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February 18, 2015

Mr. Mike Cherry, P.E.  
City Engineer/D.P.W.  
200 First Street NE  
P.O. Box 616  
Waverly, IA 50677

Re: 2015 Bridge Inspections

Dear Mr. Cherry:

We have completed the inspection of the roadway and rail-trail bridges for the City of Waverly.

Enclosed you will find the following information:

1. An inspection report, with recommendations, for the roadway and rail-trail bridges.
2. Photographs of the roadway and rail-trail bridges.
3. Copies of the Structural Inventory and Appraisal (S.I. & A) forms for the roadway bridges.
4. A copy of our Operating Rating Report for the roadway bridges.

With the exception of the 3<sup>rd</sup> Street SE bridge, the bridges were found to be in satisfactory condition with none in need of immediate repairs. Where necessary, we have listed recommendations for repairs in the summary for each bridge in the report.

As you are aware, we did recommend closure of the 3<sup>rd</sup> Street SE bridge to vehicular and pedestrian traffic last Friday, February 13th. As mentioned in previous inspection reports, this bridge has several significant problems in the superstructure, piers and abutments. During this inspection, we also noticed the occurrence of a crack in the web of one stringer and the initiation of a crack in another stringer, as well as indications of out-of-plane bending in the truss due to differential settlement of the deteriorated truss bearings. These, as well as many of the other issues mentioned in this report, are serious issues. Based on our engineering judgment, the deterioration of this bridge has advanced to the point where closure of this structure is necessary.

Various repairs have been completed on this bridge over the years to deal with localized problems which have extended the lifespan of the structure to this point. Although, due to the extent of deterioration, we do not believe future repairs are a feasible option for this structure. Performing long-term repairs on a structure of this type is very rare, due to the difficulty/costs associated with this type of work. Since this structure has so many significant issues, any short-term repairs would also involve a considerable amount of work. And, it is likely that future problems would arise in other members that were not repaired, due to similarities in structural details across the entire bridge. For instance, even if the two stringers mentioned were

Mike Cherry  
February 18, 2015  
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repaired/replaced, there are well over 100 other similar stringers on the bridge that could start showing cracks at any time.

Please let us know if you have any questions regarding this report.

Sincerely,

**WHKS** & CO.

*Jeff J. Pape*

Jeff J. Pape, P.E.


[jpape@whks.com](mailto:jpape@whks.com)

JJP: 5756.09

Enclosures

**2015  
BRIDGE INSPECTION  
AND  
MAINTENANCE REPORT**

CITY OF WAVERLY, IOWA

	<p>I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.</p>
	<p><u>Jeff J. Pape</u> <span style="float: right;"><u>2/18/2015</u></span> Jeff J. Pape, P.E. <span style="float: right;">Date</span></p>
	<p>License number <u>16531</u></p>
	<p>My license renewal date is December 31, 2016.</p>
	<p>Pages or sheets covered by this seal: <u>All pages</u> _____ _____</p>

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- 4<sup>th</sup> Ave. SW & 3<sup>rd</sup> St. SW - FHWA No. 502250
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# NBI Bridge Report

# CITY OF WAVERLY 2013 ROADWAY BRIDGE INSPECTION

## 1<sup>st</sup> Street NW (Adams Pkwy) - FHWA No. 12240



### Condition:

**Deck and Joints:** There are some areas in the top of deck with small spalls and transverse cracks. The spalling is more pronounced adjacent to the joints at each abutment. Approximately 2% of the top of deck was delaminated; however the rate of increase is minimal, when compared to previous inspections. Most of the delamination occurs adjacent to the abutment expansion joints and above the piers where there is high negative flexure. We consider the deck to be in fair condition with some minor cracking and spalling.

The utility on the north side has the exterior casing slightly crushed. The gas main on the East side appears to be stressed tight against the cavity going through the abutment, at the NE corner.

**Curb and Sidewalk:** The curb along the full length of the bridge has some spalling and deterioration, however is quite minor.

**Abutments and Berms:** The bearings at each abutment are rusty. The base plates under the bearings at the south abutment have some pack rust with minor section loss (*See Figure 2 in Appendix A*). The base plates and bearings at the north abutment are also rusty but not as bad as the south abutment. There are a few hairline vertical cracks in abutments.

**Piers:** All piers have minor vertical cracks, particularly at the top and center of each pier, with up to 1/16" separation at the top, narrowing to just hairline at the waterline. Form tie holes in the piers either were not filled in or the grout has fallen out.

**Superstructure:** Due to the development of previous fatigue cracks, dual sets of holes have been drilled in the top of the girder webs near the transverse stiffeners directly over the piers and at each inflection point. The original fatigue cracks are still apparent between the dual holes, but no further cracking is apparent. The exterior side of the east girder has some surface rust spots in spans 1 and 2, possibly caused by rocks thrown at the bridge. Two top bolts in 2<sup>nd</sup> floor beam north of pier 3 at the inside of the West girder are missing, but likely not placed at construction.

### Recommendation:

**We anticipate the need for a concrete overlay and new deck expansion joints within the next 5 to 10 years.**

**2<sup>nd</sup> Ave. NW - FHWA No. 502260**



**Condition:**

The top of deck is pitted with minor cracking. There are hairline cracks in the walls with some leaching. On the north end, there are cracks and some minor spalling where the wings meet the barrel of the culvert. The sidewalk slab bridge has a transverse crack near the center support and additional cracks at the east support under the rail posts. There is visible deflection of the sidewalk slab due to concrete creep. All barrels have minor silt in them.

**2<sup>nd</sup> Street SW - FHWA No. 502300**



**Condition:**

There are hairline cracks in walls. The SE headwall has cracks with leaching and spalling on the roadway face that extend all the way through the headwall. The asphalt roadway near the NW headwall is broken up and has some depressions. There is a 3/8" wide crack at the south end of the NW headwall. There are cracks with leaching at the construction joints. There is minor settlement of the approaches adjacent to the culvert. Both barrels have minor silt in them.

### 3<sup>rd</sup> Street SE - FHWA No. 12250



#### **Condition:**

**Posting:** The bridge is posted 5 tons, One Lane Bridge, and Low Clearance 8'-0 at both ends. Bridge was closed with signs and barricades at both ends following the inspection.

**Deck:** The deck is in satisfactory condition with some areas showing minor deterioration. The south pier joint cover plate on the top of the deck is loose and is vibrating the deck when traffic crosses.

**Superstructure:** There is significant pack rust typical at many connections. Pack rust is causing distortion of plates built up near bearings and

bulging of pins. There is also significant section loss (including through holes) of plates adjacent to the pins, and the connection has failed at the southeast and northwest bearings of the south truss resulting in some settlement of the truss, the southwest bearing is near failure. Two additional plates were welded to the gusset plates directly above the bearing pin, at the east side of the south abutment, during the 2006 repair in order to temporarily alleviate the potential for failure. Member U1-L2 on the east side of the south truss has slight sweep (out of plane bending) that is likely due to differential settlement of the truss at the failed bearings. There is section loss on some anchor bolts and nuts are not tight at several locations. The bearings are also tipped outward which is the opposite direction based on the current temperature.

At the bottom of the diagonals, pack rust is causing distortion of up to approx. 3/8" of the connection angles and up to approx. 1/8" section loss. Pack rust is causing up to approx. 1/4" distortion of the tie plates on the diagonal members. The repair performed at several verticals along the west side is deteriorating. There is pack rust between the original and repair materials indicating failure of the welds. There is pack rust between the angles in the west bottom chord between panel points two and five causing distortion and section loss. The overhead bracing members have minor pack rust as well. There is a loose bolt at the bottom chord connection to vertical six in the center truss, west side. Several other bottom chord connections have heavy pitting including on the fasteners. There is impact damage to diagonal L4-U5 on the west side of the center truss, diagonal L3-U4 on the east side of the center truss, and minor impact damage to tie plates at other locations. There are several discrete locations of leaf rust and other deformation to tie plates.

There is heavy pitting and significant section loss on floor beams and stringers. The flanges of the floor beams have the heaviest loss at the connections to the truss, but much of the section loss is not active and has been painted over. The webs have heavy pack rust and section loss at the connection angles to the stringers. The stringers have significant section loss in the flanges with some through holes. The webs have significant section loss especially at the connections to the floor beams. There are two stringers in the south truss that have serious section loss at the web connection to the floor beam, one that is cracked and the other with a crack initiating. Many of the locations that were repaired have pack rust between the original repair materials indicating failure of the webs and new section loss. There is significant deterioration of the stringer to floor beam connection angles, especially those with fasteners replaced by welds.

See Figures 1 to 18 in Appendix A for photos of superstructure deterioration.

**Sidewalk:** Pack rust has caused significant section loss in the bottom members of the sidewalk overhang bracket resulting in some through holes at the bottom of the web. The top plate of the



sidewalk overhang bracket is rusted through in some locations as well. The overhang bracket has significant section loss on the flanges with through holes in some areas. There is heavy leaf rust on the top flange of stringers under the sidewalk. There is heavy “white rust” on the bottom of the sidewalk pan. See Figures 14 to 16 in Appendix A for photos of sidewalk connection deterioration.

**Abutments:** Both abutments have vertical cracks with leaching. The north abutment has a large area that has been previously repaired, but is cracked and leaching again. There is significant delamination and spalling with some reinforcing exposed and corroded. The north backwall is cracked at the roadway adjacent to the bridge and appears to be crumbling. See Figures 19 and 20 in Appendix A for photos of abutment deterioration.

**Piers:** Areas of both piers near the waterline have large spalls, including a large spall in the north pier on the west end below the ice guard. The south pier has significant map cracking with leaching and the east end is spalling. The bridge seats are deteriorating especially on the south pier at the west bearing. See Figures 21 to 23 in Appendix A for photos of pier deterioration.

**Recommendation:**

**This bridge should remain closed to vehicular and pedestrian traffic due to the advanced deterioration of multiple aspects of this structure.**

**4<sup>th</sup> Ave. SW & 3<sup>rd</sup> Street SW – FHWA # 502250**



**Condition:**

There are minor transverse cracks with leaching in top of barrel near middle of NE barrel. There are minor cracks in the wingwalls. There is minor silting in both barrels. There is minor settlement of the approaches adjacent to the structure.

**5<sup>th</sup> Ave. NW – FHWA # 502270**



**Condition:**

There are spalls in the south end of the 3<sup>rd</sup> wall from the west with reinforcing steel exposed. There are vertical cracks in the south corners of the culvert with reinforcing steel exposed. The sidewalk slab bridge has a transverse crack near the center support. There is visible deflection of the sidewalk slab due to concrete creep.

**12<sup>th</sup> Street SE – FHWA # 79040**



**Condition:**

The bridge is posted “Semi Traffic Prohibited” on the north end. There are seven inches of asphalt and gravel with a chip seal surface on the bridge. The ends of all caps are split and some of them have begun to rot. The east end of the north abutment pile cap has rotted extending approximately 12”+/- deep. Piles in the south abutment are leaning slightly. The 1<sup>st</sup> pile from the East leans approximately 6” in 6’, but movement seems stable from past inspections. Many piles have minor vertical splits in them. There is minor section loss of some stringers but is minor There is minor section loss in the 3<sup>rd</sup> pile

from the east in the north pier.

### **12<sup>th</sup> Street NW – FHWA # 12220**



#### **Condition:**

There are minor cracks with leaching in the walls and the top of the barrels. There is minor silting in all barrels. There is minor cracking and pitting on top of deck. The east end of the third wall from the south is spalled with some reinforcing steel exposed and starting to rust. There is some minor spalling at the northwest corner. Both approaches have minor settlement.

### **35<sup>th</sup> St. NW (Over Abandoned RR) – FHWA # 15511**



#### **Condition:**

There are minor hairline cracks in the top of deck and two small areas with exposed reinforcing near the center of the deck. There are minor diagonal cracks with leaching in bottom of deck at all four corners. The north approach is beginning to deteriorate near the joint. There is minor spalling in the concrete at some of the pier diaphragms.

# Appendix A

3<sup>rd</sup> Street SE Bridge Photos



**Figure 1 - Example Deterioration around Bearing**



**Figure 2 - Example Deterioration at Bearing**





**Figure 3 - Example Deterioration at Bearing**



**Figure 4 - Example Deterioration at Bearing**



Figure 5 - Example Deterioration at Bearing



Figure 6 - Example Deterioration at Bearing (2013 Photo)



**Figure 7 - Example Deterioration Above Bearing**



**Figure 8 - Example Deterioration Above Bearing**





Figure 9 - Example Deterioration Above Bearing



Figure 10 - Example Deterioration Above Bearing



**Figure 11 - Example Deterioration Above Bearing**



**Figure 12 - Example Deterioration at Bottom Chord**





**Figure 13 - Example Deterioration at Bottom Chord**



**Figure 14 - Example Deterioration at Lower Sidewalk Connection**



**Figure 15 - Example Deterioration at Lower Sidewalk Connection**



**Figure 16 - Example Deterioration at Lower Horizontal Gusset Plate**





**Figure 17 - Crack Progression in Stringer Web**



**Figure 18 - Example Deterioration at Stringer Connection**



**Figure 19 – Deterioration at North Abutment**



**Figure 20 – Deterioration at North Abutment**





**Figure 21 – Deterioration at South Pier**



**Figure 22 – Deterioration at South Pier**



**Figure 23 – Deterioration at South Pier (2013 Photo)**



# Appendix B

NBI Bridge SI & A Forms





## Structure Inventory and Appraisal

Bridge ID: 502260 FHWA No.: 502260	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%; text-align: center;">Official</td> <td style="width: 33%; text-align: center;">SR: 97.0</td> <td style="width: 33%; text-align: center;">SD/FO: Not Deficient or Obsolete</td> </tr> <tr> <td style="text-align: center;">Unofficial</td> <td style="text-align: center;">SR: 97.0</td> <td style="text-align: center;">SD/FO: Not Deficient or Obsolete</td> </tr> </table>	Official	SR: 97.0	SD/FO: Not Deficient or Obsolete	Unofficial	SR: 97.0	SD/FO: Not Deficient or Obsolete																																																						
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## Structure Inventory and Appraisal

Bridge ID: 09-502300

FHWA No.: 502300

Official

SR: 97.0

SD/FO: Not Deficient or Obsolete

Unofficial

SR: 97.0

SD/FO: Not Deficient or Obsolete

IDENTIFICATION	INSPECTION
7 Facility Carried: 2ND ST SW	90 Inspection Date: 02/13/2015 Inspection Type: Routine
5B Rte. Signing Prefix: 5	Next Routine Insp Date: 02/13/2017 91 Frequency: 24
5C Level of Service: 1 - MAINLINE	Next Insp Type: Regular
5D Inventory Route: 00000	Inspection Agency: 5 - Consultant Inspection Group: WHKS & Co.
City: WAVERLY	93A FC Inspection Date:
3 County: 009 - Bremer	92A FC Frequency: 0 Next FC Insp.: NA
9 Location: 000000000	93B UW Inspection Date:
5E Directional Suffix: 0 - NOT APPLICABLE	92B UW Frequency: 0 Next UW Insp.: NA
6 Feature Intersected: SMALL STREAM	93C SI Date:
2 District: 0	92C SI Frequency: 0 Next Spec. Insp.: NA
Garage: 000	Other Non-NBI Date:
98 Border Bridge Code:	Other Non-NBI Freq.: Next Other Insp.: NA
% Responsibility: 0	
99 Border Bridge No.:	
STRUCTURE TYPE AND MATERIALS	CONDITION
43A Main Span 1 - Concrete	58 Deck: N - Not Applicable
43B Main Span Design: 19 - Culvert (includes frame culverts)	59 Super: N - Not Applicable
45 No. Spans Main Unit: 2	60 Sub: N - Not Applicable
44A Appr. Span 000 - NA	61 Channel/Channel Prot.: 8 - Banks are protected
44B Appr. Span Design: 000 - NA	62 Culvert: 6 - Deterioration or initial disintegration
46 No. of Appr. Spans: Near 0 Far 0	
107 Deck Type: 1 - Concrete Cast-in-Place	APPRAISAL
108A Wearing Surface: 6 - Bituminous	67 Str. Evaluation: 6 - Equal to present minimum criteria
108B Membrane: 0 - None	68 Deck Geometry: 7 - Better than present minimum criteria
108C Deck Protection: 0 - None	69 Underclear Vert & Horiz: N - Not applicable
	71 Waterway Adequacy: 7 - Slight Chance of Overtopping Bridge
	72 Approach Alignment: 8 - Equal to present desirable criteria
	36A Bridge Rail: 0 - DOES NOT MEET CURRENT SAFETY STANDARDS, OR IS NOT THERE AND IS NEEDED.
	36B Transition: 0 - DOES NOT MEET CURRENT SAFETY STANDARDS, OR IS NOT THERE AND IS NEEDED
	36C Approach Rail: 0 - DOES NOT MEET CURRENT SAFETY STANDARDS, OR IS NOT THERE AND IS NEEDED
	36D Approach Rail Ends: 0 - DOES NOT MEET CURRENT SAFETY STANDARDS, OR IS NOT THERE AND IS NEEDED
	113 Scour Critical: 8 - Stable - Excellent Condition
GEOMETRIC DATA	LOAD RATING AND POSTING
48 Length Max Span: 16 ft.	31 Design Load: 0 - Unknown
49 Structure Length: 33 ft.	63 Rating Method: 0 - Field evaluation and documented engineering judgment
34 Skew: 60°	64 Operating Rating: 57.0 Tons
Deck Area: 1557.6 sq. ft.	65 Rating Method: 0 - Field evaluation and documented engineering judgment
50B Curb/Sdwk Width R: 0 ft.	66 Inventory Rating: 35.6 Tons
50A Curb/Sdwk Width L: 0 ft.	70 Posting: 5 - Equal to or above legal loads
51 Width Curb to Curb: 35.1 ft.	41 Posting Status: A - Open
52 Width Out to Out: 47.2 ft.	
32 Appr. Roadway width: 25 ft.	AGE AND SERVICE
(w/ Shoulders)	27 Year Built: 1953 Design No.: 0
33 Median: 0 - No median	106 Year Reconstructed: 0
35 Structure Flared: 00 - No flare	42A Type of Service on: 1 - Highway
10 Vertical Clearance: 99'99"	42B Type of Service Under: 5 - Waterway
47 Horiz. Clearance: 34'00"	28A Lanes on: 2 28B Lanes under: 0
53 Min. Vert. Clearance Over: 99'99"	29 ADT: 183 30 Year of ADT: 1975
54B Min. Vert. Underclearance: 00'00"	109 Truck ADT: 0 % Speed Limit: 25
55 Min. Lat. Underclearance R: 00'00"	19 Detour Length: 0 mi.
56 Min. Lat. Underclearance L: 00'00"	
NAVIGATION DATA	CLASSIFICATION
38 Navigation Control: 0 - No navigation control on waterway (bridge permit not required)	112 NBIS Length: Y
111 Pier Protection:	26 Functional Class: 19 - Urban - Local
39 Vertical Clearance: 00'00"	100 STRAHNET: 0 - Not a defense highway
40 Horiz. Clearance: 000'00"	101 Parallel Structure: N - No parallel structure
	102 Direction of Traffic: 2 - 2-way traffic
	22 Owner: 04 - City or Municipal Highway Agency
	21 Custodian: 04 - City or Municipal Highway Agency
	37 Historical Significance: 5 - Not eligible
	75A Type of Work Proposed:
	75B Work Done by:
16 Latitude: 42.72008805 17 Longitude: -92.47309853	
FRA No. (if RR Bridge): Mile Post:	



## Structure Inventory and Appraisal

Bridge ID: 09-012250 FHWA No.: 12250	Official SR: 22.9 Unofficial SR: 22.9	SD/FO: Not Deficient or Obsolete SD/FO: Not Deficient or Obsolete
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<p style="text-align: center;"><b>IDENTIFICATION</b></p> 7 Facility Carried: 3RD ST SE 5B Rte. Signing Prefix: 5 5C Level of Service: 1 - MAINLINE 5D Inventory Route: 00000 City: WAVERLY 3 County: 009 - Bremer 9 Location: 000000000 5E Directional Suffix: 0 - NOT APPLICABLE 6 Feature Intersected: CEDAR RIVER 2 District: 0 Garage: 000 98 Border Bridge Code: % Responsibility: 0 99 Border Bridge No.:	<p style="text-align: center;"><b>INSPECTION</b></p> <b>90 Inspection Date:</b> 02/13/2015 Next Routine Insp Date: 02/13/2017 Inspection Agency: 5 - Consultant 93A FC Inspection Date: 02/13/2015 92A FC Frequency: 24 93B UW Inspection Date: 92B UW Frequency: 0 93C SI Date: 92C SI Frequency: 0 Other Non-NBI Date: Other Non-NBI Freq.:
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<p style="text-align: center;"><b>STRUCTURE TYPE AND MATERIALS</b></p> 43A Main Span 3 - Steel 43B Main Span Design: 10 - Truss Thru 45 No. Spans Main Unit: 3 44A Appr. Span 000 - NA 44B Appr. Span Design: 000 - NA 46 No. of Appr. Spans: Near 0 Far 0 107 Deck Type: 3 - Open Grating 108A Wearing Surface: 0 - None (No Additional Concrete Thickness Or Wearing Surface Is Included In The Bridge Deck) 108B Membrane: 0 - None 108C Deck Protection: 0 - None	<p style="text-align: center;"><b>CONDITION</b></p> 58 Deck: 7 - Good Condition (some minor problems) 59 Super: 3 - Serious Condition (primary structure affected) 60 Sub: 4 - Poor Condition (advanced deterioration) 61 Channel/Channel Prot.: 7 - Bank protection needs minor repairs 62 Culvert: N - Not Applicable
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<p style="text-align: center;"><b>GEOMETRIC DATA</b></p> 48 Length Max Span: 121 ft. 49 Structure Length: 363 ft. 34 Skew: 0° Deck Area: 6534.0 sq. ft. 50B Curb/Sdwb Width R: 5 ft. 50A Curb/Sdwb Width L: 0 ft. 51 Width Curb to Curb: 17.1 ft. 52 Width Out to Out: 18.0 ft. 32 Appr. Roadway width: 34 ft. (w/ Shoulders) 33 Median: 0 - No median 35 Structure Flared: 00 - No flare 10 Vertical Clearance: 12'04" 47 Horiz. Clearance: 17'02" 53 Min. Vert. Clearance Over: 12'04" 54B Min. Vert. Underclearance: 00'00" 55 Min. Lat. Underclearance R: 00'00" 56 Min. Lat. Underclearance L: 00'00"	<p style="text-align: center;"><b>APPRAISAL</b></p> 67 Str. Evaluation: 0 - Bridge closed 68 Deck Geometry: 0 - Bridge closed 69 Underclear Vert & Horiz: N - Not applicable 71 Waterway Adequacy: 7 - Slight Chance of Overtopping Bridge 72 Approach Alignment: 8 - Equal to present desirable criteria 36A Bridge Rail: 0 - DOES NOT MEET CURRENT SAFETY STANDARDS, OR IS NOT THERE AND IS NEEDED. 36B Transition: 0 - DOES NOT MEET CURRENT SAFETY STANDARDS, OR IS NOT THERE AND IS NEEDED 36C Approach Rail: 0 - DOES NOT MEET CURRENT SAFETY STANDARDS, OR IS NOT THERE AND IS NEEDED 36D Approach Rail Ends: 0 - DOES NOT MEET CURRENT SAFETY STANDARDS, OR IS NOT THERE AND IS NEEDED 113 Scour Critical: 8 - Stable - Excellent Condition
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<p style="text-align: center;"><b>NAVIGATION DATA</b></p> 38 Navigation Control: 0 - No navigation control on waterway (bridge permit not required) 111 Pier Protection: 39 Vertical Clearance: 00'00" 40 Horiz. Clearance: 000'00"	<p style="text-align: center;"><b>LOAD RATING AND POSTING</b></p> 31 Design Load: 0 - Unknown 63 Rating Method: 0 - Field evaluation and documented engineering judgment 64 Operating Rating: 0.0 Tons 65 Rating Method: 0 - Field evaluation and documented engineering judgment 66 Inventory Rating: 0.0 Tons 70 Posting: 0 - More than 39.9% below legal loads 41 Posting Status: K - Closed
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<p style="text-align: center;"><b>AGE AND SERVICE</b></p> 27 Year Built: 1917 106 Year Reconstructed: 2006 42A Type of Service on: 5 - Highway-pedestrian 42B Type of Service Under: 5 - Waterway 28A Lanes on: 1 29 ADT: 3130 109 Truck ADT: 0 % 19 Detour Length: 2 mi.	<p style="text-align: center;"><b>CLASSIFICATION</b></p> 112 NBIS Length: Y 26 Functional Class: 17 - Urban - Collector 100 STRAHNET: 0 - Not a defense highway 101 Parallel Structure: N - No parallel structure 102 Direction of Traffic: 3 - One lane bridge for 2-way traffic 22 Owner: 04 - City or Municipal Highway Agency 21 Custodian: 04 - City or Municipal Highway Agency 37 Historical Significance: 3 - May be eligible for National Register 75A Type of Work Proposed: 31 - Replacement - Load/Geometry 75B Work Done by: 1 - Work to be done by contract
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16 Latitude: 42.72061583 17 Longitude: -92.46680714	FRA No. (if RR Bridge): Mile Post:
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## Structure Inventory and Appraisal

Bridge ID: 09-502270 FHWA No.: 502270	Official SR: 97.0 Unofficial SR: 97.0	SD/FO: Not Deficient or Obsolete SD/FO: Not Deficient or Obsolete
<b>IDENTIFICATION</b> 7 Facility Carried: 5TH AVE NW 5B Rte. Signing Prefix: 5 5C Level of Service: 1 - MAINLINE 5D Inventory Route: 00000 City: WAVERLY 3 County: 009 - Bremer 9 Location: 000000000 5E Directional Suffix: 0 - NOT APPLICABLE 6 Feature Intersected: SMALL STREAM 2 District: 0 Garage: 000 98 Border Bridge Code: % Responsibility: 0 99 Border Bridge No.:	<b>INSPECTION</b> 90 Inspection Date: 02/13/2015 Next Routine Insp Date: 02/13/2017 Inspection Agency: 3 - City 93A FC Inspection Date: 92A FC Frequency: 0 93B UW Inspection Date: 92B UW Frequency: 0 93C SI Date: 92C SI Frequency: 0 Other Non-NBI Date: Other Non-NBI Freq.:	Inspection Type: Routine 91 Frequency: 24 Next Insp Type: Regular Inspection Group: WHKS & Co. Next FC Insp.: NA Next UW Insp.: NA Next Spec. Insp.: NA Next Other Insp.: NA
<b>STRUCTURE TYPE AND MATERIALS</b> 43A Main Span 1 - Concrete 43B Main Span Design: 19 - Culvert (Includes frame culverts) 45 No. Spans Main Unit: 4 44A Appr. Span 000 - NA 44B Appr. Span Design: 000 - NA 46 No. of Appr. Spans: Near 0 Far 0 107 Deck Type: 1 - Concrete Cast-in-Place 108A Wearing Surface: 6 - Bituminous 108B Membrane: 0 - None 108C Deck Protection: 0 - None	<b>CONDITION</b> 58 Deck: N - Not Applicable 59 Super: N - Not Applicable 60 Sub: N - Not Applicable 61 Channel/Channel Prot.: 7 - Bank protection needs minor repairs 62 Culvert: 6 - Deterioration or initial disintegration	<b>APPRAISAL</b> 67 Str. Evaluation: 6 - Equal to present minimum criteria 68 Deck Geometry: 6 - Equal to present minimum criteria 69 Underclear Vert & Horiz: N - Not applicable 71 Waterway Adequacy: 7 - Slight Chance of Overtopping Bridge 72 Approach Alignment: 9 - Superior to present desirable criteria 36A Bridge Rail: 0 - DOES NOT MEET CURRENT SAFETY STANDARDS, OR IS NOT THERE AND IS NEEDED. 36B Transition: 0 - DOES NOT MEET CURRENT SAFETY STANDARDS, OR IS NOT THERE AND IS NEEDED 36C Approach Rail: 0 - DOES NOT MEET CURRENT SAFETY STANDARDS, OR IS NOT THERE AND IS NEEDED 36D Approach Rail Ends: 0 - DOES NOT MEET CURRENT SAFETY STANDARDS, OR IS NOT THERE AND IS NEEDED 113 Scour Critical: 8 - Stable - Excellent Condition
<b>GEOMETRIC DATA</b> 48 Length Max Span: 6 ft. 49 Structure Length: 27 ft. 34 Skew: 15° Deck Area: 1188.0 sq. ft. 50B Curb/Sdwk Width R: 0 ft. 50A Curb/Sdwk Width L: 0 ft. 51 Width Curb to Curb: 40.0 ft. 52 Width Out to Out: 44.0 ft. 32 Appr. Roadway width: 39 ft. (w/ Shoulders) 33 Median: 0 - No median 35 Structure Flared: 00 - No flare 10 Vertical Clearance: 99'99" 47 Horiz. Clearance: 39'08" 53 Min. Vert. Clearance Over: 99'99" 54B Min. Vert. Underclearance: 00'00" 55 Min. Lat. Underclearance R: 00'00" 56 Min. Lat. Underclearance L: 00'00"	<b>LOAD RATING AND POSTING</b> 31 Design Load: 0 - Unknown 63 Rating Method: 0 - Field evaluation and documented engineering judgment 64 Operating Rating: 57.0 Tons 65 Rating Method: 0 - Field evaluation and documented engineering judgment 66 Inventory Rating: 35.6 Tons 70 Posting: 5 - Equal to or above legal loads 41 Posting Status: A - Open	<b>AGE AND SERVICE</b> 27 Year Built: 1900 Design No.: 0 106 Year Reconstructed: 1962 42A Type of Service on: 1 - Highway 42B Type of Service Under: 5 - Waterway 28A Lanes on: 2 28B Lanes under: 0 29 ADT: 3100 30 Year of ADT: 2013 109 Truck ADT: 0 % Speed Limit: 25 19 Detour Length: 0 mi.
<b>NAVIGATION DATA</b> 38 Navigation Control: 0 - No navigation control on waterway (bridge permit not required) 111 Pier Protection: 39 Vertical Clearance: 00'00" 40 Horiz. Clearance: 000'00" 16 Latitude: 42.73052161 17 Longitude: -92.47791188	<b>CLASSIFICATION</b> 112 NBIS Length: Y 26 Functional Class: 16 - Urban - Minor Arterial 100 STRAHNET: 0 - Not a defense highway 101 Parallel Structure: N - No parallel structure 102 Direction of Traffic: 2 - 2-way traffic 22 Owner: 04 - City or Municipal Highway Agency 21 Custodian: 04 - City or Municipal Highway Agency 37 Historical Significance: 3 - May be eligible for National Register 75A Type of Work Proposed: 75B Work Done by:	FRA No. (if RR Bridge): Mile Post:





## Structure Inventory and Appraisal

Bridge ID: 079040 FHWA No.: 79040	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%; text-align: center;">Official</td> <td style="width: 33%; text-align: center;">SR: 69.1</td> <td style="width: 33%; text-align: center;">SD/FO: Not Deficient or Obsolete</td> </tr> <tr> <td style="text-align: center;">Unofficial</td> <td style="text-align: center;">SR: 63.7</td> <td style="text-align: center;">SD/FO: Not Deficient or Obsolete</td> </tr> </table>	Official	SR: 69.1	SD/FO: Not Deficient or Obsolete	Unofficial	SR: 63.7	SD/FO: Not Deficient or Obsolete																																																						
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75A Type of Work Proposed:	35 - Rehabilitation - Deterioration																																																												
75B Work Done by:	2 - Work to be done by owner's forces																																																												
<table style="width: 100%; border-collapse: collapse;"> <tr> <td>16 Latitude: 42.71848582</td> <td>17 Longitude: -92.45477744</td> </tr> </table>	16 Latitude: 42.71848582	17 Longitude: -92.45477744																																																											
16 Latitude: 42.71848582	17 Longitude: -92.45477744																																																												
FRA No. (if RR Bridge): Mile Post:																																																													





### Structure Inventory and Appraisal

Bridge ID: 09-012220  
FHWA No.: 12220

Official	SR: 96.7	SD/FO: Not Deficient or Obsolete
Unofficial	SR: 96.7	SD/FO: Not Deficient or Obsolete

**IDENTIFICATION**  
7 Facility Carried: 12TH ST NW  
5B Rte. Signing Prefix: 5  
5C Level of Service: 1 - MAINLINE  
5D Inventory Route: 00000  
City: WAVERLY  
3 County: 009 - Bremer  
9 Location: 000000000  
5E Directional Suffix: 0 - NOT APPLICABLE  
6 Feature Intersected: DRAINAGE  
2 District: 0  
Garage: 000  
98 Border Bridge Code:  
% Responsibility: 0  
99 Border Bridge No.:

**INSPECTION**  
90 Inspection Date: 02/13/2015  
Next Routine Insp Date: 02/13/2017  
Inspection Agency: 5 - Consultant  
93A FC Inspection Date:  
92A FC Frequency: 0  
93B UW Inspection Date:  
92B UW Frequency: 0  
93C SI Date:  
92C SI Frequency: 0  
Other Non-NBI Date:  
Other Non-NBI Freq.:

Inspection Type: Routine  
91 Frequency: 24  
Next Insp Type: Regular  
Inspection Group: WHKS & Co.  
Next FC Insp.: NA  
Next UW Insp.: NA  
Next Spec. Insp.: NA  
Next Other Insp.: NA

**STRUCTURE TYPE AND MATERIALS**  
43A Main Span 1 - Concrete  
43B Main Span Design: 19 - Culvert (Includes frame culverts)  
45 No. Spans Main Unit: 4  
44A Appr. Span 000 - NA  
44B Appr. Span Design: 000 - NA  
46 No. of Appr. Spans: Near 0 Far 0  
107 Deck Type: 1 - Concrete Cast-in-Place  
108A Wearing Surface: 1 - Monolithic Concrete (concurrently placed with structural deck)  
108B Membrane: 0 - None  
108C Deck Protection: 0 - None

**CONDITION**  
58 Deck: N - Not Applicable  
59 Super: N - Not Applicable  
60 Sub: N - Not Applicable  
61 Channel/Channel Prot.: 7 - Bank protection needs minor repairs  
62 Culvert: 6 - Deterioration or initial disintegration

**GEOMETRIC DATA**  
48 Length Max Span: 7 ft.  
49 Structure Length: 27 ft.  
34 Skew: 0°  
Deck Area: 1320.3 sq. ft.  
50B Curb/Sdwb Width R: 4 ft.  
50A Curb/Sdwb Width L: 4 ft.  
51 Width Curb to Curb: 41.0 ft.  
52 Width Out to Out: 48.9 ft.  
32 Appr. Roadway width: 42 ft.  
(w/ Shoulders)  
33 Median: 0 - No median  
35 Structure Flared: 00 - No flare  
10 Vertical Clearance: 99'99"  
47 Horiz. Clearance: 40'00"  
53 Min. Vert. Clearance Over: 99'99"  
54B Min. Vert. Underclearance: 00'00"  
55 Min. Lat. Underclearance R: 00'00"  
56 Min. Lat. Underclearance L: 00'00"

**APPRAISAL**  
67 Str. Evaluation: 7 - Better than present minimum criteria  
68 Deck Geometry: 6 - Equal to present minimum criteria  
69 Underclear Vert & Horiz: N - Not applicable  
71 Waterway Adequacy: 9 - Bridge Above Flood Water Elevations  
72 Approach Alignment: 8 - Equal to present desirable criteria  
36A Bridge Rail: 0 - DOES NOT MEET CURRENT SAFETY STANDARDS, OR IS NOT THERE AND IS NEEDED.  
36B Transition: 0 - DOES NOT MEET CURRENT SAFETY STANDARDS, OR IS NOT THERE AND IS NEEDED  
36C Approach Rail: 0 - DOES NOT MEET CURRENT SAFETY STANDARDS, OR IS NOT THERE AND IS NEEDED  
36D Approach Rail Ends: 0 - DOES NOT MEET CURRENT SAFETY STANDARDS, OR IS NOT THERE AND IS NEEDED  
113 Scour Critical: 8 - Stable - Excellent Condition

**NAVIGATION DATA**  
38 Navigation Control:  
0 - No navigation control on waterway (bridge permit not required)  
111 Pier Protection:  
39 Vertical Clearance: 00'00"  
40 Horiz. Clearance: 000'00"

**LOAD RATING AND POSTING**  
31 Design Load: 0 - Unknown  
63 Rating Method: 0 - Field evaluation and documented engineering judgment  
64 Operating Rating: 57.0 Tons  
65 Rating Method: 0 - Field evaluation and documented engineering judgment  
66 Inventory Rating: 35.6 Tons  
70 Posting: 5 - Equal to or above legal loads  
41 Posting Status: A - Open

16 Latitude: 42.73080764 17 Longitude: -92.4851209

**AGE AND SERVICE**  
27 Year Built: 1962 Design No.: 0  
106 Year Reconstructed: 1985  
42A Type of Service on: 1 - Highway  
42B Type of Service Under: 5 - Waterway  
28A Lanes on: 2 28B Lanes under: 0  
29 ADT: 2930 30 Year of ADT: 2013  
109 Truck ADT: 0% Speed Limit: 25  
19 Detour Length: 1 mi.

FRA No. (if RR Bridge):  
Mile Post:

**CLASSIFICATION**  
112 NBIS Length: Y  
26 Functional Class: 16 - Urban - Minor Arterial  
100 STRAHNET: 0 - Not a defense highway  
101 Parallel Structure: N - No parallel structure  
102 Direction of Traffic: 2 - 2-way traffic  
22 Owner: 04 - City or Municipal Highway Agency  
21 Custodian: 04 - City or Municipal Highway Agency  
37 Historical Significance: 5 - Not eligible  
75A Type of Work Proposed:  
75B Work Done by:



## Structure Inventory and Appraisal

Bridge ID: 09-015511 FHWA No.: 15511	Official SR: 98.4 Unofficial SR: 98.6	SD/FO: Not Deficient or Obsolete SD/FO: Not Deficient or Obsolete
<b>IDENTIFICATION</b> 7 Facility Carried: 35TH ST NW 5B Rte. Signing Prefix: 5 5C Level of Service: 1 - MAINLINE 5D Inventory Route: 00000 City: WAVERLY 3 County: 009 - Bremer 9 Location: 000000000 5E Directional Suffix: 0 - NOT APPLICABLE 6 Feature Intersected: ABANDON RR 2 District: 2 Garage: 809 98 Border Bridge Code: % Responsibility: 0 99 Border Bridge No.:	<b>INSPECTION</b> 90 Inspection Date: 02/13/2015 Next Routine Insp Date: 02/13/2017 Inspection Agency: 5 - Consultant 93A FC Inspection Date: 92A FC Frequency: 0 93B UW Inspection Date: 92B UW Frequency: 0 93C SI Date: 92C SI Frequency: 0 Other Non-NBI Date: Other Non-NBI Freq.:	Inspection Type: Routine 91 Frequency: 24 Next Insp Type: Regular Inspection Group: WHKS & Co. Next FC Insp.: NA Next UW Insp.: NA Next Spec. Insp.: NA Next Other Insp.: NA
<b>STRUCTURE TYPE AND MATERIALS</b> 43A Main Span 5 - Prestressed Concrete 43B Main Span Design: 02 - Stringer/Multi-beam or Girder 45 No. Spans Main Unit: 3 44A Appr. Span 000 - NA 44B Appr. Span Design: 000 - NA 46 No. of Appr. Spans: Near 0 Far 0 107 Deck Type: 1 - Concrete Cast-in-Place 108A Wearing Surface: 1 - Monolithic Concrete (concurrently placed with structural deck) 108B Membrane: 0 - None 108C Deck Protection: 1 - Epoxy Coated Reinforcing	<b>CONDITION</b> 58 Deck: 7 - Good Condition (some minor problems) 59 Super: 7 - Good Condition (some minor problems) 60 Sub: 7 - Good Condition (some minor problems) 61 Channel/Channel Prot.: N - Not Applicable 62 Culvert: N - Not Applicable	<b>APPRAISAL</b> 67 Str. Evaluation: 7 - Better than present minimum criteria 68 Deck Geometry: 7 - Better than present minimum criteria 69 Underclear Vert & Horiz: N - Not applicable 71 Waterway Adequacy: N - Not Applicable 72 Approach Alignment: 6 - Equal to present minimum criteria 36A Bridge Rail: 1 - MEETS CURRENT SAFETY STANDARDS. 38B Transition: 1 - MEETS CURRENT SAFETY STANDARDS. 36C Approach Rail: 1 - MEETS CURRENT SAFETY STANDARDS. 36D Approach Rail Ends: 1 - MEETS CURRENT SAFETY STANDARDS. 113 Scour Critical: N - N/A
<b>GEOMETRIC DATA</b> 48 Length Max Span: 57 ft. 49 Structure Length: 171 ft. 34 Skew: 11° Deck Area: 8071.2 sq. ft. 50B Curb/Sdwb Width R: 0 ft. 50A Curb/Sdwb Width L: 0 ft. 51 Width Curb to Curb: 44.0 ft. 52 Width Out to Out: 47.2 ft. 32 Appr. Roadway width: 44 ft. (w/ Shoulders) 33 Median: 0 - No median 35 Structure Flared: 00 - No flare 10 Vertical Clearance: 99'99" 47 Horiz. Clearance: 43'00" 53 Min. Vert. Clearance Over: 99'99" 54B Min. Vert. Underclearance: 00'00" 55 Min. Lat. Underclearance R: 00'00" 56 Min. Lat. Underclearance L: 00'00"	<b>LOAD RATING AND POSTING</b> 31 Design Load: 5 - HS 20 63 Rating Method: 1 - Load Factor (LF) reported in english tons using HS-20 loading. 64 Operating Rating: 69.7 Tons 65 Rating Method: 1 - Load Factor (LF) reported in english tons using HS-20 loading. 66 Inventory Rating: 37.5 Tons 70 Posting: 5 - Equal to or above legal loads 41 Posting Status: A - Open	<b>AGE AND SERVICE</b> 27 Year Built: 1978 106 Year Reconstructed: 0 42A Type of Service on: 1 - Highway 42B Type of Service Under: 0 - Other 28A Lanes on: 2 28B Lanes under: 0 29 ADT: 2350 30 Year of ADT: 2013 109 Truck ADT: 0 % Speed Limit: 55 19 Detour Length: 8 mi.
<b>NAVIGATION DATA</b> 38 Navigation Control: N - Not applicable, no waterway 111 Pier Protection: 39 Vertical Clearance: 00'00" 40 Horiz. Clearance: 000'00"	<b>CLASSIFICATION</b> 112 NBIS Length: Y 26 Functional Class: 16 - Urban - Minor Arterial 100 STRAHNET: 0 - Not a defense highway 101 Parallel Structure: N - No parallel structure 102 Direction of Traffic: 2 - 2-way traffic 22 Owner: 04 - City or Municipal Highway Agency 21 Custodian: 04 - City or Municipal Highway Agency 37 Historical Significance: 5 - Not eligible 75A Type of Work Proposed: 75B Work Done by:	16 Latitude: 42.73707182 17 Longitude: -92.51207545
FRA No. (if RR Bridge): Mile Post:		

## CITY OF WAVERLY BRIDGE RATINGS - 2015

NOTE: Posted Restrictions represent the actual postings in place in the field during inspection.  
The Operating Ratings are the calculated ratings for the structure.

BRIDGE LOCATION	POSTED RESTRICTIONS	WEARING SURFACE	OPERATING RATINGS		
			TYPE 4 (27 TONS)	TYPE 3S3 (40 TONS)	TYPE 3-3 (40 TONS)
1 <sup>ST</sup> Street NW (Adams PKWY)			Legal	Legal	Legal
2 <sup>nd</sup> Ave. NW			Legal	Legal	Legal
2 <sup>nd</sup> Street SW			Legal	Legal	Legal
3 <sup>rd</sup> Street SE	CLOSED	STEEL GRID	N/A	N/A	N/A
4 <sup>th</sup> Ave. SW & 3 <sup>rd</sup> Street SW			Legal	Legal	Legal
5 <sup>th</sup> Ave. NW			Legal	Legal	Legal
12 <sup>th</sup> Street SE	POSTED "SEMI TRAFFIC PROHIB."	7" AC & ROCK	Legal	Legal	Legal
12 <sup>th</sup> Street NW			Legal	Legal	Legal
35 <sup>th</sup> Street NW			Legal	Legal	Legal

# Rail-Trail Bridge Report

# CITY OF WAVERLY / BREMER COUNTY 2015 RAIL-TRAIL BRIDGE INSPECTION

## BRIDGE LOCATION

## COMMENTS AND RECOMMENDATIONS

### #1 (INTERURBAN)

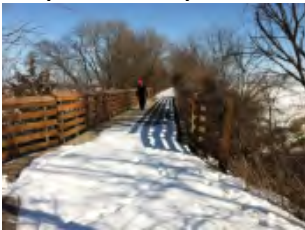


#### **Condition:**

The approach asphalt has settled and has been patched on both sides. The asphalt on the bridge deck has some transverse cracks. Some piles are split, show deterioration and sound hollow.

**Recommendation: None**

### #2 (IVANHOE)



#### **Condition:**

The approach asphalt has settled approximately 3 inches and has been patched adjacent to the bridge. The asphalt on the bridge deck has some transverse cracks. Two piles adjacent to the west side of the gravel road in Pier 3 were damaged by vehicular collision some time ago and repaired. The repair job on these piles has failed and the piles now carry no support (See Photo 1). Load rating calculations show that the pile cap is sufficient to carry the current loading on the bridge. However, if the bridge is subject to heavier loading in the future (potentially for trail reconstruction) then repair work will need to be done to this structure.

**Recommendation: Consider repairing damaged piling in Pier 3.**



**Photo No. 1 – Ivanhoe Pier 3**



### #3 (BASKINS CREEK)



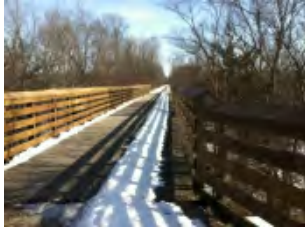
#### Condition:

The approach asphalt has been patched at both abutments. The west abutment backwall is undermined allowing some fill material to move under the abutment. Some of the piles at the east end of the structure have fire damage. The outside piles and the 2<sup>nd</sup> pile from the south in the east abutment are in poor condition. A few of the piles near the center spans of the bridge (piles running through the creek) have advanced deterioration. The pile deterioration does not affect the overall stability of the bridge for current loading at this time.

#### Recommendation:

**Repair undermining problem at the west abutment.**

### #4 (PRAIRIE RUN)



#### Condition:

The approach asphalt has settled. The asphalt on the bridge deck has some transverse cracks. The hole in the east approach asphalt has been patched; however, the broken backwall has not been repaired (See Photo 2). There is some asphalt under the bridge next to the west abutment, which flowed through the backwall during construction. A few piles (mainly located in the creek) have some deterioration and sound hollow.

#### Recommendation:

**Repair the backwall on the east abutment.**



**Photo No. 2 – Prairie Run East Abut (2011 Photo)**

#### #5 (SLEMMONS RUN)



#### Condition:

The approach asphalt is slightly settled. There is minor undermining of the abutment backwall at the east abutment. The asphalt on the bridge deck has some transverse cracks. The piles at the west abutment are not completely under the cap. The 2<sup>nd</sup>, 4<sup>th</sup>, and 6<sup>th</sup> piles from the south sound hollow. The 4<sup>th</sup> pile has only about 25% of the pile under the cap. The east abutment piles are also not completely under the cap. Piles in the piers show varying levels of deterioration. The bracing between the piers is in very poor condition and in some cases has completely failed.

#### Recommendation:

**Repair undermining problem at the east abutment.**

***Note: For the current loading the loss of the bracing between the piers does not affect the structural capacity of the bridge.***

#### #6 (CEMETERY RUN)



#### Condition:

There is some undermining of the west abutment. The asphalt on the bridge deck has some transverse cracks. The exterior pile on the south end of the east abutment is less than 25% effective. The south end of the east abutment cap is hollow about 3 ft. into the cap. The exterior pile on the north end of the west abutment is 25% effective.

#### Recommendation:

**Repair undermining problem at the west abutment.**

#### #7 (BANTAM)



#### Condition:

Some piles are split, show deterioration, and sound hollow. The 12x12's under the center span bearings have some rotting and hollow areas in some members.

#### Recommendation: None

#### #8 (CEDAR RIVER)



#### Condition:

Snow was obstructing much of the view of the top of deck, but as stated in the previous report, the top of deck is in satisfactory condition with some boards showing signs of wear and a few nails protruding from the top of the deck. At each pier and both abutments the limestone blocks show signs of deterioration (See Photo 3 and Photo 4). Cracks have developed in the mortar joints at both the 1<sup>st</sup> and the 2<sup>nd</sup> piers from the west and it appears that some settlement has occurred at both of these locations. In general, the condition of the limestone blocks at the piers and abutments is fair to poor with some of the primary structural elements showing signs of section loss and deterioration.

#### Recommendation:

**Repair any protruding nails.**

***Note: In general, the condition of the limestone blocks at the piers and abutments has reduced their structural capacity; however, it is our opinion that they are still structural sufficient for the current loading. We do recommend that the piers be closely monitored for additional settlement especially following a significant flooding event.***



**Photo No. 3 – Cedar River Pier**



**Photo No. 4 – Cedar River Pier**