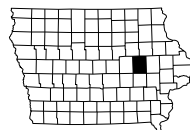


BENTON COUNTY

Bridge Replacement - PPCB
BRFN-150-2(024)--39-06

LETTING DATE
Jan 17, 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 - 2	Typical Cross Sections and Details
D Sheets	Mainline Plan and Profile Sheets
* D.1	Plan & Profile Legend & Symbol Information Sheet
* D.2	IA 150
G Sheets	Survey Sheets
G.1 - 3	Reference Ties and Bench Marks
G.4	Horizontal Control Tab.
J Sheets	Traffic Control and Staging Sheets
J.1	Traffic Control Plan
V Sheets	Bridge and Culvert Situation Plans
* V.1 - 2	Bridge and Culvert Situation Plans
W Sheets	Mainline Cross Sections
* W.1 - 9	IA 150
	* Color Plan Sheets



PLANS OF PROPOSED IMPROVEMENT ON THE
PRIMARY ROAD SYSTEM
BENTON COUNTY
 Bridge Replacement - PPCB
 Prairie Creek 1.8 mi N of Co Rd V71

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

22

PROJECT IDENTIFICATION NUMBER

19-06-150-010

PROJECT NUMBER

BRFN-150-2(024)--39-06

R.O.W. PROJECT NUMBER

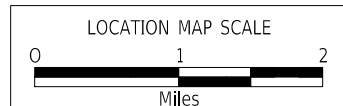
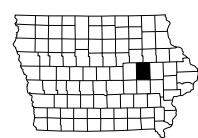
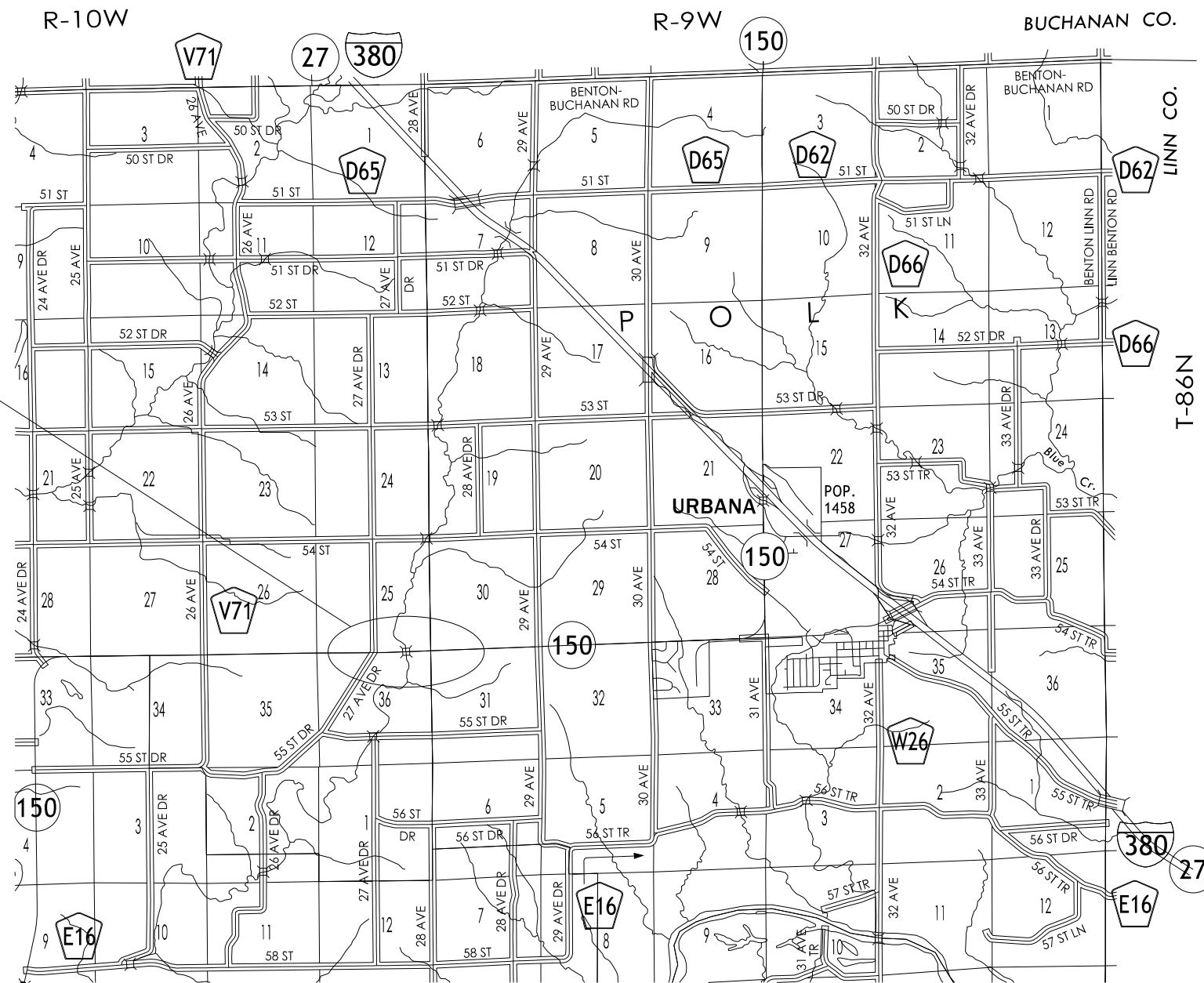
INDEX OF SEALS		
SHEET NO.	NAME	TYPE
A.1	Kelly Bell	Primary Signature Block

PRELIMINARY PLANS

Subject to change by final design.

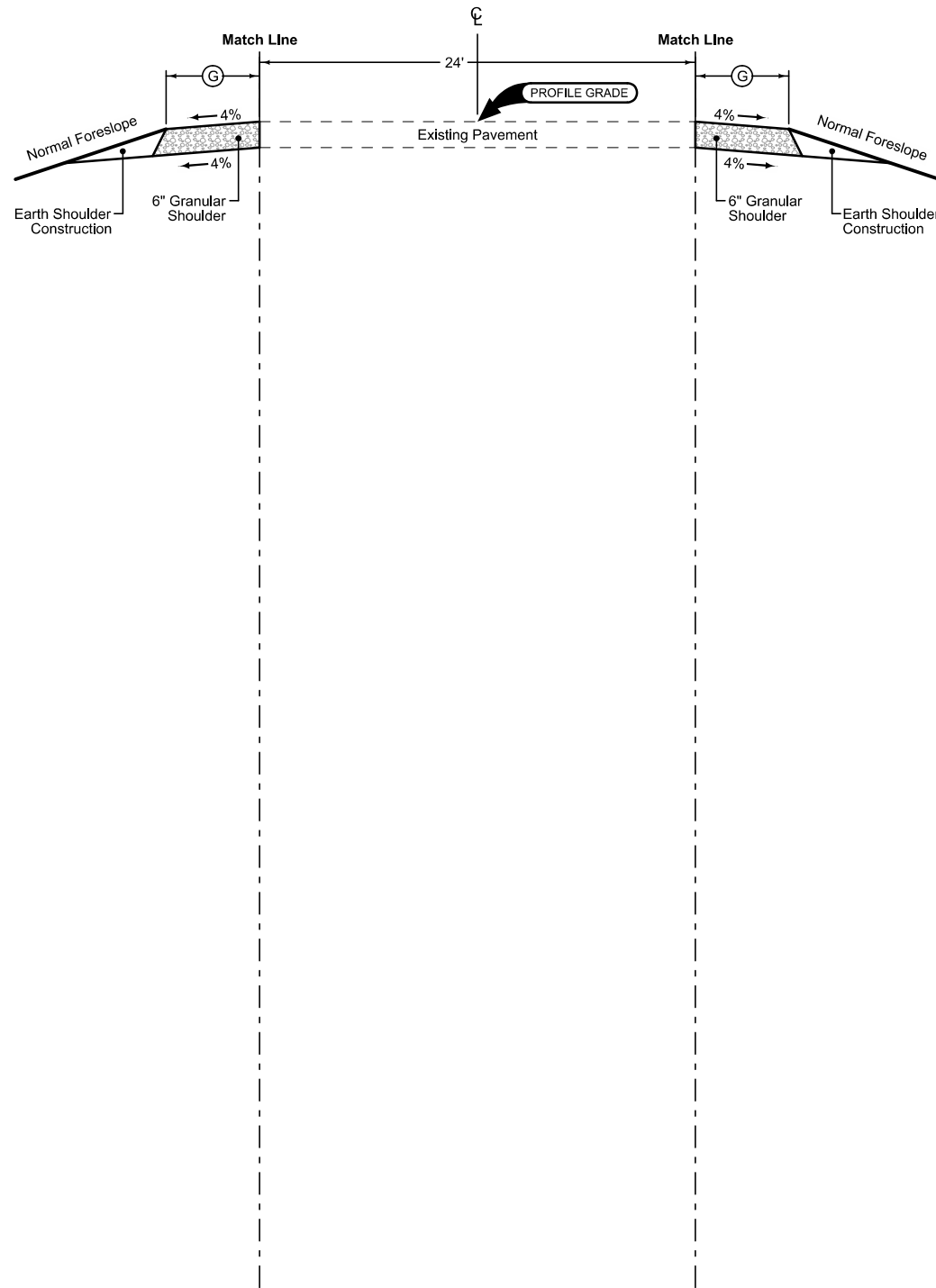
D5 PLAN - Date: 5-26-2022

BRIDGE OVER PRAIRIE CREEK
 FHWA# 14480
 Maintenance# 0608.5S150



Granular Shoulder

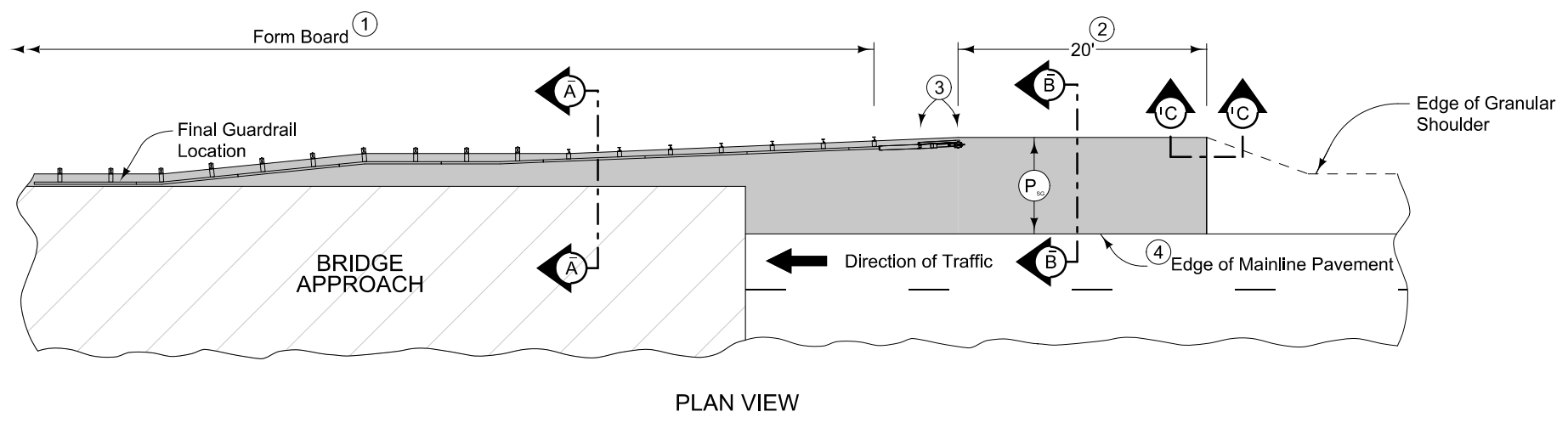
STATION TO STATION		Ⓞ Feet
380+80.00	381+06.93	6.0-13.2
384+89.37	385+28.00	14.9-1.5



Granular Shoulder

STATION TO STATION		Ⓞ Feet
380+60.00	380+82.05	9.0-14.9
384+64.43	385+05.00	13.2-3.0

IOWA HIGHWAY 150

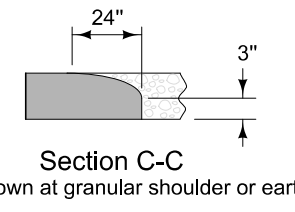
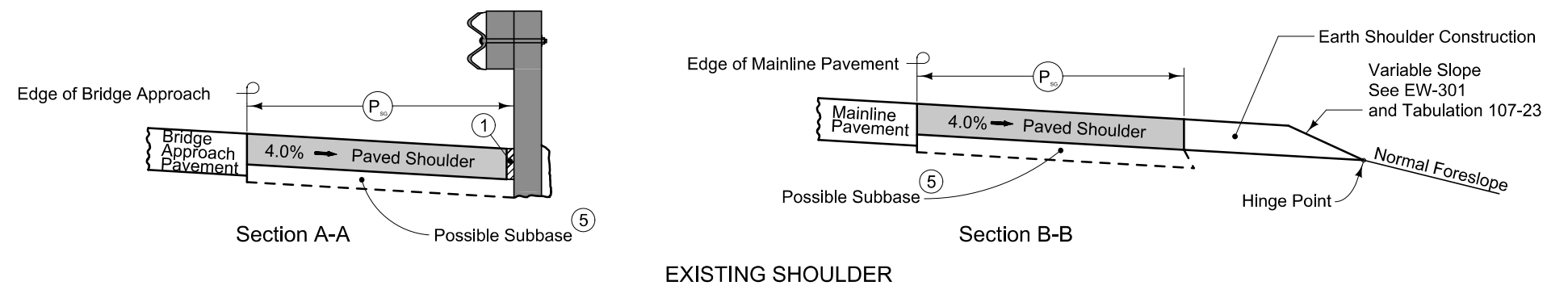


8" PCC Paved Shoulder at guardrail with the following jointing layout:

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.

Refer to Tabulation 112-9 for shoulder quantities.

- ① 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.
- ② Continue paved shoulder 20 feet beyond the center of the first post.
- ③ Shoulder may be notched for first 2 posts or post sleeves may be installed through pavement. Do not drive posts through pavement.
- ④ 'KT' joint (per PV-101) for PCC shoulder.
- ⑤ 6" Special Backfill.



PAVED SHOULDER AT GUARDRAIL
(GRANULAR SHOULDER ADJACENT TO MAINLINE)

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

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
Yellow	(4)		Proposed Pavement Shading
Orange	(6)		Proposed Granular Shading
Orange	(70)		Proposed Shoulder Granular Shading
Yellow	(68)		Proposed Shoulder Paved Full Depth Shading
Yellow	(70)		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

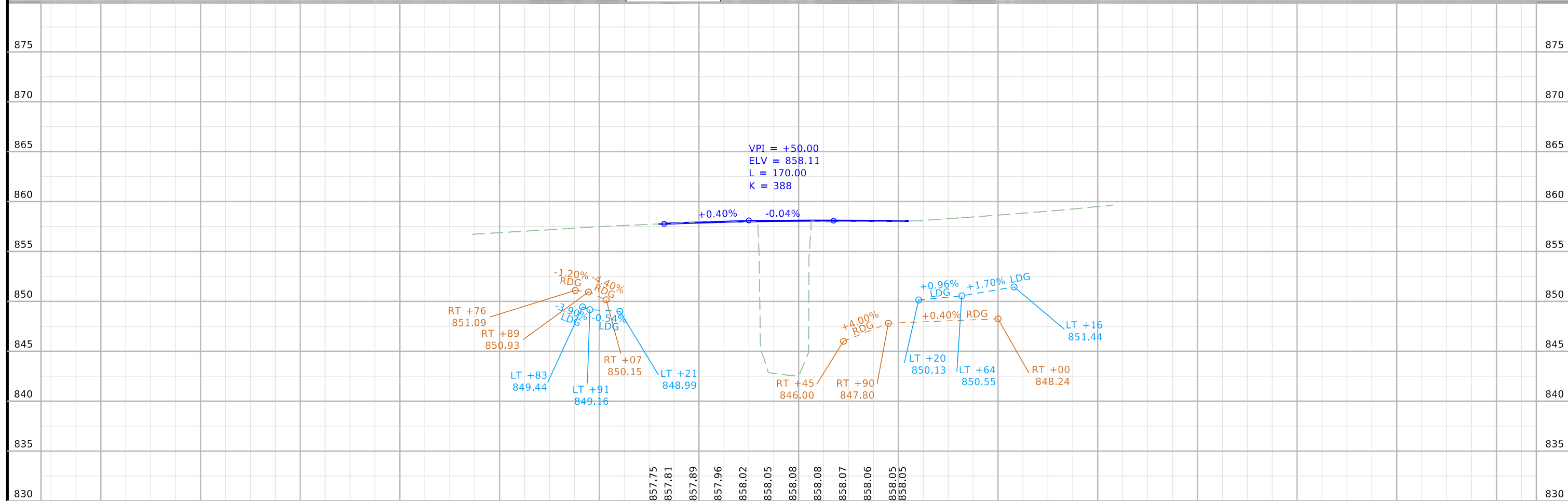
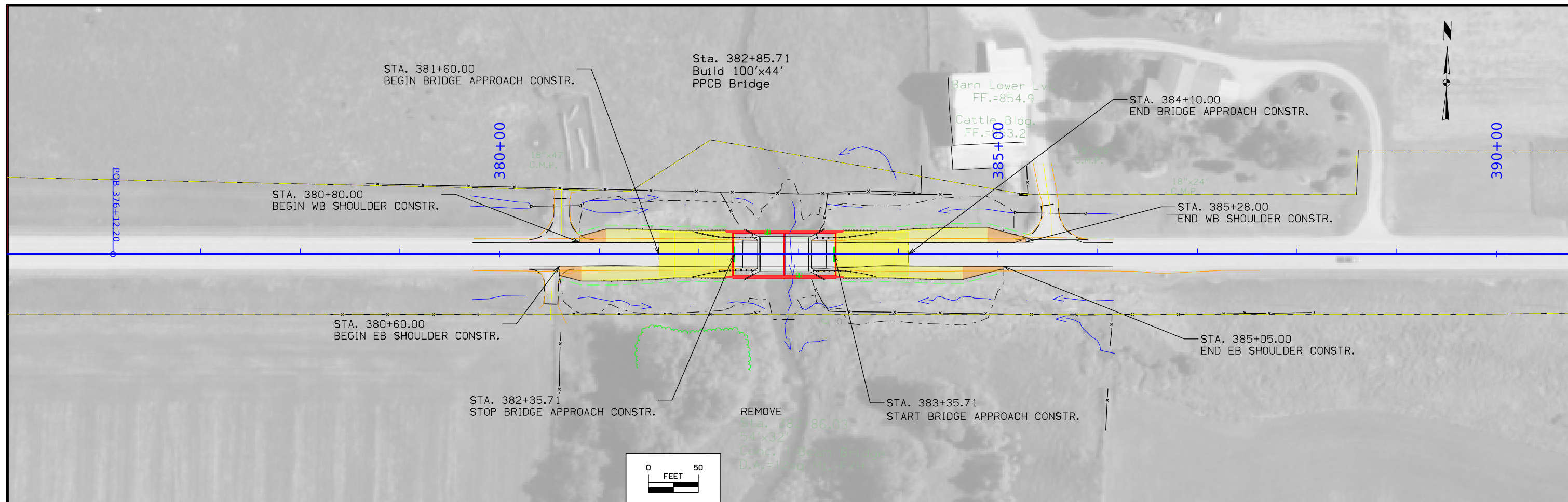
LINEWORK		Design Color No.	
Green	(2)		Existing Ground Line Profile
Blue	(1)		Proposed Profile and Annotation
Magenta	(5)		Existing Utilities
Blue, Light	(230)		Proposed Ditch Grades, Left
Black	(0)		Proposed Ditch Grades, Median
Rust	(14)		Proposed Ditch Grades, Right

- 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. 32199	ENGLISH	DESIGN TEAM Flattery \ Bell \ Phillips	BENTON COUNTY	PROJECT NUMBER BRFN-150-2(024)--39-06	SHEET NUMBER D.2
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Survey Information

SURVEY INDEX

Benton County
SAP-0969.0

PIN 19-06-150-010

Project Number: BRFN-150-2(24)--39-06

Location: on IA Hwy. 150 over Prairie Creek 1.8mi. E. of Co. Rd. V71

Type of Work: Bridge Replacement

Project Directory: 0615001019

Survey Personnel

Geoff Tinker, PLS – Land Surveyor, Sr. (Field Survey & Proj. DGN's)
John Hahn – Assist. Party Chief (Water safety assist. 07/07/21)

Date(s) of Survey

Begin Date(s) 06/15/2021 thru 06/17/2021 Roadway Embank. & Structure
End Date(s) 07/07/2021 and 07/08/2021 Waterway Details & BLDG's

General Information

Measurement units for this survey are US survey feet, upon IaRCS Zone 10.
This survey is for proposed Bridge Survey (Topo) along IA Hwy. 150 over Prairie Creek located 3.2mi. West of Urbana, Iowa and 1.8mi. East of Co. Road V 71.

Project Control

Coordinates were determined for primary project control points by conducting concurrent Static Survey observations, with Post Processing and Adjustment being constrained to surrounding Iowa Real Time Network (IaRTN) reference stations.

Refer to separate Control Index File Report I-0615001019_0969-CNTRL for complete details, at:

pw:\projectwise.dot.int.lan:PWMMain\Documents\Projects\0615001019\PrelimSurvey\0969\Control

PROJECT DATUM: NAD83(2011) EPOCH 2010.00
COORDINATE SYSTEM: IOWA RCS ZONE 10 (CEDAR RAPIDS)
VERTICAL DATUM: NAVD88 (w/Geoid12B)

Alignment Information

Alignment Geom. points were recovered during Static Survey Sessions and nRTK Control Checks for Project, per 1948 Grading Plans #24370823 (Project No. F-263). 1950 Bridge #14480 As-Built plans were also reviewed.

Note at time of Preliminary Survey, points were impacted by a Summer 2021 Resurfacing Project (Cold-in-Place Recycling) that destroyed previous Centerline Geom. herein detailed. Refer to record Monument Preservation Records, as available for updated project reference.

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

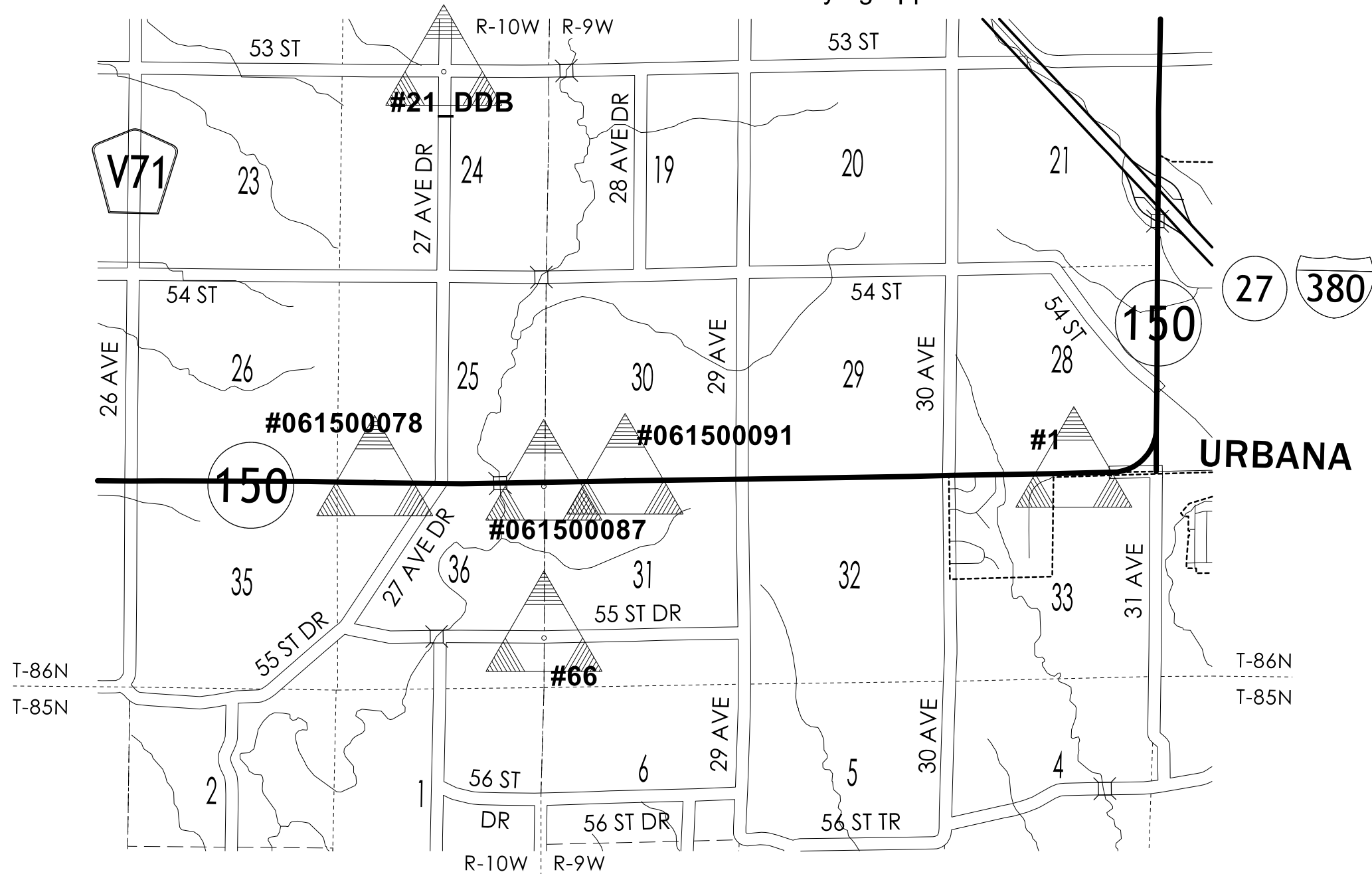
Plan PT Sta. 376+12.2 (Pnt. GT601, being Found MAG NAIL) = 376+11.3 Old Sur. CL
= Survey PT Sta. 376+12.2ft (B.O.P M.L. Sta. HELD)

Plan POT Sta. 386+88.7 (Pnt. GT602, being Found 3/8in Nail w/Washer aka Shiner)
= Survey POT Sta. 386+88.921ft @ 0.098ft Rt. (South) of C.L. Held

Plan P.I. Sta. 421+31.8 (Pnt. GT603, being Found MAG NAIL)
= Survey P.I. Sta. 421+31.169ft (Tang. HELD)

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

VERT. DATUM: NAVD88

1a. Regional Coordinate System Zone 10

Coordinate listing from next sheet will be used with 1aRTN for monument recovery. No other reference ties are given.

HORIZONTAL AND VERTICAL PROJECT CONTROL COORDINATE LISTING

HORIZ. DATUM: NAD83(2011) EPOCH 2010.00

VERT. DATUM: NAVD88

1a. Regional Coordinate System Zone 10
Project Control Marks are Bench Marks

Point Name	Northing	Easting	Elevation	Feature Definition-Description
1	8143047.54	20437138.24	898.045	FENO FND TYP. FENO MON. STAMPED "CP1" LOC. 500FT EAST OF BING MILLER LN.; AND 45FT NORTH OF CL. HWY. 150; AND 7.6FT NE OF T-POST ROW CORNER; AND 9.0FT SE OF T-POST ROW CORNER
61500078	8142828.324	20419214.81	893.516	CP IADOT ROW RAIL 13IN HT. AT PUNCH HOLE IN BULB LOC. 61.9FT NORTH OF CL. HWY. 150; AND 58.7 EAST OF REF. PT SIGN; AND 142FT NE. OF STA 350 SIGN ON S. SIDE OF HWY. 150
61500087	8142721.756	20423551.78	870.82	CP IADOT 4IN DIA. ROUND PCC REF. TIE MON. +5IN ABOVE GRND. AT #4 REBAR PER AVG. OF 2 PPADJ OBS. LOC. 51.8FT SOUTH OF CL. HWY. 150; AND 95.9FT EAST OF 5TH P.P. EAST OF BRIDGE OVER PRAIRIE CREEK; AND 2FT NORTH OF WIRE FENCE; AND 10.5FT WEST OF YELLOW NPZ PCV O
61500091	8142873.021	20425636.14	896.31	FENO SET 1M. L. FENO MON. W/2IN DIA. BRONZE CAP STAMPED "150_0091" AT -4IN DP. LOC. 59.1FT NORTH OF CL HWY. 150; AND 1.7FT SOUTH OF SOUTH FACE SQ. PCC COR. POST AT ALONG N. R/W; AND 129.8FT EAST OF FIELD TILE END/OUTLET; AND 107.9FT NORTH OF STA 415 SIGN; AND
21_DDB	8153351.292	20420987.81	901.22	CP USGS MON. 21DDB 1966 3RD ORDER BM LOCATED AT NW. CORNER INTERSECTION OF 55TH ST. DRIVE AND 53RD ST. AT 2MI. NORTH OF IA. HWY. 150
66	8138838.655	20423555.8	888.079	CP BERNTSEN ROD MON. W/ACCESS COVER AT -7IN DEEP LOC. 18.5FT EAST OF RED STEEL CORNER POST; AND 12.7FT WNW'LY OF TOP END CMP; AND 30.3FT NORTH OF CL GRAVEL RD

NOTE:

The first two digits in the control point name refer to the county number.
The next 3 digits refer to the highway number.
The next 3 digits refer to the highway milepost.
The last digit refers to the distance from the referenced milepost to the nearest tenth of a mile.

ALIGNMENT COORDINATES

Name	Location	Point on Tangent			Begin Spiral			Begin Curve			Simple Curve PI or Master PI of SCS		End Curve			End Spiral	
		Station	Coordinates		Station	Coordinates		Station	Coordinates		Station	Coordinates		Station	Coordinates		
			Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)	
1	ML150	376+12.20	8142738.87	20421750.75													
1	ML150	421+31.17	8142826.70	20426268.86													

511 TRAVEL RESTRICTIONS

Route	Direction	County	Location Description	Feature Crossed	Object Type	Maint. Bridge No., Structure ID, or FHWA No.	Type of Restriction	Existing Measurement	Construction Measurement	Construction Measurement as Signed	Projected As Built Measurement	Remarks
			No Travel Restrictions Expected									

TRAFFIC CONTROL PLAN

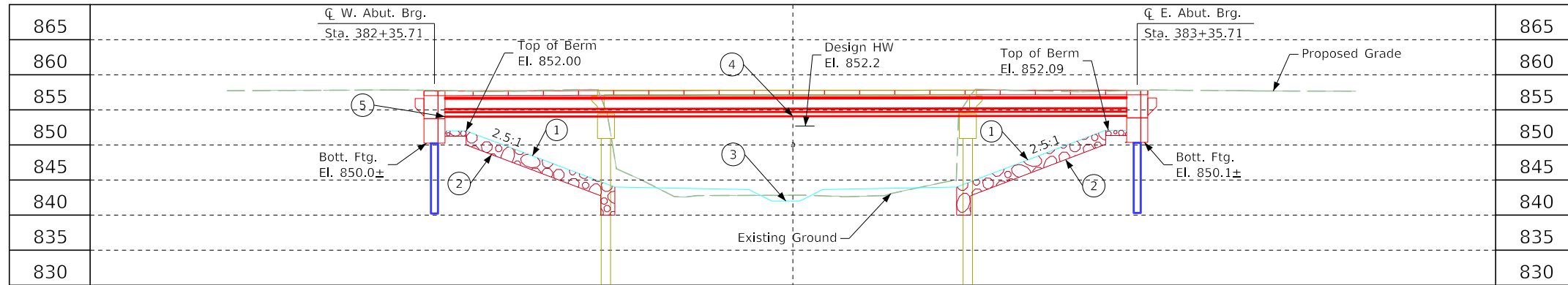
1. Iowa Highway 150 traffic shall be maintained via an off-site detour.
2. The detour shall be installed and maintained by XXXXXXXX
3. The contractor is required to provide access to the entrances withing the reconstruction limits at all times.

COORDINATED OPERATIONS

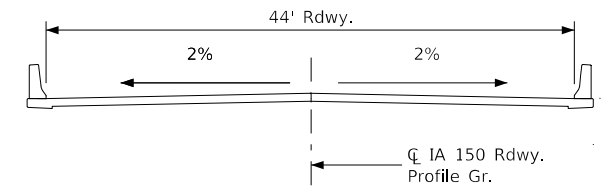
Other work in progress during the same period of time will include the construction of the projects listed. Coordinate operations with those of other contractors working within the same area.

Project	Type of Work
None Provided	

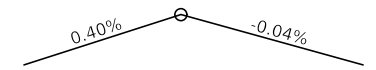
Control Point 801: N 8142734.0, E 20422455.4; BM Top Nail in Outside of SE Wingwall, Elev. 857.900



- ① Grading Surface
- ② Embedded Class E Revetment
- ③ Streambed EL. 842.0
- ④ Regulatory Low Beam
- ⑤ Operational Low Beam



TYPICAL BRIDGE SECTION



VPI Sta. = 382+50 VC = 170'
VPI Elev. = 858.11

Proposed Profile
Grade IA 150

Note:
Top of bridge deck at centerline roadway is 0.03' or below the profile grade to account for deck cross slope and parabolic crown.

LONGITUDINAL SECTION ALONG CL IA 150

General Notes:
This design is for the replacement of the existing 50' x 30' I Beam Bridge, Benton Design No. 2147, FHWA No. 14480, Maint. No. 0608.5S150.

Design Notes:
1. TL-4 Bridge Railing Proposed
2. BTB Beams Proposed
3. The proposed bridge will be constructed using Accelerated Bridge Construction (ABC) methods with a selected closure of 5 weeks.

Hydraulic Data

Drainage Area = 11.7 Sq. Mi.
Stream Slope = 7.4 Ft./Mi.
Avg. Low Water Stage = 842.7

Q₅₀ = 3,920 CFS
Stage = 852.2
Regulatory Low Beam = 853.8
Backwater = 0.97'
Avg. Bridge Velocity = 6.6 FPS

Q₁₀₀ = 4,640 CFS
Stage = 852.7
Operational Low Beam = 853.8
Backwater = 1.3 Ft.

Utilities Legend

Utility Survey not conducted

Utilities shown on this sheet are for information only, see Road Design sheets for final utility information.

Traffic Estimate

2020 AADT 3230 V.P.D.
2044 AADT 4800 V.P.D.
Trucks 8 %
Total
Design ESALs 800,000

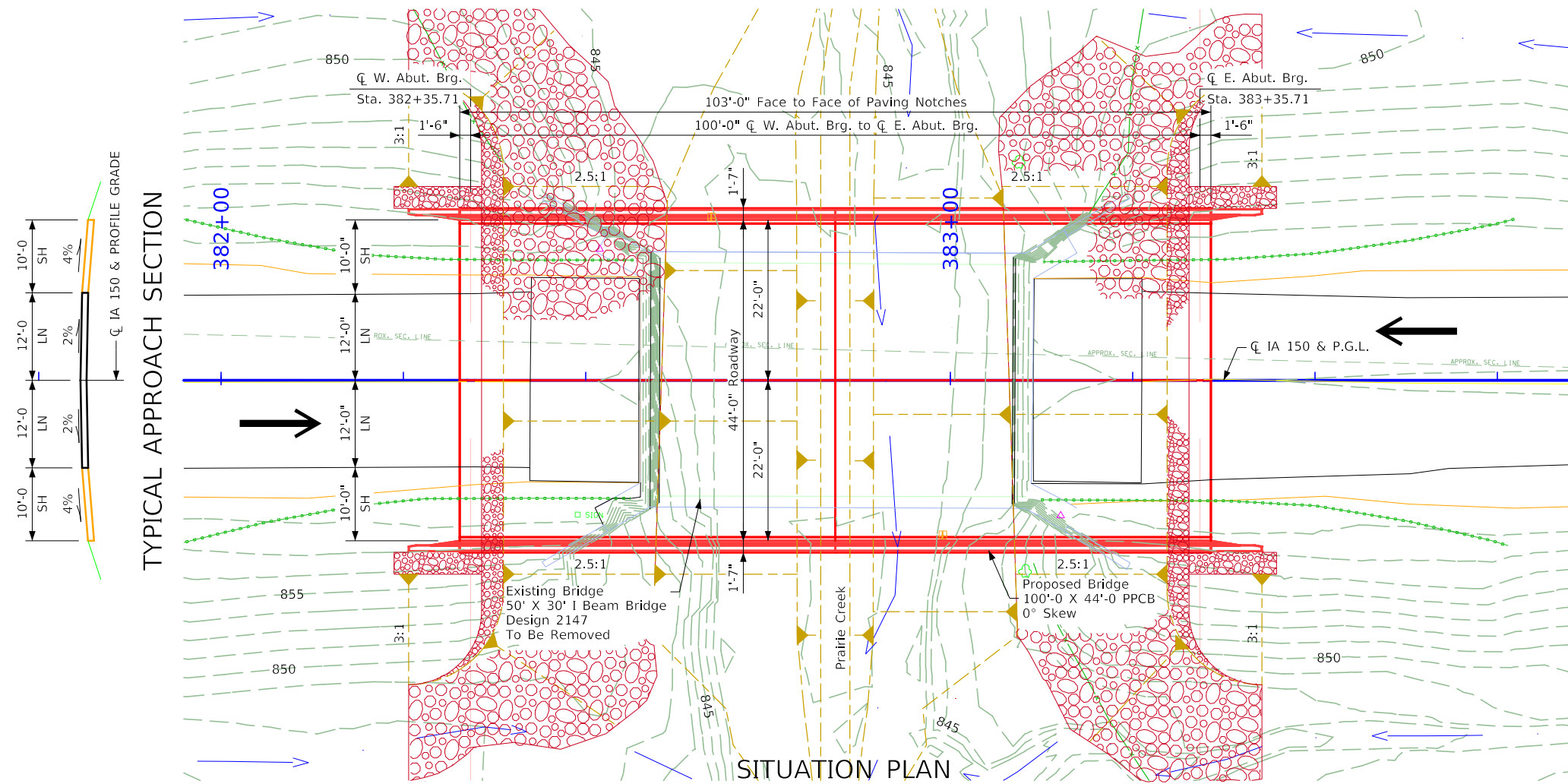
Location

Q₂₀₀ = 6,010 CFS
Stage = 853.5
Calculated Design Scour = 3.8'

Q₅₀₀ = 6,580 CFS
Stage = 853.8
Calculated Check Scour = 4.8'

Roadway Overtop 856.5±
Sta. 379+11

IA 150 over Prairie Ck
T-86N R-10W
Section 25/36
Harrison Township
Benton County
FHWA No. 014481
Bridge Maint. No. 0608.5S150
Latitude 42.224685°
Longitude -91.953133°



Preliminary

Design For 0° Skew

100'-0" x 44'-0" Pretensioned Prestressed Concrete Beam Bridge

100'-0" Span BTB Beams

Situation Plan

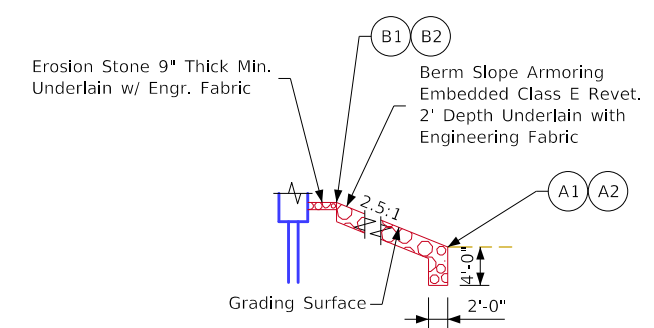
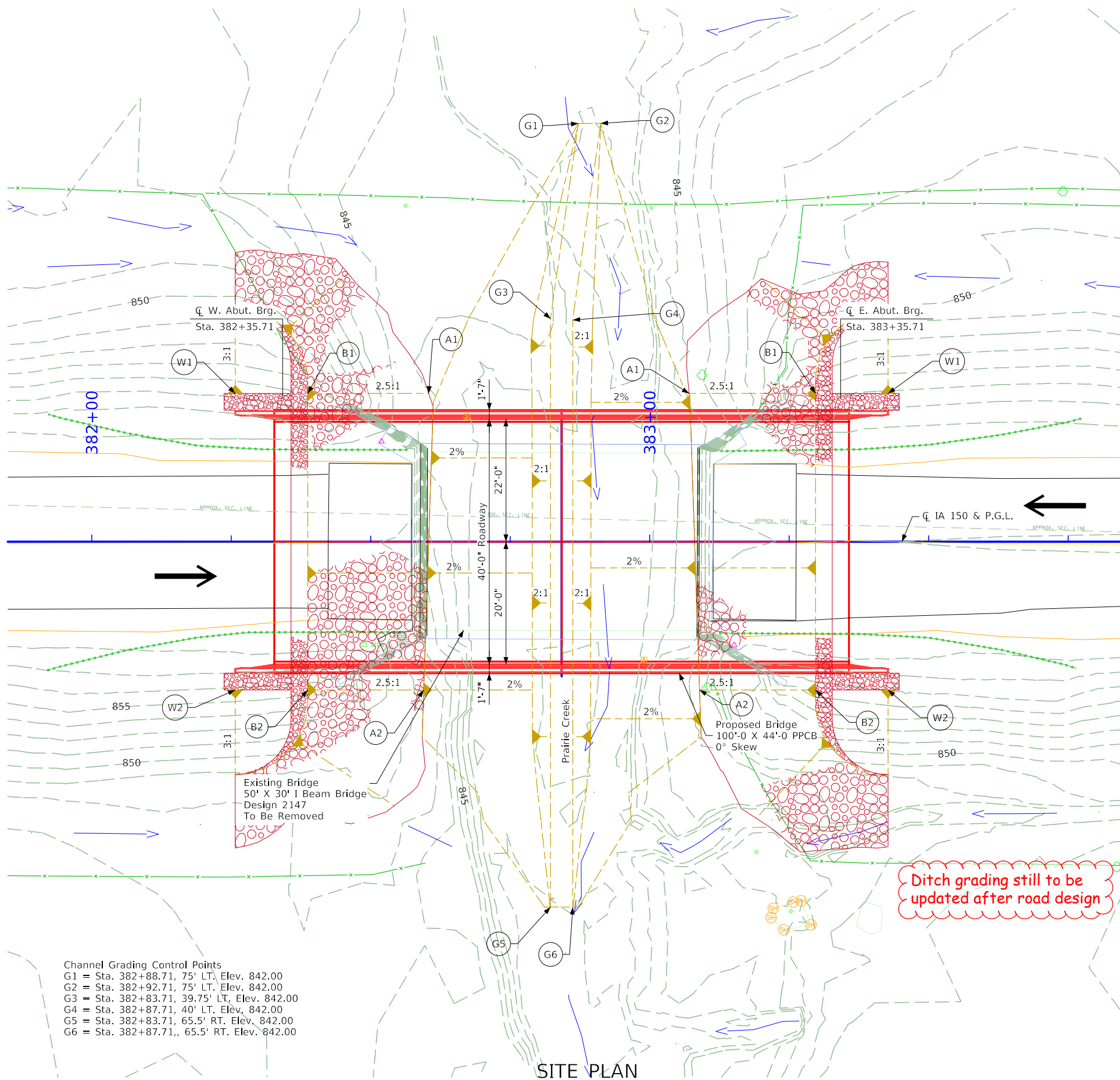
STA. 382+85.71 (IA 150) March 2022

Benton County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 224 Design Sheet No. 1 of 2 FHWA No. 014480

Control Point 801: N 8142734.0, E 20422455.4; BM Top Nail in Outside of SE Wingwall, Elev. 857.900



EMBEDDED BERM REVETMENT

Location	Revetment CL. E (Ton)	Erosion Stone (Ton)	Engineering Fabric (SY)	Excavation (CY)
Berm Lining - W. Abut.	290.4	9.9	400.8	211.0
Berm Lining - E. Abut.	292.2	9.9	403.5	212.2
Totals	582.6	19.9	804.4	423.2

Excavation quantity calculated from grading surface.

Points	West Abutment			East Abutment		
	Station	Offset	Elev.	Station	Offset	Elev.
A1	382+61.90	26.58' LT	843.45	383+08.56	26.58' RT	843.43
A2	382+60.99	26.58' RT	843.58	383+10.43	26.58' LT	843.59
B1	382+40.21	26.58' LT	852.00	383+31.21	26.58' RT	852.09
B2	382+40.21	26.58' RT	852.00	383+31.21	26.58' LT	852.09
W1	382+27.21	26.58' LT	857.38	383+44.21	26.58' RT	857.48
W2	382+27.21	26.58' RT	857.38	383+44.21	26.58' LT	857.48

Berm slope elevations reflect the grading surface.

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.

Heidi Lane
Signature _____ Date _____

Printed or Typed Name
My license renewal date is December 31, 2023

Pages or sheets covered by this seal: Sheets V.1-V.2

- Channel Grading Control Points
- G1 = Sta. 382+88.71, 75' LT, Elev. 842.00
 - G2 = Sta. 382+92.71, 75' LT, Elev. 842.00
 - G3 = Sta. 382+83.71, 39.75' LT, Elev. 842.00
 - G4 = Sta. 382+87.71, 40' LT, Elev. 842.00
 - G5 = Sta. 382+83.71, 65.5' RT, Elev. 842.00
 - G6 = Sta. 382+87.71, 65.5' RT, Elev. 842.00

Ditch grading still to be updated after road design



Preliminary

Design For 0° Skew

100'-0" x 44'-0" Pretensioned Prestressed Concrete Beam Bridge

100'-0" Span BTB Beams

Situation Plan - Site

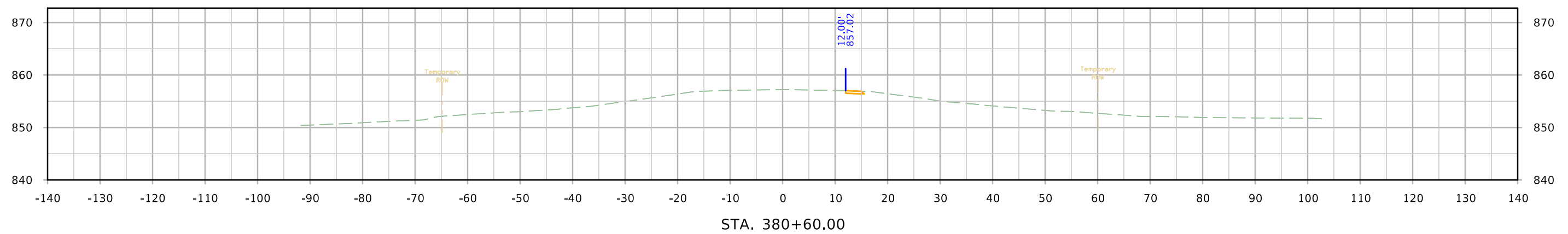
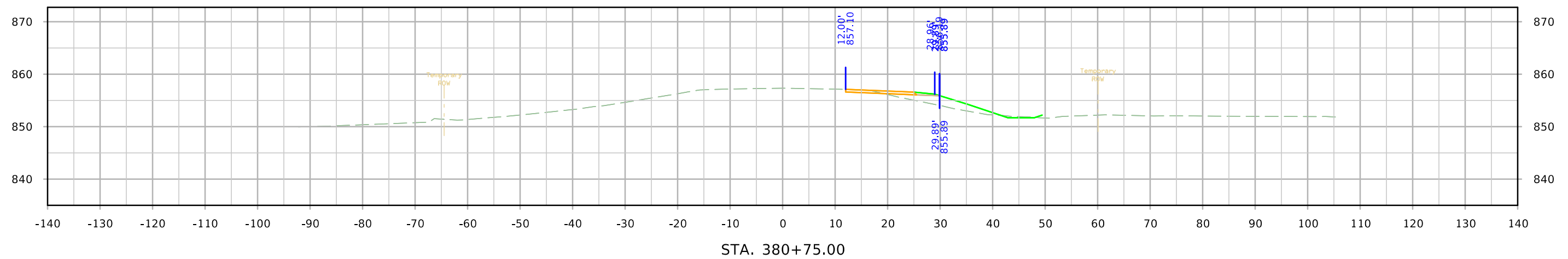
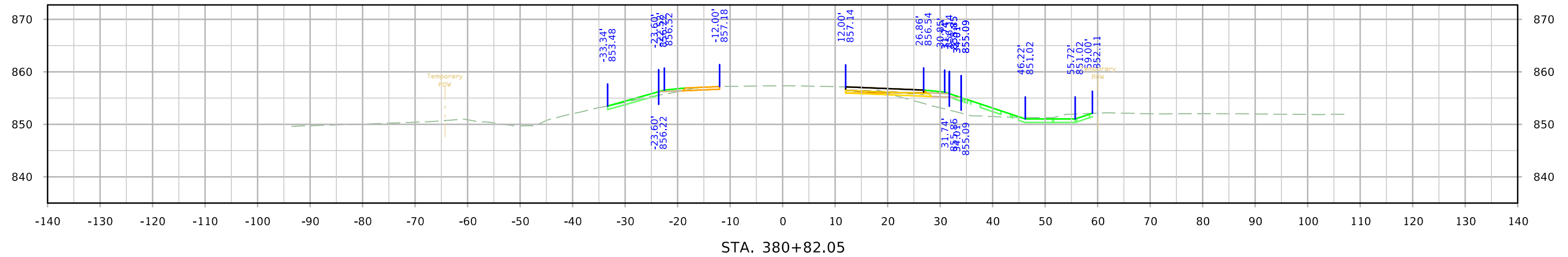
STA. 382+85.71 (IA 150) March 2022

Benton County

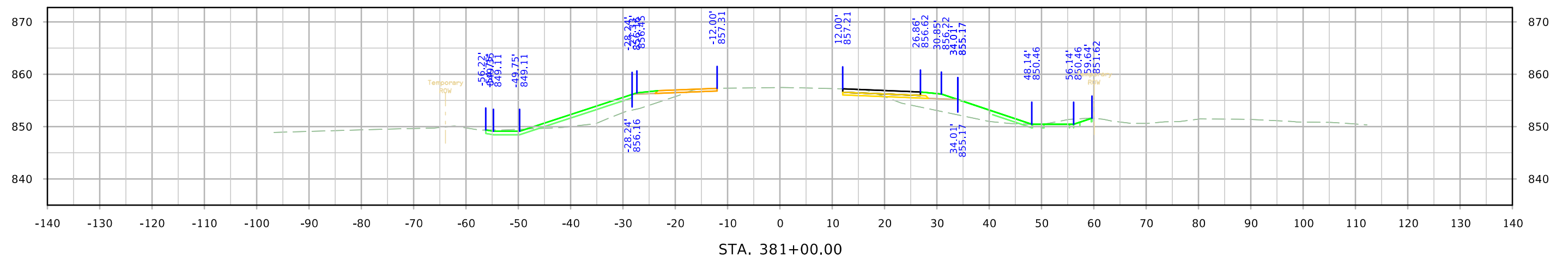
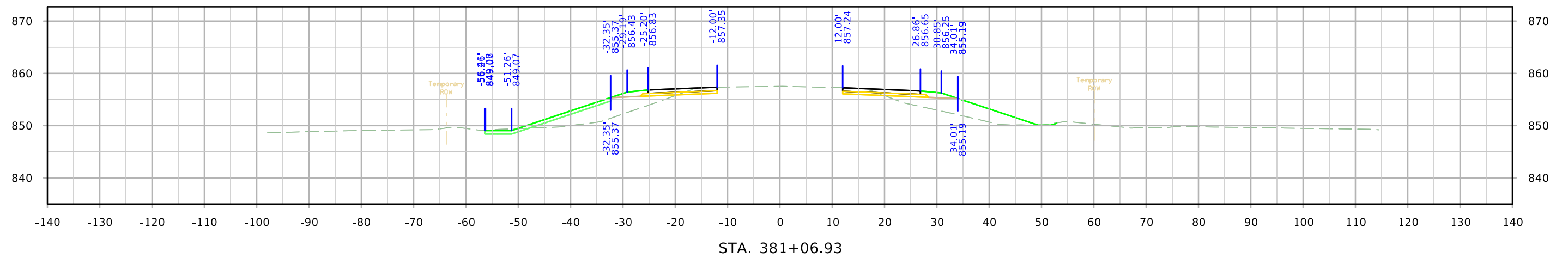
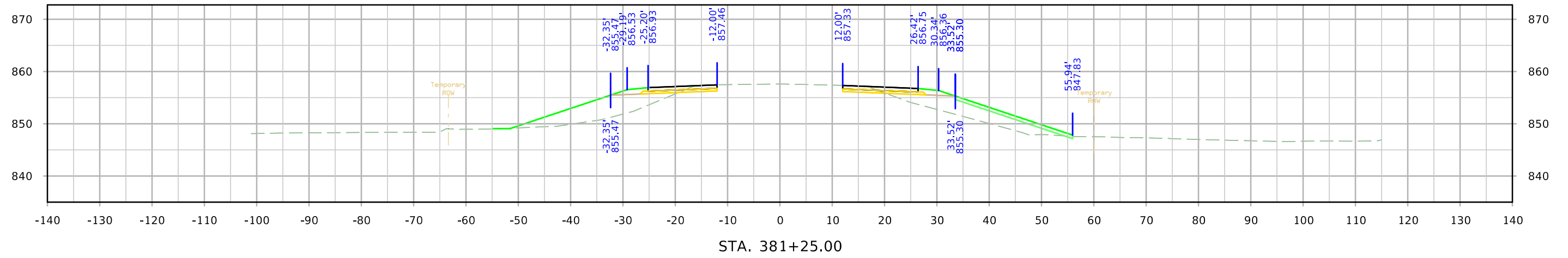
IOWA DEPARTMENT OF TRANSPORTATION

Design No. 224 Design Sheet No. 2 of 2 FHWA No. 014480

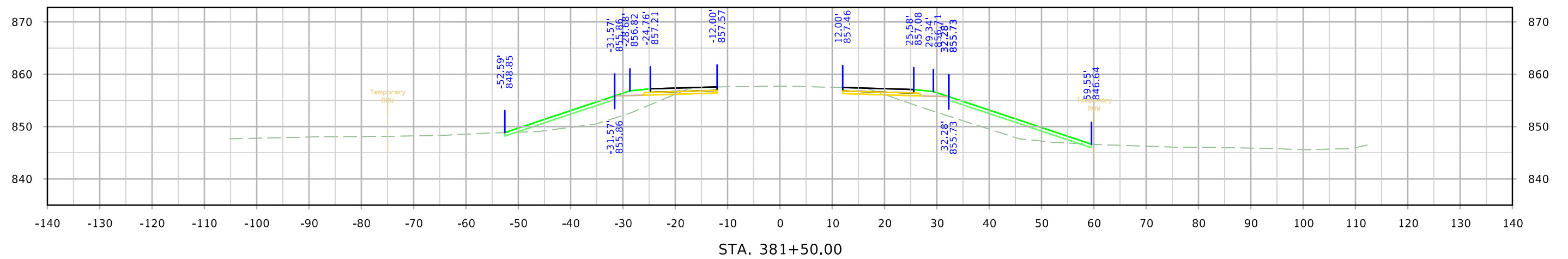
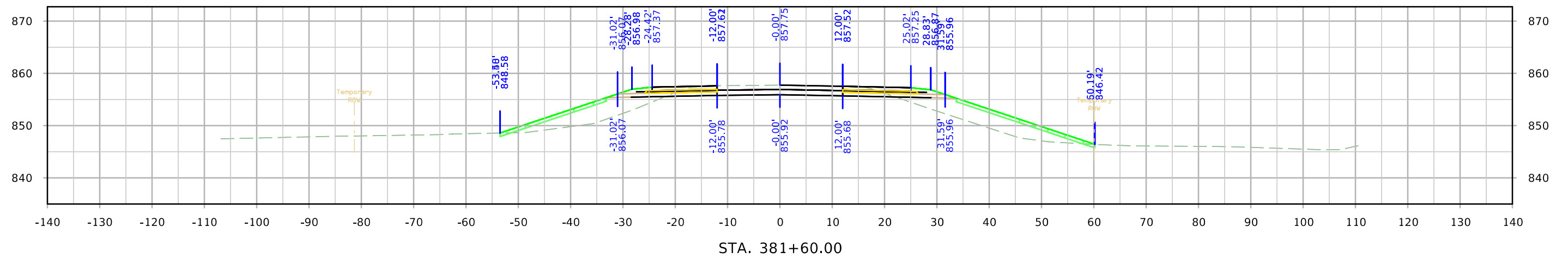
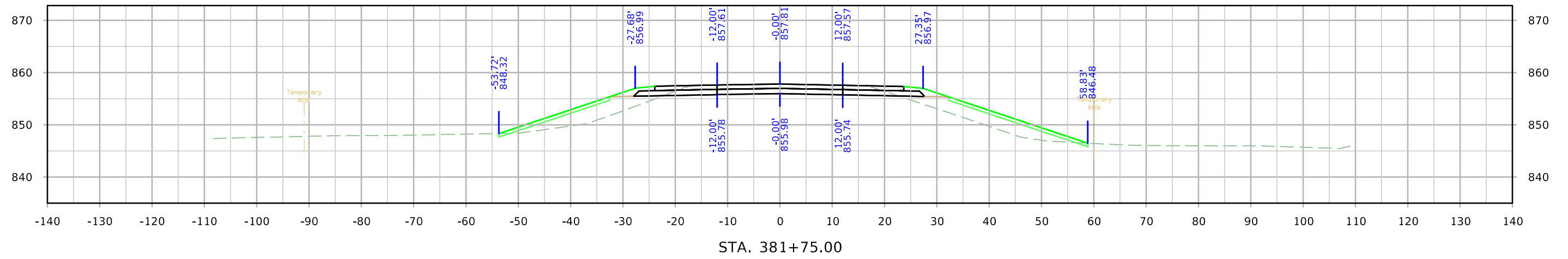
ML - US150



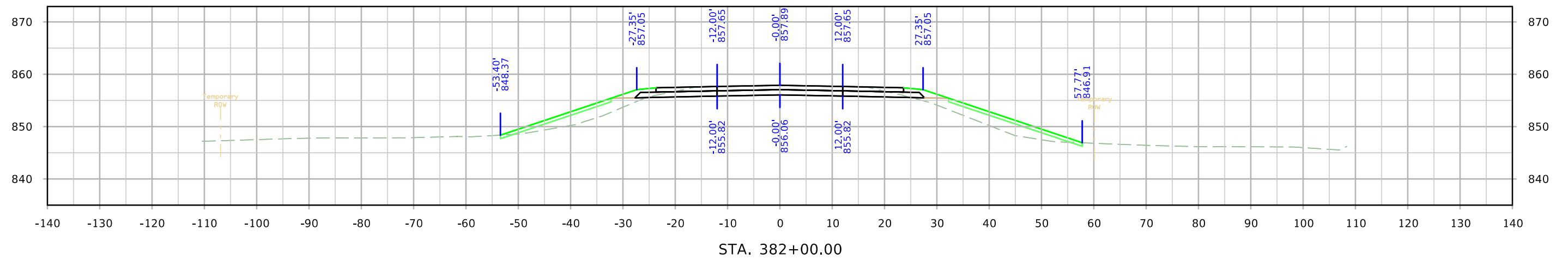
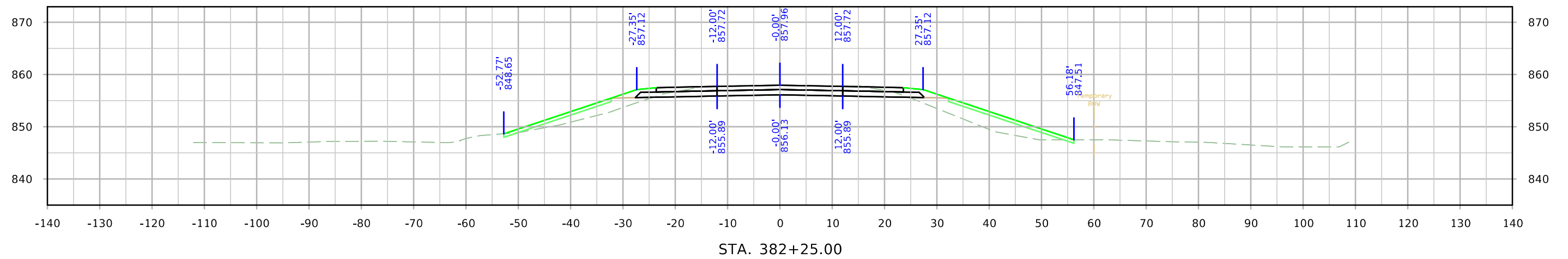
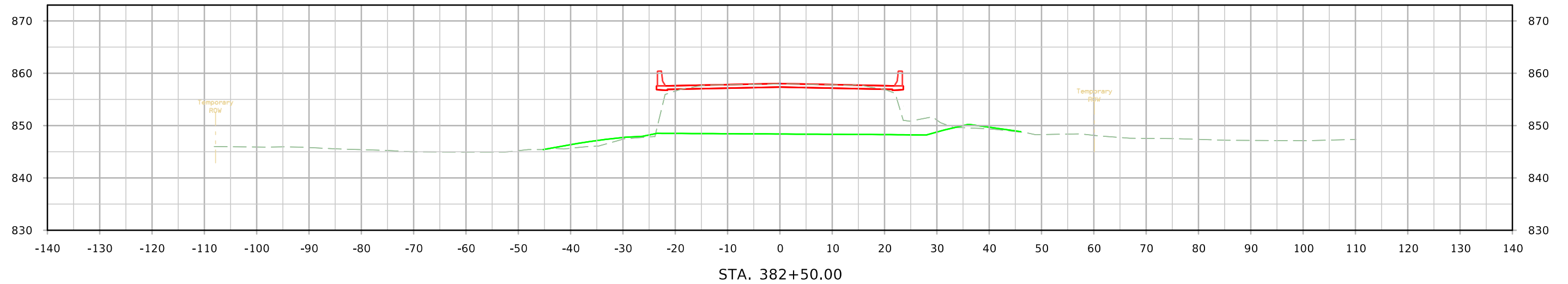
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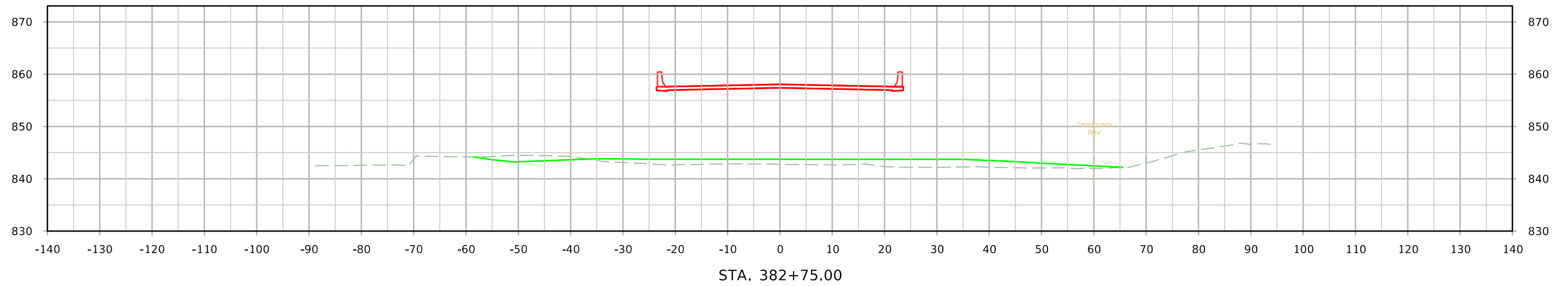
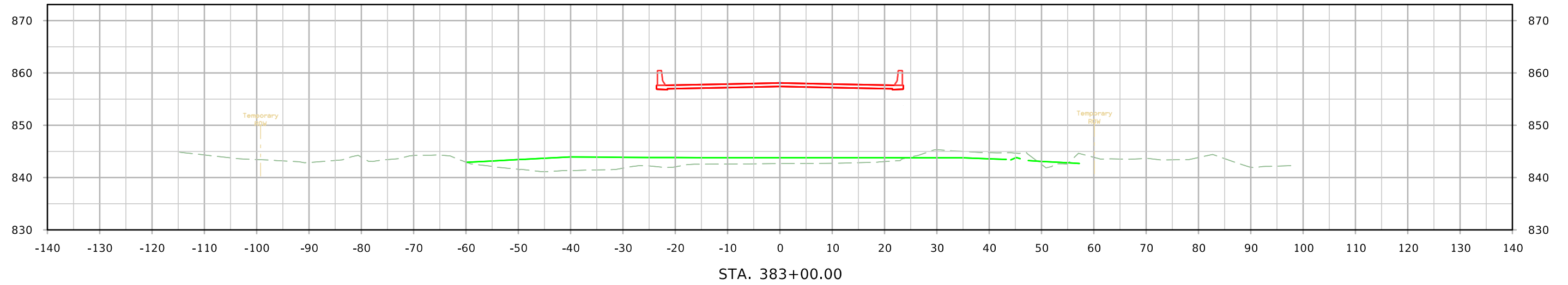
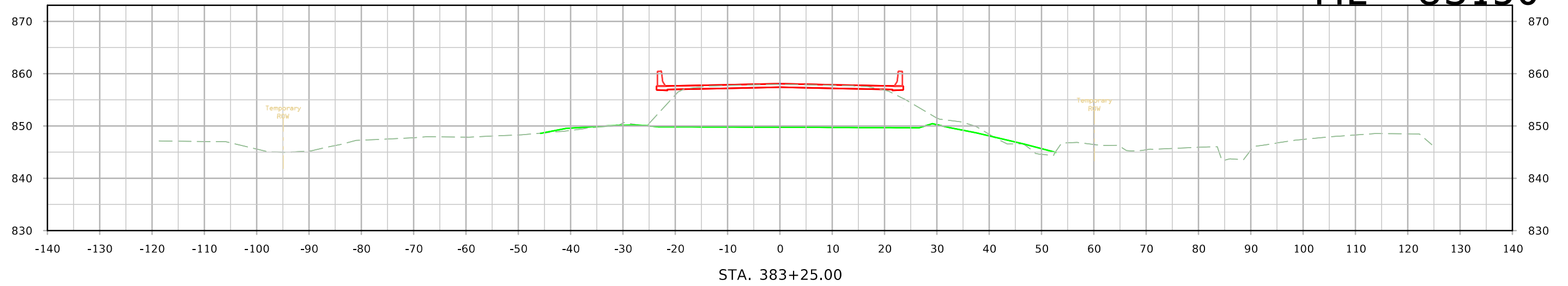
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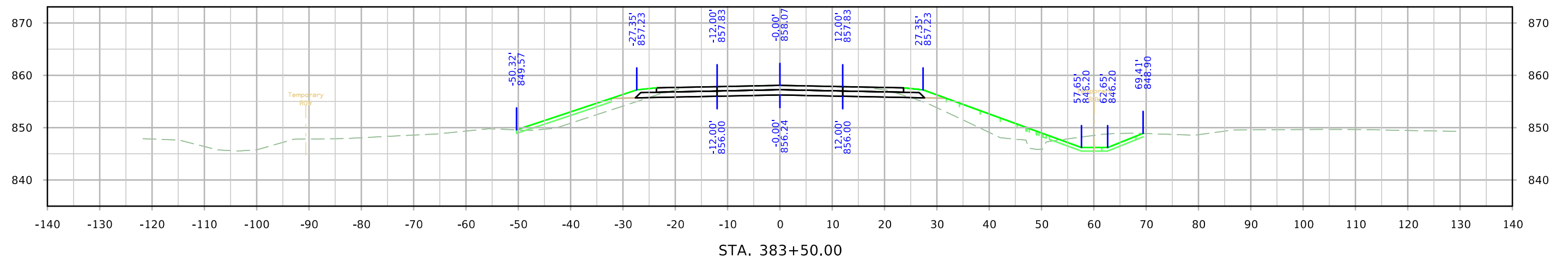
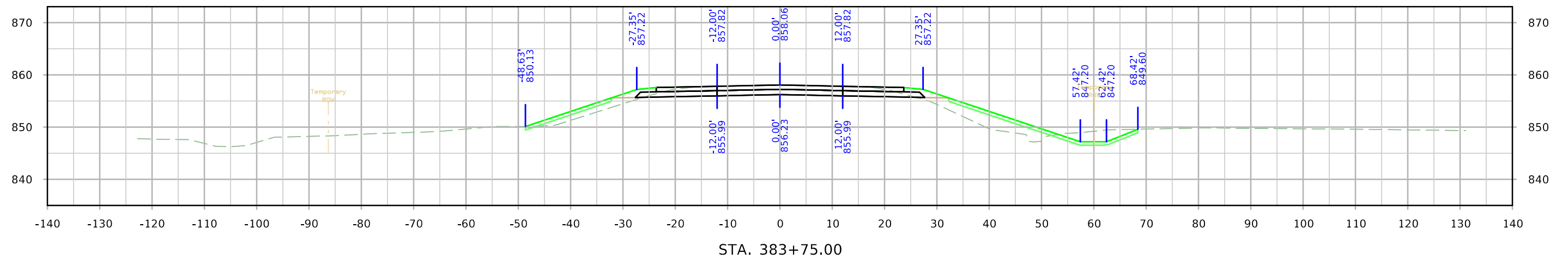
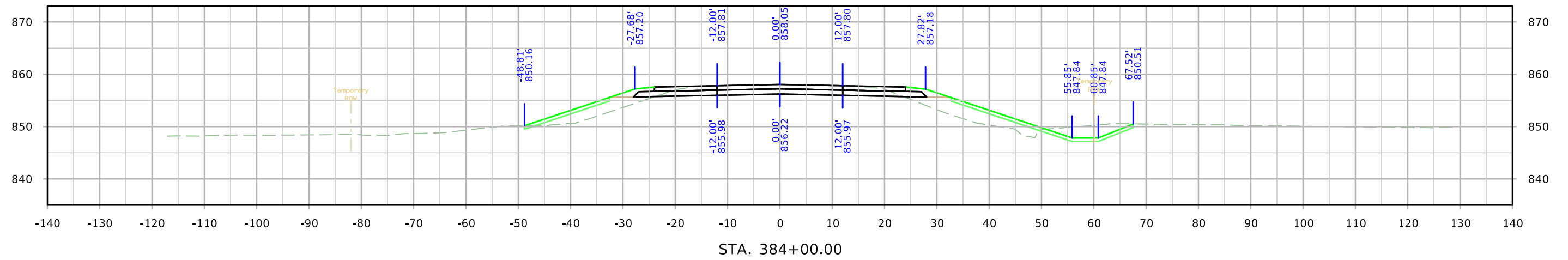
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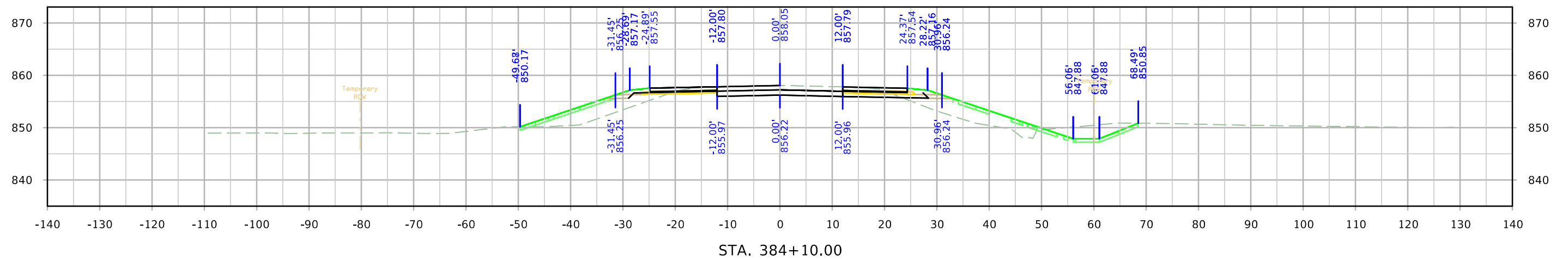
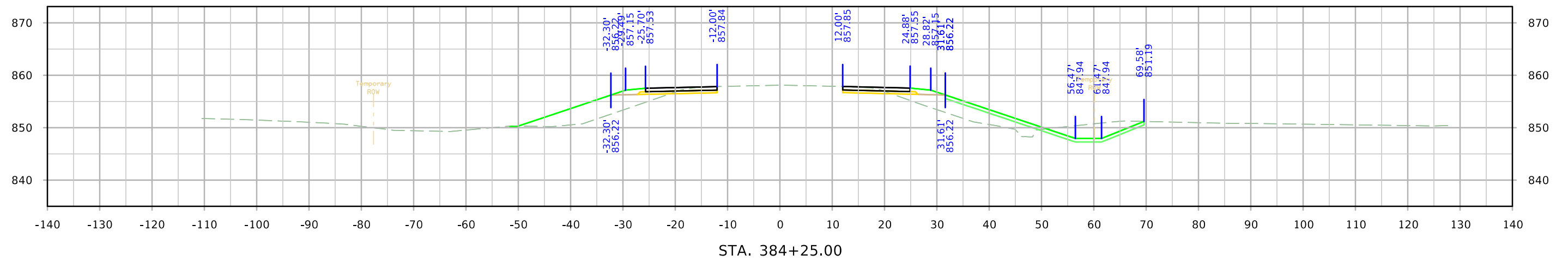
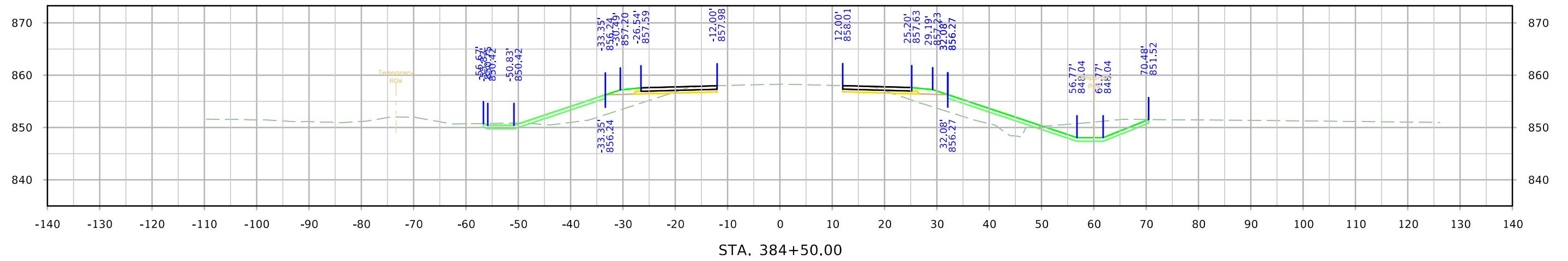
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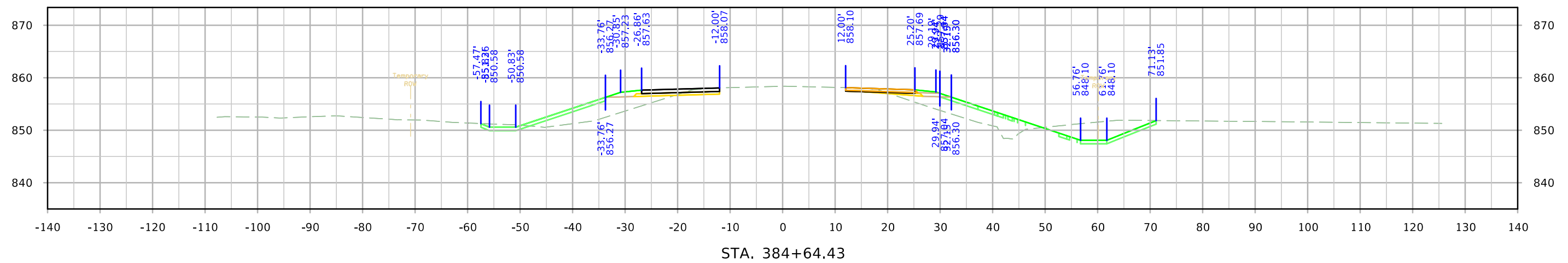
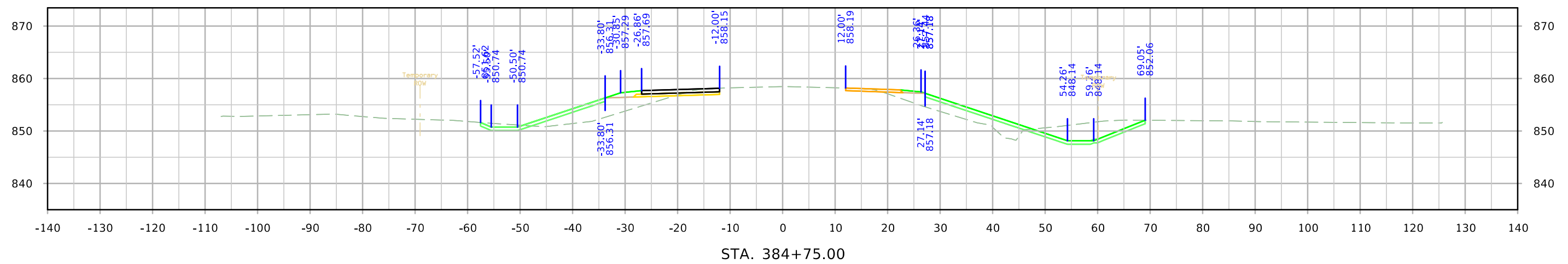
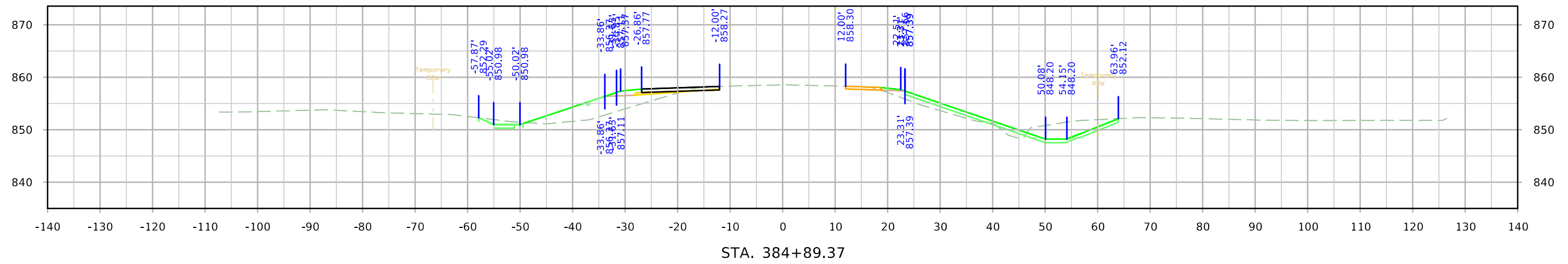
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