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IOWA DEPARTMENT OF TRANSPORTATION

To Office District 5 Date December 31, 2019

Attention Mark Van Dyke, Assistant District Engineer Ref No. Wapello County
BRFN-034-7(150)--39-90
From WHKS / Joe Stanisz PIN 19-90-034-010
Design No(s). 221 (EB)
321 (WB)
Bureau Bridges and Structures File No. 31863
FHWA No(s). 50550/50560

Subject Final Concept for Bridge Deck Replacement of Dual 470' x 28' Continuous I-Beam Bridges
Bridge Maintenance Nos. 9091.0R/L034

The bridges on US 34 over BNSF RR, 1.2 mi E of W Jct. US 63 in Ottumwa, have been programmed for bridge deck replacement to be let on 10/17/2023, with a possibility for advancement to October 2021. The current cost estimate is $2,993,238, which includes inflation based on the advanced letting date and 20% contingency. The MB program budgeted amount is $4,000,000.

The bridge concept review on 10/9/2019 was attended by Casey Faber and Kirk Romsey with WHKS; and Mark Van Dyke and Junior Jones with District 5.

EXISTING CONDITIONS

The bridges were constructed in 1967/1968. 1967 is R bridge and 1968 is L bridge (Design No. 964).

The bridge deck is PC concrete with a PC overlay placed in 2002 (Design Nos. 102/202). The top of deck has several areas of cracking. The bottom of the deck has some spalls and areas of delamination and several areas of cracking with leaching and rust staining.

The existing strip seal joints are in fair condition. There is evidence that joint leakage prior to installation of the strip seal joints caused deterioration to the abutments, corrosion of the beam ends and bearings, and some berm erosion.

The backwalls are cracked with some rust staining.

Several areas of spalling were observed in the pier columns.

Retrofit concrete barrier rails were installed in 1987 (Design No. 1186). The rails and end sections are 30.5" above the riding surface and have thrie beam connections. The curbs are in poor condition with several areas of spalling and cracking with heavy leaching. The rails are in fair condition with some cracking.

US 34 in the vicinity of the bridges is a 4-lane divided roadway with a 16-foot wide depressed PCC paved median. There are two 12-foot wide HMA/PCC lanes of traffic in both directions. It has 10-foot wide outside shoulders (4-foot HMA and 6-foot granular). The roadway is posted at 45 mph and has a 2017 ADT of 8,200 vehicles per day including 12.9% trucks. This traffic estimate includes both eastbound and westbound lanes.

The first 15’ of the bridge approaches are PCC and are in good condition. The remainder of the bridge approaches are HMA/PCC and are in fair to poor condition.

The guardrail meets current standards for height but does not meet current standards for transition sections and terminal sections. The outside guardrail has STS bridge rail connections and FLEAT end treatments. The median guardrail at both end of the bridges have STS bridge rail connections and obsolete end treatments connecting guardrail from both bridges.

There is a signalized intersection approximately 860’ north of the bridges.

RECOMMENDATIONS

It is recommended that the following repairs be made:

1. Remove bridge deck, joints, and barrier rails and construct new 8” thick bridge deck with 31-foot roadway and 2’-10 rectangular concrete barrier railings or 30-foot roadway and standard TL-4, F-shape barrier railings.
2. Existing girders will need to be load rated to confirm new deck thickness.
3. Remove and reconstruct top of backwall including paving support.
4. Install new strip seal joints.
5. Repaint 10’ of superstructure at ends including bearings.
6. Clean and seal abutments.
7. Perform concrete repairs to pier columns and abutment footings.
8. Perform berm shaping (north abutment of eastbound bridge).
9. Remove and replace bridge approaches (70’) at both ends of both bridges.
10. Install new bridge end drains as per DR-402.
11. Remove and replace the outside shoulder guardrail to meet requirements for NHS.
12. Construct HMA paved shoulders in front of the guardrail as per Typical Detail 7156.
13. Remove and replace the median guardrail with a combination of guardrail and attenuators.

Construction will be staged one bridge at a time while maintaining traffic head to head on the other bridge. This will require paved median removal and construction of temporary paving for median crossovers.

This project is not considered a Traffic Critical Project. Traffic control will involve a temporary lane separator system with Standard Road Plan TC-61, modified for the narrower mediate width and a slower speed limit.

The District should provide a site survey of the utilities. Asbestos inspection should be performed. A paint scrape sample is requested.

Estimated cost of repairs is as follows:

EB BRIDGE ESTIMATE:				
Item	**Quantity**	**Unit**	**Rate**	**Amount**
Concrete Repair	26	SF	$180	$4,680
Removals, As Per Plan	1	LS	$250,000	$250,000
Structural Concrete (Bridge)	400	CY	$700	$280,000

Reinforcing Steel, Epoxy Coated	103750	LB	$2	$155,625
Excavation, Class 20	8	CY	$150	$1,200
Steel Extrusion Joint With Neoprene	62.5	LF	$200	$12,500
Neoprene Gland Installation and Testing	62.5	LF	$38	$2,375
Concrete Barrier Rail	950	LF	$70	$66,500
Bridge Cleaning for Painting	1	LS	$920	$920
Blast Cleaning of Structural Steel	1	LS	$4,600	$4,600
Painting of Structural Steel	1	LS	$5,520	$5,520
Containment	1	LS	$7,360	$7,360
Bank Shaping	1	LS	$10,000	$10,000
Railroad Insurance/Flaggers	1	LS	$20,000	$20,000
Mobilization	1	LS	10%	$82,128
	Base Cost:			$903,408
	Contingency:		20%	$180,682
	2 Years Inflation:		4.5%	$99,763
	BRIDGE TOTAL:			**$1,183,853**

EB ROADWAY ESTIMATE:

Item	Quantity	Unit	Rate	Amount
Embankment-In-Place	100	CY	$25	$2,500
Class 13 Excavation	3	CY	$35	$105
Paved Shoulder, HMA, 9"	122	SY	$55	$6,710
Pave Shoulder for Bridge End Drain	44	SY	$140	$6,160
Bridge End Drain (DR-402)	2	EACH	$5,000	$10,000
Removal of Steel Beam Guardrail	331.25	LF	$17	$5,631
Steel Beam Guardrail	350	LF	$22	$7,700
Steel Beam Guardrail, BTS Section	2	EACH	$2,035	$4,070
Steel Beam Guardrail, Bolted End Anchor	2	EACH	$275	$550
Steel Beam Guardrail, End Terminal	1	EACH	$2,535	$2,535
Crash Cushion, Severe Use	1	EACH	$24,200	$24,200
Temp. Crash Cushion	1	EACH	$1,250	$1,250
Temporary Lane Separator System	1000	LF	$10	$10,000
Bridge Approach, 12"	400	SY	$220	$88,000
Removal of Pavement	993	SY	$15	$14,895
Detour Pavement	593	SY	$45	$26,685
Traffic Control	1	LS	$5,000	$5,000
Additional Roadway Items	1	LS	$5,000	$5,000
Mobilization	1	LS	10%	$21,599
	Base Cost:			$242,590
	Contingency:		20%	$48,518
	2 Years Inflation:		4.5%	$26,789

ROADWAY TOTAL:	**$317,898**
PROJECT TOTAL:	**$1,501,751**

WB BRIDGE ESTIMATE:

Item	Quantity	Unit	Rate	Amount
Concrete Repair	42	SF	$180	$7,560
Removals, As Per Plan	1	LS	$250,000	$250,000
Structural Concrete (Bridge)	400	CY	$700	$280,000
Reinforcing Steel, Epoxy Coated	103750	LB	$2	$155,625
Excavation, Class 20	8	CY	$150	$1,200
Steel Extrusion Joint With Neoprene	62.5	LF	$200	$12,500
Neoprene Gland Installation and Testing	62.5	LF	$38	$2,375
Concrete Barrier Rail	950	LF	$70	$66,500
Bridge Cleaning for Painting	1	LS	$920	$920
Blast Cleaning of Structural Steel	1	LS	$4,600	$4,600
Painting of Structural Steel	1	LS	$5,520	$5,520
Containment	1	LS	$7,360	$7,360
Railroad Insurance/Flaggers	1	LS	$20,000	$20,000
Mobilization	1	LS	10%	$81,416
	Base Cost:			$895,576
	Contingency:		20%	$179,115
	2 Years Inflation:		4.5%	$98,898
	BRIDGE TOTAL:			**$1,173,590**

WB ROADWAY ESTIMATE:

Item	Quantity	Unit	Rate	Amount
Embankment-In-Place	100	CY	$25	$2,500
Class 13 Excavation	3	CY	$35	$105
Paved Shoulder, HMA, 9"	122	SY	$55	$6,710
Pave Shoulder for Bridge End Drain	44	SY	$140	$6,160
Bridge End Drain (DR-402)	2	EACH	$5,000	$10,000
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Crash Cushion, Severe Use	1	EACH	$24,200	$24,200
Temp. Crash Cushion	1	EACH	$1,250	$1,250
Temporary Lane Separator System	1000	LF	$10	$10,000
Bridge Approach, 12"	400	SY	$220	$88,000

Removal of Pavement	993	SY	$15	$14,895
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Traffic Control	1	LS	$5,000	$5,000
Additional Roadway Items	1	LS	$5,000	$5,000
Mobilization	1	LS	10%	$21,599
	Base Cost:			$242,590
	Contingency:		20%	$48,518
	2 Years Inflation:		4.5%	$26,789
	ROADWAY TOTAL:			**$317,898**
	PROJECT TOTAL:			**$1,491,487**

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