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REFERENCE: U-5169

PROJECT: 45220

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-5169	1	52

ROADWAY SUBSURFACE INVESTIGATION

COUNTY GUILFORD
PROJECT DESCRIPTION I-74/US 311 AND NC 68
(EASTCHESTER DRIVE) INTERCHANGE RAMP
REPLACEMENT

INVENTORY

CONTENTS

<u>LINE</u>	<u>STATION</u>	<u>PLAN</u>	<u>PROFILE</u>
-LNB-	10+00 TO 43+70	4-5	9-10
-LSB-	10+00 TO 38+00	4-5	10-11
-Y-	14+00 TO 57+00	4, 6-8	12-13
-Y1-	11+10 TO 20+60	7	14
-Y2-	10+83 TO 16+50	4, 7	14
-Y3-	10+00 TO 16+58	4, 7	15
-C1-	10+00 TO 11+38	7	15
-YLPA-	10+00 TO 19+49	4	17
-YLPC-	10+00 TO 18+72	4	18
-YRPA-	10+00 TO 29+32	4-5	16
-YRPC-	10+00 TO 24+73	4	18
-YRPB-	10+00 TO 22+54	4	17
-YRPD-	10+00 TO 20+60	4-5	19
-DRVI-	10+44 TO 12+00	7	19

CROSS SECTIONS

<u>LINE</u>	<u>STATION</u>	<u>SHEETS</u>
-LNB-	19+50 TO 22+50	20-22
-LNB-	32+50 TO 40+50	22-26
-LSB-	20+50 TO 22+00	27-27
-LSB-	26+50 TO 29+50	28-29
-Y-	17+50 TO 21+50	30-31
-Y-	36+50 TO 40+00	32-34
-Y1-	18+75 TO 20+50	35-36
-Y2-	11+00 TO 13+25	37-39
-Y2-	13+75 TO 14+25	39-40
-Y2-	14+75 TO 16+75	40-41
-YLPA-	13+00 TO 13+50	42-42
-YLPC-	12+00 TO 14+00	43-44
-YRPA-	19+50 TO 24+50	45-48

APPENDICES

<u>APPENDIX</u>	<u>TITLE</u>	<u>SHEETS</u>
A	LABORATORY RESULTS	49-50

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

PERSONNEL

D. GOODNIGHT

J. CAIN

P. DEWIRE

B. JOHNSON

INVESTIGATED BY D. GOODNIGHT

DRAWN BY T. WELLS

CHECKED BY X. BARRETT

SUBMITTED BY KLEINFELDER, INC.

DATE FEBRUARY 2016

NC REGISTERED FIRM LICENSE NO. F-1132



DocuSigned by:
Xavier C. Barrett

2D00374FA88B407... 2/29/2016

SIGNATURE DATE

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

TIP PROJECT: U-5169

CONTRACT:

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY

LOCATION: I-74/US311 AND NC 68 (EASTCHESTER DRIVE)

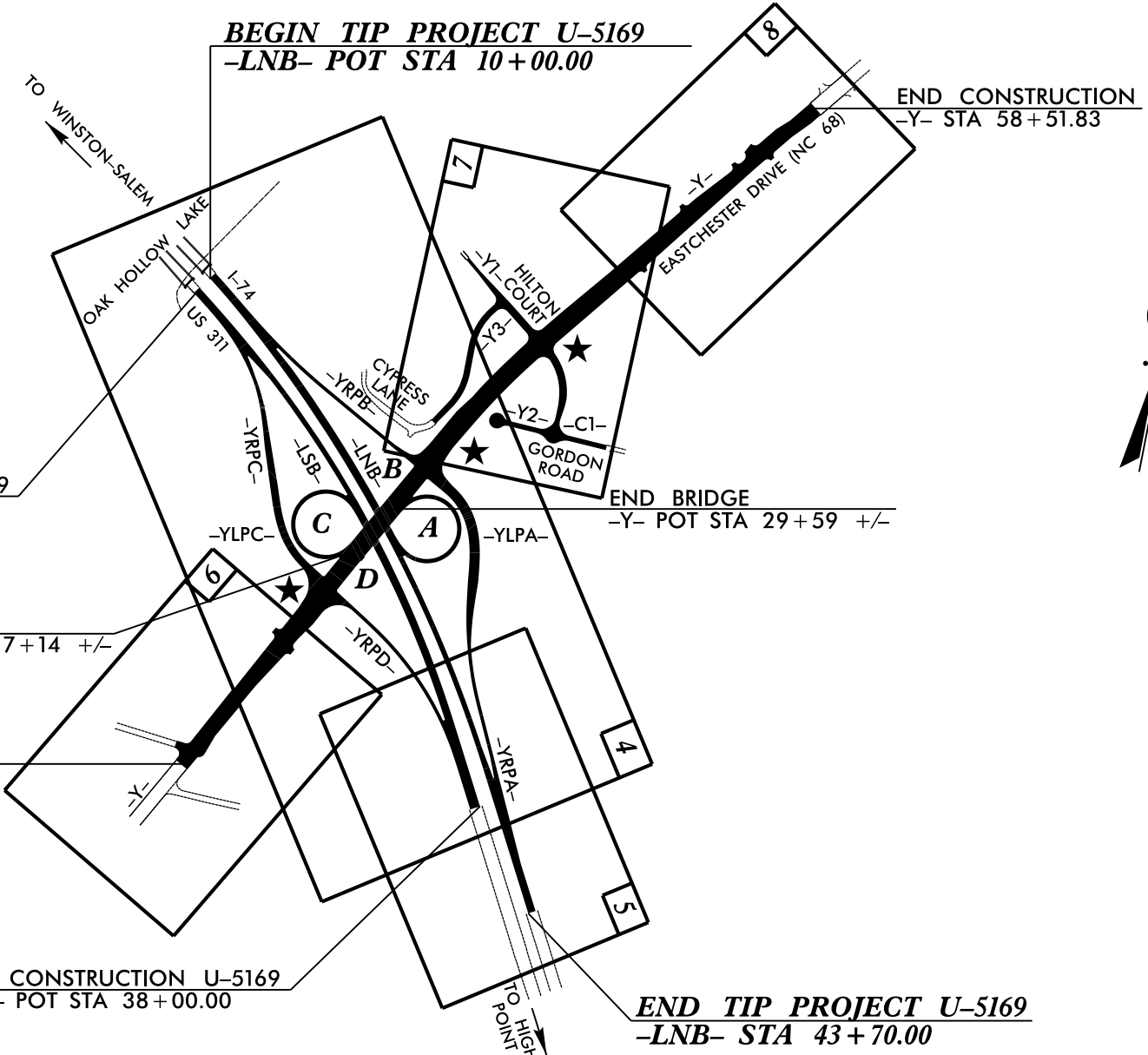
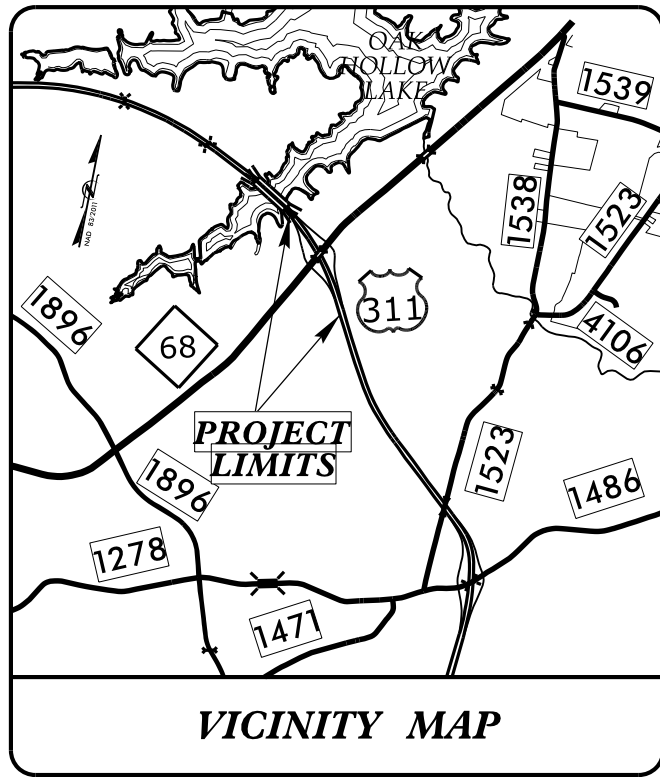
INTERCHANGE RAMP REPLACEMENT

TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURES

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5169	3	52
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
45220.1.2	NHS-0311(32)	PE	

25% ROADWAY PLANS

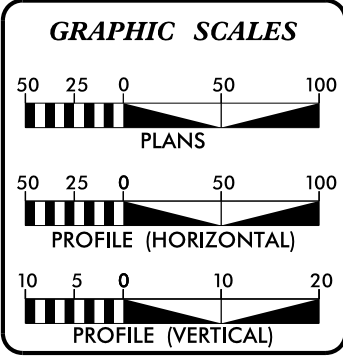
★ PROPOSED SIGNAL



NOTES:

1. CLEARING ON THIS PROJECT SHALL BE PREFORMED TO THE LIMITS ESTABLISHED BY METHOD
2. THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF HIGH POINT.
3. A PORTION OF THIS PROJECT IS A CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES.

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



DESIGN DATA

ADT 2018 =	41,584
ADT 2038 =	72,144
K =	12 %
D =	60 %
T =	6 % *
V =	65 MPH
* TTST =	4% DUAL 2%
FUNC CLASS =	INTERSTATE
STATEWIDE TIER	

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-5169 =	0.638 MILES
TOTAL LENGTH TIP PROJECT U-5169 =	0.638 MILES

Prepared in the Office of:

HNTB
HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JUNE 17, 2016

LETTING DATE:
JUNE 19, 2018

DAVID W. BASS, PE
PROJECT ENGINEER

BRIAN BLACKWELL, EI
PROJECT DESIGN ENGINEER

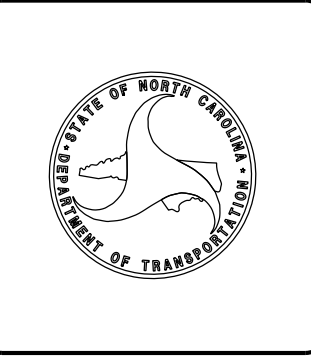
REKHA PATEL, PE
NCDOT CONTACT

HYDRAULICS ENGINEER

ROADWAY DESIGN ENGINEER

SIGNATURE: _____ P.E.

SIGNATURE: _____ P.E.





February 19, 2015
File No. 20151548.017A

STATE PROJECT: 45220.1.2 (U-5169)
FEDERAL PROJECT: NHS-0311 (32)
COUNTY: Guilford
DESCRIPTION: I-74/US 311 & NC 68 (Eastchester Drive) Interchange Ramp Replacement

SUBJECT: GEOTECHNICAL REPORT - INVENTORY

PROJECT DESCRIPTION

This project consists of the reconstruction of the interchange of I-74/US 311 (-LNB- and -LSB-) and NC 68/Eastchester Drive (-Y-), including the replacement of the bridge. Also proposed is the reconstruction of Hilton Court (-Y1-), Gordon Road (-Y2-), Cypress Lane (-Y3-), ramps (-YRPA-, -YRPB-, -YRPC-, and -YRPD-), loops (-YLPA- and -YLPC-), new traffic circle (-C1-) and new drive (-DRV1-).

The geotechnical investigation was conducted during October of 2015. Standard Penetration Test borings were advanced with a CME 550X and a Diedrich D-50. Both drill machines utilized automatic hammers. Representative soil samples were collected for visual classification in the field and selected samples were submitted for laboratory analysis by Kleinfelder, Inc.

The following alignments, totaling approximately 3.9 miles, were investigated. Subsurface profiles and cross sections of these alignments are included in this report.

<u>LINE</u>	<u>STATIONS</u>
-LNB-	10+00 to 43+70
-LSB-	10+00 to 38+00
-Y-	14+00 to 57+00
-Y1-	11+10 to 20+60
-Y2-	10+83 to 16+50
-Y3-	10+00 to 16+58
-C1-	10+00 to 11+38
-YLPA-	10+00 to 19+49
-YLPC-	10+00 to 18+72
-YRPA-	10+00 to 29+32
-YRPC-	10+00 to 24+73
-YRPB-	10+00 to 22+54
-YRPD-	10+00 to 20+60
-DRV1-	10+44 to 12+00

AREAS OF SPECIAL GEOTECHNICAL INTEREST

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

<u>LINE</u>	<u>STATIONS</u>	<u>OFFSETS</u>
-LNB-	34+25 to 39+25	LT to RT
-LSB-	15+00 to 18+50	RT
-Y-	19+50 to 23+00	RT
-Y-	36+75 to 39+75	LT
-Y-	49+00 to 51+00	RT
-Y1-	18+75 to 20+60	LT to RT
-Y2-	10+83 to 13+10	LT to RT

A discussion of these highly plastic clay soils is located below in the section titled "Soil Properties".

2) Artificial Fill: Artificial fill was encountered on the project at the following locations:

<u>LINE</u>	<u>STATIONS</u>	<u>OFFSETS</u>
-Y-	36+50 to 38+90	LT
-Y-	52+50 to 53+50	LT
-Y1-	17+00 to 18+00	LT to RT

3) Groundwater: The following areas exhibit a high water table, seasonal high groundwater or the potential for groundwater related construction problems:

<u>LINE</u>	<u>STATIONS</u>
-YRPD-	14+00 to 17+00
-YRPC-	21+00 to 23+00
-YRPB-	14+00 to 21+00
-LNB-	14+00 to 18+50
-LSB-	16+00 to 18+00
-DRV1-	10+44 to 12+00

4) Crystalline Rock: The following areas exhibit shallow crystalline rock within 6 feet of the proposed grade (including at or above the proposed grades):

<u>LINE</u>	<u>STATIONS</u>
-YLPC-	12+00 to 14+00

PHYSIOGRAPHY AND GEOLOGY

The project is located in the Piedmont Physiographic Province. The project corridor is comprised primarily of residential and business properties. The general topography of the site consists of rolling hills with flat to steep slopes along the existing roadway.

Geologically, the project is located within the Carolina Slate Belt. Soils are derived from the underlying metamorphic bedrock primarily consisting of metamorphosed granite.

Surface water is drained from the corridor by the existing roadway ditches.

SOIL PROPERTIES

Soils encountered during this investigation are separated into three categories based on origin. They consist of artificial fill, roadway embankment, and residual soils.

Artificial fill soils are present along -Y- and -Y1- on the project. These soils consist of moist, very loose, non plastic, coarse to fine silty sands (A-2-4) with some gravel and organics, and soft, slightly plastic, coarse to fine sandy silt (A-4).

Roadway Embankment soils are present along the existing roadways on the project and in the gore areas around the main interchange. These soils consist of moist, soft to stiff, slightly plastic, clayey coarse to fine sandy silt (A-5) with a little gravel and trace of organic matter, soft to stiff, non plastic, coarse to fine sandy silt (A-4) with variable amounts of gravel and trace of organic matter, slightly to moderately plastic, medium stiff to stiff, coarse to fine sandy clay (A-6) with variable amounts of gravel and organic matter, soft to stiff, moderately to highly plastic, coarse to fine sandy silty clay (A-7-5) with some gravel,

very loose to medium dense, non plastic to slightly plastic, silty coarse to fine sand (A-2-4/A-2-5) with a trace of gravel and organic matter, and

loose to medium dense, slightly plastic, silty clayey coarse to fine sand (A-2-6) with a trace of gravel and organic matter.

The plasticity index of the roadway embankment clay soils tested ranged from 11 to 21.

Residual soils are derived from the weathering of underlying metamorphosed granitic rock. The majority of the residual soils encountered consist of moist to wet, soft to hard, non plastic, coarse to fine sandy, silt (A-4), moist to wet, loose to very dense, non plastic, silty coarse to fine sand (A-2-4), and moist, soft to very stiff, moderately plastic to highly plastic, coarse to fine sandy clays (A-7-5/A-7-6). Minor amounts of moist to wet, medium stiff to stiff, slightly plastic, clayey coarse to fine sandy silt (A-5), moist to wet, very soft to stiff, slightly plastic, coarse to fine sandy clay (A-6), and moist, loose, slightly plastic clayey coarse to fine sand (A-2-6) are also present. The plasticity index of the residual clay soils tested ranged from 11 to 38, and the plasticity index for the residual silt tested was 6.

ROCK PROPERTIES

Weathered rock was encountered along the existing roadways (-LSB-, -LNB-, -Y-, -Y1-, -Y3-, -YLPC-, -YRPB-, -YRPC-, and -YRPD-) at elevations ranging from 802.3 to 852.3 feet (MSL). The majority of the weathered rock consists of tan, white, and brown metamorphosed granite.

Crystalline bedrock was encountered along the existing roadways (-LSB-, -LNB-, -Y-, -Y1-, -YLPC-, -YRPC-, and -YRPD-) at elevations ranging from 795.1 to 830.5 feet (MSL). The majority of the crystalline rock consists of metamorphosed granite.

GROUNDWATER

Groundwater was encountered at elevations ranging from 805.8 to 836.9 feet MSL along the proposed roadways of the project.

Prepared by,

DocuSigned by:
Dana J. Goodnight
A184F26E82914E7...
Dana J. Goodnight, PE
Senior Professional

DJG/XCB:cas

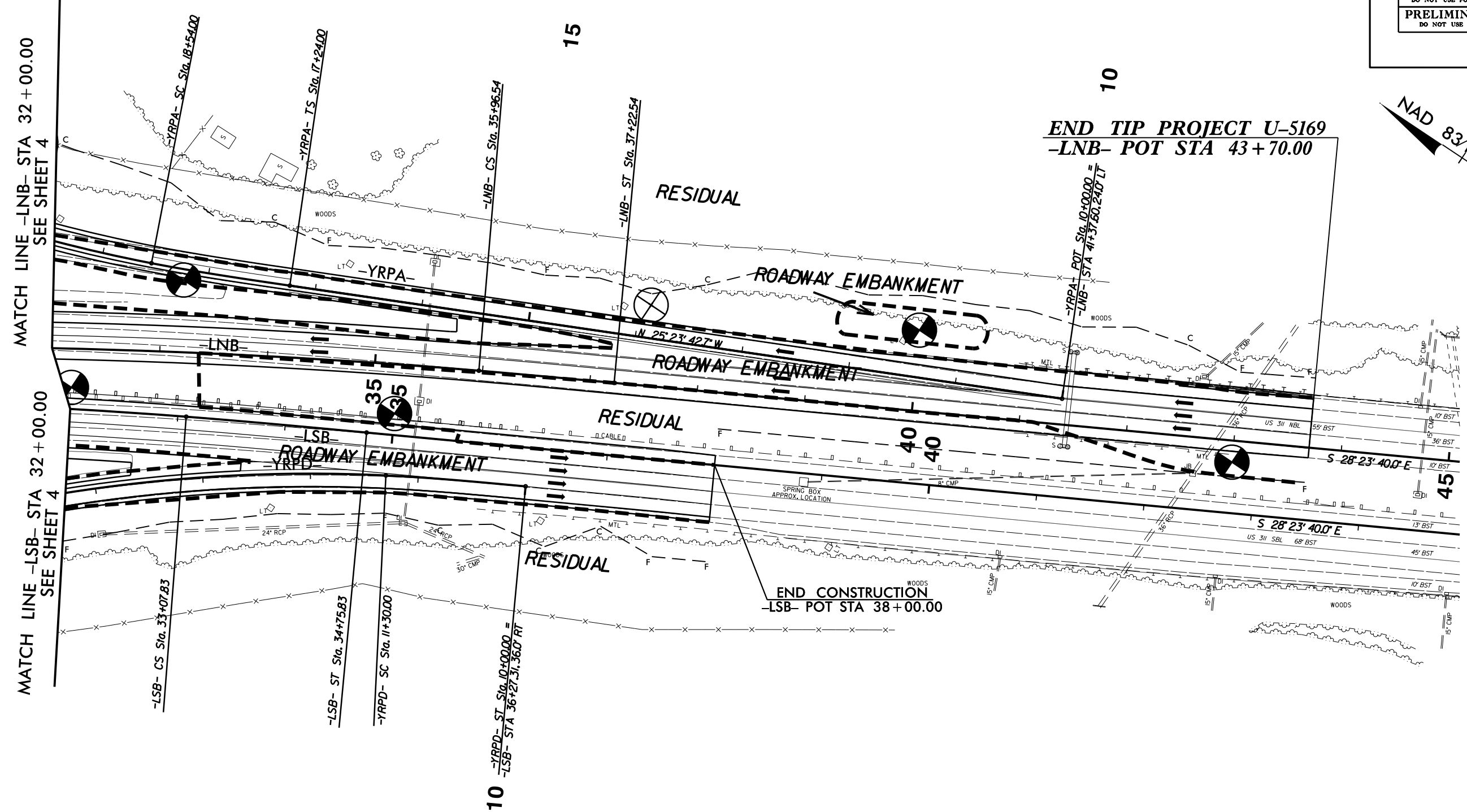
DocuSigned by:
Xavier C. Barrett
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Xavier C. Barrett, PE
Principal Professional

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U-5169	5
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

NAD 83/NSRS 2011

END TIP PROJECT U-5169
-LNB- POT STA 43+70.00

END CONSTRUCTION
-LSB- POT STA 38+00.00



MATCH LINE -LNB- STA 32+00.00
 SEE SHEET 4

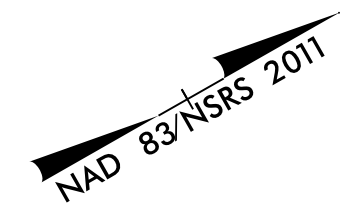
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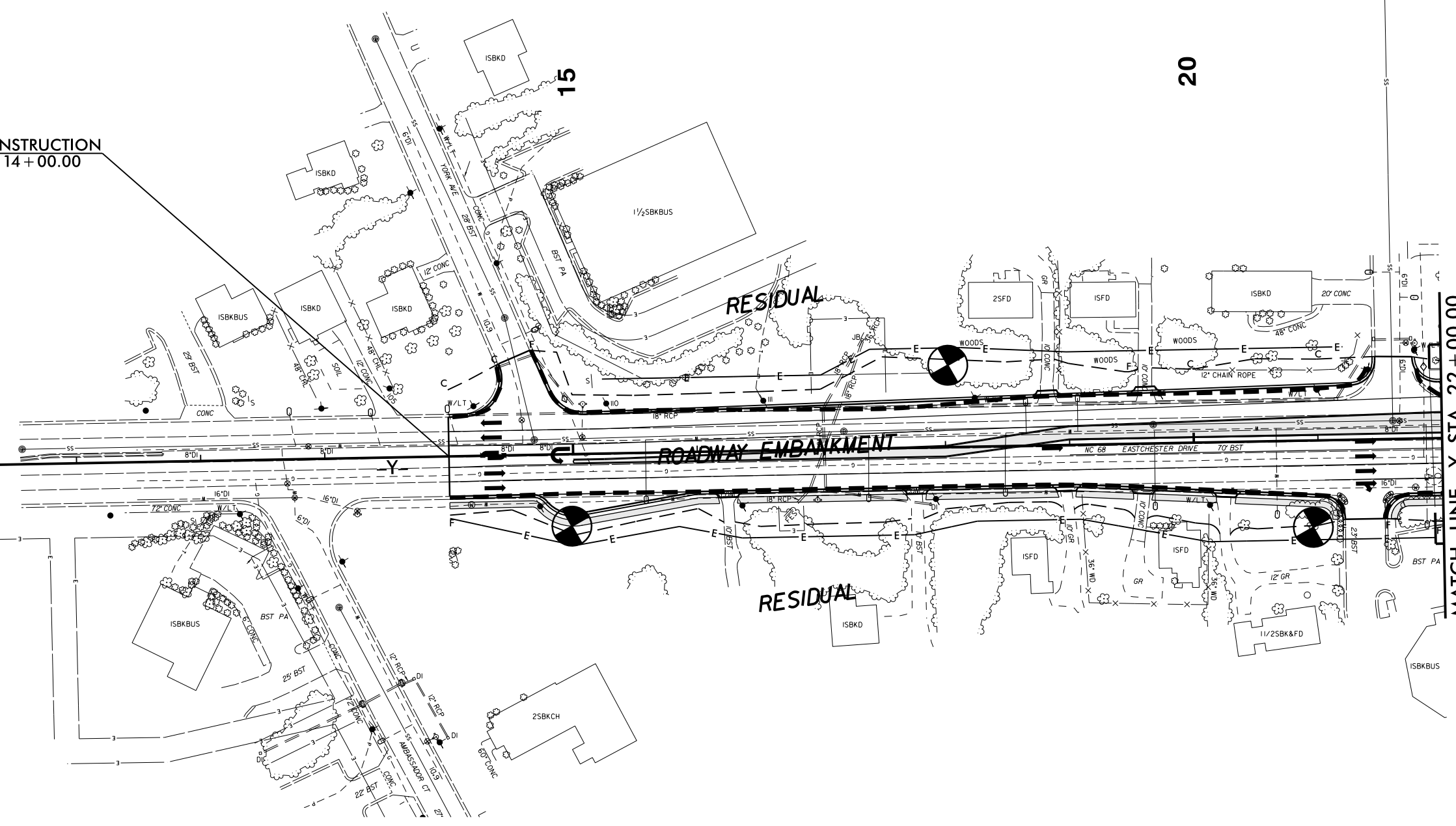
FOR -LNB- PROFILE, SEE SHEET 9 & 10
 FOR -LSB- PROFILE, SEE SHEET 11
 FOR -YRPA- PROFILE, SEE SHEET 16
 FOR -YRPD- PROFILE, SEE SHEET 19

PROJECT REFERENCE NO.	SHEET NO.
U-5169	6
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



10
 BEGIN CONSTRUCTION
 -Y- STA 14+00.00

-Y- POT Sta. 10+00.00

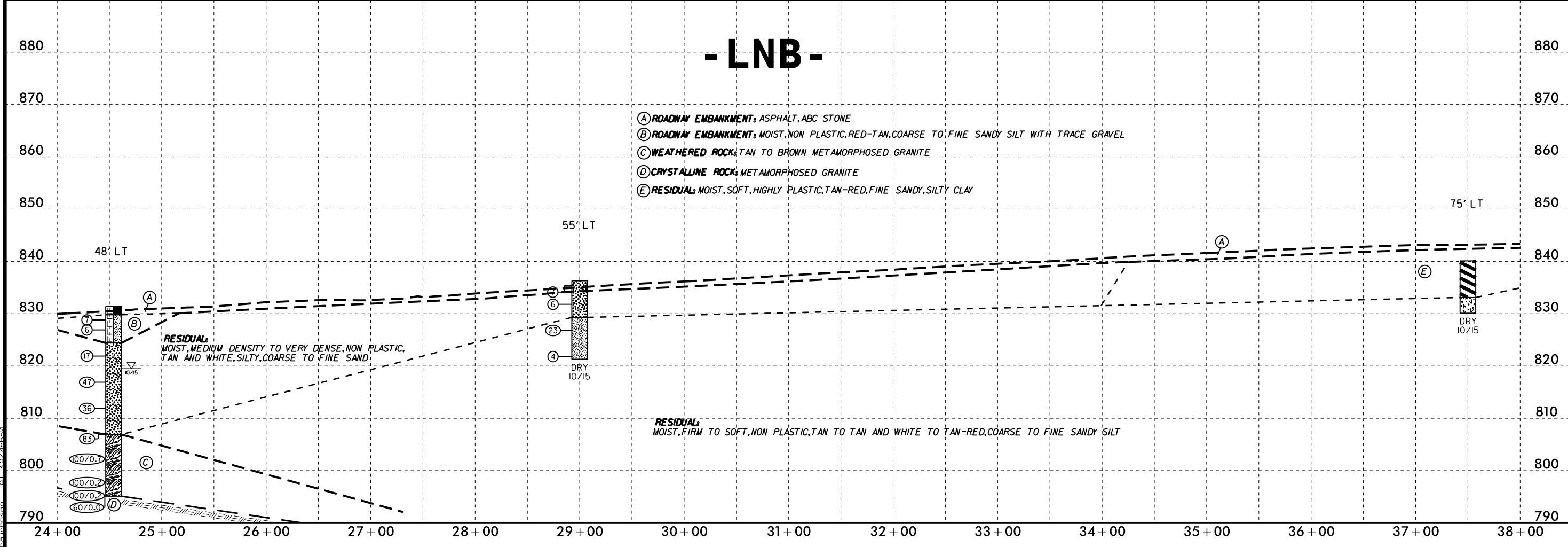
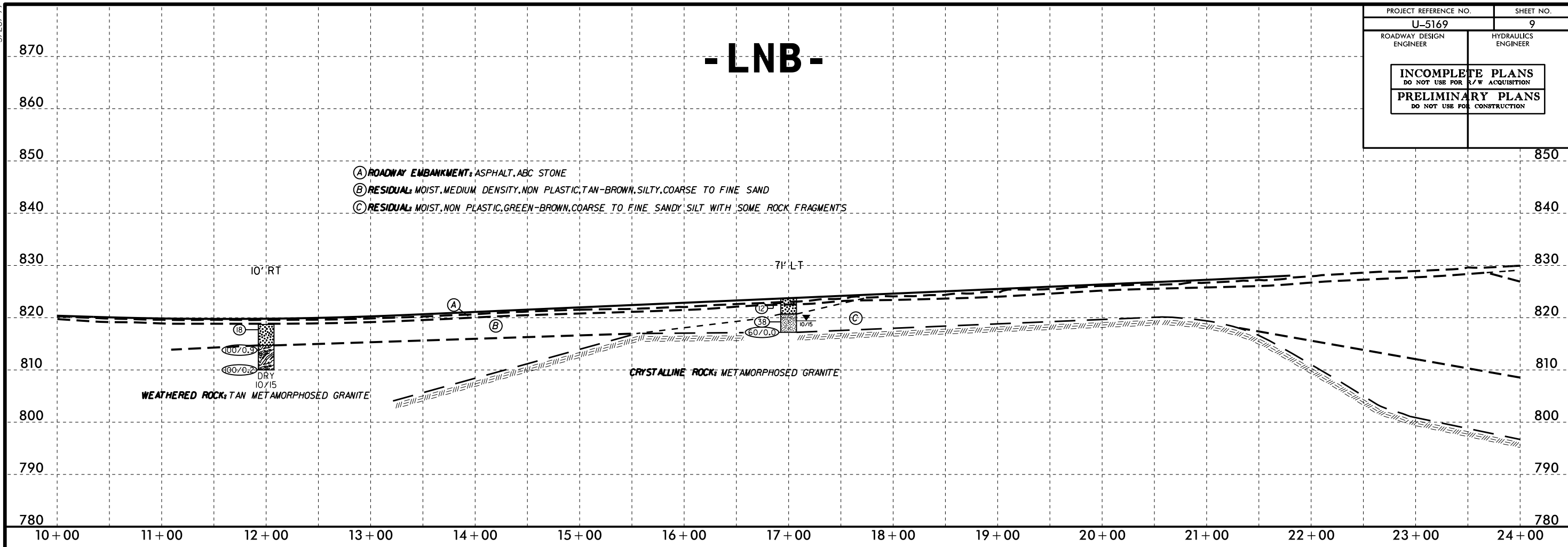


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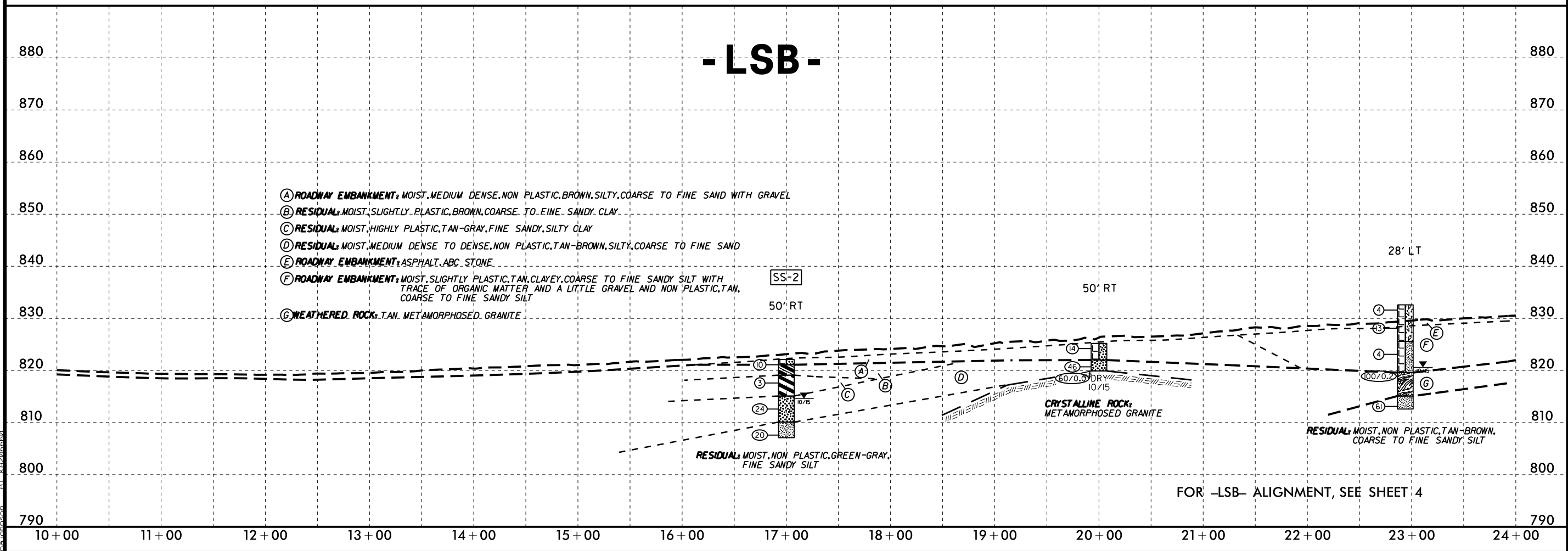
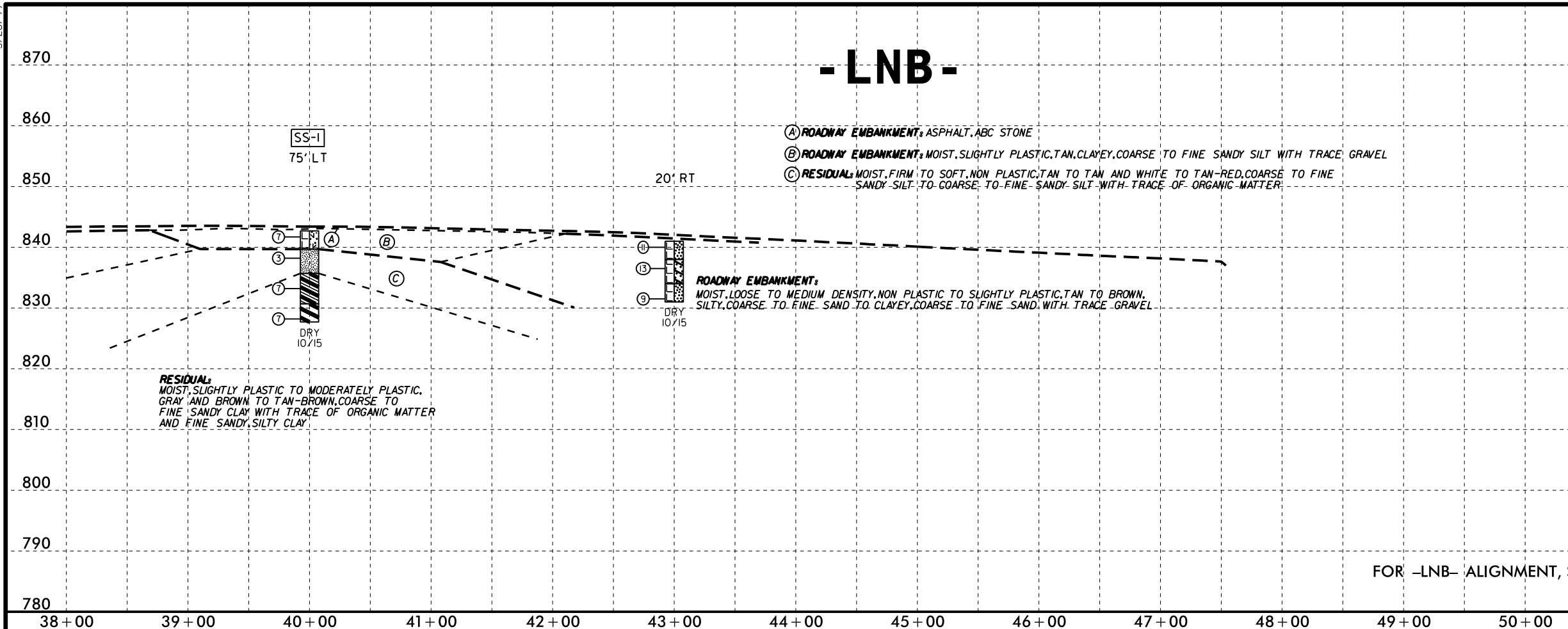
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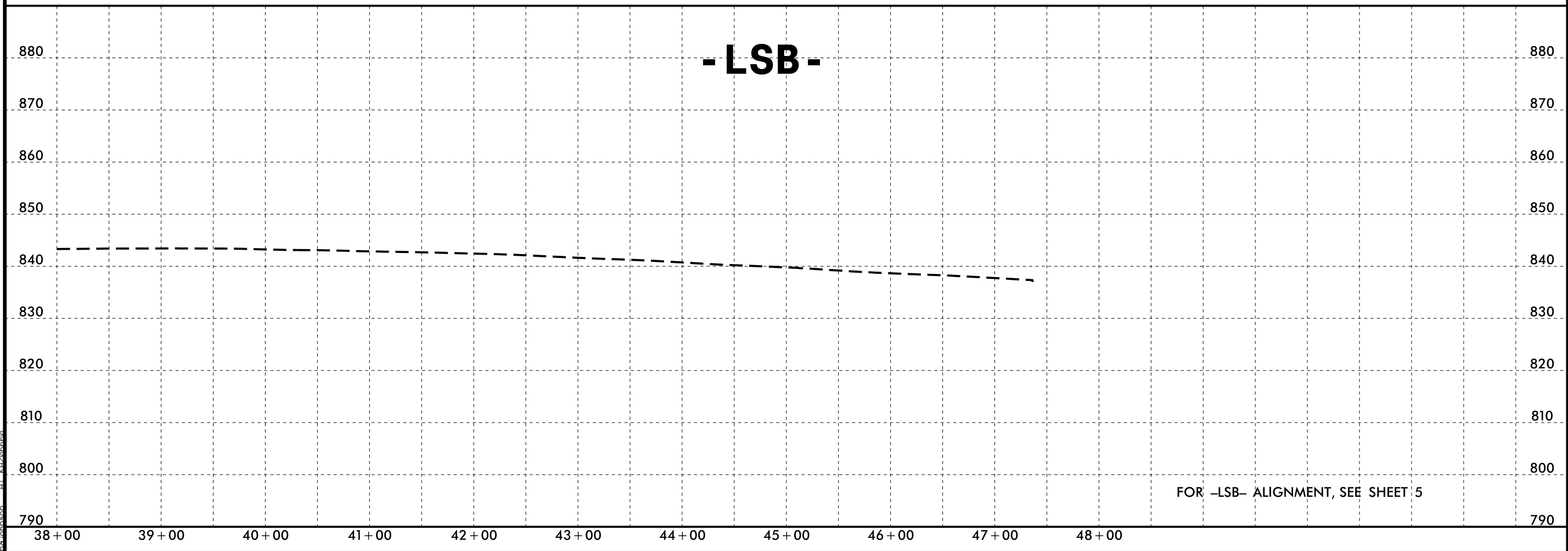
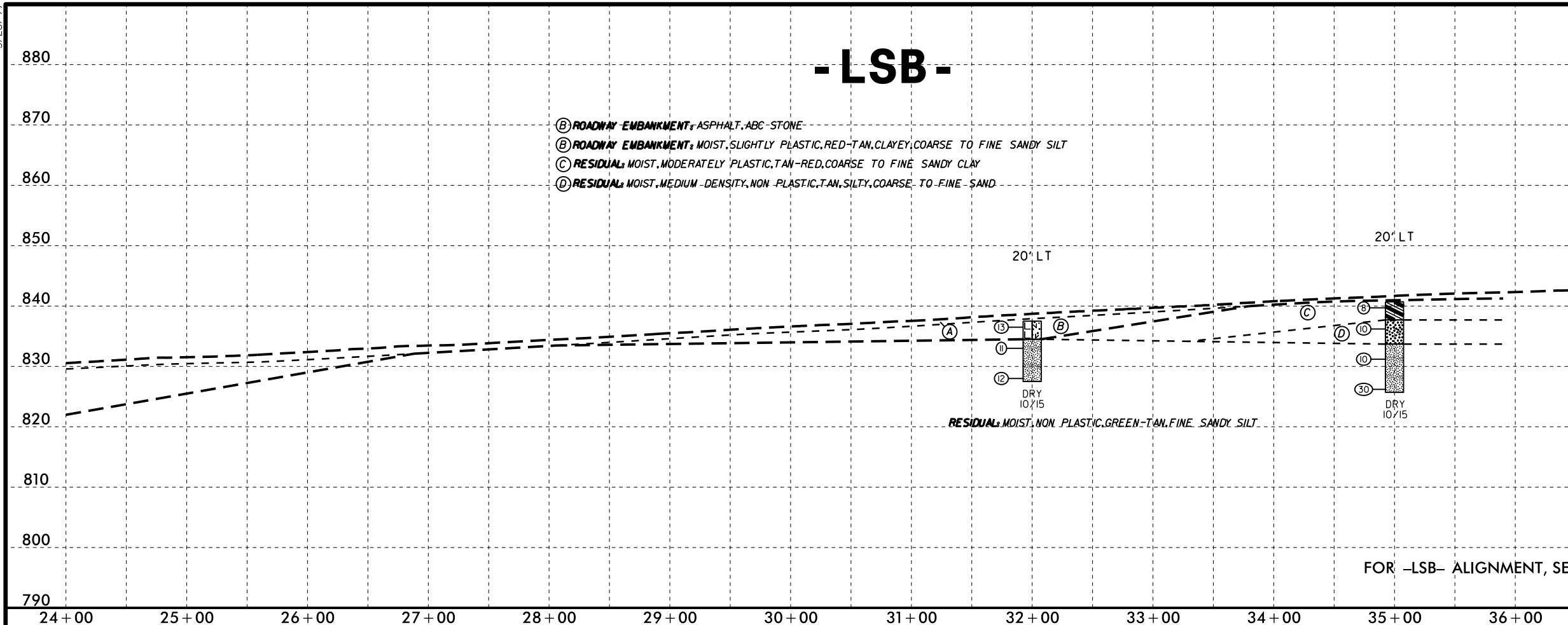
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 ba johnson

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PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



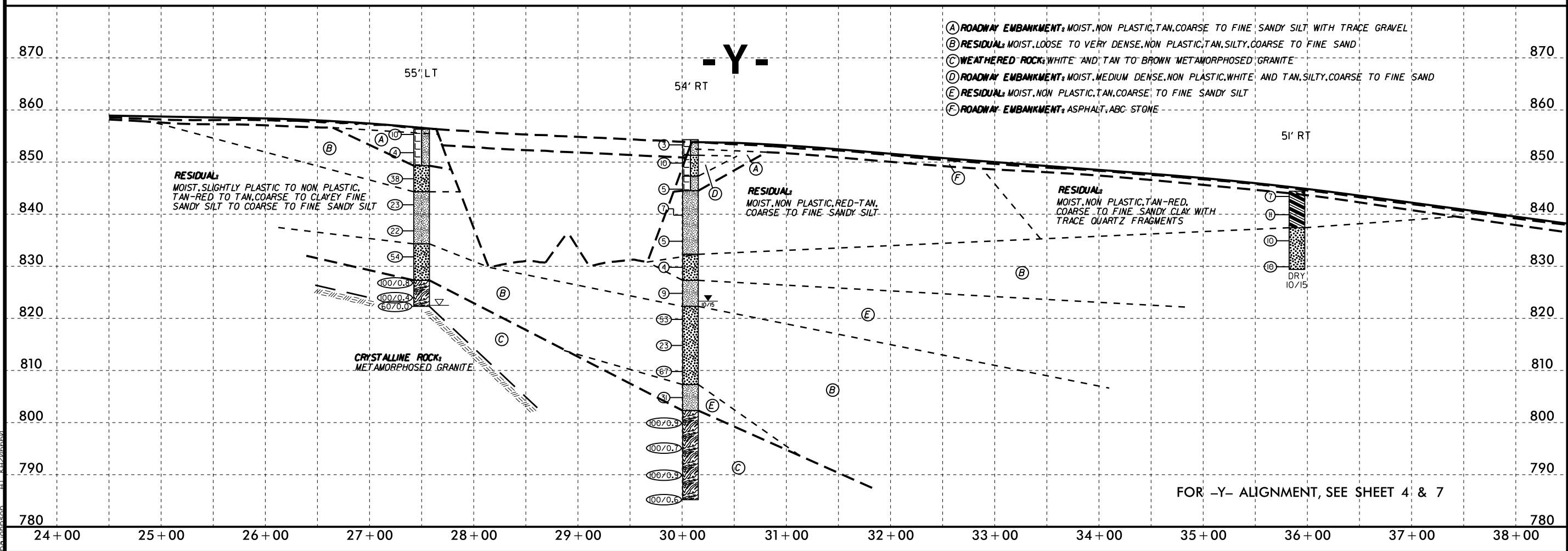
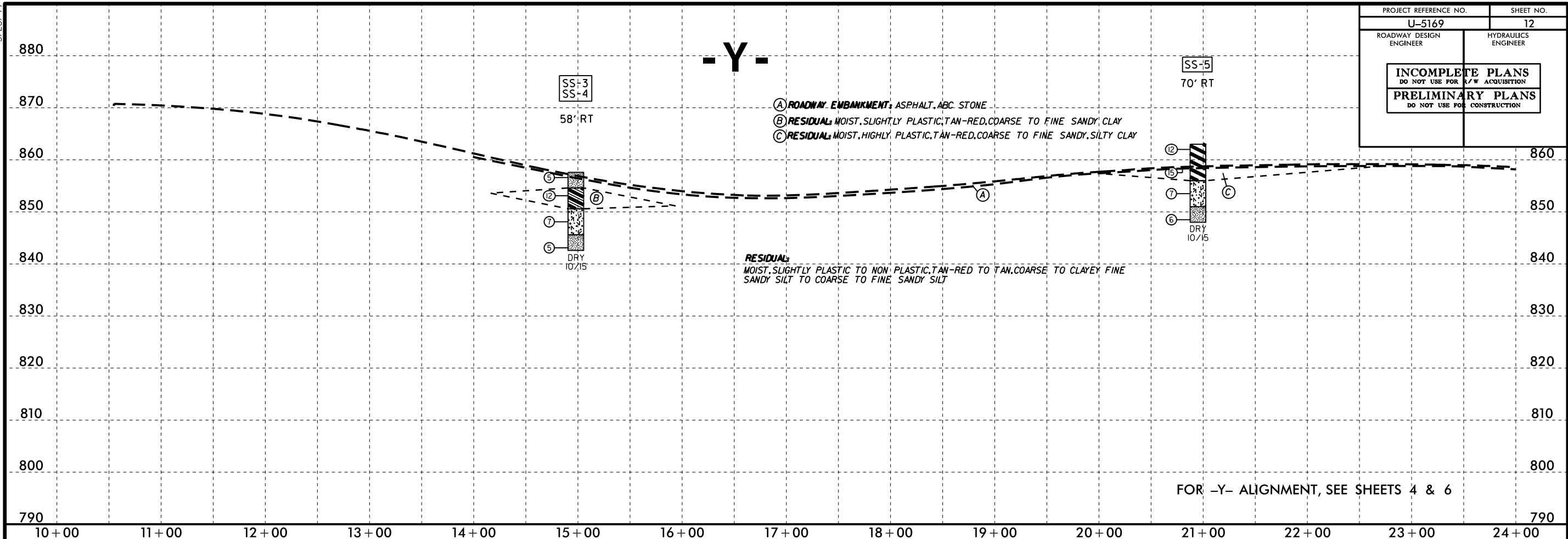
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ba johnson

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PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



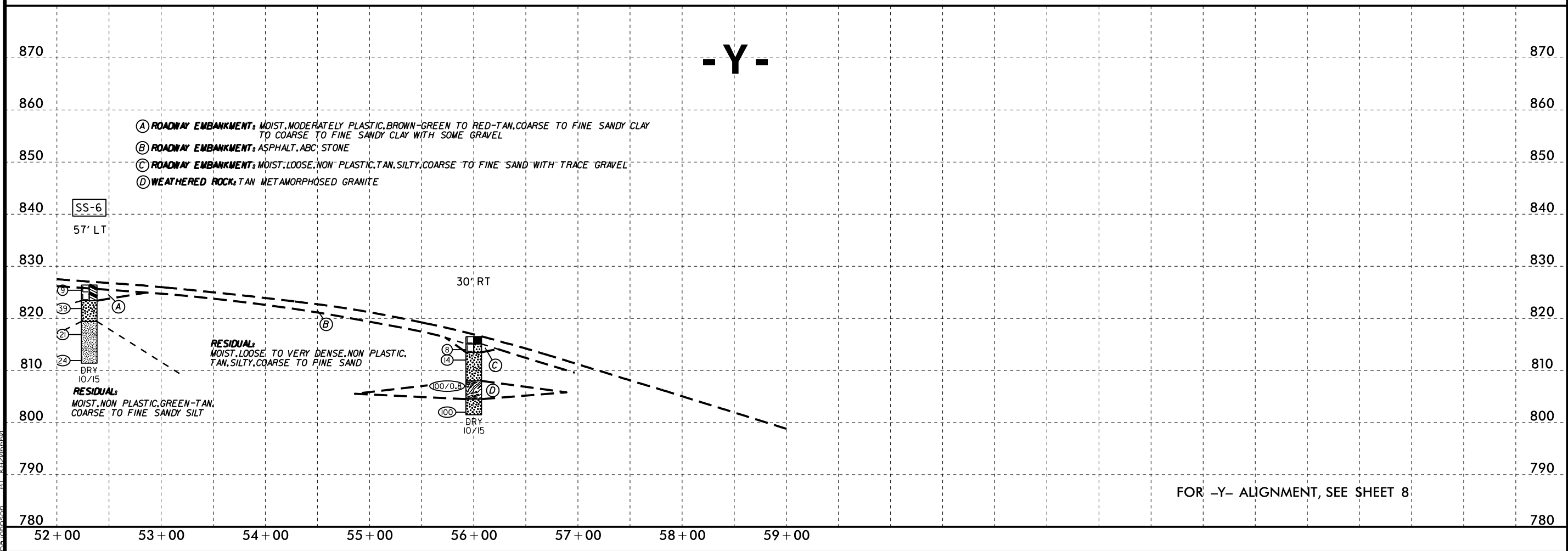
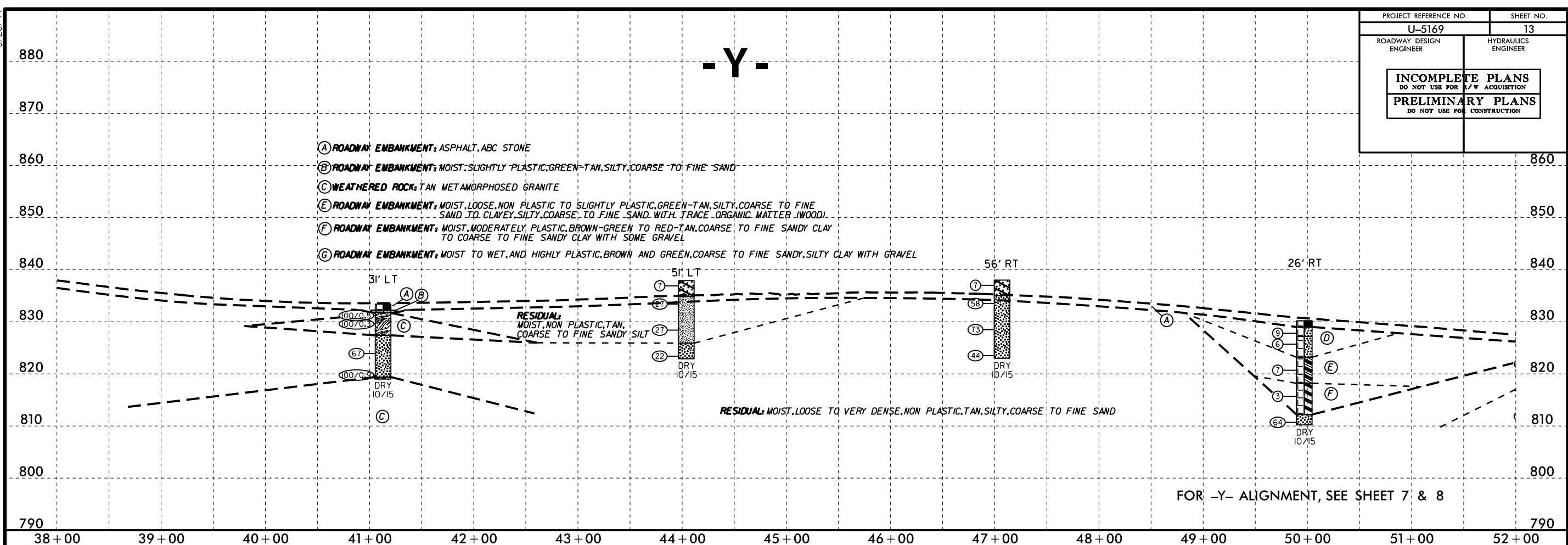
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 ba johnson

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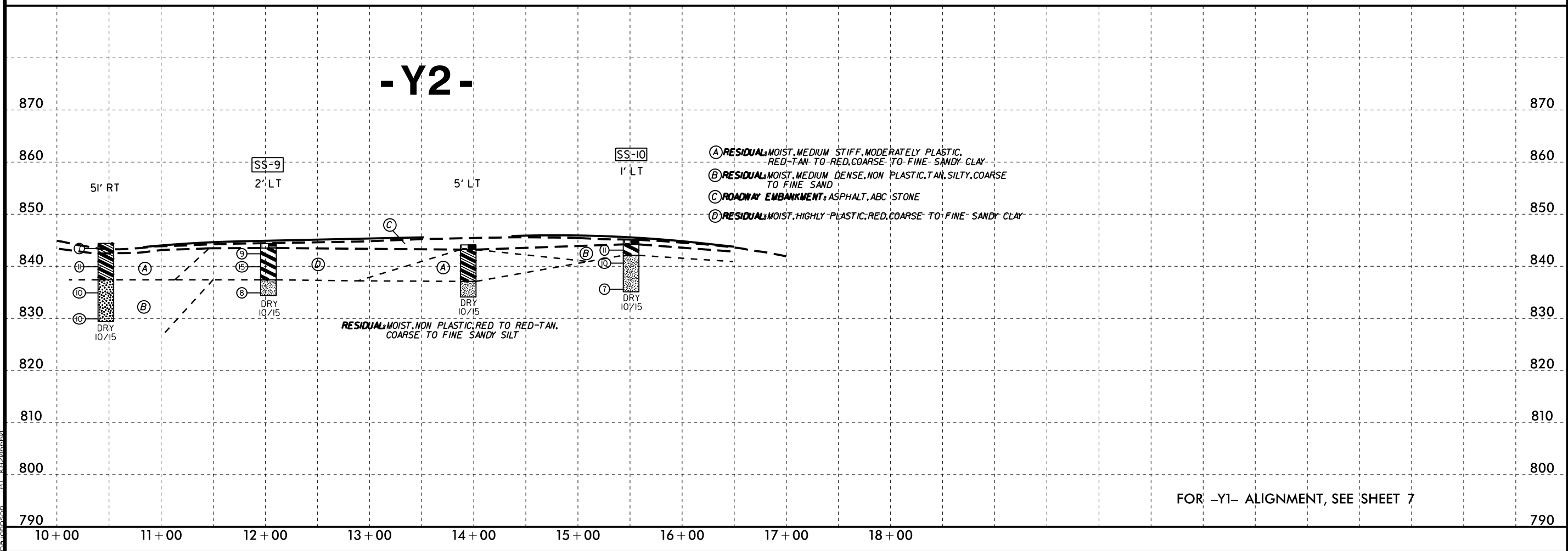
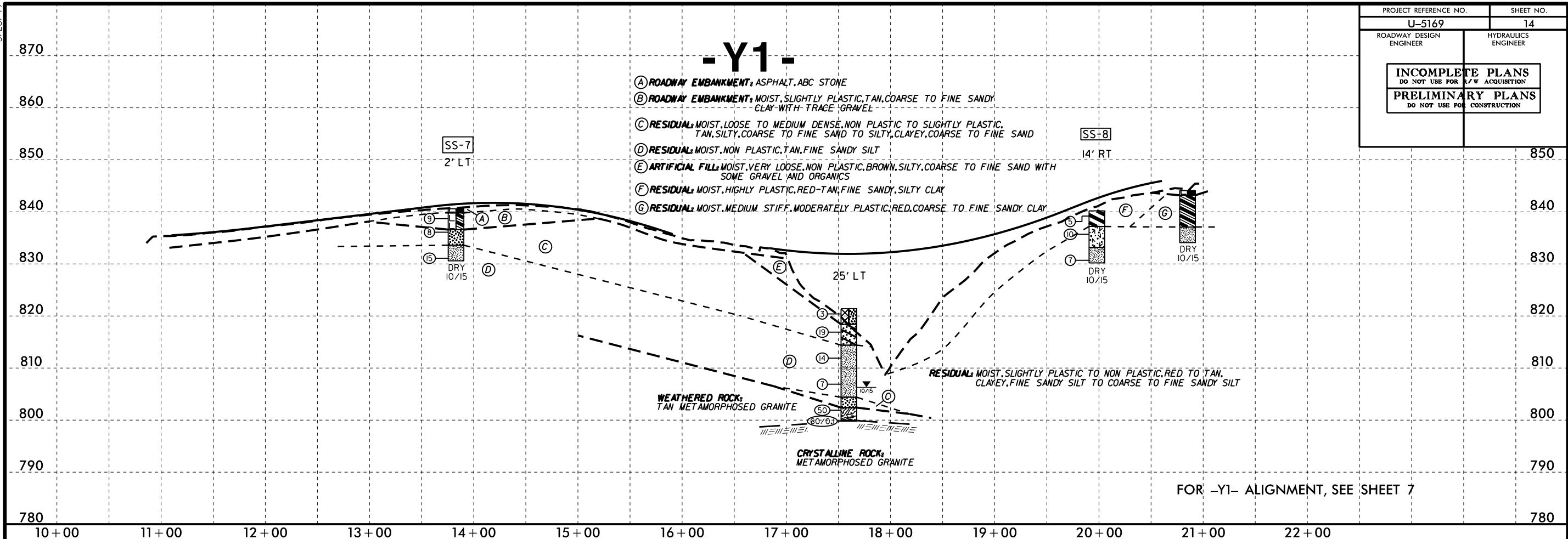
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INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



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 ba johnson

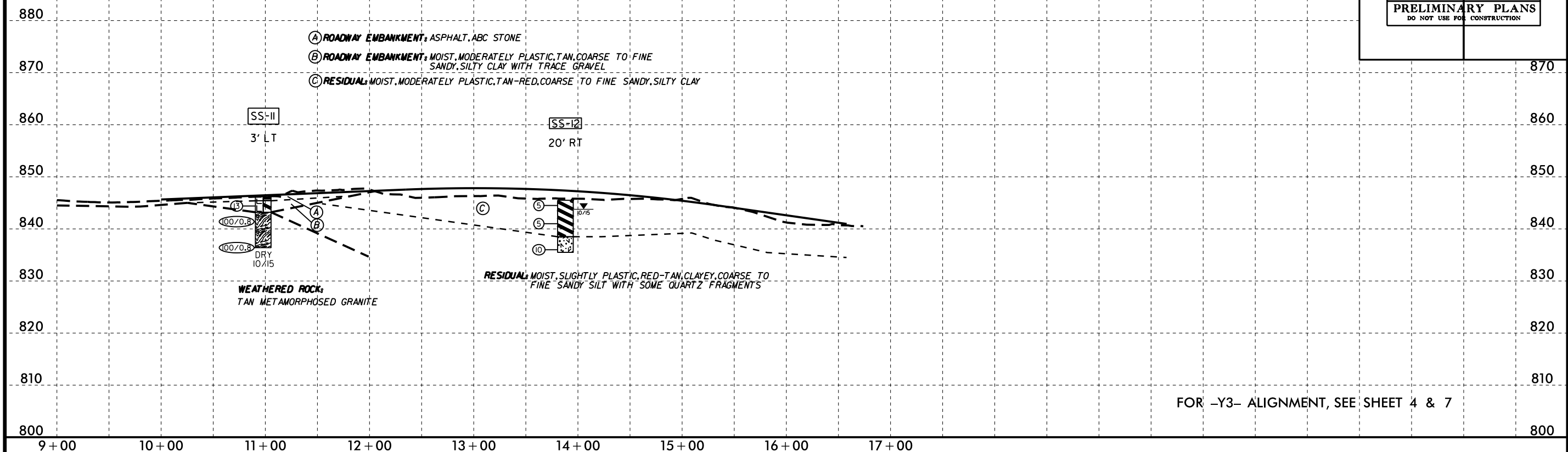
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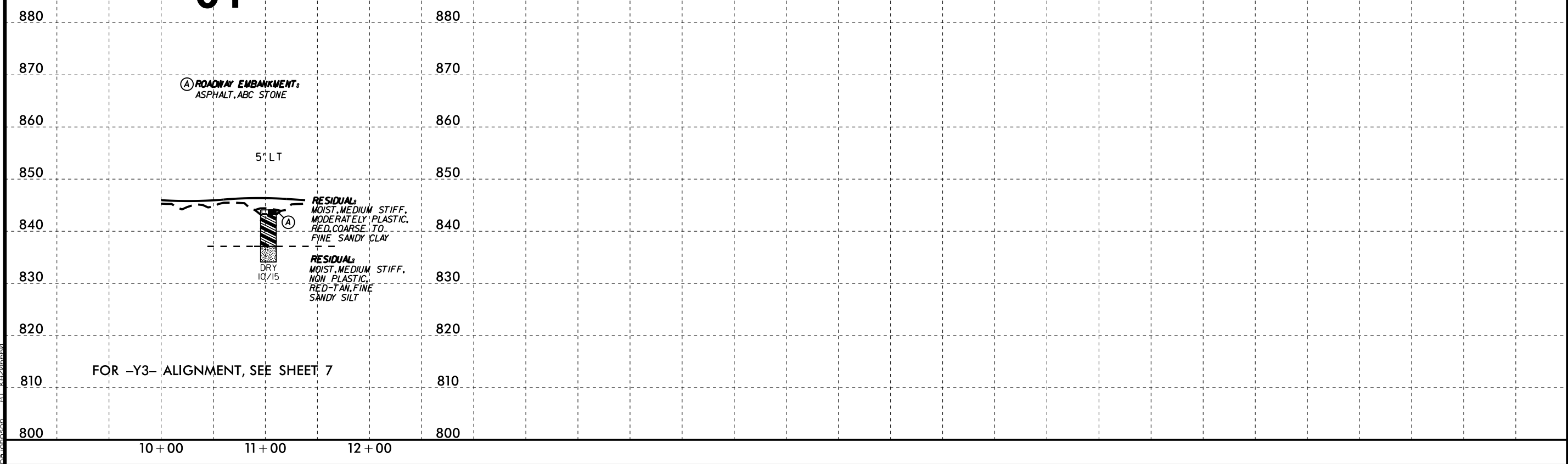
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PROJECT REFERENCE NO. U-5169	SHEET NO. 15
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-Y3-

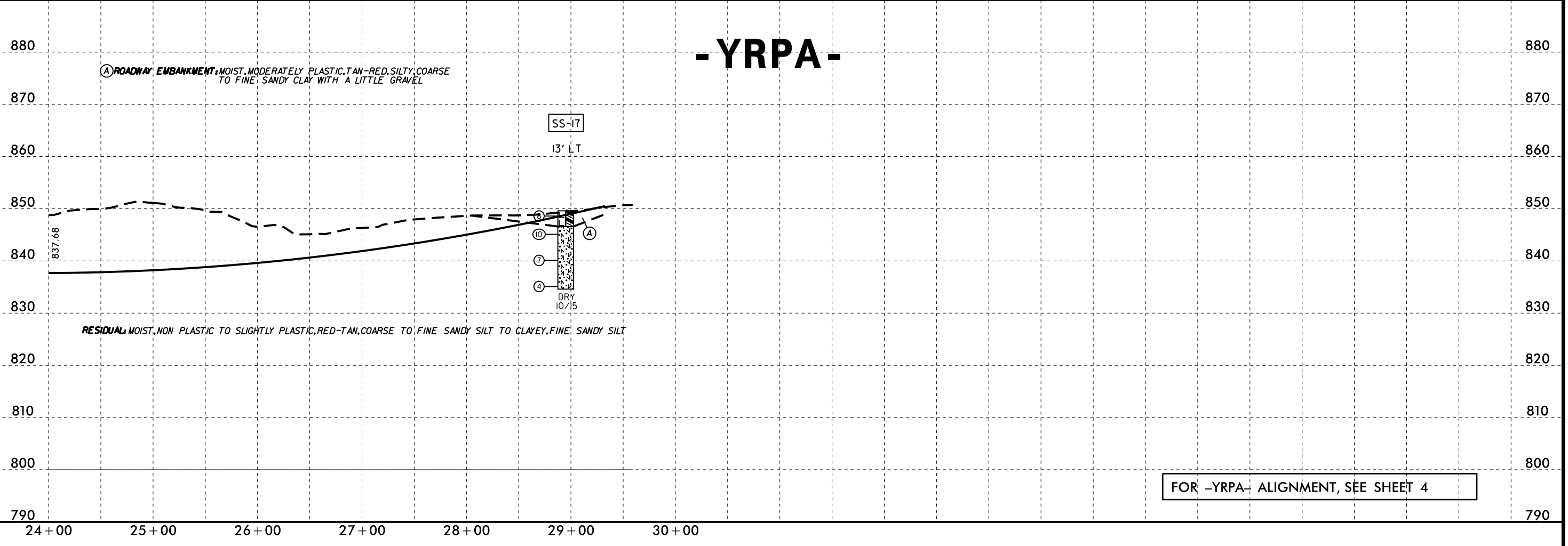
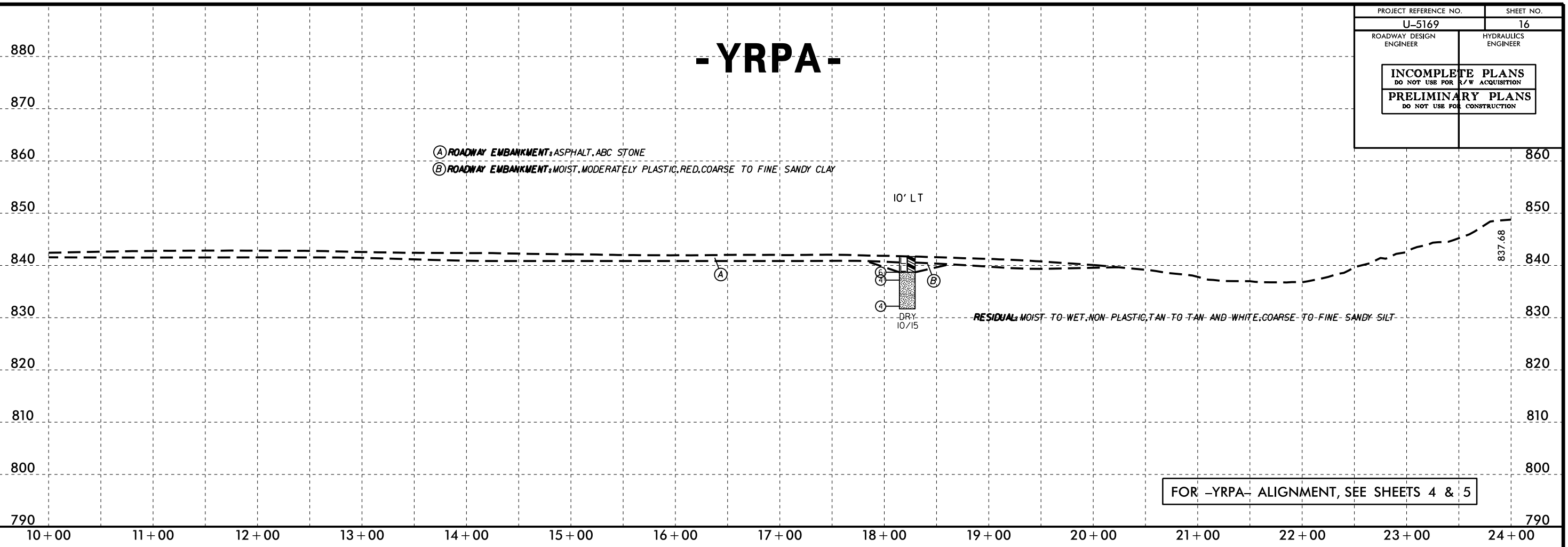


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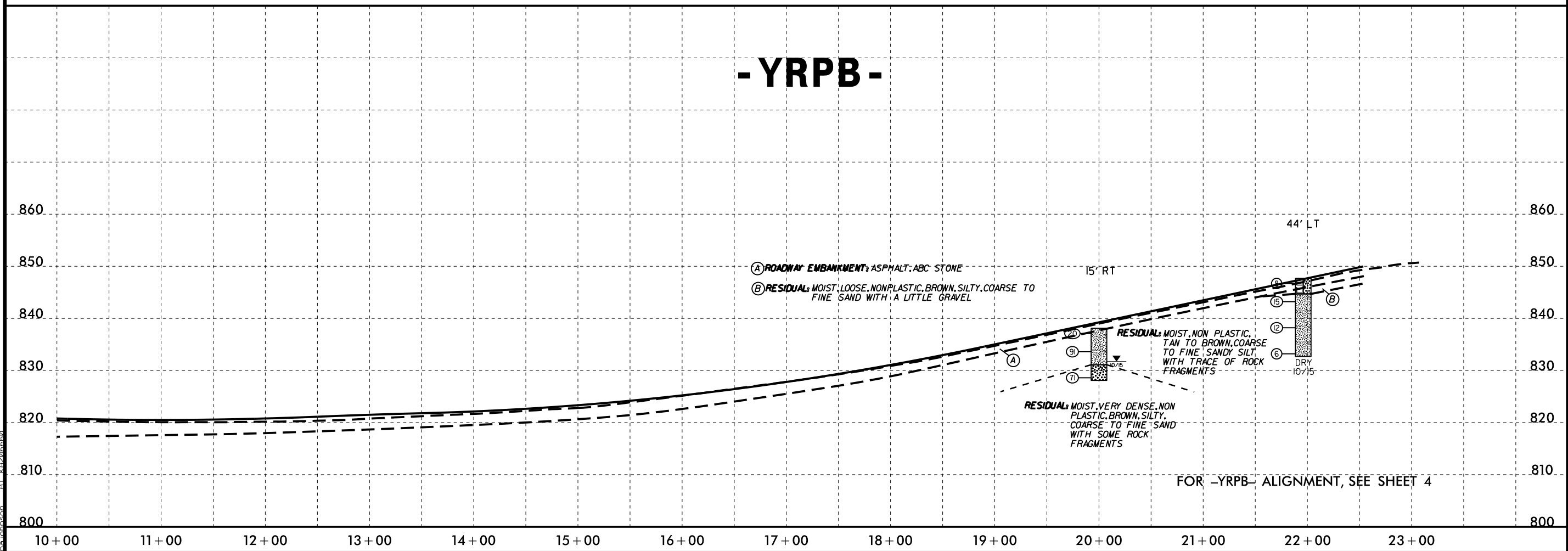
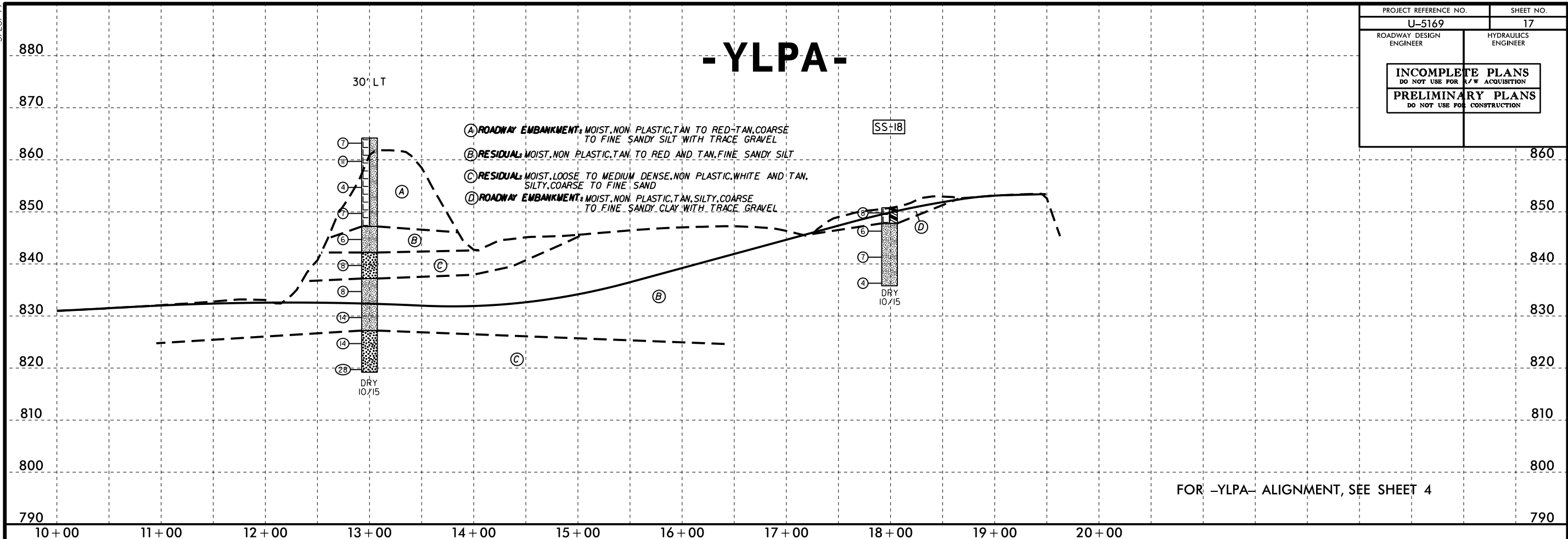
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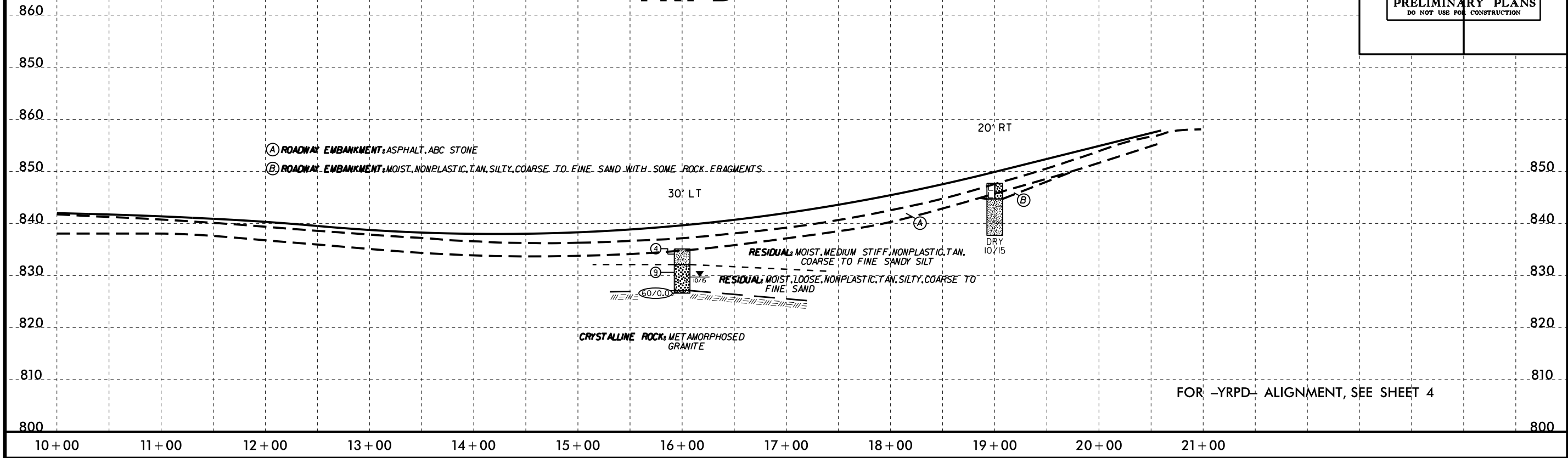
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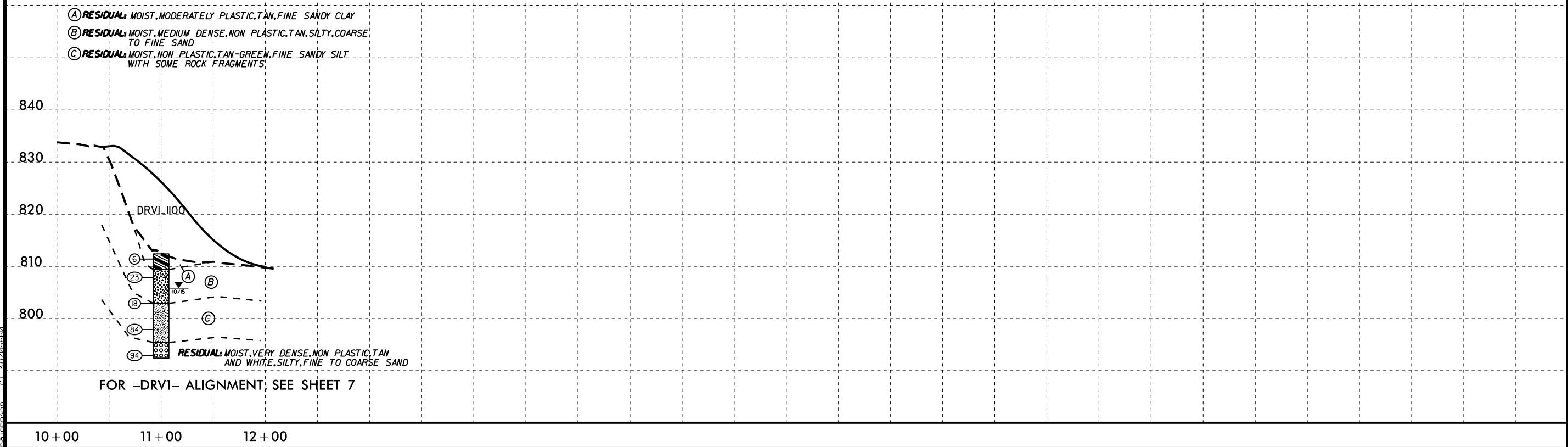
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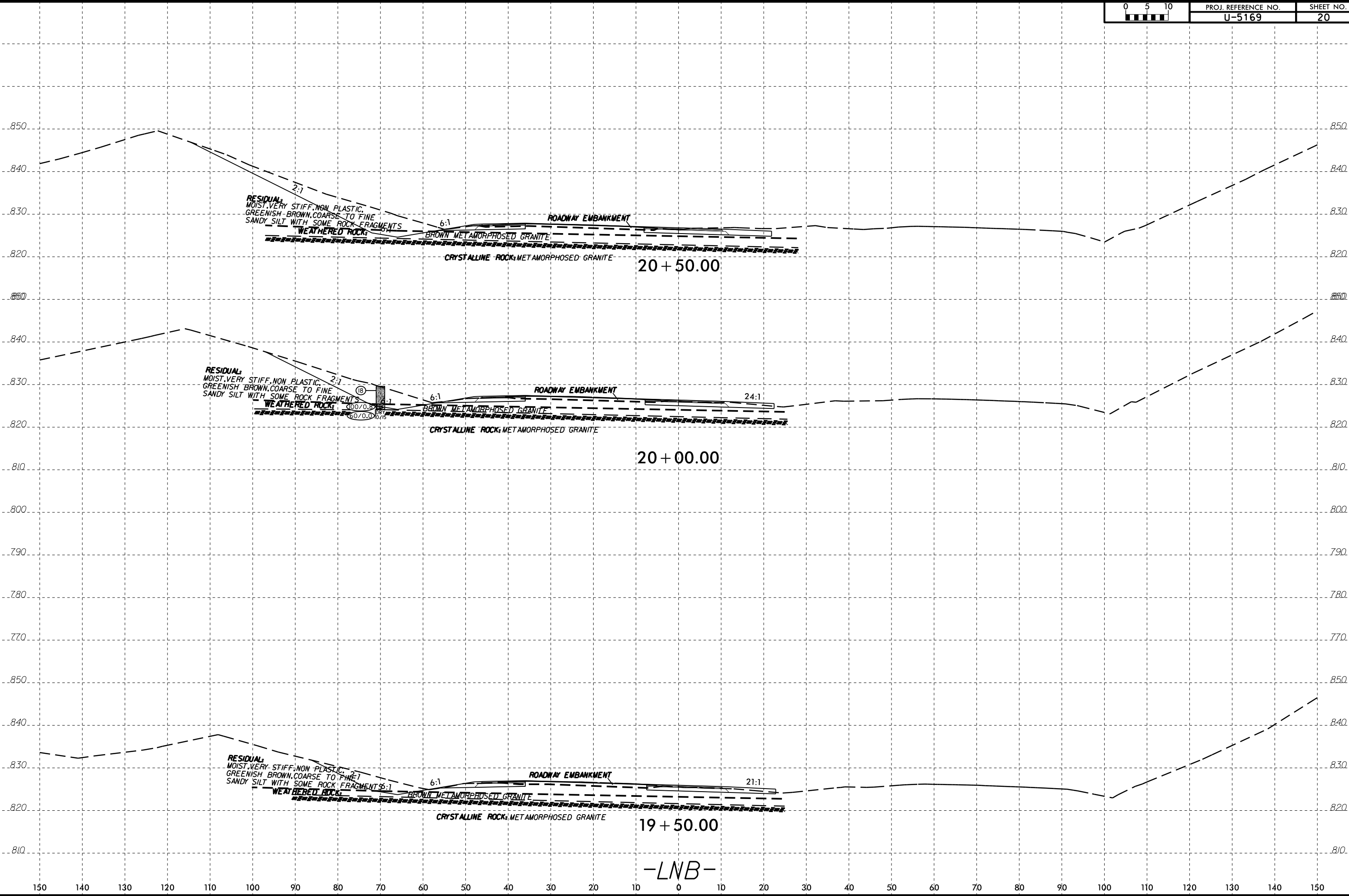
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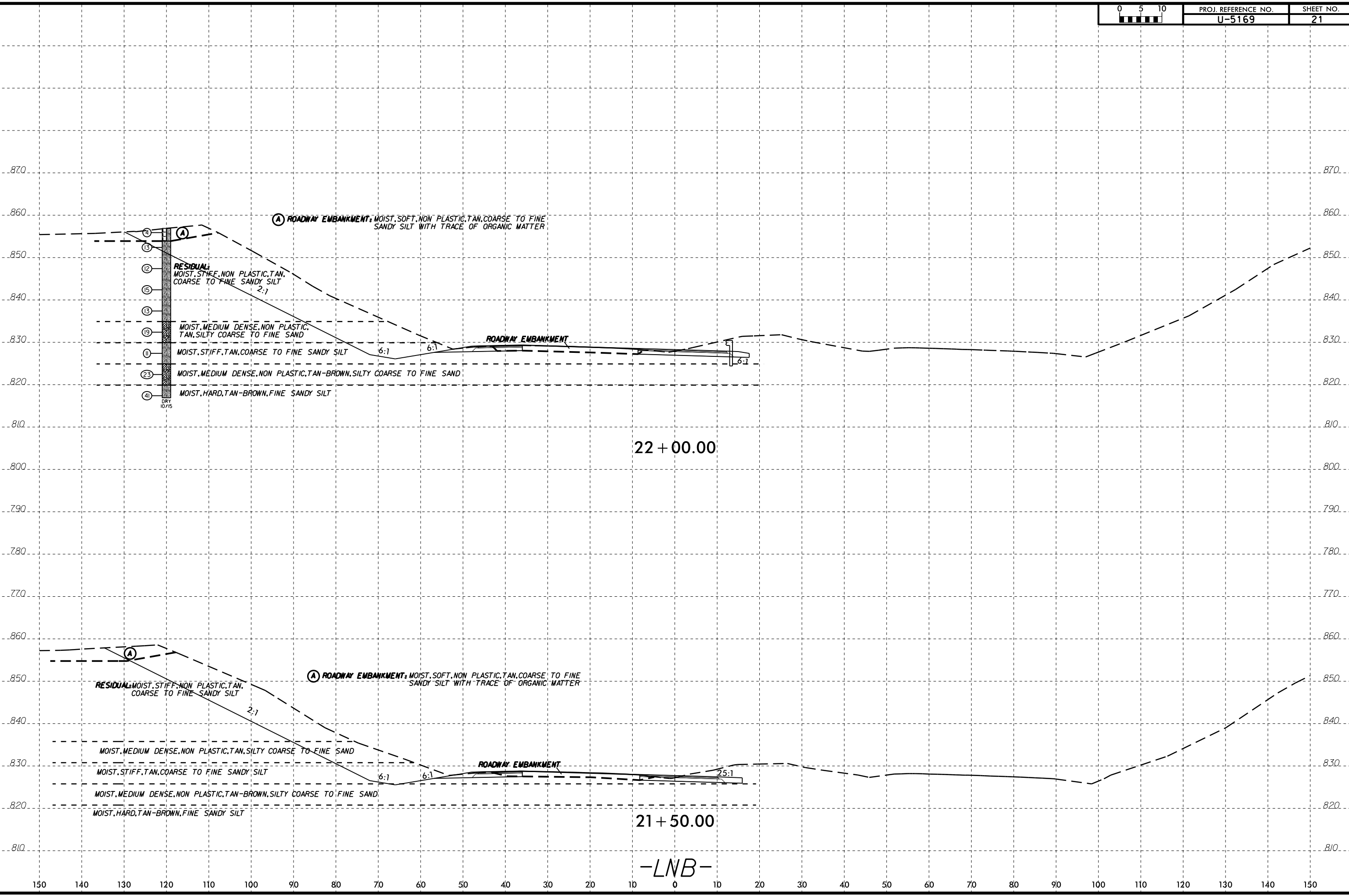
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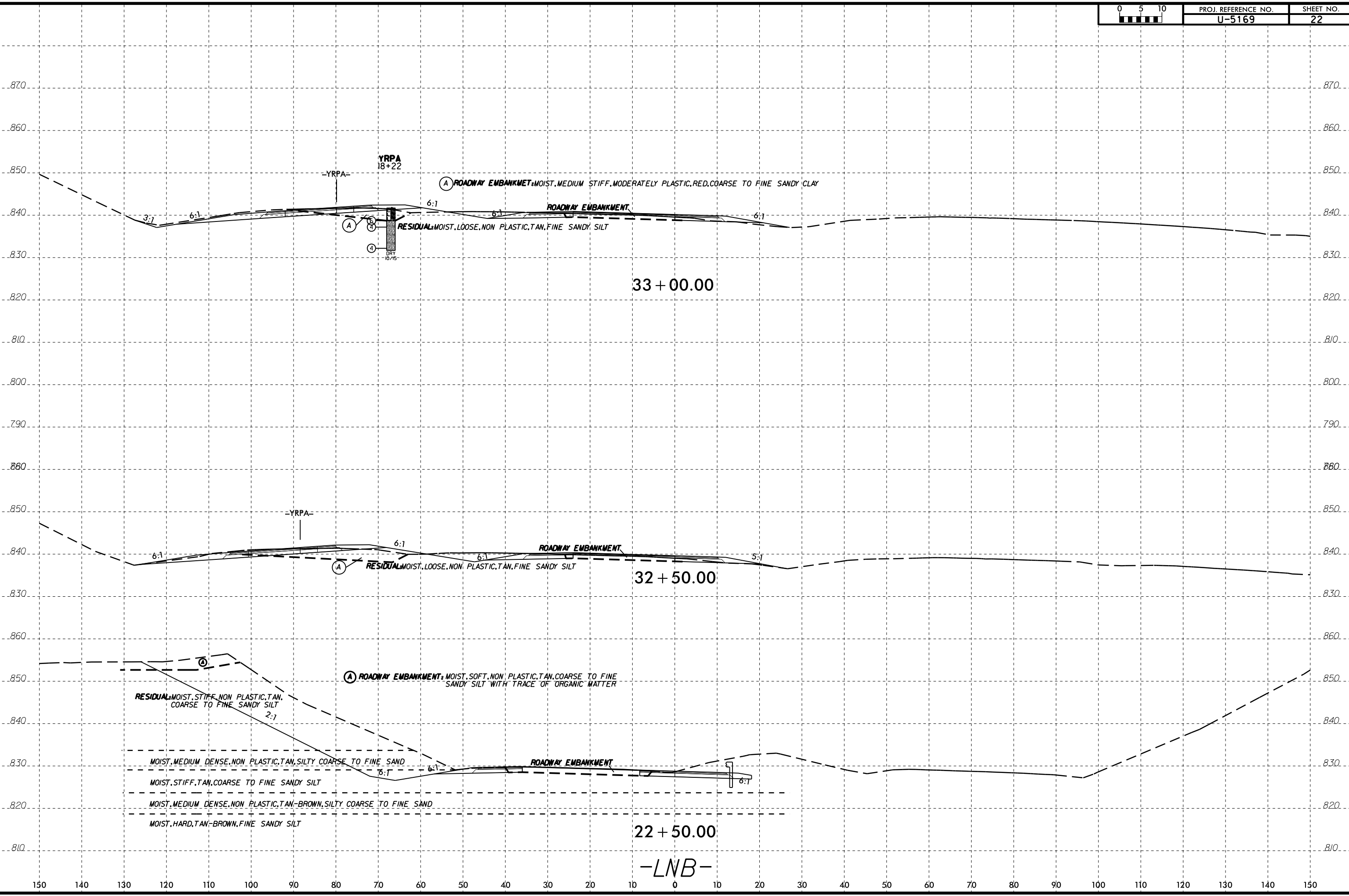


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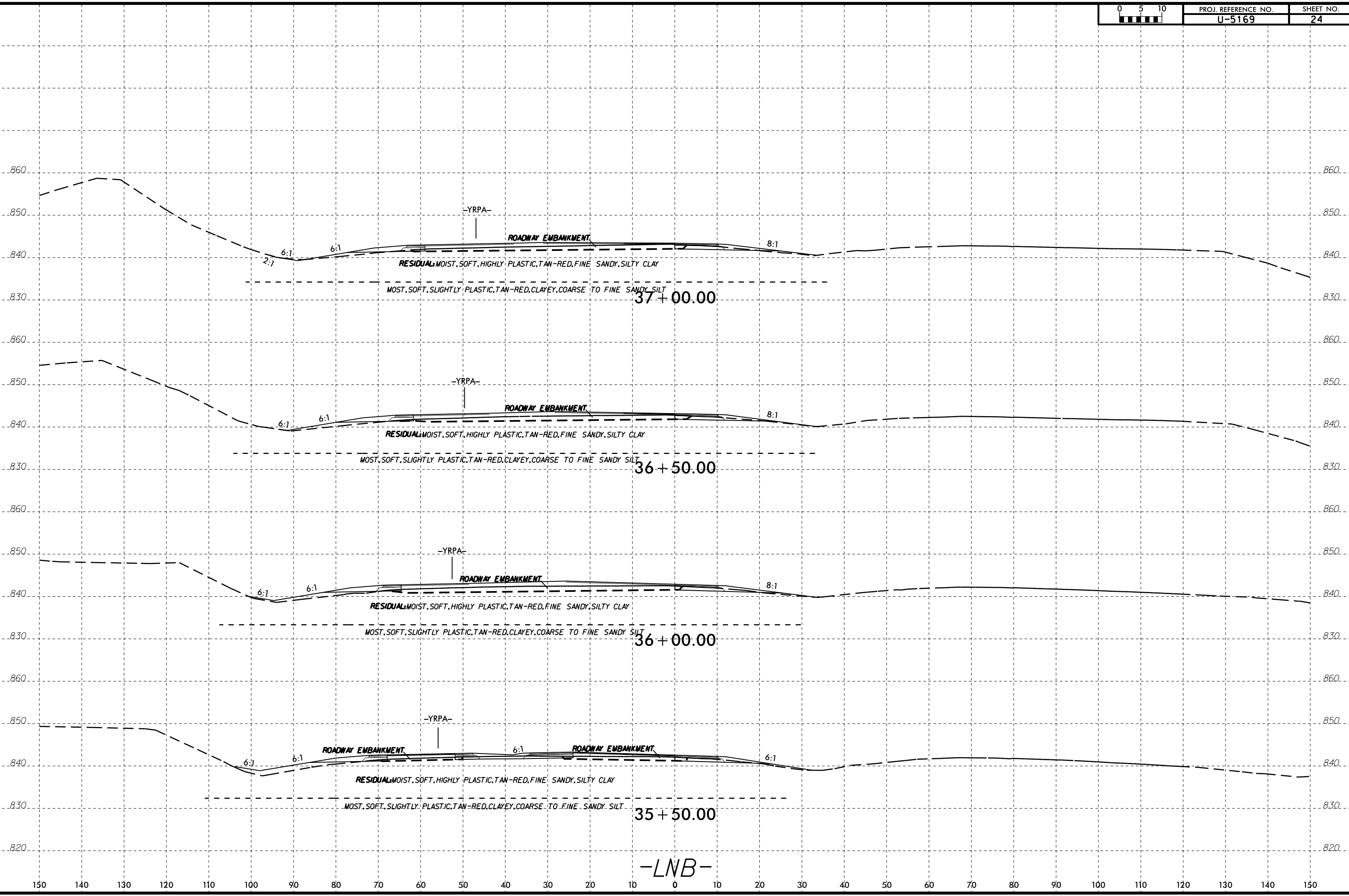
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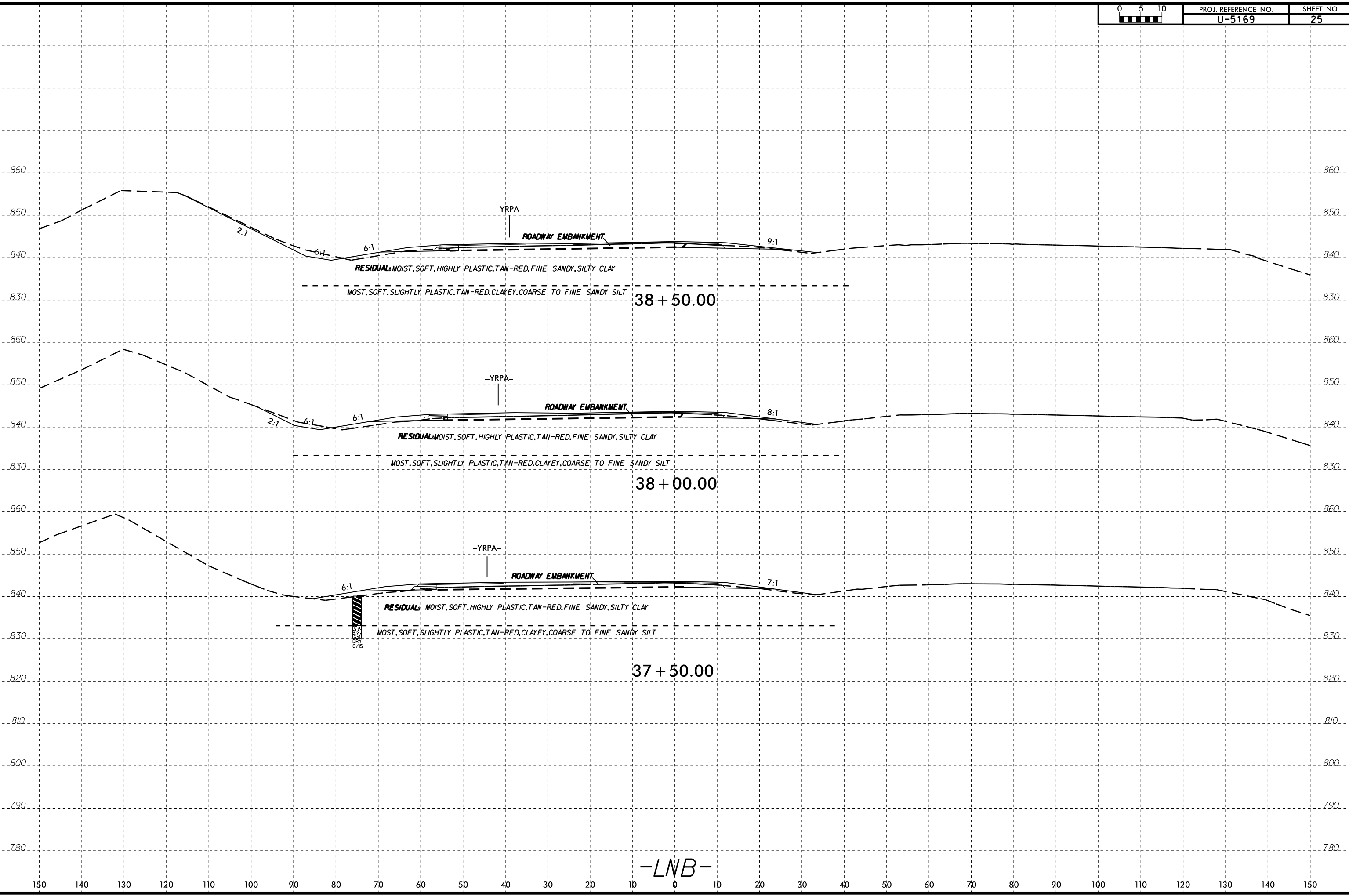
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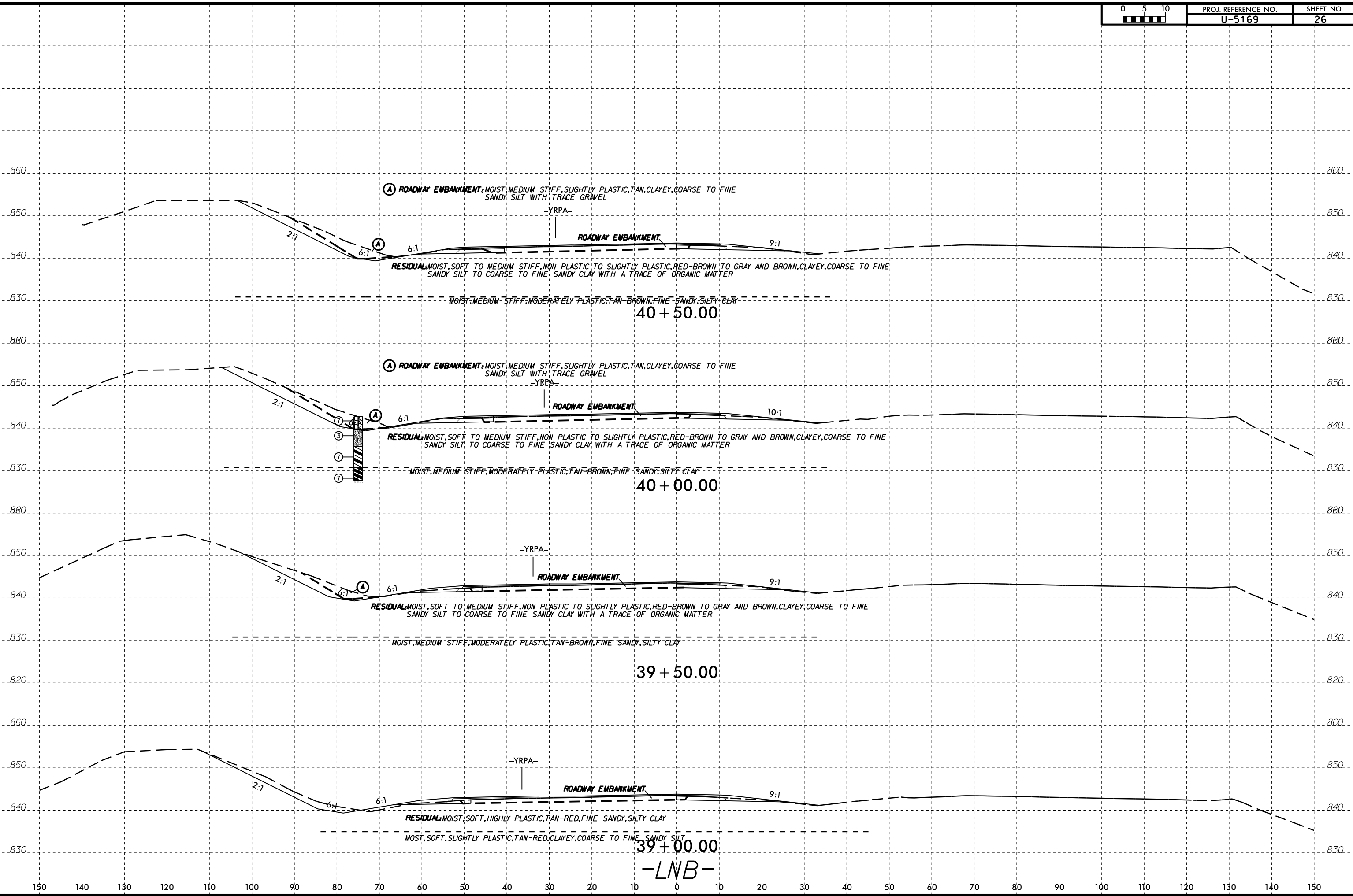


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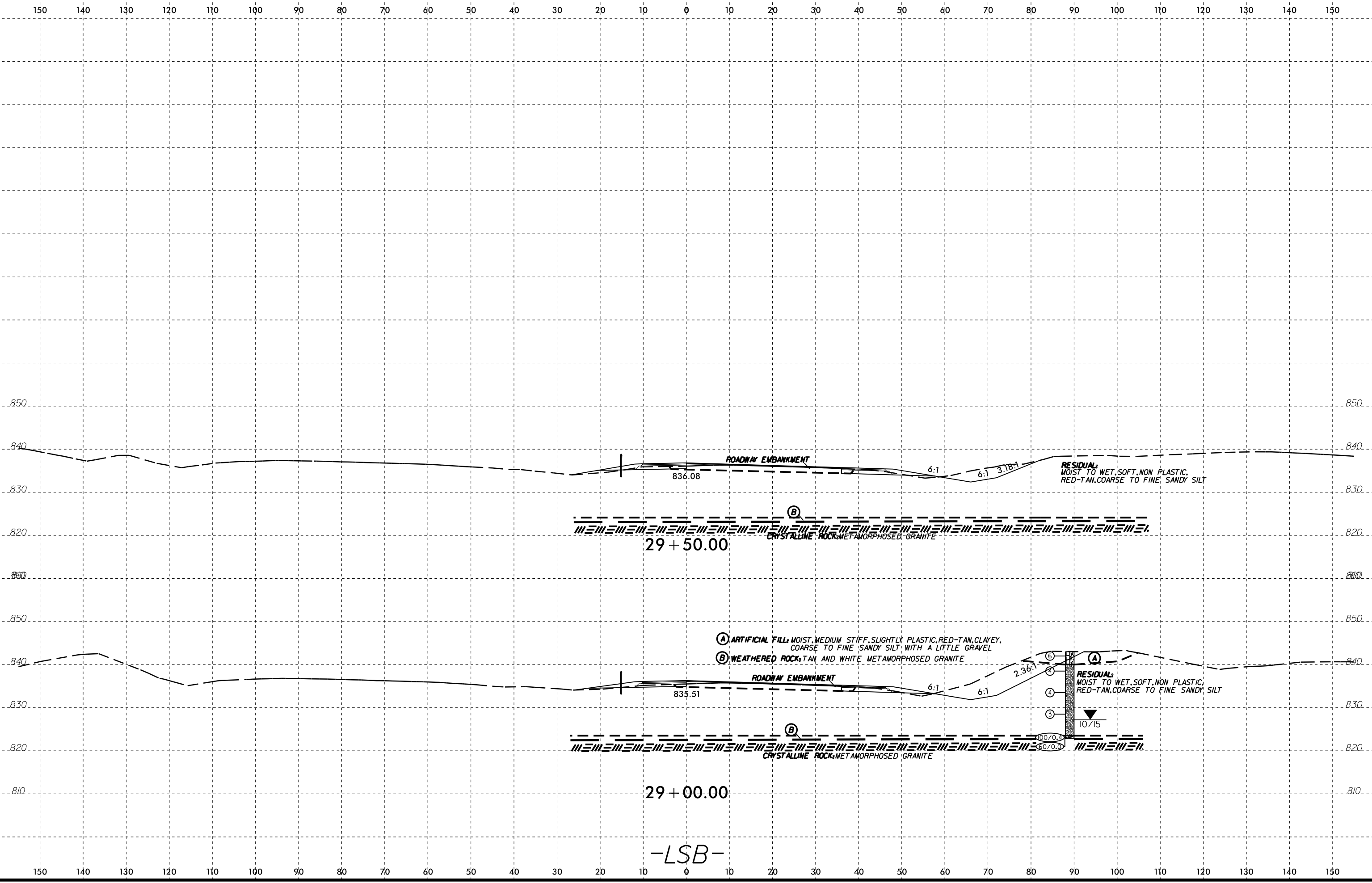
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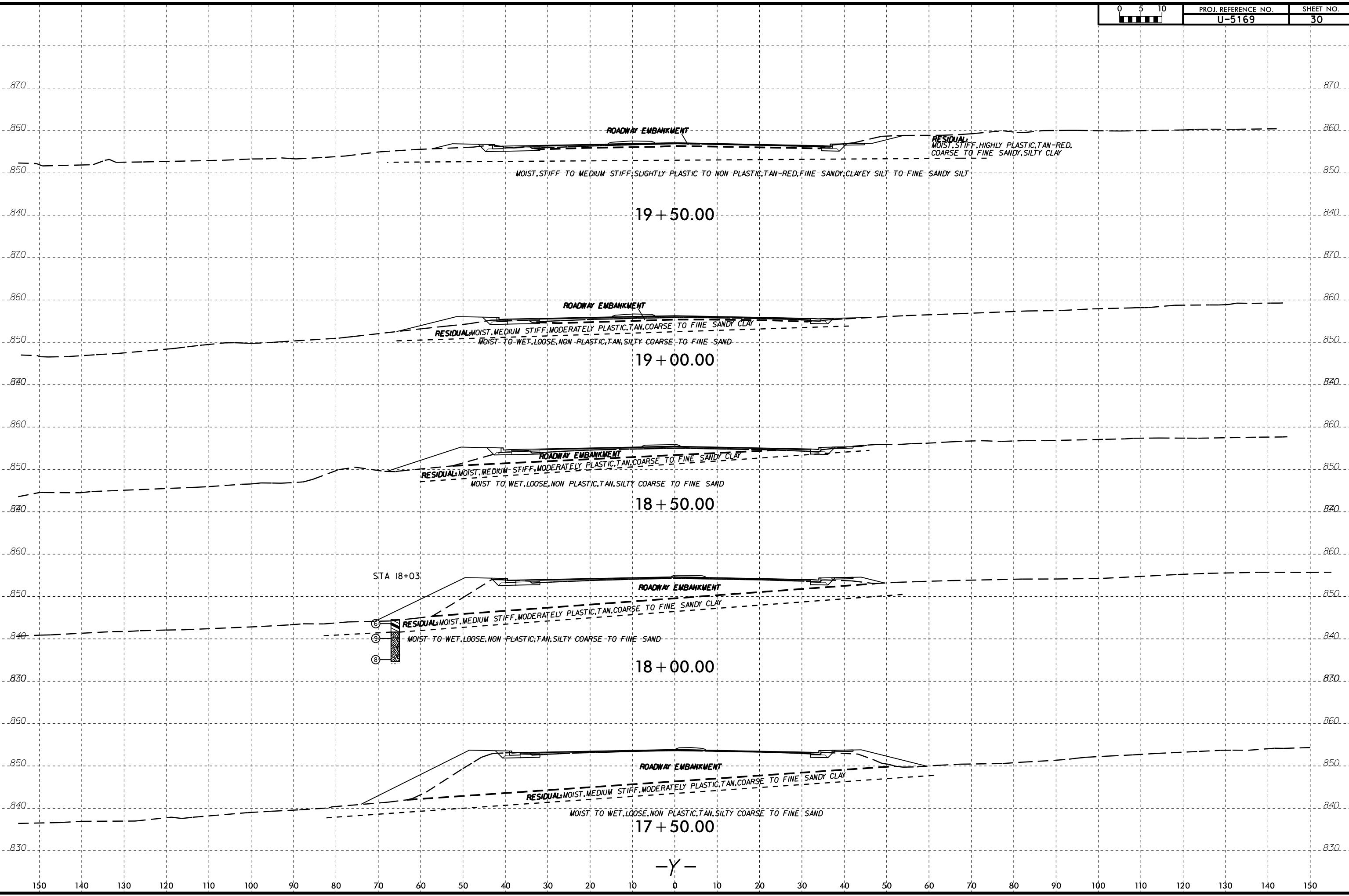


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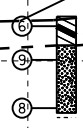
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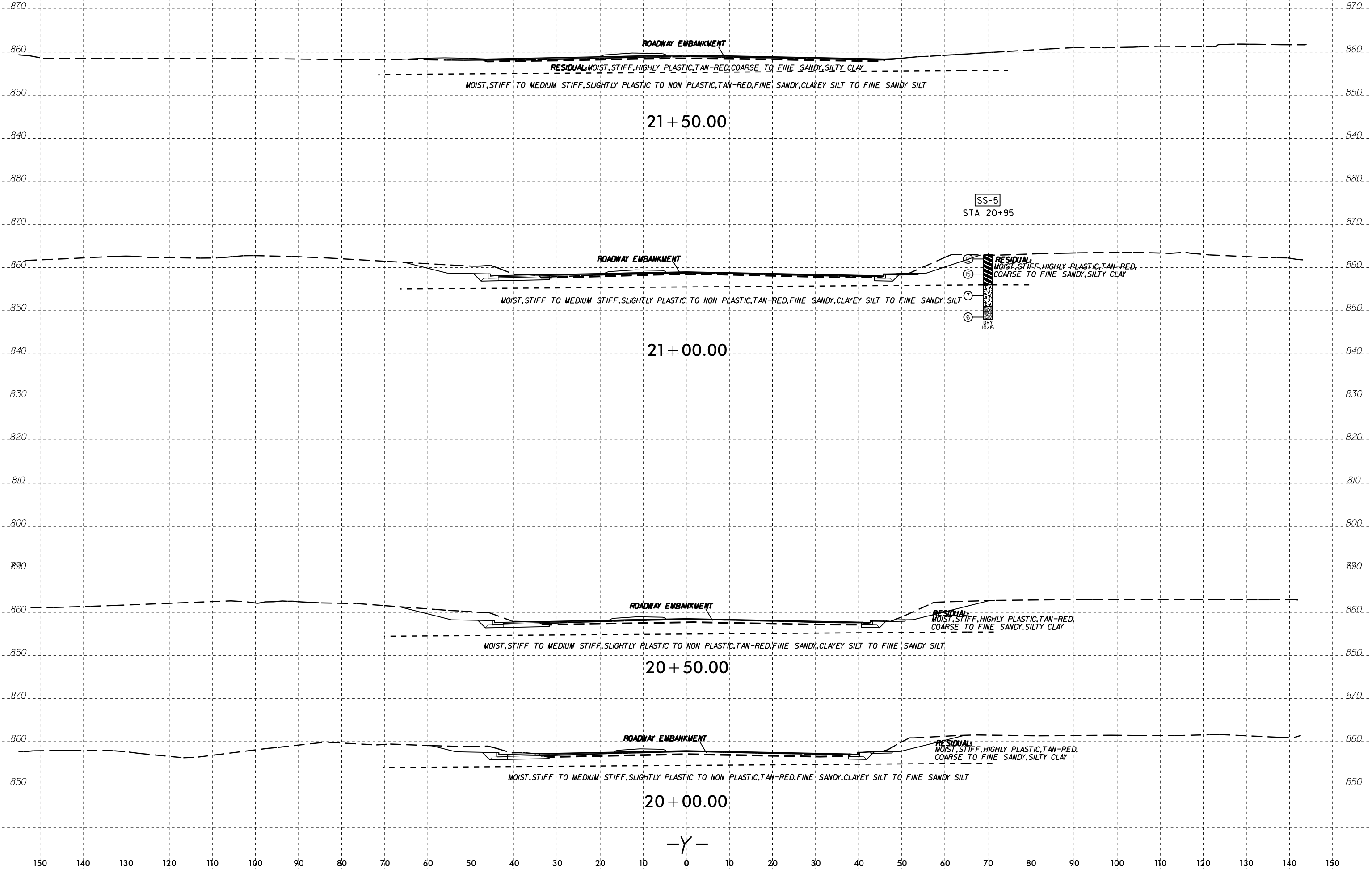
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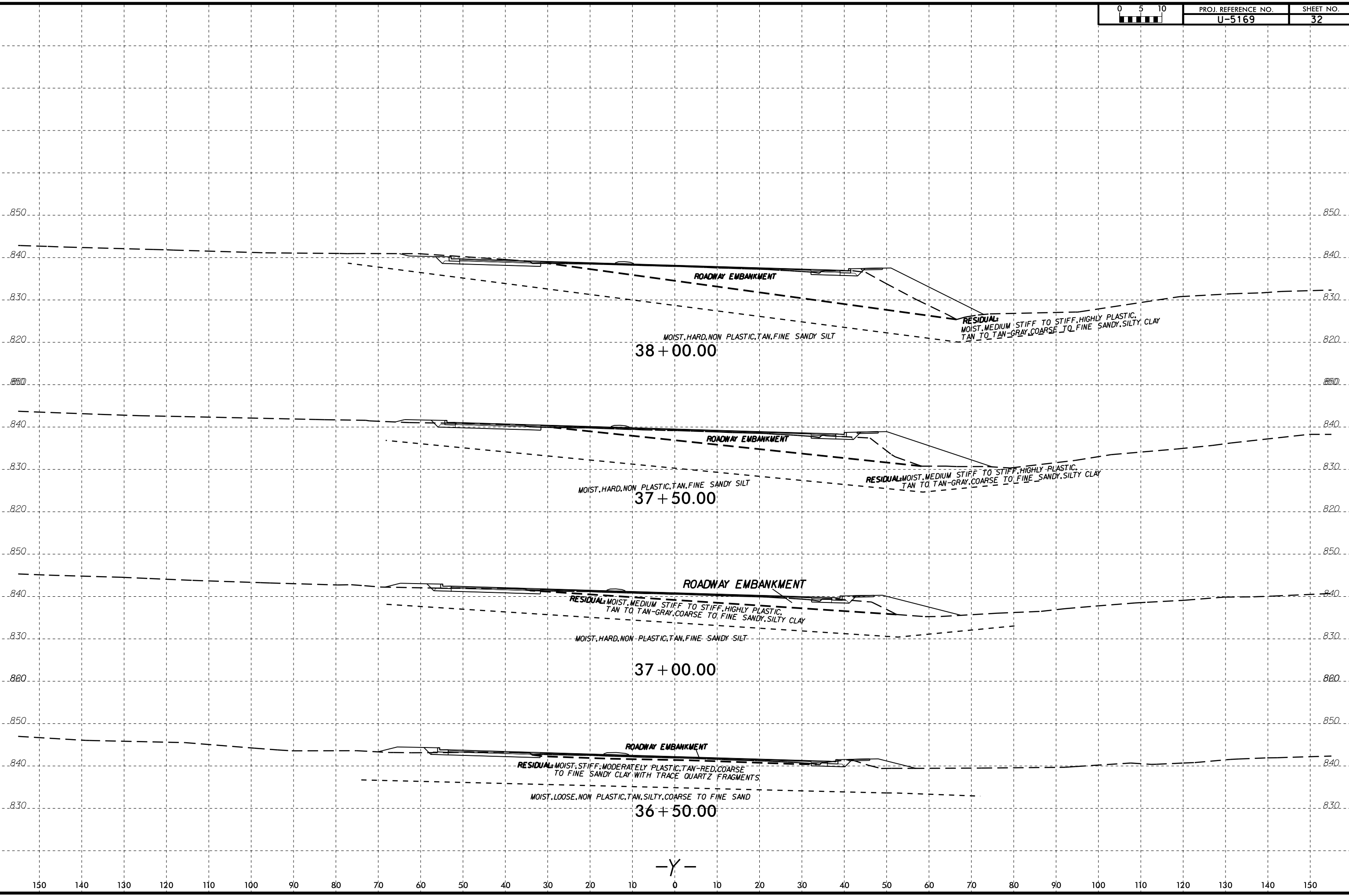
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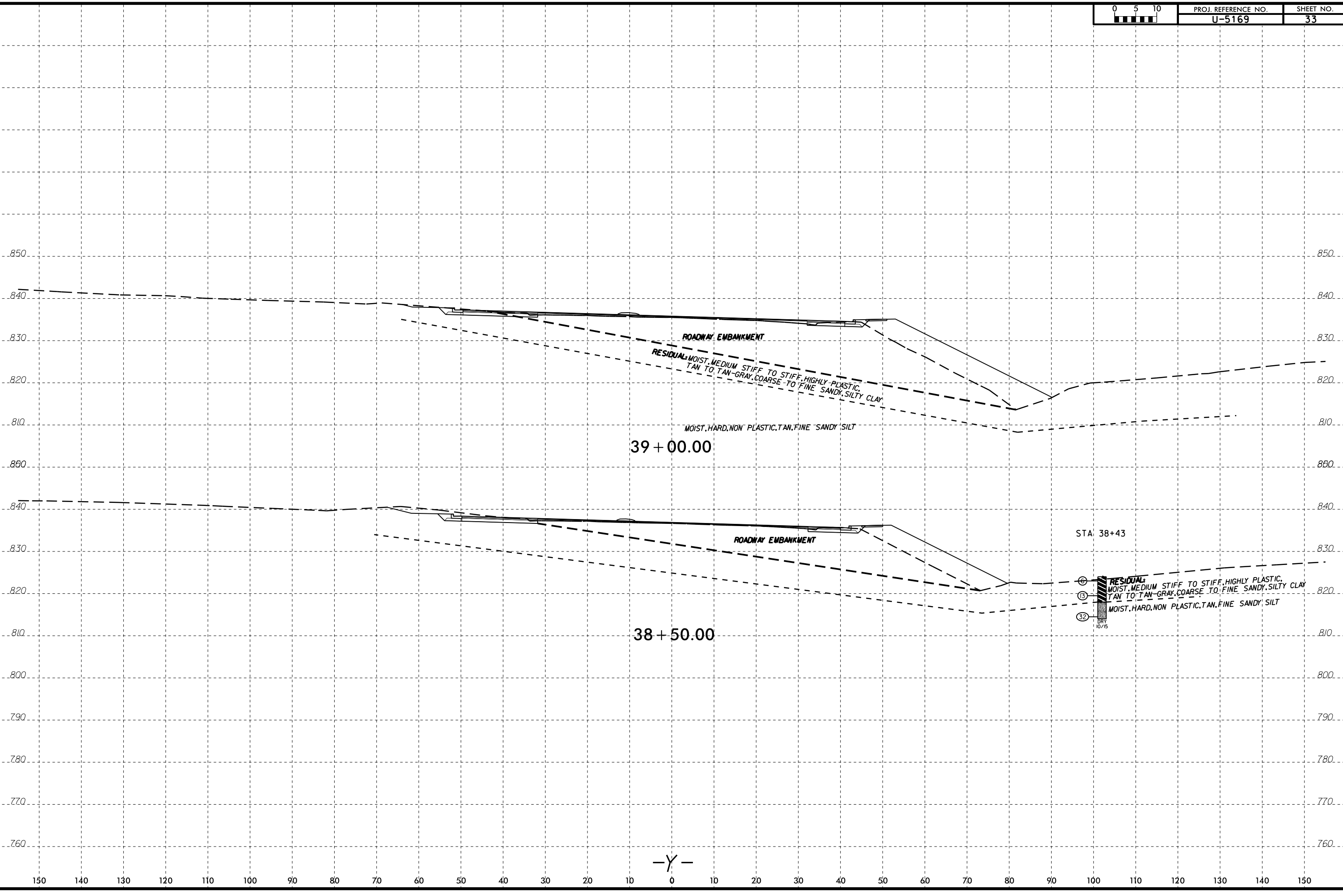
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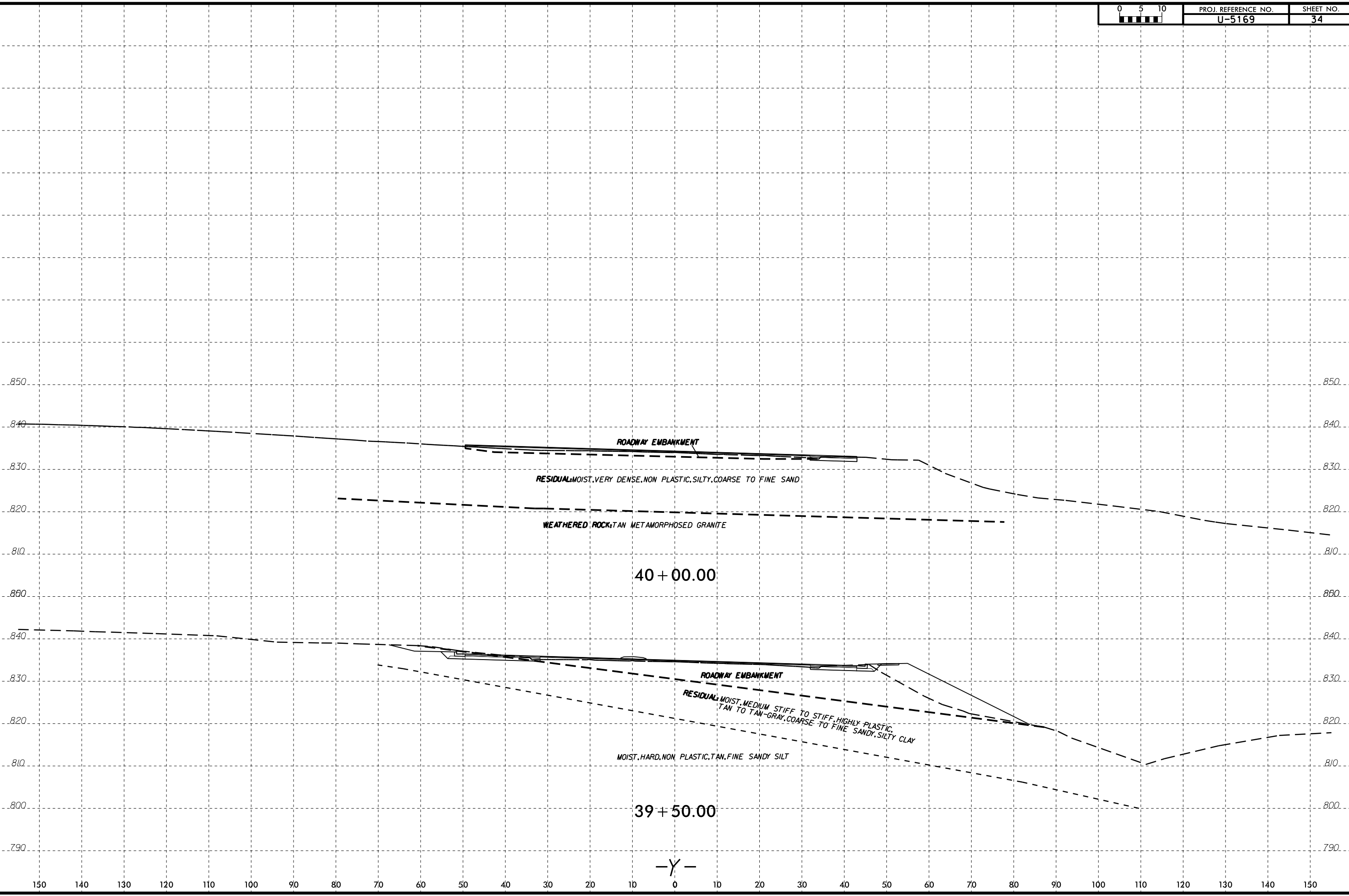
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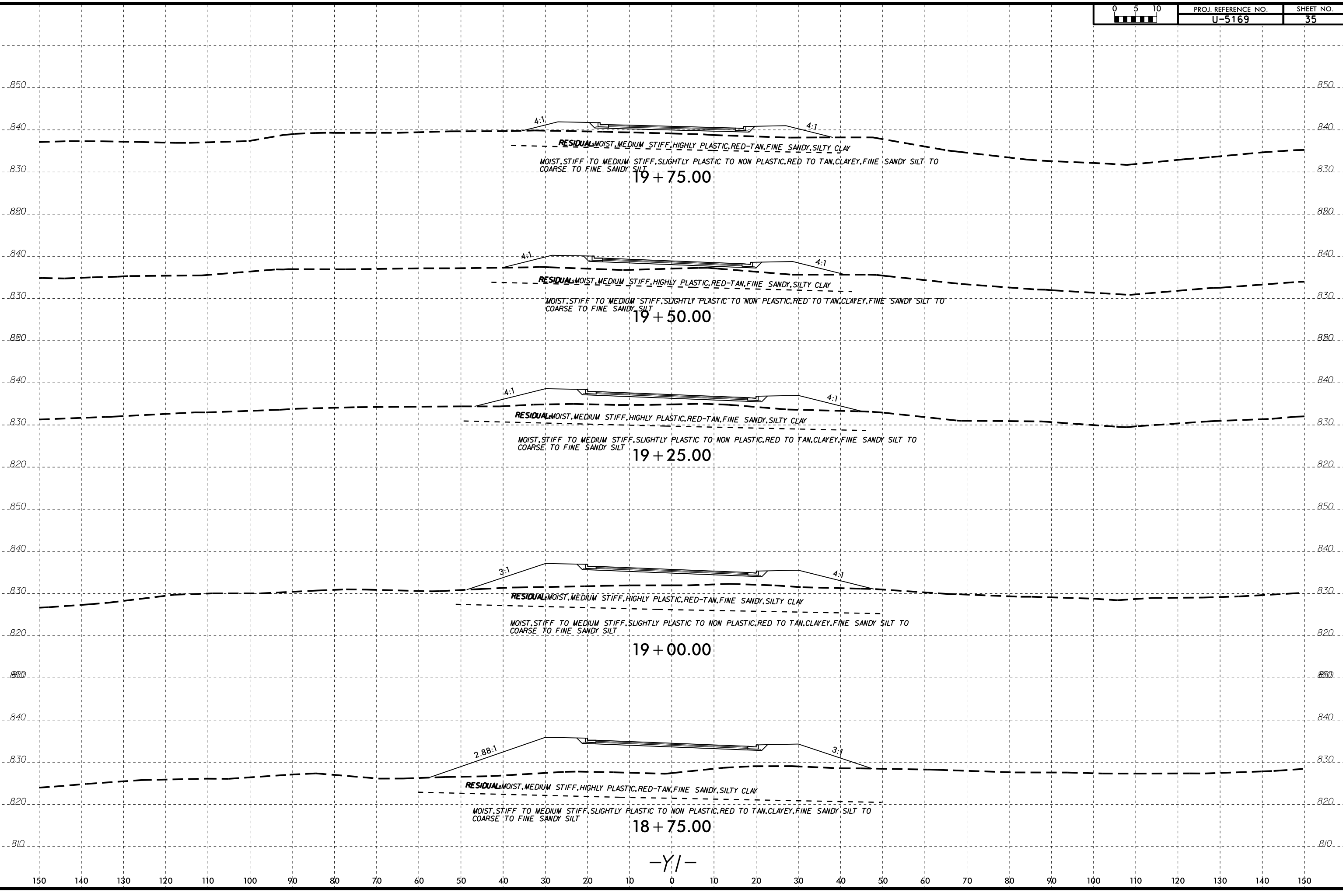


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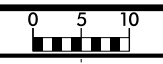
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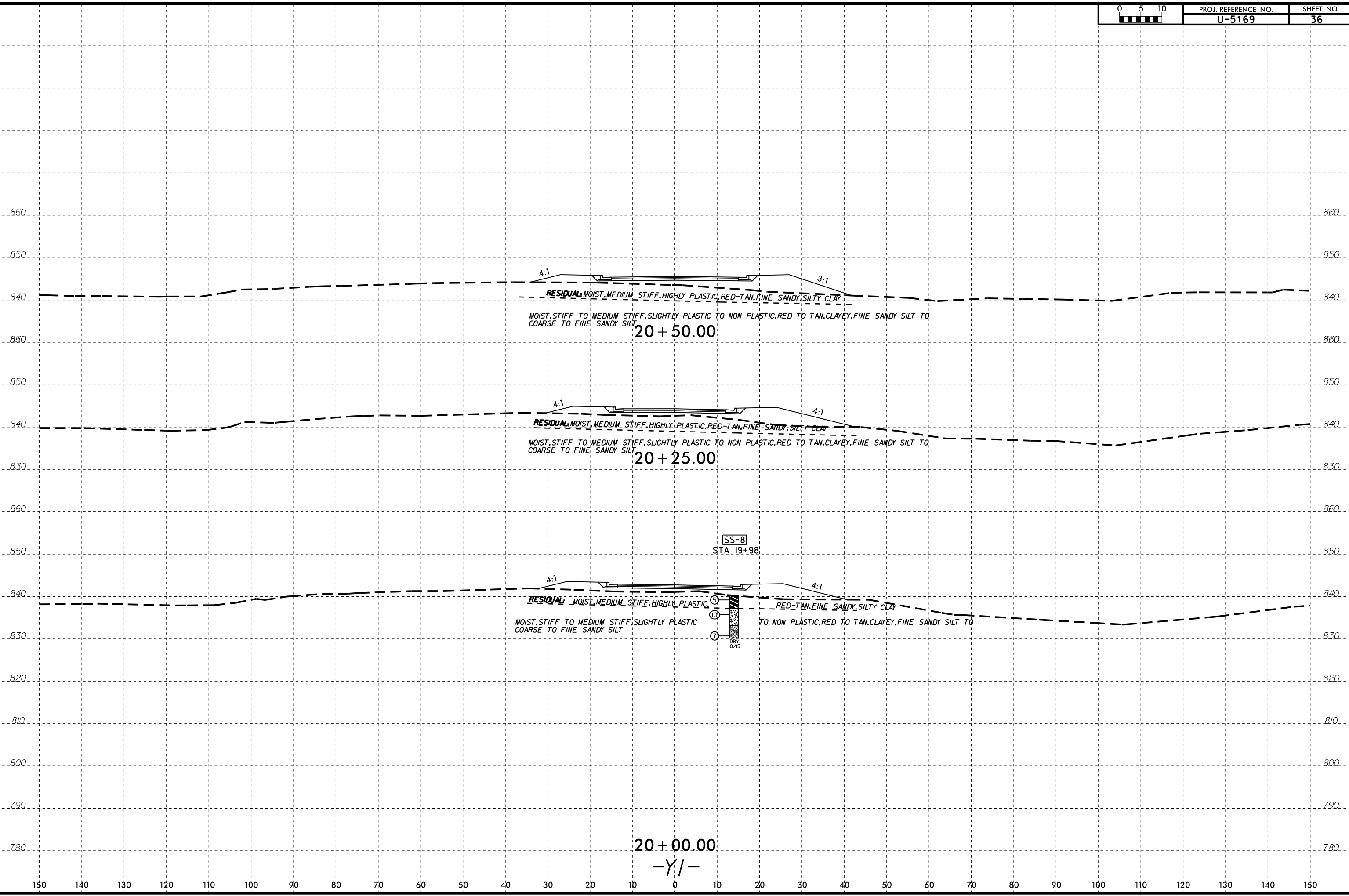
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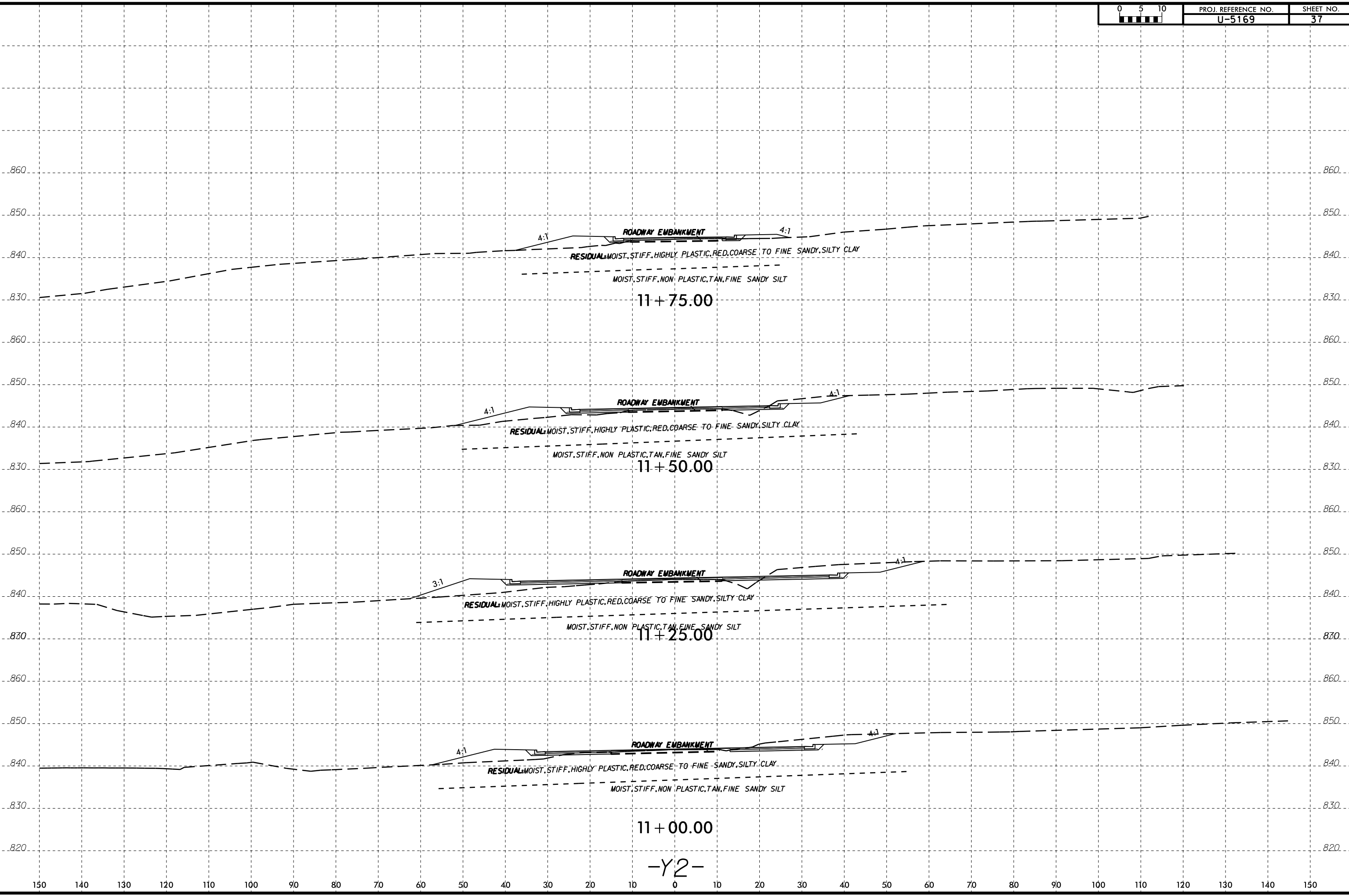
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U-5169

SHEET NO.
36

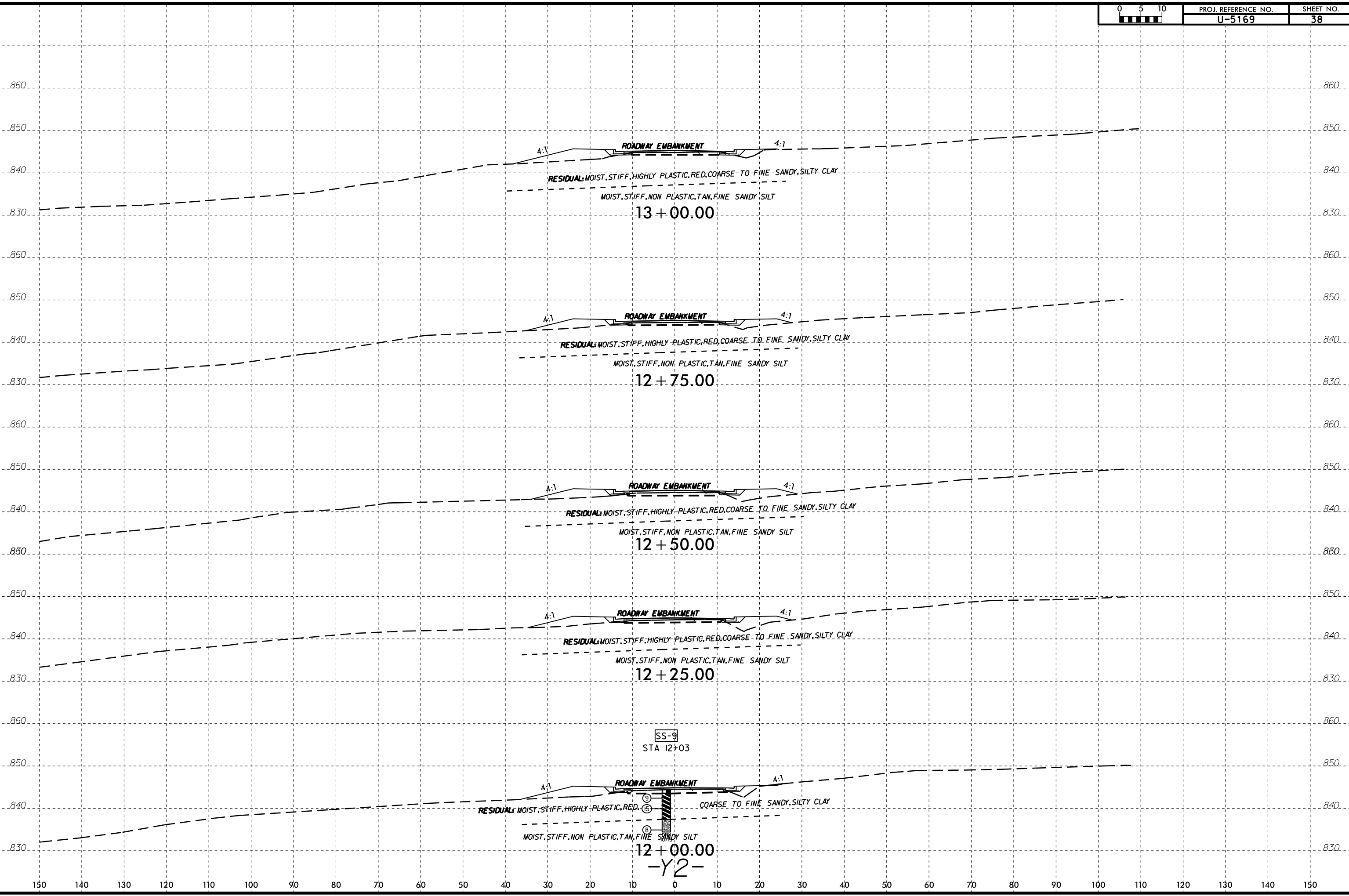


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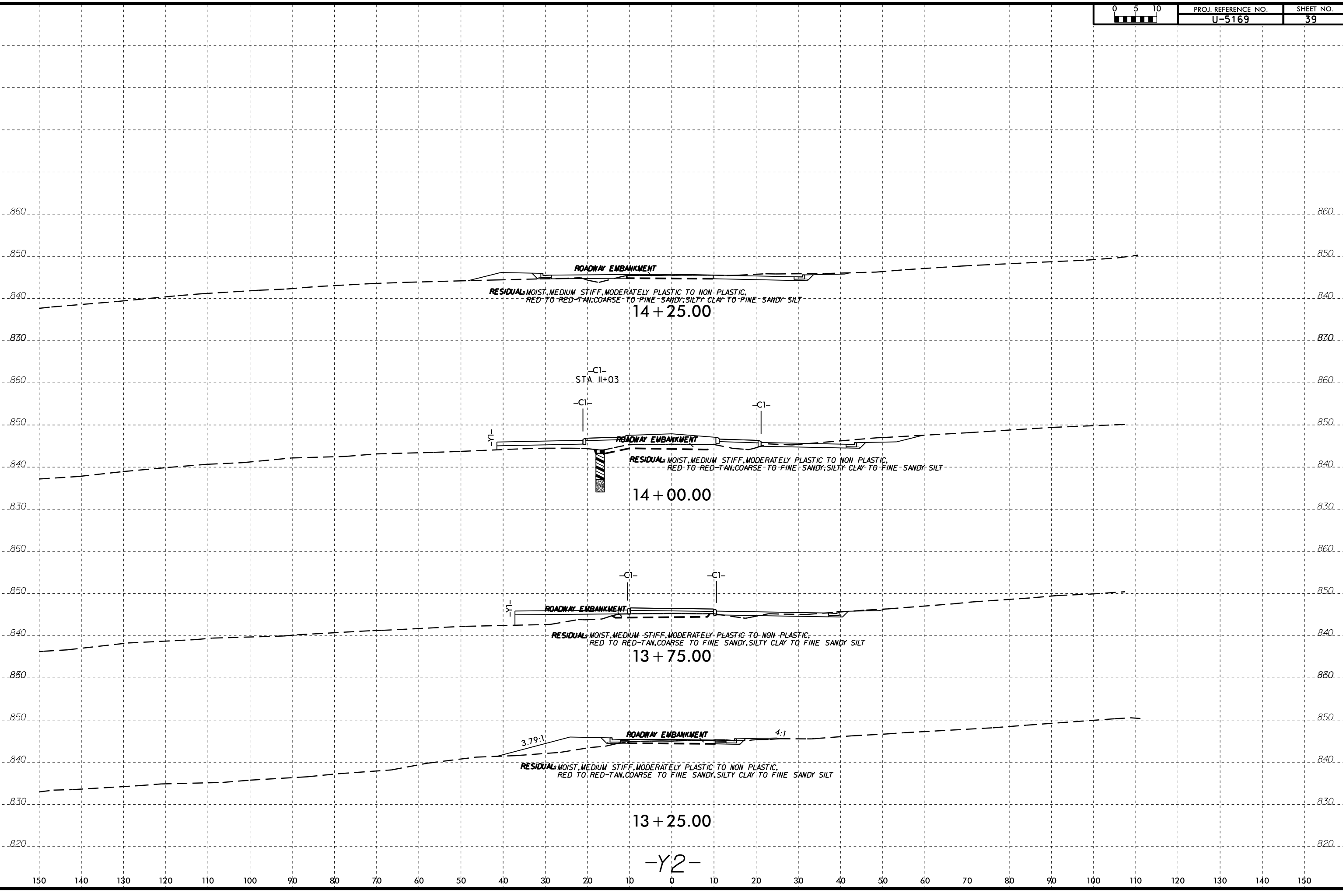
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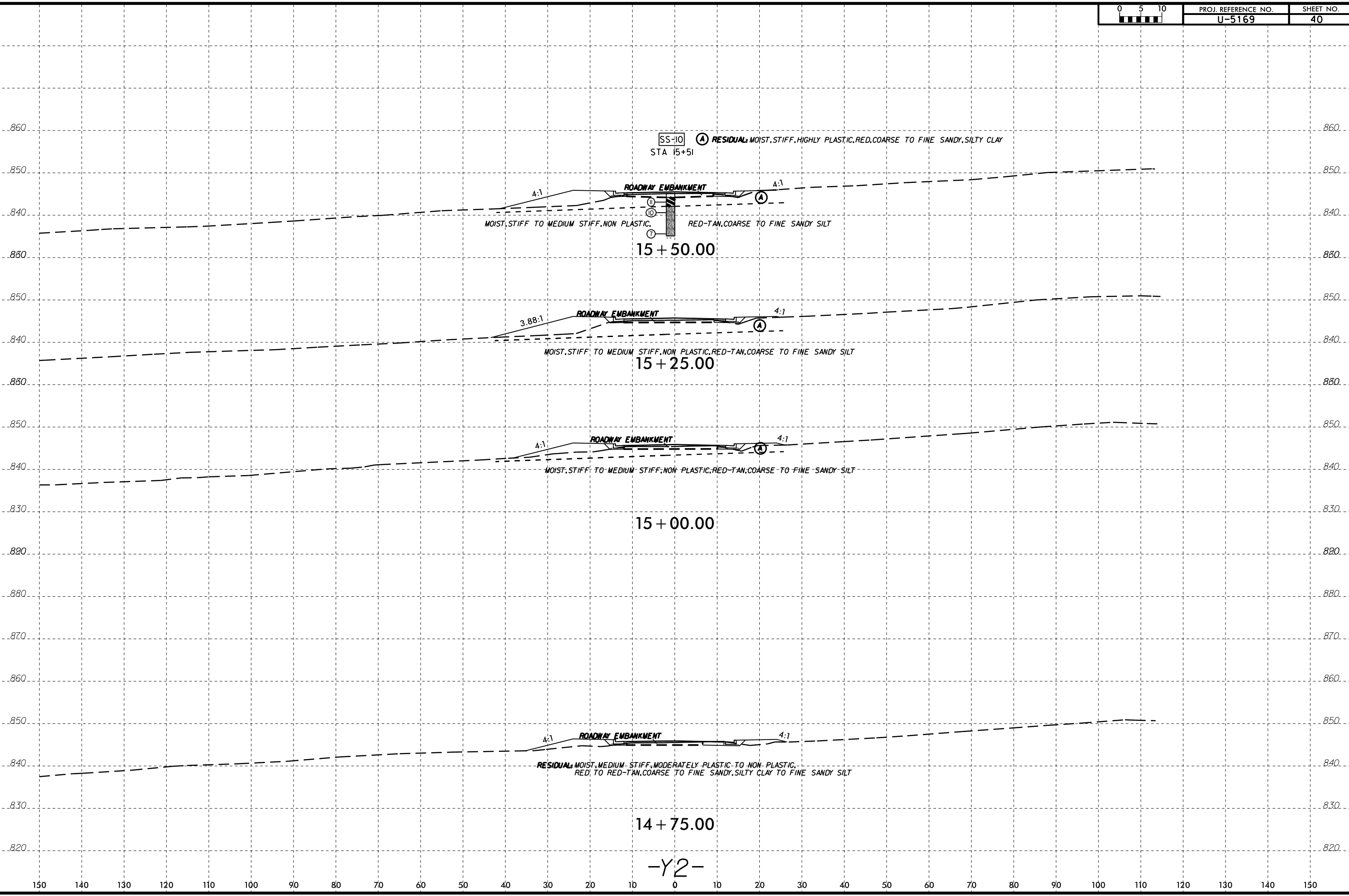


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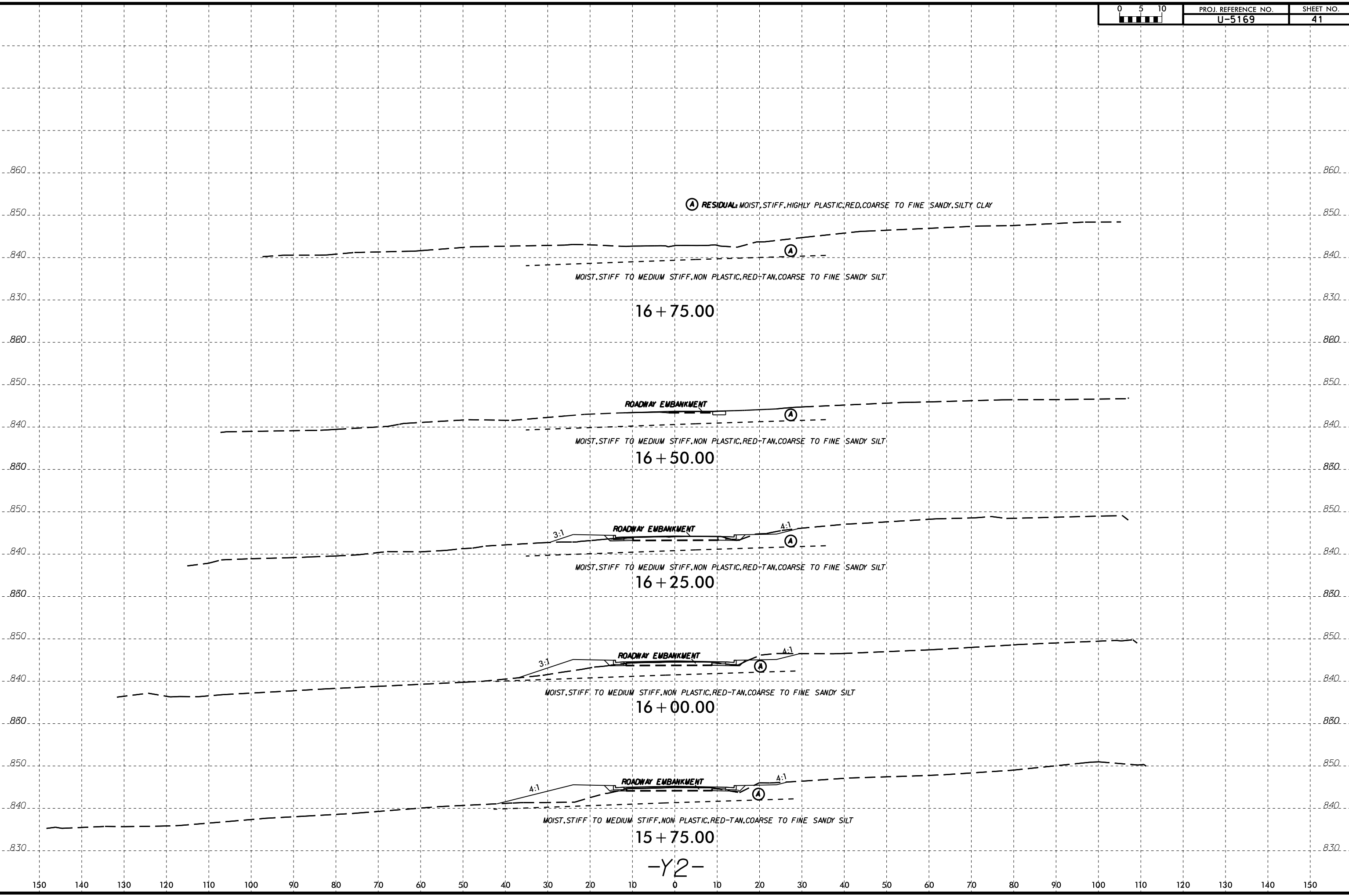
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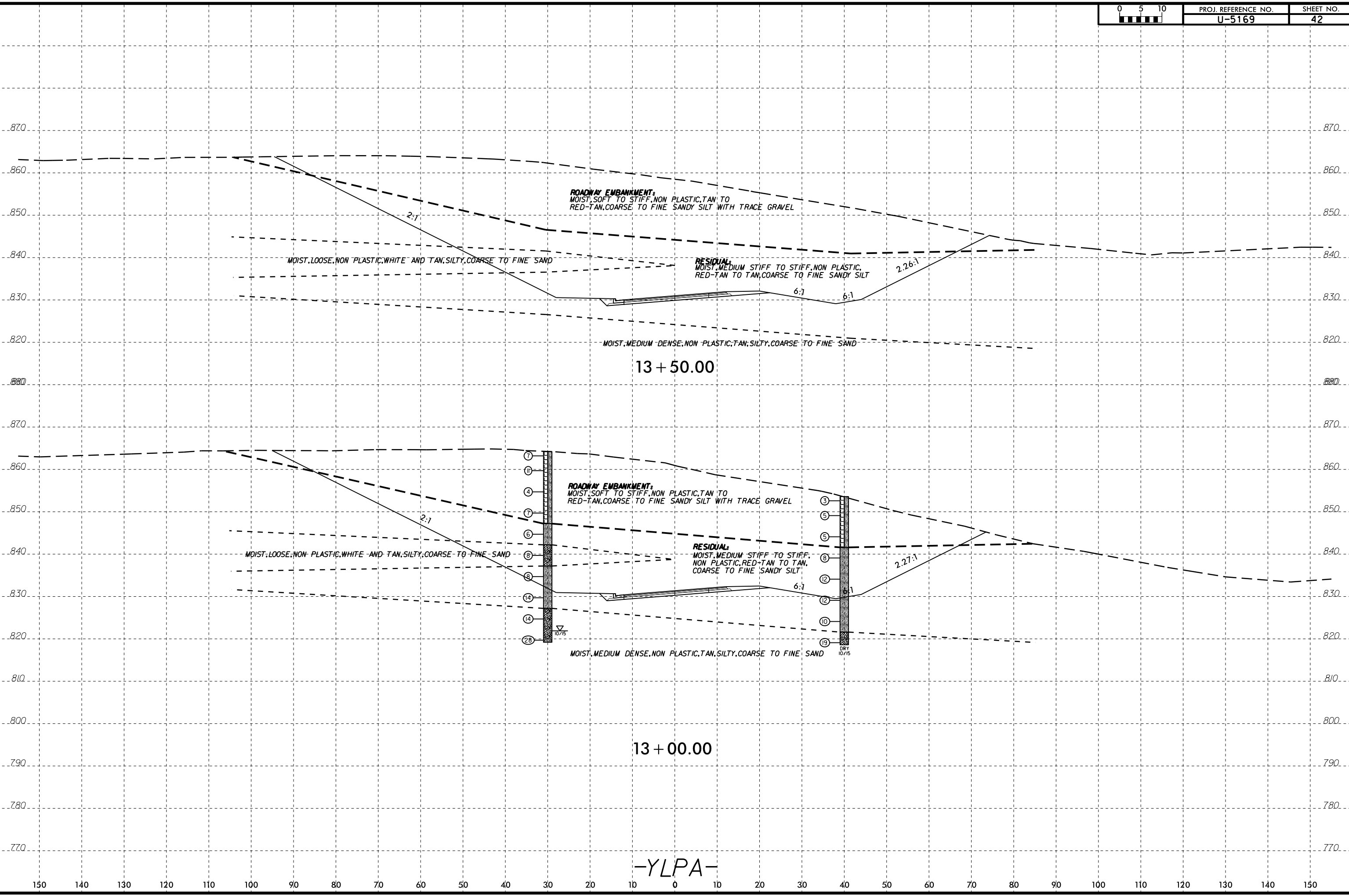
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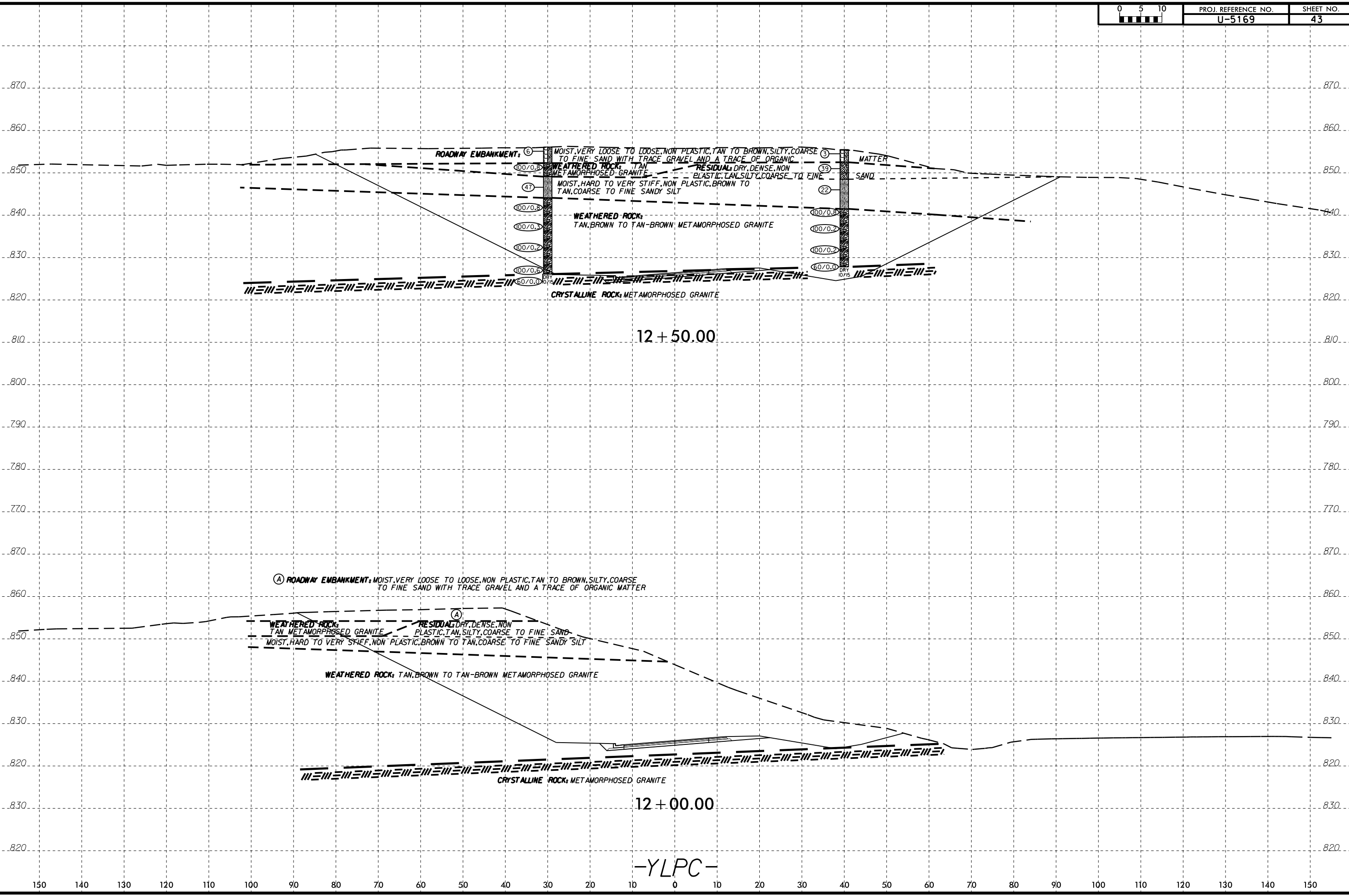


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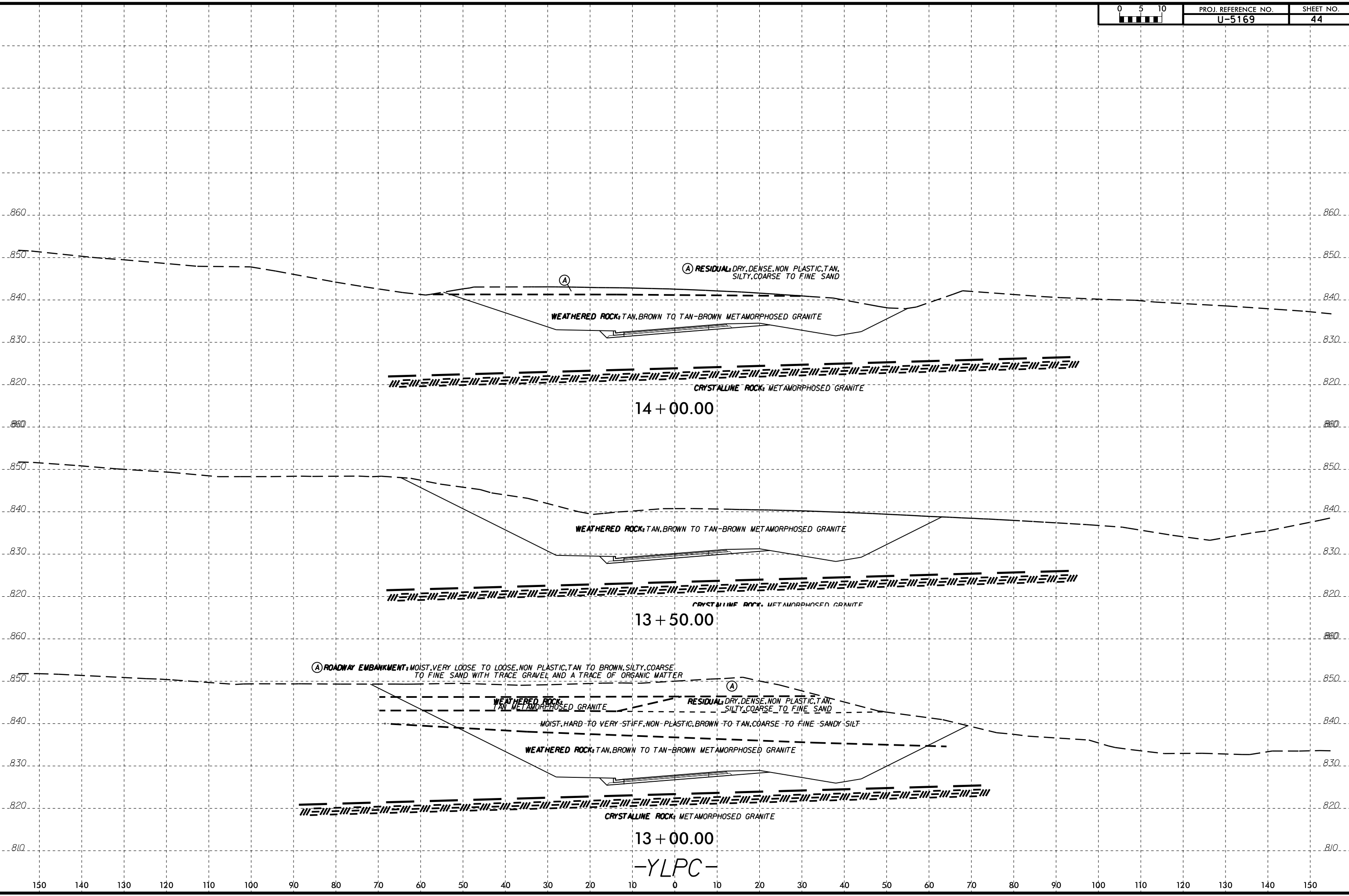


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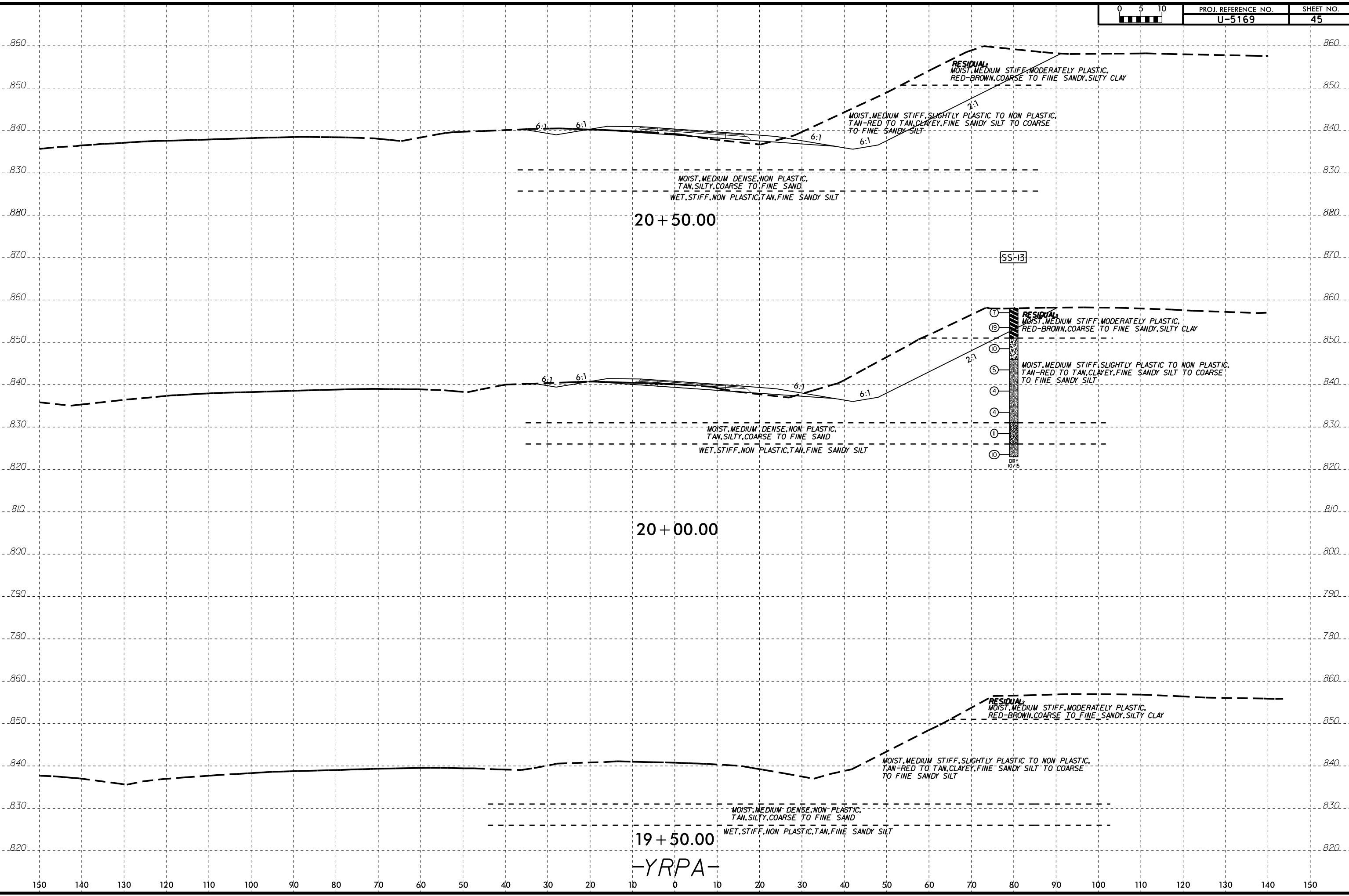


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W. Johnson



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

SUBSURFACE INVESTIGATION

*APPENDIX A
LABORATORY RESULTS*

REFERENCE: U-5169

PROJECT: 45220

SUMMARY OF LABORATORY TEST DATA

**PROJECT NO. 45220.1.2 (U-5169)
 COUNTY: GUILFORD
 I-74/US 311 & NC 68 (EASTCHESTER DRIVE) INTERCHANGE RAMP REPLACEMENT**

Sample No.	Boring Number	Station	Offset	Alignment	Sample Depth (ft.)	Natural Moisture Content (%)	AASHTO Class (Group Index)	N-Value (blows/ ft.)	Atterberg Limits			Gradation Results							
									L.L.	P.L.	P.I.	Pass #10 Sieve	Pass #40 Sieve	Pass #200 Sieve	Retained #270 Sieve	Coarse Sand (%)	Fine Sand (%)	Silt (%)	Clay (%)
SS-1	LNB_4000	40+00	75' LT	-LNB-	8.5-10.0	-	A-6(5)	7	35	22	13	93	81	56	45.2	19.6	25.6	25.5	29.3
SS-2	LSB_1700	17+00	50' RT	-LSB-	0.0-1.5	20.0	A-6(2)	10	30	19	11	94	78	49	52.2	26.3	25.9	23.5	24.3
SS-3	Y_1498	14+98	58' RT	-Y-	0.0-1.5	15.5	A-4(0)	5	21	15	6	96	89	54	49.6	15.9	33.7	14.1	36.3
SS-4	Y_1498	14+98	58' RT	-Y-	3.5-5.0	-	A-6(4)	12	36	24	12	98	88	53	50.5	19.5	31.0	21.8	27.7
SS-5	Y_2095	20+95	70' RT	-Y-	0.0-1.5	-	A-7-6(36)	12	69	31	38	99	96	83	18.3	6.5	11.8	16.6	65.1
SS-6	Y_5231	52+31	57' LT	-Y-	0.0-1.5	-	A-6(6)	9	34	17	17	86	74	53	43.5	20.6	22.9	32.5	24.0
SS-7	Y1_1383	13+83	2' LT	-Y1-	0.9-2.4	18.8	A-6(3)	9	32	18	14	79	67	44	49.4	23.8	25.6	26.4	24.2
SS-8	Y1_1998	19+98	14' RT	-Y1-	0.0-1.5	-	A-7-5(32)	5	67	39	28	100	99	89	12.4	3.5	8.9	22.9	64.7
SS-9	Y2_1203	12+03	2' LT	-Y2-	1.0-2.5	23.9	A-7-6(25)	9	58	27	31	100	96	76	27.3	9.4	17.9	13.7	59.0
SS-10	Y2_1551	15+51	1' LT	-Y2-	1.0-2.5	-	A-7-6(29)	11	67	34	33	100	95	79	22.8	10.4	12.4	18.4	58.8
SS-11	Y3_1098	10+98	3' LT	-Y3-	0.8-2.3	-	A-7-5(9)	13	43	22	21	94	86	57	44.0	17.3	26.7	17.7	38.3
SS-12	Y3_1388	13+88	20' RT	-Y3-	3.5-5.0	-	A-7-5(28)	5	61	39	22	100	100	94	8.8	0.8	8.0	42.2	49.0
SS-13	YRPA_2000	20+00	80' RT	-YRPA-	3.5-5.0	-	A-7-5(20)	19	63	52	11	100	99	96	6.0	1.1	4.9	38.4	55.6
SS-14	YRPA_2200	22+00	70' RT	-YRPA-	3.5-5.0	-	A-7-5(9)	24	41	22	19	99	91	58	45.1	16.4	28.7	14.1	40.8
SS-15	YRPA_2400	24+00	50' RT	-YRPA-	3.5-5.0	24.8	A-7-5(18)	21	61	46	15	100	92	82	19.8	11.0	8.8	28.6	51.6
SS-16	YRPA_2700	27+00	65' RT	-YRPA-	0.0-1.5	-	A-6(11)	7	40	22	18	99	94	67	34.8	11.8	23.0	22.6	42.6
SS-17	YRPA_2895	28+95	13' LT	-YRPA-	0.0-1.5	-	A-7-5(10)	8	45	27	18	88	79	62	31.9	16.3	15.6	36.8	31.3
SS-18	YLPA_1799	17+99	CL	-YLPA-	0.0-1.5	20.1	A-6(6)	8	40	24	16	78	68	52	36.3	18.8	17.5	35.1	28.6
SS-19	YRPC_1921	19+21	11' RT	-YRPC-	0.0-1.5	26.2	A-6(6)	6	39	28	11	81	77	64	25.3	8.3	17.0	41.2	33.5

SS = Split-Barrel Sample (ASTM-D-1586) ST = Shelby Tube (Undisturbed) Sample

S = Grab Sample

NP -- Non Plastic

NA-- Non Applicable

Lab Technician: NCDOT Certification No.: 111-06-1203

Rhonda K. Hudson

Rhonda Hudson