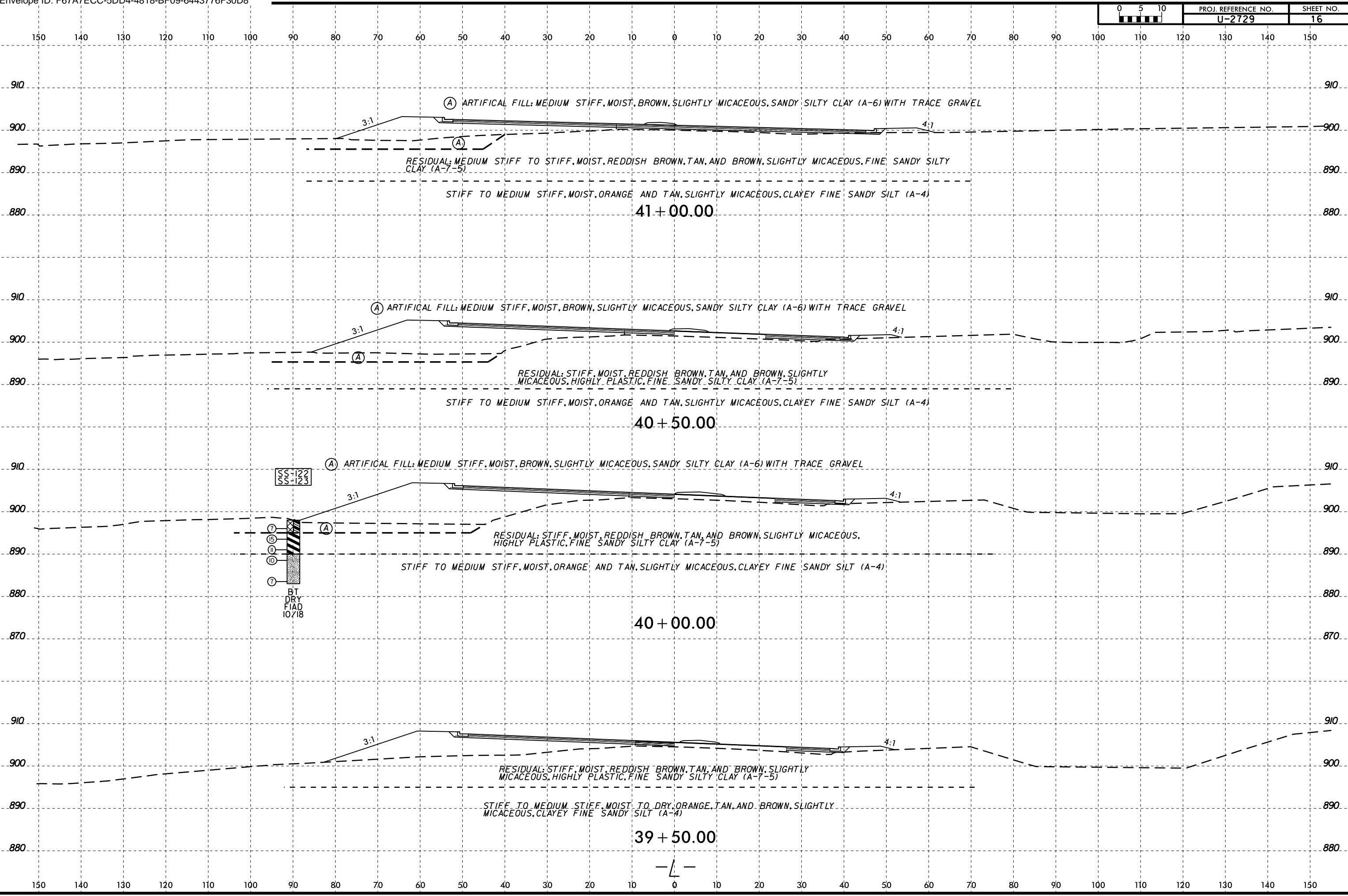


14-DEC-2018 08:08
 P:\Projects\2018\6468188106 U-2729 Hanes Mill Road\6.0 Deliverables\U2729_GEO_RDWY\CADD_GEOTECH\SSC\U2729_GEO.XSI.L.dgn
 \$\$\$\$SURNAME\$\$\$\$



14-DEC-2018 08:08
 P:\T\Projects\Road\NC-001\2018\6468188106 U-2729 Hanes Mill Road\6.0 Deliverables\U2729_GEO_RDWY\CADD_GEOTECH\SSC\U2729_GEO_xst.L.dgn
 \$\$\$\$SURNAME\$\$\$\$

6/23/16



14-DEC-2018 08:08
 P:\Projects\2018\6468188106 U-2729 Hanes Mill Road\6.0 Deliverables\U2729_GEO_RDWY\CADD_GEOTECH\SSC\U2729_GEO_xst.L.dgn
 6/23/16

41 + 00.00

40 + 50.00

40 + 00.00

39 + 50.00

SS-122
SS-123

BT
DRY
FIAD
10/18

(A) ARTIFICIAL FILL: MEDIUM STIFF, MOIST, BROWN, SLIGHTLY MICACEOUS, SANDY SILTY CLAY (A-6) WITH TRACE GRAVEL

RESIDUAL: MEDIUM STIFF TO STIFF, MOIST, REDDISH BROWN, TAN, AND BROWN, SLIGHTLY MICACEOUS, FINE SANDY SILTY CLAY (A-7-5)

STIFF TO MEDIUM STIFF, MOIST, ORANGE AND TAN, SLIGHTLY MICACEOUS, CLAYEY FINE SANDY SILT (A-4)

(A) ARTIFICIAL FILL: MEDIUM STIFF, MOIST, BROWN, SLIGHTLY MICACEOUS, SANDY SILTY CLAY (A-6) WITH TRACE GRAVEL

RESIDUAL: STIFF, MOIST, REDDISH BROWN, TAN, AND BROWN, SLIGHTLY MICACEOUS, HIGHLY PLASTIC, FINE SANDY SILTY CLAY (A-7-5)

STIFF TO MEDIUM STIFF, MOIST, ORANGE AND TAN, SLIGHTLY MICACEOUS, CLAYEY FINE SANDY SILT (A-4)

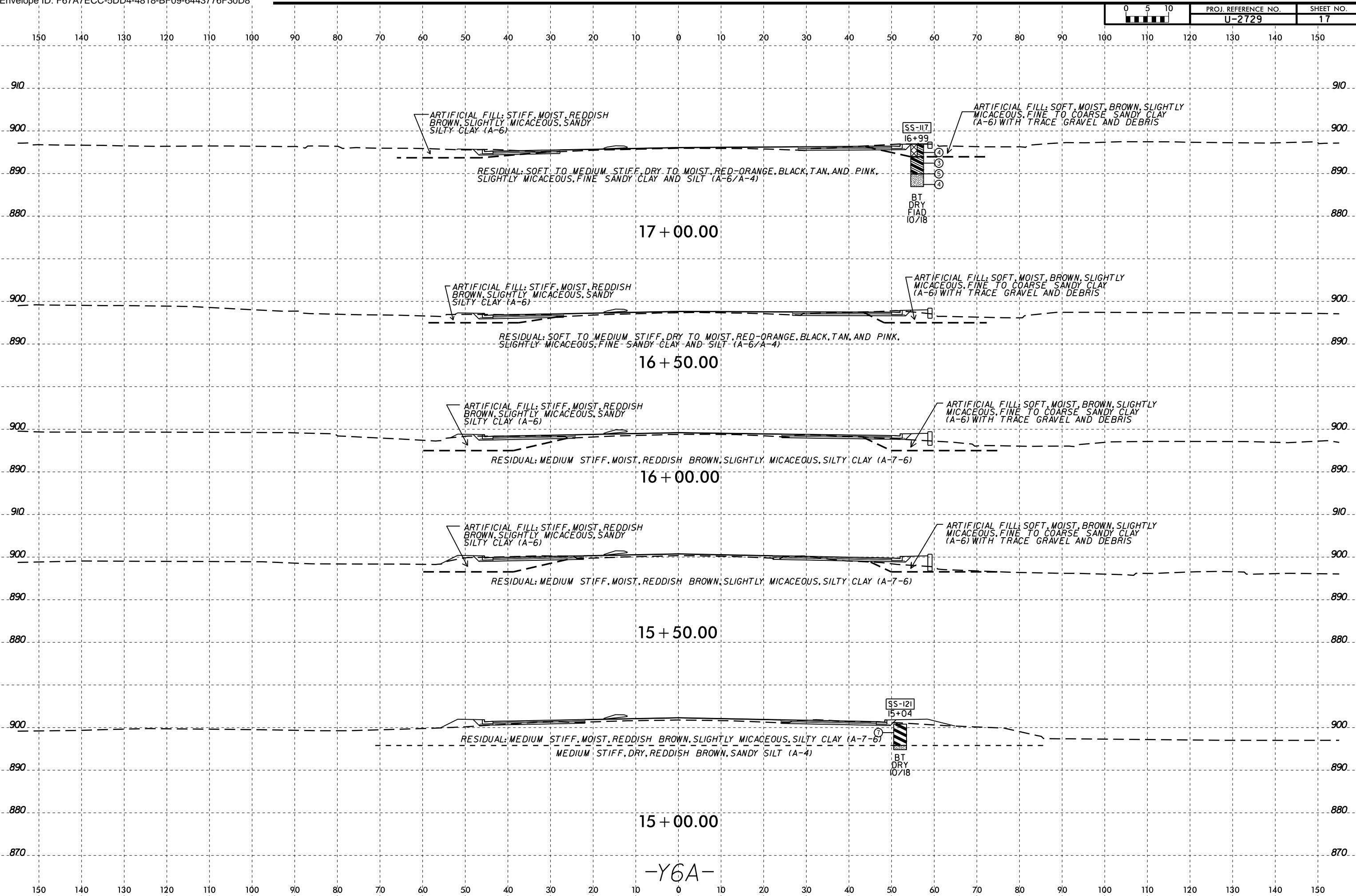
(A) ARTIFICIAL FILL: MEDIUM STIFF, MOIST, BROWN, SLIGHTLY MICACEOUS, SANDY SILTY CLAY (A-6) WITH TRACE GRAVEL

RESIDUAL: STIFF, MOIST, REDDISH BROWN, TAN, AND BROWN, SLIGHTLY MICACEOUS, HIGHLY PLASTIC, FINE SANDY SILTY CLAY (A-7-5)

STIFF TO MEDIUM STIFF, MOIST, ORANGE AND TAN, SLIGHTLY MICACEOUS, CLAYEY FINE SANDY SILT (A-4)

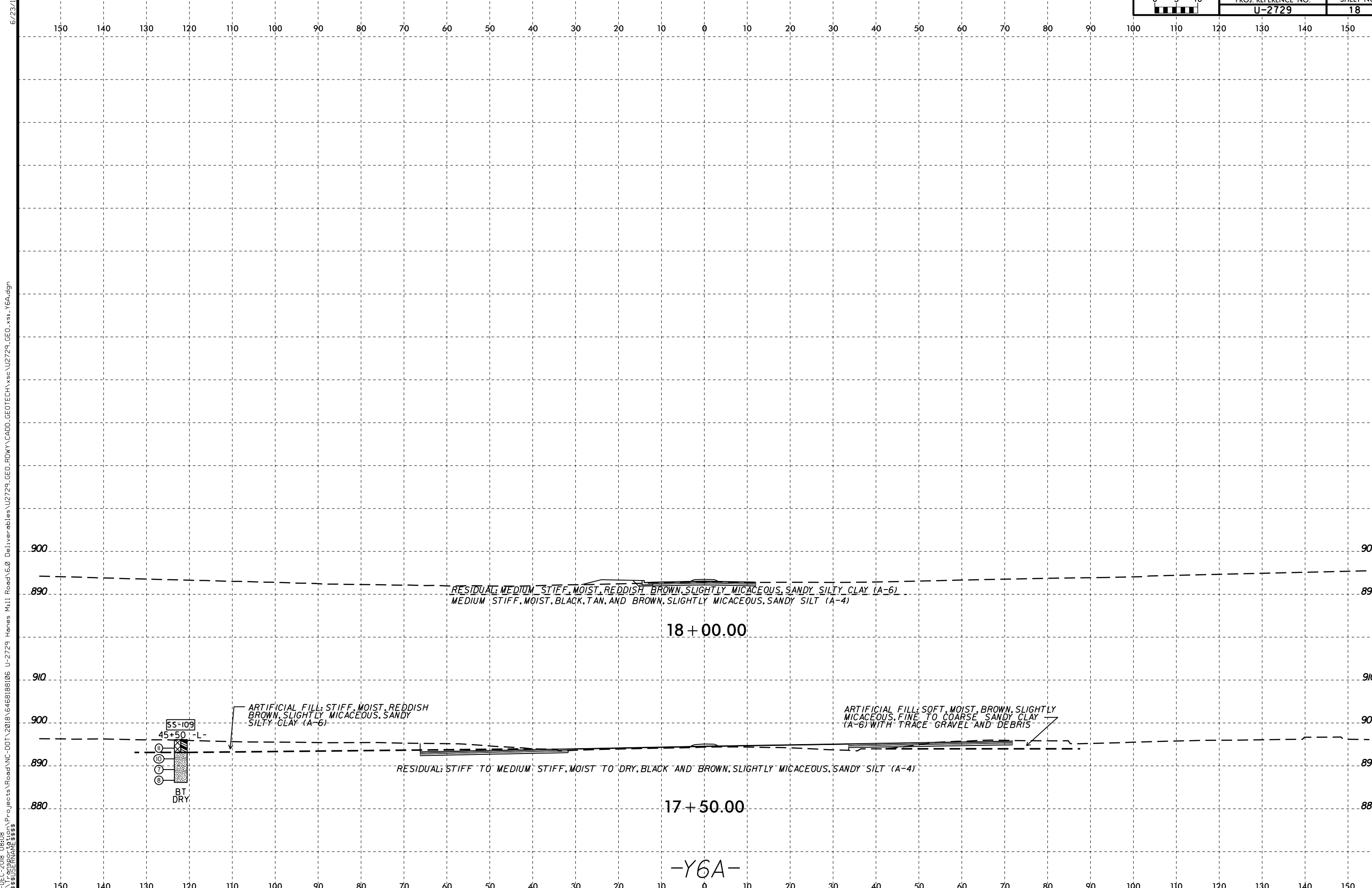
RESIDUAL: STIFF, MOIST, REDDISH BROWN, TAN, AND BROWN, SLIGHTLY MICACEOUS, HIGHLY PLASTIC, FINE SANDY SILTY CLAY (A-7-5)

STIFF TO MEDIUM STIFF, MOIST TO DRY, ORANGE, TAN, AND BROWN, SLIGHTLY MICACEOUS, CLAYEY FINE SANDY SILT (A-4)



-Y6A-

14-DEC-2018 08:08 P:\Projects\Road\NC-DOT\2018\6468188106 U-2729 Hanes Mill Road\6.0 Deliverables\U2729_GEO_RDWY\CADD_GEO\TECH\SSC\U2729_GEO_xst_16A.dgn



14-DEC-2018 08:08
 P:\Projects\2018\6468188106 U-2729 Hanes Mill Road\6.0 Deliverables\U2729_GEO_RDWY\CADD_GEO\TECH\SSC\U2729_GEO.XSI_Y6A.dgn
 \$\$\$\$SURNAME\$\$\$\$

-Y6A-

PROJECT NO.	SHEET NO.
U-2729	19

SOIL TEST RESULTS

SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING SIEVES			% Moisture	% ORGANIC
								C. SAND	F. SAND	SILT	CLAY	10.0	40	200.0		
SS-1	12+83	31' LT	-L-	1.0-2.5	A-6(13)	38	18	16.5	8.3	31.8	42.7	99.3	87.3	75.8	12.6	-
SS-5	14+80	34' LT	-L-	1.0-2.5	A-4(6)	33	10	15.7	9.2	44.3	28.5	97.7	87.7	74.2	12.0	-
SS-6	14+80	34' LT	-L-	3.5-5.0	A-4(6)	36	10	15.7	17.5	39.1	27.0	99.3	89.7	69.0	11.0	-
SS-26	21+62	70' RT	-L-	1.0-2.5	A-7-6(21)	48	21	4.9	6.7	27.3	60.9	99.8	97.0	89.3	27.2	-
SS-29	21+62	70' RT	-L-	8.5-10.0	A-4(2)	28	7	23.2	15.5	40.6	18.6	97.9	81.0	61.5	12.2	-
SS-32	22+79	62' RT	-L-	1.0-2.5	A-7-5(24)	52	20	3.4	1.8	27.5	67.3	100.0	97.9	95.2	31.3	-
SS-66	27+00	39' LT	-L-	1.0-2.5	A-4(5)	38	8	21.6	14.7	36.9	25.4	98.6	83.8	64.7	23.9	-
SS-154	35+01	68' LT	-L-	1.0-2.5	A-6(7)	39	12	17.7	15.3	44.3	21.2	98.5	86.4	67.7	25.4	-
SS-139	36+56	72' LT	-L-	1.0-2.5	A-6(11)	36	15	11.6	12.0	48.9	27.4	99.9	93.0	79.5	24.9	-
SS-131	38+76	63' LT	-L-	1.0-2.5	A-7-5(39)	69	37	7.1	5.4	24.0	63.5	100.0	95.3	88.7	26.2	-
SS-122	40+00	90' LT	-L-	1.0-2.5	A-6(8)	33	14	14.8	15.7	33.4	34.6	98.5	89.3	70.3	15.1	-
SS-123	40+00	90' LT	-L-	3.5-5.0	A-7-6(37)	63	36	6.7	4.2	29.1	59.7	99.7	95.6	89.7	26.3	-
SS-127	42+03	68' LT	-L-	1.0-2.5	A-6(11)	37	17	15.6	11.6	18.7	52.0	97.9	87.7	72.4	39.9	-
SS-82	43+44	51' RT	-L-	1.0-2.5	A-6(9)	39	13	22.1	5.3	45.3	26.8	99.5	82.9	73.2	24.0	-
SS-109	45+50	55' LT	-L-	1.0-2.5	A-6(13)	38	18	19.1	6.7	27.7	44.8	98.3	85.2	75.9	15.1	-
SS-90	47+16	54' RT	-L-	1.0-2.5	A-7-6(17)	48	20	12.4	7.9	14.0	65.2	99.5	91.3	80.2	23.6	-
SS-105	48+50	50' LT	-L-	1.0-2.5	A-7-6(16)	43	21	13.8	8.3	25.1	50.7	97.9	89.2	76.7	21.1	-
SS-101	52+41	71' LT	-L-	1.0-2.5	A-7-6(22)	53	25	11.2	8.5	29.5	49.1	98.3	91.2	79.9	25.7	-
SS-18	10+58	CL	-RDBT-	1.0-2.5	A-7-6(17)	48	23	13.9	11.6	30.6	42.3	98.4	89.9	74.5	22.7	-
SS-44	15+87	33' LT	-LPA-	1.0-2.5	A-4(5)	32	9	19.7	13.5	38.4	26.8	98.4	85.3	67.1	20.4	-
SS-57	20+99	38' RT	-RPA-	1.0-2.5	A-6(11)	34	18	16.4	10.0	25.2	46.8	98.4	86.4	73.9	23.5	-
SS-150	16+07	36' RT	-LPB-	1.0-2.5	A-7-6(11)	42	16	13.9	15.5	29.9	39.9	99.2	90.4	73.4	20.1	-
SS-146	17+97	61' RT	-LPB-	1.0-2.5	A-7-6(19)	48	20	8.3	6.4	19.9	65.1	99.7	94.2	86.1	27.6	-
SS-14	12+62	24' LT	-Y1A-	1.0-2.5	A-7-6(16)	52	25	20.1	12.5	43.3	20.5	96.4	81.8	66.3	21.4	-
SS-16	12+62	24' LT	-Y1A-	6.0-7.5	A-6(8)	36	13	18.6	16.2	45.2	19.9	99.9	87.9	67.5	28.6	-
SS-74	10+68	27' LT	-Y5-	1.0-2.5	A-7-6(19)	49	24	11.4	9.5	30.9	45.6	97.4	90.2	78.1	20.3	-
SS-113	13+03	46' RT	-Y6A-	1.0-2.5	A-7-6(21)	50	24	14.6	5.3	30.8	49.3	100.0	89.5	80.8	23.9	-
SS-121	15+04	52' RT	-Y6A-	1.0-2.5	A-7-6(21)	46	22	7.9	5.9	17.7	68.3	99.8	95.2	87.0	24.6	-
SS-117	16+99	56' RT	-Y6A-	1.0-2.5	A-6(11)	40	19	19.9	11.2	28.4	37.1	96.6	82.8	67.1	20.2	-
SS-86	12+03	67' LT	-Y6B-	1.0-2.5	A-7-5(13)	49	18	23.3	8.2	35.4	32.8	99.7	86.3	69.3	30.4	-