

Historic Bridge Management Plan

Inspection and Maintenance Plan

Mn/DOT Bridge 4175

Over the Minnesota River
City of Shakopee, Scott County

Report prepared for

Minnesota Department of Transportation

Report prepared by



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Minnesota Department of Transportation (Mn/DOT) Historic Bridge Management Plan

Bridge Number: 4175

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1.0 Introduction

In December 2009 the Minnesota Department of Transportation (Mn/DOT) let a contract for a rehabilitation project to accomplish the recommendations identified in the 2006 Historic Bridge Management Plan for Bridge Number 4175, prepared by Mead & Hunt and HNTB, as updated in the 2009 evaluation by HDR Engineering, Inc. Construction documents were prepared for Mn/DOT by HDR. Work began in spring 2010 and the project was scheduled for completion by the end of 2010.

This Inspection and Maintenance Plan was prepared prior to completion of the 2010 rehabilitation project. It supersedes the inspection and maintenance plans, schedules, and cost estimates included in the June 2006 Historic Bridge Management Plan (2006 HBMP).

The following major specific repairs were included in the 2010 rehabilitation project:

1. Removal of the existing concrete traffic barriers.
2. Removal of existing lighting units.
3. Installation of historic lighting units on the metal railing.
4. Removal of existing concrete sidewalk slabs, and replacement with new concrete sidewalk slabs. The new concrete sidewalk slabs will be constructed to reduce the opening between the slab and bottom of railing to be four inches or less.
5. Milling two inches from the existing concrete deck slab and overlaying with a minimum two-inch thick portland cement concrete wearing course.
6. Removal and replacement of all deck expansion joint devices with waterproof devices. The new joints are to have checkered steel cover plates.
7. Removal of all existing drain downspouts.
8. Repairs to spalled, deteriorated and delaminated concrete surfaces of abutments, piers and approach spans. The repairs are identified as Architectural Concrete Texture (Historic) Type 1 and Architectural Concrete (Historic) Type 2. The repairs are to use materials that are sympathetic to the existing materials in character and appearance, including matching of color, finish, surface variation and texture.
9. Repair or replacement of components of the steel truss spans with extensive section loss, including addition of new steel reinforcing plates. These components are stringers, overhang brackets, floor beams, gusset plates and truss members.

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10. Removal and replacement of deteriorated rivets with new shop-installed rivets or field-installed high-strength bolts. New bolts that will be visible are to be tension controlled bolts of button head design to replicate the existing rivets.
11. Removal and replacement of bearing pins of the main truss spans at nine expansion bearing locations. This item also includes removal and replacement of six additional bearing pins at the fixed bearing locations of the main truss spans if tests on the removed bearing pins at the expansion bearings have cracks.
12. Removal and replacement of three elastomeric bearing assemblies.
13. Repair of concrete surfaces and pipe railing of north abutment staircases according to historic treatment specifications.
14. Removal of wooden staircase near southeast corner of the bridge.
15. Placement of Class III stone riprap around Pier 4 footing.
16. Removal of existing ornamental railing.
17. Replacement with new ornamental railing in-kind. The existing cast iron newel posts are to be reused. Openings in railings that exceed current AASHTO standards to be reduced by steel cables attached to the railing posts. The top horizontal rail member is to be galvanized; the entire railing system is to be painted olive green with a semi-gloss finish.
18. Removal and containment of the original lead-based paint system on the existing steel members.
19. Painting of all in-place and new structural steel members bearing devices and hardware, except for new components of the ornamental railing, with an organic zinc-rich, three coat, paint system.
20. Removal and reinstallation of the National Weather Service gage on the new ornamental railing.
21. Removal of graffiti on the concrete components of the bridge.
22. Installation of epoxy paint pavement markings on the bridge deck.
23. Clear and grub vegetation at the north and south ends of the bridge.

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2.0 Recommendations for Inspections for Monitoring the Bridge Condition Following the 2010 Rehabilitation

The following inspections should be performed for monitoring the condition of Bridge 4175 following the 2010 rehabilitation:

1. Conduct routine inspections annually. Implement resulting recommended maintenance efforts within a 12-month period.
2. Conduct an in-depth, arm's length inspection at 5-year intervals. Implement resulting recommended maintenance or repair efforts within a 24-month period
3. Conduct an underwater inspection at 5-year intervals. Implement resulting recommended maintenance or repair efforts within a 24-month period.

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3.0 Recommendations for Maintenance Activities Following the 2010 Rehabilitation

The following maintenance activities should be performed following the 2010 rehabilitation of Bridge 4175:

1. Power-wash the ornamental railings and bridge deck annually, preferably in the spring.
2. Spot paint and/or metalize and paint deteriorated steel elements, following Mn/DOT standard procedures, at 10-year intervals. This should also include the ornamental railings.
3. Completely repaint the structural steel, following Mn/DOT standard procedures, at 40-year intervals.
4. Lubricate bearings at 2-year intervals.
5. Replace expansion joint glands at 20-year intervals.
6. Research and implement use of small-scale or portable microabrasive blast unit (e.g., Black Diamond product) for removal of occasional graffiti on historic concrete surfaces. This technology and process has been approved by the Minnesota State Historic Preservation Office (SHPO) and results in a more complete removal with a far better appearance than conventional paint-over approaches. (Note: microabrasive blast is different from conventional sandblast, which is not approved and should not be used.) This recommendation is not included in the projected cost schedule.

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4.0 Projected Costs for Maintenance

Appendix A presents the maintenance schedule for Bridge 4175. The schedule includes the activity listing and costs associated with maintenance activities. Note: this schedule does not include costs for the graffiti removal process using microabrasive blast that is recommended in Section 3.

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Appendices

Appendix A. Cost Details

Mn/DOT Maintenance Schedule for Bridge 4175
BRIDGE No. 4175 MAINTENANCE Activity Listing and Costs - April 2010

Notes:

- 1 Costs are presented in 2010 dollars.
- 2 Unit costs are presented to the dollar or cent depending on the precision of the specific value.

MAINTENANCE COST SUMMARY

	ITEM	ANNUAL COSTS
1.00	SUPERSTRUCTURE	\$ 36,900
2.00	SUBSTRUCTURE	\$ -
3.00	RAILINGS	\$ 2,000
4.00	DECK	\$ 2,000
5.00	OTHER	\$ -
		\$ 40,900

1.00 SUPERSTRUCTURE

REF. No.	ITEM / DESCRIPTION OF WORK	EXPECTED LIFE CYCLE - YEARS	ITEM QTY	QTY UNIT	UNIT COST	ITEM TOTAL	ANNUAL COST
1.05	Spot Paint Steel	10	1	LS	\$ 50,000.00	\$ 50,000	\$ 5,000
1.10	Complete Repainting of the Steel	40	1	LS	\$ 1,200,000	\$ 1,200,000	\$ 30,000
1.15	Lubricate Truss Bearings	2	1	LS	\$ 1,200.00	\$ 1,200	\$ 600
1.20	Replace Expansion Joint Glands	20	1	LS	\$ 25,000.00	\$ 25,000	\$ 1,250
1.25					\$ -	\$ -	\$ -
1.30					\$ -	\$ -	\$ -
1.35					\$ -	\$ -	\$ -
1.40					\$ -	\$ -	\$ -
1.45					\$ -	\$ -	\$ -
1.50					\$ -	\$ -	\$ -
						\$ 1,276,200	\$ 36,850

2.00 SUBSTRUCTURE

REF. No.	ITEM / DESCRIPTION OF WORK	EXPECTED LIFE CYCLE - YEARS	ITEM QTY	QTY UNIT	UNIT COST	ITEM TOTAL	ANNUAL COST
2.05					\$ -	\$ -	\$ -
2.10					\$ -	\$ -	\$ -
2.15					\$ -	\$ -	\$ -
2.20					\$ -	\$ -	\$ -
2.25					\$ -	\$ -	\$ -
2.30					\$ -	\$ -	\$ -
2.35					\$ -	\$ -	\$ -
2.40					\$ -	\$ -	\$ -
2.45					\$ -	\$ -	\$ -
2.50					\$ -	\$ -	\$ -
						\$ -	\$ -

3.00 RAILINGS

REF. No.	ITEM / DESCRIPTION OF WORK	EXPECTED LIFE CYCLE - YEARS	ITEM QTY	QTY UNIT	UNIT COST	ITEM TOTAL	ANNUAL COST
3.05	Flush railings with water	1	1	LS	\$ 2,000.00	\$ 2,000	\$ 2,000
3.10					\$ -	\$ -	\$ -
3.15					\$ -	\$ -	\$ -
3.20					\$ -	\$ -	\$ -
3.25					\$ -	\$ -	\$ -
3.30					\$ -	\$ -	\$ -
3.35					\$ -	\$ -	\$ -
3.40					\$ -	\$ -	\$ -
3.45					\$ -	\$ -	\$ -
3.50					\$ -	\$ -	\$ -
						\$ 2,000	\$ 2,000

4.00 DECK

REF. No.	ITEM / DESCRIPTION OF WORK	EXPECTED LIFE CYCLE - YEARS	ITEM QTY	QTY UNIT	UNIT COST	ITEM TOTAL	ANNUAL COST
4.05	Flush deck with water	1	1	LS	\$ 2,000.00	\$ 2,000	\$ 2,000
4.10					\$ -	\$ -	\$ -
4.15					\$ -	\$ -	\$ -
4.20					\$ -	\$ -	\$ -
4.25					\$ -	\$ -	\$ -
4.30					\$ -	\$ -	\$ -
4.35					\$ -	\$ -	\$ -
4.40					\$ -	\$ -	\$ -
4.45					\$ -	\$ -	\$ -
4.50					\$ -	\$ -	\$ -
						\$ 2,000	\$ 2,000

5.00 OTHER

REF. No.	ITEM / DESCRIPTION OF WORK	EXPECTED LIFE CYCLE - YEARS	ITEM QTY	QTY UNIT	UNIT COST	ITEM TOTAL	ANNUAL COST
5.05					\$ -	\$ -	\$ -
5.10					\$ -	\$ -	\$ -
5.15					\$ -	\$ -	\$ -
5.20					\$ -	\$ -	\$ -
5.25					\$ -	\$ -	\$ -
5.30					\$ -	\$ -	\$ -
5.35					\$ -	\$ -	\$ -
						\$ -	\$ -