

REFERENCE: R-5600

PROJECT: 34839

SEE SHEET 3 FOR PLAN SHEET LAYOUT
AT TIME OF INVESTIGATION

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-Y1-	11+00 - 14+54	15	24
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-Y3-	10+34 - 12+95	5	24
-Y4-	10+30 - 14+21	5	24
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CROSS SECTIONS

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-L-	63+50 - 68+00	50 - 52
-L-	70+00	52
-L-	76+00 - 79+50	53 - 55
-L-	88+50 - 109+00	56 - 76
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-L-	116+00 - 120+00	77 - 78
-L-	122+50 - 130+50	78 - 86
-L-	133+50 - 136+50	86 - 88
-L-	141+50	88
-L-	145+50	88
-L-	148+00	89
-L-	149+50	89
-Y-	15+00 - 21+00	90 - 96
-Y-	24+50	97
-Y-	27+00 - 28+50	97 - 98
-Y4-	12+00 - 13+00	99
-Y5B-	11+00 - 13+00	100
-Y6-	12+50 - 15+00	101 - 102
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-Y15-	13+50 - 15+00	106
-Y23-	10+75 - 11+25	107

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
ROADWAY
SUBSURFACE INVESTIGATION

COUNTY JACKSON
PROJECT DESCRIPTION NC 107 IMPROVEMENTS FROM
WEST US 23 BUSINESS TO SOUTH OF NC 116 AND
US 23 BUSINESS FROM SKYLAND DRIVE TO
WEST OF MUNICIPAL DRIVE

INVENTORY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5600	1	114

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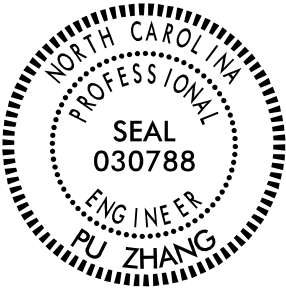
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PERSONNEL
B. CAYTON
C. TAYLOR
P. GRAINGER
M. MORGAN
F. WOODARD

INVESTIGATED BY	HDR INC
DRAWN BY	P. ZHANG
CHECKED BY	K. BUSSEY
SUBMITTED BY	P. ZHANG
DATE	MAY, 2019

NC Engineering F-1253 NC Geology C-247



Paul Zhang 4/18/2024
SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

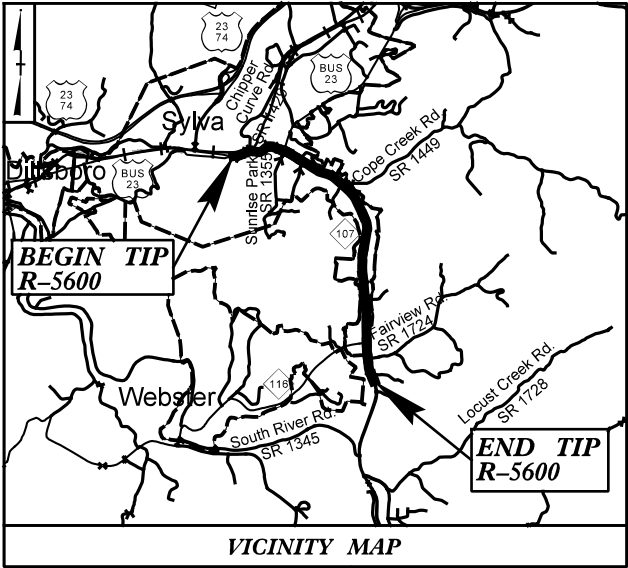
DATE: 8-15-14

09/08/2021

PLOT DRIVER: \$PLTDRVS\$
USER: \$USER\$
FILE: \$PWVARVAULTPATHDESC\$
DATE: \$DATE\$
PENTABLE: \$PENTBL\$
TIME: \$TIME\$

CONTRACT:

TIP PROJECT: R-5600



VICINITY MAP

25% REVIEW PLANS

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

JACKSON COUNTY

LOCATION: SYLVA - N.C. 107 FROM WEST OF U.S. 23 BUSINESS (ASHEVILLE HIGHWAY) TO SOUTH OF N.C. 116 (WEBSTER ROAD) AND U.S. 23 BUS. FROM SKYLAND DRIVE TO WEST OF MUNICIPAL DRIVE

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

END TIP PROJECT R-5600

-Y- STA. 28 + 50.00

END TIP PROJECT R-5600

-L- STA. 149 + 57.42

BEGIN TIP PROJECT R-5600

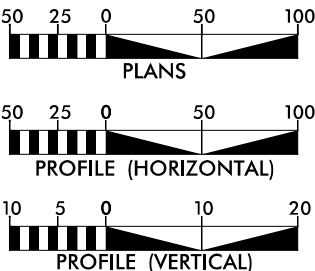
-L- STA. 11 + 20.00

NOTES:
A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF SYLVA.
CLEARING ON THIS PROJECT SHOULD BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD ____
DESIGN SPEED = 30 MPH FROM -L- STA. 12+00.00 TO 29+50.00
DESIGN SPEED = 40 MPH FROM -L- STA. 29+50.00 TO 123+00.00
DESIGN SPEED = 50 MPH FROM -L- STA. 123+00.00 TO 149+58.00

★ PROPOSED TRAFFIC SIGNAL
☆ UPGRADED TRAFFIC SIGNAL

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

GRAPHIC SCALES



DESIGN DATA

ADT 2020 = 34,300
ADT 2040 = 40,800
K = 9 %
D = 55 %
T = 5 % *
V = 30 MPH TO 50 MPH
* TTST = 4% DUAL = 3%
FUNC CLASS = ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-5600 = 2.586 MILES
LENGTH STRUCTURES TIP PROJECT R-5600 = 0.035 MILES
TOTAL LENGTH TIP PROJECT R-5600 = 2.621 MILES



Prepared In the Office of:
HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JANUARY 6, 2020

LETTING DATE:
DECEMBER 21, 2021

PHILLIP E. ROGERS, PE
PROJECT ENGINEER

ALEXANDER D. SNIDER, PE
PROJECT DESIGN ENGINEER

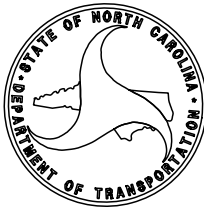
JONATHAN WOODARD, PE
NCDOT CONTACT

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN
ENGINEER

SIGNATURE: P.E.



May 8, 2019

WBS Number:

34839.1.8

TIP Number:

R-5600

COUNTY:

Jackson

DESCRIPTION:

NC 107 Improvements from West US 23 Business to South of NC 116 and US 23 Business from Skyland Drive to West of Municipal Drive

SUBJECT:

Geotechnical Inventory Report

Project Description

The project area lies on the east side of the town of Sylva, NC between Highway 74 and NC 116. This project consists of upgrading N.C. 107 to a four-lane, median divided facility from West US 23 Business to South of NC 116 and US 23 Business from Skyland Drive to West of Municipal Drive for approximately 2.5 miles. Additionally, a two-span bridge over Scott’s Creek, four culverts, and twenty-five retaining walls are included with this project.

The geotechnical field investigation was conducted from August, 2018 to January, 2019. Two drill rigs mounted on a rubber tracked all-terrain carrier and equipped with an automatic hammer (CME 55 and CME 45C) were used to advance borings for the subsurface exploration. Hollow stem auger drilling procedures were used to advance borings to the required depths. Standard Penetration Tests were performed at approximately 2.5-foot to 5.0-foot intervals to termination in selected borings. Representative soil samples were collected for visual classification in the field and selected samples were submitted for laboratory analysis.

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

Line	Stations (±)
-L-	11+25 – 145+00
-Y-	10+38 – 28+50
-YS-	10+00 – 11+67
-Y1-	11+00 – 14+54
-Y2-	10+33 – 13+25
-Y3-	10+34 – 12+95
-Y4-	10+30 – 14+21
-Y5A-	10+11 – 12+50
-Y5B-	10+00 – 13+12
-Y6-	12+00 – 15+04
-Y7-	10+60 – 13+25
-Y8-	10+38 – 11+10
-Y9-	11+00 – 15+82
-Y10-	10+38 – 13+70
-Y11-	10+12 – 11+05
-Y12-	10+75 – 11+80
-Y13-	10+38 – 11+08
-Y14-	10+70 – 13+15
-Y15-	10+10 – 14+68
-Y16-	10+40 – 12+32
-Y17-	10+09 – 10+73
-Y18-	10+25 – 11+87

-Y19-	10+38 – 11+15
-Y20-	10+38 – 11+50
-Y21-	11+60 – 12+71
-Y22-	10+38 – 12+10
-Y23-	10+38 – 11+40
-Y24-	10+33 – 12+20
-DR1-	11+30 – 12+22
-DR2-	10+50 – 12+30
-DRWY1-	10+48 – 11+90
-DRWY2-	10+50 – 11+25
-DRWY3-	10+50 – 13+65
-DRWY4-	10+20 – 12+76

Areas of Special Geotechnical Interest

- 1)
- Loose/Soft Soils: The following sections contain very soft or very loose, compressible soils (N-value < 4) which have the potential to cause embankment/subgrade and/or slope stability problems during construction.

Line	Stations (±)	Offsets (ft.)
-L-	25+75 – 26+76	LT & RT
-L-	27+67 – 29+50	LT & RT
-L-	34+25 – 35+25	RT
-L-	40+75 – 41+75	RT
-L-	66+50 – 67+25	LT
-L-	69+75 – 70+40	LT
-L-	79+25 – 82+25	RT
-L-	87+25 – 88+75	RT
-L-	90+75 – 91+25	RT
-L-	92+25 – 94+25	LT
-L-	106+25 – 107+75	LT & RT
-L-	112+25 – 119+75	LT & RT
-L-	122+75 – 125+75	LT
-L-	133+75 – 136+25	LT
-L-	140+75 – 142+25	LT
-Y-	16+25 – 16+75	LT & RT
-Y4-	11+75 – 13+25	LT & RT
-Y6-	12+75 – 13+75	LT & RT
-Y15-	13+75 – 14+68	RT

- 2)
- Highly Plastic Soils: The following sections contain highly plastic soils which have the potential to cause embankment/subgrade and/or slope stability problems during construction.

Line	Stations (±)	Offsets (ft.)
-L-	39+25 – 41+25	LT & RT
-L-	102+75 – 103+75	LT

	-L-	112+25 – 113+75	RT
	-L-	129+75 – 130+25	LT

3) Organic Soils: The following areas on the project contained organic matter and wood debris.

<u>Line</u>	<u>Station (±)</u>	<u>Offset (ft)</u>
-L-	135+70	69 LT
-L-	137+40	95 LT
-Y4-	12+45	20 LT – 20 RT

4) Artificial Fill: Artificial fill was encountered at the following locations.

<u>Line</u>	<u>Station (±)</u>	<u>Offset (ft)</u>
-L-	29+50 – 33+00	60 RT
-L-	46+50 – 51+00	50 LT
-L-	88+50 – 102+50	110 LT – 100 RT
-L-	106+00 – 112+00	50 LT – 50 RT
-L-	123+00 – 135+00	120 LT – 50 RT

Several smaller areas of artificial fill are present throughout the project corridor and are related to business developments, gravel and soil driveways, as well as previous construction of utility lines.

5) Crystalline Rock: Crystalline rock was encountered within 6 feet of proposed grade at the following locations:

<u>Line</u>	<u>Station (±)</u>	<u>Offset (ft)</u>
-L-	49+75 – 50+25	LT
-L-	76+50 – 79+50	LT & RT

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

<u>Line</u>	<u>Station (±)</u>
-L-	72+75 – 74+75
-L-	78+00 – 81+50
-L-	84+50 – 95+50
-L-	97+25 – 97+75
-L-	114+75 – 115+75
-L-	125+75 – 130+25
-Y-	18+25 – 19+25

7) Ponds: Two ponds occur on or within close proximity of right of way on this project. These were noted at the following locations:

<u>Line</u>	<u>Station (±)</u>	<u>Offset (ft)</u>
-L-	98+33 – 99+51	950 LT – 1050 LT
-L-	130+61 – 131+44	577 RT – 807 RT

8) Water Wells: Several water wells were found within or in close proximity to the proposed right of way at the following locations:

<u>Line</u>	<u>Station (±)</u>	<u>Offset (ft)</u>
-L-	66+44	420 LT
-L-	84+62	85 RT
-L-	119+63	86 LT
-Y12-	12+26	23 LT
-DRWY4-	11+51	75 RT

Physiography and Geology

The project is located in the Blue Ridge Physiographic Province. Land use along the project corridor consists of residential, agricultural, commercial businesses and woods. Geologically, the project is located within the Blue Ridge Belt. Bedrock generally consists of rocks from the Coweeta Group (**ZYbn**), consisting of migmatitic Biotite Gneiss interlayered and gradational with biotite-garnet gneiss and amphibolite, with intrusive metamorphosed gabbro and diorite. Scott Creek and its tributaries and a few ditches drain the project towards west and northwest in general.

Soil Properties

Soils encountered at the project site include roadway embankment, artificial fill, alluvial, residual, weathered metamorphic rock and crystalline metamorphic rock.

Roadway Embankment soils were mainly encountered near the intersection of NC 107 SR 1724 (Fairview Road), along the entrance ramp at a local storage unit off SR 1350 (Barnes Street), and associated with existing culverts, consisting of red and brown, soft to medium stiff sandy silt and clay (A-5, A-7-5).

Artificial fill soils were encountered primarily along business developments, gravel and soil driveways, pipes and culverts, and utility easements throughout the site. These soils consist of red, orange, and brown, very soft to very stiff, sandy silt and clay (A-4, A-5, A-6, A-7), and very loose to medium dense, silty and clayey sand and gravel (A-2-4, A-2-6, A-1). The artificial fill is underlain by alluvial or residual soils.

Alluvial deposits are located within the floodplains of Scott Creek, ditches and wetland areas that traverse the project. These soils are primarily brown, red, and gray, very soft to stiff, silt and clay with gravel (A-4, A-5, A-6, A-7), and very loose to medium dense, silty sand and gravel (A-2-4, A-1-b).

Residual soils were encountered throughout the project. These soils consist primarily of red, tan, and brown, very soft to hard silt and clay (A-4, A-5, A-6, A-7), and loose to very dense, silty and clayey sand (A-2-4, A-2-5, A-2-6, A-2-7).

Rock Properties

Weathered rock was encountered during the roadway investigation at elevations ranging from approximately 2181 to 1980 feet. It originates from the underlying metamorphic rock.

Crystalline rock was encountered during the roadway investigation at elevations ranging from approximately 2133 to 1977 feet, and consists of biotite Gneiss, granitic garnet Gneiss, and Schist. Refer to the “Areas of Special Geotechnical Interest” for areas of rock encountered within 6 feet of proposed grade.

Ground Water

Groundwater was encountered in multiple borings and ranges in elevation from approximately 2033 to 2203 feet. Groundwater may fluctuate with seasonal precipitation.

Culvert

Station 64+35 -L-

The proposed structure is an extension of the existing 3 @ 6' x 6' reinforced concrete box culvert (RCBC). Overall length is 200 feet. The proposed culvert has inlet elevation of 2078 feet and outlet of 2076 feet. Natural ground elevations range from 2076± feet at the stream bottom to 2087± feet along the adjacent floodplain. Approximately 9± feet of artificial fill soils consisting of loose to very loose silty sand (A-2-4) was encountered near the ground surface. Alluvial deposits exists at the ground surface or below the artificial fill (where encountered) and extend to depths ranging from 9± to 14± feet below existing grade, consisting of very loose silty sand (A-2-4) and very soft to stiff silt and clay (A-5, A-7-6). Residual soils were encountered near the ground surface or below the alluvial deposits (where encountered) and consist of very soft to stiff silt and clay (A-4, A-7-6) and medium dense silty sand (A-2-4). During this investigation, groundwater was measured at elevation 2080± feet.

Station 135+50 -L-

The proposed structure is an extension of the existing 8' x 8' RCBC. Overall length is 170 feet. The proposed culvert has inlet elevation of 2107 feet and outlet of 2106 feet. Natural ground elevations range from 2106± feet at the stream bottom to 2124± feet along the adjacent floodplain. Alluvial deposits were encountered at the ground surface and extended to depths ranging from 8± to 13± feet below existing grade, consisting of very soft to medium stiff silt and clay (A-4, A-5, A-7-6) and very loose to medium dense silty and clayey sand (A-2-4, A-2-6). Residual soils were encountered below the alluvial deposits and consist of very loose silty sand (A-2-4) and soft to medium stiff silt (A-4, A-5). During this investigation, groundwater was measured at elevation 2108± feet.

Station 12+95 -Y6-

The proposed structure is a 3@ 7' x 7' RCBC. Overall length is 54 feet. The proposed culvert has inlet elevation of 2052 feet and outlet of 2051 feet. Natural ground elevations range from 2052± feet at the stream bottom to 2075± feet along the adjacent floodplain. Residual soils were encountered near the ground surface and consist of very loose silty sand (A-2-4) and very soft to stiff silt and clay (A-4, A-5, A-6, A-7-6). During this investigation, groundwater was measured at elevation 2053± feet.

Station 12+27 -Y4-

The proposed structure is a 3@ 7' x 7' RCBC. Overall length is 45 feet. The proposed culvert has inlet elevation of 2046 feet and outlet of 2045 feet. Natural ground elevations range from 2044± feet at the stream bottom to 2052± feet along the adjacent floodplain. Alluvial deposits were encountered at the ground surface and extended to the boring termination depth of 16± feet below existing grade, consisting of very soft silty clay with wood pieces (A-7-6) and very loose to loose clayey sand (A-2-7). Residual soils were encountered near ground surface (where alluvium was not encountered) and consist of soft to stiff silt and clay (A-5, A-7-6). During this investigation, groundwater was measured at elevation 2048± feet.

Retaining Wall

Wall No. 1, Station 30+25 to 32+30 -L-, 46 ft RT

The maximum wall height of the proposed structure is approximately 3 feet. Overall length is 204 feet. Natural ground elevations range from 2049± to 2053± feet along the proposed wall envelope. Approximately 4 to 8 feet of artificial fill soils consisting of loose to medium dense silty sand and sand with gravel (A-2-4, A-1-a, A-1-b) and medium stiff to very stiff clay (A-6, A-7-6) were encountered near the ground surface. Residual soils were encountered below the artificial fills and consist of soft to very stiff silt and clay (A-4, A-6, A-7-6) and loose silty sand (A-2-4). During this investigation, groundwater was measured at elevation 2041± to 2046± feet.

Wall No. 2, Station 34+50 to 35+40 -L-, 86 to 51 ft RT

The maximum wall height of the proposed structure is approximately 3 feet. Overall length is 94 feet. Natural ground elevations range from 2056± to 2059± feet along the proposed wall envelope. Residual soils were encountered near the ground surface and consist of very soft to medium stiff silt and clay (A-4, A-5, A-6, A-7-6) and very loose to medium dense silty and clayey sand (A-2-4, A-2-6). During this investigation, groundwater was measured at elevation 2047± feet.

Wall No. 3, Station 14+20 to 43+35 -Y6-, 25 to 51 ft RT

The maximum wall height of the proposed structure is approximately 5 feet. Overall length is 127 feet. Natural ground elevations range from 2068± to 2078± feet along the proposed wall envelope. Residual soils were encountered near the ground surface and consist of soft to medium stiff silt and clay (A-4, A-5, A-7-6). During this investigation, groundwater was not encountered.

Wall No. 4, Station 47+00 to 48+77 -L-, 48 ft LT

The maximum wall height of the proposed structure is approximately 15 feet. Overall length is 178 feet. Natural ground elevations range from 2079± to 2095± feet along the proposed wall envelope. Approximately 4 to 20 feet of artificial fill soils consisting of very soft to medium stiff silt and clay (A-4, A-5, A-6) were encountered near the ground surface. Residual soils were encountered below the artificial fills and consist of medium stiff to hard silt (A-4, A-5) and very dense silty sand with rock fragments (A-2-4). During this investigation, groundwater was measured at elevation 2060± to 2069± feet.

Wall No. 5, Station 49+05 to 50+40 -L-, 48 ft LT

The maximum wall height of the proposed structure is approximately 4 feet. Overall length is 127 feet. Natural ground elevation is 2083± feet along the proposed wall envelope. Approximately 4 to 5 feet of artificial fill soils consisting of medium dense silty sand (A-2-4) and stiff clay (A-6) were encountered near the ground surface. Residual soils were encountered near the ground surface or below the artificial fills (where encountered) and consist of medium stiff to stiff silt (A-4) and medium dense to very dense silty sand with rock fragments (A-2-4). Weathered metamorphic rock was encountered under residual soils underlain by crystalline metamorphic rock at some locations. During this investigation, groundwater was not encountered.

Wall No. 6, Station 55+25 to 56+29 -L-, 50 ft LT

The maximum wall height of the proposed structure is approximately 3 feet. Overall length is 111 feet. Natural ground elevations range from 2081± to 2083± feet along the proposed wall envelope. Residual soils were encountered near the ground surface and consist of medium stiff to very stiff silt and clay (A-5, A-6, A-7-6) and medium dense silty sand (A-2-4). During this investigation, groundwater was not encountered.

Wall No. 7, Station 59+85 to 61+29 -L-, 48 ft LT

The maximum wall height of the proposed structure is approximately 5 feet. Overall length is 144 feet. Natural ground elevation is 2084± feet along the proposed wall envelope. Residual soils were encountered near the ground surface and consist of medium stiff to very stiff silt (A-4, A-5) and medium dense to very dense silty sand (A-2-4) with rock fragments. During this investigation, groundwater was measured at elevation 2079± feet.

Wall No. 8, Station 65+40 to 67+84 -L-, 48 ft LT

The maximum wall height of the proposed structure is approximately 4 feet. Overall length is 252 feet. Natural ground elevations range from 2088± to 2092± feet along the proposed wall envelope. Residual soils were encountered near the ground surface and consist of very soft to very stiff silt and clay (A-4, A-5, A-6, A-7-6). During this investigation, groundwater was measured at elevation 2081± to 2086± feet.

Wall No. 9, Station 10+50 to 12+00 -Y12-, 16 ft LT

The maximum wall height of the proposed structure is approximately 9 feet. Overall length is 148 feet. Natural ground elevations range from 2135± to 2140± feet along the proposed wall envelope. Residual soils were encountered near the ground surface and consist of soft to very stiff silt and clay (A-4, A-5, A-7-6) and loose to medium dense silty sand (A-2-4) with rock fragments. Weathered metamorphic rock was encountered under residual soils underlain by crystalline metamorphic rock at some locations. During this investigation, groundwater was measured at elevation 2117± to 2123± feet.

Wall No. 10, Station 10+99 to 11-81 -Y12-, 23 to 32 ft RT

The maximum wall height of the proposed structure is approximately 21 feet. Overall length is 137 feet. Natural ground elevations range from 2110± to 2130± feet along the proposed wall envelope. Residual soils were encountered near the ground surface and consist of soft to hard silt (A-4, A-5) and loose silty sand (A-2-4). Crystalline metamorphic rock was encountered under residual soils at some locations. During this investigation, groundwater was measured at elevation 2108± to 2115± feet.

Wall No. 11, Station 88+65 to 92+10 -L-, 69 to 51 ft RT

The maximum wall height of the proposed structure is approximately 29 feet. Overall length is 367 feet. Natural ground elevations range from 2164± to 2189± feet along the proposed wall envelope. Approximately 7 to 14 feet of artificial fill soils consisting of soft to stiff silt and clay (A-5, A-7-5, A-7-6) were encountered near the ground surface. Residual soils were encountered near the ground surface or below the artificial fills (where encountered) and consist of very soft to hard silt and clay (A-4, A-5, A-6) and very loose to dense silty and clayey sand with rock fragments (A-2-4, A-2-6). Weathered metamorphic rock was encountered under residual soils underlain by crystalline metamorphic rock at some locations. During this investigation, groundwater was measured at elevation 2154± to 2160± feet.

Wall No. 12, Station 91+95 to 98+83 -L-, 50 to 230 ft LT

The maximum wall height of the proposed structure is approximately 18 feet. Overall length is 845 feet. Natural ground elevations range from 2176± to 2217± feet along the proposed wall envelope. Approximately 7 to 9 feet of artificial fill soils consisting of medium stiff to stiff silt and clay (A-5, A-6, A-7-6) were encountered near the ground surface. Residual soils were encountered near the ground surface or below the artificial fills (where encountered) and consist of soft to hard silt and clay (A-4, A-5, A-6, A-7-6) and very loose to loose silty and clayey sand with rock fragments (A-2-4, A-2-6). During this investigation, groundwater was measured at elevation 2159± to 2180± feet.

Wall No. 13, Station 12+50 to 13+25 -DRWY3-, 16 to 7 ft LT

The maximum wall height of the proposed structure is approximately 5 feet. Overall length is 74 feet. Natural ground elevation is 2195± feet along the proposed wall envelope. Approximately 7 to 12 feet of artificial fill soils consisting of soft to stiff silt and clay (A-5, A-6, A-7-6) were encountered near the ground surface. Residual soils were encountered below the artificial fills and consist of medium stiff to stiff silt and clay (A-4, A-5, A-7-6). During this investigation, groundwater was not encountered.

Wall No. 14, Station 95+75 to 96+85 -L-, 62 ft RT

The maximum wall height of the proposed structure is approximately 29 feet. Overall length is 115 feet. Natural ground elevation is 2189± feet along the proposed wall envelope. Approximately 3 to 7 feet of artificial fill soils consisting of soft to stiff silt and clay (A-5, A-6, A-7-6) were encountered near the ground surface. Residual soils were encountered below the artificial fills and consist of medium stiff to very stiff silt and clay (A-5, A-7-6). During this investigation, groundwater was not encountered.

Wall No. 15, Station 99+61 to 103+60 -L-, 175 to 59 ft LT

The maximum wall height of the proposed structure is approximately 24 feet. Overall length is 481 feet. Natural ground elevations range from 2176± to 2208± feet along the proposed wall envelope. Approximately 12 to 22 feet of artificial fill soils consisting of soft to stiff silt and clay (A-4, A-5, A-7-6) were encountered near the ground surface. Residual soils were encountered below the artificial fills (where encountered) and consist of medium stiff to hard silt and clay (A-4, A-5, A-7-6) and loose to very dense silty sand with rock fragments (A-2-4). Weathered metamorphic rock seams were encountered underneath residual soils at some locations. During this investigation, groundwater was measured at elevation 2149± to 2159± feet.

Wall No. 16, Station 103+03 to 104+90 -L-, 64 to 51 ft RT

The maximum wall height of the proposed structure is approximately 6 feet. Overall length is 201 feet. Natural ground elevations range from 2163± to 2174± feet along the proposed wall envelope. Residual soils were encountered near the ground surface and consist of medium stiff to stiff silt and clay (A-4, A-7-6). During this investigation, groundwater was not encountered.

Wall No. 17, Station 106+75 to 107+60 -L-, 48 ft LT

The maximum wall height of the proposed structure is approximately 3 feet. Overall length is 85 feet. Natural ground elevations range from 2144± to 2146± feet along the proposed wall envelope. Approximately 4 to 8 feet of artificial fill soils consisting of soft silt and clay (A-4, A-6, A-7-6) were encountered near the ground surface. Residual soils were encountered below the artificial fills and consist of soft clay (A-6, A-7-6) and very loose to loose silty sand (A-2-4). During this investigation, groundwater was not encountered.

Wall No. 18, Station 108+30 to 109+10 -L-, 48 ft LT

The maximum wall height of the proposed structure is approximately 3 feet. Overall length is 80 feet. Natural ground elevation is 2142± feet along the proposed wall envelope. Approximately 6 to 8 feet of artificial fill soils consisting of medium stiff to stiff silt and clay (A-4, A-6, A-7-6) were encountered near the ground surface. Residual soils were encountered below the artificial fills and consist of very soft to stiff silt and clay (A-5, A-6, A-7-6). During this investigation, groundwater was measured at elevation 2133± feet.

Wall No. 19, Station 115+68 to 116+15 -L-, 46 to 47 ft RT

The maximum wall height of the proposed structure is approximately 3 feet. Overall length is 47 feet. Natural ground elevation is 2131± feet along the proposed wall envelope. Residual soils were encountered near the ground surface and consist of soft to medium stiff clay (A-7-6) and loose silty sand (A-2-4). During this investigation, groundwater was not encountered.

Wall No. 20, Station 123+50 to 130+78 -L-, 50 to 57 ft LT

The maximum wall height of the proposed structure is approximately 13 feet. Overall length is 731 feet. Natural ground elevations range from 2121± to 2133± feet along the proposed wall envelope. Approximately 4 to 10 feet of artificial fill soils consisting of soft to stiff silt and clay (A-4, A-5, A-6, A-7-6) were encountered near the ground surface. Residual soils were encountered below the artificial fills (where encountered) and consist of very soft to stiff silt (A-4, A-5) and very loose to very dense silty sand (A-2-4) with rock fragments. During this investigation, groundwater was measured at elevation 2104± to 2124± feet.

Wall No. 21, Station 133+50 to 134+75 -L-, 48 ft RT

The maximum wall height of the proposed structure is approximately 6 feet. Overall length is 127 feet. Natural ground elevations range from 2115± to 2117± feet along the proposed wall envelope. Approximately 4 to 8 feet of artificial fill soils consisting of loose clayey sand (A-2-6) and soft to medium stiff clay (A-6, A-7-6) were encountered near the ground surface. Residual soils were encountered near the ground surface or below the artificial fills (where encountered) and consist of soft to medium stiff silt and clay (A-4, A-7-6). During this investigation, groundwater was measured at elevation 2107± to 2111± feet.

Wall No. 22, Station 14+84 to 18+20 -Y-, 45 ft RT

The maximum wall height of the proposed structure is approximately 23 feet. Overall length is 334 feet. Natural ground elevations range from 2076± to 2101± feet along the proposed wall envelope. Approximately 4 feet of artificial fill soils consisting of medium stiff silt (A-5) were encountered near the ground surface at the beginning of the proposed wall. Residual soils were encountered near the ground surface or below the artificial fills (where encountered) and consist of medium stiff to hard silt (A-4, A-5) and medium dense silty sand (A-2-4). Weathered metamorphic rock was encountered under residual soils underlain by crystalline metamorphic rock. During this investigation, groundwater was measured at elevation 2046± to 2064± feet.

Wall No. 23, Station 12+00 to 21+00 -Y3-, 17 ft LT to 48 ft RT

The maximum wall height of the proposed structure is approximately 38 feet. Overall length is 361 feet. Natural ground elevations range from 2092± to 2127± feet along the proposed wall envelope. Residual soils were encountered near the ground surface and consist of medium stiff to hard silt and clay (A-4, A-5, A-7-6) and medium dense to very dense sand and silty sand with rock fragments (A-1-b, A-2-4). Weathered metamorphic rock was encountered under residual soils underlain by crystalline metamorphic rock. During this investigation, groundwater was measured at elevation 2083± to 2108± feet.

Wall No. 24, Station 26+85 to 28+50 -Y-, 40 to 34 ft LT

The maximum wall height of the proposed structure is approximately 8 feet. Overall length is 164 feet. Natural ground elevations range from 2133± to 2144± feet along the proposed wall envelope. Residual soils were encountered near the ground surface and consist of medium stiff to hard silt (A-4). Weathered metamorphic rock was encountered under residual soils or near ground surface at some locations. During this investigation, groundwater was not encountered.

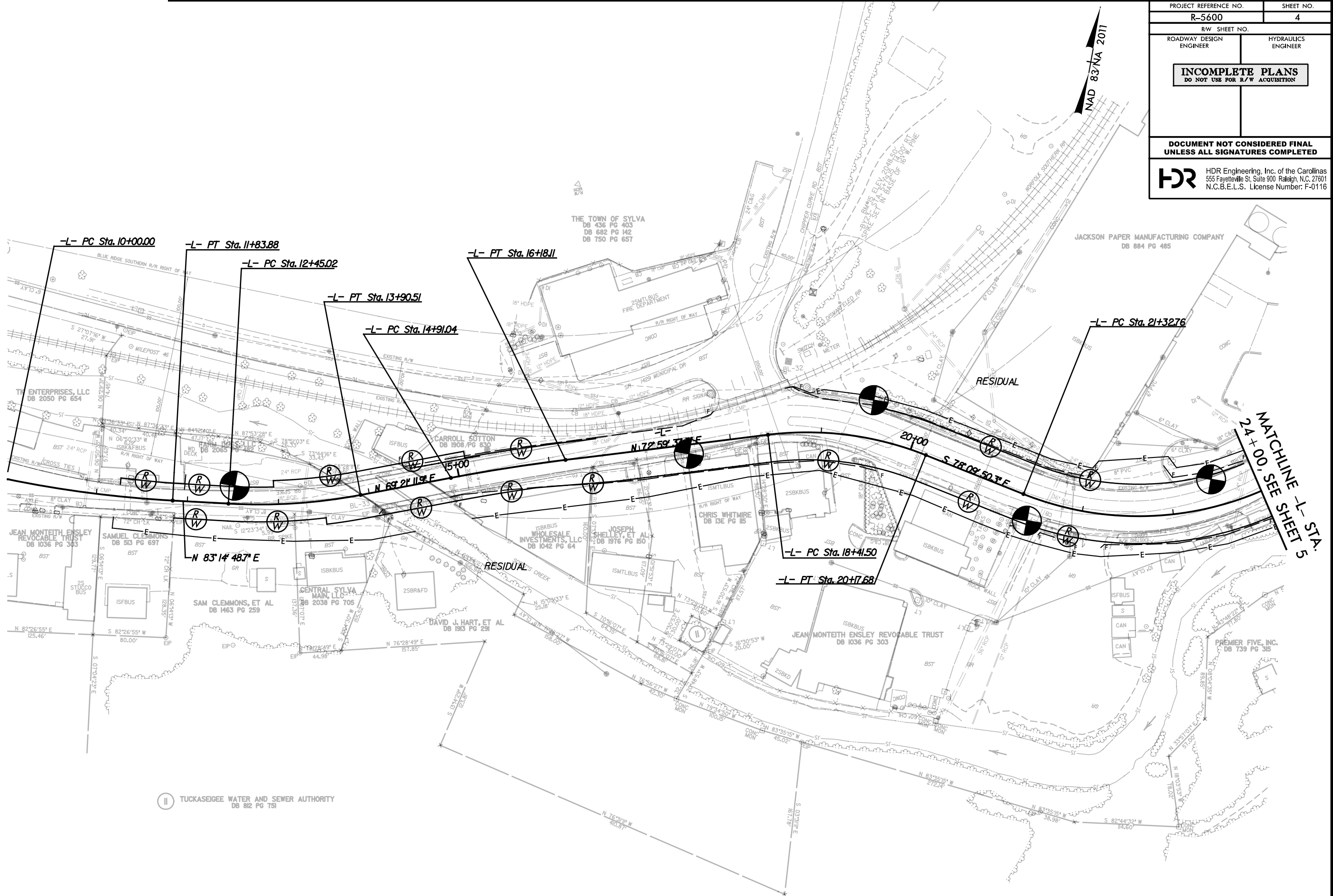
Wall No. 25, Station 12+10 to 13+35 -Y-, 19 ft LT

The maximum wall height of the proposed structure is approximately 7 feet. Overall length is 115 feet. Natural ground elevations range from 2156± to 2161± feet along the proposed wall envelope. Approximately 5 feet of roadway embankment soils consisting of medium stiff silty clay (A-7-5) were encountered near the ground surface. Residual soils were encountered below the roadway embankment and consist of very stiff to stiff silt (A-4). During this investigation, groundwater was not encountered.

Prepared By,
HDR Engineering, Inc., of the Carolinas

Pu Zhang, P.E.
Senior Geotechnical Project Manager

PROJECT REFERENCE NO.		SHEET NO.	
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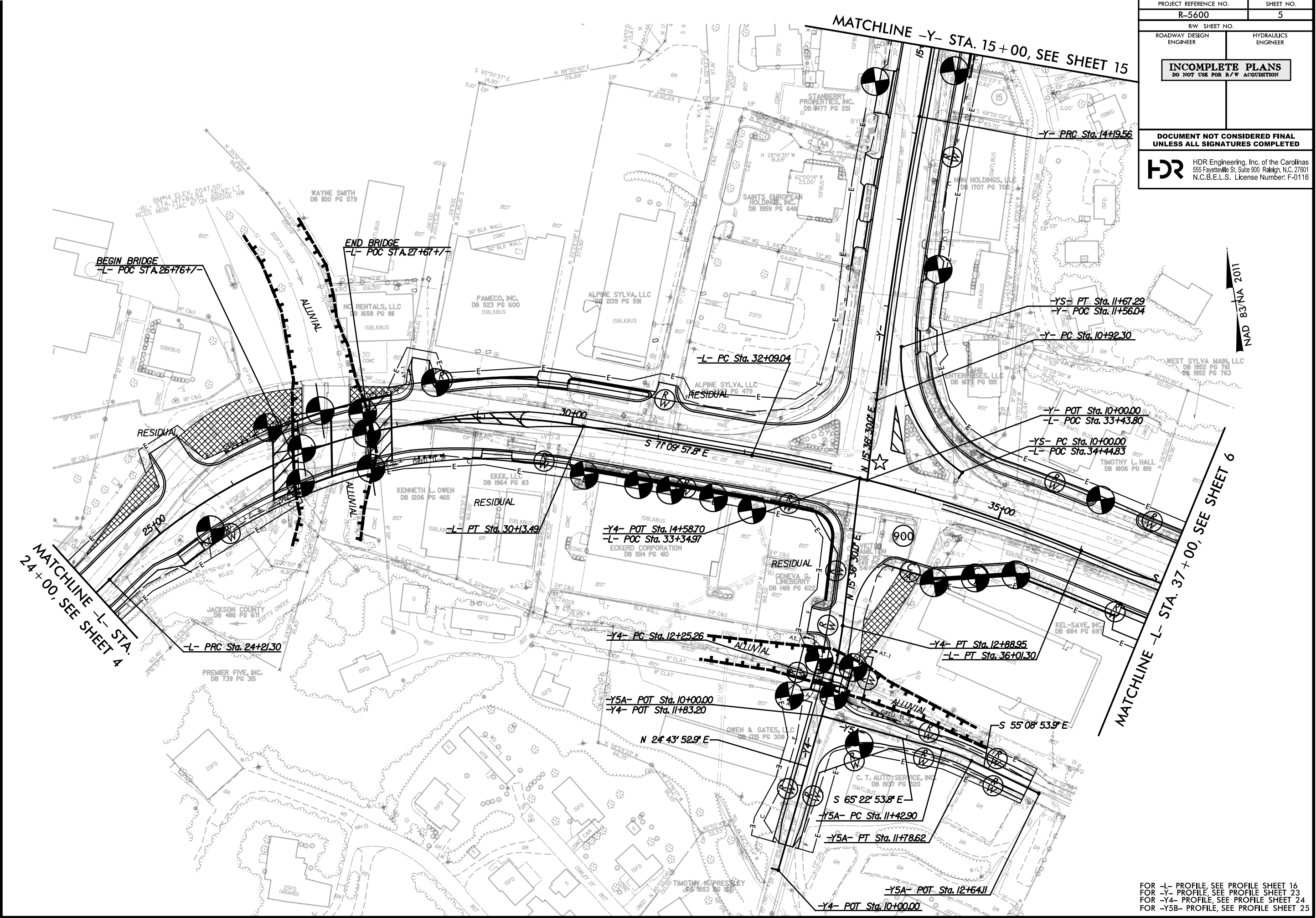


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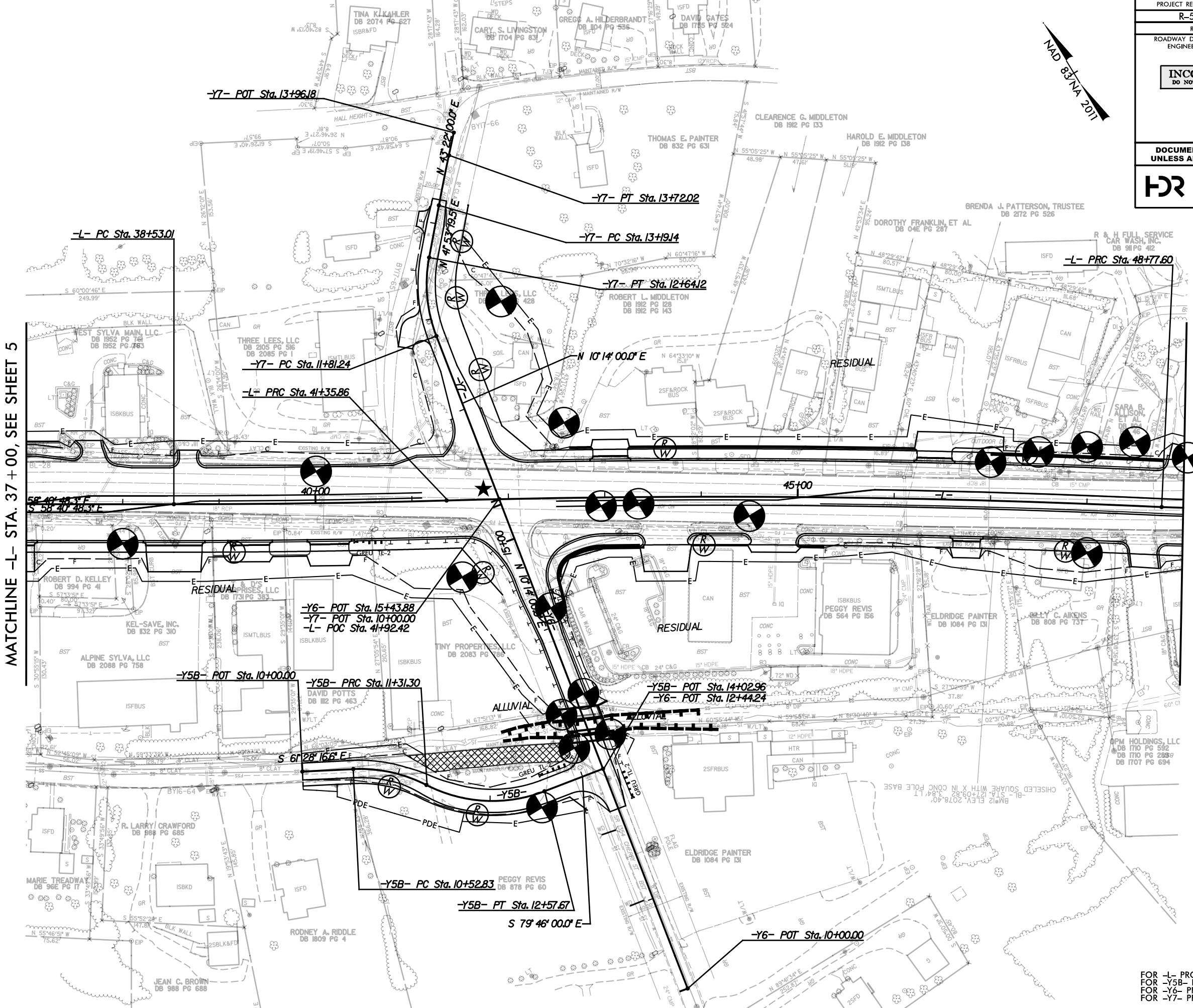
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FOR -Y4- PROFILE, SEE PROFILE SHEET 24
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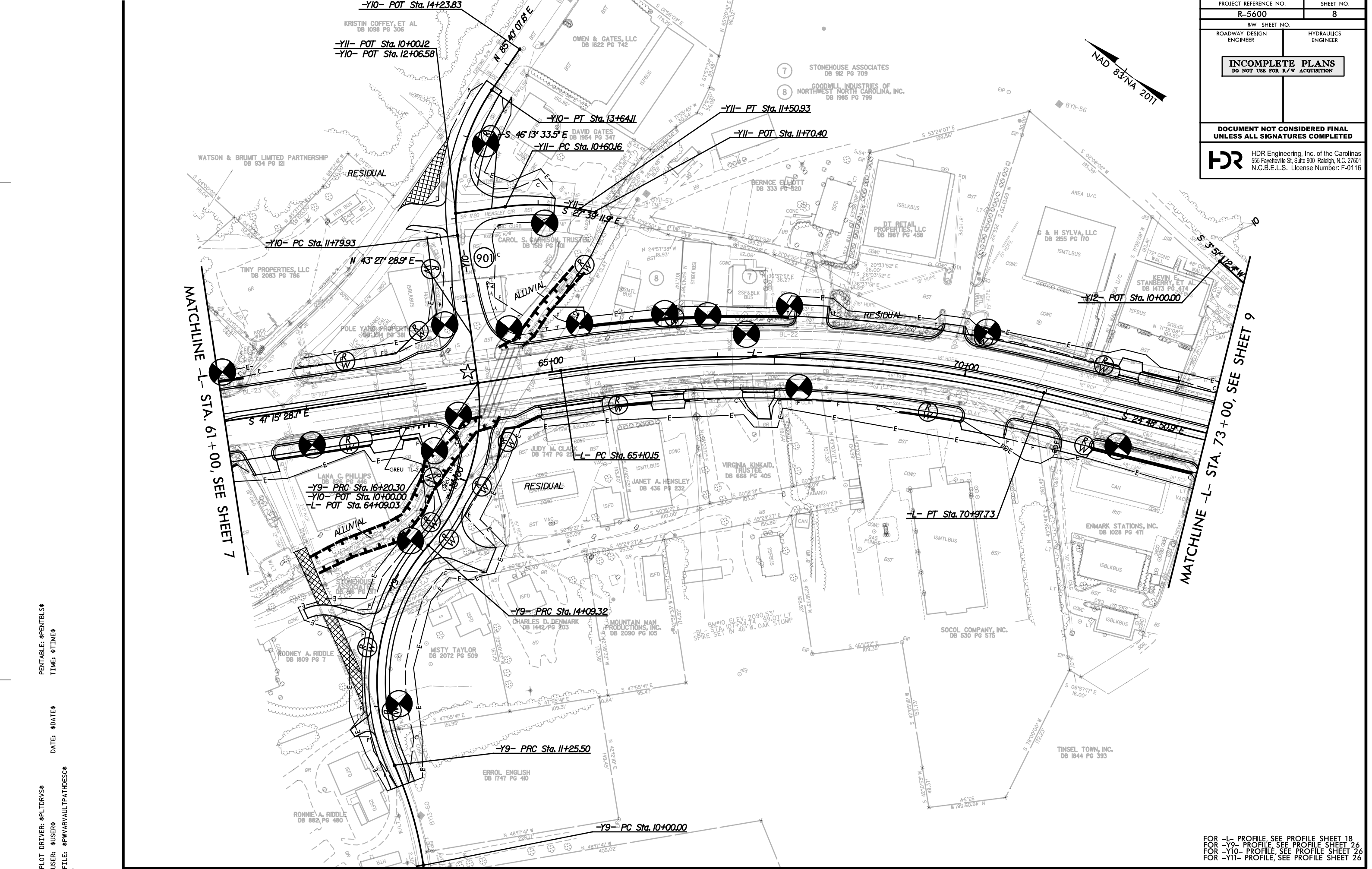
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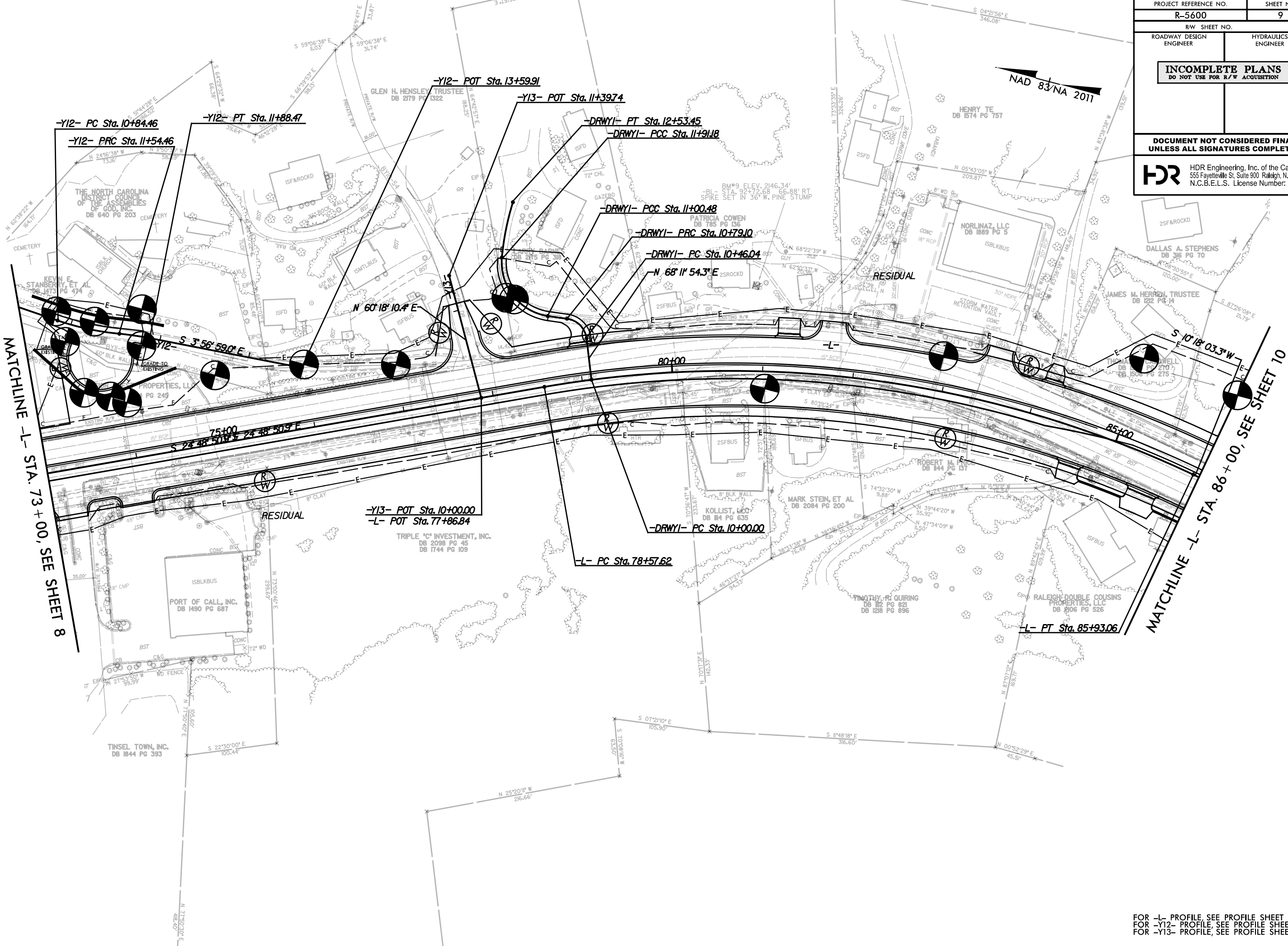




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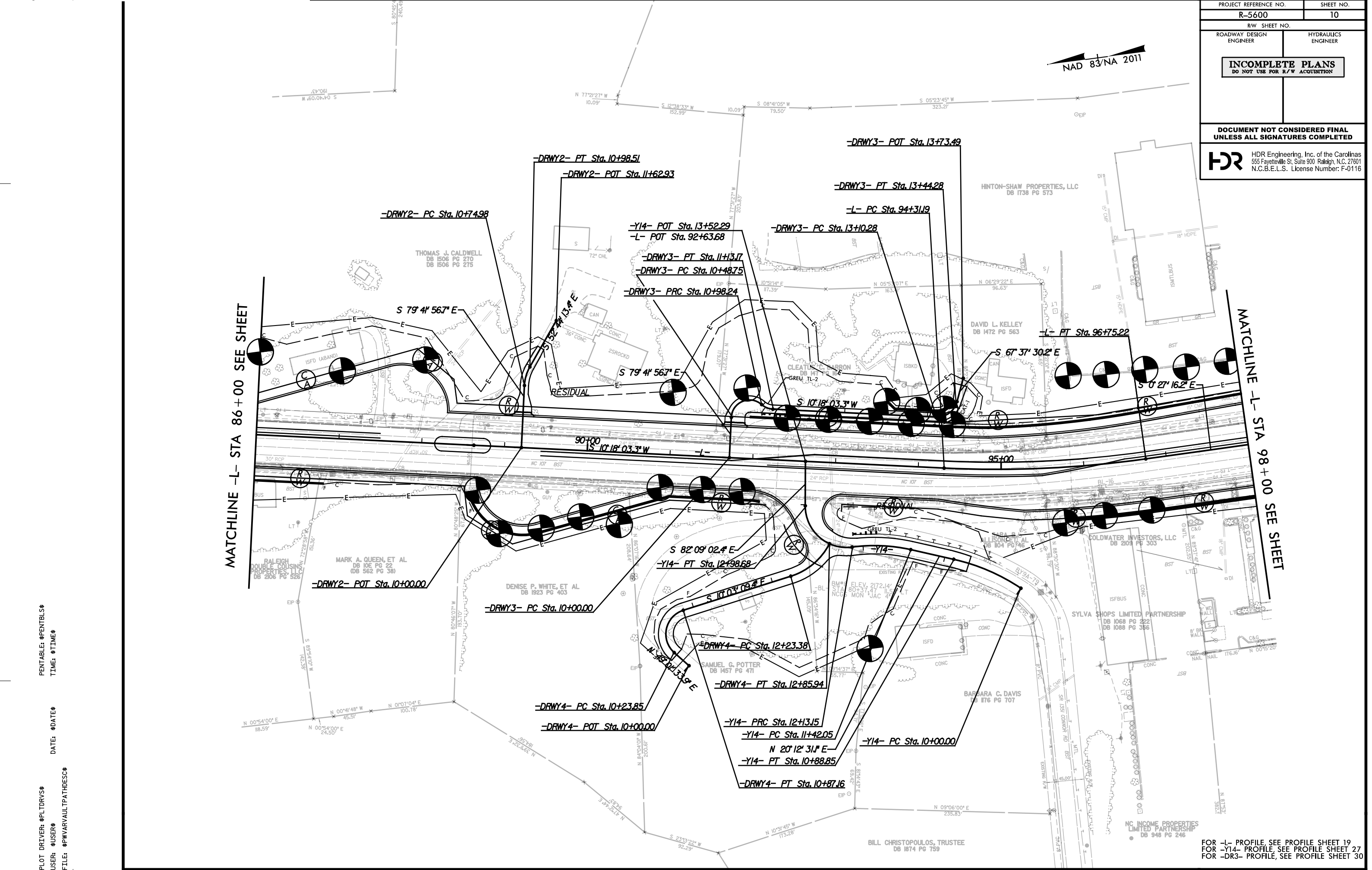
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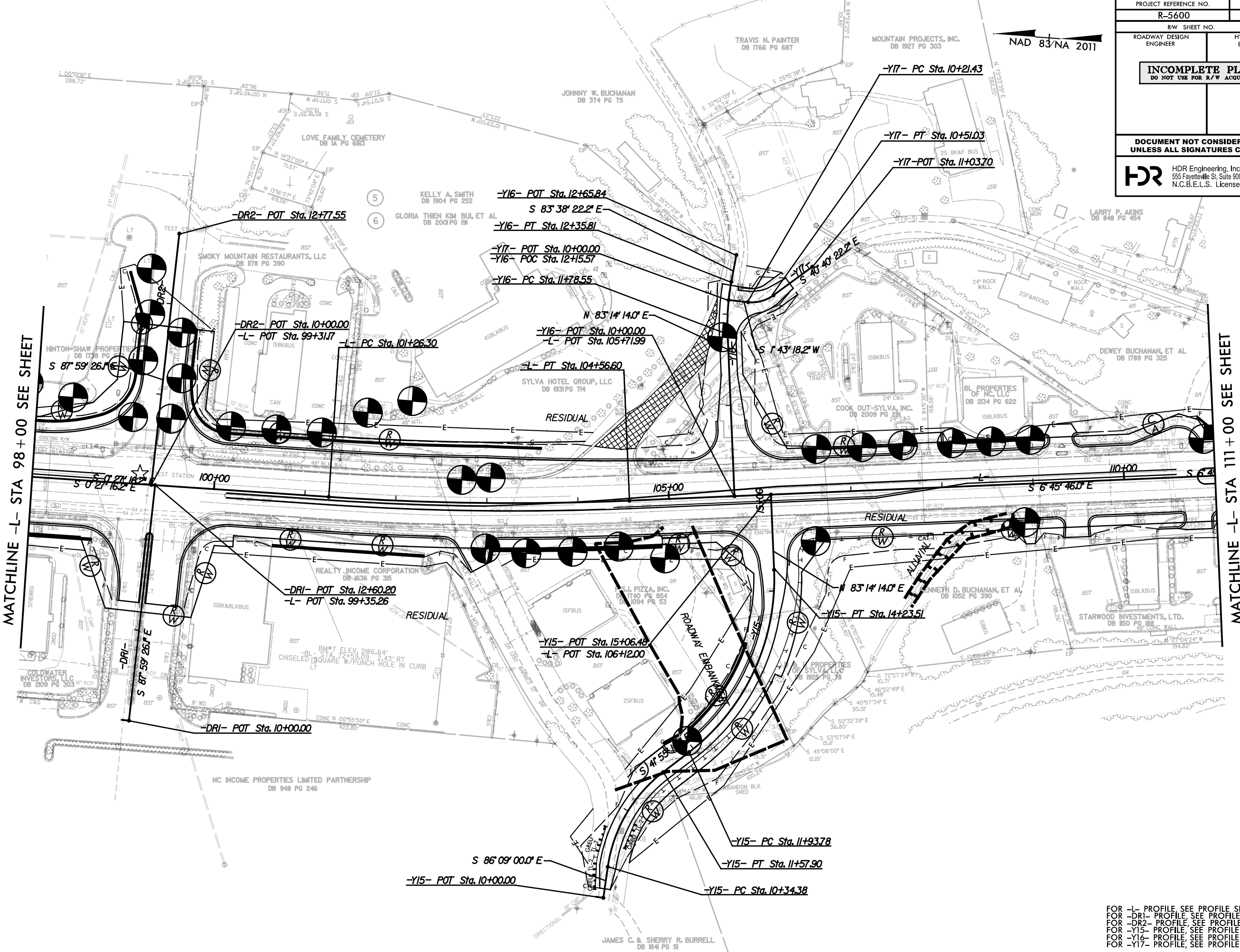
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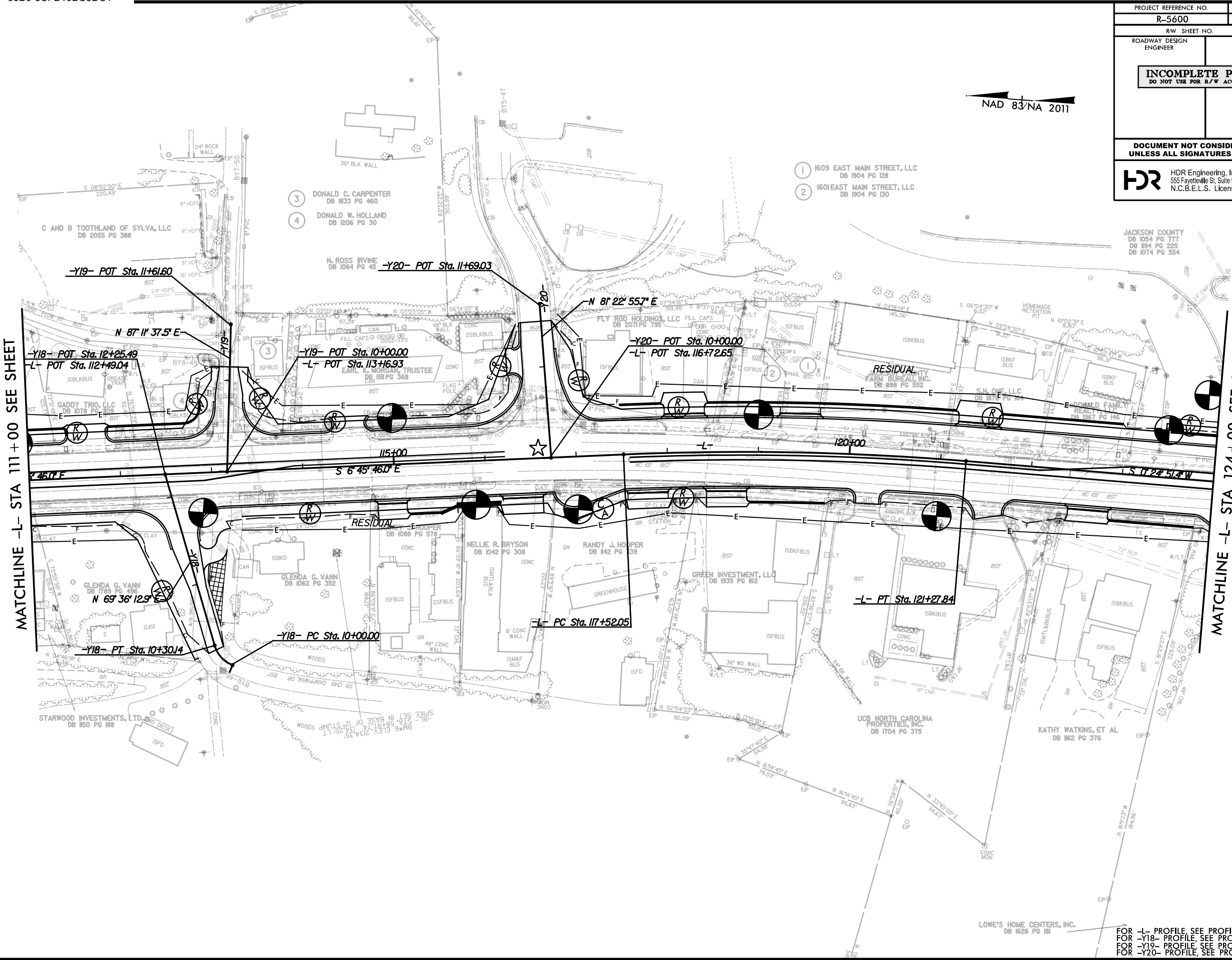
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FOR -Y17- PROFILE, SEE PROFILE SHEET 28



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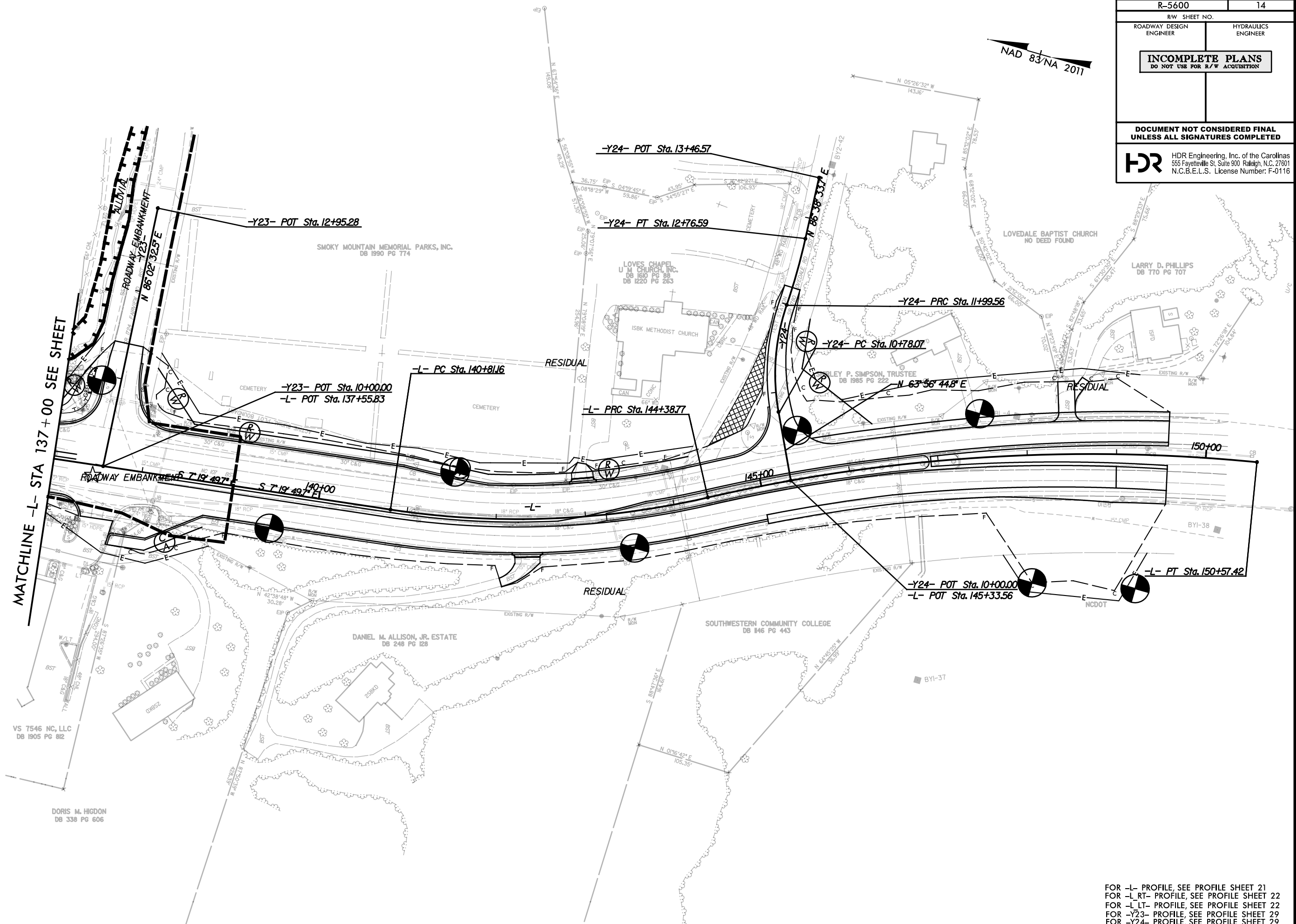
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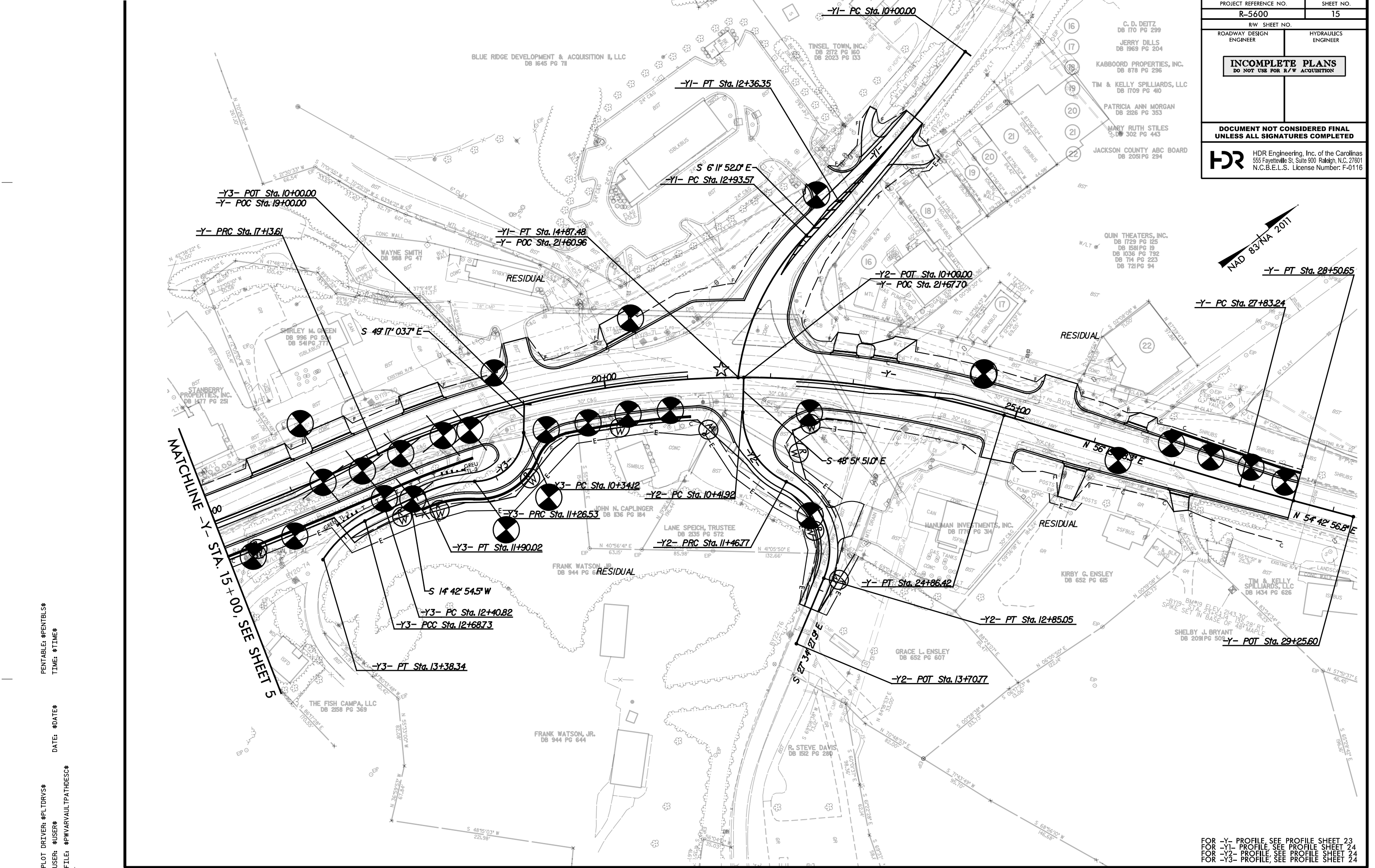
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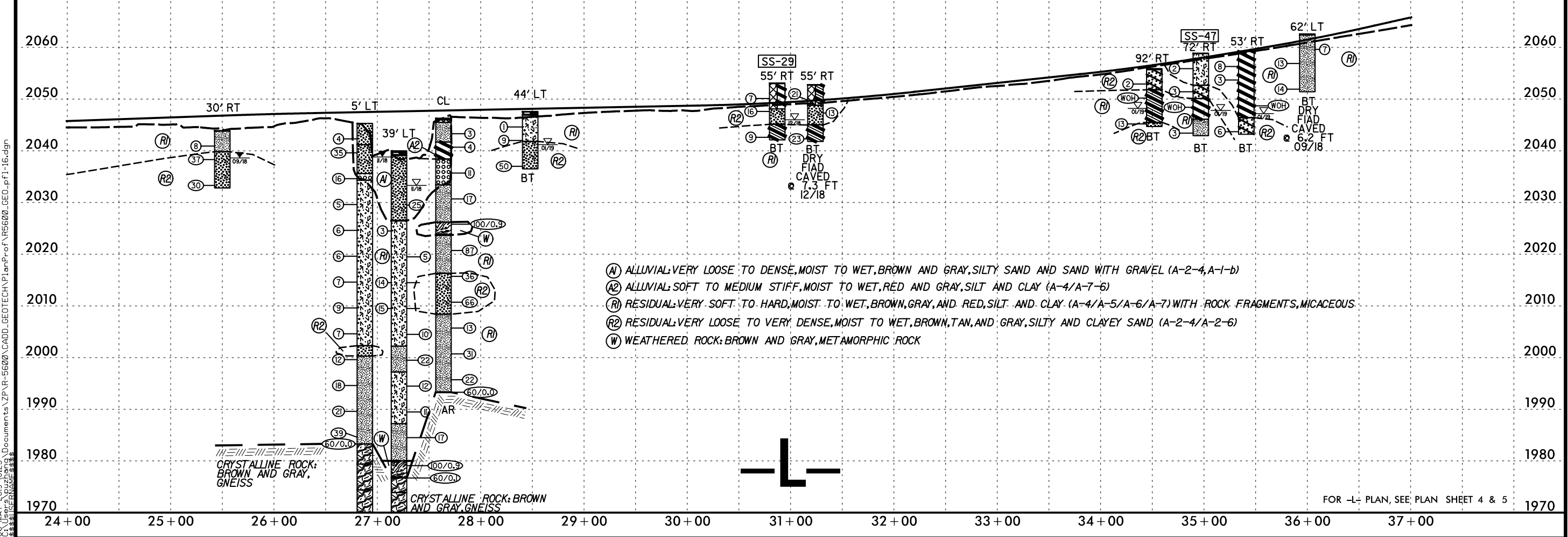
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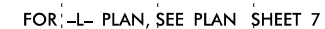
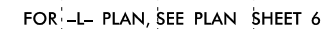
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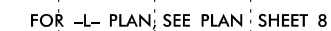
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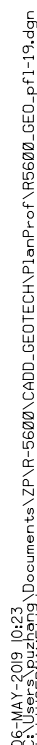


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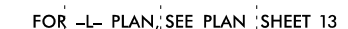
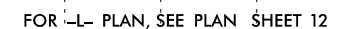
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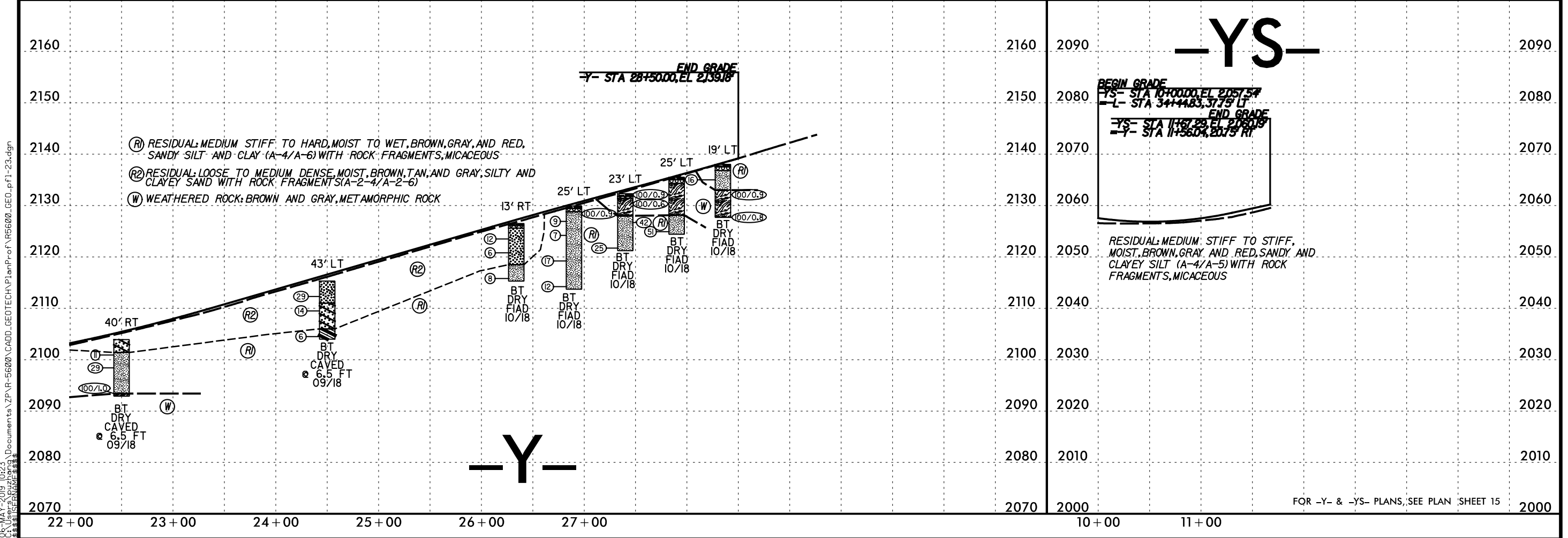
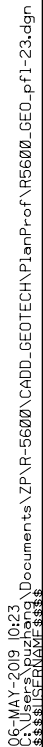


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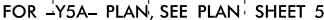


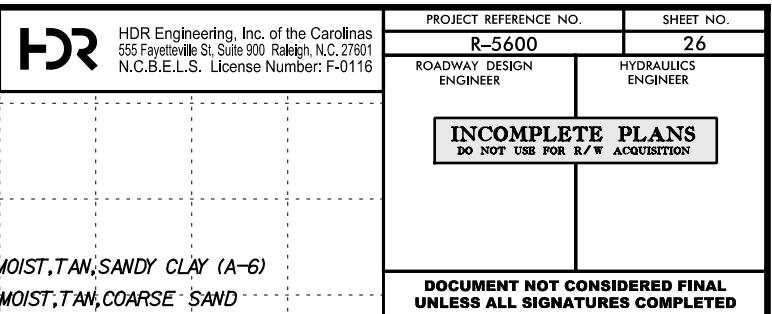
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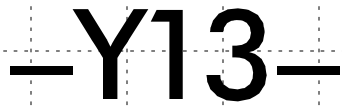








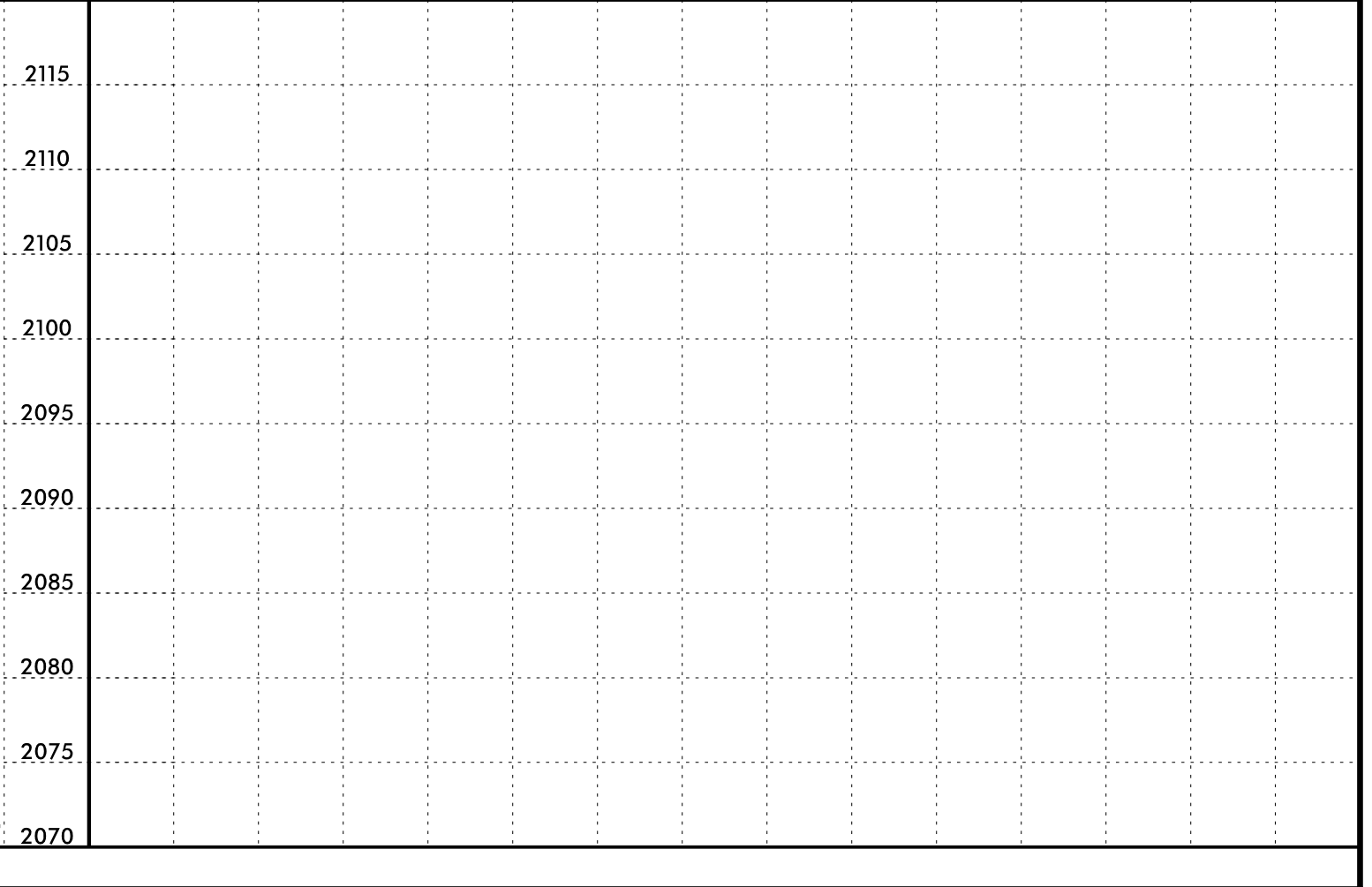
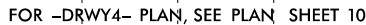
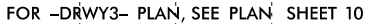
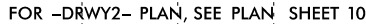








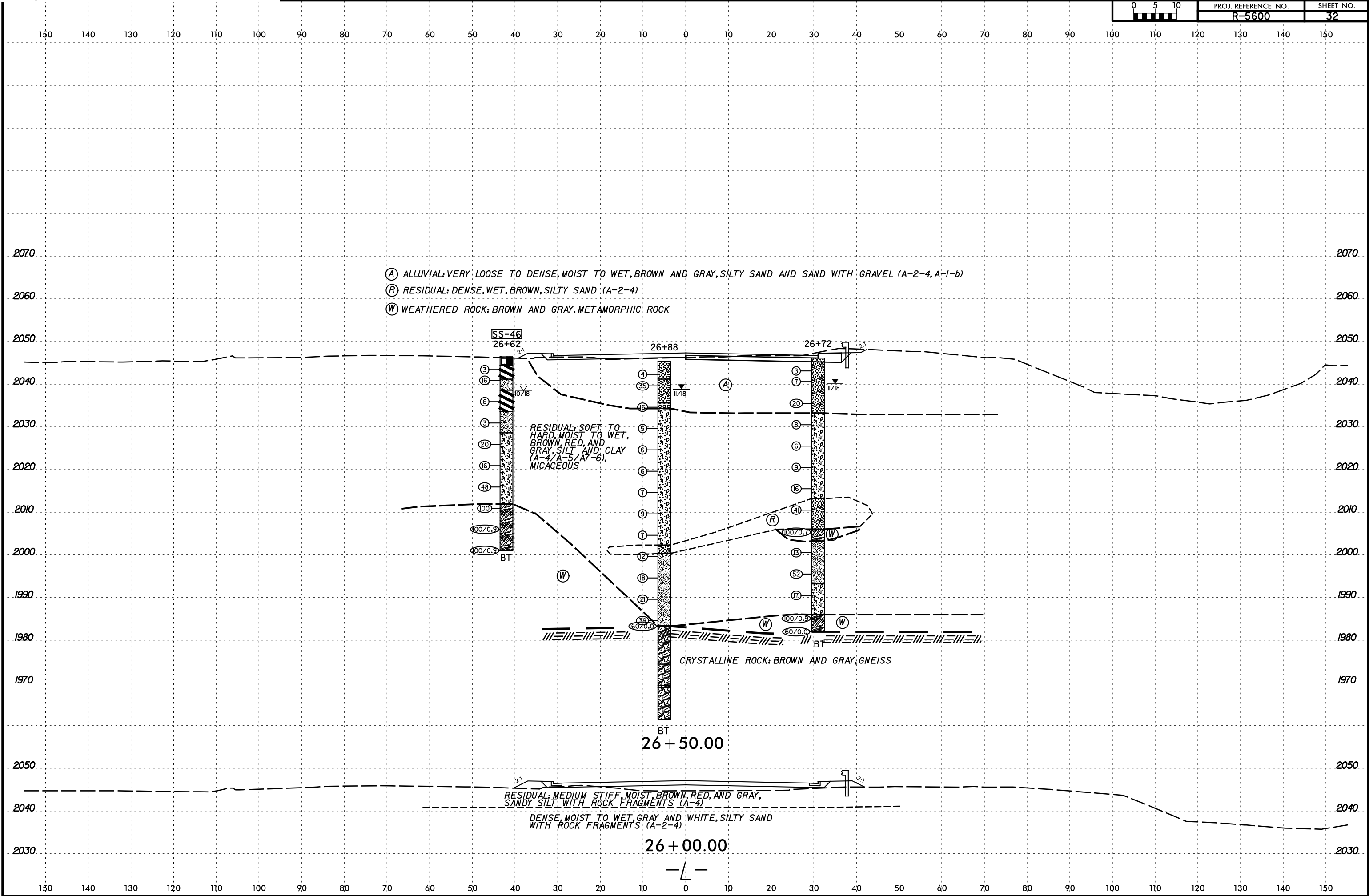




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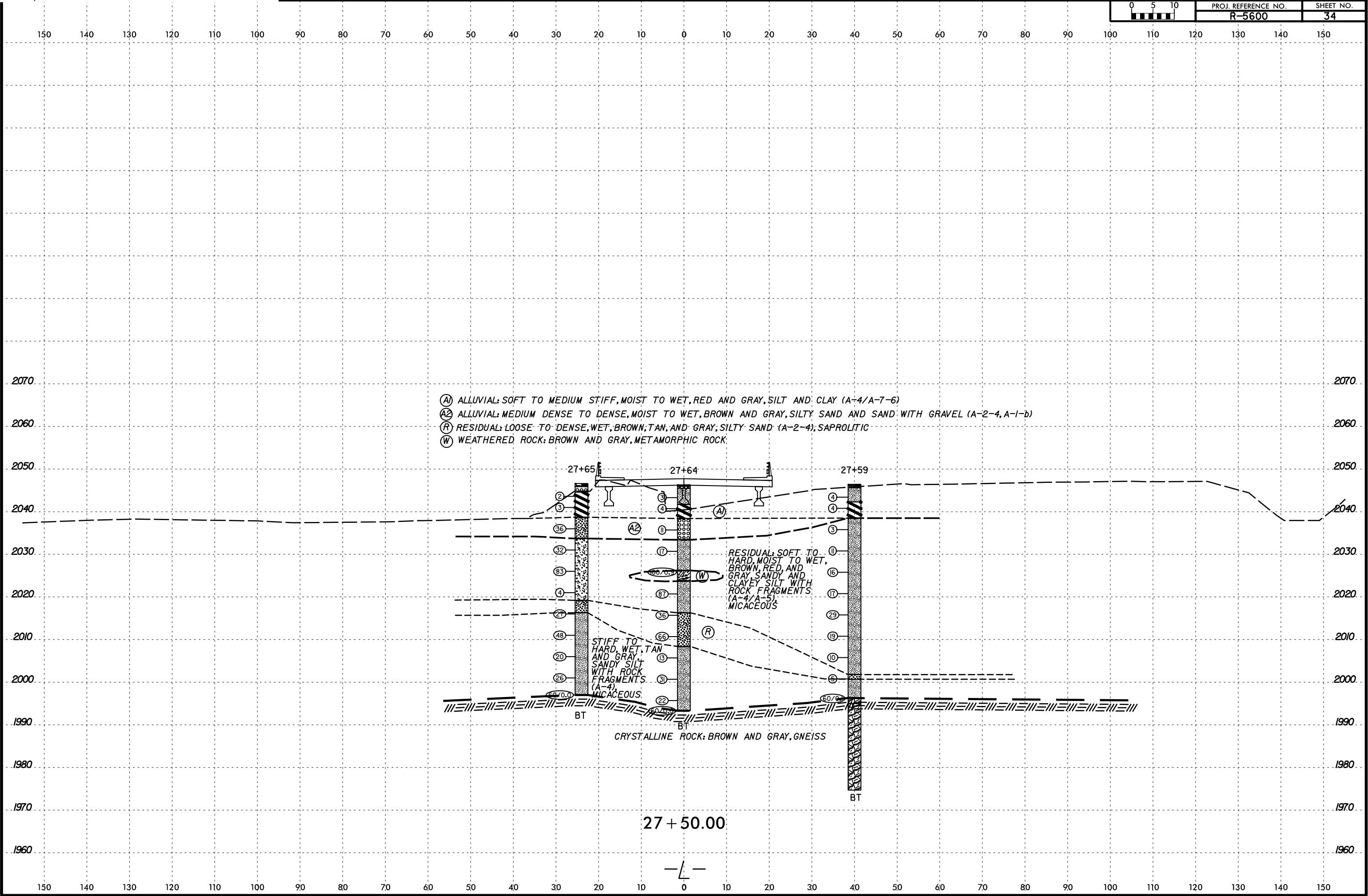


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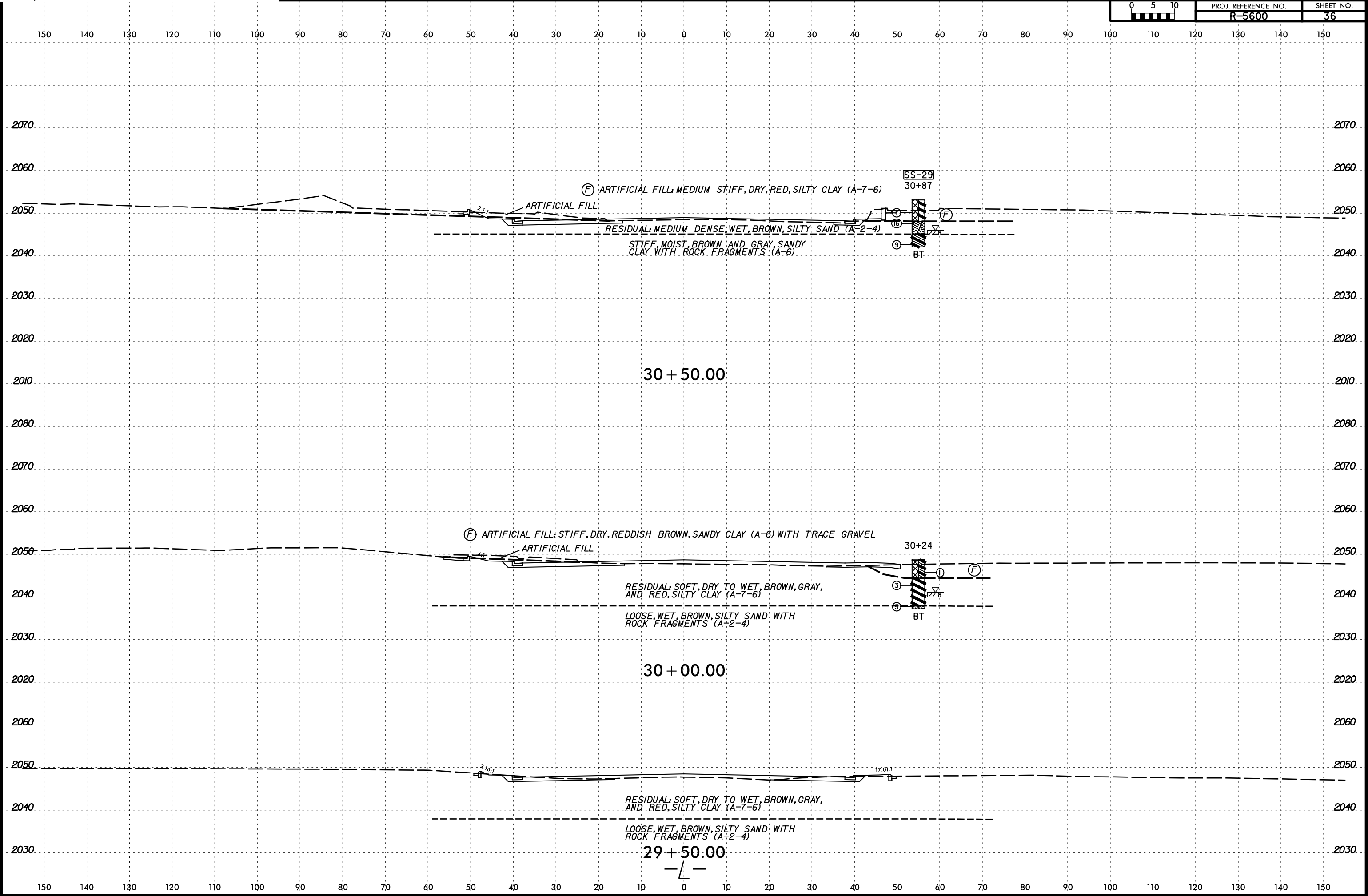


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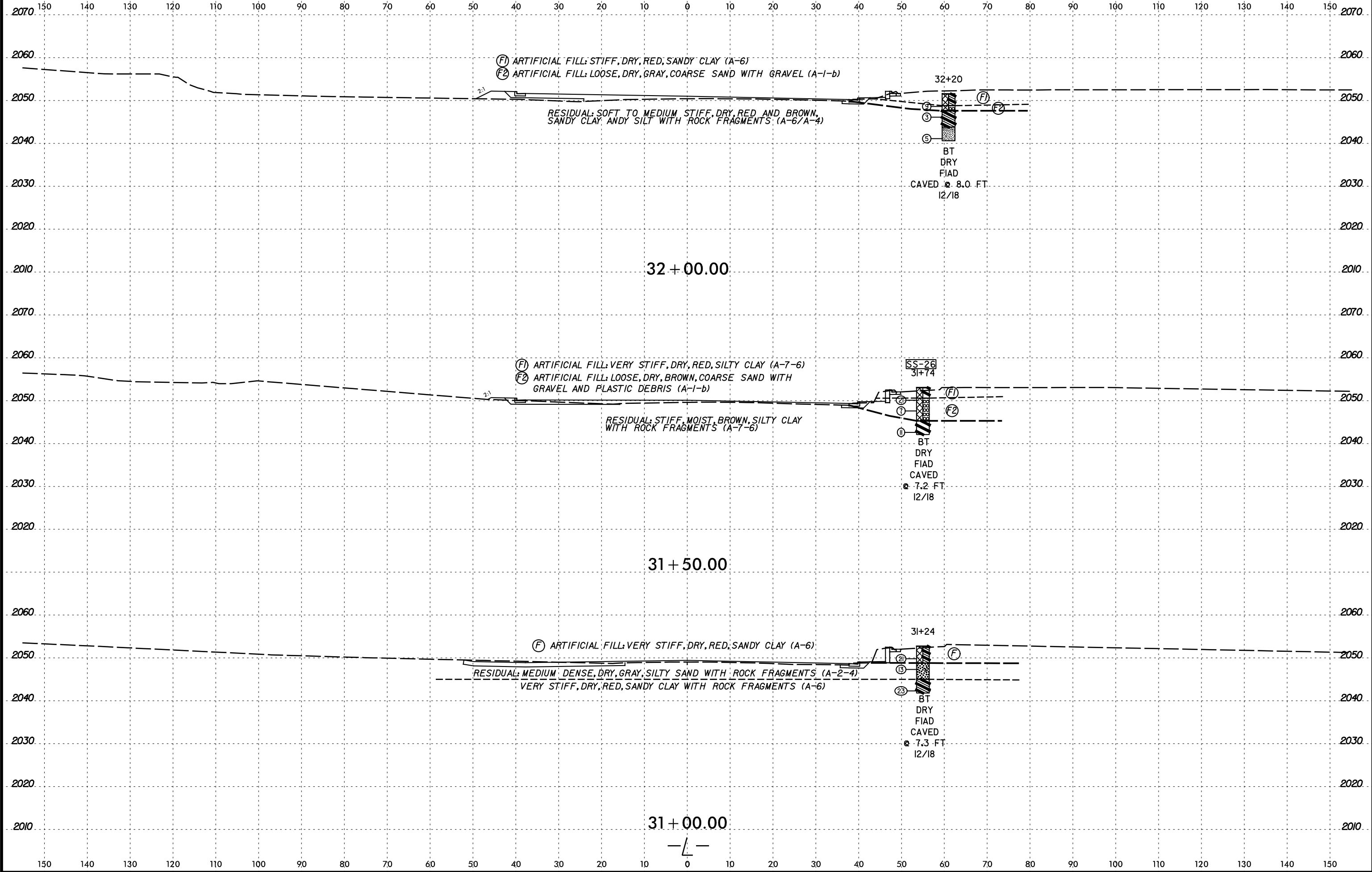
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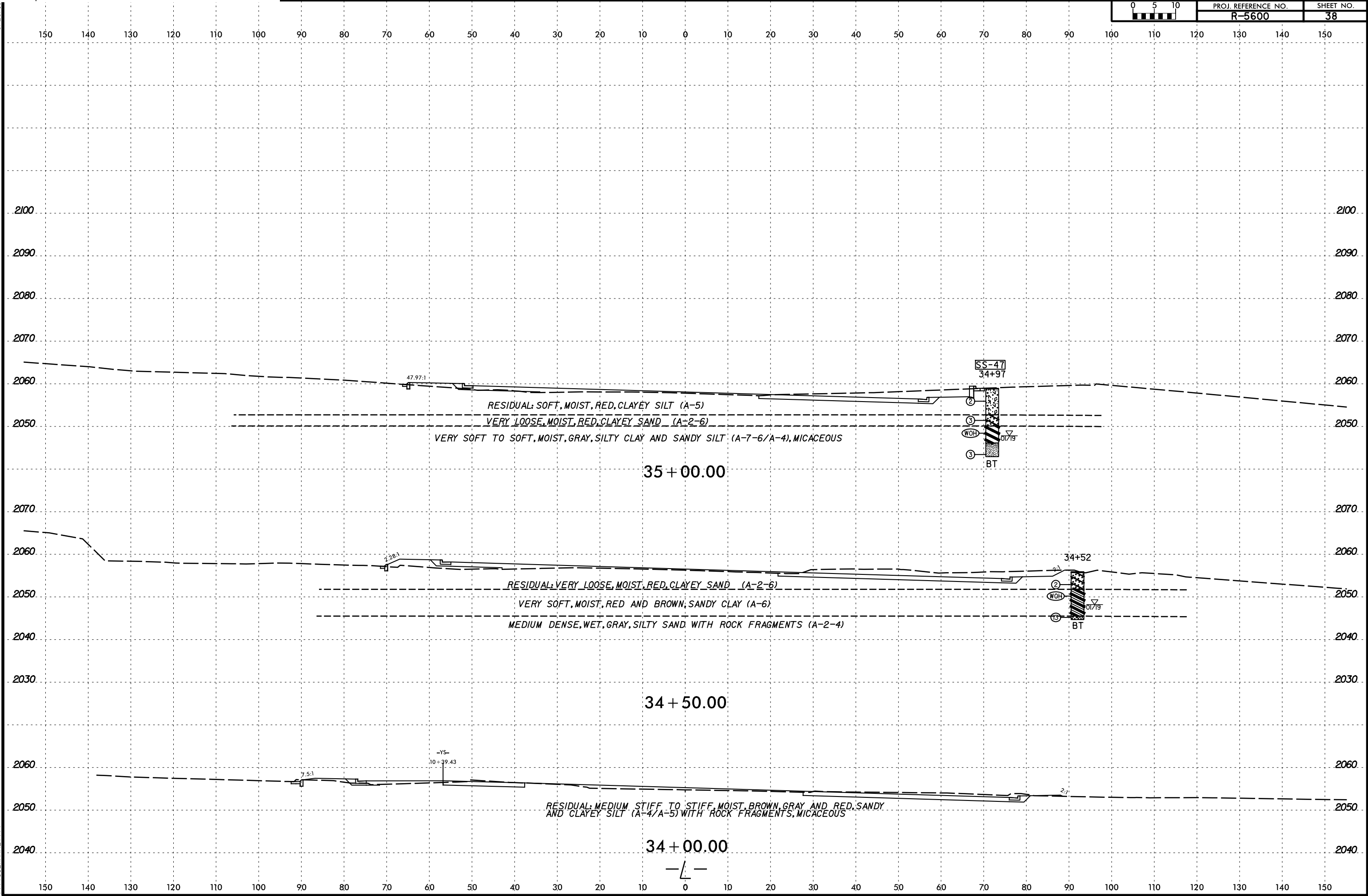
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R-5600	37



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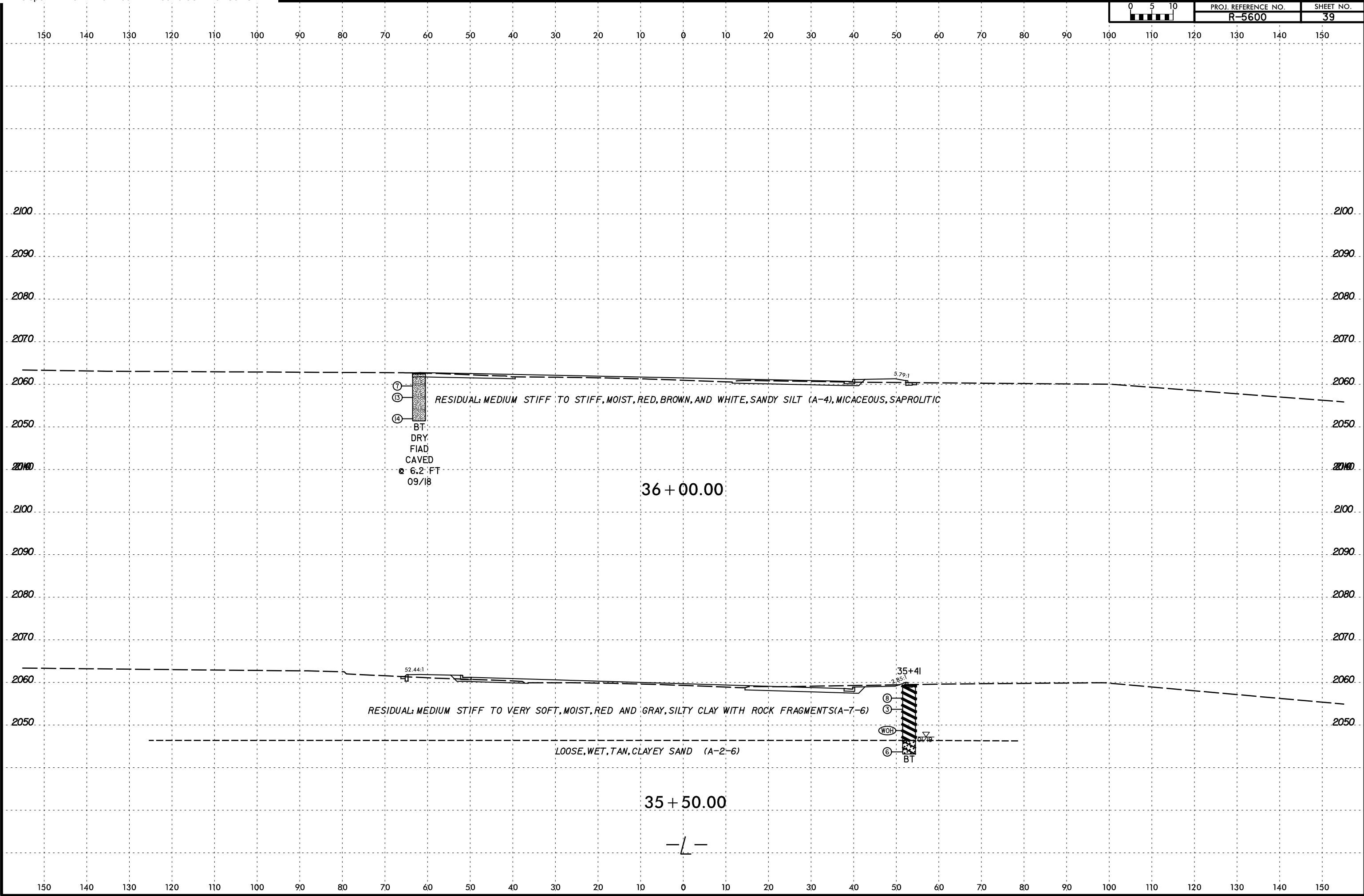
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R-5600	38



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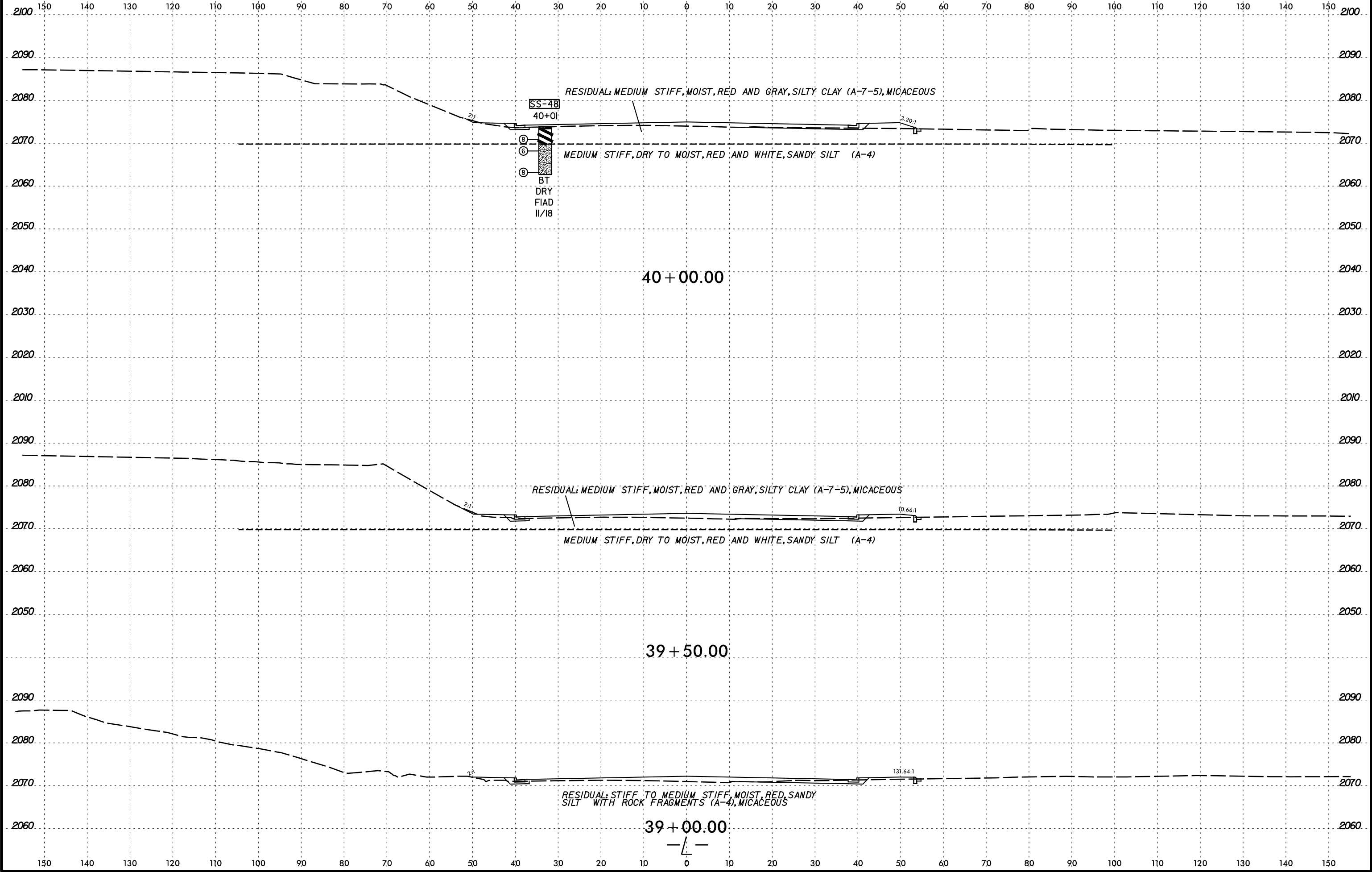
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R-5600	40

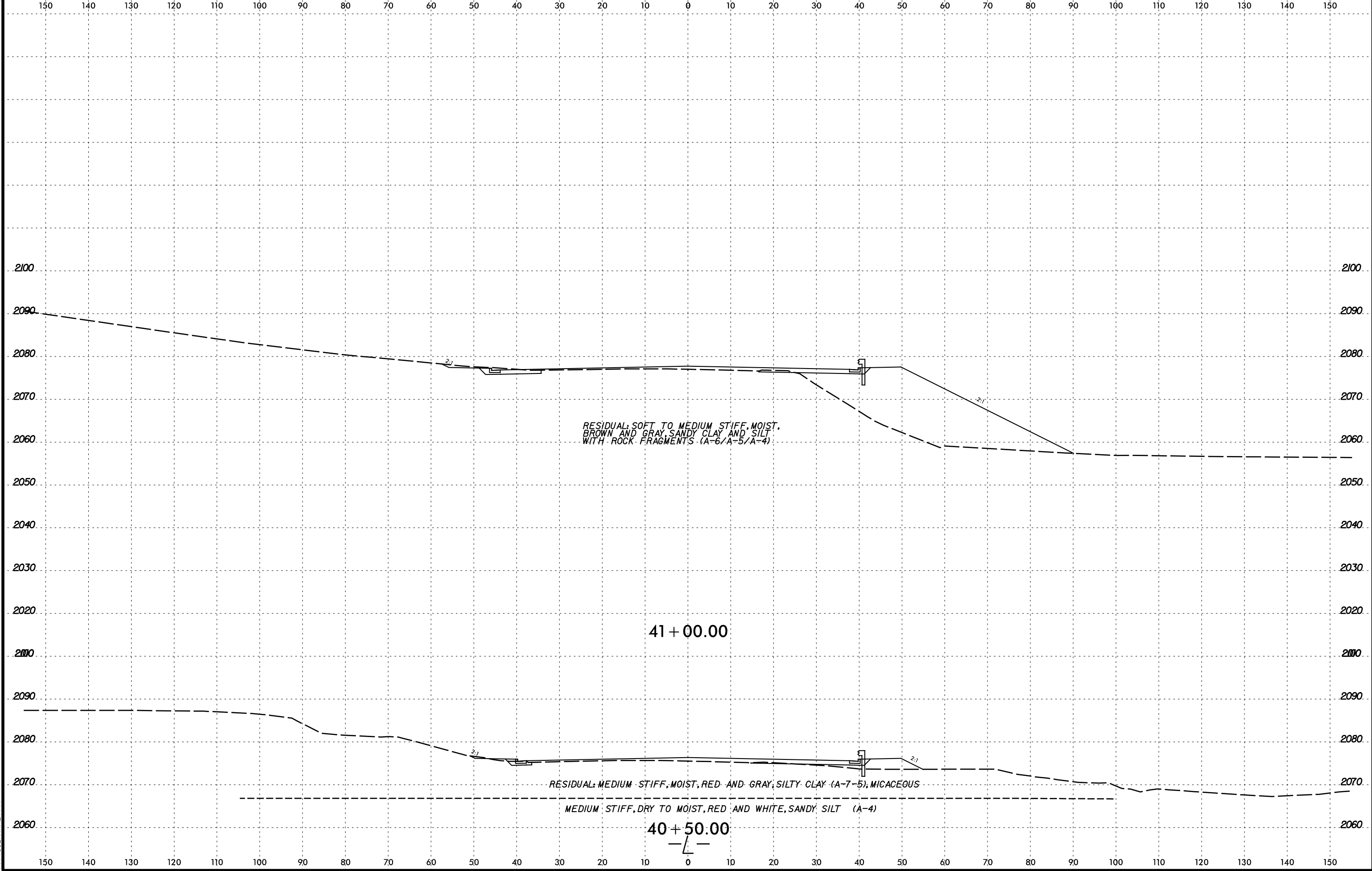


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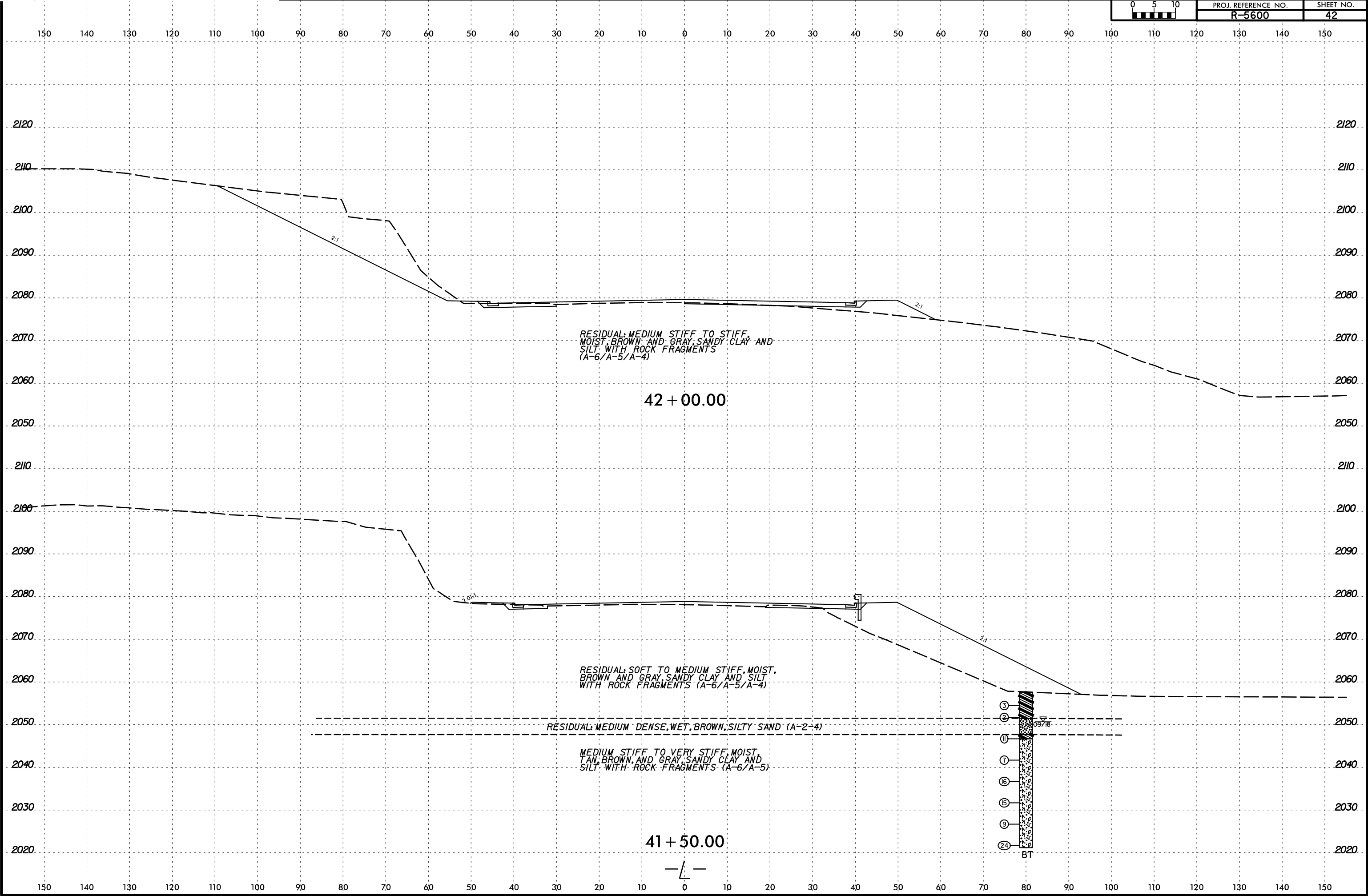
SHEET NO.
41



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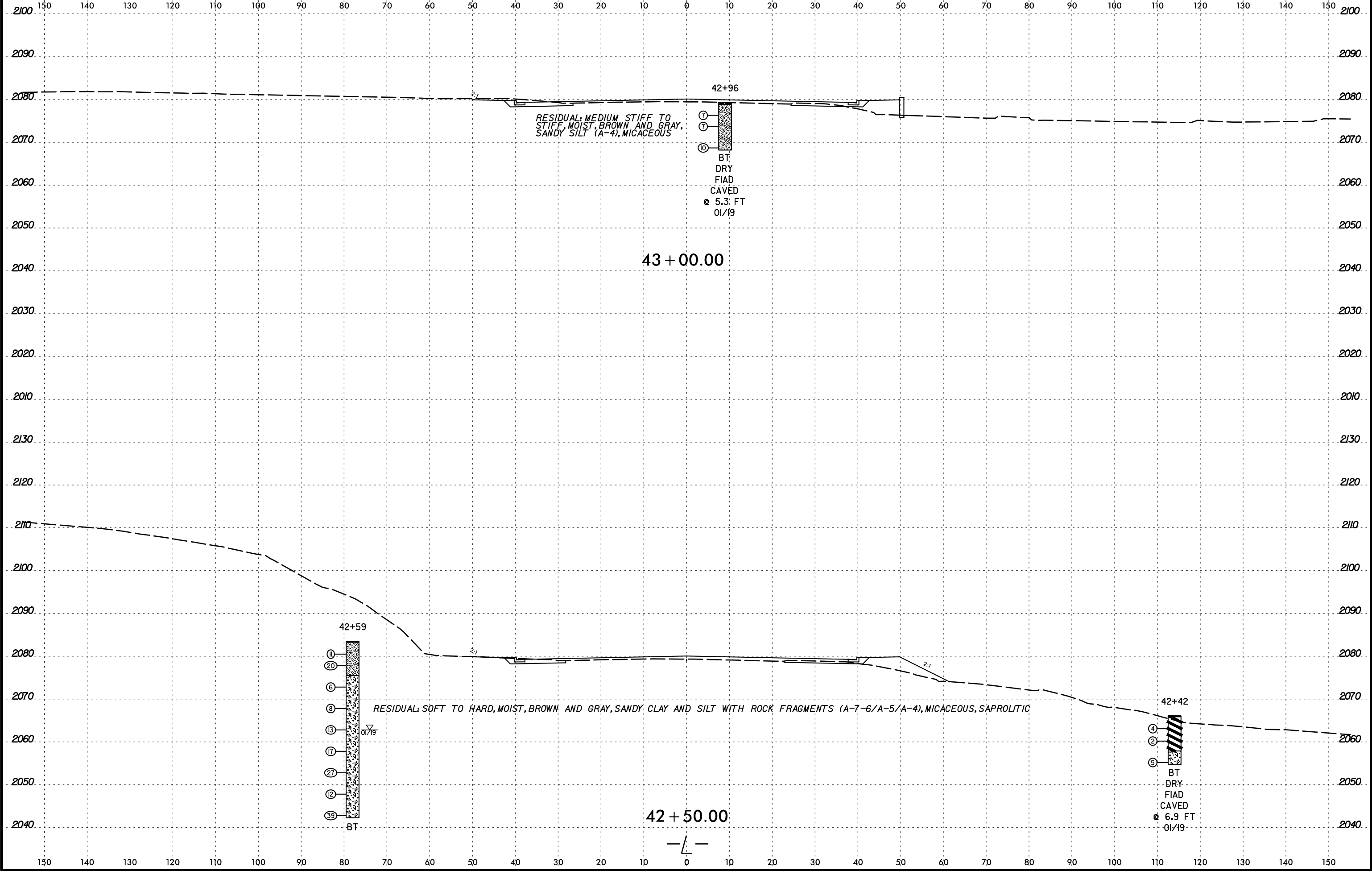
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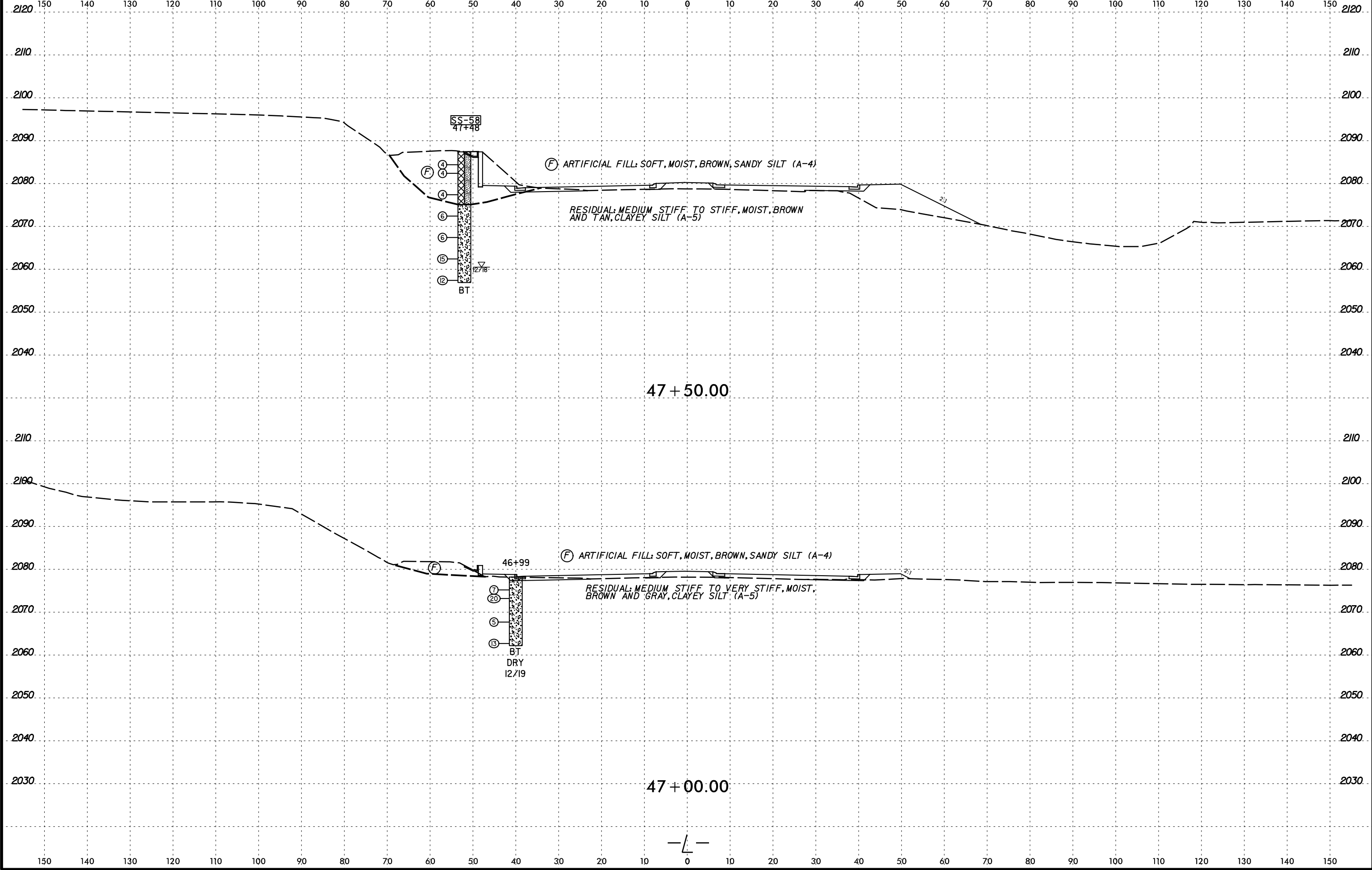
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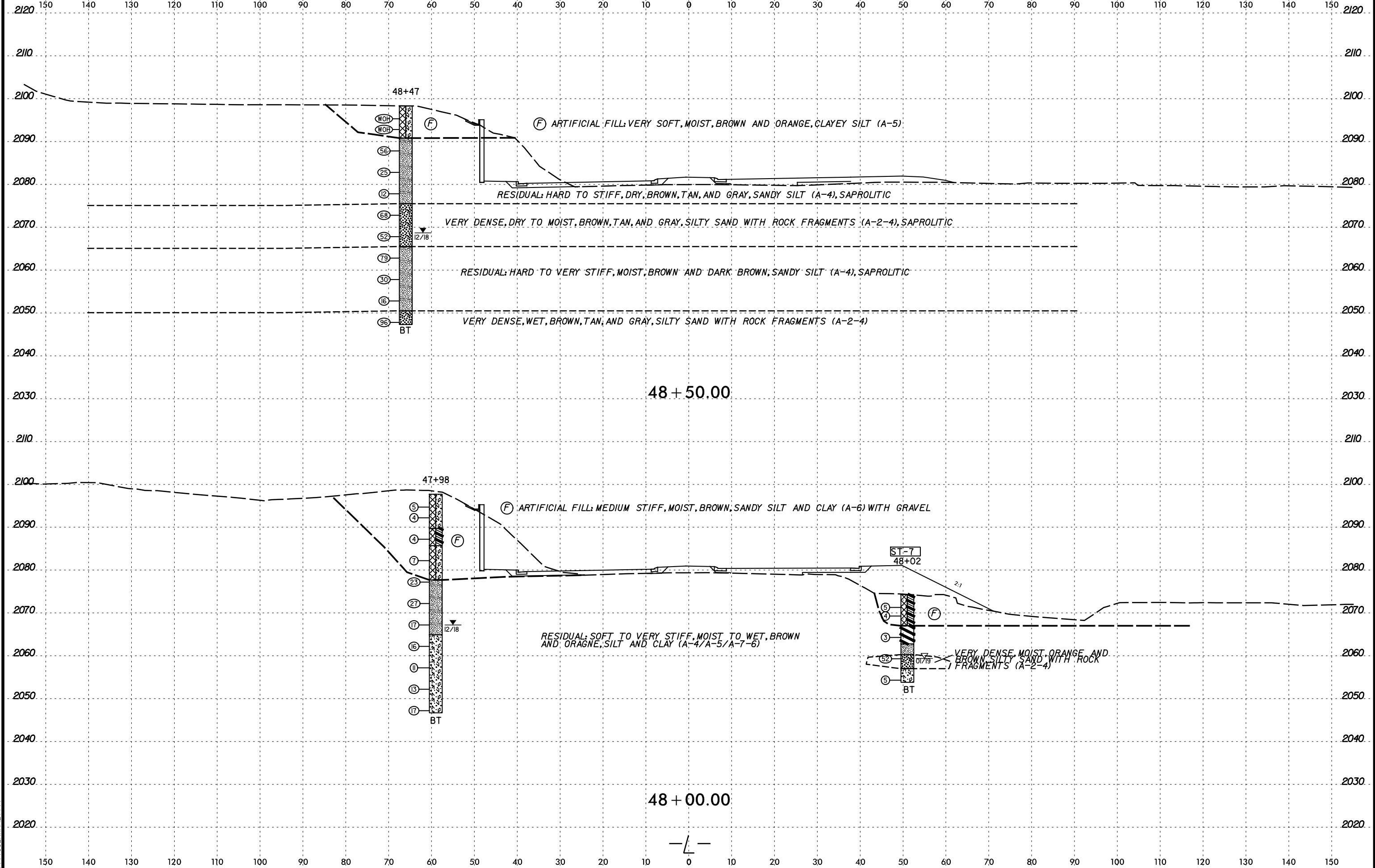
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R-5600	44



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PROJ. REFERENCE NO.	SHEET NO.
R-5600	45

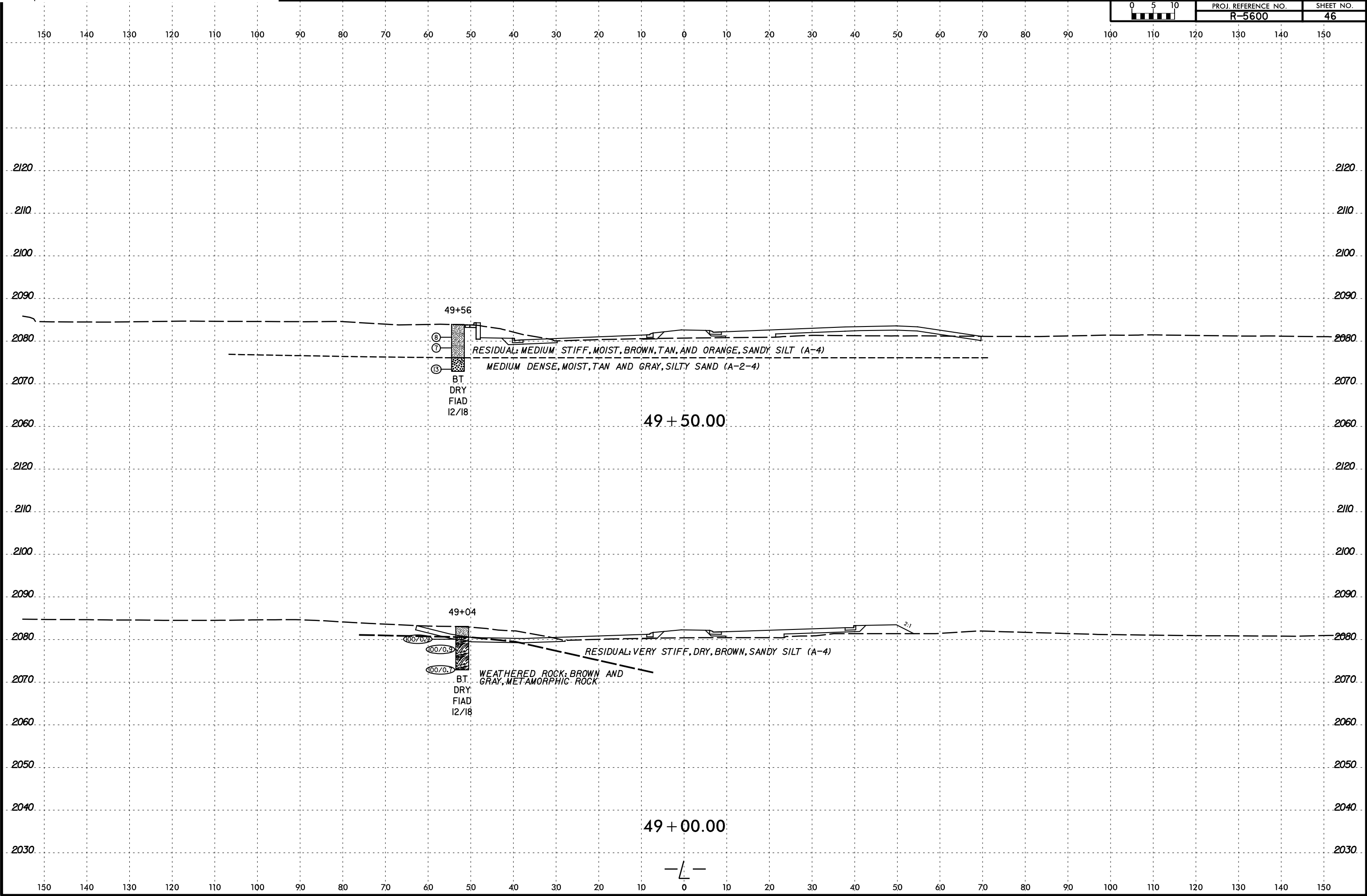


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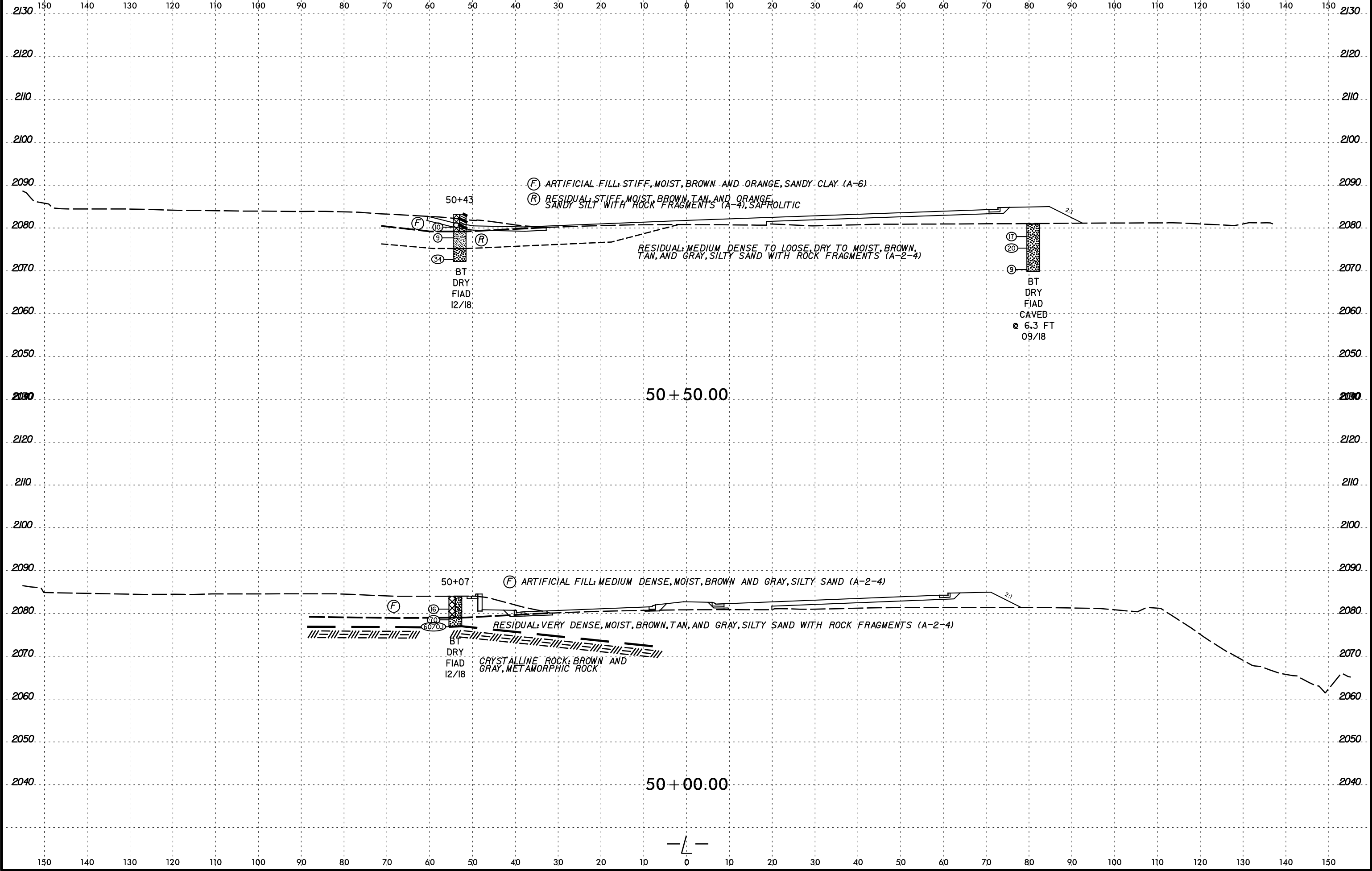
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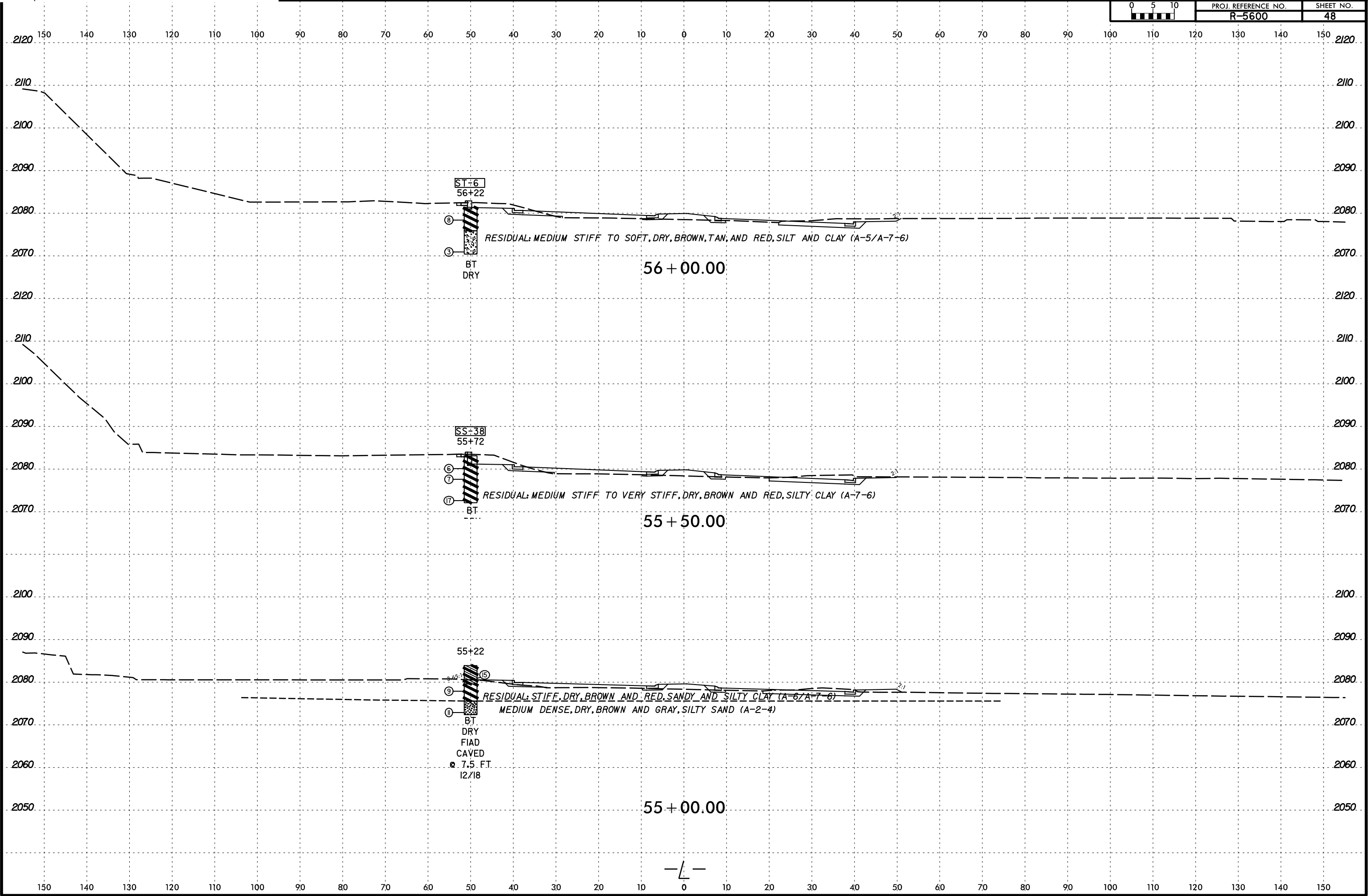
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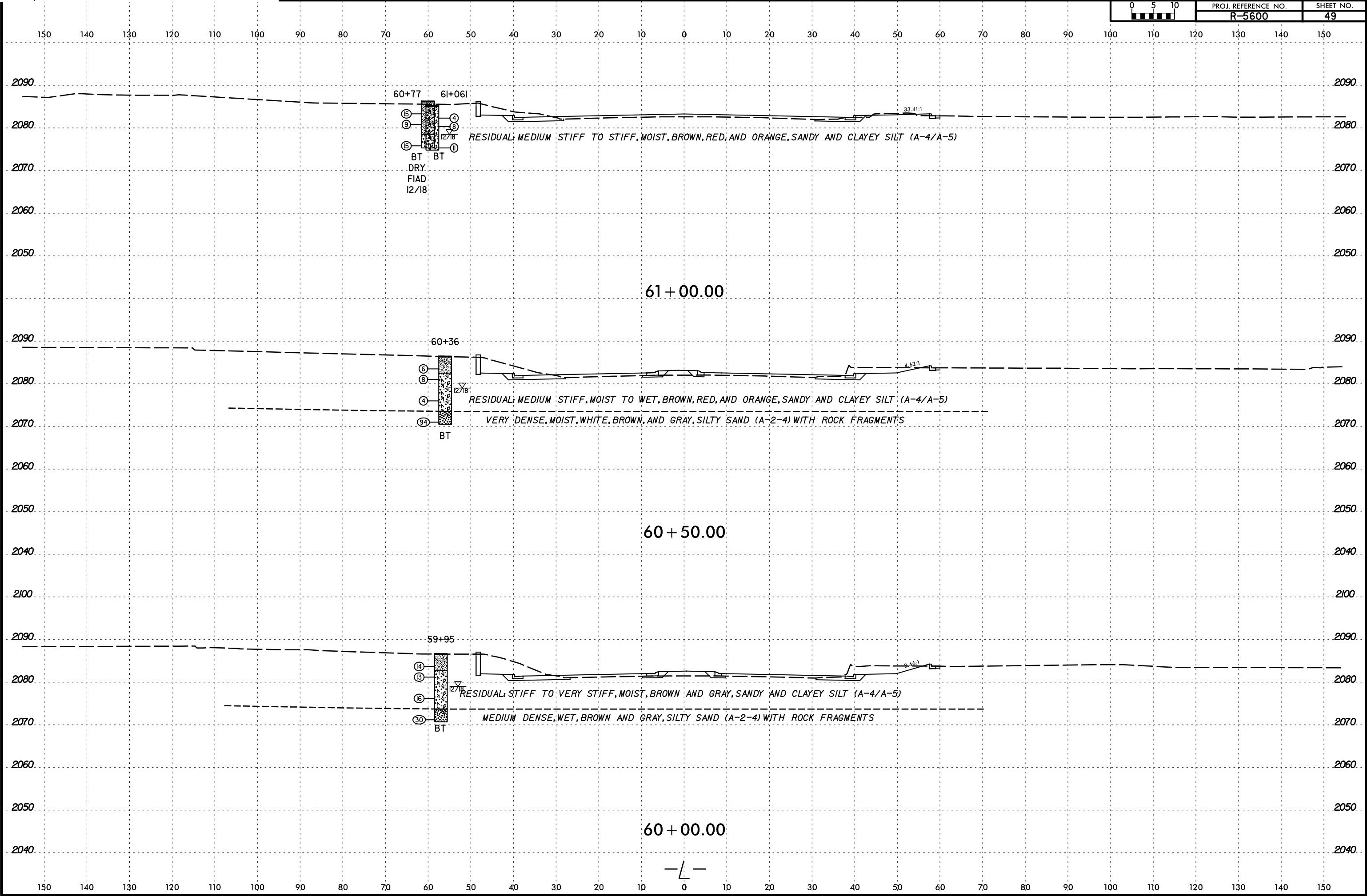
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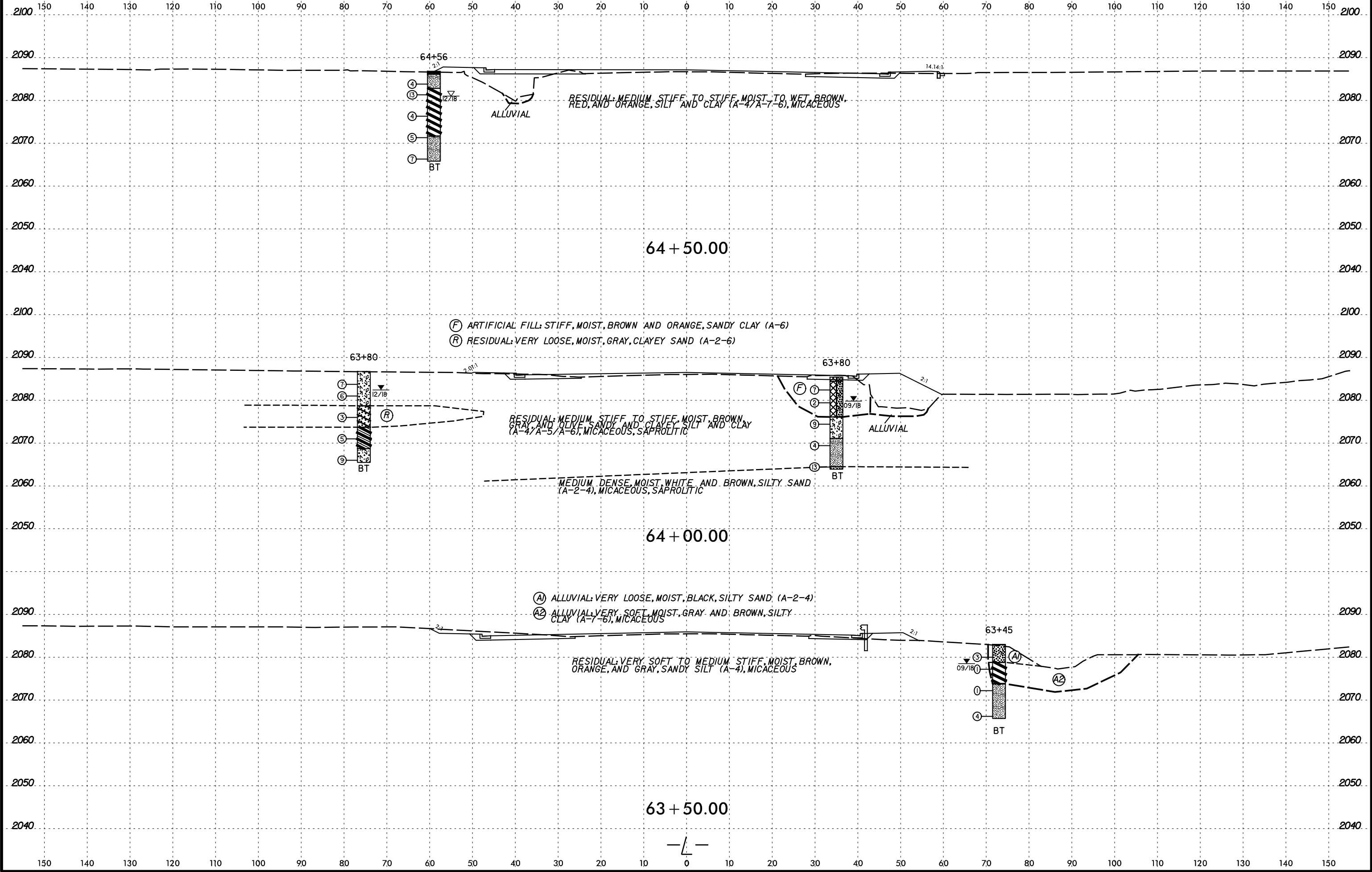
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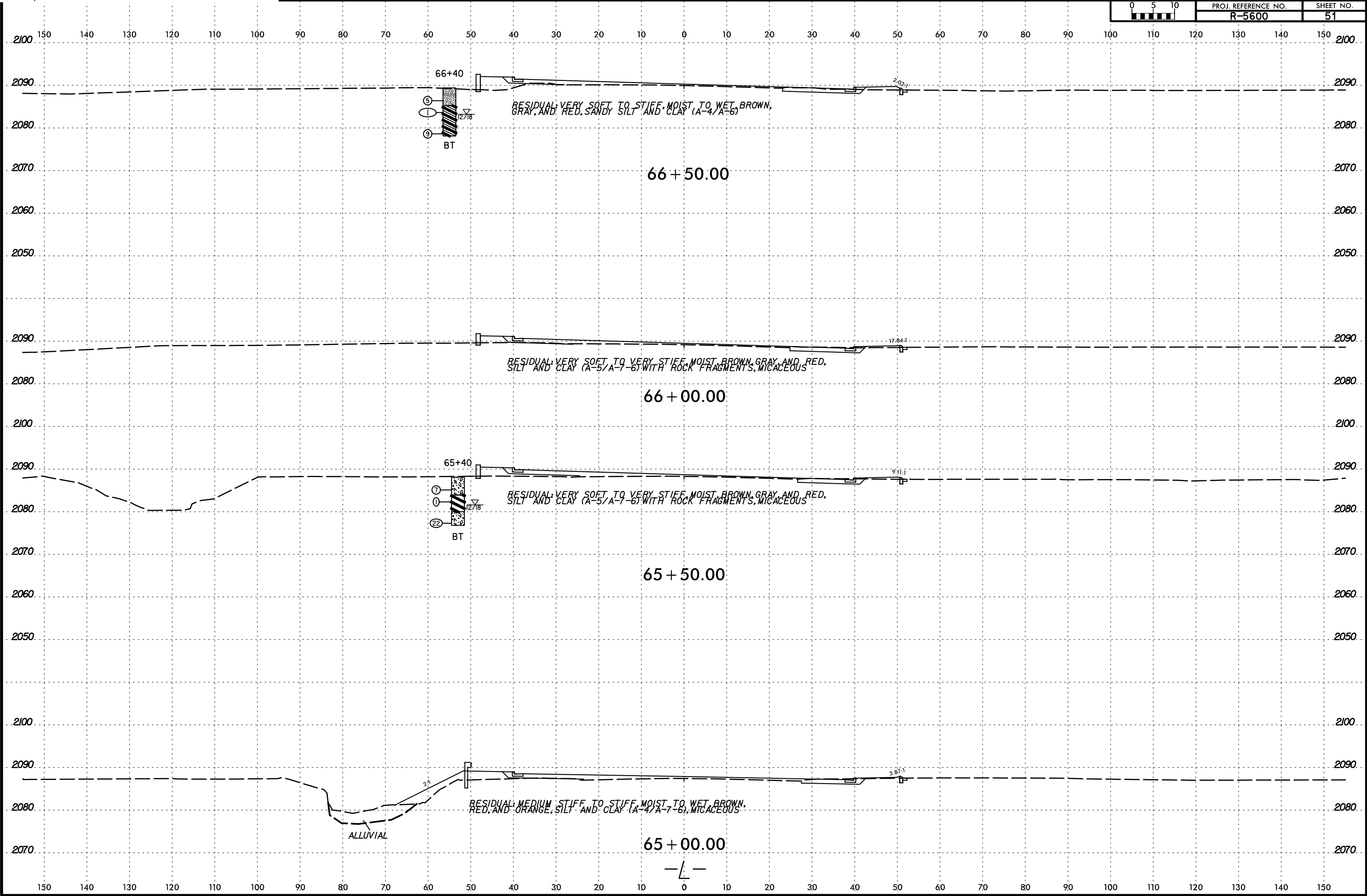
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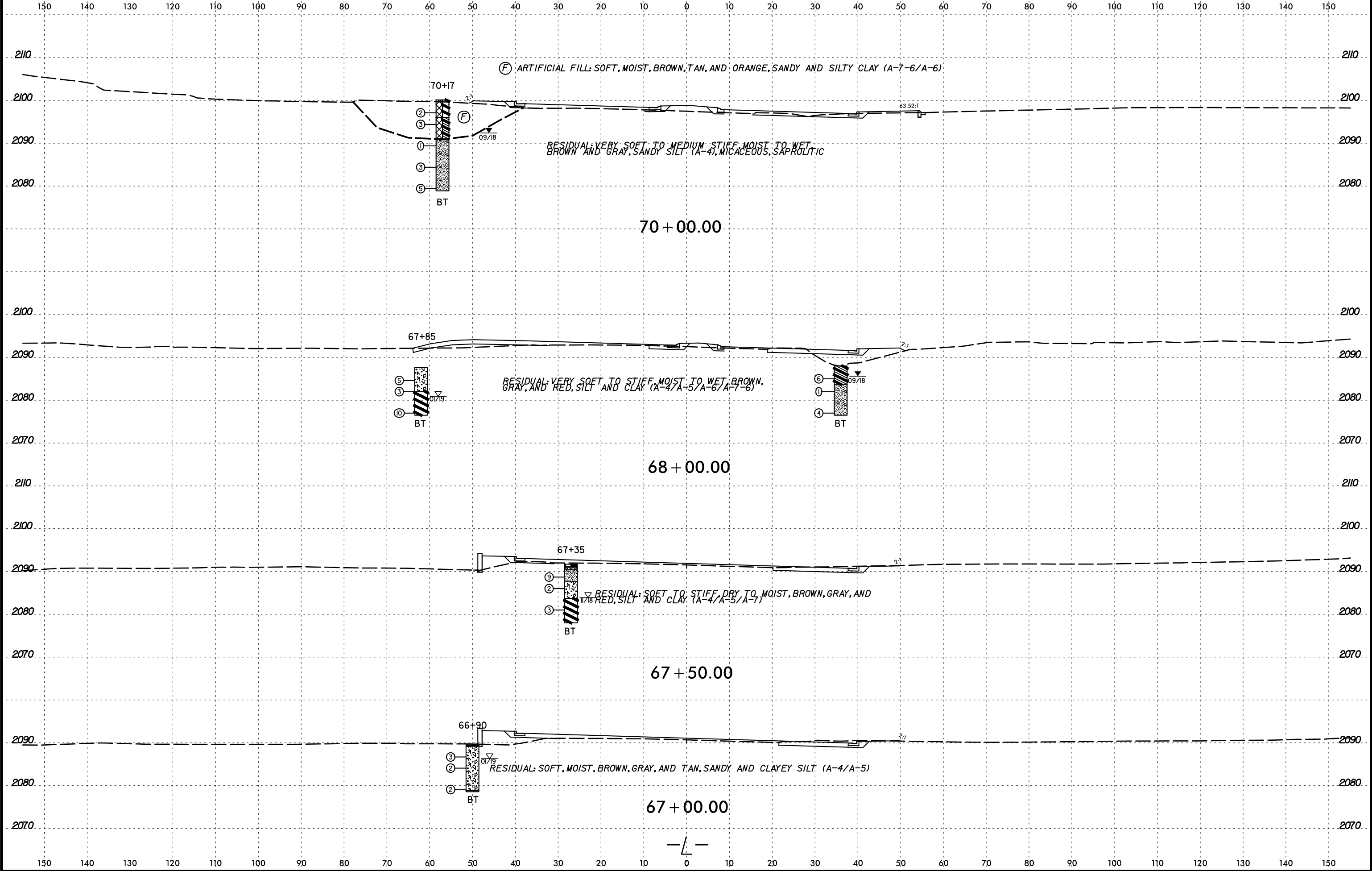
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R-5600	51



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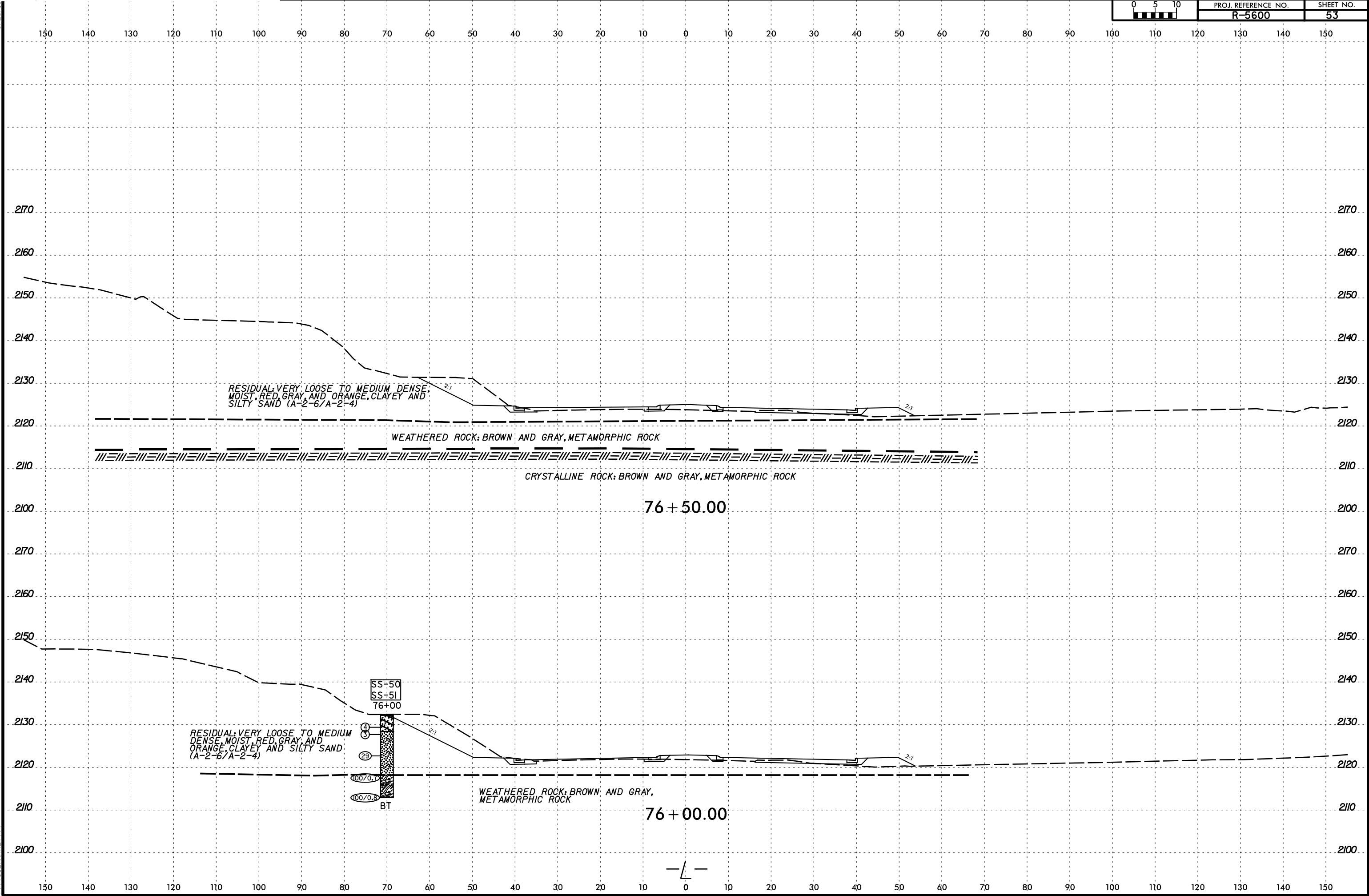
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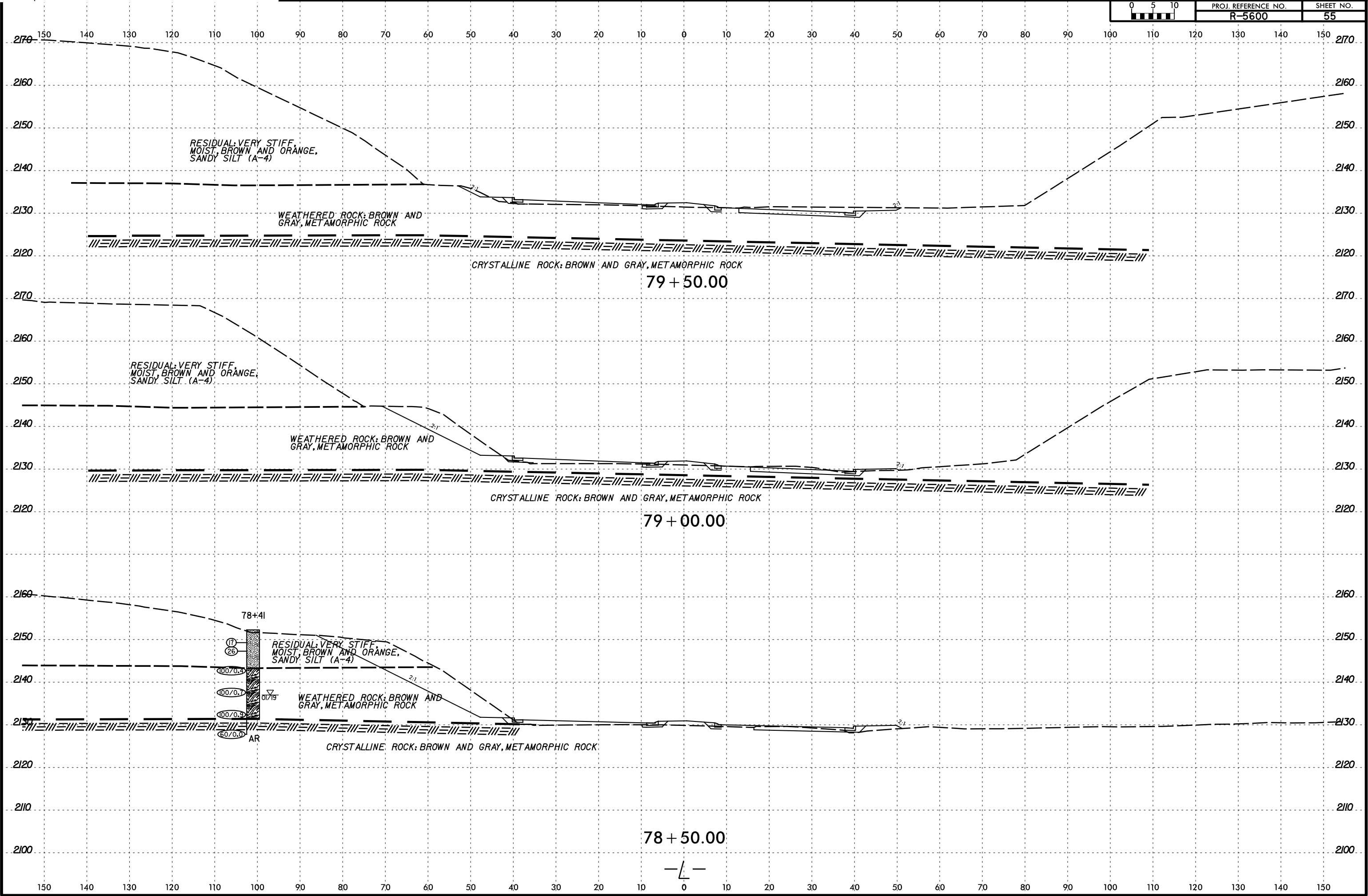


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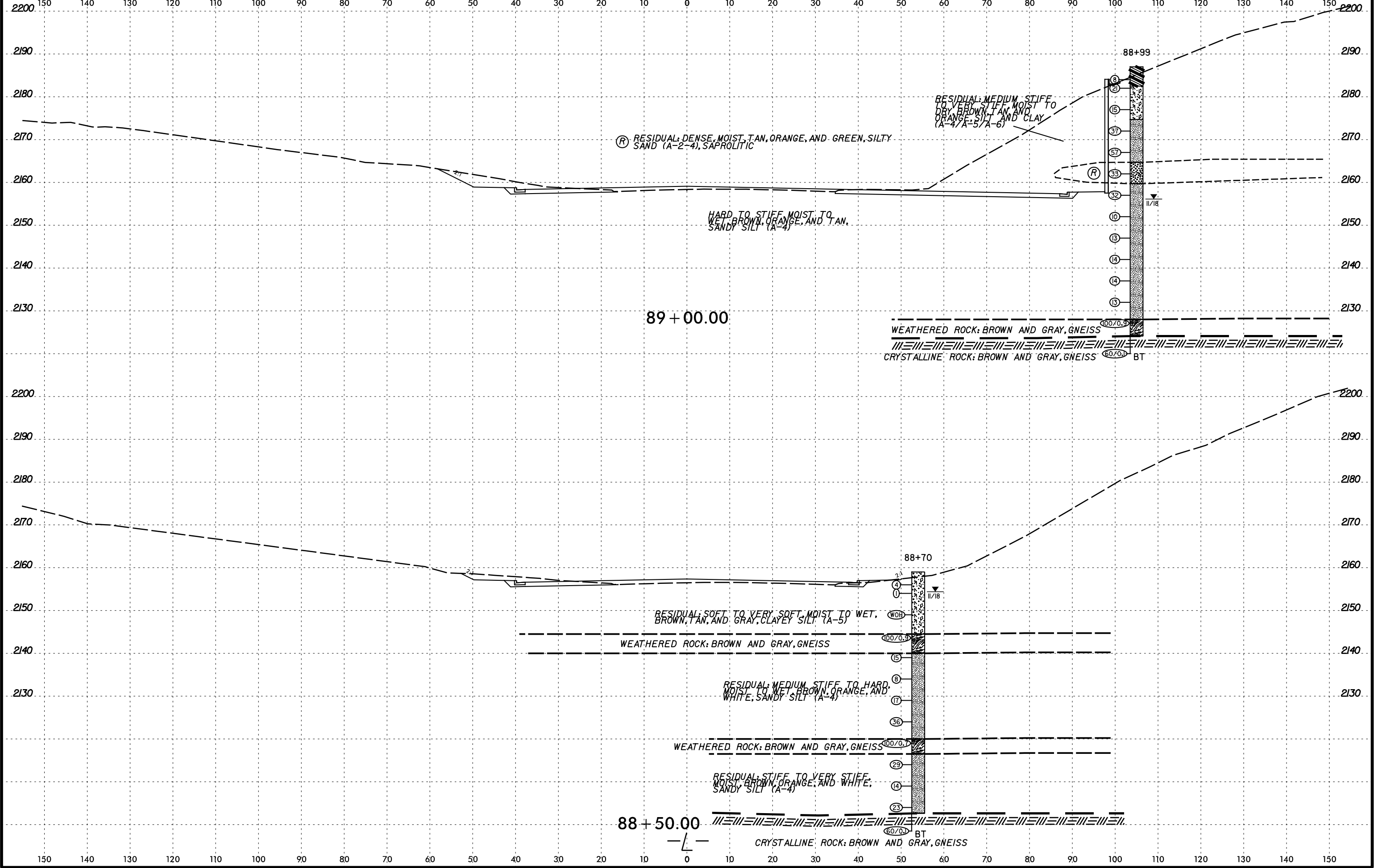
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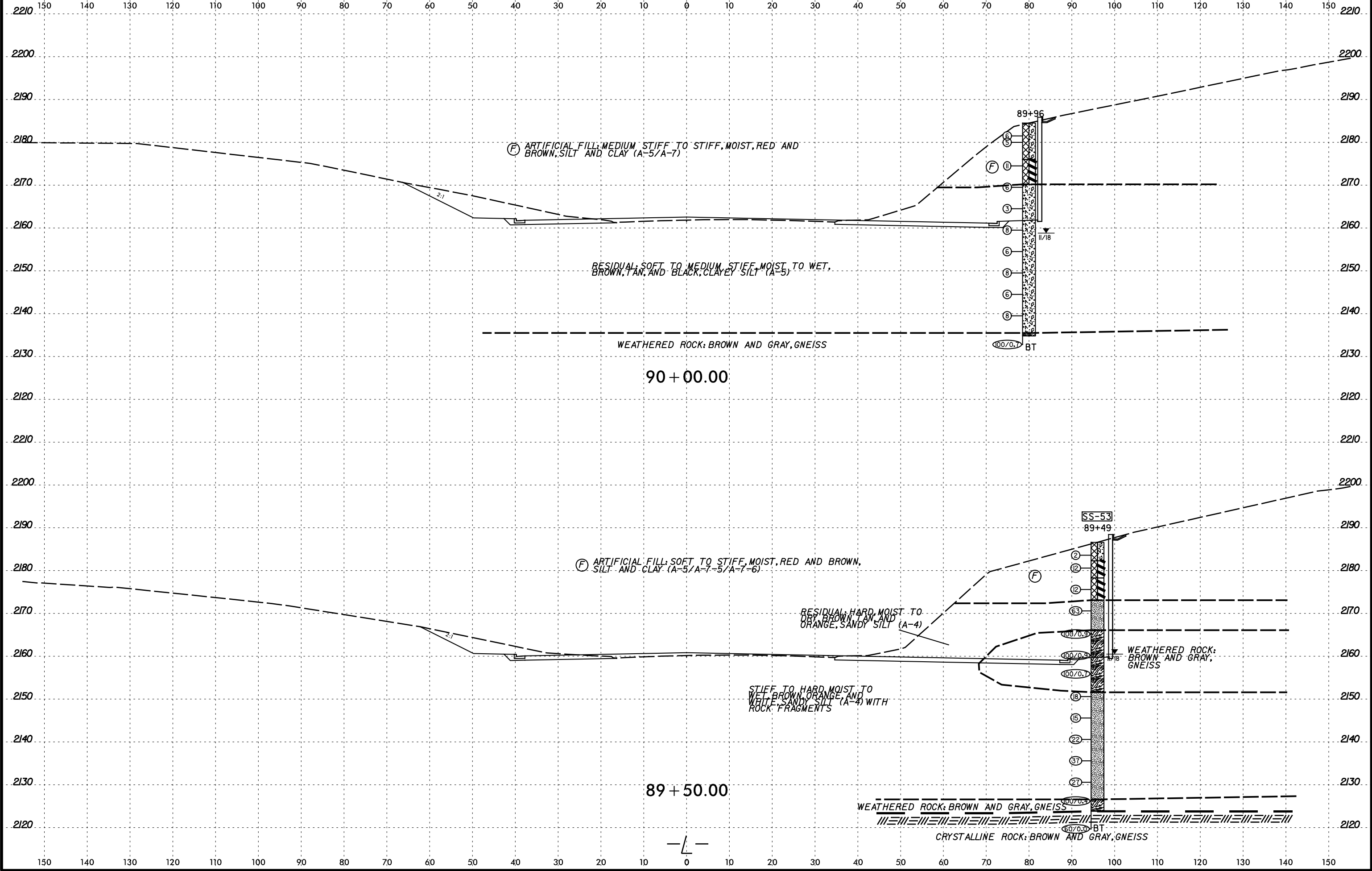
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R-5600	56



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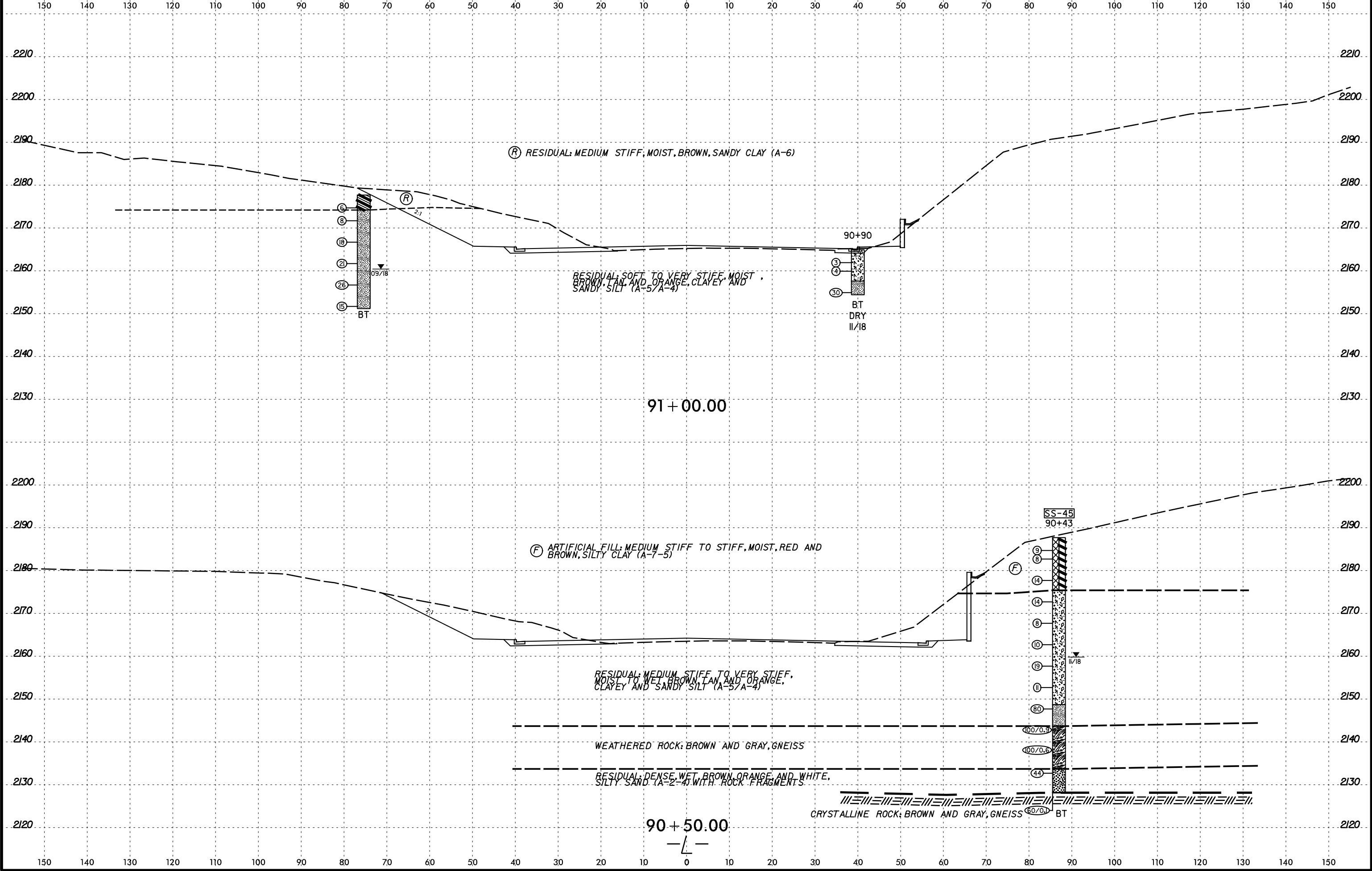
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R-5600	57



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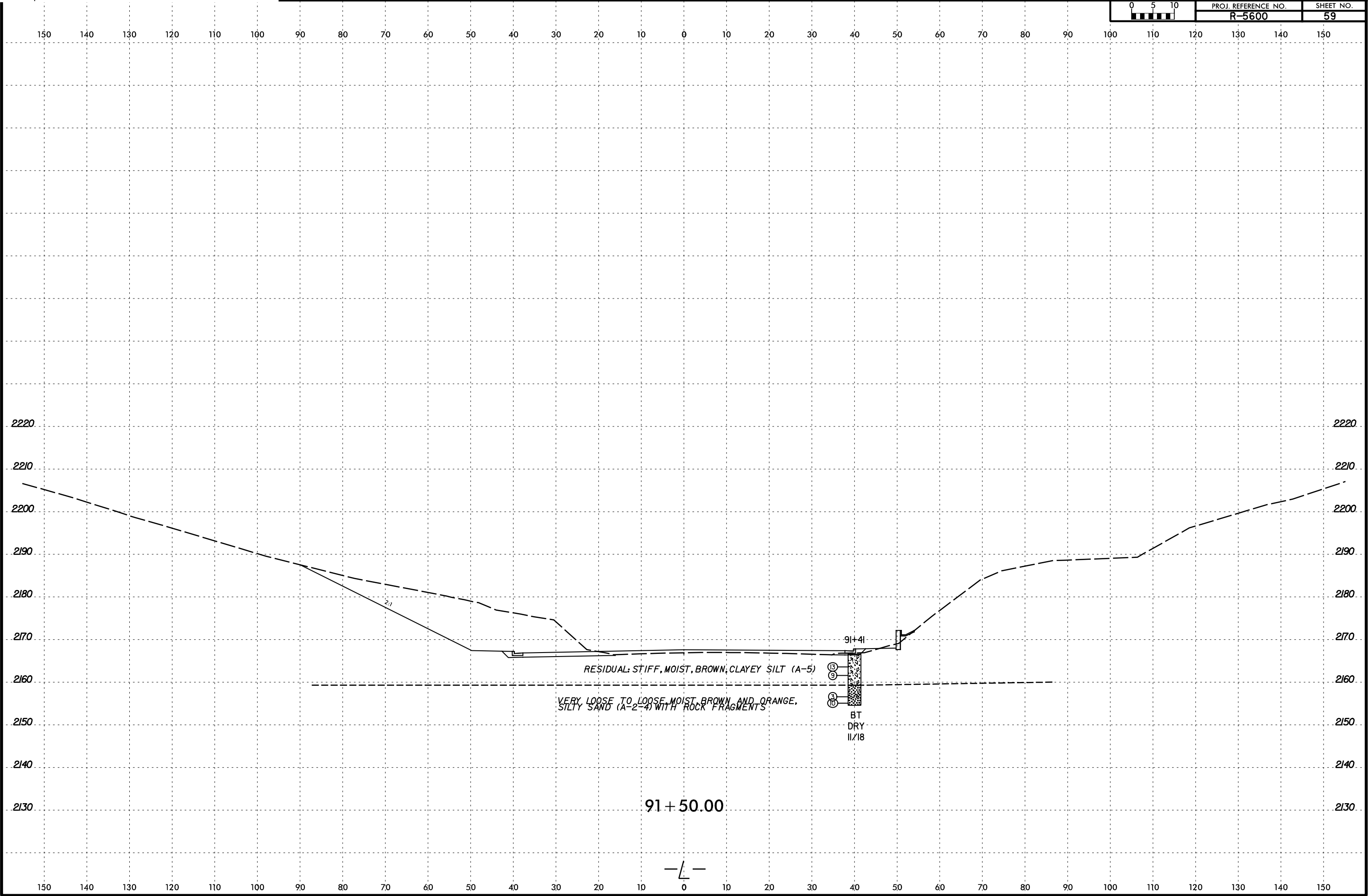


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R-5600	58



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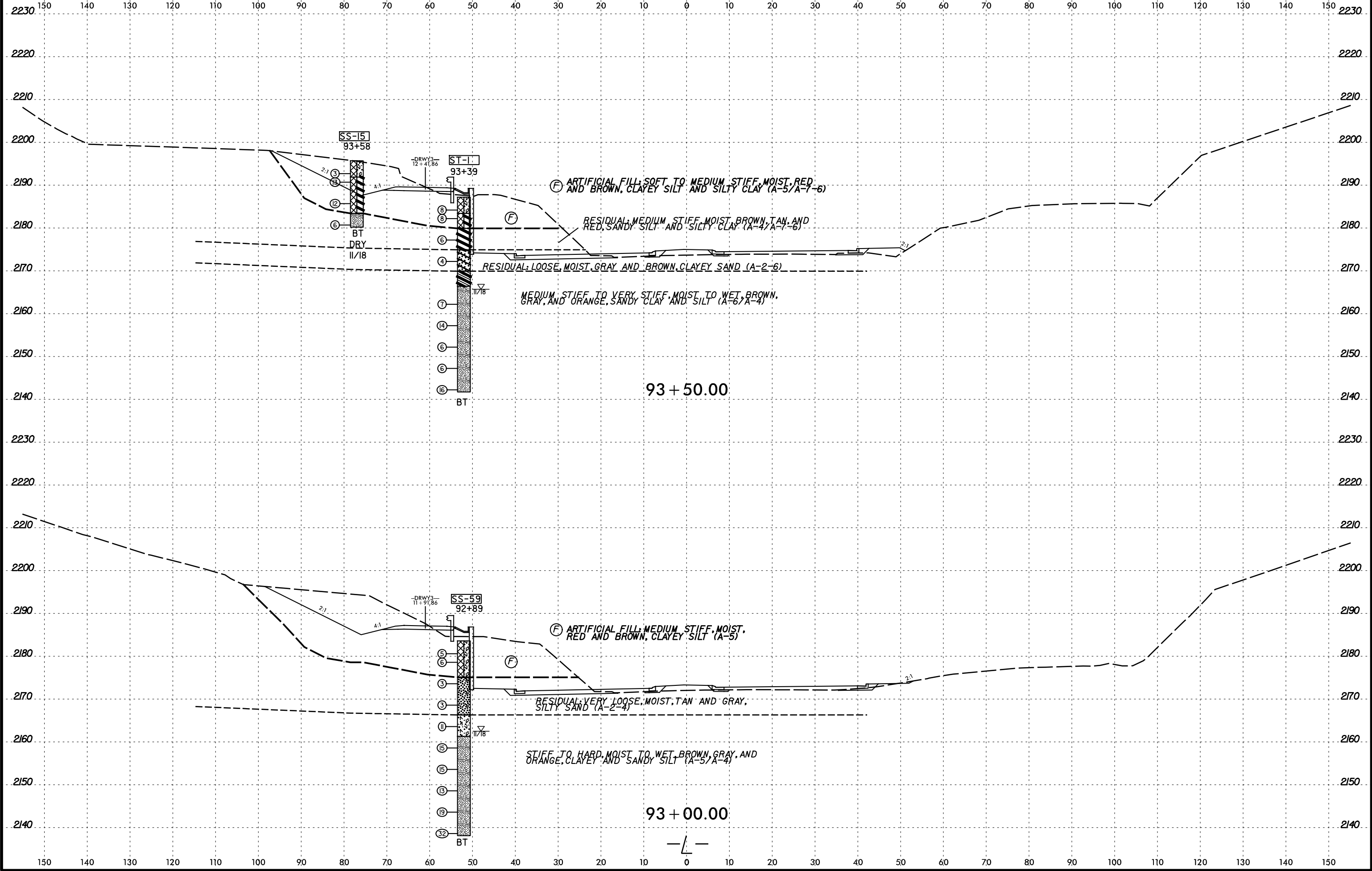




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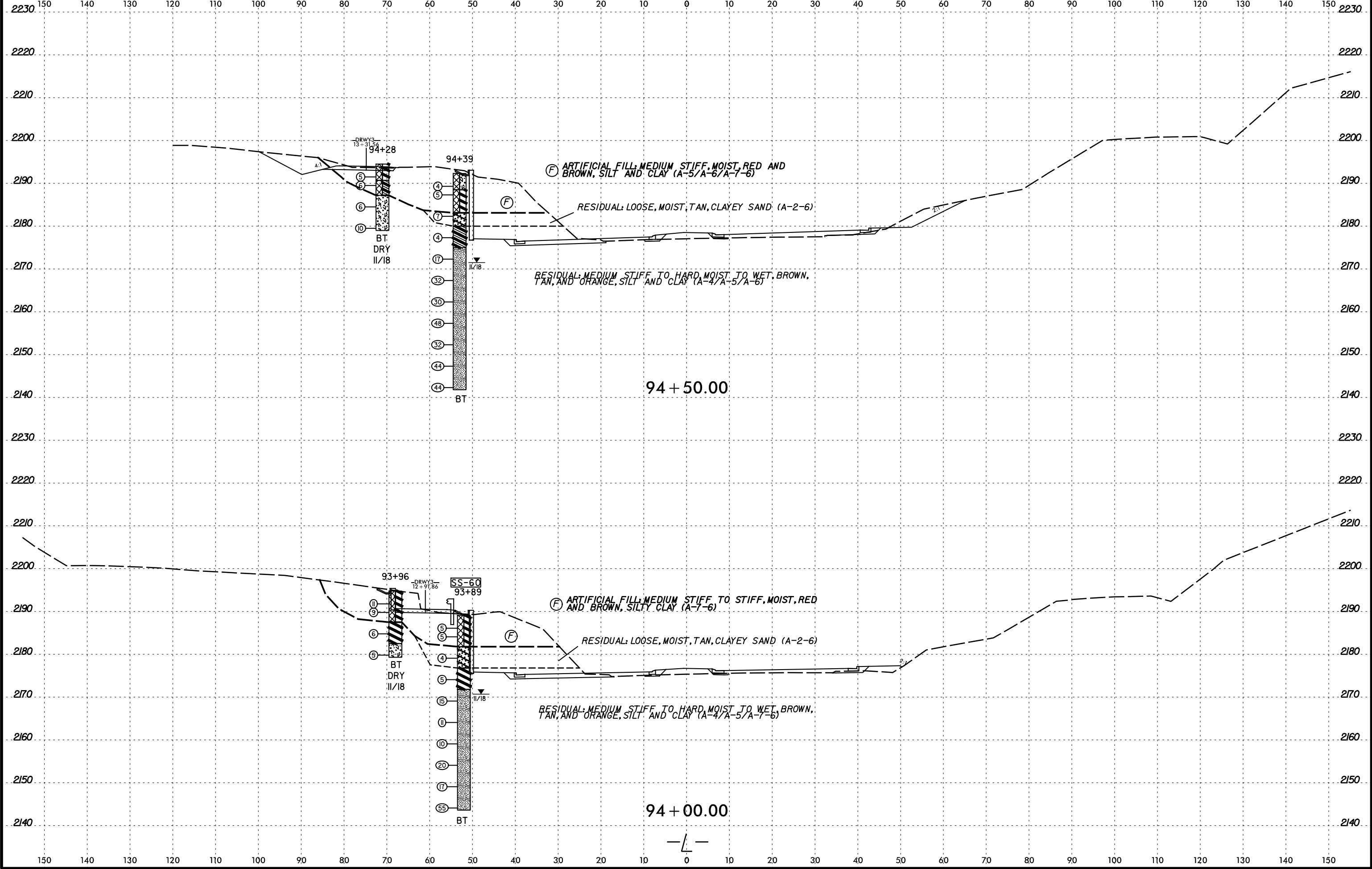
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PROJ. REFERENCE NO.	SHEET NO.
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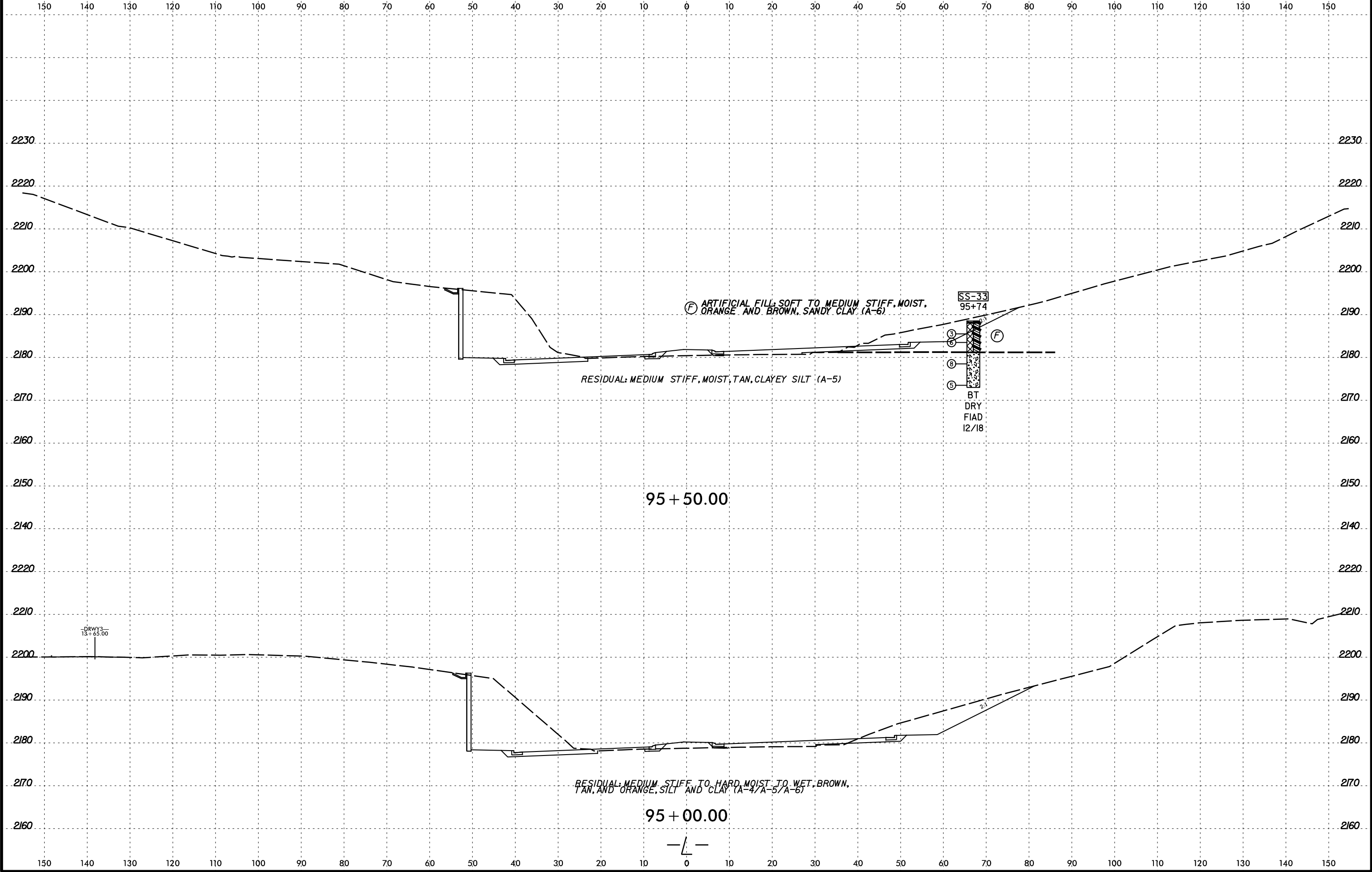


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SHEET NO.
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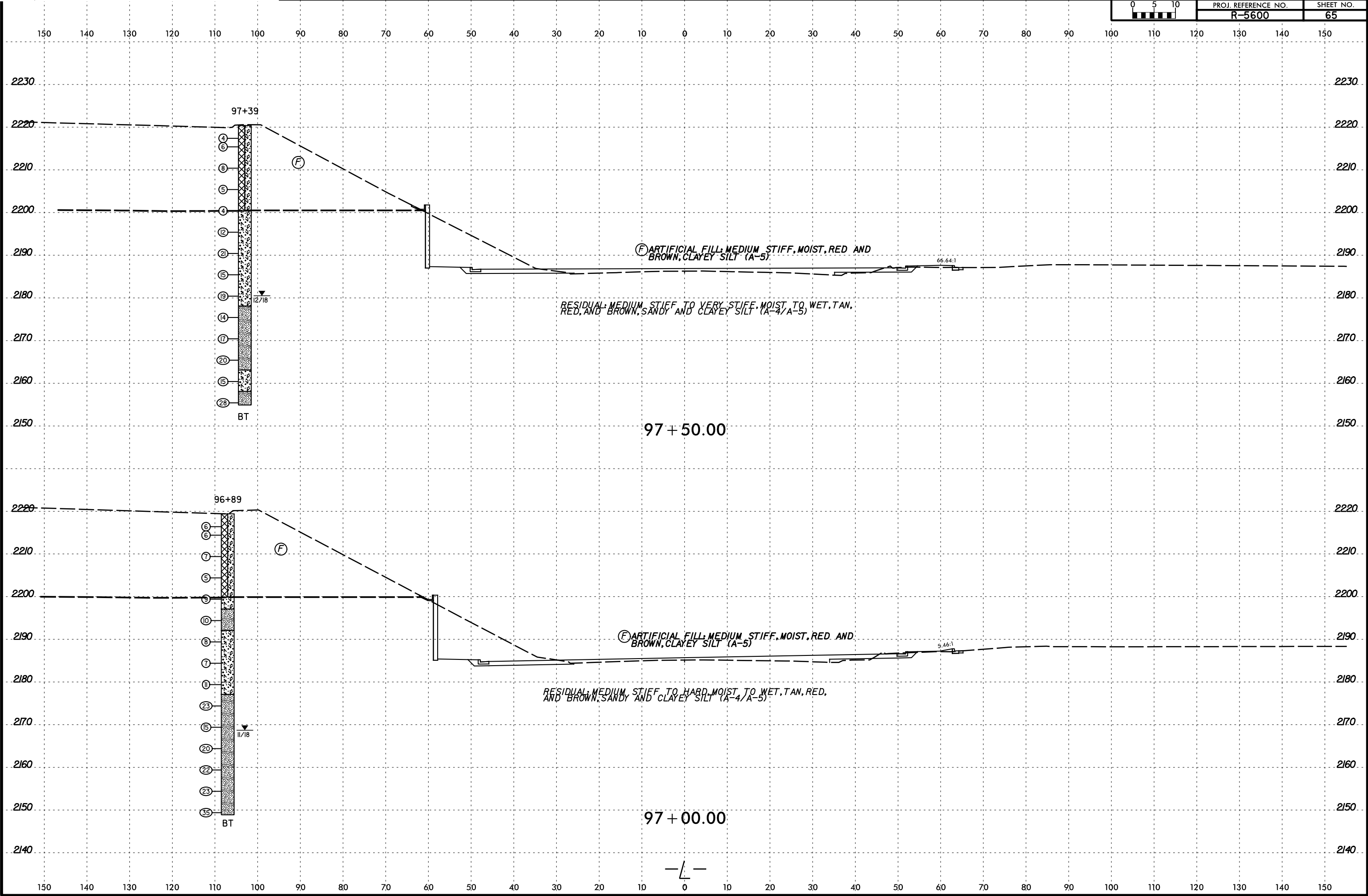




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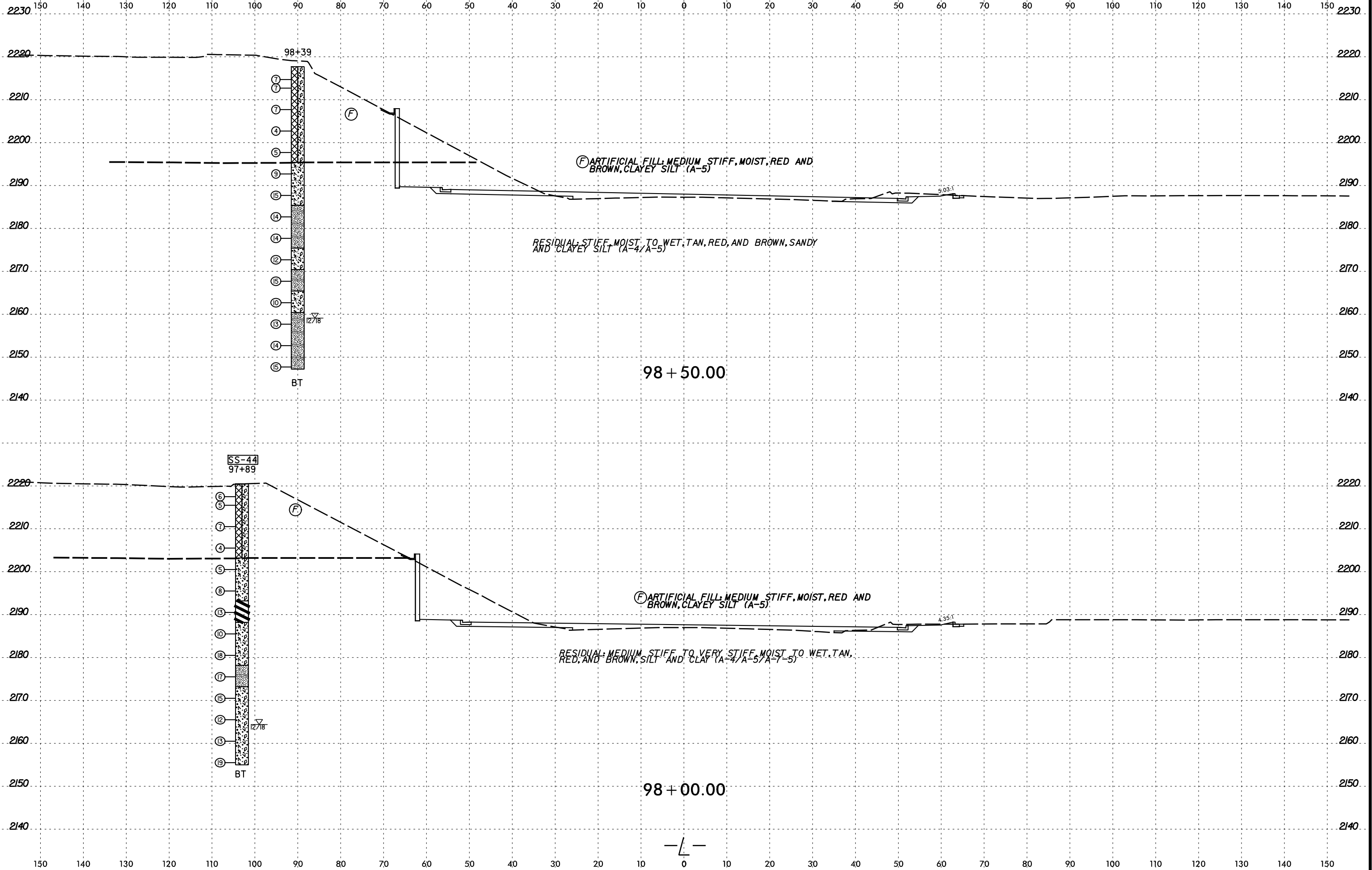
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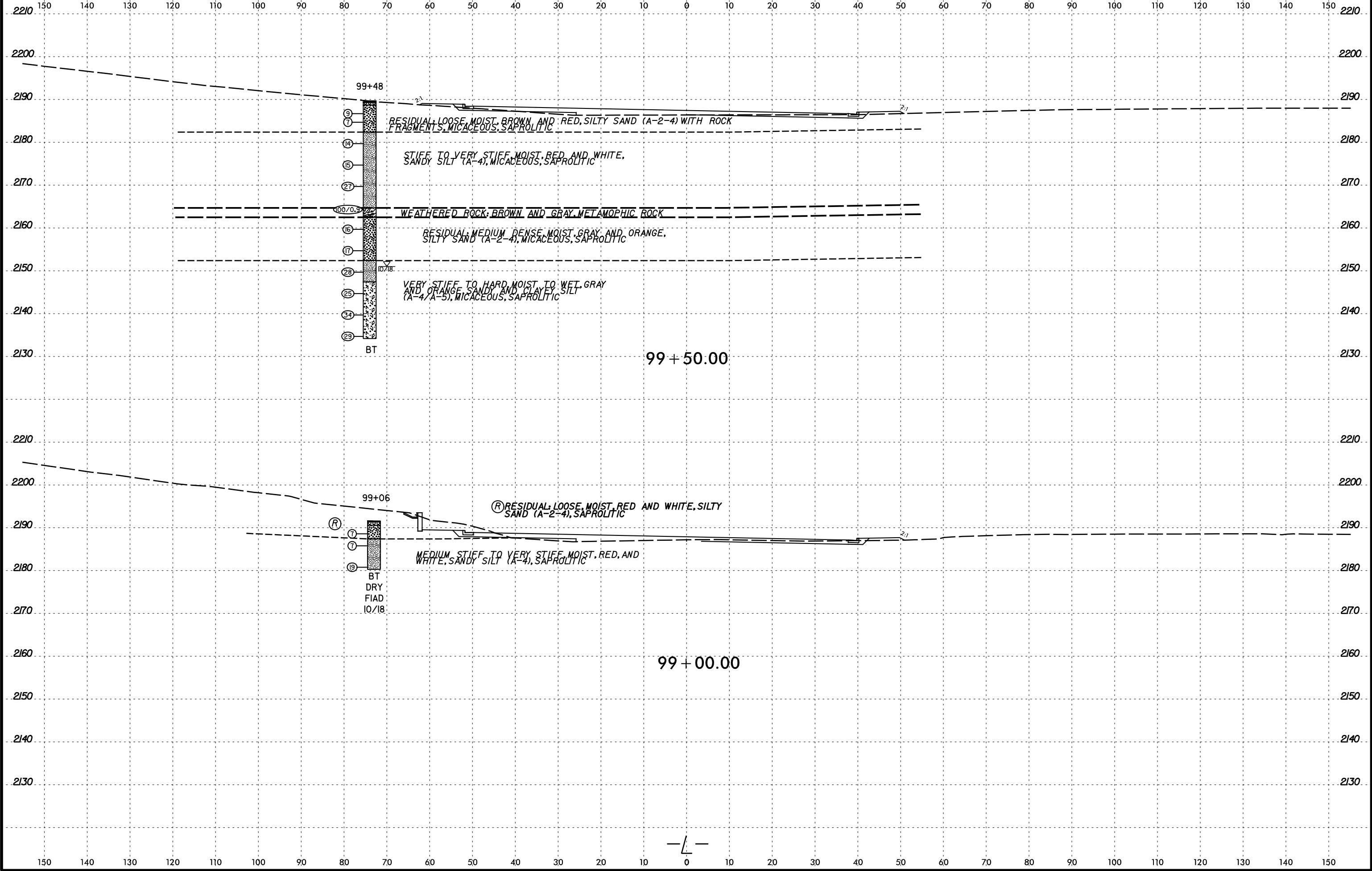
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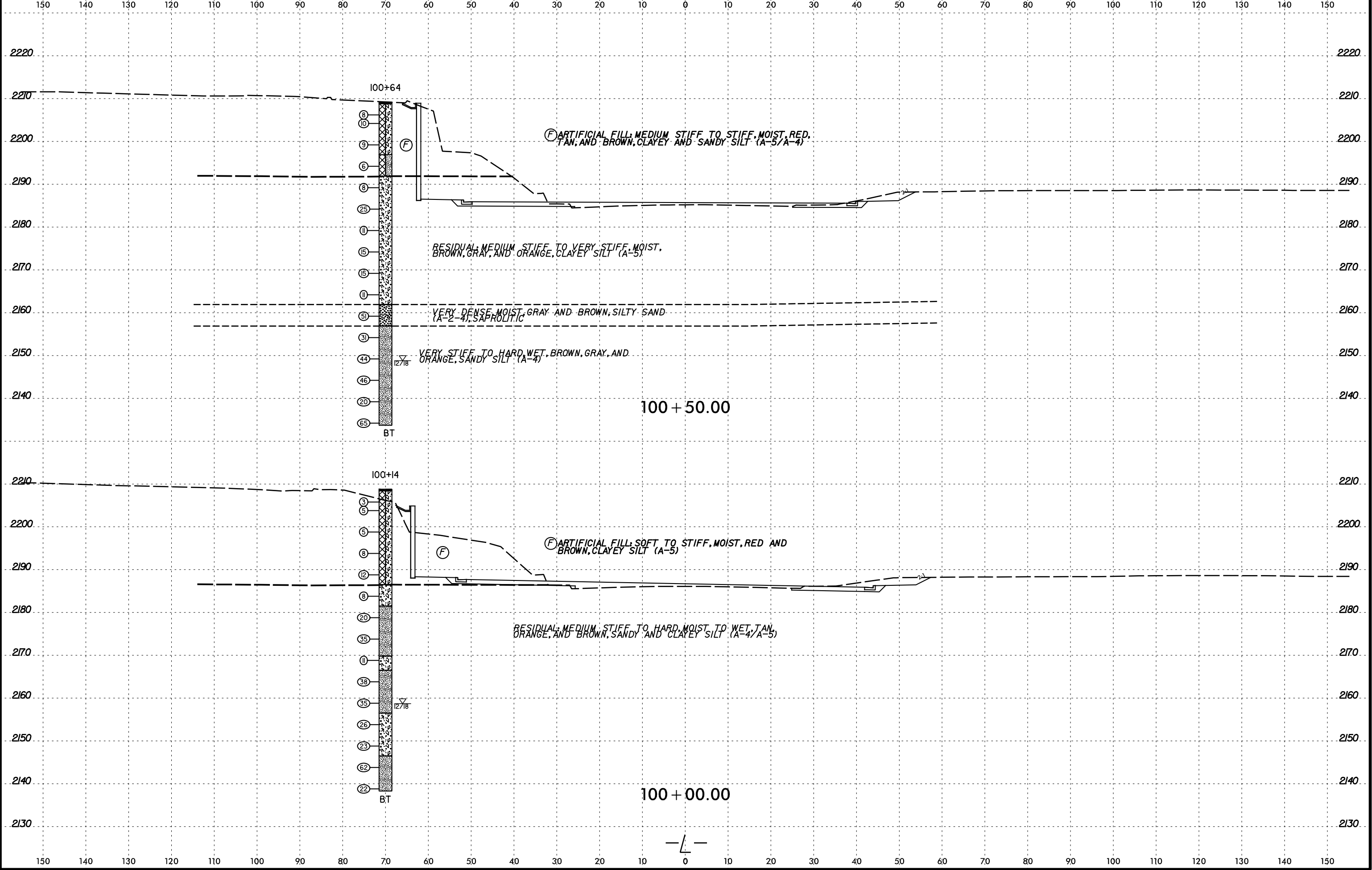


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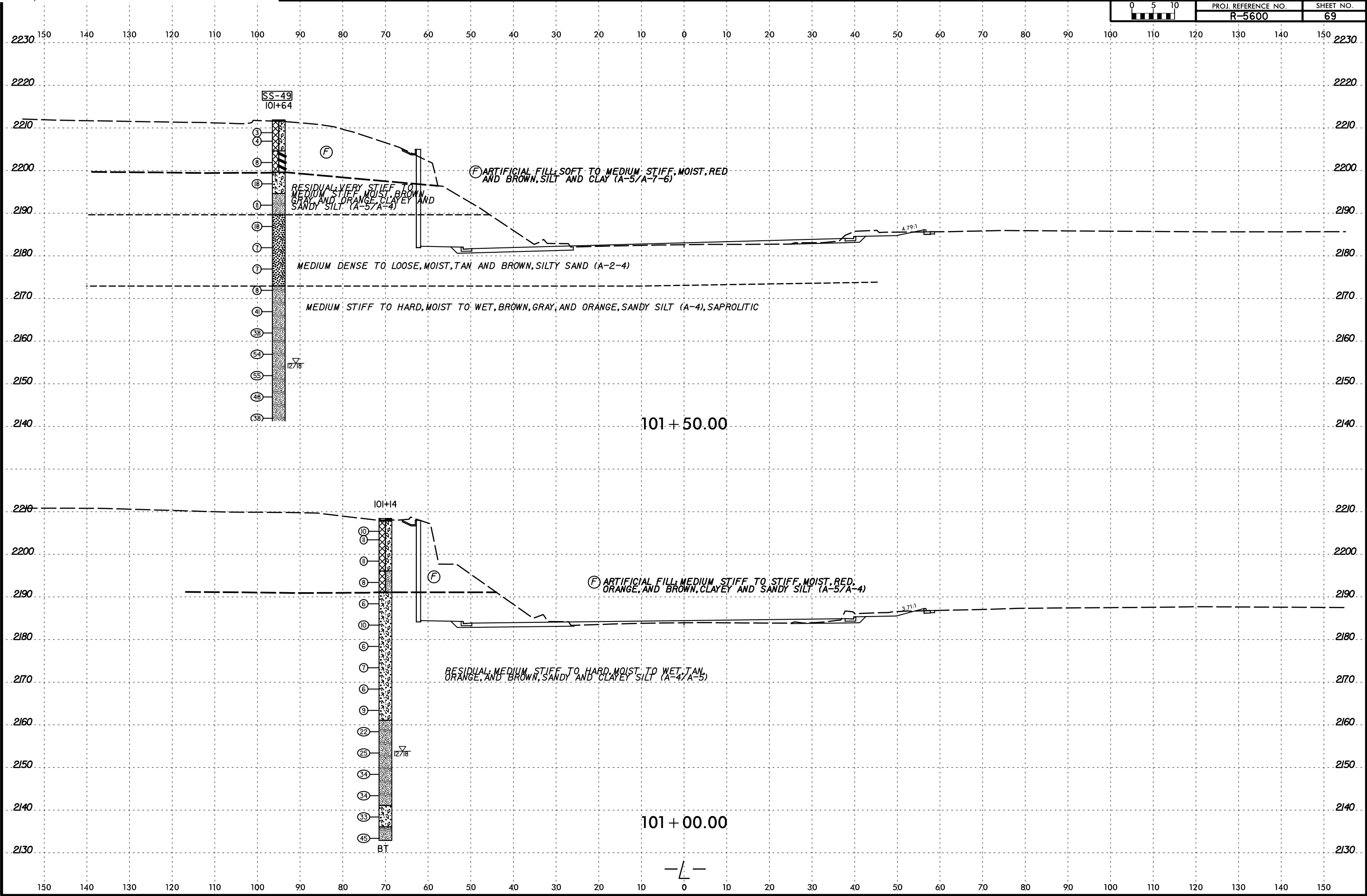
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			R-5600	68



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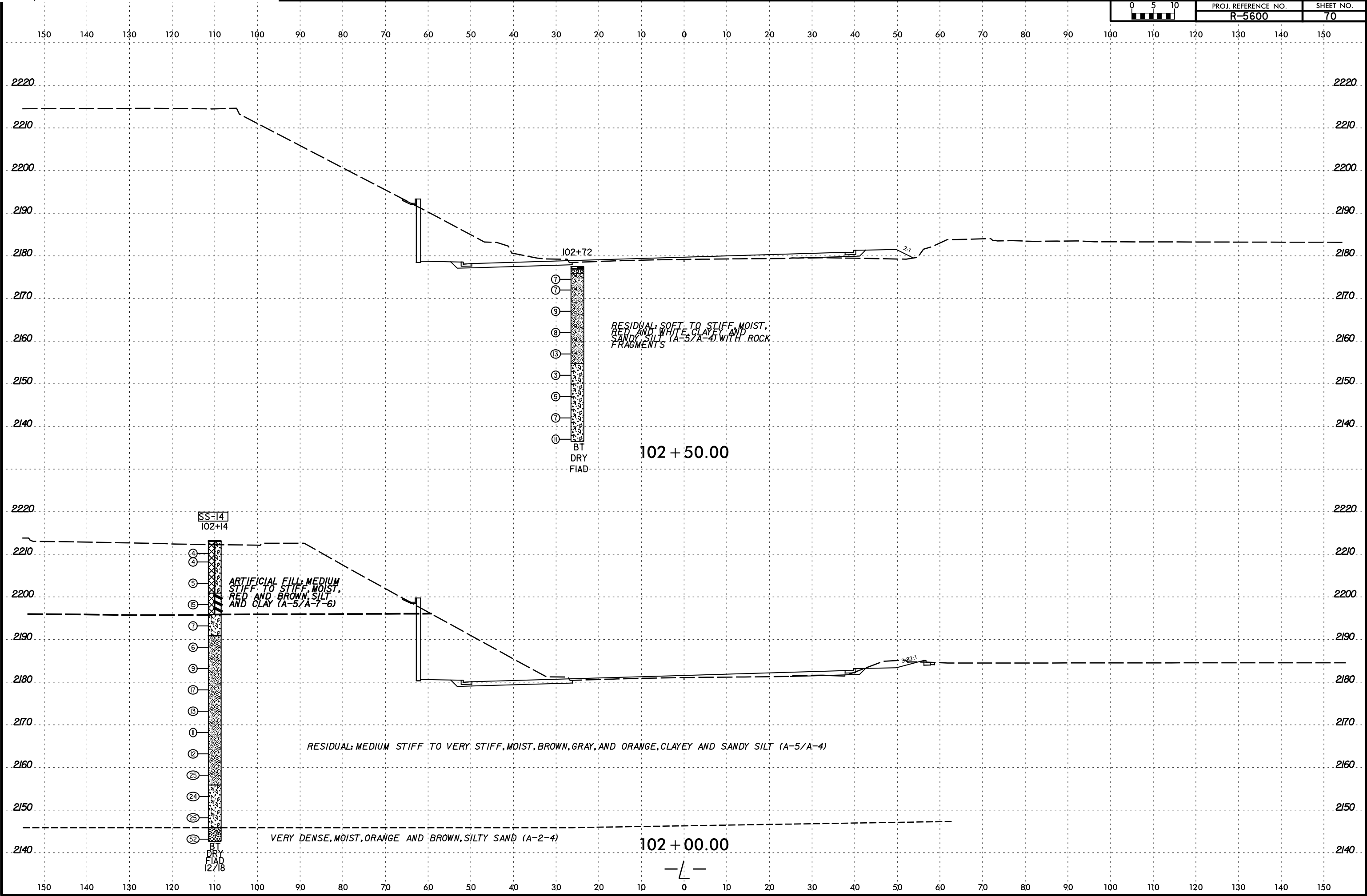
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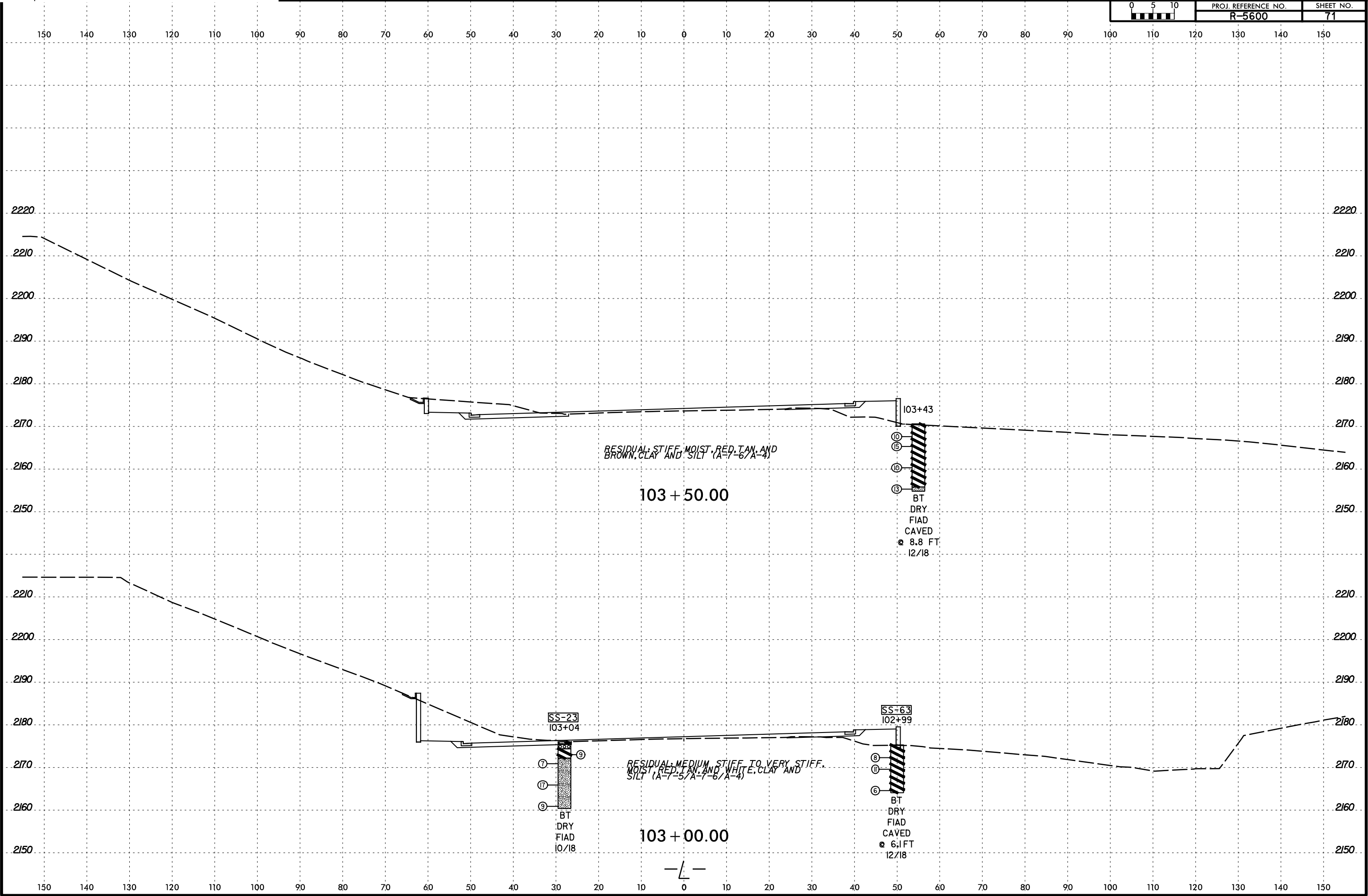
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PROJ. REFERENCE NO.	SHEET NO.
R-5600	70



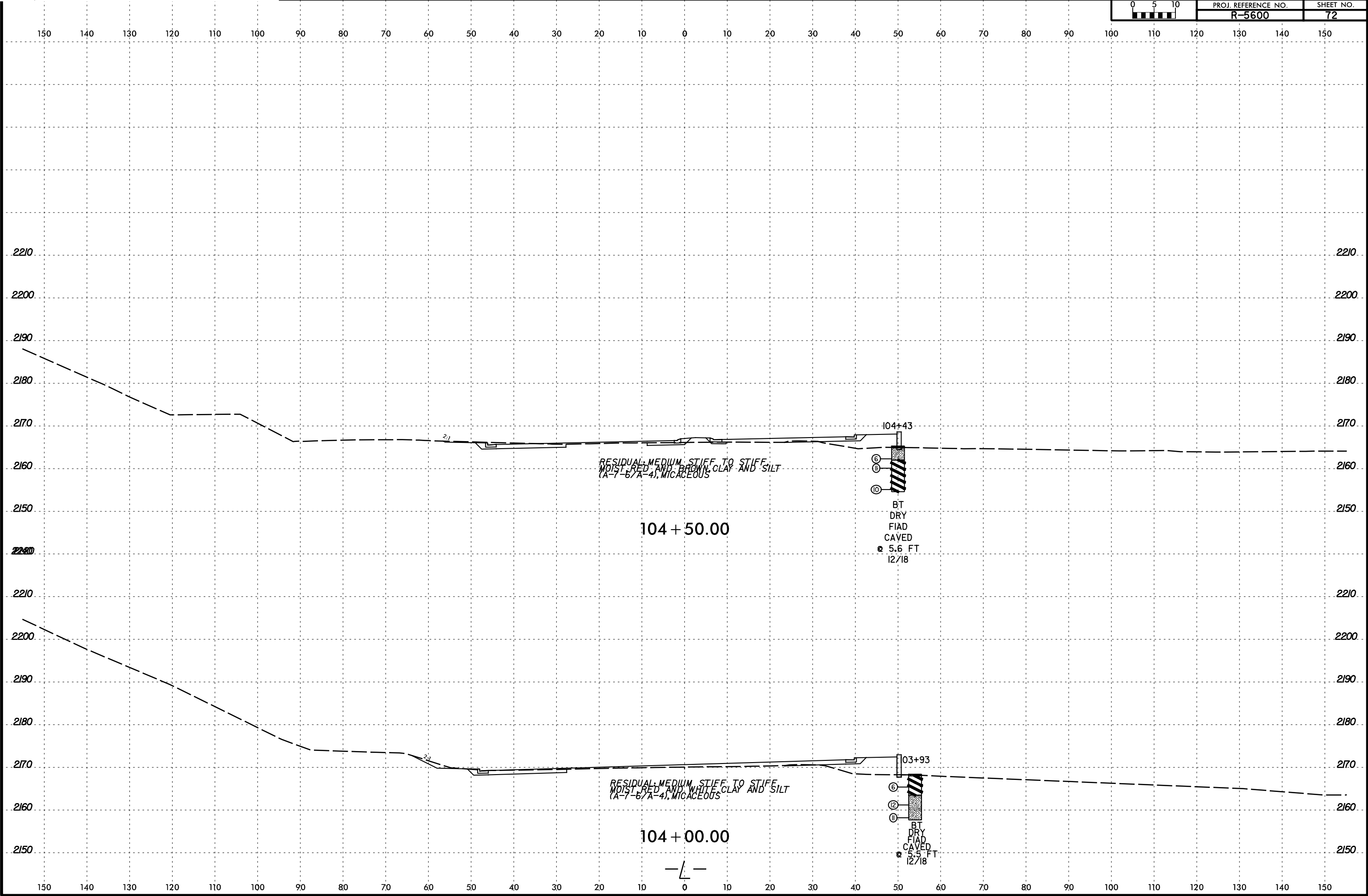
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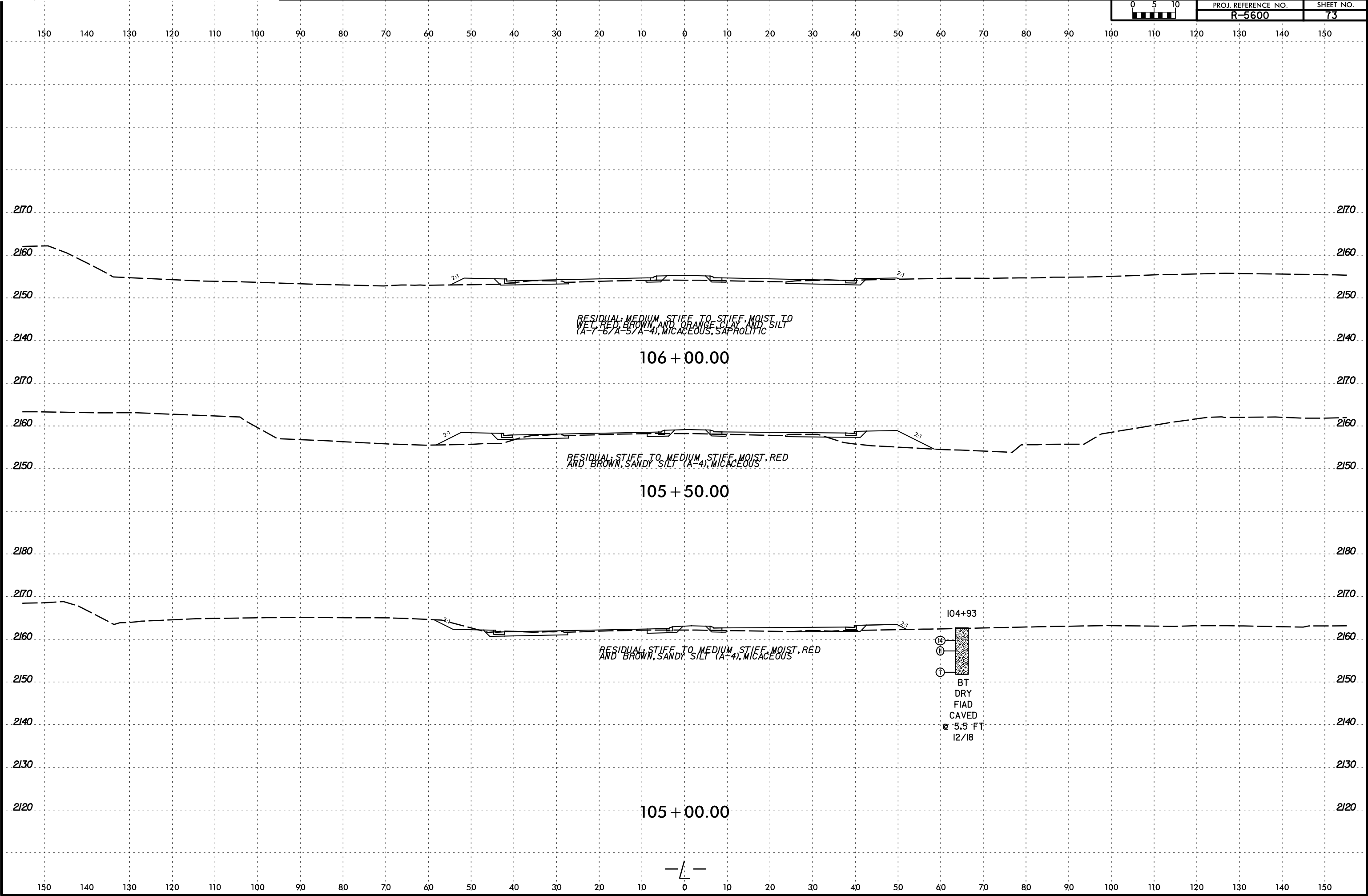
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R-5600	72



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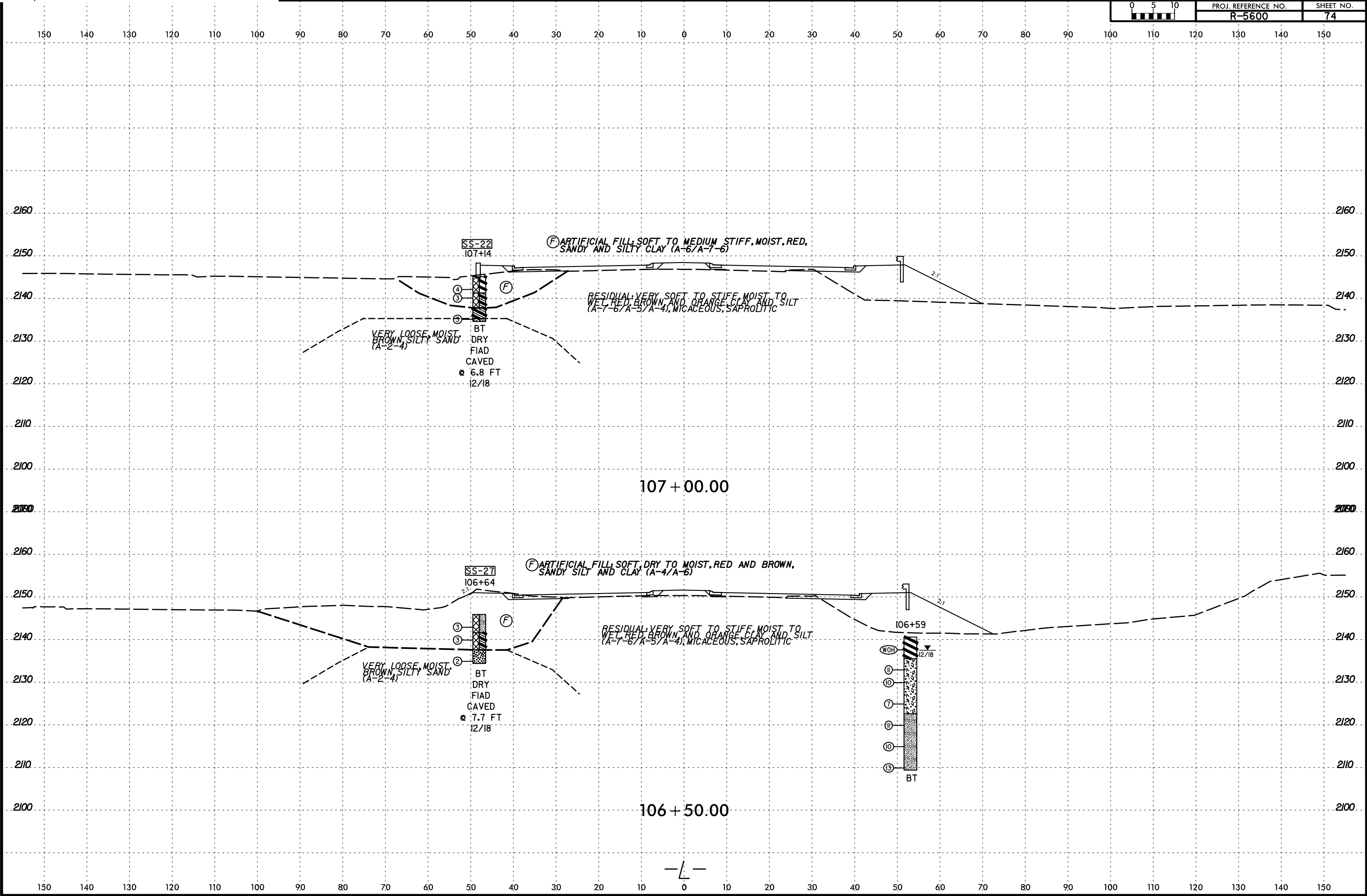
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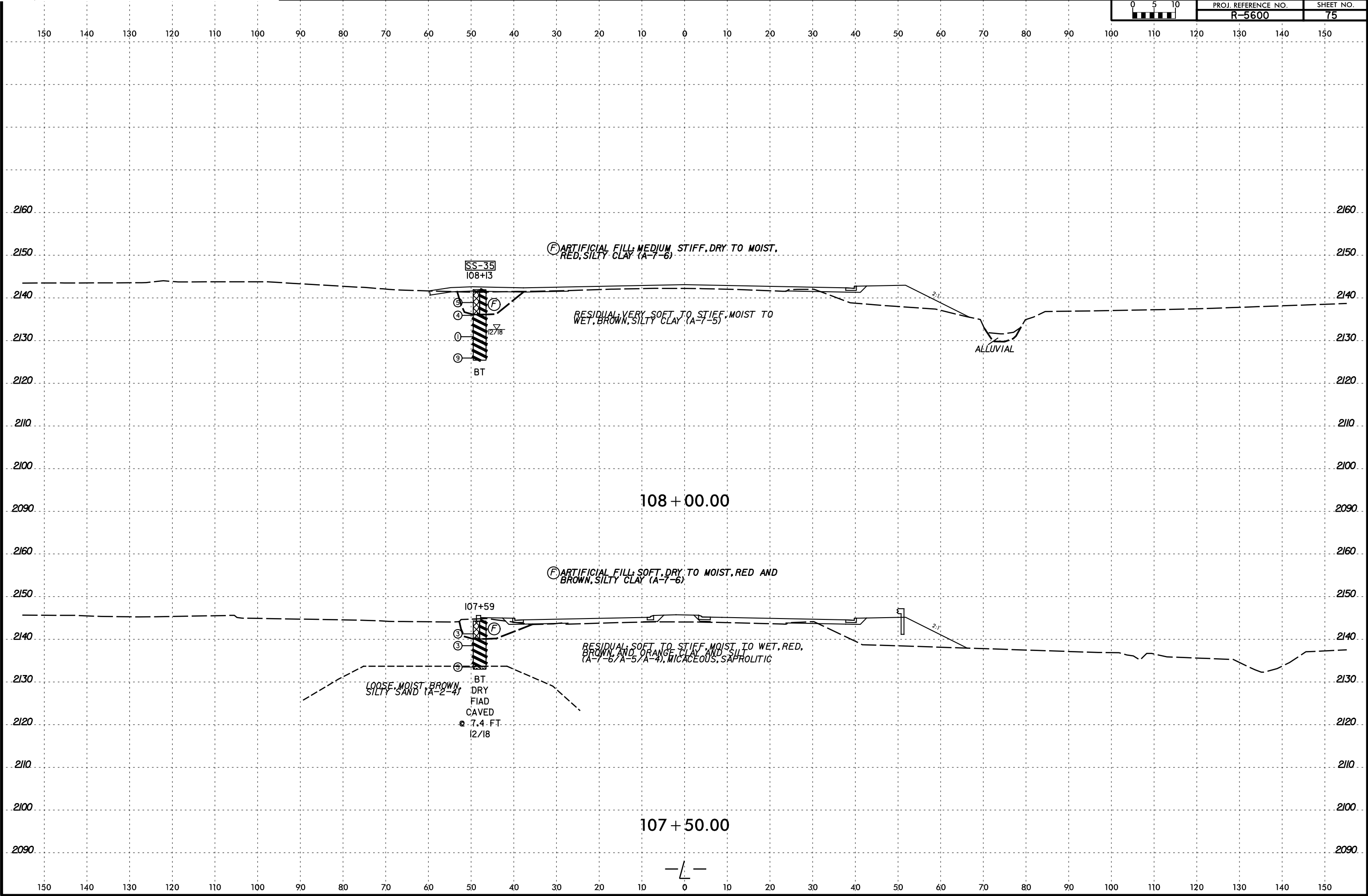
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R-5600	74



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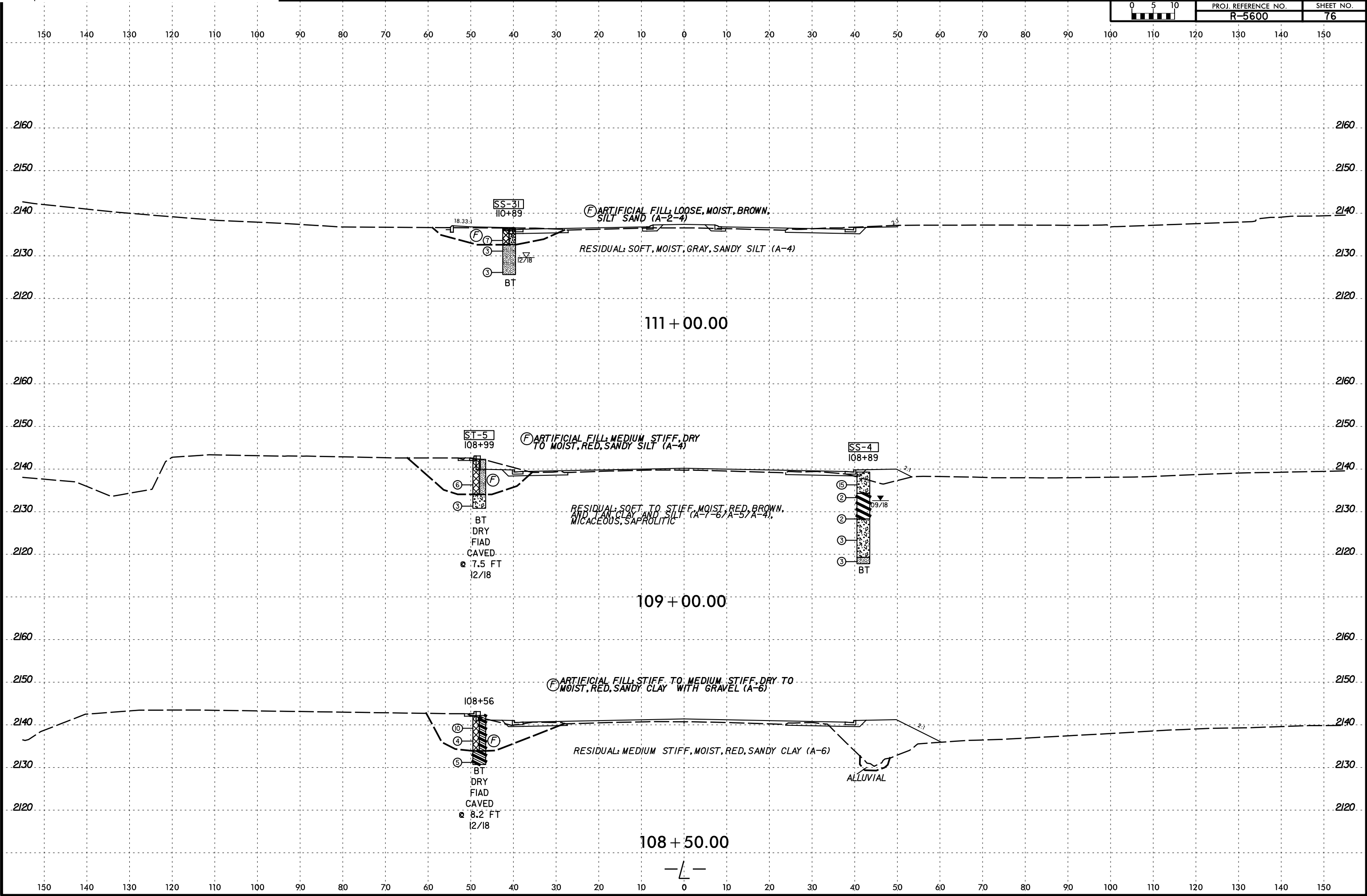
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R-5600	75



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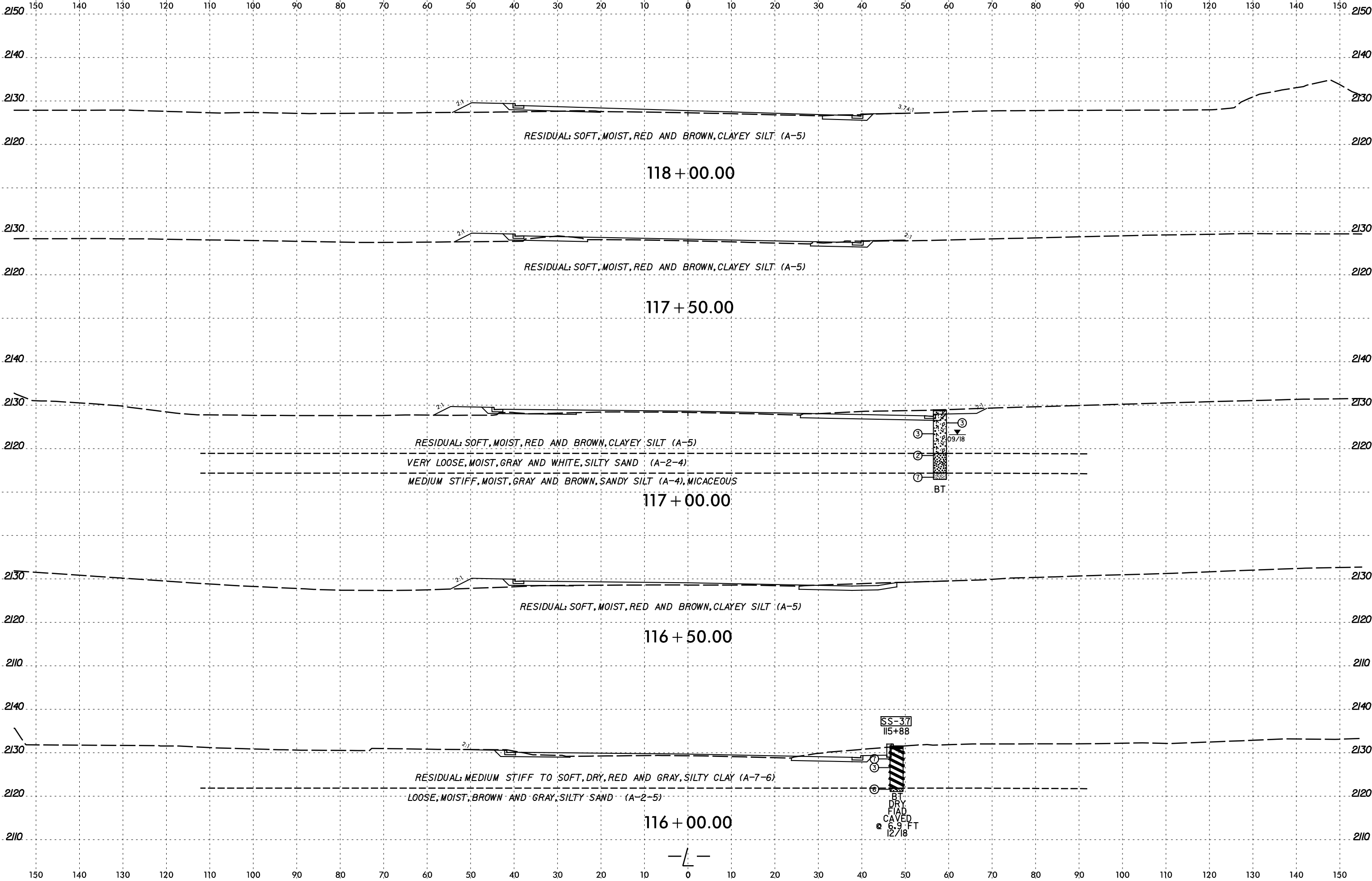
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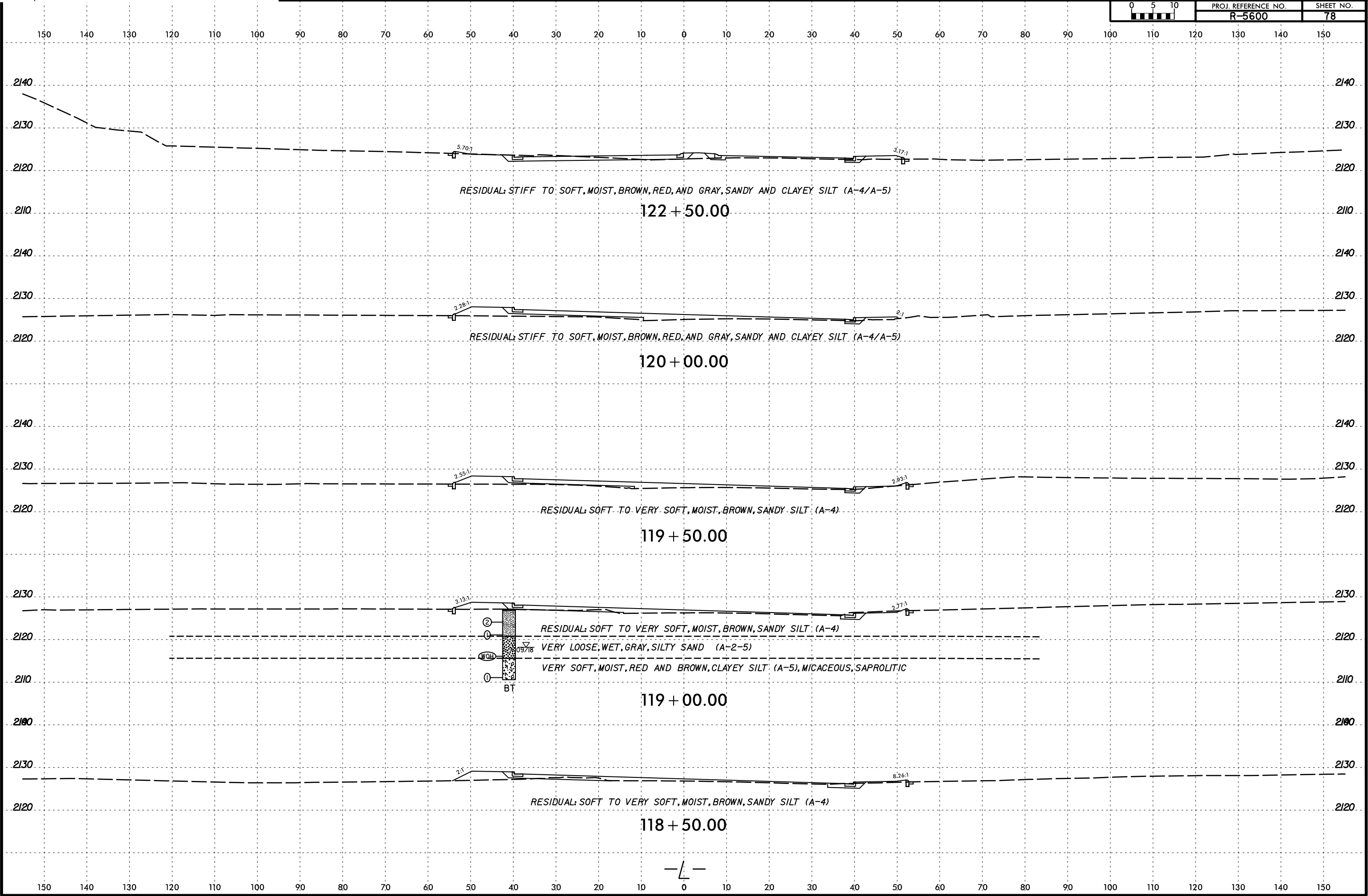
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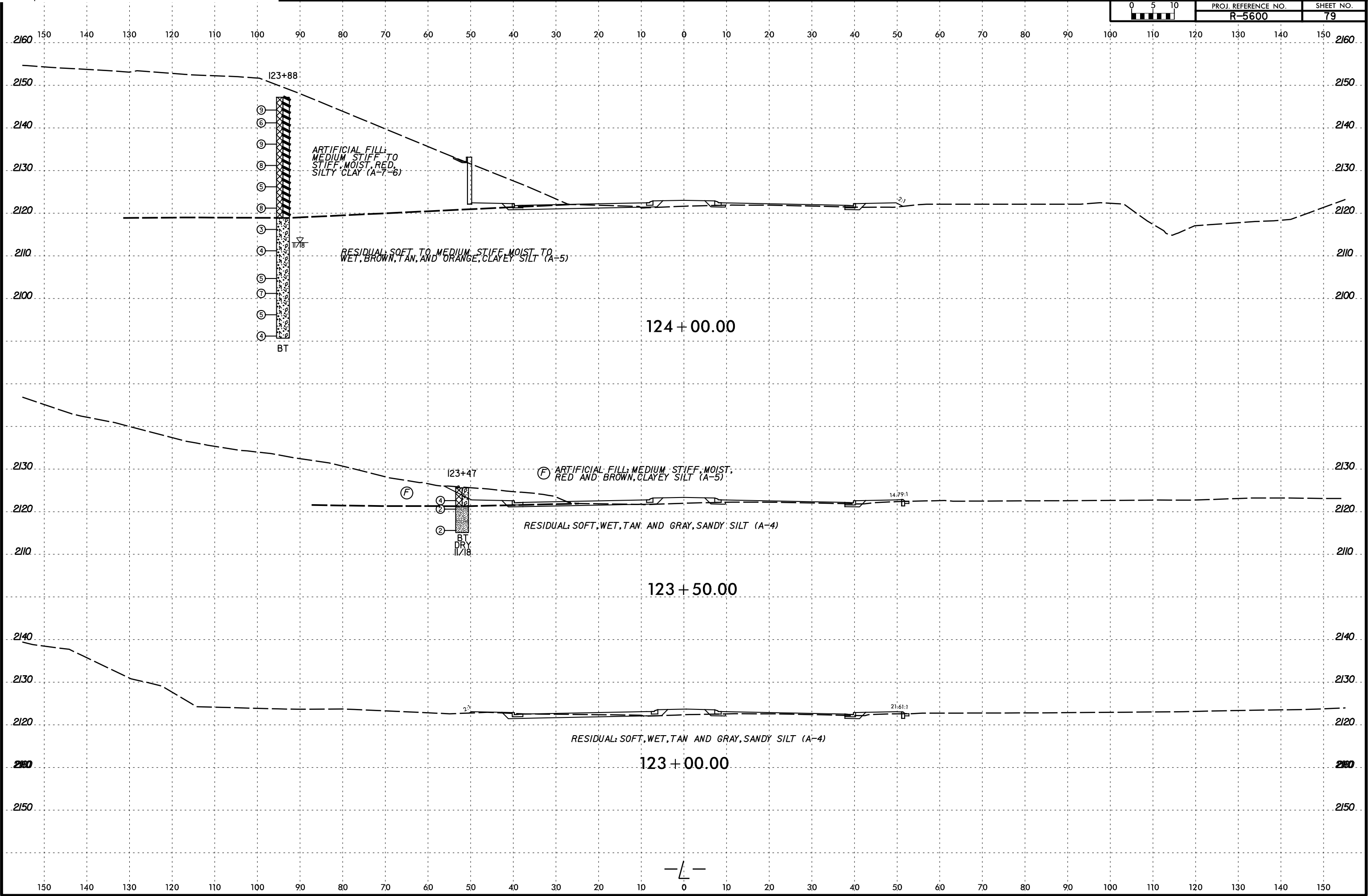
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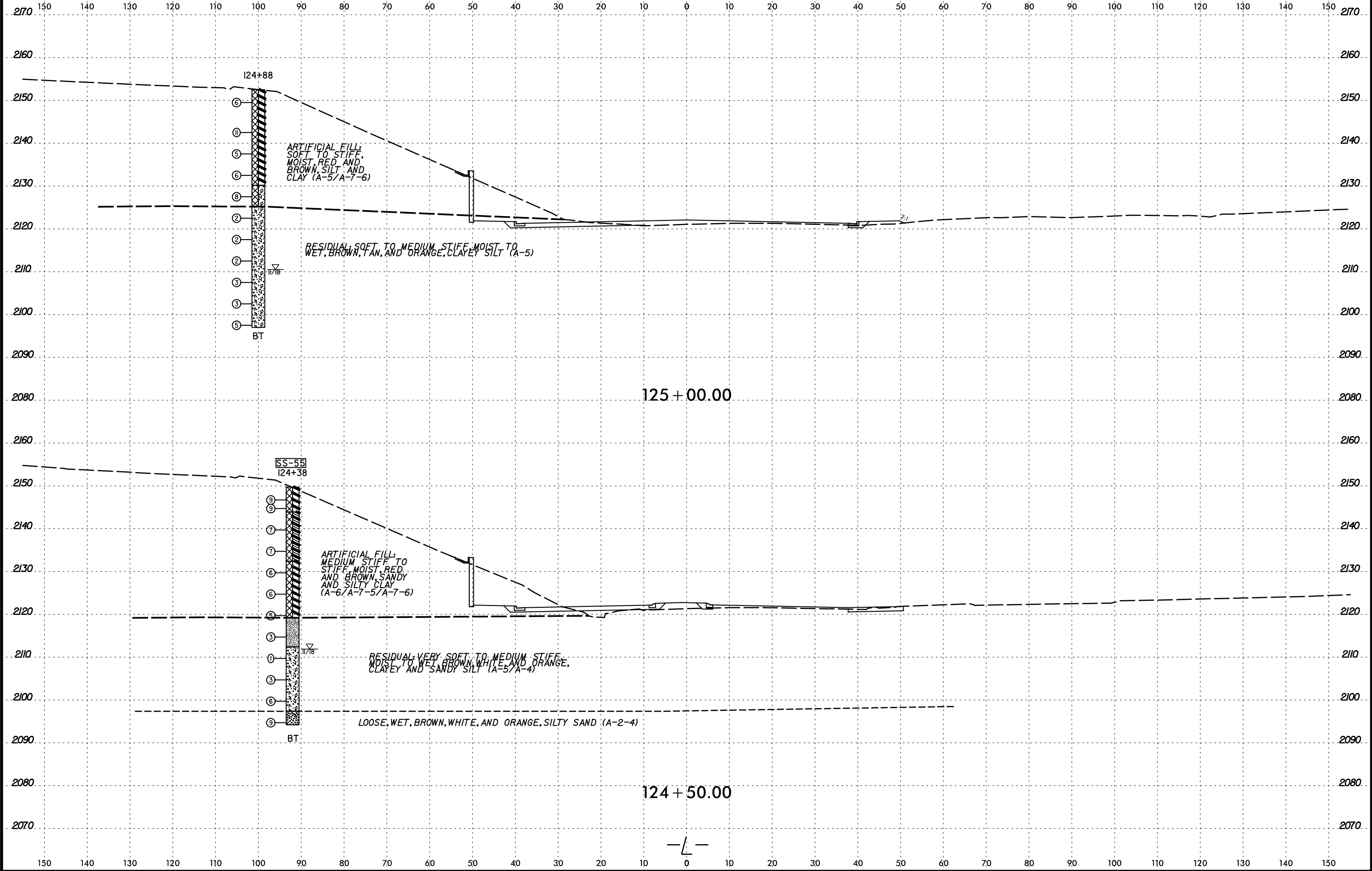


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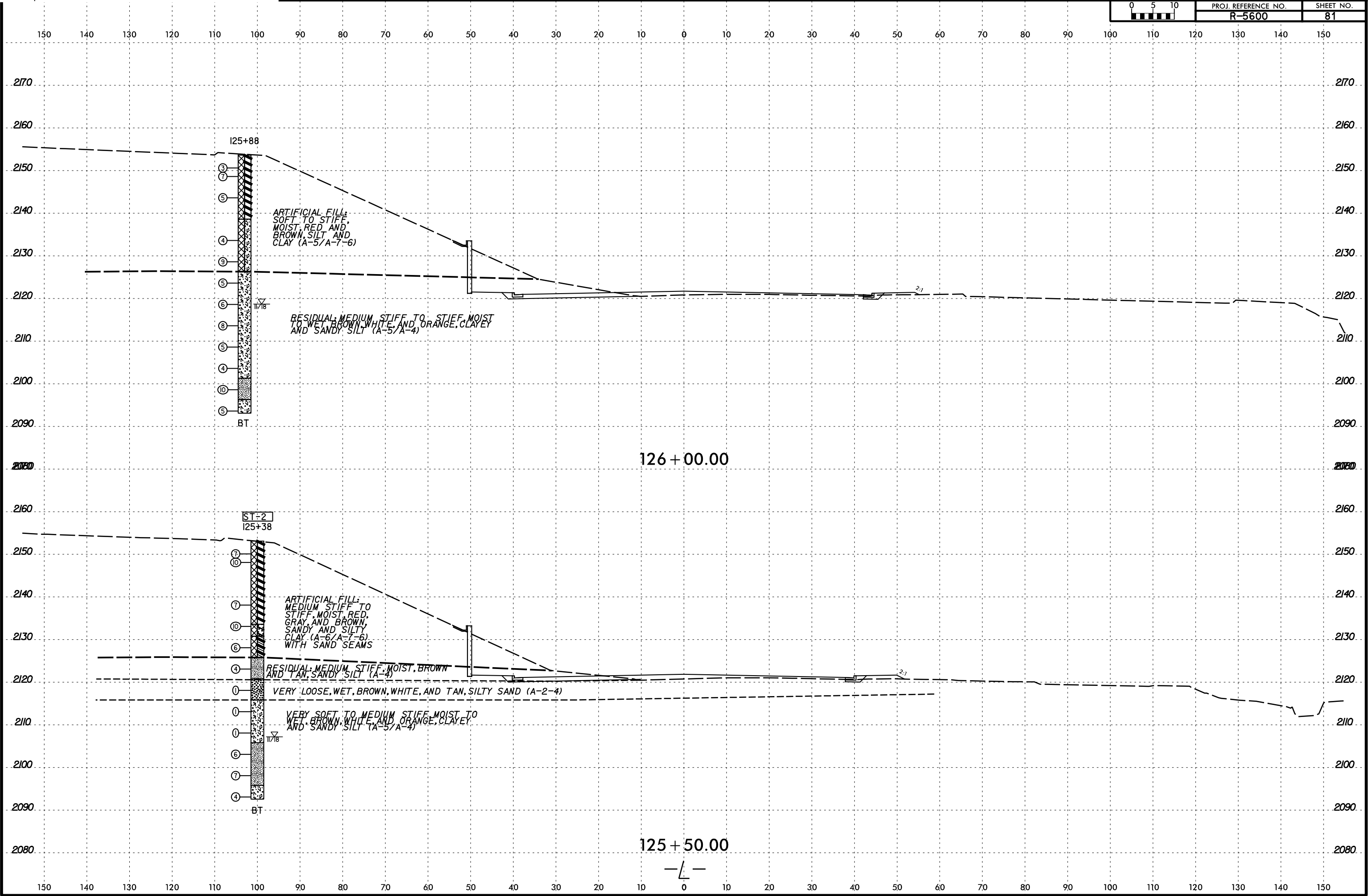


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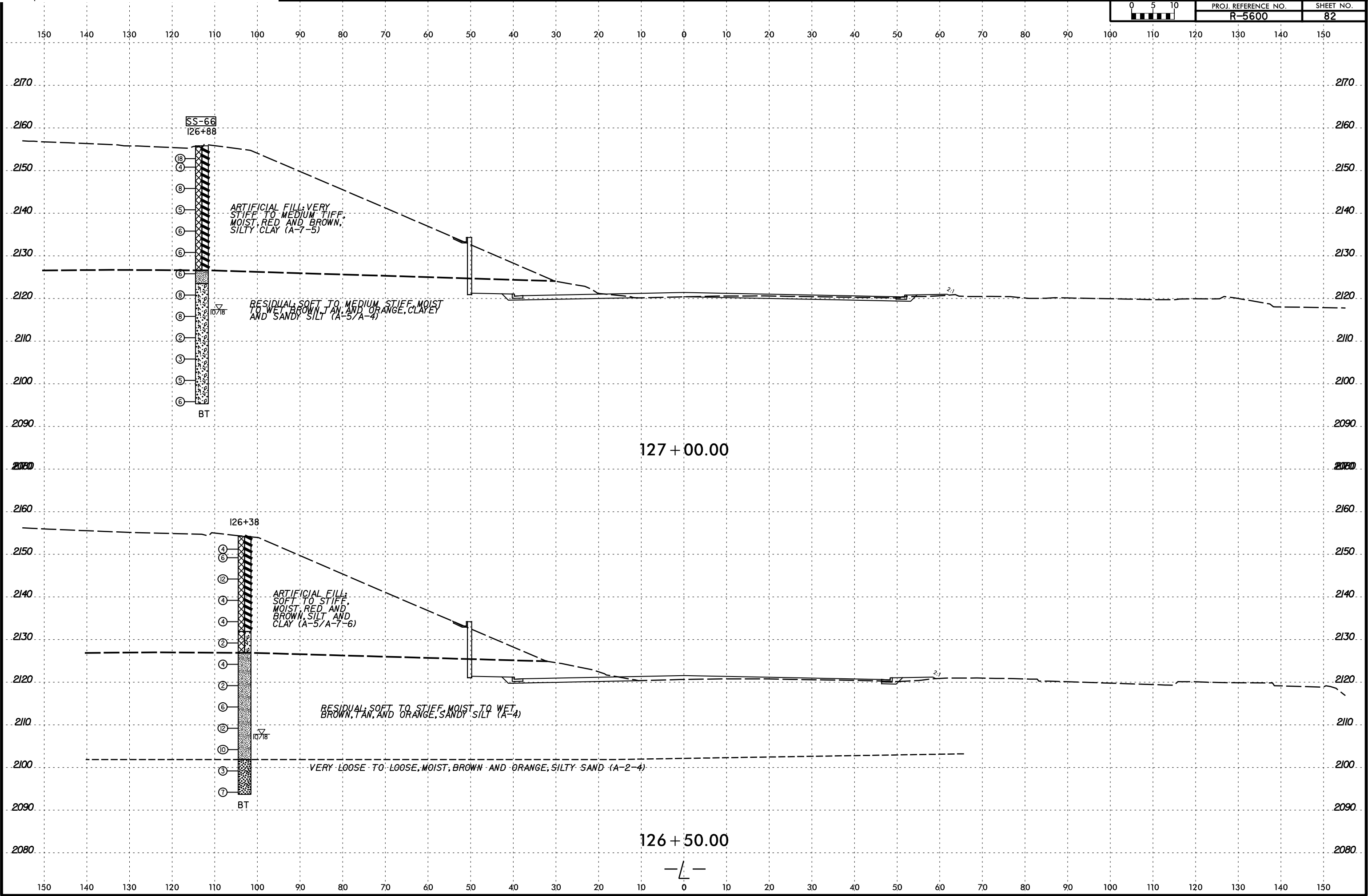
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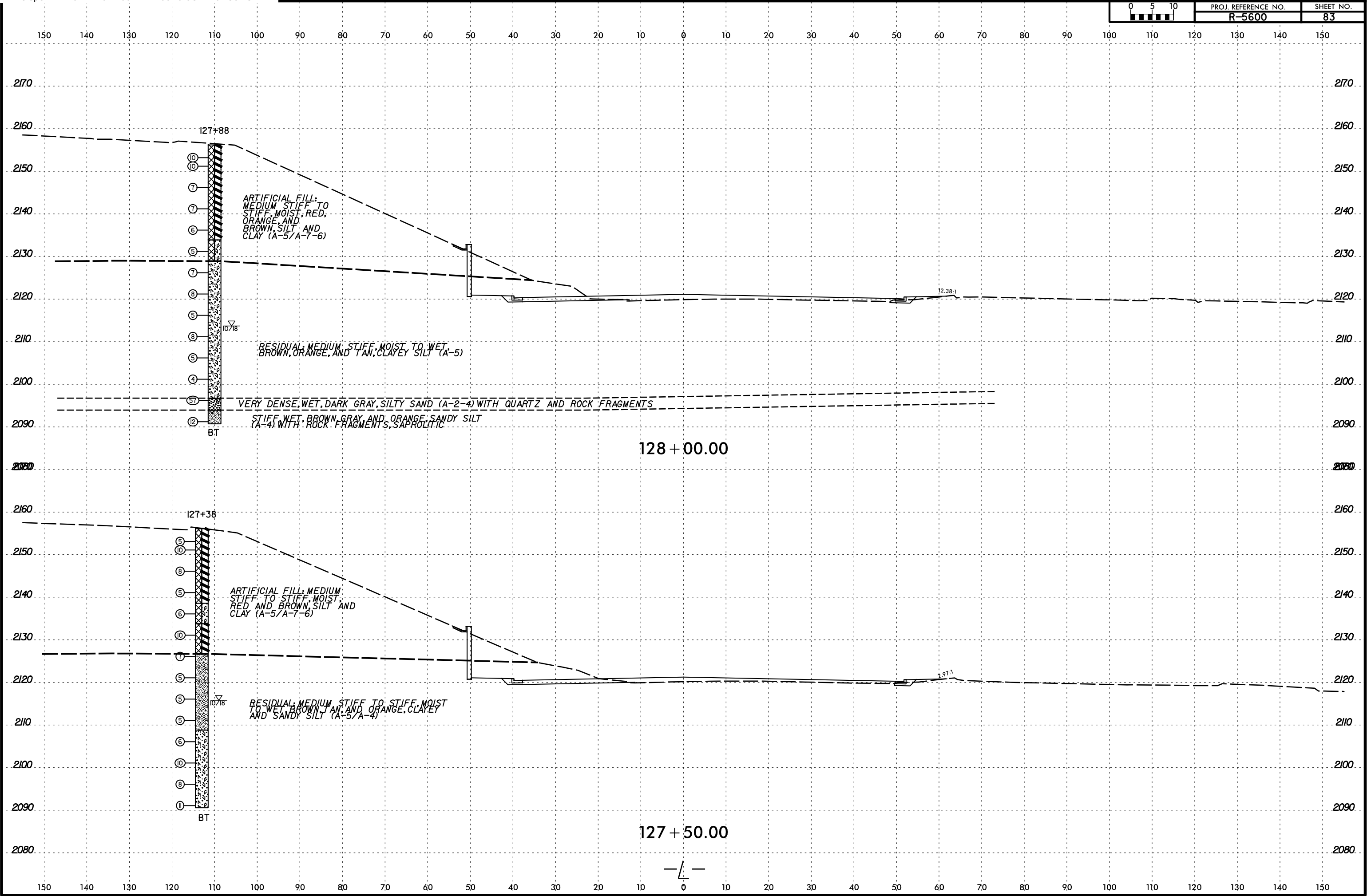
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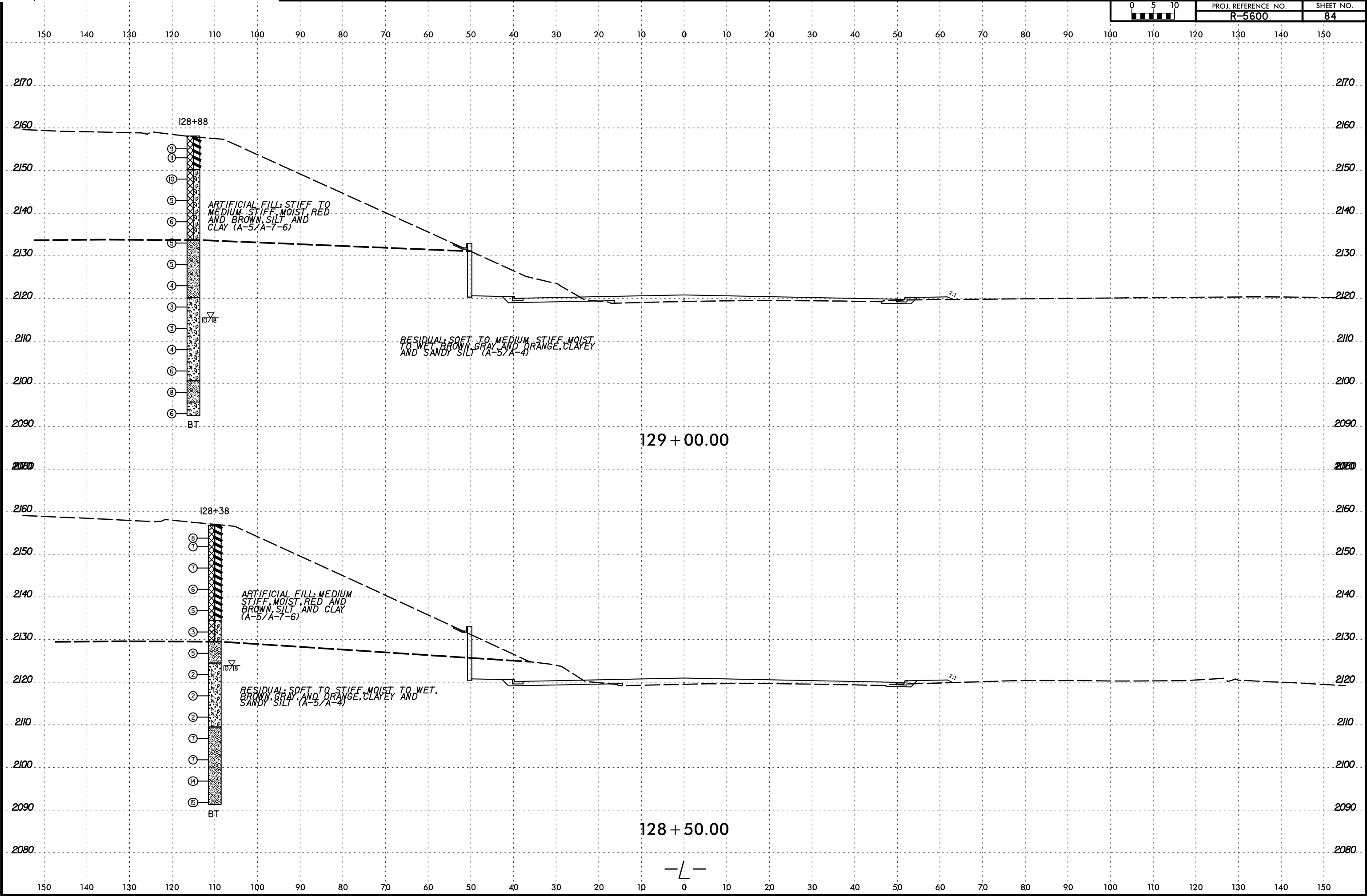


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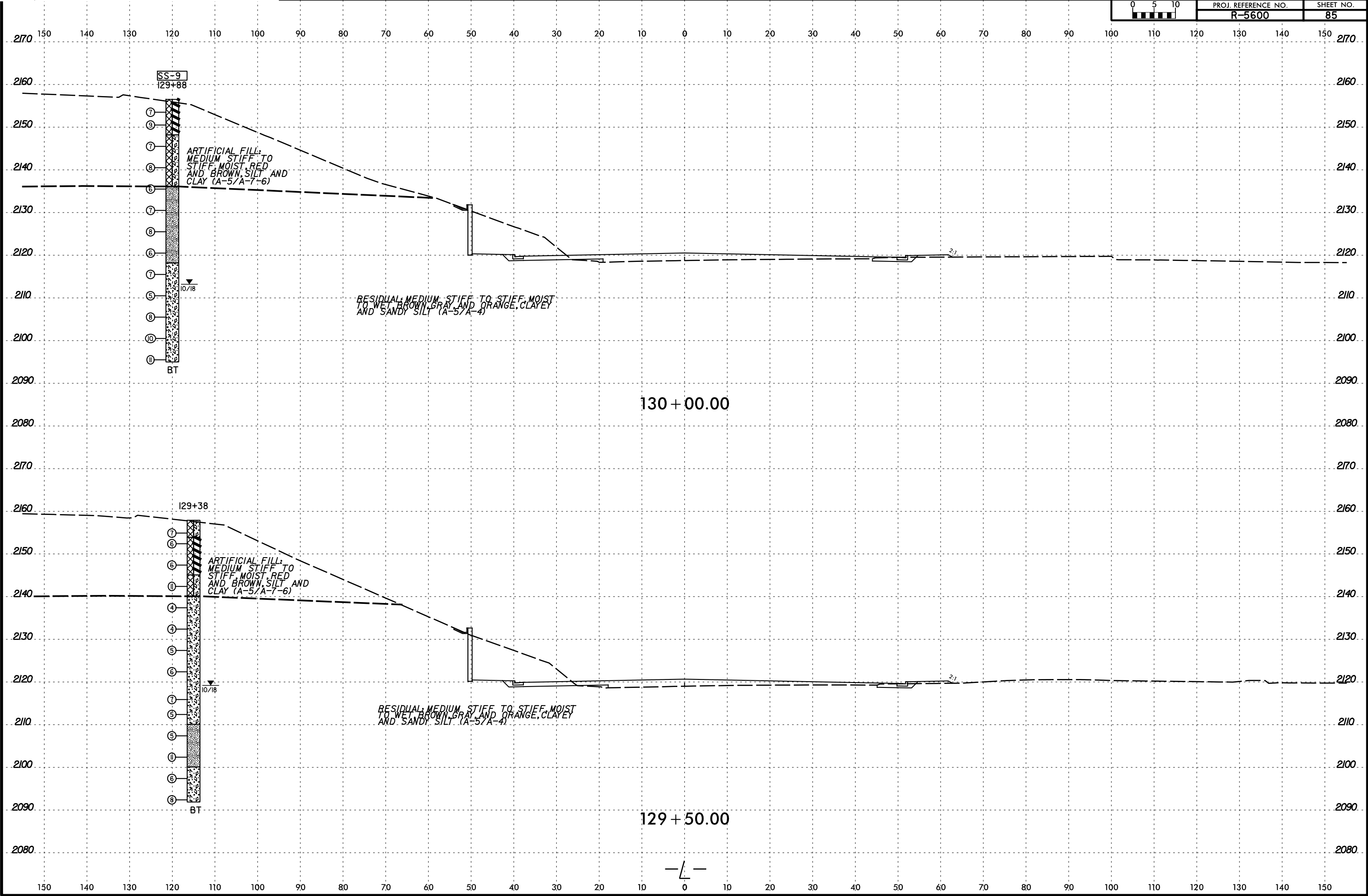
SHEET NO.
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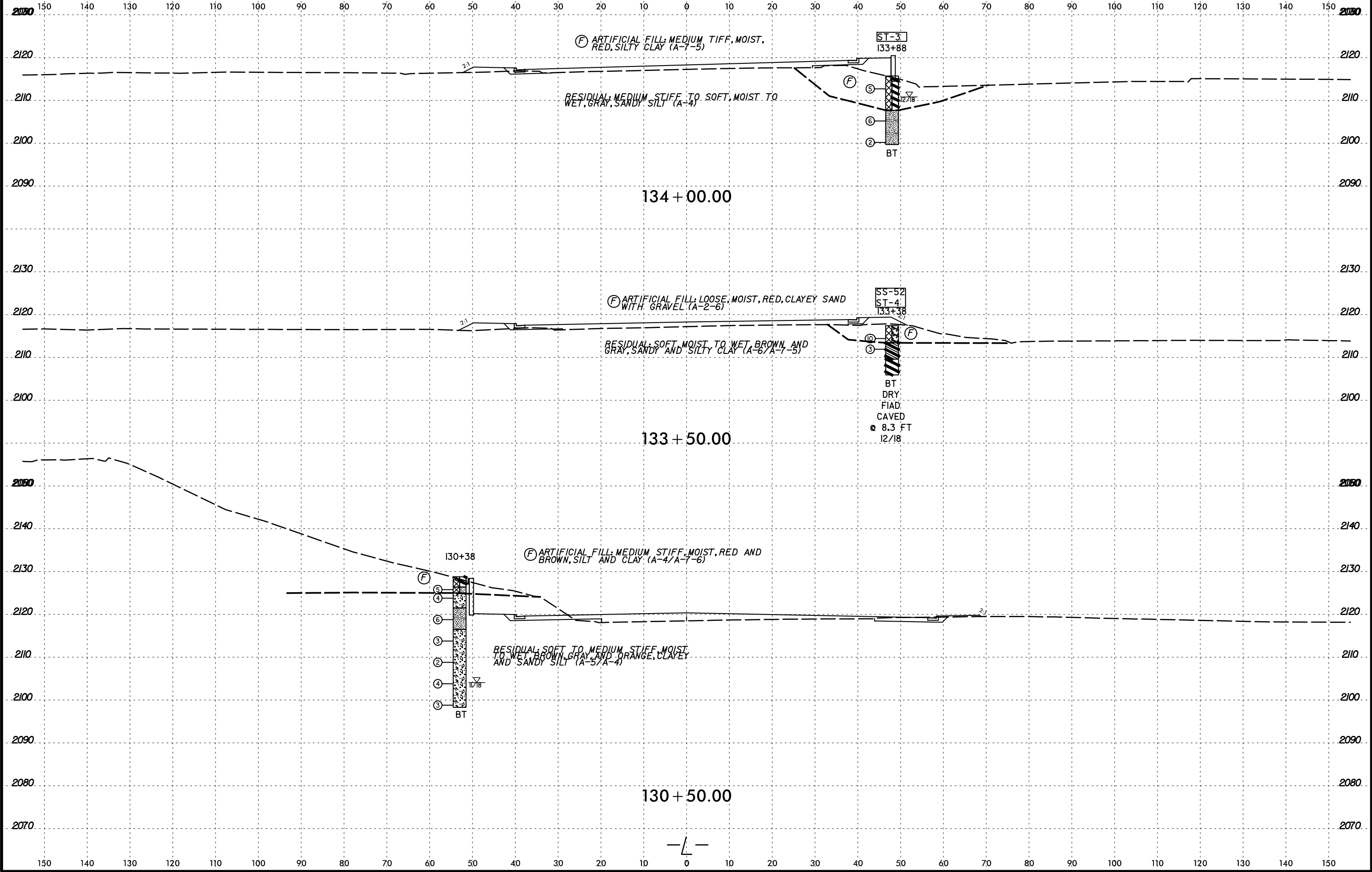
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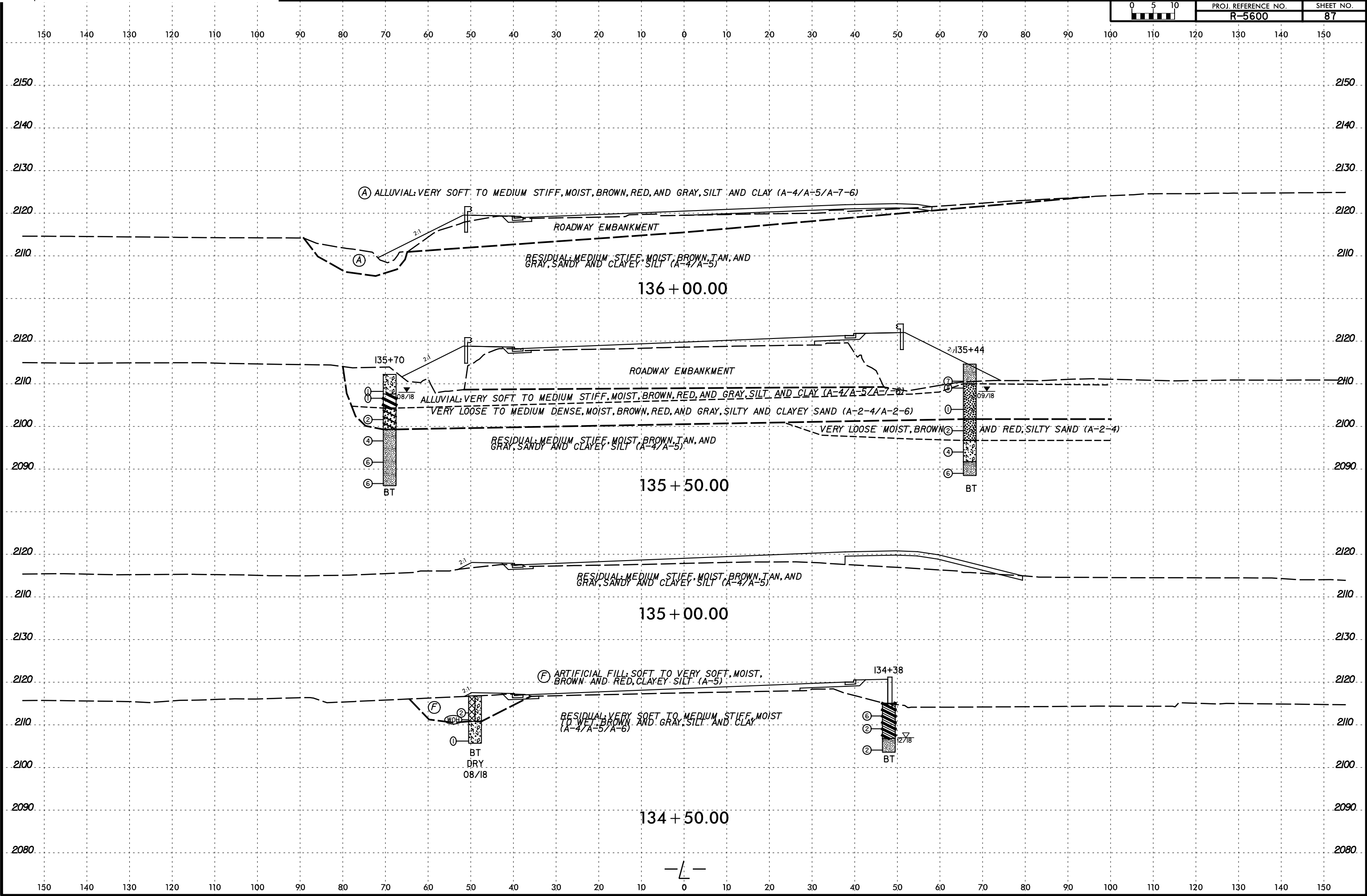
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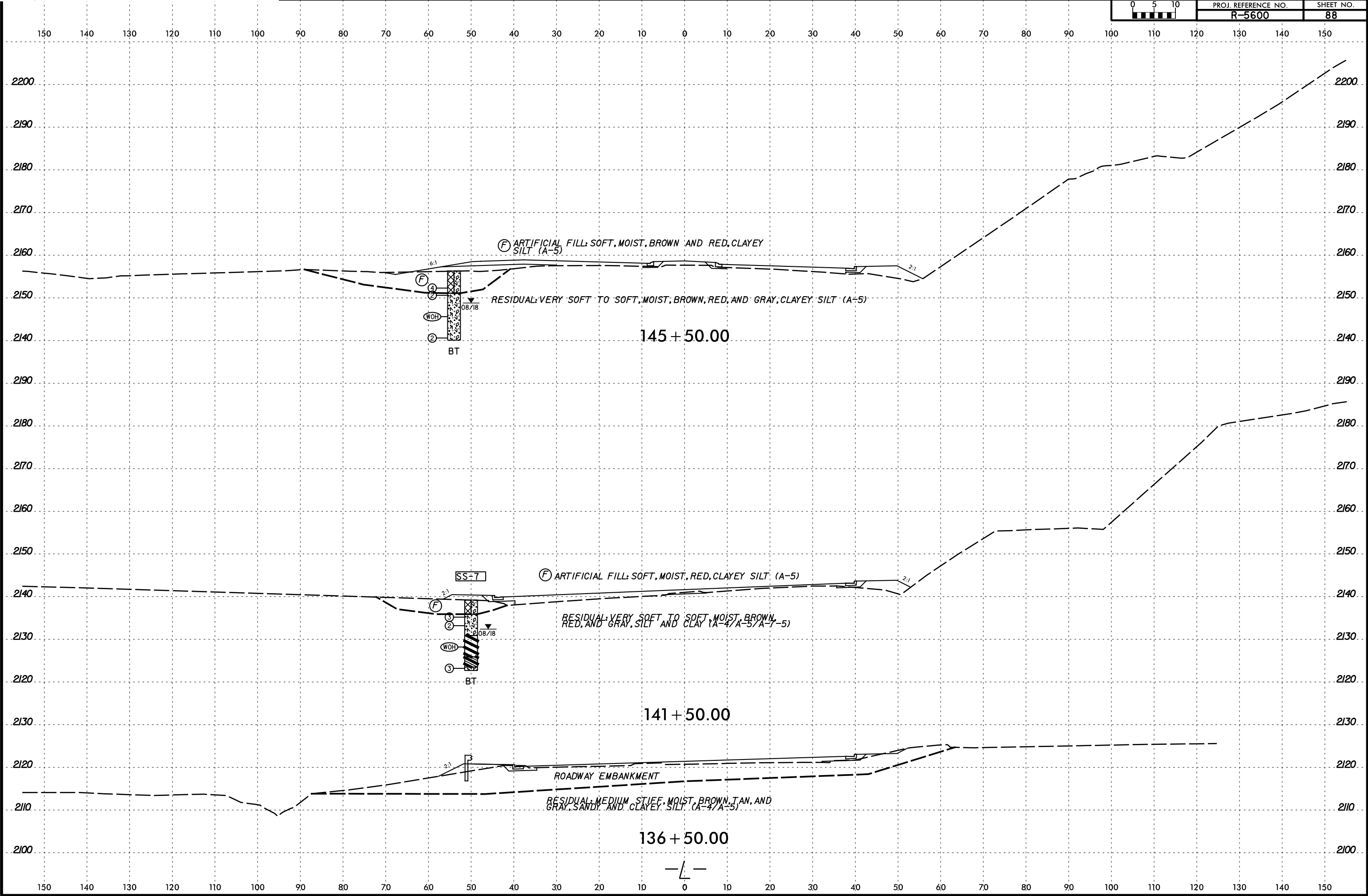
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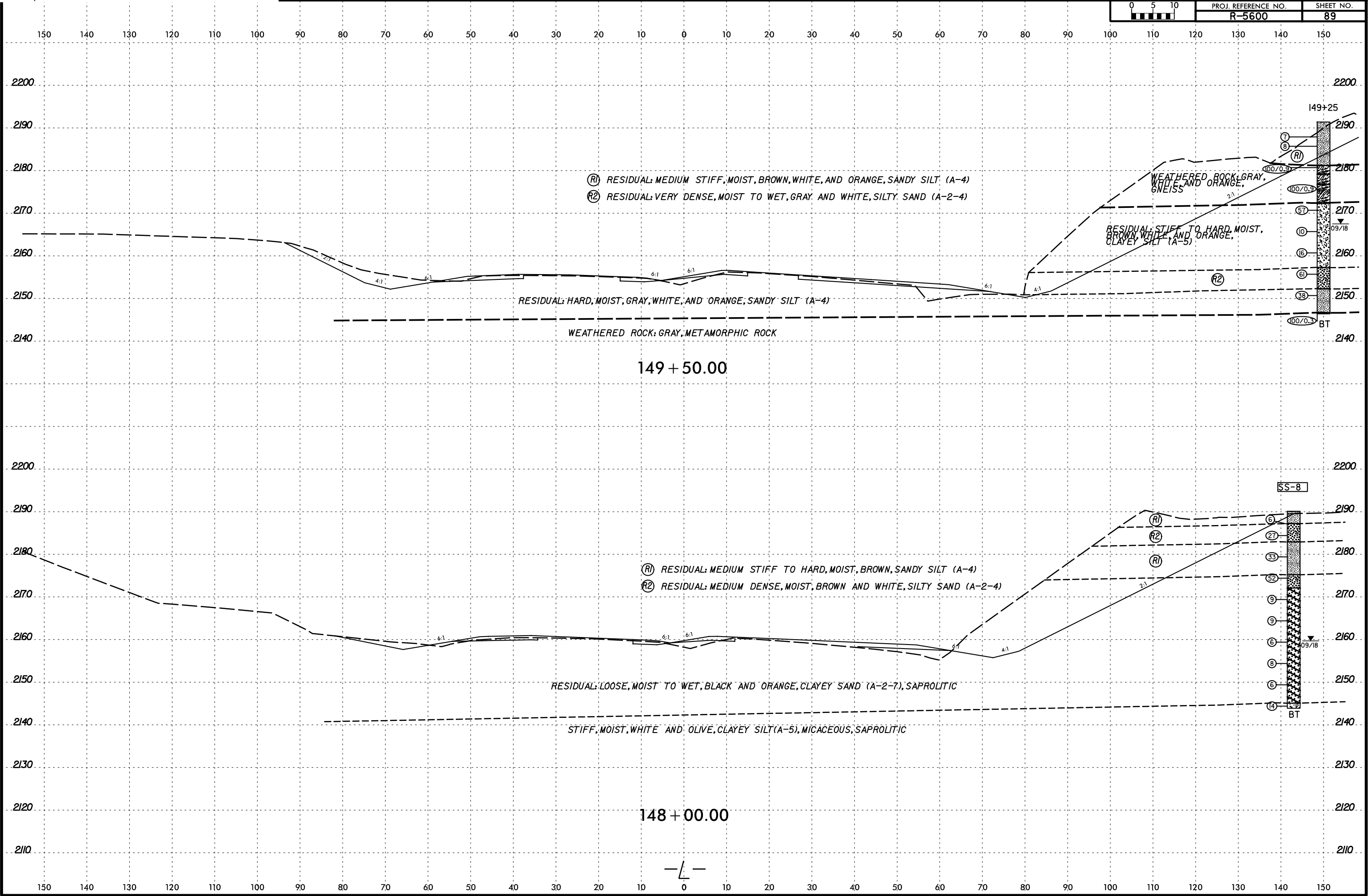
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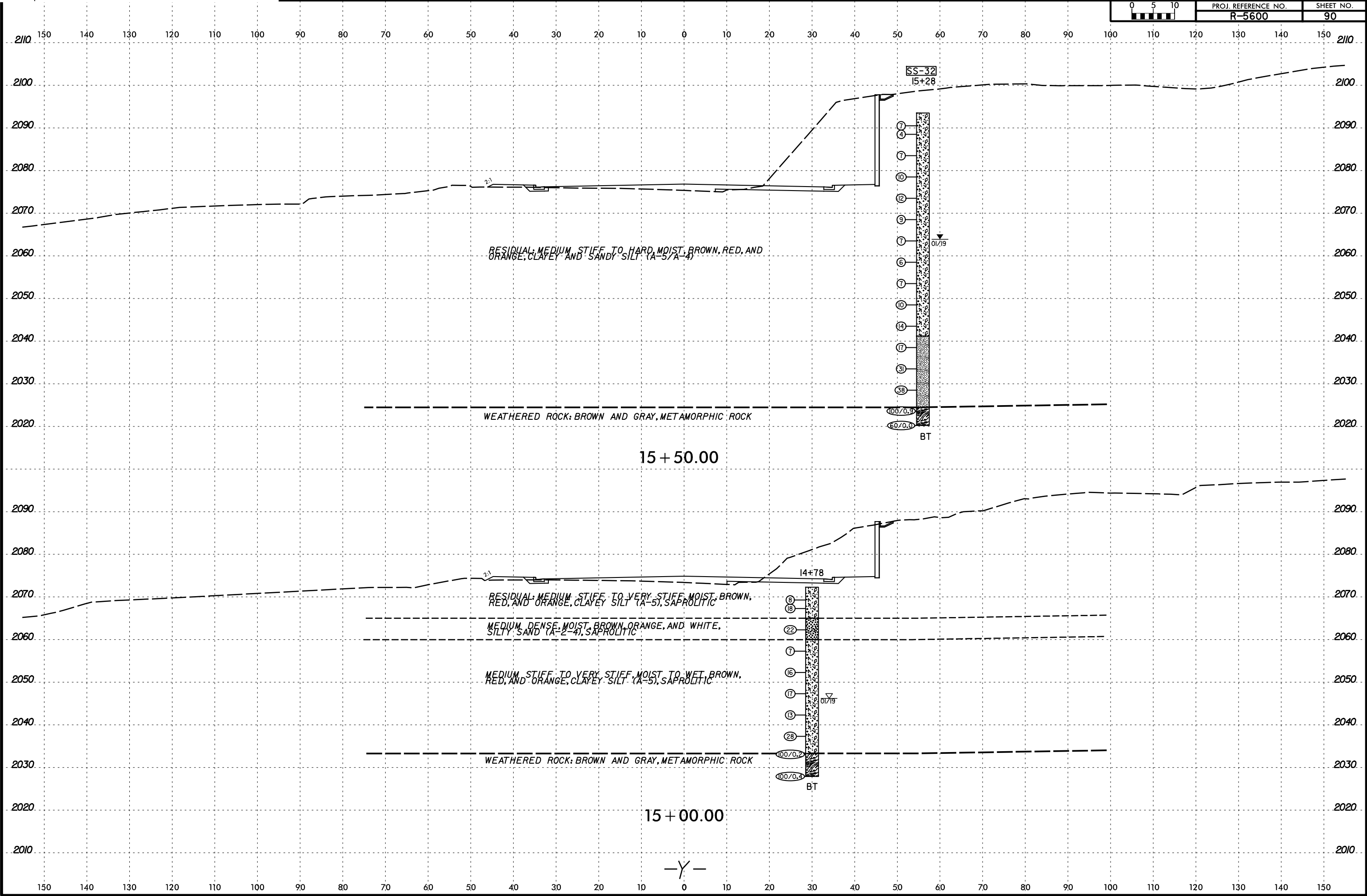
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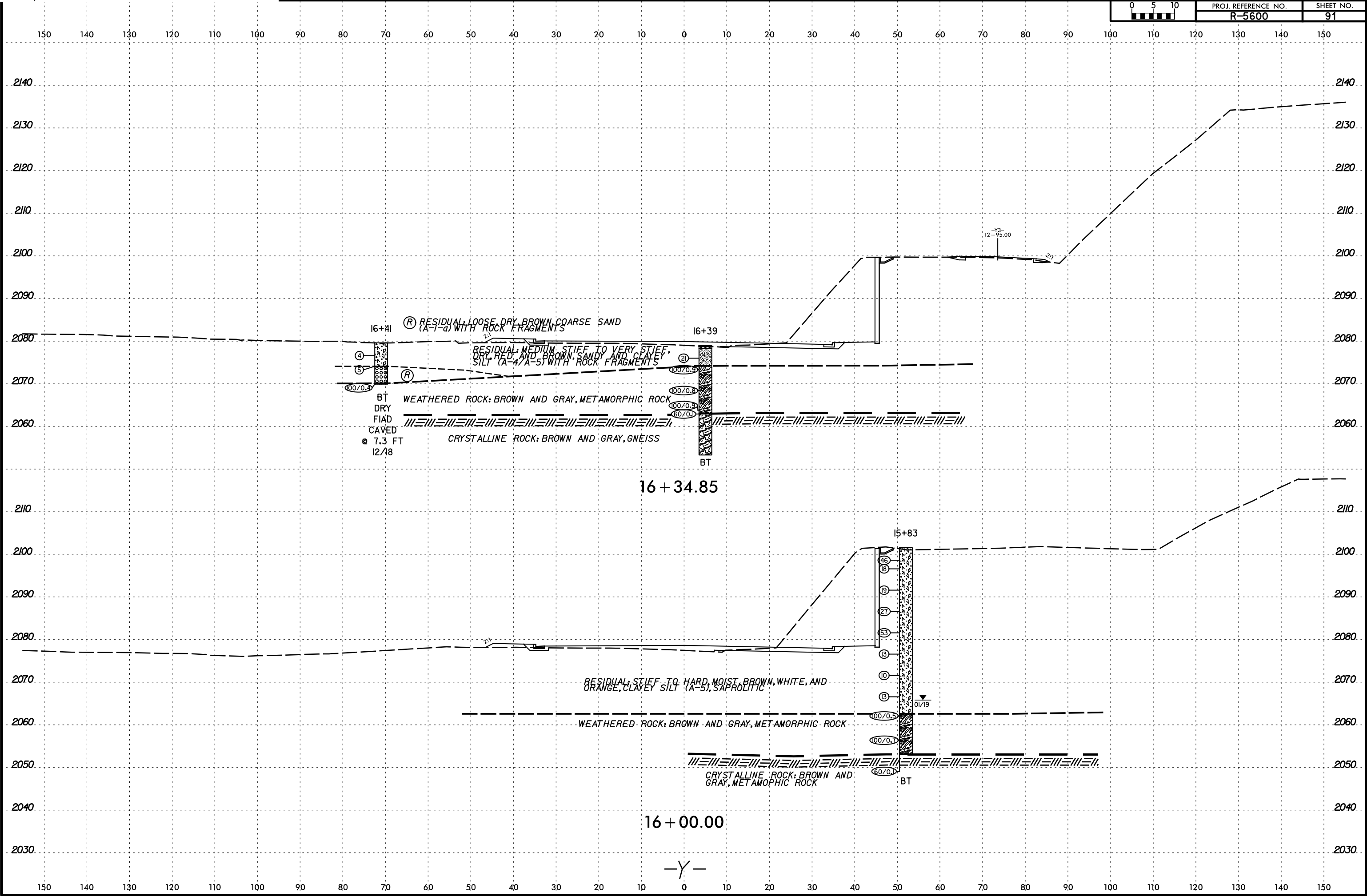
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PROJ. REFERENCE NO.	SHEET NO.
R-5600	90



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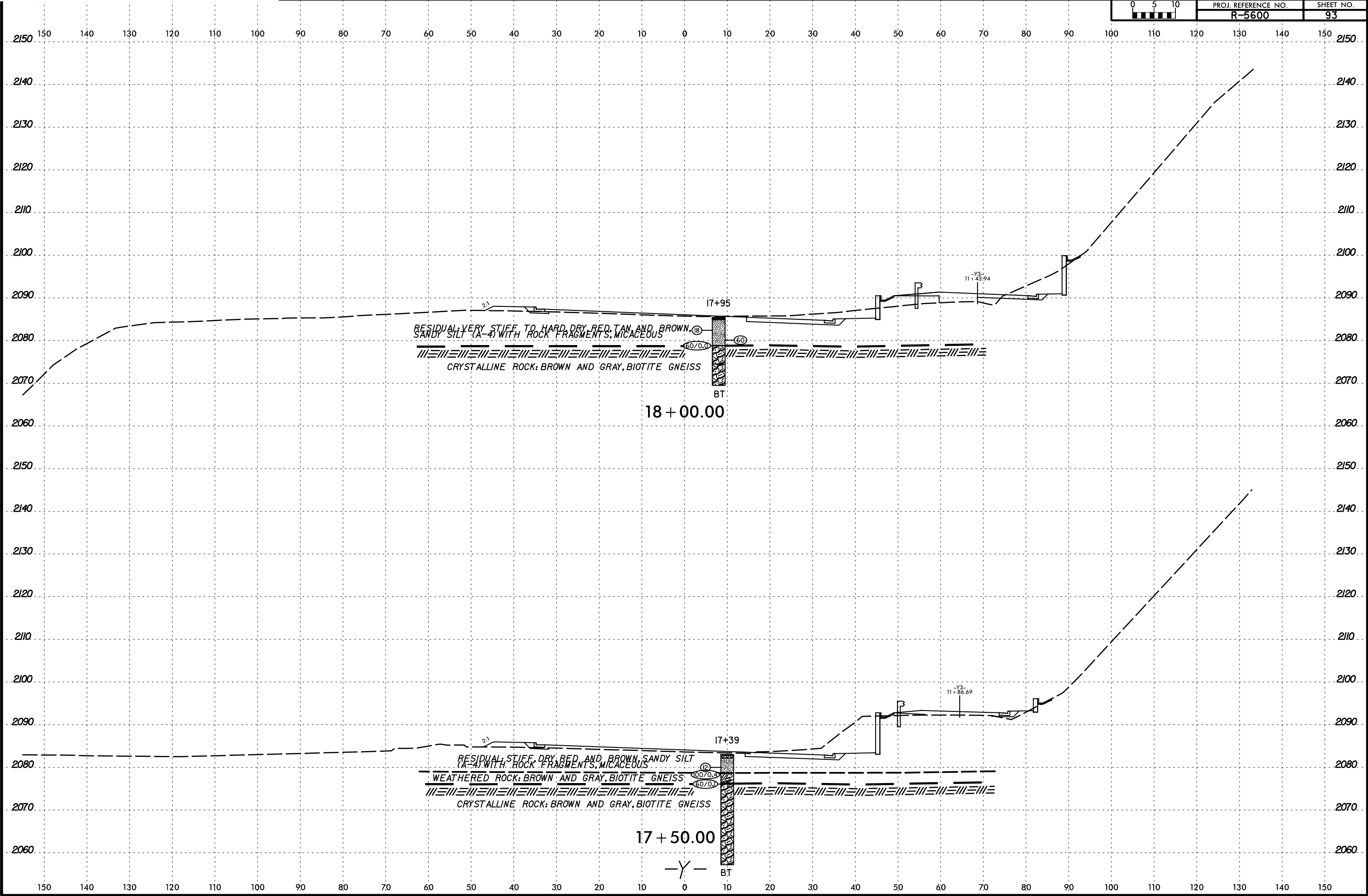




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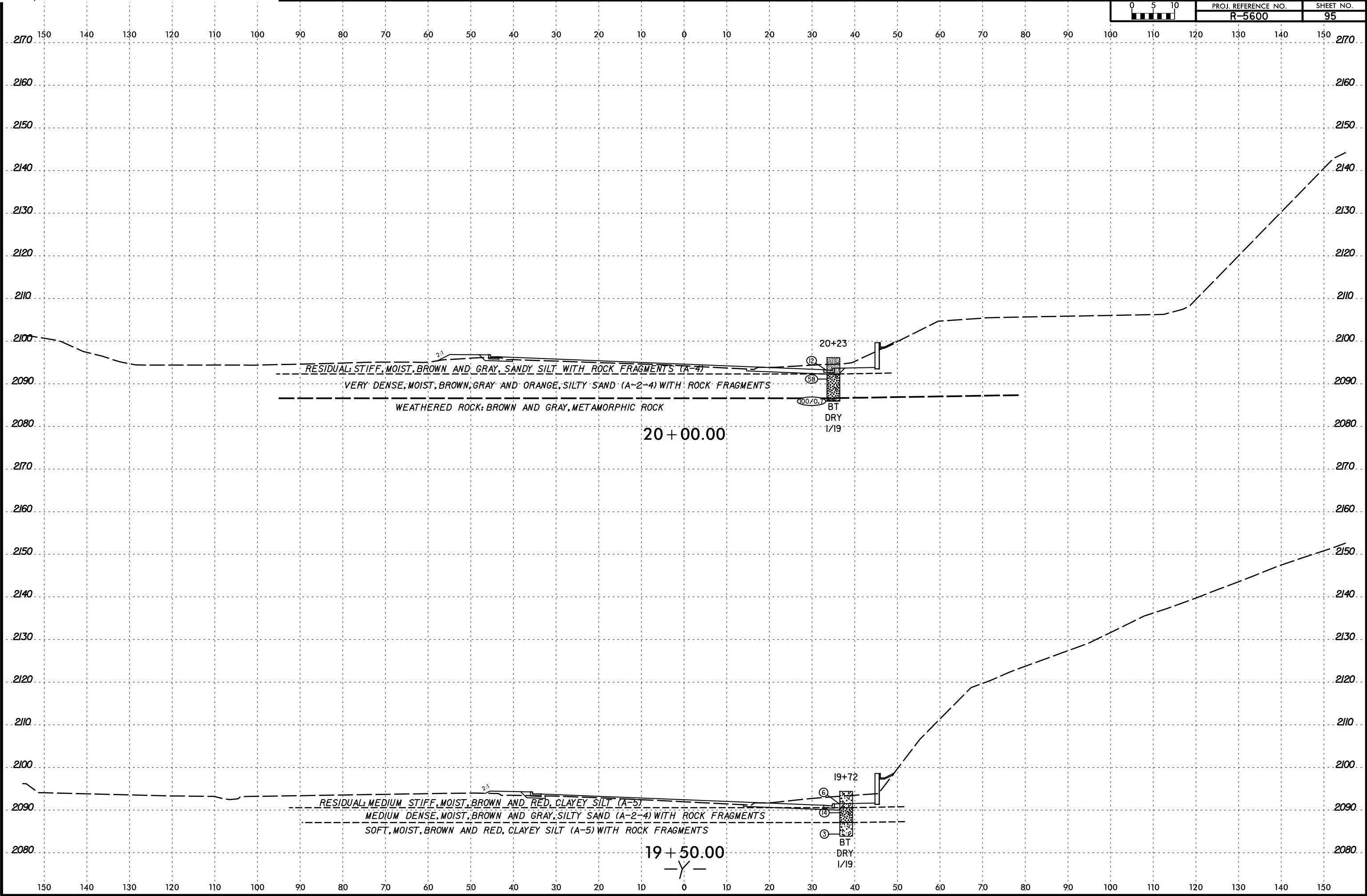


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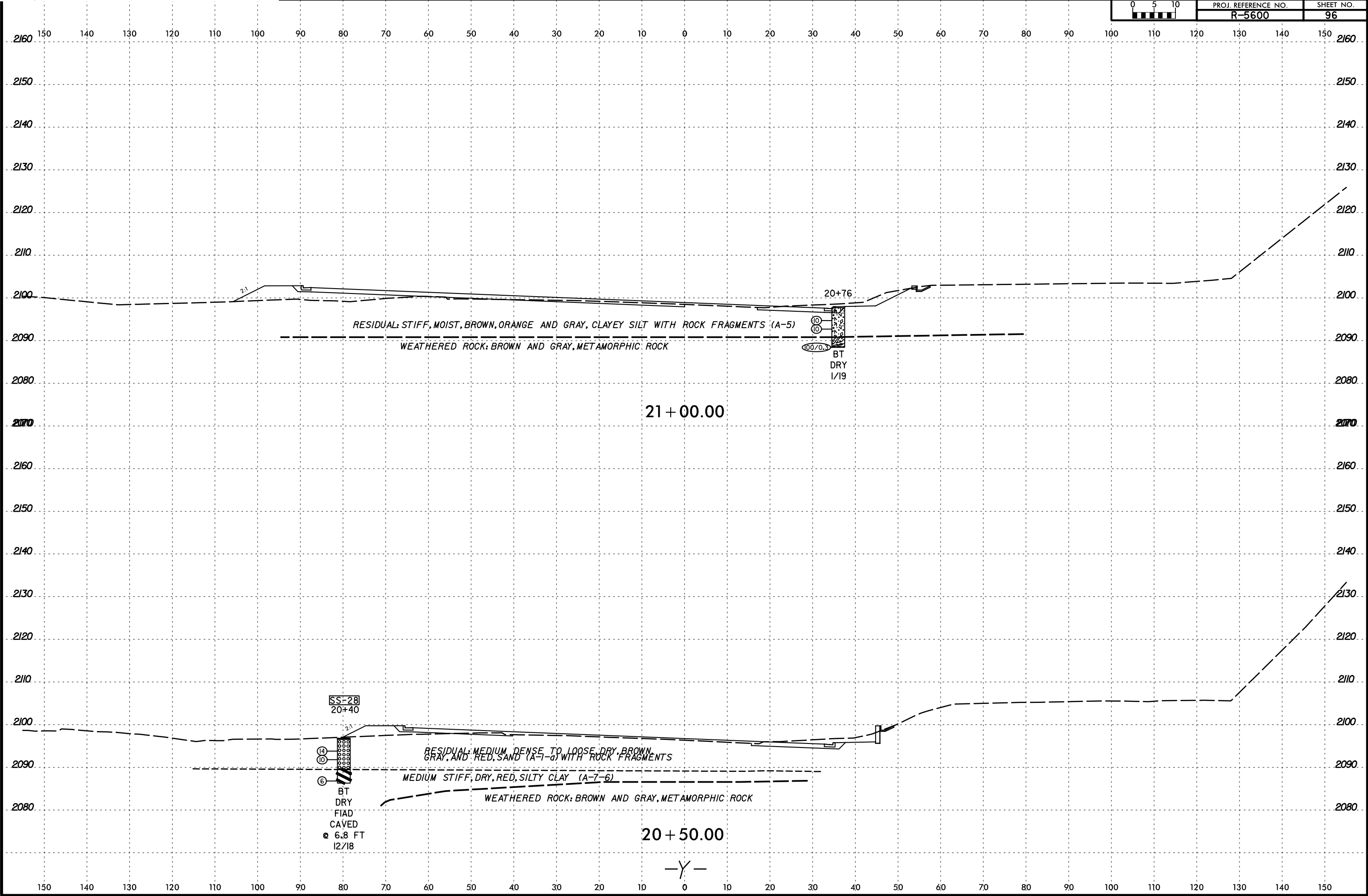
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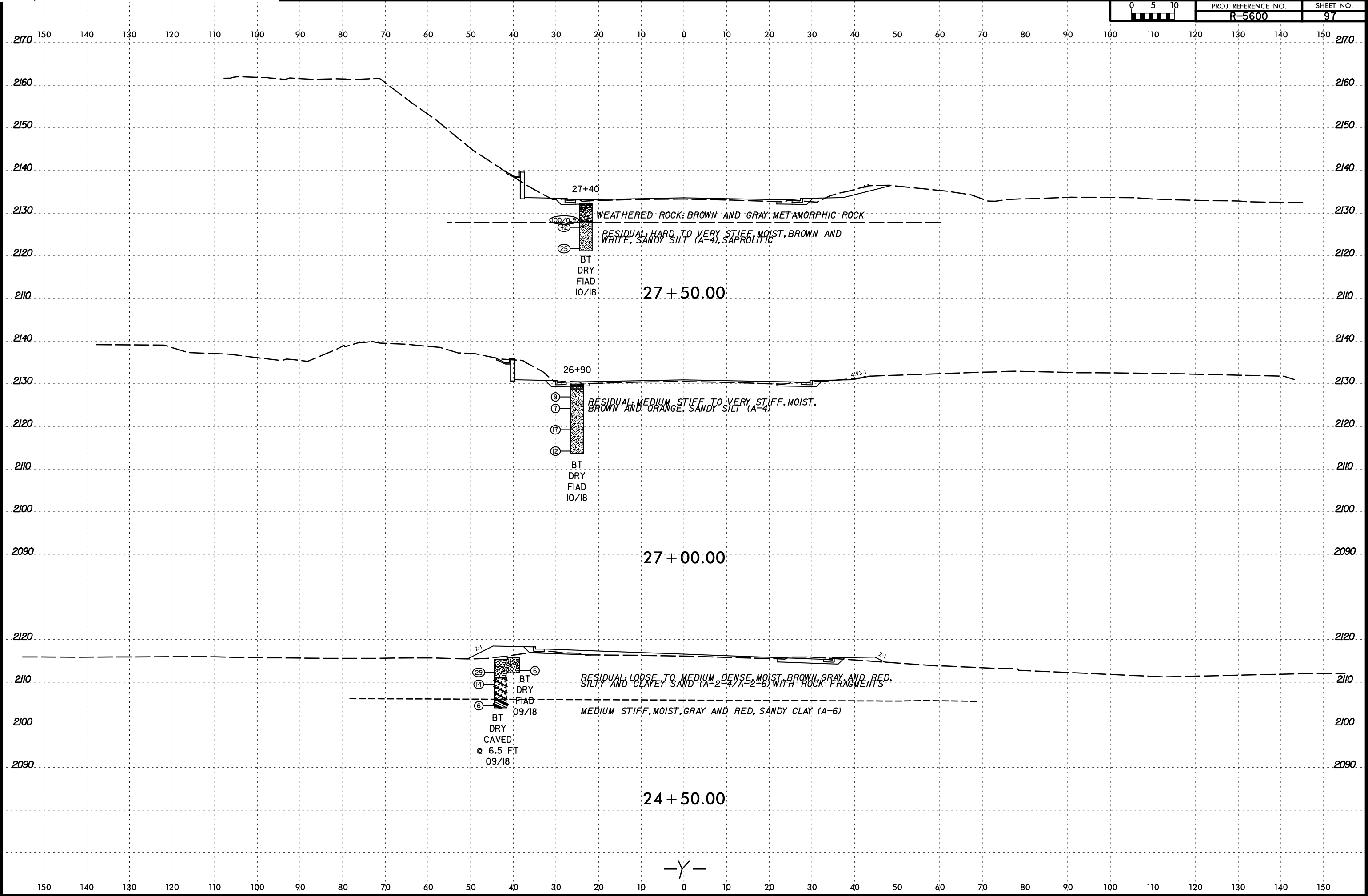
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PROJ. REFERENCE NO.	SHEET NO.
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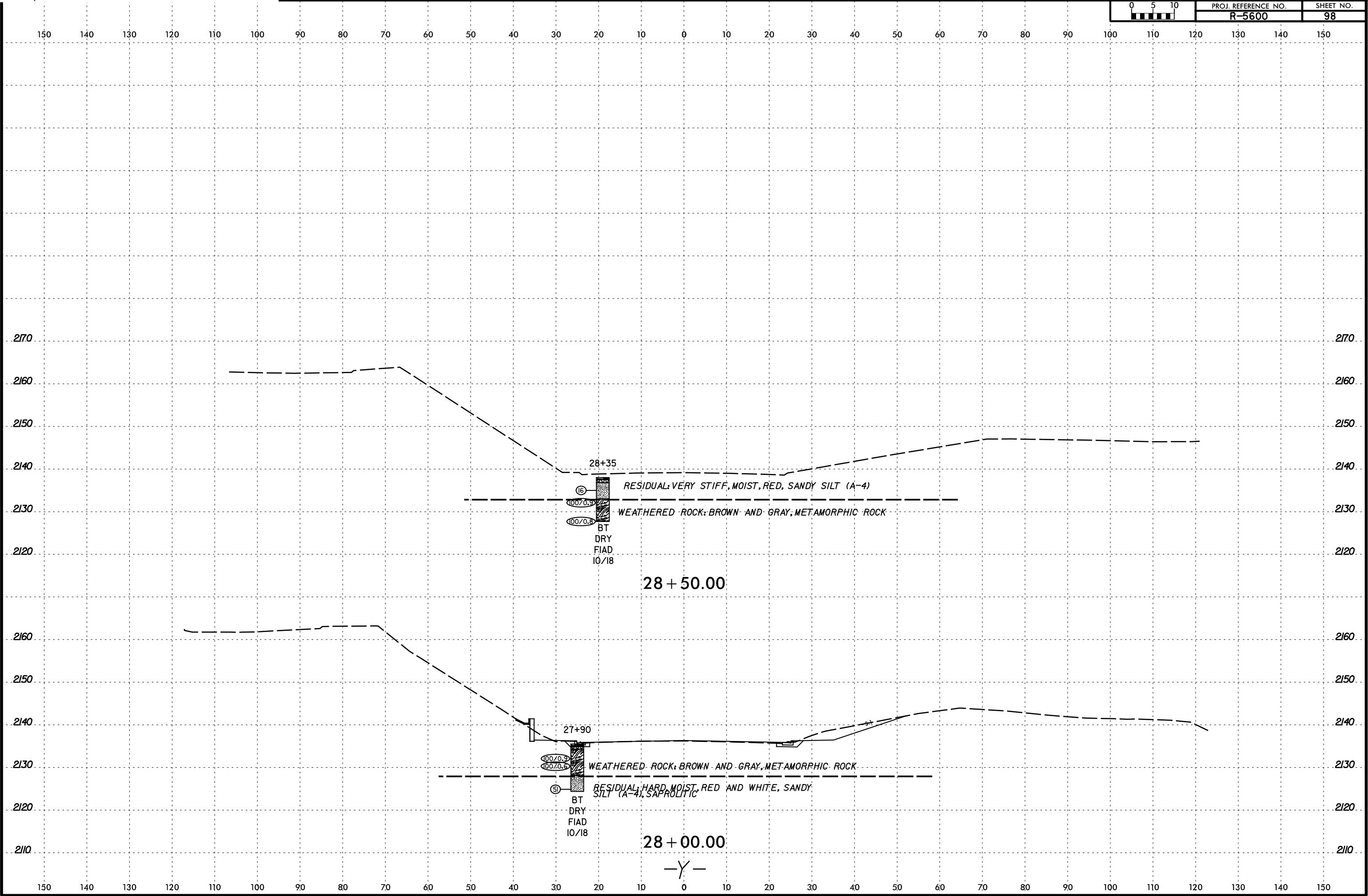


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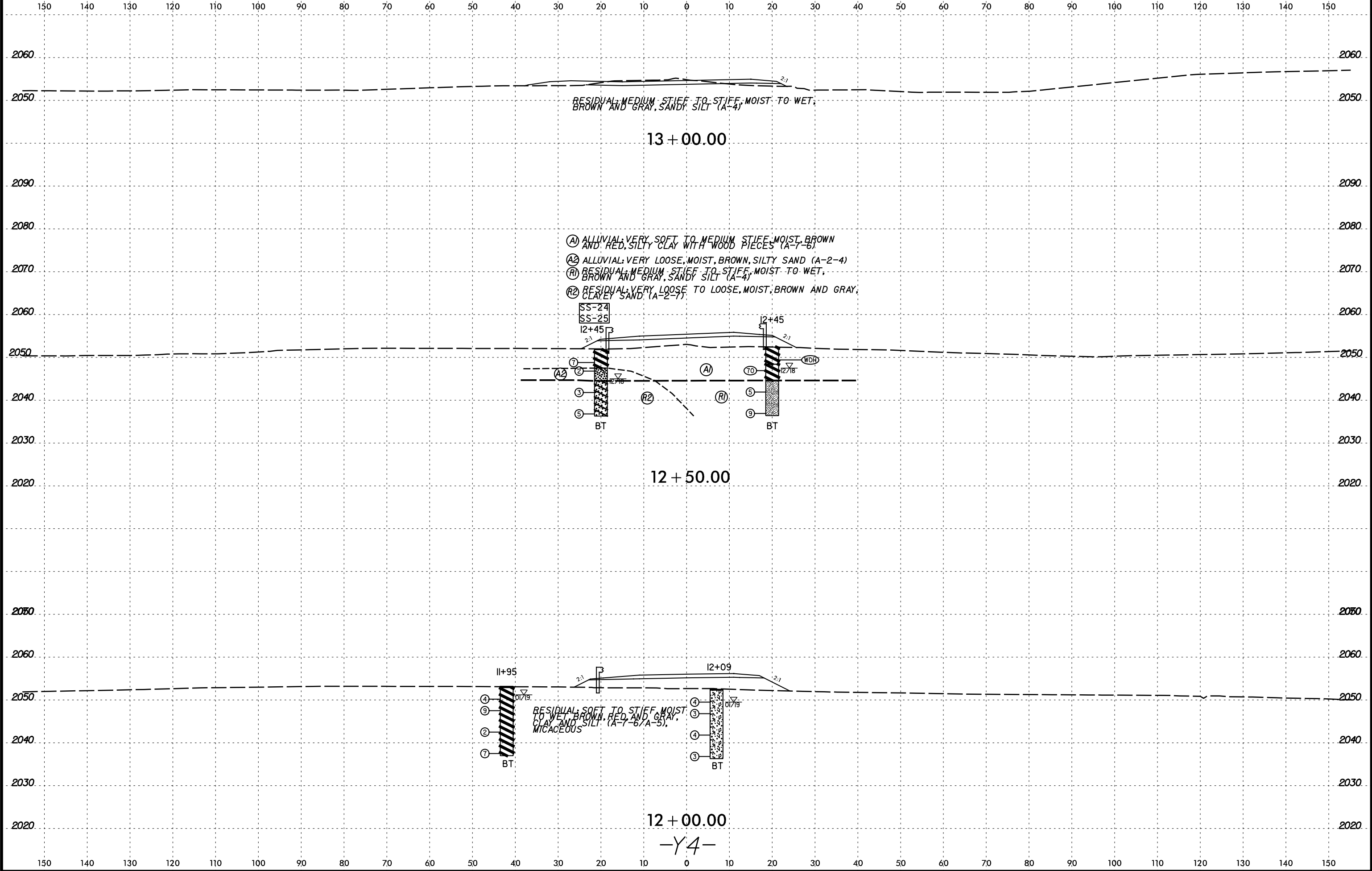
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			R-5600	98



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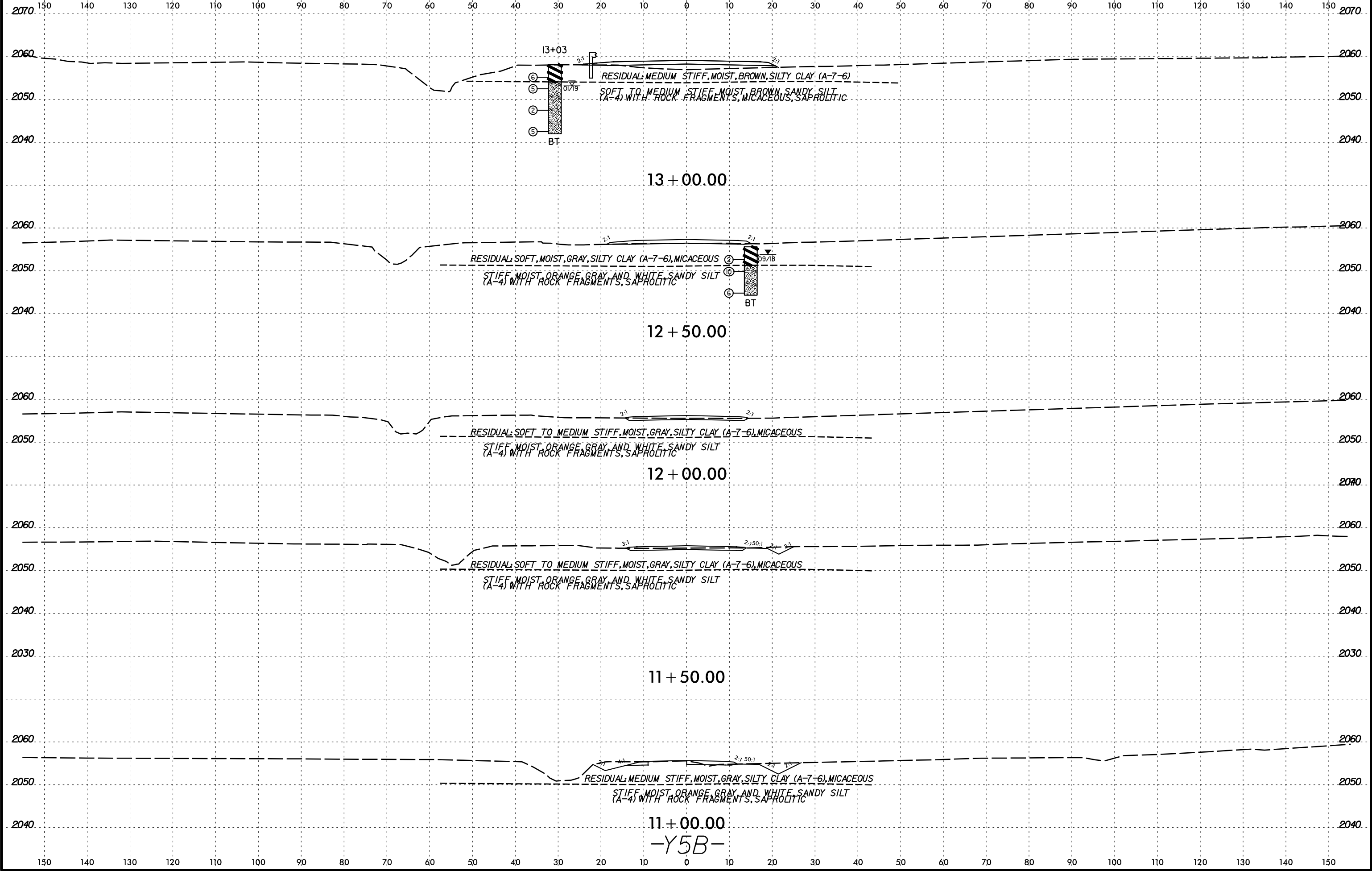
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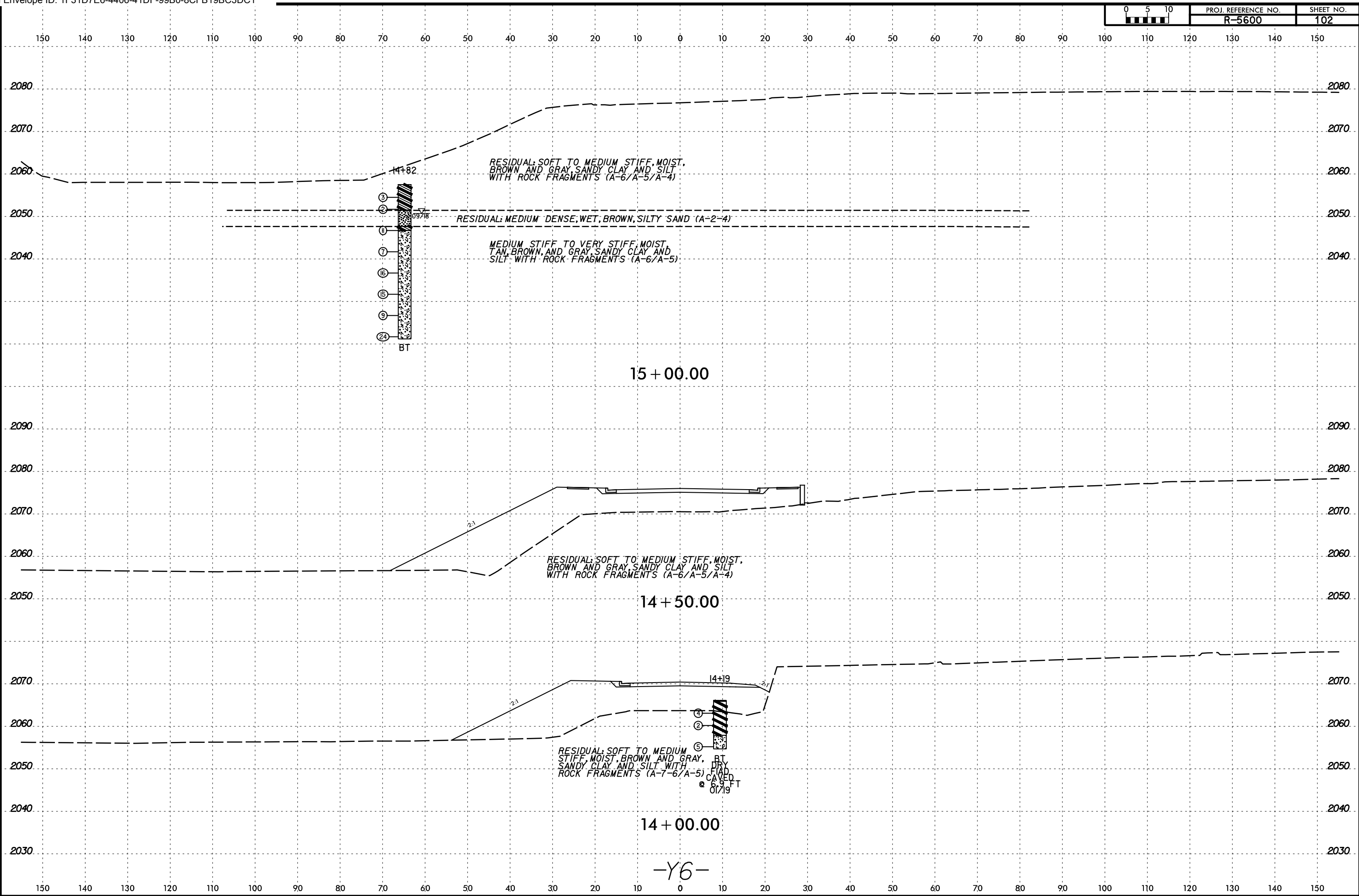
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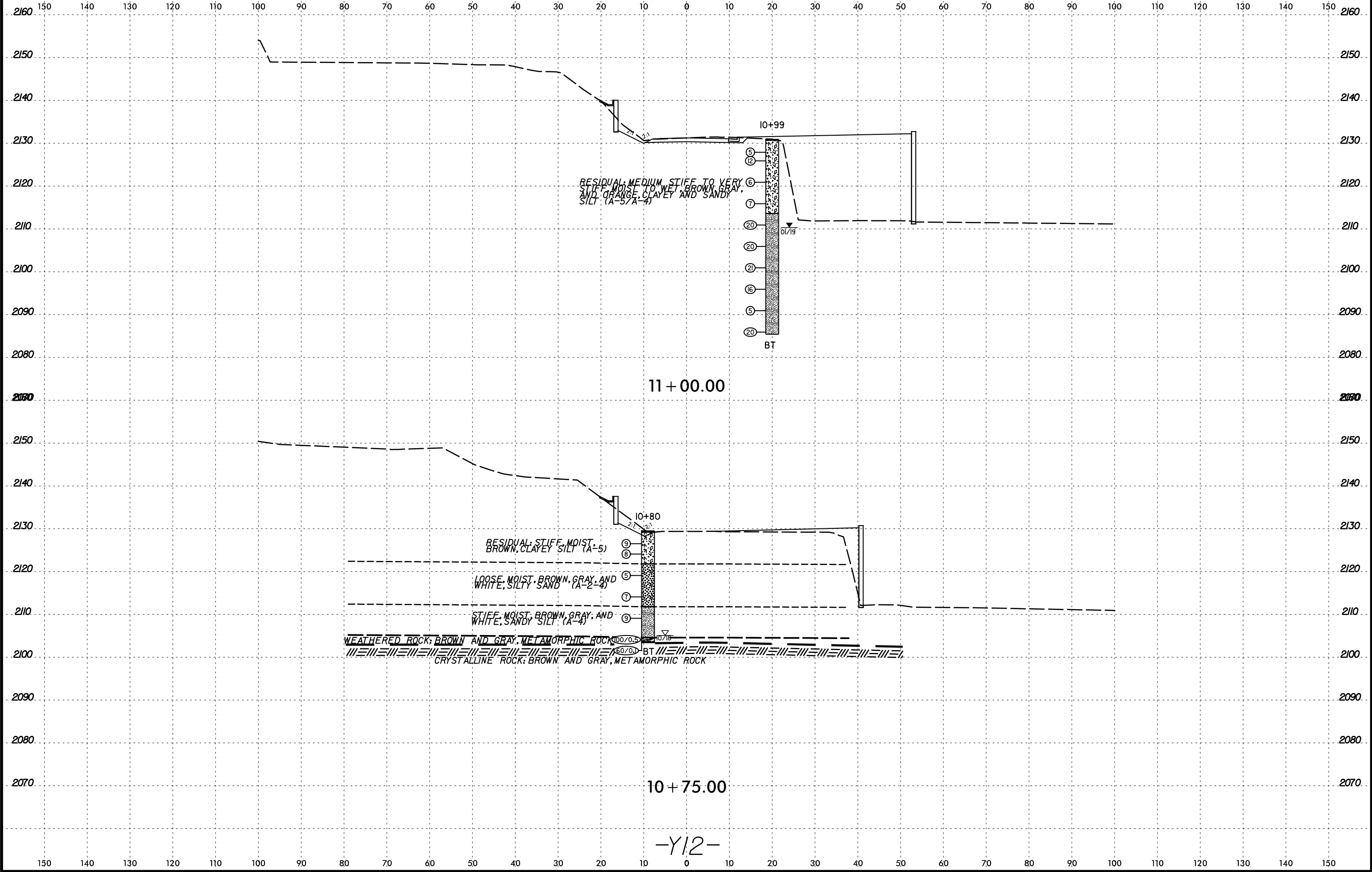




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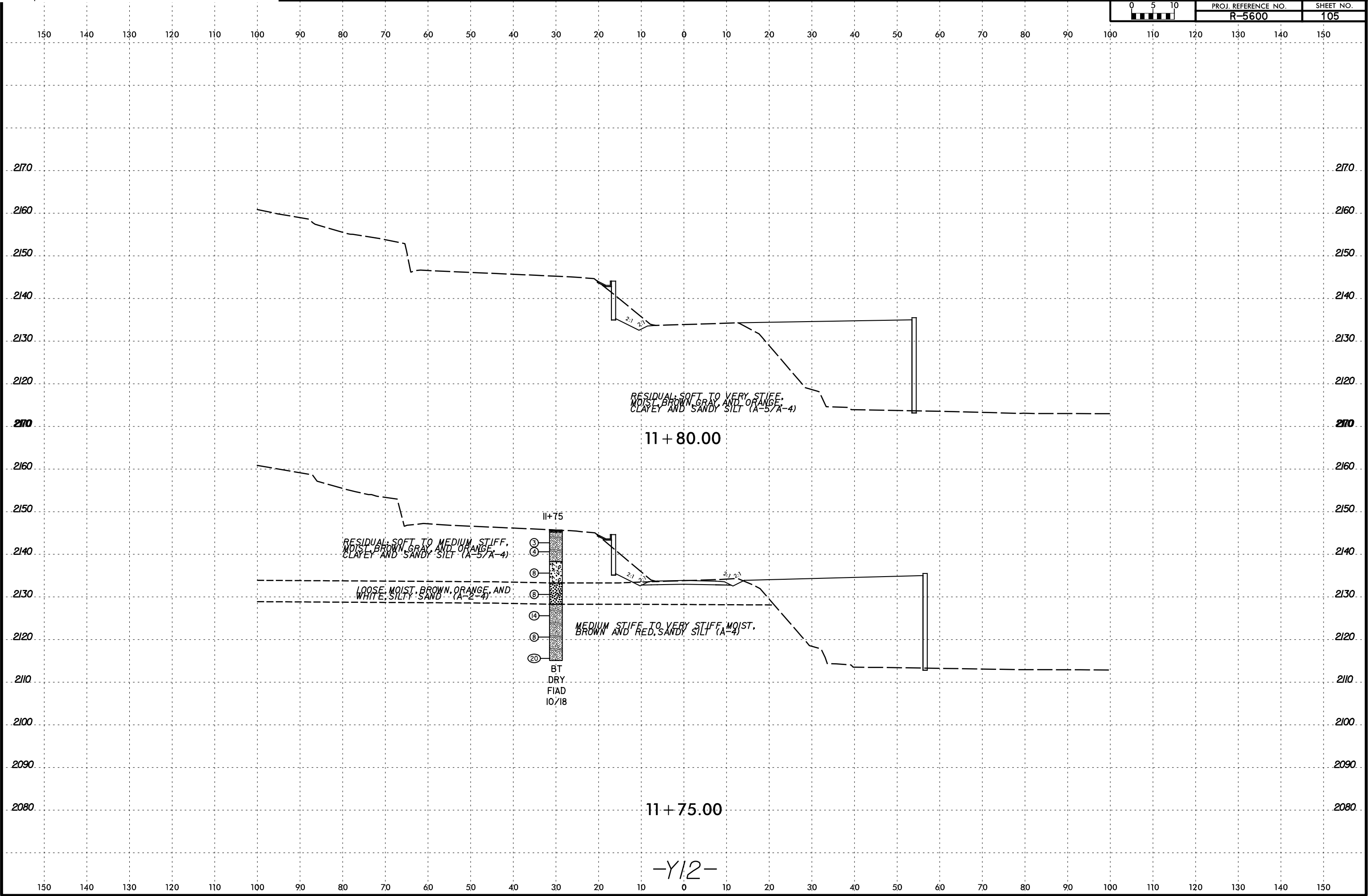


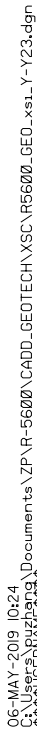
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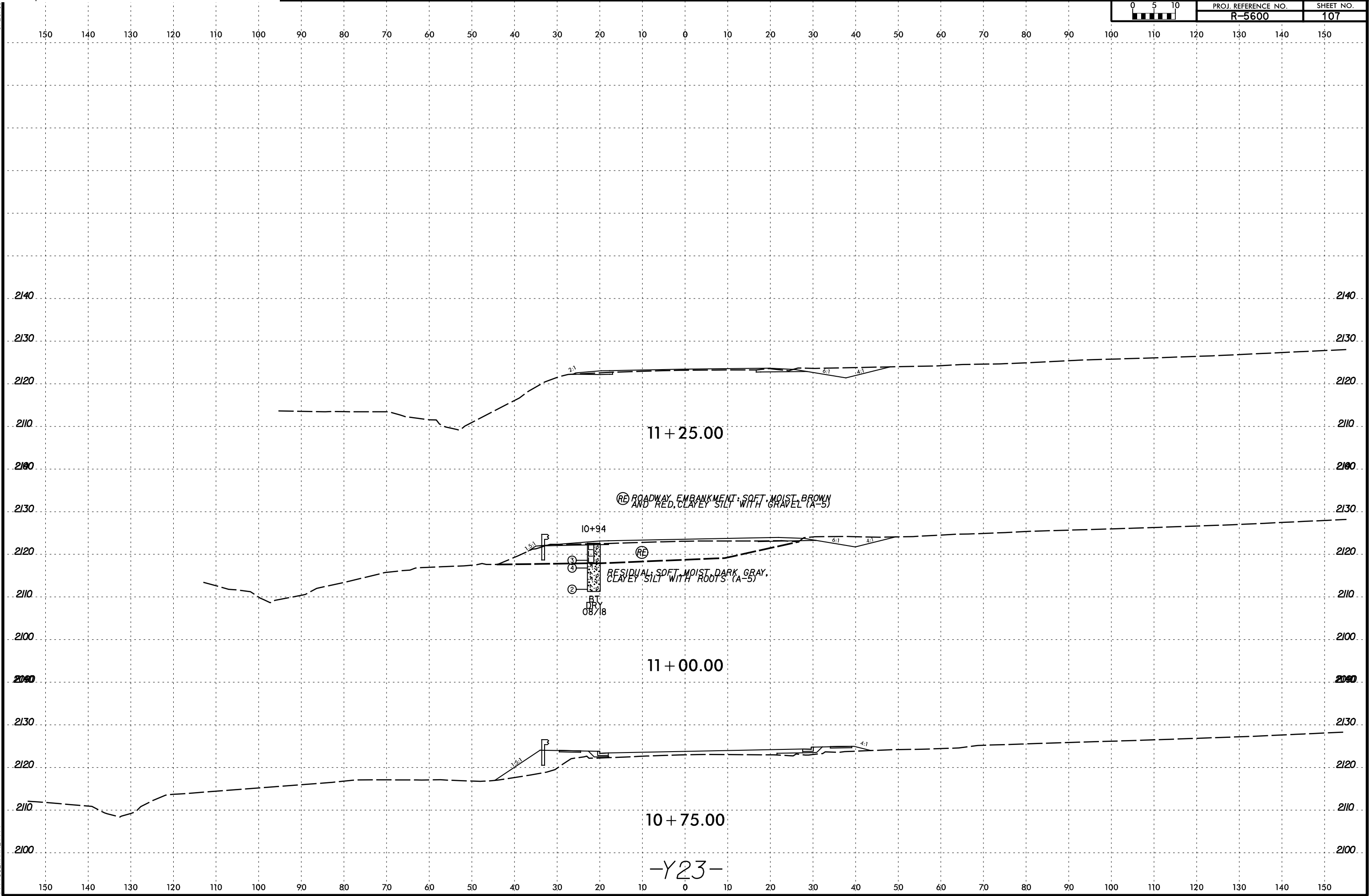
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SOIL TEST RESULTS																	
SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT					% PASSING SIEVES			% Moisture	% ORGANIC
								Gravel	C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-46	26+62	42' LT	-L-	2.0-3.5	A-7-6 (4)	42	14	11.2	17.0	25.1	24.2	22.5	88.8	80.0	48.1	28.2	-
SS-29	30+87	61' RT	-L-	4.5-6.0	A-2-4 (0)	32	6	37.6	20.2	16.5	15.6	10.1	62.4	48.1	28.4	27.2	-
SS-26	31+74	61' RT	-L-	2.0-3.5	A-1-b (0)	29	6	41.2	22.4	15.9	12.8	7.7	58.8	42.3	23.3	19.4	-
SS-47	34+97	72' RT	-L-	2.0-3.5	A-5 (3)	44	9	12.3	18.9	20.0	26.8	22.0	87.7	75.9	50.4	27.6	-
SS-48	40+01	33' LT	-L-	2.0-3.5	A-7-5 (17)	65	30	12.4	14.2	14.0	27.0	32.4	87.6	78.2	60.3	34.3	-
SS-58	47+48	52' LT	-L-	9.0-10.5	A-4 (3)	35	10	1	23.2	27.4	32.4	16.0	99.0	84.9	49.9	27.5	-
ST-7	48+02	51' RT	-L-	10.5-12.4	A-4 (1)	34	7	0.6	23.2	34.6	25.5	16.1	99.4	86.8	46.9	8.1	-
SS-41	52+50	55' RT	-L-	2.0-3.5	A-7-6 (6)	49	19	15	17.8	19.6	21.7	25.9	85.0	74.3	49.0	21.9	-
SS-42	52+50	55' RT	-L-	9.5-11.0	A-7-5 (3)	44	13	4.6	8.5	51.7	26.4	8.8	95.4	92.6	43.0	47.1	-
SS-38	55+72	50' LT	-L-	4.5-6.0	A-7-6 (11)	46	21	1.8	18.1	20.0	20.3	39.8	98.2	88.8	60.6	19.4	-
ST-6	56+22	50' LT	-L-	4.5-6.5	A-5 (2)	42	9	0	15.0	49.6	26.3	9.1	100.0	94.2	43.8	20.3	-
SS-2	59+01	50' LT	-L-	4.5-6.0	A-2-4 (0)	35	3	1.8	29.3	44.7	21.2	3.0	98.2	83.7	27.8	15.2	-
SS-50	76+00	70' LT	-L-	2.0-3.5	A-2-6 (1)	34	14	13.2	34.7	33.9	17.2	1.0	86.8	66.9	22.5	23.6	-
SS-51	76+00	70' LT	-L-	3.7-5.2	A-2-4 (0)	36	NP	0.4	28.3	53.4	12.8	5.1	99.6	86.3	21.4	20.5	-
SS-18	81+03	19' RT	-L-	2.0-3.5	A-2-5 (0)	45	6	15.4	30.6	21.5	21.1	11.4	84.6	63.8	34.1	33.3	-
SS-56	87+00	82' LT	-L-	2.0-3.5	A-6 (3)	38	16	4.1	31.9	23.9	15.7	24.4	95.9	75.6	43.1	17.3	-
SS-57	87+00	82' LT	-L-	4.0-5.5	A-7-5 (7)	47	15	1.9	24.6	17.6	25.2	30.7	98.1	82.4	56.9	20.1	-
SS-3	88+00	100' LT	-L-	4.6-6.1	A-4 (0)	34	8	6.4	34.7	20.8	19.1	19.0	93.6	71.5	40.8	26.6	-
SS-53	89+49	96' RT	-L-	4.0-5.5	A-7-5 (15)	54	22	0.2	16.2	16.9	31.3	35.4	99.8	90.4	67.6	24.6	-
SS-45	90+43	87' RT	-L-	4.0-5.5	A-7-5 (12)	50	20	0.4	21.4	15.3	18.5	44.4	99.6	86.3	63.2	33.2	-
SS-61	91+89	40' RT	-L-	2.0-3.5	A-7-6 (3)	42	15	21	24.1	13.8	22.1	19.0	79.0	61.5	42.0	26.1	-
SS-62	91+89	40' RT	-L-	4.0-5.5	A-7-6 (9)	43	18	4.2	20.3	17.5	25.8	32.2	95.8	82.6	60.5	22.6	-
SS-12	91+89	85' LT	-L-	18.8-20.3	A-4 (0)	30	NP	0.5	24.9	44.5	27.0	3.1	99.5	84.5	35.6	20.8	-
SS-59	92+89	52' LT	-L-	14.0-15.5	A-2-4 (0)	32	5	2.6	42.1	27.7	7.0	20.6	97.4	69.4	29.8	23.7	-
ST-1	93+39	52' LT	-L-	19.0-20.8	A-6 (1)	40	13	0.4	34.0	36.4	5.7	23.5	99.6	79.1	35.5	32.8	-
SS-60	93+89	52' LT	-L-	14.0-15.5	A-7-6 (8)	51	24	1.1	29.6	22.7	4.9	41.7	98.9	80.9	47.9	22.1	-
SS-33	95+74	67' RT	-L-	2.0-3.5	A-6 (5)	35	15	1	30.1	18.6	27.3	23.0	99.0	80.0	52.6	28.1	-
SS-64	96+19	62' RT	-L-	4.0-5.5	A-7-5 (15)	53	19	1.2	16.4	9.6	17.6	55.2	98.8	88.3	73.0	31.2	-
SS-65	96+19	62' RT	-L-	9.0-10.5	A-7-6 (10)	48	19	1.1	23.6	17.4	35.0	22.9	98.9	84.3	60.5	32.6	-
SS-13	96+39	107' LT	-L-	2.0-3.5	A-6 (0)	38	11	0	35.2	36.0	21.7	7.1	100.0	79.9	35.1	15.9	-
SS-43	96+39	107' LT	-L-	29.0-30.5	A-7-5 (0)	42	11	0	31.1	36.5	29.3	3.1	100.0	83.5	36.1	15.1	-
SS-34	96+74	62' RT	-L-	2.0-3.5	A-7-6 (14)	46	20	0.4	16.4	12.4	26.6	44.2	99.6	89.6	72.6	34.9	-
SS-44	97+89	103' LT	-L-	29.0-30.5	A-7-5 (6)	47	14	0.3	27.0	18.3	16.2	38.2	99.7	83.5	55.2	23.9	-
SS-49	101+64	95' LT	-L-	29.0-30.5	A-2-4 (0)	37	6	0	42.0	29.2	24.7	4.1	100.0	74.9	31.3	13.4	-
SS-14	102+14	110' LT	-L-	14.0-15.5	A-7-6 (9)	43	22	1	25.7	21.2	21.0	31.1	99.0	84.1	55.0	23.5	-
SS-63	102+99	50' RT	-L-	2.0-3.5	A-7-5 (9)	46	15	1.5	19.4	15.1	8.5	55.5	98.5	87.3	64.7	26.0	-
SS-23	103+04	28' LT	-L-	2.0-3.5	A-7-6 (14)	55	26	2	22.1	19.5	20.6	35.8	98.0	85.4	59.3	23.9	-
SS-27	106+64	48' LT	-L-	5.0-6.5	A-6 (6)	38	14	0.6	23.3	21.7	29.3	25.1	99.4	85.9	57.4	28.3	-

SOIL TEST RESULTS																	
SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT					% PASSING SIEVES			% Moisture	% ORGANIC
								Gravel	C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-22	107+14	48' LT	-L-	2.0-3.5	A-7-6 (8)	47	20	1.1	23.2	22.6	36.0	17.1	98.9	85.5	54.4	25.7	-
SS-35	108+13	48' LT	-L-	10.0-11.5	A-7-5 (6)	56	13	0	13.8	42.0	40.1	4.1	100.0	90.2	51.6	29.9	-
ST-5	108+99	48' LT	-L-	2.0-4.0	A-4 (3)	37	7	0.1	16.6	32.4	39.8	11.1	99.9	90.8	57.5	22.0	-
SS-4	109+00	42' RT	-L-	5.0-6.5	A-7-6 (4)	43	14	13.8	17.3	25.2	34.9	8.8	86.2	76.3	47.5	36.9	-
SS-31	110+89	41' LT	-L-	2.0-3.5	A-2-4 (0)	27	1	7.2	40.1	23.0	28.0	1.7	92.8	59.2	33.3	23.7	-
SS-54	112+89	44' RT	-L-	2.0-3.5	A-7-6 (13)	53	25	0.1	25.7	16.7	28.6	28.9	99.9	83.6	58.2	27.1	-
SS-37	115+88	48' RT	-L-	2.0-3.5	A-7-6 (5)	45	18	7.5	30.6	16.0	33.7	12.2	92.5	71.4	46.5	14.6	-
SS-5	119+00	41' LT	-L-	10.0-11.5	A-2-5 (0)	47	10	10.9	30.9	28.2	24.5	5.5	89.1	70.2	33.8	63.7	-
SS-55	124+38	92' LT	-L-	24.0-25.5	A-7-5 (11)	50	16	7.2	12.9	14.0	28.4	37.5	92.8	86.0	66.3	24.5	-
ST-2	125+38	100' LT	-L-	9.0-10.7	A-7-5 (12)	50	20	7	13.9	18.6	19.5	41.0	93.0	85.2	63.5	32.2	-
SS-66	126+88	113' LT	-L-	24.0-25.5	A-7-5 (16)	54	20	0.2	12.4	14.4	15.9	57.1	99.8	93.2	73.7	20.7	-
SS-9	129+88	120' LT	-L-	5.0-6.5	A-7-5 (7)	59	28	5.2	27.4	28.7	25.9	12.8	94.8	78.3	42.4	22.8	-
SS-6	132+50	42' RT	-L-	4.7-6.2	A-7-6 (13)	47	19	1.3	13.3	20.0	16.6	48.8	98.7	92.1	68.1	19.4	-
SS-52	133+38	48' RT	-L-	2.0-3.5	A-2-6 (0)	39	11	22.4	25.5	21.6	24.2	6.3	77.6	61.8	31.8	25.6	-
ST-4	133+38	48' RT	-L-	9.5-11.5	A-7-5 (4)	48	15	2.6	28.7	25.6	26.3	16.8	97.4	81.9	45.8	62.0	-
ST-3	133+88	48' RT	-L-	4.5-6.5	A-7-5 (5)	45	14	1.4	24.4	28.0	22.7	23.5	98.6	83.2	50.7	30.8	-
SS-7	141+50	50' LT	-L-	10.0-11.5	A-7-5 (2)	56	12	2.7	28.1	32.6	29.6	7.0	97.3	82.2	40.7	21.8	-
SS-8	148+00	143' RT	-L-	24.7-26.2	A-2-7 (1)	48	17	31.5	20.5	20.7	20.9	6.4	68.5	54.6	31.7	38.1	-
SS-39	14+50	57' LT	-Y-	2.0-3.5	A-7-6 (12)	45	19	3.9	13.4	15.3	24.3	43.1	96.1	88.5	68.0	23.0	-
SS-40	14+50	57' LT	-Y-	4.4-5.9	A-7-5 (12)	50	16	5.1	14.4	14.2	23.8	42.5	94.9	85.4	68.7	25.8	-
SS-32	15+28	56' RT	-Y-	9.0-10.5	A-5 (0)	45	7	0.7	26.0	36.5	23.7	13.1	99.3	86.0	39.9	25.5	-
SS-36	19+19	36' RT	-Y-	2.0-3.5	A-7-6 (6)	46	20	13.1	19.5	23.9	20.8	22.7	86.9	75.5	47.0	17.4	-
SS-28	20+40	80' LT	-Y-	4.0-5.5	A-1-a (0)	24	4	60	16.7	10.2	9.3	3.8	40.0	27.3	14.7	30.5	-
SS-30	12+50	25' RT	-Y1-	4.0-5.5	A-2-4 (0)	35	6	29.1	26.2	19.6	20.0	5.1	70.9	51.8	28.7	15.7	-
SS-24	12+45	20' LT	-														