Bridge Replacement
BRFN-003-1(116)--39-75

LETTING DATE 11/20/29

PLYMOUTH COUNTY

INDEX OF SHEETS	
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D Sheets	**Mainline Plan and Profile Sheets**
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D.2	IA 3
G Sheets	**Survey Sheets**
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PLANS OF PROPOSED IMPROVEMENT ON THE

PRIMARY ROAD SYSTEM
PLYMOUTH COUNTY

Bridge Replacement

Big Sioux Overflow
1.0 mi W of IA 12

SCALES: As Noted

Refer to the Proposal Form for list of applicable specifications.

Value Engineering Saves. Refer to Article 1105.13 of the Specifications.

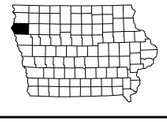
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www.iowaonecall.com
811 Know what's below. Call before you dig.

REVISIONS

TOTAL
..
PROJECT IDENTIFICATION NUMBER
24-75-003-030
PROJECT NUMBER
BRFN-003-1(116)--39-75
R.O.W. PROJECT NUMBER
STPN-003-1(120)--2J-75

Scan the QR code or click the link below to leave plan quality feedback and help us improve future projects.

Design QR Feedback Link



DESIGN DATA RURAL			
20 30	AADT	1200	V.P.D.
20 50	AADT	1300	V.P.D.
20 –	DHV	–	V.P.H.
TRUCKS		35	%
Total Design ESALs		–	

D3 PLAN: 10-30-26
B1 PLAN: 1-29-27
D5 PLAN: 3-26-27
R1 PLAN: 6-25-27

PRELIMINARY PLANS

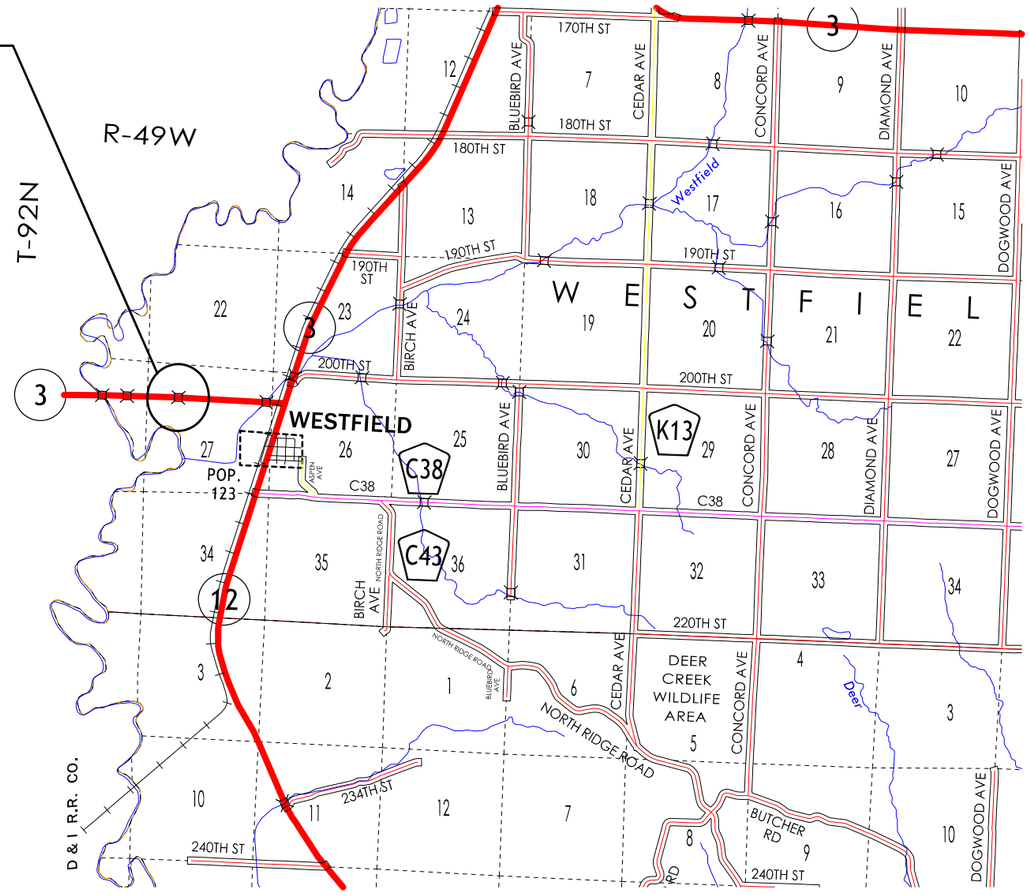
Subject to change by final design.

D2 PLAN: 9-25-26

FILE NO. 98765	ENGLISH	DESIGN TEAM Miller/Krug	PLYMOUTH COUNTY	PROJECT NUMBER BRFN-003-1(116)--39-75	SHEET NUMBER A.1

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PROJECT LOCATION
FHWA 039670
REF LOC 1



LOCATION MAP SCALE
0 1 2 3
Miles

FILE NO. 98765	ENGLISH	DESIGN TEAM Miller/Krug	PLYMOUTH COUNTY	PROJECT NUMBER BRFN-003-1(116)--39-75	SHEET NUMBER A.2

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IOWA DEPARTMENT OF TRANSPORTATION

TO OFFICE: District 3 **DATE:** March 9, 2026

ATTENTION: Jessica Felix **PROJECT:** Plymouth County
BRFN-003-1(116)--39-75

FROM: John E. Bartholomew Project Code: 24-75-003-030

BUREAU: Design

SUBJECT: Project Concept Statement; (Final, D0)

This project involves the replacement of the IA 3 bridge (Maint. No. 7500.6S003) over the Big Sioux Overflow, 1.0 miles west of IA 12.

A concept review was held on December 10, 2025. Those present included Michael Thayer, Bethany Waltersdorf, Shane Tymkowicz, Dylan Pryor, and Todd Huju from the District 3 Office; Jimmy Ellis and George Sefain from the Bridges and Structures Bureau; Christine Schwienebart, Jim Galliart, Marc Solberg, Janee Becker, Shawn Goetz, Samuel Sturtz, and Chelsea Duncan from the Location and Environment Bureau; Tami Quam from Project Management Bureau; Brian Birkland, Scott Sweet, and Josh Opheim from WHKS; and John Bartholomew, Hollie Richey, Jason Holst, Yuejia Gu, and Yanxiao Jia from the Design Bureau.

The two alternatives considered were:

1. Replace the existing IA 3 bridge with a 140 ft. x 40 ft. continuous concrete slab (CCS) bridge utilizing off-site detour. Estimated cost for this project is **$2,098,700.**
2. Replace the existing IA 3 bridge with a 140 ft. x 40 ft. continuous concrete slab (CCS) bridge, utilizing staged construction. This alternative has been dismissed due to staged construction difficulties.

Alternative 1 is the preferred alternative. Additional right of way may be required. Traffic will be maintained by off-site detour.

The Draft Project Concept Statement was sent out for review and comment with concerns to be resolved by Wednesday, March 4, 2026. Comments received during the review period have been considered and resolved.

This project is recommended for construction in FY 2030. The Bridges and Structures Bureau will coordinate plan preparation with assistance from the Design Bureau.

JEB: hsr
Attach.
cc:

C. Purcell
M. Dell
M. A. Swenson
S. Majors
D. L. Newell
W. A. Sorenson
A. A. Welch
B. Hofer
W. Musgrove
J. Holst
T. Lovan
D. Dudley
L. Narigon
M. E. Khoda
J. Ellis
J. Klemme
J. Becker
S. Tracy
B. Waltersdorf
B. Birkland
S. Sturtz
C. Duncan

K. D. Nicholson
C. Carter
A. Knight
A. Poole
D. Breitbach
E. C. Wright
J. Harris
G. Karssen
S. Anderson
R. Harris
M. Solberg
L. Armstrong
J. Hauber
M. Gordy
A. Yates
S. Tymkowicz
A. Wiertzema
B. Strueker
C. Schwienebart
J. Opheim
S. Goetz
G. Sefain

Y. Jia
M. Nop
C. C. Poole
K. Brink
J. W. Laaser-Webb
M. E. Ross
M. Van Dyke
D. Johnson
D. Stokes
B. Dolan
T. Gustafson
B. Smith
S. Sersland
M. Todsen
R. Miller
S. Sweet
M. Thayer
J. Pottorff
T. Quam
B. Krug
J. Galliart
FHWA

FINAL PROJECT CONCEPT STATEMENT

IA 3 Bridge over Big Sioux Overflow 1.0 mi W of IA 12

Plymouth County
BRFN-003-1(116)--39-75
Project Code: 24-75-003-030
Maint. No. 7500.6S003
FHWA No. 39670

Highway Division
Design Bureau

John Bartholomew, P.E.
515-239-1540

March 9, 2026

I. STUDY AREA

A. Project Description

This project involves the replacement of the IA 3 bridge (Maint. No. 7500.6S003) over the Big Sioux Overflow 1.0 miles west of IA 12.

The two alternatives considered were:

1. Replace the existing IA 3 bridge with a 140 ft. x 40 ft. continuous concrete slab (CCS) bridge utilizing off-site detour. Estimated cost for this project is **$2,098,700.**
2. Replace the existing IA 3 bridge with a 140 ft. x 40 ft. continuous concrete slab (CCS) bridge, utilizing staged construction. This alternative has been dismissed due to staged construction difficulties.

Alternative 1 is the preferred alternative due to construction difficulties with staging, project coordination along IA 3, and the availability of an off-site detour. Estimated cost for this project is $2,098,700.

B. Need for Project

The existing structure is a 100 ft. x 30 ft. concrete slab bridge that was built in 1962 and overlaid in 2009. The top of the deck has many leaching cracks and spall areas. The bottom of the deck has several cracks, rust staining, delaminated areas, and spalling with exposed steel. The substructure also has several cracks, spalled areas, and staining from the leaking deck joints. Due to the overall condition of the bridge, a replacement is recommended.

Photos from SIIMS



Figure 1: with route, 2024



Figure 3: against route, 2024



Figure 2: left profile, near to far, 2024



Figure 4: right profile, far to near, 2024

C. Present Facility

The existing structure is a 100 ft. x 30 ft., concrete slab bridge constructed in 1962 and overlaid in 2009.

IA 3 in the project area is 24 ft. wide, 8 in. PCC pavement with 8 ft. wide earth shoulders and 3:1 foreslopes, constructed in 1963. Diamond grinding was accomplished in 2022.

D. Traffic Estimates

The 2030 construction year and 2050 design year average daily traffic estimates are 1,200 ADT with 35% trucks and 1,300 ADT with 34% trucks, respectively.

E. Sufficiency Ratings

IA 3 is classified as an "Access Route" and is a maintenance service level "C" roadway. The Bridge Condition Index is 62.0 and the Bridge Condition Rating is "Fair".

F. Access Control

Access rights will not be acquired for this project.

G. Crash History

During the five-year study period from January 1, 2020 through December 31, 2024, there were 2 personal property crashes.

The potential for crash reduction (PCR) medium for all crashes and negligible for severe crashes. The PCR value is 0.277 crash/mile/year for all crashes and -0.007 crash/mile/year for severe crashes.

II. PROJECT CONCEPT

A. Feasible Alternatives

Alternative #1 - Replace the existing IA 3 bridge with a 140 ft. x 40 ft. continuous concrete slab (CCS) bridge, utilizing an off-site detour

The existing 100 ft. x 30 ft., concrete slab bridge will be replaced with a three span, 140 ft. x 40 ft. continuous concrete slab (CCS) bridge.

The typical cross section adjacent to the bridge approach will consist of a 24 ft. roadway with 8 ft. granular shoulders and 3:1 foreslopes.

This bridge will be constructed on the existing vertical and horizontal alignment. The new bridge center will be shifted approximately 13 ft. west of the existing bridge center. New bridge approaches will be constructed. The existing guardrail will be

replaced with new guardrail and the shoulders will be paved 20 ft. beyond the ends of the guardrail. Class 10 will be necessary to flatten the existing foreslopes and to construct the new guardrail blisters. Class B revetment will be placed under the bridge for slope protection. New bridge end drains will be constructed on both ends of the bridge. Revetment should be connected across the channel due to the overflow situation.

Access to entrances will need to be maintained at all times. Field Entrance in the northeast quadrant of bridge will be UAC. It is likely that new guardrail will encroach on the existing entrance, if so it is recommended that a crash cushion be used in place of traditional steel beam guardrail.

Apply erosion control and rural seeding and fertilizing to all disturbed areas.

It appears that right of way may be required for this project, it is programmed for $10,000.

Traffic will be maintained by an off-site detour.

This project will be constructed in coordination with two other projects on IA 3 and utilize the same proposed detour route.

These projects are:

BRF-003-1(121)--38-75
PIN Number: 24-75-003-040
Big Sioux Overflow 1.3 mi W of IA 12
FHWA No. 39660
Maint. No.: 7500.2S003

BRF-003-1(123)--38-75
Project Code: 25-75-003-050
Westfield Creek 0.2 mi W of W Jct IA 12
FHWA No. 39690
Maint. No.: 7501.4S003

Bridge Items	Estimated Costs
New Bridge	$881,500
Bridge Removal	100,000
Revetment	140,000
Mobilization - 10%	125,000
M & C - 20%	320,000
Bridge Costs	**$1,566,500**

Right of Way	**$ 10,000**
Roadway Items	
Bridge Approaches	$146,800
Removal of Pavement	12,000
Excavation Class 13 Waste	14,700
Guardrail (Includes Removal)	18,100
Paved Shoulders for Guardrail	58,300
Class 10 for Guardrail Blisters	16,400
Crash Cushion	28,900
Bridge End Drains	14,000
Clearing and Grubbing	5,700
Seeding and Fertilizing	700
Erosion Control	50,000
Traffic Control - 5%	24,000
Mobilization - 5%	24,000
M & C - 20%	96,200
Roadway costs	**$ 522,200**
Project Total	**$2,098,700**

Alternative #2 - Replace the existing IA 3 bridge with a 140 ft. x 40 ft. continuous concrete slab (CCS) bridge, utilizing staged construction

This alternative was dismissed because staged construction is not desirable for CCS bridge (BDM 3.6.9) due to construction difficulties. Staging would result in approximate 11 ft. 6 in. lane widths.

A layout of the proposed staged construction is available in the concept attachments.

B. Detour Analysis

IA 3 will be closed and an offsite detour will be utilized. It is anticipated the detour will be in place for approximately 180 days. The detour would follow IA 3/SD 50 to CR2/477th Ave. traveling north to SD 48/Big Sioux River Rd. east to IA 12 then traveling south to return to IA 3. Out of distance travel is 5.16 miles. The total distance user cost is anticipated to be $351,200. The cost for county road maintenance will be $15,300 as calculated by the Gas Tax Method. Detour signing costs will be $10,000.

C. Recommendations

It is recommended that the present structure be replaced, as described in Alternative No. 1. Estimated cost for this project is **$2,098,700**.

D. Construction Sequence

It is anticipated that all work on this project will be awarded to one prime contractor. The Bridges and Structures Bureau will coordinate the plan preparation with assistance from the Design Bureau.

E. ADA Accommodations

There are no bike paths or sidewalks adjacent to IA 3; therefore, no ADA accommodations are planned in conjunction with this project.

F. Special Considerations

This will not be a traffic critical project.

The ABC Rating Score of 45 is less than the first stage filter threshold of 50, therefore this bridge will be constructed using traditional methods.

No bike path or sidewalk will be required as part of this project.

Waterway is not on a state water trail or paddling route.

No additional survey requests.

Right of Way may be required for this project, it is programmed for $10,000.

Location and Environment Bureau members attended the Concept Review Meeting and no special concerns were noted. NRCS easements are located to the north and south of the bridge project area and should be avoided by staying within right of way limits. An exhibit can be viewed in the concept attachments.

An Environmental Research Study Area (ERSA) has been developed for this project and can be viewed in the concept attachments.

This project will be constructed in coordination with two other projects on IA 3 and utilize the same detour. These projects are BRF-003-1(121)--38-75 located over Big Sioux Overflow 1.3 mi W of IA 12 and BRF-003-1(123)--38-75 located over Westfield Creek 0.2 mi W of W Jct IA 12.

G. Program Status

Site data has been developed by the Design Bureau. This project is listed in the 2026-2030 Iowa Transportation Improvement Program, with $10,000 programmed for right of way in FY 2030, and $2,475,000 for replacement in FY 2030. Costs for this project may be eligible for bridge replacement funds. A schedule of events will be developed following approval of the Project Concept.

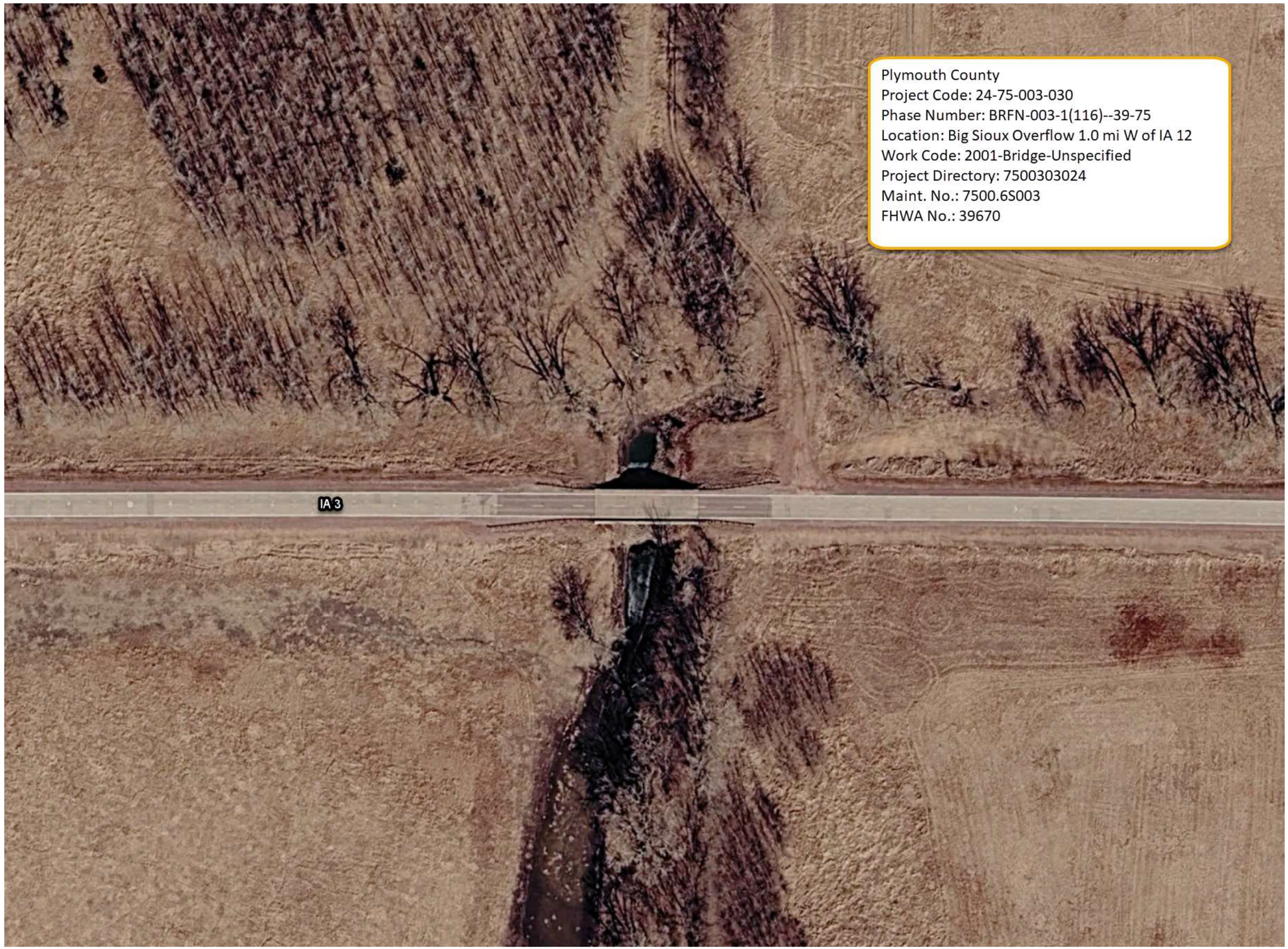
JEB: hsr

Utilities

City of Akron
Gary Horton
Ph: 712-551-6711
ghorton@akronia.org

Premier Communications
Jake Van Roekel
Ph: 712-722-3451
jakevr@mypremieronline.com

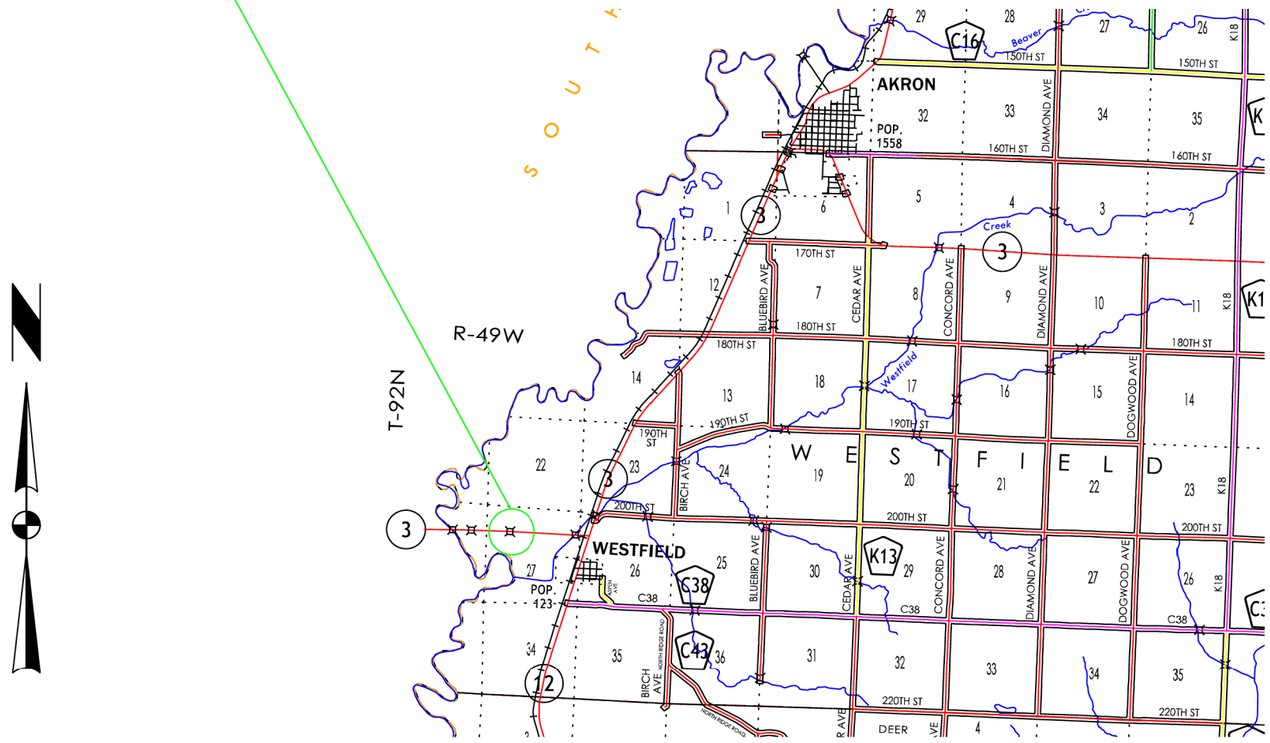
Sprint/Cogent Communications
Michael Chebul
Ph: 402-880-8720
mchebul@cogento.com



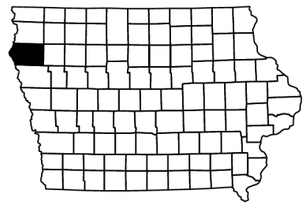
Plymouth County
Project Code: 24-75-003-030
Phase Number: BRFN-003-1(116)--39-75
Location: Big Sioux Overflow 1.0 mi W of IA 12
Work Code: 2001-Bridge-Unspecified
Project Directory: 7500303024
Maint. No.: 7500.6S003
FHWA No.: 39670

PLYMOUTH COUNTY

STA 181+00
FHWA 39670
MAINT. NO. 7500.6S003
DESIGN 260



ON IA 3 OVER BIG SIOUX OVERFLOW, 1.0 MI
W OF IA 12
BRF–003–1(116)—39–75
PROJECT CODE: 25–75–003–030

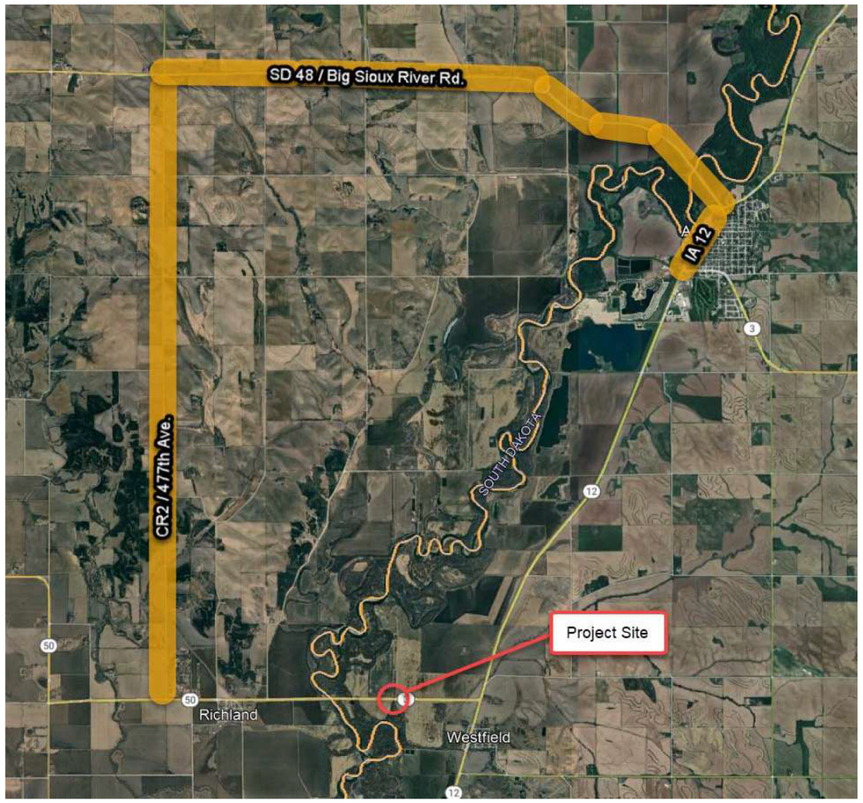


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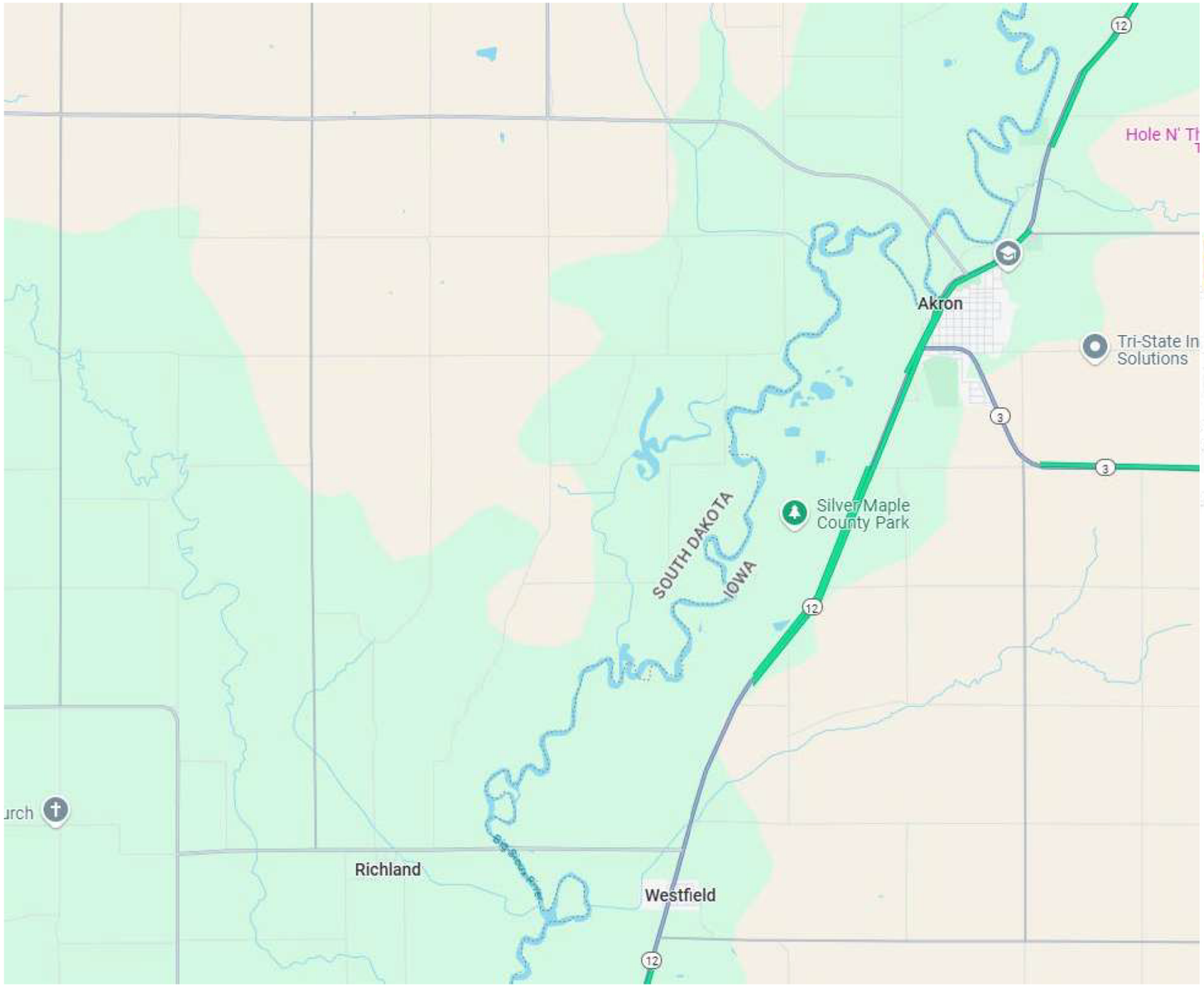
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PROPOSED DETOUR

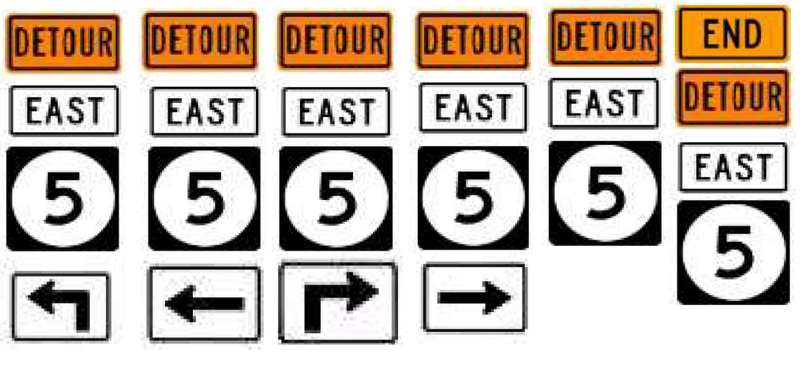




Plymouth County
Project Code: 24-75-003-030
Phase Number: BRFN-003-1(116)--39-75
Location: Big Sioux Overflow 1.0 mi W of IA 12
Work Code: 2001-Bridge-Unspecified
Project Directory: 7500303024
Maint. No.: 7500.6S003
FHWA No.: 39670











Detour Route

Road Closed





PDMS

FILE NO. 98765	ENGLISH	DESIGN TEAM Miller/Krug	PLYMOUTH COUNTY	PROJECT NUMBER BRFN-003-1(116)--39-75	SHEET NUMBER A.11

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IOWA | DOT
ERSA Layout
User Guide
Edit feature
Settings
ERSA
NewOrAddedArea*
New ERSA
PhaseUniqueID*
66975
CreatorName*
Yuejia Gu
Comments
ERSA: New ERSA
Zoom to
Creator
Yuejia.Gu@iowadot.us_IowaDOT
NewOrAddedArea
New ERSA
Last edited by Yuejia.Gu@iowadot.us_IowaDOT on 11/3/2025, 12:06 PM.
State Highway 3
State Highway 3
State Highway 3



FILE NO. 98765	ENGLISH	DESIGN TEAM Miller/Krug	PLYMOUTH COUNTY	PROJECT NUMBER BRFN-003-1(116)--39-75	SHEET NUMBER A.13

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Bridge Bureau Attachment for Concept Statement

Date: November 25, 2025 (rev. 1/15/2026)
By: J. Opheim & B. Birkland, WHKS
Location: IA 3 over Big Sioux Overflow, 1.0 mi W of IA 12

County: Plymouth
Phase No.: BRFN-003-1(116)--39-75
Project Code: 24-75-003-030

1. Regulatory/Coordination

   a. Iowa DNR Flood Plain permit = Yes
   b. Iowa DNR Sovereign Lands permit = No
   c. Local Record of Coordination = No
   d. Flood Insurance Study = Yes - Zone AE, Panel 19149C0213E, 10/27/22
   e. Drainage District = No
   f. Corps of Engineers Section 408 = No
   g. State Water Trail or Paddling Route = No
   h. Historic Structure = No
   i. Federally owned land in vicinity = No
   j. USGS or Iowa Flood Center (IFC) gage or sensor impacted? = No
   k. Obstruction Evaluation/Airport Airspace Analysis per FAA website = No

2. Hydrologic/Hydraulic Analysis/RIDB Dataset

   a. Design discharge methodology = 2022 FEMA hydraulic model peak flows
   b. Hydraulic analysis done = Yes, HEC-RAS 2D pre-survey level (LiDAR)
   c. If DA > 10 sq. mi. Riverine Infrastructure Database (RIDB) dataset is required with B1 submittal = Yes - BigSiouxR_39.23
   d. Project development hydraulic analysis will comply with the RIDB Guidelines at a minimum.

3. Structure/Roadway Layout Considerations

   a. Proposed bridge is on existing alignment.
   b. Proposed bridge is shifted approximately 13’ west of existing bridge center.
   c. Roadway profile grade raise is not anticipated.

4. Special construction issues

   a. New structure foundations located to avoid existing foundations.
   b. There is a possibility for pile conflicts between existing abutment timber piles and new pier piles below Elev. 1094 (~20’ below grade).
   c. Bridge does not meet Iowa DOT desired freeboard criteria because structures is an overflow. Consideration of inundation to be considered in Final Design.

5. Special survey = No

6. Aesthetic enhancements = No

7. Other

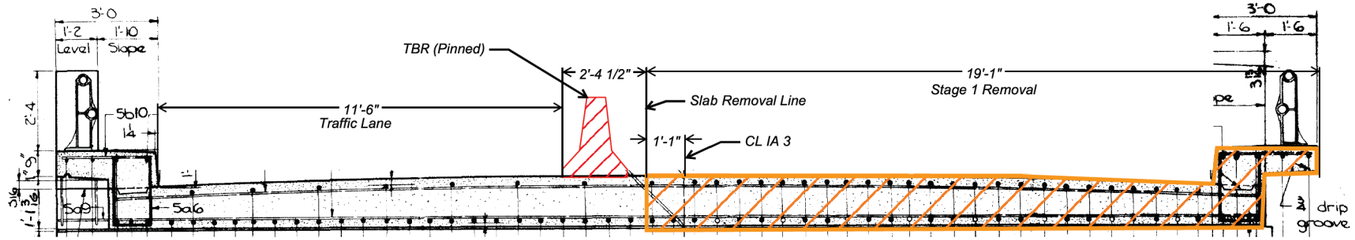
   a. Maintenance of Traffic
      i. Staged construction is not desirable for CCS bridge due to construction difficulties (BDM 3.6.9). If approved, staging would result in approx. 11’-6” lane widths. See Staging Diagram.
      ii. On-Site detour appears to be feasible. ROW width ~ 150’ on the south side. Construction would involve temporary fill and detour pavement to follow approximate profile of the overflow channel. No drainage pipes are needed. It is desirable to maintain detour for both overflow bridges considering 0.3-mi separation.
      iii. Off-site detour is preferred by the District. Preferred detour route: IA 12 north to Akron, SD 48 west to CR2/477th Ave, south to SD 50/IA 3. Out of distance travel ~ 15 miles.

Special Survey: None

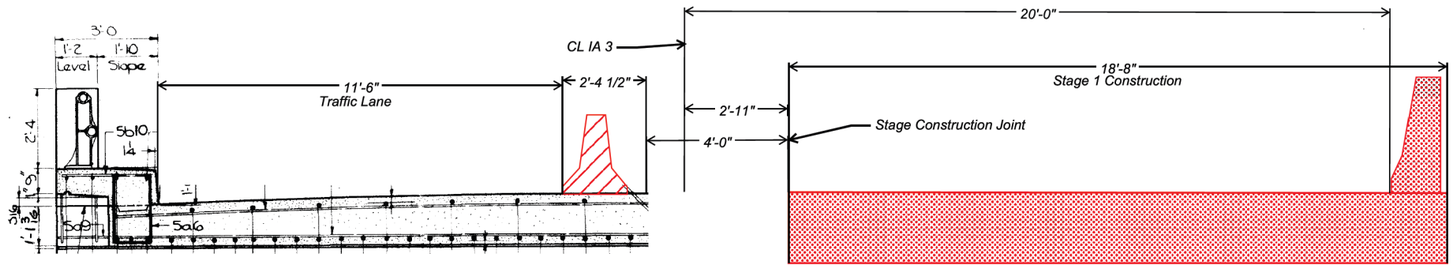
IA 3 over Big Sioux River Overflow

Possible Staging Diagrams

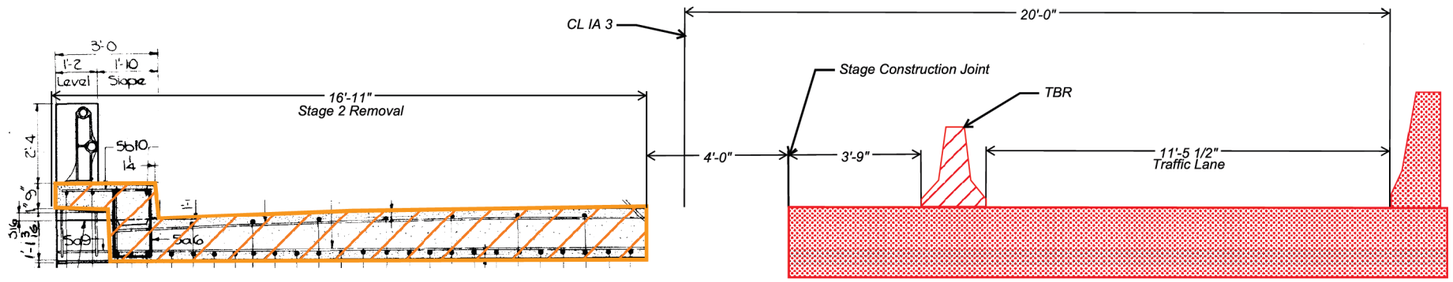
WHKS-J. Opheim
11/25/25



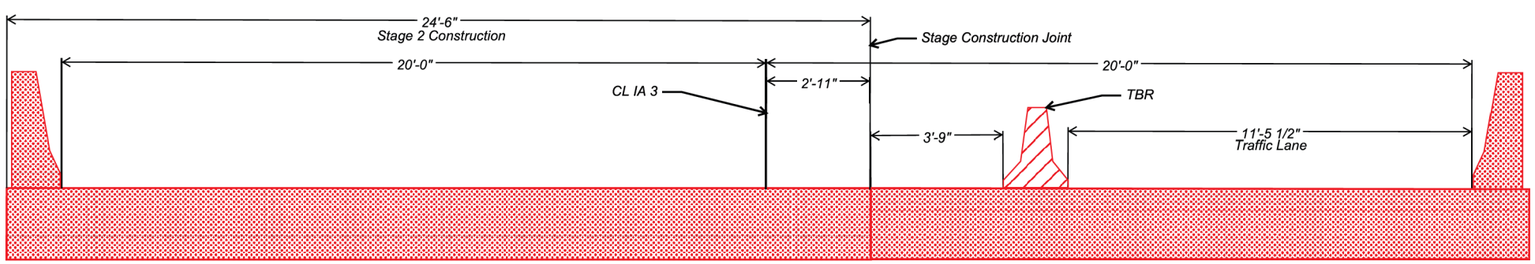
Stage 1 Removal



Stage 1 Construction



Stage 2 Removal



Stage 2 Construction

Roadway	IA 3			
PIN Number	24-75-003-030		**Submittal Date**	
Project Number	BRFN-003-1(116)--39-75			**Approval Date**
District	District 3	**Assistant District Engineer**	Shane Tymkowicz	
County	PLYMOUTH		**or**	
Route	IA 3	**Office Director**		
Location	IA 3 Bridge over Big Sioux Overflow 1.0 mi W of IA 12			
Work Type	Bridge Replacement			
Segment Manager	Ryan Miller			
Designer	Bobbi Krug			

Design Manual Section 1C-1
Last Updated: 04-29-19

Rural Two-Lane Highways (Rural Arterials)

Design Element		Preferred	Acceptable	Project Values
Design speed (mph)		60	50	65
Maximum superelevation rate (Refer to Section 2A-2)		6%	8%	-
Design lane width (ft)		12	12	-
Full depth paved width (ft)		12	12	-
Right turn lane (ft)		12	10	-
Climbing Lane (ft)		12	12	-
Left turn lane (ft)		12	10	-
Pavement cross-slope (on tangent sections)	Through lanes	2%	1.5% minimum, 2% maximum	-
	Auxiliary and turn lanes	3%	3% maximum	-
	Crown break at centerline	4%	4% maximum	-
Shoulder cross-slope (on tangent sections)		4%	Shoulder cross-slope cannot be less than the adjacent lane, 6% max for paved or granular shoulders, 8% max for earth shoulders	4%
Curb type (Refer to Section 3C-2)	Design speed = 50 or 55 mph	6-inch sloped	6-inch standard	-
	Design speed ≥ 60 mph	4-inch sloped	6-inch sloped	-
Foreslope (For fill areas greater than 40 ft, contact the Soils Design Section for assistance)	Adjacent to shoulder	10:1 for 4' then 6:1	3:1	4:1
	Beyond standard ditch depth and design clear zone	3.5:1	3:1	3.5:1
	Curbed roadways	2%	not steeper than 3:1	-
Backslope (For cut areas greater than 25 feet, contact the Soils Design Section for assistance with backslope benches.)		3:1	2.5:1	3:1
Transverse Slopes	w/ drainage structures	8:1	6:1	-
	w/o drainage structures	10:1	6:1	-
Ditches (Refer to Section 3G-1)	Outside ditch (depth x width) (ft)	5 x 10	--	-
Bridge width—new*	Bridge length ≤ 200 ft	design lane widths + effective shoulder widths	design lane widths + effective shoulder widths	40'
	Bridge length > 200 ft	design lane widths + effective shoulder widths	design lane width + 4' right and left of the design lane widths	-
Bridge width—existing*		design lane widths + no less than 2 ft left and right	design lane widths + 2 ft. offset left and right	30'
Vertical clearance (ft) (above lanes, shoulders and 25 feet left and right of the center of railroad tracks)	Over primary	16.5	16	-
	Over non-primary	16.5 at interchange locations, 15 at all other locations	14	-
	Over railroad	23.3	23.3	-
	Sign trusses and pedestrian bridges	17.5	17	-
Structural Capacity		Contact Office of Bridges and Structures	Contact Office of Bridges and Structures	
Level of Service		B	B	B

*FHWA notification via email is required if acceptable critera is not met on the NHS system (No formal design exeption is required)

Design year ADT = 1300

Design Manual Section 1C-1
Last Updated: 04-29-19

Effective Shoulder Width and Type for Two-Lane Highways

Preferred (values shown in feet)			Acceptable (values shown in feet)			Project Values
	Rural Roadways	Urban Roadways		Rural Roadways	Urban Roadways	
Turn lanes with shoulders	6	6	Turn lanes with shoulders	6	0	-
Turn lanes with curbs	6	See Section 3C-2	Turn lanes with curbs	6	0	-
	Effective Shoulder Width	Paved Width		Effective Shoulder Width	Paved Width	
Climbing Lanes	6	4	Climbing Lanes	4	0	-
Two-Lane Highways	Effective Shoulder Width	Paved Width	Two-Lane Highways	Effective Shoulder Width	Paved Width	
Routes where bicycles are to be accommodated	10	10	Design year ADT > 2000 vpd	8	0*	8
On roadways approaching urban areas (due to increased bike traffic)	10	10				
On all curves with a superelevation rate of 7.0% or greater	10	10				
On roadways with design year ADT > 5000	10	6	Design year ADT between 400 - 2000 vpd	6	0*	
On all other NHS	10	6				
On non-NHS routes with design year ADT > 3000	10	6	Design year ADT < 400 vpd	4	0*	
On non-NHS routes with design year ADT < 3000	8	0*				

*Requires safety edge-Refer to Section 3C-6

Curbs should be located beyond the outer edge of the effective shoulder width in rural areas

Refer to Section 3C-2 for curb offsets in urban areas

Notes:

Roadway Design Speed (mph) =	65

Design Manual Section 1C-1
Last Updated: 04-29-19

Design Criteria for High Speed Roadways

Design Element			Preferred Criteria Design Speed, mph						Acceptable Criteria Design Speed, mph						Project Values
			50	55	60	65	70	75	50	55	60	65	70	75	
Stopping sight distance (ft) (Refer to Section 6D-1)			425	495	570	645	730	820	425	495	570	645	730	820	645
Minimum horizontal curve radius (ft) (Refer to Sections 2A-2 and 2A-3)	Method 5 superelevation and side friction distribution	e_{max} = 6%	833	1060	1330	1660	2040	2500	833	1060	1330	1660	2040	2500	1660
		e_{max} = 8%	--	--	--	--	--	--	758	960	1200	1480	1810	2210	1480
Minimum vertical curve length (ft) (Refer to Section 2B-1)			150	165	180	195	210	225	150	165	180	195	210	225	195
Minimum rate of vertical curvature (K) (Refer to Section 2B-1)	crest vertical curves		84	114	151	193	247	312	84	114	151	193	247	312	193
	sag vertical curves	roadways without fixed source lighting	96	115	136	157	181	206	96	115	136	157	181	206	-
		roadways with fixed-source lighting	96	115	136	157	181	206	54	66	78	91	106	121	-
Minimum gradient (%)	(Refer to Section 2B-1)		0.5						0.3% with a curb, 0.0% without a curb						0.5
Maximum gradient (%) (Refer to Section 2B-1)		Urban roadways	4		3				7	6	6	--	--	--	3
		Rural roadways							5	5	4	4	4	4	3
		Interstates							5	5	4	4	4	4	3
Clear zone			See "Preferred Clear Zone" table in Section 8A-2						See "Acceptable Clear Zone" table in Section 8A-2						

		FORESLOPES		BACKSLOPES			
design speed	design ADT	6:1 or flatter	Steeper than 6:1, up to and including 4:1	Steeper than 4:1	Steeper than 4:1*	4:1 or flatter, up to 6:1	6:1 or flatter
40 mph or less	ADT < 750	10	10	**	10	10	10
	750 ≤ ADT < 1500	12	14	**	12	12	12
	1500 ≤ ADT < 6000	14	16	**	14	14	14
	ADT ≥ 6000	16	18	**	16	16	16
45 – 50 mph	ADT < 750	12	14	**	10	10	12
	750 ≤ ADT < 1500	16	20	**	12	14	16
	1500 ≤ ADT < 6000	18	26	**	14	16	18
	ADT ≥ 6000	22	28	**	16	20	22
55 mph	ADT < 750	14	18	**	10	12	12
	750 ≤ ADT < 1500	18	24	**	12	16	18
	1500 ≤ ADT < 6000	22	30	**	16	18	22
	ADT ≥ 6000	24	32	**	18	22	24
60 mph	ADT < 750	18	24	**	12	14	16
	750 ≤ ADT < 1500	24	32	**	14	18	22
	1500 ≤ ADT < 6000	30	40	**	18	22	26
	ADT ≥ 6000	32	44	**	22	26	28
65 – 70 mph	ADT < 750	20	26	**	12	16	16
	750 ≤ ADT < 1500	26	36	**	16	20	22
	1500 ≤ ADT < 6000	32	42	**	20	24	28
	ADT ≥ 6000	34	46	**	24	30	30

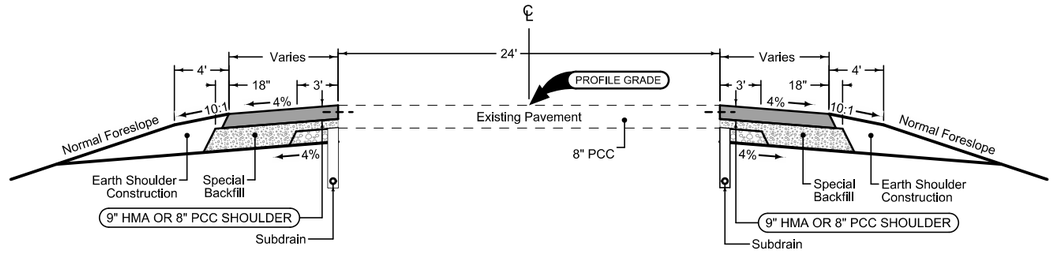
Questions:

1) How are we maintaining access to field entrances?

2) Do we want to do any work to the pavement between the bridges?

3) Will coordination with the railroad be needed?

4) Do we want to replace pavement out to the extent of new guardrail shoulders?



Paved Shoulder at Guardrail

PCC Shoulder Jointing:
Longitudinal joint: BT-1 or BT-5
Transverse joints: C at mainline spacing
HMA Shoulder Jointing:
Longitudinal joint: B

2_P_Guard_ 04-21-20	
STATION TO STATION	
178+58.42	179+42.95

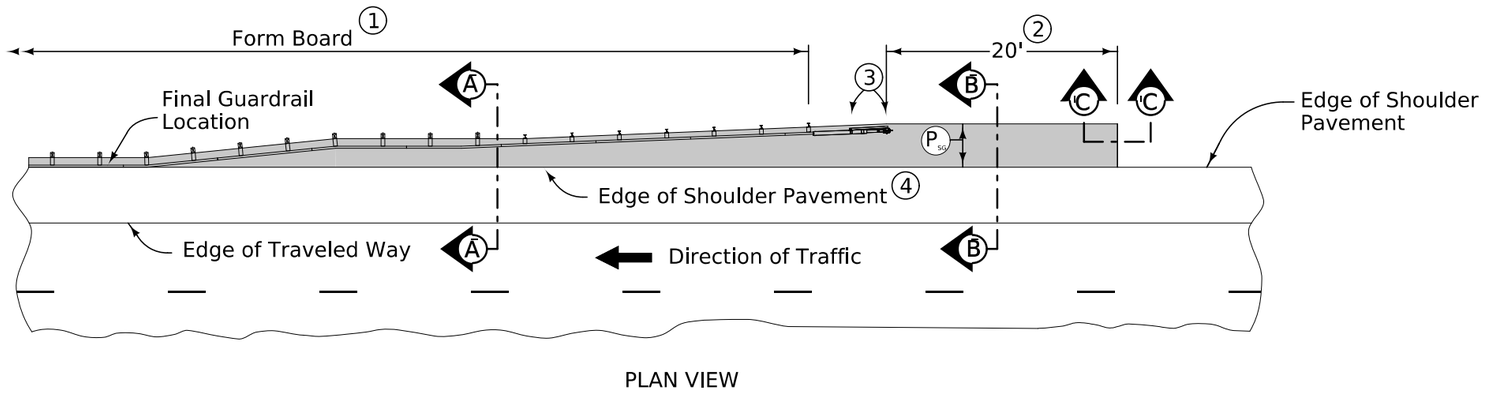
Paved Shoulder at Guardrail

PCC Shoulder Jointing:
Longitudinal joint: BT-1 or BT-5
Transverse joints: C at mainline spacing
HMA Shoulder Jointing:
Longitudinal joint: B

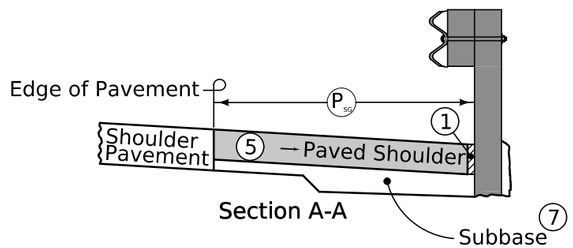
2_P_Guard_ 04-21-20	
STATION TO STATION	
177+89.53	179+42.95
182+27.31	183+05.65

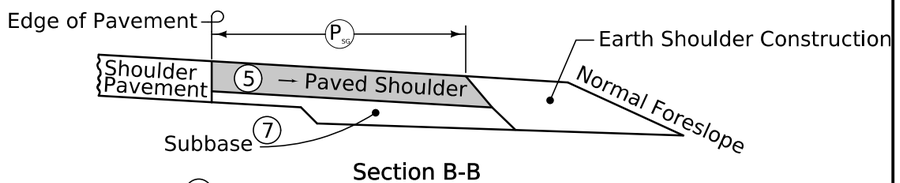
DESIGNER INFORMATION

7158
10-21-25



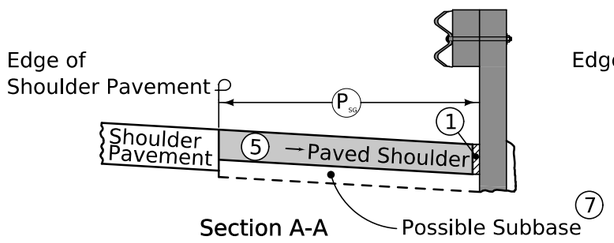
PLAN VIEW

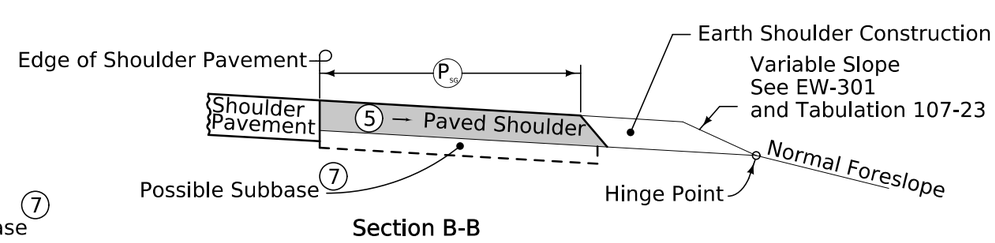




NEW CONSTRUCTION

6





EXISTING SHOULDER

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) 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.

(2) Continue paved shoulder 20 feet beyond the center of the first post.

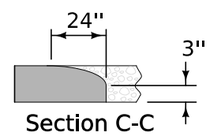
(3) Shoulder may be notched for first 2 posts or post sleeves may be installed through pavement. Do not drive posts through pavement.

(4) 'BT' (per PV-101) joint for PCC shoulder.
'B' (per PV-101) joint for HMA shoulder.

(5) Match shoulder slope.

(6) The Contractor has the option to pave the paved shoulder at guardrail and the full width paved shoulder as one operation.

(7) Refer to other details in the plan.



Roll down at granular shoulder or earth.

PAVED SHOULDER AT GUARDRAIL
(ADJACENT TO FULL WIDTH PAVED SHOULDER)

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
- WH Water Hydrant (Rural)
- ST Septic Tank
- C Cistern
- LP L.P. Gas Tank (No Footing)
- UST Underground Storage Tank
- Latrine
- Satellite TV Dish
- WHU Water Hook Up
- RT Radio Tower
- TA Tower Anchor
- Guardrail (Beam or Cable)
- GP Guard Post (one or two)
- Guard Post (over two)
- FP Filler Pipe
- GV Gas Valve
- WV Water Valve
- SL Speed Limit Sign
- MM Mile Marker Post
- SIGN Sign
- TCB Traffic Signal Control Box
- RRB Rail Road Signal Control Box
- TSB Telephone Switch Box
- EB 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.**		**Transparency**
Pink, Dark	(13)	Temporary Pavement Shading	50%
Yellow	(4)	Proposed Pavement Shading	50%
Orange	(6)	Proposed Granular Shading	50%
Orange	(70)	Proposed Shoulder Granular Shading	50%
Yellow	(68)	Proposed Shoulder Paved Full Depth Shading	50%
Yellow	(132)	Proposed Shoulder Paved Partial Depth Shading	50%
Brown, Light	(236)	Grading Shading	50%
Orange, Light	(134)	Proposed Granular Entrance Shading	50%
Yellow	(220)	Proposed Paved Entrance Shading	50%
Tan	(8)	Proposed Sidewalk Shading	50%
Blue, Light	(230)	Proposed Sidewalk Landing Shading	50%
Pink	(11)	Proposed Sidewalk Ramp Shading	50%
Red	(3)	Proposed Structure Shading	50%
Red	(3)	Delineates Restricted Areas	0%

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

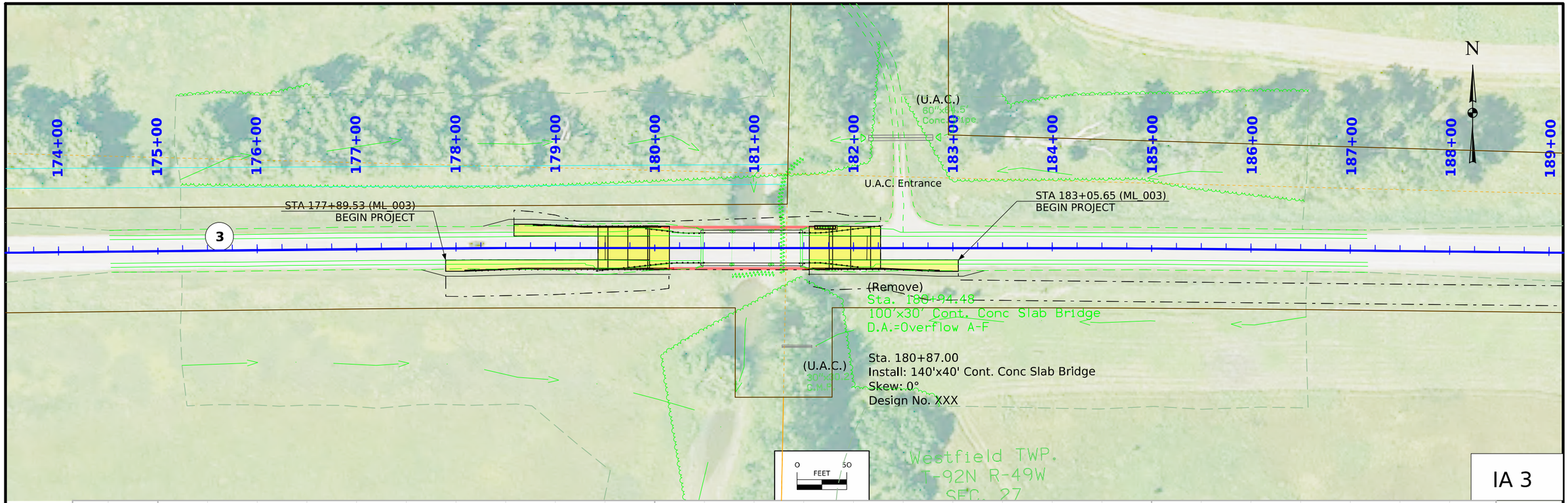
- Proposed Right-of-Way Symbol
- Proposed Right-of-Way Line
- Existing Right of Way
- Existing and Proposed Right-of-Way
- Easement and Existing Right-of-Way
- Easement (Temporary) Symbol
- Easement (Temporary) Line
- Easement
- C/A Access Control
- Property Line Symbol
- Property Line

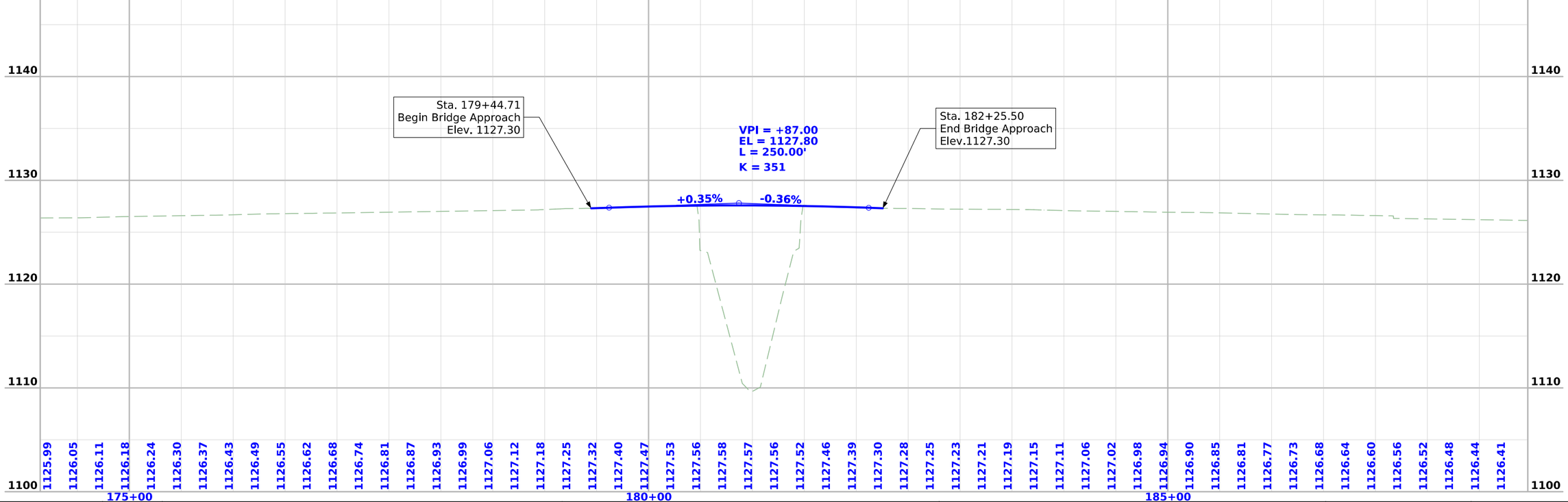
PLAN AND PROFILE LEGEND AND SYMBOL INFORMATION SHEET

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

FILE NO. 98765	ENGLISH	DESIGN TEAM Miller/Krug	PLYMOUTH COUNTY	PROJECT NUMBER BRFN-003-1(116)--39-75	SHEET NUMBER D.1	

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FILE NO. 98765	ENGLISH	DESIGN TEAM Miller/Krug	PLYMOUTH COUNTY	PROJECT NUMBER BRFN-003-1(116)--39-75	SHEET NUMBER D.2

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SURVEY INDEX

County: Plymouth
PIN: 24-75-003-030
Project Number: BRFN-003-1(116)--39-75
Location: Big Sioux Overflow 1.0 mi W of IA 12
Type of Work: Bridge Unspecified
Project Directory: 7500303024

Survey Personnel

Clayton Henningsen – Survey Party Chief
Jason Arn – Survey Party Chief

Date(s) of Survey

Begin Date	08/20/2025
End Date	03/03/2026

General Information

This survey is for IA Hwy 3 Big Sioux River overflow bridge repair at location 1.0 mi W of IA Hwy 12. This survey request was for the US Hwy 34 corridor only. This project is a Full Field DTM survey.

Utility Information

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

Project Control

Coordinates were determined for primary project control points by conducting concurrent six-hour static observations. Post processing is constrained to nearby Iowa Real Time Network reference stations. For additional details of the control survey, contact the Preliminary Survey department.

PROJECT DATUM: NAD83(2011) for EPOCH 2010.00 (IaRTN 2019 ADJUSTMENT)
COORDINATE SYSTEM: IOWA REGIONAL COORDINATE SYSTEM ZONE 04 (U.S. SURVEY FOOT)
VERTICAL DATUM: NAVD88
GEOID MODEL: 2018u2

Alignment Information

The horizontal alignment for IA Hwy 3 this survey is a retrace of PCC Paving Plans No. F-1010(3) 1963. Survey stationing was equated to the plan PI at Sta. 1780+00.00 and carried back and ahead with/without equation throughout the survey.

Survey stationing relates to as built plan stationing as follows:

PI Sta. 1780+00.00 PCC Paving Plans No. F-1010(3) 1963
Survey PI Sta. 1780+00.00

PI Sta. 185+05.63 PCC Paving Plans No. F-1010(3) 1963
Survey PI Sta. 185+00.81

POT Sta. 226+63.03 PCC Paving Plans No. F-1010(3) 1963
Survey POT Sta. 226+57.98

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) for EPOCH 2010.00 (IaRTN 2019 Adjustment) - Iowa RCS Zone 04 (U.S. Survey Foot)

VERT. DATUM: NAVD88 - Geoid Model: 2018u2

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

Point Name	Northing	Easting	Elevation	Feature Definition-Description
50 426	8688338.01	14014750.69	1119.88	CP SOUTH DAKOTA MONUMENT AS DESCRIBED IN GOOD CONDITION
75003001	8688193.72	14022384.74	1119.63	CP FD REBAR IN SOUTH ROW LINE IA HWY 3
CP1	8688310.86	14018647.92	1117.33	CP FD T POST IN SOUTH DITCH IA HWY 3
X 145	8681500.06	14022430.18	1121.13	CP NGS MONUMENT AS DESCRIBED IN GOOD CONDITION
Z 145	8690697.64	14025253.99	1131.93	CP NGS MONUMENT AS DESCRIBED IN GOOD CONDITION

108_23A

8/15/22

TRAFFIC CONTROL PLAN

Traffic on IA 3 will be maintained at all times via an off-site detour.
Refer to Sheet J.2 for detour route.

8/13/2026 11:45:19 AM bobbi.krug@iowadot.us

111_01
10/14/22

COORDINATED OPERATIONS

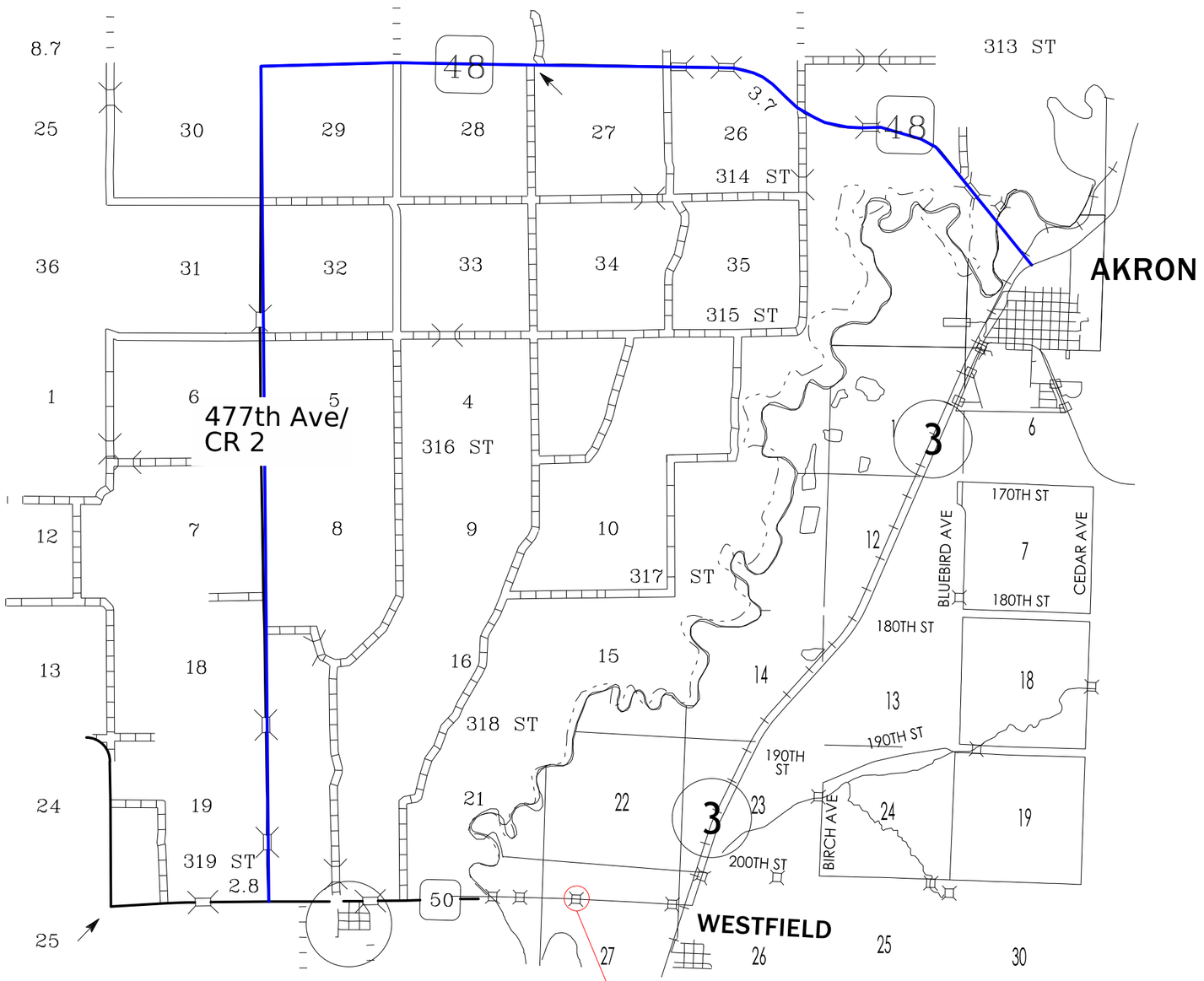
Other work in progress during the same period of time will include the construction of the projects listed. Coordinate operations with those of other contractors working within the same area.

Project	Type of Work
BRF-003-1(121)--38-75	Bridge Replacement
BRF-003-1(123)--38-75	Bridge Replacement

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Detour Route

Plymouth County, IA
Union County, SD

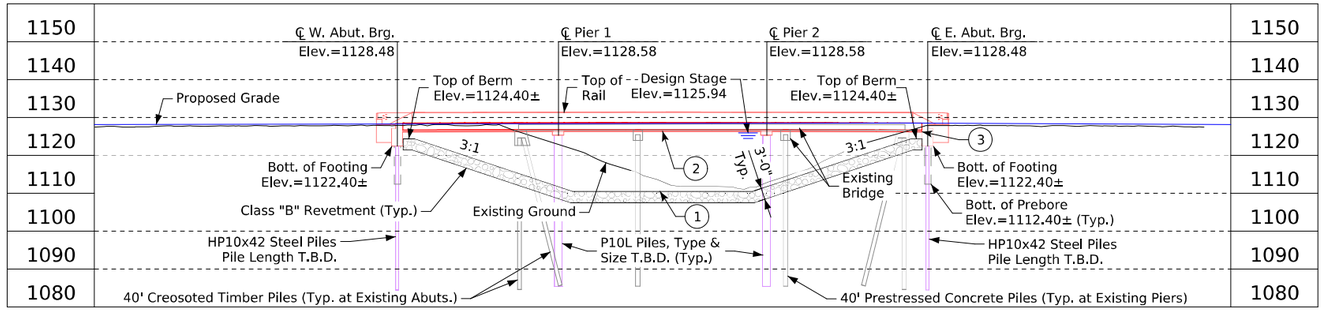


FILE NO. 98765	ENGLISH	DESIGN TEAM Miller/Krug	PLYMOUTH COUNTY	PROJECT NUMBER BRFN-003-1(116)--39-75	SHEET NUMBER J.3

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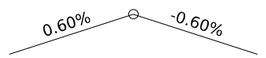
Control Point:

1. Bottom of Streambed
   Elev. = 1110.50
2. Channel Low Slab
   Elev. = See Hydraulic Data
3. Operational Low Slab
   Elev. = See Hydraulic Data



Location

IA 3 over Big Sioux
River Overflow
T-92N R-49W
Section 27
Westfield Township
Plymouth County
FHWA No. 39670 (Existing)
Bridge Maint. No. 7500.6SO03
Latitude 42.761828°
Longitude -96.620562°



VPI Sta. = 180+87.00 VC = 250'
VPI Elev. = 1129.00

Proposed Profile Grade ℄ IA 3

General Notes:

This design is for the replacement of the existing 100' x 30' Continuous Concrete Slab Bridge, Plymouth County, Design 260, Maint. No. 7500.6SO03.

The existing contours shown are from LIDAR. The alignment shown is based on the existing bridge plans (Design No. 260).

Plan Notes:

Top of bridge slab at ℄ roadway is 0.03' below the P.G.L. to account for deck cross slope and parabolic crown.

Class "B" revetment stone is embedded.

The bridge will be designed to withstand the applicable effects of ice and the horizontal stream loads and uplift forces associated with the Q_{100} flood.

Design Notes:

TL-4 Single Slope Bridge Railing Proposed.

Standard CCS Bridge Proposed (J40-25).

Pier Type - Pile Bent Pier with Fully Encased Piles (P10L Standard). Assumed pier width = 24".

Abutment Type - Integral.

There is a potential for conflicts between the existing timber piles at the West Abutment and new piles at the proposed Pier 1 below Elevation 1094.

An Iowa DNR Flood Plain Permit is required. Preliminary Design will submit the application and place the permit in the PW Regulatory_Permits subdirectory folder upon receipt.

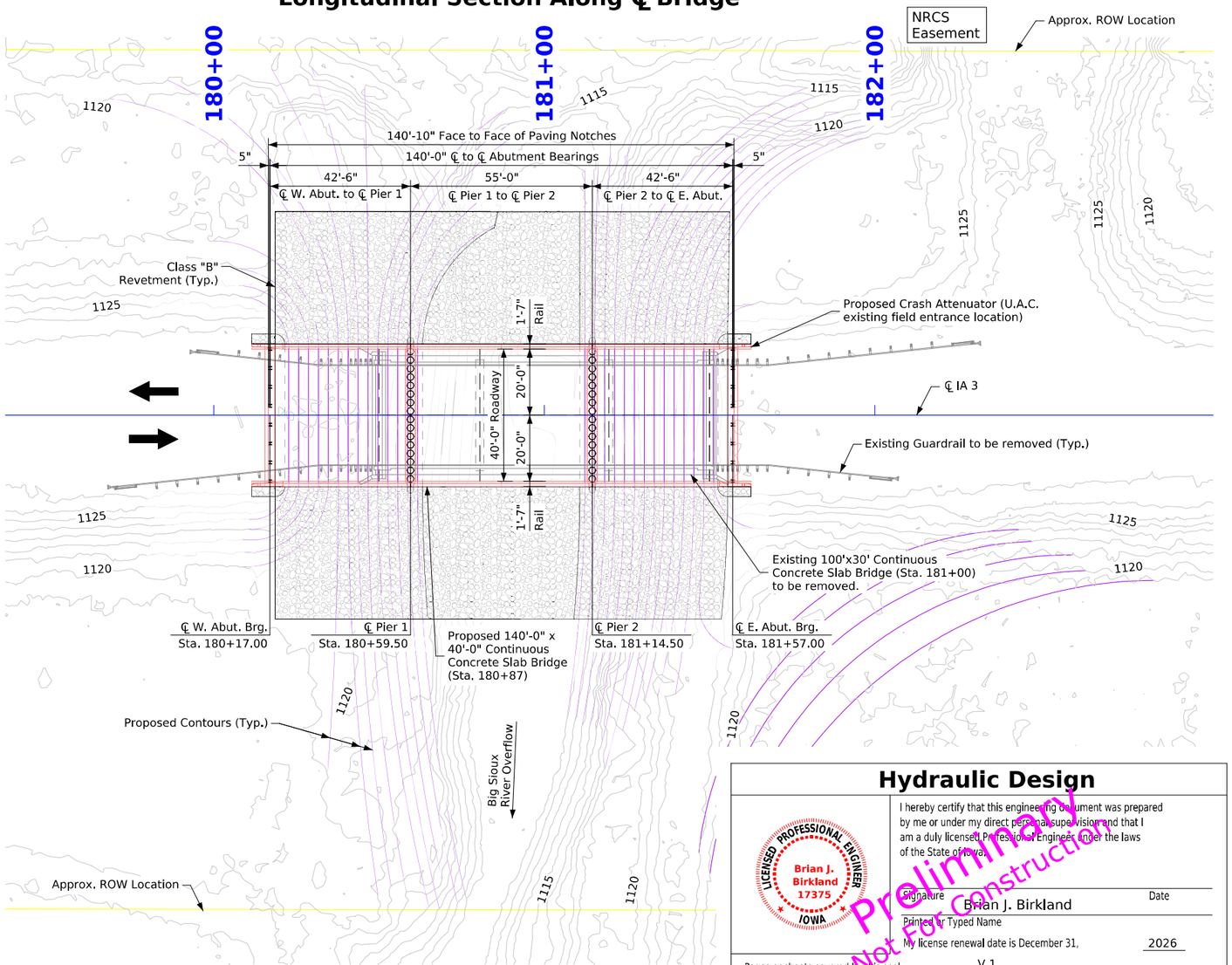
The bridge does not meet Iowa DOT's desired operational and channel freeboard per BDM 3.2.2.4 because the structure is an overflow. Final design aspects in the BDM related to inundation required.

No wing dikes proposed due to NRCS easement on north side.

N

whks
engineers + planners + land surveyors

Longitudinal Section Along ℄ Bridge



0 20
Scale In Feet

Situation Plan

Hydraulic Data

RIDB: BIGSIOUXR_39.23
Overflow Bridge 1.0 mi. West of IA 12
Drainage Area = 7950 Sq. Mi.
Site Stream (HGL) Slope = 0.042% (2.2 ft./Mi.)
Discharges from 2022 FEMA Flood Insurance Study Model (Rounded), based on USGS gage data at Akron, IA, shared by Big Sioux River Bridge and 2nd overflow bridge.
Discharges shown represent bridge opening flow.
Discharges in parenthesis represent total river flow.

Operational Low Slab = 1126.20
Channel Low Slab = 1126.32
Avg. Low Water Stage = 1111.5
Extreme Highwater Stage = 1128.70 (>500-yr-6-23-2024)
Roadway Overtopping El. = 1125.6
~2100 ft. east of bridge
Sta. 202+00 (~19-yr event from upstream levee-breaching headwater effects)

Q_{25} = 6,740 cfs (55,500 cfs)
(Downstream) Stage = 1123.92
Backwater = 1.34 ft.
Avg. Bridge Velocity = 4.8 fps
Operational Freeboard = 2.28 ft
Scour = TBD

Q_{50} = 8,340 cfs (72,000 cfs)
Stage = 1125.08
Backwater = 1.14 ft.
Avg. Bridge Velocity = 5.5 fps
Operational Freeboard = 1.12 ft.
Scour = TBD

Q_{100} (Design) = 9,170 cfs (90,600 cfs)
Stage = 1125.94
Backwater = 0.97 ft.
Avg. Bridge Velocity = 5.8 fps
Operational Freeboard = 0.26 ft.
Scour = TBD

Q_{500} = 9,140 cfs (141,600 cfs)
Stage = 1127.61
Backwater = 0.47 ft.
Avg. Bridge Velocity = 5.7 fps
Scour = TBD

Design Data Rural

2024 AADT	1,200 V.P.D.
TRUCKS	35 %

Hydraulic Design

LICENSED PROFESSIONAL ENGINEER
Brian J. Birkland
17375
IOWA

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 Date
Brian J. Birkland
Printed or Typed Name
My license renewal date is December 31, 2026
Pages or sheets covered by this seal: V.1

Preliminary
not for construction

Preliminary

Design For 0° Degree Skew

140'-0" x 40'-0" Continuous Concrete Slab Bridge

42'-6" End Spans 55'-0" Interior Span

Situation Plan

STA. 180+87.00 (IA 3) Turn-in Date: January 2026

Plymouth County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. XXX Design Sheet No. 1 of 1 FHWA No. 39670

FILE NO. XXXXX	ENGLISH	DESIGN TEAM BJB\RCM\JJO	PLYMOUTH COUNTY	PROJECT NUMBER BRFN-003-1(116)--39-75	SHEET NUMBER V.1

3:38:21 PM 1/16/2026 CalvinMartin pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\7500303024\Bridge\(116)_Bridge-Unspecified\SHT_75003116_WHKS_DSN#_39670_Z04

CROSS SECTION VIEW COLOR LEGEND

Design Color No.	Feature
Aggregate	
(64)	Choke Stone
(42)	Engineering Fabric
(8)	Flooded Backfill
(92)	Macadam Stone
(20)	Modified
(12)	Plowing Shaping
(14)	Porous Backfill
(8)	Revetment Class A
(6)	Revetment Class B
(62)	Revetment Class C
(188)	Revetment Class D
(28)	Revetment Class E
(12)	Shoulder Special Backfill
(12)	Special Backfill
(20)	Subbase
(20)	Subbase Lower
(20)	Subbase Upper
(118)	Subgrade Treatment
Asphalt	
(207)	HMA Base Course
(207)	HMA Interim Course
(207)	HMA Surface Course
Bridge	
(0)	Bridge
Concrete	
(0)	Barrier Concrete
(0)	Barrier Concrete Footing
(0)	Curb Gutter
(48)	Flowable Mortar
(0)	Median Concrete
(0)	PCC Pavement
(0)	Sidewalk
Existing	
(0)	Existing Pavement
Shoulder	
(209)	Shoulder HMA
(0)	Shoulder PCC
(6)	Shoulder Granular
Structural	
(112)	Noise Wall
(112)	Noise Wall Footing
(112)	Retaining Wall Back
(112)	Retaining Wall Back Excavate
(112)	Retaining Wall Face
(112)	Retaining Wall Front Excavate
(112)	Retaining Wall Front Footing
(112)	Retaining Wall MSE Gutter
(112)	Retaining Wall Reinforced Earth

Design Color No.	Feature
Grading	
(8)	Behind Curb Cut
(6)	Granular
(13)	Granular Back Fill
(48)	Rock Undercut
(8)	Shoulder Earth Fill
(2)	Side Slopes
(226)	Side Slopes Dressing
Substrata	
(128)	Boulder
(209)	Boulder Removed
(48)	Broken Weathered
(210)	Broken Weathered Removed
(3)	Core Out
(115)	Core Out Remove Only
(195)	Core Out Remove and Replace
(203)	Existing Pavement
(184)	Existing Pavement Remove Only
(200)	Existing Pavement Remove and Replace
(6)	Loam
(211)	Loam Removed
(80)	Rock
(212)	Rock Removed
(4)	Select Sand
(214)	Select Sand Removed
(3)	Shale
(215)	Shale Removed
(10)	Topsoil
(2)	Topsoil Remove Only
(4)	Topsoil Remove and Replace
Unsuitable / Waste	
(3)	Unsuitable Type A
(216)	Unsuitable Type A Removed
(13)	Unsuitable Type B
(217)	Unsuitable Type B Removed
(11)	Unsuitable Type C
(218)	Unsuitable Type C Removed
(3)	Waste
(219)	Waste Removed

NOTES:

Text

NOTES:

Text

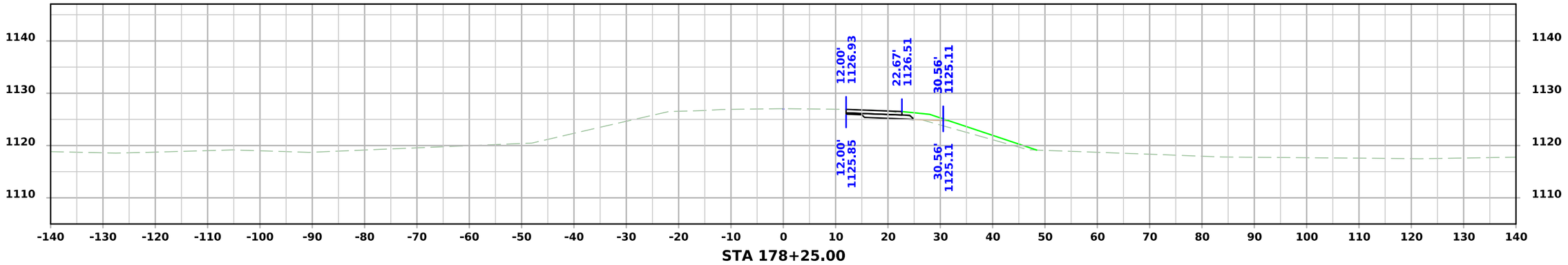
CROSS SECTIONS
LEGEND AND INFORMATION SHEET

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

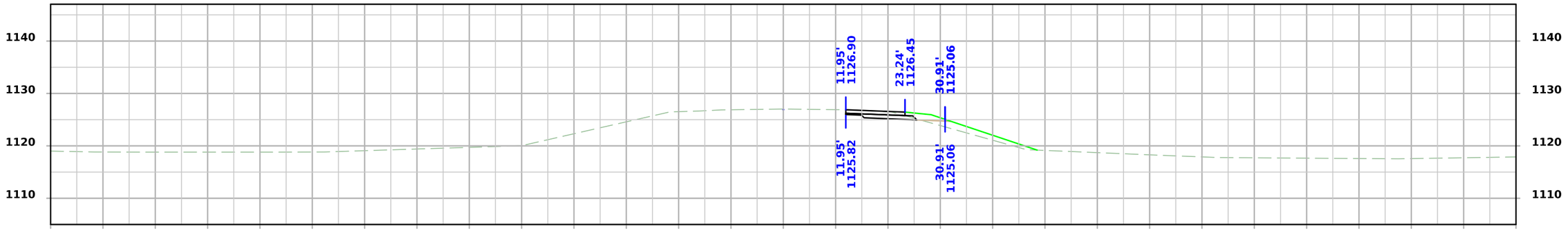
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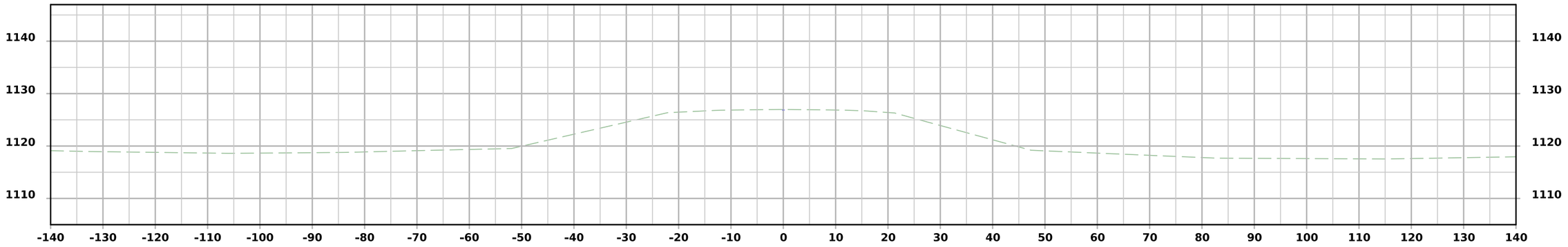
ML - IA 3



STA 178+25.00



STA 178+00.00

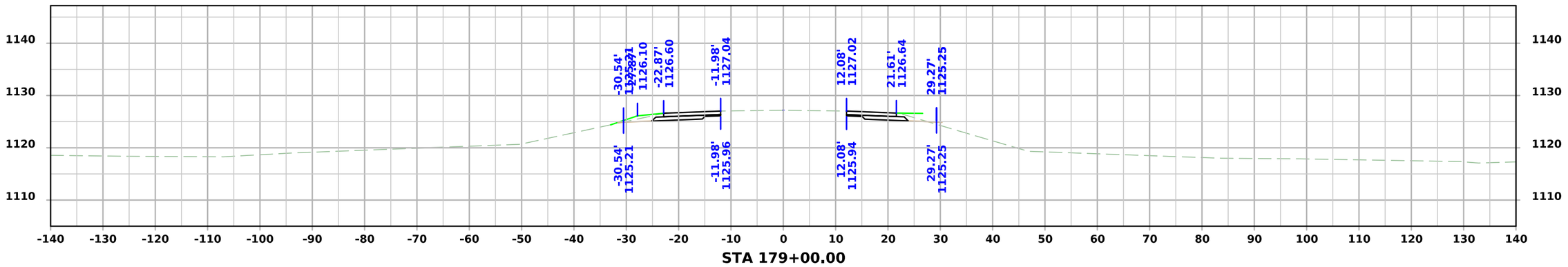


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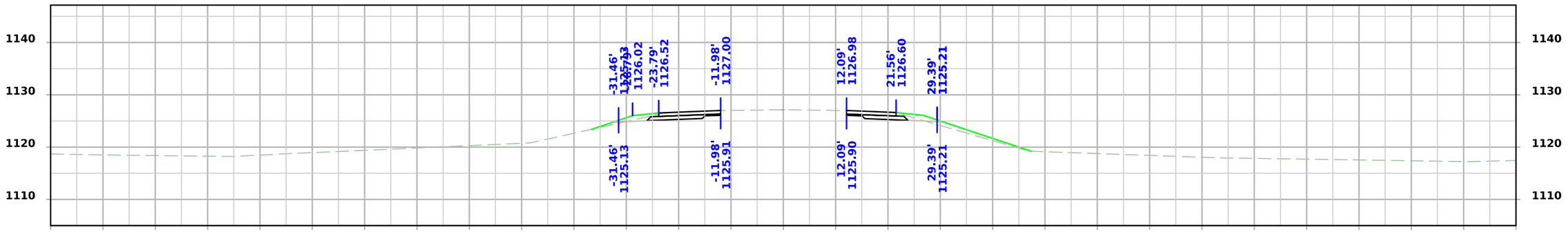
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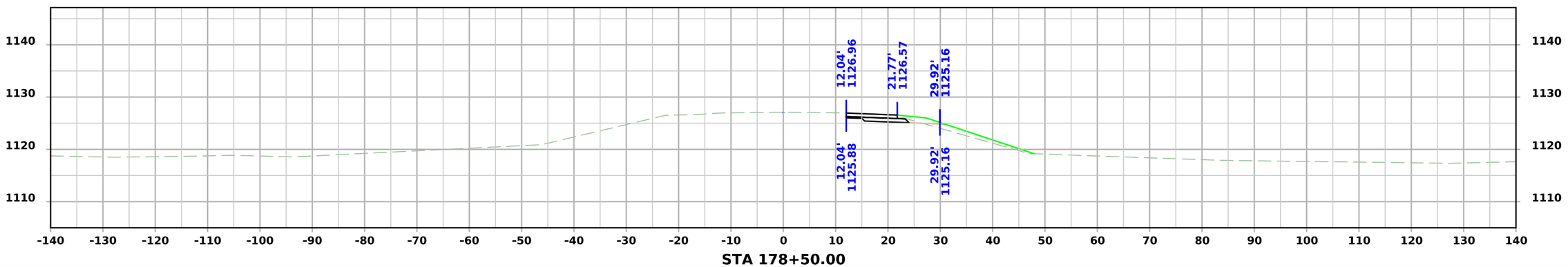
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STA 179+00.00



STA 178+75.00

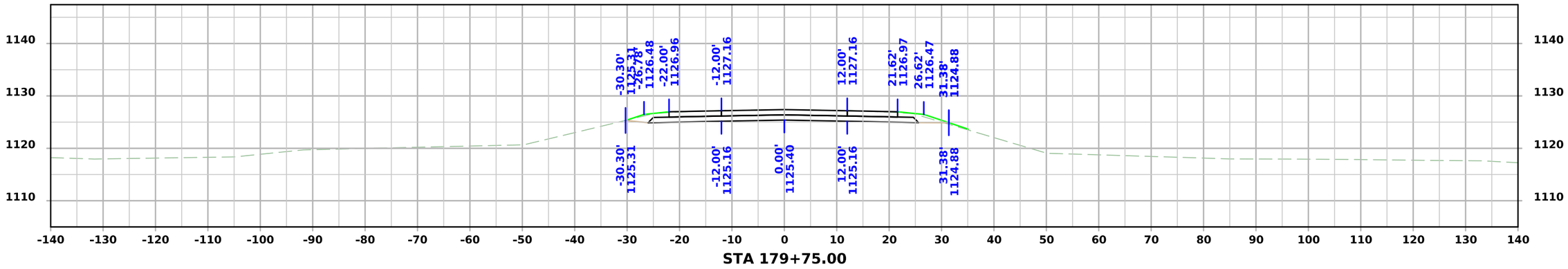


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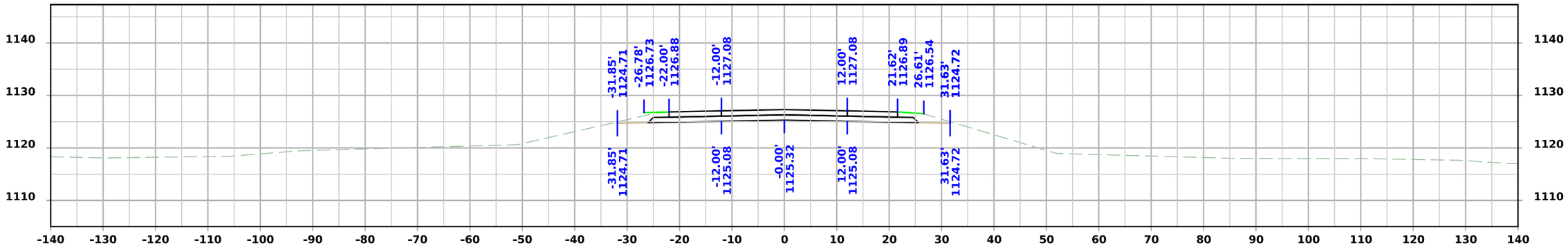
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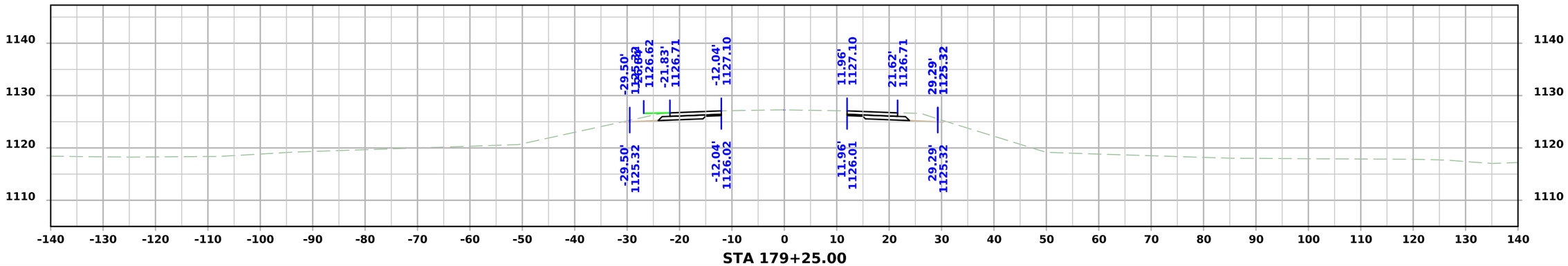
ML - IA 3



STA 179+75.00



STA 179+50.00

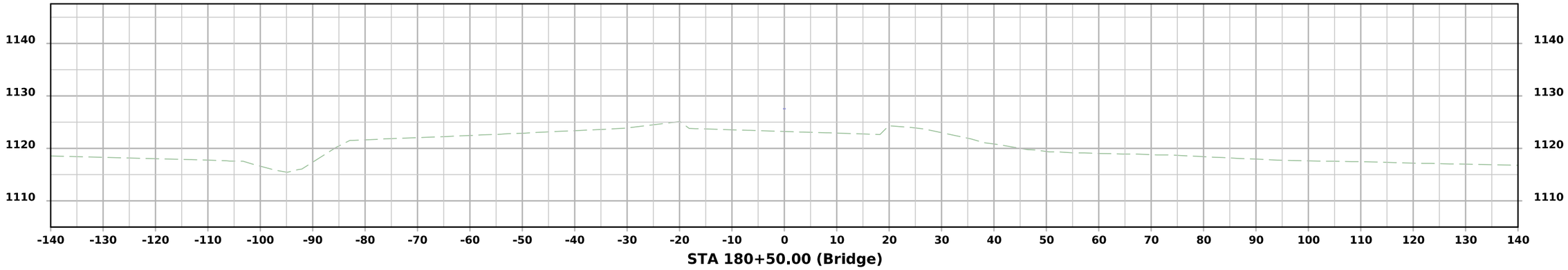


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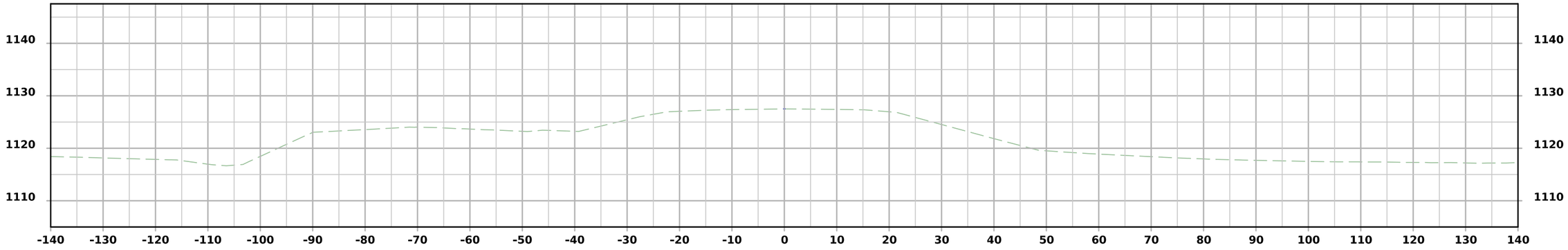
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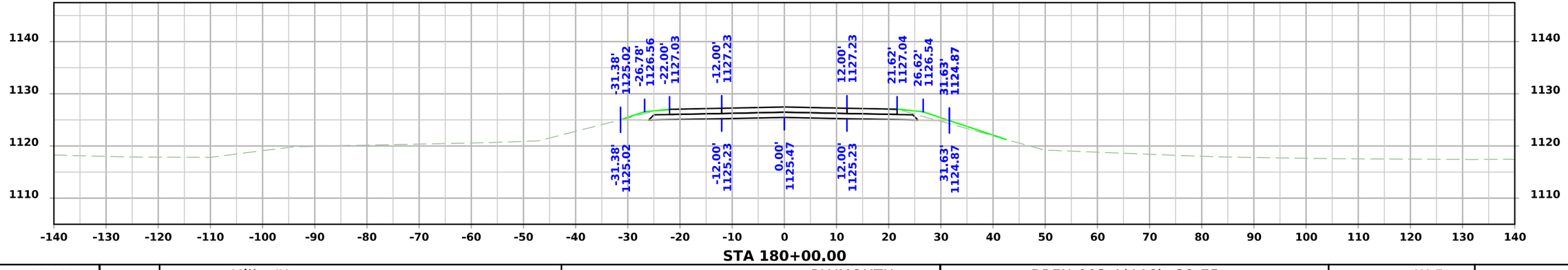
ML - IA 3



STA 180+50.00 (Bridge)



STA 180+25.00 (Bridge)

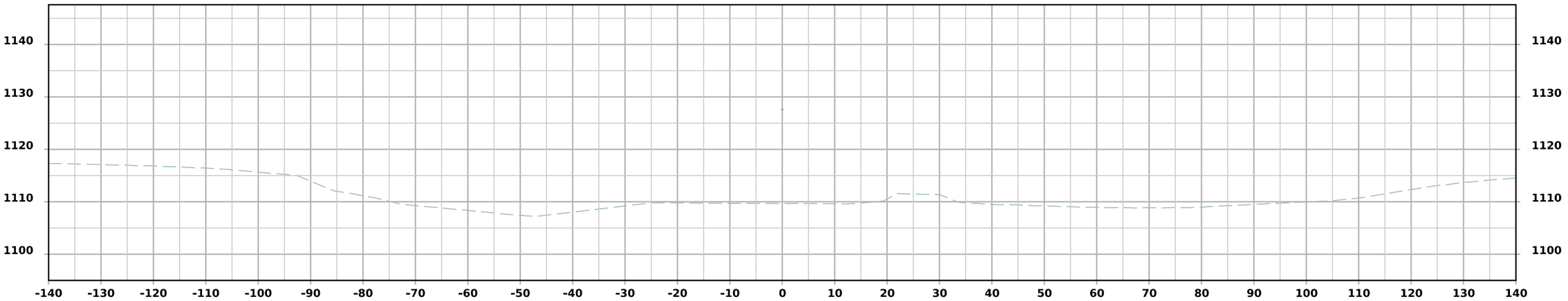


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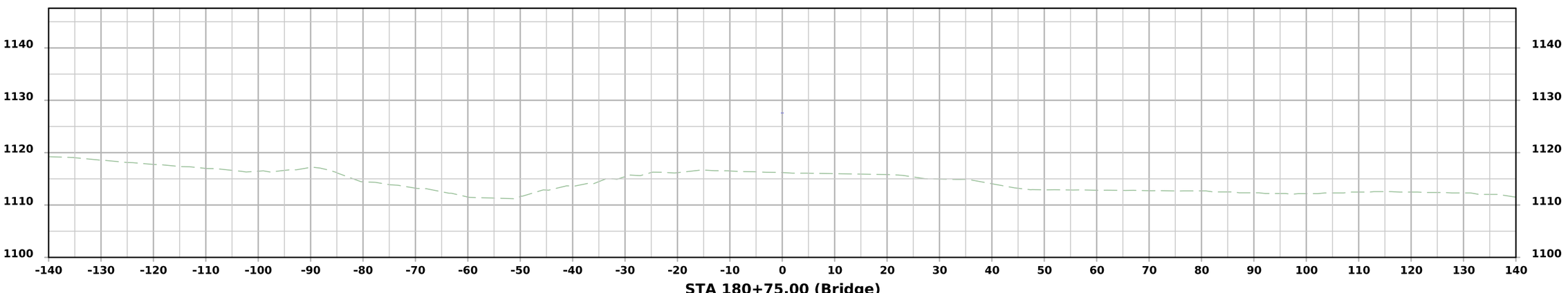
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ML - IA 3



STA 181+00.00 (Bridge)

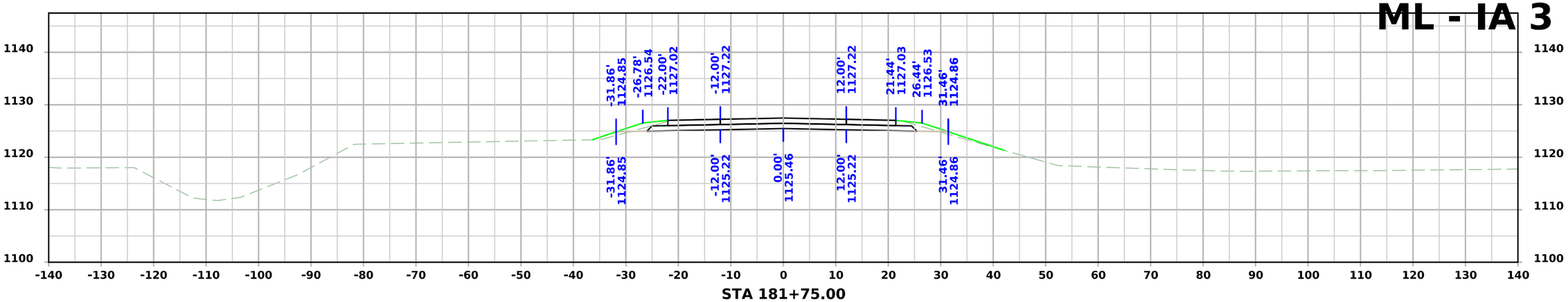


STA 180+75.00 (Bridge)

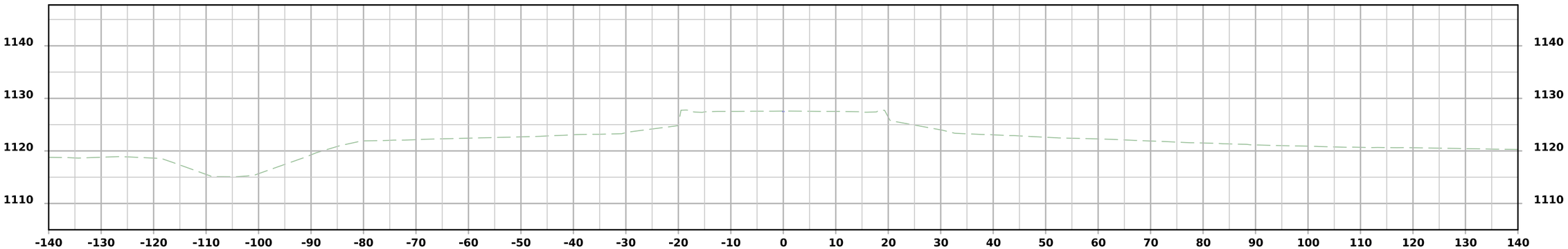
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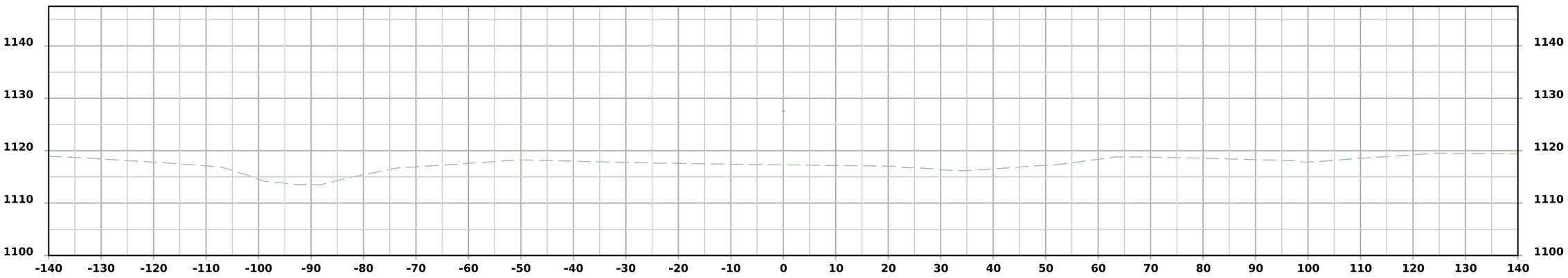
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STA 181+75.00



STA 181+50.00 (Bridge)

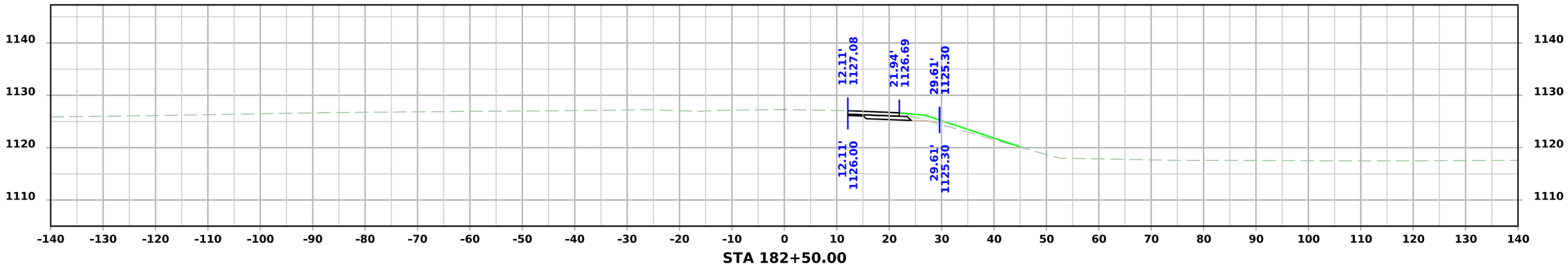


STA 181+25.00 (Bridge)

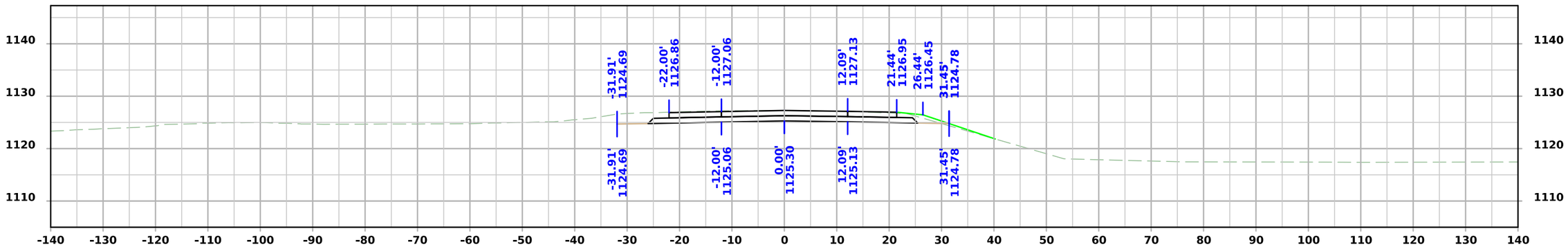
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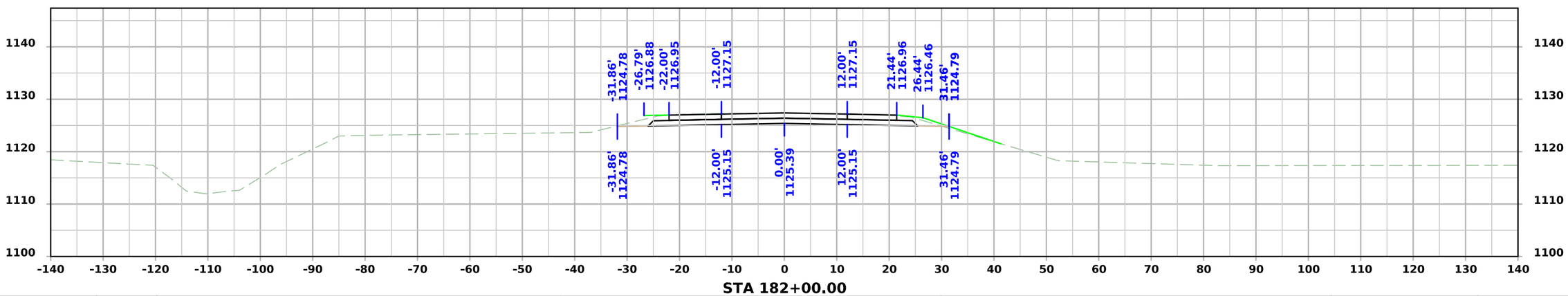
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STA 182+50.00



STA 182+25.00

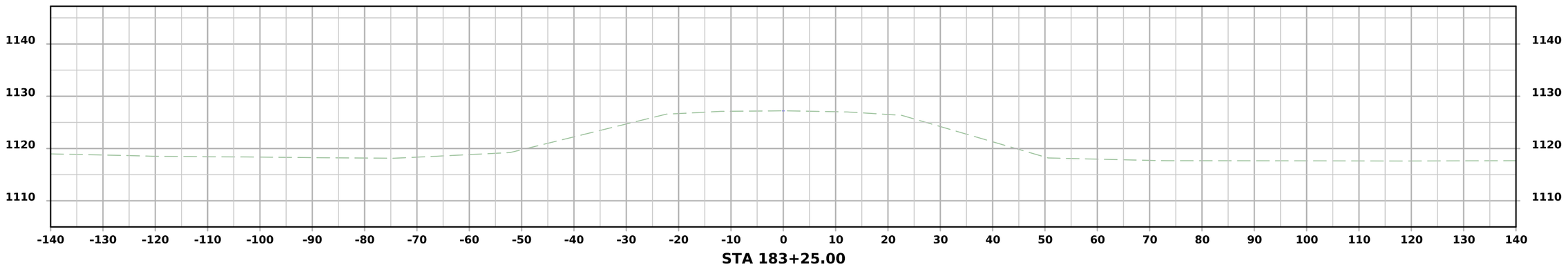


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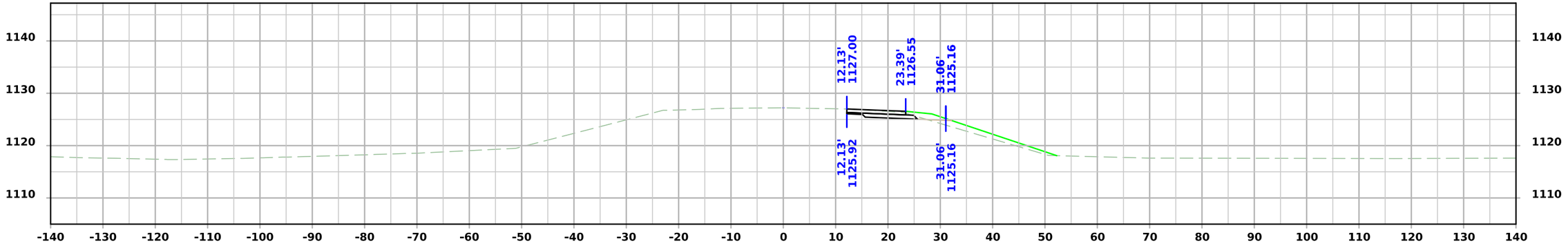
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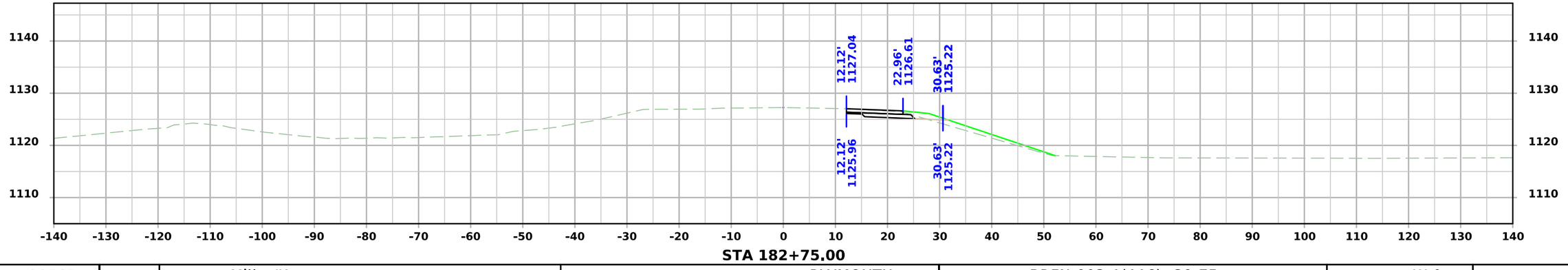
ML - IA 3



STA 183+25.00



STA 183+00.00



STA 182+75.00

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