

# Winona Bridge Work Package #6

## Bridge No. 5900 (Existing Bridge) Approach Span Reconstructions

### Options Overview

May 29, 2016

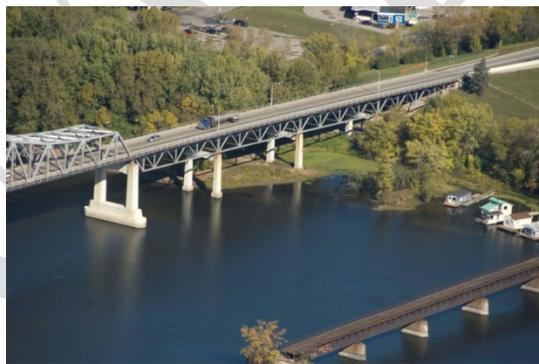
#### Background

The scope of work on the Winona Bridge project consists of new Bridge No. 85851 and rehabilitation and reconstruction of existing historic Bridge No. 5900 to provide a long-term four-lane Mississippi River crossing for Winona and the trade region.

In regards to existing Bridge No. 5900, Work Package #5 includes rehabilitation of the through-truss and removal of the approach spans. Here are the options for moving forward with the approach span reconstruction work in Work Package #6 for Bridge No. 5900.



Winona South Approach



Latsch Island North Approach

#### Bridge No. 5900 Approach Span Options *(hybrids between these are possible)*

##### **Option #1 – Historical Full Build**

The current scope of work for the rehabilitation and reconstruction of Bridge No. 5900 consists of a long-term, lowest possible maintenance cost solution that meets today’s MnDOT bridge design standards and all historical requirements for the project. This work preserves the historic nature of the bridge and resulted in a No Adverse Effect determination by the State Historical Preservation Office. Called the Historical Full Build, it is based on the Preferred Alternate from the Environmental Assessment with a higher level investment in the through-truss which:

- Provides a 50-year design life on the through-truss rehabilitation (contained in Work Package #5).
  - Includes structural strengthening to meet current American Association of State Highway and Transportation Officials (AASHTO) bridge design requirements and to be able to carry all standard MnDOT permit vehicles.
  - Includes structural strengthening to address the current state of deterioration in regards to the through-truss.
  - Incorporates internal redundancy into the through-truss.



- Provides a 75-year design life on all reconstructed approach spans to the through-truss. All approach span bridge elements would replicate existing elements to the maximum historical context possible.
  - Incorporates internal redundancy in the new replicated deck truss approach spans.

Existing Bridge No. 5900



Through-Truss



Existing Deck Truss Approach Spans



Existing Concrete Beam Approach Spans

**Option #2 – Through-Truss Historical Build with Non-Historic Approach Spans**

The scope of work for the through-truss is the same as Option #1; however, all approach spans would be reconstructed in a non-historic manner with longer span lengths in Winona and all approach spans consisting of modern concrete beams. This option:

- Provides the through-truss rehabilitation from Option #1 above (included in Work Package #5).
- Provides a 75-year design life on all reconstructed approach spans to the through-truss with longer span lengths for spans 1-15 and prestressed concrete beams on all approach spans.

Note: There could be hybrids between Options #1 and #2 that are considered and potentially implemented. These could include, among other hybrids, the use of steel beams or historic full build replication of the deck trusses (Option #1), both with standardized concrete beam spans in Winona for the existing non-deck truss approach spans.

### **Option #3 – Removal**

This option includes removal of existing Bridge No. 5900 and costs to modify the roadway configurations to handle bi-directional traffic on new Bridge No. 85851. It does not include a new second bridge.

### **Option #4 - Pedestrian Facility**

This option modifies existing Bridge No. 5900 to remove vehicular traffic from the bridge and accommodate pedestrians and bikers only. It does not include a new second traffic bridge until a later date when traffic demands would meet the need.

### **Option #5 - Through Truss 20-Year Fix**

This option minimizes the upfront expenditure on the through-truss work as much as possible. This option:

- Provides a 20-year design life on the through-truss rehabilitation.
  - Does not include structural strengthening to meet current AASHTO bridge design requirements and to be able to carry all standard MnDOT permit vehicles, but does meet design load requirements for this type of historic structure.
  - Does not include structural strengthening to address the current state of deterioration in regards to the through-truss, resulting in the likelihood of the bridge being load posted and closed periodically for major maintenance.
  - Does not incorporate internal redundancy into the through-truss.
- Provides a 75-year design life on all reconstructed approach spans to the through-truss. All approach span bridge elements would be replicated to the maximum historical context possible.

### **Option #6 – New Bridge**

This option provides a new second bridge once existing Bridge No. 5900 is removed. This option:

- Provides a 75-year to 100-year design life for a new bridge.

## **Attachments**

Phase I Options Screening Evaluation Criteria

Phase I Options Screening Evaluation

# Winona Bridge Work Package #6

## Bridge No. 5900 (Existing Bridge) Approach Span Options

### FHWA, MnDOT and MnHPO Staff Level Team

### Phase I Screening Evaluation Criteria

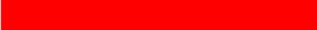
May 31, 2016

The criteria below are proposed for our team to perform the initial screening evaluation of the family of options developed:

- Does the option meet the Purpose and Need for the Project:
  - *The purpose of the project is to provide a structurally sound bridge-crossing of the Mississippi River Channel at Winona, Minnesota that maintains access to Latsch Island and the Wisconsin Highway system, with adequate capacity to safely accommodate existing and future transportation needs within the design life of the bridge, while maintaining traffic to the maximum extent possible during construction.*
- Does the option result in an adverse effect under Section 106 (Section 4[f] use)?
- Does the option adhere to the Historical Context (National Register Eligibility)? If unknown, what is the potential for continued eligibility for NRHP (low, medium, high)?
- Is the option supported by our respective agencies?
- Is the option supported by the City of Winona, Winona Historic Preservation Commission, Winona County Historical Society and/or do they have a preference?
- Public Feedback on options.
- What is the overall rough order of magnitude construction cost and/or cost range?

	<u>Option #1</u>	<u>Option #2</u>	<u>Option #3</u>	<u>Option #4</u>	<u>Option #5</u>	<u>Option #6</u>
<u>CRITERIA</u>	Historical Full Build	Through Truss Full Rehabilitation and Non-Historic Approach Span Reconstruction	Removal	Pedestrian Facility	Through Truss 20-year Fix	New Bridge
Meets Purpose and Need						
Section 4(f) Adverse Effect						
National Register Eligibility	H	H - M	L	M	H	L
Supported by Project Agency Parnters						
Supported by City of Winona, WHPC, and WCHS						
Public Feedback						
Rough Order of Magnitude Construction Costs	\$145 Million (1)	\$136-\$138 Million (2)	\$87-\$90.5 Million (3) (4)	\$90-\$100 Million (5) (6)	\$95-\$120 Million (7)	\$140-\$160 Million (8)
Worthy of Further Consideration	Yes	Yes	No	No	No	No

LEGEND

	Little to No Concern
	Caution
	Area of Concern

Likelihood of Continued National Register Eligibility

H - High  
 M - Medium  
 L - Low or not Eligible

**All options include construction costs for new Bridge No. 85851.**

- (1) Also includes construction costs for rehabilitation and reconstruction of Bridge No. 5900.
- (2) Also includes construction costs for rehabilitation and reconstruction of Bridge No. 5900 with non-historic approach spans.
- (3) Also includes construction costs for modifications to handle two-way traffic on the new bridge.
- (4) Does not include the costs for a second bridge.
- (5) Also includes construction costs for modifications to Bridge No. 5900 to handle pedestrian movements.
- (6) Does not include the costs for a second bridge in the future.
- (7) Also includes construction costs for rehabilitation and reconstruction of Bridge No. 5900 with a 20-year service life on the through truss rehabilitation.
- (8) Also includes construction costs for removal of existing Bridge No. 5900 and a new bridge.