Winona Bridge Work Package #5

Bridge No. 5900 (Existing Bridge) Rehabilitation and Reconstruction

Installment #5

Options and Agency Interactions

March 29, 2016

Background

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

We've provided background installments regarding the project budget, project delivery phases, the $30 million cost overrun estimate, and the use of CMGC. In this installment, we'll explore options for moving forward with the work on the existing bridge, including interactions with stakeholder agencies.

Let's start with what we know will be factors in any chosen solution:

- The existing bridge was built in 1942, is 74 years old and in deteriorated condition. The original design life was 50 years, and the deterioration rate has accelerated in recent years. For the bridge to continue as a serviceable structure, something needs to be done.

- The design life, or anticipated service life of an option, describes the expected timeline before another significant investment is required. There will still be periodic maintenance investments to keep the facility in service during the design life. The end of the design life does not mean a structure is unsafe.

- The existing bridge is eligible for the National Register of Historic Places based on several factors, most notably the through-truss is Minnesota's only surviving example of a cantilever through-truss dating from before 1946. The cantilever design, used for long spans over navigable water, required significant engineering.

- Section 106 of the National Historic Preservation Act of 1966 (NHPA) requires federal agencies to take into account the effects of their undertakings on historic properties, and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment. The historic preservation review process mandated by Section 106 is outlined in regulations issued by the ACHP. Revised regulations, "Protection of Historic Properties" (36 CFR Part 800), became effective August 5, 2004. Public involvement is a key ingredient in successful Section 106 consultation, and the views of the public should be solicited and considered throughout the process.

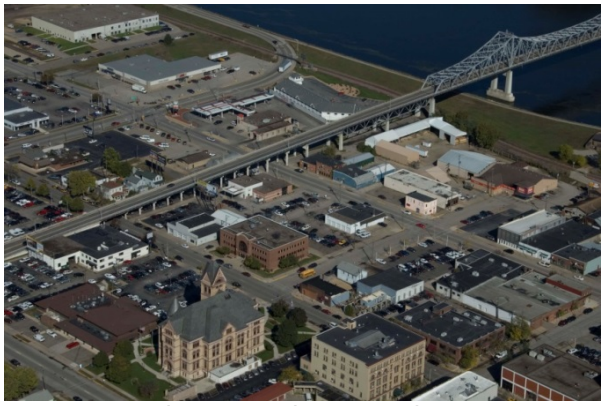
- The existing bridge is a 4(f) property. As stated in the original Section 4(f) legislation of 1966 and its revisions (1968 and 1983), Section 4(f) protects the following basic types of properties: publicly owned park and recreation areas that are open to the general public, publicly owned wildlife and waterfowl refuges, and public or privately owned historic sites. The term historic sites includes prehistoric and historic districts, sites, buildings, structures or objects listed in, or eligible for, the National Register of Historic Places.

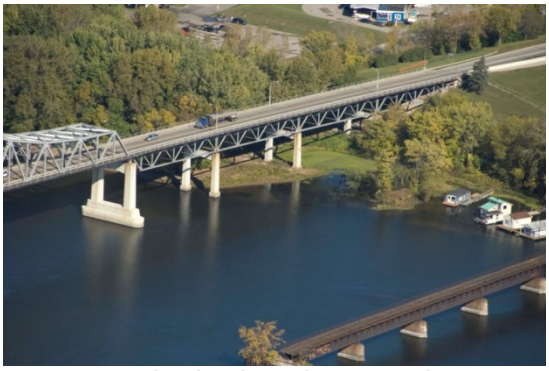
- Before an alternative involving the use or taking of a Section 4(f) resource can be selected, avoidance alternatives and minimization measures must be considered. Avoidance alternatives are those that totally avoid the use of Section 4(f) properties while meeting the defined project needs; minimization measures are efforts to minimize the impact of a project on a Section 4(f) property. Minimization measures may include mitigation, which is compensation for Section 4(f) impacts that cannot be avoided. Mitigation may entail replacement of Section 4(f) property or facilities.

- Traffic projections predict a four-lane river crossing would be warranted around 2038. There is no way to forecast whether future transportation funding would accommodate a new structure to meet this potential need.

- Municipal Consent from the City of Winona is required when there are right-of-way, access or capacity changes.

- A goal of the Winona Bridge Project team has been to follow the opening of the new bridge with the work on the existing Bridge No. 5900 to keep the Ames Construction team in Winona. This minimizes re-mobilization costs and maximizes efficiencies.


Winona South Approach


Latsch Island North Approach

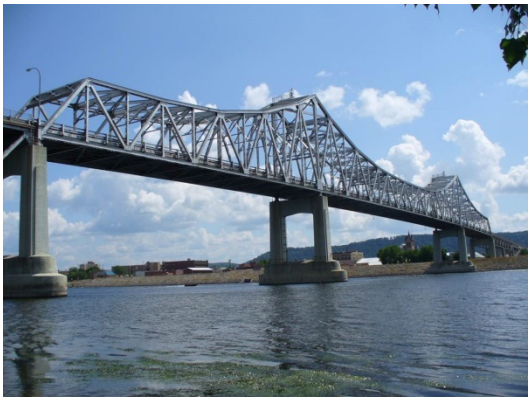
Options (there could be hybrids between these)

Option #1 – Historical Full Build

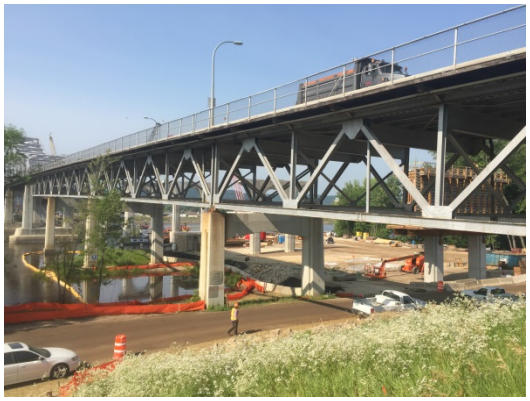
The current scope of work for the rehabilitation and reconstruction of Bridge No. 5900 consists of a long-term, lowest possible maintenance cost solution that meets today's MnDOT bridge design standards and all historical requirements for the project. Called the Historical Full Build, it also:

- 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 extent possible.
- Provides a 50-year design life on the through-truss rehabilitation.
- 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 and the new replicated deck truss approach spans.

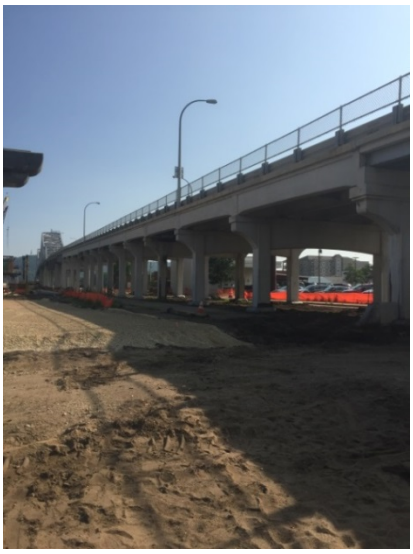
Existing Bridge No. 5900



Through-Truss



Deck Truss Approach Spans



Concrete Beam Approach Spans

Option #2 – Through-Truss Historical Full 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 spans in Winona consisting of modern concrete beams. This option:

- Provides a 50-year design life on the through-truss rehabilitation.
- Provides a 75-year design life on all reconstructed approach spans to the through-truss.
- Includes structural strengthening to meet current 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.

Option #3 – Removal
This option includes removal of existing Bridge No. 5900 and costs to modify the roadway configurations. It does not include the costs of a new 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.

Option #5 - Through Truss 20-Year Fix
This option minimizes the expenditure on the through-truss work as much as possible. This option:

- Provides a 75-year design life on all reconstructed approach spans to the through-truss. All approach span bridge elements.
- 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.
- Does not include structural strengthening to address the current state of deterioration in regards to the through-truss, again 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.

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Winona Bridge Project
Existing Bridge No. 5900
Options

Option	Construction Costs	Construction and Engineering Cost Savings from Option #1	Budget Impact w/ Engineering	City of Winona Cost Impacts	Approvals Required	Challenges / Assumptions
#1 - Historical Full Build	$65 million	n/a	$30 million over budget	$421,000 estimated previously.	City of Winona Cooperative Agreement.	Budget increase.
					MnHPO "No Adverse Effect" letter provided.	
					Budget Increase by MnDOT, Area Transportation Partnership and FHWA.	
#2 - Through-Truss Historical Full Build with Non-Historic Approach Spans	$55-$57 million	$7-$9 million	$21-$23 million over budget	No change anticipated.	4(f) for Adverse Effect to historic property.	Minimal historic mitigation costs anticipated.
					Section 106.	Keeping Ames Construction mobilized through the 4(f) and Section 106 processes.
					Budget Increase by MnDOT, Area Transportation Partnership and FHWA.	
					Possible Environmental Assessment Update.	
#3 - Removal	$7-$10.5 million	$54-$57.5 million	$24-$27.5 million under budget	Unknown costs for future bridge in corridor.	City of Winona - Municipal Consent.	Future bridge cost range $50-$70 million in today's dollars depending on bridge type. Inflation not included.
				Need to revisit aesthetic lighing on existing bridge.	4(f) and Section 106.	Unlikely any $ would be preserved for a future bridge in corridor.
					Environmental Assessment Update.	
#4 - Pedestrian Facility	$10-$30 million	$33.5-$53.5 million	$3.5-$23.5 million under budget	Costs to construction bike and sidewalk approach infrastructure.	City of Winona - Municipal Consent.	Channelization of pedestrian loadings on bridge.
				Unknown costs for future bridge in corridor.	Possible 4(f) and Section 106.	Future corridor expansion to four-lane becomes a significant concern.
					Environmental Assessment Update.	
#5 - Through-Truss 20-year Fix	$15-$40 million	$24.5 - $49.5 million	$19.5 million under budget to $5.5 million over budget	No change anticipated.	Possible Budget Increase by MnDOT, Area Transportation Partnership and FHWA.	Load Postings and potential bridge closures anticipated.
						What happens in 20 years?
						Does not address fracture critical nature of existing bridge.