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Highway Division

PLANS OF PROPOSED IMPROVEMENT ON THE

**PRIMARY ROAD SYSTEM
BENTON COUNTY
BRIDGE REPLACEMENT**

US 218 - Small stream, 0.1 mi E of Cty Rd V61

SCALES: As Noted

Refer to the Proposal Form for list of applicable specifications.

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



REVISIONS

FIELD EXAM MARK-UP

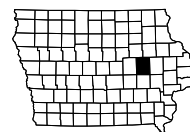
TOTAL
21
PROJECT IDENTIFICATION NUMBER
18-06-218-020
PROJECT NUMBER
BRFN-218-6(56)--39-06
R.O.W. PROJECT NUMBER

Field Exam held virtually on 6/14/21

Meeting Attendees:

- Roger Walton (IDOT)
- Steven Schroder (IDOT)
- James Glaspie (IDOT)
- Matt Erickson (IDOT)
- Mark Harle (IDOT)
- Mark Sloppy (IDOT)
- Danielle Alvarez (IDOT)
- Dave Claman (IDOT)
- Edward Engle (IDOT)
- Jesse Tibodeau (IDOT)
- Jenifer Bates (Shive-Hattery)
- Joe Appel (Shive-Hattery)
- Mike Janecek (Shive-Hattery)
- Dan Jensen (Shive-Hattery)

For Project Location Map
Refer to Sheet No. A.02



DESIGN DATA RURAL			
2024	AADT	3,000	V.P.D.
2044	AADT	3,100	V.P.D.
2044	DHV	320	V.P.H.
	TRUCKS	11	%
	Total Design ESALs	--	

INDEX OF SEALS		
SHEET NO.	NAME	TYPE
A.1	Michael J. Janecek	Primary Signature Block
V.1	Phillip M. Harpole	Hydraulic Design

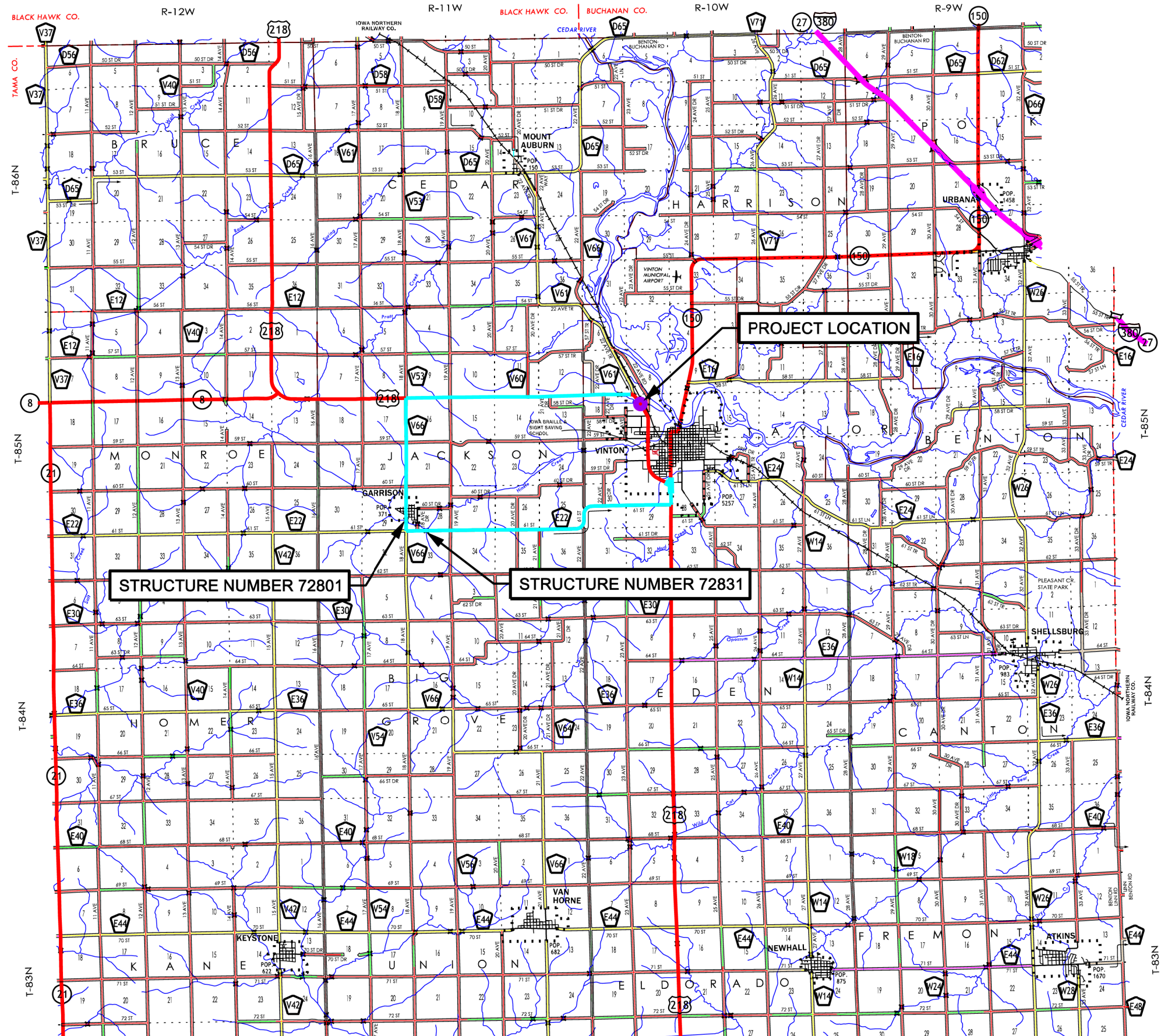
- D3 PLAN - Date: July 16, 2021
- D5 PLAN - Date: October 15, 2021
- D4 PLAN - Date: July 5, 2023

PRELIMINARY PLANS

Subject to change by final design.

D2 PLAN - Date: June 18, 2021

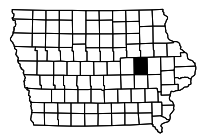
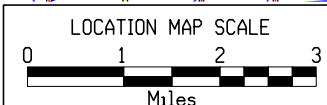
Detour okay as shown. Contractor will install and maintain detour signing as part of contract. SH will create signing plan.



STRUCTURE NUMBER 72801

STRUCTURE NUMBER 72831

PROJECT LOCATION



Roadway			
PIN Number	18-06-218-020	Submittal Date	7/3/2020
Project Number	BRFN-218-6(56)--39-06	Approval Date	
District	District 6	Assistant District Engineer	Jesse Tibodeau
County	BENTON	or	
Route	US 218	Office Director	
Location	Small stream, 0.1 miles E of Cty Rd V61		
Work Type	Bridge Replacement		
Segment Manager	John Bartholomew		
Designer	Jenifer Bates		

[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	60
Maximum superelevation rate (Refer to Section 2A-2)	6%	8%	6%
Design lane width (ft)	12	12	12
Full depth paved width (ft)	12	12	12
Right turn lane (ft)	12	10	N/A
Climbing Lane (ft)	12	12	N/A
Left turn lane (ft)	12	10	N/A
Pavement cross-slope (on tangent sections)	Through lanes	1.5% minimum, 2% maximum	2%
	Auxiliary and turn lanes	3% maximum	N/A
	Crown break at centerline	4% maximum	N/A
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	N/A
	Design speed ≥ 60 mph	4-inch sloped	N/A
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	6:1
	Beyond standard ditch depth and design clear zone	3.5:1	3:1
	Curbed roadways	2%	N/A
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	8:1
	w/o drainage structures	10:1	10:1
Ditches (Refer to Section 3G-1)	Outside ditch (depth x width) (ft)	5 x 10	5 x 10
Bridge width—new*	Bridge length ≤ 200 ft	design lane widths + effective shoulder widths	44'
	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
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 criteria is not met on the NHS system (No formal design exception is required)

Design year ADT =		3000				
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*	Effective = 8' Paved = 4'
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:

This corridor is about to undergo concepting for a 3R project that will be tied with this project. Therefore, the typical section and shoulder widths may need to be modified after that process is complete to better tie in with the 3R project. As per the site concept meeting, we will show 8' effective shoulders (4' paved, 4' granular).

Due to the proximity of the railroad to the end of the proposed culvert, the acceptable clear zone width was used on the east side of the road to provide additional clearance from the right of way line.

Preferred clear zone width was used on the west side of the road where there were no right of way restrictions.

Roadway Design Speed (mph) =		60														
Design Manual Section 1C-1 Last Updated: 04-29-19																
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 Section 6D-1)	425	495	570	645	730	820	425	495	570	645	730	820	570			
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	1330
		$e_{max} = 8\%$		--	--	--	--	--	--	758	960	1200	1480	1810	2210	N/A
Minimum vertical curve length (ft) (Refer to Section 2B-1)	crest vertical curves		150	165	180	195	210	225	150	165	180	195	210	225	180	
Minimum rate of vertical curvature (K) (Refer to Section 2B-1)	sag vertical curves	roadways without fixed-source lighting		84	114	151	193	247	312	84	114	151	193	247	312	151
		roadways with fixed-source lighting		96	115	136	157	181	206	96	115	136	157	181	206	136
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	--	--	--		
	Rural roadways		4			3			5	5	4	4	4	4	3	
	Interstates		4			3			5	5	4	4	4	4		
Clear zone	See "Preferred Clear Zone" table in Section 8A-2						See "Acceptable Clear Zone" table in Section 8A-2						30' W/26' E			

FINAL PROJECT CONCEPT STATEMENT

US 218 Reinforced Box Culvert over small stream, 0.1 miles E of Cty Rd V61.

IOWA DEPARTMENT OF TRANSPORTATION

TO OFFICE: District 6
ATTENTION: Jim Schnoebelen
FROM: Jenifer Bates
OFFICE: Shive-Hattery
SUBJECT: Project Concept Statement; (Final, D0)

DATE: August 11, 2020
PROJECT: Benton County
 BRFN-218-6(56)--39-06
 PIN: 18-06-218-020

Benton County
 Proj. BRFN-218-6(56)--39-06
 PIN: 18-06-218-020
 Maint. No. 0649.2S218
 FHWA No. 14345

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

August 11, 2020

This project involves the replacement of the US 218 bridge (Maint. No 0649.2S218) over small stream, 0.1 miles E of County Rd V61.

A concept review was held virtually on July 1, 2020. Those present included Jesse Tibodeau and Jeffery Tjaden from District 6; Steven Schroder, David Claman, Matthew Erickson, Kevin Patel, Jeremy Vortherms, Mark Sloppy, and Mary Kay Solberg from the Iowa DOT and Jenifer Bates, Joe Appel, Mike Janecek, and Mark Harpole from Shive-Hattery.

One alternative was considered:

- 1) Replace the existing structure with a twin 10' x 10' reinforced concrete box culvert at an estimated cost of \$644,000 (see attached concept for details). Additional right of way looks like it will be required. Iowa Northern Railway coordination will be required. Traffic will be maintained using a detour.

The Draft Project Concept Statement was sent out for review and comment with concerns to be resolved by August 7, 2020. Comments received during the review period have been considered and resolved.

This project is recommended for construction in FY 2024. The Bridges and Structures Bureau will coordinate the plan preparation with the assistance of 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
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	B. Bradley	B. E. Azeltine
B. D. Hofer	T. D. Crouch	S. J. Gent
S. Anderson	J. Selmer	K. K. Patel
S. Godbold	D. R. Claman	J. Hauber
A. Abu-Hawash	M. E. Khoda	K. Olson S. Neubauer
N. M. Abuissa	V. A. Brewer	C. L. Cutler
M. J. Donovan	S. W. Flockhart	S. McElmeel
M. K. Solberg	T. M. Storey	J. J. Tjaden
R. R. Walton	J. Tibodeau	M. Sloppy
J. Bartholomew		

I. STUDY AREA

A. Project Description

This project involves the replacement of the US 218 bridge (Maint. No 0649.2S218) over small stream, 0.1 miles E of County Rd V61.

The alternative considered was:

1. Replace the existing structure with twin 10' x 10' reinforced concrete box culvert using a detour.

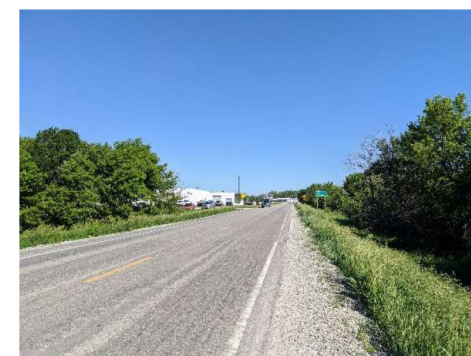
Alternative 1 is the preferred alternative due to the site topography, low traffic volumes, proximity to adjacent businesses, safety considerations, and availability of a suitable detour route.

Traffic will be maintained by an off-site detour.

The preliminary project cost is \$644,000. (This does not include costs associated with detour.)

B. Need for Project

This is twin 6' x 10' reinforced concrete box culvert that was built in 1926. The head wall has spalling with exposed steel. The barrels have spalls with exposed steel, delamination, and leaching cracks. Due to the age and condition of the culvert, a replacement is recommended.



SH Project #4202330

Shive-Hattery | 4125 Westown Parkway | Suite 100 | West Des Moines, IA 50266 | 515.223.8104 | shive-hattery.com



SH Project #4202330

Shive-Hattery | 4125 Westown Parkway | Suite 100 | West Des Moines, IA 50266 | 515.223.8104 | shive-hattery.com



C. Present Facility

The existing structure is a twin 6' x 10' reinforced concrete box culvert constructed in 1926.

US 218 in the project area is 24' wide PCC pavement with 4' wide granular shoulders and 1.5:1 foreslopes, constructed in 1928. HMA resurfacing was accomplished in 1952, 1960, 1979 and 1997.

D. Traffic Estimates

The 2024 construction year and 2044 design year average daily traffic estimates are 3,000 ADT with 11 % trucks and 3,100 ADT with 11 % trucks, respectively.

E. Sufficiency Ratings

US 218 is classified as an access route and is a maintenance service level C roadway. The federal bridge sufficiency rating is 53.4.

F. Access Control

Access rights will not be acquired for this project.

G. Crash History

During the five-year study period from January 1, 2015 through December 31, 2019, there were 6 crashes including, 1 personal injury crash and 5 personal property crashes.

II. PROJECT CONCEPT

A. Feasible Alternatives

Alternative #1 - Replace with a culvert

The existing twin 6' x 10' reinforced concrete box culvert will be replaced with a twin 10' x 10' reinforced concrete box culvert.

During the site concept visit, there was a discussion regarding the proximity of the east end of the proposed culvert to the railroad right of way line. It was decided that 10' was the absolute minimum desirable clearance for the District to be able to properly maintain the culvert after construction. In reviewing options, it was found this could be accomplished by using the acceptable clear zone distance of 26' for that side and the new standard parallel headwalls. That configuration yielded a clearance of approximately 11' from the railroad right of way. The preferred clear zone of 30' was used for the west side since there weren't right of way restrictions like the east side.

The typical cross section through the corridor will consist of a 24' roadway with 8' effective shoulders (4' paved and 4' granular) and 6:1 /3:1 foreslopes. Please note, this typical section may need to be adjusted after the District has their concepting meeting for the 3R project they will be doing through this corridor.

The roadway will be reconstructed on the existing vertical and horizontal alignment. 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 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.

Outlet velocities for the proposed culvert will be evaluated and revetment installed downstream of the box culvert outlet for a length sufficient to provide a stable channel. This may require extending revetment through the railroad bridge opening.

Fiber optic utility on the west side of roadway will need to be coordinated.

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

Right of way appears to be required for this project.

Traffic will be maintained by an off-site detour.

Bridge Items	<u>Estimated Costs</u>
New Culvert	\$222,600
Culvert Removal	\$10,500
Revetment	\$12,100
Engineer Fabric	\$1,300
Mobilization - 10%	\$24,700
M & C - 20%	\$49,300
Bridge Costs	\$ 320,500

Roadway Items	
Removal of Pavement	\$6,400
PCC Pavement	\$31,200
Modified Subbase	\$4,000
Special Backfill	\$1,600
Granular Shoulder	\$1,600
Paved Shoulder	\$10,000
Embankment in place, contractor furnished	\$52,500
Excavation Class 10	\$1,000
Excavation Class 20	\$21,000
Flooded Backfill	\$9,000
Clearing and Grubbing	\$20,000
Erosion Control	\$50,000
Dust Control	\$1,600
Right of Way	\$20,000
Traffic Control - 5%	\$11,700
Mobilization - 5%	\$11,700
M & C - 30%	\$70,200
Roadway costs	\$ 323,500

Project Total **\$644,000**

Other Alternatives Considered

Staged construction would be complicated by the 5 feet of fill over the culvert and since there was a satisfactory detour route identified, this alternative was dismissed. This site is not a good candidate for a runaround due to the businesses directly to the north and south.

During the discussion regarding the proximity of the proposed culvert to the railroad right of way line, other options discussed but dismissed as less desirable included using the preferred clear zone width and headwalls that would be parallel to the roadway (yields approximately 35' of clearance from railroad right of way) or using guard rail on the east side to be able to shorten the culvert length as needed. If the railroad is not interested in the project adding

revetment on their property, even though it would help the flow characteristics within the channel, one or both of these other options may need to be explored further.

B. Detour Analysis

US 218 will be closed and an offsite detour will be utilized. It is anticipated the detour will be in place for approximately 75 days. The detour would follow US 218 west to the junction with IA 198, then south on IA 198 to Co Rd E22, then east on Co Rd E22 to its junction with US 218. Out of distance travel is 12 miles. The total distance user cost is anticipated to be \$641,300. The cost for county road maintenance will be \$31,600 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.

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 and Shive-Hattery.

E. ADA Accommodations

There are no bike paths or sidewalks adjacent to US 218; therefore, no ADA accommodations are planned in conjunction with this project.

F. Special Considerations

This will not be a traffic critical project.

District indicated dust control for approximately five residences should be included in the project costs based on the length of the detour and the likelihood of local traffic using gravel roads in place of the signed detour.

The ABC Rating Score of 36 is less than the first stage filter threshold of 50, therefore no further evaluation is considered.

Railroad coordination will be required with Iowa Northern Railway. Velocities at the downstream end of the proposed twin 10' x 10' are lower than the existing condition due to the increased box size.

No additional survey is requested at this time.

Right of Way appears to be required for this project.

Once the Location and Environment Bureau has completed their review, comments will be incorporated into the final concept statement.

G. Program Status

Site data has been developed by Shive-Hattery. This project is listed in the 2020-2024 Iowa Transportation Improvement Program, with \$600,000 programmed for replacement in FY 2024. 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

Attachment A

Jenifer J. Bates

From: ia@occinc.com
Sent: Thursday, April 30, 2020 1:45 PM
To: Wade D. Wamre
Subject: Design Information Results for Ticket # 552003265

Categories: Filed by Newforma

(ANE) ALLIANT ENERGY

Contact Name : Alliant Energy Field Engineer Contact Phone: 8002554268 Contact Email: locate_IPL@alliantenergy.com

(BEN) EAST CENTRAL IOWA REC

Contact Name : Teresa Schremser

Contact Phone: 8778504343

Contact Email: teresa.schremser@ecirec.coop

(CTLIA01) CENTURYLINK

Contact Name : Tom Sturmer

Contact Phone: 7205788090

Contact Email: Thomas.sturmer@centurylink.com

(VIN) VINTON, CITY OF

Contact Name : Chris Ward

Contact Phone: 3194724707

Contact Email: cward@vintoniowa.net

(VME) VINTON MUNICIPAL ELECTRIC UTIL

Contact Name : Brad Still

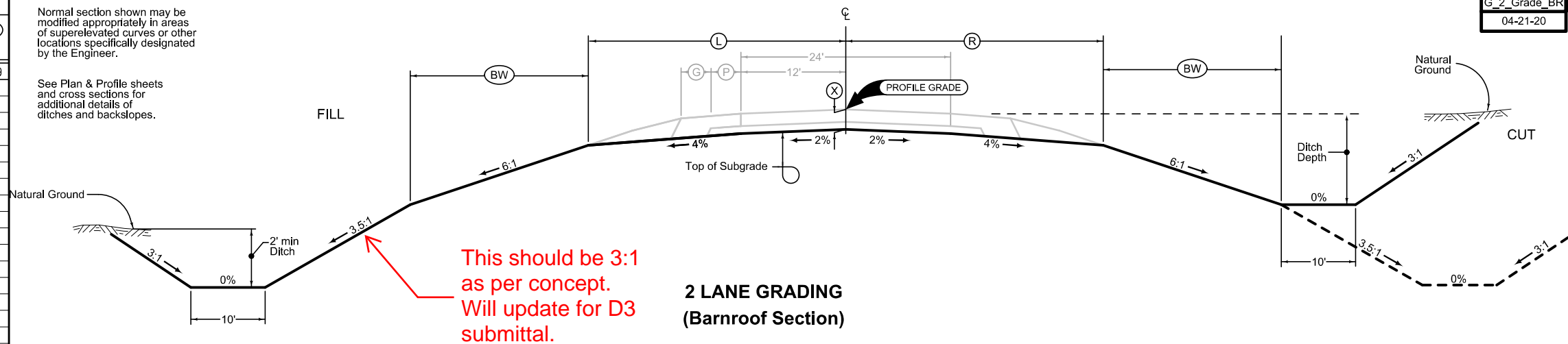
Contact Phone: 3194724813

Contact Email: linecrew@vmeu.org

LOCATION		DIMENSIONS			
ROAD IDENTIFICATION	STATION TO STATION	(L)	(R)	(X)	(BW)
		Feet	Feet	Inches	Feet
US 218	31+40.00 32+80.00	29.10	29.10	20	12.9/8.9

Normal section shown may be modified appropriately in areas of superelevated curves or other locations specifically designated by the Engineer.

See Plan & Profile sheets and cross sections for additional details of ditches and backslopes.



Combination Shoulder

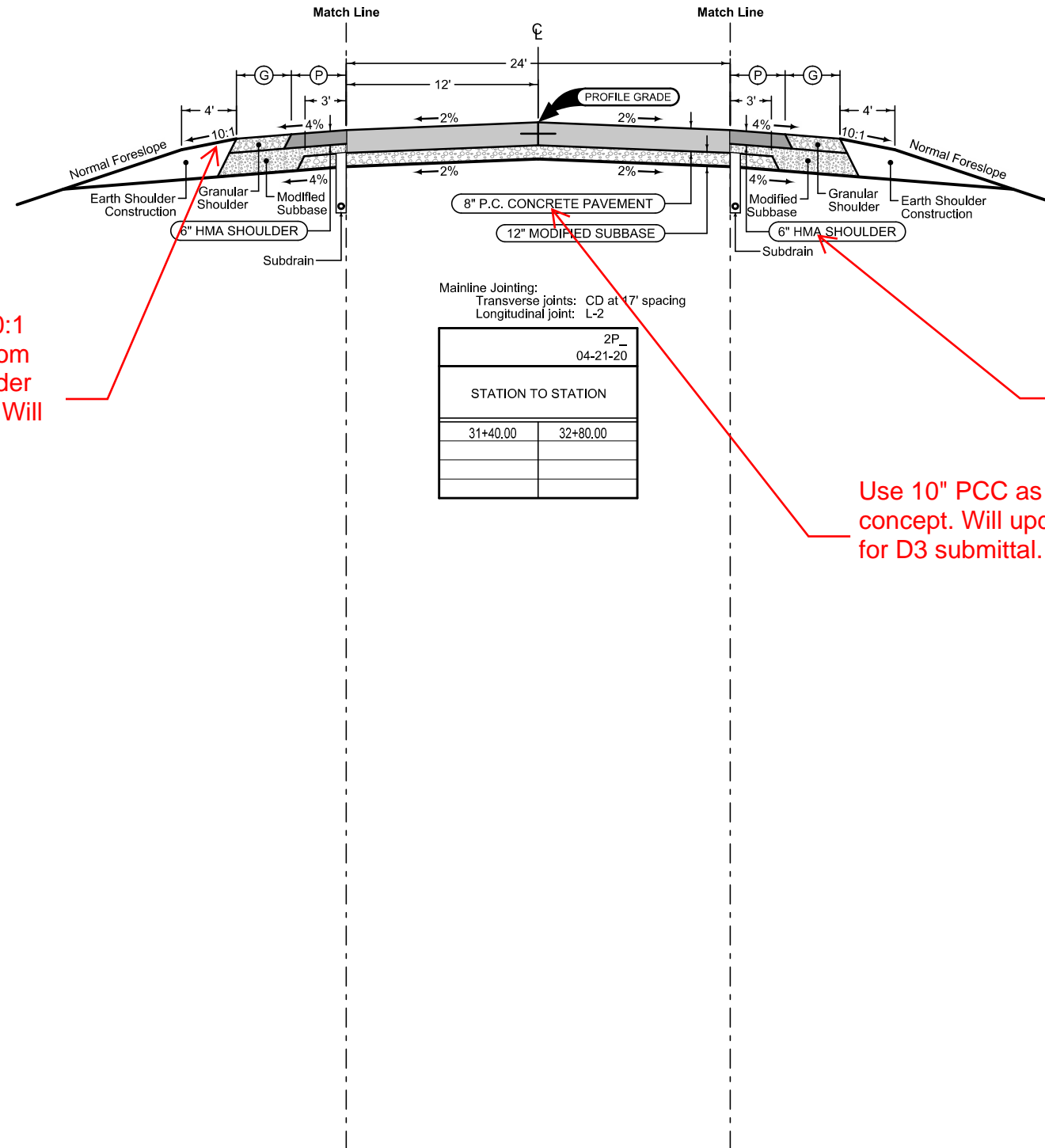
Shoulder Jointing:
Longitudinal joint: B

STATION TO STATION		(P) Feet	(G) Feet
31+40.00	32+80.00	4	4

Combination Shoulder

Shoulder Jointing:
Longitudinal joint: B

STATION TO STATION		(P) Feet	(G) Feet
31+40.00	32+80.00	4	4



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

STATION TO STATION	
31+40.00	32+80.00

There is no 10:1 section. 6:1 from edge of shoulder to clear zone. Will update for D3 submittal.

Use 7" PCC shoulders. Will update for D3 submittal.

Use 10" PCC as per concept. Will update for D3 submittal.

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

US 218

SURVEY SYMBOLS

- CP Control Point
- ◻ FENO FENO Monument
- PRO Profile Shot
- EP Edge of Paved Roads (ML or SR)
- GR Ground Shot
- - - - - BL Topo Breakline
- - - - - EW Edge of Water
- MIS Miscellaneous
- OUT Tile Outlet
- TILE — TIL Tile Line
- REF Reference Tie Point
- ~ TLNR Tree Line Right
- PPA Power Pole Co. 1
- ◻ UB Utility Box
- ◻ EB Electrical Box
- - - - - C Centerline BL of Road (ML or SR)
- EG Edge of Gravel Road
- MM Mile Marker Post
- LIN Miscellaneous Line
- PIP Pipe Culvert
- ◻ SIGN SI Sign
- TPA Telephone Pole Co. 1
- LUM Luminaire
- x - x - x - FW Wire Fence
- CUL Culvert
- FO(C) — FO1C Fiber Optic Co. 1 - Quality C
- BLS Bridge Low Steel
- BRG Bridge
- BD Bridge Deck
- +++++ RR Centerline of Railroad Tracks
- SOP Size of Pipe or Culvert

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

- PPA Power Pole Co. 1
- ◻ UB Utility Box
- ◻ EB Electrical Box
- TPA Telephone Pole Co. 1
- LUM Luminaire
- - - - - FO1C Fiber Optic Co. 1 - Quality C

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

RIGHT-OF-WAY LEGEND

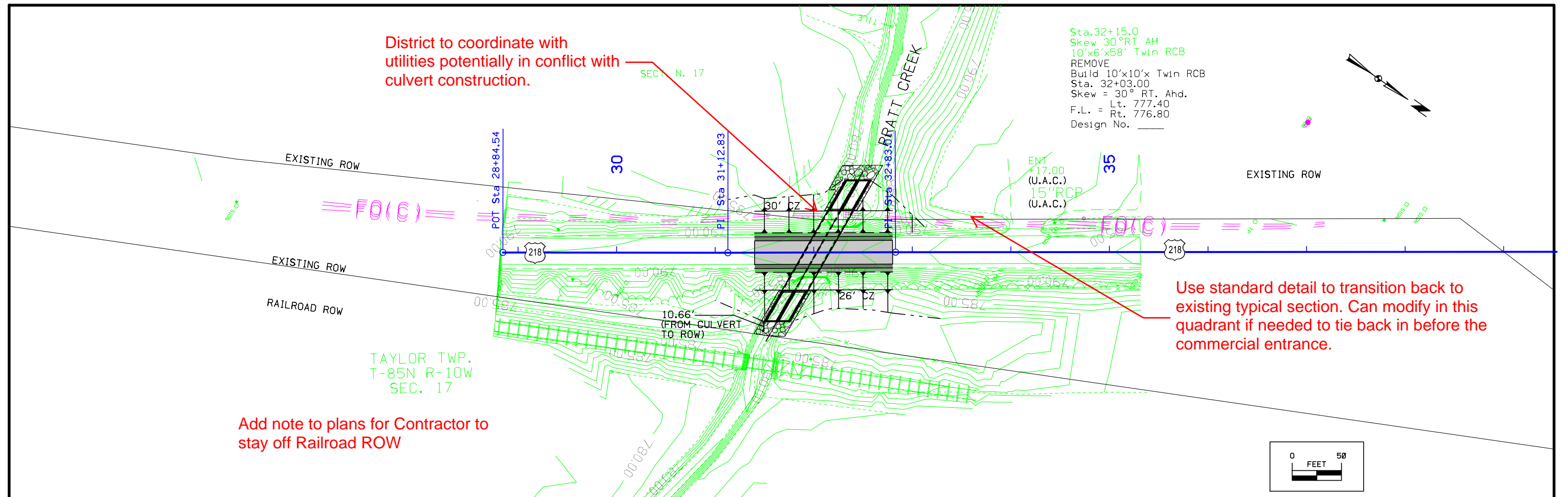
- ▲ Proposed Right-of-Way
- △ Existing Right of Way
- ▲ Existing and Proposed Right-of-Way
- ▲ Easement and Existing Right-of-Way
- Easement (Temporary)
- Easement
- C/A Access Control
- Property Line

PLAN AND PROFILE LEGEND AND SYMBOL INFORMATION SHEET

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

District to coordinate with utilities potentially in conflict with culvert construction.

Sta. 32+15.0
 Skew 30° RT AH
 10'x6'x58' Twin RCB
 REMOVE
 Build 10'x10'x Twin RCB
 Sta. 32+03.00
 Skew = 30° RT. Ahd.
 F.L. = Lt. 777.40
 Rt. 776.80
 Design No. _____



Use standard detail to transition back to existing typical section. Can modify in this quadrant if needed to tie back in before the commercial entrance.

Add note to plans for Contractor to stay off Railroad ROW

TAYLOR TWP.
 T-85N R-10W
 SEC. 17



Survey Information

Benton County
BRFN-218-6(56)-39-06
U.S. 218 Small stream 0.1 mi
E. of Co Rd V61
PIN 18-06-218-020
Sap-01971

Party Personnel

Jacob Larson - Party Chief
Hunter Wamre - Assistant Survey Party Chief

Date(s) of Survey

Begin Date 05/06/2020
End Date 05/06/2020

General Information

Measurement units for this survey are US survey feet. This survey is for proposed RCB reconstruction and reconstruction of U.S. 218. Project datum and control information is provided by Shive-Hattery, Inc. This survey request was for the U.S. 218 corridor and part of the IANR Railroad only.

Vertical Control

Iowa Regional Coordinate System: Zone 10 Cedar Rapids on the Iowa Real Time Network (IaRTN)

Vertical datum for this survey is NAVD88 (Computed using Geoid 12A). Additional benchmarks were placed throughout the project using a Total Station set up relative to Control Points 1 & 2.

Horizontal Control

(Project Coordinates from the Iowa Regional Coordinate System)

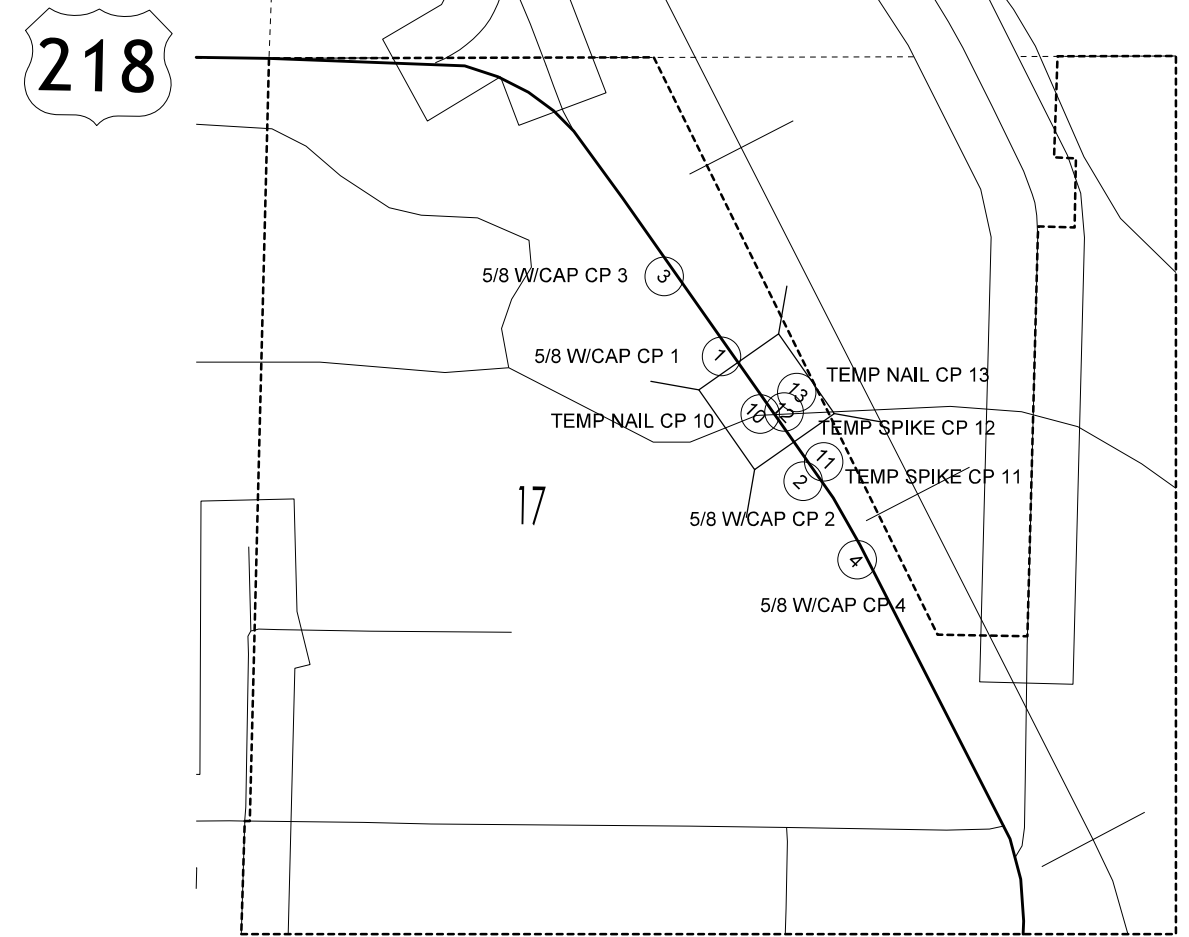
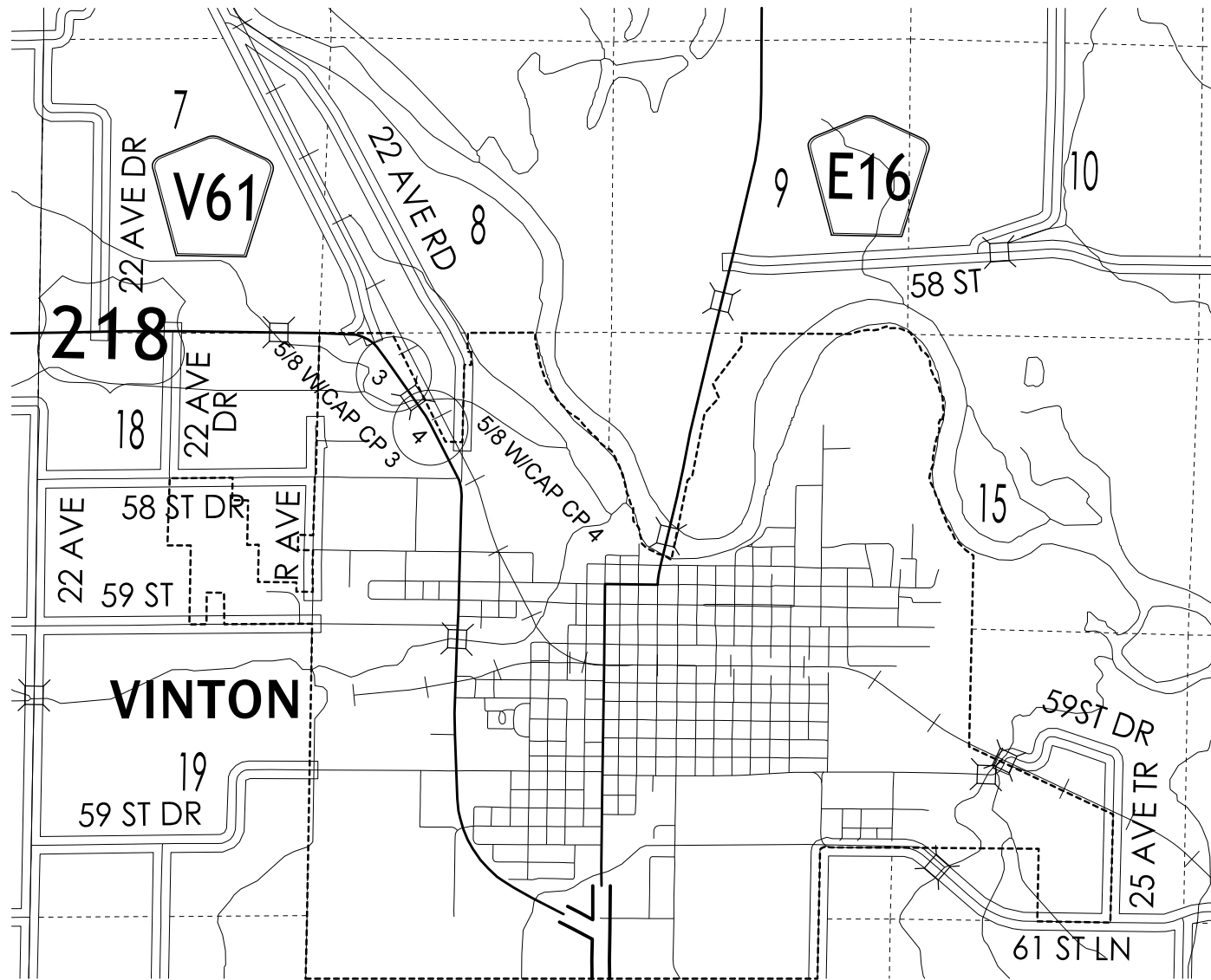
The project coordinate system for this survey is Iowa Regional Coordinate System Zone 10 Cedar Rapids (U.S. Survey Feet). This survey control is relative to IaRTN reference stations. IaRTN Reference Station coordinates are relative to the National Reference Station network datum: NAD83 (2011) for Epoch 2010.00. Coordinates were determined by averaging a minimum of five IaRTN observations with appropriate time 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 was established from best fit centerline points. Survey stationing was equated to the Plan F-251-A 1928 plan RCB Culvert Sta: 32+15 and run back and ahead without equation throughout the survey.

CONTROL POINT VICINITY MAP

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



HORIZ. DATUM: NAD83(2011) EPOCH 2010.00

VERT. DATUM: NAVD88

1a. Regional Coordinate System Zone 10

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

HORIZONTAL AND VERTICAL PROJECT CONTROL COORDINATE LISTING

HORIZ. DATUM: NAD83(2011) EPOCH 2010.00

VERT. DATUM: NAVD88

Ia. Regional Coordinate System Zone 10

CONTROL POINTS				
POINT NO.	NORTHING	EASTING	ELEVATION	DESCRIPTION
1	8125930.20	20398482.23	794.74	CP 1 5/8 W/CAP
2	8125522.61	20398778.11	787.49	CP 2 5/8 W/CAP
3	8126202.05	20398287.52	797.26	CP 3 5/8 W/CAP
4	8125239.58	20398943.20	785.70	CP 4 5/8 W/CAP
10	8125734.57	20398613.61	782.20	CP 10 NAIL
11	8125563.67	20398810.88	785.34	CP 11 SPIKE
12	8125741.68	20398694.91	783.18	CP 12 SPIKE
13	8125807.67	20398737.78	784.60	CP 13 NAIL

108-23A
08-01-08

TRAFFIC CONTROL PLAN

1) While existing bridge is removed and RCB is being constructed, US 218 traffic shall be maintained via off-site detour as shown on sheet A.2.

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
US 218	Both	Benton	0.1 Miles East of Co. Rd. V-61	Small Stream			None					

111-01
04-17-12

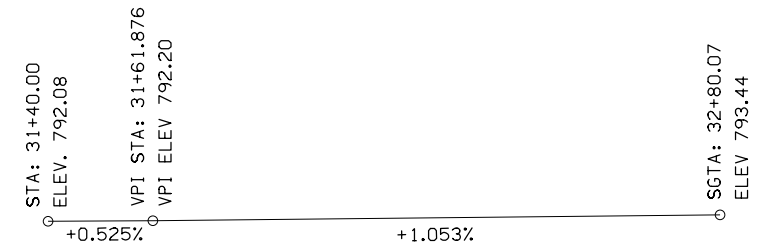
COORDINATED OPERATIONS

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.

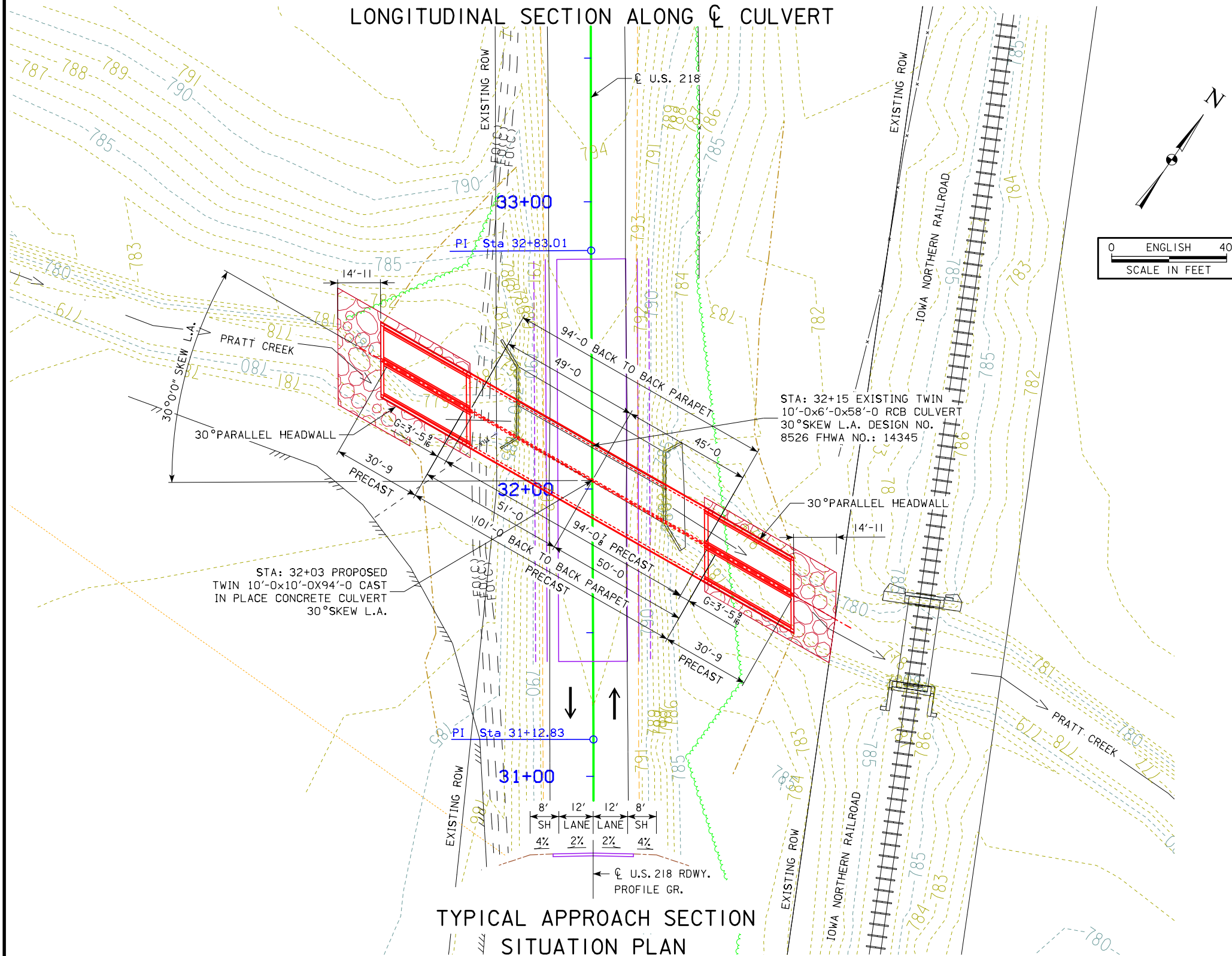
Project	Type of Work
None Provided	

800	EXISTING TWIN 10'-0x6'-0 BOX CULVERT TO BE REMOVED.	PROPOSED GRADE	U.S. 218	800
790	DESIGN H.W. ELEV. = 788.56		STA: 32+03.00	790
780	EXISTING GROUND		P.G. ELEV.= 792.87	780
770				770
760	CLASS E REVETMENT UNDERLAIN WITH ENGINEERING FABRIC ELEV.= 778.40	FL. ELEV.= 777.40		760
750		FL. ELEV.= 776.80		750

BENCH MARK NO.



LONGITUDINAL SECTION ALONG ϕ CULVERT



PROPOSED PROFILE GRADE U.S. 218

NOTES:

- EXISTING TWIN 10'-0x10'-0x58'-0 RCB CULVERT DESIGN NO. 8526.
- DRAINAGE THROUGH EXISTING CULVERT/CHANNEL MUST BE MAINTAINED THROUGHOUT CONSTRUCTION.
- FLOW LINE OF CULVERT NOMINALLY BURIED 1.0 FOOT.
- BURIED AND OVERHEAD UTILITIES TO BE RELOCATED TEMPORARILY OR PERMANENTLY AS REQUIRED FOR CONSTRUCTION.

HYDRAULIC DATA

DRAINAGE AREA = 2.5 SQ. MI.
 Q_{50} = 1,790 CFS
 HW ELEV. = 788.56
 STREAM SLOPE = 33.80 FT./MI.
 Q_{100} = 2,140 CFS
 HW ELEV. = 789.52
 Q_{500} = 3,090 CFS
 HW ELEV. = 791.06

UTILITIES LEGEND:

- ALLIANT ENERGY
- CENTRYLINK PEDISTAL
- ALLIANT ENERGY ELECTRIC BOX
- LUMINAIRE
- CENTRYLINK FIBER OPTIC

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

LOCATION TRAFFIC ESTIMATE

US 218 OVER PRATT CREEK	2024 AADT	3,000	V.P.D.
T-85N R-10W	2044 AADT	3,100	V.P.D.
SECTION 17	2044 DHV	320	V.P.H.
TAYLOR TOWNSHIP	TRUCKS	11	%
BENTON COUNTY	TOTAL		
FHWA NO. ?	DESIGN ESALS		
BRIDGE MAINT. NO. 0649.2S218			
LATITUDE 42.177795°			
LONGITUDE -92.040569°			

PRELIMINARY

DESIGN FOR 30° SKEW
TWIN 10'-0x10'-0x94'-0 CAST IN PLACE CONCRETE CULVERT
SITUATION PLAN
 STATION 32+03 JUNE 2021
BENTON COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. 1 OF 1 FILE NO. ? DESIGN NO. ?

LINE SURVEY SYMBOLS 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

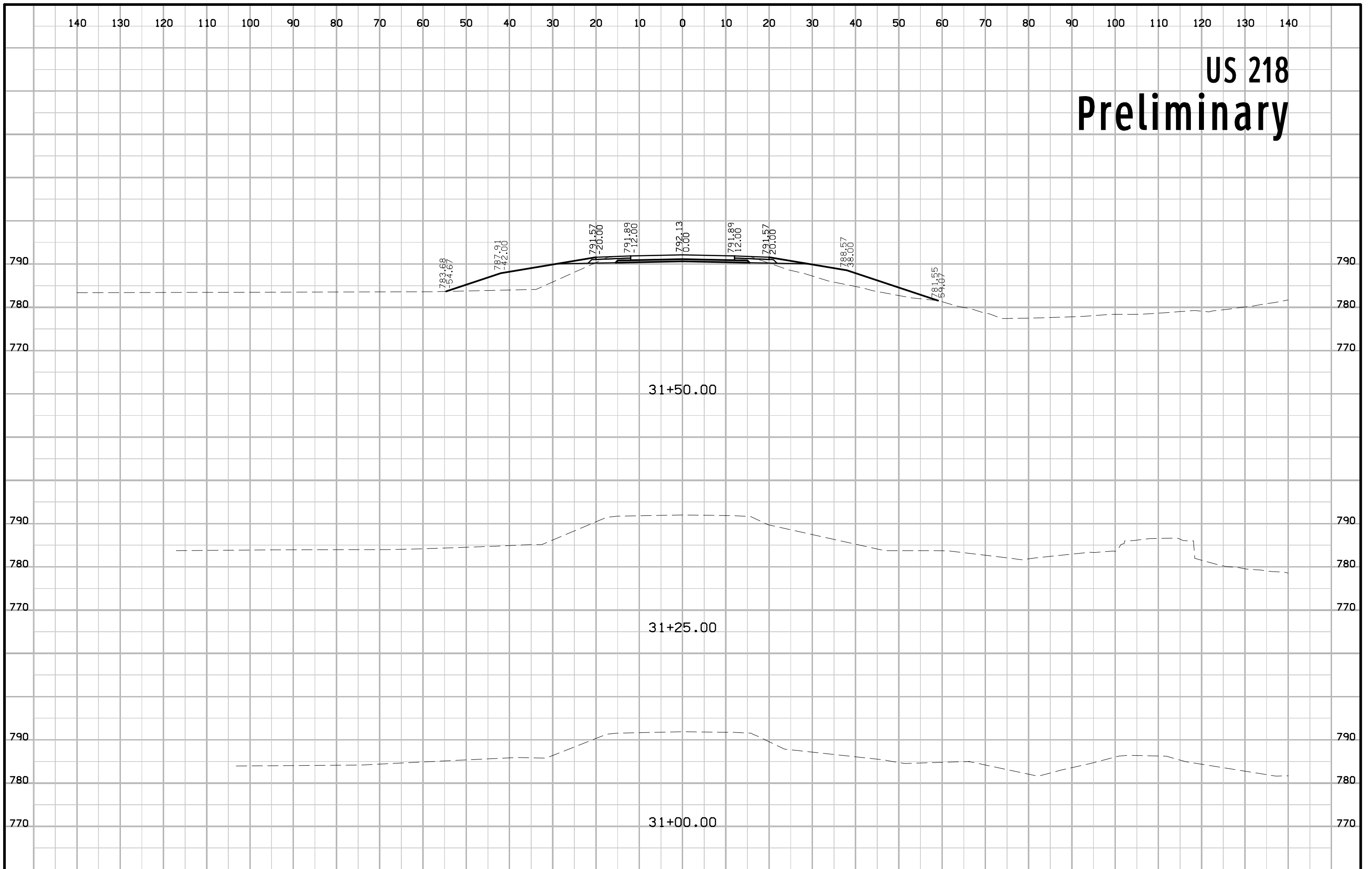
- Existing ROW
|
Existing Right-of-Way Limit
- Proposed ROW
|
Proposed Right-of-Way Limit
- Temporary ROW
|
Temporary Right-of-Way Limit

UTILITY LEGEND

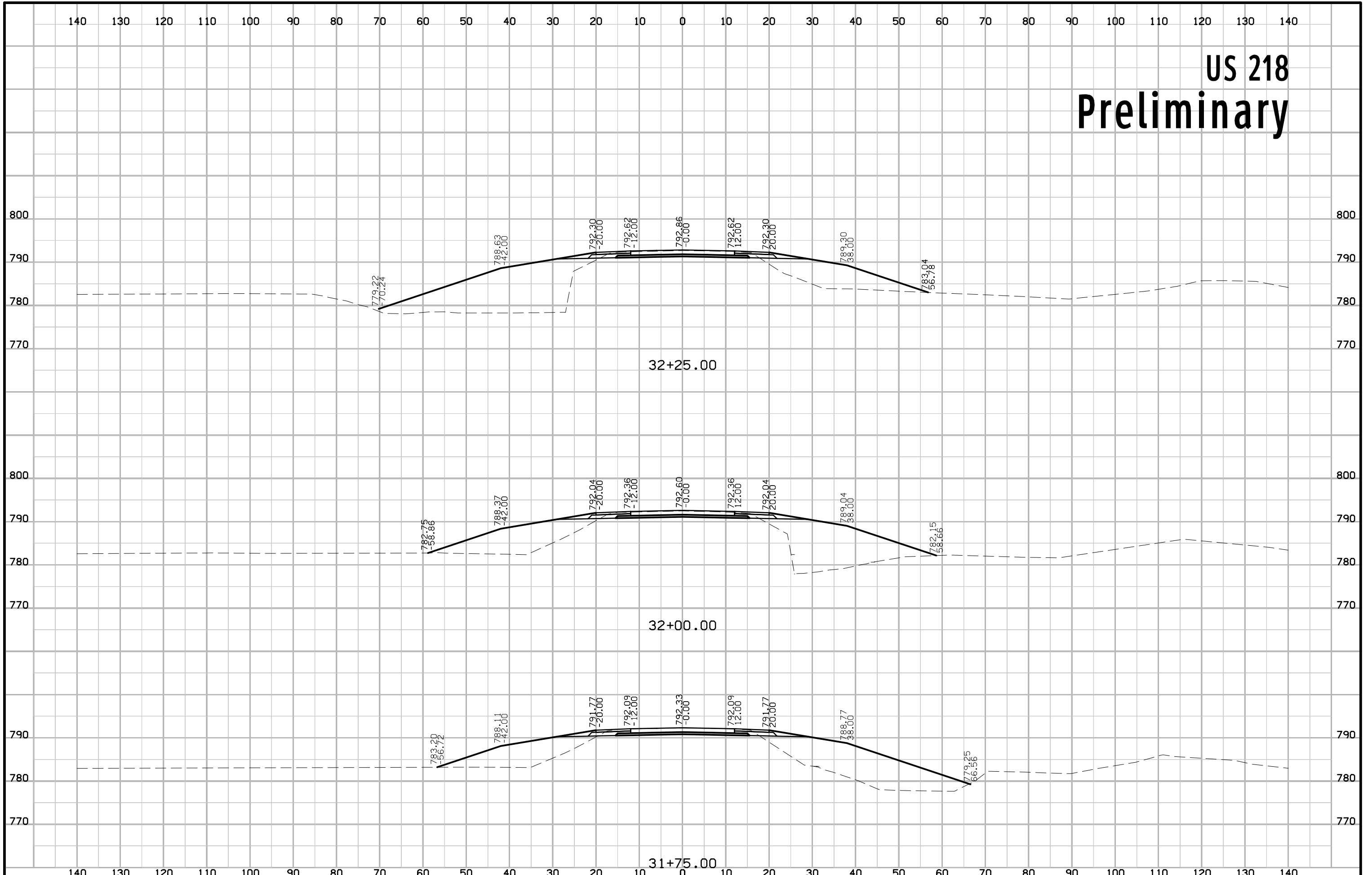
**CROSS SECTION
LEGEND AND SYMBOL
INFORMATION SHEET**

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

US 218 Preliminary



US 218 Preliminary



US 218 Preliminary

