

**AGENDA FOR THE COUNCIL MEETING OF
THE CORPORATION OF THE TOWNSHIP OF RED ROCK
FOR THE 987th REGULAR MEETING ON JULY 17th, 2023 AT 6:30 P.M.**

1. Closed Session (6:30pm)
 - Item 1.1: Resolution to enter Closed Session, as authorized by the Municipal Act, 2001. Such paragraphs as set out in the minutes for the purpose of approval of the Closed Session minutes of the meeting held on June 19, 2023 (Item 1.2); and Paragraph 239(2)(b) (identifiable individual), regarding Item 1.3; and Paragraph 239(2)(c) (proposed or pending acquisition or disposition of land), regarding Item 1.4 RES
 - Item 1.2: Minutes of the Closed Session portion of the regular Council Meeting held June 19, 2023 RES
 - Item 1.3: Report on Personnel Matters
 - Item 1.4: Report on Acquisition/Disposition of Land
 - Item 1.5: Resolution to Rise from Closed Session and Report in Open Session RES

2. Report from Closed Session

3. Preliminary Matters:
 - Item 3.1: Call to Order (7:00pm)
 - Item 3.2: Traditional Territory Acknowledgement & Moment of Silence
 - Item 3.3: Amendments to/Acceptance of Agenda RES
 - Item 3.4: Request/Receive Disclosures of Interest

4. Presentations or Deputations
 - Item 4.1: JML Engineering – Bi-Annual Inspection RES
 - Item 4.2: BDO – 2022 Audited Financial Statements RES

5. Minutes of Previous Council Meeting(s)
 - Item 5.1: Minutes of the June 19, 2023 Council Meeting RES

6. Correspondence
 - Item 6.1: Resolutions from other Municipalities RES
 - Item 6.2: Red Rock Fish & Game Club – Thank You Letter
 - Item 6.3: TBDHU – May 17, 2023 Board Meeting Minutes
 - Item 6.4: Red Rock Committee of Adjustment Notice
 - Item 6.5: NOMA – June 20, 2023 Board Meeting Summary
 - Item 6.6: TBDSSAB – Update from the Board
 - Item 6.7: Government of Canada – Boreal Caribou Conservation Timeline
 - Item 6.8: TBDSSAB – May 18, 2023 Open & Closed Session Minutes
 - Item 6.9: SNEMS – Nipigon/Red Rock Consolidation Engagement Meeting

7. Reports from Committees, Boards or Agencies

8. Reports from Administration
 - Item 8.1: Report from Director of Operations RES
 - Item 8.2: Report from Community Development Office RES (2)
 - Item 8.3: Report on Administrative Activity RES

9. By-laws

10. New Business

11. Unfinished Business

12. Closed Session (if required)

13. Report from Closed Session

14. Confirming By-law (#2023-1331)

RES

15. Adjournment



Bi-annual Inspection Four Bridges One Culvert

**FOR THE
TOWNSHIP OF RED ROCK**



Ref. No. JML2023013

May 2023



105 Villa Street, 2nd Floor
Thunder Bay, ON P7A7W5
Phone: 807.345.1131
Fax: 807.345.1229
Email: info@jmleng.com

June 2, 2023
Ref. No. JML2023013

The Corporation of the Township of Red Rock
Box 447, 42 Salls Street
Red Rock, ON P0T 2P0

Attention: Blair Westerman
Public Works Superintendent

Reference: **Bi-Annual Inspection Four Bridges One Culvert**

Dear Blair:

JML Engineering has been retained by the Township of Red Rock to conduct the bi-annual structural inspection of four bridges and one culvert located in Red Rock.

The purpose of this exercise was to assess the physical and functional characteristics of the various bridge elements, and to provide recommendations for remedial repair, where required, at each of the five structures.

Bi-annual inspections are required to be done by municipal bridge owners in accordance with the Public Transportation and Highway Improvement Act (Ontario Regulation 104/97).

The five structures considered in this exercise are as follows:

1. Red Rock Bridge No. 1 – Highway No. 628 over Trout Creek
2. Red Rock Bridge No. 2 – Red Rock Road No. 1 over Trout Creek
3. Red Rock Bridge No. 3 – Buchanan Road over Trout Creek
4. Red Rock Bridge No. 4 – Red Rock Road No. 4 over Trout Creek
5. Red Rock Bridge No. 5 – Red Rock Road No. 5 over Trout Creek

On May 24, 2023 Michael Edmonds, P.Eng., and Mathew Currie, P.Eng., from JML Engineering completed a site inspection of the existing structures. The inspection was performed and the data was recorded as per the requirements of the Ministry of Transportation's 'Ontario Structural Inspection Manual' (OSIM). The physical and functional condition of all bridge elements were assessed and recorded. Photographs were taken of all significant findings.

This report is divided into five sections; one for each structure. A brief description of each structure is provided. The significant findings observed during the field investigation are identified. Recommendations for remedial repairs are made, complete with estimated

construction costs. The Bridge Condition Index is also identified. OSIM data sheets and photographs complete the balance of each bridge report.

At Red Rock Bridge No. 1, Bent #12 has rotated toward the watercourse, resulting in a significant lean at the columns and piles. Bent #12 also contains numerous very severely rotten and split piles, and the pile cap does not bear adequately upon the piles. Elsewhere, severely rotten pile caps and piles were observed. These deficiencies are detrimental to the load carrying capacity of the structure, and require rehabilitation to be completed in the next 3-4 months. The estimated construction cost for this work, including engineering and contingency, is approximately \$ 260,000.00 + HST.

Red Rock Bridge No. 1 continues to deteriorate over successive inspections. The movements at the bents, rotten load carrying elements, rotten deck, and continual maintenance costs at this structure indicate that it is reaching the end of its useful life. Replacement of the structure should be considered within the next 5-10 years.

At Red Rock Bridge No. 3, several cotter pins which prevent the truss panel connection pins from loosening and falling out are missing. One panel pin has shifted 75 mm. We recommend new cotter pins be provided and the shifted panel pin be driven back into position. This work is urgent and should be completed in the next 1-3 months.

Significant corrosion resulting in several holes and thinning of the steel was observed at the invert of the barrel at Red Rock Bridge No. 5. This deficiency affects the load carrying capacity of the culvert, and makes it more prone to washout and/or sudden collapse. Replacement of the culvert should be considered, with an approximate replacement construction cost of \$ 378,000.00 + HST, including engineering and contingency.

A summary of the estimated construction costs to implement all recommended remedial repairs for each structure is as follows:

<u>Structure Name</u>	<u>Repair Timing</u>	<u>Estimated Remedial Repair Cost</u>
Red Rock Bridge No. 1	3-4 Months	\$ 260,000.00
	1-2 Years	\$ 138,000.00
Red Rock Bridge No. 2	1-2 Years	\$ 76,600.00
Red Rock Bridge No. 3	1-2 Years	\$ 41,200.00
Red Rock Bridge No. 4	1-2 Years	\$ 32,700.00
	5 Years	\$ 90,000.00
Red Rock Bridge No. 5	5 Years	\$ 378,000.00
Total Construction Cost Estimate		<u>\$ 1,016,500.00 + HST</u>

The estimated remaining service lives of Red Rock Bridge No. 2, No. 3, and No. 4 are 20 years, 10 years, and 25+ years, respectively.

Closing

We recommend that the next inspection of all five structures be done in 2025.

Even though the structural inspection was carefully done, we do not claim that the observations made represent all of the faults or imperfections which may exist.

We trust this report is satisfactory. Please contact the undersigned if you require any additional information or clarification.

Best regards,

JML Engineering Ltd.

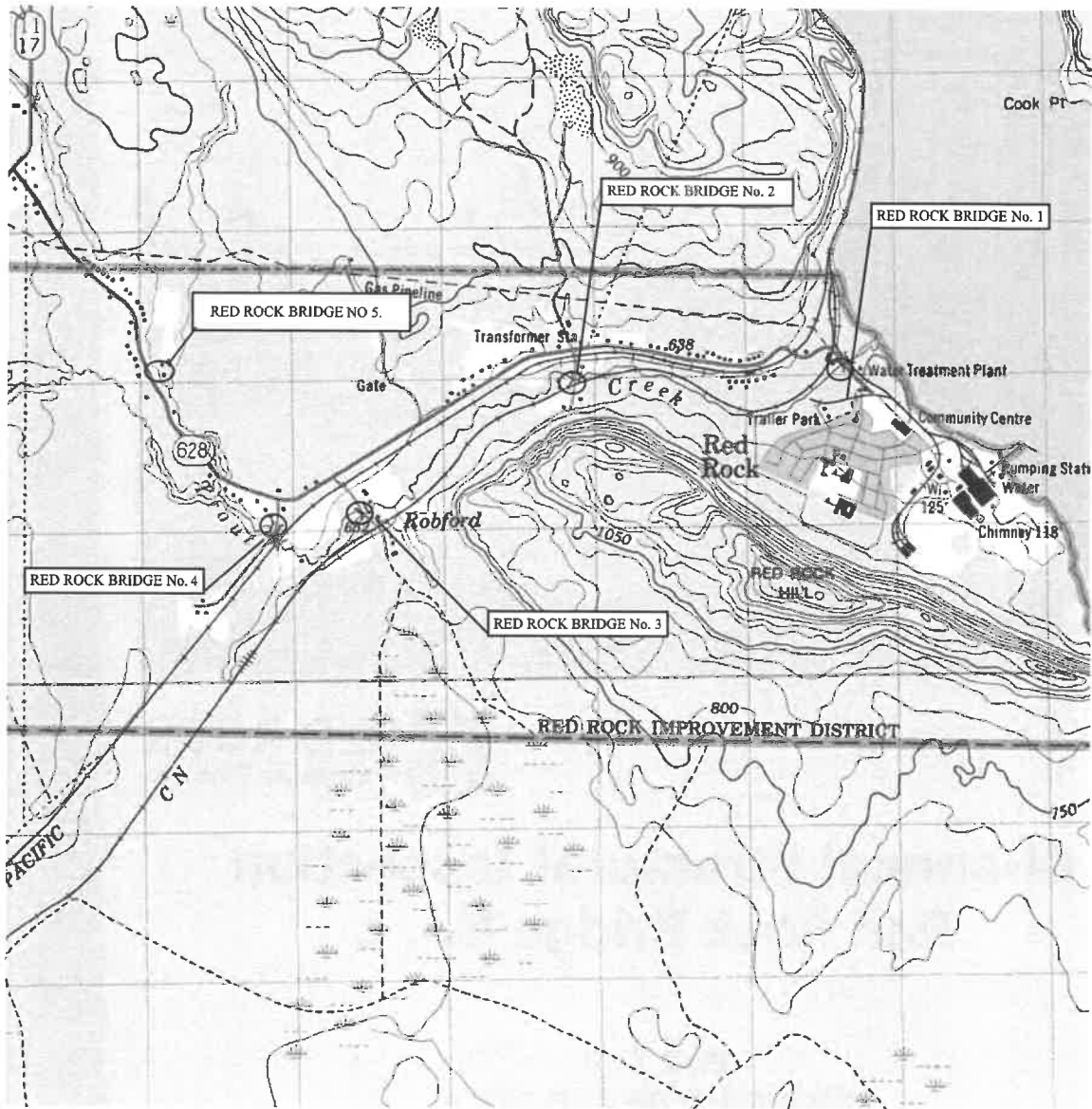


Michael Edmonds, P.Eng.
Project Engineer



John M. Lorenowich, P. Eng.
President

:me
Encl.



Location Map: Red Rock Bridges

Red Rock Bridge No. 1, Red Rock Bridge No. 2, Red Rock Bridge No. 3,
Red Rock Bridge No. 4, and Red Rock Bridge No. 5



Bi-annual Structural Inspection Red Rock Bridge No. 1

**FOR THE
TOWNSHIP OF RED ROCK**



Ref. No. JML2023013

May 2023

BRIDGE NO. 1 - HIGHWAY NO. 628 OVER TROUT CREEK

1.0 Description

Red Rock Bridge No. 1 is located on Highway No. 628 over Trout Creek at the entrance into the town of Red Rock. The structure is currently load posted at 25/40/55 tonnes.

The structure is a two lane, multi-span bridge with an overall length of approximately 59 meters. There are 14 spans which range between 2.43 and 5.25 metres. The overall width of the structure is approximately 12.65 metres. The deck consists of longitudinal nail laminated treated timbers which have been transversely post-tensioned by steel bars (installed in 1986). The wear surface consists of hot mix asphalt. The asphalt wear surface is approximately 200 mm – 225 mm thick. The deck is supported by timber pile and lagging abutments and 13 intermediate timber bents numbered from the south end to the north end. A timber pedestrian walkway is located along the west side of the structure. See attached existing bridge drawing for reference.

Substantial reconstruction of this bridge was performed in 1986 with several remedial repairs performed in 1992, 2002, 2009, 2011, 2016 and 2020.

2.0 Significant Findings

Fill loss was observed at the west side behind the south abutment wall.

Separation of timber lagging with loss of fill was observed at the south abutment.

U-shaped CSP culverts that were installed to reduce erosion at the embankments have severely corroded. Severe erosion was observed at the south embankment beneath the bridge and at the northwest embankment.

Debris has accumulated in the stream at the upstream side of the bridge.

Approximately 25 linear meters of severe longitudinal and transverse cracks were observed at the asphalt approaches. Moderate erosion was observed at the northwest corner. Gravel has accumulated throughout the approaches.

Alligator cracking was observed at the asphalt walkway approach at the south end. Impact damage was observed at the north end.

One offset timber at the west side of the bridge guiderail has severe rot. Six offset timbers at the guiderail are loose/rotated.

Seven loose guide rail splice bolts and one missing bolt was observed.

One broken clamp was observed at the guide rail outrigger at Bent #2.

Three sidewalk planks at the south end are loose or missing. Four planks are deteriorated at the

north end. Medium splits were observed throughout most planks. Medium to severe rot was observed at a few planks.

Impact damage was observed at a section of curb near the north end. Medium abrasion was observed throughout the curb.

Approximately 280 linear meters of severe longitudinal and transverse cracks were observed at the asphalt wearing surface. Several potholes were also observed.

Severe rot and failed laminations was observed at the deck soffit between Bent 4 and Bent 6.

Broken timber braces were observed at Bent #5 and severe rot was observed at a brace at Bent #4.

The piles along the north embankment, specifically Bents #10 thru #13 appear to be slowly sliding in a southerly direction towards the stream. Bent #4 and Bent #5 appear to be slowly sliding in a northerly direction towards the stream.

The columns and piles at Bent #12 are significantly out of plumb. All of the tops of the piles are severely rotten and very severely split. The bearing timber does not bear adequately upon the piles.

The second pile from the east end of Bent # 11 is out of plumb.

Very severe rot was observed at the top of one pile at both Bent #11 and Bent #13.

Very severe rot was observed at the east end of the pile caps at Bent #5 and Bent #6.

The top of piles and pile caps at Bents #4, #5, and #13 have been buried for over a decade and have not been inspected.

The structure is currently load posted at 25/40/55 tonnes. The load posting sign recommended in the JML Engineering 2009 structural evaluation was 23/40/56. However, we feel the current posting is adequate and can remain.

3.0 Monitoring

A monitoring system was established at Bent #12 in 2021. The readings taken to date are summarized on the attached sketch. The results of the monitoring are inconclusive if rotation is progressing.

4.0 Conclusions and Recommendations

The significant deficiencies observed at Bent #12, the severely rotten sections of the pile caps at Bent #5 and Bent #6, and the severely rotten tops of timber piles affect the load carrying capacity of the structure. A reduced load posting at this crossing will likely be required, based upon these

deficiencies. If rehabilitation does not proceed in the near term, a structural evaluation should be done to determine the required, reduced load posting.

The ongoing movements at the bents at the north and south embankments is likely due to subsurface slippage of the embankments.

We recommend the following remedial repairs be done **within the next 3-4 months**:

- Excavate the north and south embankments to remove excess soil. Reshape the embankments to flatten the slopes. This should reduce subsurface slippage at the embankments, and reduce movements at the bents. The U-shaped culverts will be removed and replaced in kind or with asphalt swales to facilitate this work.
- While excavating at the embankments, expose the pile caps and top of piles at Bents #4, #5, and #13 for inspection by an Engineer.
- Rehabilitate Bent #12 by cutting and splicing all piles below grade and resetting the bent plumb. Temporary closure and temporary shoring of the bridge will be required to perform this work.
- Reset the column at Bent #11 plumb.
- Replace the two rotten sections of pile caps at Bent #5 and Bent #6. This will also require temporary closure and temporary shoring of the bridge.
- Cut and splice the top of the rotten piles at Bents #11 and #13.
- Replace broken timber braces at Bent #5.

We recommend the remaining remedial repairs be done in 1-2 years:

- Provide fill behind the west side of the south abutment wall.
- Install timber lagging where lagging has separated at the south abutment.
- Remove debris upstream of bridge.
- Repair and rout and seal cracks at asphalt approaches. Remove gravel.
- Repair asphalt at walkway approach.
- Replace rotten offset timber and shim/plumb offset timbers at guide rail.
- Tighten guide rail bolts at seven locations and install one bolt.

- Replace guide rail outrigger clamp at Bent #2.
- Replace deteriorated sidewalk planks at sidewalk.
- Replace one section of curb at the north end.
- The excessive thickness of asphalt on the deck contributes significant dead load to the structure. The asphalt should be milled and repaved, maintaining 80-150 mm overall thickness. The cracks and potholes in the asphalt should be sealed.

We recommend the following additional studies be done in the next 1-2 years:

- An Enhanced OSIM inspection or Detailed Timber Investigation should be done due to the deteriorated deck laminations observed at the soffit. The entire soffit of the deck should be inspected within arm's reach based upon the observed deficiencies.
- Continue to monitor the rotation at Bent #12 monthly as per the table established within this report until the short-term repairs are done.
- Monitor the rotation of Bent #4 and Bent #5.
- Resurrect the soil monitoring system that was last done by JML Engineering in November 2009 to identify sub-surface soil movements at the two embankments.
- An underwater investigation should be done to assess the condition of the piles below the waterline.

5.0 Estimated Construction Costs

The estimated construction costs for the remedial repairs recommended within the next 3-4 months are as follows:

Excavate and reshape embankments, drainage improvements	\$ 40,000.00
Reconstruct Bent #12	\$ 90,000.00
Replace rotten section of pile caps at Bent #5 and Bent #6	\$ 40,000.00
Replumb column at Bent #11, replace broken/rotten bracing	\$ 10,000.00
Subtotal	\$ 180,000.00
Mob/Demob (15%)	\$ 20,000.00
Engineering/Contingency (35%)	\$ 60,000.00
Total Estimated Construction Cost	<u>\$ 260,000.00 + HST</u>

The following are the estimated construction costs for the remaining recommended remedial repairs to be done in 1-2 years:

Provide fill behind the north abutment wall	\$ 2,000.00
Install timber lagging at the south abutment	\$ 2,000.00
Remove debris from stream	\$ 1,000.00
Remove gravel from deck	\$ 1,000.00
Rout and seal asphalt cracks, fill potholes	\$ 30,000.00
Repair asphalt at walkway approaches	\$ 2,000.00
Guide rail repairs and maintenance	\$ 2,500.00
Replace deteriorated sidewalk planks	\$ 1,000.00
Replace one section of curb	\$ 500.00
Mill and repave asphalt	<u>\$ 50,000.00</u>
Subtotal	\$ 92,000.00
Mob/Demob (15%)	\$ 13,800.00
Engineering and Contingency (35%)	<u>\$ 32,200.00</u>
Total Construction Cost Estimate	<u>\$ 138,000.00 + HST</u>

The BCI is the ratio of the value of each bridge element in its current state to the total replacement value of the bridge. The overall Bridge Condition Index (BCI) of Red Rock Bridge No. 1 is 70. The BCI value of the bridge indicates the bridge is in fair condition. However, the BCI does not take into account the rotation of Bent #12, nor the reduced contact area at the top the piles throughout.

Inventory Data:			
Structure Name	Red Rock Bridge No. 1		
Main Hwy/Road #	Hwy 628	On <input checked="" type="checkbox"/> Under <input type="checkbox"/>	Crossing Type: <input type="checkbox"/> Navig. Water <input checked="" type="checkbox"/> Non-Navig. Water <input type="checkbox"/> Rail <input type="checkbox"/> Road <input type="checkbox"/> Ped. <input type="checkbox"/> Other
Hwy/Road Name	HWY 628		
Structure Location	2 km E along Hwy 628 from intersection with Red Rock Road No. 1		
Latitude	48° 56' 46" N	Longitude	88° 15' 40" W
Owner(s)	Township of Red Rock	Heritage Designation:	<input type="checkbox"/> Not Cons. <input type="checkbox"/> Cons./not App. <input type="checkbox"/> List/not Desig. <input type="checkbox"/> Desig./not List <input type="checkbox"/> Desig. & List
MTO Region	Northwestern	Road Class:	Freeway <input type="checkbox"/> Arterial <input type="checkbox"/> Collector <input checked="" type="checkbox"/> Local <input type="checkbox"/>
MTO District	Thunder Bay	Posted Speed	50 km/hr
Old County	Thunder Bay	No. of Lanes	Two
Geographic Twp.		AADT	
Structure Type	Longitudinal Post-Tensioned Timber Deck with Timber Substructure	% Trucks	
Total Deck Length	59.03 (m)	Inspection Route Sequence	
Overall Str. Width	12.65 (m)	Interchange Number	
Total Deck Area	501.75 (sq.m)	Interchange Structure Number	
Roadway Width	8.50 (m)	Min. Vertical Clearance	(m)
Skew Angle	0 (Degrees)	Special Routes:	<input type="checkbox"/> Transit <input type="checkbox"/> Truck <input type="checkbox"/> School <input type="checkbox"/> Bicycle
No. of Spans	14	Detour Length Around Bridge	5 (km)
Span Lengths	3.50, 2.43, 2.53, 4.50, 4.30, 4.67, 4.50, 4.45, 4.41, 4.59, 4.38, 4.42, 5.08, 5.25, 4.40, 0.85 (m)		
		Direction of Structure	North/South
		Fill on Structure	- (m)

Historical Data:			
Year Built		Year of Last Major Rehab.	2020
Last OSIM Inspection	2021	Last Evaluation	2009
Last Enhanced OSIM Inspection		Current Load Limit	25/40/55 (tonnes)
Enhanced Access Equipment (ladder, boat, lift, etc.)		Load Limit By-Law #	
Last Underwater Inspection		By-Law Expiry Date	
Last Condition Survey			
Rehab History:			
1991 – Additional horizontal timbers added to Bent #11 at pile caps to obtain full contact on posts. Granular material removed from behind Bent #11 to relieve earth pressure on piles.			
2003 – New timber handrails, new pile splices/clamps/shims, new timber bracing, new timber guiderail posts.			
2008 – Various timber pile repairs.			
2011 – Various remedial repairs to correct deficiencies outlined in 2011 report.			
2016 – Various remedial repairs to correct deficiencies outlined in 2015 report. Load posted at 23/40/56 based upon 2009 evaluation. 25/40/55 load posting currently at both approaches.			
2020 – Post tensioning rods were re-tensioned.			

Field Inspection Information:			
Date of Inspection:	May 24, 2023	Type of Inspection:	<input checked="" type="checkbox"/> OSIM <input type="checkbox"/> Enhanced OSIM
Inspector:	Michael Edmonds, P.Eng., JML Engineering		
Others in Party:	Mathew Currie, P.Eng., JML Engineering		
Access Equipment Used:			
Weather:	Clear		
Temperature:	2° Celsius		

Additional Investigations Required:	Priority		
	None	Normal	Urgent
Material Condition Survey			
Detailed Deck Condition Survey:	✓		
Non-destructive Delamination Survey of Asphalt-Covered Deck:	✓		
Concrete Substructure Condition Survey:	✓		
Detailed Coating Condition Survey:	✓		
Detailed Timber Investigation		✓	
Post-Tensioned Strand Investigation	✓		
Underwater Investigation:		✓	
Fatigue Investigation:	✓		
Seismic Investigation:	✓		
Structure Evaluation:	✓		
Monitoring			
Monitoring of Deformations, Settlements and Movements:		✓	
Monitoring Crack Widths:	✓		
Investigation Notes: Enhanced OSIM and Detailed Timber Investigation. An underwater investigation should be done to assess the condition of the piles below the waterline. Monitor rotation at Bent #12.			

Overall Structure Notes:	
Recommended Work on Structure:	<input type="checkbox"/> None <input type="checkbox"/> Minor Rehab. <input checked="" type="checkbox"/> Major Rehab. <input type="checkbox"/> Replace
Timing of Recommended Work:	<input checked="" type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years
Overall Comments:	Remove fill from embankments, rehabilitate Bent #12, and replace rotten elements this year. Replacement within 10 years.
Date of Next Inspection:	2025

Suspected Performance Deficiencies

- | | | |
|---|--|------------------------------|
| 01 Load carrying capacity | 06 Bearing not uniformly loaded/unstable | 12 Slippery surfaces |
| 02 Excessive deformations (deflections & rotations) | 07 Jammed expansion joint | 13 Flooding/channel blockage |
| 03 Continuing settlement | 08 Pedestrian/vehicular hazard | 14 Undermining of foundation |
| 04 Continuing movements | 09 Rough riding surface | 15 Unstable embankments |
| 05 Seized bearings | 10 Surface ponding | 16 Other |
| | 11 Deck drainage | |

Maintenance Needs

- | | | |
|--------------------------------------|---------------------------------|--|
| 01 Lift and Swing Bridge Maintenance | 07 Repair to Structural Steel | 13 Erosion Control at Bridges |
| 02 Bridge Cleaning | 08 Repair of Bridge Concrete | 14 Concrete Sealing |
| 03 Bridge Handrail Maintenance | 09 Repair of Bridge Timber | 15 Rout and Seal |
| 04 Painting Steel Bridge Structures | 10 Bailey Bridges - Maintenance | 16 Bridge Deck Drainage |
| 05 Bridge Deck Joint Repair | 11 Animal/Pest Control | 17 Scaling (Loose Concrete or ACR Steel) |
| 06 Bridge Bearing Maintenance | 12 Bridge Surface Repair | 18 Other |

Element Data

Element Group:	Abutment		Length:			
Element Name:	Abutment Wall		Width:	9.30 m		
Location:	North/South		Height:	1.0 m		
Material:	Timber		Count:	2		
Element Type:			Total Quantity:	19 sq. m.		
Environment:	<u>Benign</u> / Moderate / Severe		Limited Inspection	<input type="checkbox"/>		
Protection System:	Creosote					Performance Deficiencies
Condition	Units	Exc.	Good	Fair	Poor	
Data:	<u>m²</u> / m / each / % / all		19			16
Comments: Some fill loss southwest corner. Geotextile ripped at north abutment wall. South – space between lagging, between 6 th and 8 th pile.						
Recommended Work:			Rehab <input type="checkbox"/> Replace	Maintenance Needs:		13
			<input checked="" type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years	<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input checked="" type="checkbox"/> 2 year		
Install timber planks over separated lagging at south abutment.			Monitor fill loss.			

Element Group:	Abutments		Length:	0.305 m		
Element Name:	Pile Caps		Width:	9.3 m		
Location:	North/South		Height:	0.305 m		
Material:	Timber		Count:			
Element Type:			Total Quantity:	23 sq. m.		
Environment:	<u>Benign</u> / Moderate / Severe		Limited Inspection	<input type="checkbox"/>		
Protection System:	Creosote					Performance Deficiencies
Condition	Units	Exc.	Good	Fair	Poor	
Data:	<u>m²</u> / m / each / % / all		23			
Comments:						
Recommended Work:			<input type="checkbox"/> Rehab <input type="checkbox"/> Replace	Maintenance Needs:		
			<input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years	<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year		

Element Group:	Abutments		Length:	0.3 m		
Element Name:	Piles		Width:	0.300 m		
Location:	North/South		Height:	0.6 m		
Material:	Timber		Count:	23		
Element Type:	Penta		Total Quantity:	13 sq. m.		
Environment:	<u>Benign</u> / Moderate / Severe		Limited Inspection	<input type="checkbox"/>		
Protection System:						Performance Deficiencies
Condition	Units	Exc.	Good	Fair	Poor	
Data:	<u>m²</u> / m / each / % / all		13			
Comments: North – 7 th from east: 70% contact. 2,3,7,8,9,10,11 shimmed South - 4 th from east: 80% contact - 9 th from east: 60% contact - 10 th form east: 50% contact - 11 th form east: 70% contact - 12 th from east: 60% contact 10 th pile from east has been shimmed.						
Recommended Work:			<input type="checkbox"/> Rehab <input type="checkbox"/> Replace	Maintenance Needs:		
			<input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years	<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year		

Element Data

Element Group:	Bracing		Length:	Varies		
Element Name:	Cross Bracing		Width:	0.045 m		
Location:	Longitudinal and Transverse		Height:	0.150 m		
Material:	Timber		Count:	44 transverse and 24 longitudinal		
Element Type:			Total Quantity:	68		
Environment:	Benign / Moderate / Severe		Limited Inspection	<input type="checkbox"/>		
Protection System:	Creosote					Performance Deficiencies
Condition Data:	Units m ² / m (each) % / all	Exc.	Good 68	Fair	Poor	Performance Deficiencies 01
Comments: Through bolts severely corroded.						
Recommended Work:			<input type="checkbox"/> Rehab <input type="checkbox"/> Replace <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs: 09	
					<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year	

Element Group:	Bracing		Length:	Varies		
Element Name:	Horizontal		Width:	0.045 m		
Location:	Longitudinal and Transverse		Height:	0.203 m		
Material:	Timber		Count:	22 transverse and 4 longitudinal		
Element Type:			Total Quantity:	30		
Environment:	Benign / Moderate / Severe		Limited Inspection	<input type="checkbox"/>		
Protection System:	Penta					Performance Deficiencies
Condition Data:	Units m ² / m (each) % / all	Exc.	Good 27	Fair	Poor 3	Performance Deficiencies
Comments: Longitudinal bracing is buried between Bent #4 and #5. Two broken braces at Bent #5. One severely rotten brace at Bent "4.						
Recommended Work:			<input type="checkbox"/> Rehab <input checked="" type="checkbox"/> Replace <input checked="" type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs:	
					<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year	
Replace broken and rotten bracing.						

Element Group:	Accessories		Length:			
Element Name:	Signs		Width:			
Location:	Corners of Structure		Height:			
Material:	Steel		Count:			
Element Type:			Total Quantity:	6		
Environment:	Benign / Moderate / Severe		Limited Inspection	<input type="checkbox"/>		
Protection System:	Galvanized/Painted					Performance Deficiencies
Condition Data:	Units m ² / m (each) % / all	Exc.	Good 6	Fair	Poor	Performance Deficiencies
Comments: Four Hazard Marker signs, two load posting signs.						
Recommended Work:			<input type="checkbox"/> Rehab <input type="checkbox"/> Replace <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs:	
					<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year	

Element Data

Element Group:	Embankments and Streams	Length:	
Element Name:	Embankments	Width:	
Location:	North/South	Height:	
Material:	Silty clay with grass/shrubs	Count:	6
Element Type:		Total Quantity:	6
Environment:	Benign / Moderate / Severe	Limited Inspection	<input type="checkbox"/>
Protection System:			Performance Deficiencies
Condition	Units	Exc.	Good
Data:	m ² / m / (each) / % / all		3
			Fair
			3
			Poor
Comments: U-shaped culvert sections were installed in 2011 to reduce erosion of embankments. They have very severe corrosion. Severe erosion at south embankment beneath bridge. Light erosion under bridge at north end. Very severe erosion at northwest embankment.			
Recommended Work:		<input checked="" type="checkbox"/> Rehab <input type="checkbox"/> Replace	Maintenance Needs:
		<input checked="" type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years	<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year
Provide slope protection. Replace culvert sections.		Monitor slope stability.	

Element Group:	Embankments and Streams	Length:	
Element Name:	Streams and Waterways	Width:	
Location:		Height:	
Material:		Count:	
Element Type:		Total Quantity:	All
Environment:	Benign / Moderate / Severe	Limited Inspection	<input type="checkbox"/>
Protection System:			Performance Deficiencies
Condition	Units	Exc.	Good
Data:	m ² / m / each / % / (all)		X
			Fair
			Poor
Comments: Multiple logs and debris at upstream side.			
Recommended Work:		<input type="checkbox"/> Rehab <input type="checkbox"/> Replace	Maintenance Needs:
		<input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years	18
			<input type="checkbox"/> Urgent <input checked="" type="checkbox"/> 1 year <input type="checkbox"/> 2 year
		Remove logs.	

Element Group:	Approaches	Length:	6.0 m
Element Name:	Wear Surface	Width:	8.4 m
Location:	North/South	Height:	
Material:	Asphalt	Count:	2
Element Type:		Total Quantity:	101 sq. m.
Environment:	Benign / Moderate / Severe	Limited Inspection	<input type="checkbox"/>
Protection System:			Performance Deficiencies
Condition	Units	Exc.	Good
Data:	(m ²) / m / each / % / all		91
			Fair
			2
			Poor
			8
Comments: Approximately 25 linear meters of severe longitudinal and transverse cracks. Gravel accumulation. Moderate erosion at northwest corner.			
Recommended Work:		<input checked="" type="checkbox"/> Rehab <input type="checkbox"/> Replace	Maintenance Needs:
		<input checked="" type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years	02
			<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input checked="" type="checkbox"/> 2 year
Fill erosion and pave.		Remove gravel.	

Element Data

Element Group:	Approaches		Length:	5 m		
Element Name:	Sidewalk		Width:	1.2 m		
Location:	North/South		Height:			
Material:	Asphalt		Count:	2		
Element Type:			Total Quantity:	12 sq. m.		
Environment:	Benign / Moderate <u>Severe</u>		Limited Inspection	<input type="checkbox"/>		
Protection System:						Performance Deficiencies
Condition	Units	Exc.	Good	Fair	Poor	
Data:	m ² / m / each / % / all		7	2	3	16
Comments: Impact damage at northwest corner. Medium longitudinal crack at south end. Light alligator cracks at south end.						
Recommended Work:			<input type="checkbox"/> Rehab <input type="checkbox"/> Replace <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs: 18	
					<input type="checkbox"/> Urgent <input checked="" type="checkbox"/> 1 year <input type="checkbox"/> 2 year Repair asphalt at ramp.	

Element Group:	Approaches		Length:	53 m east side, 38 m west side		
Element Name:	Railing System		Width:			
Location:	North Approach		Height:			
Material:	Timber/Steel		Count:			
Element Type:			Total Quantity:	91 m		
Environment:	Benign / <u>Moderate</u> Severe		Limited Inspection	<input type="checkbox"/>		
Protection System:	Galvanizing					Performance Deficiencies
Condition	Units	Exc.	Good	Fair	Poor	
Data:	m ² / m / each / % / all		78		13	
Comments: One severely rotten offset west side. Two offsets rotated west side, one offset rotated east side. Weathering and a few corroded fasteners. Loose splice bolts at west side.						
Recommended Work:			<input checked="" type="checkbox"/> Rehab <input type="checkbox"/> Replace <input checked="" type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs:	
					<input type="checkbox"/> Urgent <input checked="" type="checkbox"/> 1 year <input type="checkbox"/> 2 year Replace one rotten offset – west side. Replumb rotated offsets. Tighten loose bolts.	

Element Group:	Approaches		Length:	56 m east side, 35 m west side		
Element Name:	Railing System		Width:			
Location:	South Approach		Height:			
Material:	Timber/Steel		Count:			
Element Type:			Total Quantity:	91 m		
Environment:	Benign / <u>Moderate</u> / Severe		Limited Inspection	<input type="checkbox"/>		
Protection System:	Penta/Galvanized					Performance Deficiencies
Condition	Units	Exc.	Good	Fair	Poor	
Data:	m ² / m / each / % / all		87	4		
Comments: Light surface corrosion was observed. Two offsets rotated - east side. One offset rotated – west side. Medium splits at most posts. Two loose splice bolts at east and west sides. One bolt missing at southeast corner.						
Recommended Work:			<input checked="" type="checkbox"/> Rehab <input type="checkbox"/> Replace <input checked="" type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs:	
					<input type="checkbox"/> Urgent <input checked="" type="checkbox"/> 1 year <input type="checkbox"/> 2 year Replumb rotated offsets. Provide bolt at post. Tighten loose bolts.	

Element Data

Element Group:	Sidewalks/Curbs	Length:	59.5 m
Element Name:	Sidewalks	Width:	1.225 m
Location:	West side of structure	Height:	
Material:	Timber	Count:	1
Element Type:		Total Quantity:	73 sq. m
Environment:	Benign / Moderate Severe	Limited Inspection	<input type="checkbox"/>
Protection System:	CCA		
Condition	Units	Exc.	Good
Data:	m ² m / each / % / all		67
			Fair
			3
			Poor
			3
			Performance Deficiencies
			08
Comments: Medium splits throughout most planks. Medium abrasion throughout. Impact damage north end. Three planks missing at south end, medium to severe rot at a few planks.			
Recommended Work:		<input type="checkbox"/> Rehab <input type="checkbox"/> Replace	Maintenance Needs:
		<input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years	<input type="checkbox"/> Urgent <input checked="" type="checkbox"/> 1 year <input type="checkbox"/> 2 year
			12
			Replace 12 planks.

Element Group:	Sidewalks/Curbs	Length:	59.03 m
Element Name:	Curb	Width:	0.34 m
Location:	East Side of Structure	Height:	0.34 m
Material:	Timber	Count:	80 sq. m.
Element Type:		Total Quantity:	2
Environment:	Benign / Moderate Severe	Limited Inspection	<input type="checkbox"/>
Protection System:	CCA		
Condition	Units	Exc.	Good
Data:	m ² m / each / % / all		72
			Fair
			Poor
			8
			Performance Deficiencies
			08
Comments: Medium abrasion observed throughout. Impact damage at northwest corner.			
Recommended Work:		<input checked="" type="checkbox"/> Rehab <input type="checkbox"/> Replace	Maintenance Needs:
		<input checked="" type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years	<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year
			12
			Replace northwest section of curb.

Element Group:	Decks	Length:	59.03 m
Element Name:	Wearing Surface	Width:	8.50 m
Location:		Height:	0.10 m
Material:	Asphalt	Count:	
Element Type:		Total Quantity:	502 sq. m
Environment:	Benign / Moderate Severe	Limited Inspection	<input type="checkbox"/>
Protection System:			
Condition	Units	Exc.	Good
Data:	m ² m each / % / all		412
			Fair
			Poor
			90
			Performance Deficiencies
			09
Comments: Approximately 280 linear meters of severe transverse and longitudinal cracks. Two potholes. Poorly patched potholes at west side. Gravel accumulation along curbs. Approximately 200 mm – 225 mm thick asphalt.			
Recommended Work:		<input checked="" type="checkbox"/> Rehab <input type="checkbox"/> Replace	Maintenance Needs:
		<input checked="" type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years	<input type="checkbox"/> Urgent <input checked="" type="checkbox"/> 1 year <input type="checkbox"/> 2 year
			02
			Remove gravel.
			Shave asphalt leaving 80 mm – 150 mm. Patch potholes. Potholes indicate distress in deck top. Rout and seal cracks.

Element Data

Element Group:	Deck		Length:	59.0 m		
Element Name:	Deck Top		Width:	9.3 m		
Location:			Height:	0.250 m		
Material:	Timber		Count:			
Element Type:			Total Quantity:	546 sq. m		
Environment:	Benign / Moderate / Severe		Limited Inspection	<input checked="" type="checkbox"/>		
Protection System:						
Condition	Units	Exc.	Good	Fair	Poor	Performance Deficiencies
Data:	m ² m / each / % / all		369	90	90	
Comments: Unable to inspect majority of deck top due to wearing surface.						
Recommended Work:			<input type="checkbox"/> Rehab <input type="checkbox"/> Replace <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs:	
					<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year	

Element Group:	Deck		Length:	59.03 m		
Element Name:	Soffit		Width:	9.3 m		
Location:			Height:	0.250 m		
Material:	Timber		Count:			
Element Type:			Total Quantity:	549 sq. m.		
Environment:	Benign / Moderate / Severe		Limited Inspection	<input checked="" type="checkbox"/>		
Protection System:						
Condition	Units	Exc.	Good	Fair	Poor	Performance Deficiencies
Data:	m ² m / each / % / all		497	26	26	
Comments: Soffit appears wet at each side. Post-tensioned rods are lightly corroded. Severe rot and failed laminations at Bent 4. Medium rot and delamination (moisture) between Bent #5-#6. Delaminations between Bents #7-#8 and #8-#9 above 6 th column from east. Post tensioning channel and plates medium corrosion through out.						
Recommended Work:			<input type="checkbox"/> Rehab <input type="checkbox"/> Replace <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs:	
					<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year	

Element Group:	Decks		Length:			
Element Name:	Drainage System		Width:			
Location:	West side		Height:			
Material:	Steel		Count:	25		
Element Type:			Total Quantity:	25		
Environment:	Benign / Moderate / Severe		Limited Inspection	<input type="checkbox"/>		
Protection System:						
Condition	Units	Exc.	Good	Fair	Poor	Performance Deficiencies
Data:	m ² (each) % / all		25			
Comments: Drainage tubes below sidewalk. Gravel accumulation.						
Recommended Work:			<input type="checkbox"/> Rehab <input type="checkbox"/> Replace <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs:	
					<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year	

Element Data

Element Group:	Piers	Length:	12.6 m
Element Name:	Caps	Width:	0.305 m
Location:		Height:	0.305 m
Material:	Timber	Count:	14
Element Type:		Total Quantity:	218 sq. m.
Environment:	Benign / Moderate / Severe	Limited Inspection	<input type="checkbox"/>
Protection System:			
Condition	Units	Exc.	Good
Data:	m / m / each / % / all		218
Comments: Light checking throughout.			
Recommended Work:	<input type="checkbox"/> Rehab	<input type="checkbox"/> Replace	Maintenance Needs:
	<input type="checkbox"/> 1-5 years	<input type="checkbox"/> 6-10 years	<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year

Element Data

Element Group:	Piers	Length:	0.310			
Element Name:	Piles	Width:	0.300 m			
Location:		Height:	1.2 m			
Material:	Timber	Count:	110			
Element Type:		Total Quantity:	129 sq. m.			
Environment:	Benign / Moderate / Severe	Limited Inspection	<input type="checkbox"/>			
Protection System:	Creosote					Performance Deficiencies
Condition	Units	Exc.	Good	Fair	Poor	
Data:	m / each / % / all		89	20	20	01
Comments: *Note: Bents are numbered from south to north. Piles are numbered from east to west.						
Bent #1						
<ul style="list-style-type: none"> - 1st pile from east side, approx. 80% contact. - 2nd pile from east side, severe crack completely through pile, approx. 60% contact. Pile is banded. - 3rd pile from east side, medium split, approx. 70% contact. Pile is banded. - 4th pile from east side, severe crack completely through pile, approx. 90% contact. Pile is banded. Bands are loose. - 5th pile from east side, approx. 80% contact, pile is banded. 						
Bent #2						
<ul style="list-style-type: none"> - 2nd pile from east side, approx. 90% contact. - 3rd pile from east side, approx. 80% contact. - 4th pile from east side, approx. 80% contact. - 5th pile from east side, approx. 50% contact. Pile is shimmed. 						
Bent #4 – Very severe splits 2 nd pile from east. Piles are buried and not accessible.						
Bent #5 – Piles are buried, not accessible.						
Bent #6						
<ul style="list-style-type: none"> - 1st and 2nd pile from east side, severe splits. - 3rd pile from east side, severe split in line with bolt at strap. - 4th pile from east side 60% contact, shimmed. - 6th pile from east side medium rot. - 7th pile from east side 70% contact. - 8th pile from east side 80% contact. - 10th pile from east side, medium split along south side. 						
Bent #7						
<ul style="list-style-type: none"> - 1st pile from east side, approx. 80% contact. - 2nd, 3rd, 4th and 11th pile from east side, severe split in line with bolt at strap. - 4th pile from east side 80% contact. - 5th pile from east side very severe split. - 11th pile from east side, severe splitting and checking along north side, strapping has buckled. 						
Bent #8						
<ul style="list-style-type: none"> - 1st pile from east side, severe split. - 2nd pile from east side, approx. 60% contact, severe split. - 3rd pile from east side 70% contact. - 6th pile from east side, severe split at vertical strap. - 7th pile from east side, severe split on west side. 						

Comments: *Note: Bents are numbered from south to north. Piles are numbered from east to west.

Bent #9

- 1st pile from east side, severe split, broken strapping.
- 2nd and 6th pile from east side, medium splitting throughout.
- 3rd pile from east side – 60% contact, medium splits.
- 4th pile from east side – 80% contact.
- 7th pile from east side, medium split along north side.
- 11th pile from east side, medium split.
- 12th pile from east side – very severe split and severe rot.

Bent #10

- 1st pile from east side, approx. 5% contact (redundant, 2nd pile close by).
- 2nd pile from east side, severe split.
- 4th pile from east side, severe split, loose strapping.
- 5th pile from east side, severe split.
- 7th pile from east side, 80% contact.
- 8th pile from east side, severe split.
- 9th pile from east side, medium split along north side.

Bent #11

- 1st, 2nd, 3rd, 5th, 7th spliced.
- 4th pile from east side, shimmed, severe split.
- 6th pile from east side, medium split, approx. 70% contact.
- 8th pile from east side, severe split and light to medium rot, approx. 50% contact. Pile is shimmed.
- 9th pile from east side, very severe split and crushing, very severe rot.

Bent #12

- Bent #12 is leaning significantly to the south, see attached monitoring sketch.
- 1st pile cut off but not replaced.
- 2nd pile, top has been spliced and replaced, 10% contact with pile cap due to rotation. Pile splice has shifted off pile.
- 3rd and 4th piles from east side, very severe vertical splits, 3rd 70% contact, 4th 30% contact however due to rotation drift pin is splitting top of pile.
- 5th pile from east side, severe split, 30% contact due to rotation. Has been shimmed with plastic plates.
- 6th pile from east side, very severe split and approx. 80 mm of decay on exposed face of pile, 20% contact. Significantly out of plumb. Plastic shim is loose.
- 7th pile, top has been spliced and replaced. Pile splice leaning opposite to other piles, implying splice connection has failed below grade.
- 8th pile has been shimmed with plastic plates. Very severely rotten.
- 9th pile very severe deterioration, but redundant. Spike has severe corrosion.

Bent #13

- 1st, 2nd and 7th piles from east side are buried.
- 6th pile from east side has very severe rot and splits.

Bent #14

- 1st pile from east side, removed but not replaced.
- 7th pile from east, replaced with 250x250 member and steel jacket.

It was observed that the piles along the north embankment, specifically Bents #10 thru #13 are slowly sliding in a southerly direction. The piles at Bent #12 are all severely out of plumb.

Recommended Work:	<input checked="" type="checkbox"/> Rehab	<input type="checkbox"/> Replace	Maintenance Needs:	09
	<input checked="" type="checkbox"/> 1-5 years	<input type="checkbox"/> 6-10 years	<input type="checkbox"/> Urgent	<input type="checkbox"/> 1 year
Shims to be installed to re-establish full bearing where required. Provide splice at missing/broken piles. Provide clamps at one pile at Bent #11. Splice one pile at Bent #11 and Bent #13. Rehabilitate Bent #12.			Monitor progression of splits. Monitor rotation of Bent #12.	

Element Data

Element Group:	Piers	Length:	9.00m
Element Name:	Pile Caps	Width:	0.305m
Location:		Height:	0.305m
Material:	Timber	Count:	1 per bent
Element Type:		Total Quantity:	156 sq. m.
Environment:	Benign / Moderate / Severe	Limited Inspection	<input checked="" type="checkbox"/>
Protection System:			
Condition	Units	Exc.	Good
Data:	m ² / m / each / % / all		134
			Fair
			11
			Poor
			11
Performance Deficiencies			
Comments: A severe split exists at the east end of the pile cap at Bent #11. Very severe full thickness split, very severe rot and crushing at east end, 4.6 m long at Bent #6. Severe rot at east 4.6 m at Bent #5.			
Recommended Work:		<input checked="" type="checkbox"/> Rehab <input checked="" type="checkbox"/> Replace	Maintenance Needs: 09
		<input checked="" type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years	<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input checked="" type="checkbox"/> 2 year
Replace rotten pile caps.		Monitor progression of split.	

Element Group:	Piers	Length:	0.305 m
Element Name:	Columns	Width:	0.305 m
Location:		Height:	5.30 m
Material:	Timber	Count:	7 per bent
Element Type:		Total Quantity:	634 sq. m.
Environment:	Benign / Moderate / Severe	Limited Inspection	<input checked="" type="checkbox"/>
Protection System:			
Condition	Units	Exc.	Good
Data:	m ² / m / each / % / all		574
			Fair
			60
			Poor
Performance Deficiencies			
Comments: Many columns are out of plumb with the most significant variances at Bents #11 through #13. Medium to severe checks and splits. Bent #12 – All columns leaning significantly south. Bent #5 - Post 1 and 3 from east, strapping has buckled. Bent #5 – All posts shifted north approximately 75 mm except #2 and #6, pile cap and piles moving north. Bent #4 – All columns shifted except #2 and #6 similar to Bent #5. Bent #10 - 6 th post from east overhanging pile cap, no strapping at base. Bent #11 – 2 nd column severe split at top, base shifted north overhanging 48 mm at east corner.			
Recommended Work:		<input checked="" type="checkbox"/> Rehab <input type="checkbox"/> Replace	Maintenance Needs:
		<input checked="" type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years	<input type="checkbox"/> Urgent <input checked="" type="checkbox"/> 1 year <input type="checkbox"/> 2 year
		Underwater inspection to confirm condition of piles.	

Element Group:	Barriers	Length:	59.0 m
Element Name:	Railing System	Width:	
Location:	East and West sides	Height:	
Material:	Steel and timber	Count:	2
Element Type:		Total Quantity:	118 m
Environment:	Benign / Moderate / Severe	Limited Inspection	<input type="checkbox"/>
Protection System:	Galvanized/CCA		
Condition	Units	Exc.	Good
Data:	m ² / m / each / % / all		118
			Fair
			Poor
Performance Deficiencies			
Comments: Light checking. Two loose splice bolts at west side, three loose at east side. One broken clamp at guide rail outrigger at Bent #2.			
Recommended Work:		<input type="checkbox"/> Rehab <input type="checkbox"/> Replace	Maintenance Needs: 18
		<input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years	<input type="checkbox"/> Urgent <input checked="" type="checkbox"/> 1 year <input type="checkbox"/> 2 year
		Tighten loose bolts.	

Element Data

Element Group:	Barriers	Length:	59.0 m			
Element Name:	Handrail	Width:	0.24 m			
Location:	West Side of Structure	Height:	0.19 m			
Material:	Timber	Count:				
Element Type:		Total Quantity:	59 m			
Environment:	Benign / Moderate / Severe		Limited Inspection <input type="checkbox"/>			
Protection System:						Performance Deficiencies
Condition Data:	Units m ² (m) each / % / all	Exc.	Good 59	Fair	Poor	
Comments:						
Recommended Work:		<input type="checkbox"/> Rehab	<input type="checkbox"/> Replace	Maintenance Needs:		
		<input type="checkbox"/> 1-5 years	<input type="checkbox"/> 6-10 years	<input type="checkbox"/> Urgent	<input type="checkbox"/> 1 year	<input type="checkbox"/> 2 year



Photo 1: North approach.



Photo 2: South approach.



Photo 3: Upstream view.



Photo 4: Downstream view.



Photo 5: Upstream elevation.



Photo 6: Downstream elevation.



Photo 7: Northeast embankment.



Photo 8: Southeast embankment.



Photo 9: Northwest embankment.



Photo 10: Southwest embankment.



Photo 11: Deck cross section.



Photo 12: North abutment.



Photo 13: South abutment.



Photo 14: Deck underside (typ.).



Photo 15: Impact damage at asphalt at north walkway approach.



Photo 16: Severe transverse crack at asphalt wear surface (typ.).



Photo 17: Medium longitudinal crack at south approach.



Photo 18: Medium cracking at pedestrian walkway.

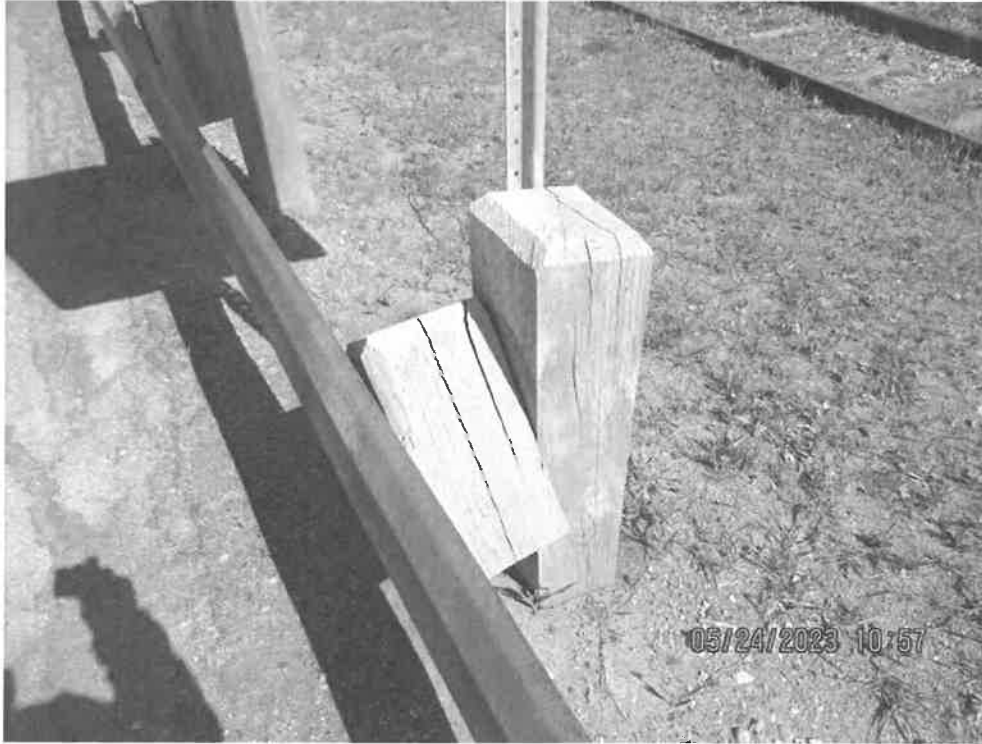


Photo 19: Rotated loose offset timber at guide rail post (typ.).



Photo 20: Severe rot at offset at northeast approach.



Photo 21: Missing bolt at guide rail to post connection.



Photo 22: Three missing deck timbers at walkway.



Photo 23: Impact damage at curb at north end.



Photo 24: Severe longitudinal crack full length of deck at southbound lane.



Photo 25: Severe transverse cracks full width of deck.



Photo 26: First pile from east removed at Bent #14.



Photo 27: Very severe rot at 8th pile from east at Bent #12.



Photo 28: Approximately 50% contact at two piles at the south abutment (9th and 10th pile from east).

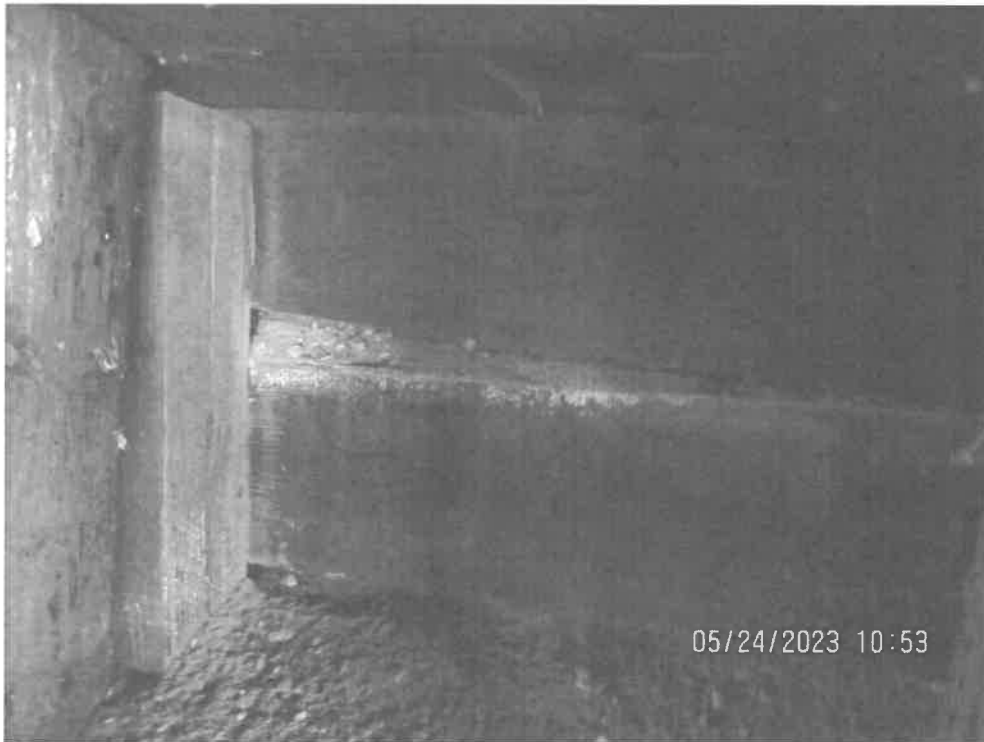


Photo 29: Separation of timber lagging at south abutment.



Photo 30: Severe separation of deck timbers (typ.).

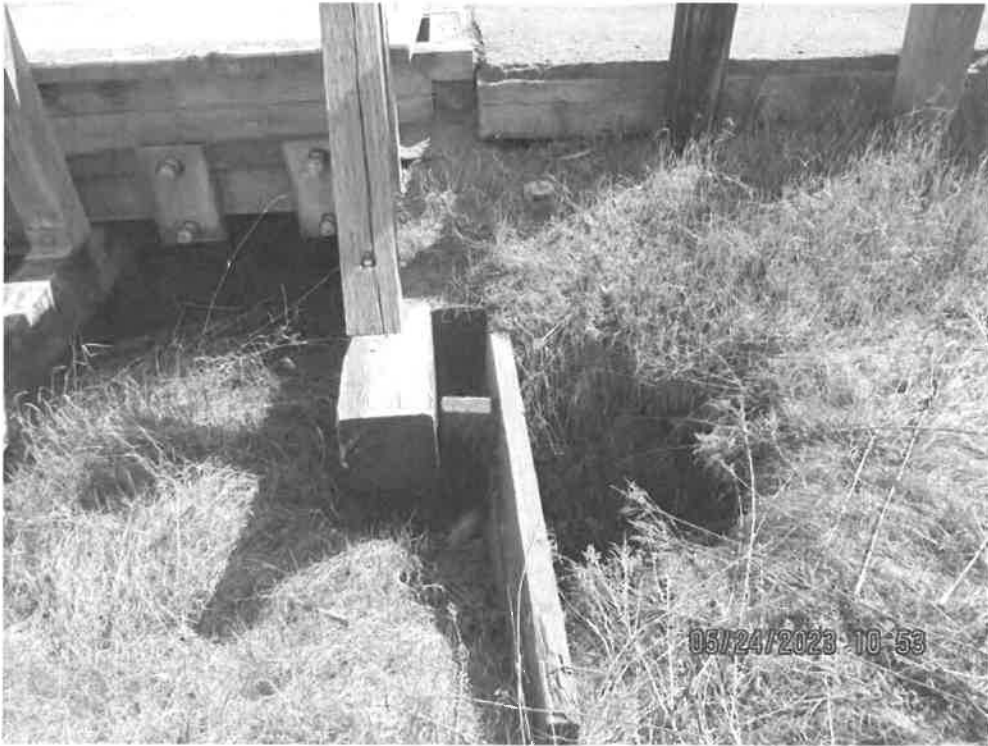


Photo 31: Erosion at southwest embankment.



Photo 32: Severe corrosion at drainage culvert at southwest corner.



Photo 33: Severe erosion at south embankment.



Photo 34: Severe erosion at north embankment.



Photo 35: Load posting sign (typ.).



Photo 36: Broken thru-bolt at clamp at Bent #2.



Photo 37: Strapping buckled at pile (typ.).



Photo 38: Pile not in full contact with pile cap (typ.).



Photo 39: Rotation of piles and pile cap at Bent #12.



Photo 40: Severe rot and pile not in contact at Bent #12.



Photo 43: Cracks in soil between Bent #12 and #13.



Photo 44: Broken timber brace (typ.).

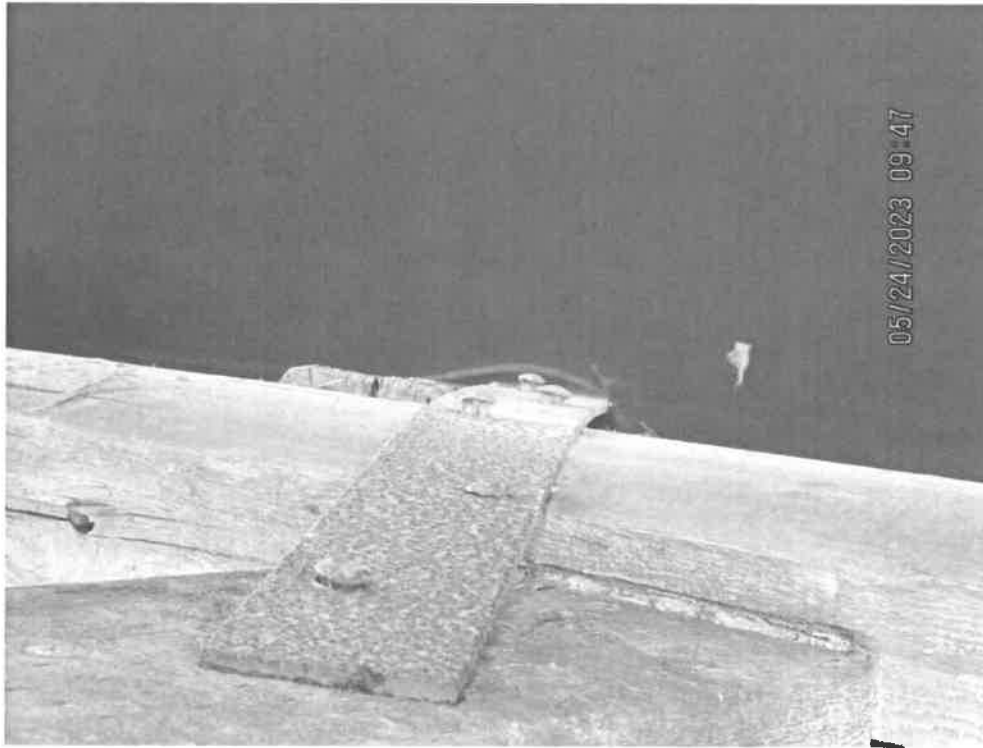


Photo 45: Very severe rot at pile cap.



Photo 46: Typical translation of piles and bents.



Bi-annual Structural Inspection Red Rock Bridge No. 2

**FOR THE
TOWNSHIP OF RED ROCK**



Ref. No. JML2023013

May 2023

RED ROCK BRIDGE NO. 2 – RED ROCK ROAD NO. 1 OVER TROUT CREEK

1.0 Description

Red Rock Bridge No. 2 is located on Red Rock Road No. 1 over Trout Creek approximately 0.2 kilometres west of Highway No. 628. The structure is currently load posted at 25/40/55 Tonnes.

The structure is a single lane, single span Double-Single Reinforced Bailey Bridge with a timber deck and a timber wear surface constructed in a herringbone pattern. The deck is supported by steel stringers on steel transom beams. The ends of the transoms sit upon “double-single reinforced” pre-engineered steel trusses which bear upon steel base plates over timber levelling pads. The bridge span is 24.384 metres. The deck width between curbs is 3.35 metres.

2.0 Significant Findings

Most wearing surface planks are loose and deflect under wheel loads.

Five rotten wearing surface planks were observed.

One bolt is missing at the east curb. All bolts are loose at both curbs.

The curbs do not extend the full length of the bridge.

One panel pin is backed out at the east side of the bridge. Five cotter pins are missing. One bracing bolt is loose.

Three loose sway braces were observed.

Gravel has accumulated on the bearing timbers. There are two large wood blocks beneath the transom beam at the north bearing timber.

The Narrow Structure sign at the south approach is missing.

A Hazard Marker sign at south side is leaning.

The steel flex beam guide rail at the approaches is mounted too high. Only half of guide rail splice bolts are installed. The guide rail connection to the bridge is improper and does not extend across the bridge.

Three offset timbers have rotated at the south approach. One loose bolt and impact damage was observed at the northeast guiderail.

Erosion was observed at the southwest and north embankments.

3.0 Conclusions and Recommendations

We recommend the following remedial repairs be done within the next 1-2 years:

- Secure loose wearing surface planks.
- Replace five wearing surface planks.
- Tighten loose bolts and provide one bolt at curb.
- Extend and provide new curb at the corners of the bridge.
- Re-install one panel pin, provide five cotter pins, and tighten one loose bracing bolt.
- Tighten three braces.
- Remove gravel and wood blocks at bearing timbers.
- Provide a Narrow Structure sign at the south approach.
- Plumb Hazard Marker sign.
- Replace steel beam guide rail at approaches, and extend guide rail across the bridge at the correct height.
- Shim three offset timbers at the south approach guide rail, and tighten one loose bolt.
- Replace one section of guiderail at the northeast corner of the site.
- Provide rock protection c/w geotextile at eroded areas.

4.0 Estimated Construction Costs

The following are the estimated construction costs for the recommended remedial repairs:

Secure wearing surface planks	\$ 500.00
Replace five wearing surface planks	\$ 500.00
Tighten loose bolts and provide one bolt at curb	\$ 500.00
Tighten three braces	\$ 1,000.00
Provide curb at corners of bridge	\$ 1,500.00
Reinstall one panel pin, provide cotter pins, tighten bracing bolt	\$ 500.00
Remove gravel and wood blocks from bearing timbers	\$ 1,000.00
Provide Narrow Structure sign at south approach, plumb Hazard Marker sign	\$ 1,000.00
Replace guide rail at approaches.	\$ 12,000.00
Extend guide rail across bridge	\$ 16,000.00
Shim offset timbers and tighten one loose bolt.	\$ 500.00
Replace one section of guide rail	\$ 1,000.00
Provide Rock protection c/w geotextile	\$ 15,000.00
Subtotal	\$ 51,000.00
Mob/Demob (15%)	\$ 7,600.00
Engineering and Contingency (35%)	\$ 18,000.00
Total Construction Cost Estimate	\$ 76,600.00 + HST

The existing load rating of 25/40/55 tonnes is based upon two transom beams per panel. To achieve unlimited load rating, two additional transom beams must be provided per panel (16 transom beams total). To install the transoms, the wear surface and deck will likely require replacement and the stringers should be removed. The estimated construction cost to provide new transom beams is an additional \$ 65,000.00 + HST.

The BCI is the ratio of the value of each bridge element in its current state to the total replacement value of the bridge. The overall Bridge Condition Index (BCI) of Red Rock Bridge No. 2 is 74. The BCI value of the bridge indicates the bridge is in fair condition.

Inventory Data:			
Structure Name	Red Rock Bridge No. 2		
Main Hwy/Road #	<input type="text"/>	On <input checked="" type="checkbox"/> Under <input type="checkbox"/>	Crossing Type: <input type="checkbox"/> Navig. Water <input checked="" type="checkbox"/> Non-Navig. Water <input type="checkbox"/> Rail <input type="checkbox"/> Road <input type="checkbox"/> Ped. <input type="checkbox"/> Other
Hwy/Road Name	Red Rock Road No. 1		
Structure Location	0.2 km west of Hwy 628		
Latitude	48° 56' 43" N	Longitude	88° 17' 08" W
Owner(s)	Township of Red Rock	Heritage Designation	<input type="checkbox"/> Not Cons. <input type="checkbox"/> Cons./not App. <input type="checkbox"/> List/not Desig. <input type="checkbox"/> Desig./not List <input type="checkbox"/> Desig. & List
MTO Region	Northwestern	Road Class:	Freeway <input type="checkbox"/> Arterial <input type="checkbox"/> Collector <input type="checkbox"/> Local <input checked="" type="checkbox"/>
MTO District	Thunder Bay	Posted Speed	<input type="text"/> No. of Lanes <input type="text"/> 1
Old County	Thunder Bay	AADT	<input type="text"/> % Trucks <input type="text"/>
Geographic Twp.	<input type="text"/>	Inspection Route Sequence	<input type="text"/>
Structure Type	Bailey – Double Single	Interchange Number	<input type="text"/>
Total Deck Length	30.49 (m)	Interchange Structure Number	<input type="text"/>
Overall Str. Width	5.49 (m)	Min. Vertical Clearance	<input type="text"/> (m)
Total Deck Area	104.27 (sq.m)	Special Routes:	<input type="checkbox"/> Transit <input type="checkbox"/> Truck <input type="checkbox"/> School <input type="checkbox"/> Bicycle
Roadway Width	3.42 (m)	Detour Length Around Bridge	5 (km)
Skew Angle	0 (Degrees)	Direction of Structure	North to South
No. of Spans	One	Fill on Structure	<input type="text"/> (m)
Span Lengths	24.4 (m)		

Historical Data:			
Year Built	<input type="text"/>	Year of Last Major Rehab.	2016
Last OSIM Inspection	2021	Last Evaluation	2009
Last Enhanced OSIM Inspection	<input type="text"/>	Current Load Limit	25/40/55 (tonnes)
Enhanced Access Equipment (ladder, boat, lift, etc.)	<input type="text"/>	Load Limit By-Law #	<input type="text"/>
Last Underwater Inspection	<input type="text"/>	By-Law Expiry Date	<input type="text"/>
Last Condition Survey	<input type="text"/>		
Rehab History: 2016 – Wear surface replaced. New granular foundations provided. Load posted at 25/40/55 tonnes based upon two transom beams per bay.			

Field Inspection Information:			
Date of Inspection:	May 24, 2023	Type of Inspection:	<input checked="" type="checkbox"/> OSIM <input type="checkbox"/> Enhanced OSIM
Inspector:	Michael Edmonds, P.Eng., JML Engineering		
Others in Party:	Mathew Currie, P.Eng., JML Engineering		
Access Equipment Used:			
Weather:	Sunny		
Temperature:	4° Celsius		

Additional Investigations Required:	Priority		
	None	Normal	Urgent
Material Condition Survey			
Detailed Deck Condition Survey:	✓		
Non-destructive Delamination Survey of Asphalt-Covered Deck:	✓		
Concrete Substructure Condition Survey:	✓		
Detailed Coating Condition Survey:	✓		
Detailed Timber Investigation	✓		
Post-Tensioned Strand Investigation	✓		
Underwater Investigation:	✓		
Fatigue Investigation:	✓		
Seismic Investigation:	✓		
Structure Evaluation:	✓		
Monitoring			
Monitoring of Deformations, Settlements and Movements:	✓		
Monitoring Crack Widths:	✓		
Investigation Notes:			

Overall Structure Notes:	
Recommended Work on Structure:	<input type="checkbox"/> None <input checked="" type="checkbox"/> Minor Rehab. <input type="checkbox"/> Major Rehab. <input type="checkbox"/> Replace
Timing of Recommended Work:	<input checked="" type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years
Overall Comments:	Miscellaneous repairs and minor rehabilitation are required.
Date of Next Inspection:	2025

Suspected Performance Deficiencies

- | | | |
|---|--|------------------------------|
| 01 Load carrying capacity | 06 Bearing not uniformly loaded/unstable | 12 Slippery surfaces |
| 02 Excessive deformations (deflections & rotations) | 07 Jammed expansion joint | 13 Flooding/channel blockage |
| 03 Continuing settlement | 08 Pedestrian/vehicular hazard | 14 Undermining of foundation |
| 04 Continuing movements | 09 Rough riding surface | 15 Unstable embankments |
| 05 Seized bearings | 10 Surface ponding | 16 Other |
| | 11 Deck drainage | |

Maintenance Needs

- | | | |
|--------------------------------------|---------------------------------|--|
| 01 Lift and Swing Bridge Maintenance | 07 Repair to Structural Steel | 13 Erosion Control at Bridges |
| 02 Bridge Cleaning | 08 Repair of Bridge Concrete | 14 Concrete Sealing |
| 03 Bridge Handrail Maintenance | 09 Repair of Bridge Timber | 15 Rout and Seal |
| 04 Painting Steel Bridge Structures | 10 Bailey Bridges - Maintenance | 16 Bridge Deck Drainage |
| 05 Bridge Deck Joint Repair | 11 Animal/Pest Control | 17 Scaling (Loose Concrete or ACR Steel) |
| 06 Bridge Bearing Maintenance | 12 Bridge Surface Repair | 18 Other |

Element Data

Element Group:	Decks		Length:	24.390 m	
Element Name:	Wearing Surface		Width:	3.658 m	
Location:			Height:	0.045 m	
Material:	Wood		Count:		
Element Type:	Planks on herringbone pattern		Total Quantity:	90 sq. m	
Environment:	Benign / Moderate <u>Severe</u>		Limited Inspection	<input type="checkbox"/>	
Protection System:					Performance Deficiencies
Condition Data:	Units m ² / m / each / % / all	Exc.	Good 90	Fair	Poor
Comments: Wearing surface replaced in 2016. Most planks deflect under wheel loads. Five rotten planks.					
Recommended Work:	<input checked="" type="checkbox"/> Rehab <input type="checkbox"/> Replace <input checked="" type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs:		
Re-secure all loose planks.			<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year		

Element Group:	Decks		Length:	24.39 m	
Element Name:	Deck Top		Width:	3.658 m	
Location:	Deck		Height:	0.045 m	
Material:	Wood		Count:		
Element Type:	Wood Planks (timber chesses)		Total Quantity:	90 sq. m	
Environment:	Benign / Moderate <u>Severe</u>		Limited Inspection	<input checked="" type="checkbox"/>	
Protection System:	CCA				Performance Deficiencies
Condition Data:	Units m ² / m / each / % / all	Exc.	Good 90	Fair	Poor
Comments: Unable to inspect top of deck due to wearing surface.					
Recommended Work:	<input type="checkbox"/> Rehab <input type="checkbox"/> Replace <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs:		
			<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year		

Element Group:	Sidewalks/Curbs		Length:	24.3 m	
Element Name:	Curbs		Width:	0.152 m	
Location:	East and West sides		Height:	0.102 m	
Material:	Wood		Count:	8 timbers per side	
Element Type:			Total Quantity:	12 sq. m	
Environment:	Benign / Moderate <u>Severe</u>		Limited Inspection	<input type="checkbox"/>	
Protection System:	CCA				Performance Deficiencies
Condition Data:	Units m ² / m / each / % / all	Exc.	Good 9	Fair 3	Poor
Comments: Medium checks at a few timbers, medium abrasion. East bolts - 6 loose, 1 missing. West bolts - 7 loose. No curb at 4 corners of approach spans. All curb bolts loose.					
Recommended Work:	<input type="checkbox"/> Rehab <input checked="" type="checkbox"/> Replace <input checked="" type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs:		
Provide curb at 4 corners of approaches.			18 <input type="checkbox"/> Urgent <input checked="" type="checkbox"/> 1 year <input type="checkbox"/> 2 year		
			Re-fasten loose bolts. Provide new bolt.		

Element Data

Element Group:	Beams/Main Longitudinal Elements	Length:	3.048 m		
Element Name:	Stringers	Width:	0.045 m		
Location:	Deck	Height:	0.102 m		
Material:	Steel	Count:	3 per stringer set, 5 sets per span 8 spans		
Element Type:	I-type complete with diaphragms	Total Quantity:	120		
Environment:	Benign / (Moderate) Severe	Limited Inspection	<input type="checkbox"/>		
Protection System:	Hot dip galvanizing				Performance Deficiencies
Condition	Units	Exc.	Good	Fair	
Data:	m ² /m (each) % / all		120		
Comments: Light corrosion throughout.					
Recommended Work:		<input type="checkbox"/> Rehab	<input type="checkbox"/> Replace	Maintenance Needs:	
		<input type="checkbox"/> 1-5 years	<input type="checkbox"/> 6-10 years	<input type="checkbox"/> Urgent	<input type="checkbox"/> 1 year <input type="checkbox"/> 2 year

Element Group:	Beams/Main Longitudinal Elements	Length:	5.490 m		
Element Name:	Transom Beams	Width:	0.114 m		
Location:	Deck	Height:	0.254 m		
Material:	Steel	Count:	2 per panel		
Element Type:	I-type	Total Quantity:	79 sq. m.		
Environment:	Benign / (Moderate) Severe	Limited Inspection	<input type="checkbox"/>		
Protection System:	Hot dip galvanizing				Performance Deficiencies
Condition	Units	Exc.	Good	Fair	
Data:	m ² /m / each / % / all		78	1	
Comments: Light corrosion throughout. Medium corrosion at one transom. There are only 2 transom beams per bay. Impact damage at the end of one transom.					
Recommended Work:		<input type="checkbox"/> Rehab	<input type="checkbox"/> Replace	Maintenance Needs:	
		<input type="checkbox"/> 1-5 years	<input type="checkbox"/> 6-10 years	<input type="checkbox"/> Urgent	<input type="checkbox"/> 1 year <input type="checkbox"/> 2 year

Element Group:	Trusses/Arches	Length:	24.384 m		
Element Name:	Top and Bottom Chords	Width:	0.051 m		
Location:	East and West sides	Height:	0.102 m		
Material:	Steel	Count:	16		
Element Type:		Total Quantity:	160 sq. m		
Environment:	Benign / (Moderate) Severe	Limited Inspection	<input type="checkbox"/>		
Protection System:	Hot dip galvanizing/Painted				Performance Deficiencies
Condition	Units	Exc.	Good	Fair	
Data:	m ² /m / each / % / all		160		
Comments: Light corrosion of the painted portion of the top and bottom chords.					
Recommended Work:		<input type="checkbox"/> Rehab	<input type="checkbox"/> Replace	Maintenance Needs:	
		<input type="checkbox"/> 1-5 years	<input type="checkbox"/> 6-10 years	<input type="checkbox"/> Urgent	<input type="checkbox"/> 1 year <input type="checkbox"/> 2 year

Element Data

Element Group:	Trusses/Arches		Length:	1.175 m		
Element Name:	Verticals/Diagonals		Width:	0.038 m		
Location:	East and West sides		Height:	0.076 m		
Material:	Steel		Count:	11 per panel, 176		
Element Type:			Total Quantity:	63 sq. m.		
Environment:	Benign / Moderate / Severe		Limited Inspection	<input type="checkbox"/>		
Protection System:	Hot dip galvanizing					Performance Deficiencies
Condition	Units	Exc.	Good	Fair	Poor	
Data:	m / m / each / % / all		62		1	16
Comments: Light impact damage southwest end post.						
Recommended Work:			<input type="checkbox"/> Rehab <input type="checkbox"/> Replace <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs:	
					<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year	

Element Group:	Trusses/Arches		Length:			
Element Name:	Connections		Width:			
Location:	East and West sides		Height:			
Material:	Steel		Count:			
Element Type:	Panel pins		Total Quantity:			
Environment:	Benign / Moderate / Severe		Limited Inspection	<input type="checkbox"/>		
Protection System:	Hot dip galvanizing					Performance Deficiencies
Condition	Units	Exc.	Good	Fair	Poor	
Data:	m ² / m / each / % / all		99		1	16
Comments: One backed-out panel in, two missing cotter pins.						
Recommended Work:			<input checked="" type="checkbox"/> Rehab <input type="checkbox"/> Replace <input checked="" type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs:	
					<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year	
Reinstall panel pins and provide cotter pins to secure. Tighten bolt.						

Element Group:	Trusses/Arches		Length:			
Element Name:	Connections		Width:			
Location:	East and West sides		Height:			
Material:	Steel		Count:	4 per transom		
Element Type:	Transom clamps		Total Quantity:	68		
Environment:	Benign / Moderate / Severe		Limited Inspection	<input type="checkbox"/>		
Protection System:	Hot dip galvanizing					Performance Deficiencies
Condition	Units	Exc.	Good	Fair	Poor	
Data:	m ² / m / each / % / all		68			
Comments:						
Recommended Work:			<input type="checkbox"/> Rehab <input type="checkbox"/> Replace <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs:	
					<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year	

Element Data

Element Group:	Bracing		Length:	5.105 m		
Element Name:	Sway bracing		Width:	0.025 m diameter		
Location:	Underside of deck between trusses		Height:			
Material:	Steel		Count:	2 per panel		
Element Type:	Rod		Total Quantity:	16		
Environment:	Benign / <u>Moderate</u> / Severe		Limited Inspection	<input type="checkbox"/>		
Protection System:	Hot dip galvanizing					Performance Deficiencies
Condition	Units	Exc.	Good	Fair	Poor	
Data:	m ² / m / <u>each</u> % / all		16			16
Comments: Light surface corrosion. Three loose braces.						
Recommended Work:			<input checked="" type="checkbox"/> Rehab <input type="checkbox"/> Replace <input checked="" type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs:	
Tighten loose bracing.					<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year	

Element Group:	Coatings		Length:			
Element Name:	Structural Steel		Width:			
Location:	Bailey bridge		Height:			
Material:	Steel		Count:			
Element Type:	Various		Total Quantity:	223 sq. m.		
Environment:	Benign / <u>Moderate</u> / Severe		Limited Inspection	<input type="checkbox"/>		
Protection System:	Hot dip galvanizing/Painted					Performance Deficiencies
Condition	Units	Exc.	Good	Fair	Poor	
Data:	<u>m²</u> m / each / % / all		201	22		
Comments: Light corrosion at 22 top chord members. Light corrosion at 22 bottom chord members.						
Recommended Work:			<input type="checkbox"/> Rehab <input type="checkbox"/> Replace <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs:	
					<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year	

Element Group:	Abutments		Length:	0.457 m		
Element Name:	Bearings		Width:	0.220 m		
Location:	North and South abutments		Height:	0.097 m		
Material:	Steel		Count:	4 each abutment		
Element Type:	Pin and shoe bracket		Total Quantity:	8		
Environment:	Benign / <u>Moderate</u> / Severe		Limited Inspection	<input type="checkbox"/>		
Protection System:	Hot dip galvanizing					Performance Deficiencies
Condition	Units	Exc.	Good	Fair	Poor	
Data:	m ² / m / <u>each</u> % / all		8			
Comments:						
Recommended Work:			<input type="checkbox"/> Rehab <input type="checkbox"/> Replace <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs:	
					<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year	

Element Data

Element Group:	Abutments	Length:	1.397 m
Element Name:	Bearings	Width:	0.900 m
Location:	North and South abutments	Height:	0.050 m
Material:	Steel	Count:	2 each abutment
Element Type:	Base Plate	Total Quantity:	4
Environment:	Benign / (Moderate) Severe	Limited Inspection	<input type="checkbox"/>
Protection System:	Paint		
Condition	Units	Exc.	Good
Data:	m ² / m (each) / % / all		4
Performance Deficiencies	Fair	Poor	
Comments: Gravel accumulation and light corrosion.			
Recommended Work:	<input type="checkbox"/> Rehab <input type="checkbox"/> Replace <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years	Maintenance Needs:	18 <input type="checkbox"/> Urgent <input checked="" type="checkbox"/> 1 year <input type="checkbox"/> 2 year
		Remove gravel.	

Element Group:	Abutments	Length:	7.000 m
Element Name:	Bearings	Width:	0.300 m
Location:	North and South abutments	Height:	0.300 m
Material:	Wood	Count:	3 per abutment
Element Type:	Leveling pad	Total Quantity:	6
Environment:	Benign / (Moderate) Severe	Limited Inspection	<input type="checkbox"/>
Protection System:	Penta		
Condition	Units	Exc.	Good
Data:	m ² / m (each) / % / all		6
Performance Deficiencies	Fair	Poor	
Comments: Two large wood blocks at middle of bridge on leveling pad at north. Gravel accumulation.			
Recommended Work:	<input type="checkbox"/> Rehab <input type="checkbox"/> Replace <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years	Maintenance Needs:	<input type="checkbox"/> Urgent <input checked="" type="checkbox"/> 1 year <input type="checkbox"/> 2 year
		Remove gravel and wood blocks.	

Element Group:	Embankments and Streams	Length:	
Element Name:	Streams and waterways	Width:	
Location:		Height:	
Material:		Count:	
Element Type:		Total Quantity:	All
Environment:	Benign / Moderate / Severe	Limited Inspection	<input type="checkbox"/>
Protection System:			
Condition	Units	Exc.	Good
Data:	m ² / m / each / % (all)		
Performance Deficiencies	Fair	Poor	X
Comments:			
Recommended Work:	<input type="checkbox"/> Rehab <input type="checkbox"/> Replace <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years	Maintenance Needs:	18 <input type="checkbox"/> Urgent <input checked="" type="checkbox"/> 1 year <input type="checkbox"/> 2 year
		Remove beaver dam	

Element Data

Element Group:	Embankments and Streams		Length:			
Element Name:	Embankments		Width:			
Location:	North and South embankments		Height:			
Material:	Earth		Count:	6		
Element Type:			Total Quantity:	6		
Environment:	Benign / Moderate / Severe		Limited Inspection	<input type="checkbox"/>		
Protection System:						Performance Deficiencies
Condition Data:	Units m ² / each / % / <u>all</u>	Exc.	Good 4	Fair	Poor 2	
Comments: Embankments appear to be stable. Erosion at southwest and north embankment.						
Recommended Work:			<input checked="" type="checkbox"/> Rehab <input type="checkbox"/> Replace <input checked="" type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs:	
Provide rock protection c/w geotextile.					<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year	

Element Group:	Embankments and Streams		Length:			
Element Name:	Slope Protection		Width:			
Location:	North and South embankments		Height:			
Material:			Count:	6		
Element Type:			Total Quantity:	6		
Environment:	Benign / <u>Moderate</u> / Severe		Limited Inspection	<input type="checkbox"/>		
Protection System:	Rock protection on geotextile at south embankment, vegetation at north embankment.					Performance Deficiencies
Condition Data:	Units m ² / m / each / % / <u>all</u>	Exc.	Good 6	Fair	Poor	
Comments: Slope protection appears to be stable and effective.						
Recommended Work:			<input type="checkbox"/> Rehab <input type="checkbox"/> Replace <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs:	
					<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year	

Element Group:	Accessories		Length:			
Element Name:	Signs		Width:			
Location:			Height:			
Material:	Steel		Count:			
Element Type:			Total Quantity:	8		
Environment:	Benign / <u>Moderate</u> / Severe		Limited Inspection	<input type="checkbox"/>		
Protection System:	Hot dip galvanizing/Painted					Performance Deficiencies
Condition Data:	Units m ² / m / each / % / all	Exc.	Good 6	Fair 1	Poor 1	Performance Deficiencies 16
Comments: Four Hazard Marker signs, two load posting signs, two Narrow Structure signs. Southwest hazard sign is leaning. No Narrow Structure sign at the south approach.						
Recommended Work:			<input type="checkbox"/> Rehab <input type="checkbox"/> Replace <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs:	
					<input type="checkbox"/> Urgent <input checked="" type="checkbox"/> 1 year <input type="checkbox"/> 2 year	
			Provide Narrow Bridge sign at South approach.			

Element Data

Element Group:	Approaches		Length:	3.280 m		
Element Name:	Wearing Surface		Width:	3.658 m		
Location:	North and South ramps		Height:	0.045 m		
Material:	Wood		Count:	2		
Element Type:	Planks in herringbone pattern		Total Quantity:	24 sq. m		
Environment:	Benign <u>Moderate</u> Severe		Limited Inspection	<input type="checkbox"/>		
Protection System:						Performance Deficiencies
Condition	Units	Exc.	Good	Fair	Poor	
Data:	m ² m / each / % / all		24			
Comments:						
Recommended Work:			<input type="checkbox"/> Rehab <input type="checkbox"/> Replace <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs:	
					<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year	

Element Group:	Approaches		Length:	3.658 m		
Element Name:	Approach ramp		Width:	0.152 m		
Location:	North and South ramps		Height:	0.045 m		
Material:	Wood		Count:	10 per approach		
Element Type:	Timber Chesses		Total Quantity:	73 m		
Environment:	Benign / <u>Moderate</u> Severe		Limited Inspection	<input checked="" type="checkbox"/>		
Protection System:	CCA					Performance Deficiencies
Condition	Units	Exc.	Good	Fair	Poor	
Data:	m ² (m) each / % / all		73			
Comments:						
Recommended Work:			<input type="checkbox"/> Rehab <input type="checkbox"/> Replace <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs:	
					<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year	

Element Group:	Approaches		Length:	3.040 m		
Element Name:	Approach span		Width:	0.080 m		
Location:	North and South ramps		Height:	0.130 m		
Material:	Steel		Count:	5 per approach		
Element Type:	I-type stringers		Total Quantity:	90 m		
Environment:	Benign / <u>Moderate</u> / Severe		Limited Inspection	<input checked="" type="checkbox"/>		
Protection System:	Hot dip galvanizing					Performance Deficiencies
Condition	Units	Exc.	Good	Fair	Poor	
Data:	m ² m / each / % / all		90			
Comments: Light corrosion throughout.						
Recommended Work:			<input type="checkbox"/> Rehab <input type="checkbox"/> Replace <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs:	
					<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year	

Element Data

Element Group:	Approaches		Length:	3.049 m		
Element Name:	Approach span		Width:			
Location:	North and South ramps		Height:			
Material:	Wood		Count:	1 each end		
Element Type:	Sleeper		Total Quantity:	2		
Environment:	Benign / Moderate / Severe		Limited Inspection	<input type="checkbox"/>		
Protection System:	Penta					Performance Deficiencies
Condition Data:	Units m ² /m (each) % / all	Exc.	Good 2	Fair	Poor	
Comments:						
Recommended Work:			<input type="checkbox"/> Rehab <input type="checkbox"/> Replace <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs:	
					<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year	

Element Group:	Approaches		Length:	3.040 m		
Element Name:	Railing Systems		Width:			
Location:	North and South approaches		Height:			
Material:	Wood and steel		Count:	2 per approach		
Element Type:	Steel flex beam per wood post		Total Quantity:	13 m		
Environment:	Benign / Moderate / Severe		Limited Inspection	<input type="checkbox"/>		
Protection System:	Penta/Hot dip galvanizing					Performance Deficiencies
Condition Data:	Units m ² (m) each / % / all	Exc.	Good	Fair 13	Poor	
Comments: Steel flex beam mounted at improper height. Only 1/2 bolts are installed at joints. The guide rail connection to the bridge is improper. Two rotated offset timbers at southwest approach, 1 rotated offset at southeast corner. Impact damage at northeast corner. One loose bolt at north guide rail.						
Recommended Work:			<input checked="" type="checkbox"/> Rehab <input type="checkbox"/> Replace <input checked="" type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs:	
					<input type="checkbox"/> Urgent <input checked="" type="checkbox"/> 1 year <input type="checkbox"/> 2 year	
Lower guiderail to proper elevation, install all bolts at lap joints and provide guiderail across structure. Shim rotated offsets. Replace one guide rail section.			Tighten loose bolts.			

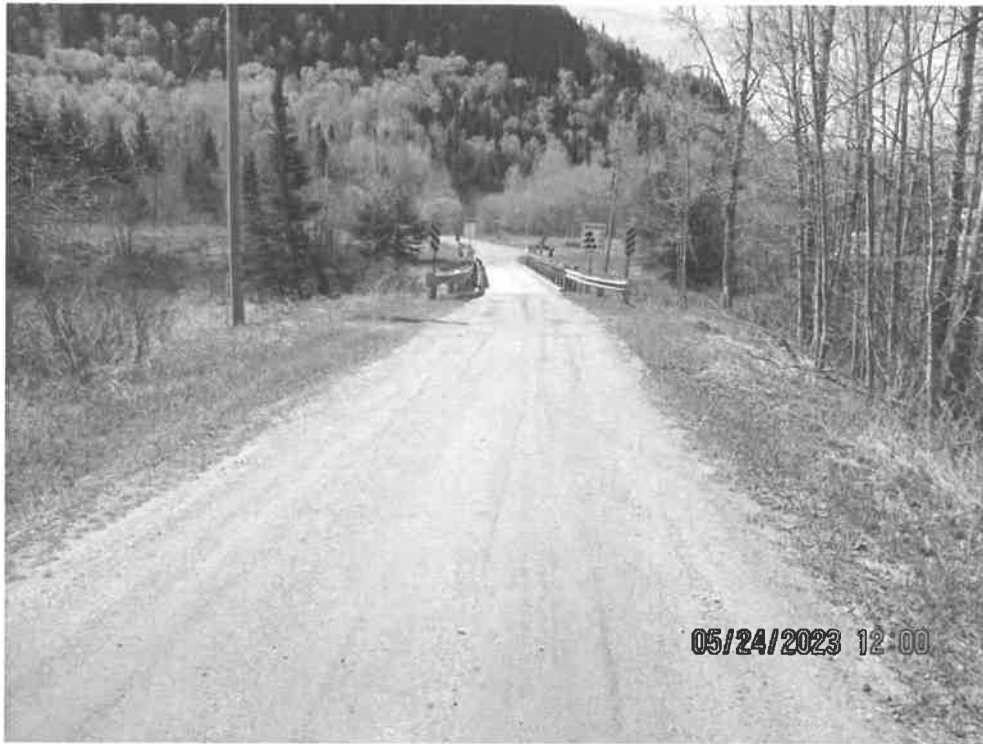


Photo 1: North approach.



Photo 2: South approach.



Photo 3: Upstream view.

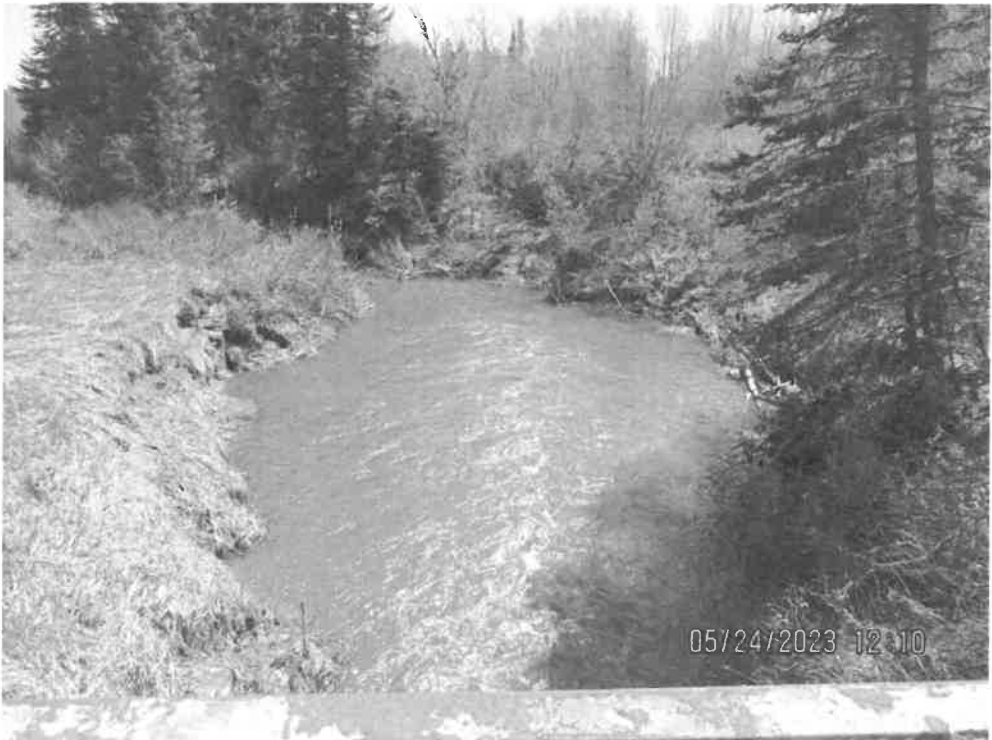


Photo 4: Downstream view.



Photo 5: Upstream elevation.



Photo 6: Downstream elevation.



Photo 7: Northeast embankment.



Photo 8: Southeast embankment.



Photo 9: Northwest embankment.



Photo 10: Southwest embankment.



Photo 11: Deck cross-section.



Photo 12: North abutment.



Photo 13: South abutment.



Photo 14: Underside of deck (typ.).



Photo 15: Loose/missing bolt at curb (typ.).



Photo 16: Improper connection of guide rail to bridge.



Photo 17: Loose panel pin.



Photo 18: Loose cotter pin/panel pin.



Photo 19: Guide rail mounted at improper height at southwest corner. Southwest Hazard Marker sign is leaning.

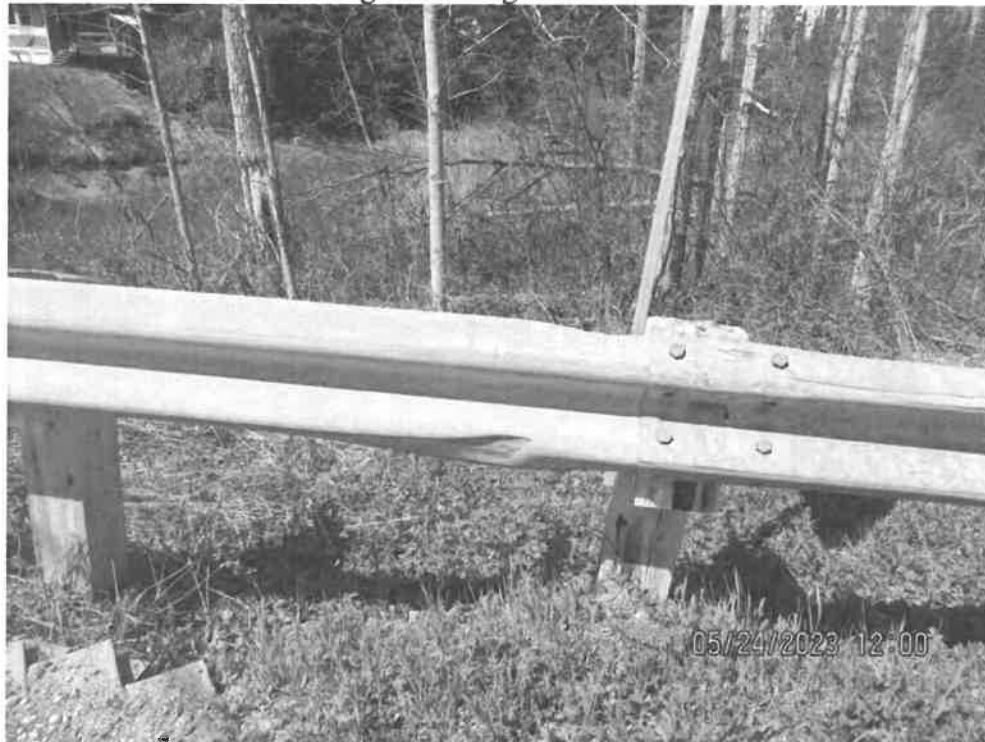


Photo 20: Guide rail splice bolts missing at all locations.



Photo 21: Impact damage at guide rail. Missing curb at 4 corners of approaches.



Photo 22: Loose sway bracing beneath bridge.



Photo 23: Medium corrosion at transom.



Photo 24: Loose curb bolts (typ.).



Photo 25: Severe rot at wearing surface.



Photo 26: Gravel accumulation at approach ramp.



Photo 27: Gravel accumulation at bearing timber (typ.).



Bi-annual Structural Inspection Red Rock Bridge No. 3

**FOR THE
TOWNSHIP OF RED ROCK**



Ref. No. JML2023013

May 2023

RED ROCK BRIDGE NO. 3 – BUCHANEN ROAD OVER TROUT CREEK

1.0 Description

Red Rock Bridge No. 3 is located on Buchanan Road over Trout Creek, approximately 0.2 kilometres south of Highway No. 628. The structure is load posted at 25/40/55 tonnes.

The structure is a single lane, single span, Double-Double Bailey Bridge with a timber deck and a longitudinal timber wear surface below the wheel locations. The deck is supported by steel stringers on steel transom beams. The ends of the transoms sit upon “double-double” pre-engineered steel trusses which bear upon steel base plates over timber levelling pads. The bridge span is 27.432 metres. The deck width between curbs is 3.3 metres.

2.0 Significant Findings

All cotter pins are missing at the top chords (32 total). One nut is missing, and one vertical bracing bolt is loose at a top chord connection. Three additional cotter pins are missing at the east side of the bridge.

The northeast bearing pin has shifted 75 mm.

The wearing surface planks flex when driven over. The ends are loose where sawcuts were made for previous stringer replacement.

Gravel has accumulated on the approach spans.

Severe rot was observed at the centre of one deck timber.

A few curb bolts were loose or missing.

Loose bolts were observed at the connection between the guide rail system and the trusses at 11 locations. There are only four bolts provided at each guide rail splice. The guide rail is not connected to a post at the southwest corner.

One bolt is missing at the top of the vertical bracing frame at the south end of the east truss.

Eight transom clamps are loose, and one is missing at the east side. 12 transom clamps are loose at the west side of the bridge.

Gravel has accumulated at the abutments bearings and levelling pads.

The north and south Narrow Bridge signs are blocked by vegetation.

Three Hazard Marker signs are loose/out of plumb.

Two stringer sets, at the eleventh and thirteenth transoms from the south end of the bridge are loose. One stringer, at the fifth transom from the south, is not fully bearing on a transom.

Vegetation growth was observed on the curbs. Impact damage was observed at the northeast and northwest curbs.

Very severe corrosion was observed at six approach span stringers.

Two rotated offset timbers were observed at the north approach guide rail. Two rotated offset timbers were observed at the south approach guide rail. One bolt is missing at the south approach west side railing system.

3.0 Conclusions and Recommendations

We recommend the following urgent remedial repairs be done within the next 1-3 months:

- Re-drive pin at northeast bearing.
- Provide all cotter pins at the top chords of the trusses. Provide one nut, and tighten one loose bracing bolt. Provide three additional cotter pins at the east side of the bridge.

We recommend the following remedial repairs be done within the next 1-2 years:

- Install new wearing surface planks over previous sawcut locations.
- Remove gravel accumulation from the approach spans.
- Tighten loose bolts and provide new nuts/bolts at the curb.
- Tighten all loose bolts between the guide rail system and the trusses. Provide proper number of bolts at all guide rail splices. Reconnect to one post.
- Provide one bolt at the top of the vertical bracing frame at the south end of the east truss.
- Tighten all loose transom clamps. Provide one transom clamp.
- Replace severely corroded stringer sets at both approaches. The deck wearing surface, and curbs will need to be removed and reinstalled to facilitate.
- Remove gravel accumulation from the bearing timbers and levelling pads.
- Remove vegetation in front of north and south Narrow Structure signs.

- Re-secure/plumb all Hazard Marker signs.
- Replace two sections of curb.
- Shim all loose offset timbers. Provide one bolt at railing system.

Since the severe rot observed at the deck timber is not located at a wheel location, this deck timber does not require replacement this time. If the rot progresses beneath the wearing surface or progresses to additional deck timbers, replacement may be required.

4.0 Estimated Construction Costs

The following are the estimated construction costs for the recommended remedial repairs:

Install new wearing surface planks over previous sawcut locations	\$ 2,500.00
Remove gravel accumulation at the ends of bridge	\$ 500.00
Tighten/provide bolts at curb	\$ 500.00
Tighten all loose bolts at guide rail to trusses connection	\$ 500.00
Provide proper number of bolts at guide rail splices	\$ 1,000.00
Provide one vertical bracing bolt	\$ 100.00
Provide all missing cotter pins, nuts, and tighten one bolt	\$ 900.00
Tighten loose transom clamps. Provide one transom clamp	\$ 1,000.00
Replace severely corroded stringer sets	\$ 17,000.00
Remove gravel from abutment bearing timbers and levelling pads	\$ 1,000.00
Re-drive pin at northeast bearing	\$ 200.00
Trim vegetation blocking Narrow Bridge signs	\$ 100.00
Reinstall three Hazard Marker signs	\$ 500.00
Replace two sections of curb	\$ 1,000.00
Shim loose offsets. Provide one bolt	\$ 300.00
Subtotal	\$ 27,100.00
Mob/Demob (15%)	\$ 4,100.00
Engineering and Contingency (35%)	\$ 10,000.00
Total Construction Cost Estimate	\$ 41,200.00 + HST

To achieve an unlimited load rating, two additional transom beams must be provided per panel (18 new transom beams total). To provide new transoms, the wearing surface and the deck will most likely require replacement, and the stringers must be removed to facilitate installation. The additional estimated construction cost to provide 18 new transoms is **\$ 72,000.00 + HST**.

The BCI is the ratio of the value of each bridge element in its current state to the total replacement value of the bridge. The overall Bridge Condition Index (BCI) of Red Rock Bridge No. 3 is 63. The BCI value of the bridge indicates the bridge is in poor to fair condition, and rehabilitation may be required to ensure the longevity of the structure.

Ontario Structure Inspection Manual – Inspection Form MTO Site Number: Red Rock Bridge No. 3

Inventory Data:			
Structure Name	Red Rock Bridge No. 3		
Main Hwy/Road #	<input type="text"/>	On <input checked="" type="checkbox"/> Under <input type="checkbox"/>	Crossing Type: <input type="checkbox"/> Navig. Water <input checked="" type="checkbox"/> Non-Navig. Water <input type="checkbox"/> Rail <input type="checkbox"/> Road <input type="checkbox"/> Ped. <input type="checkbox"/> Other
Hwy/Road Name	Buchanan Road		
Structure Location	0.2 km west of Hwy 628		
Latitude	48° 56' 16" N	Longitude	88° 18' 14" W
Owner(s)	Township of Red Rock	Heritage Designation:	<input type="checkbox"/> Not Cons. <input type="checkbox"/> Cons./not App. <input type="checkbox"/> List/not Desig. <input type="checkbox"/> Desig./not List <input type="checkbox"/> Desig. & List
MTO Region	Northwestern	Road Class:	Freeway <input type="checkbox"/> Arterial <input type="checkbox"/> Collector <input type="checkbox"/> Local <input checked="" type="checkbox"/>
MTO District	Thunder Bay	Posted Speed	<input type="text"/> No. of Lanes <input type="text" value="1"/>
Old County	Thunder Bay	AADT	<input type="text"/> % Trucks <input type="text"/>
Geographic Twp.	<input type="text"/>	Inspection Route Sequence	<input type="text"/>
Structure Type	Bailey – Double Double	Interchange Number	<input type="text"/>
Total Deck Length	<input type="text" value="33.537"/> (m)	Interchange Structure Number	<input type="text"/>
Overall Str. Width	<input type="text" value="5.49"/> (m)	Min. Vertical Clearance	<input type="text"/> (m)
Total Deck Area	<input type="text" value="114.697"/> (sq.m)	Special Routes:	<input type="checkbox"/> Transit <input type="checkbox"/> Truck <input type="checkbox"/> School <input type="checkbox"/> Bicycle
Roadway Width	<input type="text" value="3.42"/> (m)	Detour Length Around Bridge	<input type="text"/> (km)
Skew Angle	<input type="text" value="0"/> (Degrees)	Direction of Structure	North to South
No. of Spans	<input type="text" value="One"/>	Fill on Structure	<input type="text"/> (m)
Span Lengths	<input type="text" value="27.432"/> (m)		

Historical Data:			
Year Built	<input type="text"/>	Year of Last Major Rehab.	<input type="text" value="2012"/>
Last OSIM Inspection	<input type="text" value="2021"/>	Last Evaluation	<input type="text" value="2009"/>
Last Enhanced OSIM Inspection	<input type="text"/>	Current Load Limit	<input type="text" value="25 / 40 / 55"/> (tonnes)
Enhanced Access Equipment (ladder, boat, lift, etc.)	<input type="text"/>	Load Limit By-Law #	<input type="text"/>
Last Underwater Inspection	<input type="text"/>	By-Law Expiry Date	<input type="text"/>
Last Condition Survey	<input type="text"/>		
Rehab History:			
2012: KA Vanderzwaag Construction leveled bearing pads at South end of bridge.			
2017: Replaced select transoms, stringers, north abutment bearing timbers.			

Ontario Structure Inspection Manual – Inspection Form MTO Site Number: Red Rock Bridge No. 3

Field Inspection Information:			
Date of Inspection:	May 24,2023	Type of Inspection:	<input checked="" type="checkbox"/> OSIM <input type="checkbox"/> Enhanced OSIM
Inspector:	Michael Edmonds, P.Eng., JML Engineering		
Others in Party:	Mathew Currie, P.Eng., JML Engineering		
Access Equipment Used:			
Weather:	Sunny		
Temperature:	6° Celsius		

Additional Investigations Required:	Priority		
	None	Normal	Urgent
Material Condition Survey			
Detailed Deck Condition Survey:	✓		
Non-destructive Delamination Survey of Asphalt-Covered Deck:	✓		
Concrete Substructure Condition Survey:	✓		
Detailed Coating Condition Survey:	✓		
Detailed Timber Investigation	✓		
Post-Tensioned Strand Investigation	✓		
Underwater Investigation:	✓		
Fatigue Investigation:	✓		
Seismic Investigation:	✓		
Structure Evaluation:	✓		
Monitoring			
Monitoring of Deformations, Settlements and Movements:	✓		
Monitoring Crack Widths:	✓		
Investigation Notes:			

Overall Structure Notes:	
Recommended Work on Structure:	<input type="checkbox"/> None <input checked="" type="checkbox"/> Minor Rehab. <input type="checkbox"/> Major Rehab. <input type="checkbox"/> Replace
Timing of Recommended Work:	<input checked="" type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years
Overall Comments:	Maintenance and minor rehabilitation are required.
Date of Next Inspection:	2025

Suspected Deficiencies

- | | | |
|---|--|------------------------------|
| 01 Load carrying capacity | 06 Bearing not uniformly loaded/unstable | 12 Slippery surfaces |
| 02 Excessive deformations (deflections & rotations) | 07 Jammed expansion joint | 13 Flooding/channel blockage |
| 03 Continuing settlement | 08 Pedestrian/vehicular hazard | 14 Undermining of foundation |
| 04 Continuing movements | 09 Rough riding surface | 15 Unstable embankments |
| 05 Seized bearings | 10 Surface ponding | 16 Other |
| | 11 Deck drainage | |

Maintenance Needs

- | | | |
|--------------------------------------|---------------------------------|--|
| 01 Lift and Swing Bridge Maintenance | 07 Repair to Structural Steel | 13 Erosion Control at Bridges |
| 02 Bridge Cleaning | 08 Repair of Bridge Concrete | 14 Concrete Sealing |
| 03 Bridge Handrail Maintenance | 09 Repair of Bridge Timber | 15 Rout and Seal |
| 04 Painting Steel Bridge Structures | 10 Bailey Bridges – Maintenance | 16 Bridge Deck Drainage |
| 05 Bridge Deck Joint Repair | 11 Animal/Pest Control | 17 Scaling (Loose Concrete or ACR Steel) |
| 06 Bridge Bearing Maintenance | 12 Bridge Surface Repair | 18 Other |

Ontario Structure Inspection Manual – Inspection Form MTO Site Number: Red Rock Bridge No. 3
Element Data

Element Group:	Decks			Length:	27.439 m	
Element Name:	Wearing Surface			Width:	2.43 m	
Location:				Height:	0.045 m	
Material:	Wood			Count:	6 planks per wheel location	
Element Type:				Total Quantity:	67 sq. m.	
Environment:	Benign / Moderate Severe			Limited Inspection	<input type="checkbox"/>	
Protection System:	CCA					Performance Deficiencies
Condition	Units	Exc.	Good	Fair	Poor	
Data:	m ² / m / each / % / all		67			08
Comments: Planks flex when driven over. Sawcuts were made in wearing surface to replace stringers, ends of planks not nailed down. Gravel accumulation at ends of bridge.						
Recommended Work:				Maintenance Needs:		
<input type="checkbox"/> Rehab <input checked="" type="checkbox"/> Replace <input checked="" type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years				<input type="checkbox"/> Urgent <input checked="" type="checkbox"/> 1 year <input type="checkbox"/> 2 year		09, 02
Install new planks over previous sawcut locations.				Re-fasten boards. Remove gravel accumulation.		

Element Group:	Decks			Length:	27.439 m	
Element Name:	Deck Top			Width:	3.658 m	
Location:				Height:	0.045 m	
Material:	Wood			Count:	13 planks per panel x 9 panels	
Element Type:	Wood Planks (timber chesses)			Total Quantity:	100 sq. m.	
Environment:	Benign / Moderate / Severe			Limited Inspection	<input checked="" type="checkbox"/>	
Protection System:	CCA					Performance Deficiencies
Condition	Units	Exc.	Good	Fair	Poor	
Data:	m ² / m / each / % / all		100			08
Comments: Gravel accumulation at ends of bridge. One deck timber is severely rotten at the centre.						
Recommended Work:				Maintenance Needs:		
<input type="checkbox"/> Rehab <input type="checkbox"/> Replace <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years				<input type="checkbox"/> Urgent <input checked="" type="checkbox"/> 1 year <input type="checkbox"/> 2 year		02
				Remove gravel accumulation.		

Element Group:	Sidewalks/Curbs			Length:	27.439	
Element Name:	Curbs			Width:	0.152 m	
Location:	East and West sides			Height:	0.152 m	
Material:	Wood			Count:	2	
Element Type:				Total Quantity:	17 sq. m.	
Environment:	Benign / Moderate / Severe			Limited Inspection	<input type="checkbox"/>	
Protection System:	CCA					Performance Deficiencies
Condition	Units	Exc.	Good	Fair	Poor	
Data:	m ² / m / each / % / all		17			08
Comments: A few loose and missing bolts.						
Recommended Work:				Maintenance Needs:		
<input type="checkbox"/> Rehab <input type="checkbox"/> Replace <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years				<input type="checkbox"/> Urgent <input checked="" type="checkbox"/> 1 year <input type="checkbox"/> 2 year		18
				Tighten loose bolts. Provide missing nuts.		

Ontario Structure Inspection Manual – Inspection Form MTO Site Number: Red Rock Bridge No. 3
Element Data

Element Group:	Barriers	Length:	27.432 m		
Element Name:	Railing Systems	Width:			
Location:	East and West sides of deck	Height:			
Material:	Steel	Count:	2 sides		
Element Type:	Steel flex beam along Bailey Bridge	Total Quantity:	55 m		
Environment:	Benign / <u>Moderate</u> / Severe	Limited Inspection	<input type="checkbox"/>		
Protection System:	Hot dip galvanizing				Performance Deficiencies
Condition	Units	Exc.	Good	Fair	Poor
Data:	m ² / <u>m</u> / each / % / all		55		
Comments: Light to medium corrosion and impact damage throughout. Loose bolts at connection to trusses at one location, not connected to post at southwest corner. Four bolts provided at each splice. Lower bolt holes do not align. Eleven loose splice bolts.					
Recommended Work:		<input type="checkbox"/> Rehab <input type="checkbox"/> Replace <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs:	
				<input type="checkbox"/> Urgent <input checked="" type="checkbox"/> 1 year <input type="checkbox"/> 2 year Tighten loose bolts and loose splice connection.	

Element Group:	Beams/Main Longitudinal Elements	Length:	3.048 m		
Element Name:	Stringers	Width:	0.045 m		
Location:	Deck	Height:	0.102 m		
Material:	Steel	Count:	3 per stringer set, 5 sets per span, 9 spans		
Element Type:	I-type complete with diaphragms	Total Quantity:	135		
Environment:	Benign / <u>Moderate</u> / Severe	Limited Inspection	<input type="checkbox"/>		
Protection System:	Paint				Performance Deficiencies
Condition	Units	Exc.	Good	Fair	Poor
Data:	m ² / m / <u>each</u> / % / all	21	63	45	6
Comments: Medium corrosion was observed throughout the stringers. Some stringers have been replaced. Fifth transom from north and south stringers not bearing, loose and missing diaphragms therefore unbraced. 11 th (both sides) and 13 th stringer sets from north (south side) are loose. One stringer set very severely corroded mid span.					
Recommended Work:		<input type="checkbox"/> Rehab <input type="checkbox"/> Replace <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs:	
				<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year	

Element Group:	Beams/Main Longitudinal Elements	Length:	5.284 m		
Element Name:	Transom Beams	Width:	0.114 m		
Location:	Deck	Height:	0.254 m		
Material:	Steel	Count:	2 per panel		
Element Type:	I-type	Total Quantity:	86 sq. m.		
Environment:	Benign / <u>Moderate</u> / Severe	Limited Inspection	<input type="checkbox"/>		
Protection System:	Paint				Performance Deficiencies
Condition	Units	Exc.	Good	Fair	Poor
Data:	<u>m²</u> / m / each / % / all	40	46		
Comments: Paint peeling and light to medium corrosion was observed throughout. Nine transom beams have been replaced. There are only 2 transom beams per bay.					
Recommended Work:		<input type="checkbox"/> Rehab <input type="checkbox"/> Replace <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs:	
				<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year	

Ontario Structure Inspection Manual – Inspection Form MTO Site Number: Red Rock Bridge No. 3
Element Data

Element Group:	Trusses/Arches		Length:	27.432 m		
Element Name:	Top and Bottom Chords		Width:	0.051 m		
Location:	East and West sides		Height:	0.102 m		
Material:	Steel		Count:	9 panels		
Element Type:			Total Quantity:	90 sq. m.		
Environment:	Benign / Moderate / Severe		Limited Inspection	<input type="checkbox"/>		
Protection System:	Paint					Performance Deficiencies
Condition	Units	Exc.	Good	Fair	Poor	
Data:	m ² /m / each / % / all		64	26		
Comments: Paint peeling and light to medium corrosion throughout. Impact damage to flange at top chord of top truss at north end, both west and east trusses. East truss north end leaning 1.7°.						
Recommended Work:			<input type="checkbox"/> Rehab <input type="checkbox"/> Replace		Maintenance Needs:	
			<input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year	

Element Group:	Trusses/Arches		Length:	1.448 m, 1.024 m		
Element Name:	Verticals/Diagonals		Width:	0.038 m		
Location:	East and West sides		Height:	0.076 m		
Material:	Steel		Count:	9 panels each side		
Element Type:			Total Quantity:	275 sq. m.		
Environment:	Benign / Moderate / Severe		Limited Inspection	<input type="checkbox"/>		
Protection System:	Paint					Performance Deficiencies
Condition	Units	Exc.	Good	Fair	Poor	
Data:	m ² /m / each / % / all		192	75	8	01
Comments: Paint peeling and light to medium corrosion throughout. A bent flat bar diagonal member was observed at the vertical bracing frame at the north end of the east truss. A bolt is missing at the top of the vertical bracing frame at the south end of the east truss. Damaged gusset plate, exterior truss, at north end, east side. Damages appear to be minor.						
Recommended Work:			<input checked="" type="checkbox"/> Rehab <input type="checkbox"/> Replace		Maintenance Needs:	
			<input checked="" type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year	
Replace the missing fastener.						

Element Group:	Trusses/Arches		Length:			
Element Name:	Connections		Width:			
Location:	East and West sides		Height:			
Material:	Steel		Count:			
Element Type:	Panel Pins		Total Quantity:			
Environment:	Benign / Moderate / Severe		Limited Inspection	<input type="checkbox"/>		
Protection System:	Paint					Performance Deficiencies
Condition	Units	Exc.	Good	Fair	Poor	
Data:	m ² /m / each / (%) all			80	20	01
Comments: All cotter pins are missing at top chords (32 total). Three additional missing cotter pins at east side.						
Recommended Work:			<input type="checkbox"/> Rehab <input type="checkbox"/> Replace		Maintenance Needs:	
			<input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		<input checked="" type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year	
Replace all missing cotter pins and drive panel pin back into position.						

Ontario Structure Inspection Manual – Inspection Form MTO Site Number: Red Rock Bridge No. 3
Element Data

Element Group:	Trusses/Arches		Length:			
Element Name:	Connections		Width:			
Location:	East and West sides		Height:			
Material:	Steel		Count:	4 clamps per transom, 19 transoms		
Element Type:	Transom Clamps		Total Quantity:	76		
Environment:	Benign / <u>Moderate</u> / Severe		Limited Inspection	<input type="checkbox"/>		
Protection System:	Paint					Performance Deficiencies
Condition	Units	Exc.	Good	Fair	Poor	Performance Deficiencies
Data:	m ² / m <u>each</u> % / all		54		22	
Comments: East – 8 loose, 1 missing. West – 12 loose.						
Recommended Work:			<input type="checkbox"/> Rehab <input type="checkbox"/> Replace <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs: 10	
					<input type="checkbox"/> Urgent <input checked="" type="checkbox"/> 1 year <input type="checkbox"/> 2 year Tighten and secure loose transom clamps. Provide one transom clamp.	

Element Group:	Bracing		Length:	5.105 m		
Element Name:	Sway Bracing		Width:	0.025 m diameter		
Location:	Underside of deck between trusses		Height:			
Material:	Steel		Count:	2 per panel		
Element Type:	Rod		Total Quantity:	18		
Environment:	Benign / <u>Moderate</u> / Severe		Limited Inspection	<input type="checkbox"/>		
Protection System:	Paint					Performance Deficiencies
Condition	Units	Exc.	Good	Fair	Poor	Performance Deficiencies
Data:	m ² / m <u>each</u> % / all			14	4	
Comments:						
Recommended Work:			<input type="checkbox"/> Rehab <input type="checkbox"/> Replace <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs:	
					<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year	

Element Group:	Coatings		Length:			
Element Name:	Structural Steel		Width:			
Location:	Bailey Bridge		Height:			
Material:	Steel		Count:			
Element Type:	Various		Total Quantity:	365 sq. m.		
Environment:	Benign / <u>Moderate</u> / Severe		Limited Inspection	<input type="checkbox"/>		
Protection System:	Painted					Performance Deficiencies
Condition	Units	Exc.	Good	Fair	Poor	Performance Deficiencies
Data:	<u>m</u> / m / each / % / all		105	130	130	
Comments: Light corrosion and some coating failure.						
Recommended Work:			<input type="checkbox"/> Rehab <input type="checkbox"/> Replace <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs:	
					<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year	

Ontario Structure Inspection Manual – Inspection Form MTO Site Number: Red Rock Bridge No. 3
Element Data

Element Group:	Coatings		Length:			
Element Name:	Railing systems		Width:			
Location:	Approaches and bridge		Height:			
Material:	Steel		Count:			
Element Type:	Steel flex beam		Total Quantity:			
Environment:	Benign / <u>Moderate</u> / Severe		Limited Inspection	<input type="checkbox"/>		
Protection System:	Hot dip galvanizing					Performance Deficiencies
Condition Data:	Units m ² / m / each <u>(%)</u> / all	Exc.	Good 100	Fair	Poor	
Comments: Light corrosion throughout.						
Recommended Work:			<input type="checkbox"/> Rehab <input type="checkbox"/> Replace <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs:	
					<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year	

Element Group:	Abutments		Length:	0.457 m		
Element Name:	Bearings		Width:	0.381 m		
Location:	North and South Abutments		Height:	0.097 m		
Material:	Steel		Count:	2 each abutment		
Element Type:	Pin and Shoe bracket		Total Quantity:	4		
Environment:	Benign / <u>Moderate</u> / Severe		Limited Inspection	<input type="checkbox"/>		
Protection System:	Paint					Performance Deficiencies
Condition Data:	Units m ² / m <u>(each)</u> % / all	Exc.	Good	Fair 4	Poor	Performance Deficiencies 06
Comments: Paint peeling and medium corrosion. Pin on northeast bracket has loosened by 75 mm. Southwest cotter pin is missing. Gravel accumulation.						
Recommended Work:			<input type="checkbox"/> Rehab <input type="checkbox"/> Replace <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs:	
					<input checked="" type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year Drive pin back into position. Remove gravel.	

Element Group:	Abutments		Length:	1.397 m		
Element Name:	Bearings		Width:	0.900 m		
Location:	North and South abutments		Height:	0.050 m		
Material:	Steel		Count:	2 each abutment		
Element Type:	Base plate		Total Quantity:	4		
Environment:	Benign / <u>Moderate</u> / Severe		Limited Inspection	<input type="checkbox"/>		
Protection System:	Paint					Performance Deficiencies
Condition Data:	Units m ² / m <u>(each)</u> % / all	Exc.	Good	Fair 4	Poor	Performance Deficiencies
Comments: Paint peeling with medium surface corrosion. Accumulation of gravel at northwest abutment.						
Recommended Work:			<input type="checkbox"/> Rehab <input type="checkbox"/> Replace <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs:	
					<input type="checkbox"/> Urgent <input checked="" type="checkbox"/> 1 year <input type="checkbox"/> 2 year Remove gravel off base plates and bearings.	

Ontario Structure Inspection Manual – Inspection Form MTO Site Number: Red Rock Bridge No. 3
Element Data

Element Group:	Abutments	Length:	0.3 m		
Element Name:	Bearings	Width:	7.0 m		
Location:	North and South abutments	Height:	0.300 m		
Material:	Wood	Count:	3 per abutment		
Element Type:	Leveling Pad	Total Quantity:	6 timbers		
Environment:	Benign / Moderate / Severe	Limited Inspection	<input type="checkbox"/>		
Protection System:	Penta				Performance Deficiencies
Condition Data:	Units m ² / m (each) % / all	Exc.	Good 6	Fair	Poor
Comments: Gravel accumulation at south leveling pad.					
Recommended Work:		<input type="checkbox"/> Rehab	<input type="checkbox"/> Replace	Maintenance Needs:	
		<input type="checkbox"/> 1-5 years	<input type="checkbox"/> 6-10 years	<input type="checkbox"/> Urgent	<input type="checkbox"/> 1 year <input type="checkbox"/> 2 year
18					

Element Group:	Embankments and Streams	Length:			
Element Name:	Streams and Waterways	Width:			
Location:		Height:			
Material:		Count:			
Element Type:		Total Quantity:	All		
Environment:	Benign / Moderate / Severe	Limited Inspection	<input type="checkbox"/>		
Protection System:					Performance Deficiencies
Condition Data:	Units m ² / m / each / % (all)	Exc.	Good X	Fair	Poor
Comments:					
Recommended Work:		<input type="checkbox"/> Rehab	<input type="checkbox"/> Replace	Maintenance Needs:	
		<input type="checkbox"/> 1-5 years	<input type="checkbox"/> 6-10 years	<input type="checkbox"/> Urgent	<input type="checkbox"/> 1 year <input type="checkbox"/> 2 year

Element Group:	Embankments and Streams	Length:			
Element Name:	Embankments	Width:			
Location:	North and South embankments	Height:			
Material:	Earth	Count:	6		
Element Type:		Total Quantity:	6		
Environment:	Benign / Moderate / Severe	Limited Inspection	<input type="checkbox"/>		
Protection System:					Performance Deficiencies
Condition Data:	Units m ² / m / each / % (all)	Exc.	Good 6	Fair	Poor
Comments: Light erosion at south embankment.					
Recommended Work:		<input type="checkbox"/> Rehab	<input type="checkbox"/> Replace	Maintenance Needs:	
		<input type="checkbox"/> 1-5 years	<input type="checkbox"/> 6-10 years	<input type="checkbox"/> Urgent	<input type="checkbox"/> 1 year <input type="checkbox"/> 2 year

Element Data

Ontario Structure Inspection Manual – Inspection Form MTO Site Number: Red Rock Bridge No. 3

Element Group:	Embankments and Streams		Length:			
Element Name:	Slope Protection		Width:			
Location:	North and South embankments		Height:			
Material:	Stones at North, Grass at South		Count:	6		
Element Type:			Total Quantity:	6		
Environment:	Benign / Moderate / Severe		Limited Inspection	<input type="checkbox"/>		
Protection System:						Performance Deficiencies
Condition	Units	Exc.	Good	Fair	Poor	
Data:	m ² / m / each / % (all)		6			15
Comments: Slopes are stable.						
Recommended Work:			<input type="checkbox"/> Rehab <input type="checkbox"/> Replace <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs:	
					<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year	

Element Group:	Signs		Length:			
Element Name:	Narrow Structure Signs		Width:			
Location:	50 m from approaches		Height:			
Material:	Steel		Count:	1 each approach		
Element Type:	Hot dip galvanizing/Painted		Total Quantity:	2		
Environment:	Benign Moderate / Severe		Limited Inspection	<input type="checkbox"/>		
Protection System:	Hot dip galvanizing/Paint					Performance Deficiencies
Condition	Units	Exc.	Good	Fair	Poor	
Data:	m ² / m / (each) % / all		2			08
Comments: South approach sign covered by trees. North approach sign partially blocked by vegetation.						
Recommended Work:			<input type="checkbox"/> Rehab <input type="checkbox"/> Replace <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs:	
					<input type="checkbox"/> Urgent <input checked="" type="checkbox"/> 1 year <input type="checkbox"/> 2 year	
			Remove vegetation.			

Element Group:	Signs		Length:			
Element Name:	Hazard Marker Signs		Width:			
Location:	Corners of Structure		Height:			
Material:	Steel		Count:	1 each corner		
Element Type:			Total Quantity:	4		
Environment:	Benign / (Moderate) / Severe		Limited Inspection	<input type="checkbox"/>		
Protection System:	Hot dip galvanizing/Paint					Performance Deficiencies
Condition	Units	Exc.	Good	Fair	Poor	
Data:	m ² / m / (each) % / all		4			08
Comments: Northeast, southwest, and southeast signs are loose.						
Recommended Work:			<input type="checkbox"/> Rehab <input type="checkbox"/> Replace <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs:	
					<input type="checkbox"/> Urgent <input checked="" type="checkbox"/> 1 year <input type="checkbox"/> 2 year	
			Re-align signs vertically.			

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Element Data

Element Group:	Approaches		Length:	3.280 m		
Element Name:	Wearing Surface		Width:	2.40 m		
Location:	North and South ramps		Height:	0.045 m		
Material:	Wood		Count:	6 planks per wheel location		
Element Type:	Longitudinal planks at running boards		Total Quantity:	16 sq. m.		
Environment:	Benign / <u>Moderate</u> / Severe		Limited Inspection <input type="checkbox"/>			
Protection System:	CCA					Performance Deficiencies
Condition Data:	Units (m ²) / m / each / % / all	Exc.	Good 16	Fair	Poor	
Comments:						
Recommended Work:			<input type="checkbox"/> Rehab <input type="checkbox"/> Replace <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs:	
					<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year	

Element Group:	Approaches		Length:	3.658 m		
Element Name:	Approach Span		Width:	0.152 m		
Location:	North and South ramps		Height:	0.045 m		
Material:	Wood		Count:	10 per approach		
Element Type:	Timber Chesses		Total Quantity:	73 sq. m.		
Environment:	Benign / <u>Moderate</u> / Severe		Limited Inspection <input type="checkbox"/>			
Protection System:	CCA					Performance Deficiencies
Condition Data:	Units (m ²) / m / each / % / all	Exc.	Good 73	Fair	Poor	
Comments:						
Recommended Work:			<input type="checkbox"/> Rehab <input type="checkbox"/> Replace <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs:	
					<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year	

Element Group:	Approaches		Length:	3.040 m		
Element Name:	Approach Span		Width:	0.080 m		
Location:	North and South ramps		Height:	0.130 m		
Material:	Steel		Count:	15 per approach		
Element Type:	I-type stringers		Total Quantity:	90 m		
Environment:	Benign / <u>Moderate</u> / Severe		Limited Inspection <input type="checkbox"/>			
Protection System:	Painted					Performance Deficiencies
Condition Data:	Units m ² (m) / each / % / all	Exc.	Good	Fair 70	Poor 20	
Comments: Medium to very severe corrosion observed throughout the bottom sections of steel. Bottom flange reduced to 72 mm wide, 1 mm thick at edges. Approach stringer is corroded through web at north end.						
Recommended Work:			<input type="checkbox"/> Rehab <input checked="" type="checkbox"/> Replace <input checked="" type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs:	
					<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year	
Replace severely corroded stringer sets at both approaches.						

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Element Data

Element Group:	Approaches		Length:			
Element Name:	Approach span		Width:	4.0 m		
Location:	North and South ramps		Height:			
Material:	Wood		Count:	1 each end		
Element Type:	Sleeper		Total Quantity:	2		
Environment:	Benign (Moderate) / Severe		Limited Inspection	<input checked="" type="checkbox"/>		
Protection System:	Penta					Performance Deficiencies
Condition Data:	Units m ² / m / (each) % / all	Exc.	Good 2	Fair	Poor	
Comments: Wood sleeper is buried.						
Recommended Work:			<input type="checkbox"/> Rehab <input type="checkbox"/> Replace <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs:	
					<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year	

Element Group:	Approaches		Length:	3.049 m		
Element Name:	Curbs		Width:	0.150 m		
Location:	North and South ramps		Height:	0.150 m		
Material:	Wood		Count:	2 per approach		
Element Type:			Total Quantity:	4 sq. m.		
Environment:	Benign / (Moderate) / Severe		Limited Inspection	<input type="checkbox"/>		
Protection System:	CCA					Performance Deficiencies
Condition Data:	Units m ² / m / each / % / all	Exc.	Good 4	Fair	Poor	
Comments: Vegetation growth on north and south approaches. Curbs loose at southwest and southeast corner. Two damaged sections at northeast and northwest corner.						
Recommended Work:			<input type="checkbox"/> Rehab <input checked="" type="checkbox"/> Replace <input checked="" type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs:	
Replace 2 sections of curb.					18 <input type="checkbox"/> Urgent <input checked="" type="checkbox"/> 1 year <input type="checkbox"/> 2 year	
			Remove vegetation off curbs. Refasten loose curb sections.			

Element Group:	Approaches		Length:	6.0 m		
Element Name:	Railing Systems		Width:			
Location:	North and South approaches		Height:			
Material:	Wood and Steel		Count:	2 per approach		
Element Type:	Steel flex beam on wood post		Total Quantity:	24 m		
Environment:	(Benign) / Moderate / Severe		Limited Inspection	<input type="checkbox"/>		
Protection System:	Hot Dip galvanizing					Performance Deficiencies
Condition Data:	Units m ² (m) each / % / all	Exc.	Good	Fair 24	Poor	
Comments: Light to medium corrosion and impact damage to steel beam guide rail. Two rotated offset northwest corner. One rotated southeast. One missing bolt southwest. One rotated at southwest corner						
Recommended Work:			<input checked="" type="checkbox"/> Rehab <input type="checkbox"/> Replace <input checked="" type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years		Maintenance Needs:	
Provide bolt. Re-plumb offset timbers.					<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year	



Photo 1: North approach.



Photo 2: South approach.



Photo 3: Upstream view.

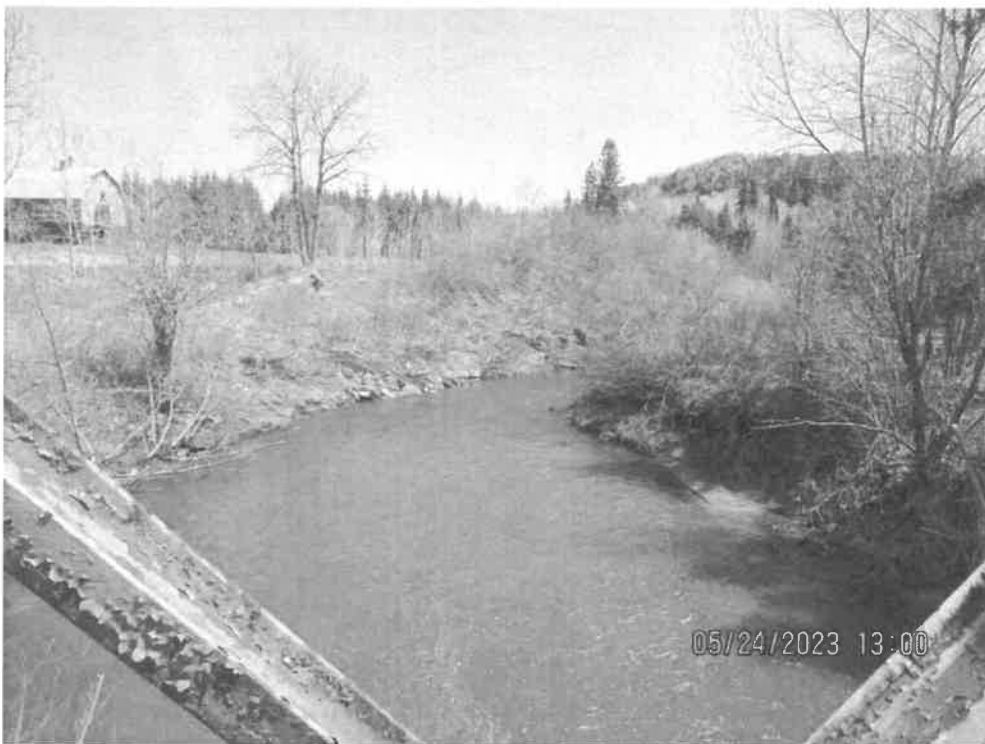


Photo 4: Downstream view.



Photo 5: Upstream elevation.



Photo 6: Downstream elevation.



Photo 7: Northeast embankment.



Photo 8: Southeast embankment.



Photo 9: Northwest embankment.



Photo 10: Southwest embankment.



Photo 11: Deck cross-section.



Photo 12: North abutment.



Photo 13: South abutment.



Photo 14: Underside of deck (typ.).

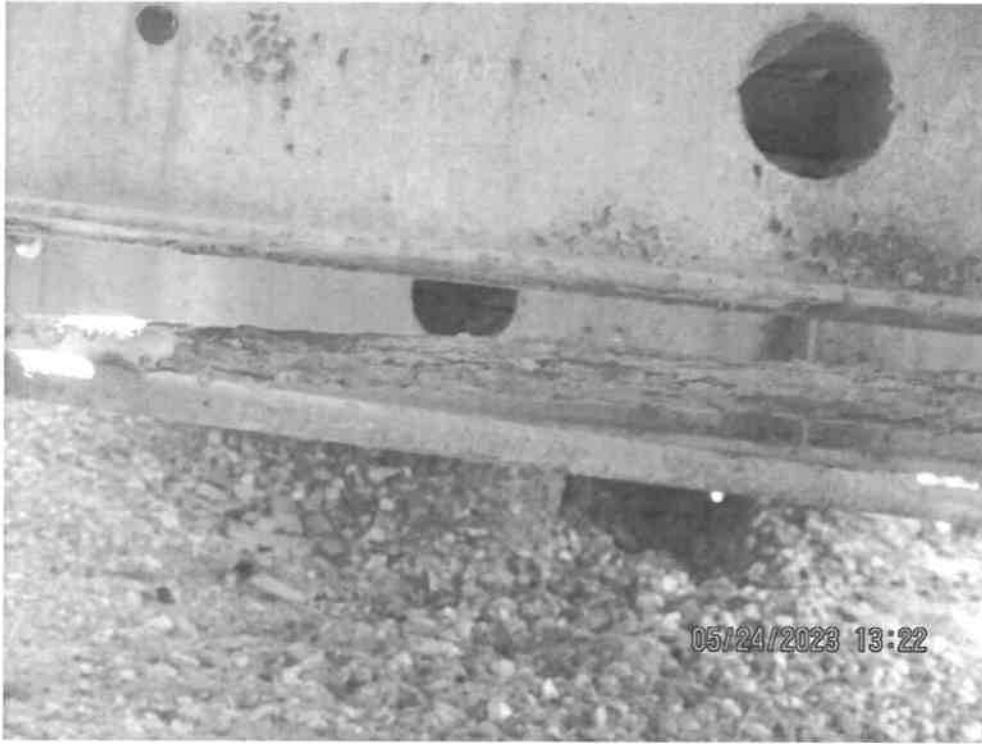


Photo 15: Severe corrosion at diagonal bracing at south end.



Photo 16: Loose bolt at curb (typ.).



Photo 17: Rotated offset (typ.).



Photo 18: Missing bolts at guide rail splice (typ.).



Photo 19: Missing transom clamp at east side.



Photo 20: Severely corroded stringers (typ.).



Photo 21: Stringer set not bearing on transom.



Photo 22: Severe corrosion at end diaphragm of stringer set.



Photo 23: Gravel accumulation at abutment (typ.).



Photo 24: Severe impact damage at curb.

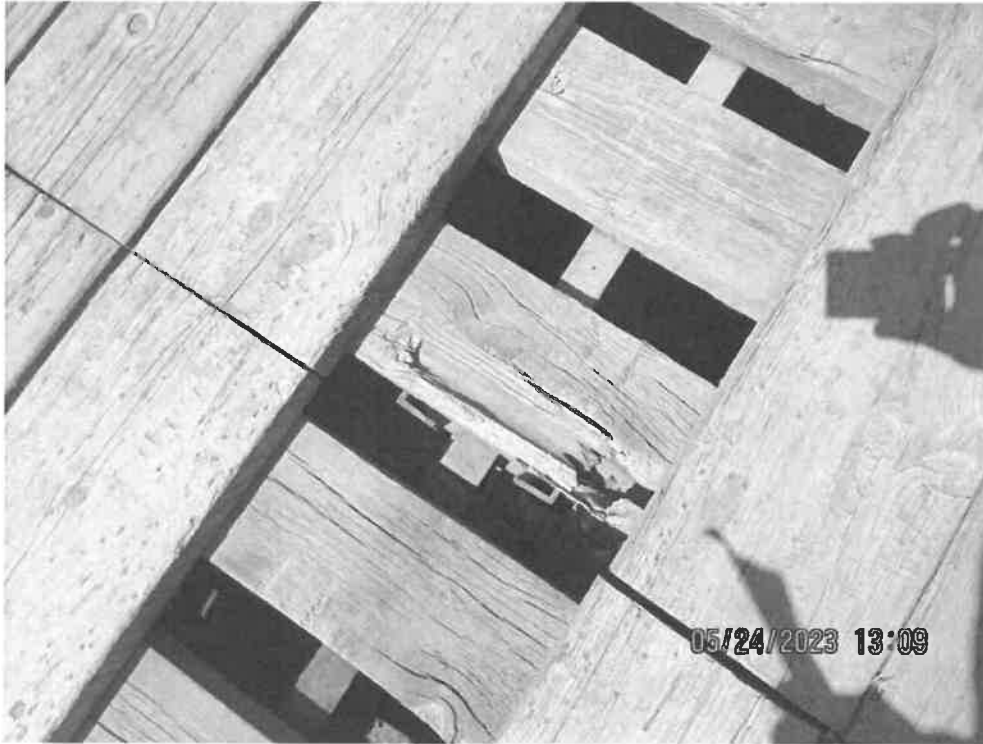


Photo 25: Severe rot at deck timber.



Photo 26: Gravel accumulation at approach (typ.).

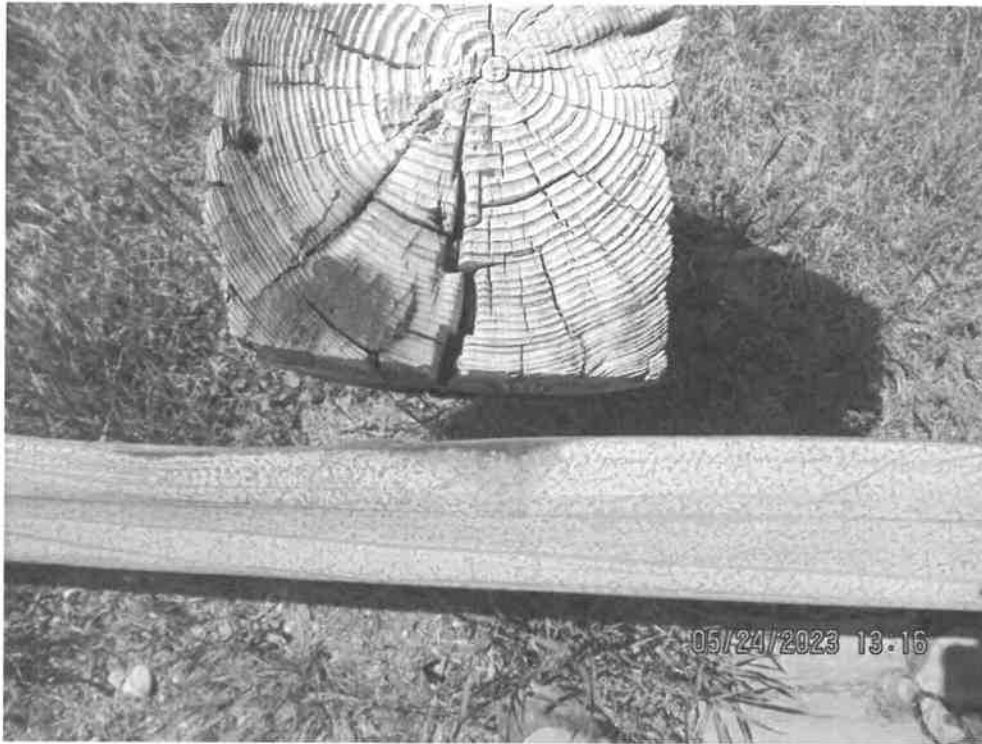


Photo 27: Missing thru bolt at guide rail south approach.



Photo 28: Missing truss brace bolt at southeast corner.

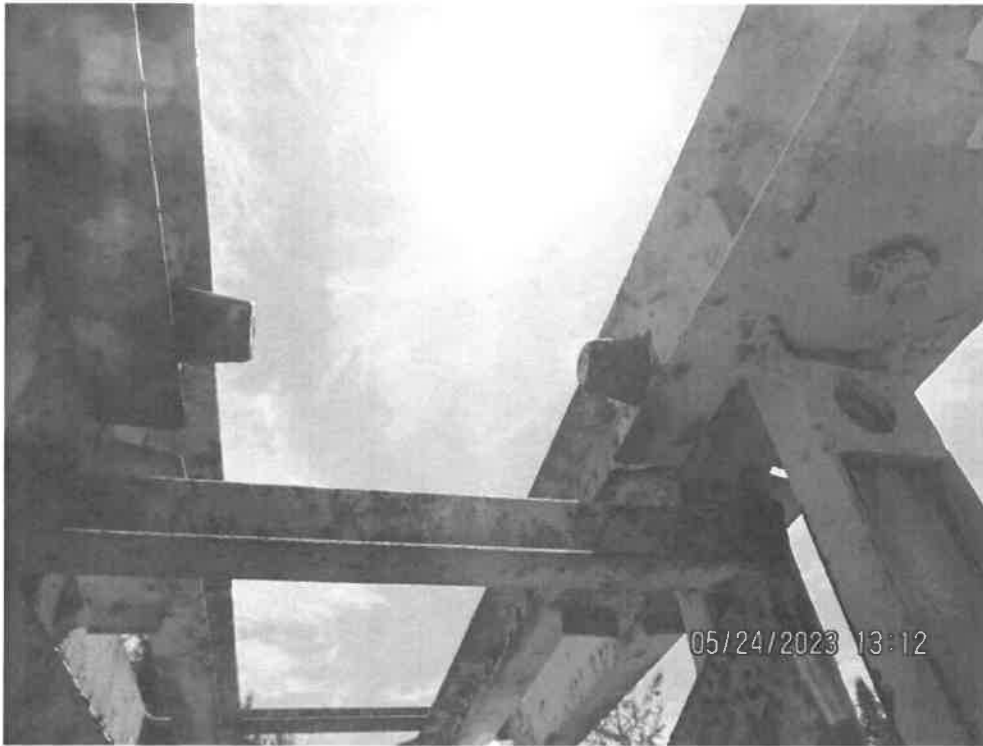


Photo 29: Missing cotter pins at panel pins (typ.).

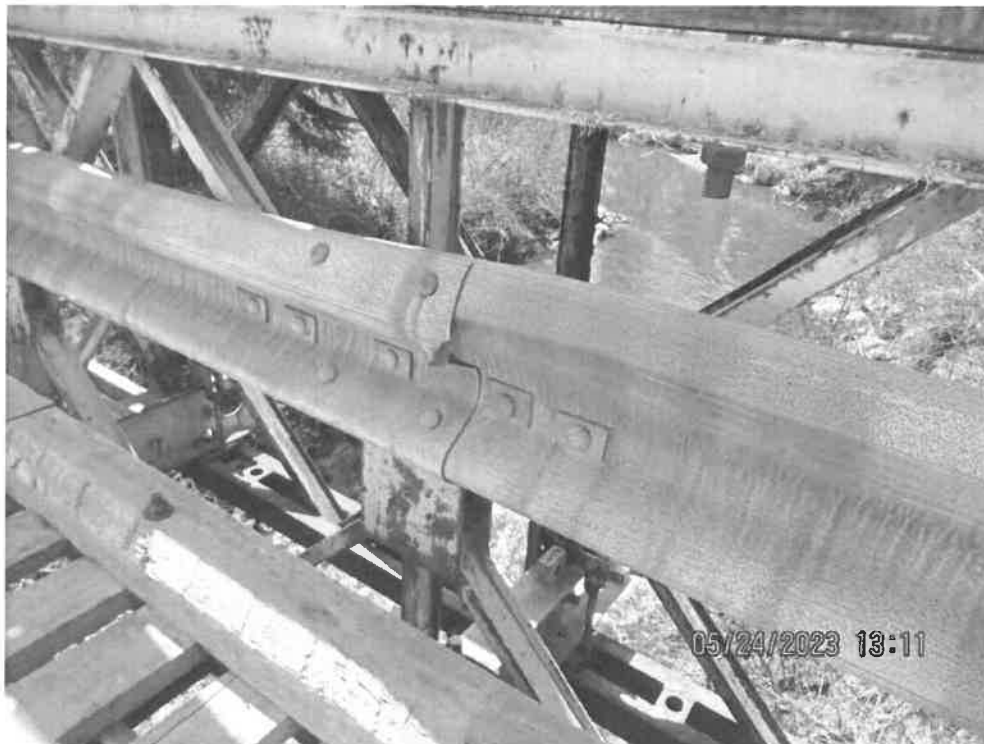


Photo 30: Impact damage at curb and guide rail.