

REFERENCE: U-5711

PROJECT: 50160

SEE SHEET 3 FOR PLAN SHEET LAYOUT
AT TIME OF INVESTIGATION

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APPENDICES

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

ROADWAY
SUBSURFACE INVESTIGATION

COUNTY RANDOLPH
PROJECT DESCRIPTION WIDEN SR 1712 (PINEVIEW ROAD/PINEVIEW STREET) FROM WEST OF SYLVAN DRIVE TO US 220 BUSINESS, -L-

INVENTORY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5711	1	44

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.

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 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.

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DATE JUNE 2018



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CS 6/28/2018

C6DB1CBADD0F44A 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 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, <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:												ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (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.															
SOIL LEGEND AND AASHTO CLASSIFICATION												ANGULARITY OF GRAINS												WEATHERED ROCK (WR)												CRISTALLINE ROCK (CR)															
GENERAL CLASS.		GRANULAR MATERIALS (≤ 35% PASSING #200)						SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS				THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.												FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.																							
GROUP CLASS.		A-1		A-1-b		A-3		A-2-4		A-2		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																																													
MATERIAL PASSING #40		50 MX		30 MX		15 MX		50 MX		25 MX		10 MX		35 MX		35 MX		35 MX		36 MN		36 MN		36 MN		36 MN		36 MN		36 MN																					
LL		—		—		—		40 MX		41 MN		40 MX		41 MN		40 MX		41 MN		40 MX		41 MN		40 MX		41 MN		40 MX		41 MN																					
PI		6 MX		—		—		10 MX		10 MX		11 MN		11 MN		10 MX		10 MX		11 MN		11 MN		10 MX		11 MN		10 MX		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		UNSATISFACTORY																																	
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30																																																			
CONSISTENCY OR DENSENESS												MISCELLANEOUS SYMBOLS												ROCK HARDNESS												BEDDING															
PRIMARY SOIL TYPE		COMPACTNESS OR CONSISTENCY		RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)		RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)		ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION												DIP & DIP DIRECTION OF ROCK STRUCTURES												CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.																			
GENERAL		VERY LOOSE		< 4		N/A		SOIL SYMBOL												TEST BORING												SLOPE INDICATOR INSTALLATION																			
GRANULAR MATERIAL (NON-COHESIVE)		LOOSE		4 TO 10				ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT												AUGER BORING												CONE PENETROMETER TEST																			
		MEDIUM DENSE		10 TO 30																CORE BORING												SOUNDING ROD																			
		DENSE		30 TO 50																MONITORING WELL												TEST BORING WITH CORE																			
		VERY DENSE		> 50																PIEZOMETER INSTALLATION												SPT N-VALUE																			
GENERAL		VERY SOFT		< 2		< 0.25		INFERRED SOIL BOUNDARY																																											
SILT-CLAY MATERIAL (COHESIVE)		SOFT		2 TO 4		0.25 TO 0.5		INFERRED ROCK LINE																																											
		MEDIUM STIFF		4 TO 8		0.5 TO 1.0																																													
		STIFF		8 TO 15		1 TO 2																																													
		VERY STIFF		15 TO 30		2 TO 4																																													
		HARD		> 30		> 4																																													
TEXTURE OR GRAIN SIZE												RECOMMENDATION SYMBOLS												ROCK HARDNESS												BEDDING															
U.S. STD. SIEVE SIZE OPENING (MM)		4		10		40		60		200		270		UNDERCUT												UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE												UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL													
		4.76		2.00		0.42		0.25		0.075		0.053		SHALLOW UNDERCUT												UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK																									
BOULDER (BLDR.)		COBBLE (COB.)		GRAVEL (GR.)		COARSE SAND (CSE, SD.)		FINE SAND (F SD.)		SILT (SL.)		CLAY (CL.)																																							
GRAIN SIZE		305		75		2.0		0.25		0.05		0.005																																							
		12		3																																															
SOIL MOISTURE - CORRELATION OF TERMS												ABBREVIATIONS												ROCK HARDNESS												BEDDING															
SOIL MOISTURE SCALE (ATTERBERG LIMITS)		FIELD MOISTURE DESCRIPTION		GUIDE FOR FIELD MOISTURE DESCRIPTION		AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST e - VOID RATIO F - FINE FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS HI. - HIGHLY												MED. - MEDIUM MICA. - MICACEOUS MOD. - MODERATELY NP - NON PLASTIC ORG. - ORGANIC PMT - PRESSUREMETER TEST SAP. - SAPROLITIC SD. - SAND, SANDY SL. - SILT, SILTY SLI. - SLIGHTLY TCR - TRICONE REFUSAL w - MOISTURE CONTENT V - VERY												VST - VANE SHEAR TEST WEA. - WEATHERED γ _u - UNIT WEIGHT γ _d - DRY UNIT WEIGHT SAMPLE ABBREVIATIONS S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING RATIO																					
LL		LIQUID LIMIT		USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE																																															
PLASTIC RANGE (PI)		PLASTIC LIMIT		SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE																																															
OM		OPTIMUM MOISTURE		SOLID; AT OR NEAR OPTIMUM MOISTURE																																															
SL		SHRINKAGE LIMIT		REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE																																															
PLASTICITY												EQUIPMENT USED ON SUBJECT PROJECT												ROCK HARDNESS												BEDDING															
PLASTICITY INDEX (PI)		DRY STRENGTH		DRILL UNITS:												ADVANCING TOOLS:												HAMMER TYPE:												TERM											
NON PLASTIC		0-5		CME-45C												CLAY BITS												AUTOMATIC												VERY WIDE											
SLIGHTLY PLASTIC		6-15		CME-55												6" CONTINUOUS FLIGHT AUGER												MANUAL												WIDE											
MODERATELY PLASTIC		16-25		CME-550												8" HOLLOW AUGERS												CORE SIZE:												MODERATELY CLOSE											
HIGHLY PLASTIC		26 OR MORE		VANE SHEAR TEST												HARD FACED FINGER BITS												-B												CLOSE											
				PORTABLE HOIST												TUNG.-CARBIDE INSERTS												-N												VERY CLOSE											
																CASING												HAND TOOLS:																							
																TRICONE												POST HOLE DIGGER																							
																TRICONE												HAND AUGER																							
																CORE BIT												SOUNDING ROD																							
																												VANE SHEAR TEST																							

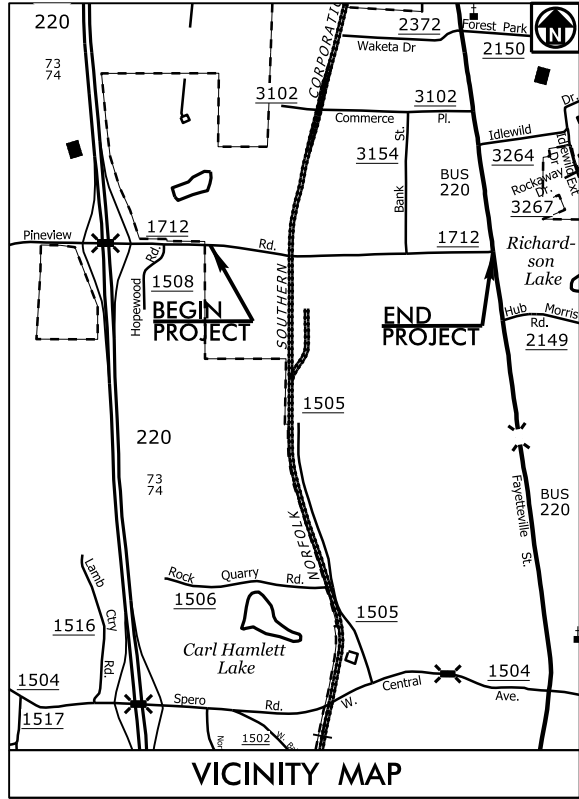
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\$\$\$\$\$USERNAME\$\$\$\$\$

09/08/99

CONTRACT:

TIP PROJECT: U-5711

See Sheet 1A For Index of Sheets
See Sheet 1B For Conventional Plan Sheet Symbols



VICINITY MAP

25% PLANS

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

RANDOLPH COUNTY

LOCATION: SR 1712 (PINEVIEW ROAD) FROM WEST OF
SYLVAN DRIVE TO US 220 BUSINESS IN ASHEBORO

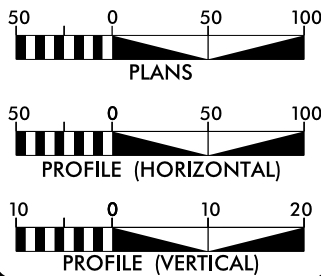
TYPE OF WORK: GRADING, PAVING, DRAINAGE AND SIGNALS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5711	3	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
50160.1.1		P.E.	

DESIGN EXCEPTION:
LANE WIDTH
SHOULDER WIDTH
SAG VERTICAL CURVE K
CREST VERTICAL CURVE K
VERTICAL SSD
SUPERELEVATION

THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF ASHEBORO
CLEARING ON THIS PROJECT SHALL BE PREPARED TO THE LIMITS ESTABLISHED BY METHOD _____.

GRAPHIC SCALES



DESIGN DATA

ADT 2020 = 6,835
ADT 2040 = 8,400
K = 10 %
D = 70 %
T = 10 % *
V = 40 MPH
* TTST = 5% DUAL 5%
FUNC CLASS =
MAJOR COLLECTOR
REGIONAL TIER

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT U-5711 = 0.795 MI
TOTAL LENGTH OF TIP PROJECT U-5711 = 0.795 MI

M M
MOTT
MACDONALD
2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
AUGUST 17, 2018

LETTING DATE:
FEBRUARY 18, 2020

PLANS PREPARED FOR THE NCDOT BY:

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DIVISION EIGHT PROJECT ENGINEER

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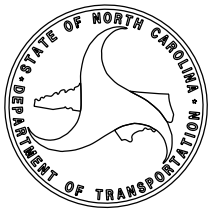
SIGNATURE: _____ P.E.

ROADWAY DESIGN
ENGINEER

SIGNATURE: _____ P.E.

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

EXISTING SIGNAL





STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

JAMES H. TROGDON, III
SECRETARY

June 22, 2018

STATE PROJECT: 50160.1.1 (U-5711)
F.A. PROJECT: N/A
COUNTY: Randolph
DESCRIPTION: Widen SR 1712 (Pineview Road/Pineview Street) from west of Sylvan Drive to US 220 Business

SUBJECT: Geotechnical Report – Inventory

Project Description

The project consists of widening the existing two-lane roadway to three lanes; one travel lane in each direction, with a center turn lane.

The geotechnical investigation was conducted in February 2018 utilizing NCDOT Geotechnical Engineering Unit personnel. Borings were advanced using a hand-auger. Representative soil samples were collected and submitted to the Materials and Tests Unit for laboratory analysis.

The following alignment was investigated for this project:

<u>Line</u>	<u>Station (±)</u>
-L-	14+00 to 55+00

Physiography, Geology and Surface Water

The project corridor is located in the central portion of the Piedmont Physiographic Province within the city of Asheboro. Topography in the area is gently rolling to hilly. The project area is suburban in nature with some industrial and residential development.

Geologically, the project area consists of Cambrian/Late Proterozoic-age sediments of the Tillery Formation, part of the Carolina Slate Belt. Rock encountered throughout the project includes weathered meta-mudstone.

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Customer Service: 1-877-368-4968

Website: www.ncdot.gov

Location:
CENTURY CENTER COMPLEX
ENTRANCE B-2
1020 BIRCH RIDGE DRIVE
RALEIGH NC

Surface water is drained to the south from the project site by two unnamed tributaries to Haskett’s Creek.

Soils Properties

Soils encountered along the project corridor include roadway embankment, artificial fill, alluvial, residual, and weathered rock. Typically, these soils consist of silts and clays that are laterally discontinuous and vary in thickness.

Roadway embankment soils associated with the existing roadway consists of up to 8 feet of red-brown, medium stiff, sandy silt, and silty clay with gravel (A-4, A-7).

Artificial Fill soils associated with the existing roadway consists of up to 8 feet of red-brown, soft to stiff, sandy and silty clay with gravel (A-6, A-7) and sandy silt (A-4) with gravel.

Alluvial deposits are located within the floodplains of the two unnamed creeks that flow south, perpendicular to the project corridor. These soils consist of red-brown and grey, very soft to medium stiff, sandy silt (A-4), silty sandy clay (A-6, A-7), and very loose to loose, clayey sand (A-2-6).

Residual soils throughout the project consist of red-brown, orange, pink, and tan, very soft to stiff, sandy and silty clay (A-6 and A-7) ranging in PI from 12 to 41, as well as tan, brown, and grey sandy silt (A-4) ranging in PI from 6 to 9.

Rock Properties

Weathered rock consisting of meta-mudstone was encountered during the roadway investigation. Elevation ranges from 693.6 feet to 698.2 feet MSL.

Ground Water

Ground water was not encountered on this project. All borings were dry at the time of drilling, and were filled immediately upon boring termination.

Culvert at –L– Station 44+00

A triple-barrel, corrugated metal pipe culvert was observed at approximate -L- Station 44+00, channeling an unnamed tributary to Haskett’s Creek. It is understood that the existing structure will be retained, with the outer two pipes being cleared of excessive sediment buildup.

Areas of Special Geotechnical Interest

1) Plastic Soils - Abundant moderately to highly plastic soils were found within the area investigated. These soils were noted at the following locations:

<u>Line</u>	<u>Station (±)</u>
-L-	15+00 to 22+00
-L-	24+00 to 31+00
-L-	35+00 to 36+00
-L-	38+00 to 39+50
-L-	44+50 to 45+50

2) Soils with High Liquid Limit - Soils with a liquid limit of 50 or greater were encountered on this project. These soils were noted at the following locations:

<u>Line</u>	<u>Station (±)</u>
-L-	15+00 to 31+00
-L-	39+00 to 43+00
-L-	47+05
-L-	51+00 to 55+00

3) Soils with High Percent Passing #200 Sieve - Soils with greater than 90% of material passing through a #200 sieve were encountered along much of the project. These soils were noted at the following locations:

<u>Line</u>	<u>Station (±)</u>	<u>Passing #200 Sieve (%)</u>
-L-	15+00 to 31+00	91 to 99
-L-	35+00 to 55+00	90 to 100

4) Artificial Fill Soils - Artificial Fill material consisting of sandy and silty clay, sandy silt, may be unsuitable for subgrade and are found at the following locations:

<u>Line</u>	<u>Station (±)</u>
-L-	14+00 to 24+00
-L-	42+75 to 44+00

5) Alluvial Soils - Alluvial deposits consisting of sandy and silty clay, sandy silt, and clayey sand which may have the potential to cause embankment stability/settlement problems at the following sections:

<u>Line</u>	<u>Station (±)</u>
-L-	31+00 to 33+50
-L-	42+50 to 44+00

6) Weathered Rock – Weathered rock consisting of meta-mudstone was encountered within 6 feet of grade at the following locations:

<u>Line</u>	<u>Station (±)</u>
-L-	29+00 to 30+00
-L-	35+00

7) Water Wells - Water wells were found within proposed right of way limits at the following location:

<u>Line</u>	<u>Station</u>	<u>Offset (ft)</u>
-L-	34+40	40’ RT

Respectfully Submitted,

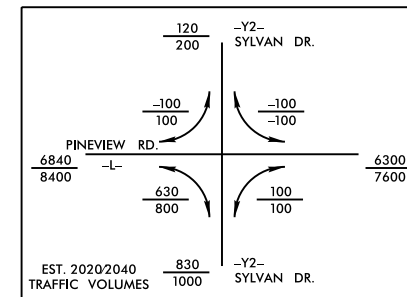
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C6DB1CBA0D0F44A...
Christina M. Bruinsma, LG

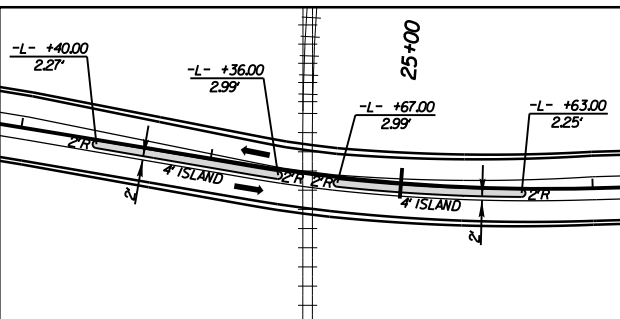
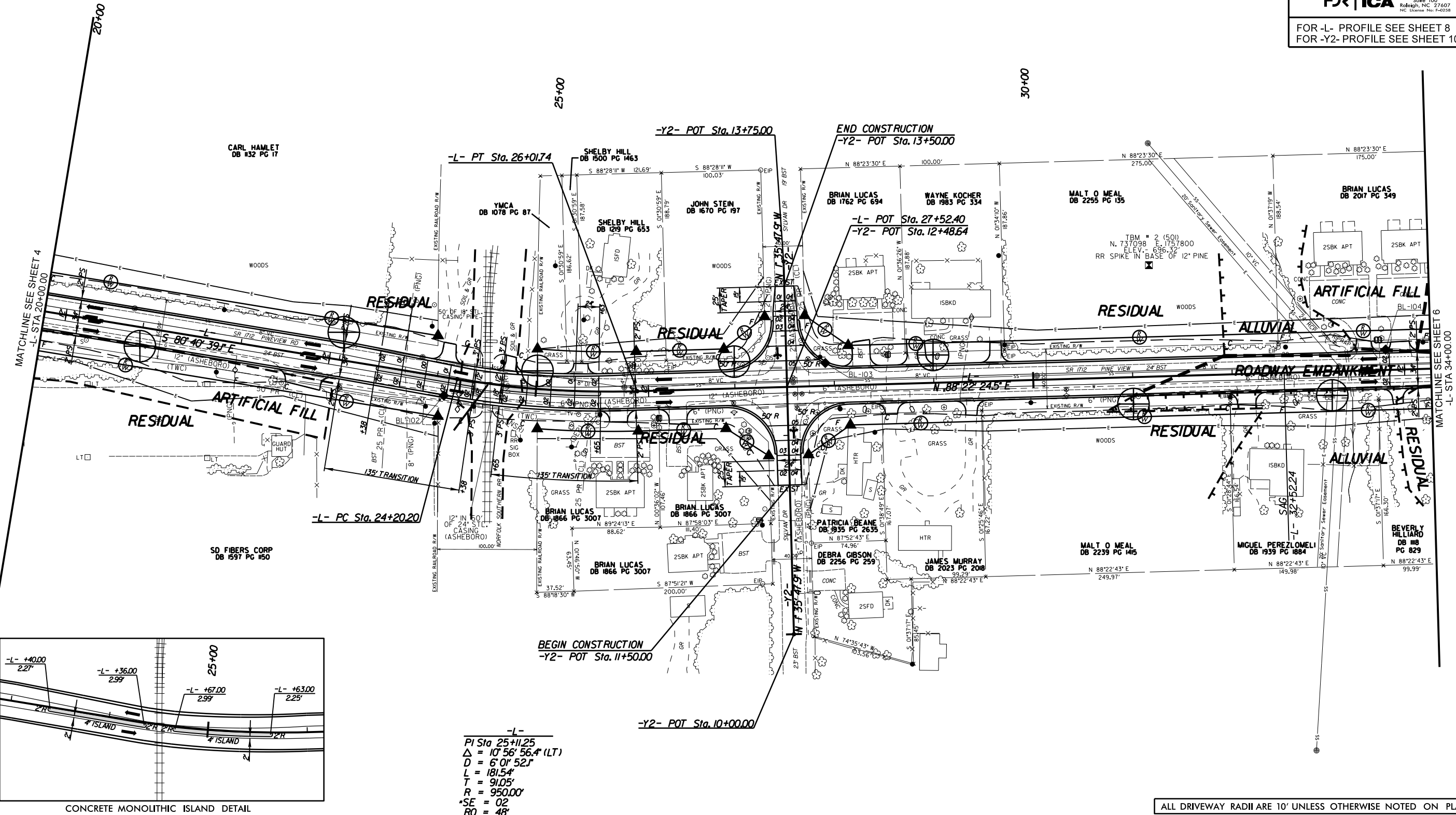
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*DESIGN EXCEPTION REQUIRED:
SUPERELEVATION

NAD 83/NA 2011

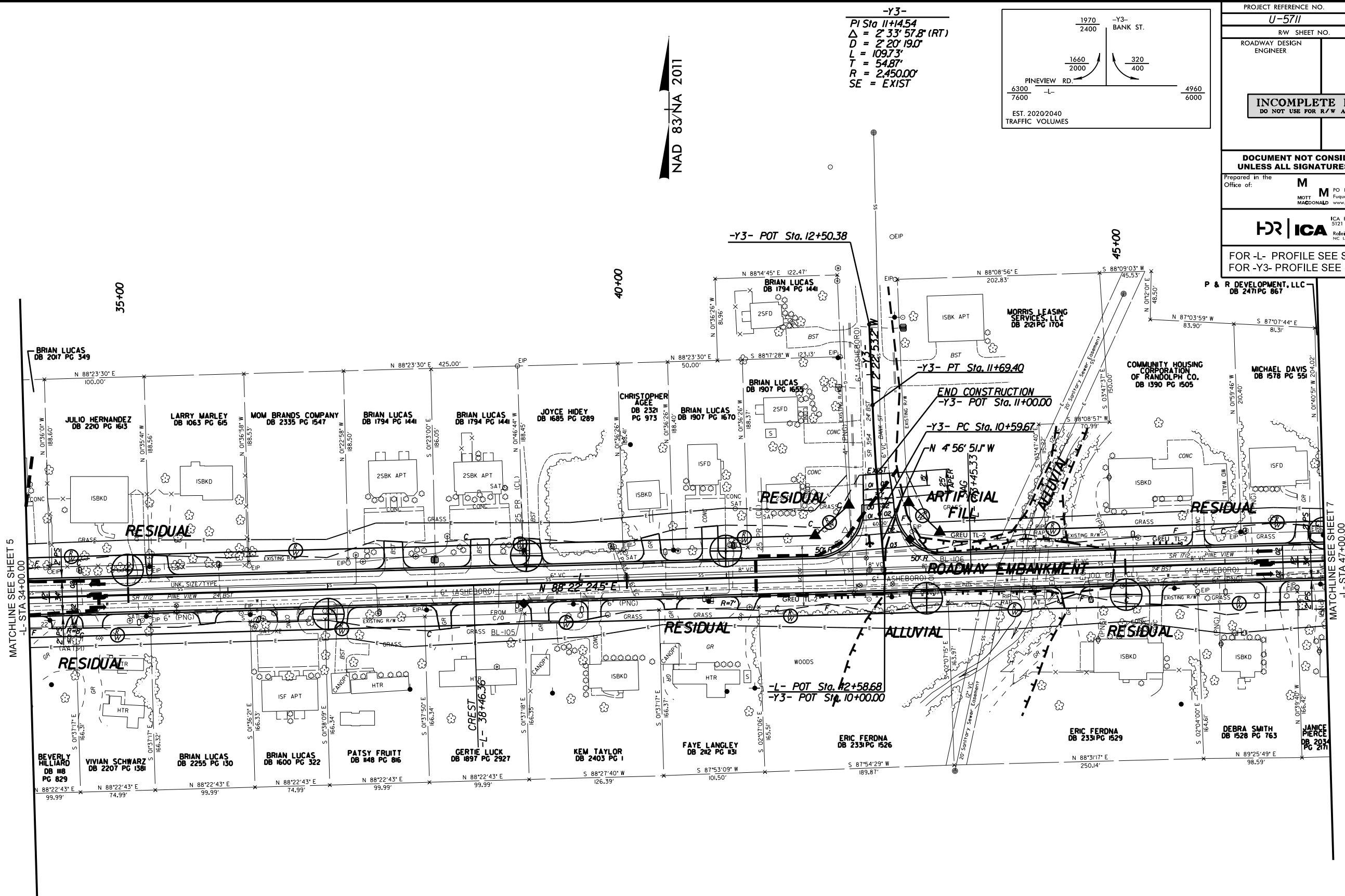


PROJECT REFERENCE NO. U-5711		SHEET NO. 5	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION			
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			
Prepared in the Office of:		MOTT MACDONALD	
ICA Engineering, Inc.		PO Box 700 Fuquay-Varina, NC 27526 www.mottmac.com/america	
FOR -L- PROFILE SEE SHEET 8 FOR -Y2- PROFILE SEE SHEET 10			

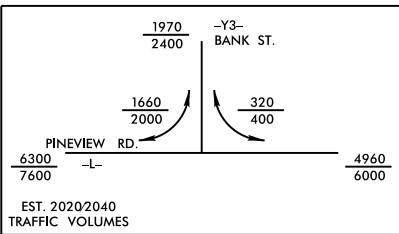


-L-
PI Sta 25+11.25
Δ = 10° 56' 56.4" (LT)
D = 6' 01' 52.1"
L = 181.54'
T = 91.05'
R = 950.00'
SE = 02
RO = 48'

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED ON PLANS.

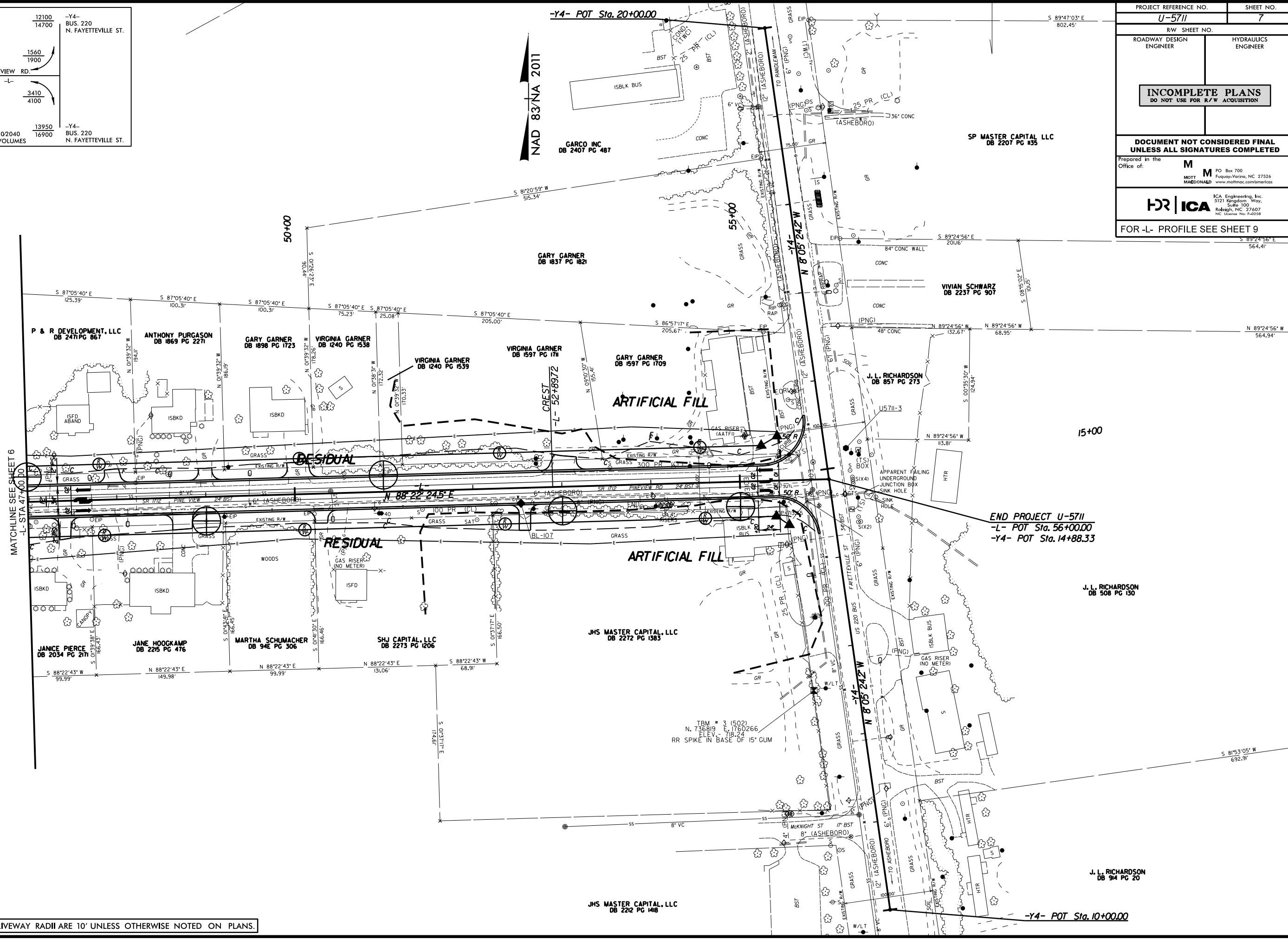


-Y3-
PI Sta 11+14.54
 $\Delta = 2' 33' 57.8''$ (RT)
 $D = 2' 20' 19.0''$
 $L = 109.73'$
 $T = 54.87'$
 $R = 2,450.00'$
SE = EXIST



PROJECT REFERENCE NO.		SHEET NO.	
U-5711		6	
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			
Prepared in the Office of:		MOTT MACDONALD	
		PO Box 700 Fuquay-Varina, NC 27526 Raleigh, NC 27607 NC License No. F-0258	
ICA		ICA Engineering, Inc. 5121 Kingdom Way, Suite 100 Raleigh, NC 27607 NC License No. F-0258	
FOR -L- PROFILE SEE SHEETS 8 & 9 FOR -Y3- PROFILE SEE SHEET 10			

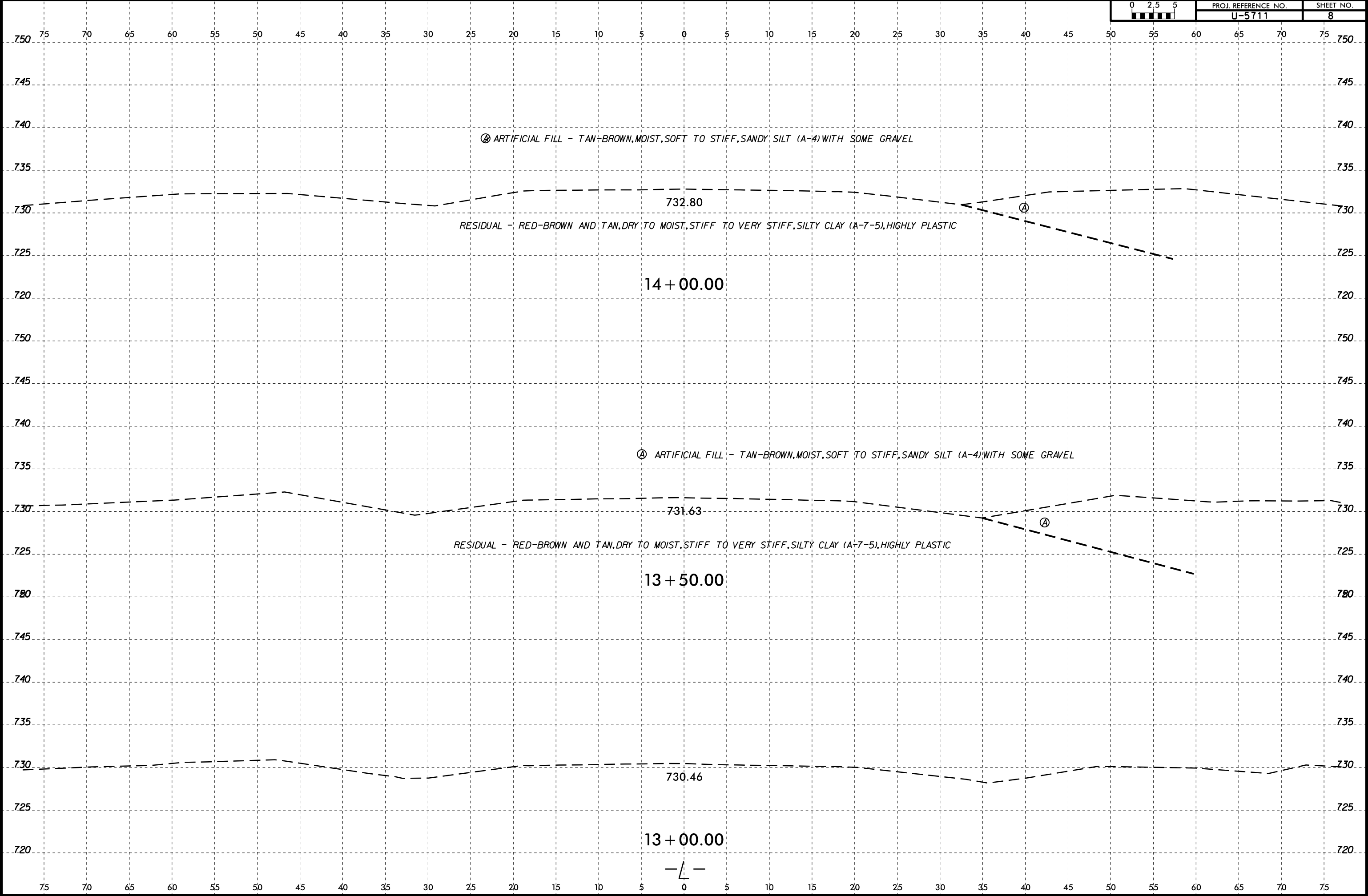
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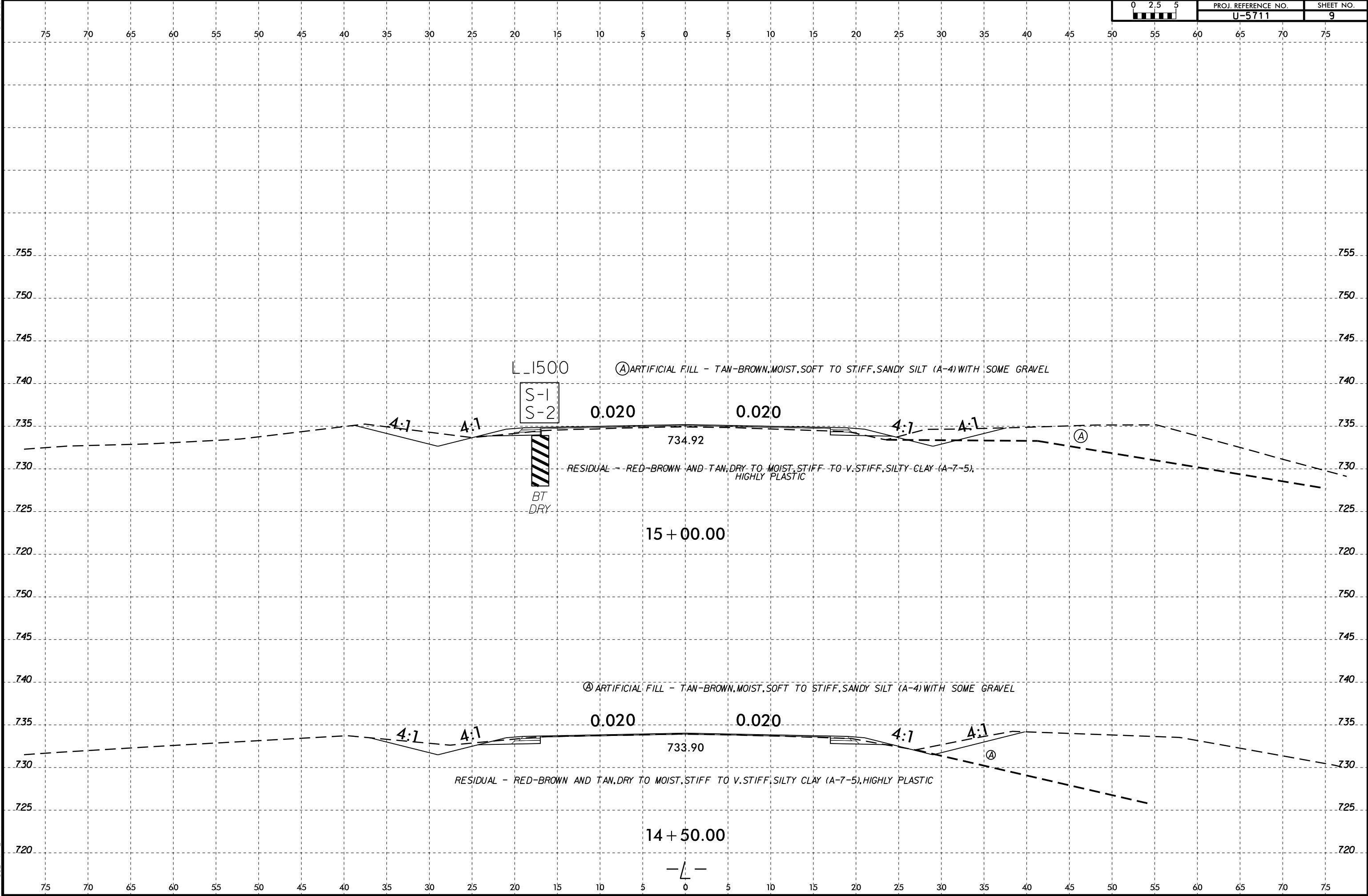
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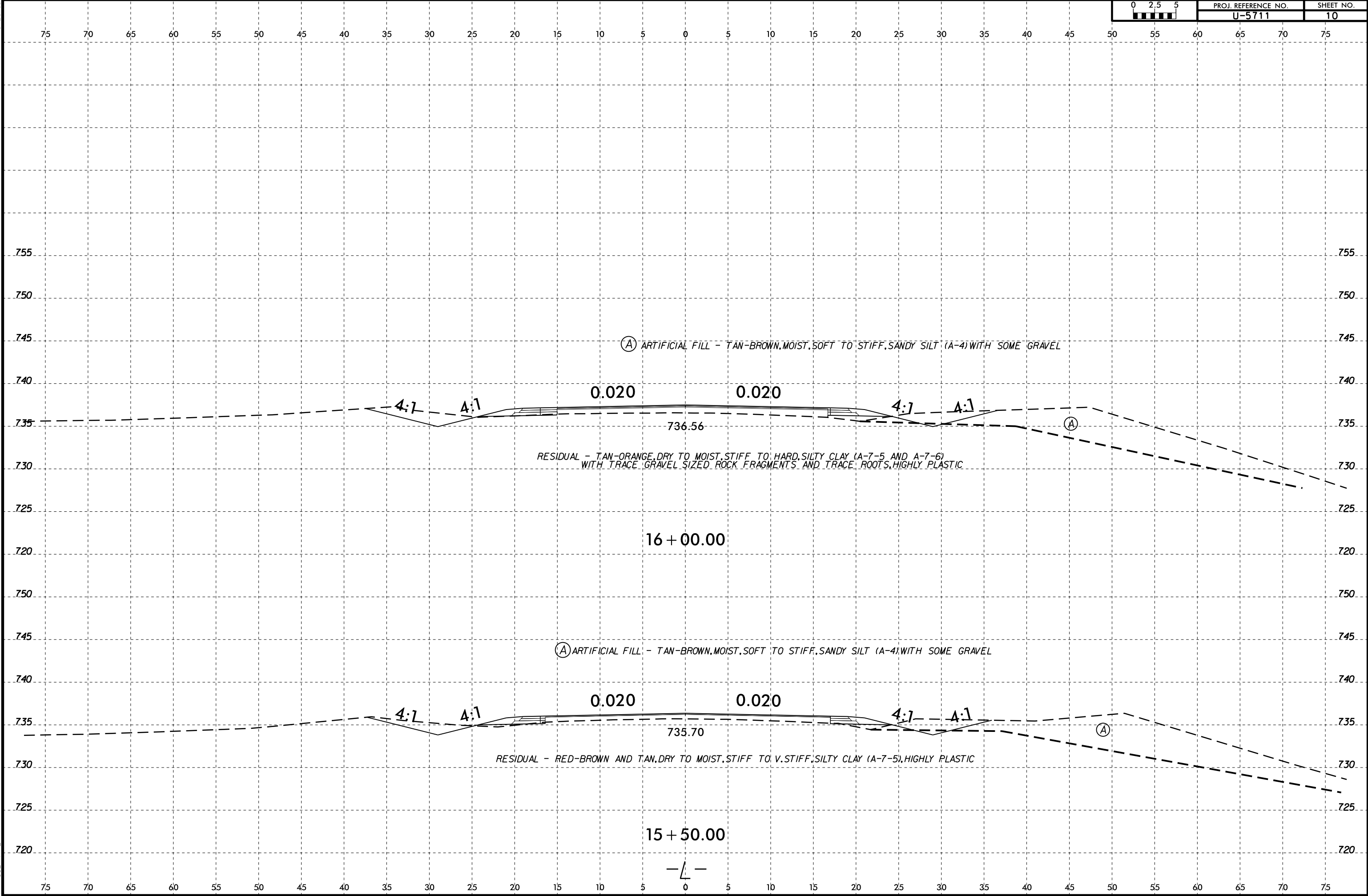
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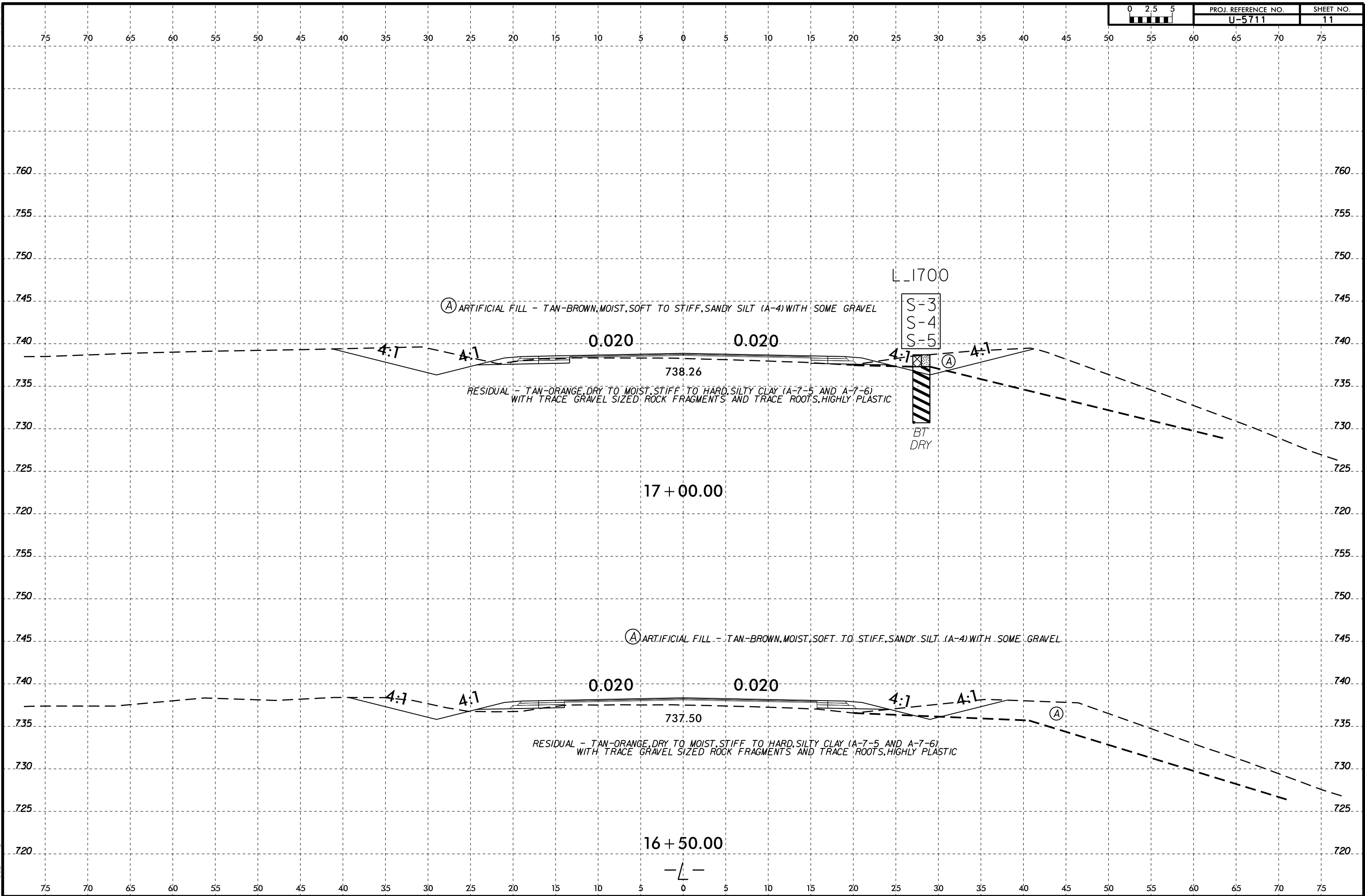
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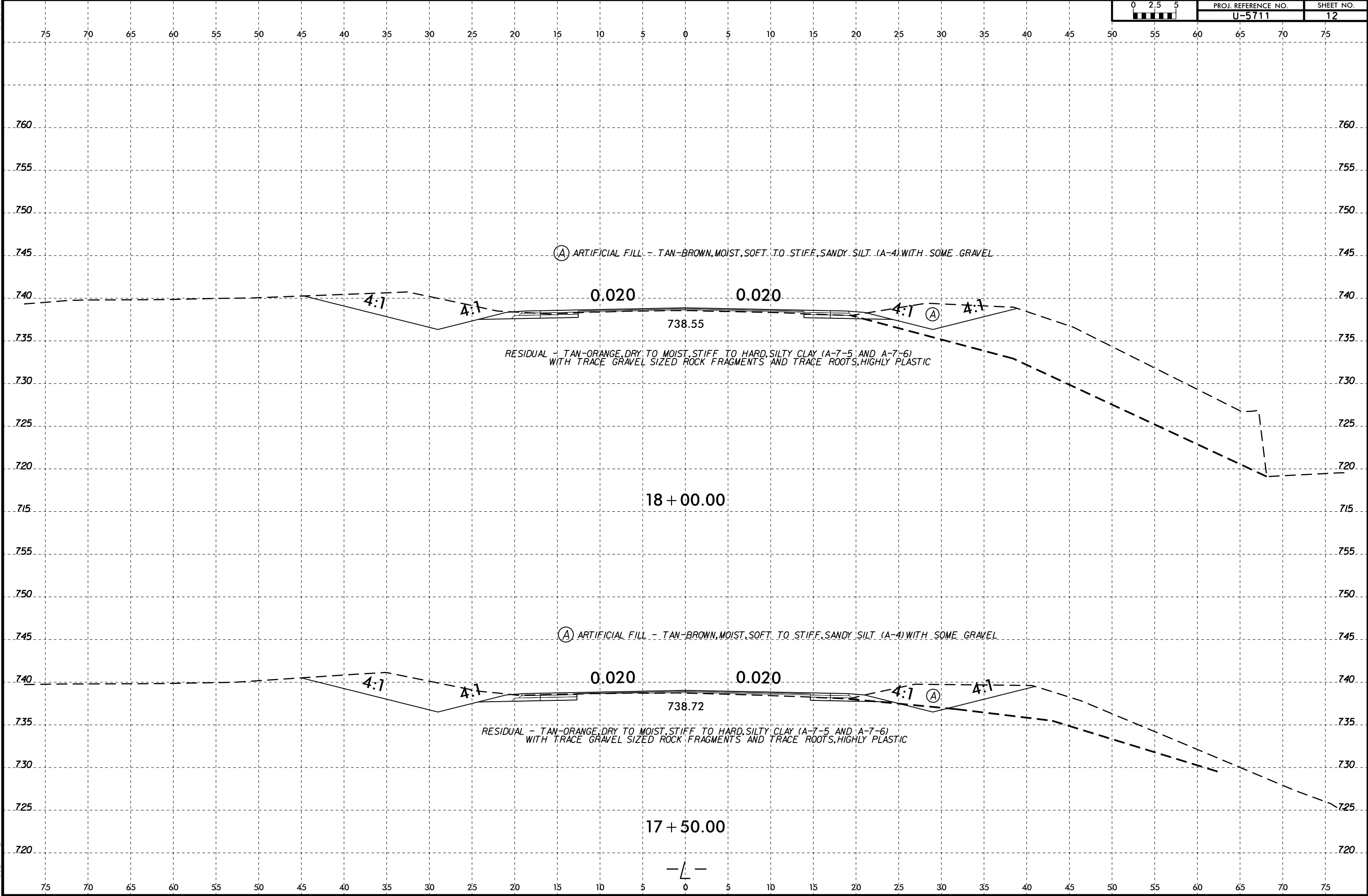




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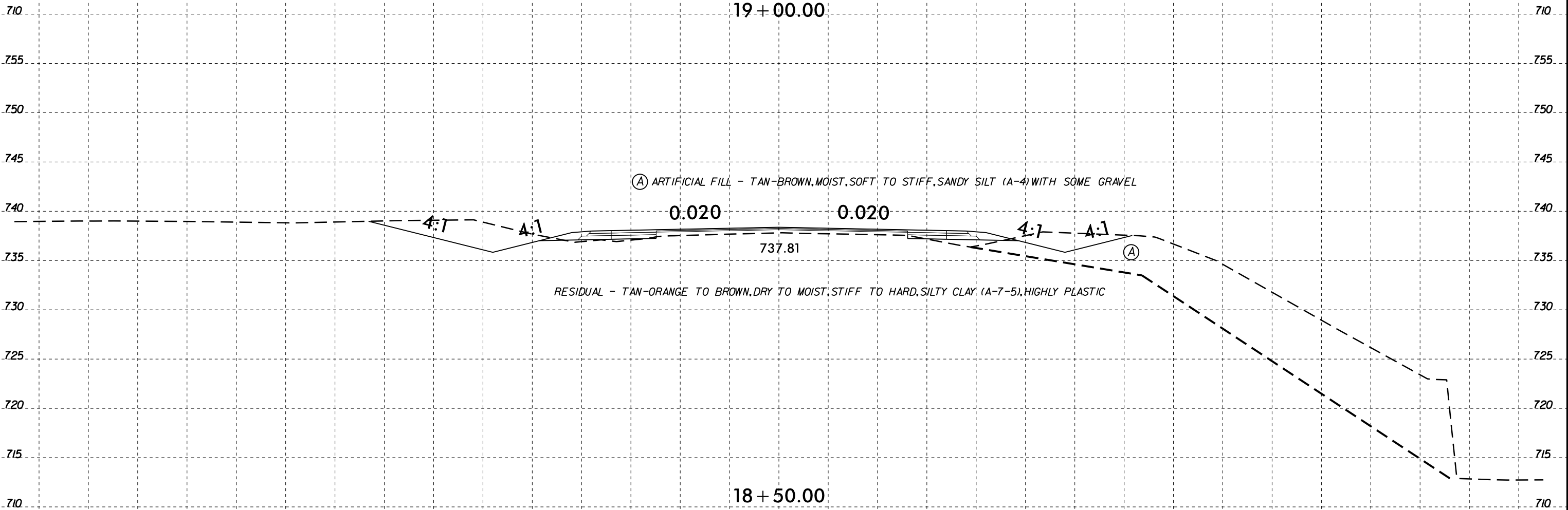
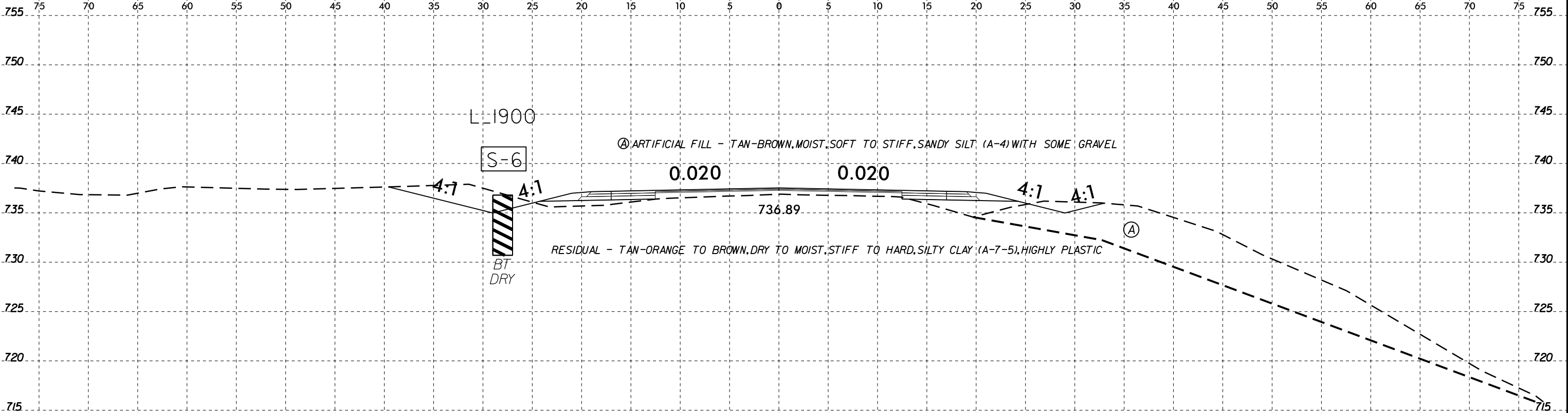
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6/23/16



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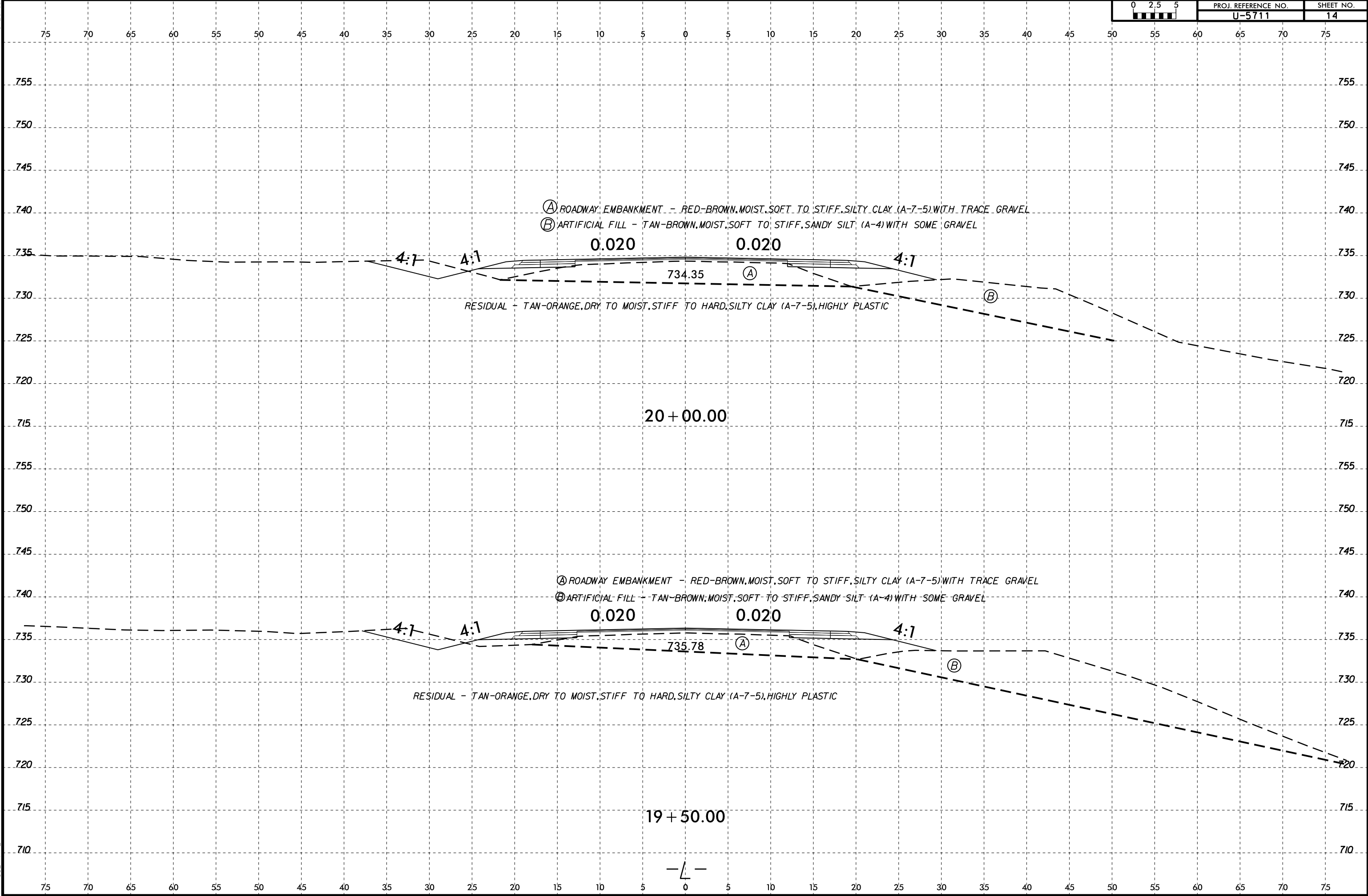
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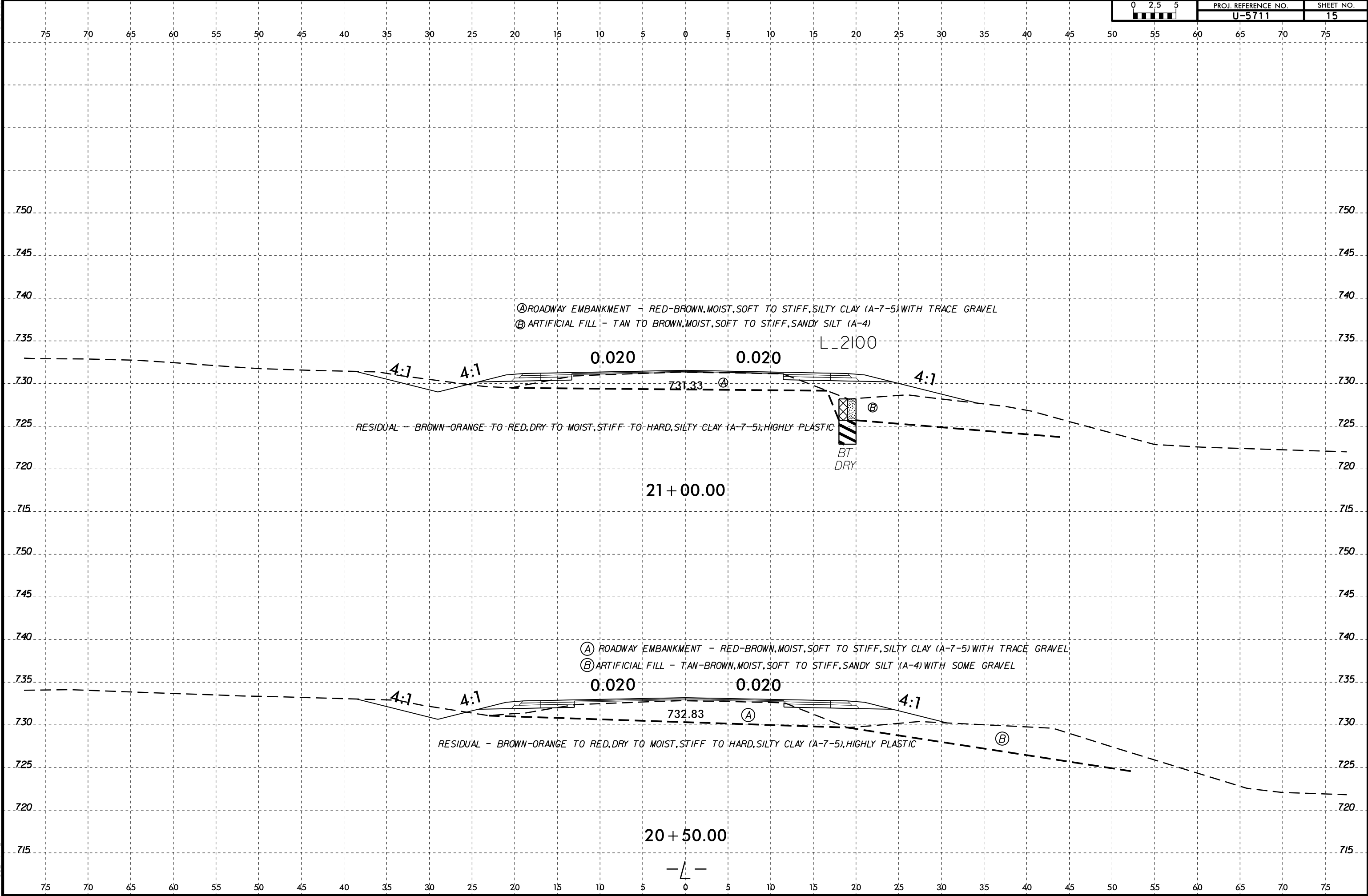
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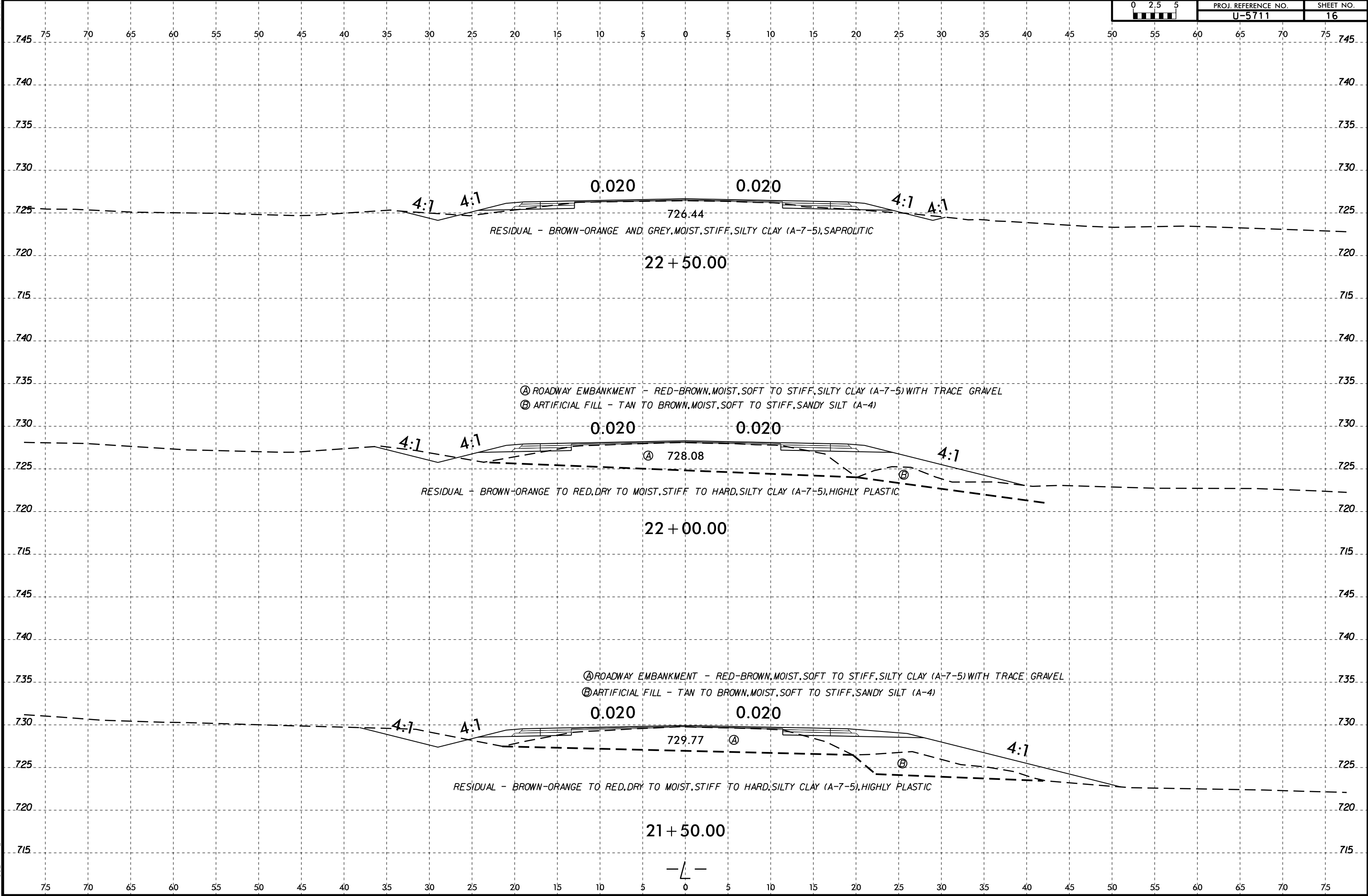
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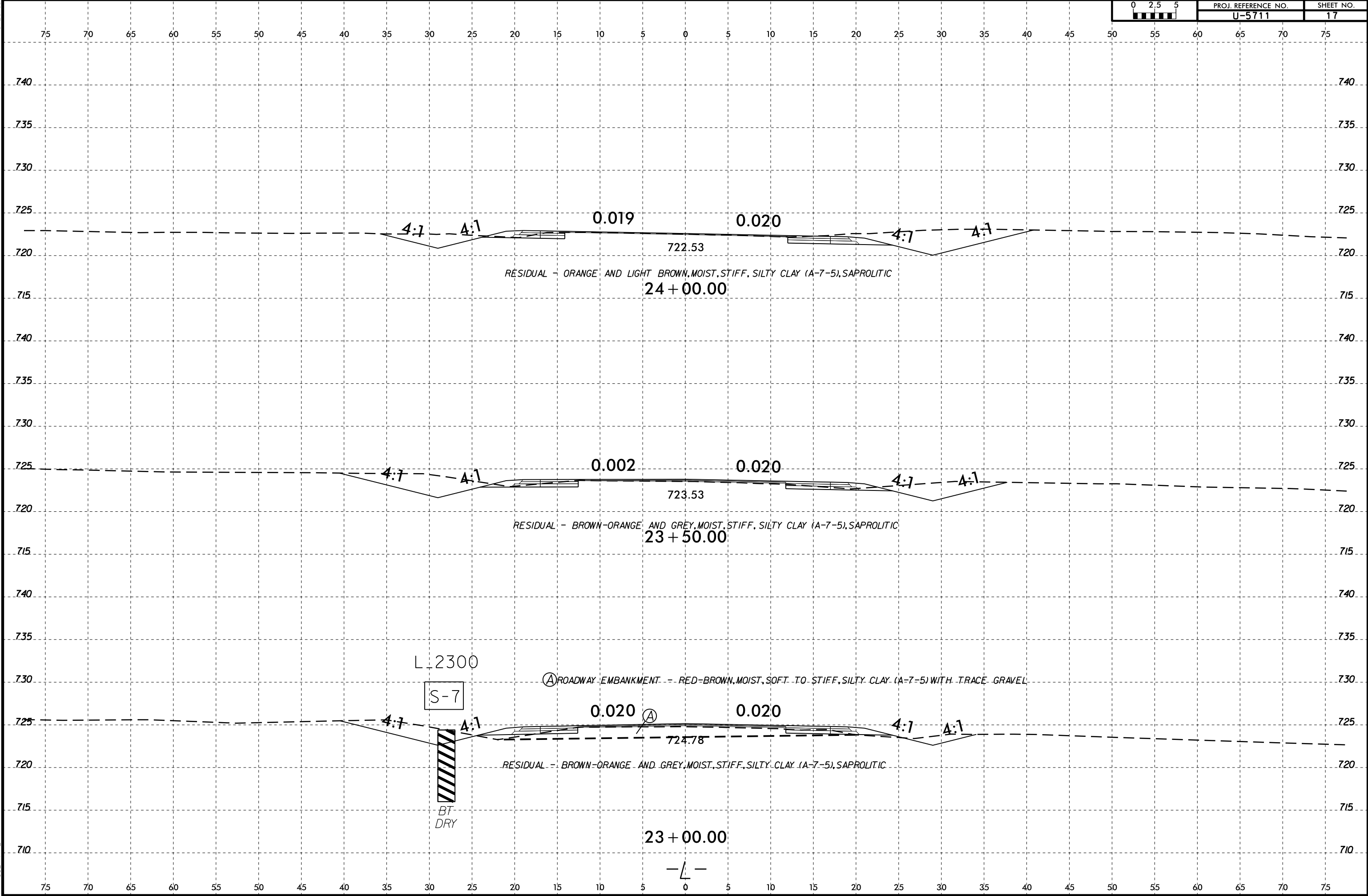


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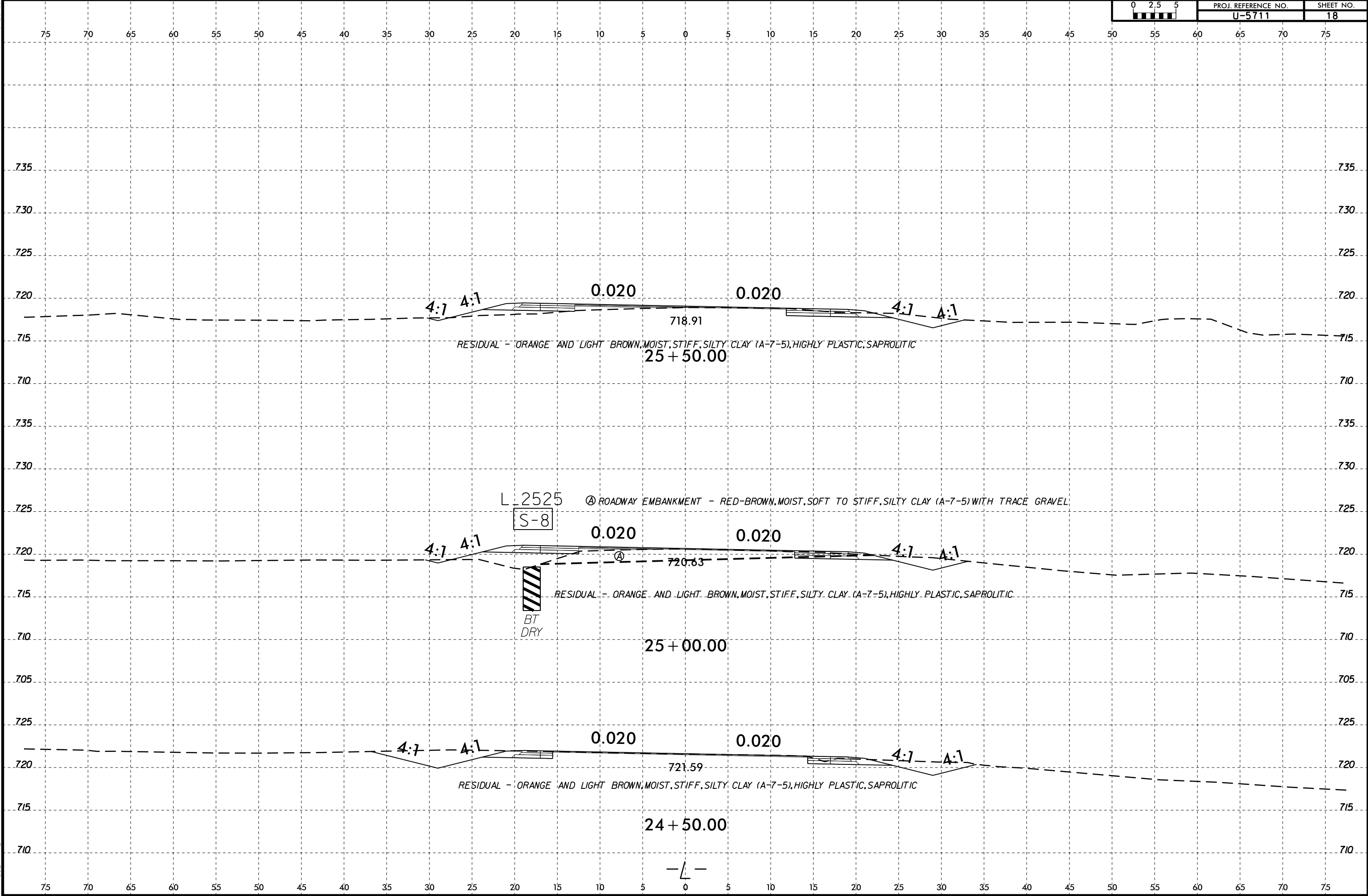
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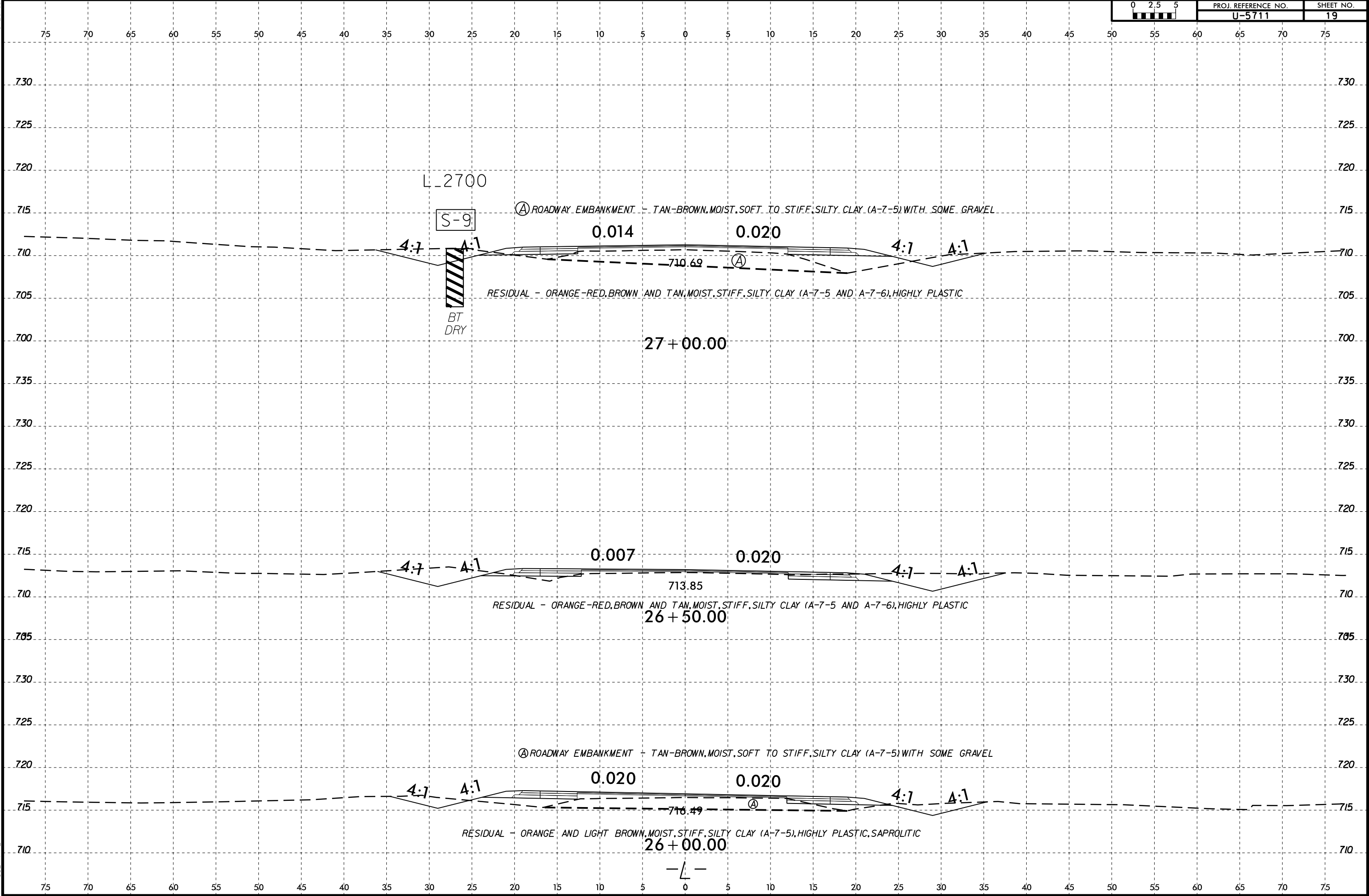
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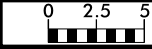
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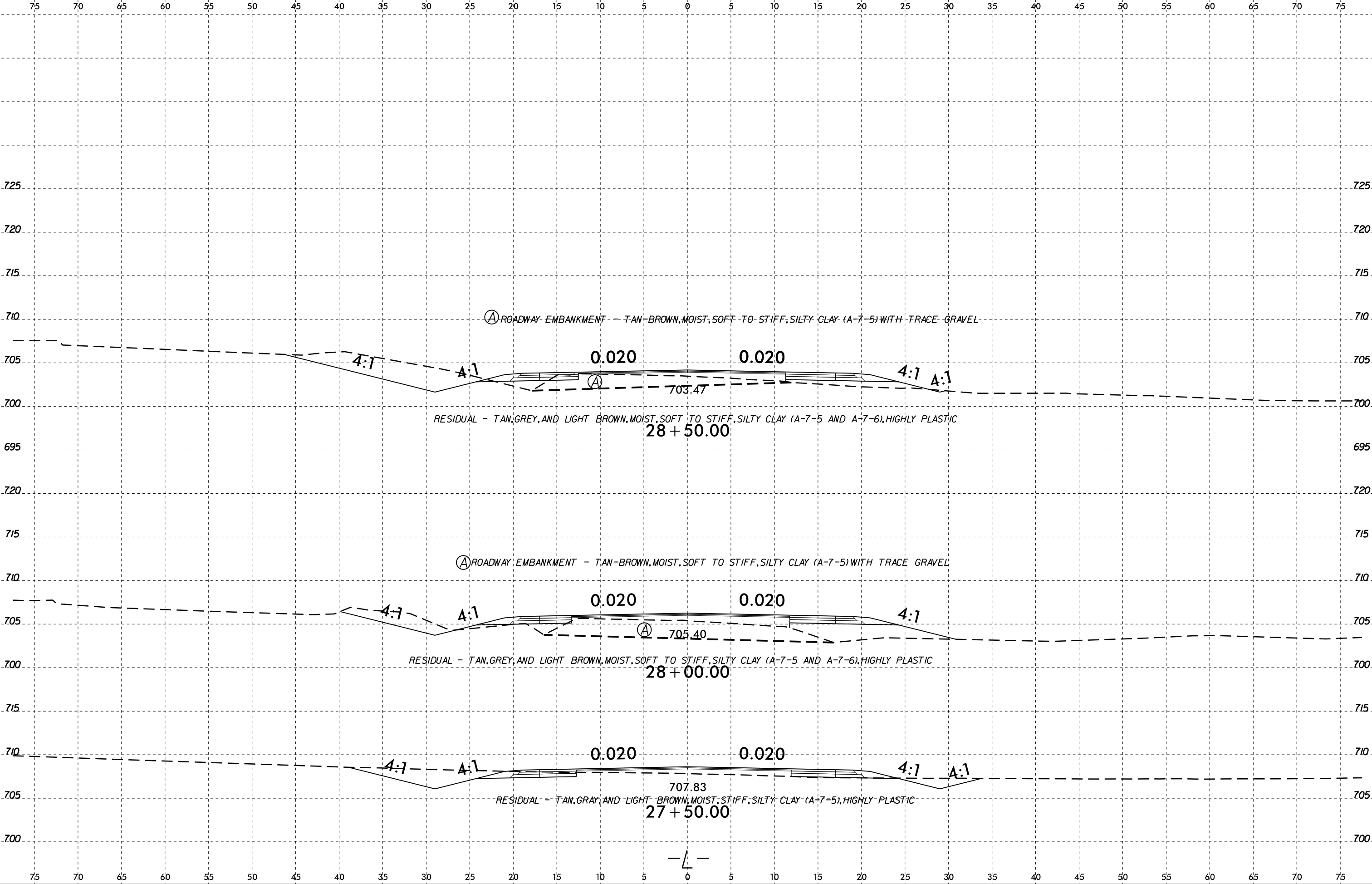


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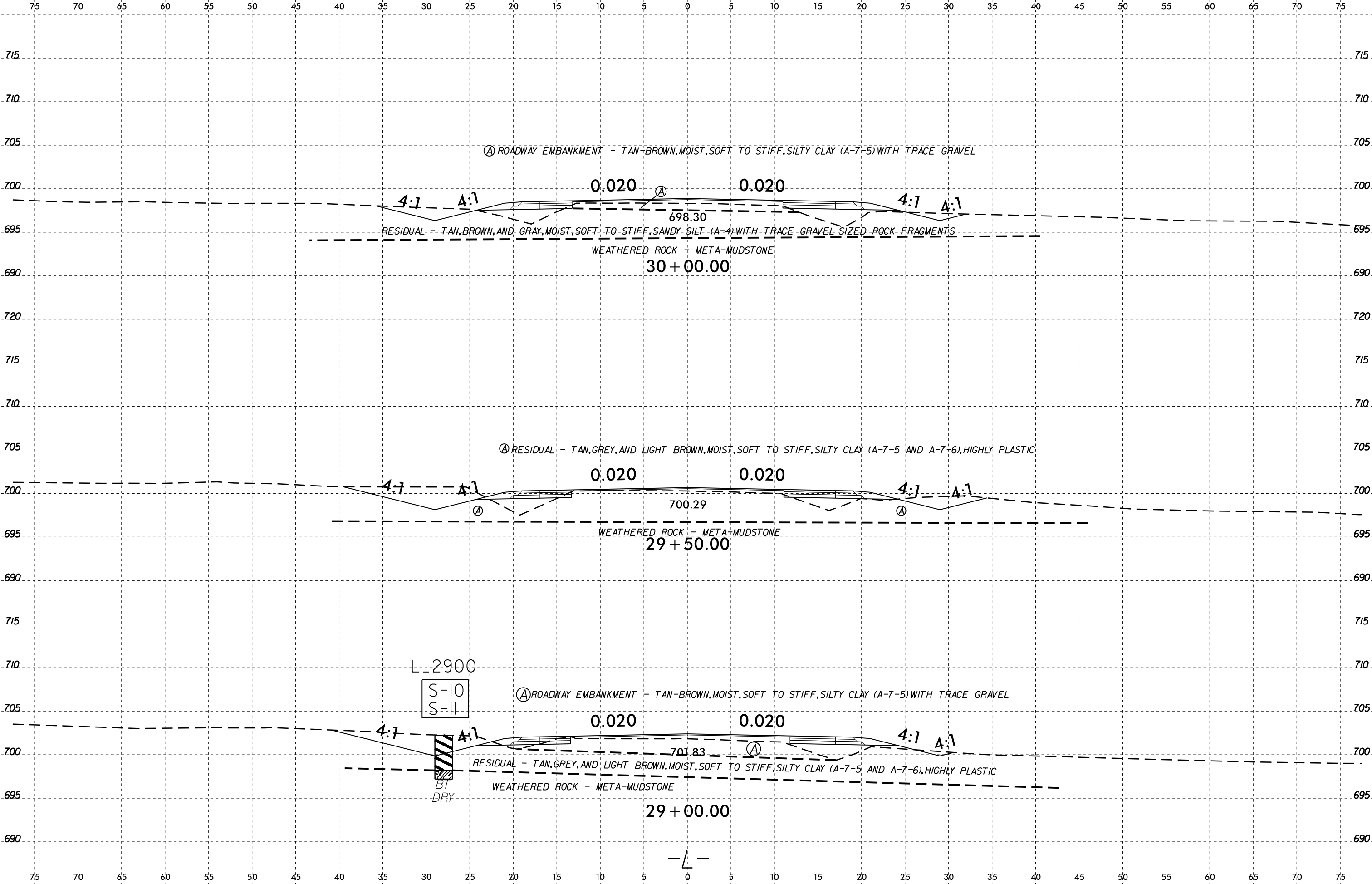


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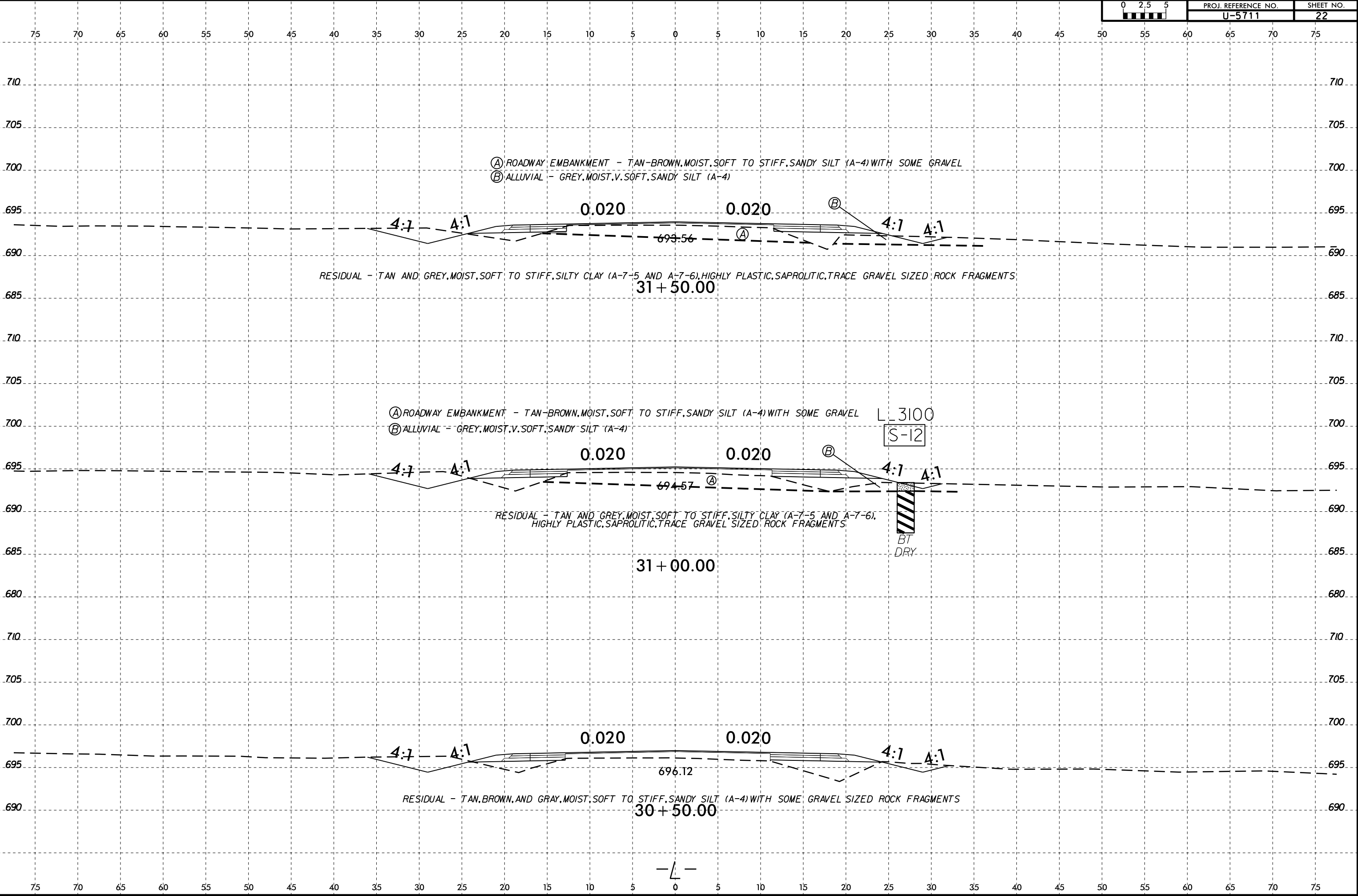


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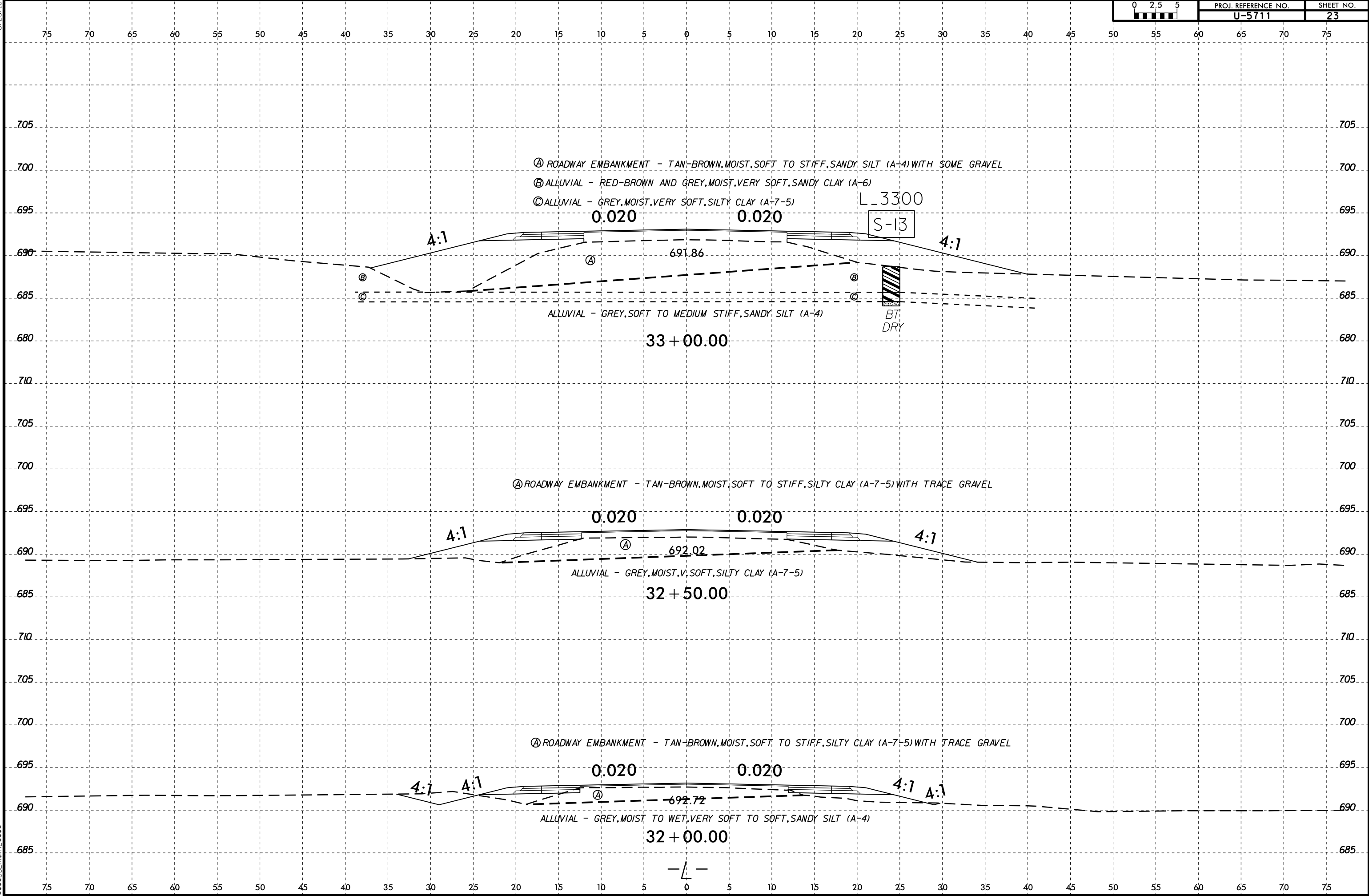


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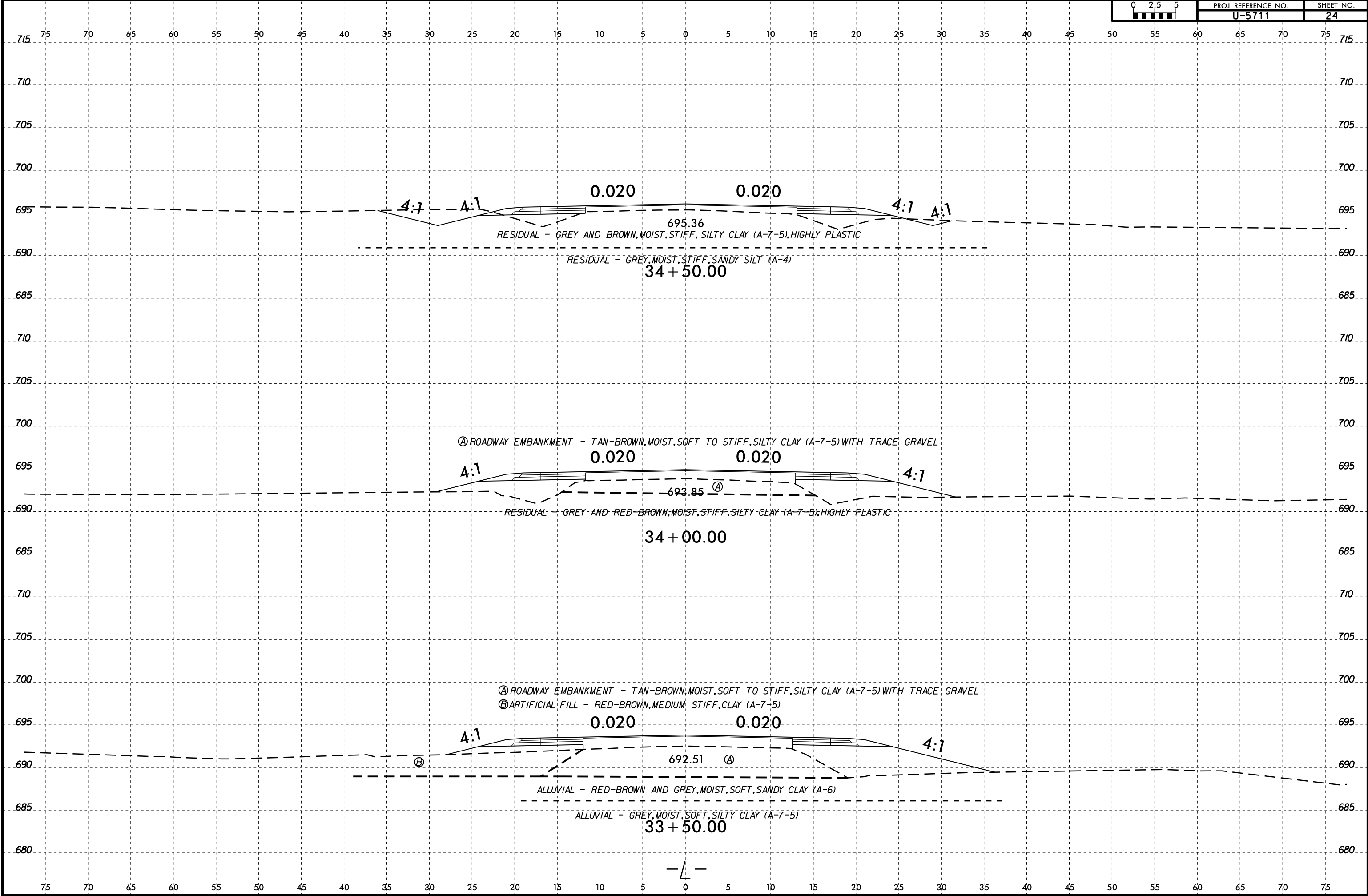


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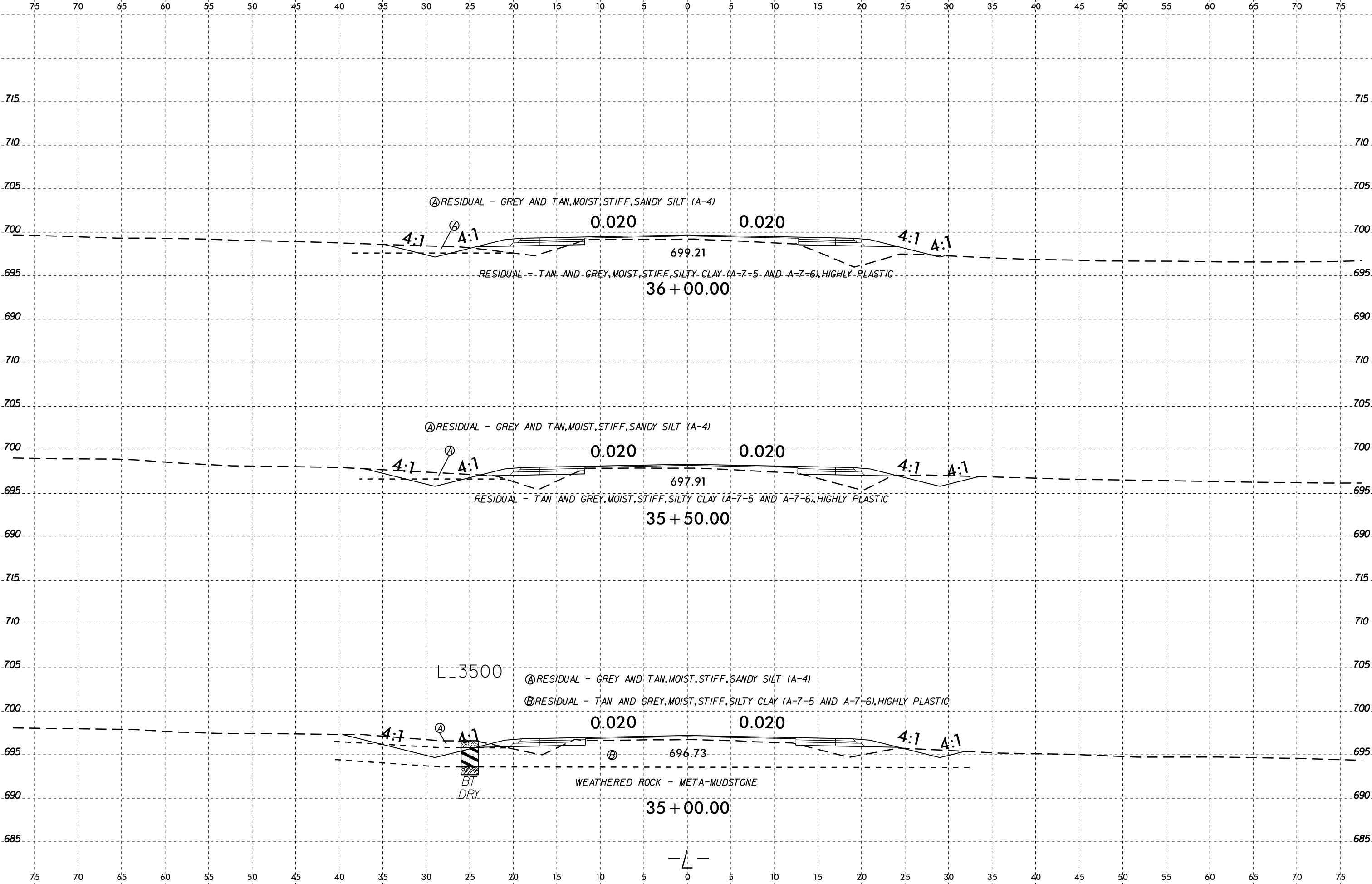


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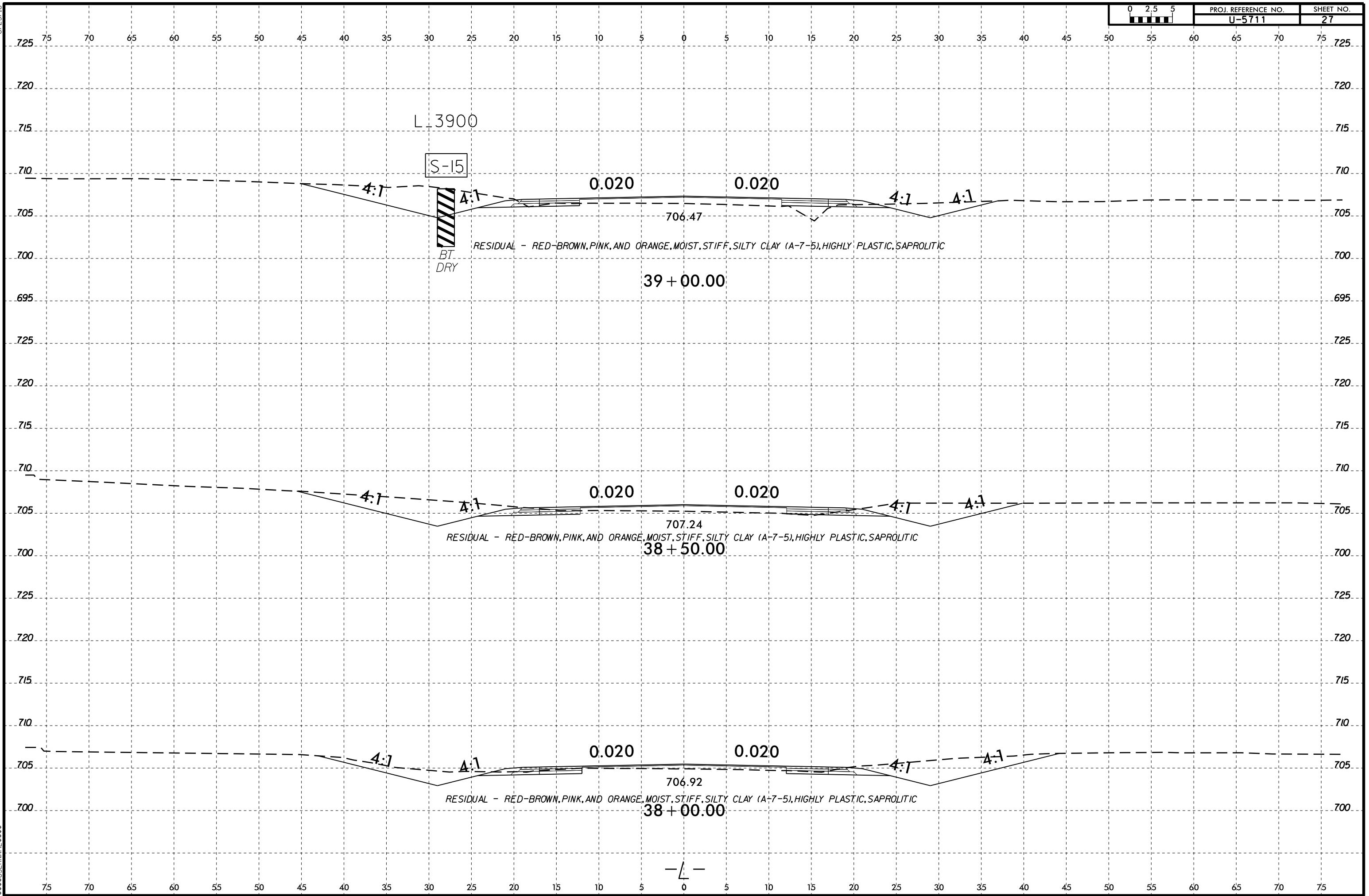


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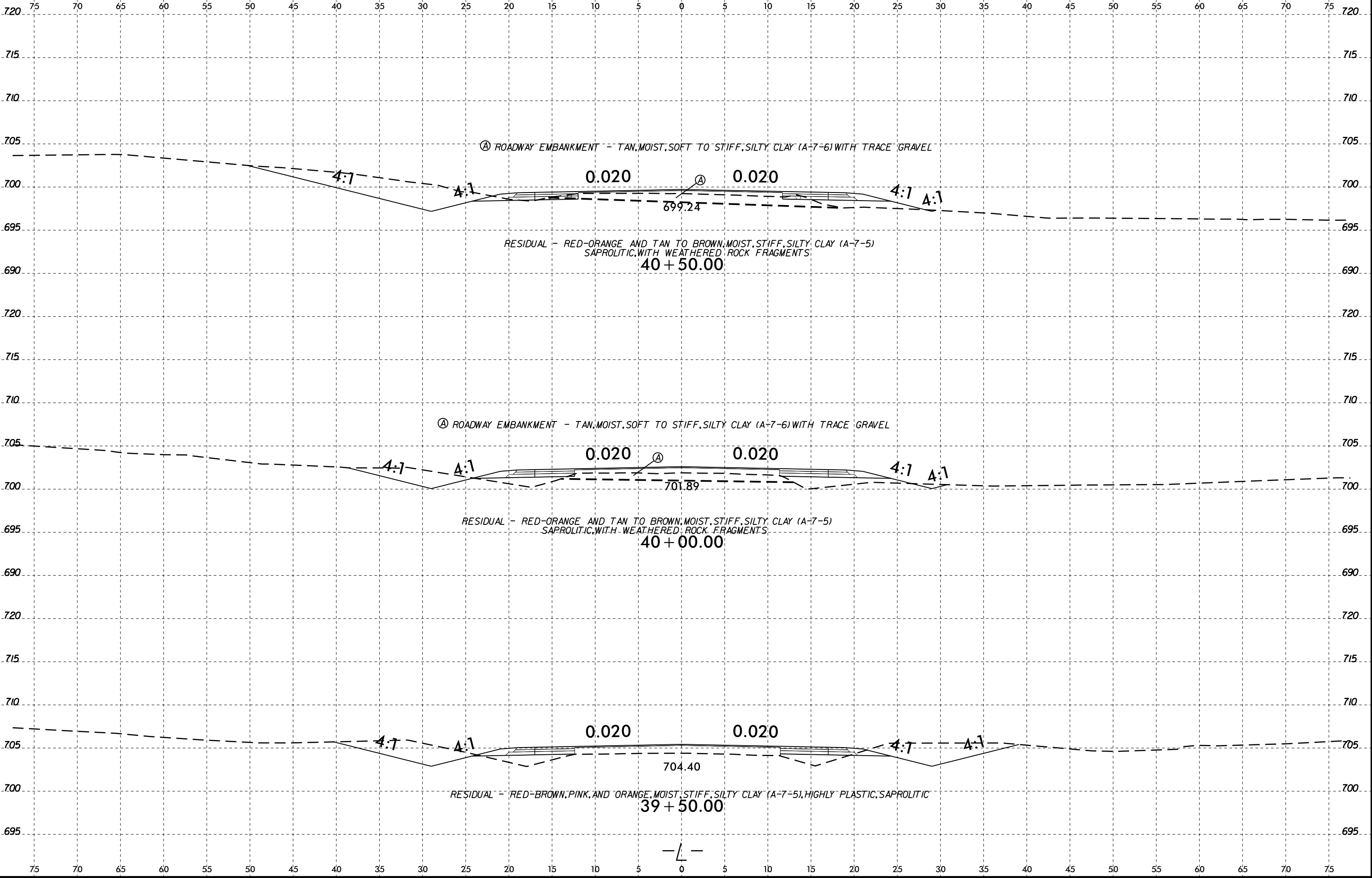


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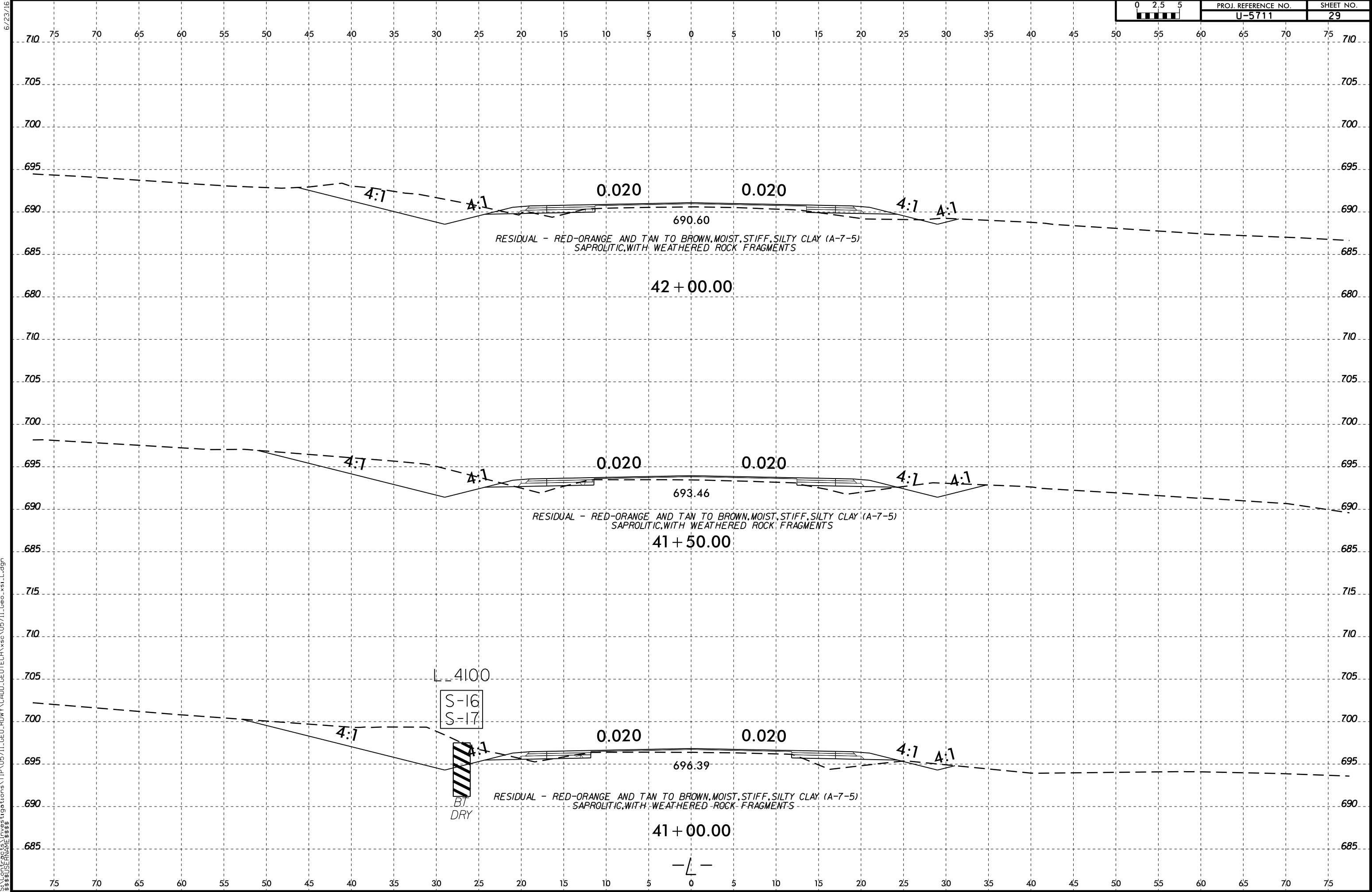


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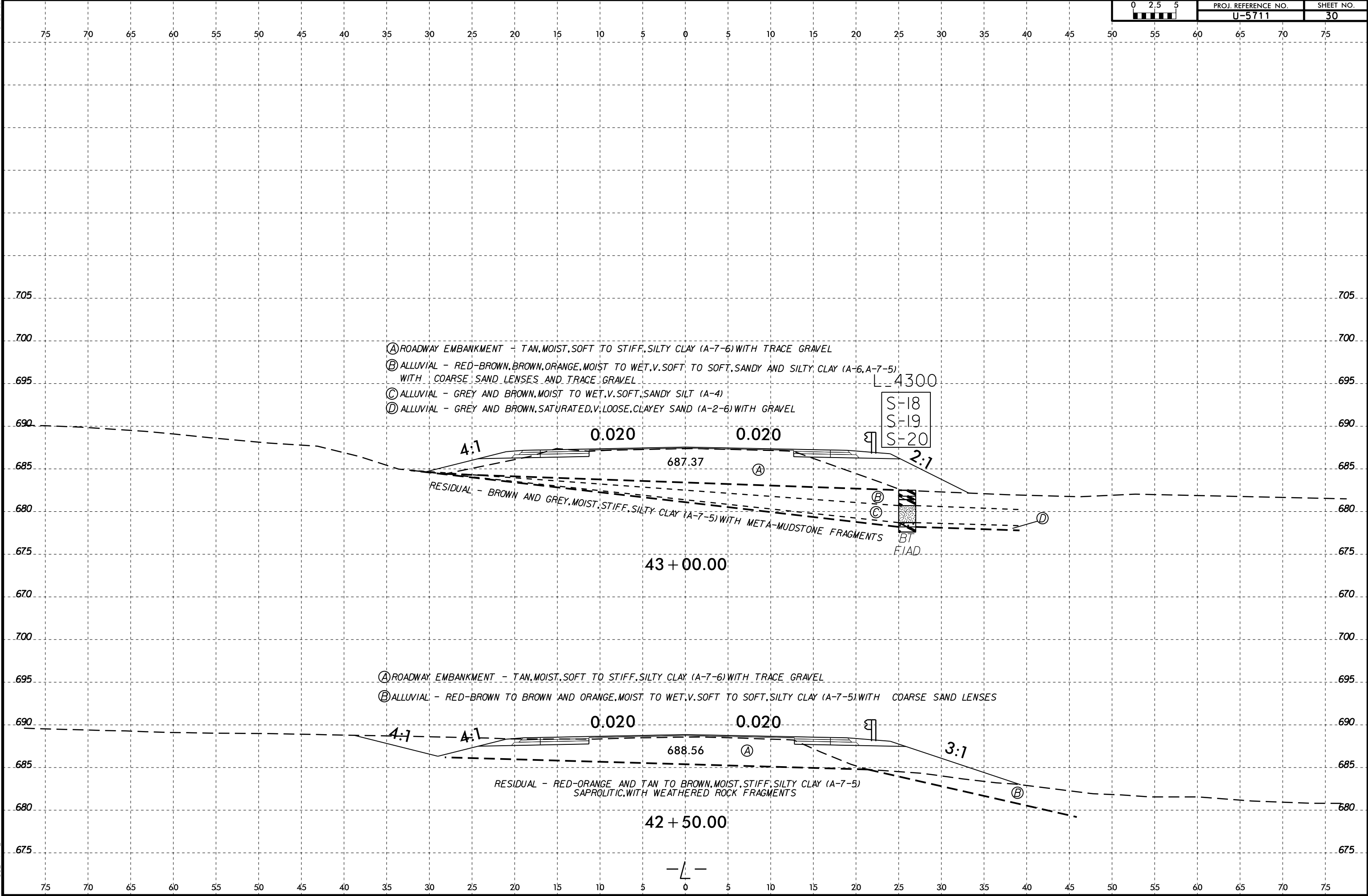
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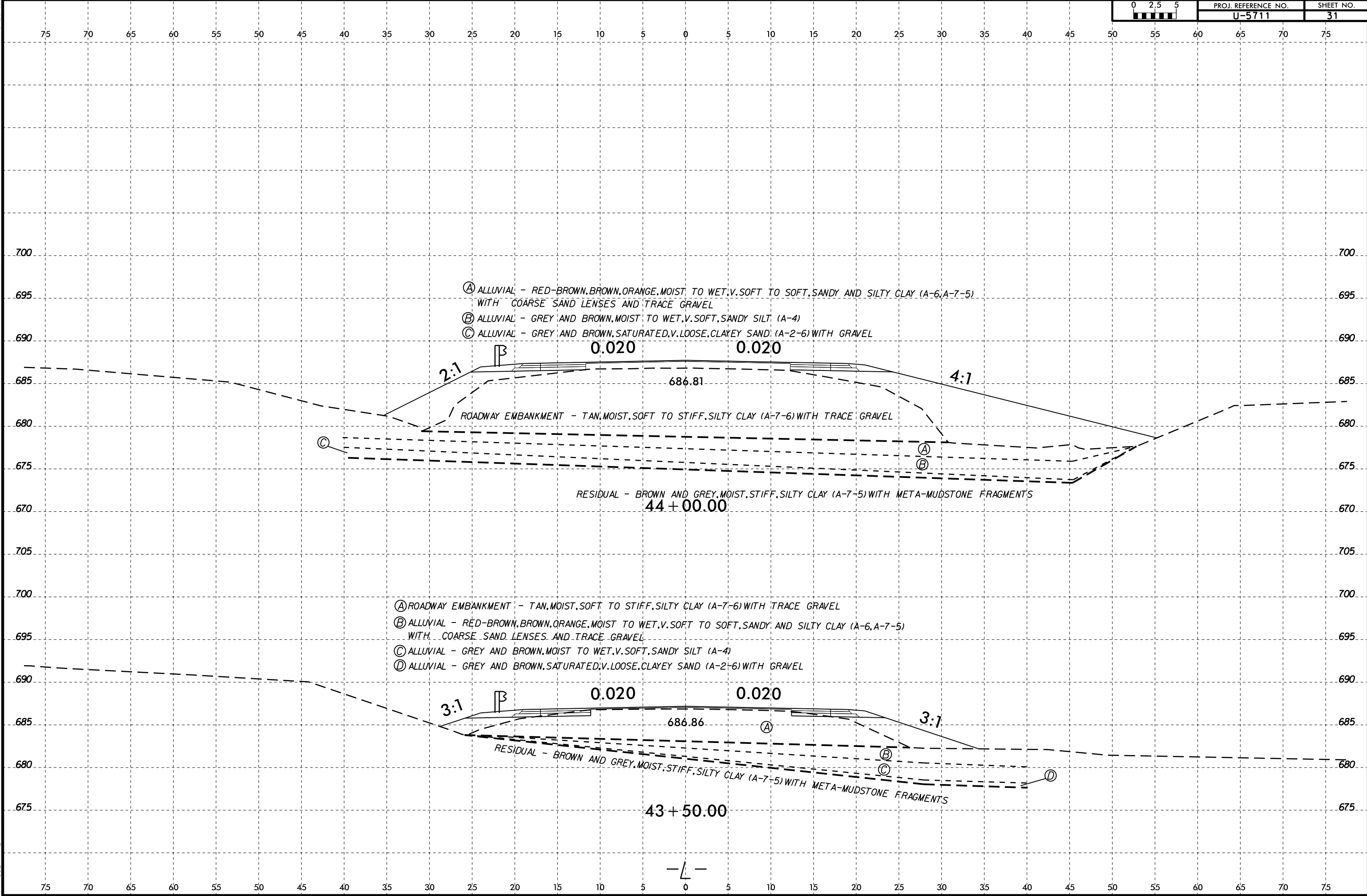


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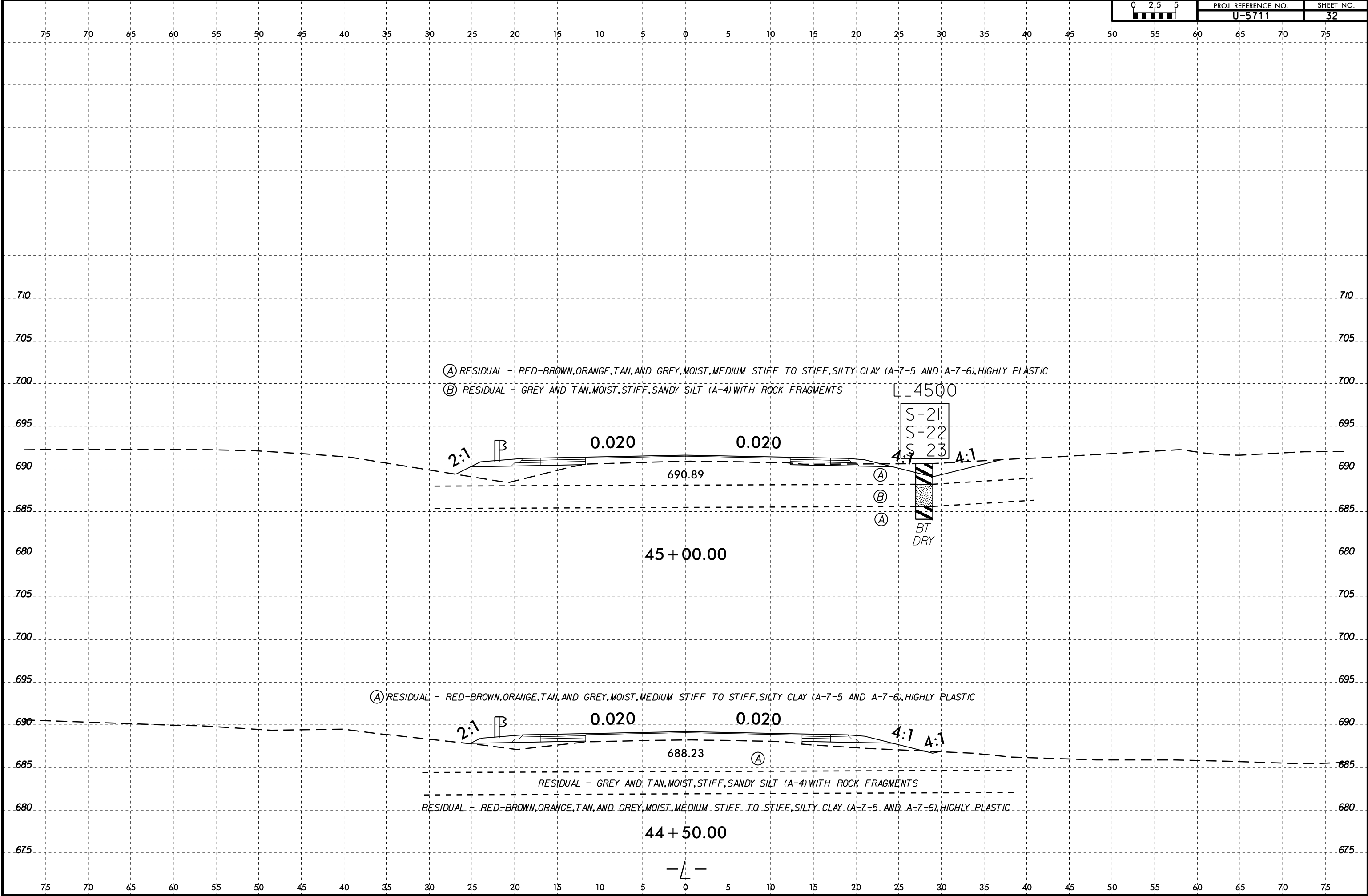
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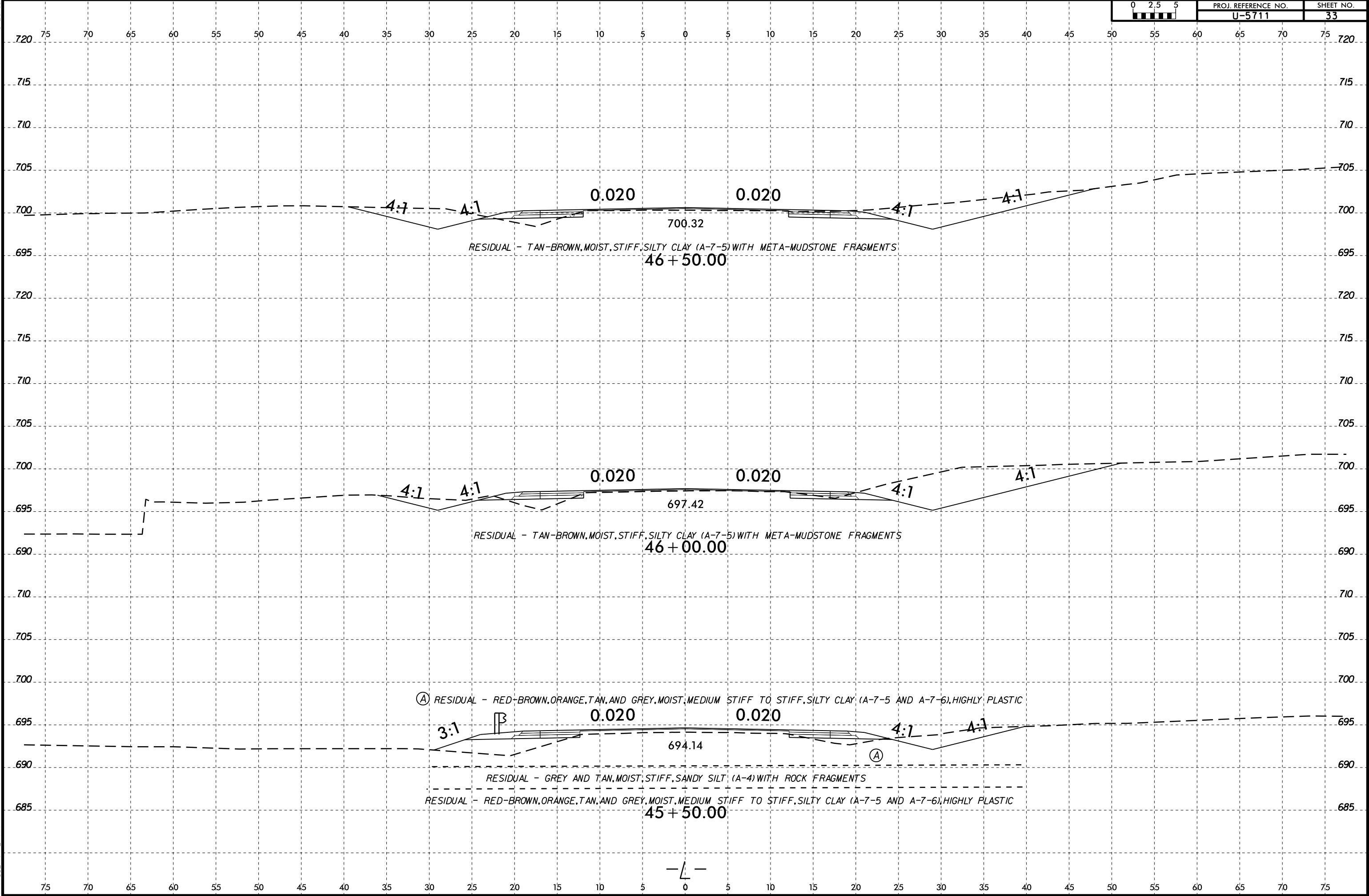
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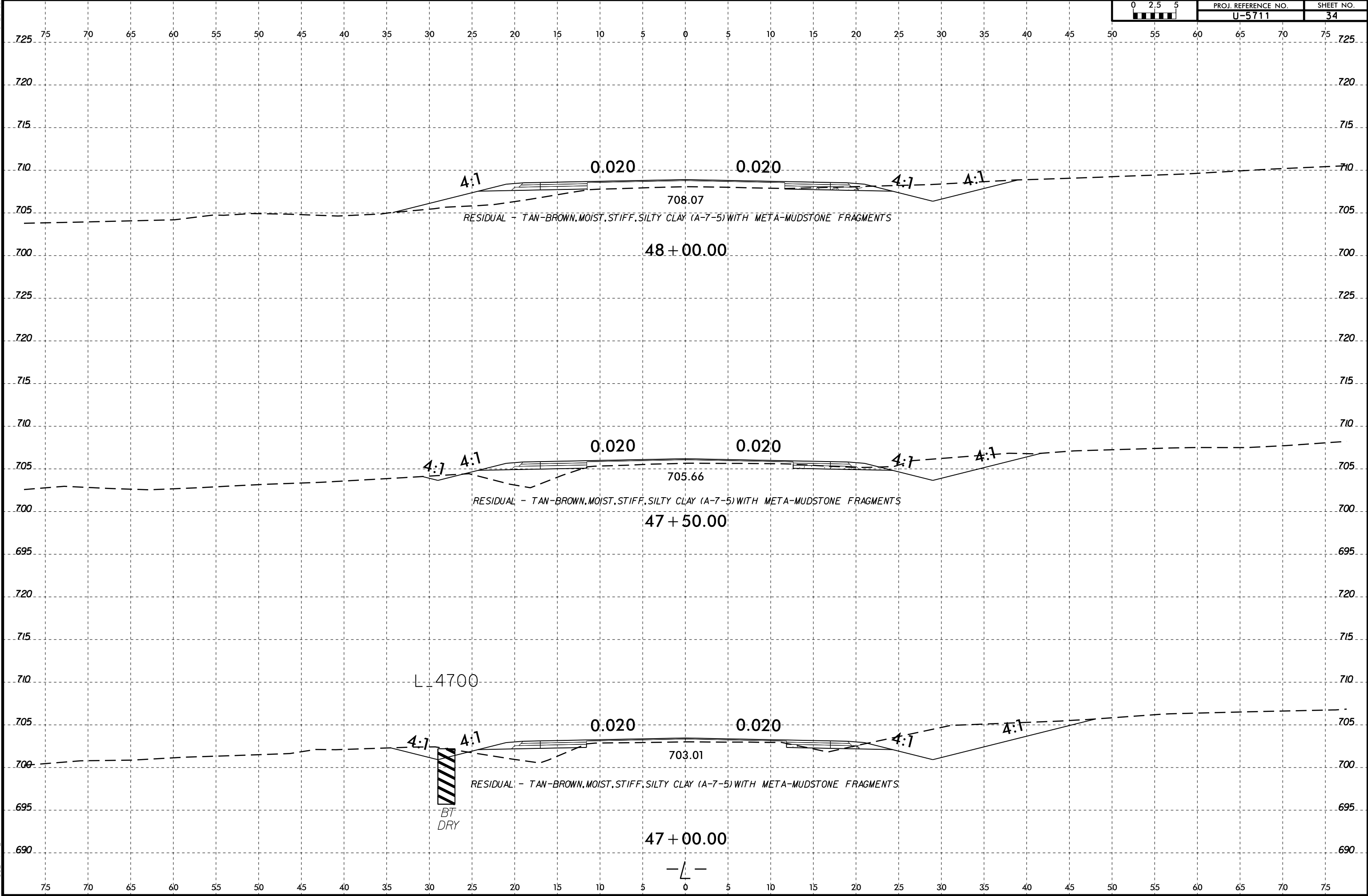
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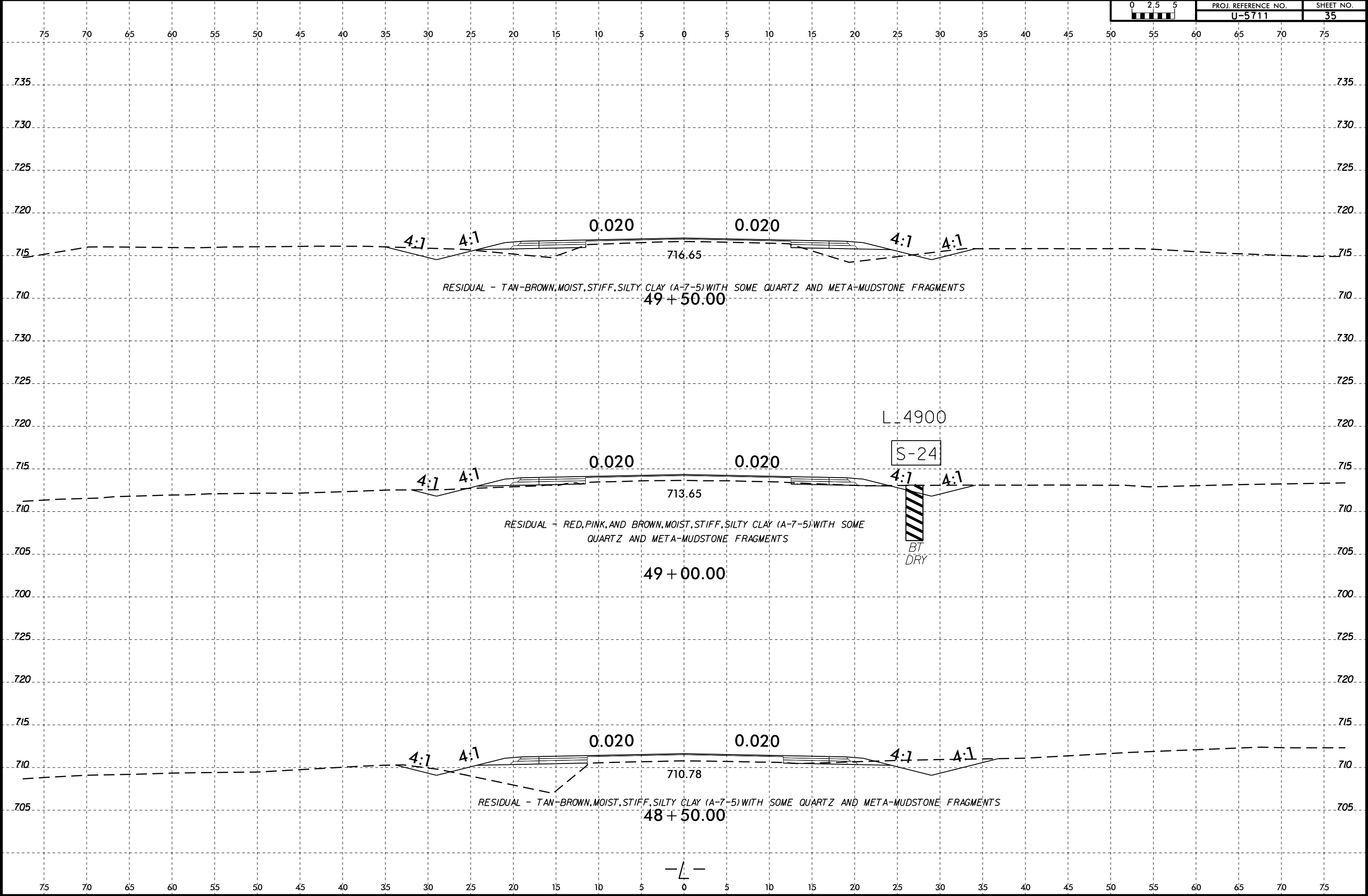
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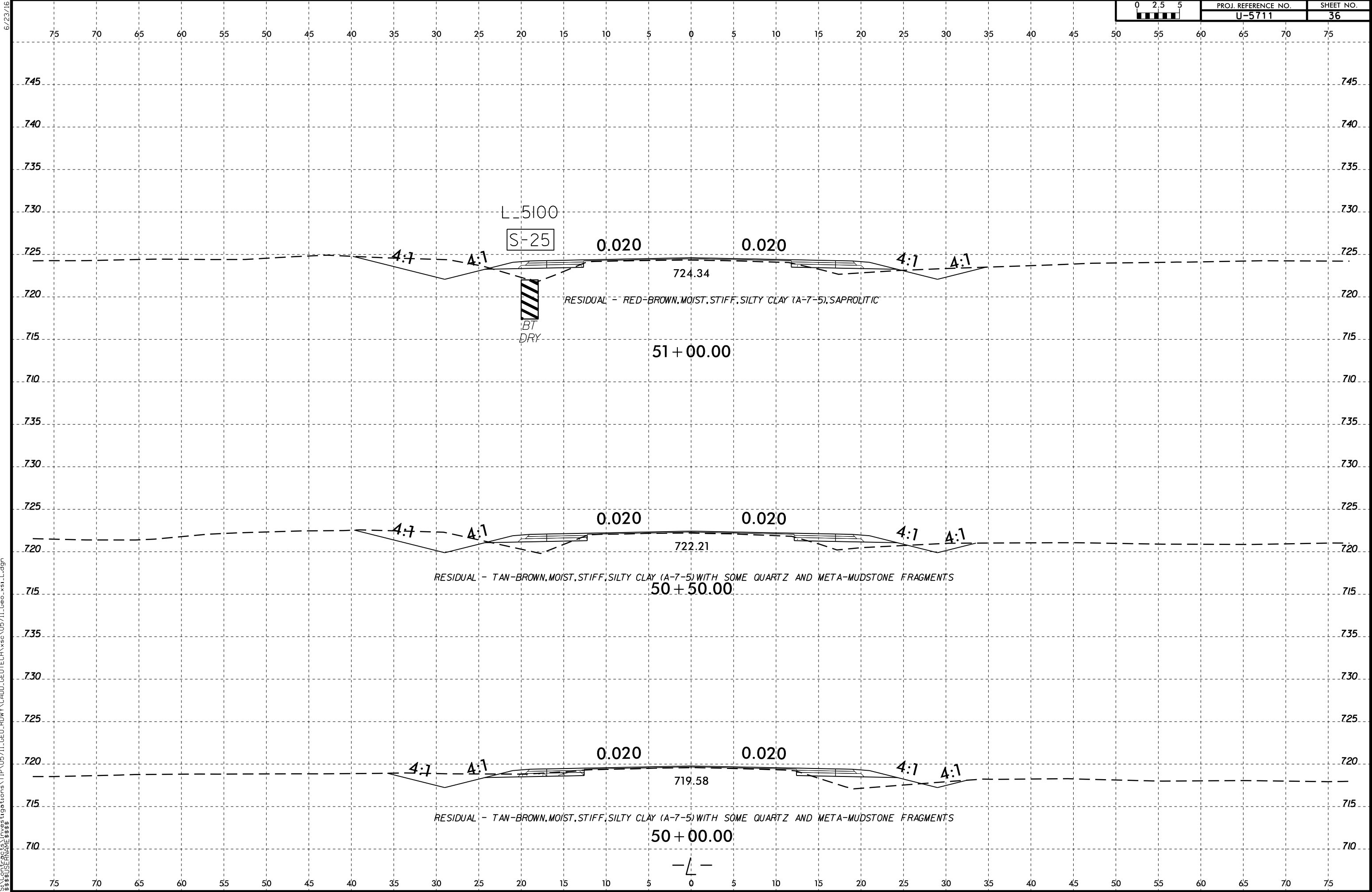
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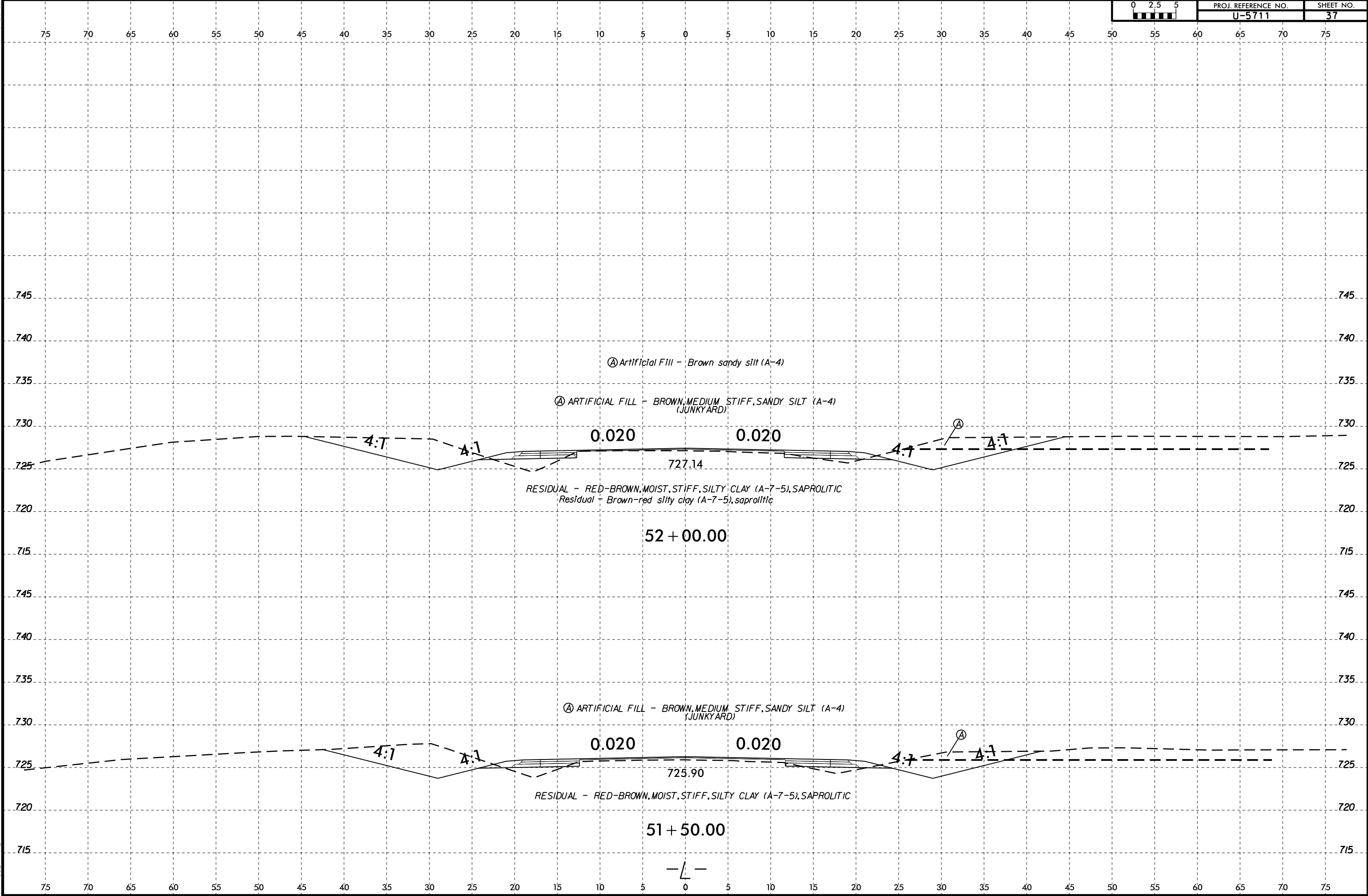


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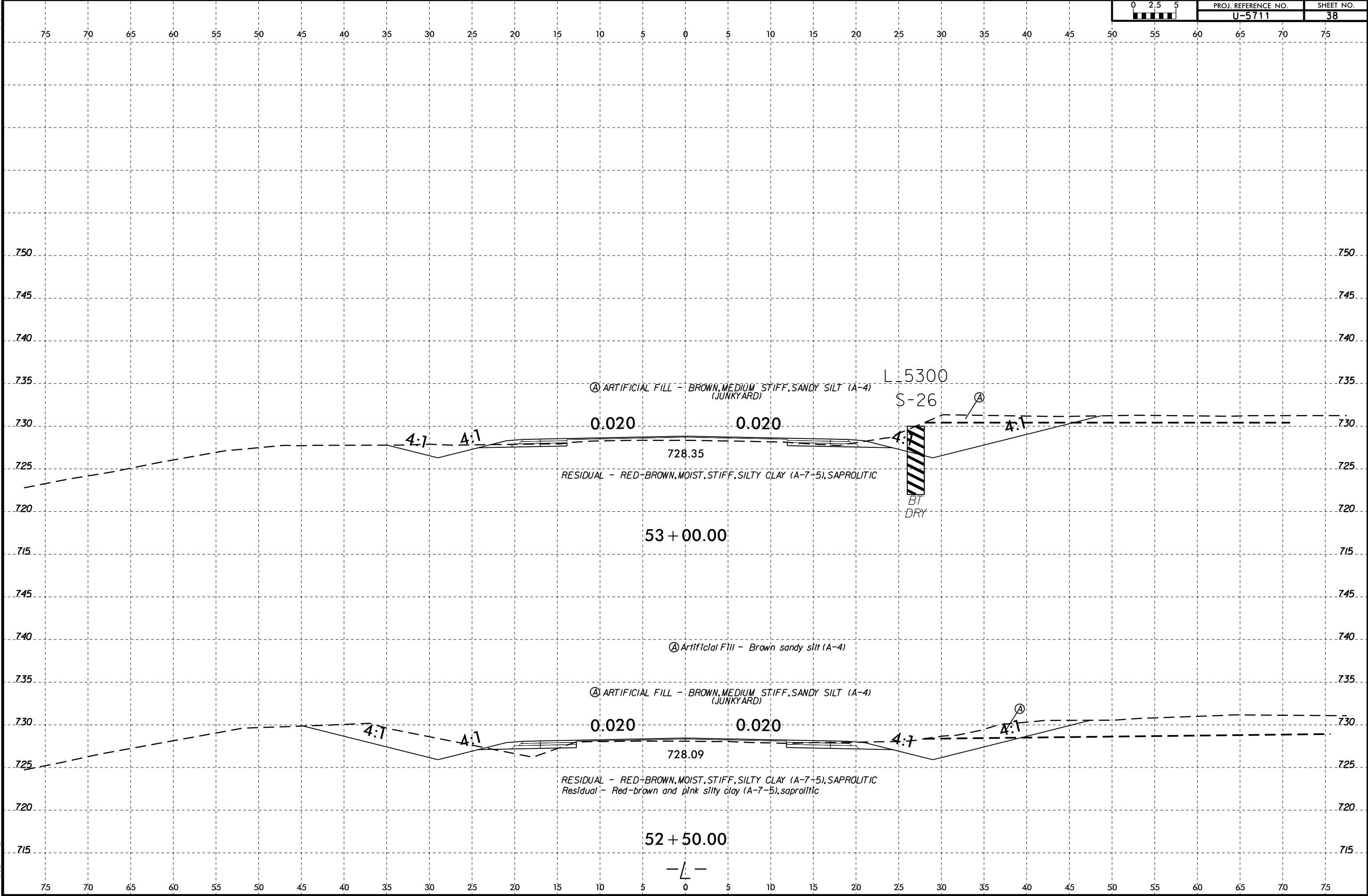
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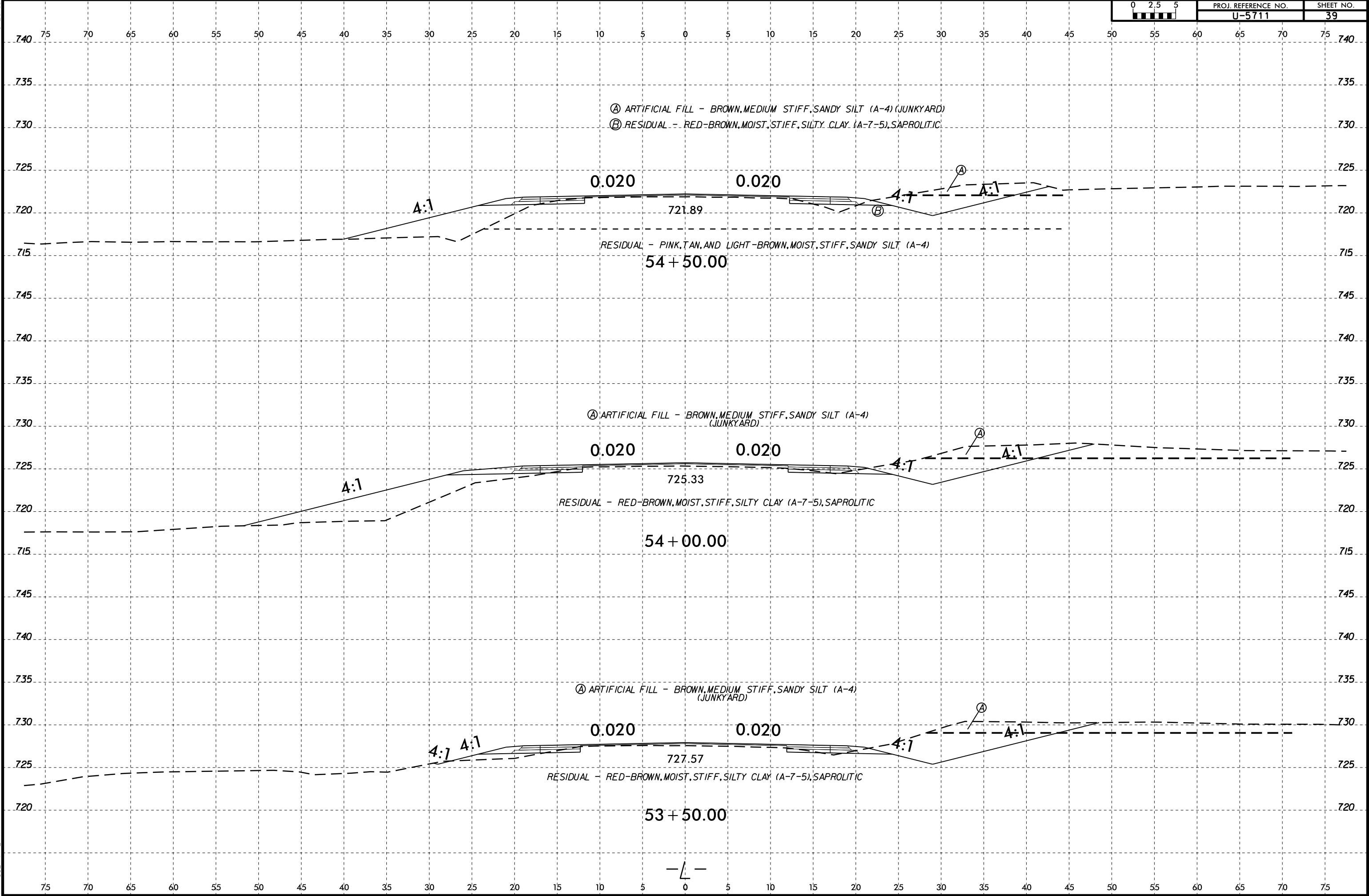


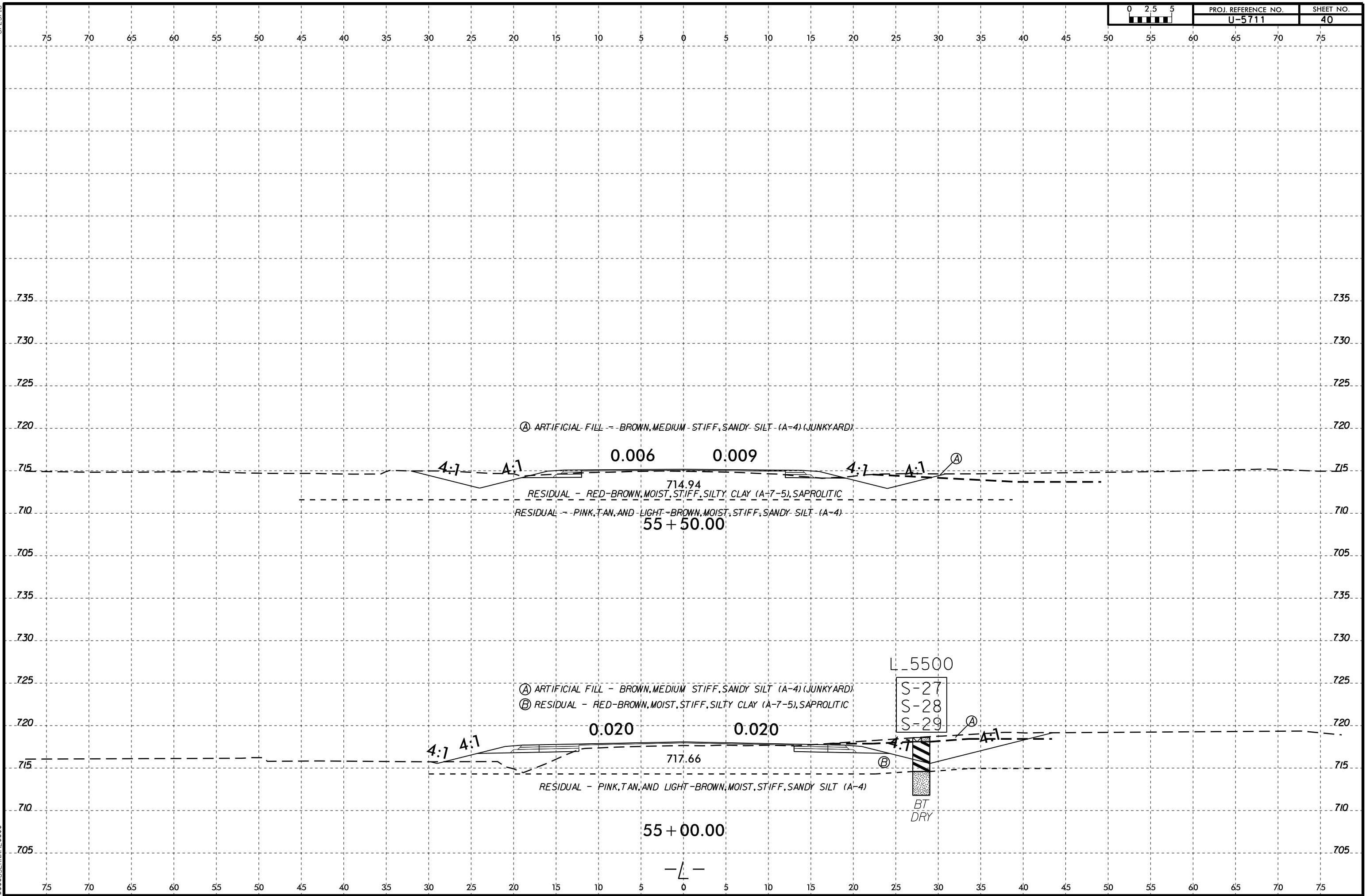
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REFERENCE: U-5711

PROJECT: 50160

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
APPENDIX A
LABORATORY RESULTS

PROJECT REFERENCE NO.

U-5711

SHEET NO.

41

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		
S-1R	17' LT	15+00	0.0-4.0	A-7-6(29)	53	25	1.2	1.8	40.5	56.5	100	99	98	-	-
S-2R	17' LT	15+00	5.0-6.0	A-7-5(14)	45	14	7.9	8.9	45.0	38.3	100	97	85	-	-
S-1	17' LT	15+00	0.5-1.0	A-7-5(48)	75	41	1.6	4.0	25.7	68.7	100	99	96	-	-
S-2	17' LT	15+00	5.0-5.9	A-7-5(30)	66	24	0.0	12.1	37.4	50.5	100	99	93	-	-
S-3	28' RT	17+00	0.5-1.0	A-4(4)	27	8	5.5	12.5	57.8	24.2	87	83	75	-	-
S-4	28' RT	17+00	1.4-2.0	A-7-6(23)	45	25	2.2	8.1	39.2	50.5	96	95	89	-	-
S-5	28' RT	17+00	3.5-4.0	A-7-5(35)	64	29	0.0	5.3	30.1	64.6	100	100	97	-	-
S-6	28' LT	19+00	5.5-6.1	A-7-5(25)	53	19	0.0	3.8	51.7	44.4	100	100	99	-	-
S-7	28' LT	23+00	3.0-3.5	A-7-5(15)	48	12	3.0	7.3	39.2	50.5	100	98	91	-	-
S-8	18' LT	25+25	1.4-1.8	A-7-5(42)	71	34	0.4	2.2	32.7	64.6	100	100	98	-	-
S-9	27' LT	27+00	0.5-1.0	A-7-6(14)	41	13	2.6	7.1	56.0	34.3	99	97	91	-	-
S-10	28' LT	29+00	2.3-2.8	A-7-6(29)	51	27	1.8	4.0	37.6	56.6	100	99	95	-	-
S-11	28' LT	29+00	3.4-3.9	A-7-6(13)	43	12	9.1	5.3	63.4	22.2	100	93	87	-	-
S-12	27' RT	31+00	0.5-1.0	A-4(0)	22	3	8.3	8.5	59.0	24.2	94	88	80	-	-
S-13	24' RT	33+00	1.0-1.5	A-6(15)	38	18	5.7	8.5	45.5	40.4	94	91	83	-	-
S-14	25' RT	37+00	3.0-3.5	A-7-6(25)	46	24	4.0	1.8	41.6	52.5	100	97	95	-	-
S-15	28' LT	39+00	5.3-5.8	A-7-5(19)	54	14	3.0	3.0	57.6	36.4	100	99	94	-	-
S-16	27' LT	41+00	0.5-1.0	A-7-5(29)	56	25	1.8	2.2	37.4	58.6	100	99	96	-	-
S-17	27' LT	41+00	3.8-4.3	A-7-5(16)	49	13	4.4	6.3	65.1	24.2	100	99	90	-	-
S-18	26' RT	43+00	0.3-0.7	A-7-5(13)	45	14	9.1	9.5	55.2	26.3	95	90	80	-	-
S-19	26' RT	43+00	0.7-1.1	A-6(3)	37	13	39.4	5.5	24.8	30.3	86	57	48	-	-
S-20	26' RT	43+00	3.8-4.2	A-2-6(0)	30	12	33.5	12.9	29.3	24.2	43	33	24	-	-
S-21	28' RT	45+00	0.6-1.1	A-7-5(21)	48	17	1.2	1.8	50.5	46.5	100	99	98	-	-
S-22	28' RT	45+00	3.2-3.6	A-4(6)	31	9	6.3	7.1	58.4	28.3	88	85	78	-	-
S-23	28' RT	45+00	5.5-5.9	A-7-6(23)	49	20	2.4	3.0	50.1	44.4	99	97	95	-	-
S-24	27' RT	49+00	0.5-1.0	A-7-5(15)	43	13	2.4	4.0	51.1	42.4	97	96	92	-	-
S-25	19' LT	51+00	0.4-0.8	A-7-5(24)	53	21	3.4	3.4	34.5	58.6	99	97	93	-	-
S-26	27' RT	53+00	0.4-0.8	A-7-5(27)	55	21	0.0	1.0	40.5	58.6	100	100	100	-	-
S-27	28' RT	55+00	0.6-1.0	A-7-6(26)	51	25	1.6	4.6	41.2	52.5	96	95	91	-	-
S-28	28' RT	55+00	4.6-5.0	A-4(10)	36	8	0.0	3.0	60.6	36.4	100	100	98	-	-
S-29	28' RT	55+00	6.4-6.8	A-4(7)	33	6	1.2	4.4	62.0	32.3	99	98	96	-	-