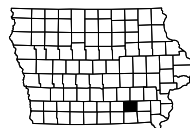


WAPELLO COUNTY

Bridge Replacement
BRFN-034-7(148)--39-90

LETTING DATE
10/15/2024



INDEX OF SHEETS	
No.	DESCRIPTION
A Sheets	Title Sheets
A.1	Title Sheet
A.2	Location Map Sheet
B Sheets	Typical Cross Sections and Details
B.1	Typical Cross Sections and Details
D Sheets	Mainline Plan and Profile Sheets
* D.1	Plan & Profile Legend & Symbol Information Sheet
* D.2	US 34 Plan & Profile
G Sheets	Survey Sheets
G.1	Survey Information
G.2	Control Point Vicinity Map
G.3	Coordinates
J Sheets	Traffic Control and Staging Sheets
* J.1	Traffic Control Plan
* J.2	Detour Map
U Sheets	500 Series, Mod.Stds. and Detail Sheets
U.1 - 2	500 Series, Modified Standards and Detail Sheets
V Sheets	Bridge and Culvert Situation Plans
V.1 - 2	Bridge Situation Plans
W Sheets	Mainline Cross Sections
* W.1	Cross Sections Legend & Symbol Information Sheet
* W.2 - 30	Mainline Cross Sections
	* Color Plan Sheets



PLANS OF PROPOSED IMPROVEMENT ON THE
PRIMARY ROAD SYSTEM
WAPELLO COUNTY
Bridge Replacement
US 34 over South Avery Creek
0.7 mi. E of Co Rd T61

SCALES: As Noted

Refer to the Proposal Form for list of applicable specifications.

Value Engineering Saves. Refer to Article 1105.14 of the Specifications.



REVISIONS

TOTAL	44
PROJECT IDENTIFICATION NUMBER	18-90-034-020
PROJECT NUMBER	BRFN-034-7(148)--39-90
R.O.W. PROJECT NUMBER	

DESIGN DATA RURAL			
2018	AAVT	4,840	V.P.D.
2021	AAVT	4,840	V.P.D.
20	--	--	V.P.H.
	TRUCKS	9	%
	Total		
	Design ESALs	--	

INDEX OF SEALS			
SHEET NO.	NAME	TYPE	BID QUANTITY SHEETS
A.1	X	Primary Signature Block	X
X	X	X	X

PRELIMINARY PLANS

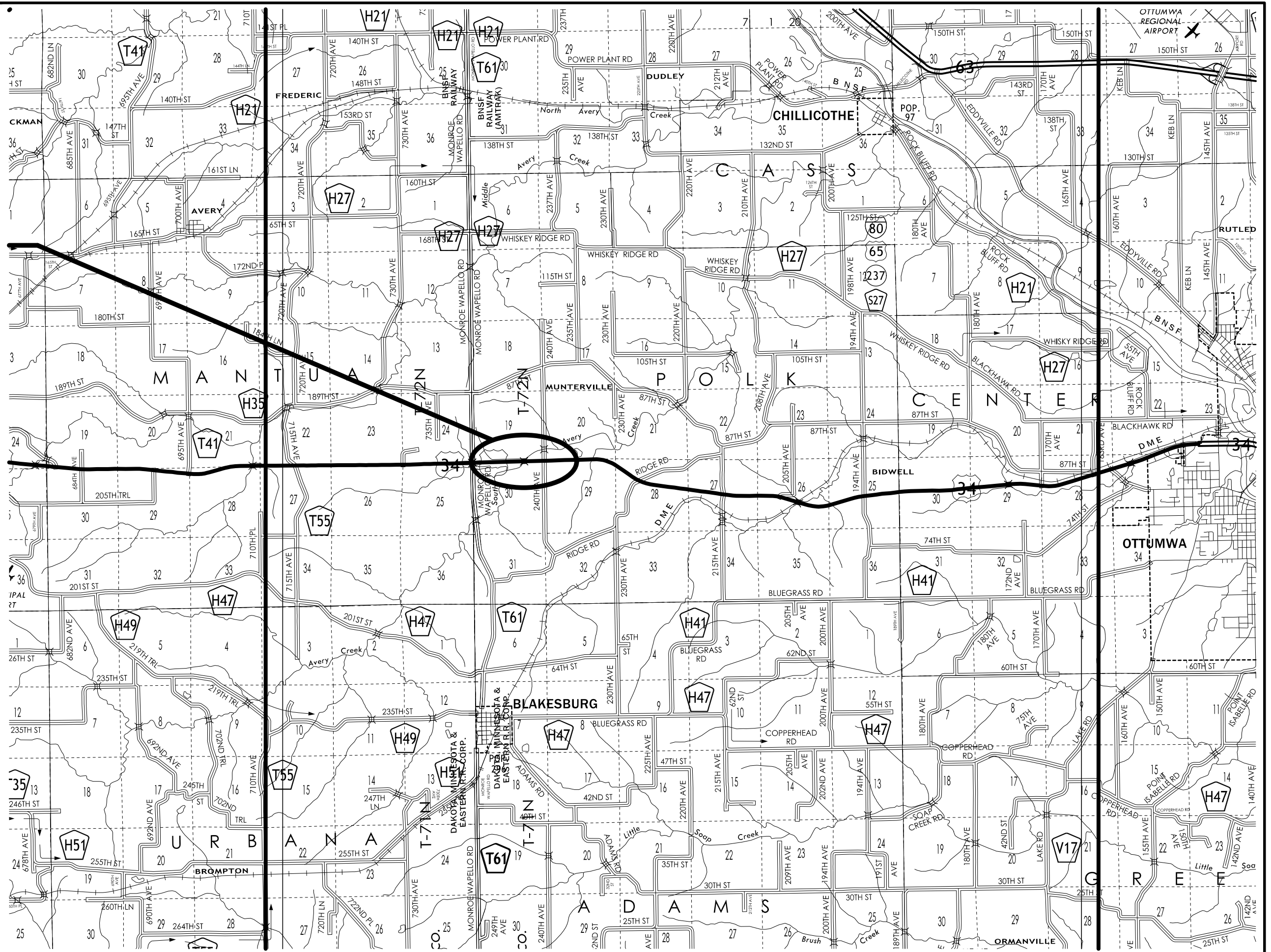
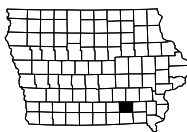
Subject to change by final design.

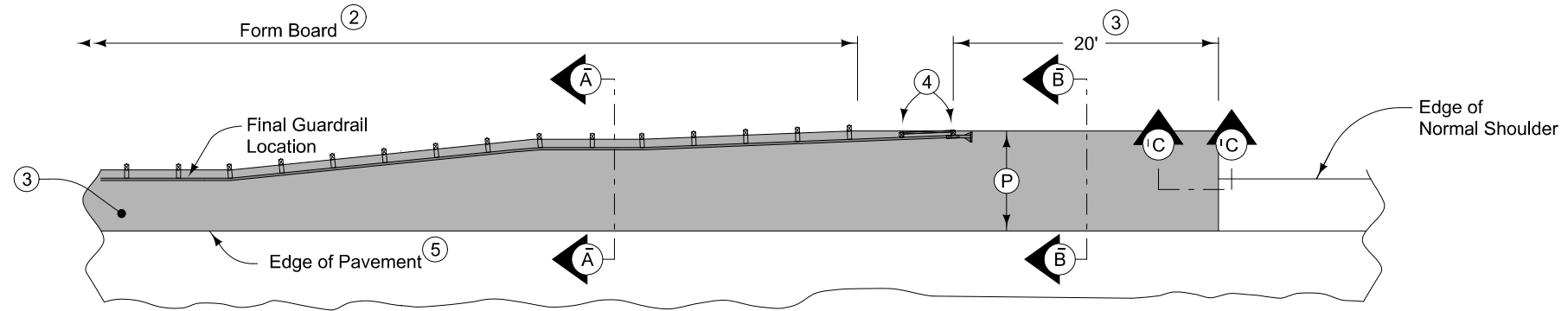
D5 PLAN - Date: 11/08/2022

PROJECT LOCATION



NOT TO SCALE





PLAN VIEW

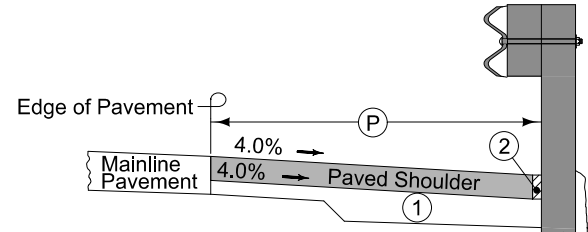
9" HMA Paved Shoulder at guardrail. 8" PCC may be substituted with the following jointing layout:

Match mainline pavement joint spacing. When mainline pavement is 8" or greater in thickness, place additional transverse 'C' joints in shoulder at mid-panel of the mainline pavement. Place longitudinal 'C' joint at P/2 from edge of mainline pavement when P is greater than 10' wide. Terminate longitudinal joint at transverse joint less than 10' in length.

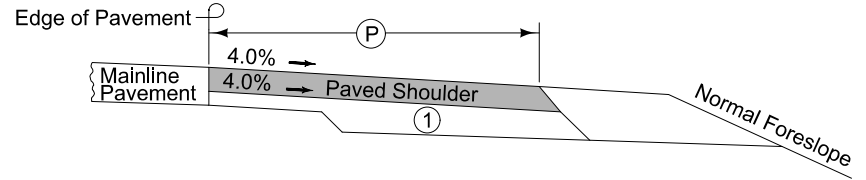
Compaction of HMA is required to face of guardrail post. Hand compaction will be allowed under guardrail. Removal and reinstallation of guardrail will be allowed with no additional payment.

Refer to Tabulation 112-9 for shoulder quantities.

- ① For subgrade treatment, refer to other details in the plan.
- ② PCC option only: When guardrail posts are installed prior to construction of PCC paved shoulder, fasten form board to the face of guardrail posts for the length shown. Refer to note 4 for final 2 posts.
- ③ Continue paved shoulder to existing paved shoulder or 20 feet beyond the center of the first post.
- ④ Shoulder may be notched for final 2 posts or post sleeves may be installed through pavement. Do not drive posts through pavement.
- ⑤ 'KT-1 joint for PCC shoulder. 'B' joint for HMA shoulder.

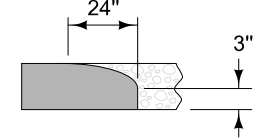


Section A-A

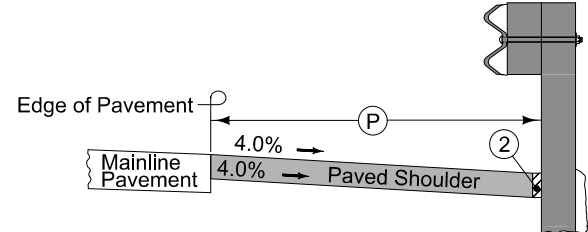


Section B-B

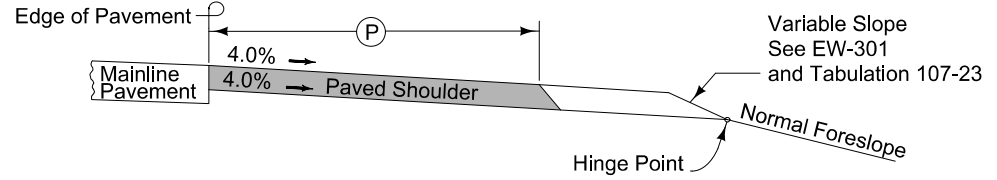
NEW CONSTRUCTION



Section C-C
Roll down at granular shoulder or earth.



Section A-A



Section B-B

EXISTING SHOULDER

PAVED SHOULDER AT GUARDRAIL

SURVEY SYMBOLS

- Interstate Highway Symbol
- U.S. Highway Symbol
- Iowa Highway Symbol
- County Road Highway Symbol
- Evergreen Tree
- Deciduous Tree
- Fruit Tree
- Shrub (Bushes)
- Timber
- Hedge
- Stump
- Swamp
- Rock Outcrop
- Broken Concrete
- Revetment (Rip Rap)
- Cemetery
- Grave
- Cave
- Sink Hole
- Board Fence
- Chain Link or Security Fence
- Wire Fence
- Terrace
- Earth Dam or Dike (Existing)
- Tile Outlet
- Edge of Water
- Existing Drainage
- Right of Way Rail or Lot Corner
- Concrete Monument
- Well
- Windmill
- Beehive Intake
- Existing Intake
- Existing Utility Access (Manhole)
- Fire Hydrant
- Water Hydrant (Rural)
- Septic Tank
- Cistern
- L.P. Gas Tank (No Footing)
- Underground Storage Tank
- Latrine
- Satellite TV Dish
- Water Hook Up
- Radio Tower
- Tower Anchor
- Guardrail (Beam or Cable)
- Guard Post (one or two)
- Guard Post (over two)
- Filler Pipe
- Gas Valve
- Water Valve
- Speed Limit Sign
- Mile Marker Post
- Sign
- Traffic Signal Control Box
- Rail Road Signal Control Box
- Telephone Switch Box
- Electric Box

UTILITY LEGEND

- TI - CenturyLink
Sadie Hull
918-547-0147
sadie.hull@lumen.com
- FO - Iowa Communications Network
Shannon Marlow
800-572-3940
icnoutsideplantiowaonecall@iowa.gov
- SAN.(C) Wapello Rural Water Association
Kathy Alex or Donnie Johnston
641-682-8351
onecall@wrh2o.com

PLAN VIEW COLOR LEGEND OF PLAN AND PROFILE SHEETS

LINEWORK		Design Color No.	
Green	(2)		Existing Topographic Features and Labels
Blue	(1)		Proposed Alignment, Stationing, Tic Marks, and Alignment Annotation
Magenta	(5)		Existing Utilities
SHADING		Design Color No.	
Lavender	(9)		Temporary Pavement Shading
Gray, Light	(48)		Proposed Pavement Shading
Gray, Med	(80)		Proposed Granular Shading
Gray, Dark	(112)		Proposed Paved Shoulder at Guardrail
Yellow	(68)		Proposed Shoulder Paved Full Depth Shading
Yellow	(132)		Proposed Shoulder Paved Partial Depth Shading
Gray, Dark	(112)		Proposed Grade and Pave Shading "In conjunction with a paving project"
Brown, Light	(236)		Grading Shading
Orange, Light	(134)		Proposed Granular Entrance Shading
Yellow	(220)		Proposed Paved Entrance Shading
Tan	(8)		Proposed Sidewalk Shading
Blue, Light	(230)		Proposed Sidewalk Landing Shading
Pink	(11)		Proposed Sidewalk Ramp Shading
Green, Light	(225)		Existing Pavement Shading
Red	(3)		Proposed Structure Shading

PROFILE VIEW COLOR LEGEND OF PLAN AND PROFILE SHEETS

LINEWORK		Design Color No.	
Green	(10)		Existing Ground Line Profile
Blue	(1)		Proposed Profile and Annotation
Magenta	(5)		Existing Utilities
Blue, Light	(230)		Proposed Ditch Grades, Left
Black	(0)		Proposed Ditch Grades, Median
Rust	(14)		Proposed Ditch Grades, Right

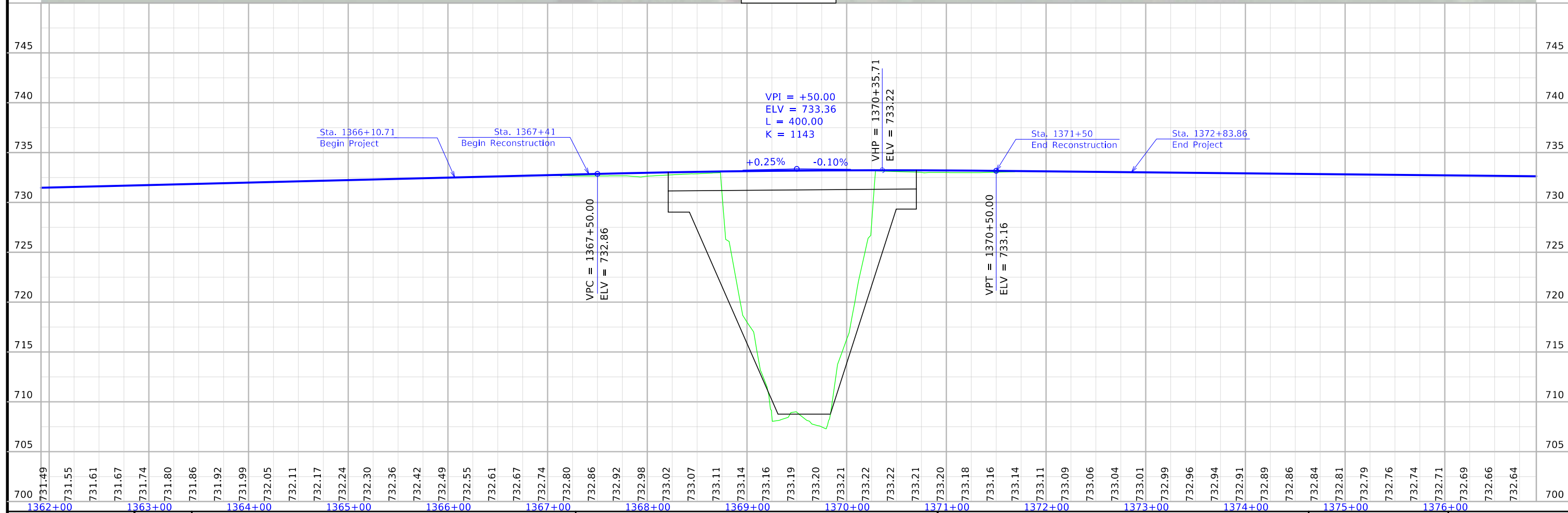
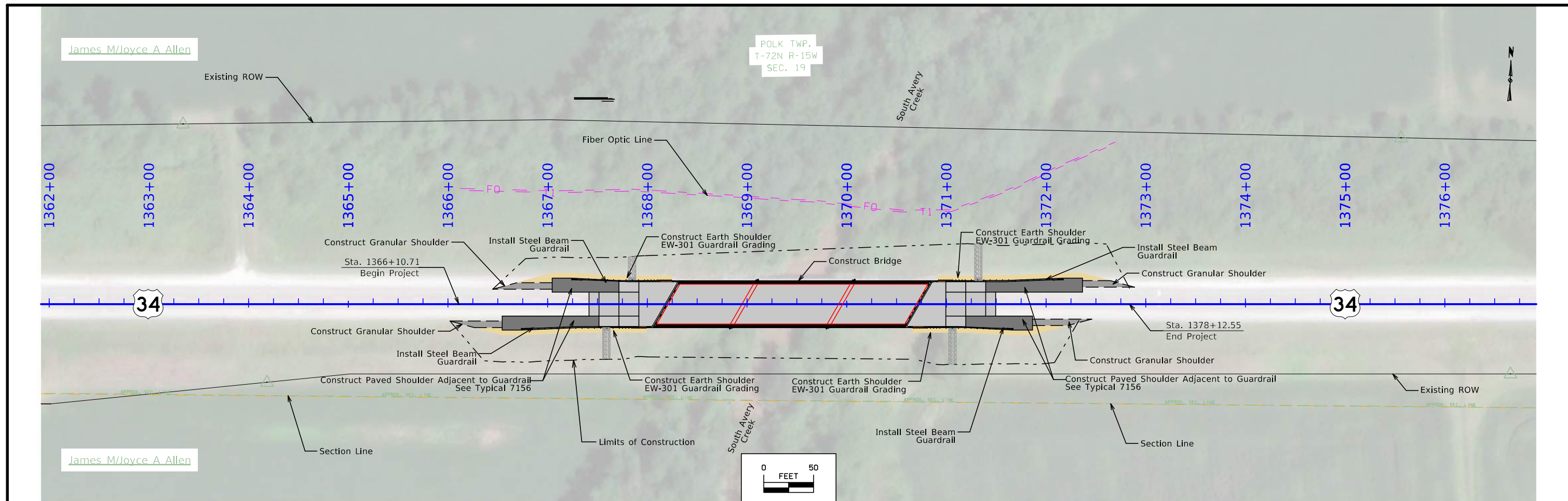
- Reference Point
- Station
- Survey Line
- Section Corner
- Ground Line Intercept
- Saw Cut
- Guardrail
- Trench Drain
- HighTension Cable Guardrail
- Sheet Pile
- Pavement Removal
- Clearing & Grubbing Area

RIGHT-OF-WAY LEGEND

- Proposed Right-of-Way
- Existing Right of Way
- Existing and Proposed Right-of-Way
- Easement and Existing Right-of-Way
- Easement (Temporary)
- Easement
- Access Control
- Property Line

PLAN AND PROFILE LEGEND AND SYMBOL INFORMATION SHEET

(COVERS SHEET SERIES D, E, F, & K)



FILE NO. 31833	ENGLISH	DESIGN TEAM WHKS & CO.	WAPELLO COUNTY	PROJECT NUMBER BRFN-034-7(148)--39-90	SHEET NUMBER D.2
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Survey Information

SURVEY INDEX

County: Wapello

PIN: 18-90-034-020

Project Number: BRF-034-7(148)--38-90

Location: South Avery Creek 0.7 Miles East of County Road T61

Type of Work: Bridge Replacement

Project Directory: 9003402018

Survey Personnel

Jeremy Leemon	Survey Project Manager
Chris Ries	Assistant Survey Project Manager
CJ Beckman	Instrument
Jacob Powers	Instrument

Date(s) of Survey

Begin Date	05/2/2022
End Date	06/06/2022

General Information

Measurement units for this survey are US survey feet. This survey is for US Hwy 34 bridge replacement over South Avery Creek, 0.7 miles east of County Road T61. This project is a Full Field DTM survey.

Project Control

Nearby Iowa Real Time Network reference stations were utilized to obtain horizontal and vertical control on primary project control points. Two 3-minute observations were taken with appropriate time spans between and used in a weighted average to obtain final coordinate values. The Horizontal Scale Factor is: 1.0000027343. Additional control was established from the calibration along the site. For additional details of the control survey, contact the Preliminary Survey department.

PROJECT DATUM: NAD83(2011) EPOCH 2010.00

VERTICAL DATUM: NAVD88

COORDINATE SYSTEM: IOWA REGIONAL COORDINATE SYSTEM ZONE 12

GEOID MODEL: 18

Alignments Information

The horizontal alignment for this survey is a retrace of As-Built Grading Plans FN 1027(6). Survey stationing was equated to the plan POT at STA 1384+62.3 at point #4008, Found Mag Nail, and run back and forward without equation throughout the survey.

Survey stationing relates to As-built plan stationing as follows:

POT Sta. 1384+62.3 Plan
= Survey POT Sta. 1384+62.30

TS Sta. 1420+84.8 Plan
= Survey POT Sta. 1420+84.80

Utility Information

For logging data and other utility details see Utility Survey and Ownership Report in the Utility folder of the PrelimSurvey project directory.

CONTROL POINT VICINITY MAP

This map is a guide to the vicinity of the primary project control points. Primary control is for use with RTK base stations and for RTN validation. Future surveys will use primary project control to establish temporary control as needed for construction or other surveying applications.



HORIZ. DATUM: NAD83(2011) EPOCH 2010.00 - Ia. RCS Zone 12
VERT. DATUM: NAVD88 - Geoid Model 18

Coordinate listing from next sheet will be used with IaRTN for monument recovery. No other reference ties are given.

HORIZONTAL AND VERTICAL PROJECT CONTROL COORDINATE LISTING

HORIZ. DATUM: NAD83(2011) EPOCH 2010.00
 1a. Regional Coordinate System Zone 12

VERT. DATUM: NAVD88
 Geoid Model 18
 Project Control Marks are Bench Marks

Point Name	Northing	Easting	Elevation	Description
100	6238350.150	22809735.893	726.663	Set Rebar W/ Cap 62' N of US 34 CL, 31' E of Farm Ent
101	6240744.865	22806353.429	857.973	Set Rebar 33' W of T59 CL, 24' S of Antenna Ent
103	6236781.257	22811829.312	860.544	Set Rebar 36' E of 240th Ave CL at Pasture Ent
500	6238282.913	22810178.105	733.075	Fd IHC BM SW Wing of Bridge
501	6238220.834	22809819.610	722.178	Fd ROW Rail 69' S of US 34 CL, 400' W of S Avery Creek
502	6238230.453	22810119.324	722.506	Fd ROW Rail 69' S of US 34 CL, 110' W of S Avery Creek

TRAFFIC CONTROL PLAN

US 34 shall be closed to traffic for the duration of the project in accordance with Standard Road Plan TC-252.

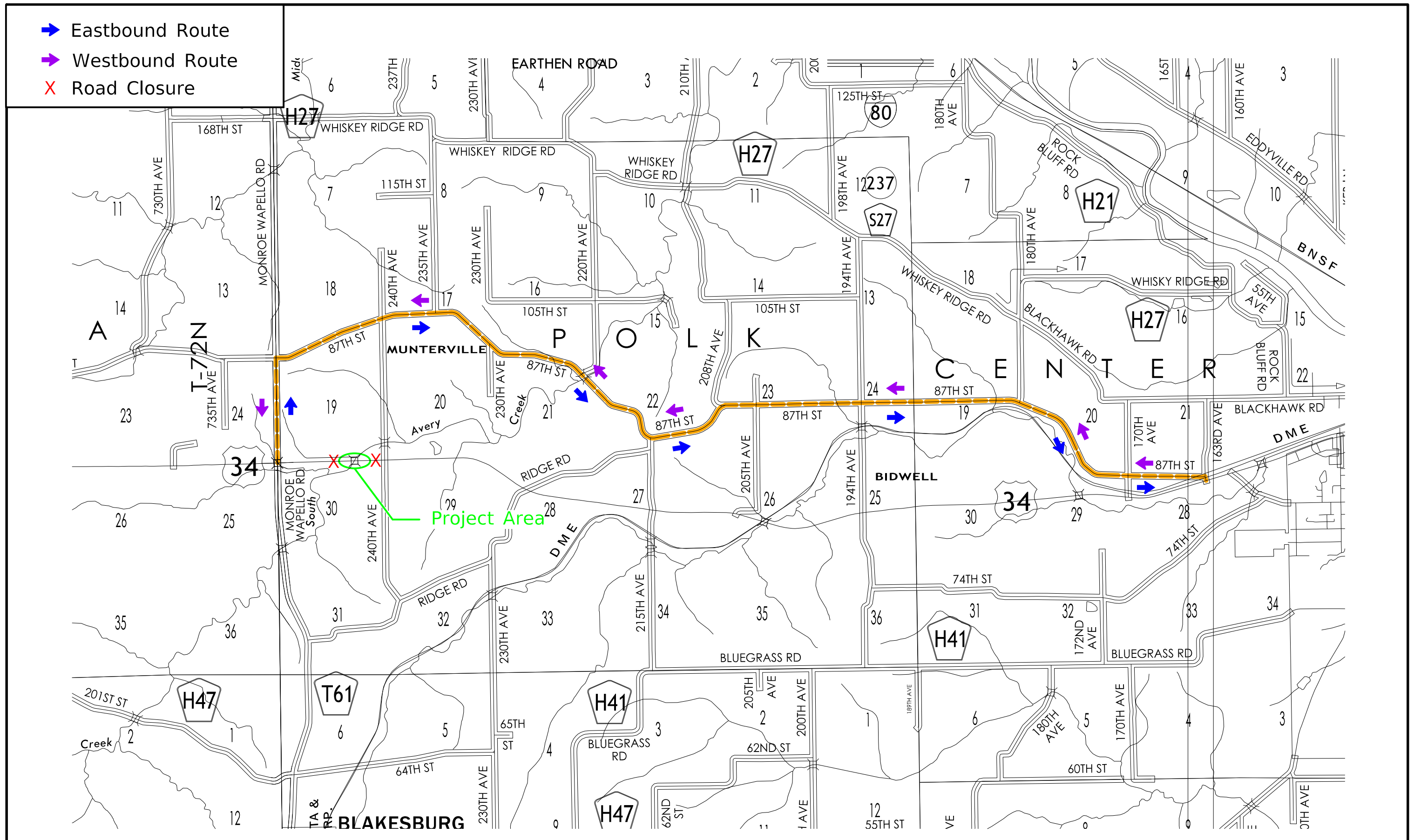
All traffic control devices shall be installed, maintained, and removed by the Contractor.
SW.

DETOUR DETAILS:

Detour furnished, maintained and removed by Contractor.

The proposed detour route follows 87th St. for eastbound and westbound US 34 traffic.
Monroe Wapello Rd. shall mark the beginning and end of the detour route west of the project area.
163rd St. shall mark the beginning and end of the detour route east of the project area.

- ➔ Eastbound Route
- ➔ Westbound Route
- ✗ Road Closure



Not to Scale
 Detour Distance: 10.75 miles

Proposed Detour Route



1364+00

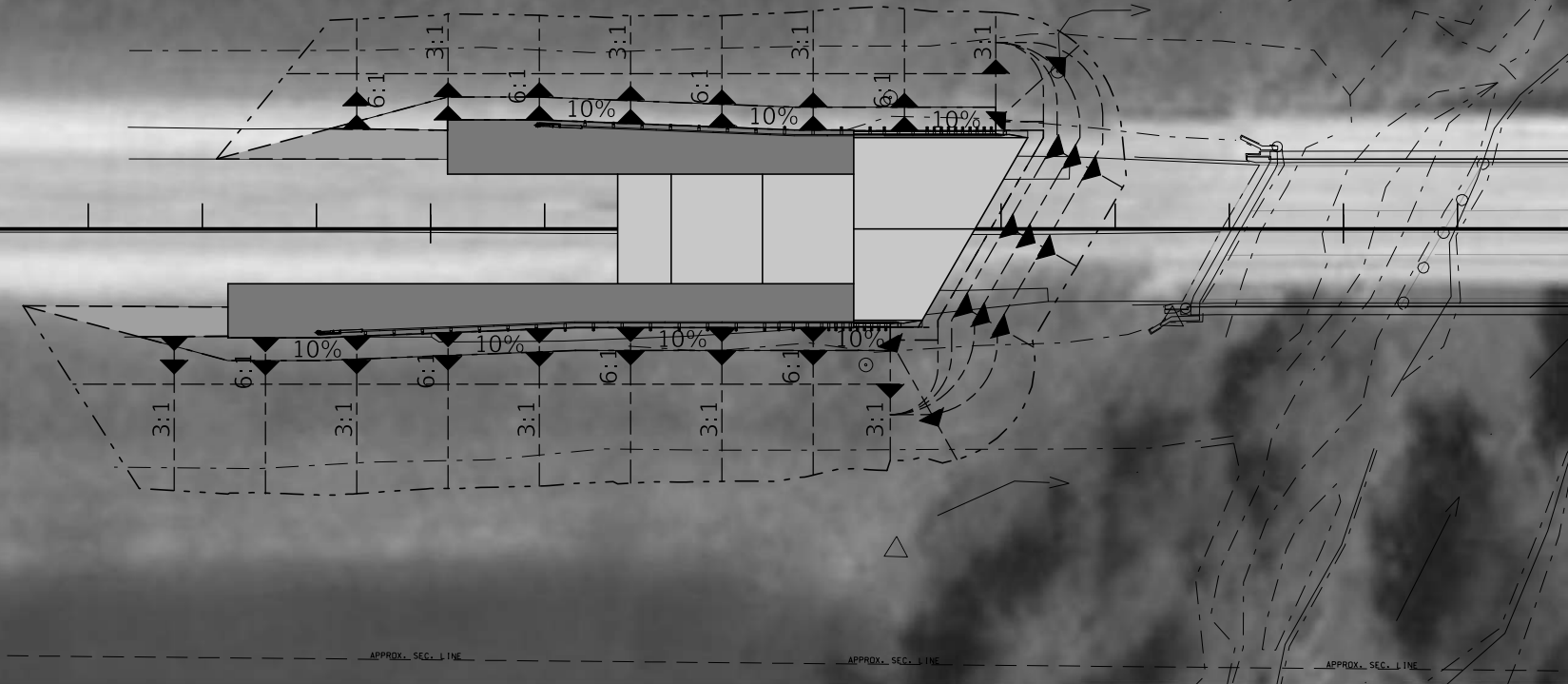
1365+00

1366+00

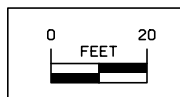
1367+00

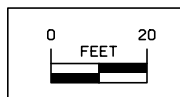
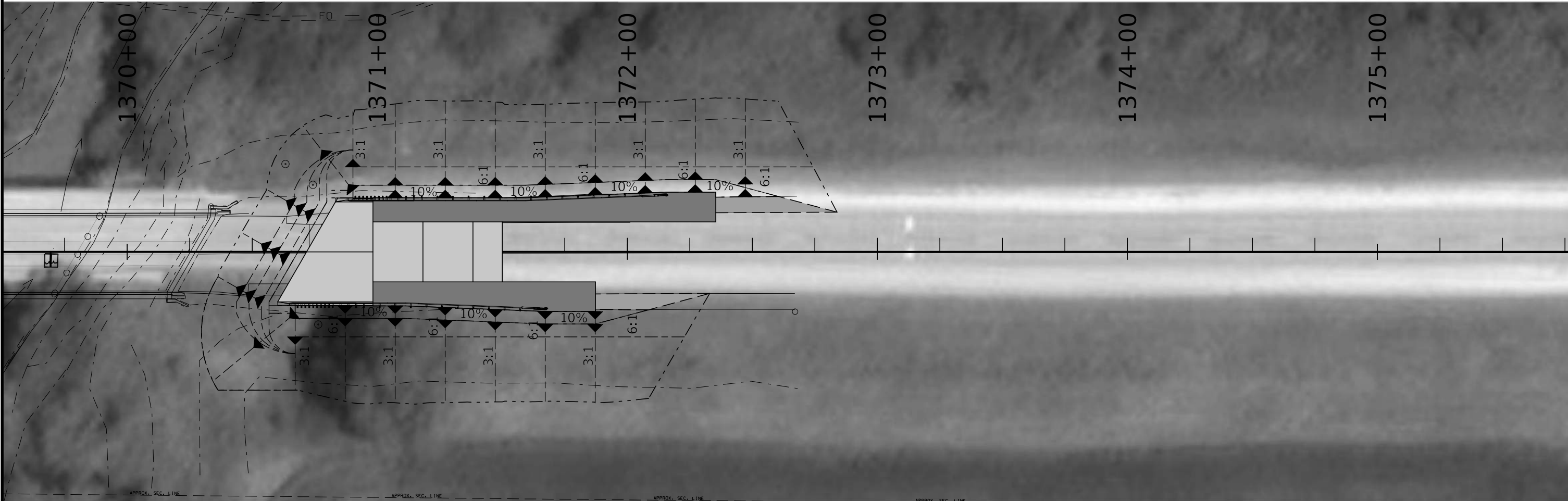
1368+00

1369+00

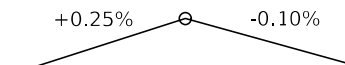
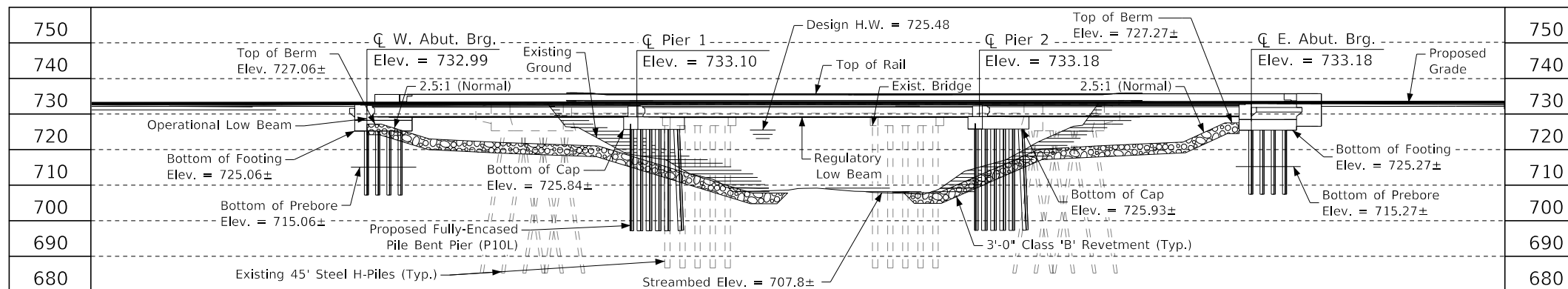


APPROX. SEC. LINE APPROX. SEC. LINE APPROX. SEC. LINE APPROX. SEC. LINE APPROX. SEC. LINE APPROX. SEC. LINE





Control Point: #111,6238321.233,22810080.674,731.777,CP CP Set Rebar 6" Deep ~110 ft. W of existing Bridge, 21.6' ft. N. of centerline
 #112,6238291.690,22810582.692,732.174,CP CP Set Rebar 6" Deep ~200 ft. E of existing Bridge, 23.9' ft. S. of centerline



VPI Sta. = 1369+50.00 VC = 400'
 VPI Elev. = 733.36

Proposed Profile Grade - US 34

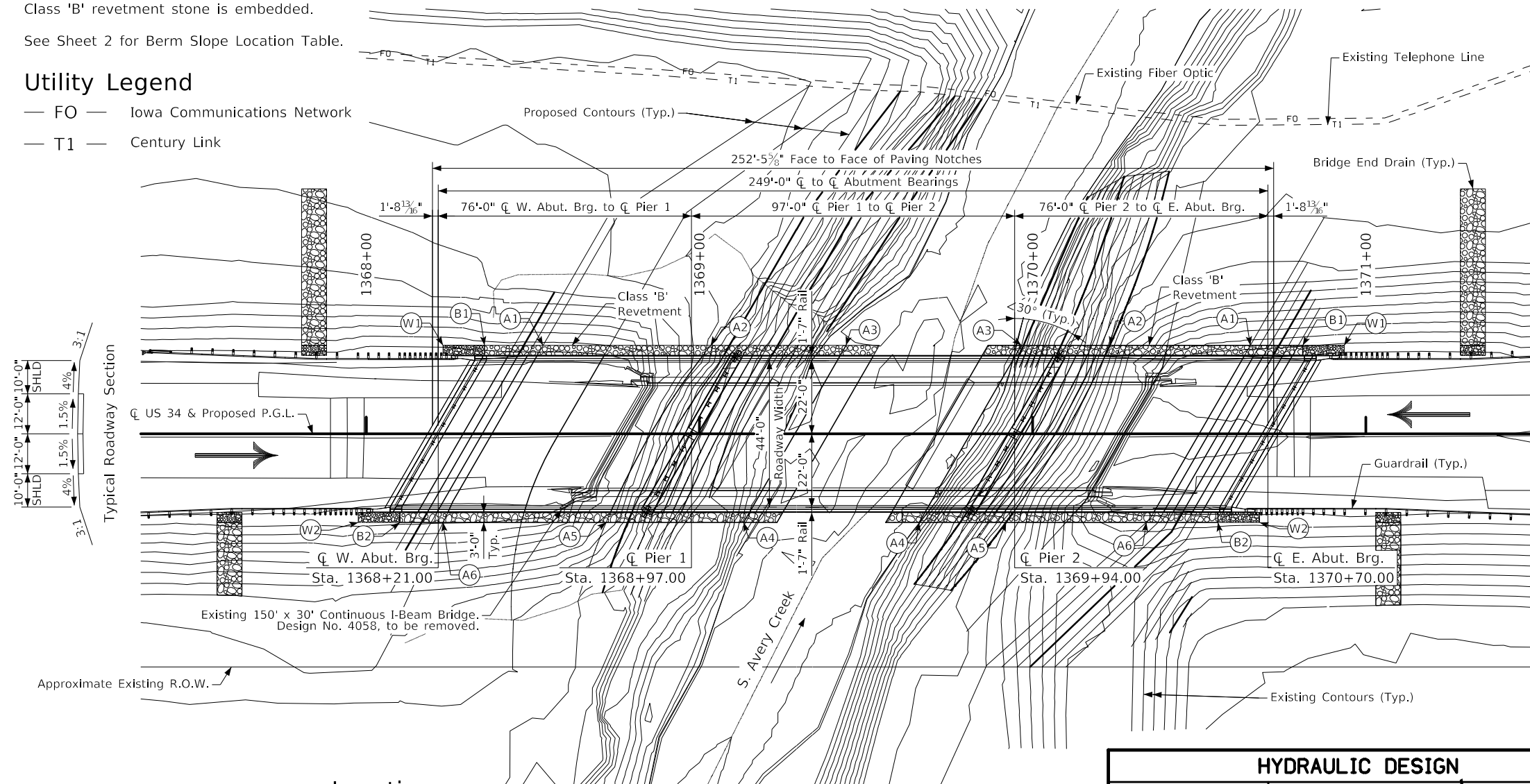
Notes:
 Top of bridge deck crown is 0.03' below profile grade.

Longitudinal Section Along Centerline Approach Roadway

Class 'B' revetment stone is embedded.
 See Sheet 2 for Berm Slope Location Table.

Utility Legend

- FO — Iowa Communications Network
- T1 — Century Link



Hydraulic Data

Discharges determined from weighted independent estimate between USGS Report 2013-5086 regression equations and nearby gage data.

The stage and backwater values shown below include backwater from the downstream bridge at 240th Ave.

Drainage Area (D.A.) = 32.9 Sq. Mi.
 (D.A.) Main Channel Slope = 11.0 Ft./Mi.
 Site Stream Slope = 0.11% (5.8 Ft./Mi.)
 Avg. Low Water Stage = 708.5
 Regulatory Low Beam = 728.88
 Operational Low Beam = 728.72
 Roadway Overtopping EL = 730.70
 Roadway Overtopping STA = 1356+05

Q₂₅ = 11,370 CFS
 Stage = 724.97
 Backwater = 1.08 Ft.
 Avg. Bridge Velocity = 7.0 FPS

Q₅₀ (Design) = 13,060 CFS
 Stage (Design) = 725.48
 Backwater = 1.28 Ft.
 Avg. Bridge Velocity = 7.6 FPS

Q₁₀₀ = 14,660 CFS
 Stage = 725.92
 Backwater = 1.48 Ft.
 Avg. Bridge Velocity = 8.1 FPS

Q₂₀₀ = 16,260 CFS
 Stage = 726.31
 Backwater = 1.74 Ft.
 Avg. Bridge Velocity = 8.6 FPS
 Design Scour = TBD

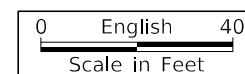
Q₅₀₀ = 18,350 CFS
 Stage = 726.78
 Backwater = 2.02 Ft.
 Avg. Bridge Velocity = 9.3 FPS
 Calculated Design Scour = TBD

Extreme Highwater Stage = Unknown

Location

US 34 over S. Avery Creek
 T-72N R-15W
 Sections 19 & 30
 Polk Township
 Wapello County
 FHWA No. 050400
 Bridge Maint. No. 9077.6S034
 Latitude 41.016321°
 Longitude -92.625714°

Situation Plan



Traffic Estimate

2021 AADT 4,840 V.P.D.
 Trucks 10 %

HYDRAULIC DESIGN

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

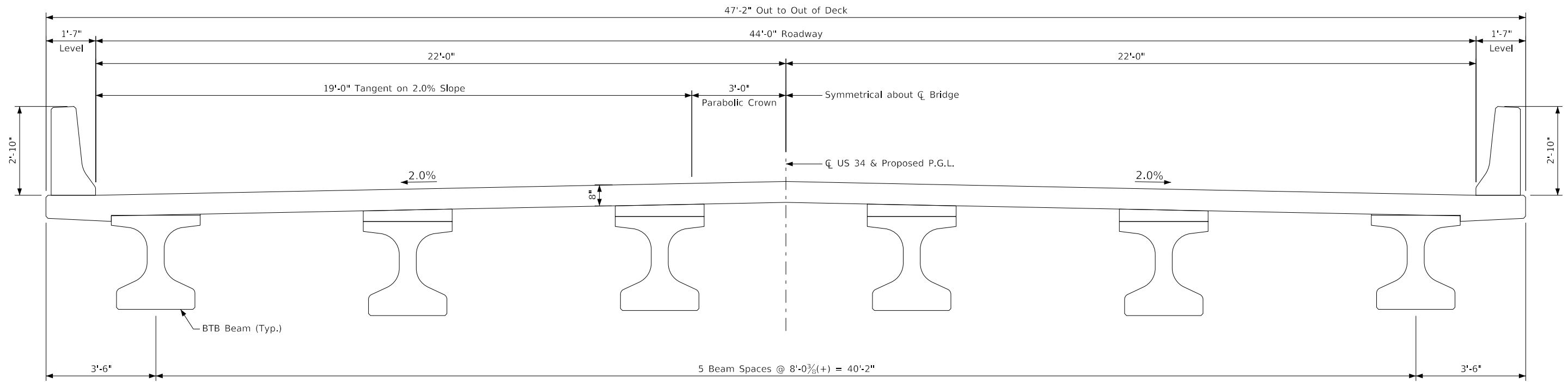
Signature: Brian J. Birkland Date: _____
 Printed or Typed Name: Brian J. Birkland
 My license renewal date is December 31, 2022

Pages or sheets covered by this seal: SHEETS 1-2

Preliminary

Design For 30° L.A.
249'-0" x 44'-0" Prestressed Pretensioned Concrete Beam Bridge
 76'-0" End Spans 97'-0" Interior Span

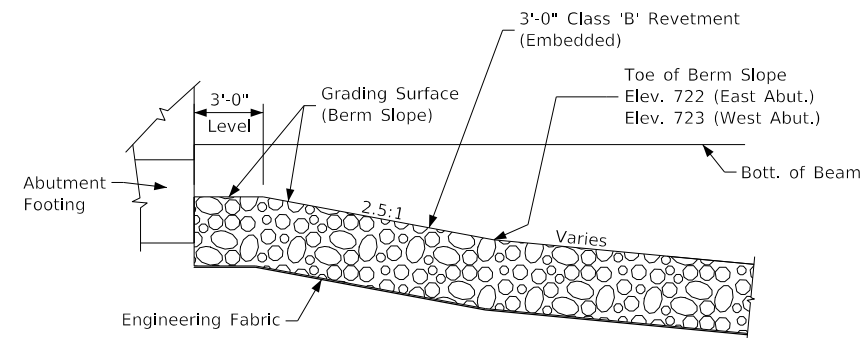
Situation Plan
 STA. 1369+45.50 (US 34) Turn-In Date: September, 2022
Wapello County
 IOWA DEPARTMENT OF TRANSPORTATION
 Design No. Design Sheet No. 1 of 2 FHWA No. 050400



Transverse Section

Berm Slope Location Table						
Points	West Abutment			East Abutment		
	Station	Offset	Elev.	Station	Offset	Elev.
A1	1368+53.07	26.58' LT.	723.00	1370+65.31	26.58' LT.	722.00
A2	1369+03.39	26.58' LT.	721.00	1370+23.16	26.58' LT.	720.00
A3	1369+43.99	26.58' LT.	707.80	1369+96.63	26.58' LT.	707.80
A4	1369+13.29	26.58' RT.	707.80	1369+65.93	26.58' RT.	707.80
A5	1368+76.77	26.58' RT.	721.00	1369+92.03	26.58' RT.	720.00
A6	1368+23.09	26.58' RT.	723.00	1370+34.14	26.58' RT.	722.00
B1	1368+35.50	26.58' LT.	727.06	1370+81.03	26.58' LT.	727.27
B2	1368+10.09	26.58' RT.	727.06	1370+55.63	26.58' RT.	727.27
W1	1368+23.03	26.58' LT.	732.29	1370+93.50	26.58' LT.	732.47
W2	1367+97.63	26.58' RT.	732.24	1370+68.09	26.58' RT.	732.48

Berm slope elevations reflect the grading surface.
Stations and offsets based on centerline.



Typical Berm Armoring Detail
Normal to Slope

General Notes:

(Final designer to include in final plans)
This design is for the replacement of the existing 150'-0" x 30'-0" Continuous I-Beam Bridge, Wapello Design No. 4058, FHWA No. 50400, Maintenance No. 9077.6S034

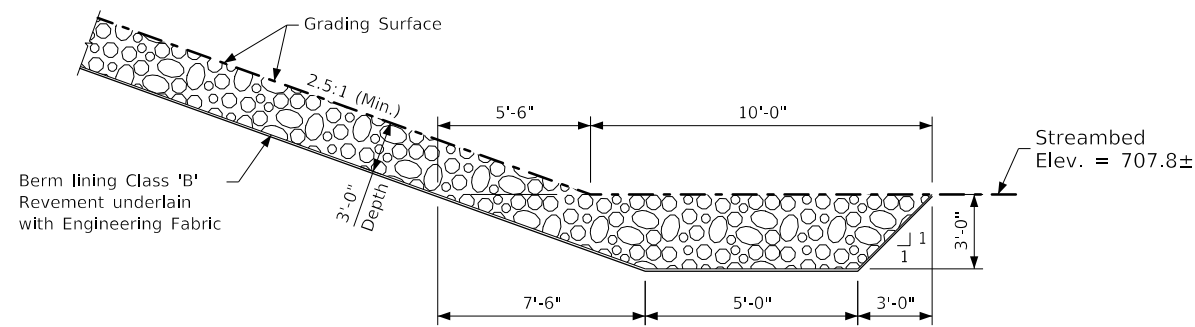
Design Notes:

(Final designer to delete these notes from final Situation Plan.)
TL-4 railing proposed

Proposed Fully-Encased Pile Bent Pier (P10L) -
Pile size & length T.B.D. in final design.

Estimated Berm Armoring Quantities			
Location	Revetment CL. 'B' (Ton)	Engineering Fabric (SY)	Excavation (CY)
West Berm	1143.2	824.3	714.5
East Berm	958.5	689.5	599.1
Totals	2101.7	1513.8	1313.6

Excavation quantity calculated from grading surface.



Section Thru Embedded Channel Lining
Normal to Slope

Preliminary
Design For 30° L.A.
249'-0" x 44'-0" Prestressed Pretensioned Concrete Beam Bridge
76'-0" End Spans 97'-0" Interior Span
Situation Plan - Misc.
STA. 1369+45.50 (US 34) Turn-In Date: September, 2022
Wapello County
IOWA DEPARTMENT OF TRANSPORTATION
Design No. Design Sheet No. 2 of 2 FHWA No. 050400



CROSS SECTION VIEW COLOR LEGEND

Design Color No.	Feature	Design Color No.	Feature
Aggregate			
(64)	Choke Stone	(112)	Noise Wall
(42)	Engineering Fabric	(112)	Noise Wall Footing
(8)	Flooded Backfill	(112)	Retaining Wall Back
(92)	Macadam Stone	(112)	Retaining Wall Back Excavate
(20)	Modified	(112)	Retaining Wall Face
(12)	Plowing Shaping	(112)	Retaining Wall Front Excavate
(14)	Porous Backfill	(112)	Retaining Wall Front Footing
(8)	Revetment Class A	(112)	Retaining Wall MSE Gutter
(6)	Revetment Class B	(112)	Retaining Wall Reinforced Earth
(62)	Revetment Class C	Grading	
(188)	Revetment Class D	(8)	Behind Curb Cut
(28)	Revetment Class E	(6)	Granular
(12)	Shoulder Special Backfill	(13)	Granular Back Fill
(12)	Special Backfill	(48)	Rock Undercut
(20)	Subbase	(8)	Shoulder Earth Fill
(20)	Subbase Lower	(2)	Side Slopes
(20)	Subbase Upper	(226)	Side Slopes Dressing
(118)	Subgrade Treatment	Substrata	
Asphalt			
(207)	HMA Base Course	(128)	Boulder Substrata
(207)	HMA Interim Course	(48)	Broken Weathered Substrata
(207)	HMA Surface Course	(3)	Core Out Substrata
Concrete			
(0)	Barrier Concrete	(203)	Existing Pavement Substrata
(0)	Barrier Concrete Footing	(6)	Loam Substrata
(0)	Curb Gutter	(80)	Rock Substrata
(48)	Flowable Mortar	(4)	Select Sand Substrata
(0)	Median Concrete	(3)	Shale Substrata
(0)	PCC Pavement	(10)	Topsoil Substrata
(0)	Sidewalk	Unsuitable / Waste	
Shoulder			
(209)	Shoulder HMA	(3)	Unsuitable Type A
(0)	Shoulder PCC	(13)	Unsuitable Type B
(6)	Shoulder Granular	(11)	Unsuitable Type C
(0)	Shoulder	(3)	Waste
Existing			
(0)	Existing Pavement		

NOTES:

Text

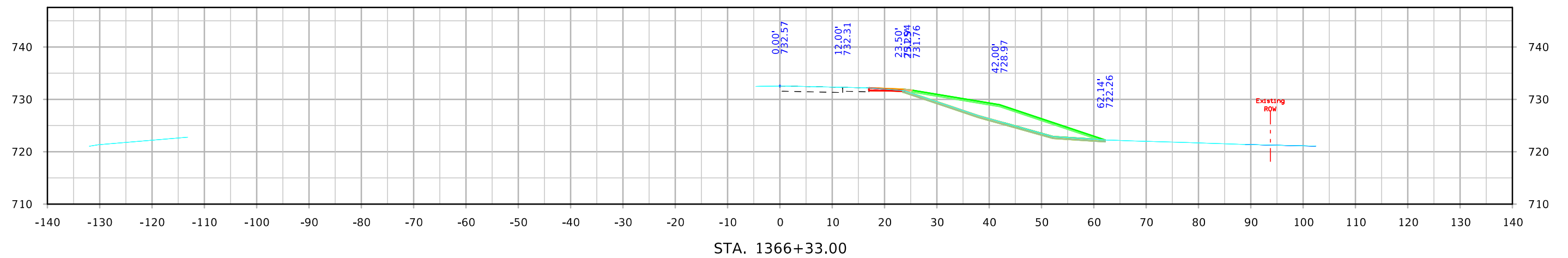
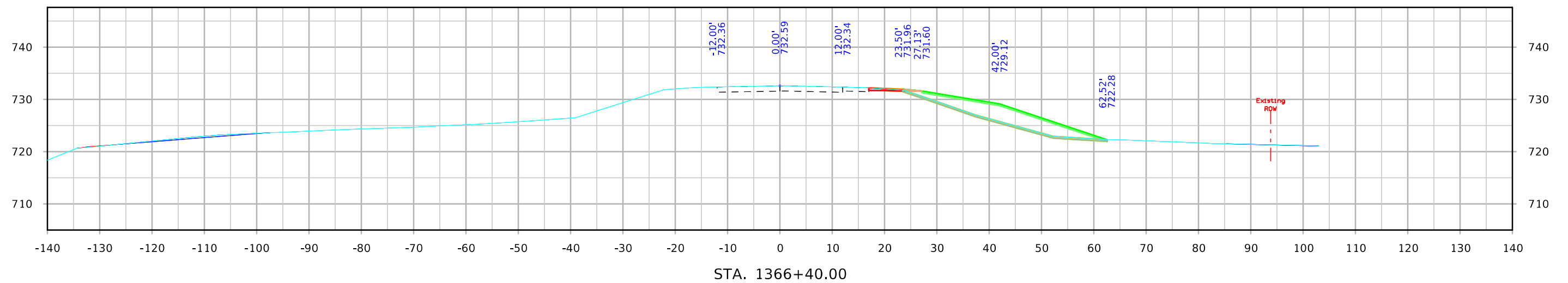
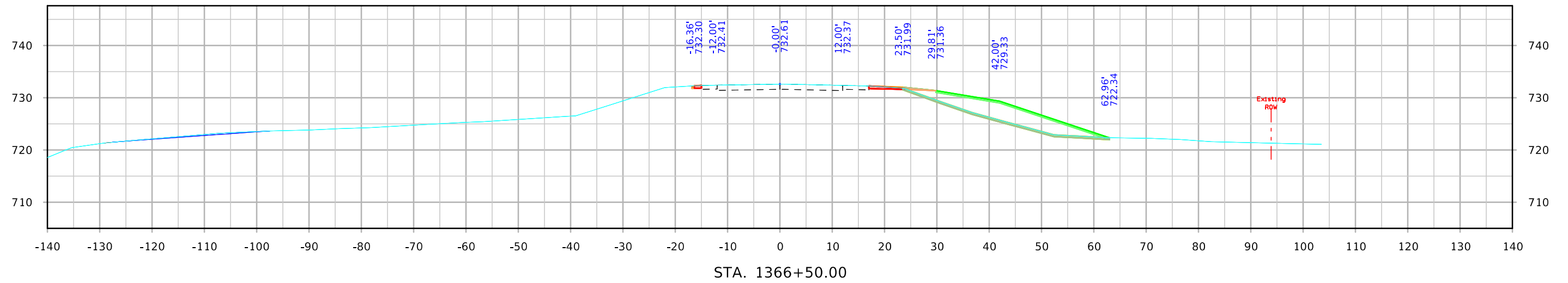
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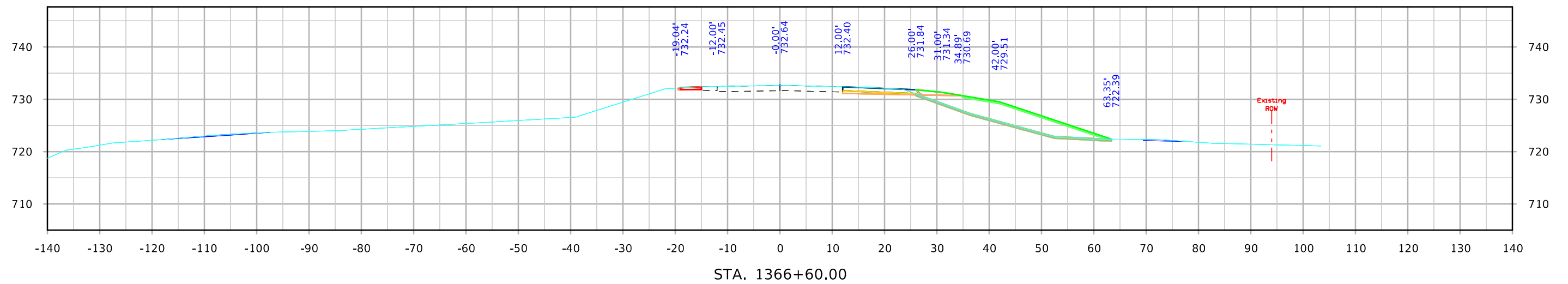
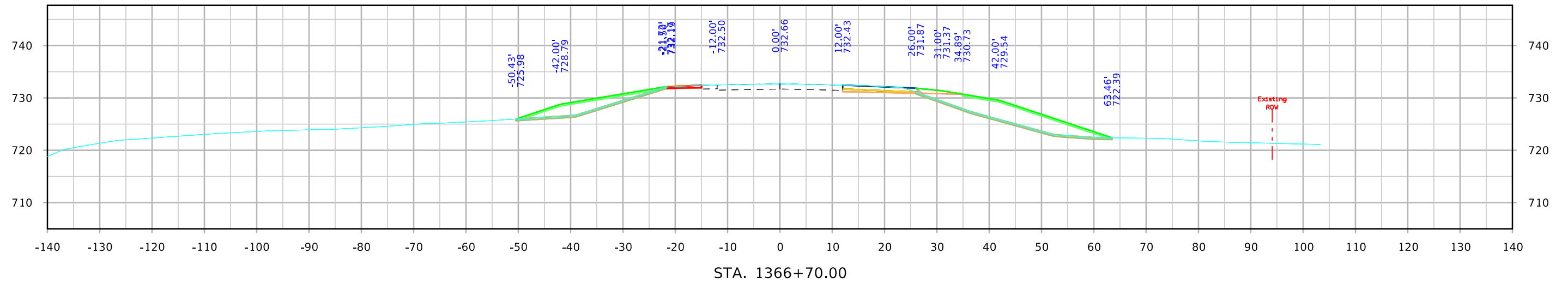
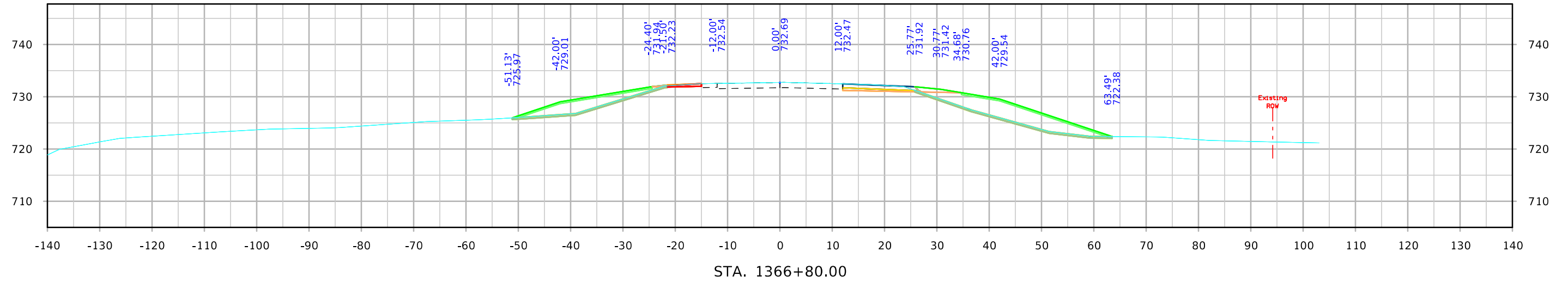
CROSS SECTIONS LEGEND AND INFORMATION SHEET

(COVERS SHEET SERIES W, X, Y, & Z)

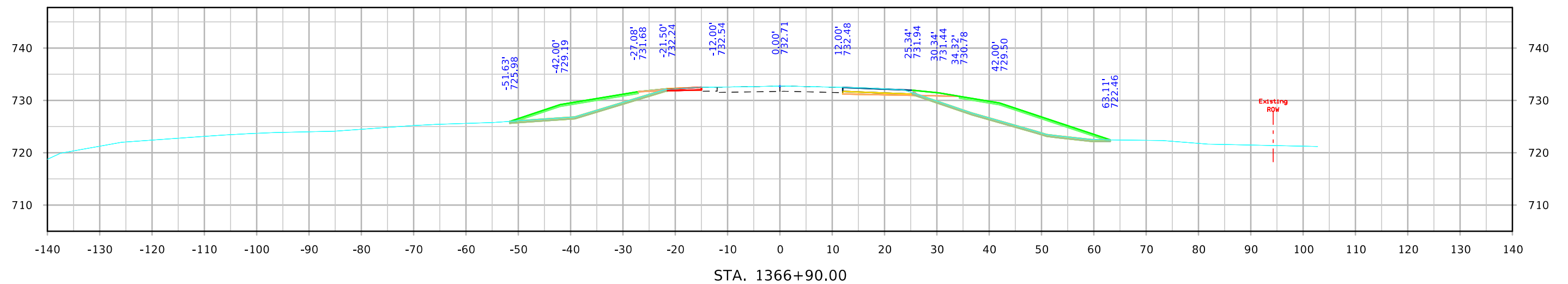
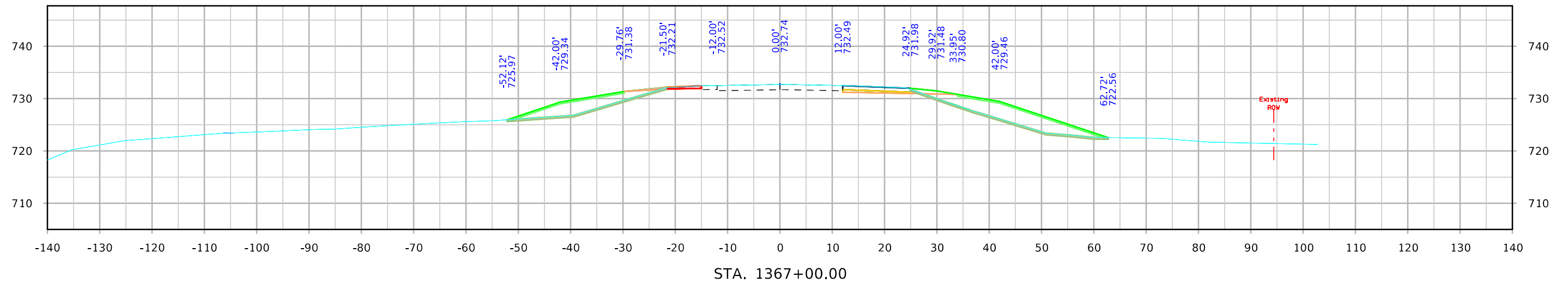
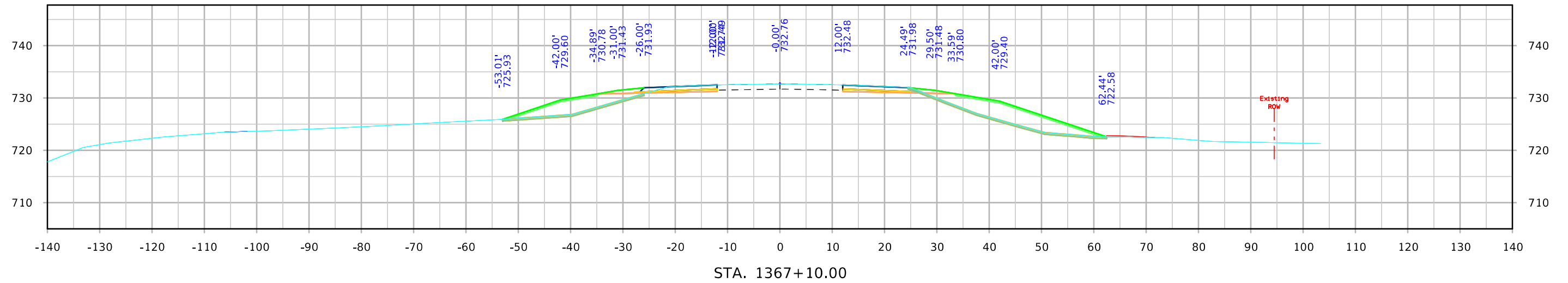
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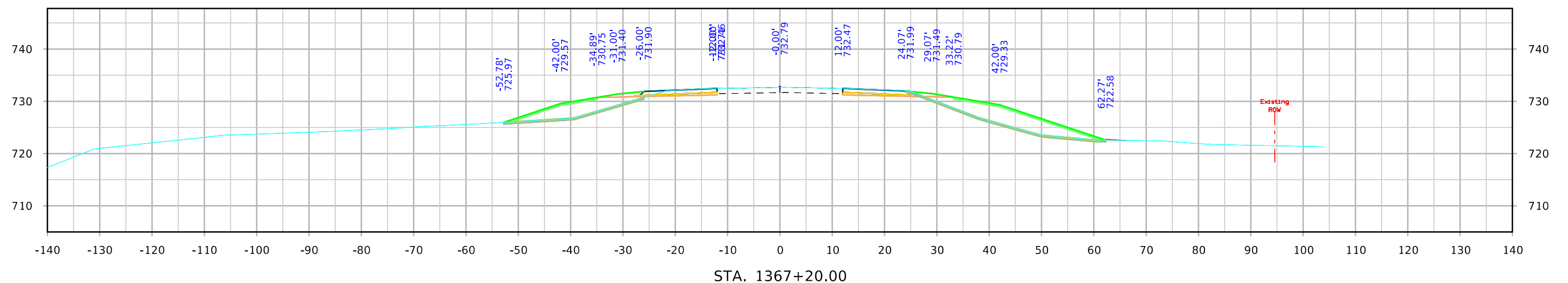
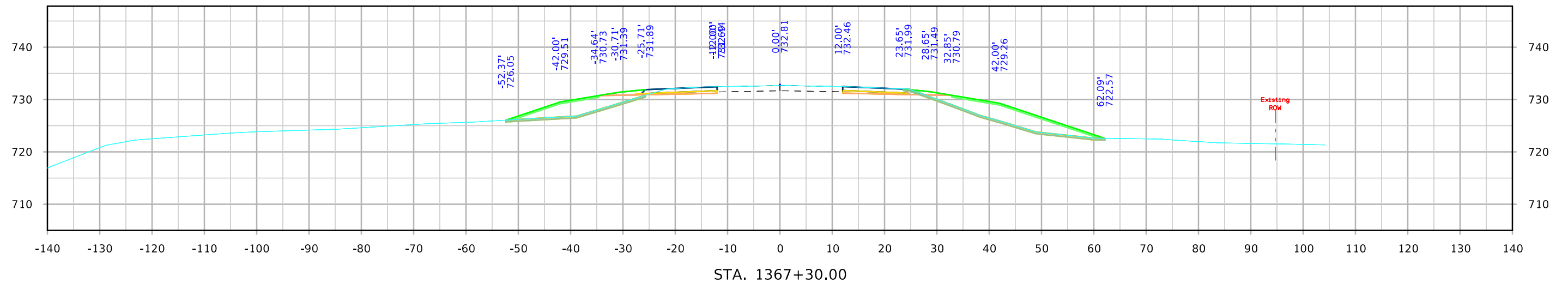
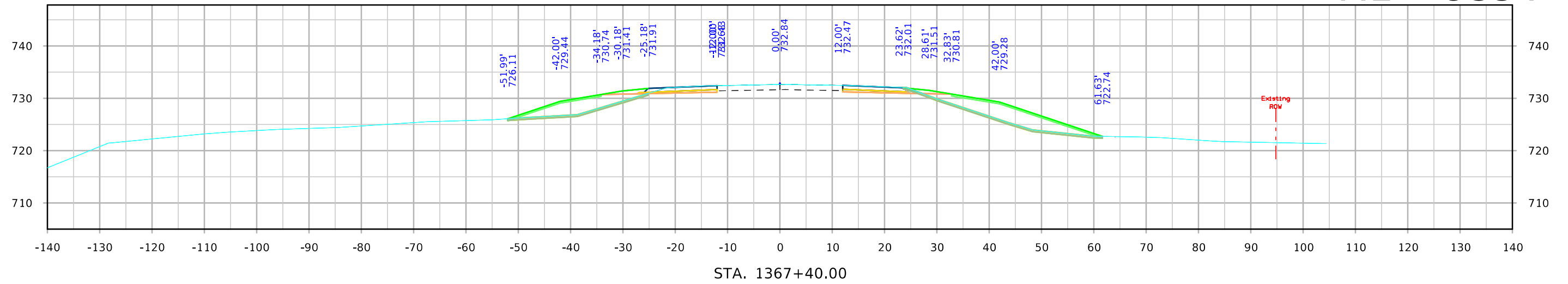
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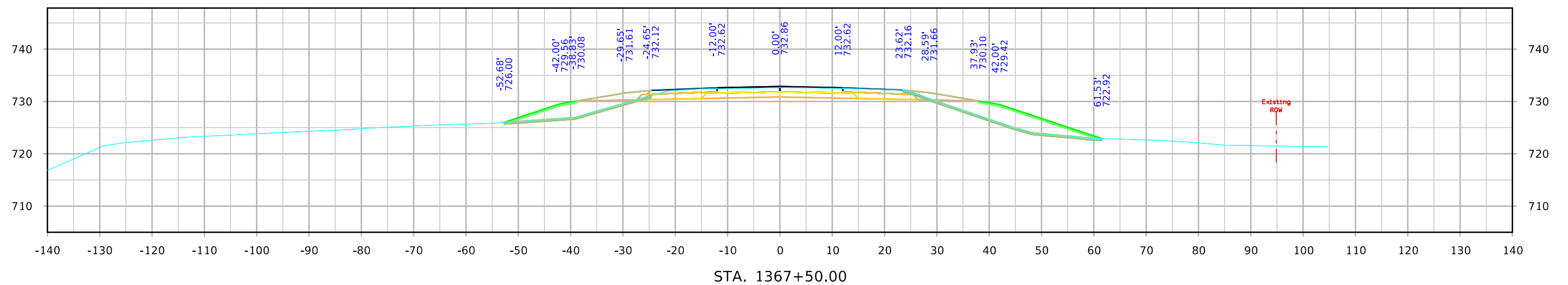
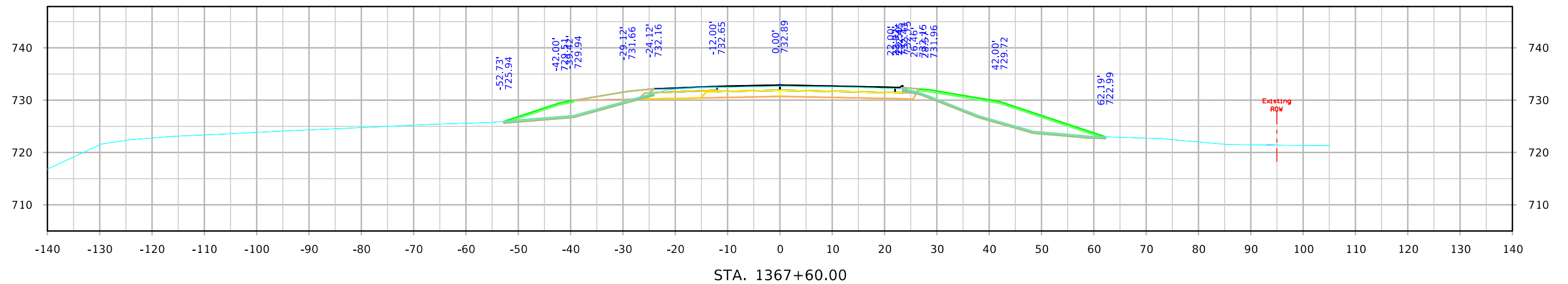
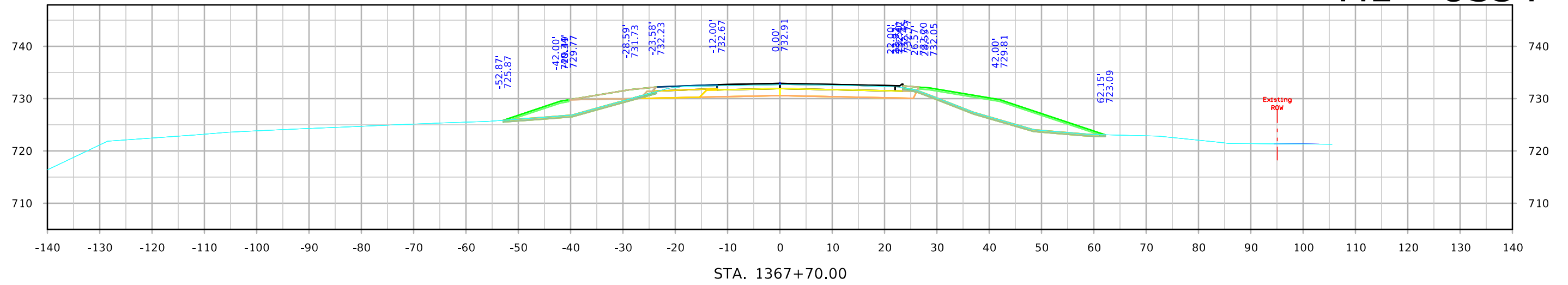
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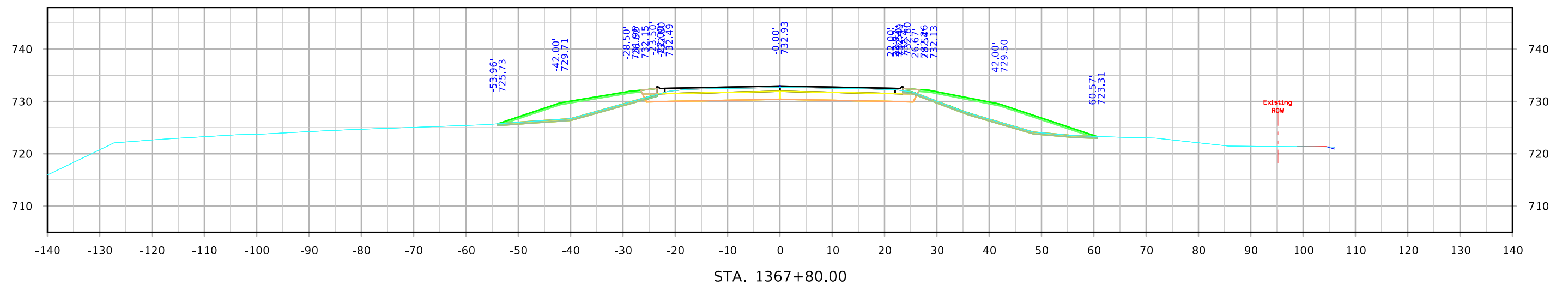
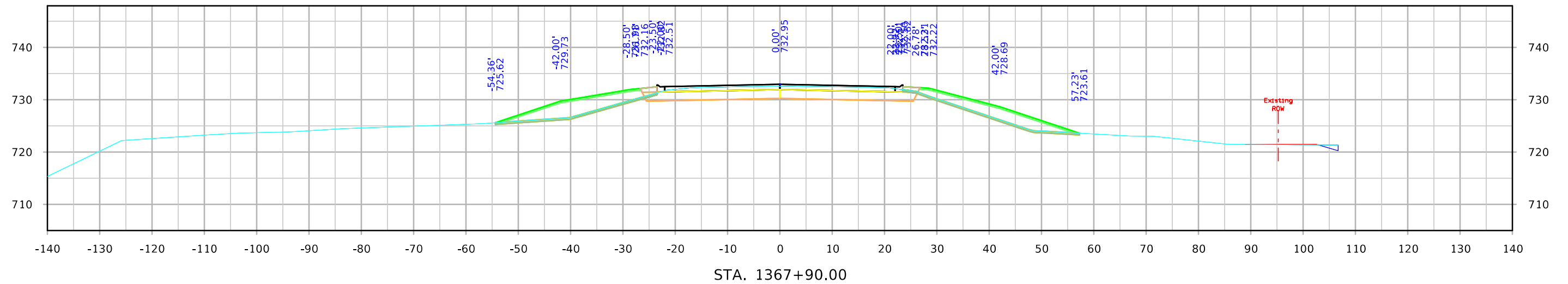
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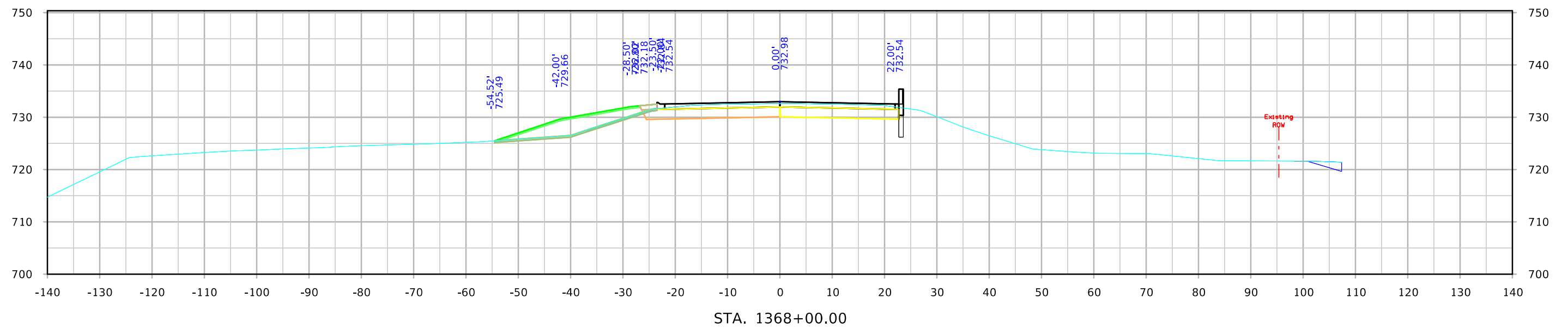
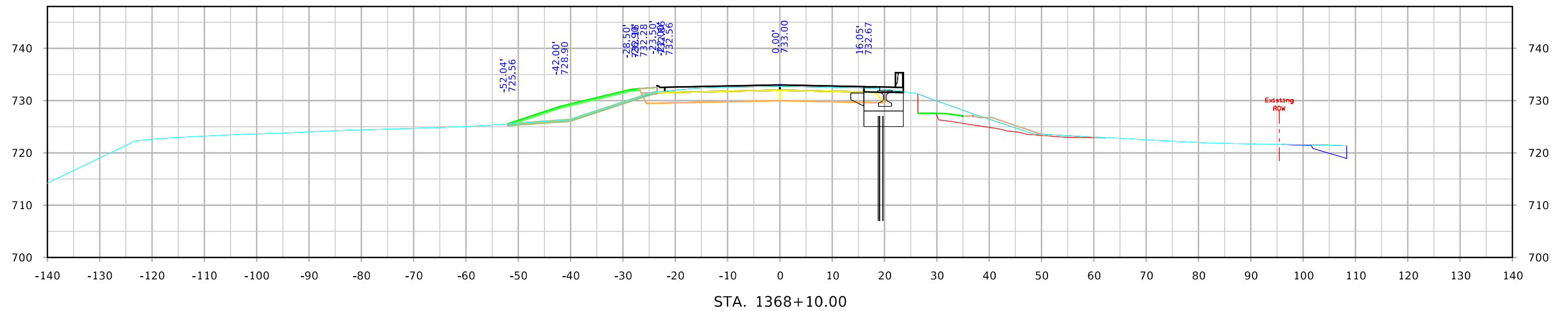
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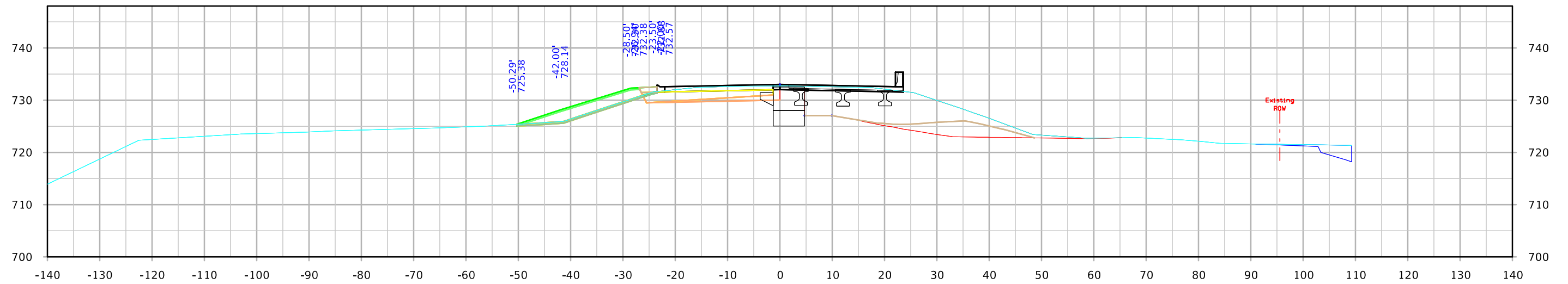
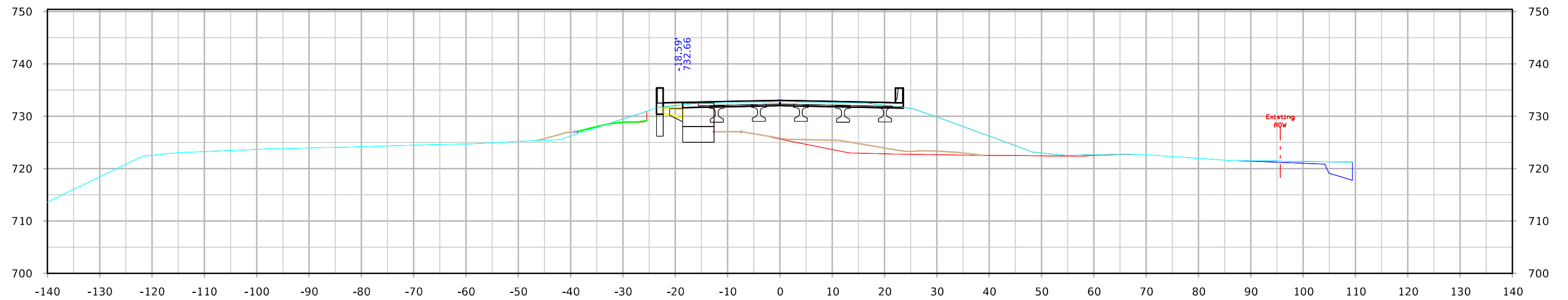
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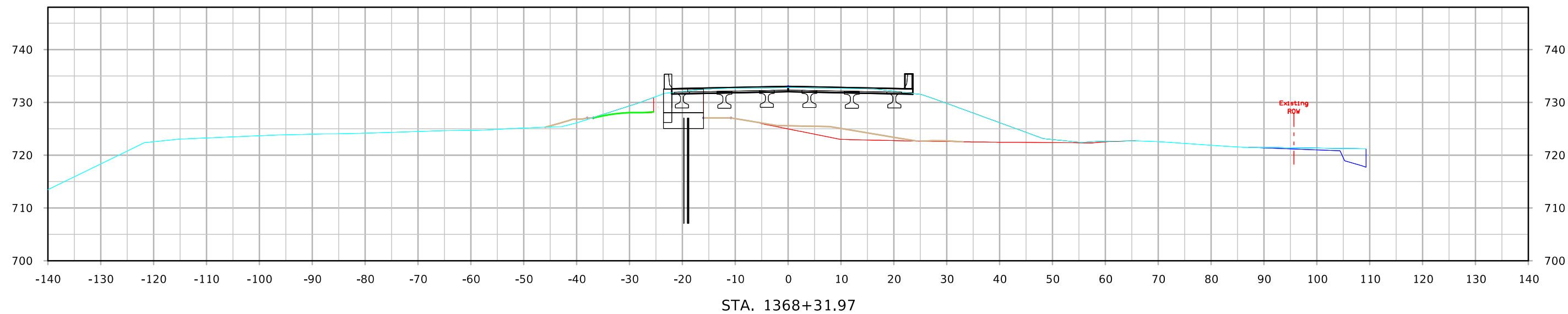


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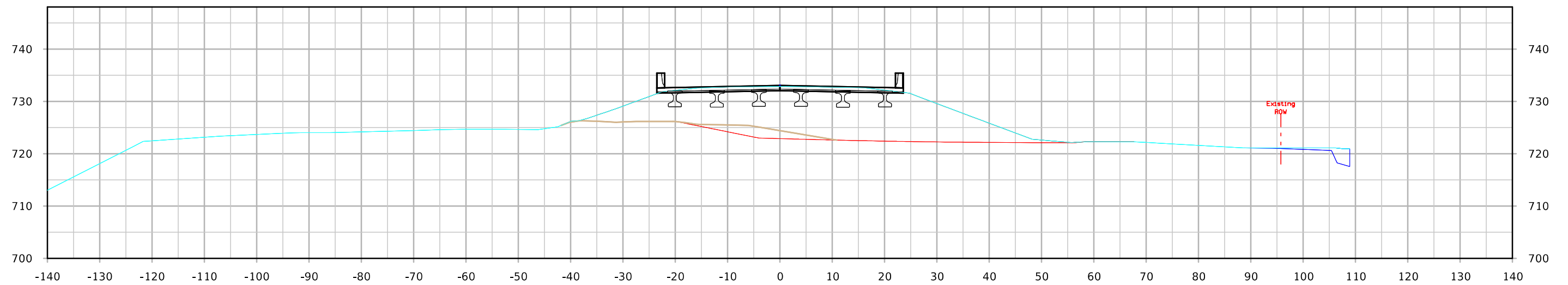


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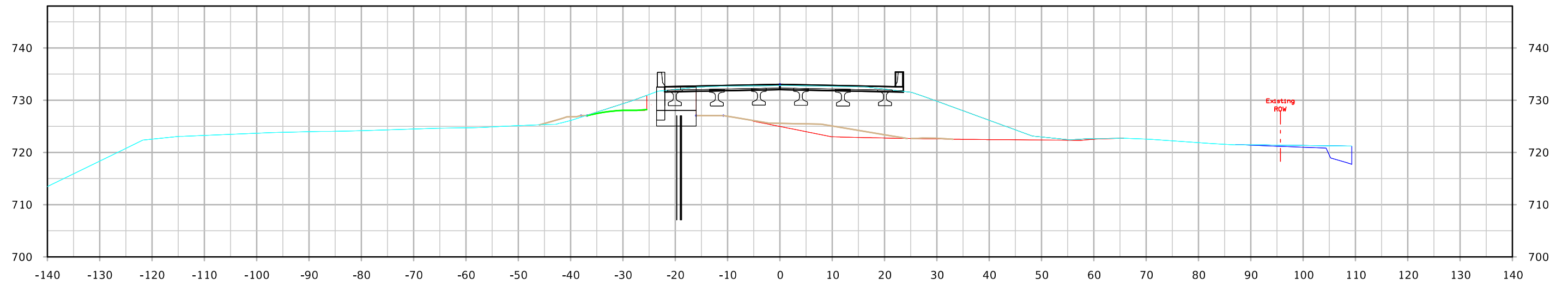




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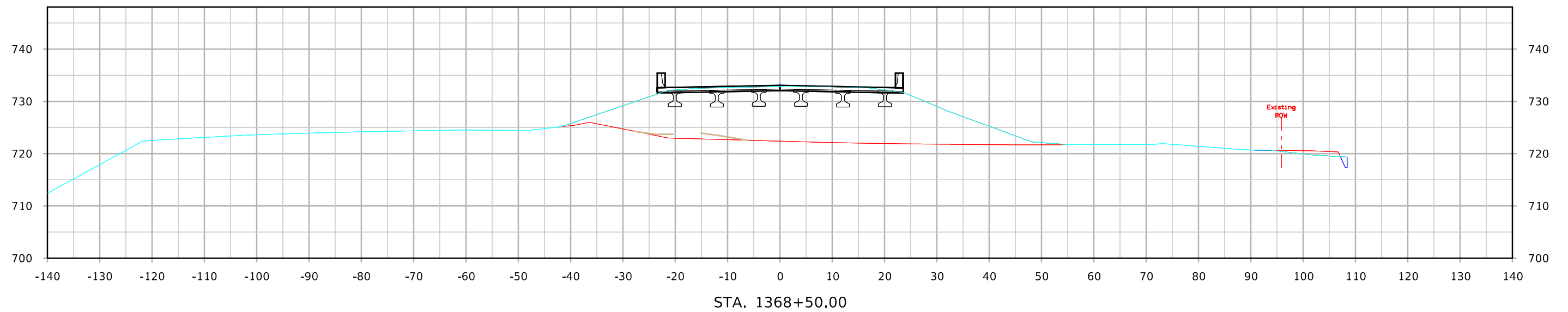
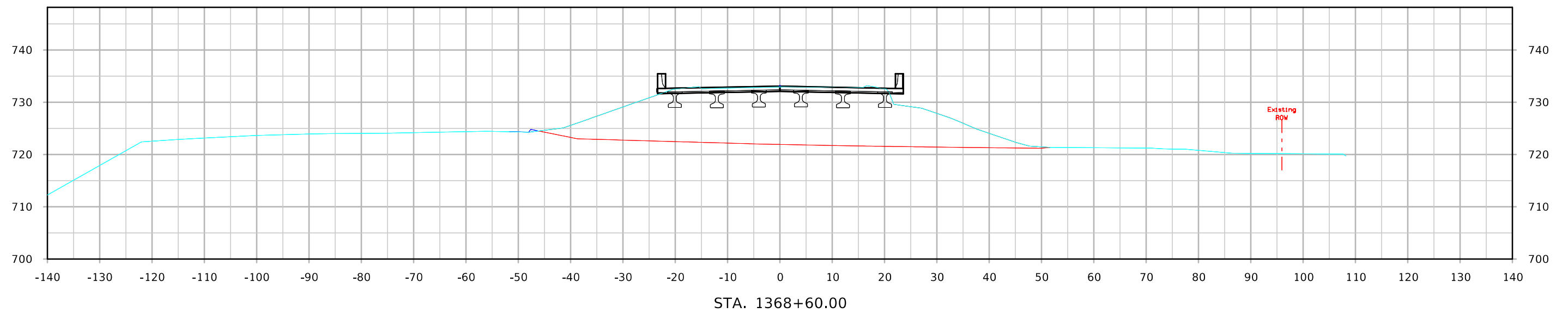


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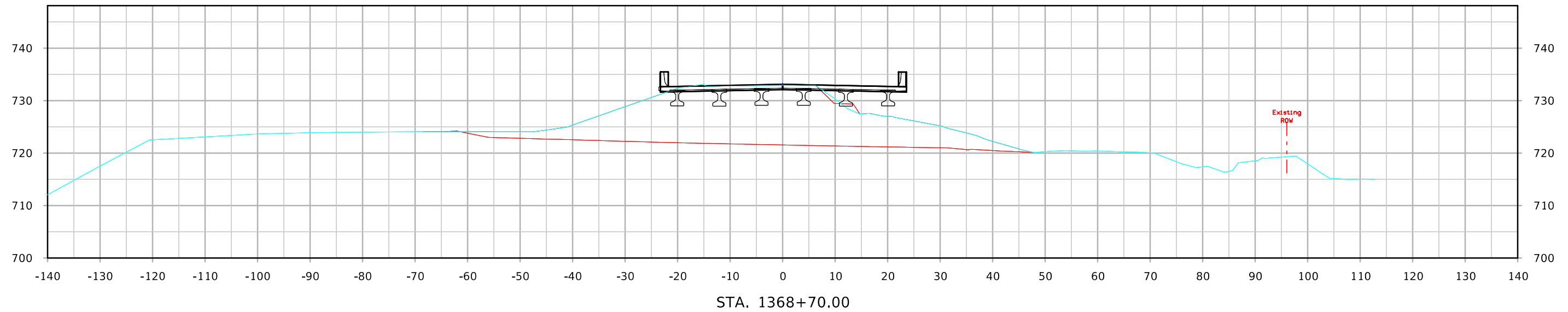
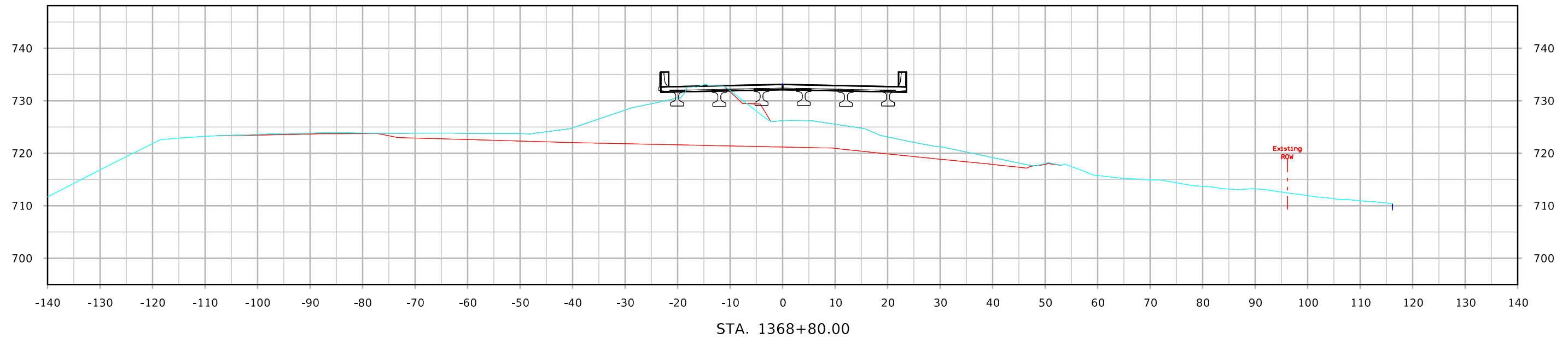


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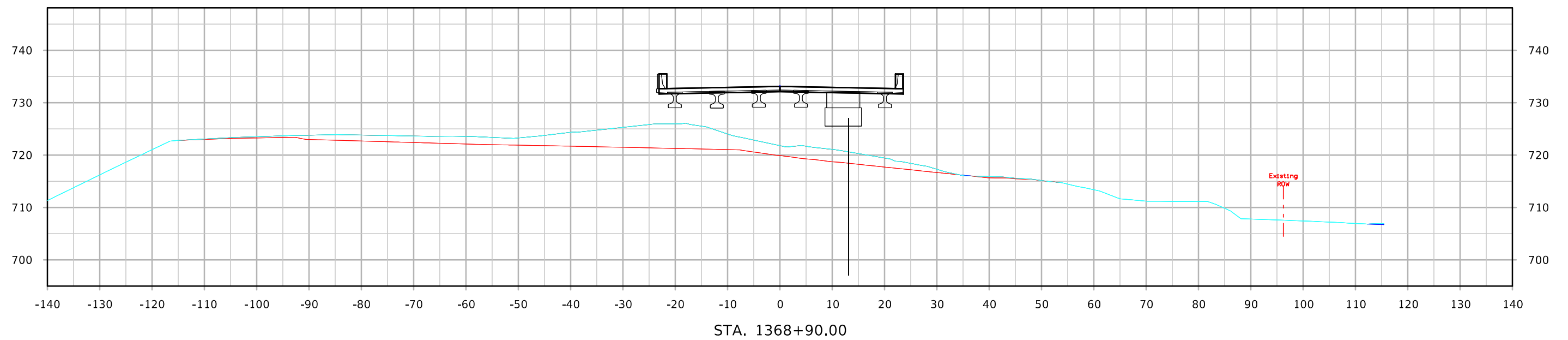
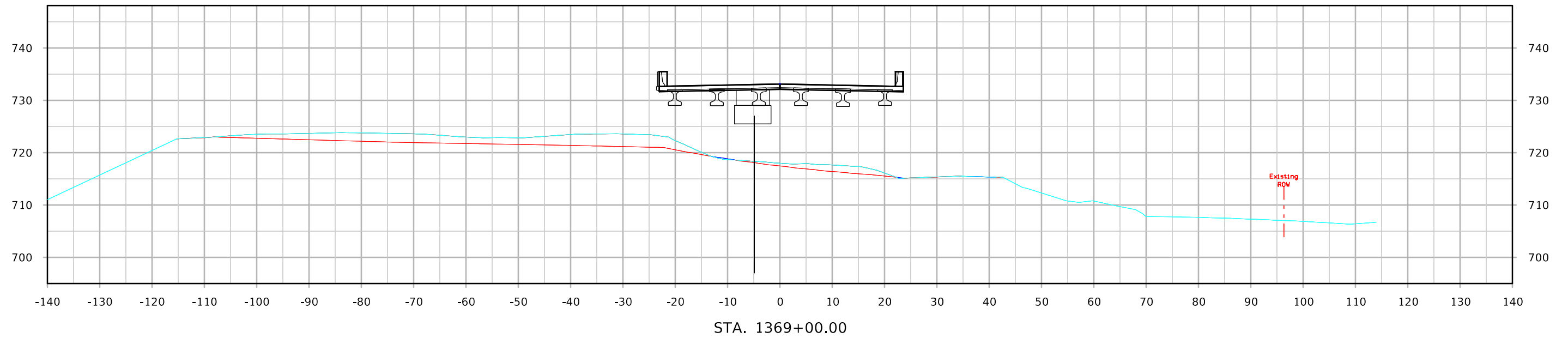
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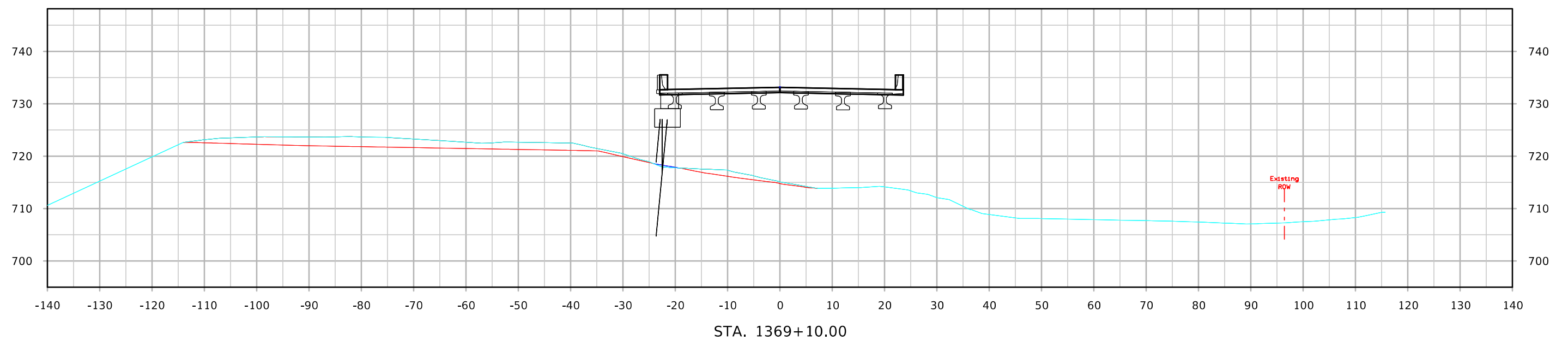
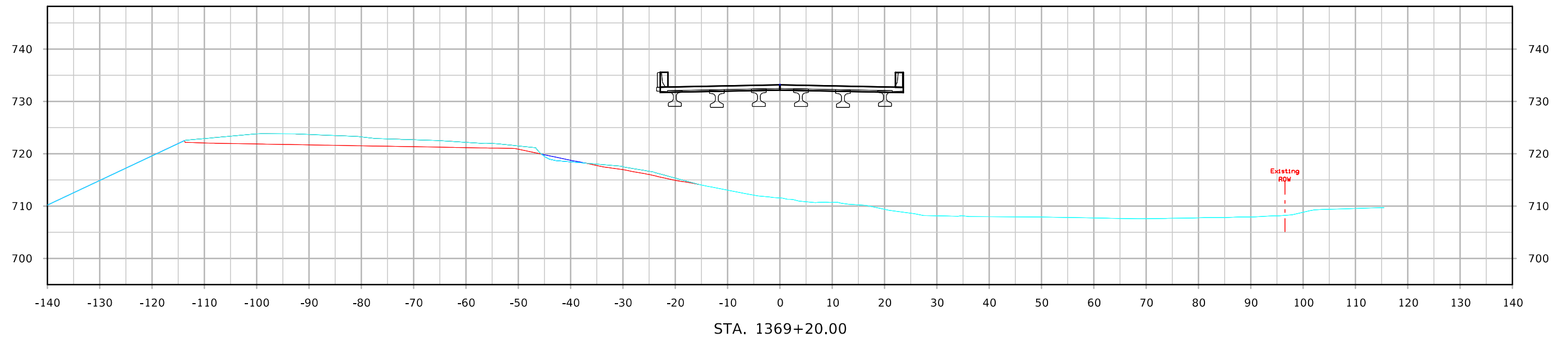
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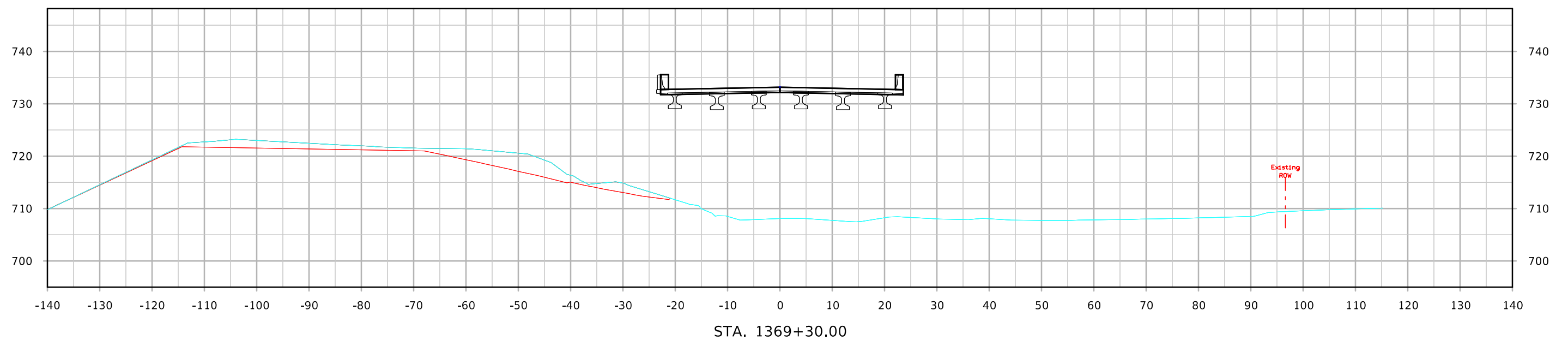
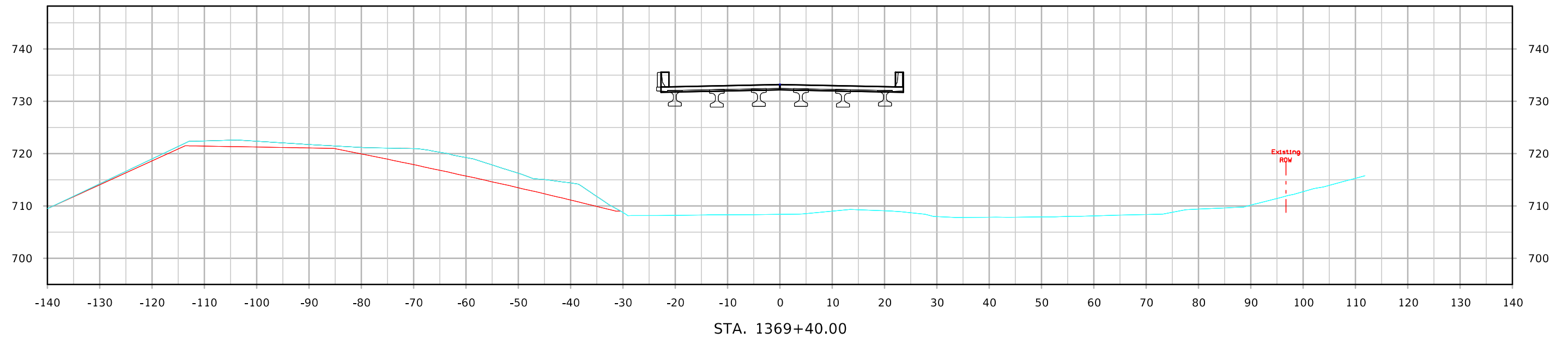
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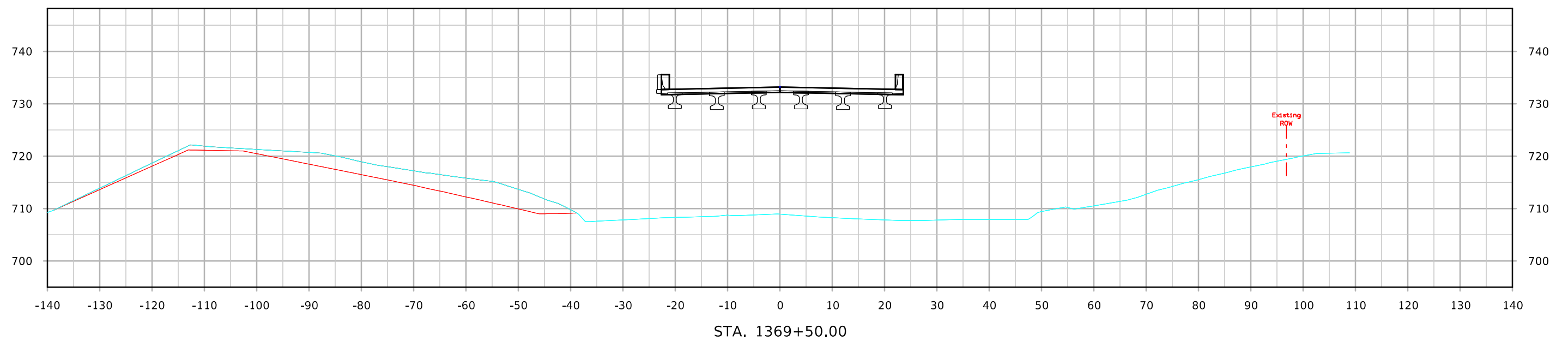
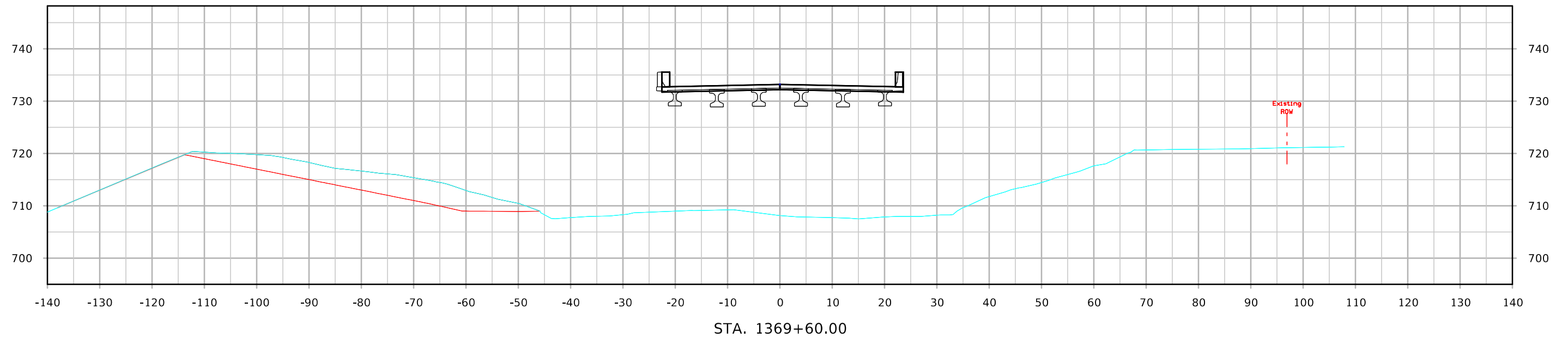
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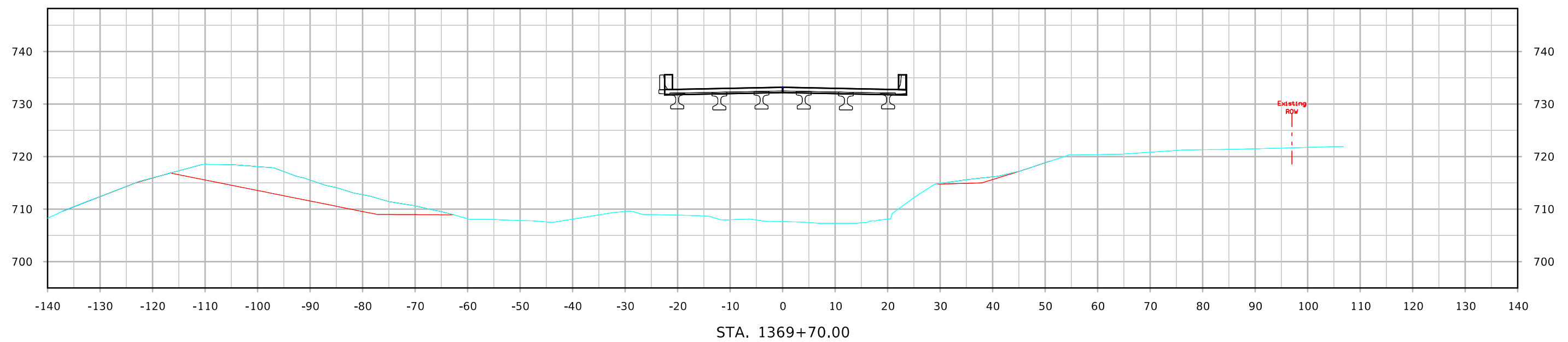
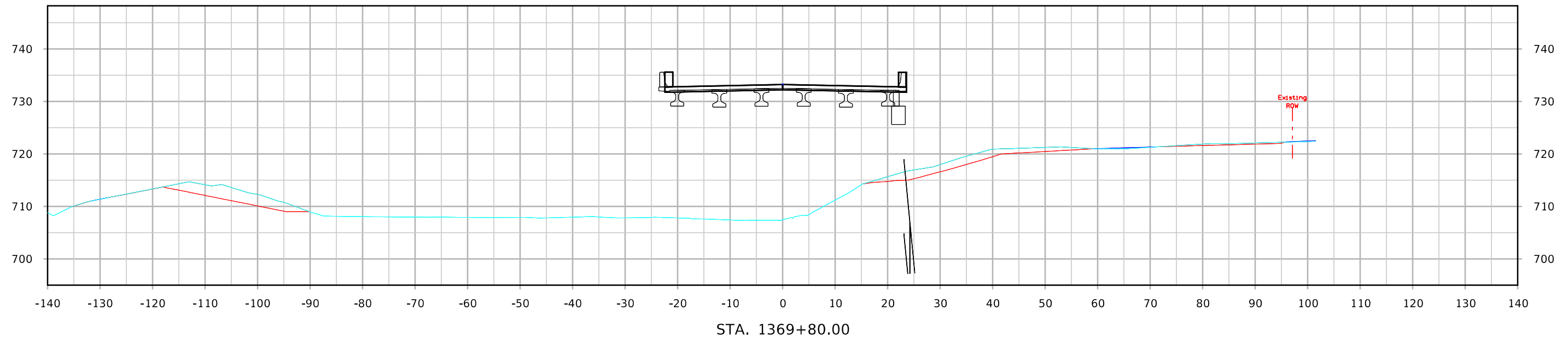
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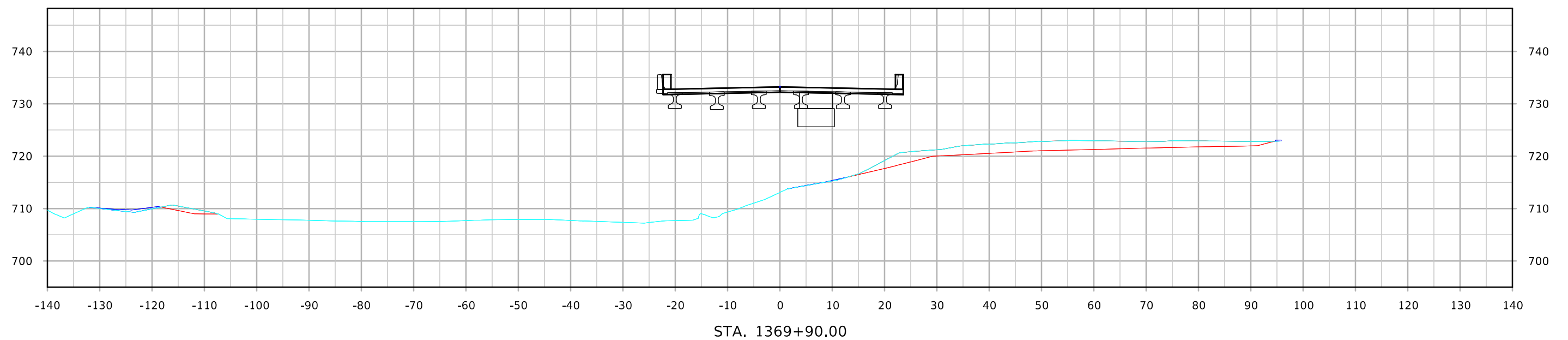
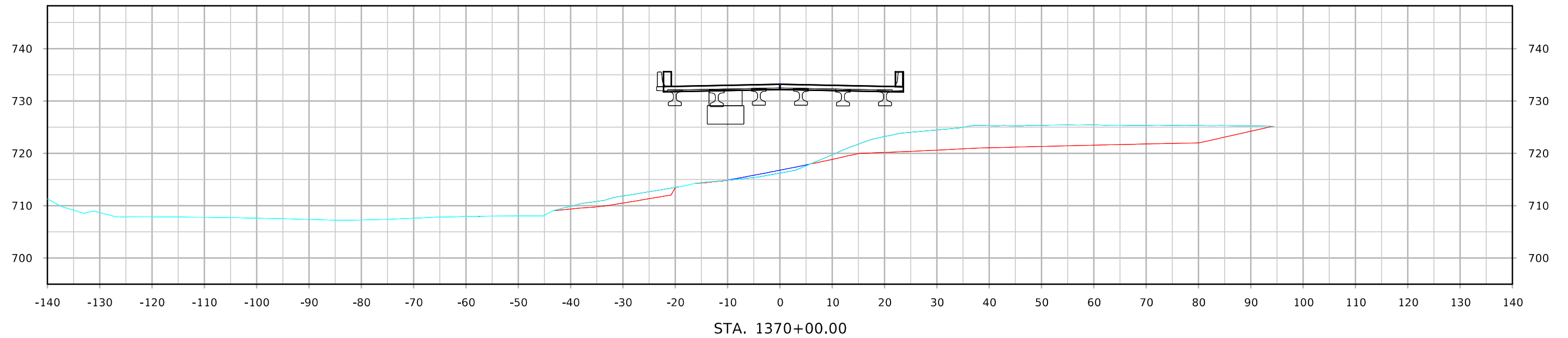
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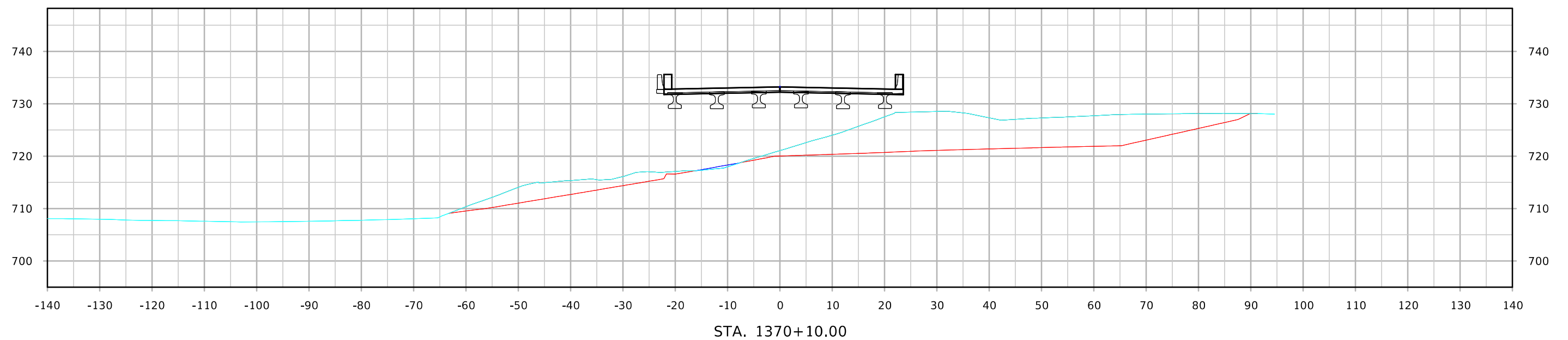
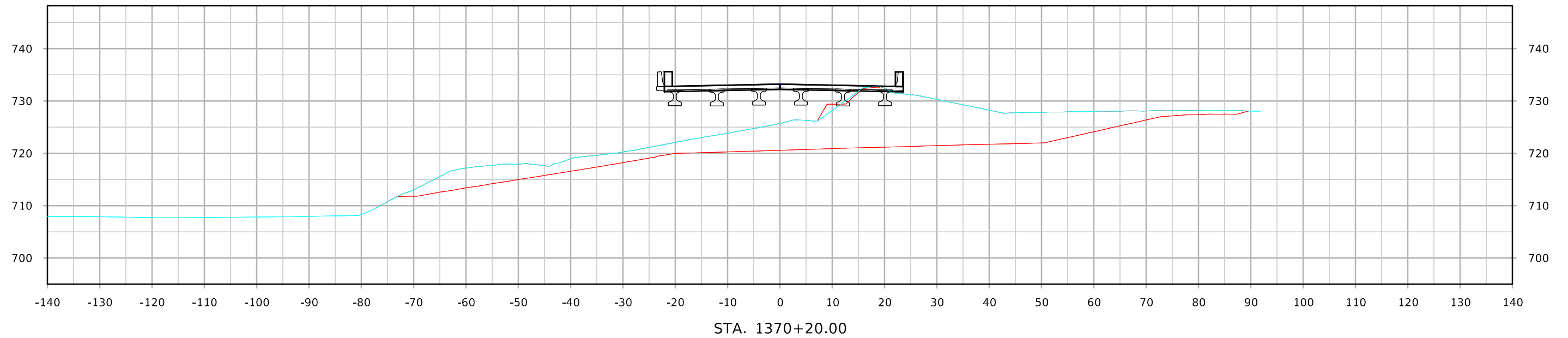
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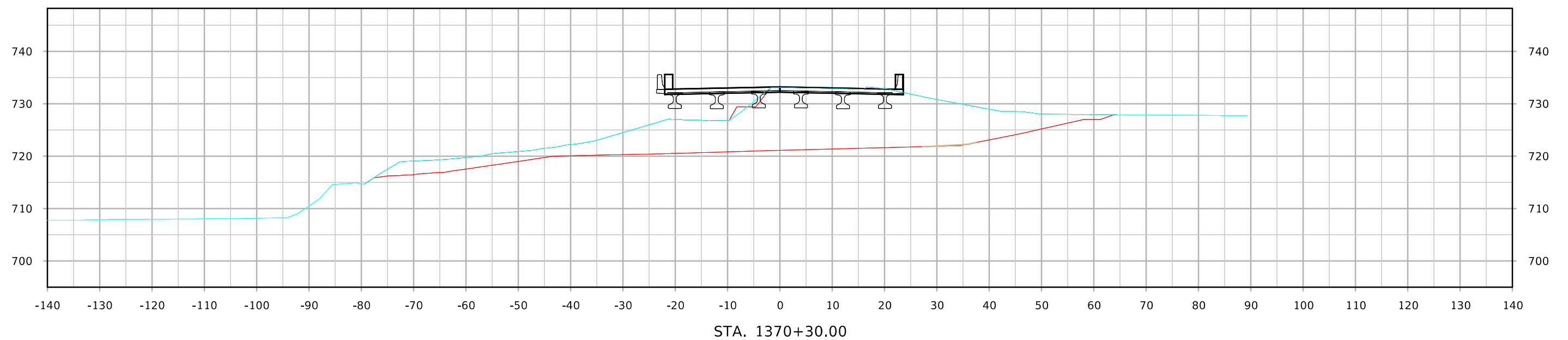
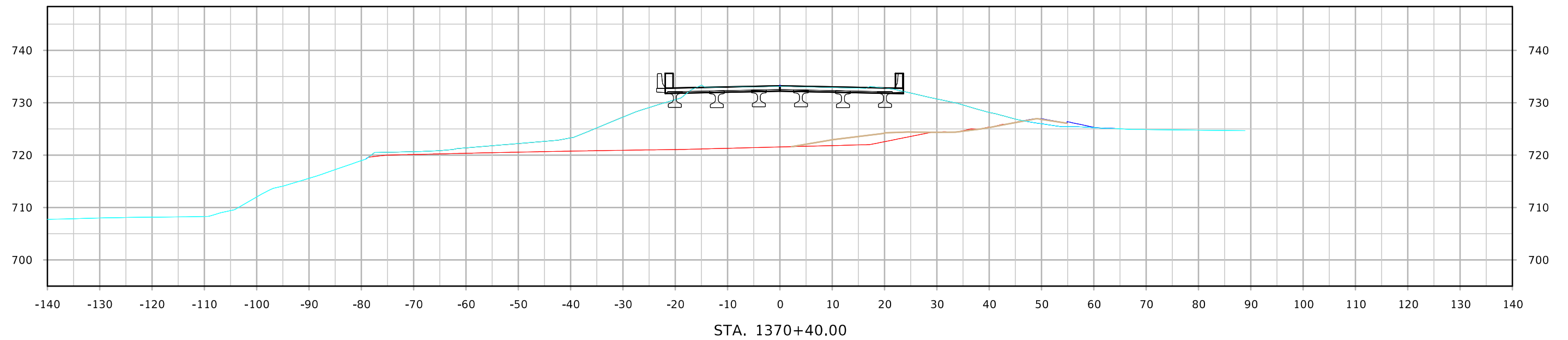
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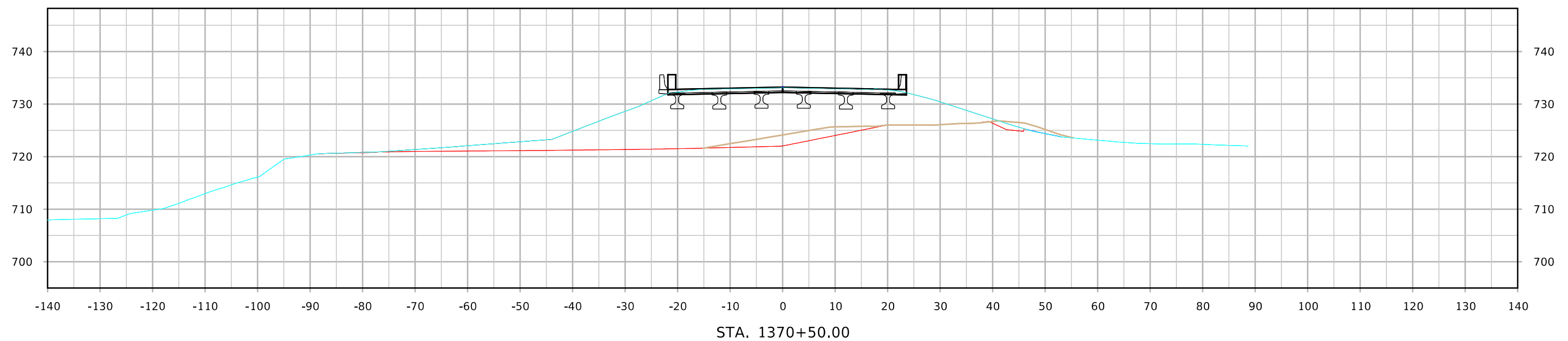
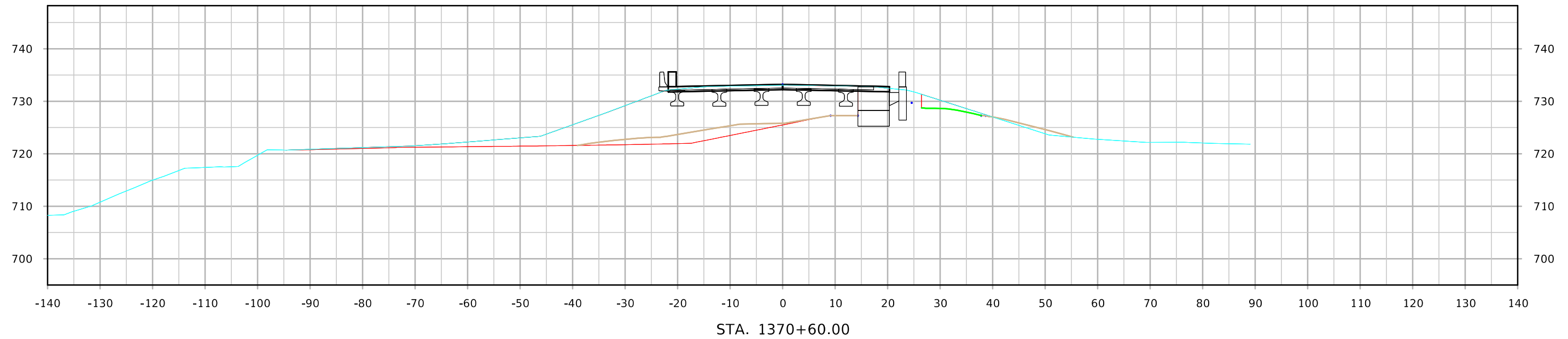
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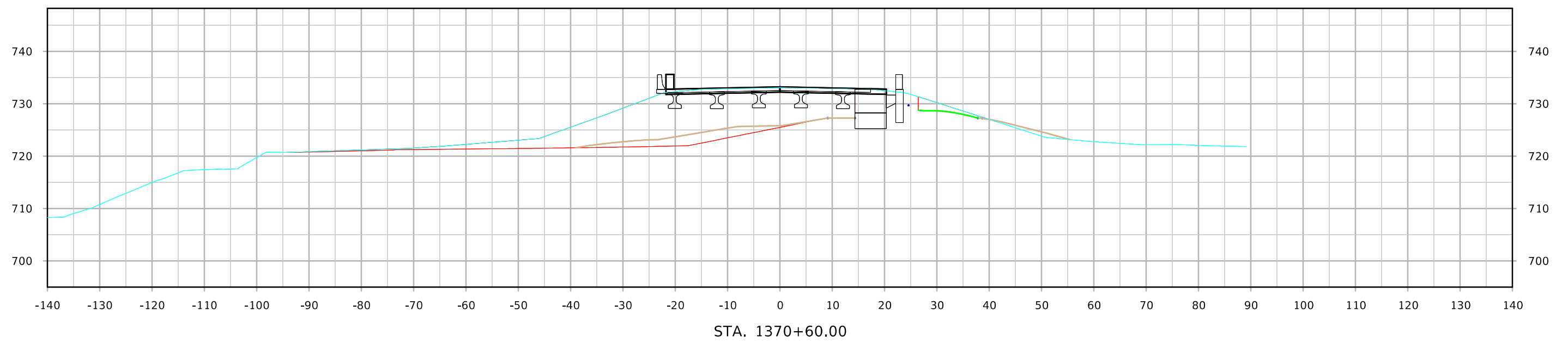
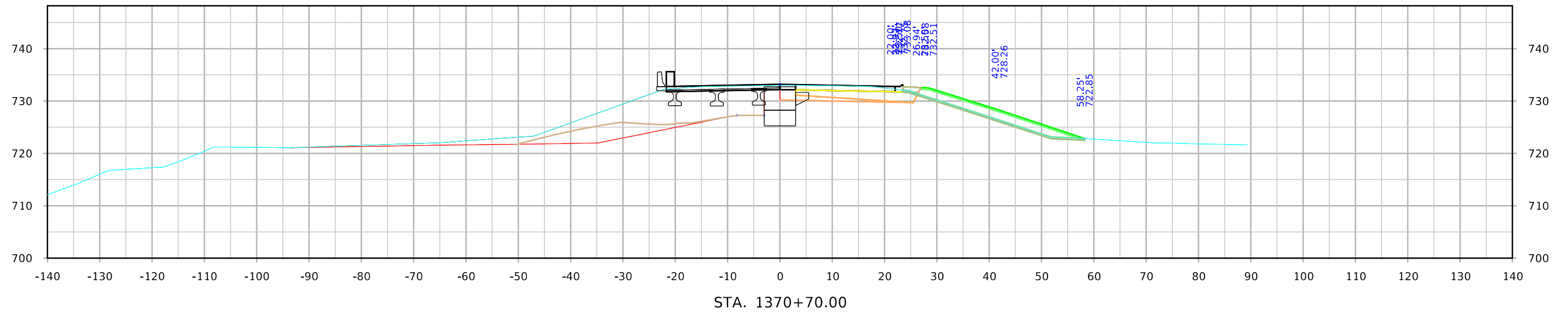
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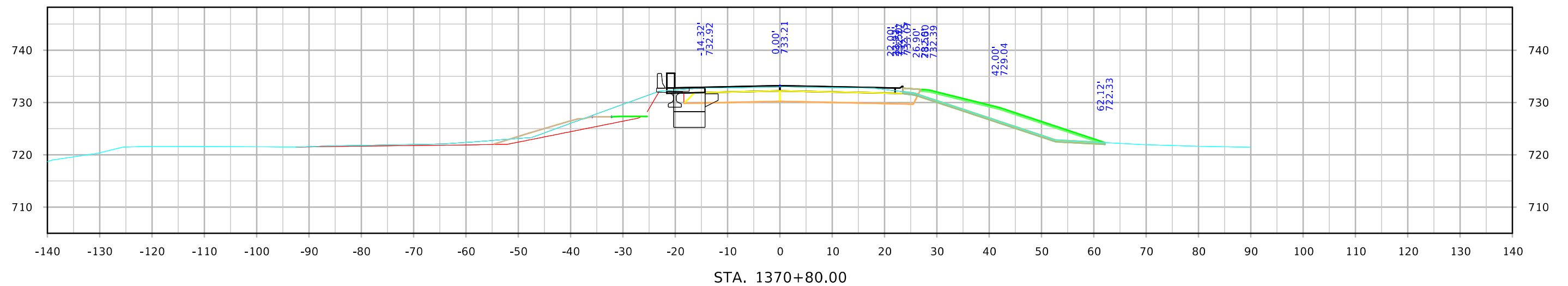
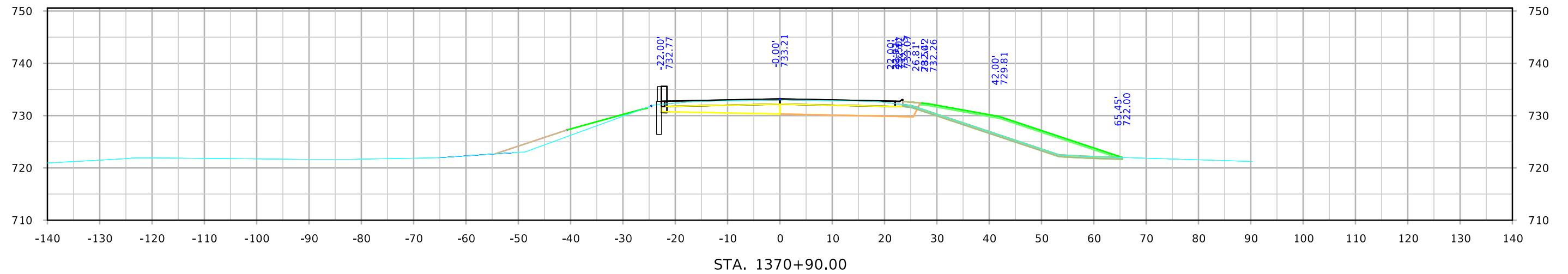
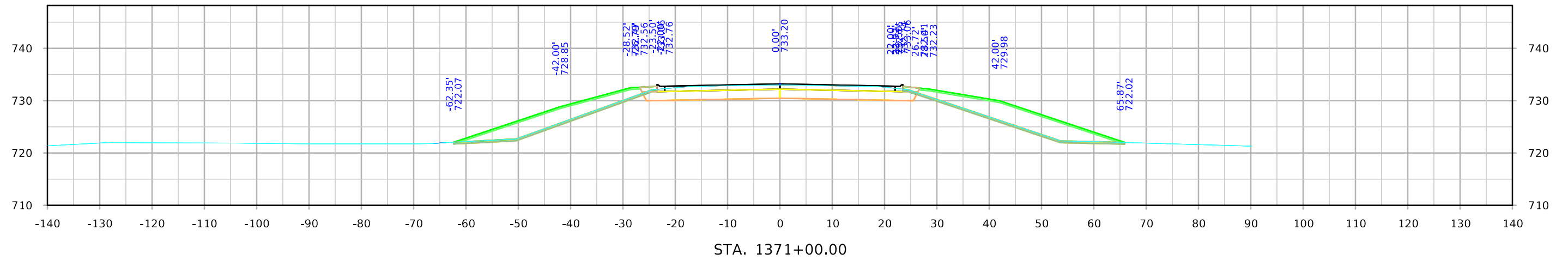
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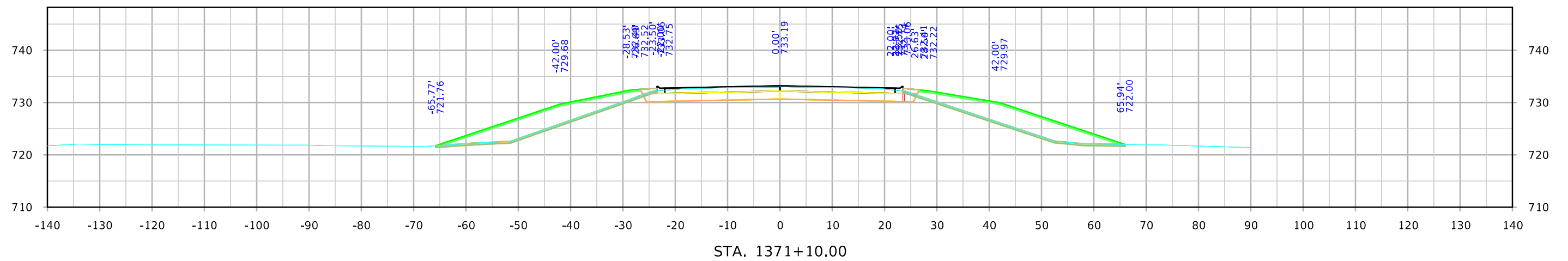
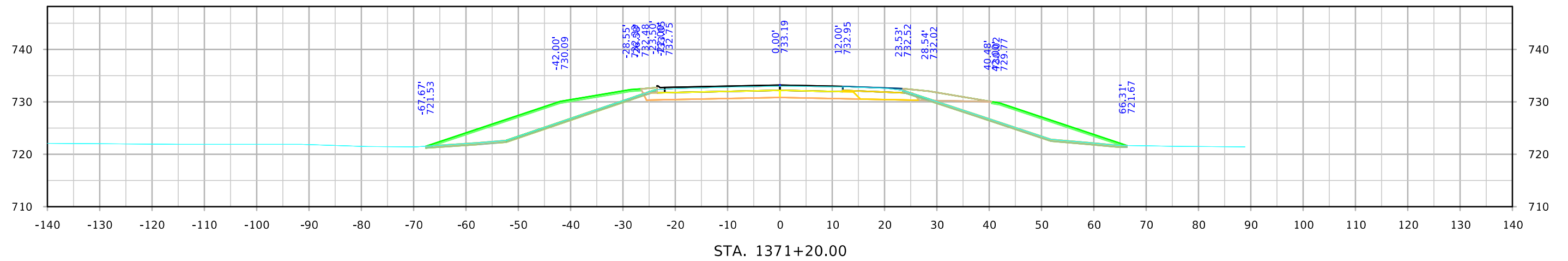
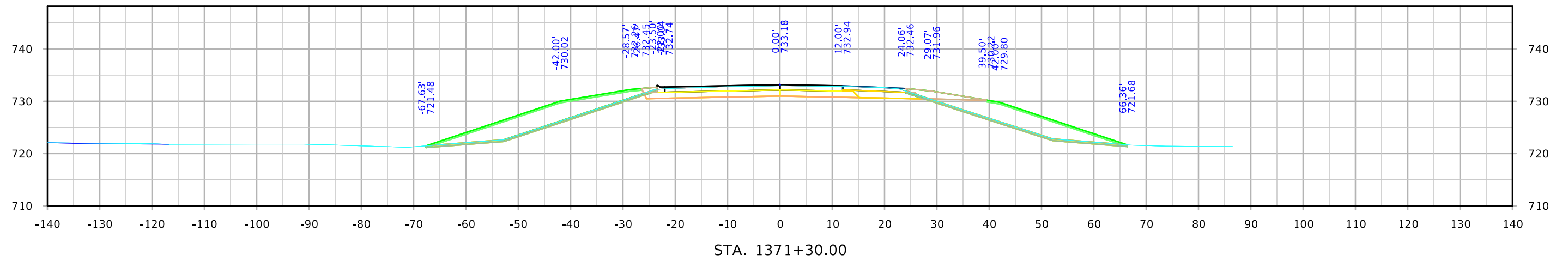
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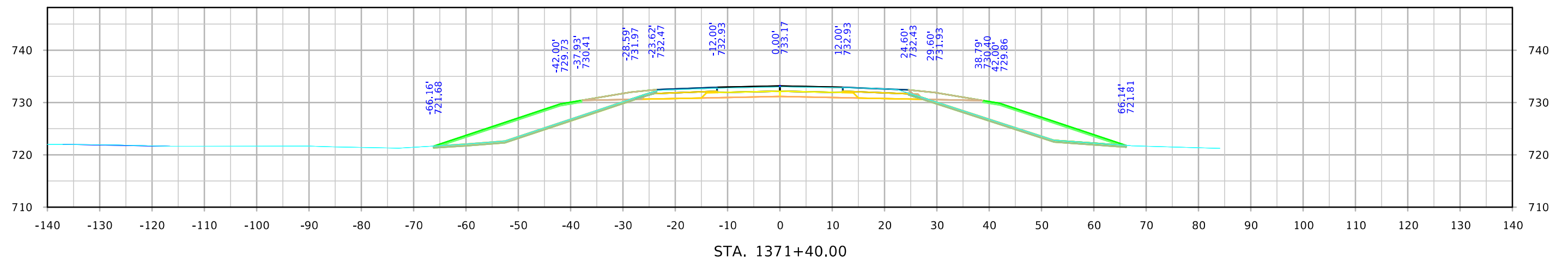
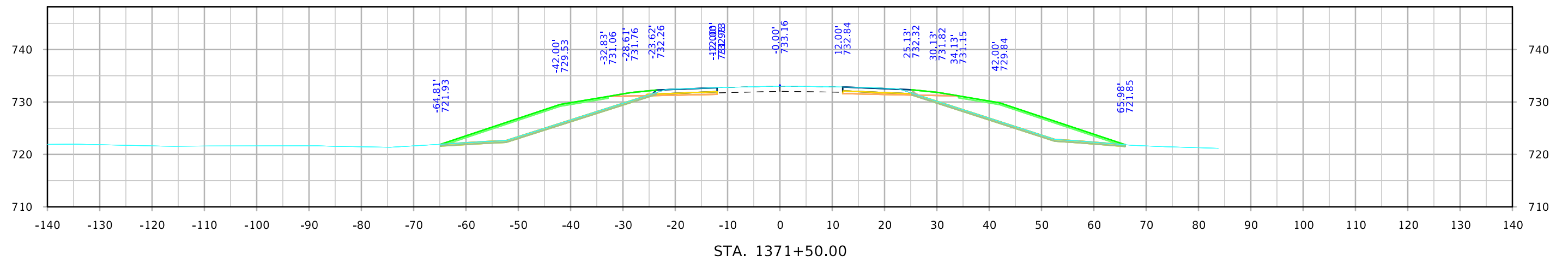
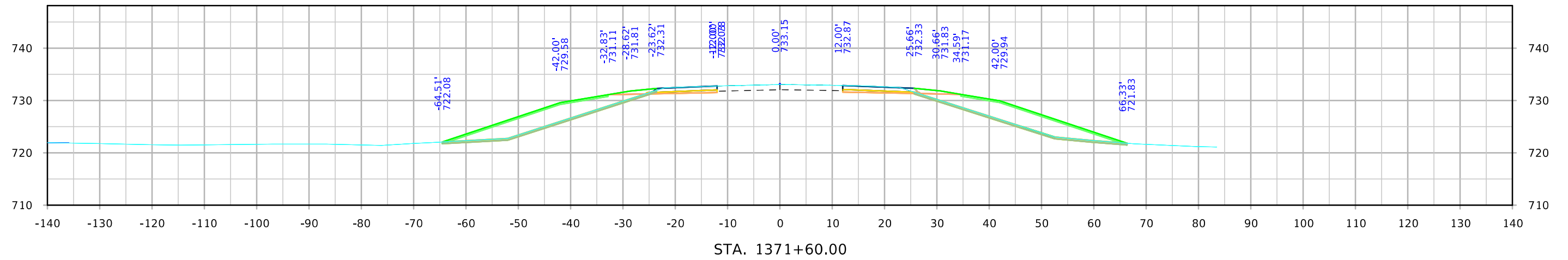
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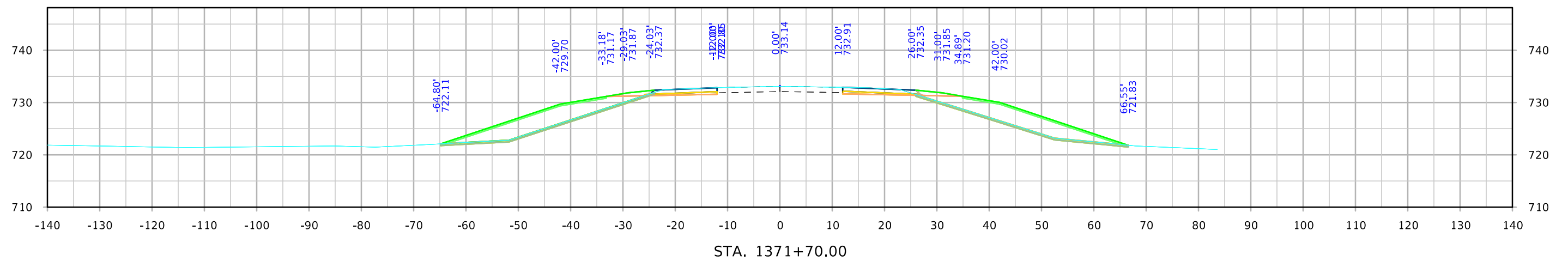
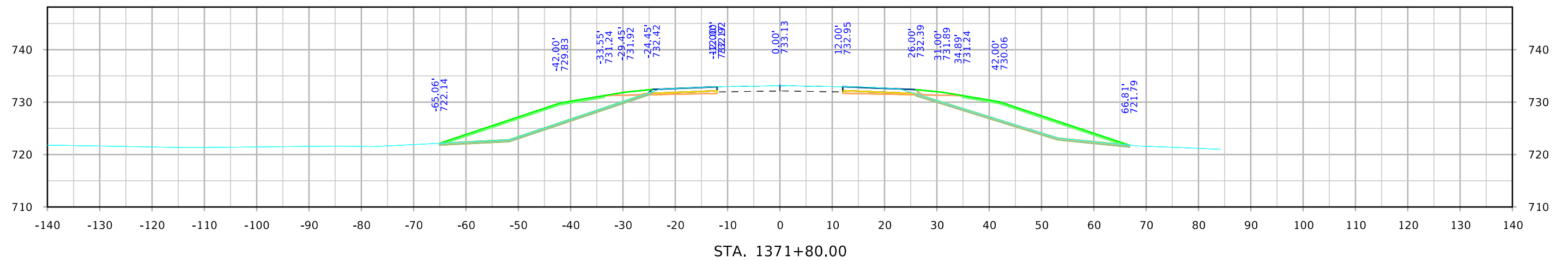
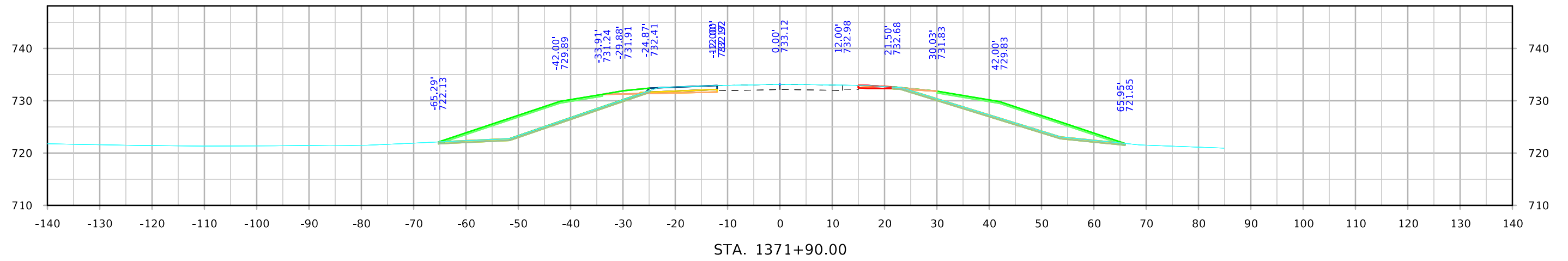
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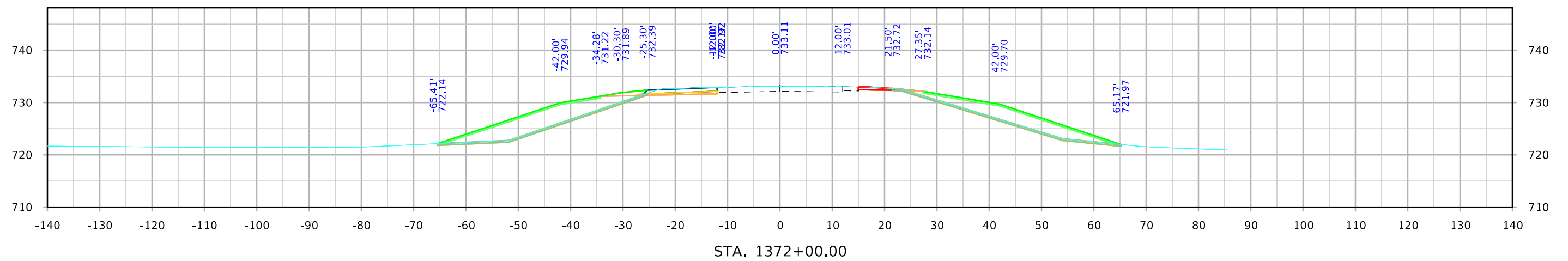
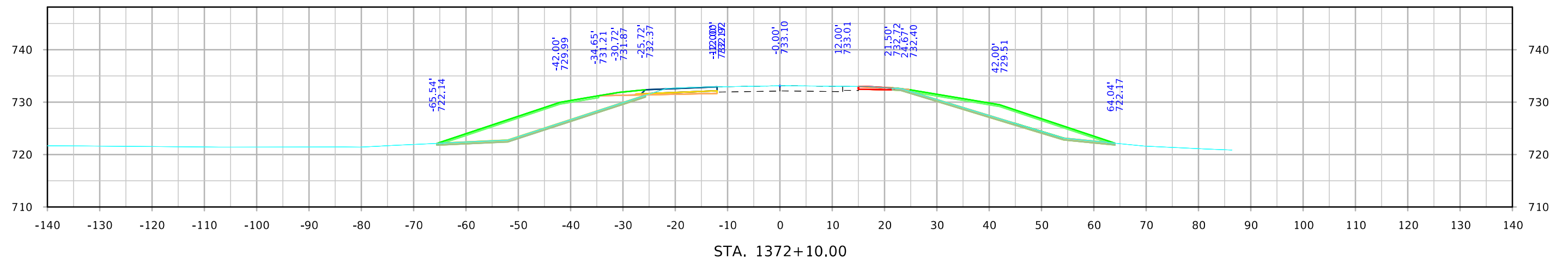
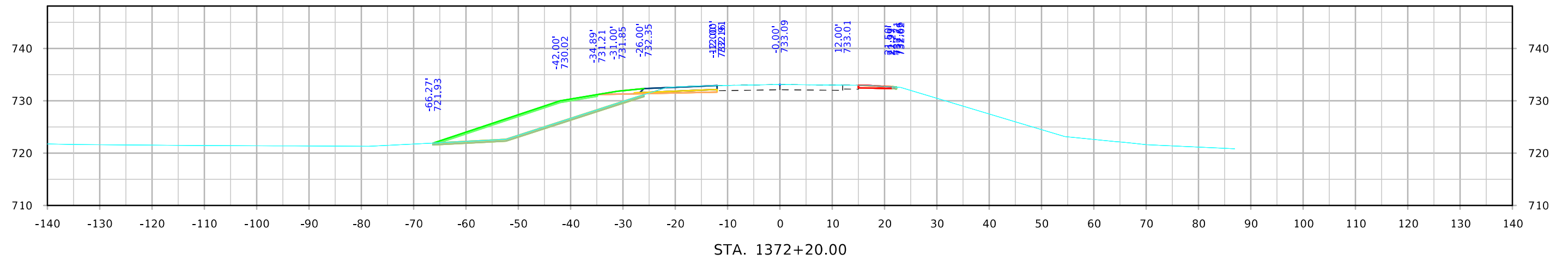
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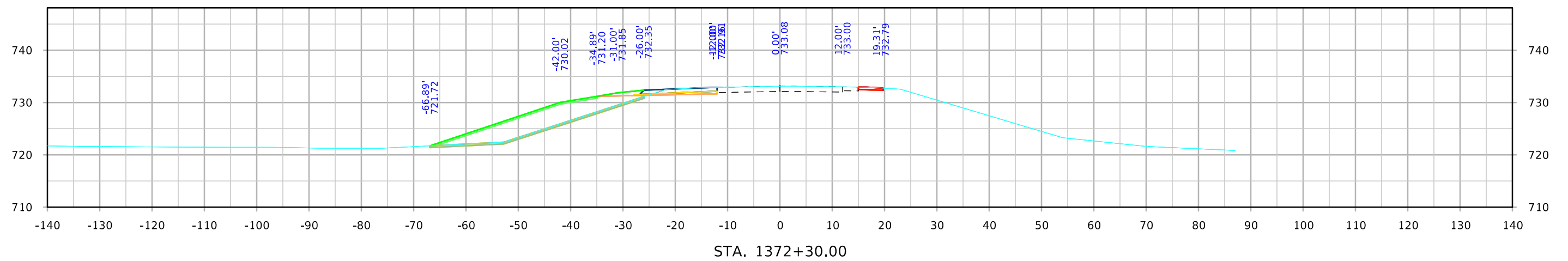
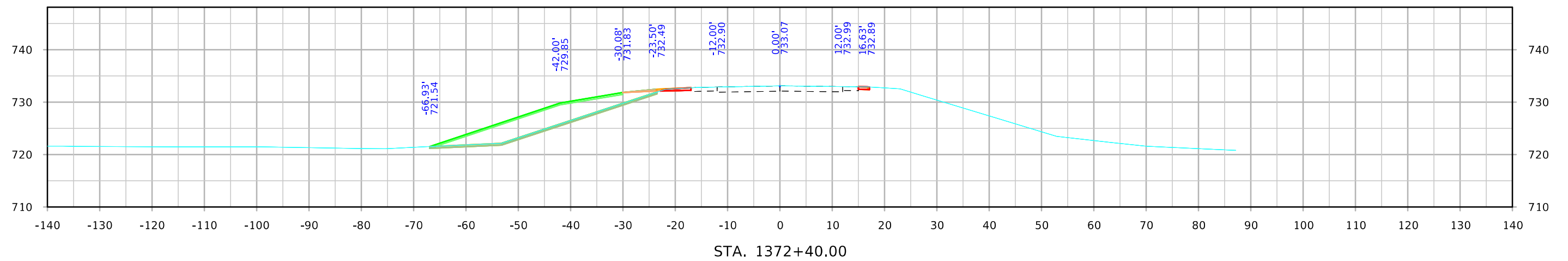
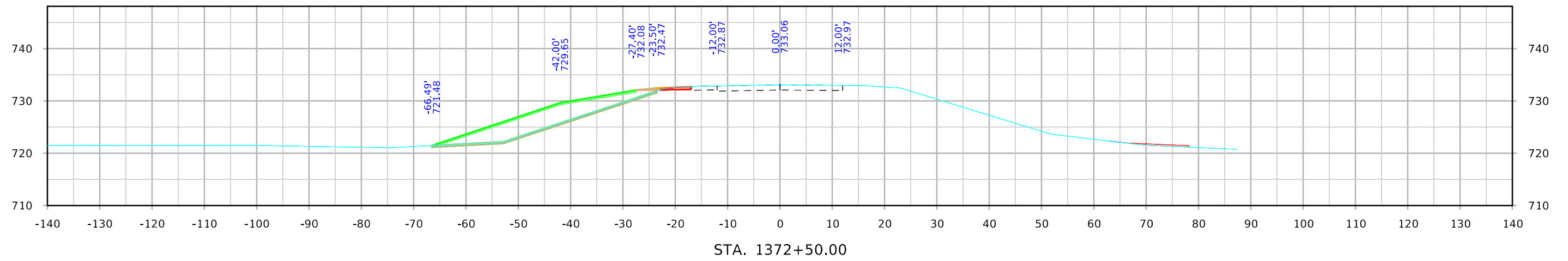
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