

IOWA DEPARTMENT OF TRANSPORTATION

TO OFFICE: District 4

DATE: October 16, 2019

ATTENTION: Scott Schram

PROJECT: Ringgold County
BRFN-169-1(46)--39-80
PIN: 18-80-169-010

FROM: Jenifer Bates

OFFICE: Shive-Hattery

SUBJECT: Project Concept Statement; (Final Approval, D0)

This project involves the replacement of the US 169 bridge (Maint. No. 8000.1S169) over stream 0.1 mi N of Missouri, D4.

A concept review was held on September 16, 2019. Those present included Orest Lechnowsky and Scott Nixon from District 4; Steven Schroder, Matthew Erickson and Marc Solberg from the Iowa DOT; and Jenifer Bates, Joe Appel and Mark Harpole from Shive-Hattery.

Two alternatives were considered:

1. Replace the existing structure with a single 14' x 14' x 124' RCB culvert on a ten degree right ahead skew and fifteen-degree bends constructed using flowable mortar method with an estimated cost of \$941,000.
2. Replace the existing structure with a single 14' x 14' x 124' RCB culvert on a ten degree right ahead skew and fifteen-degree bends constructed using a four week maximum detour to remove the superstructure, backfill, and reconstruct the pavement with an estimated cost of \$804,100. (This does not include costs associated with detour.)

Alternative 2 is the preferred alternative due to lower construction costs and the maintenance benefits of removing the existing superstructure

Traffic will be detoured for a limited period of up to four weeks maximum to remove the superstructure, backfill, and reconstruct the pavement.

The Draft Project Concept Statement was sent out for review and comment with concerns to be resolved by Tuesday, October 8, 2019. Comments received during the review period have been considered and resolved.

This project is recommended for construction in FY 2023. The Bridges and Structures Bureau will coordinate plan preparation with assistance from the Design Bureau and Shive-Hattery.

Cc:	C. Purcell	M. J. Kennerly	K. D. Nicholson	S. J. Megivern
	J. S. Nelson	B. Walls	M. Nop	M. A. Swenson
	R. A. Younie	D. R. Tebben	K. Brink	D. L. Newell
	J. W. Laaser-Webb	W. A. Sorenson	D. E. Sprengeler	E. C. Wright
	M. E. Ross	A. A. Welch	N. M. Miller	C. C. Poole
	M. J. Sankey	B. E. Azeltine	B. D. Hofer	T. D. Crouch
	S. J. Gent	S. Anderson	P. C. Keen	J. Selmer
	K. K. Patel	S. Godbold	D. R. Claman	J. Hauber
	A. Abu-Hawash	M. E. Khoda	K. Olson	S. Neubauer
	S. Mefford	J. Garton	O. Lechnowsky	R. Moraine
	D. Redmond	K. Shackelford	M. Solberg	S. Suhr
	J. Woodcock	W. Mayberry	J. Bartholomew	



FINAL PROJECT CONCEPT STATEMENT

US 169 Bridge over Stream 0.1 mi N of Missouri, D4

Ringgold County
Proj. BRFN-169-1(46)--39-80
PIN: 18-80-169-010
Maint. No. 8000.1S169
FHWA No. 46240

Jenifer J. Bates, P.E.
515-223-8104

October 16, 2019

I. STUDY AREA

A. Project Description

This project involves the replacement of the US 169 bridge (Maint. No. 8000.1S169) over stream 0.1 mi N of Missouri, D4.

Two alternatives were considered:

1. Replace the existing structure with a single 14' x 14' x 124' RCB culvert on a ten degree right ahead skew and fifteen-degree bends constructed using flowable mortar method.
2. Replace the existing structure with a single 14' x 14' x 124' RCB culvert on a ten degree right ahead skew and fifteen-degree bends constructed using a four-week maximum detour to remove the superstructure, backfill, and reconstruct the pavement.

Alternative 2 is the preferred alternative due to lower construction costs and the maintenance benefits of removing the existing superstructure.

Traffic will be detoured for a limited period of up to four weeks maximum to remove the superstructure, backfill, and reconstruct the pavement. Please note, there may be complications with the detour route since approximately half of the route is in the state of Missouri. We are working with the Iowa DOT staff to determine what those complications may be, but at this time, they are not known.

The preliminary project cost is \$804,100. (This does not include costs associated with detour.)

B. Need for Project

This is an 89' x 26' Continuous Concrete Slab Bridge that was constructed in 1923 and reconstructed in 1952. The bridge deck was overlaid in 1978 and epoxy injected. The overlay is now reaching the end of its service life. The channel shifting towards the left end of pier 2 undermining the footing and exposing the untreated wood piles. The streambed elevation at its deepest point is about 7' below plan. The bridge was designed for live loads below current standards. Due to the extent of these deficiencies to the deck, superstructure and substructure, the bridge should be replaced instead of repaired.





C. Present Facility

US 169 is a two-lane roadway. The existing structure is an 86' x 26' continuous concrete slab bridge constructed in 1951.

US 169 in the project area was originally constructed as a 24' wide asphalt cement concrete pavement with 7.5' wide granular shoulders and 3:1 foreslopes in 1951. US 169 was then resurfaced with asphalt cement concrete in 2000.

D. Traffic Estimates

The 2022 construction year and 2042 design year average daily traffic estimates are 600 ADT with 15% trucks and 700 ADT with 15% trucks, respectively.

E. Sufficiency Ratings

US 169 is classified as an Access route and is a maintenance service level C roadway. The federal bridge sufficiency rating is 84.

F. Access Control

Access rights will not be acquired for this project.

G. Crash History

During the five-year study period from January 1, 2014 through December 31, 2018, there was one personal property crash.

II. PROJECT CONCEPT

A. Feasible Alternatives

Alternative #1 - Replace with a culvert utilizing the flowable mortar method

The existing 86' x 26' continuous concrete slab bridge will be replaced with a single 14' x 14' x 124' reinforced concrete box (RCB) placed at a ten degree right ahead skew. Two fifteen-degree bends will be required in the box to fit the existing significant stream bend. The flow line of the box will be buried 1' below the existing flow line in the channel. This will allow the bottom of the box to silt in and provide a natural bottom for fish passage.

The typical cross section over the culvert will consist of a 24' roadway with 8' effective shoulders, then 6:1 foreslopes to clear zone, then 3:1 to tie-in. This bridge is located within a superelevated curve and there is significant erosion of the shoulder on the low side of the curve (west side). After discussions at the concept site visit, District requested to pave the 8' shoulder on the low side and pave 4' of the 8' effective shoulder on the high side to allow for the addition of rumble strips. All paving will be HMA to match the existing full depth HMA pavement.

Flowable mortar method vertical and horizontal clearance requirements are met so the new RCB can be built under the existing bridge without disturbing the bridge. District will require deck patching to be done if the existing bridge deck is to be left in place. After the culvert has been constructed and the deck patching is complete, flooded granular backfill and flowable mortar will be used to fill the void between the RCB and bridge deck. Once the new embankment for the shoulders and 6:1/3:1 foreslopes have been placed adjacent to the bridge, the existing concrete bridge barrier, curb, and guardrail can be removed. The new 8' wide shoulders can then be constructed.

The roadway will be reconstructed on the existing vertical and horizontal alignment. The existing ditches will need to be relocated to meet the inlet and outlet flowlines of the new RCB. Class E revetment will be placed at the ends of the RCB.

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

It appears that right of way will be required for this project.

Traffic will be maintained at all times. However, it will be necessary to reduce traffic down to one lane via the use of flaggers during the removal of the bridge rail, guardrail and placement of the flowable mortar.

Culvert Items	<u>Estimated Cost</u>
New Culvert	\$153,400
Headwalls	\$32,100
Removal of Concrete (barriers, curbs)	\$9,600
Deck Repair, Class A	\$10,200
Deck Repair, Class B	\$12,500
Revetment	\$3,700
Engineering Fabric	\$300
Mobilization - 10%	\$22,200
Contingency - 20%	\$44,400
Culvert Total	\$288,400

Roadway Items	
Clear & Grubb	\$40,000
Special Backfill	\$10,500
Embankment in place, contractor furnished	\$135,000
Pavement Scarification & HMA Overlay	\$12,700
HMA Paved Shoulder	\$29,300
Granular Shoulders	\$2,000
Flooded backfill	\$59,500
Flowable mortar	\$75,000
Erosion Control	\$50,000
Guardrail removal	\$3,000
Right of Way	\$50,000
Traffic Control @ 5%	\$23,200
Mobilization @ 5%	\$23,200

M&C @ 30%	\$139,200
Roadway Total	\$652,600
Project Total	\$941,000

Alternative #2 - Replace with a culvert utilizing a detour

The existing 86' x 26' continuous concrete slab bridge will be replaced with a single 12' x 12' x 124' reinforced concrete box (RCB) placed at a ten degree right ahead skew. Two fifteen-degree bends will be required in the box to fit the existing significant stream bend. The flow line of the box will be buried 1' below the existing flow line in the channel. This will allow the bottom of the box to silt in and provide a natural bottom for fish passage.

The typical cross section over the culvert will consist of a 24' roadway with 8' effective shoulders, then 6:1 foreslopes to clear zone, then 3:1 to tie-in. As discussed in Alternative #1, this bridge is located within a superelevated curve and there is significant erosion of the shoulder on the low side of the curve (west side). After discussions at the concept site visit, District requested to pave the 8' shoulder on the low side and pave 4' of the 8' effective shoulder on the high side to allow for the addition of rumble strips. All paving will be HMA to match the existing full depth HMA pavement.

Vertical and horizontal clearance requirements are met so the new RCB can be built under the existing bridge without disturbing the bridge. After the culvert has been constructed, traffic will be detoured for a limited period of time (estimated to be four weeks maximum for calculation purposes) for the existing superstructure, concrete bridge barrier, curb, and guardrail to be removed. Once the new embankment for the shoulders and 6:1/3:1 foreslopes have been placed. The new pavement and shoulders can then be constructed.

The roadway will be reconstructed on the existing vertical and horizontal alignment. The existing ditches will need to be relocated to meet the inlet and outlet flowlines of the new RCB. Class E revetment will be placed at the ends of the RCB.

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

It appears that right of way will be required for this project.

Traffic will be detoured for a limited period of up to four weeks maximum.

Culvert Items	<u>Estimated Cost</u>
New Culvert	\$153,400
Headwalls	\$32,100
Removal of Superstructure	\$14,400
Revetment	\$3,700
Engineering Fabric	\$300
Mobilization - 10%	\$20,400
Contingency - 20%	<u>\$40,800</u>
Culvert Total	\$265,100
Roadway Items	
Clear & Grubb	\$40,000
Special Backfill	\$10,500
Embankment in place, contractor furnished	\$150,000
Modified Subbase	\$2,800
HMA Pavement	\$9,000

HMA Paved Shoulder	\$29,300
Granular Shoulders	\$2,000
Flooded Backfill	\$42,000
Erosion Control	\$50,000
Guardrail removal	\$3,000
Right of Way	\$50,000
Traffic Control @ 5%	\$18,800
Mobilization @ 5%	\$18,800
M&C @ 30%	\$112,800
Roadway Total	\$539,000
Project Total	\$804,100

Other Alternatives Considered

A straight culvert placed between the existing piers does not fit the stream for a flowable mortar method. Moving a straight culvert further south (requiring the removal of a pier) still does not fit the stream well.

A bridge was not considered due to more maintenance and guardrail installation to maintain. Culverts are usually preferred over bridges when hydraulically adequate and site conditions allow for a culvert.

Existing roadway geometrics, grades and topography do not make this site a good candidate for either staged construction or an on-site runaround due to the lack of site distance in either direction.

B. Detour Analysis

There may be an off-site detour utilized for a short duration if the District wants the superstructure of the existing bridge removed. If the detour option is chosen, US 169 will be closed for a limited time (estimated to be four weeks maximum). The detour would follow IA 2 east to County Road P46, then south on County Road P46 (which becomes County Road O once in Missouri) to junction with MO 46, then west on MO 46 to junction with US 169. Out of distance travel is 26 miles. The total distance user cost is anticipated to be \$68,000. The cost for county road maintenance will be \$4,000 as calculated by the Gas Tax Method. User and maintenance costs were calculated assuming similar gas tax rates and traffic volumes for the portions within Missouri as their counterparts in Iowa. Detour signing costs will be \$10,000.

C. Recommendations

It is recommended that the present structure be replaced with a reinforced box culvert, as described in Alternative No. 2.

D. Construction Sequence

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

E. ADA Accommodations

There are no bike paths or sidewalks adjacent to US 169; 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. Score based on using a three span bridge although box culvert is proposed. Score is less than 50 therefore no further evaluation is considered

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

Additional survey is requested for grading the ditches and around the RCB wingwalls.

It appears that right of way will be required for this project.

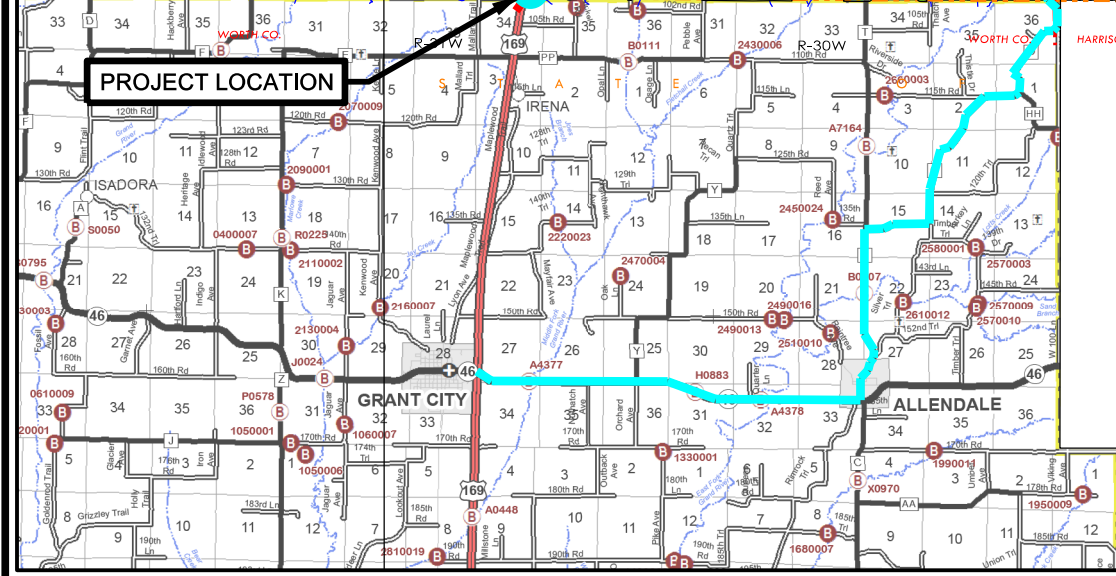
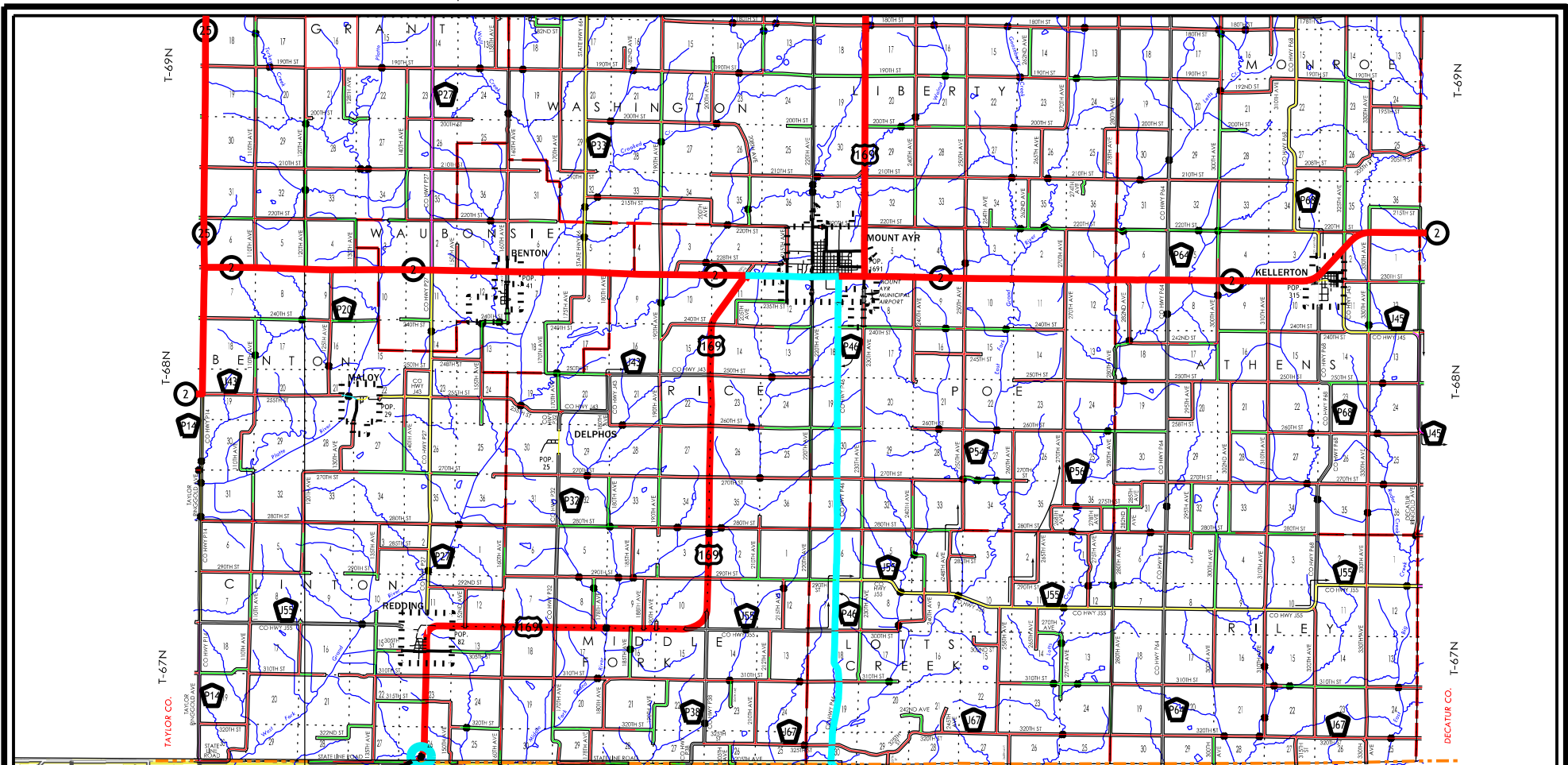
The Location and Environment Bureau has not reviewed this project at this time. Once their review is completed, comments will be incorporated into the final concept statement.

F. Program Status

Site data has been developed by Shive-Hattery. This project is listed in the 2020-2024 Iowa Transportation Improvement Program, with \$920,000 programmed for replacement in FY 2023. Costs for this project may be eligible for bridge replacement funds. A schedule of events will be developed following approval of the Project Concept.

Following page has a map of the county showing the location of the project area and the anticipated detour route.

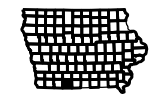
Attachment A - Utilities



HARRISON CO. R-29W R-28W HARRISON CO.

M I S S O U R I

DETOUR ROUTE



RINGGOLD COUNTY

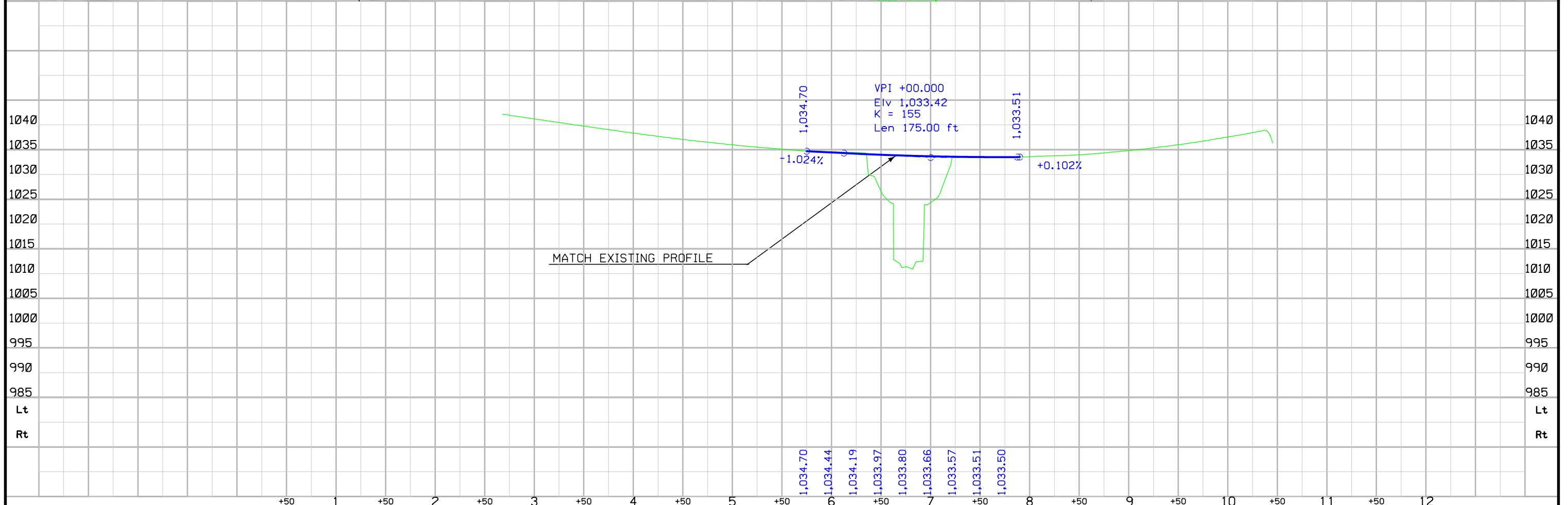
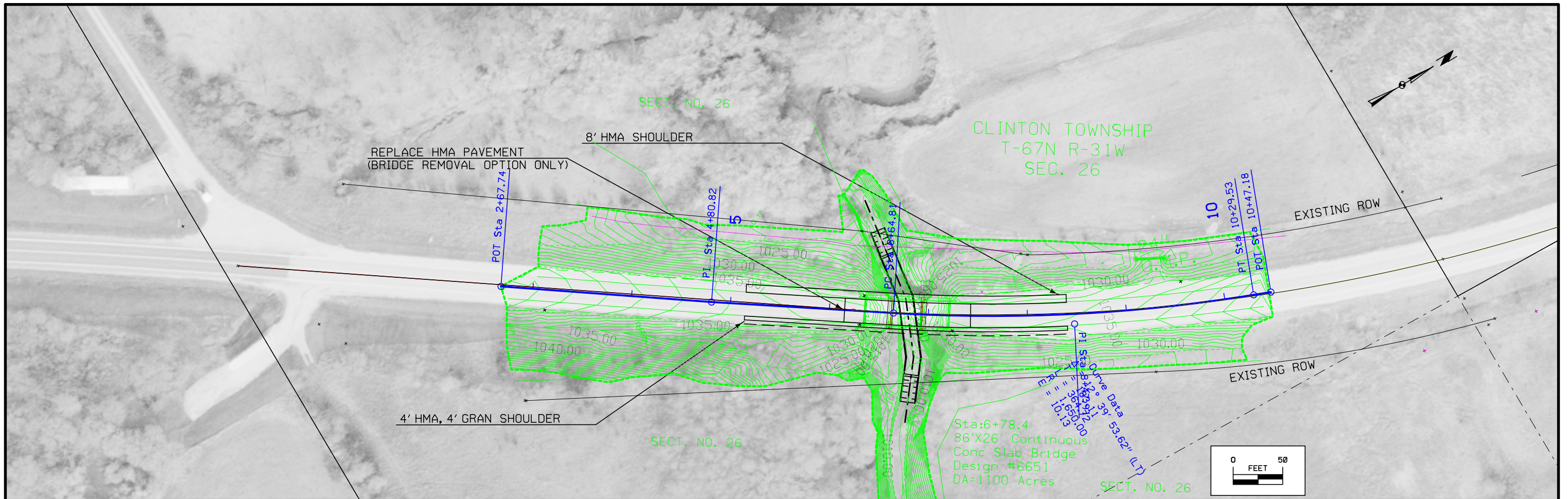
ATTACHMENT A

Jenifer J. Bates

From: ia@occinc.com
Sent: Tuesday, May 21, 2019 12:26 PM
To: Murray B. Berting
Subject: Design Information Results for Ticket # 551903734

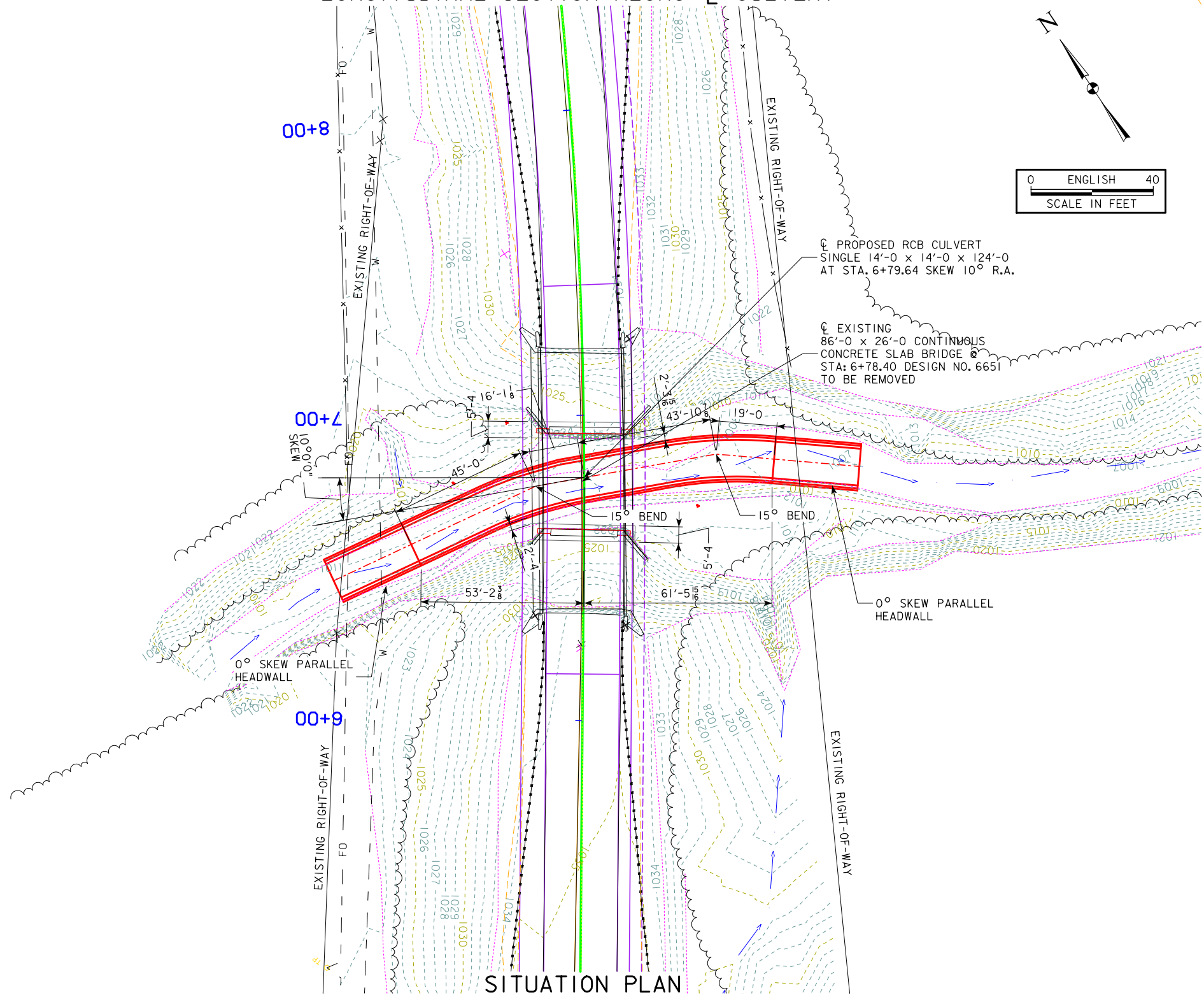
(SIR) SOUTHERN IOWA RURAL WATER ASSO
Contact Name : Dan McIntosh
Contact Phone: 6417825744
Contact Email: dmc@sirwa.org

(WINIA) WINDSTREAM COMMUNICATIONS
Contact Name : LOCATE DESK
Contact Phone: 8002891901
Contact Email: LOCATE.DESK@WINDSTREAM.COM



X		X
X		X
X		X
X		X
X		X
X		X

LONGITUDINAL SECTION ALONG CULVERT



HYDRAULIC DATA

DRAINAGE AREA = 1.76 SQ. MI.
 Q₅₀ = 2180 CFS
 HW ELEV. = 1024.90
 STREAM SLOPE = 66.6 FT./MI.
 Q₁₀₀ = 2680 CFS HW ELEV. = 1029.10
 Q₁₀₀₀ = 3860 CFS HW ELEV. = 1034.20

UTILITIES LEGEND:

- W — RURAL WATER LINE
- FO — FIBER OPTIC LINE

UTILITIES SHOWN ON THIS SHEET ARE FOR INFORMATION ONLY, SEE ROAD DESIGN SHEETS FOR FINAL UTILITY INFORMATION.

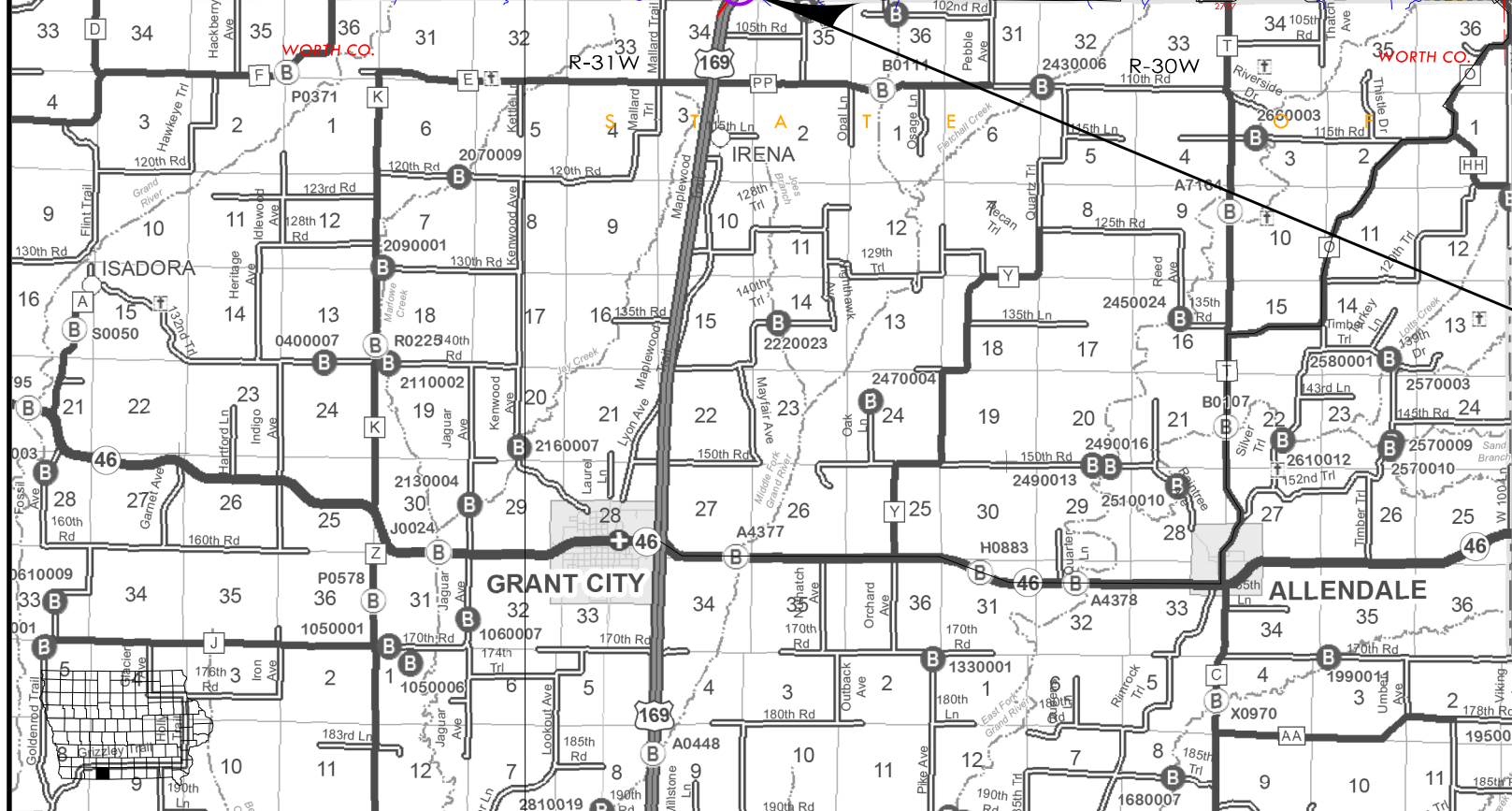
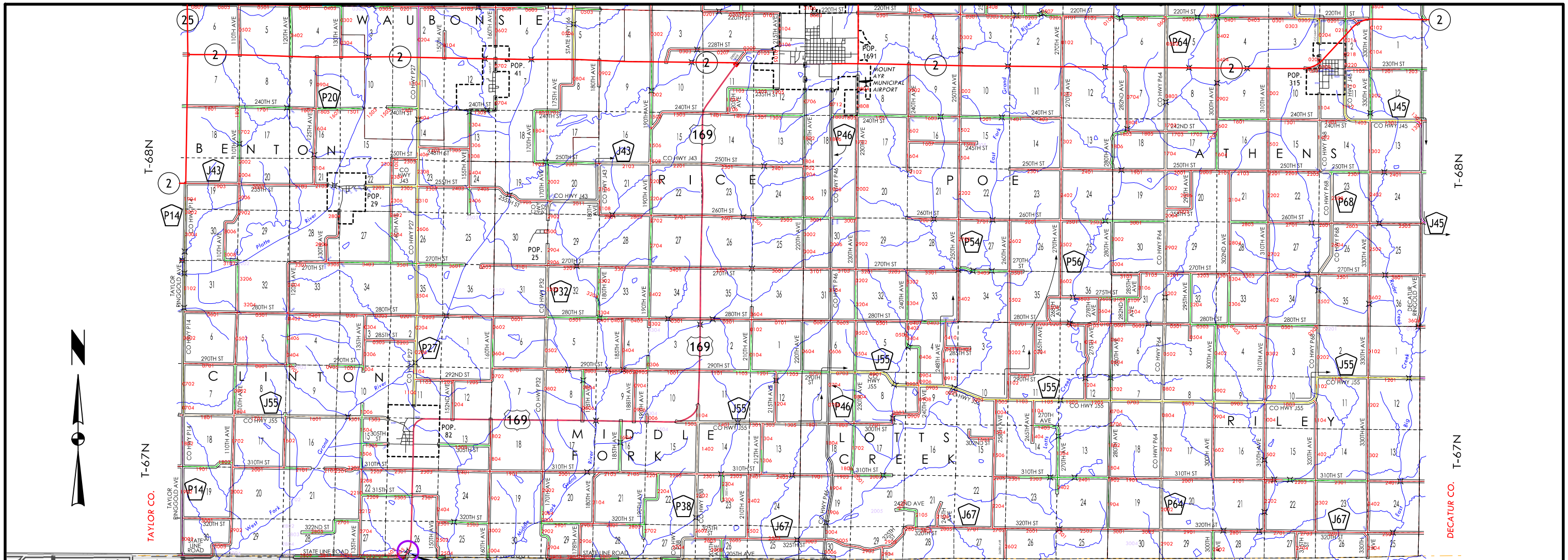
LOCATION

US169 OVER STREAM 0.1 MI NORTH OF MISSOURI T-67N R-31W SECTION 26 CLINTON TOWNSHIP RINGGOLD COUNTY FHWA NO. ? BRIDGE MAINT. NO. ? LATITUDE LONGITUDE

TRAFFIC ESTIMATE

2022 AADT	600	V.P.D.
2042 AADT	700	V.P.D.
2042 DHV	70	V.P.H.
TRUCKS	15	%

DESIGN FOR 10° SKEW R.A.
SINGLE 14'-0 X 14'-0 X 124'-0
CAST IN PLACE CONCRETE CULVERT
SITUATION PLAN
 STATION 6+79.64 OCTOBER 2019
RINGGOLD COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. ___ OF 1 FILE NO. ___ DESIGN NO. ___



HARRISON CO. R-29W R-28W

M I S S O U R I

PROJECT LOCATION
 US 169 BRIDGE REPLACEMENT
 STA.: 417+43.30
 FHWA NO.: N/A
 MAINT. NO.: 8000.1S169
 MP: 0.1

LOCATION MAP SCALE
 0 1 2 3
 Miles

RINGGOLD COUNTY

Paved Shoulder

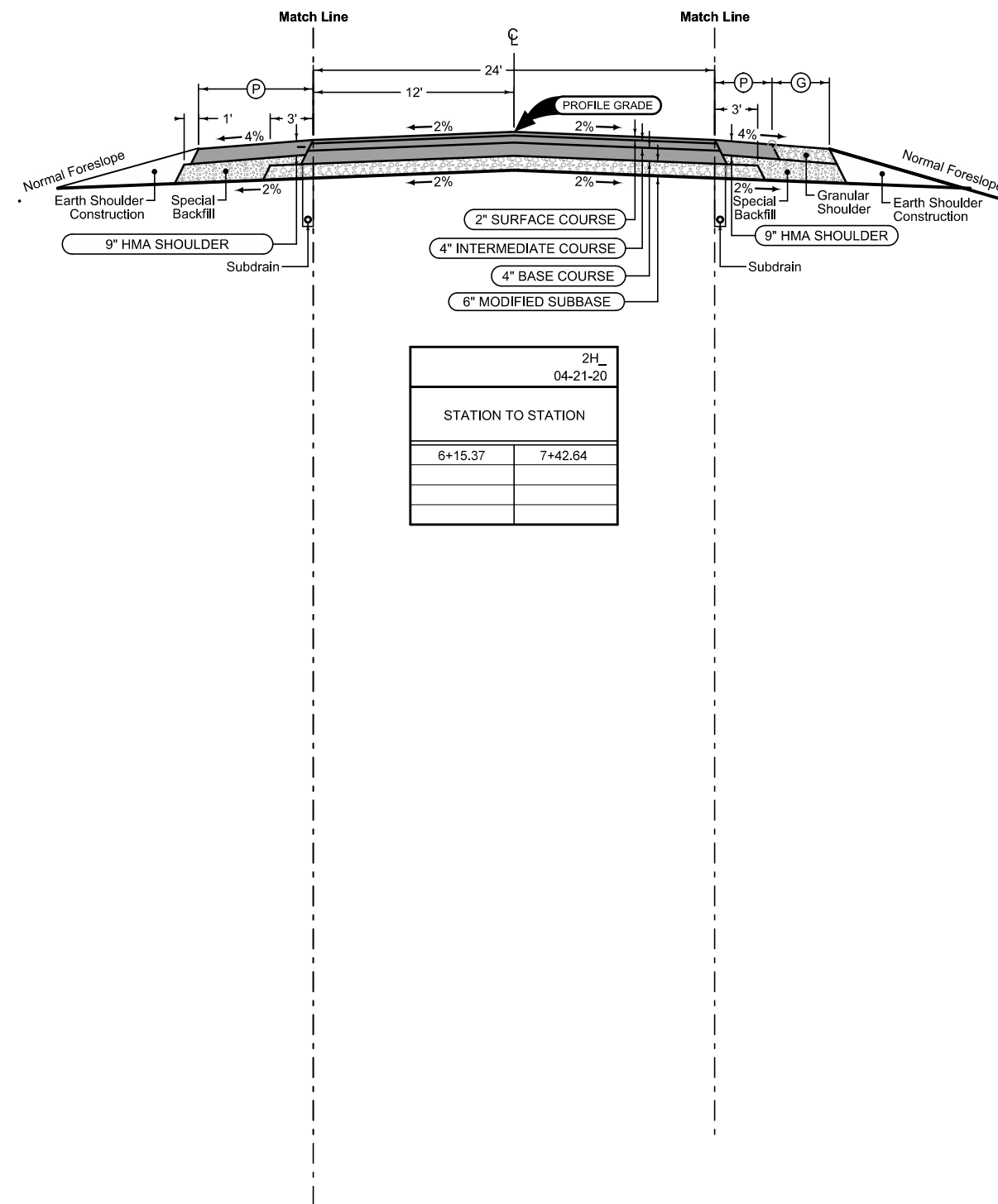
PCC Shoulder Jointing:
 Longitudinal joint: BT-1 or BT-5
 Transverse joints: C at mainline spacing
 HMA Shoulder Jointing:
 Longitudinal joint: B

STATION TO STATION		(P) Feet
5+15.00	8+44.00	8

Combination Shoulder

Shoulder Jointing:
 Longitudinal joint: B

STATION TO STATION		(P) Feet	(G) Feet
6+15.37	7+42.64	4	4



STATION TO STATION	
6+15.37	7+42.64

See Tab 100-24 or 100-25 for pavement quantities.
 See Tab 112-9 for shoulder quantities.

US 169

SURVEY SYMBOLS

- CP Control Point
- BM Bench Mark
- ✕ PCT Photo Control Target
- EP Edge of Paved Roads (ML or SR)
- TOP Top of Bridge Pier
- BBB Bottom of Bridge Beam
- BLS Bridge Low Steel
- GR Ground Shot
- BL Topo Breakline
- DU Centerline Draw or Stream (Up)
- WL1D Water Line Co. 1 - Quality D
- PIP Pipe Culvert
- D Centerline Draw or Stream (Down)
- TW Top of Water
- BD Bridge Deck
- EG Edge of Gravel Road
- SIGN SI Sign
- C Centerline BL of Road (ML or SR)
- ✕ FW Wire Fence
- BRG Bridge
- RET Retaining Walls
- GDL Guard Rail Steel
- BCL Bridge Centerline
- FO1B Fiber Optic Co. 1 - Quality B
- TP TPD Telephone Pedestal
- WL2D Water Line Co. 2 - Quality D
- PCP Photo Control Point
- PLG Location of General Photo
- SBR Size of Bridge

UTILITY LEGEND

Sub-Surface Utility Mapping Quality Level is in accordance with CI/ASCE 38-02 Standard Guidelines for the Collection and Depiction of Existing Subsurface Utility Data.

Remark Abbreviations
 QLA Quality Level A Highest guideline quality level
 QLD Quality Level D Lowest guideline quality level

- WL1D Water Line Co. 1 - Quality D
- PIP Pipe Culvert

- FO1B Fiber Optic Co. 1 - Quality B
- TP TPD Telephone Pedestal
- WL2D Water Line Co. 2 - Quality D

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.		
Yellow	(4)	█	Highlight for Critical Notes or Features
Red	(3)	▨	Delineates Restricted Areas
Lavender	(9)	█	Temporary Pavement Shading
Gray, Light	(48)	█	Proposed Pavement Shading
Gray, Med	(80)	█	Proposed Granular Shading
Gray, Dark	(112)	█	Proposed Grade and Pave Shading "In conjunction with a paving project"
Brown, Light	(236)	█	Grading Shading
Tan	(8)	█	Proposed Sidewalk Shading
Blue, Light	(230)	█	Proposed Sidewalk Landing Shading
Pink	(11)	█	Proposed Sidewalk Ramp Shading

PROFILE VIEW COLOR LEGEND OF PLAN AND PROFILE SHEETS

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

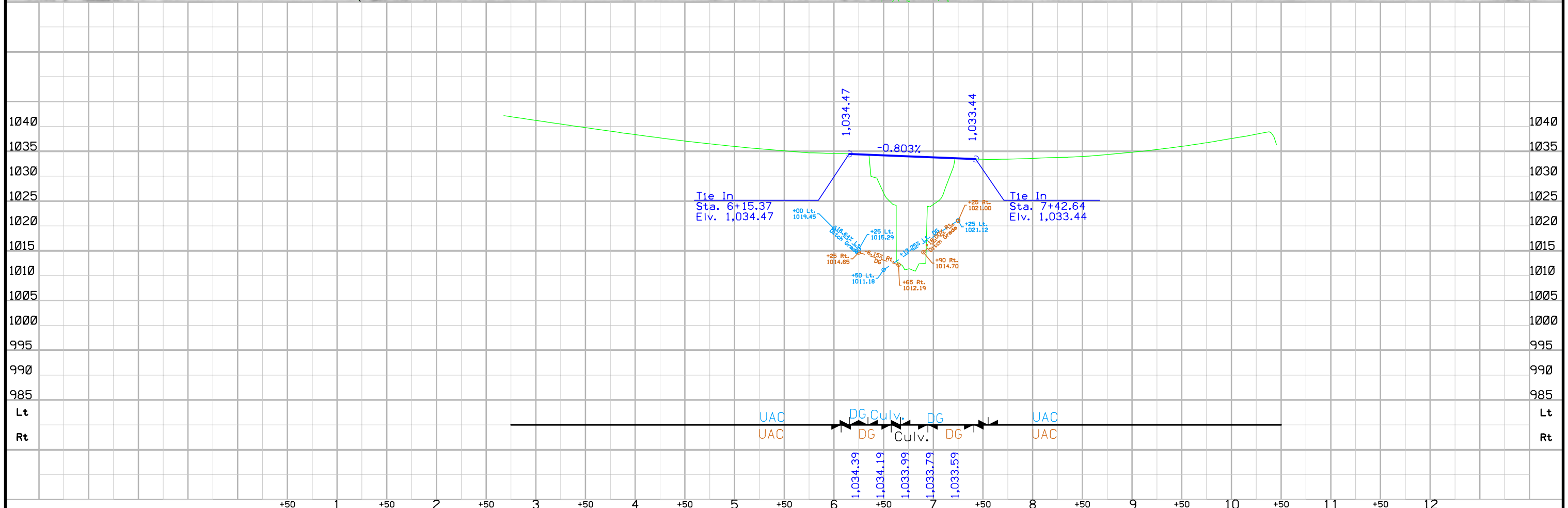
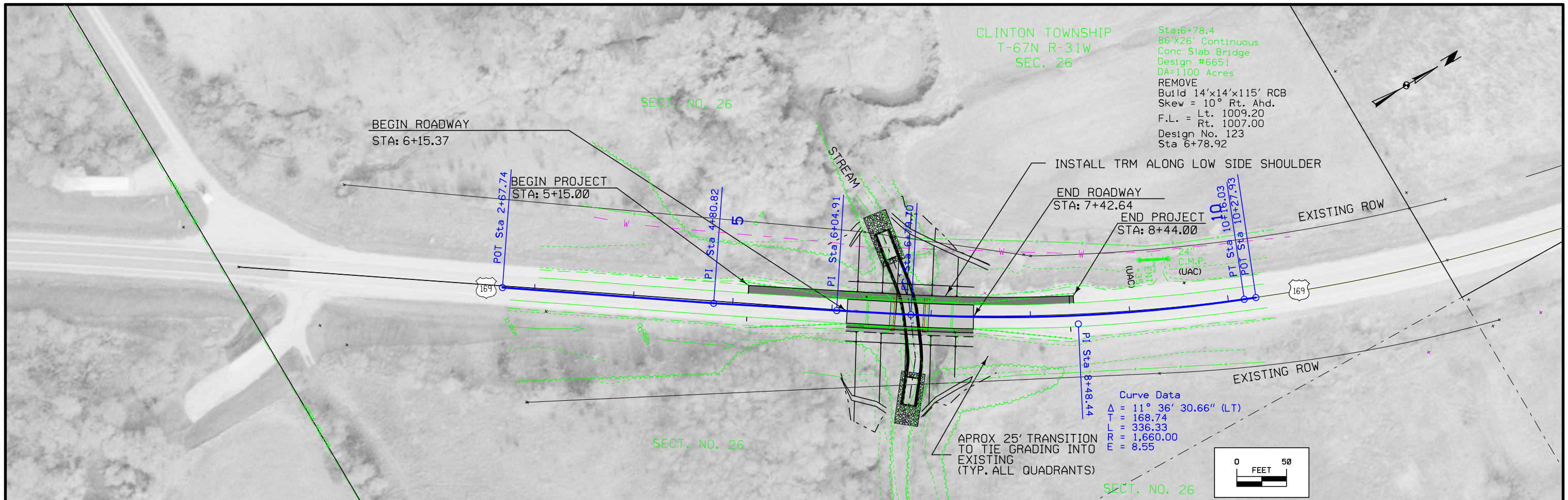
- Reference Point
- Station
- Survey Line
- Section Corner
- Ground Line Intercept
- Saw Cut
- Guardrail
- Trench Drain
- HighTension Cable Guardrail
- Sheet Pile
- Pavement Removal
- Clearing & Grubbing Area

RIGHT-OF-WAY LEGEND

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

PLAN AND PROFILE LEGEND AND SYMBOL INFORMATION SHEET

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



Survey Information

Ringgold County
BRFN-169-1(46)39-80
Hwy 169 over Stream 0.1 mi N. of Missouri
PIN 18-80-169-010
Sap-0200.3

Party Personnel

Murray Berting- Party Chief
Derek Alleman- Assistant Survey Party Chief
Oscar Contreras- Assistant Survey Party Chief
Grant Hemphill- Assistant Survey Party Chief

Date(s) of Survey

Begin Date 05/23/2019
End Date 06/06/2019

General Information

Measurement units for this survey are US survey feet. This survey is for proposed Bridge reconstruction and reconstruction of US 169 over stream. Project datum and control information is provided by Shive-Hattery, Inc. This project is a Full DTM with Photo control. This survey request was for the US 169 Corridor and stream reconstruction.

Vertical Control

IARTN
Vertical datum for this survey is NAVD88 (Computed using Geoid12A). Additional benchmarks were placed throughout the project using a Total Station setup relative to Point 1 and Point 2. Vertical control was verified between control points with check shots by Total Station through multiple setup from various occupation points with a vertical error of less than 0.05 feet.

This survey found a local control benchmark monument (benchmark plug on bridge abutment in SE corner bridge). No vertical information was available at the time field work was completed.

Horizontal Control

(Project Coordinates from Redundant IARTN Observations)

The project coordinate system is Iowa Regional Coordinate System Zone 12 (U.S. Survey Feet. This survey control is relative to the IARTN reference stations. IARTN Reference Station coordinates are relative to the National Reference Station network datum: NAD83 (2011) for Epoch 2010.00. Coordinates were determined by IARTN observations with appropriate occupation times. Additional control points were placed throughout the project using a Total Station setup relative to Point 1 and Point 2.

Alignment Information

The horizontal alignment for this survey is a retrace of As-built Plans No. F.931(I). Survey stationing was equated to the plan PI at STA 12+04.7 and run back and ahead without equation throughout the survey.

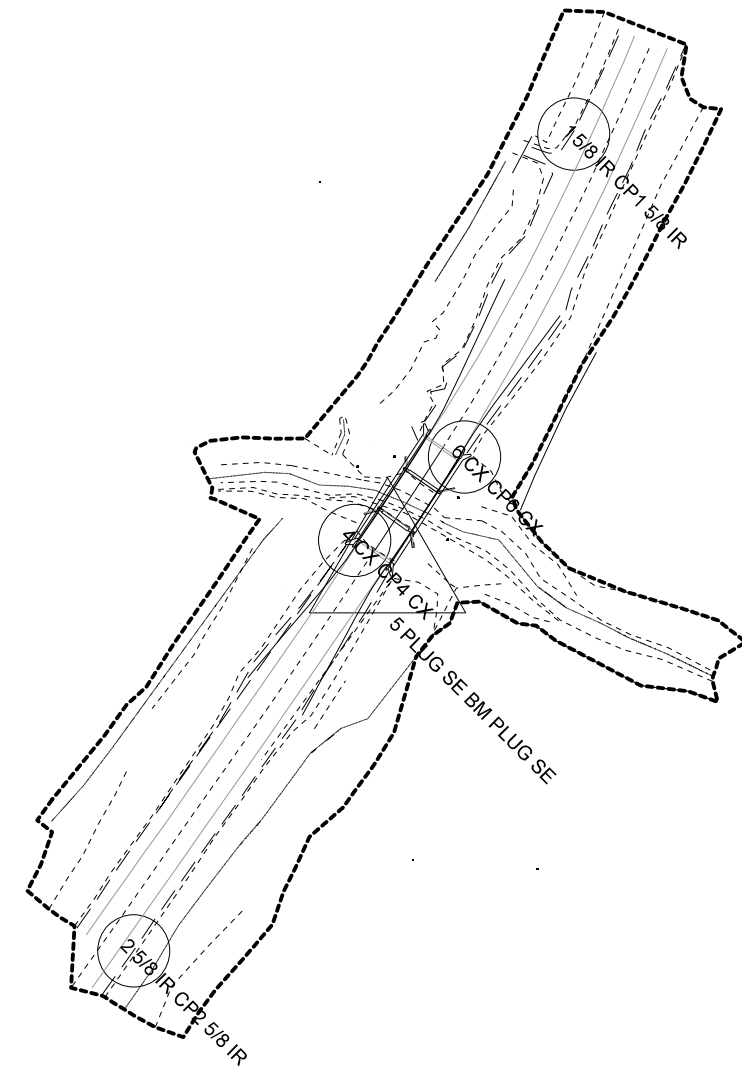
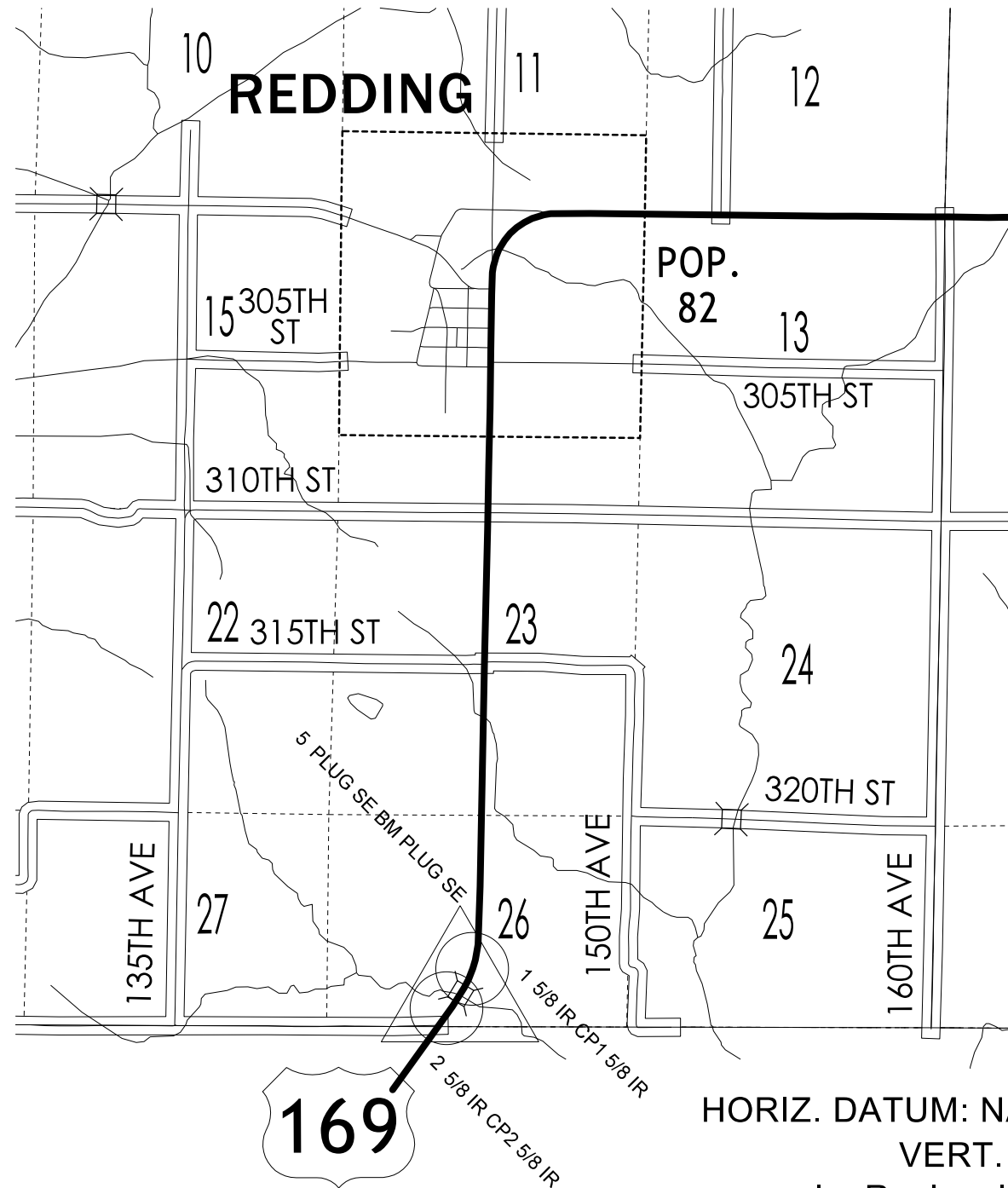
Survey stationing relates to as built plan stationing as follows:

PI Sta. 12+04.7 As-built Plans Project No. F.931(I)
Survey PI Sta: 12+04.7

Bridge Sta 6+78.4 Project No. F.931(I)
Survey Bridge STA 6+78.4

CONTROL POINT VICINITY MAP

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



HORIZ. DATUM: NAD83(2011) EPOCH 2010.00

VERT. DATUM: NAVD88

1a. Regional Coordinate System Zone 12

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

HORIZONTAL AND VERTICAL PROJECT CONTROL COORDINATE LISTING

HORIZ. DATUM: NAD83(2011) EPOCH 2010.00

VERT. DATUM: NAVD88

Ia. Regional Coordinate System Zone 12

Point Name	Northing	Easting	Elevation	Feature Definition	Description
1	6075660.01	22322895.11	1034.28	CP1	5/8" Iron Rod
2	6075094.34	22322590.35	1039.98	CP2	5/8" Iron Rod
4	6075378.62	22322743.41	1034.47	CP4	"X" Cut in Concrete
5	6075359.66	22322766.17	1037.74	BM	Plug on Soiutheast Bridge Abutment
6	6075436.46	22322819.40	1033.52	CP6	"X" Cut in Concrete

ALIGNMENT COORDINATES

101-16
10-20-09

Name	Location	Point on Tangent			Begin Spiral			Begin Curve			Simple Curve PI or Master PI of SCS			End Curve			End Spiral		
		Station	Coordinates		Station	Coordinates		Station	Coordinates		Station	Coordinates		Station	Coordinates		Station	Coordinates	
			Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)
ML1691		2+67.74	6,075,068.88	22,322,547.04															
ML1693		4+80.82	6,075,243.12	22,322,669.68															
ML1695		6+04.91	6,075,345.67	22,322,739.56															
ML169.7								6+79.70	6,075,407.64	22,322,781.43	8+48.44	6,075,547.46	22,322,875.89	10+16.03	6,075,703.43	22,322,940.30			
ML1699		10+27.93	6,075,714.43	22,322,944.84															

SPIRAL OR CIRCULAR CURVE DATA

101-17
04-19-11

Name	Location	Δ_{scs}	Horizontal Alignment Data													Remarks			
			Spiral Data					Curve Data											
			θ_s	Ls	Ts	Es	Xc	Yc	L.T.	S.T.	Δ_c	T	L	R	E				
ML169.7														11° 36' 30.66" LT	168.74'	336.33'	1,660.00'	8.55'	

108-26A
08-01-08

STAGING NOTES

Stage 1:
Maintain traffic on US 169 while culvert is being constructed below existing bridge structure.

Stage 2:
Detour traffic, remove existing superstructure, backfill and reconstruct pavement.

Reopen to normal traffic operations.

108-23A
08-01-08

TRAFFIC CONTROL PLAN

- 1) Maintain traffic on US 169 during culvert construction.
- 2) Detour traffic during roadway reconstruction and superstructure removal. (See sheet J.2 for detour route)

108-25
10-21-14

511 TRAVEL RESTRICTIONS

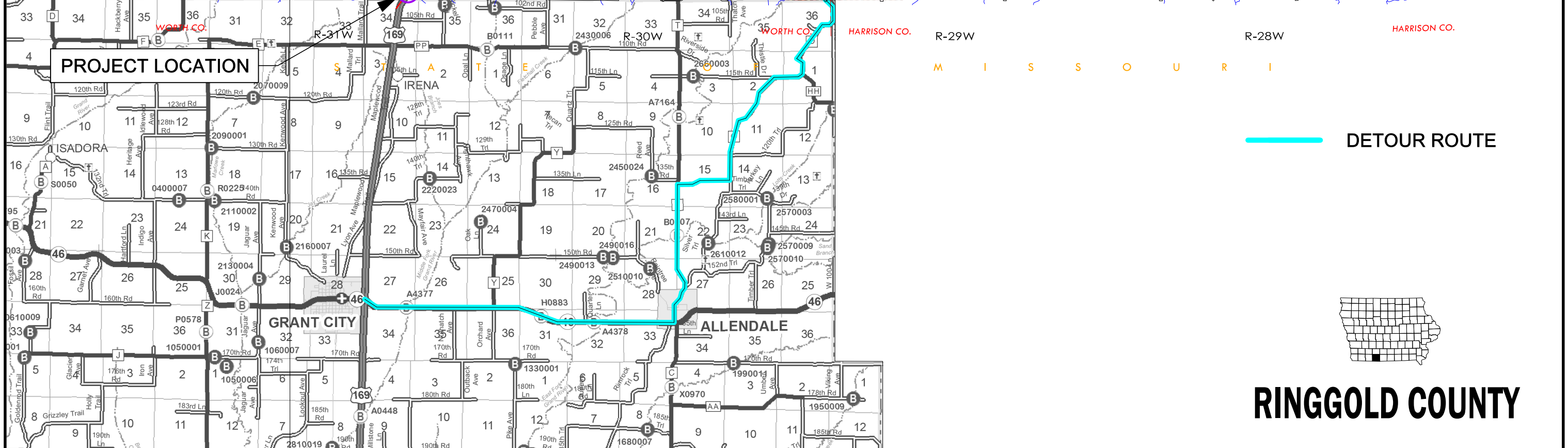
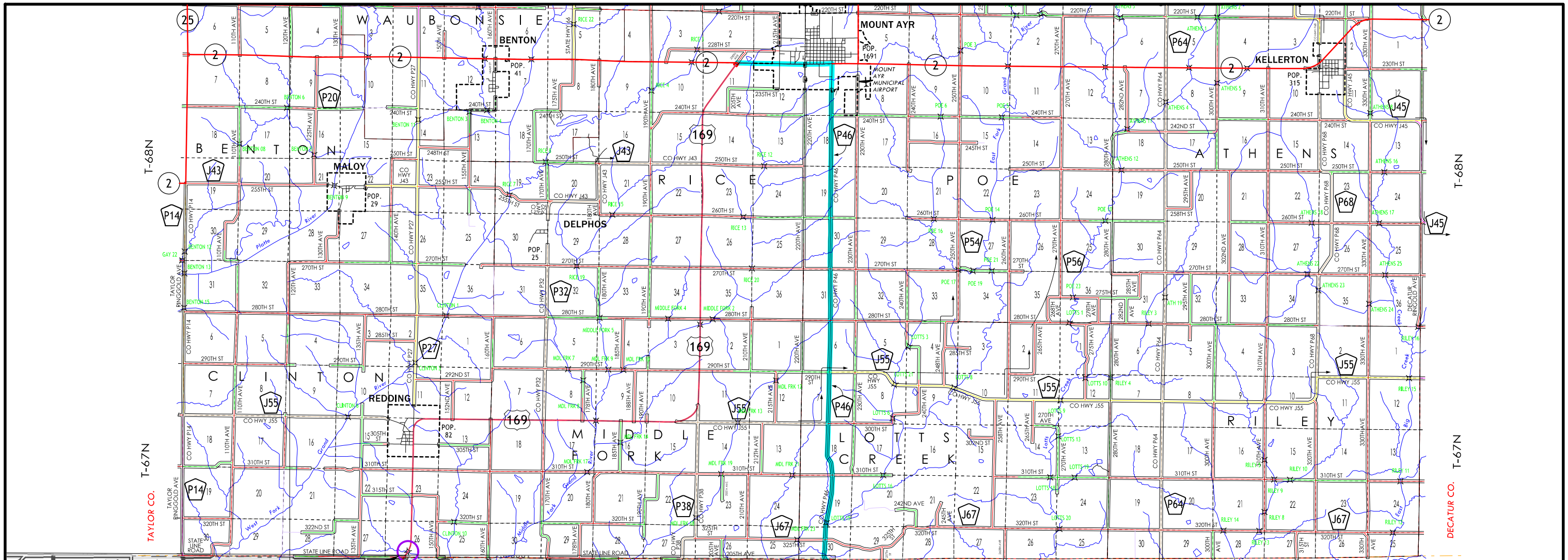
Route	Direction	County	Location Description	Feature Crossed	Object Type	Maint. Bridge No., Structure ID, or FHWA No.	Type of Restriction	Existing Measurement	Construction Measurement	Construction Measurement as Signed	Projected As Built Measurement	Remarks
			No Travel Restrictions Expected									

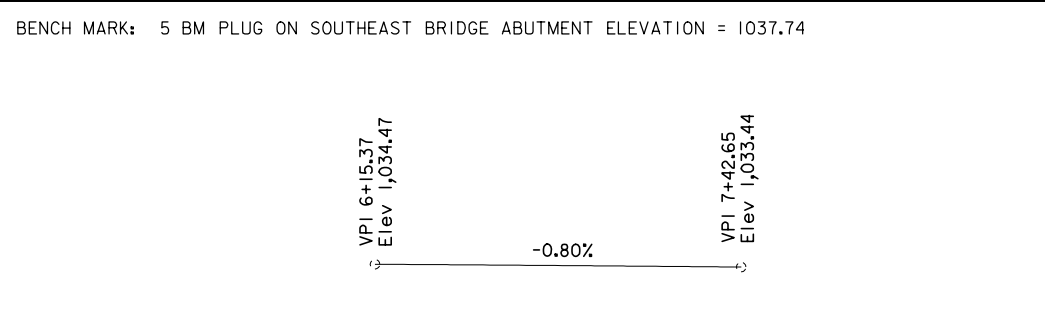
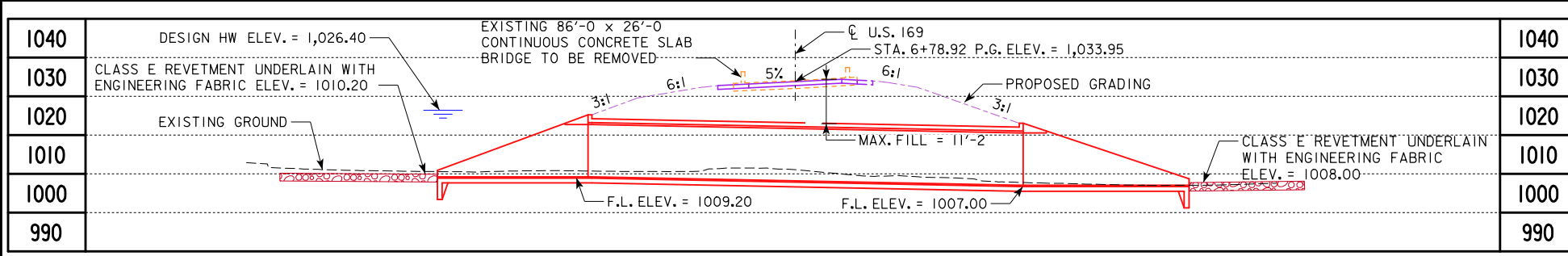
111-01
04-17-12

COORDINATED OPERATIONS

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

Project	Type of Work
None Provided	





**PROPOSED PROFILE
GRADE U.S. 169**

NOTES:

- EXISTING 86'-0 x 26'-0 CONTINUOUS CONCRETE SLAB BRIDGE DESIGN NO. 6651 TO BE REMOVED
- DRAINAGE THROUGH EXISTING CULVERT/CHANNEL MUST BE MAINTAINED THROUGHOUT CONSTRUCTION.
- FLOW LINE OF CULVERT NOMINALLY BURIED 1.0 FOOT.
- RCB WILL BE CONSTRUCTED UNDER THE EXISTING BRIDGE BEFORE CLOSING ANY LANES AND BEFORE REMOVING ANY OF THE EXISTING BRIDGE.
- DIMENSIONS IN PARENTHESES ARE FOR PRECAST RCB WHERE THEY ARE DIFFERENT THAN THE CAST IN PLACE.

HYDRAULIC DATA

DRAINAGE AREA = 1.76 SQ. MI.
 Q₅₀ = 2180 CFS
 HW ELEV. = 1026.40
 STREAM SLOPE = 66.6 FT./MI.
 Q₁₀₀ = 2680 CFS HW ELEV. 1028.80
 Q₅₀₀ = 3860 CFS HW ELEV. = 1034.40

UTILITIES LEGEND:

- w — RURAL WATER LINE
- FO — FIBER OPTIC LINE

UTILITIES SHOWN ON THIS SHEET ARE FOR INFORMATION ONLY, SEE ROAD DESIGN SHEETS FOR FINAL UTILITY INFORMATION.

LOCATION

US 169 OVER STREAM
 T-67N R-31W
 SECTION 26
 CLINTON TOWNSHIP
 RINGGOLD COUNTY
 FHWA NO. N/A
 BRIDGE MAINT. NO. 8000.IS169
 LATITUDE 40.572933°
 LONGITUDE -94.387891°

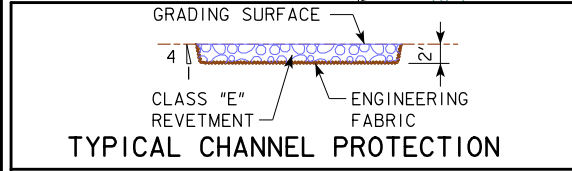
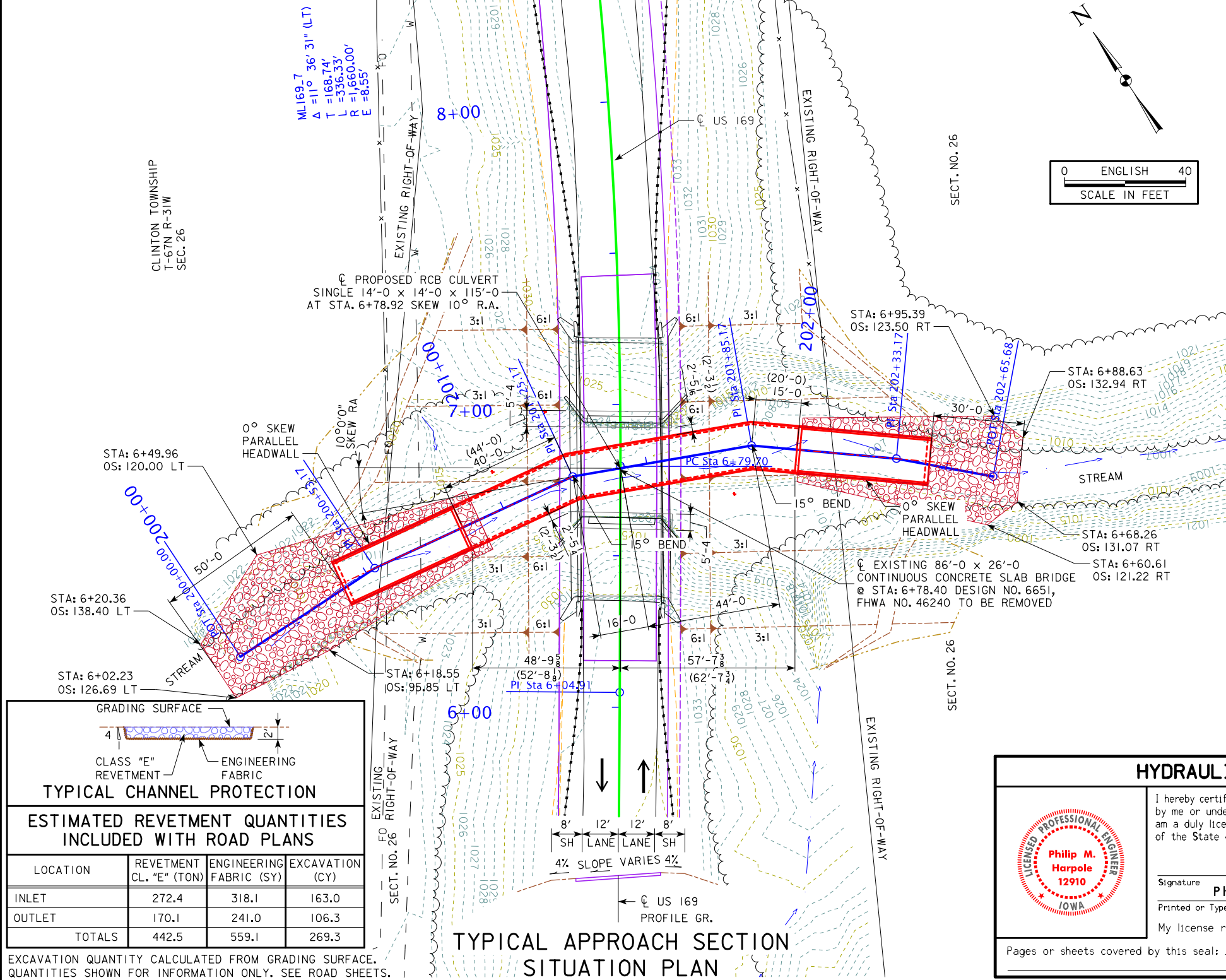
TRAFFIC ESTIMATE

2022 AADT	600	V.P.D.
2042 AADT	700	V.P.D.
2042 DHV	70	V.P.H.
TRUCKS	15	%

PRELIMINARY

DESIGN FOR 10° SKEW R.A.
**SINGLE 14'-0 X 14'-0 X 115'-0
 CAST IN PLACE CONCRETE CULVERT
 SITUATION PLAN**
 STATION 6+78.92 JULY 2020
 RINGGOLD COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. 1 OF 1 FILE NO. 31707 DESIGN NO. 123

LONGITUDINAL SECTION ALONG CULVERT



ESTIMATED REVELTMENT QUANTITIES INCLUDED WITH ROAD PLANS

LOCATION	REVELTMENT CL. "E" (TON)	ENGINEERING FABRIC (SY)	EXCAVATION (CY)
INLET	272.4	318.1	163.0
OUTLET	170.1	241.0	106.3
TOTALS	442.5	559.1	269.3

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE. QUANTITIES SHOWN FOR INFORMATION ONLY. SEE ROAD SHEETS.

TYPICAL APPROACH SECTION SITUATION PLAN

HYDRAULIC DESIGN

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

Signature: **Philip M Harpole** Date: _____
 Printed or Typed Name: Philip M Harpole
 My license renewal date is December 31, 2021

Pages or sheets covered by this seal: _____

LINE STYLE LEGEND OF CROSS SECTION SHEETS (ROAD)

- - - - - - Existing Ground Line
- Proposed Template
- Proposed Topsoil Placement
- - - - - Additional Topsoil Removal
- Subgrade Treatment
- - - - - Granular Shoulder
- Pavement
- - - - - Existing Pipe\RCB
- Proposed Pipe\RCB
- Proposed Dike
- All Elements Associated with Proposed Entrances

LINE STYLE LEGEND OF CROSS SECTION SHEETS (SOILS)

- Topsoil (Class 10)
- Slope Dressing Only
- Class 10 Materials
- Select Loams And Clay-Loams
- Select Sand
- Unsuitable Type A Disposal
- Unsuitable Type B Disposal
- Unsuitable Type C Disposal
- Shale
- Waste
- Broken and Weathered Rock
- Solid Rock
- Boulders

Note: All layer lines and descriptions identify layers above the line.

Note: Vertical or near vertical lines connecting soil layers at edges of cross sections are only for the purpose of calculating template quantities and do not depict soil stratification.

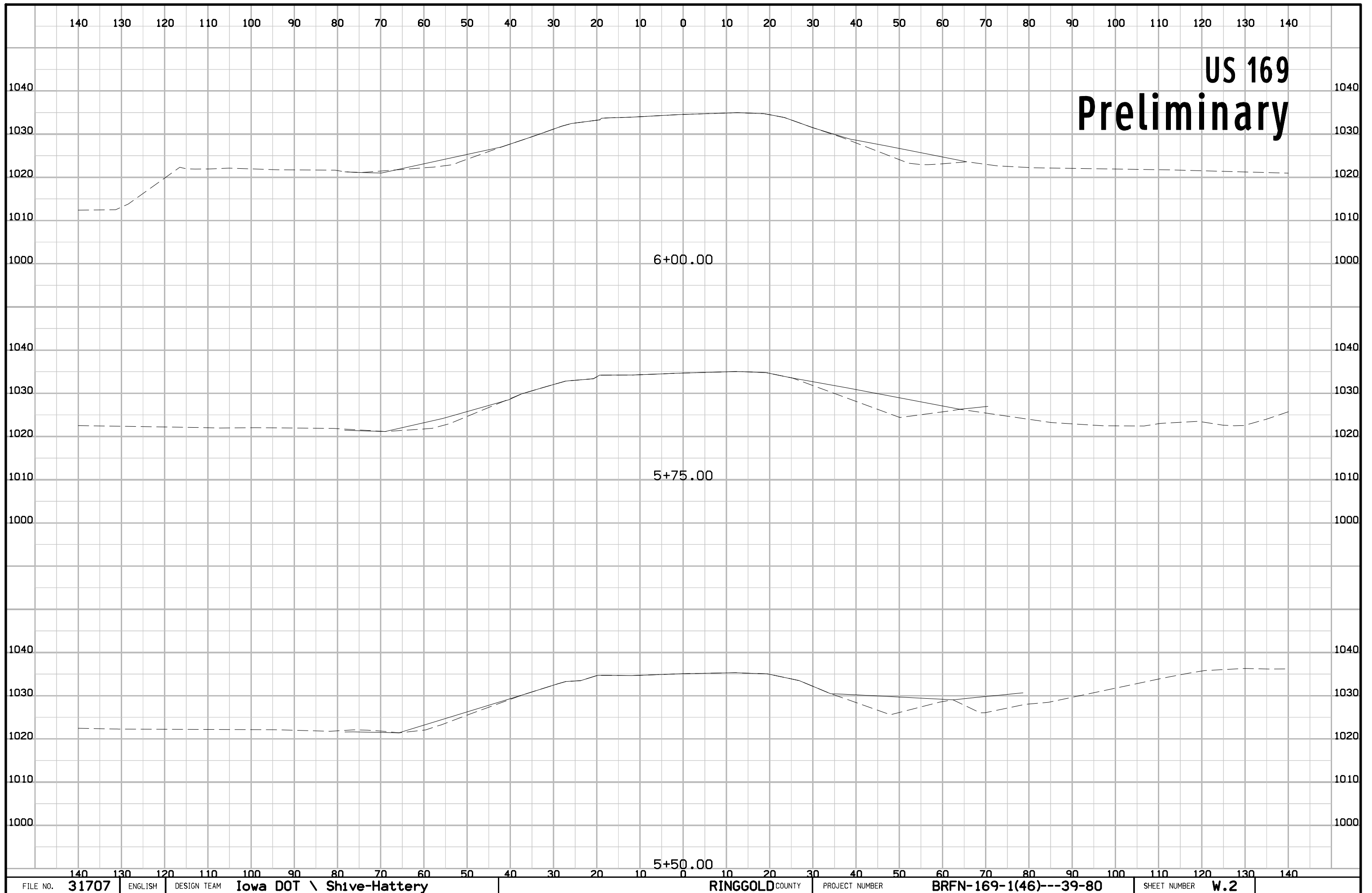
SYMBOL LEGEND OF CROSS SECTION SHEETS

- Existing ROW
|
Existing Right-of-Way Limit
- Proposed ROW
|
Proposed Right-of-Way Limit
- Temporary ROW
|
Temporary Right-of-Way Limit

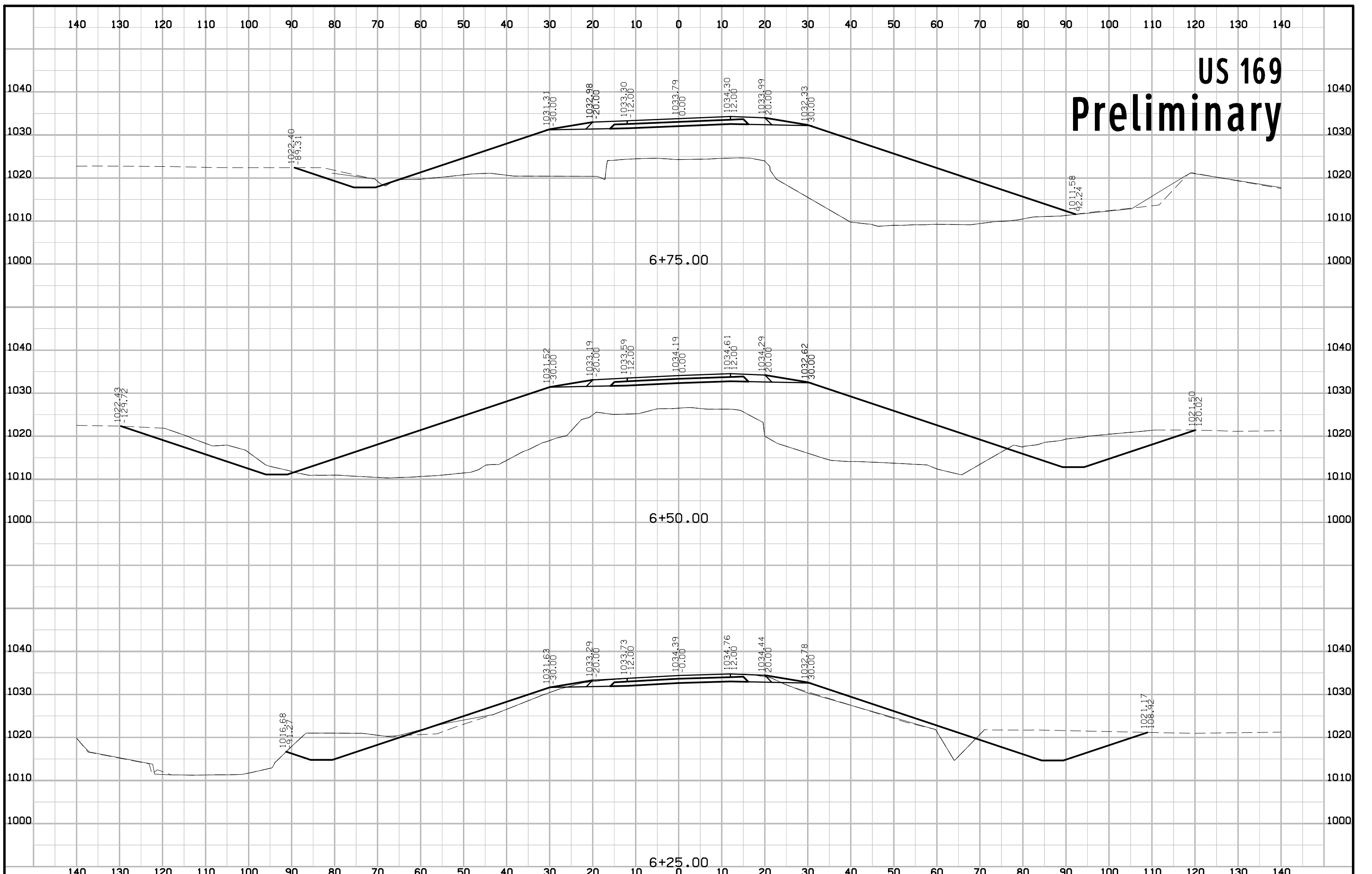
**CROSS SECTION
LEGEND AND SYMBOL
INFORMATION SHEET**

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

US 169 Preliminary



US 169 Preliminary



US 169 Preliminary

