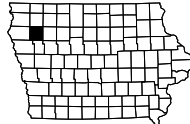


CHEROKEE COUNTY

BRIDGE REPLACEMENT
BRFN-031-3(016)--39-18

LETTING DATE
11/21/2028



DESIGN DATA RURAL				
20 23	AADT	1,370	V.P.D.	
20 29	AADT	1,543	V.P.D.	
20 29	DHV	-	V.P.H.	
TRUCKS		13.0	%	
Total				
Design ESALs		600,000		

INDEX OF SHEETS		105-3 10-18-05
No.	Description	
A Sheets	Title Sheets	
A.1	Title Sheet	
A.2	Project Location	
A.3-A.5	IA 31 Design Criteria	
A.6	Clear Zone Criteria	
A.7-A.17	Concept Report	
A.18	Field Exam Cost Estimate	
A.19	Field Exam Questions	
B Sheets	Typical Sections and Details	
B.1	Typical Sections and Details	
D Sheets	Plan and Profile Sheets	
D.1	Legend	
D.2-D.3	IA 31 Plan and Profile	
G Sheets	Survey Sheets	
G.1-G.3	Bench Mark and Reference Information Sheets	
G.4-G.5	Alignments	
J Sheets	Traffic Control and Staging Sheets	
J.1	Traffic Control Tabulations	
J.2	Detour Plan	
V Sheets	Bridge Plans	
V.1-V.2	TS&L	
W Sheets	Cross Sections	
W.1-W.4	Cross Section Sheets - IA 31	



PLANS OF PROPOSED IMPROVEMENT ON THE
PRIMARY ROAD SYSTEM
CHEROKEE COUNTY
BRIDGE REPLACEMENT

IA 31 OVER STRATTON CREEK, 0.1 MI N OF CO RD C66

SCALES: As Noted

- Refer to the Proposal Form for list of applicable specifications.
- Value Engineering Saves. Refer to Article 1105.14 of the Specifications.



NOTE: THIS PROJECT IS ANTICIPATED TO PRODUCE A SURPLUS OF 680 CUBIC YARDS OF EARTH.

INDEX OF SEALS			
SHEET NO.	NAME	TYPE	BID QUANTITY SHEETS

PRELIMINARY PLANS

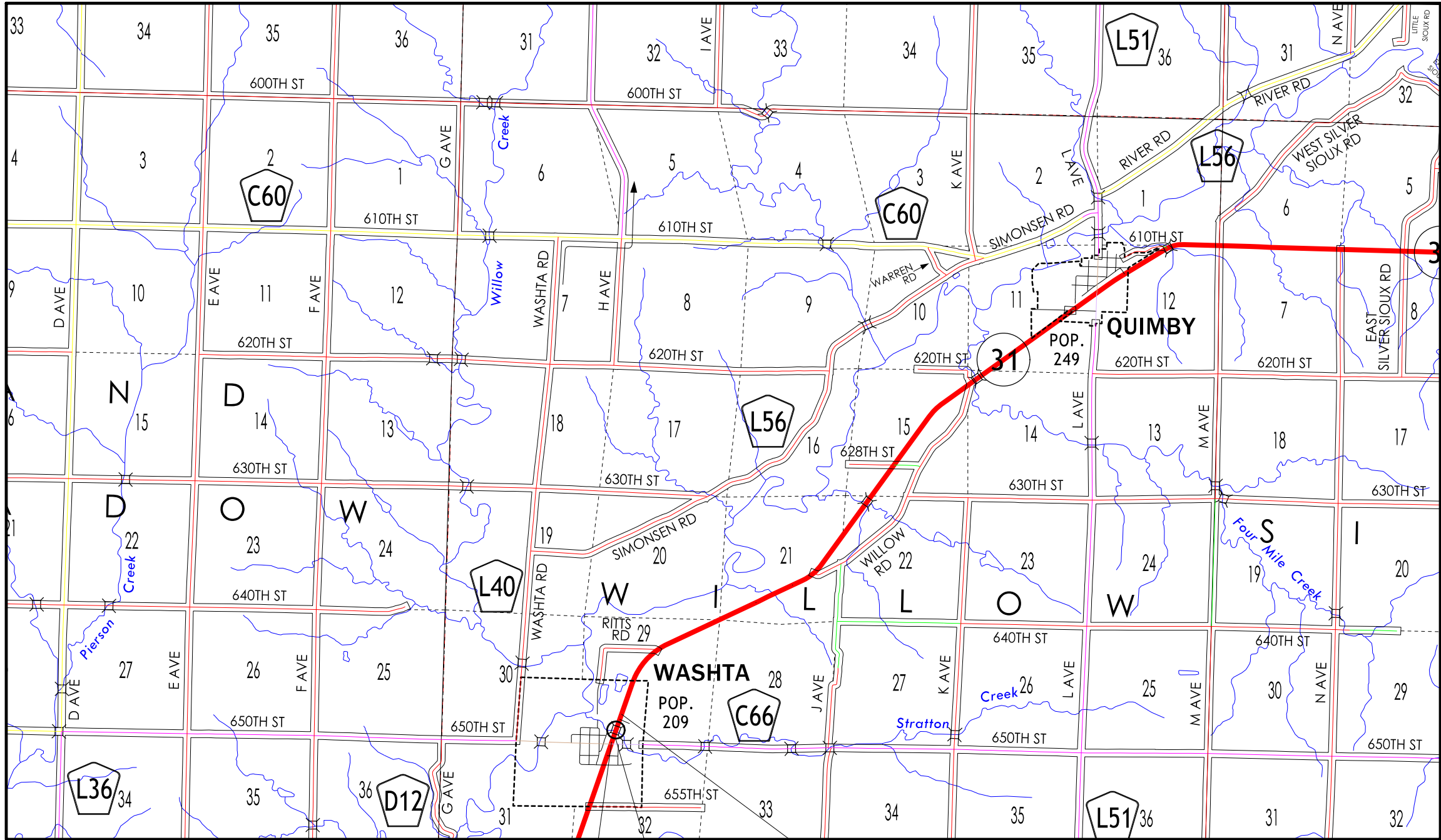
Subject to change by final design.

D2 PLAN - Date: 08-29-2025

REVISIONS

TOTAL
..
PROJECT IDENTIFICATION NUMBER
24-18-031-010
PROJECT NUMBER
BRFN-031-3(016)--39-18
R.O.W. PROJECT NUMBER

CHEROKEE COUNTY



IA 31 over Stratton Creek
0.1 mil N of Co Rd C66
BRFN-031-3(016)--39-18
PIN 24-18-031-010

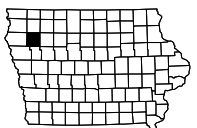
STA 1+97.34
BEGIN PROJECT

STA 3+94.50
FHWA No. 019490
Maint. No. 1829.1S031
PIN 24-18-031-010

STA 5+91.65
END PROJECT



PROJECT LOCATION



Design year ADT = 2,293						
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	N/A
Turn lanes with curbs	6	See Section 3C-2	Turn lanes with curbs	6	0	N/A
	Effective Shoulder Width	Paved Width		Effective Shoulder Width	Paved Width	
Climbing Lanes	6	4	Climbing Lanes	4	0	N/A
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' paved
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:

[illegible]

IA 31 DESIGN CRITERIA

Roadway Design Speed (mph) =			50												
Design Criteria for High Speed Roadways															
Design Element			Preferred Criteria						Acceptable Criteria						Project Values
			Design Speed, mph						Design Speed, mph						
			50	55	60	65	70	75	50	55	60	65	70	75	
Stopping sight distance (ft) (Refer to Section6D-1)			425	495	570	645	730	820	425	495	570	645	730	820	425
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	N/A
		e _{max} = 8%	--	--	--	--	--	--	758	960	1200	1480	1810	2210	N/A
Minimum vertical curve length (ft) (Refer to Section2B-1)			150	165	180	195	210	225	150	165	180	195	210	225	203.13'
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	N/A
	sag vertical curves	roadways without fixed-source lighting	96	115	136	157	181	206	96	115	136	157	181	206	96
		roadways with fixed-source lighting	96	115	136	157	181	206	54	66	78	91	106	121	N/A
Minimum gradient (%)	(Refer to Section 2B-1)		0.5						0.3% with a curb, 0.0% without a curb						0.99%
Maximum gradient (%)	(Refer to Section 2B-1)	Urban roadways	4	3				7	6	6	--	--	--	1.13%	
		Rural roadways						5	5	4	4	4	4		
		Interstates						5	5	4	4	4	4		
Clear zone			See "Preferred Clear Zone" table in Section8A-2						See "Acceptable Clear Zone" table in Section8A-2						18'

Acceptable Clear Zone Distances (feet)
(Based on AASHTO Roadside Design Guide, 4th edition)

Preferred Clear Zone Distances (feet)
(Based on AASHTO Roadside Design Guide, 4th Edition)

design speed	design ADT	FORESLOPES			BACKSLOPES		
		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	7	7	**	7	7	7
	750 ≤ ADT < 1500	10	12	**	10	10	10
	1500 ≤ ADT < 6000	12	14	**	12	12	12
	ADT ≥ 6000	14	16	**	14	14	14
45 – 50 mph	ADT < 750	10	12	**	8	8	10
	750 ≤ ADT < 1500	14	16	**	10	12	14
	1500 ≤ ADT < 6000	16	20	**	12	14	16
	ADT ≥ 6000	20	24	**	14	18	20
55 mph	ADT < 750	12	14	**	8	10	10
	750 ≤ ADT < 1500	16	20	**	10	14	16
	1500 ≤ ADT < 6000	20	24	**	14	16	20
	ADT ≥ 6000	22	26	**	16	20	22
60 mph	ADT < 750	16	20	**	10	12	14
	750 ≤ ADT < 1500	20	26	**	12	16	20
	1500 ≤ ADT < 6000	26	30	**	14	18	24
	ADT ≥ 6000	30	30	**	20	24	26
65 – 70 mph	ADT < 750	18	20	**	10	14	14
	750 ≤ ADT < 1500	24	28	**	12	18	20
	1500 ≤ ADT < 6000	28	30	**	16	22	26
	ADT ≥ 6000	30	30	**	22	26	28

* Backslopes as steep as 2.5:1 can be considered as part of the clear zone, as long as they are relatively smooth and do not contain any fixed objects. Refer to Section 8A-4 of the Design Manual for information regarding backslopes steeper than 2.5:1.

** Since a vehicle traveling on a slope steeper than 4:1 is likely to be diverted to the bottom of the slope, the width of any slope steeper than 4:1 cannot be counted in the clear zone determination. Refer to Section 8A-2 of the Design Manual for information on providing clear recovery areas at the base of steep slopes.

design speed	design ADT	FORESLOPES			BACKSLOPES		
		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

* Backslopes as steep as 2.5:1 can be considered as part of the clear zone, as long as they are relatively smooth and do not contain any fixed objects. Refer to Section 8A-4 of the Design Manual for information regarding backslopes steeper than 2.5:1.

** Since a vehicle traveling on a slope steeper than 4:1 is likely to be diverted to the bottom of the slope, the width of any slope steeper than 4:1 cannot be counted in the clear zone determination. Refer to Section 8A-2 of the Design Manual for information on providing clear recovery areas at the base of steep slopes.

IA 31

CLEAR ZONE CRITERIA

Attach.
cc:

TO OFFICE:	District 3	DATE:	February 18, 2025
ATTENTION:	Jessica Felix, PE	PROJECT:	Cherokee County BRFN-031-3(016)--39-18
FROM:	Kevin Placzek (Benesch)		PIN: 24-18-031-010
BUREAU:	Design		
SUBJECT:	Project Concept Statement; (Final Approval, D0)		

This project involves the replacement of the IA 31 bridge (Maint. No. 1829.1S031) over Stratton Creek, 0.1 mi. N of SR C66.

A concept review was held on December 9, 2024. Those present included Shane Tymkowicz, Todd Huju, Dylan Pryor, and Jason Klemme from the District 3 Office; Luka Arroyo from the Project Management Bureau; Jim Ellis, Tom Lovan, Mohamad Dokmak, and Christian Kennel from the Bridges and Structures Bureau; Janee Becker, Chelsea Duncan, and Brock Struecker from the Location and Environment Bureau; Nicole Cuva from the Right-of-way Bureau; and Kevin Patel, John Bartholomew and Jeremy Harris from the Design Bureau and Kevin Placzek, John Gislason, Jack Majcher and Eric Dean from Benesch.

The three alternatives considered were:

1. A continuous concrete slab (CCS) bridge
2. A reinforced concrete box (RCB) culvert.
3. A pretensioned prestressed concrete beam (PPCB) bridge.

Alternative 1 is the preferred alternative due to high flow of the creek preventing the use of a box culvert or a single span pretensioned prestressed concrete beam (PCB). Traffic will be maintained by an off-site detour. The estimated cost of Alternative 1 is **\$1,985,124**.

Recipients of this letter should review the attached Draft Project Concept Statement. It is requested that you submit any comments or concerns to the Design Bureau by Friday, January 27, 2025. After this time period, the Concept will be considered approved or will be revised according to concerns.

B. Hofer
M. A. Swenson
J. S. Nelson
S. P. Anderson
M. Dell
D. T. Ta
D. Blue
S. Majors
R. Meyer
J. Felix
M. Thayer
T. Huju
T. Lovan
D. Pryor
L. Arroyo
M. Dokmak
C. Kennel

J. Becker
C. Duncan
B. Struecker
J. Harris
M. J. Kennerly
K. D. Nicholson
K. Brink
N. Pohlen
C. B. Brakke
D. Stokes
R. Harris
J. E. Bartholomew
S. Cook
J. Ellis
S. Tymkowicz

J. Klemme
W. A. Sorenson
J. E. Laaser-Webb
N. L. Cuva
D. E. Sprengeler
M. Nop
B. Smith
D. Heeren
G. Cagle
B. Hucker
B. Worrel
C. Schwienebart
M. Solberg
C. Cromwell –
FHWA

CONCEPT REPORT

FINAL PROJECT CONCEPT STATEMENT

IA 31 over Stratton Creek, 0.1 mi. N of SR C66

Cherokee County
BRFN-031-3(016)--39-18
PIN: 24-18-031-010
Maint. No. 1829.1S031
FHWA No. 019490

Highway Division
Design Bureau

Benesch
Kevin Placzek, PE, SE
312-565-0450

February 18, 2025

I. STUDY AREA

A. Project Description

This project involves the replacement of the bridge (Maint. No. 1829.1S031) on IA 31 over Stratton Creek, 0.1 mi. N of SR C66.

Three alternatives were considered:

- Alternative 1 – A continuous concrete slab (CCS) bridge.
- Alternative 2 – A twin reinforced concrete box (RCB) culvert.
- Alternative 3 – A pretensioned prestressed concrete beam (PPCB) bridge.

Alternative 1 is the preferred alternative due to the high flow of the creek preventing the use of a box culvert or a single span pretensioned prestressed concrete beam (PPCB) Bridge.

B. Need for Project

The existing structure is a 40' x 30' single span I-beam bridge built in 1922, widened in 1948 and overlayed in 1987. The bridge is over 100 years old and near the end of its useful life. The existing bridge was designed for H-20-44 loading.

C. Present Facility

IA 31 is a two-way, two-lane PCC roadway with PCC and granular shoulders. Near the bridge, there are HMA shoulders out to the guardrail posts. The posted speed limit is 45 mph. Existing roadway plans are not available for this segment of IA 31.

The existing structure is a 40' x 30' single span I-beam bridge built in 1922, widened in 1948 and overlayed in 1987.



With Route



Against Route



Left Profile, Far to Near



Right Profile, Near to Far

D. Traffic Estimates

The 2023 average daily traffic is 1,370 ADT with 13% trucks. Assuming a 2% annual growth rate, the 2029 construction year average daily traffic estimate is 1,543 ADT with 13% trucks and the 2049 construction year average daily traffic estimate is 2,293 ADT with 13% trucks.

E. Sufficiency Ratings

IA 31 is not an NHS route and is a State Highway. The federal bridge sufficiency rating is 66.3.

The Bridge Condition Index is 58.1 and the Bridge Condition Rating is "Fair".

CONCEPT REPORT

F. Access Control

Access rights will not be acquired for this project.

G. Crash History

During the five-year study period from 2019-2024, there were two crashes reported near the bridge. Both crashes resulted in property damage only.

II. PROJECT CONCEPT

A. Feasible Alternatives

Alternative #1

Replace existing bridge with three span 140 ft x 40 ft continuous concrete slab (CCS) bridge.

The typical cross section adjacent to the bridge will consist of a 24 ft. PCC roadway with 8 ft. PCC shoulders to the new guardrail posts and 3:1 fore slopes.

The nearest bridge to the north, IA 31 over Silver Creek, is 28 ft. wide (24 ft. roadway with 2 ft. shoulders.) The nearest bridge to the south, IA 31 over Bitter Creek, is 44 ft. wide (24 ft. roadway with 10 ft. shoulders.)

This bridge will be constructed on the existing horizontal alignment. The vertical profile will be adjusted to move the sag curve off of the bridge. New bridge approaches will be constructed. The existing guardrail will be replaced with new guardrail and new pavement and shoulders will be paved 20 ft. beyond the ends of the guardrail. Class 10 will be necessary to flatten the existing fore slopes and to construct the new guardrail blisters. Class E revetment will be placed under the bridge for slope protection. New bridge end drains will be constructed on both ends of the bridge.

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

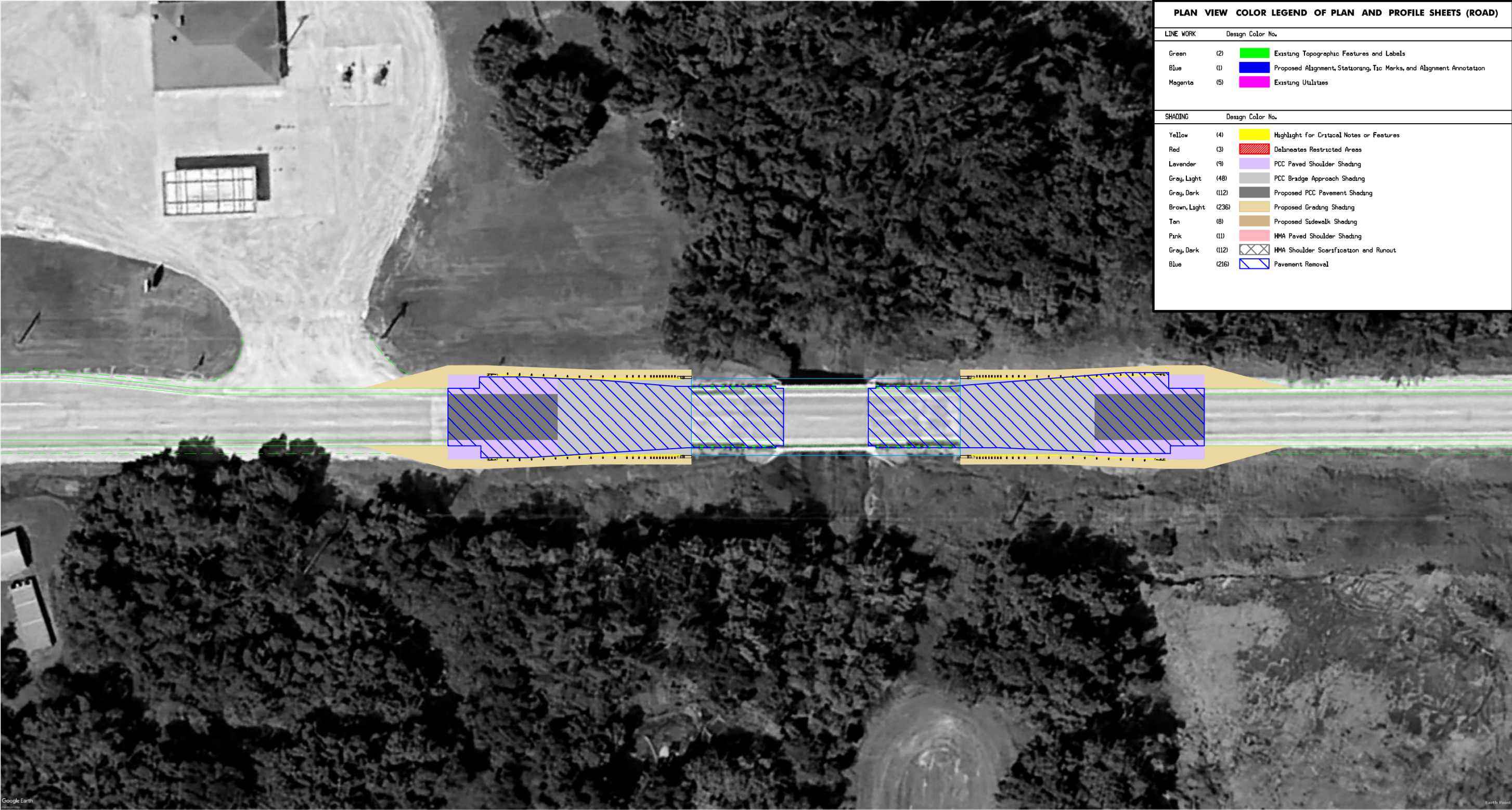
Traffic will be maintained by an off-site detour.

BRIDGE ESTIMATE:				
Item	Quantity	Unit	Rate	Amount
Bridge - CCS slab bridge	6160	SF	\$130	\$800,800
Remove Existing Bridge	1400	SF	\$10	\$14,000
Revetment, Class E	700	TON	\$50	\$35,000
Mobilization	1	LS	10.00%	\$84,980
	Base Cost:		\$934,780	
	Contingency:		20%	\$186,956
	4 Years Inflation:		4.5%	\$215,955
	BRIDGE TOTAL:		\$1,337,691	

ROADWAY ESTIMATE:				
Item	Quantity	Unit	Rate	Amount
Embankment-in-Place, Contractor Furnished	134	CY	\$40	\$5,352
Excavation, Class 13, Waste	390	CY	\$33	\$12,664
Topsoil, Furnish and Spread	45	CY	\$75	\$3,345
Modified Subbase	121	CY	\$56	\$6,804
Paved Shoulder, PCC, 8"	242	SY	\$110	\$26,610
Shoulder Construction, Earth	6.88	STA	\$615	\$4,230
PCC Pavement	305	SY	\$160	\$48,771
Longitudinal Grooving in Concrete, Bridge Deck	622	SY	\$16	\$9,956
Removal of Steel Beam Guardrail	522	LF	\$12	\$5,998
Steel Beam Guardrail	50	LF	\$40	\$2,000
Steel Beam Guardrail Barrier Transition Section, BA-201	4	EACH	\$3,100	\$12,400
Steel Beam Guardrail End Anchor, Bolted	4	EACH	\$320	\$1,280
Steel Beam Guardrail Tangent End Terminal BA-205	4	EACH	\$3,250	\$13,000
Removal of Pavement	1386	SY	\$25	\$34,644
Bridge Approach Pavement	622	SY	\$290	\$180,444
Longitudinal Grooving in Concrete, Pavement	927	SY	\$15	\$13,905
Additional Roadway Items	1	LS	\$10,000	\$10,000
Erosion Control	1	LS	1.00%	\$3,814
Detour	1	LS	5.00%	\$19,070
Mobilization	1	LS	10.00%	\$38,140
	Base Cost:		\$452,427	
	Contingency:		20%	\$90,485
	4 Years Inflation:		4.5%	\$104,521
	ROADWAY TOTAL:		\$647,433	
	PROJECT TOTAL:		\$1,985,124	

CONCEPT REPORT

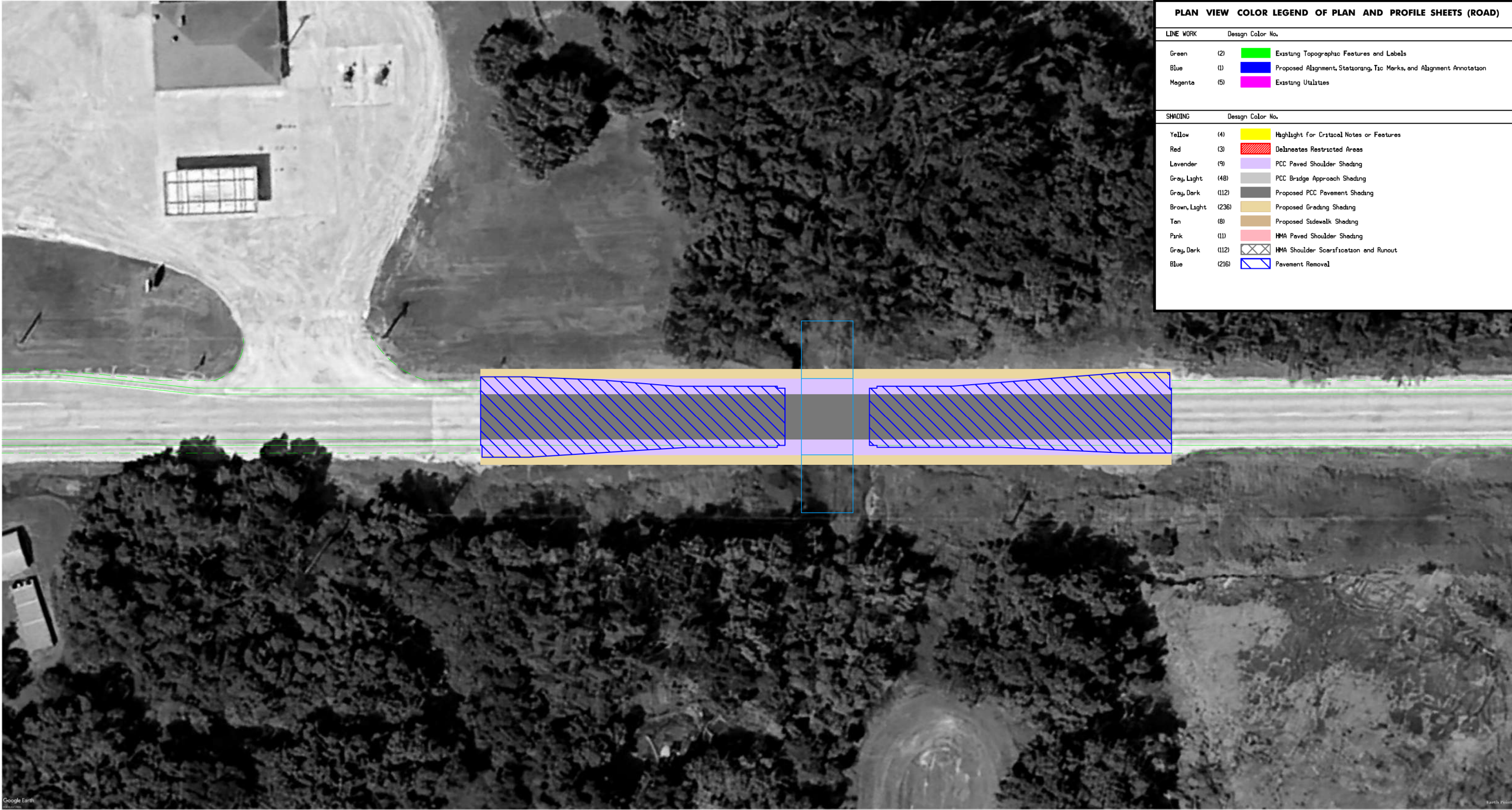
ALTERNATIVE 1



CONCEPT REPORT

ALTERNATIVE 2

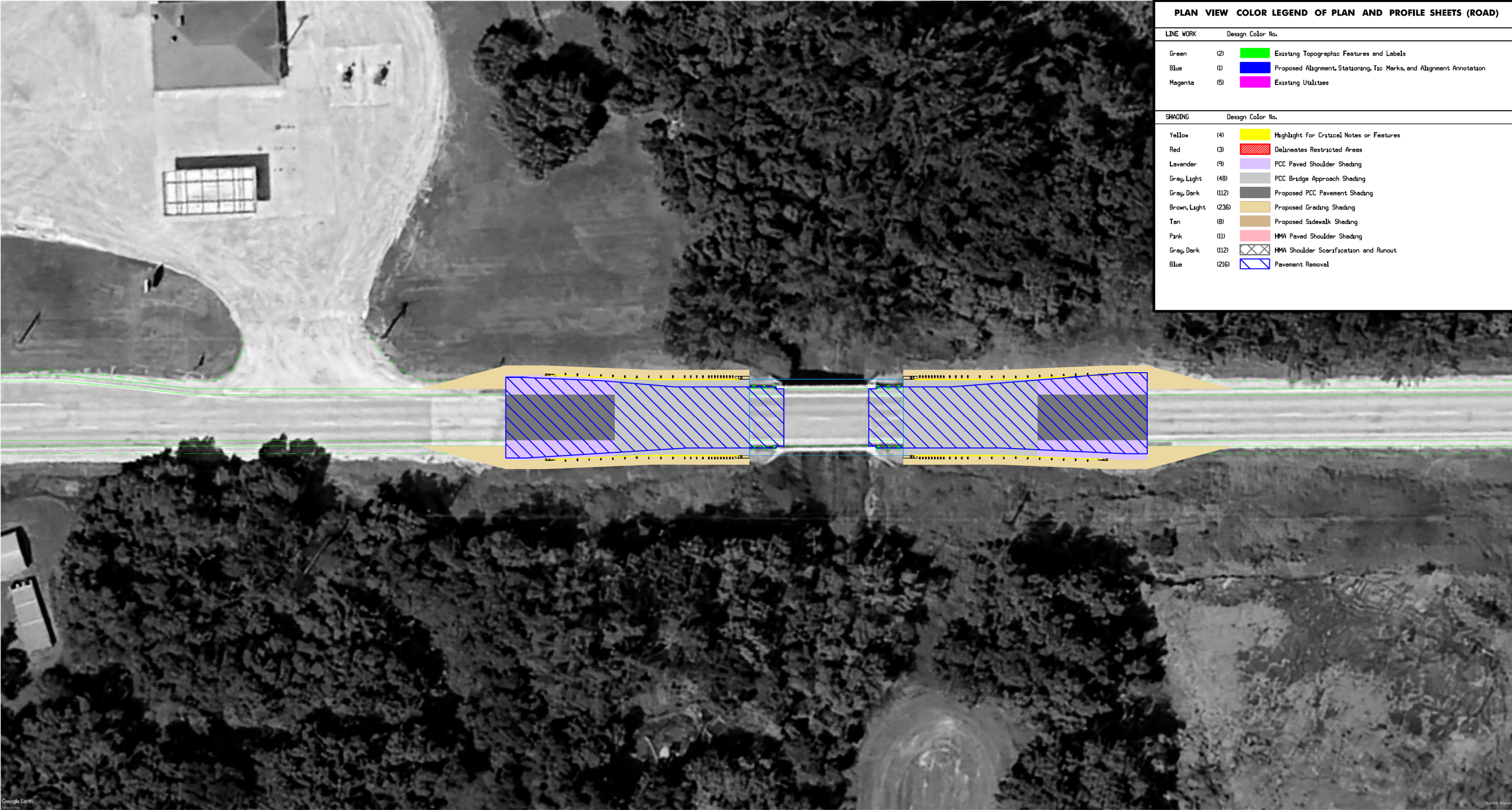
Not considered due to insufficient hydraulic capacity.



CONCEPT REPORT

ALTERNATIVE 3

Not considered due to insufficient hydraulic capacity.



CONCEPT REPORT

B. Detour Analysis

For the duration of construction, IA 31 will be closed, and an offsite detour will be utilized. Two hard surface detour routes were analyzed and are summarized below. A map of the two options is attached to the end of this document.

- Option 1
 - Route: County Road C66 (650th Street) to County Road L51 (L Avenue)
 - Length: 7.3 miles
 - Advantages
 - Shorter of the two routes
 - Disadvantages
 - Route passes through residential area of Quimby
- Option 2 (Preferred Route)
 - Route: County Road C66 (650th Street) to US 59 (Q Avenue)
 - Length: 12.8 miles
 - Advantages
 - Route avoids residential areas
 - Disadvantages
 - Longer of the two routes

C. Recommendations

It is recommended that the present structure be replaced, as described in Alternative No. 1.

D. Construction Sequence

It is anticipated that all work on this project will be awarded to one prime contractor, and that work will be completed in a single stage during a detour of traffic.

E. ADA Accommodations

There are no bike paths or sidewalks adjacent to IA 31. 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 24 is less than the first stage filter threshold of 50, therefore this bridge will be constructed using traditional methods.

Access shall be provided to the cemetery to the northeast of the bridge at all times.

Historical records indicate that historic mounds may be present in the area. If construction remains on existing ROW it should not be an issue. However, the DOT will investigate if mounds are present in the area.

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

The waterway is not on a state water trail or paddling route.

It appears that Right of Way will not be required for this project. Right of Way has not been programmed for this project.

G. Program Status

This project is listed in the 2025-2029 Iowa Transportation Improvement Program with \$975,000 for replacement in FY 2029.

Utilities

(FCI) FRONTIER COMMUNICATIONS
Company name : FRONTIER COMMUNICATIONS
Design contact : Uranan Thao
Phone : 515-573-1268
Email : frontierlocatemapsia@ftr.com

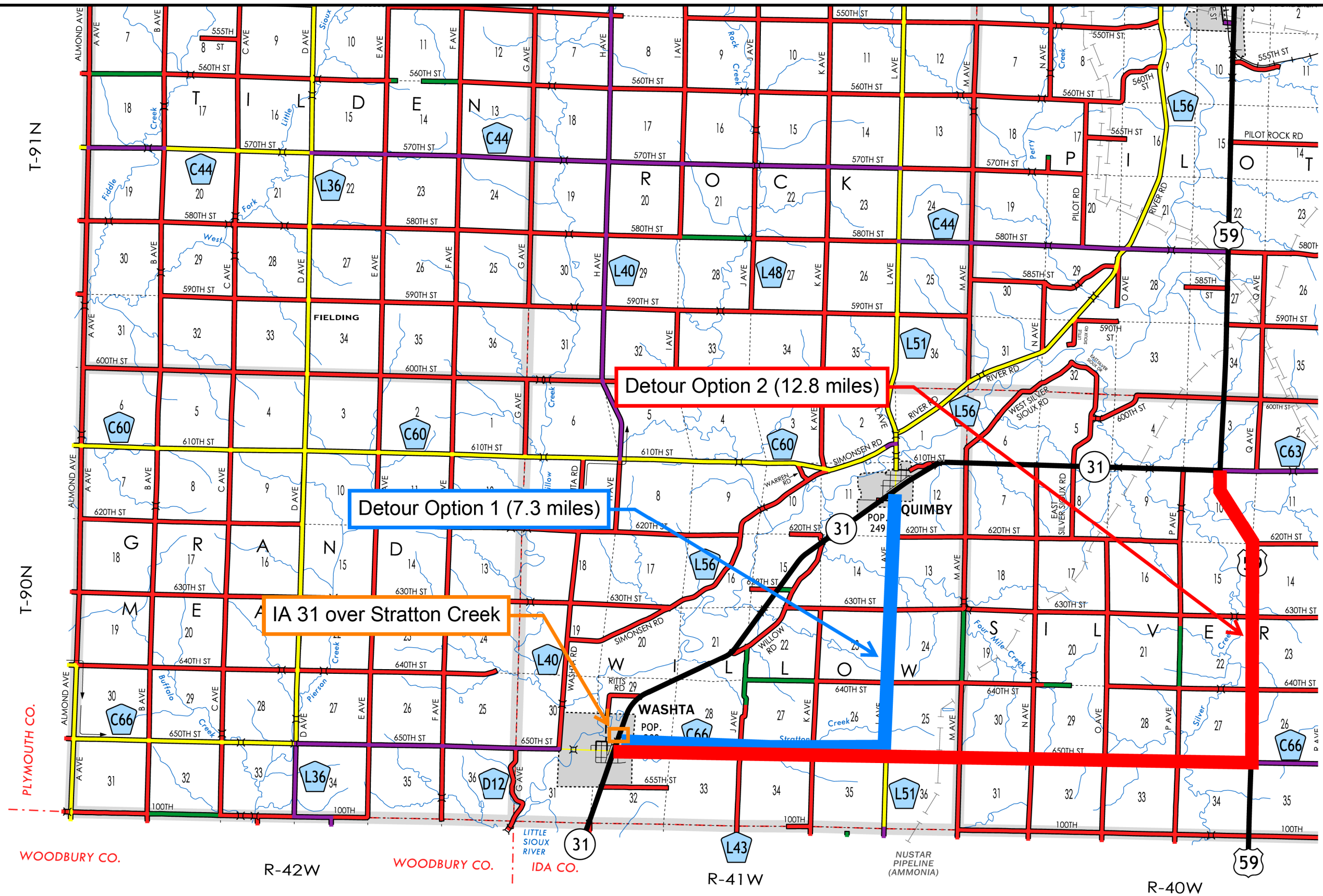
(M13E) MIDAMER-ELEC
Company name : MIDAMER-ELEC
Design contact : John Roest
Phone : 712-548-6198
Email : jhroest@midamerican.com

(M13G) MIDAMER-GAS
Company name : MIDAMER-GAS
Design contact : Connor Ouradnik
Phone : 712-548-6157
Email : CONNOR.OURADNIK@MIDAMERICAN.COM

(WAA) WASHTA, CITY OF
Company name : WASHTA, CITY OF
Design contact : Lyle Paulsen
Phone : 712-229-3396
Email : lyledeb1986@midlands.net

(WWY) WEST IOWA TELEPHONE
Company name : WEST IOWA TELEPHONE
Design contact : Phil Klein
Phone : 712-786-5576
Email : pklein@westelsystems.com

CONCEPT REPORT



Location Map and Detour Routes

CONCEPT REPORT

Bridge Bureau Attachment for Concept Statement

Date: February 18, 2025
By: Kevin Placzek (Benesch)
Location: On IA 31 over Stratton Creek, 0.1 mi. N of SR C66

County: Cherokee County
Phase No.: BRFN-031-3(016)-39-18
Project Code: 24-18-031-010

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 = No, Zone A- No Base Flood Elevation (BFE)- Flood map panels 19035C0329C and 19035C0328C effective 12/02/2021.
 - 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
2. Hydrologic/Hydraulic Analysis/RIDB Dataset
 - a. Design discharges determined = Q50 = 2,557 cfs - Q100 = 3,035 cfs, AEPD
 - b. Hydraulic analysis done = Partial, HEC_RAS and HY-8
 - c. If DA > 10 sq. mi. Riverine Infrastructure Database (RIDB) dataset is required with B1 submittal =No
 - d. Project development hydraulic analysis will comply with the RIDB Guidelines at a minimum= No, the drainage area is less than 10 sq. mi. which is the threshold for including structure in RIDB database.
3. Structure/Roadway Layout Considerations
 - a. Roadway profile grade raise is not anticipated
 - b. No Shallow rock indicated by existing borings
 - c. Channel shift recommended = No
4. Special construction issues
 - a. No shallow bedrock is present
 - b. It is desirable for new structure foundations to avoid existing foundations when possible
5. Special survey = No
6. Aesthetic enhancements = No
7. Other
 - a. Maintenance of Traffic - Off site detour potential. Approximately 7.3 miles.

Special Survey: None

Bridge Cost Estimate and Analysis for Concept Statement

Location:
County: Cherokee County
Des. No.: Not Assigned
Maint. No.: 1829.1S031
On IA 31 over Stratton Creek
Section 29; T-90N; R-41W
Functional Class: 06
By: Kevin M. Placzek (Benesch)
Phase No.: BRFN-031-3(016)-39-18
Project Code: 24-18-031-010
FHWA No.: 038460
Sta.: 3+93.73
ADT: 1370 (2023)
Date: 2-18-2025

Existing Bridge:
Type: Ex.RSB
Pier Type: None
Spans: 1 @ 40'
Skew: 0 deg
Drainage Area: 5.37 sq. mi.
New/Reconstructed Roadway Width: 40'
Length x Width: 40'x 30'
Abut. Type: Ex. Cantilevered
Approach Pavement Width: 24'

- General Comments:
- Preliminary hydraulic analysis has been completed for this project. Based on the preliminary hydraulic analysis a 140' x 40' continuous concrete slab bridge (CCS) will meet hydraulic criteria.
 - A Flood Hazard Boundary Map has been created for this area. The project is within a Zone A flood hazard area. Flood elevations have not been determined for this area.
 - The drainage area at this site is 5.37 square miles. Since this is an urban area, with a drainage area greater than 2 sq mi, a DNR permit is required.
 - Since this is in a high damage potential area, with a drainage area greater than 2 sq mi, backwater is limited to a rise of 1 ft.

Option A - Replacement Bridge, Off-Site Detour

Type: Continuous concrete slab
Pier Type: Pile Bent
Spans: 42'-6, 55'-0, 42'-6"
Stage Traffic: No, Off-site detour
Length x Width: 140'-0 x 40'-0
Abutment Type: Integral
Skew: 0 degrees

Costs:	
Bridge - 6160 sf @ \$130/sf	= \$ 800,800
Remove Exist. Bridge 1400 sf @ \$10.00/sf	= \$ 14,000
Revetment	= \$ 35,000
Mobilization (10%)	= \$ 84,980
Contingency and Misc. (20%)	= \$ 186,956
=====	
Total Option A (including 4 years inflation @ 4.5%)	\$ 1,337,691

Bridge Concept Statement

Cherokee County
Project Number BRFN-031-3(016)-39-18

Accelerated Bridge Construction (ABC):

The calculated ABC Rating Score based on Iowa DOT BDM Chapter 8 criteria and 7.3 miles out of distance travel of is 24.

The ABC Rating score of 24 is less than the first stage filter threshold of 50.

BRIDGE ESTIMATE:				
Item	Quantity	Unit	Rate	Amount
Excavation, Class 10, Channel	728.44	CY	\$8	\$5,973
Engineering Fabric	1158.62	SY	\$3	\$3,986
Revetment, Class E	1123.29	TON	\$50	\$56,165
Mobilization	1	LS	10%	\$88,369
	Base Cost:			\$972,066
	Contingency:		15%	\$145,810
	4 Years Inflation:		4.5%	\$215,212
	BRIDGE TOTAL:			\$1,333,088
ROADWAY ESTIMATE:				
Item	Quantity	Unit	Rate	Amount
Excavation, Class 13, Waste	1036	CY	\$33	\$34,188
Topsoil, Furnish and Spread	234	CY	\$75	\$17,550
Modified Subbase	182	CY	\$56	\$10,192
Paved Shoulder, PCC, 9"	242	SY	\$110	\$26,620
Shoulder Construction, Earth	7	STA	\$615	\$4,305
PCC Pavement, 9"	305.00	SY	\$160	\$48,800
Longitudinal Grooving in Concrete, Bridge Deck	622	SY	\$16	\$9,952
Removal of Steel Beam Guardrail	522	LF	\$12	\$6,264
Steel Beam Guardrail	50	LF	\$40	\$2,000
Steel Beam Guardrail Barrier Transition Section, BA-201	4	EACH	\$3,100	\$12,400
Steel Beam Guardrail End Anchor, Bolted	4	EACH	\$320	\$1,280
Steel Beam Guardrail Tangent End Terminal BA-205	4	EACH	\$3,250	\$13,000
Removal of Pavement	1370	SY	\$25	\$34,250
Bridge Approach Pavement	622	SY	\$290	\$180,380
Longitudinal Grooving in Concrete, Pavement	1675	SY	\$15	\$25,125
Bridge End Drain, DR-402	4	EACH	\$4,500	\$18,000
Additional Roadway Items	1	LS	\$10,000	\$10,000
Erosion Control	1	LS	1%	\$4,443
Detour	1	LS	5%	\$22,215
Mobilization	1	LS	10%	\$44,431
	Base Cost:			\$525,395
	Contingency:		20%	\$105,079
	4 Years Inflation:		4.5%	\$121,378
	ROADWAY TOTAL:			\$751,852
PROJECT TOTAL:				\$2,084,940

FIELD EXAM COST ESTIMATE

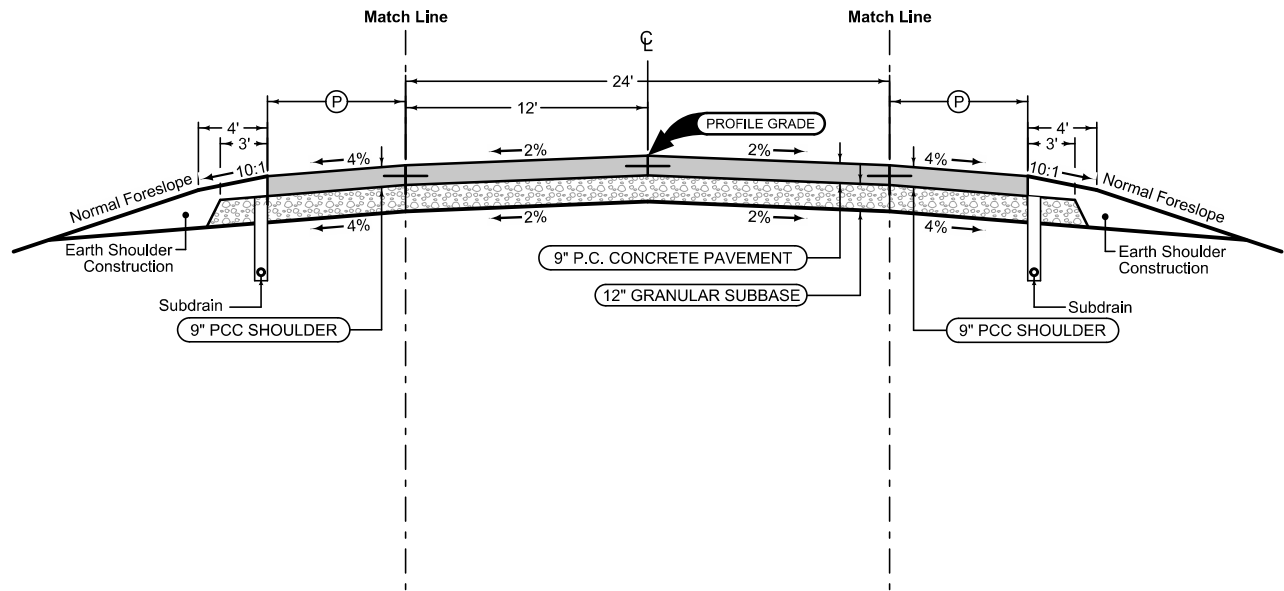
Plan and Profile:

The speed limit on IA 31 is 45 mph and we are using a 50 mph Design Speed. If we can get an exception to reduce the design speed to 45 mph, this would reduce the earthwork as well as construction limits.

Power poles will be located within ditch area. Discuss utility relocation.

The limits of construction go beyond the existing ROW. Do we need to revise the grading to avoid ROW impact?

FIELD EXAM QUESTIONS



Mainline Jointing:
Transverse joints: CD at 17' spacing
Longitudinal joint: L-2

2P_ 04-21-20	
STATION TO STATION	
1+97.34	2+54.50
5+34.50	5+91.65

Full Depth PCC Shoulder

Shoulder Jointing:
Longitudinal joint: BT-2, or L-2
Transverse joints: C at 17' spacing

2_P_FullPCC_ 04-15-25		
STATION TO STATION		(P) Feet
1+97.34	2+17.34	10
2+17.34	2+54.50	8.5-10
5+34.50	5+71.65	8.5-10
5+71.65	5+91.65	10

	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

— F0 — Existing Fiber Optics

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

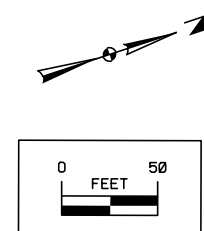
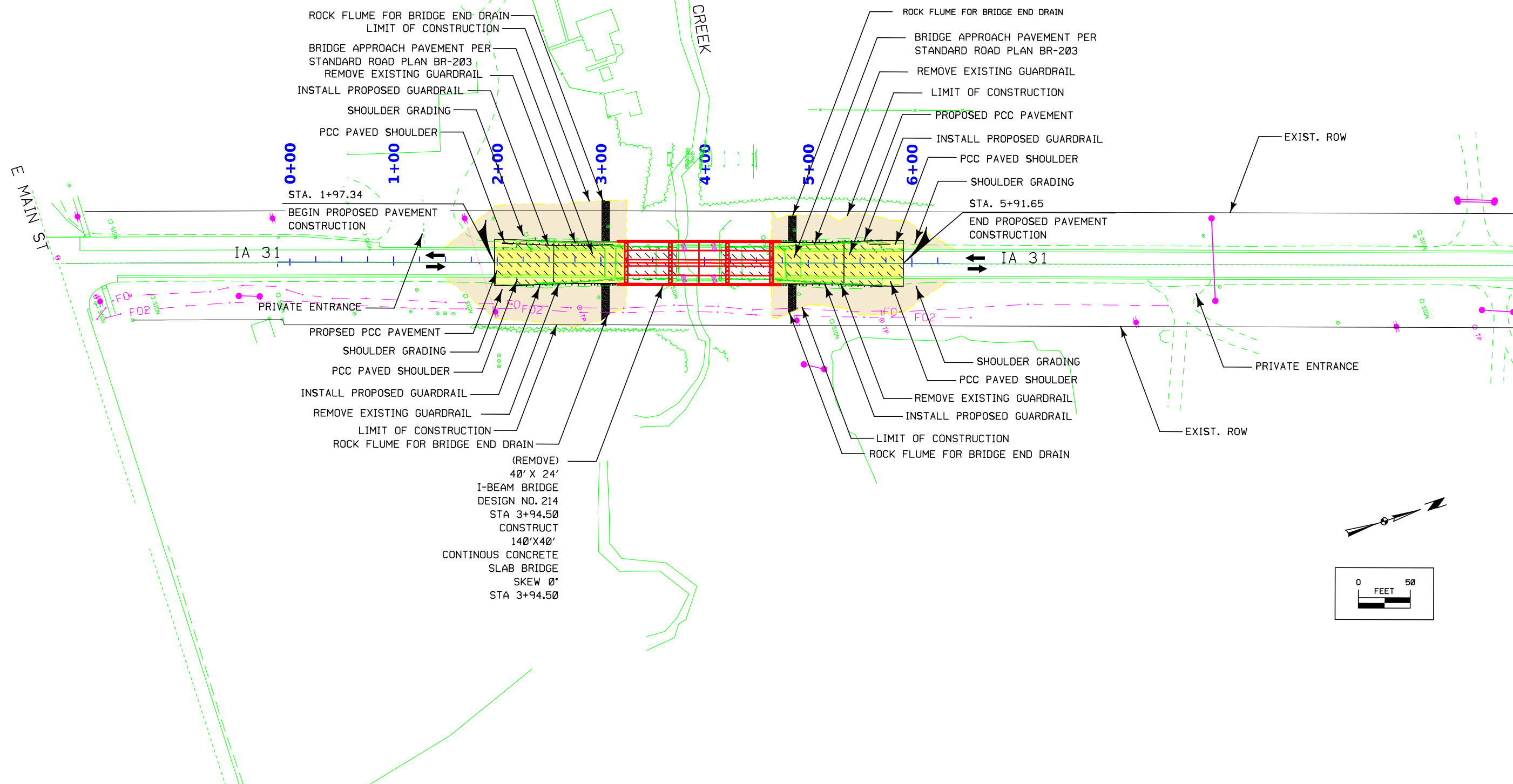
SHADING	Design Color No.		Transparency
Pink, Dark	(13)		Temporary Pavement Shading
Yellow	(4)		Proposed Pavement Shading
Orange	(6)		Proposed Granular Shading
Orange	(70)		Proposed Shoulder Granular Shading
Yellow	(68)		Proposed Shoulder Paved Full Depth Shading
Yellow	(132)		Proposed Shoulder Paved Partial Depth Shading
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
Red	(3)		Proposed Structure Shading
Red	(3)		Delineates Restricted Areas

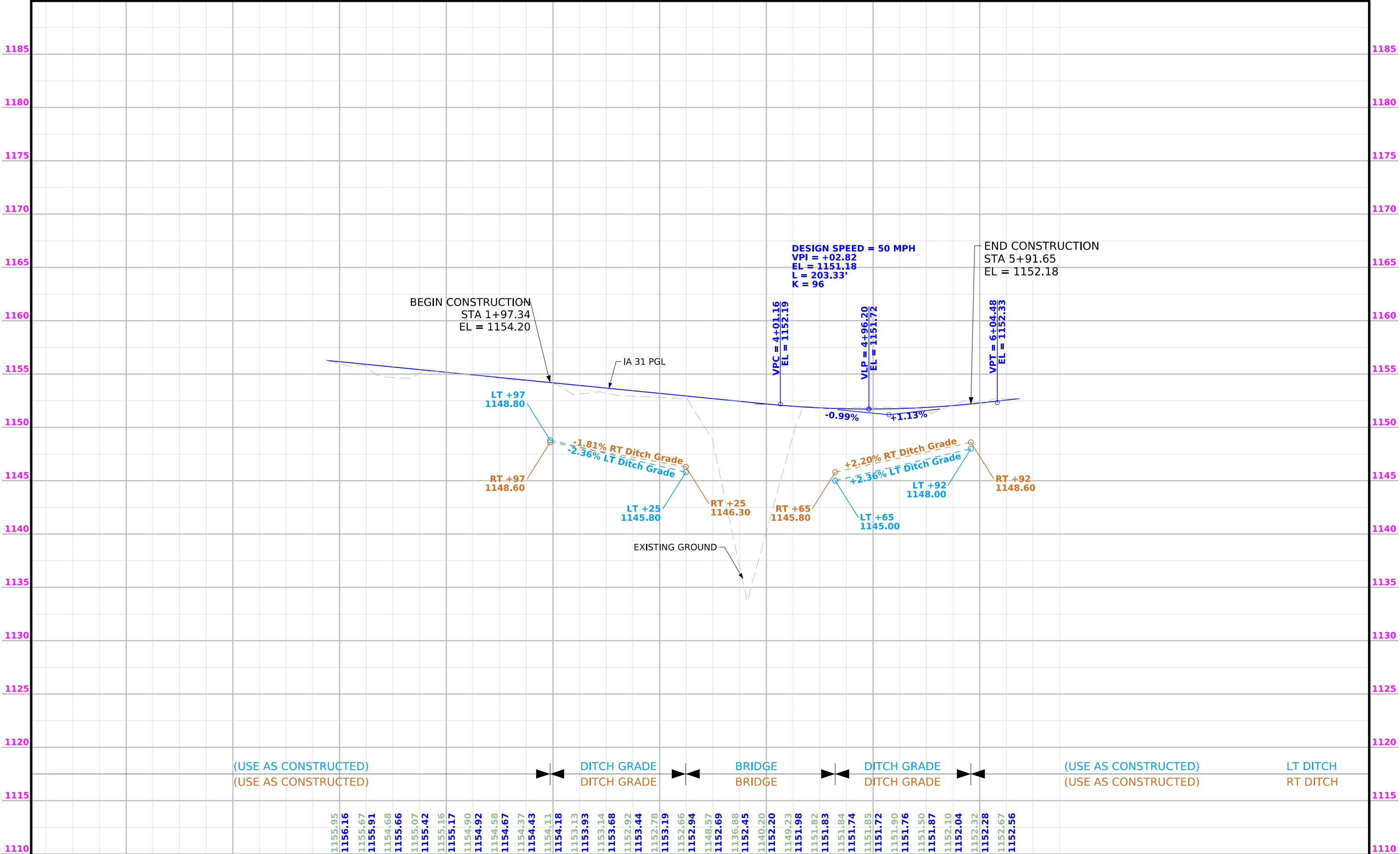
LINEWORK	Design Color No.
Green	(10) Existing Ground Line Profile
Blue	(1) Proposed Profile and Annotation
Magenta	(5) Existing Utilities
Blue, Light	(230) Proposed Ditch Grades, Left
Black	(0) Proposed Ditch Grades, Median
Rust	(14) Proposed Ditch Grades, Right

- 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
- Access Control
- Property Line Symbol
- Property Line

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

Willow TWP.
T-90N R-41W
SEC. 29





Survey Information

SURVEY INDEX

County: Cherokee
PIN: 24-18-031-010
Project Number: BRFN-031-3(016)--39-18
Location: IA 31 bridge over Stratton Creek, 0.1 mi. N of SR C66
Type of Work: Bridge Replacement
Project Directory: 1803101024

Survey Personnel

Tom Pajula – Survey Party Chief
Eric Wesel – Assistant Survey Party Chief

Date(s) of Survey

Begin Date 01/07/2025
End Date 01/15/2025

General Information

This survey is for IA 31 bridge replacement over Stratton Creek at location 0.1 mi N of SR C66. 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

Nearby Iowa Real Time Network reference stations were utilized to obtain horizontal and vertical control on primary project control points. Three five-minute observations were taken with a minimum two-hour time span between and used in a weighted average to obtain final coordinate values. 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: 2018u3

Alignment Information

The horizontal alignment for IA 31 for this survey is a retrace of Plans No. F-744(1). Survey stationing was equated to the plan face of east abutment at Sta. 4+14.50, split the pavement to the east, and carried back and ahead without equation throughout the survey. Stationing increases to the east in both the plan and the survey.

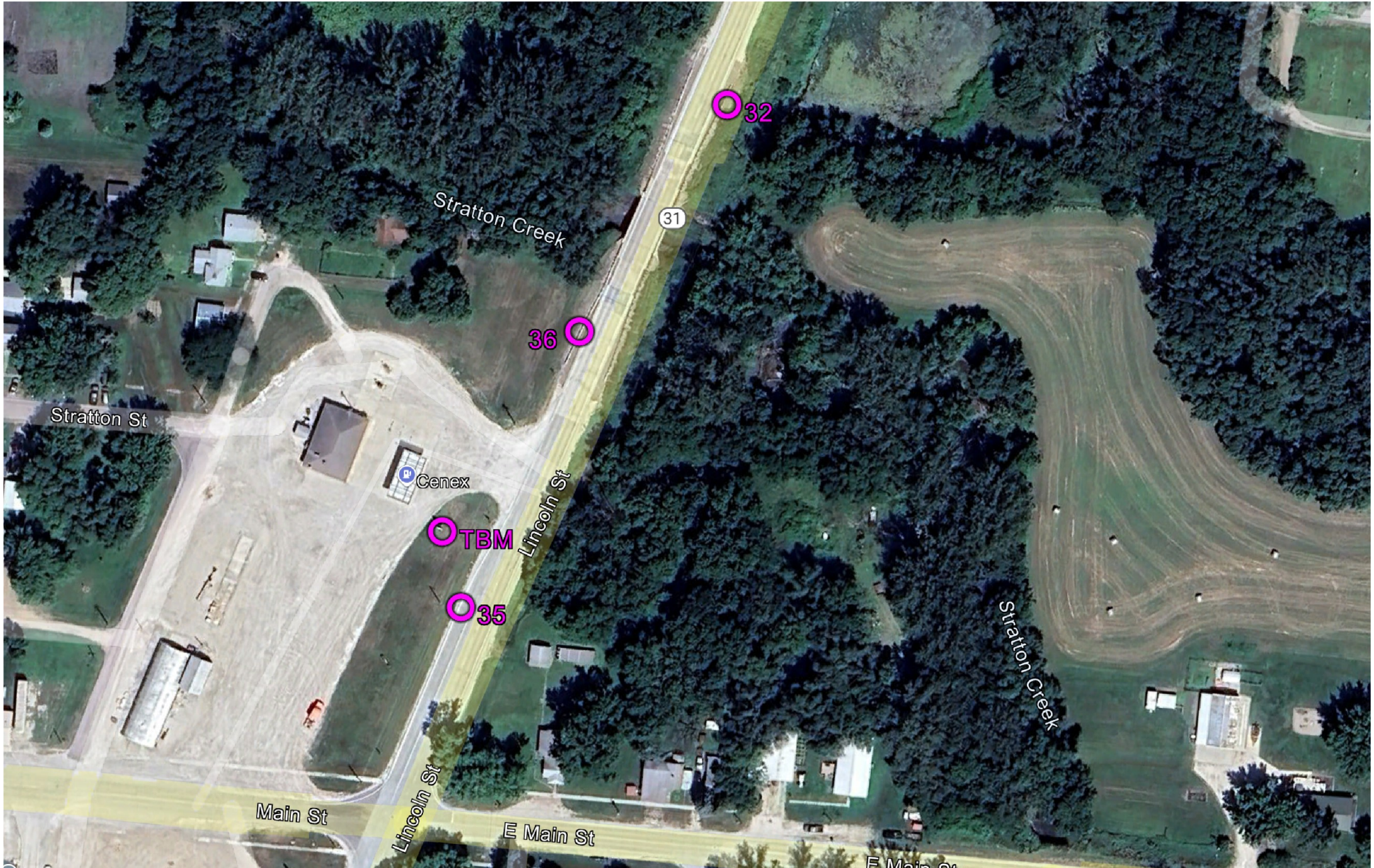
Survey stationing relates to as built plan stationing as follows:

POT Sta. 4+14.50 Plans Project No. F-744(1)
Survey POT Sta. 4+14.50

PT Sta. 3+84 Plans Project No. F-744(1)
Survey PT Sta. 3+84

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: 2018u3

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) for EPOCH 2010.00 (IaRTN 2019 Adjustment)
Ia. Regional Coordinate System Zone 04 (U.S. Survey Foot)
VERT. DATUM: NAVD88
Geoid Model: 2018u3

Point Name	Northing	Easting	Elevation	Code Description
32	8617333.42	14262681.83	1151.77	CP SET REBAR WITH CAP +/-139FT NORTH OF STRATTON CREEK +/-8.6FT EAST OF THE EAST EDGE OF CONC SHOULDER OF IA 31 +/-52.9FT NORTHWEST OF THE FIRST POWERPOLE NORTH OF STRATTON CREEK
35	8616833.75	14262466.54	1156.44	CP SET CROSS CUT IN WEST CONC SHOULDER OF IA 31 +/-390 SOUTH OF STRATTON CREEK +/-19.4FT EAST OF SECOND POWERPOLE SOUTH OF STRATTON CREEK WEST OF IA 31 +/-74.9FT SOUTHEAST OF THE GAS STATION SIGN FOUNDATION
36	8617106.65	14262558.57	1152.63	SET REBAR WITH CAP +/-101FT SOUTH OF STRATTON CREEK +/-8.3FT WEST OF THE WEST EDGE OF CONC SHOULDER OF IA 31 +/-110.0FT NORTHEAST OF FIRST POWERPOLE SOUTH OF STRATTON CREEK WEST OF IA 31
TBM	8616904.7	14262442.5	1154.08	BM SQUARE CUT SET ON THE SOUTHEAST CORNER OF THE FOUNDATION FOR NEW COOPERATIVE GAS STATION SIGN WEST SIDE OF IA 31 SOUTH OF THE BRIDGE OVER STRATTON CREEK

00+0

1+00

2+00

3+00

4+00

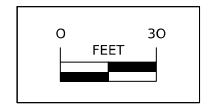
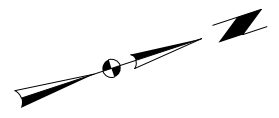
5+00

6+00

POB -0+11.99

POE 6+37.18

CL IA 31



ALIGNMENT
IA 31

ALIGNMENT COORDINATES																			101_16 10/25/24
Name	Location	Point on Tangent Station	Point on Tangent Y Northing	Point on Tangent X Easting	Begin Spiral Station	Begin Spiral Y Northing	Begin Spiral X Easting	Begin Curve Station	Begin Curve Y Northing	Begin Curve X Easting	Simple Curve PI or Master PI Station	Simple Curve PI or Master PI Y Northing	Simple Curve PI or Master PI X Easting	End Curve Station	End Curve Y Northing	End Curve X Easting	End Spiral Station	End Spiral Y Northing	End Spiral X Easting
PrCL IA 31	Mainline	-11.99	8616825.51	14262488.88															
PrCL IA 31	Mainline	6+37.18	8617441.55	14262693.63															

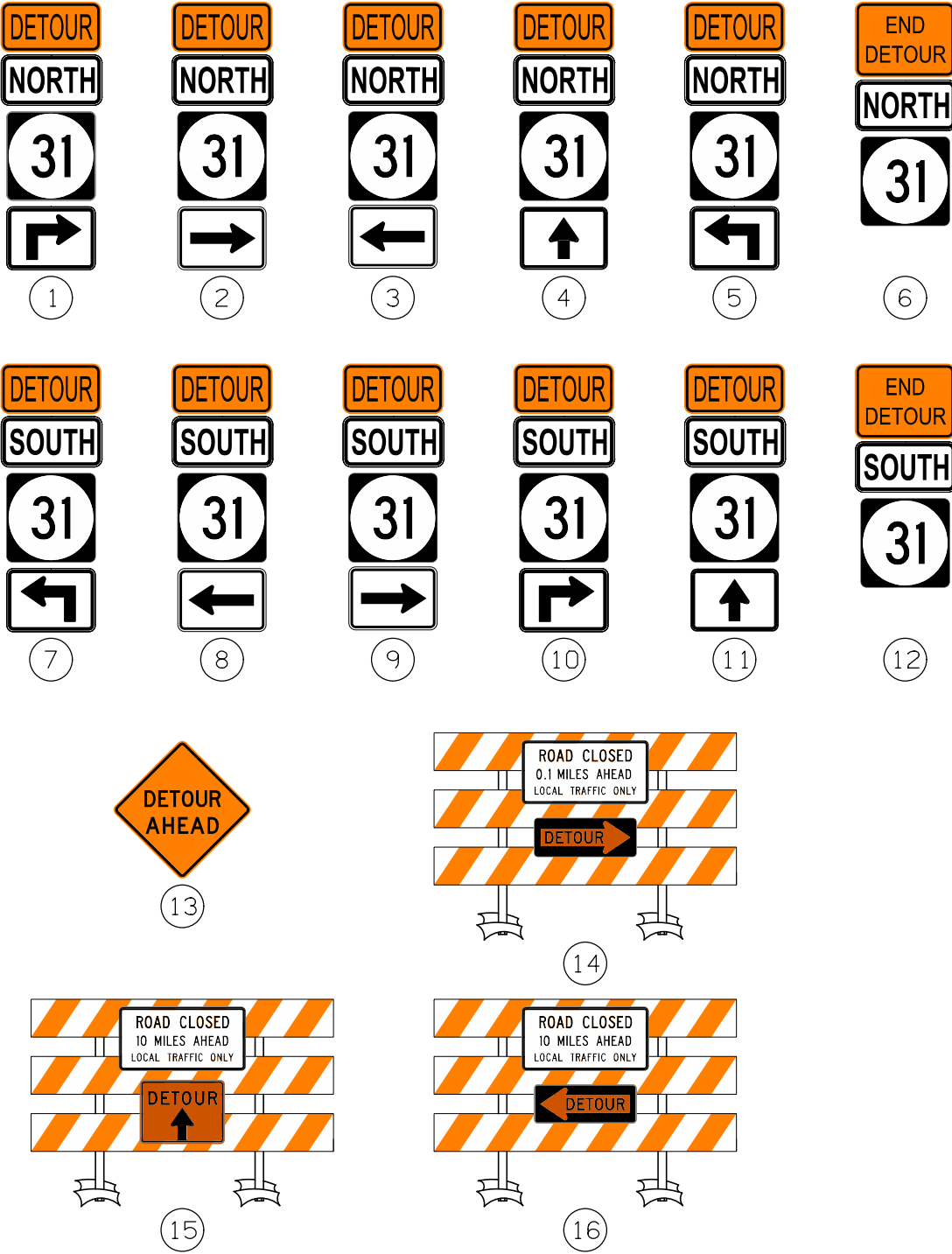
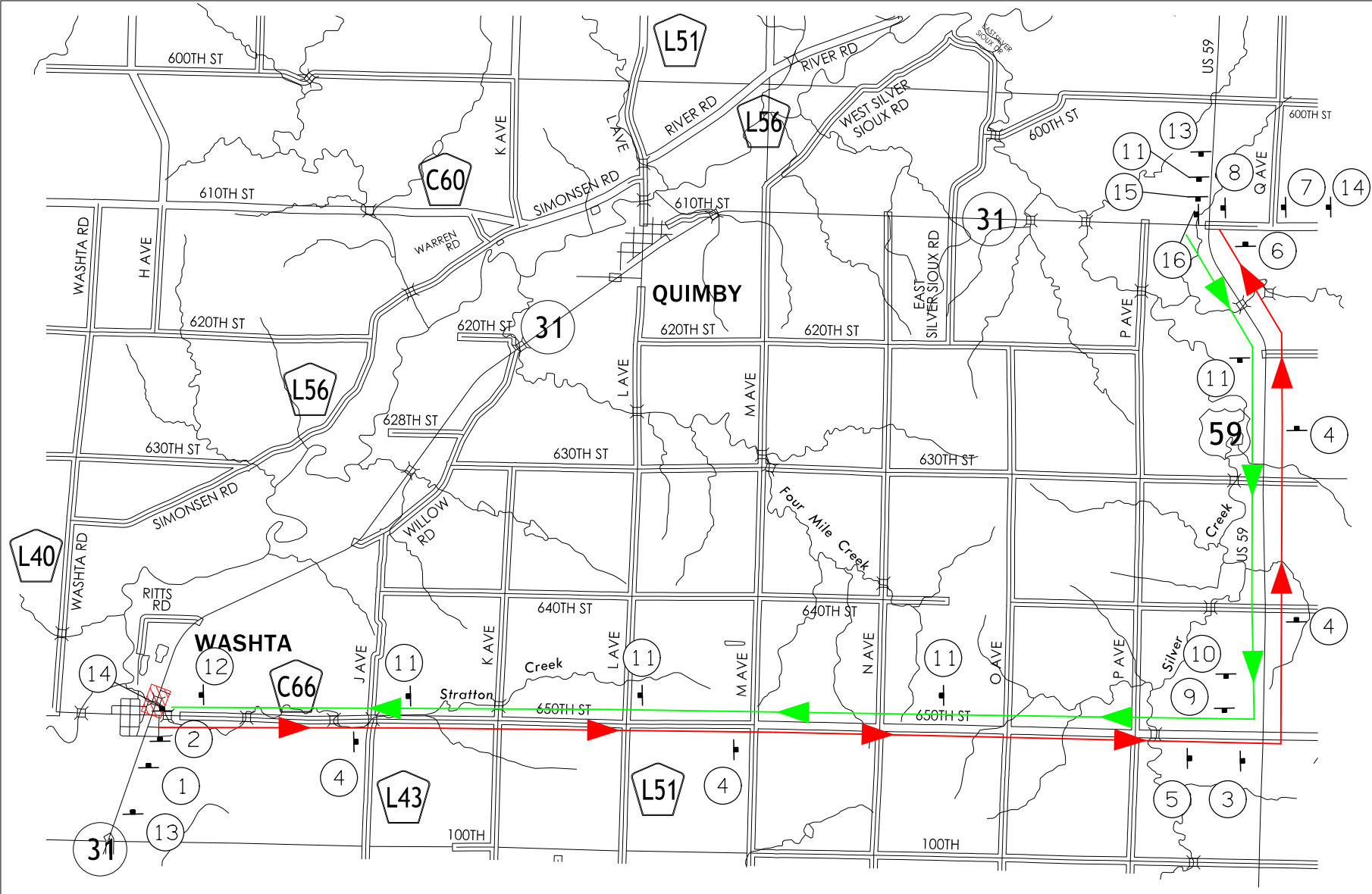
108_23A 8/15/22
TRAFFIC CONTROL PLAN
IA 31 will be closed to traffic during construction using Standard Road Plan TC-252. Traffic will be detoured via County Road C66 (650th Street) and US 59 (Q Avenue). All detour signs are to be provided, placed, maintained and removed by the Contractor as part of the Traffic Control bid item.

108_25
3/28/24

511 TRAVEL RESTRICTIONS												
Route	Direction	County	Location Description	Feature Crossed	Object Type	Maint. Bridge No. or Structure ID or FHWA No.	Type of Restriction	Existing Measurement	Construction Measurement	Construction Measurement as Signed	Projected As Built Measurement	Remarks
			NONE ANTICIPATED				None					

108_26A 8/15/22
STAGING NOTES
Construction will be performed in a single stage during a full closure of the bridge.

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
NONE ANTICIPATED	

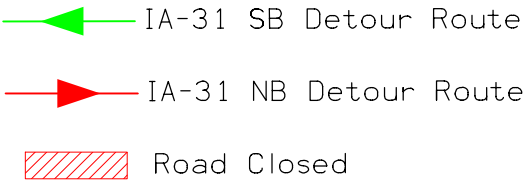


Notes:
All detour signs are to be provided, placed, maintained and removed by the Contractor as part of the Traffic Control bid item.

Access to all entrances on IA 31 shall be maintained.

The Contractor shall cover or temporarily turn all conflicting signing along the detour routes.

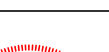
The Contractor shall maintain MUTCD required spacing between all signing while placing detour signing.



DETOUR
FOR CLOSURE OF IA 31

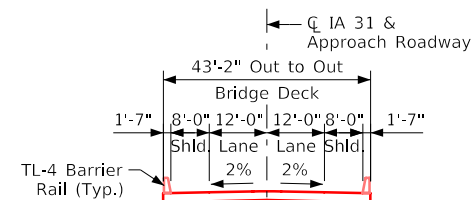
[illegible]

General Notes:
This design is for the replacement of the
existing 40'-0" x 30'-0" I-Beam Bridge,
Cherokee County, Original Design No. 55,
FHWA No. 019490, Maint. No. 1829.1S031

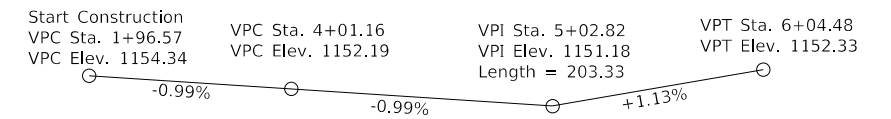
	Hydraulic Design	
	I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.	
		10/3/2025
	Signature Eric J. Dean	Date
	Printed or Typed Name	
	My license renewal date is December 31,	2026
Pages or sheets covered by this seal: <u>V.1,V.2</u>		

Design Notes:

1. IA 31 will be closed during construction.
2. TL-4 Single Slope Bridge Railing Proposed.
3. Standard Bridge Index No. J40.
4. Fully Encased Pile Bent - 3'-0" cap.
5. There is a potential for conflicts with existing foundations. The existing abutment footing/ piles with the new pier piles.
6. An Iowa DNR Flood Plan Permit is required. Preliminary Design will submit the application and place the permit in the PW Regulatory Permits subdirectory folder upon receipt.



Plan view of the proposed bridge structure. The bridge consists of three spans: Span 1 (42'-6"), Span 2 (55'-0"), and Span 3 (42'-6"). The total length is 140'-0" from centerline to centerline of abutment bearings and 143'-0" face to face of paving notches. The bridge is supported by two abutments (S. Abut. Brg. and N. Abut. Brg.) and two piers (Pier No. 1 and Pier No. 2). The roadway is 40'-0" wide and includes a 4'-0" approach roadway. The bridge deck is 43'-2" out to out. The bridge is a continuous concrete slab bridge. The bridge is located over Stralton Creek. The bridge is shown in a plan view with a north arrow pointing towards the top right. The bridge is shown in a plan view with a north arrow pointing towards the top right. The bridge is shown in a plan view with a north arrow pointing towards the top right.



RIDB: "Not Applicable"
Drainage Area = 5.4 Sq. Mi.
Stream Slope (HGL) = 34.8 ft./Mi.
Avg. Low Water Stage = 1134.3

Q₅₀ = 2557 cfs
Stage = 1141.50
Operational Freeboard = 7.99 ft.
Avg. Bridge Velocity = 6.9 fps

Q₁₀₀ = 3035 cfs
Stage = 1142.50
Operational Freeboard = 6.99 ft.
Backwater = 0.9 ft.
Avg. Bridge Velocity = 7.3 fps

Q₂₀₀ = 3944 cfs
Stage = 1142.40
Calculated Design Scour = 1121.80

Q₅₀₀ = 4325 cfs
Stage = 1144.9
Channel Freeboard = 4.83 ft.
Avg. Bridge Velocity = 7.7 fps
Calculated Check Scour = 1118.50

Utilities shown on this sheet are for information only. See Road Design sheets for utility information.

E - Electric Line
G - Gas Line
SAN. - Sanitary Sewer
T - Telephone Line
W - Water Line

FO - Fiber Optic Line
GHP - Gas High Pressure
ST S - Storm Sewer
TV - TV
● - Power Poles

IA 31 over Stratton Creek
City of Washta
T-90N R-41W
Section 29
Willow Township
Cherokee County
FHWA No. 019490
Bridge Maint. No. 1829.15031
Latitude 42.577093°
Longitude -95.714676°

2024 AADT	1,370 V.P.D.
2029 AADT	1,543 V.P.D.
TRUCKS	13 %
Total	
Design ESALs	600,000

Design For 0 Degree

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

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

Situation Plan

STA. 3+94.50 (IA 31) Turn-in Date: Oct 2025

Cherokee County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. ????? Design Sheet No. 1 of 2 FHWA No. 019490

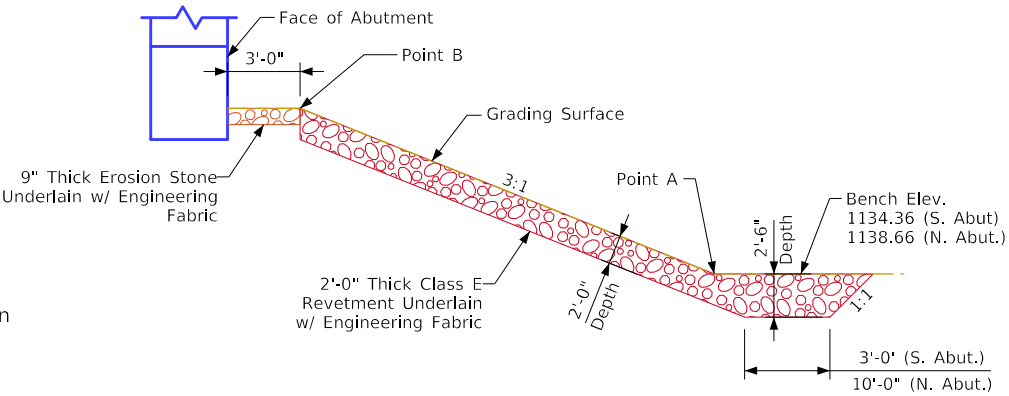
Control Point 32: Set Rebar with cap ±139 ft. north of Stratton Creek ±8.6 ft. east of the east edge of concrete shoulder of IA 31 ±52.9 ft. northwest of the first powerpole north of Stratton Creek, N:8617333.42, E:14262681.83, Elev. 1151.77

Berm Slope Location Table						
Points	South Abutment			North Abutment		
	Station	Offset	Elev.	Station	Offset	Elev.
A1	3+74.94	24.58 Lt.	1134.36	4+33.50	24.58 Lt.	1138.66
A2	3+74.94	24.58 Rt.	1134.36	4+33.50	24.58 Rt.	1138.66
B1	3+29.00	24.58 Lt.	1148.67	4+60.00	24.58 Lt.	1147.49
B2	3+29.00	24.58 Rt.	1148.67	4+60.00	24.58 Rt.	1147.49
W1	3+16.00	24.58 Lt.	1152.25	4+73.00	24.58 Lt.	1150.97
W2	3+16.00	24.58 Rt.	1152.25	4+73.00	24.58 Rt.	1150.97

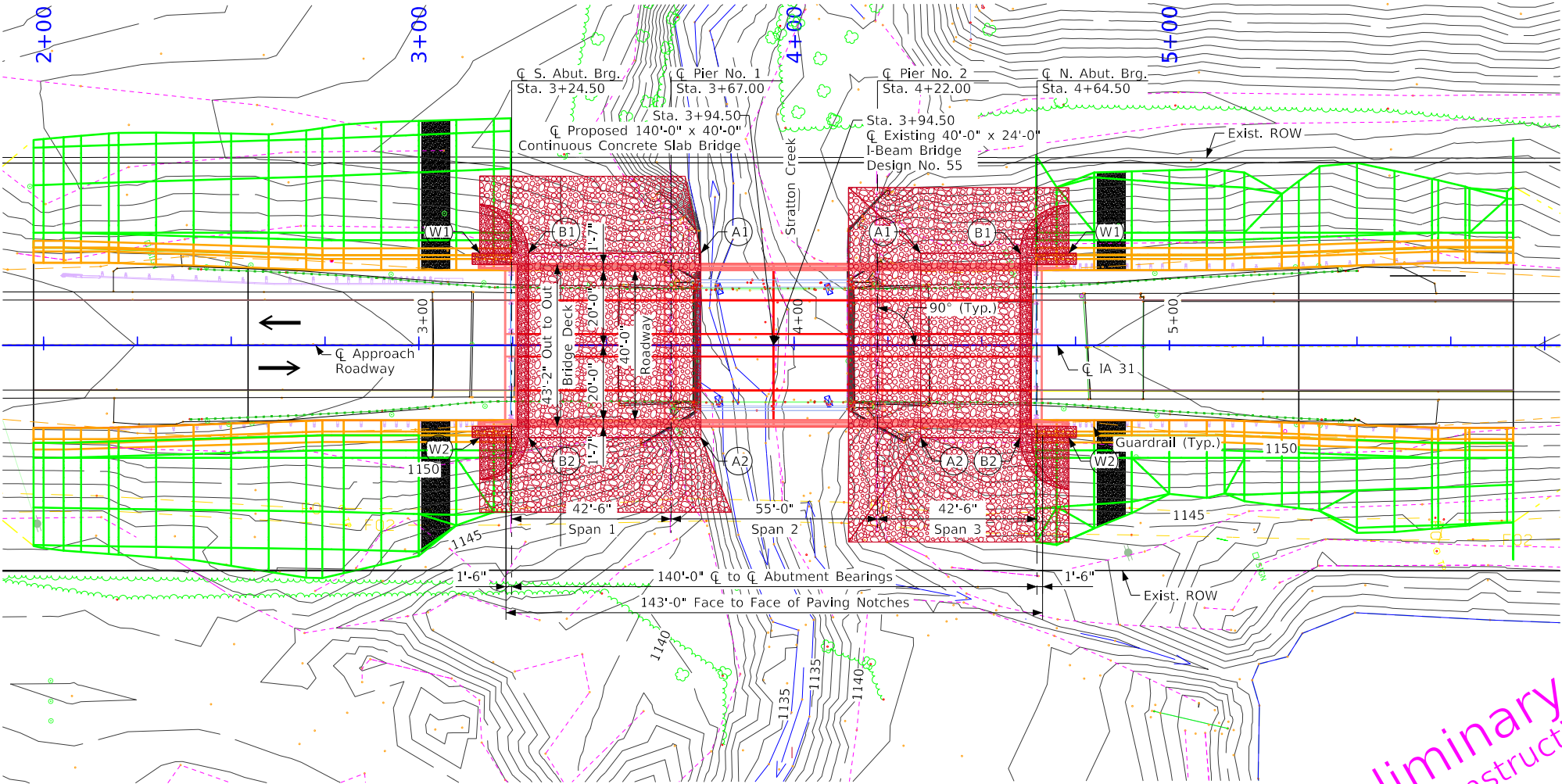
Berm slope elevations reflect the grading surface.
Offsets are given from the CL IA 31.
All points are 3'-0" from the edge of the bridge deck

Estimated Berm Armoring Quantities				
Location	Erosion Stone (Ton)	Revetment CL E (Ton)	Engineering Fabric (SY)	CL. 10 Channel Excavation (CY)
Berm Lining - South	20.60	555.78	571.91	360.08
Berm Lining - North	22.14	567.51	586.71	368.36
Totals	42.74	1123.29	1158.62	728.44

Excavation quantity calculated from proposed grading surface and includes only the excavation required to embed the slope protection.
Revetment based on density of 1.6 ton/CY.
Erosion stone based on a density of 120 lb/CF.



Section Thru Embedded Revetment Berm



Site Plan

Preliminary
Not For Construction



Design For 0 Degree

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

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

Situation Plan - Site

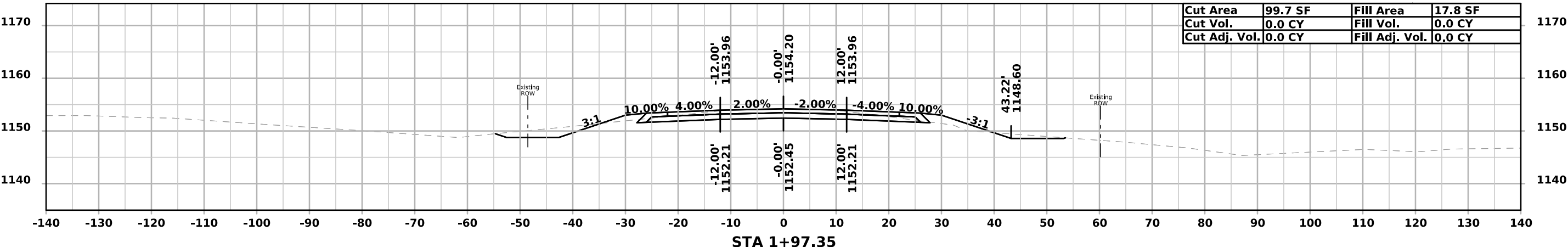
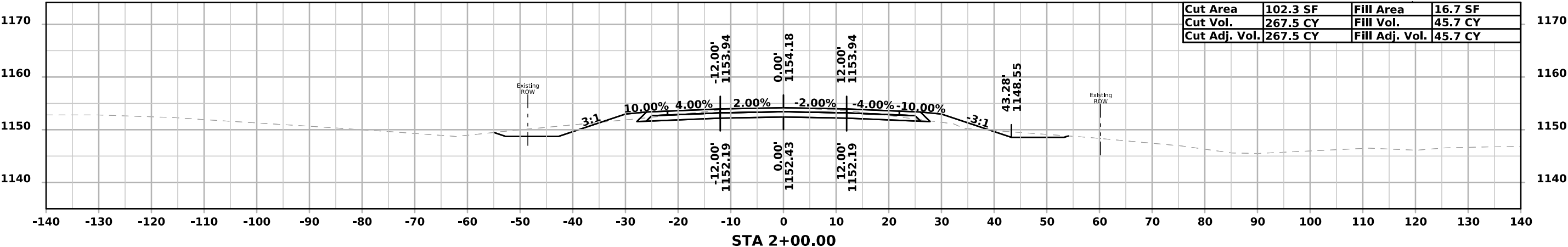
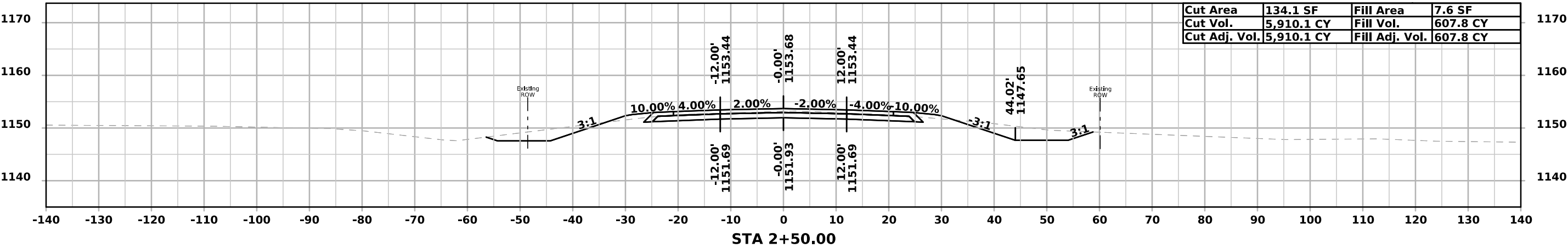
STA. 3+94.50 (IA 31) Turn-In Date: Oct 2025

Cherokee County

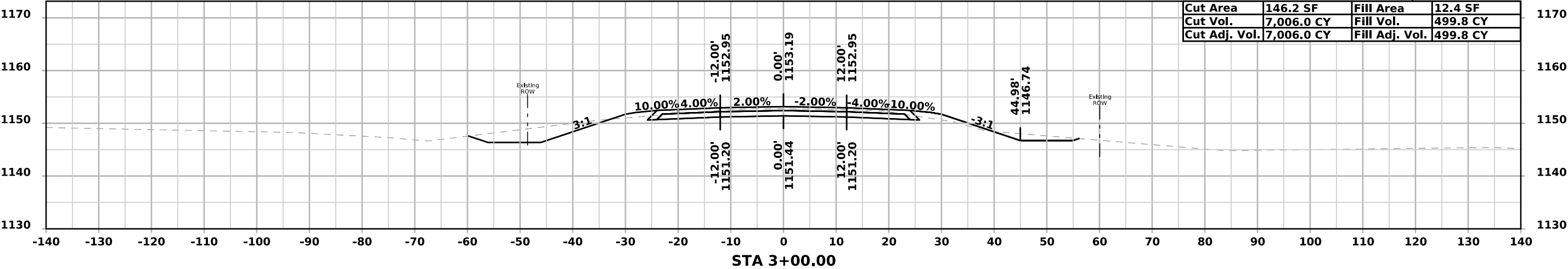
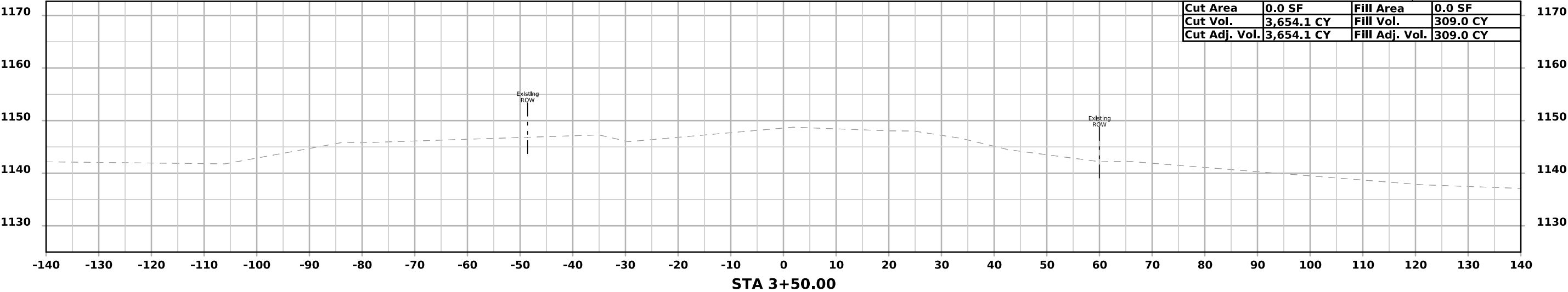
IOWA DEPARTMENT OF TRANSPORTATION

Design No. ????? Design Sheet No. 2 of 2 FHWA No. 019490

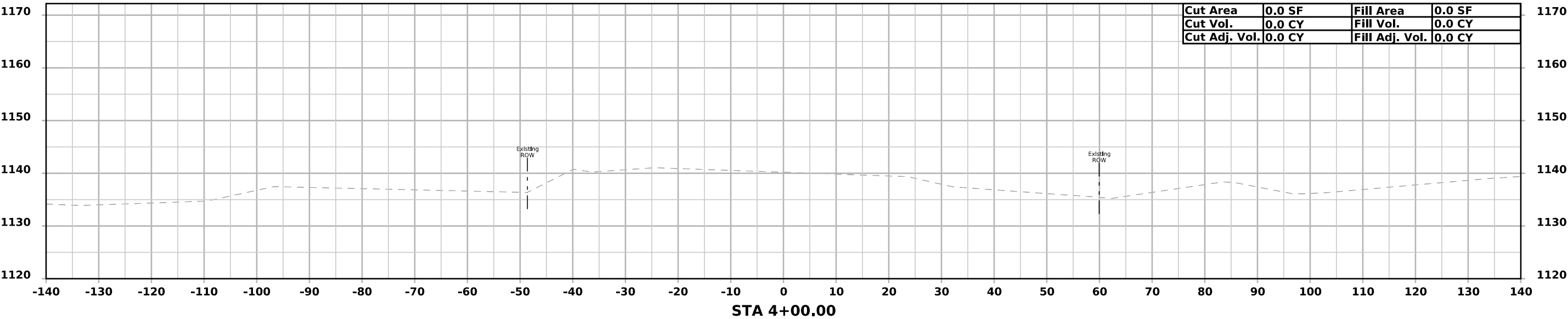
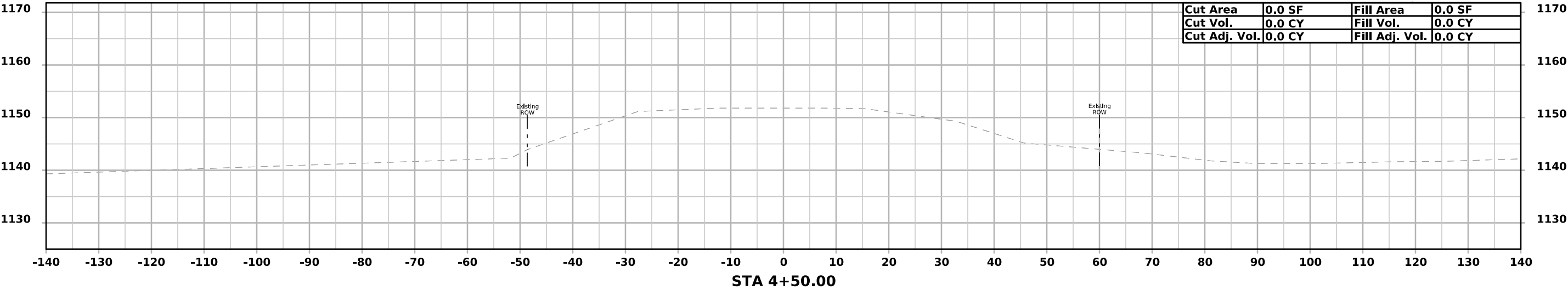
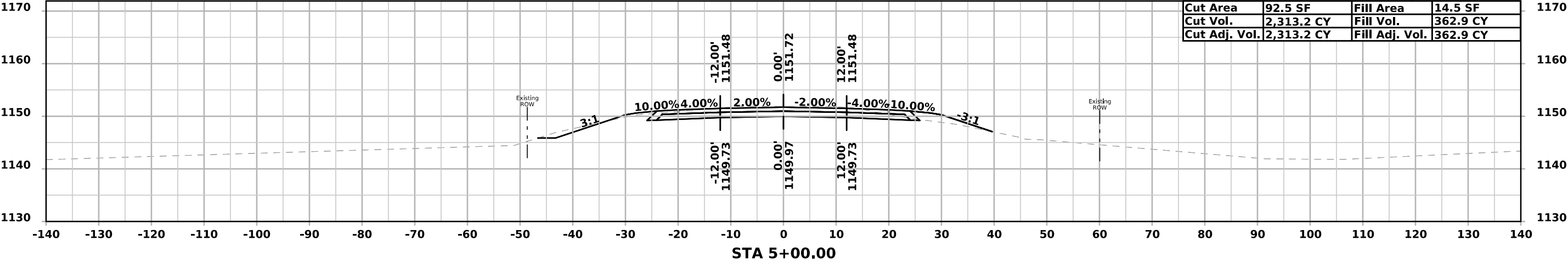
ML - IA 31



ML - IA 31



ML - IA 31



ML - IA 31

