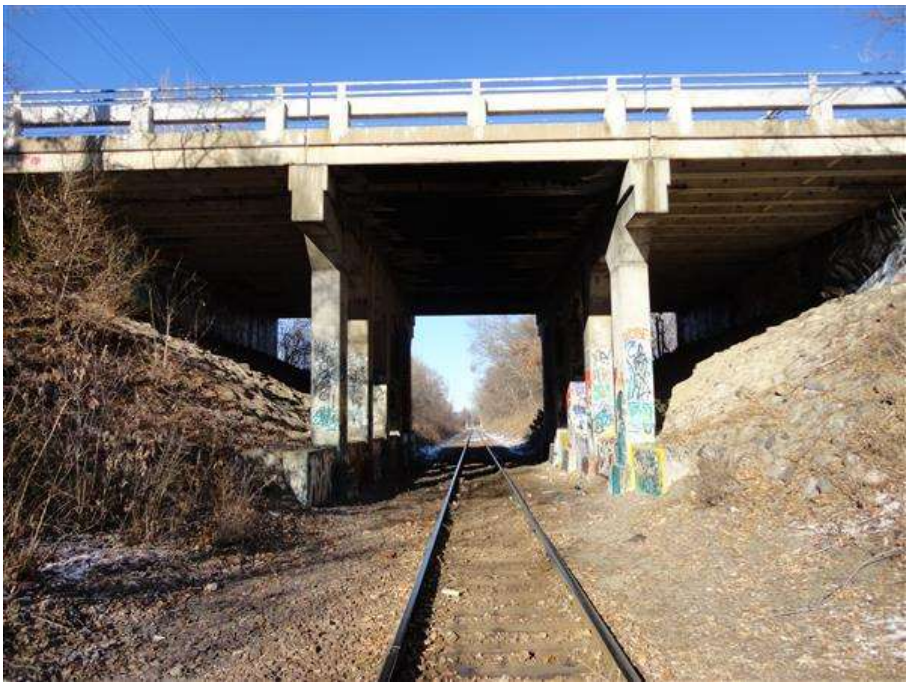
2016 ROUTINE
BRIDGE INSPECTION REPORT



BRIDGE # 4533
CSAH 77 over MC RY

DISTRICT: Metro **COUNTY:** Ramsey **CITY/TOWNSHIP:** New Brighton

STATE: Minnesota

Date of Inspection: 11/16/2016

Equipment Used:

Owner: County Highway Agency

Inspected By: Bodelson, Dan

Report Written By: Dan Bodelson

Report Reviewed By: Nicklaus Fischer

Final Report Date: 12/02/2016

Table of Contents

Minnesota Structure Inventory Report

Bridge ID: 4533 CSAH 77 **over** MC RY **Date:** 12/02/2016

GENERAL

Agency Br. No.
District Metro
Maint. Area **Crew**
County 062 - Ramsey
City New Brighton
Township
Desc. Loc. 0.2 MI E OF JCT CSAH 45
Sect., Twp., Range 29 - 030N - 23W
Latitude **Deg** 45 **Min** 3 **Sec** 36.49
Longitude **Deg** 93 **Min** 11 **Sec** 43.43
Custodian 02 - County Highway Agency
Owner 02 - County Highway Agency
BMU Agreement
Year Built 1926
MN Year Reconstructed 1973
FHWA Year Reconstructed
MN Temporary Status
Bridge Plan Location 3 - COUNTY
Date Opened to Traffic
On-Off System 1 - ON
Legislative District 50B
ABC Suitable

STRUCTURE

Service On 5 - Highway-pedestrian
Service Under 2 - Railroad
Main Span Type
5 - Prestress or Precast 11 - Channel Span
Main Span Detail
Appr. Span Type
Appr. Span Detail
Skew 0
Culvert Type
Barrel Length ft.
Cantilever ID

NUMBER OF SPANS

MAIN: 3 **APPR:** 0 **TOTAL:** 3
Main Span Length 22.0 ft.
Structure Length 65.9 ft.
Deck Width (Out-to-Out) 63.5 ft.
Deck Material 2 - Concrete Precast Panels
Wear Surf Type 6 - Bituminous
Wear Surf Install Year
Wear Course/Fill Depth 0.20 ft.
Deck Membrane 0 - None
Deck Rebars 0 - None
Deck Rebars Install Year
Structure Area (Out-to-Out) 4185 sq. ft.
Roadway Area (Curb-to-Curb) 3423 sq. ft.
Sidewalk Width **Lt** 4.50 ft. **Rt** 4.50 ft.
Curb Height **Lt** 0.75 ft. **Rt** 0.75 ft.
Rail Type **Lt** 14 **Rt** 14

ROADWAY

Bridge Match ID (TIS) 0
Roadway O/U Key Route On Structure
Route Sys 04 - CSAH **Number** 77
Roadway Name or Description
CSAH 77
Level of Service 1 - MAINLINE
Roadway Type 2 - 2-way traffic
Control Section (TH Only)
Reference Point 001+00.820
Detour Length 5.0 mi
Lanes **On** 4 **Under** 0
ADT 8366 **Year** 2008
HCADT 0 **ADTT** 0 **%**
Functional Class 16 - Urban - Minor Arterial

RDWY DIMENSIONS

If Divided	NB-EB	SB-WB
Roadway Width	52.00 ft.	ft.
Vertical Clearance	ft.	ft.
Max. Vert. Clear.	ft.	ft.
Horizontal Clear.	51.9 ft.	ft.
Lateral Clearance	ft.	ft.

Appr. Surface Width 43.0 ft.
Bridge Roadway Width 52.0 ft.
Median Width On Bridge ft.

MISC. BRIDGE DATA

Structure Flared 0 - No flare
Parallel Structure N - No parallel structure
Field Conn. ID
Abutment Foundation 1 - CONC
(Material/Type) 5 - U TYPE ABUT
Pier Foundation 1 - CONC
(Material/Type) 3 - FTG PILE
Historic Status 5 - Not eligible

PAINT

Year Painted
Unsound Paint %
Painted Area sq. ft.
Primer Type
Finish Type

BRIDGE SIGNS

Posted Load 2 - Vehicle & Semi (Type R12-5)
Traffic 0 - Not Required
Horizontal 1 - Object Markers
Vertical 0 - Not Required

INSPECTION

Userkey 102
Unofficial Structurally Deficient Y
Unofficial Functionally Obsolete N
Unofficial Sufficiency Rating 43.6
Routine Inspection Date 11/16/2016
Routine Inspection Frequency 12
Inspector Name CO Bridge
Status P - Posted for Load

NBI CONDITION RATINGS

Deck 5 - Fair Condition
Unsound Deck %
Superstructure 4 - Poor Condition
Substructure 5 - Fair Condition
Channel N - Not Applicable
Culvert N - Not Applicable

NBI APPRAISAL RATINGS

Structure Evaluation 4
Deck Geometry 4
Underclearances 3
Water Adequacy N - Not Applicable
Approach Alignment 6 - Equal to present minimu

SAFETY FEATURES

Bridge Railing 1 - MEETS STANDARDS
GR Transition 0 - SUBSTANDARD
Appr. Guardrail 1 - MEETS STANDARDS
GR Termini 1 - MEETS STANDARDS

IN DEPTH INSP.

	Y/N	Freq	Date
Frac. Critical	N		
Underwater	N		
Pinned Asbly.	N		
Spec. Feat.			

WATERWAY

Drainage Area (sq. mi.)
Waterway Opening sq. ft.
Navigation Control N - Not applicable, no waterw
Pier Protection
Nav. Clr. (ft.) **Vert.** ft. **Horiz.** ft.
Nav. Vert. Lift Bridge Clear. (ft.)
MN Scour Code A - NON WATER' **Year**

CAPACITY RATINGS

Design Load 5 - HS 20
Operating Rating 1 - LF (LF) HS 42.2
Inventory Rating 1 - LF (LF) HS 25.4
Posting VEH: 26 **SEMI:** 40 **DBL:** 40
Rating Date 06/10/2011

Minnesota Permit Codes

A: N - N/A
B: N - N/A
C: N - N/A

Minnesota Structure Inventory Report

Bridge ID: 4533 **CSAH 77 over MC RY** Date: 11/08/2016

+GENERAL+

Agency Br. No.	**Crew**
District	05 **Maint. Area**
County	062 - Ramsey
City	New Brighton
Township	
Desc. Loc.	0.2 MI E OF JCT CSAH 45
Sect., Twp., Range	29 - 030N - 23W
Latitude	45 ° 3 ' 36.49 "
Longitude	93 ° 11 ' 43.43 "
Custodian	02 - County Highway Agency
Owner	02 - County Highway Agency
BMU Agreement	
Year Built	1926
MN Year Reconstructed	1973
FHWA Year Reconstructed	
MN Temporary Status	
Bridge Plan Location	3 - COUNTY
Date Opened to Traffic	
On - Off System	1 - ON
Legislative District	50B
Potential ABC	2 - N/A

+STRUCTURE+

Service On	5 - Highway-pedestrian
Service Under	2 - Railroad
Main Span Type	5 - Prestress or Precast
Main Span Design	11 - Channel Span
Main Span Detail	
Appr. Span Type	
Appr. Span Design	
Appr. Span Detail	
Skew	0
Culvert Type	
Barrel Length	
Cantilever ID	

Number of Spans

MAIN: 3 **APPR:** 0 **TOTAL:**

Main Span Length			22.0	**ft.**
Structure Length			65.9	**ft.**
Deck Width (Out-to-Out)			63.5	**ft.**
Deck Material	2 - Concrete Precast Panels			
Wear Surf Type	6 - Bituminous			
Wear Surf Install Year				
Wear Course/Fill Depth	0.20 **ft.**			
Deck Membrane	0 - None			
Deck Rebars	0 - None			
Deck Rebars Install Year				
Structure Area (Out-to-Out)		4185		**sq. ft.**
Roadway Area (Curb-to-Curb)		3423		**sq. ft.**
Sidewalk Width	**50A. Lt** 4.50 **ft.**	**50B. Rt** 4.50		**ft.**
Curb Height	**Lt** 0.75 **ft.**	**Rt** 0.75		**ft.**
Rail Type	**Lt** 14	**Rt** 14		

+ROADWAY+

Bridge Match ID (TIS)	0
Roadway O/U Key	Route On Structure
Route Sys	04 - CSAH **Number** 77
Roadway Name or Description	CSAH 77
Level of Service	1 - MAINLINE
Roadway Type	2 - 2-way traffic
Control Section (TH Only)	
Reference Point	001+00.820
Detour Length	5.0 **mi.**
Lanes	**ON** 4 **UNDER** 0
	ADT 8366 **YEAR** 2008
HCADT	**ADTT** **%**
Functional Class	16 - Urban - Minor Arterial

+RDWY DIMENSIONS+

If Divided	**NB-EB**	**SB-WB**
Roadway Width	52.00 **ft.**	**ft.**
Vertical Clearance	**ft.**	**ft.**
Max. Vert. Clear.	**ft.**	**ft.**
Horizontal Clear.	51.9 **ft.**	**ft.**
Lateral Clearance	**ft.**	**ft.**

Appr. Surface Width	43.0 **ft.**
Bridge Roadway Width	52.0 **ft.**
Median Width On Bridge	**ft.**

+MISC. BRIDGE DATA+

Structure Flared	0 - No flare
Parallel Structure	N - No parallel structure
Field Conn. ID	
Abutment Foundation (Material/Type)	1 - CONC 5 - U TYPE ABUT
Pier Foundation (Material/Type)	1 - CONC 3 - FTG PILE
Historic Status	5 - Not eligible

+PAINT+

Year Painted	
Unsound Paint %	
Painted Area	**sq. ft.**
Primer Type	
Finish Type	

+BRIDGE SIGNS+

Posted Load	2 - Vehicle & Semi (Type R12-5)
Traffic	0 - Not Required
Horizontal	1 - Object Markers
Vertical	0 - Not Required

+INSPECTION+

Userkey	102
Structurally Deficient	Y
Functionally Obsolete	N
Sufficiency Rating	43.6
Routine Inspection Date	11/16/2016
Routine Inspection Frequency	12
Inspector Name	Bodelson, Dan
Status	P - Posted for Load

+NBI CONDITION RATINGS+

Deck	5	**Unsound Deck %**
Superstructure	4	
Substructure	5	
Channel	N	
Culvert	N	

+NBI APPRAISAL RATINGS+

Structure Evaluation	4
Deck Geometry	4
Underclearances	3
Waterway Adequacy	N
Approach Alignment	6

+SAFETY FEATURES+

Bridge Railing	1 - MEETS STANDARDS
GR Transition	0 - SUBSTANDARD
Appr. Guardrail	1 - MEETS STANDARDS
GR Termini	1 - MEETS STANDARDS

+IN DEPTH INSP.+

	Y/N	**Freq**	**Date**
Frac. Critical	N		
Underwater	N		
Pinned Asbly.	N		
Spec. Feat.			

+WATERWAY+

Drainage Area (sq. mi.)	
Waterway Opening (sf.)	
Navigation Control	N - Not applicable, no
Pier Protection	
Nav. Clr. (ft.)	**Vert.** 0.0 **Horiz.** 0.0
Nav. Vert. Lift Bridge Clear. (ft.)	
MN Scour Code	A - NON **Year**

+CAPACITY RATINGS+

Design Load	5 - HS 20	
Operating Rating	2 - HS TRUCK	42.2
Inventory Rating	2 - HS TRUCK	25.4

Posting **VEH:** 26 **SEMI:** 40 **DBL:** 40

Rating Date 06/10/2011

Overweight Permit Codes

A N - N/A **B** N - N/A **C** N - N/A

BRIDGE 4533 CSAH 77 OVER MC RY **ROUTINE INSP. DATE: 11/16/2016**

County: Ramsey
City: New Brighton
Township:
Section: 29 Township: 030N Range: 23W
Span Type: 5 - Prestressed Concrete 2 - Stringer/Multi-beam or Girder
List:
NBI Deck: 5 Super: 4 Sub: 5 Chan: N Culv: N

Location: 0.2 MI E OF JCT CSAH 45
Route: 04 - CSAH 77 Ref. Pt.: 001+00.820
Control Section:
Maint. Area:
Local Agency Bridge Nbr.:
Open, Posted, Closed: P - Posted for Load
MN Scour Code: A - NON WATERWAY

Length: 65.9 ft.
Deck Width: 63.5 ft.
Rdwy. Area/ Pct. Unsnd: 3423 sq. ft. / %
Paint Area/ Pct. Unsnd: sq. ft. / %
Culvert: N/A
Postings: 26 40 40

Appraisal Ratings - Approach: 6 Waterway: N
Required Bridge Signs - Load Posting: 2 - Vehicle & Semi (Type R12-5) Traffic: 0 - Not Required
Horizntal: 1 - Object Markers Vertical: 0 - Not Required

Unofficial Structurally Deficient Y
Unofficial Functionally Obsolete N
Unofficial Sufficiency Rating 43.6

ELEM NBR	ELEMENT NAME	ENV	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4	QTY CS 5
013	Bituminous Overlay (Concrete Deck)	2	Routine	11/16/2016	4187 SF	0	0	4187	0	0
			Routine	11/19/2015	4187 SF	0	0	4187	0	0

Notes: [2010-2015] There is moderate to major longitudinal and transverse cracking of bituminous overlay.
[2009-2015] There is deck leakage @ deck joints (transverse cracking) & along pre-cast sections- 6 on each side of centerline (longitudinal cracking).
Milled an average of 1 1/4" and paved 0.20' in July 2007.
Difficult to determine the condition of concrete deck due to the bituminous overlay.

205	Reinforced Concrete Column	2	Routine	11/16/2016	10 EA	0	7	3	0	N/A
			Routine	11/19/2015	10 EA	0	7	3	0	N/A

Notes: [2015] The north side of column #3 & #5 at the top has exposed re-bar with corrosion.
[2013-2015] Minor spalls are present. The north side of #7 column at the top has exposed re-bar with corrosion.
[2003-2015] Numerous minor horizontal & vertical cracking. Rebar and form tie corrosion is present on columns.

215	Reinforced Concrete Abutment	2	Routine	11/16/2016	128 LF	0	54	74	0	N/A
			Routine	11/19/2015	128 LF	0	54	74	0	N/A

Notes: [2015] There is spall at the NW corner abutment back wall.
[2014-2015] There is a major 1" delamination on the top of the west abutment between channels 5 & 15.
[2014-2015] There is a major spall at west abutment below #16 channel.
[2013-2015] The west abutment contains minor to moderate spalls throughout. There is a major spall at west abutment below #5 channel.
[2010-2015] The east abutment contains major spalls at channel #5, channels #3 & #16 at construction joints.
[2008-2015] There are 2 moderate vertical cracks in each abutment with delamination at the construction joints.
[2003-2015] There are 36 LF of horizontal cracks on east abut. & 35 LF on west abut. 4" below the abutment seat.
Scaling at abutment seats. Hairline cracks outside edges of SE & SW corners of bridge seats 1994-2015.
Sealed in 1982. Reappeared in 1983. Visible 1983-2015.
[2013-2014] There is delamination at the NW corner abutment back wall.

220	Reinforced Concrete Footing	2	Routine	11/16/2016	10 EA	0	10	0	0	N/A
			Routine	11/19/2015	10 EA	0	10	0	0	N/A

Notes: [2015] Minor spalls are present with numerous minor horizontal & vertical cracking.

234	Reinforced Concrete Pier Cap	2	Routine	11/16/2016	128 LF	0	54	74	0	N/A
			Routine	11/19/2015	128 LF	0	54	74	0	N/A

Notes: [2014-2015] There is moderate delamination on the north construction joint of the east pier cap.
[2009-2015] There is moderate vertical cracking at construction joints. There are moderate spalls underneath side of concrete caps. There are 36 LF of horizontal cracking on each pier cap.

ELEM NBR	ELEMENT NAME	ENV	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4	QTY CS 5
333	Masonry, Other or Combination Material Railing	2	Routine	11/16/2016	200 LF	0	182	18	N/A	N/A
			Routine	11/19/2015	200 LF	0	182	18	N/A	N/A

Notes: [2015] 18 LF in CS 3 & 182 LF in CS 2.
[2015] 75% of concrete posts have moderate spalls & delamination with corrosion present.
[2015] There is moderate spalls on #9, #11 & #12 posts on the south side.
[2014-2015] There is longitudinal cracking on top of railing the east 1/2 of the north side railing.
[2009-2015] There is longitudinal cracking on top of railing the west 1/2 of the north side railing.
[2006-2015] There is major delamination with section loss south side on the #5 post.
[2004-2015] Concrete parapet needs repair & paint. Galvanizing protection is chalking on metal railing.
[2009-2014] There is moderate delamination of #9, #11 & #12 posts on the south side.
[2004-2014] 50% of concrete posts have moderate spalling & delamination with corrosion present.
Railing is a combination concrete parapet & metal railing.

ELEM NBR	ELEMENT NAME	ENV	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4	QTY CS 5
375	Pre-cast Concrete Channel	2	Routine	11/16/2016	1320 LF	0	138	980	202	N/A
			Routine	11/19/2015	1320 LF	0	138	980	202	N/A

Notes: [2015] Spans 1,2,3,6,7,8,9,10,11,14,15,18,19 & 20 have major spalls with exposed rebar and some significant section loss. Spans 4,5,12,13,16 & 17 have major delamination.
[2014] West span has major delamination on channels #1, #10, #12, & #14.
[2014] Center span has major delamination on channels #2, #6, & #9.
[2014] East span has major delamination on channels #1, #4, #5, #9, #12, & #14.
[2013-2014] West span has major spalls w/ exposed rebar on channels #3, #7, #9, #11, #15, #16, #19, #21. Major effluence on channel #4
[2013-2014] Center span has major spalls w/ exposed rebar on channels #3. #7, #10, #15, #19, #21
[2013-2014] East span has major spalls w/ exposed rebar on channels #3,#8, #10, #11, #19, #21
[2009-2014] Numerous minor shear & flexure cracking exist throughout all pre-cast channel spans. Also contains some leaching through from the deck.100% in condition state 3.
Span #1
[2013-2014] Channel #1, #10, #14, #15, #18 & #20 have longitudinal cracking w/corrosion 100% length.
#14 & #15 have 8' of delamination with section loss.
Chan. #2 & #3 has exposed re-bar w/section loss 100% length. Also leaching through from the deck.
Chan. #5 has 4' long. crack. w/corr. Chan. #4, #6, #7& #12 has long. crack. w/corr. 50% length.
Chan. #8 & #9 has long. crack. w/corr. 100% length. Chan. #8 has 4' exposed re-bar w/ sect. loss.
Chan. #8 &#10 have 2' of delamination w/ sect. loss @ pier. Channel #14 &#15 have 4' delamination @ abutment. Chan. #18 has 6' of delam. w/ sect. loss.
Chan. #13 has a 4' longitudinal crack & 6" moderate spall w/corr. @ abutment.
Chan. #16 - 2' & #17 - 1' of long. crack. w/corrosion.
Chan. #11, #18 & #19 have long. cracking 100% length with 50% delam. & section loss.
Span #2
[2011-2014] Chan. #2 & #3 have cracking w/corr. 100% length & delam. w/ exposed re-bar & sect. loss 75% L.
Chan. #1, #4, #5, #16 & #17 have 2' crack. w/corr. @ each pier. Chan. #8 has 4' crack w/corr. @ west pier & 2' crack. w/corr. @ east pier.
Chan. #6, #7, #11, #12 & #13 have long. crack. w/corr. 50% length. #7 has 2' delamination w/section loss.
Chan. #9 & #10 have delam. w/ exposed re-bar & sect. loss 50% L.
Chan. #14 & #15 have cracking 100% length. Chan. #14 & #15 also has exposed re-bar & sect. loss 75% length.
Chan. #18, #19 & #20 cracking w/corr. 100% L. Chan #19 has delam. w/ exposed re-bar & sect. loss 100% length.
Span #3
[2011-2014] Chan. #7, #10, #13, #15, #16, #17 has long. crack. w/corr. 50% length.
Chan. #1, #2 & #3 have long. crack. w/corr. 75% length.
Channel #2,#3,#9,#10 & #11 have 6' of delamination w/ exposed re-bar & section loss @ east abutment.
Chan. #4 & #5 have 50% long. crack. w/corrosion. #4 has 2' delam. @ abut.
Chan. #6 has 1' long. crack. w/corr. @ pier.
Chan. #8, #18, #19 & #20 have long crack. w/corr. 100% length. Channel #19 has 8' of delam. w/ exposed re-bar & sect. loss.
Chan. #14 has a 1' spall & 6' longitudinal crack with corrosion.

ELEM NBR	ELEMENT NAME	ENV	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4	QTY CS 5
387	Reinforced Concrete Wingwall	2	Routine	11/16/2016	4 EA	0	3	1	0	N/A
			Routine	11/19/2015	4 EA	0	3	1	0	N/A

Notes: [2013-2015] Minor spalls present on all concrete wingwalls.
[2008-2015] There is a major spall at the NW corner bridge seat.
[2003-2015] There is minor cracking with evidence of corrosion at the SW & NW corners.
[2005-2015] There also is some cracking all corners at back wall bridge seats.

ELEM NBR	ELEMENT NAME	ENV	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4	QTY CS 5
407	Bituminous Approach Roadway	2	Routine	11/16/2016	2 EA	0	2	0	0	N/A
			Routine	11/19/2015	2 EA	0	2	0	0	N/A
	Notes: [2010-2015] Moderate cracking with settlement present at both ends. [2007] New mill & overlay. Milled an average of 1 1/4" and paved 0.20' in July 2007.									
964	Critical Finding Smart Flag	2	Routine	11/16/2016	1 EA	1	0	N/A	N/A	N/A
			Routine	11/19/2015	1 EA	1	0	N/A	N/A	N/A
	Notes: DO NOT DELETE THIS CRITICAL FINDING SMART FLAG.									
965	Concrete Shear Cracking Smart Flag	2	Routine	11/16/2016		0	0	0	0	N/A
			Routine	11/19/2015		0	0	0	0	N/A
	Notes:									
981	Signing	2	Routine	11/16/2016	1 EA	1	0	0	0	0
			Routine	11/19/2015	1 EA	1	0	0	0	0
	Notes: [2003-2015] Horizontal clearance signs are in place. Load posting signs are in place.									
982	Approach Guardrail	2	Routine	11/16/2016	1 EA	0	1	0	N/A	N/A
			Routine	11/19/2015	1 EA	0	1	0	N/A	N/A
	Notes: [2007-2015] There is moderate damage to all four segments but still functions as intended.									
984	Deck & Approach Drainage	2	Routine	11/16/2016	1 EA	0	1	0	N/A	N/A
			Routine	11/19/2015	1 EA	0	1	0	N/A	N/A
	Notes: [2005-2015] Drains off the bridge east and west. Drainage is operating properly.									
985	Slopes & Slope Protection	2	Routine	11/16/2016	1 EA	0	1	0	N/A	N/A
			Routine	11/19/2015	1 EA	0	1	0	N/A	N/A
	Notes: [2009-2015] Slope protection has moderate deterioration. Grouted riprap has moderate cracking and settlement. [2005-2015] Minor to moderate erosion at the SW & NW corners. Slope protection consists of grouted rip rap.									
986	Curb & Sidewalk	2	Routine	11/16/2016	1 EA	0	1	0	N/A	N/A
			Routine	11/19/2015	1 EA	0	1	0	N/A	N/A
	Notes: [2014-2015] There is a 2" settlement of walk @ SE corner of bridge. [2013-2015] Major horizontal crack w/ spalling along face of north curb (44') [2012-2015] Minor cracking and moderate spalling are present. [2004-2015] Settlement of sidewalk at the NE & NW corners have been patched with bituminous.									
988	Miscellaneous Items	2	Routine	11/16/2016		0	0	0	N/A	N/A
			Routine	11/19/2015		0	0	0	N/A	N/A
	Notes:									

General Notes: 2016 Bridge safety inspection was completed by Dan Bodelson, Brian Essler & Rob Gaetz on 11/16/2016.
2015 Bridge safety inspection was completed by Brian Essler & Dan Bodelson on 11/19/2015.
2014 Bridge safety inspection was completed by Dan Bodelson, Brian Essler & Randy Bussiere on 11/21/2014.
2013 Bridge safety inspection was completed by Dan Bodelson & Brian Essler on 11/07/2013.
2012 Bridge safety inspection was completed by B. Wieman on 11/26/2012.
2011 Bridge safety inspection was conducted by B. Wieman on 11/9/2011.
2010 Bridge safety inspection by B. Wieman & D. Bodelson on 11/02/2010.

ELEM NBR	ELEMENT NAME	ENV	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4	QTY CS 5

	2010 Also inspected by MN/DOT Bridge Dept. as part of compliance review. 2009 Bridge safety inspection by B. Wieman on 7/21/2009. 2008 Bridge safety inspection by B. Paine & B. Wieman 10/27/2008. 2007 Bridge safety inspection by B. Wieman 7/26/2007 . Bridge rating by TKDA 11/28/2006. Inventory rating - HS 24.9, Operating rating HS 41.5. Graffiti is on abutment, pier columns & wing walls 2003-2015. Bridge #4533 was constructed in 1926. Bridge #4533 was remodeled in 1973.
58. Deck NBI:	There is major longitudinal and transverse cracking of bituminous overlay. There is deck leakage @ deck joints (transverse cracking) & along pre-cast sections
36A. Brdg Railings NBI:	Vehichular railings meet current standards.
36B. Transitions NBI:	Guardrail transitions do not meet current standards. Posts are 3' spacing @ bridge, not 1'-6 3/4" as per MnDOT Standard Plate
36C. Appr Guardrail NBI:	Approach guardrail meets current standards.
36D. Appr Guardrail Terminal NBI:	Guardrail terminations meet current standards.
59. Superstructure NBI:	Major spalls w/ exposed rebar & significant section loss on channels
60. Substructure NBI:	Major delamination & spalls on abutment Minor spalls with exposed rebar on columns
61. Channel NBI:	No Water
62. Culvert NBI:	Bridge
71. Waterway Adeq NBI:	No Water
72. Appr Roadway Alignment NBI:	Minor speed reduction due to horizontal & vertical curves
Inventory Notes:	

Dan Bodelson
Inspector's Signature

Nicklaus Fischer
Reviewer's Signature

MINNESOTA BRIDGE INSPECTION REPORT

12/02/2016

Inspector: CO Bridge

BRIDGE 4533 CSAH 77 OVER MC RY

County: Ramsey
Location: 0.2 MI E OF JCT CSAH 45
Length: 65.9 ft.

City: New Brighton
Route: 04 - CSAH 77 Ref. Pt.: 001+00.820
Deck Width: 63.5 ft.

Township:
Control Section:
Rdwy. Area/ Pct. Unsnd: 3423 sq. ft. / %

Section: 29 Township: 030N Range: 23W Maint. Area:
Paint Area/ Pct. Unsnd: sq. ft. / %

Span Type: 5 - Prestressed Concrete
List: 2 - Stringer/Multi-beam or Girder
Local Agency Bridge Nbr.:
Culvert: N/A
Postings: 26 40 40

NBI Deck: 5 Super: 4 Sub: 5 Chan: N Culv: N

Open, Posted, Closed: P - Posted for Load

MN Scour Code: A - NON WATERWAY

Appraisal Ratings - Approach: 6 Waterway: N

Unofficial Structurally Deficient Y

Required Bridge Signs - Load Posting: 2 - Vehicle & Semi (Type R12-5)
Traffic: 0 - Not Required

Unofficial Functionally Obsolete N

Horizntal: 1 - Object Markers
Vertical: 0 - Not Required

Unofficial Sufficiency Rating 43.6

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
16	Reinforced Concrete Top Flange	Routine	11/16/2016	4185 SF	0	418	3055	712
		Migrated Values		4185 SF	0	418	3055	712

Notes: [2016] Migrator assumed CS1.
[2016] Extensive delamination & spalling, exposed rebar with section loss.
[2016] 10% - 418 SF CS2, 73% - 3055 SF CS3, 17% - 712 SF CS4 - see attached file.

510 - Wearing Surfaces	Routine	11/16/2016	3423 SF	3081	0	342	0
	Migrated Values		3423 SF	3081	0	342	0

Notes: Bituminous Overlay Notes: [2010-2016] There is moderate to major longitudinal and transverse cracking of bituminous overlay.
[2009-2016] There is deck leakage @ deck joints (transverse cracking) & along pre-cast sections- 6 on each side of centerline (longitudinal cracking).
Milled an average of 1 1/4" and paved 0.20' in July 2007.
Difficult to determine the condition of concrete deck due to the bituminous overlay.

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
110	Reinforced Concrete Open Girder/Beam	Routine	11/16/2016	2640 LF	0	248	1936	456
		Migrated Values		2640 LF	0	248	1936	456

Notes: [2016] Migrator estimated the quantity of the channel spans. Verify the quantity by multiplying the number of vertical beams (2 beams per precast section) by the deck length.
[2016] 1320 ft. of precast sections x 2 = 2640 ft. beams.
[2016] 10% - 248ft. CS2, 73% - 1936 ft., CS3, 17% - 456 ft. - CS4 - see attached file.
[2015-2016] Spans 1,2,3,6,7,8,9,10,11,14,15,18,19 & 20 have major spalls with exposed rebar and some significant section loss. Spans 4,5,12,13,16 & 17 have major delamination.
[2014-2016] West span has major delamination on channels #1, #10, #12, & #14.
[2014-2016] Center span has major delamination on channels #2, #6, & #9.
[2014-2016] East span has major delamination on channels #1, #4, #5, #9, #12, & #14.
[2013-2016] West span has major spalls w/ exposed rebar on channels #3, #7, #9, #11, #15, #16, #19, #21. Major effluence on channel #4
[2013-2016] Center span has major spalls w/ exposed rebar on channels #3. #7, #10, #15, #19, #21
[2013-2016] East span has major spalls w/ exposed rebar on channels #3,#8, #10, #11, #19, #21
[2009-2014] Numerous minor shear & flexure cracking exist throughout all pre-cast channel spans. Also contains some leaching through from the deck.100% in condition state 3.
Span #1
[2013-2014] Channel #1, #10, #14, #15, #18 & #20 have longitudinal cracking w/corrosion 100% length.
#14 & #15 have 8' of delamination with section loss.
Chan. #2 & #3 has exposed re-bar w/section loss 100% length. Also leaching through from the deck.
Chan. #5 has 4' long. crack. w/corr. Chan. #4, #6, #7& #12 has long. crack. w/corr. 50% length.
Chan. #8 & #9 has long. crack. w/corr. 100% length. Chan. #8 has 4' exposed re-bar w/ sect. loss.
Chan. #8 10 have 2' of delamination w/ sect. loss @ pier. Channel #14 15 have 4' delamination @ abutment. Chan. #18 has 6' of delam. w/ sect. loss.
Chan. #13 has a 4' longitudinal crack & 6" moderate spall w/corr. @ abutment.
Chan. #16 - 2' & #17 - 1' of long. crack. w/corrosion.
Chan. #11, #18 & #19 have long. cracking 100% length with 50% delam. & section loss.
Span #2
[2011-2014] Chan. #2 & #3 have cracking w/corr. 100% length & delam. w/ exposed re-bar & sect. loss 75% L.
Chan. #1, #4, #5, #16 & #17 have 2' crack. w/corr. @ each pier. Chan. #8 has 4' crack w/corr. @ west pier & 2' crack. w/corr. @ east pier.
Chan. #6, #7, #11, #12 & #13 have long. crack. w/corr. 50% length. #7 has 2' delamination w/section loss.
Chan. #9 & #10 have delam. w/ exposed re-bar & sect. loss 50% L.
Chan. #14 & #15 have cracking 100% length. Chan. #14 & #15 also has exposed re-bar & sect. loss 75% length.
Chan. #18, #19 & #20 cracking w/corr. 100% L. Chan #19 has delam. w/ exposed re-bar & sect. loss 100% length.
Span #3
[2011-2014] Chan. #7, #10, #13, #15, #16, #17 has long. crack. w/corr. 50% length.
Chan. #1, #2 & #3 have long. crack. w/corr. 75% length.
Channel #2,#3,#9,#10 & #11 have 6' of delamination w/ exposed re-bar & section loss @ east abutment.
Chan. #4 & #5 have 50% long. crack. w/corrosion. #4 has 2' delam. @ abut.
Chan. #6 has 1' long. crack. w/corr. @ pier.
Chan. #8, #18, #19 & #20 have long crack. w/corr. 100% length. Channel #19 has 8' of delam. w/ exposed re-bar & sect. loss.
Chan. #14 has a 1' spall & 6' longitudinal crack with corrosion.

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
205	Reinforced Concrete Column	Routine	11/16/2016	10 EA	0	6	4	0
		Migrated Values		10 EA	0	6	4	0

Notes: [2016] Major delamination on column # 6, move to CS3
[2015-2016] The north side of column #3 & #5 at the top has exposed re-bar with corrosion.
[2013-2016] Minor spalls are present. The north side of #7 column at the top has exposed re-bar with corrosion.
[2003-2016] Numerous minor horizontal & vertical cracking. Rebar and form tie corrosion is present on columns.

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
215	Reinforced Concrete Abutment	Routine	11/16/2016	196 LF	0	105	91	0
		Migrated Values		196 LF	0	105	91	0

Notes: [2016] Migrator added 40 LF to abutment quantity to account for wingwalls (CS1:0 CS2:30 CS3:10 CS4:0).
[2016] 17' on all 4 wingwalls with 128' of abutment = 196 ft. Total.
[2016] 3 wingwalls @ 17' = 51' + 54' abut. = 105 ft. CS2 - 1 wingwall @ 17' with 74' abut. = 91 ft. CS3.
[2016] There is spall at the NW corner abutment back wall.
[2014-2016] There is a major 1" delamination on the top of the west abutment between channels 5 & 15.
[2014-2016] There is a major spall at west abutment below #16 channel.
[2013-2016] The west abutment contains minor to moderate spalls throughout. There is a major spall at west abutment below #5 channel.
[2010-2016] The east abutment contains major spalls at channel #5, channels #3 & #16 at construction joints.
[2008-2016] There are 2 moderate vertical cracks in each abutment with delamination at the construction joints.
[2003-2016] There are 36 LF of horizontal cracks on east abut. & 35 LF on west abut. 4" below the abutment seat.
Scaling at abutment seats. Hairline cracks outside edges of SE & SW corners of bridge seats 1994-2015.
Sealed in 1982. Reappeared in 1983. Visible 1983-2015.
[2013-2016] There is delamination at the NW corner abutment back wall.

Wingwall notes: [2013-2015] Minor spalls present on all concrete wingwalls.
[2008-2015] There is a major spall at the NW corner bridge seat.
[2003-2015] There is minor cracking with evidence of corrosion at the SW & NW corners.
[2005-2015] There also is some cracking all corners at back wall bridge seats.

220	Reinforced Concrete Pile Cap/Footing	Routine	11/16/2016	106 LF	0	106	0	0
		Migrated Values		106 LF	0	106	0	0

Notes: [2016] Migrator assumed 10LF per EA quantity, a total of 100 LF.
[2016] 9.5' between 5 piers = 4 x 9.5' = 38' + 7.5' on north & south ends =53 ft. x 2 (east & west piers) = 106' total CS 2
[2015-2016] Minor spalls are present with numerous minor horizontal & vertical cracking.

234	Reinforced Concrete Pier Cap	Routine	11/16/2016	128 LF	0	54	74	0
		Migrated Values		128 LF	0	54	74	0

Notes: [2014-2016] There is moderate delamination on the north construction joint of the east pier cap.
[2009-2016] There is moderate vertical cracking at construction joints. There are moderate spalls underneath side of concrete caps. There are 36 LF of horizontal cracking on each pier cap.

330	Metal Bridge Railing	Routine	11/16/2016	200 LF	0	200	0	0
		Migrated Values		200 LF	0	200	0	0

Notes: [2016] Migrator assumed concrete/metal combination type rail.
[2016] 200 ft. CS 2 for Metal Bridge Rail.
[2016] Minor chalking & fading of finish coat.
[2015] 18 LF in CS 3 & 182 LF in CS 2.
[2015-2016] 75% of concrete posts have moderate spalls & delamination with corrosion present.
[2015-2016] There is moderate spalls on #9, #11 & #12 posts on the south side.
[2014-2016] There is longitudinal cracking on top of railing the east 1/2 of the north side railing.
[2009-2016] There is longitudinal cracking on top of railing the west 1/2 of the north side railing.
[2006-2016] There is major delamination with section loss south side on the #5 post.
[2004-2016] Concrete parapet needs repair & paint. Galvanizing protection is chalking on metal railing.
[2009-2014] There is moderate delamination of #9, #11 & #12 posts on the south side.
[2004-2014] 50% of concrete posts have moderate spalling & delamination with corrosion present.
Railing is a combination concrete parapet & metal railing.

	515 - Steel Protective Coating	Routine	11/16/2016	260 SF	0	260	0	0
		Migrated Values		260 SF	0	260	0	0

Notes: [2016] Migrator assumed CS1 and a quantity of 999 SF.
[2016] 200 LF x 1.3' high = 260 SF
[2016] Minor chalking & fading of finish coat.

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
331	Reinforced Concrete Bridge Railing	Routine	11/16/2016	200 LF	0	100	100	0
		Migrated Values		200 LF	0	100	100	0
	Notes: [2016] Migrator assumed concrete/metal combination type rail. [2016] 100 LF in CS2 & 100 LF in CS3 for Concrete Bridge Rail. [2016] 30' of moderate delamination on east half of north side of railing. [2016] major 1' x 6" spall on post # 11 on north side with cracks & delamination on all posts on north side. [2015] 18 LF in CS 3 & 182 LF in CS 2. [2015] 75% of concrete posts have moderate spalls & delamination with corrosion present. [2015] There is moderate spalls on #9, #11 & #12 posts on the south side. [2014-2015] There is longitudinal cracking on top of railing the east 1/2 of the north side railing. [2009-2015] There is longitudinal cracking on top of railing the west 1/2 of the north side railing. [2006-2015] There is major delamination with section loss south side on the #5 post. [2004-2015] Concrete parapet needs repair & paint. Galvanizing protection is chalking on metal railing. [2009-2014] There is moderate delamination of #9, #11 & #12 posts on the south side. [2004-2014] 50% of concrete posts have moderate spalling & delamination with corrosion present. Railing is a combination concrete parapet & metal railing.							
800	Critical Deficiencies or Safety Hazards	Routine	11/16/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
	Notes: NO CRITICAL FINDINGS OBSERVED DURING THE LAST INSPECTION.							
822	Bituminous Approach Roadway	Routine	11/16/2016	2 EA	0	2	0	0
		Migrated Values		2 EA	0	2	0	0
	Notes: [2016] Moderate cracks over piers. [2010-2016] Moderate cracking with settlement present at both ends. [2007] New mill & overlay. Milled an average of 1 1/4" and paved 0.20' in July 2007.							
883	Concrete Shear Cracking	Routine	11/16/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
	Notes: Use this element to monitor the presence of shear cracking on concrete elements. Pay particular attention to the concrete pier caps. [2016] no shear cracking present.							
890	Load Posting or Vertical Clearance Signing	Routine	11/16/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
	Notes: [2016] Structure requires a vertical clearance sign or load posting sign. [2003-2016] Horizontal clearance signs are in place. Load posting signs are in place.							
891	Other Bridge Signing	Routine	11/16/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
	Notes: [2003-2016] Horizontal clearance signs are in place. Load posting signs are in place.							
892	Slopes & Slope Protection	Routine	11/16/2016	1 EA	0	1	0	0
		Migrated Values		1 EA	0	1	0	0
	Notes: [2009-2016] Slope protection has moderate deterioration. Grouted riprap has moderate cracking and settlement. [2005-2016] Minor to moderate erosion at the SW & NW corners. Slope protection consists of grouted rip rap.							
893	Guardrail	Routine	11/16/2016	1 EA	0	1	0	0
		Migrated Values		1 EA	0	1	0	0
	Notes: [2007-2016] There is moderate damage to all four segments but still functions as intended. [2016] Guardrail transitions do not meet current standards. - Posts are 3' spacing @ bridge, not 1'-6 3/4" as per MnDOT Standard Plate							
894	Deck & Approach Drainage	Routine	11/16/2016	1 EA	0	1	0	0
		Migrated Values		1 EA	0	1	0	0
	Notes: [2005-2016] Drains off the bridge east and west. Drainage is operating properly.							

BRIDGE 4533 CSAH 77 OVER MC RY

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
895	Sidewalk, Curb, & Median	Routine	11/16/2016	1 EA	0	1	0	0
		Migrated Values		1 EA	0	1	0	0

Notes: [2016] There is a 3" settlement of walk @ SE corner of bridge, should be patched with bituminous.
[2016] 1' x 1' major spall in SW corner of walk.
[2014-2015] There is a 2" settlement of walk @ SE corner of bridge.
[2013-2016] Major horizontal crack w/ spalling along face of north curb (44')
[2012-2016] Minor cracking and moderate spalling are present.
[2004-2016] Settlement of sidewalk at the NE & NW corners have been patched with bituminous.

900	Protected Species	Routine	11/16/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0

Notes: Use this element to track the presence of protected species living on this structure.
[2061] No protective species found.

General Notes: 2016 Bridge safety inspection was completed by Dan Bodelson, Brian Essler & Rob Gaetz on 11/16/2016.
2015 Bridge safety inspection was completed by Brian Essler & Dan Bodelson on 11/19/2015.
2014 Bridge safety inspection was completed by Dan Bodelson, Brian Essler & Randy Bussiere on 11/21/2014.
2013 Bridge safety inspection was completed by Dan Bodelson & Brian Essler on 11/07/2013.
2012 Bridge safety inspection was completed by B. Wieman on 11/26/2012.
2011 Bridge safety inspection was conducted by B. Wieman on 11/9/2011.
2010 Bridge safety inspection by B. Wieman & D. Bodelson on 11/02/2010.
2010 Also inspected by MN/DOT Bridge Dept. as part of compliance review.
2009 Bridge safety inspection by B. Wieman on 7/21/2009.
2008 Bridge safety inspection by B. Paine & B. Wieman 10/27/2008.
2007 Bridge safety inspection by B. Wieman 7/26/2007 .
Bridge rating by TKDA 11/28/2006. Inventory rating - HS 24.9, Operating rating HS 41.5.
Graffiti is on abutment, pier columns & wing walls 2003-2015.
Bridge #4533 was constructed in 1926. Bridge #4533 was remodeled in 1973.

58. Deck NBI: There is major longitudinal and transverse cracking of bituminous overlay.
There is deck leakage @ deck joints (transverse cracking) & along pre-cast sections

36A. Brdg Railings NBI: Vehichular railings meet current standards.

36B. Transitions NBI: Guardrail transitions do not meet current standards.
Posts are 3' spacing @ bridge, not 1'-6 3/4" as per MnDOT Standard Plate

36C. Appr Guardrail NBI: Approach guardrail meets current standards.

36D. Appr Guardrail Terminal NBI: Guardrail terminations meet current standards.

59. Superstructure NBI: Major spalls w/ exposed rebar & significant section loss on channels

60. Substructure NBI: Major delamination & spalls on abutment
Minor spalls with exposed rebar on columns

61. Channel NBI: No Water

62. Culvert NBI: Bridge

71. Waterway Adeq NBI: No Water

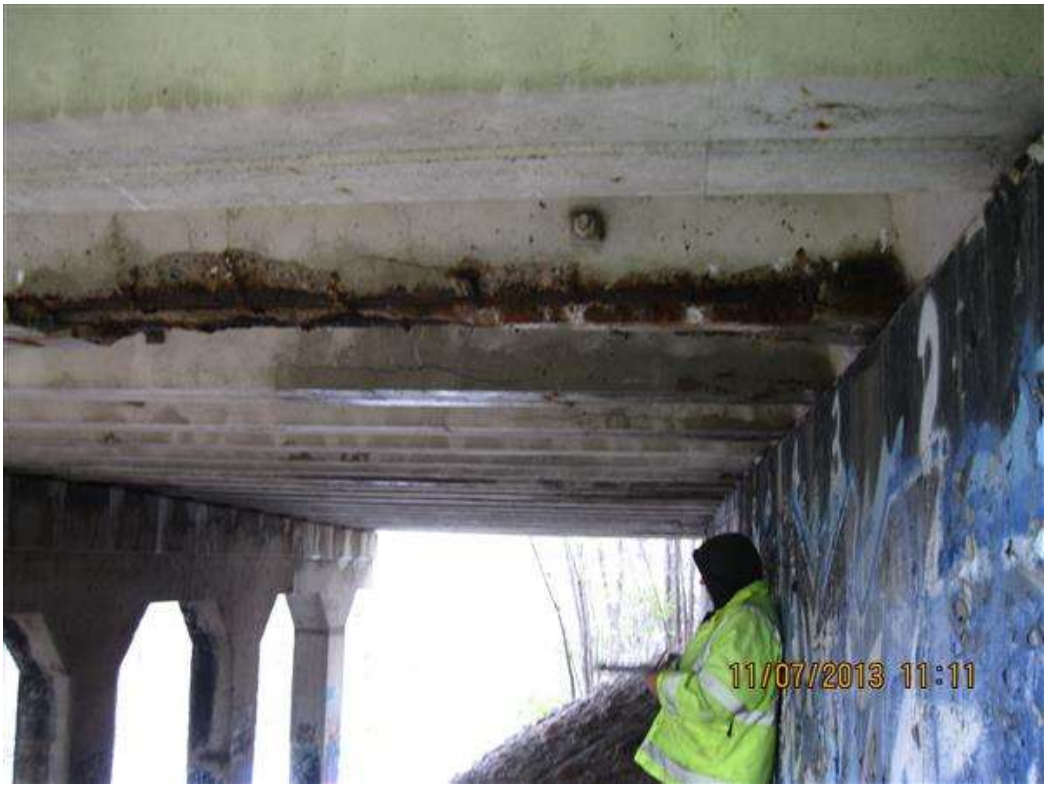
72. Appr Roadway Alignment NBI: Minor speed reduction due to horizontal & vertical curves

Inventory Notes:

Dan Bodelson
Inspector's Signature

Nicklaus Fischer
Reviewer's Signature

Pictures



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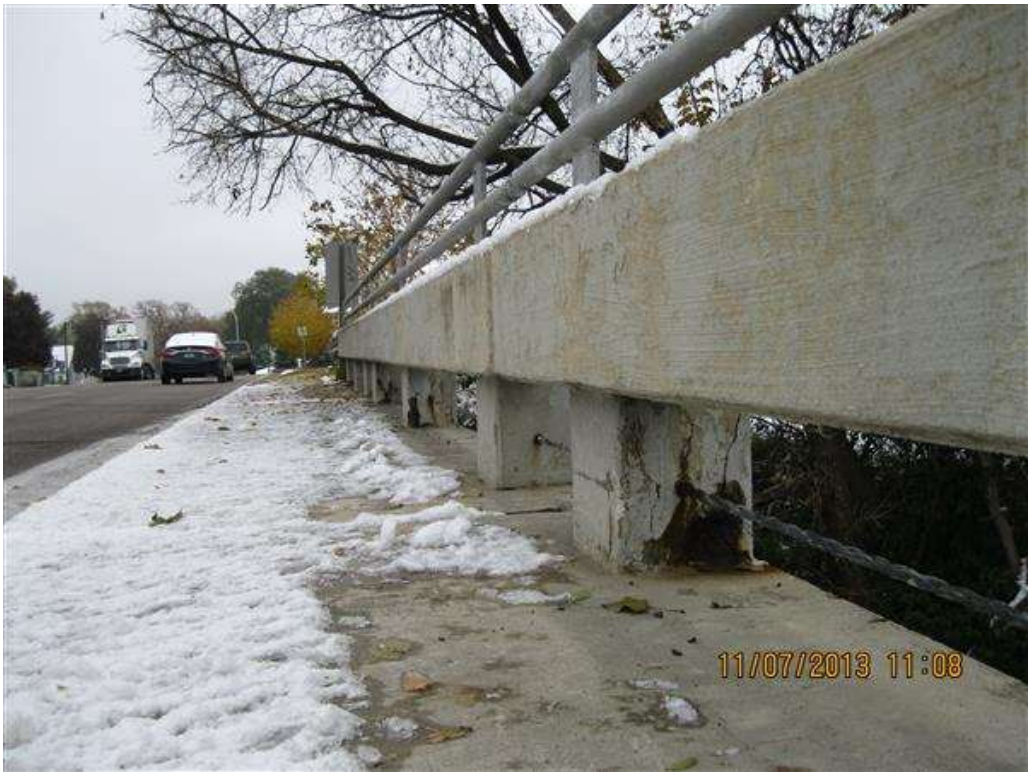
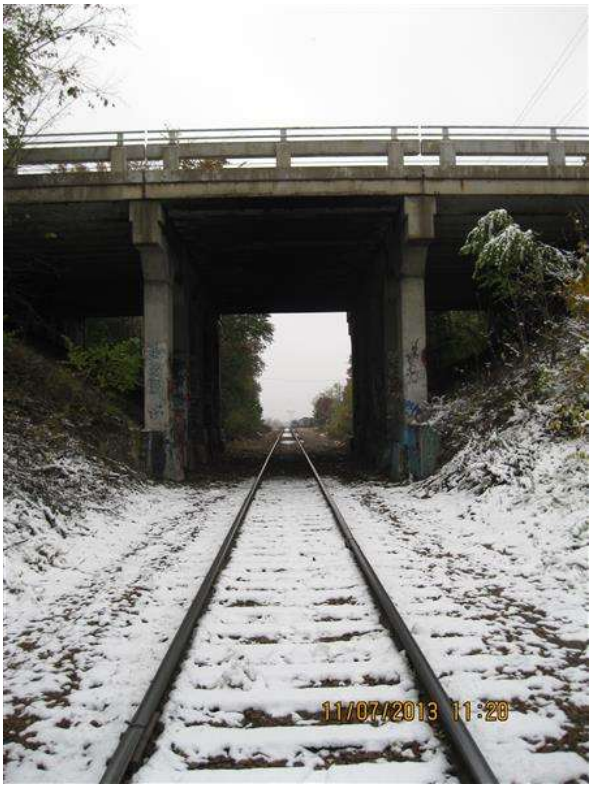


Photo 2 -

Pictures



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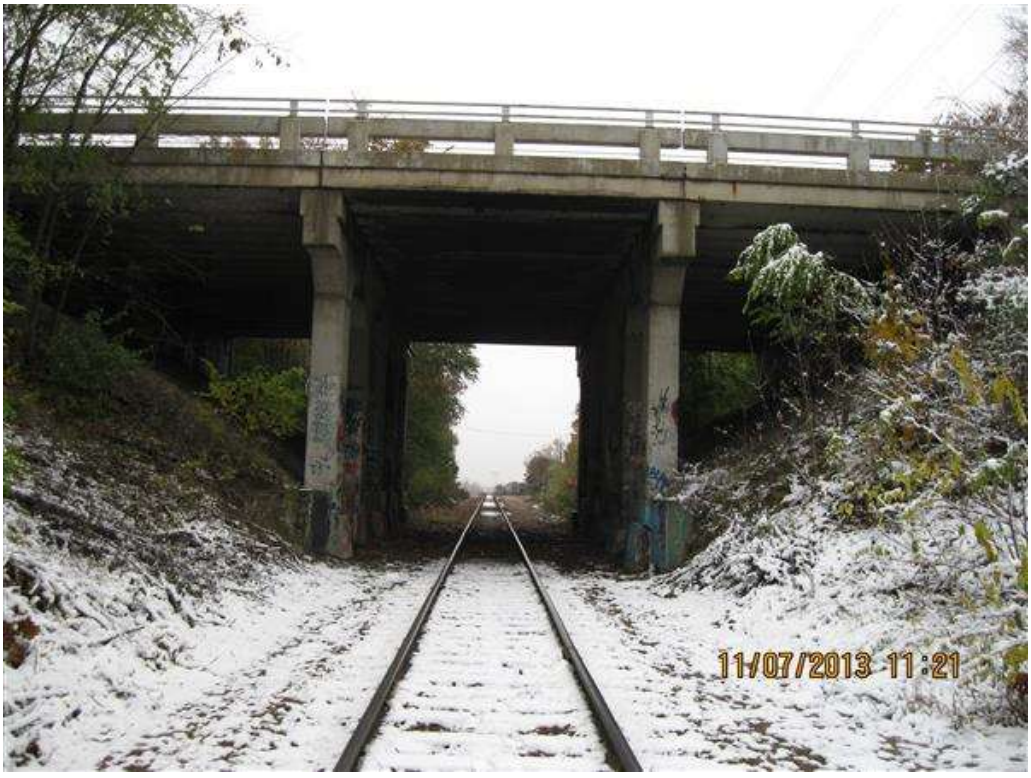

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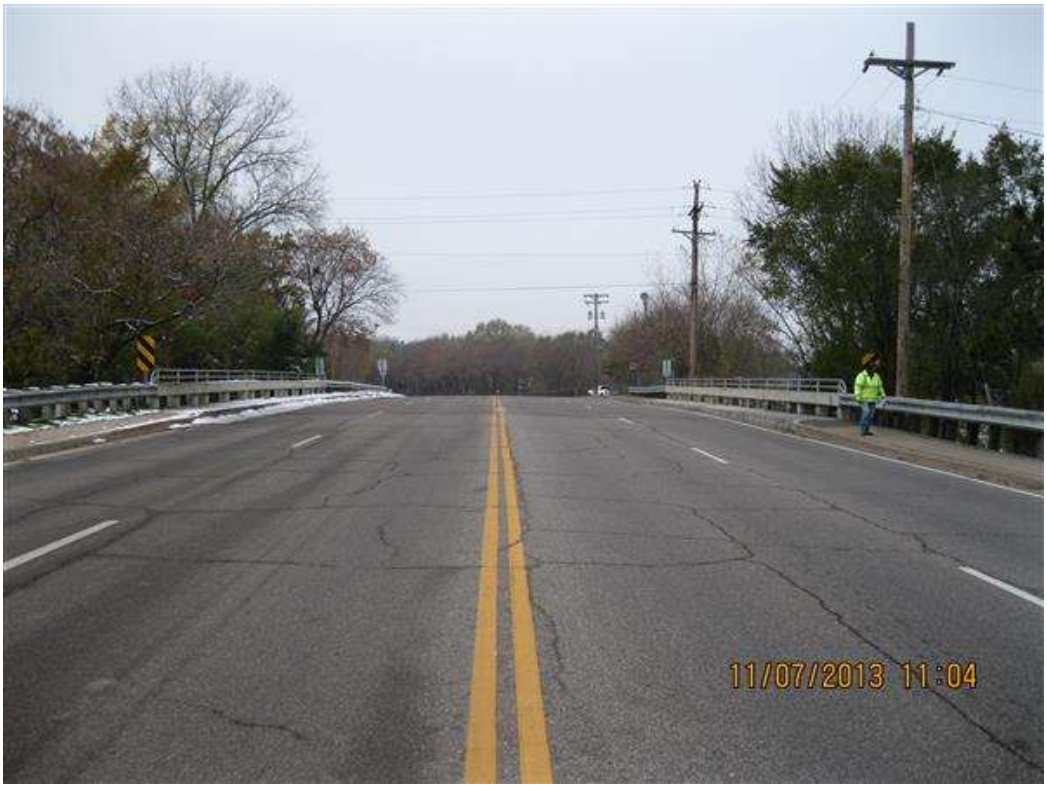
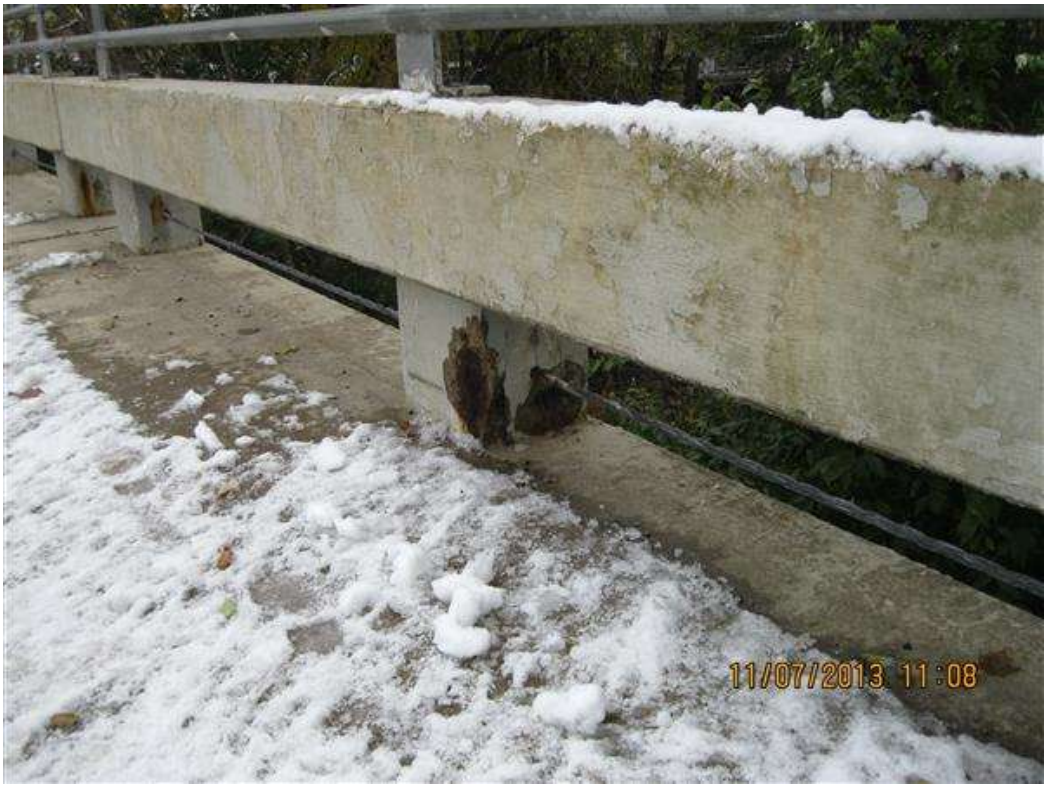


Photo 5 -

Photo 6 -

Pictures



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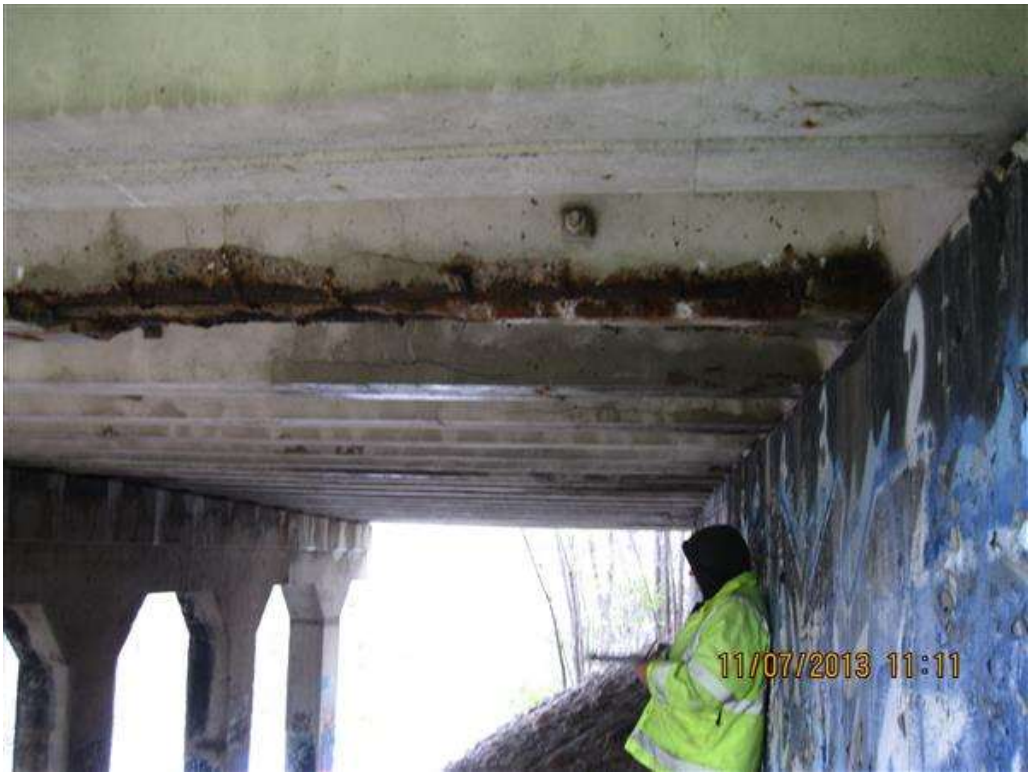

Photo 8 -

Pictures

Photo 9 -

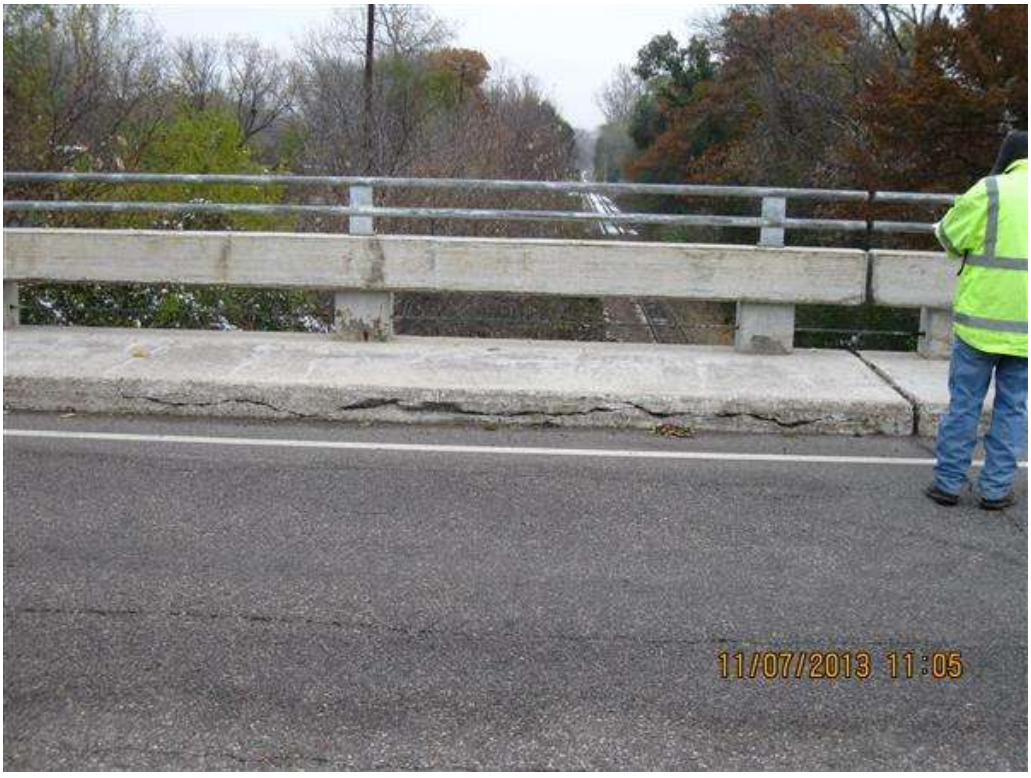

Photo 10 -

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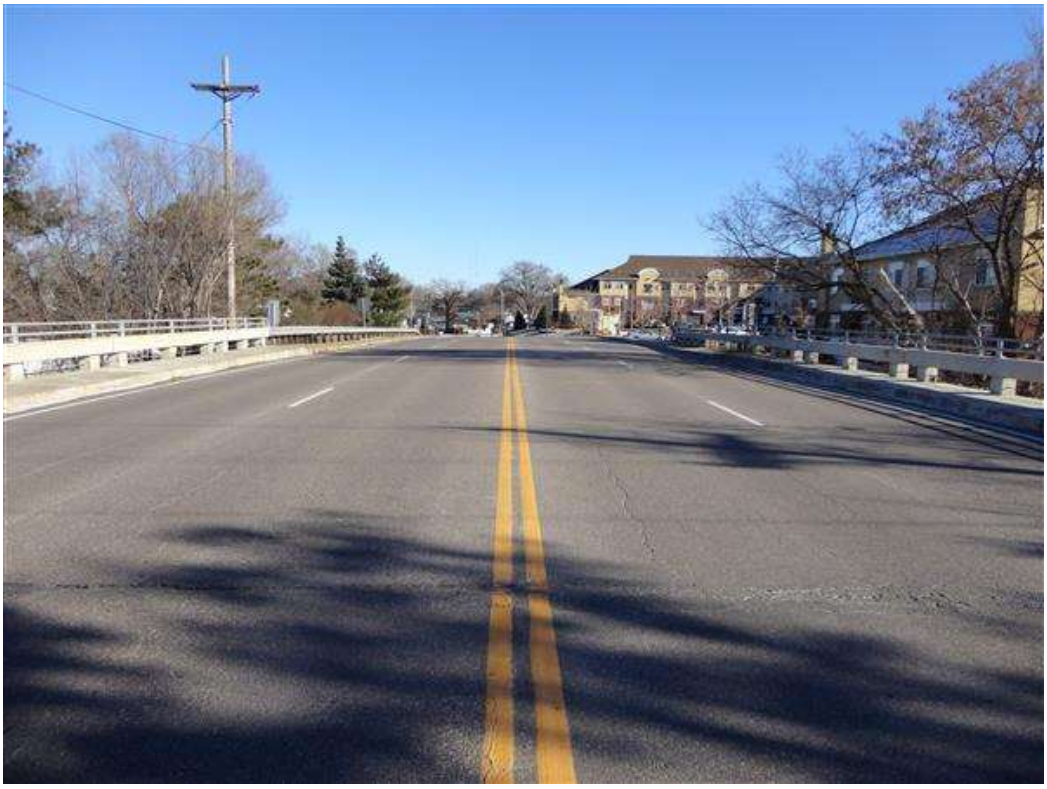

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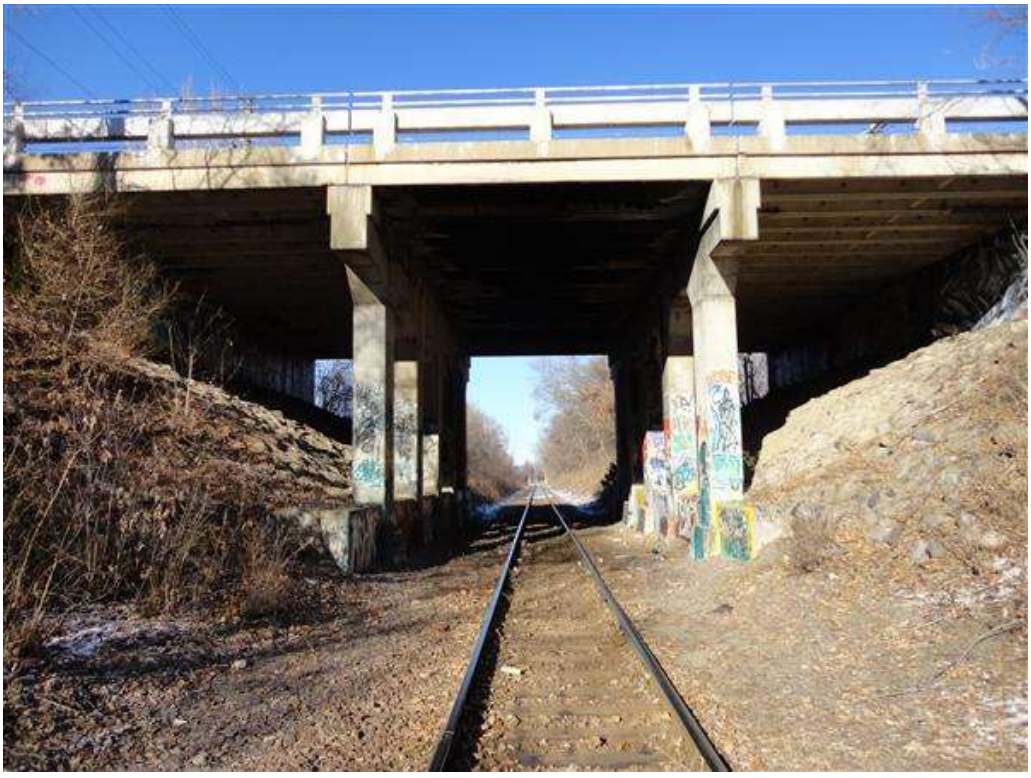

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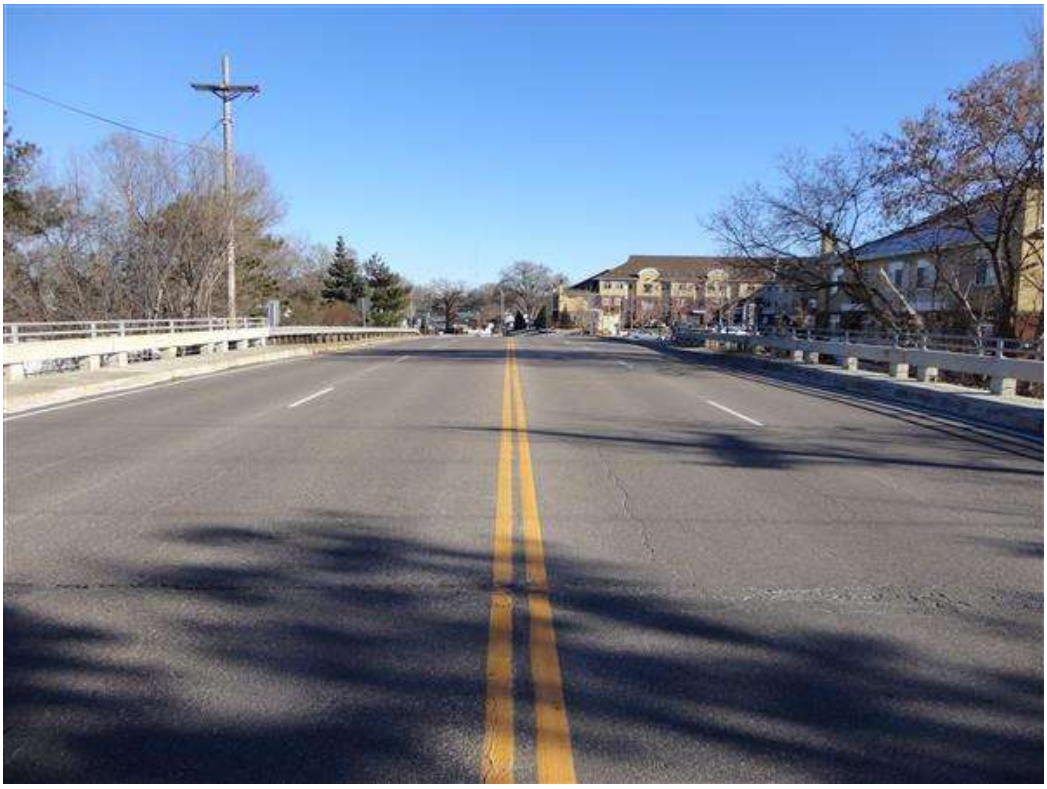

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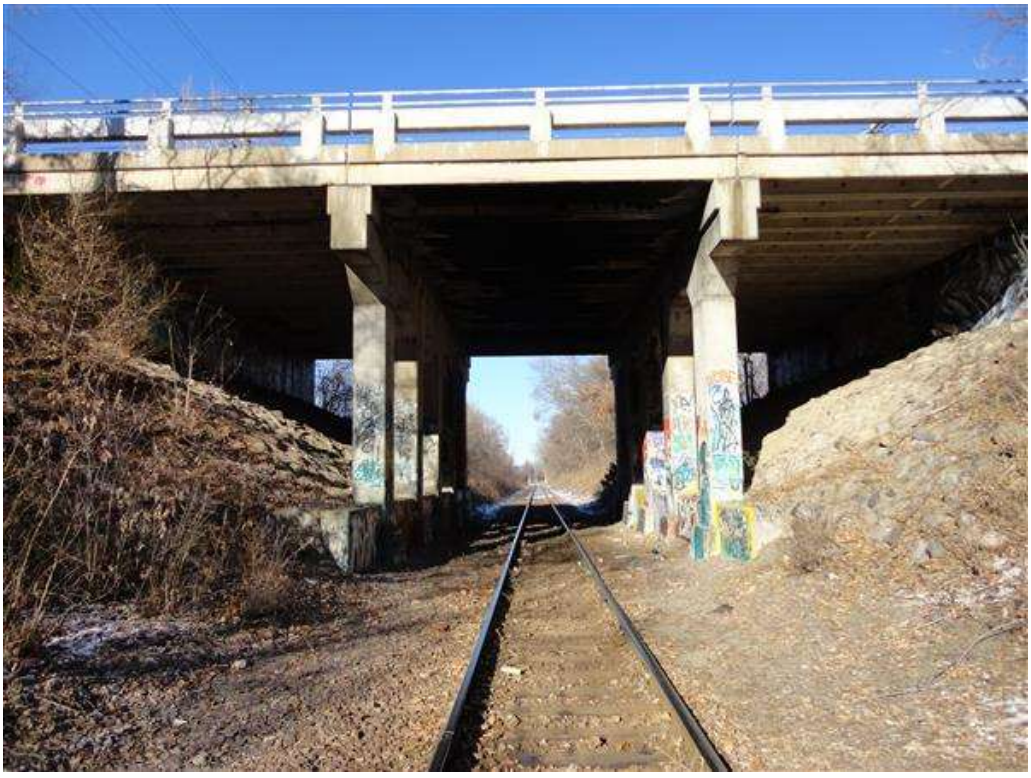

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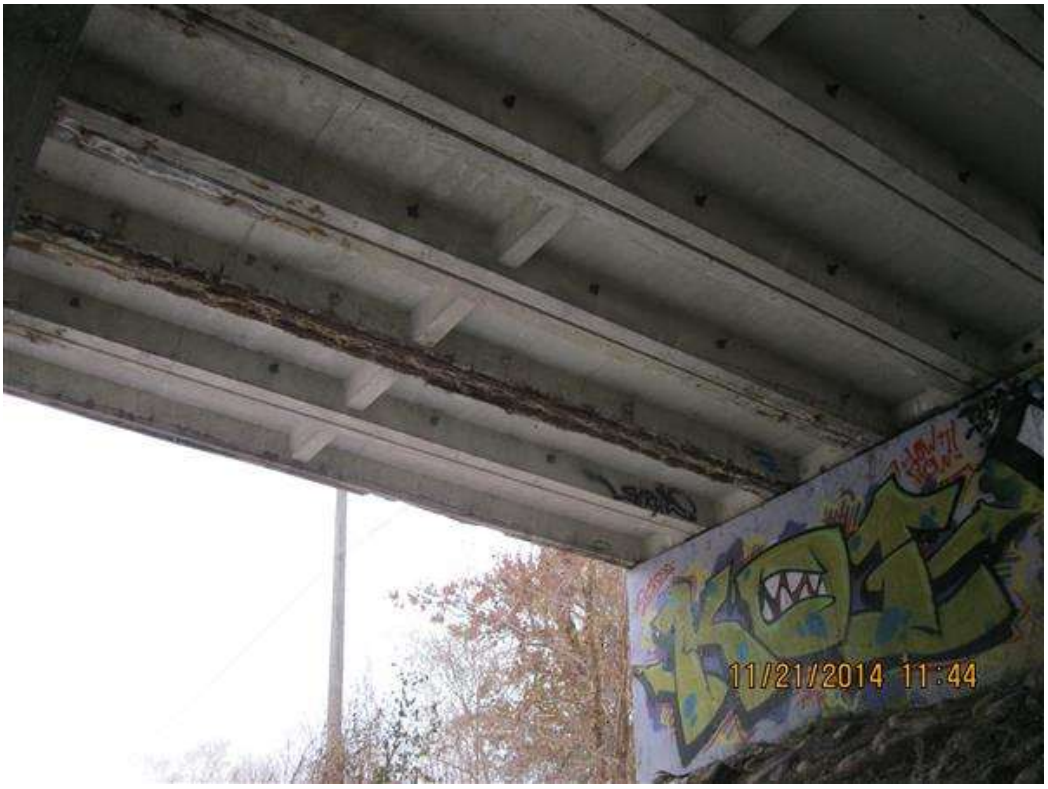
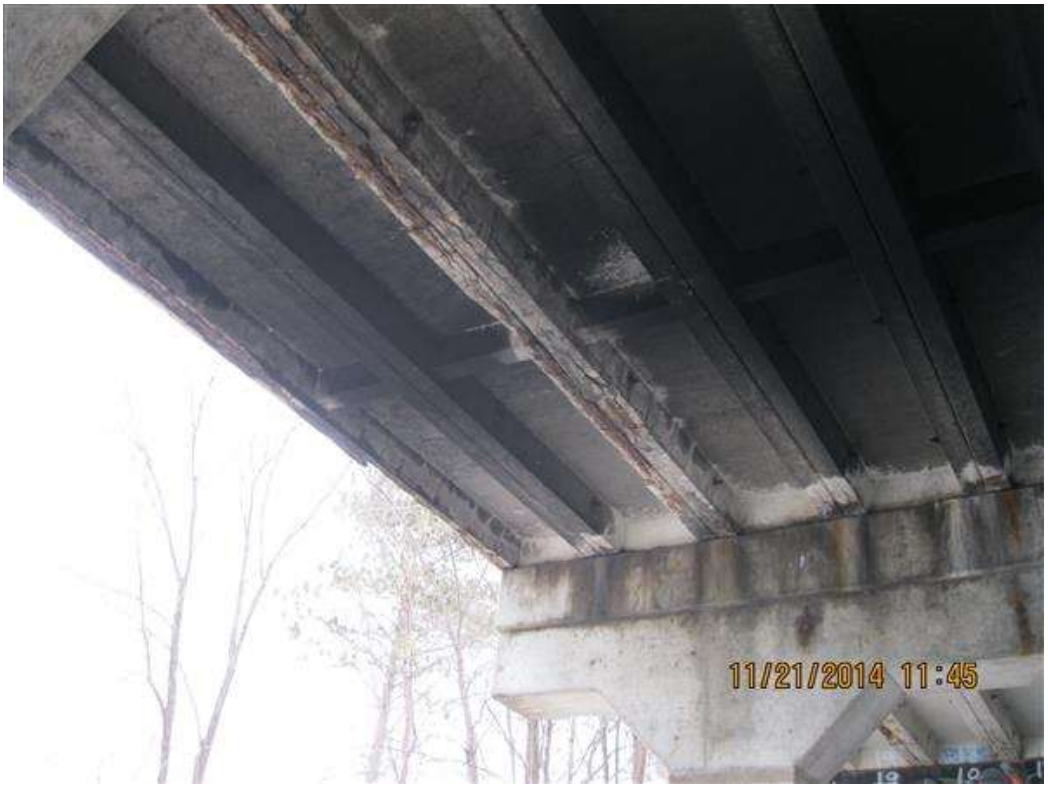


Photo 15 -

Photo 16 -

Pictures



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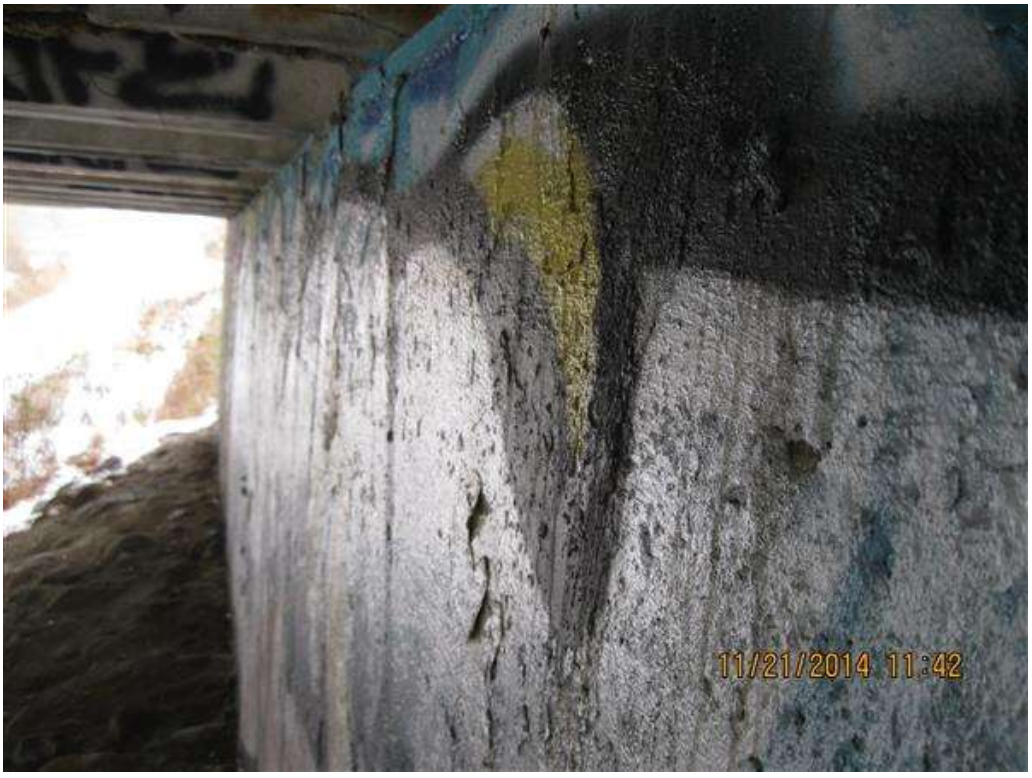


Photo 18 -

Pictures

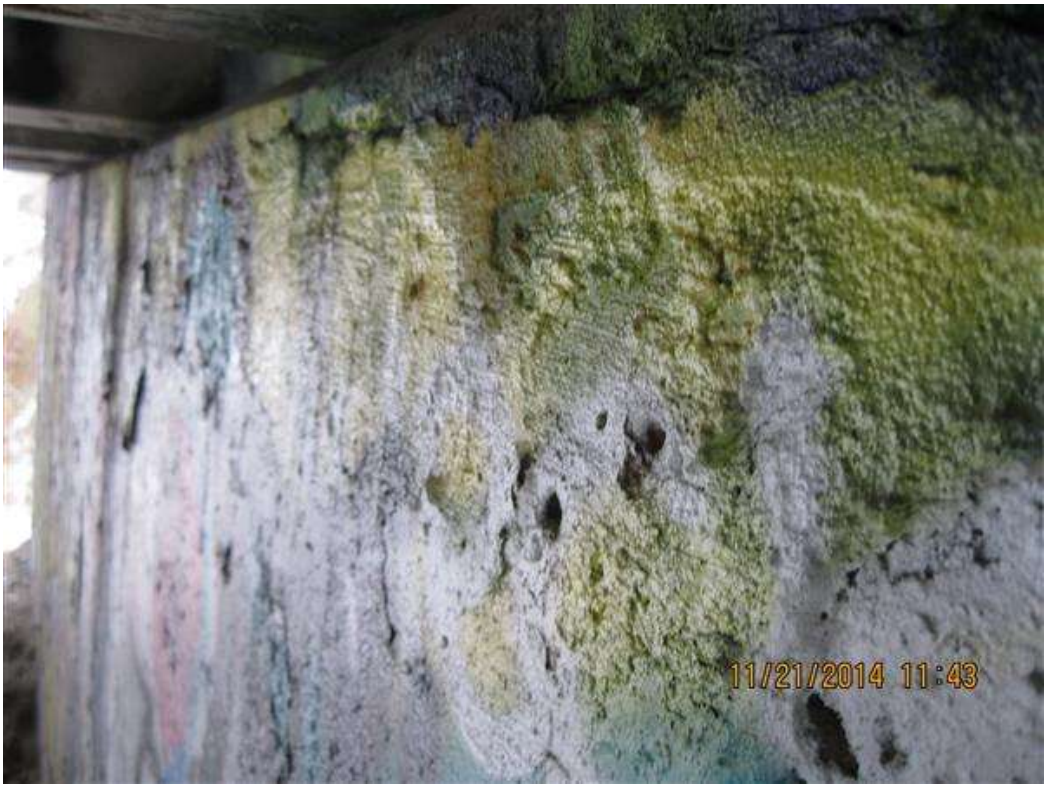
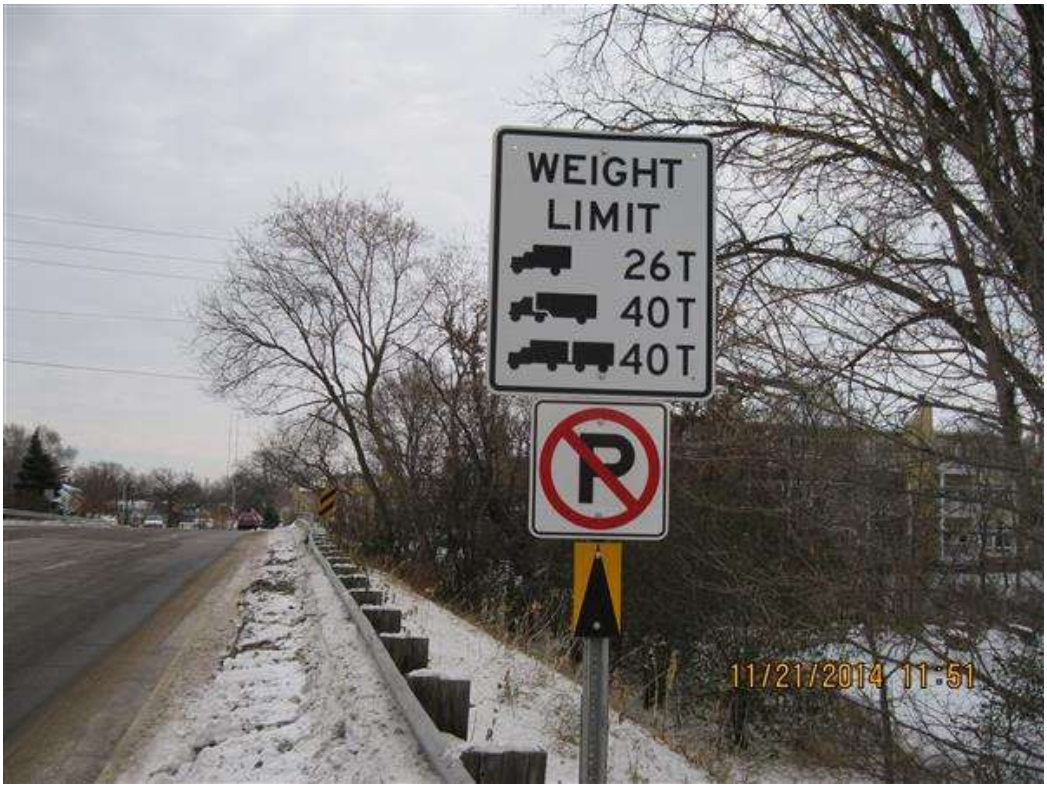


Photo 19 -

Photo 20 -

Pictures



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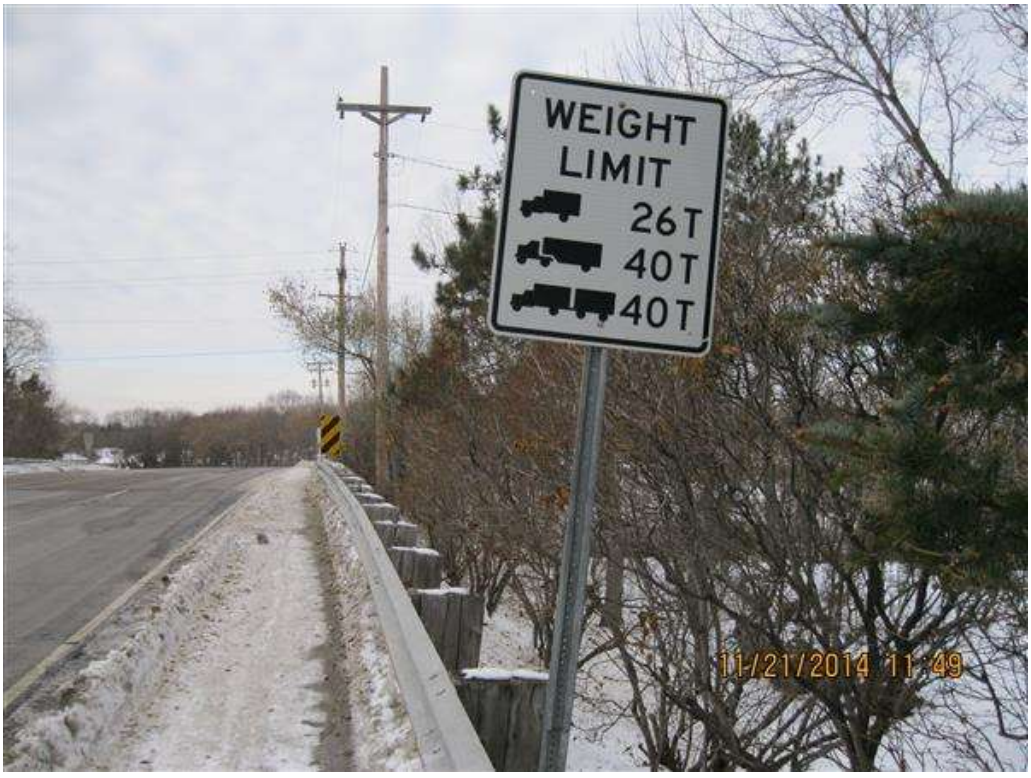

Photo 22 -

Maintenance

Element	Source Code	Work Code	Description	P/R	Priority	Work Order #	Year Due	Last Viewed	Entered	Start Date	Completed

BRIDGE STRUCTURAL ASSESSMENT REPORT

PURPOSE:

This report is a structural assessment of the structure and its ability to carry loads based on conditions identified in the attached bridge inspection report. The assessment is only a cursory review intended to provide guidance as to the relative hazards for structural conditions and deficiencies identified. This report is mandatory for all fracture critical bridges and is completed by the Minnesota Bridge Office upon receipt of the 7 Day FC Report; however, it is an OPTIONAL tool for agencies to utilize at their discretion for all other inspection types.

BRIDGE NO.: 4533

BRIDGE OWNER: County Highway Agency

DATE INSPECTED: 11/16/2016

STRUCTURE TYPE: Prestressed Concrete tringer/Multi-beam or Girder

FACILITY CARRIED: CSAH 77

FEATURES INTERSECTED: MC RY

TYPE OF INSPECTION:
- ☑ ROUTINE
- ☐ FRACTURE CRITICAL
- ☐ PINNED ASSEMBLY:
- ☐ SPECIAL:
- ☐ DAMAGE:
- ☐ COMPLEX:

Check all that apply:

Redundancy:
- ☐ Load Path
- ☐ Structural
- ☐ Internal

Connection Type:
- ☐ Riveted
- ☐ Bolted
- ☐ Welded
- ☐ Other:

1. Was a critical finding identified during this inspection or upon structural review? ☐ Yes ☐ No

   a) If selected "**Yes**" above, state briefly the finding(s):

2. If a critical finding was identified, what is the current status?
   - ☐ Pending
   - ☐ Resolved
   - ☐ N/A

   a) Briefly state actions taken:

3. Does the condition of any bridge component indicate impaired function? Examples of bridge components with impaired function include elements that are: frozen or immoveable, out-of-plumb or misaligned, distorted or structurally deformed, excessively deteriorated, cracked, broken, eroded or scoured. ☐ Yes ☐ No

a) If selected "**Yes**" above, state briefly the component(s) and condition(s):

4. Does the overall condition of the bridge, or any of its components mentioned in Question 3, suggest the need for detailed structural analysis and/or a revised load rating? ☐ Yes ☐ No

   a) If selected "**Yes**", state the reason for this recommendation and indicate a proposed timeframe in accordance with State of Minnesota Rule 8810.9500 (Subpart 2):

5. Based on the structural assessment of these findings, recommendations include:

   ☐ Repair/Maintenance ☐ Monitoring Plan
   ☐ Complex ☐ Increased Inspection Frequency

   Explain recommended actions:

6. Other comments:

Bridge Office Reviewer