Located in rural Waterford Township about 2 miles northwest of Northfield in south-central Dakota County, Bridge L3275, also known as the Waterford Bridge, carries an unpaved, pedestrian trail across the Cannon River. It is owned by Waterford Township. The bridge, constructed in 1909, consists of a 140-foot, steel, riveted and bolted, Camelback through truss on concrete abutments. The Waterford Bridge is significant as an example of a Camelback through truss with rigid connections. It is one of the earliest extant bridges with rigid (riveted and bolted) connections in Minnesota, and is the only known metal through truss bridge in Minnesota featuring a limited number of bolted connections.

Bridge L3275 is in fair condition with some individual elements exhibiting poor condition. Bridge L3275 is significantly compromised in terms of load carrying capacity. Preservation of the structure including restoring the safety and load capacity to accommodate pedestrians and small vehicles (ATV’s, snowmobiles, etc.) can be reasonably accomplished and a process is outlined herein.

Any work on Bridge L3275 should proceed according to the Secretary of the Interior’s Standards for the Treatment of Historic Properties (Standards) [36 CFR part 67] and The Secretary’s Standards with Regard to Repair, Rehabilitation, and Replacement Situations, as adapted by the Virginia Transportation Research Council (Guidelines).
Bridge Location: CANADA AVE over CANNON RIVER

PROJECT LOCATION

DAKOTA COUNTY
SEC. 20, TO 112NN, R 19W
UTM ZONE: 15       NAD: 27
USGS QUAD NAME: NORTHFIELD
EASTING: 1606893 ft.
NORTHING: 16161487 ft.
Minnesota Department of Transportation (MnDOT)
Local Historic Bridge Report

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A. Glossary
B. Guidelines for Bridge Maintenance and Rehabilitation based on the Secretary of the Interior’s Standards
C. Documents
This Bridge Report is a product of a comprehensive study performed for approximately 140 historic bridges owned by county, city, township, private and other state agencies besides MnDOT. The study is the second phase of a multi-phased process developed and executed in partnership with representatives from the Federal Highway Administration (FHWA); State Historic Preservation Office (SHPO); MnDOT State Aid; MnDOT Cultural Resources Unit (CRU); the US Army Corps of Engineers (USACE); local public works and county highway departments; county and township boards and city councils; the preservation community and the general public. To perform the study, MnDOT retained the consultant team of LHB Inc., Mead & Hunt Inc., and The 106 Group.

The general goals of the study include:

- Gathering and compiling the existing historic and bridge condition data and other relevant information on the bridges in the study group into bridge reports.
- National Register nominations for a select number of bridges within the study group which the bridge owner may request a nomination to be prepared.
- Updating MnDOT’s *Management Plan for Historic Bridges in Minnesota* based on the study’s findings.
- Producing a narrative for the MnDOT Historic Bridge Website to disseminate information regarding locally owned historic bridges in Minnesota.
- Investigating and preparing a summary regarding how other states have funded historic bridge programs and structured Programmatic Agreements when multiple non-state entities are the owners of historic bridges.

The Bridge Reports compile and summarize the historic and engineering information concerning the structures. It is important to note that this report indicates if a bridge is located within a known historic district, but it does not identify all known or potential historic properties. Potential impacts to adjacent or surrounding historic properties, such as archaeological sites or other structures must be considered. Contact MnDOT CRU early in the project planning process in order to identify other potential historic properties. The reports also document the existing use and condition of the bridges along with assessments of the maintenance, stabilization and preservation needs of each structure, including cost estimates. The maintenance activities, along with regular structural inspections and anticipated bridge component replacement activities are routine practices directed toward continued structure serviceability. Stabilization activities address immediate needs identified as necessary to maintain a bridge’s structural and historic integrity and serviceability. Preservation activities are near term or long term steps that need to be taken to preserve and in some cases restore a bridge’s structural and historic integrity and serviceability. In assessing preservation activities, a design life of 20 years or longer is typically considered. In addition to general restoration activities and dependent on the severity of deterioration, preservation activities may include spot repair, disassembly and reassembly or replacement of specific bridge components.

Recommendations within the Bridge Reports are consistent with the Secretary of the Interior’s Standards for the Treatment of Historic Properties (Standards). The Standards are basic principles created to help preserve the distinct character of a historic property and its site, while allowing for reasonable change to meet new engineering standards and codes. The Standards recommend repairing, rather than replacing...
deteriorated features whenever possible. The Standards apply to historic properties of all periods, styles, types, materials and sizes and encompass the property’s location and surrounding environment.

The Standards were developed with historic buildings in mind and cannot be easily applied to historic bridges. The Virginia Transportation Research Council (Council) adapted the Standards to address the special requirements of historic bridges. They were published in the Council’s 2001 Final Report: A Management Plan for Historic Bridges in Virginia, *The Secretary’s Standards with Regard to Repair, Rehabilitation, and Replacement Situations*, provide useful direction for undertaking maintenance, repair, rehabilitation, and replacement of historic bridges and are included in the Appendix to this plan.

Existing bridge data sources typically available for Minnesota bridges were gathered for the study. These sources include:

- PONTIS, a bridge management system formerly used by MnDOT to manage its inventory of bridges statewide, and its replacement system, SIMS (Structure Information Management System)

- The current MnDOT Structure Inventory Report and MnDOT Bridge Inspection Report. Reports are available for the majority of the bridges (not available for bridges in private ownership)

- Database and inventory forms resulting from the 2012 Minnesota Local Historic Bridge Study and other prior historic bridge studies as incorporated into the database

- Existing Minnesota historic contexts studies for bridges in Minnesota, including *Reinforced-Concrete Highway Bridges in Minnesota, 1900-1945*, *Minnesota Masonry-Arch Highway Bridges, 1870-1945*, *Iron and Steel Bridges in Minnesota, 1873-1945* and *Minnesota Bridges 1955-1970*

- Field investigations documenting the general structural condition and determining character-defining features

Additional data sources researched and gathered for some of the bridges as available also included:

- Files and records at MnDOT offices

- Original bridge construction plans, rehabilitation plans, and maintenance records of local owners

- Files and documents available at the SHPO office, including previous inventory forms, determinations of eligibility, studies, and compliance documents

- Existing historic and documentary material related to the National Register-eligible bridges

The Appendix contains the following: a Glossary explaining structural and historic preservation terms used in the report, the Guidelines for Bridge Maintenance and Rehabilitation based on the Secretary of the Interior’s Standards, a list of engineering and historic documents available for this bridge, and copies of the MnDOT Structure Inventory and Bridge Inspection Reports current at the time of the report preparation.

The Bridge Report will provide the bridge owner and other interested parties with a comprehensive summary of the bridge condition and detailed information related to the historic nature of the bridge. This information will enable historic bridge owners to make informed decisions when planning for their historic properties.
II – Historic Data

This narrative is drawn from previous documents, as available for the subject bridge, which may include determination of eligibility (also known as Phase II evaluation), Minnesota Architecture/History Inventory Form, National Register nomination, Multiple Property Documentation Form, and/or applicable historic contexts. See Sources for details on which documents were used in compiling this Historic Data section.

Contractor
Hennepin Bridge Company

Designer/Engineer
Charles A. Forbes

Description
Located in rural Waterford Township, about 2 miles northwest of Northfield in southern Dakota County, Bridge L3275, also known as the Waterford Bridge, carries an unpaved, pedestrian trail across the Cannon River. It is located in a rural setting, with trees along the river and overgrown bush along the pathways leading to the bridge. Several boulders sit at each entrance of the bridge. Short dirt trails on either side run from Canada Avenue, which has been realigned to follow the modern vehicular bridge constructed directly west of the Waterford Bridge. Railroad tracks and County Road 47 are north of the bridge.

Aligned on a southeast-northwest axis, the bridge consists of a 140-foot, steel, riveted and bolted Camelback through truss on concrete abutments. The two truss webs are identically detailed. Two channel sections with cover plate and V-lacing form the top chord, while four angle sections riveted together with V-lacing comprise the lower chord. Hip verticals are four angle sections with V-lacing; the other verticals are paired channel sections with V-lacing. All diagonal members are paired angle sections with battens. The bridge's portal bracing consists of paired angle sections in an A-configuration with knee braces. Overhead sway bracing consists of four angle sections with V-lacing. Top-lateral and bottom-lateral bracing employs crossed, cylindrical rods. The bridge railings consist of two lines of angles bolted to the truss web at either side of the bridge. A wooden beam runs along the bottom of the railings.

In 2014 the bridge plaque on the north end of the bridge was stolen. However the south plaque is still intact and reads, "Waterford Bridge/Erected by the/ Hennepin Bridge Co. / Minneapolis Minn. / 1909 Designed by/ Chas. A. Forbes/ County Surveyor" and is followed by a list of county employees. The deck consists of bituminous-surfaced concrete with a 16-foot-wide roadway. The deck has deteriorated along the west side, some gaps in the surface are covered with metal plates and some are left exposed.

The bridge's floor system consists of eight rolled stringers (six I-beams and two channel sections) bolted to rolled I-beam floorbeams, which, in turn, are bolted to the superstructure. Lateral bracing employs crossed, cylindrical rods. The bottom flange of each stringer is bolted to the top flange of each floorbeam. The floorbeams are bolted to the superstructure via gusset plates. The bridge's concrete deck was poured over corrugated-metal, semi-cylindrical sections, which are visible beneath the deck. Roller expansion bearings are located on the southeast abutment. Rock rip rap covers the slope between the concrete abutments and the river. Long concrete wingwalls project off both north and south abutments.

Alterations to the bridge are minimal. In 2014, the southeast abutment was rebuilt with a new concrete wingwall.
Significance

In the spring of 1909, the Dakota County Board voted "to assist in constructing a new bridge [over the Cannon River] in the...Town of Waterford" by appropriating "the sum of $2,500 or so much thereof as may be necessary for the payment of one half of the cost of said bridge." The town, in turn, awarded a construction contract for the project to the Hennepin Bridge Company of Minneapolis, but the bridge-building firm did not prepare the plans for the new crossing. Instead, as metal plaques on the completed structure would testify, the Waterford Bridge was "Designed by Chas. A. Forbes, County Surveyor." In 1910, the Hennepin Bridge Company received payment for its work on the Waterford Bridge.

In its form and materials, the Waterford Bridge was quite conventional. For the 140-foot crossing, Forbes selected a steel Camelback through truss – a bridge type that had been widely used for many years. In its detailing, however, the Waterford Bridge was progressive for its period, especially in its use of rigid connections. It is one of the earliest surviving examples of a rigid-connected, through highway truss. During the late nineteenth century, American engineers hotly debated the virtues of pinned versus riveted connections for steel through trusses. Pinned trusses were easier to design and erect, but riveted trusses were sturdier and more durable. The advent of economical, portable, field-riveting equipment during the first decade of the twentieth century eventually tipped the scales in favor of riveted trusses, although it took time for field riveting to establish its reliability.

Moreover, unlike most rigid-connected through truss bridges, which rely on riveting, the Waterford Bridge features a number of bolted connections, most notably the bolts connecting the floorbeams to the trusses. This was never a common practice in Minnesota, and it is viewed as an intermediate evolutionary step between pinned construction and riveted construction. The Waterford Bridge is the only known through truss highway bridge in the state featuring bolted connections.

In recent decades, the crossing has been recognized as an important community landmark. When scour threatened to undermine the bridge's abutments in the early 1980s, the residents of Waterford Township waged a successful campaign to raise the $40,000 required to stabilize the substructure.

In 2014 the bridge was rehabilitated using a grant from the National Trust for replacement of the deteriorating southeast abutment. Though the abutment has been replaced, the superstructure of the bridge is intact. As such, the bridge retains integrity of workmanship, design, and materials. The bridge carries an unpaved, pedestrian trail across the Cannon River and retains integrity of location, association, feeling and setting. The period of significance for the Waterford Bridge is 1909 to correspond with its date of construction.

The Camelback through truss, a bridge type once common in Minnesota, is now increasingly rare. The Waterford Bridge was constructed in 1909. It was about this time that bridge engineers and contractors were beginning to transition from pin-connected bridge designs to rigid-connected bridge designs. Rigid-connected bridge designs utilized bolts or rivets at panel points and floorbeams. The Waterford Bridge represents one of the earliest extant rigid-connected bridges in Minnesota. Rigid connections may include both bolts and rivets. Though the superstructure features primarily riveted connections, it includes a number of bolted connections, making it significant as the only known metal through truss bridge in Minnesota with bolted connections.
The Waterford Bridge is eligible for the National Register under *Criterion C* in the area of Engineering, within the historic context of "Historic Iron and Steel Bridges in Minnesota." The Multiple Property Documentation Form associated with this context states that properties may be eligible under *Criterion C* if "they embody distinctive characteristics of bridge engineering and construction or significant phases in the evolution of bridge engineering and construction." The Waterford Bridge satisfies this criterion.

**Historic Context**
Iron and Steel Bridges in Minnesota, 1873-1945

**National Register Status**
Listed (Individually)

**Criterion A Significance**
N/A

**Criterion C Significance**
Engineering: Important type; Distinctive method of construction; Variation of type

**Historic District**
N/A

**SHPO inventory number**
DK-WTR-005

**Sources Used to Compile Section II -- Historic Data**


Bridge L3275 File. Available at the Minnesota Department of Transportation, St. Paul.


Dakota County Highway Department, Hastings, Minnesota.


Field Inspection by Chad Perkins, 3 October 1996.

Field Inspection by LHB, Inc. and Mead & Hunt, 19 September 2013.


Bridge L3275 electronic record in the Minnesota Department of Transportation Bridge Database. Minnesota Highway Commission, Report, 1912-1913, 9-11.


Character-Defining Features
Character-defining features are prominent or distinctive aspects, qualities, or characteristics of a historic property that contribute significantly to its physical character. Features may include materials, engineering design, and structural and decorative details. Often, the character-defining features include important historic fabric. However, historic fabric can also be found on other elements of a bridge that have not been noted as character-defining. For this reason, it is important to consider both character-defining features and the bridge’s historic fabric when planning any work.

Feature 1: Design and construction of a Camelback through truss, an increasingly rare bridge type in Minnesota.
Feature 2: Use of rivets at panel point connections rather than pin-connections, which would have been standard practice at this time. Riveted connections were not yet required by the Minnesota State Highway Commission.

Feature 3: Early use of bolted connections, notably connecting the floorbeams to the trusses. Use of bolts never a common practice in Minnesota, and is viewed as an intermediate evolutionary step between pinned construction and riveted construction.
## Minnesota Department of Transportation (MnDOT)
### Local Historic Bridge Report

**Bridge Number:** L3275

### Bridge Data

<table>
<thead>
<tr>
<th>Date of Construction (remodel)</th>
<th>1909</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common Name (if any)</td>
<td>Waterford Bridge</td>
</tr>
</tbody>
</table>

### Location

- **Feature Carried:** CANADA AVE
- **Feature Crossed:** Cannon River
- **County:** Dakota
- **Ownership:** Waterford Township

### MnDOT Structure Data

- **Date of Construction (remodel):** Sep 2013
- **Main Span Type:** 303 STEEL HIGH TRUSS
- **Main Span detail:** CAMELBACK
- **Abutment:** 1-Concrete - 1-Spread/Soil
- **Piers:** N-Not Applicable - N-Not Applicable
- **Total Length:** 143 ft
- **Main Span Length:** 137 ft
- **Total Number of Span(s):** 1
- **Skew (degrees):** 0
- **Structure Flared:** No Flare
- **Roadway Function:** Rural, Local
- **Custodian/Maintenance Type:** Township

### Reported Owner Inspection Date

- **1/23/2009**

### Sufficiency Rating

- **N/A**

### Operating Rating

- **HS 3.8**

### Inventory Rating

- **HS 2.8**

### Structure Status

- **K - Bridge closed**

### Roadway Function

- **Rural, Local**

### Custodian/Maintenance Type

- **Township**

### Design Load

- **UNKN**

### Current Condition Code

- **Deck:** 2
- **Superstructure:** 5
- **Substructure:** 4
- **Channel and Protection:** 7
- **Culvert:** N

### Current Appraisal Rating

- **Structural Evaluation:** 0
- **Deck Geometry:** 0
- **Underclearances:** N
- **Waterway Adequacy:** 8
- **Approach Alignment:** 3

### Roadway Clearances

- **Roadway Width:** 15.5 ft
- **Vert. Clearance Over Rdwy:** 7.6 ft
- **Vert. Clearance Under Rdwy:** N/A
- **Lat. Clearance Right:** 0 ft
- **Lat. Clearance Left:** 0 ft

### Roadway Data

- **ADT Total:** 125 (1996)
- **Truck ADT Percentage:** 6.4
- **Bypass Detour length:** 3 miles
- **Number of Lanes:** 1

### Waterway Data

- **Scour Code:** I-LOW RISK

### Non-MnDOT Data

#### Approach Roadway Characteristics

- **Lane Widths:** 16 ft Trail
- **Shoulder Width:** N/A (Ped)
- **Shoulders Paved or Unpaved:** N/A (Ped)
- **Roadway Surfacing:** Aggregate

#### Deficient Status

- **S.D.**

**Number of Crashes reported in MnMCAT within 500 feet of Bridge Site**

- **1**

### Location of Plans

- **N/A**

**Plans Available**

- **No Plan Available**

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*Non-MnDOT data collected during field survey. All other fields of data collected from MnDOT September of 2013. See Appendix C for MnDOT inventory and inspection report data.

**Unless a significant number of crashes are noted on or near a bridge, the accident data is not detailed in this report.*
The engineering conditions and recommendations that follow reflect the observations made in September of 2013 and pre-date the abutment work performed during the summer of 2014.

Existing Conditions
Available information, as detailed in the Project Introduction section, concerning Bridge L3275 was reviewed prior to visiting the bridge site. The site visit was conducted to establish the following:

1. General condition of structure
2. Conformation to available extant plans
3. Current use of structure
4. Roadway/pedestrian trail geometry and alignment (as applicable)
5. Bridge geometry, clearances and notable site issues

General Bridge Description
Bridge L3275 is a 140-foot-long, rivet and bolt-connected, steel through truss on concrete abutments with flared and parallel concrete wingwalls. The bridge's floor system consists of rolled stringers and rolled I-beam floorbeams. Bottom-lateral bracing consists of crossed eyerods. The original bridge deck was constructed using arched corrugated metal pipes as stay-in-place forms with concrete placed above the forms. The deck has since been overlaid with bituminous material. The bridge railing consists of a combination of steel angles, channels and timber planks attached to the truss vertical members.

Bridge L3275 is in fair condition with some individual elements exhibiting poor condition. The steel truss members are in fair condition with surface rusting and limited section loss on individual members noted. The concrete north abutment is in fair condition and the south abutment is in poor condition due to spalling concrete and a significant vertical crack in the southeast corner of the abutment. The majority of the wingwalls are in poor condition. The concrete deck at the curb/edge has intermittent areas of full depth failure.

Serviceability Observations
The bridge is currently barricaded with large boulders and closed to vehicle traffic. The spacing of the boulders would allow small vehicles such as ATVs and snowmobiles to cross the bridge. This closure is the result of the bridge’s deteriorated condition and a load posting of 4 tons (tractor/trailer combinations), which was established in 1991. The controlling element for the load rating is stated to be the deteriorated condition of the bridge abutments and development of pack rust at all connections of the lower chord and floorbeams. A parallel bridge has been constructed to the west of Bridge L3275 to service vehicular traffic on Canada Avenue (Township 166) over the Cannon River. Boulders have been placed at each end of the bridge to prevent vehicular traffic from crossing. Use of the bridge by pedestrians was observed at the time of the site visit and signs prohibiting such use were not evident.
Condition Observations

Superstructure

Steel Truss
The steel truss is in fair condition. The majority of the truss elements exhibit minor section loss and rust deterioration. However, isolated regions of significant loss/deterioration are present. The truss upper lateral bracing and sway bracing is in good condition. The upper members of the truss (chord, diagonals & verticals) are in good condition except for minor areas of pack rust, impact damage and bullet holes. The lower chord members show surface rust at nearly all connections to the gusset plates and floorbeams and pack rust is forming at each connection, deforming the gusset plates from 0 inches to 1/2-inch. The floorbeams appear to be in good condition, however fracture critical reports from 2004, 2007 and 2009 (with use of snooper trucks) indicate that there are isolated areas of pack rust and section loss. The underside diagonal bracing appears to be functioning. The most notable section loss is located in the stringers where they meet the abutments and in the fascia channels of the floor system. The stringer condition throughout the floor system is questionable, not only at the abutments. The stringers are encased by the deck concrete and it is likely that they have significant deterioration due to the condition of the concrete deck. The fascia channels are severely deteriorated and the webs have rusted through in several locations. The paint system of the entire truss is deteriorating and estimated to be 50 percent failed. Inspection records indicate that the bridge was last painted in 1976.

Bearings
The north end truss bearings are fixed bearings and the south end bearings were originally designed to function as expansion bearings. Currently, the south end bearings are frozen and presumably the truss expansion/contraction is taken up through a combination of distortion of the truss, limited movement in the concrete abutments, and possible sliding of the bearings where they interface with the abutments. The concrete beneath the southeast and north bearings has spalled away.

Deck
The concrete deck is presently in poor condition. Approximately one-third of the west deck edge has a full depth failure. In some locations, the deck edge has been repaired with a steel cover plate. In other locations the failures are open. There are large transverse cracks (up to 1 inch wide) visible through the 4-inch-deep bituminous overlay at each floorbeam location and intermediate longitudinal cracking throughout. Where the cast-in-place concrete forming on the bottom of the deck has failed/fallen, cracking is visible on the underside of the concrete deck.

Bridge Railings
The metal rail attached to the truss members has been supplemented by an additional timber rail near the curb. The timber components do not appear to be original to the bridge. They are in fair condition; however this curb does not appear to meet pedestrian code. The southern 4 feet of railing (both sides) is bent and misaligned. Bolts are missing at many locations.
Substructures

Abutments
The south abutment is in poor condition. There is a large vertical crack beneath the southeast bearing. The abutment face appears to have significantly deteriorated due to the introduction of water to the face from the failed expansion joints and water seepage through cracks in the deck. The north abutment is in better condition than the south. However, it has spalling concrete at the bearing seats and a failing back wall above the abutment.

Wingwalls
The south wingwalls are in varying condition. The southwest wingwall is documented to have been replaced in 1983. It is in fair condition with minor vertical cracks present. At the time of the wingwall replacement, the corner of the abutment was replaced, restoring bearing to the truss in this location. The southeast wingwall is in poor condition with two large vertical cracks present. The concrete is delaminated and deteriorated.

The north wingwalls flare from the abutment, then return and run parallel to the roadway. The northeast wingwall is in poor condition with cracking, delaminated and deteriorated concrete. The flared portion of the northwest wingwall is also in poor condition with large pieces of concrete spalled away from the face. The parallel portion of the wingwall, however, is in fair condition.

Approach/Waterway Observations
No significant condition deficiencies were noted to the waterway in the immediate bridge vicinity. The bridge approaches appear suitable for the current bridge function as an aggregate trail with no deficiencies noted other than a fair amount of overgrowth due the lack of maintenance.

Date of Engineering Site Visit by LHB
September 19, 2013
Condition 1: Elevation view, looking east

Condition 2: North approach, looking south
Condition 3: Typical floorbeam, stringer, and deck underside condition
(note: stay-in-place forming made of arched, corrugated metal)

Condition 4: Stringer deterioration at abutment
Condition 5: Fascia channel section loss

Condition 6: Failed deck edge
Condition 7: Southeast bearing

Condition 8: South abutment
IV – Existing Conditions/Recommendations  Bridge Number: L3275

Condition 9: North abutment back wall

Condition 10: North abutment
Condition 11: Southwest railing

Condition 12: Bridge plaque
Overall Recommendations
With the parallel bridge carrying vehicular traffic nearby, it is unlikely there will be a need for Bridge L3275 to carry vehicular traffic again. The township has expressed that they are working to preserve this structure in order to incorporate it into a future trail system (at its current location) that will service both pedestrians and small vehicles such as ATV's and snowmobiles. The structural needs of the bridge, however, are such that the structural preservation recommendations are generally similar regardless of the intended future use. Stabilization and preservation activities will need to consider the historic attributes of the structure.

It is further recommended that prior to the bridge rehabilitation, the bridge be rated for its current use to ensure that the bridge can handle the current loads of pedestrians and small vehicles. The bridge should then be signed to reflect this rating. Costs for this work are not included in the stabilization or preservation estimates for this bridge.

Recommended Stabilization Activities

1. Repair or protect failed/open holes in deck.

2. Prior to major concrete repair, monitor and assess the condition of the concrete abutments at the truss bearing corners (particularly at the southeast corner).

3. Re-attach/repair bridge railing.

Recommended Preservation Activities

Superstructure

Steel Truss
Perform detailed assessment of degree of section loss to stringers, lower chord members, lower chord gussets, and vertical and diagonal members connecting at lower chord. Perform similar assessment to other truss members, although anticipated degree of section loss is less for those members. It is anticipated that a number of the fascia channels will require in-kind replacement due to the extent of deterioration. The stringers should be reviewed and repaired at the time the deck is replaced. It is possible that some stringers will require replacement due to advanced deterioration hidden by the concrete deck. To maintain structural the historic integrity of the structure and leave as much historic fabric on the bridge as possible, repair of the truss members should be done where it is possible to regain the required strength for structural stability. Work to verticals, diagonals, gusset plates and upper chord members will be limited based on the level of deterioration noted at the time of this assessment. Work for these members is not programmed into the cost estimate of this report due to their presumed good condition.

The current paint system on the trusses and remaining bridge superstructure has failed and the bridge should be repainted (not an immediate need). It is recommended the in-place paint system be entirely removed to bare metal through abrasive blasting (which through testing is determined will not degrade portions of the sound steel structure which are to remain). Following removal, the structure should be painted with a zinc-rich primer and a protective overcoat system with color and sheen to be selected...
based on a study of the historic requirements of the structure. The in-place system will require testing to determine the presence of lead. Due to the toxicity of lead, the removal of lead paint systems requires an intensive encapsulation process. For purposes of cost estimating a lead based system has been presumed.

Bearings
The bearings are presently fairly deteriorated, especially the south roller bearings which are non-functioning. It is likely replacement will be necessary, though this will need to be determined through a more detailed inspection. If replacement is determined to be necessary, replacement with components of like material and geometry should be considered to the extent possible as they are a visual element of the structure. For purposes of the preservation cost estimate only, replacement has been assumed. Additionally, bearing to the concrete abutment should be restored at locations on both the north and south abutments.

Deck
Due to the highly deteriorated condition of the deck and the numerous visible repairs that have been done, it is apparent that the deck is at the end of its lifecycle. The cracked and spalling condition of the concrete on the underside of the deck threatens boaters passing under the bridge and the missing deck edges are a danger to pedestrians. It is recommended that the bridge deck be replaced with a concrete bridge deck that matches the original deck’s geometrics and surfacing. The original deck utilized arch shaped corrugated metal stay-in-place forms. This would be replicated during the replacement of the existing deck. Upon replacement of the deck, the joints at the ends of the deck should also be replaced to protect the abutment from future damage due to water seepage.

Bridge Railings
It is unknown what, if any, of the current components of the bridge railing are original. For purposes of the preservation estimate, an allowance for repairing the bent metal components, replacing missing bolts, and replacing the timber curb has been included. The planned future use for the structure will have a strong influence as to what modifications should be made to the railing. Further research should be performed to determine what the original railing features were. This research combined with the determined future use, code safety requirements for the future use and potential variances and exceptions from current safety code requirements should be assessed. It is likely that complete replacement of the railings to a rail type which is responsive to the historic structure, and which also reaches an acceptable safety level while not fully meeting current code safety requirements, will be the solution. This is based on solutions reached on other similar structures where a balance between the historic needs and current code requirements were achieved.

Substructures

Abutments
Whenever possible, the original fabric of a structure should remain in place. In the case of the south abutment, further investigation will be required to determine whether the abutment is structurally sound enough to be repaired in place, or if a full replacement is required. This can be accomplished by taking concrete cores to determine the condition of the concrete beyond the face of the abutment. If the inner concrete is in good condition, the front 12 inches of the concrete can be replaced and the remainder of
the abutment left in place. Digging at the front face of the abutment showed that the concrete below the ground surface was missing and unsound. The depth of the abutment repair should be further investigated. The crack under the southeast bearing should also be further investigated. It is anticipated that this concrete will need to be replaced in its entirety similar to the repair performed at the southwest bearing (repaired in 1983 according to the 2009 MnDOT Bridge Inspection Report). For cost estimating purposes only, the entire south abutment is assumed to be replaced.

As previously stated, the north abutment is in better condition than the south. It is anticipated that it can be repaired with minor concrete repairs. Care in selection of material and forming/finishing methods will be necessary to allow for repair material to match in place material in finish, texture, color, and other associated requirements as necessary to meet historic standards. A full investigation of its condition is strongly advised, however. It is estimated that there are at least 75 square feet of concrete replacement required at the bearing areas. These repairs can be accomplished by lifting the corners of the truss and restoring the bearing seat of the truss, then placing the truss back on the abutment seat. Also, the backwall above the abutment will need to be replaced due to deteriorated condition and inability to properly bear the deck stringers. This replacement should be done at the same time as the deck replacement.

Wingwalls
The poor condition of the southeast, northeast and portions of the northwest wingwall may likely warrant a complete replacement. Further investigation should be done to weigh the alternatives of repair vs. replacement, with the repair option being the preferred alternative to maintain historic integrity. For purposes of cost estimating, replacement of these wingwalls is assumed.

Recommended Annual Maintenance Activities

1. Clean the abutment sills and bearings. Remove any debris that can hold moisture against the steel or in the concrete.

2. Clear vines from the truss members.

3. Clean debris from the bottom chord of the truss. Remove any debris that can hold moisture against the steel.

4. Seal cracks in deck and maintain joints at the end of the bridge. This item will only apply after a new deck is placed on the bridge.
Summarized Maintenance, Stabilization and Preservation Construction Cost Estimates

It is important to recognize that the work scope and cost estimates presented herein are based on a limited level assessment of the existing structure. In moving forward with future project planning, it will be essential to undertake a detailed structure assessment addressing the proposed work for the structure. It is also important that any future preservation work follow applicable preservation standards with emphasis to rehabilitate and repair in-place structure elements in lieu of replacement. This includes elements which are preliminarily estimated for replacement within the work scope of this report. Only through a thorough review of rehabilitation and repair options and comprehensive structural and historic assessment can a definitive conclusion for replacement of historic fabric be formed.

The opinions of probable construction and administrative costs provided below are presented in 2013 dollars. These costs were developed without benefit of a detailed, thorough bridge inspection, bridge survey or completion of preliminary design for the estimated improvements. The estimated costs represent an opinion based on background knowledge of historic unit prices and comparable work performed on other structures. The opinions of cost are intended to provide a programming level of estimated cost. These costs will require refinement and may require significant adjustments as further analysis is completed in determining the course of action for future structure improvements. A 20 percent contingency and 7 percent mobilization allowance has been included in the construction cost estimates.

Administrative and engineering costs are also presented below. Engineering and administrative costs are also to be interpreted as programming level only. Costs can be highly variable and are dependent on structure condition, intended work scope, project size and level of investigative, testing and documentation work necessary. Additional studies, evaluation, and historic consultation costs not exclusively called out may also be incurred on a case-by-case basis.

Maintenance, Stabilization and Preservation Costs (refer to appendix for work item breakdown)

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<td>Opinion of Construction Cost- Stabilization Activities</td>
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Estimated Preliminary Design, Final Design, Construction Administration Costs

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<td>Final Design and Plans</td>
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## MAINTENANCE, STABILIZATION & PRESERVATION COST ESTIMATE (2013 DOLLARS)

**Bridge No. L3275**  
**January 9, 2013**

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<td>CLEAN DEBIRS FROM BOTTOM CHORD &amp; VINES FROM TRUSS LUMP SUM</td>
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<tr>
<td>3</td>
<td>(AFTER DECK IS REPLACED) MAINTAIN DECK SEALANT JOINTS LIN FT</td>
</tr>
<tr>
<td>4</td>
<td>(AFTER DECK IS REPLACED) SEAL CRACKS IN CONCRETE DECK LIN FT (annualized @ 10% of deck - 5 year cycle)</td>
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20% CONTINGENCY LUMP SUM

**ESTIMATED MAINTENANCE COSTS** $3,481.00

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**ESTIMATED STABILIZATION COSTS** $5,480.00

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</table>

20% CONTINGENCY LUMP SUM

**ESTIMATED PRESERVATION COSTS** $562,160.00

---

**MINNESOTA DEPARTMENT OF TRANSPORTATION (MnDOT)**  
**LOCAL HISTORIC BRIDGE REPORT**  
**BRIDGE NUMBER:** L3275  
**V – PROJECTED COSTS**
Appendix A. Glossary
Glossary

*Abutment* – Component of bridge substructure at either end of bridge that transfers load from superstructure to foundation and provides lateral support for the approach roadway embankment.

*Appraisal ratings* – Five National Bridge Inventory (NBI) appraisal ratings (structural evaluation, deck geometry, under-clearances, waterway adequacy, and approach alignment, as defined below), collectively called appraisal ratings, are used to evaluate a bridge’s overall structural condition and load-carrying capacity. The evaluated bridge is compared with a new bridge built to current design standards. Ratings range from a low of 0 (closed bridge) to a high of 9 (superior). Any appraisal item not applicable to a specific bridge is coded N.

*Approach alignment* – One of five NBI inspection ratings. This rating appraises a bridge’s functionality based on the alignment of its approaches. It incorporates a typical motorist’s speed reduction because of the horizontal or vertical alignment of the approach.

*Character-defining features* – Prominent or distinctive aspects, qualities, or characteristics of a historic property that contribute significantly to its physical character. Features may include structural or decorative details and materials.

*Condition, fair* – A bridge or bridge component of which all primary structural elements are sound, but may have minor deterioration, section loss, cracking, spalling, or scour.

*Condition, good* – A bridge or bridge component which may have some minor deficiencies, but all primary structural elements are sound.

*Condition, poor* – A bridge or bridge component that displays advanced section loss, deterioration, cracking, spalling, or scour.

*Condition rating* – Level of deterioration of bridge components and elements expressed on a numerical scale according to the NBI system. Components include the substructure, superstructure, deck, channel, and culvert. Elements are subsets of components, e.g., piers and abutments are elements of the component substructure. The evaluated bridge is compared with a new bridge built to current design standards. Component ratings range from 0 (failure) to 9 (new) or N for (not applicable); elements are rated on a scale of 1-3, 1-4 or 1-5 (depending on the element type and material). In all cases condition state 1 is the best condition with condition state 3, 4 or 5 being the worst condition. In rating a bridge’s condition, MnDOT pairs the NBI system with the newer and more sophisticated Pontis element inspection information, which quantifies bridge elements in different condition states and is the basis for subsequent economic analysis.

*Corrosion* – The general disintegration of metal through oxidation.

*Cutwater* – The wedge-shaped end of a bridge pier, designed to divide the current and break up ice.
Decay – Deterioration of wood as a result of fungi feeding on its cell walls.

Delamination – Surface separation of concrete, steel, glue laminated timber plies etc. into layers.

Deck geometry – One of five NBI appraisal ratings. This rating appraises the functionality of a bridge’s roadway width and vertical clearance, taking into account the type of roadway, number of lanes, and ADT.

Deficiency – The inadequacy of a bridge in terms of structure, serviceability, and/or function. Structural deficiency is determined through periodic inspections and is reflected in the ratings that are assigned to a bridge. Service deficiency is determined by comparing the facilities a bridge provides for vehicular, bicycle, and pedestrian traffic with those that are desired. Functional deficiency is another term for functionally obsolete (see below). Remedial activities may be needed to address any or all of these deficiencies.

Deficiency rating – A nonnumeric code indicating a bridge’s status as structurally deficient (SD) or functionally obsolete (FO). See below for the definitions of SD and FO. The deficiency rating status may be used as a basis for establishing a bridge’s eligibility and priority for replacement or rehabilitation.

Design exception – A deviation from federal design and geometric standards that takes into account environmental, scenic, aesthetic, historic, and community factors that may have bearing upon a transportation project. A design exception is used for federally funded projects where federal standards are not met. Approval requires appropriate justification and documentation that concerns for safety, durability, and economy of maintenance have been met.

Design load – The usable live-load capacity that a bridge was designed to carry, expressed in tons according to the AASHTO allowable stress, load factor, or load resistance factor rating methods. An additional code was recently added to assess design load by a rating factor instead of tons. This code is used to determine if a bridge has sufficient strength to accommodate traffic load demands. A bridge that is posted for load restrictions is not adequate to accommodate present or expected legal truck traffic.

Deterioration – Decline in condition of surfaces or structure over a period of time due to chemical or physical degradation.

Efflorescence – A deposit on concrete or brick caused by crystallization of carbonates brought to the surface by moisture in the masonry or concrete.

Extant – Currently or actually existing.

Extrados – The upper or outer surfaces of the voussoirs which compose the arch ring. Often contrasted with intrados.
**Footing** – The enlarged, lower portion of a substructure which distributes the structure load either to the earth or to supporting piles.

**Fracture Critical Members** – Tension members or tension components of bending members (including those subject to reversal of stress) whose failure would be expected to result in collapse of the bridge.

**Functionally obsolete** – The Federal Highway Administration (FHWA) classification of a bridge that does not meet current or projected traffic needs because of inadequate horizontal or vertical clearance, inadequate load-carrying capacity, and/or insufficient opening to accommodate water flow under the bridge. An appraisal rating of 3 or less for deck geometry, underclearance, approach alignment, structural evaluation or waterway adequacy will designate a bridge as functionally obsolete.

**Gusset plate** – A plate that connects the horizontal and vertical members of a truss structure and holds them in correct position at a joint.

**Helicoidal** – Arranged in or having the approximate shape of a flattened coil or spiral.

**Historic fabric** – The material in a bridge that was part of original construction or a subsequent alteration within the historic period of the bridge (i.e., more than 50 years old). Historic fabric is an important part of the character of the historic bridge and the removal, concealment, or alteration of any historic material or distinctive engineering or architectural feature should be avoided if possible. Often, the character-defining features include important historic fabric. However, historic fabric can also be found on other elements of a bridge that have not been noted as character-defining.

**Historic bridge** – A bridge that is listed in, or eligible for listing in, the National Register of Historic Places.

**Historic integrity** – The authenticity of a bridge’s historic identity, evidenced by the survival and/or restoration of physical characteristics that existed during the bridge’s historic period. A bridge may have integrity of location, design, setting, materials, workmanship, feeling, and association.

**Inspections** – Periodic field assessments and subsequent consideration of the fitness of a structure and the associated approaches and amenities to continue to function safely.

**Intrados** – The inner or lower surface of an arch. Often contrasted with extrados.

**Inventory rating** – The load level a bridge can safely carry for an indefinite amount of time expressed in tons or by the rating factor described in design load (see above). Inventory rating values typically correspond to the original design load for a bridge without deterioration.

**Keystone** – Wedge-shaped stone, or voussoir, at the crown of an arch.
**Load Rating** – The determination of the live load carrying capacity of a bridge using bridge plans and supplemented by field inspection.

**Maintenance** – Work of a routine nature to prevent or control the process of deterioration of a bridge.

**Minnesota Historical Property Record** – A documentary record of an important architectural, engineering, or industrial site, maintained by the Minnesota Historical Society as part of the state’s commitment to historic preservation. MHPR typically includes large-format photographs and written history, and may also include historic photographs, drawings, and/or plans. This state-level documentation program is modeled after a federal program known as the Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER).

**National Bridge Inventory** – Bridge inventory and appraisal data collected by the FHWA to fulfill the requirements of the National Bridge Inspection Standards (NBIS). Each state maintains an inventory of its bridges subject to NBIS and sends an annual update to the FHWA.

**National Bridge Inspection Standards** – Federal requirements for procedures and frequency of inspections, qualifications of personnel, inspection reports, and preparation and maintenance of state bridge inventories. NBIS applies to bridges located on public roads.

**National Register of Historic Places** – The official inventory of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, and culture, which is maintained by the Secretary of the Interior under the authority of the National Historic Preservation Act of 1966 (as amended).

**Non-vehicular traffic** – Pedestrians, non-motorized recreational vehicles, and small motorized recreational vehicles moving along a transportation route that does not serve automobiles and trucks. Includes bicycles and snowmobiles.

**Operating rating** – Maximum permissible load level to which a bridge may be subjected based on a specific truck type, expressed in tons or by the rating factor described in design load (see above).

**Pack rust** – Rust forming between adjacent steel surfaces in contact which tends to force the surfaces apart due to the increase in steel volume.

**Pier** – A substructure unit that supports the spans of a multi-span superstructure at an intermediate location between its abutments.

**Pointing** – The compaction of mortar into the outermost portion of a joint and the troweling of its exposed surface to secure water tightness and/or desired architectural effect (when replacing deteriorated mortar).
**Pony truss** – A through bridge with parallel chords and having no top lateral bracing over the deck between the top chords.

**Posted load** – Legal live-load capacity for a bridge which is associated with the operating rating. A bridge posted for load restrictions is inadequate for legal truck traffic.

**Pontis** – Computer-based bridge management system to store inventory and inspection data and assist in other bridge data management tasks.

**Preservation** – Preservation, as used in this report, refers to historic preservation that is consistent with the Secretary of the Interior’s *Standards for the Treatment of Historic Properties*. Historic preservation means saving from destruction or deterioration old and historic buildings, sites, structures, and objects, and providing for their continued use by means of restoration, rehabilitation, or adaptive reuse. It is the act or process of applying measures to sustain the existing form, integrity, and material of a historic building or structure, and its site and setting. MnDOT’s *Bridge Preservation, Improvement and Replacement Guidelines* describe preservation differently, focusing on repairing or delaying the deterioration of a bridge without significantly improving its function and without considerations for its historic integrity.

**Preventive maintenance** – The planned strategy of cost-effective treatments that preserve a bridge, slow future deterioration, and maintain or improve its functional condition without increasing structural capacity.

**Reconstruction** – The act or process of depicting, by means of new construction, the form, features, and detailing of a non-surviving site, landscape, building, structure, or object for the purpose of replicating its appearance at a specific period of time and in its historic location. Activities should be consistent with the Secretary of the Interior’s *Standards for the Treatment of Historic Properties*.

**Rehabilitation** – The act or process of returning a historic property to a state of utility through repair or alteration which makes possible an efficient contemporary use, while preserving those portions or features of the property that are significant to its historical, architectural, and cultural values. Historic rehabilitation, as used in this report, refers to implementing activities that are consistent with the Secretary of the Interior’s *Standards for the Treatment of Historic Properties*. As such, rehabilitation retains historic fabric and is different from replacement. MnDOT’s *Bridge Preservation, Improvement and Replacement Guidelines* describe rehabilitation and replacement in similar terms.

**Restoration** – The act or process of accurately depicting the form, features, and character of a property as it appeared at a particular period of time. Activities should be consistent with the Secretary of the Interior’s *Standards for the Treatment of Historic Properties*.

**Ring stone** – One of the separate stones of an arch that shows on the face of the headwall, or end of the arch. Also known as a voussoir.
**Scaling** – The gradual distentegration of a concrete surface due to the failure of the cement surface caused by chemical attack or freeze-thaw cycles or rebar too close to the surface and oxidizing from exposure to chlorides.

**Scour** – Removal of material from a river’s bed or bank by flowing water, compromising the strength, stability, and serviceability of a bridge.

**Scour critical rating** – A measure of a bridge’s vulnerability to scour (see above). MnDOT utilizes letter designations to represent specific descriptions of a bridges susceptibility and/or present condition in regards to scour. Range in condition and scour susceptibility does not necessarily correlate alpha numerically to the MnDOT scour code letters so it is important to understand the specific scour description for each MnDOT scour code. The scour codes and descriptions can be found in the “MNDOT Bridge Inspection Field Manual”.

**Section loss** – Loss of a member’s cross sectional area and resulting strength usually by corrosion or decay.

**Serviceability** – Level of facilities a bridge provides for vehicular, bicycle, and pedestrian traffic, compared with current design standards.

**Smart flag** – Special Pontis inspection element used to report the condition assessment of a deficiency that cannot be modeled, such as cracks, section loss, and steel fatigue.

**Spall** – Depression in concrete caused by a separation of a portion of the surface concrete, revealing a fracture parallel with or slightly inclined to the surface.

**Spring line** – The imaginary horizontal line at which an arch or vault begins to curve. As example, the point of transition from the vertical face of an abutment to the start of arch curvature extending from abutment face.

**Stabilization** – The act or process of stopping or slowing further deterioration of a bridge by means of making minor repairs until a more permanent repair or rehabilitation can be completed.

**Stringcourse** – A horizontal band of masonry, generally narrower than other courses and sometimes projecting, that extends across the structure’s horizontal face as an architectural accent. Also known as belt course.

**Structural evaluation** – Condition rating of a bridge designed to carry vehicular loads, expressed as a numeric value and based on the condition of the superstructure and substructure, the inventory load rating, and the ADT.
**Structurally deficient** – Classification indicating NBI condition rating of 4 or less for any of the following: deck condition, superstructure condition, substructure condition, or culvert condition. A bridge is also classified as structurally deficient if it has an appraisal rating of 2 or less for its structural evaluation or waterway adequacy. A structurally deficient bridge is restricted to lightweight vehicles; requires immediate rehabilitation to remain open to traffic; or requires maintenance, rehabilitation, or replacement.

**Sufficiency rating** – Rating of a bridge’s structural adequacy and safety for public use, and its serviceability and function, expressed on a numeric scale ranging from a low of 0 to a high of 100. It is a relative measure of a bridge’s deterioration, load capacity deficiency, or functional obsolescence. MnDOT may use the rating as a basis for establishing eligibility and priority for replacement or rehabilitation. Typically, bridges which are structurally deficient and have sufficiency ratings between 50 and 80 are eligible for federal rehabilitation funds and those which are structurally deficient with sufficiency ratings of 50 and below are eligible for replacement.

**Through truss** – A bridge with parallel top and bottom chords and top lateral bracing with the deck generally near the bottom chord.

**Under-clearances** – One of five NBI appraisal ratings. This rating appraises the suitability of the horizontal and vertical clearances of a grade-separation structure, taking into account whether traffic beneath the structure is one- or two-way.

**Variance** – A deviation from State Aid Operations Statute Rules that takes into account environmental, scenic, aesthetic, historic, and community factors that may have bearing upon a transportation project. A design variance is used for projects using state aid funds. Approval requires appropriate justification and documentation that concerns for safety, durability and economy of maintenance have been met.

**Vehicular traffic** – The passage of automobiles and trucks along a transportation route.

**Voussoir** – One of the separate stones forming an arch ring; also known as a ring stone.

**Waterway adequacy** – One of five NBI appraisal ratings. This rating appraises a bridge’s waterway opening and passage of flow under or through the bridge, frequency of roadway overtopping, and typical duration of an overtopping event.
Appendix B. Guidelines for Bridge Maintenance and Rehabilitation based on the Secretary of the Interior’s Standards
The Secretary’s Standards with Regard to Repair, Rehabilitation, and Replacement Situations

Adapted from:

The Secretary of the Interior’s Standards for the Treatment of Historic Properties, first codified in 1979 and revised in 1992, have been interpreted and applied largely to buildings rather than engineering structures. In this document, the differences between buildings and structures are recognized and the language of the Standards has been adapted to the special requirements of historic bridges.

1. Every reasonable effort shall be made to continue an historic bridge in useful transportation service. Primary consideration shall be given to rehabilitation of the bridge on site. Only when this option has been fully exhausted shall other alternatives be explored.

2. The original character-defining qualities or elements of a bridge, its site, and its environment should be respected. The removal, concealment, or alteration of any historic material or distinctive engineering or architectural feature should be avoided.

3. All bridges shall be recognized as products of their own time. Alterations that have no historic basis and that seek to create a false historic appearance shall not be undertaken.

4. Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.

5. Distinctive engineering and stylistic features, finishes, and construction techniques or examples of craftsmanship that characterize an historic property shall be preserved.

6. Deteriorated structural members and architectural features shall be retained and repaired, rather than replaced. Where the severity of deterioration requires replacement of a distinctive element, the new element should match the old in design, texture, and other visual qualities and where possible, materials. Replacement of missing features shall be substantiated by documentary, physical, or pictorial evidence.

7. Chemical and physical treatments that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the most environmentally sensitive means possible.
8. Significant archaeological and cultural resources affected by a project shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.

9. New additions, exterior alterations, structural reinforcements, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.

10. New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.
Appendix C. Documents
Additional Electronic Data
Bridge L3275

Historic Data
  • Research

Local Data
  • Waterford Bridge Details
  • Waterford Bridge RFPLetter
  • Waterford Bridge RFPProposal
  • Waterford Bridge Scopev3

MnDOT Reports
  • Accident Report
  • Waterford Bridge Condition Sheet 2010
  • Waterford Bridge 2004 FC Report
  • Waterford Bridge 2007 FC Report (Consultant)
  • Waterford Bridge 2003 Survey
  • Waterford Bridge 2009 FC Report
  • Waterford Bridge Blank Notes
  • Waterford Bridge Inspection 01-23-09
  • Waterford Bridge Inventory 05-29-13
  • Waterford Bridge Rating Report 1991

Photos
  • L3275 LHB 9-19-13
  • L3275_M&H Photos_9-19-13
  • Report Photos
  • L3275_vehicular bridge

Plans
  • No data
Mn/DOT BRIDGE INSPECTION REPORT

BRIDGE L3275  CANADA AVE OVER CANNON RIVER  INSPE. DATE: 01-23-2009

Panel 1 - Data:

County: DAKOTA  Location: 0.1 MI SE OF JCT CSAH 47  Length: 143.0 ft
City: WATERFORD  Route: TWNS 166  Ref. Pt.: 001+00.200  Deck Width: 16.0 ft
Township: 120N  Control Section: Rdwy. Area / Pot. Unsnd: 2,217 sq ft
Range: 112  Local Agency Bridge Nbr: 8,600 sq ft 1 %
Span Type: STEEL HIGH TRUS
NBI: 124.5  Super: 5  Sub: 4  Chain: 7  Culv: N
Open, Posted, Closed: OPEN  Postings: 4 - -
Required Bridge Signs - Load Posting: BRIDGE CLOSED  Traffic: NOT REQUIRED
Horizontal: OBJECT MARKERS & WIDTH  Vertical: ROADWAY RESTRICTION

STRUCTURE UNIT: 0

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Notes: [Transverse cracks above floor beams. Some potholes developing in bituminous surfacing. Several holes go all the way through slab. West edge has 14 LF of deck missing along fascia.]
[2007] Poor condition with potholes and alligator cracking.
[6 bolts missing in west railing and 1 bolt missing in east railing. Both railings have collision damage.]
[Stringers developing rust, some have minor section loss.]
[Paint flaking off facing and some gusset plates. Two verticals on west side have bolt holes through webs. Bolt missing SE corner top of end post. Nut missing, east side top of upright at lateral strut. Last diagonal out of plane due to possible collision damage.]
[Floor beams developing rust. Bridge painted 1978.]
[Bearings are froze and badly misaligned.]
[None.]
[North abutment - massive gravity abutments show large cracks and spill. South abutment - could use a pressure grouted coating to seal exposed faces. SE corner has a very large vertical crack under the bearing surface, the bearing surface in general is deteriorating badly.]
[New wing poured 1983 SW corner now has 12 LF of light vertical cracks. SE wingwall has 2 very large vertical cracks about 8 LF. Top 1/3rd of NW corner wingwall is severely cracked and beginning to separate into large chunks.]
**Mn/DOT BRIDGE INSPECTION REPORT**

**BRIDGE L3275  CANADA AVE OVER CANNON RIVER**

**INSP. DATE: 01-23-2009**

**STRUCTURE UNIT: 0**

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<th>QTY CS 2</th>
<th>QTY CS 3</th>
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<tr>
<td>Notes:</td>
<td>[Deck rust developing at all connections of lower laterals, where floor beams are connected. Also gusset plates on lower chord have developed paint rust.]</td>
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<tr>
<td>Notes:</td>
<td>[Construction is 1/2 CSC with concrete poured over. Some CSC have corroded away, others have been painted. Several holes in slab both sides of bridge deck. Underside of deck covered with 200’-300’ of cracking both longitudinal and transverse. Severe spalling under deck, where deck is cracked.]</td>
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<td>Notes:</td>
<td>[Bullet damage to all delineators, also the inplace signs have been painted silver.]</td>
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**General Notes:** Bridge L3275 (Sec 20, 1112N, R10W) GENERAL NOTES: (2007) Fracture critical inspection performed in November under Mn/DOT contract.
(02-12-2010) Marked CLOSED per JN e-mail.

---

Inspector's Signature

Reviewer's Signature / Date
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<thead>
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<th><strong>ROADWAY</strong></th>
<th><strong>INSPECTION</strong></th>
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<td><strong>NSI CONDITION RATINGS</strong></td>
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<td>Date Opened to Traffic 08-01-1909</td>
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<td>0.1 MI SE OF JCT CSAH 47</td>
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<td>Latitude</td>
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<td><strong>SAFETY FEATURES</strong></td>
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<td>GR Termi 0-SUBSTANDARD</td>
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<td>Lateral Clear. - L/R 22.0 ft</td>
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