Duke Street Bridge over Wabigoon River

For The

City of Dryden

Ref. No. JML2024090

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DUKE STREET BRIDGE OVER WABIGOON RIVER

1.0 Description

The Duke Street Bridge over Wabigoon River is located approximately 2 km west of the Duke Street/Hwy 17 intersection. The structure is currently not load posted.

The structure is a double lane, single span bridge consisting of steel girders and a concrete deck supported on concrete abutments. The overall length of the bridge is approximately 24.9 meters, and the overall width of the bridge is 11.0 meters.

The deck consists of an asphalt wearing surface on a 225 mm thick reinforced concrete deck. Concrete barriers exist along both sides of the bridge. The railing system consists of galvanized steel, 90 mm diameter HSS, and is located on top of the concrete barriers. A steel flex beam guide rail system is located at the approaches.

The deck is supported by five-W900 painted steel girders with steel end and intermediate diaphragms. The ends of each steel girder sit upon elastomeric bearing pads at the abutments. The abutments and wingwalls consist of reinforced, cast-in-place concrete.

2.0 Significant Findings

The guide rail end termination is loose and broken off at the posts at the southeast, southwest and northeast corners of the site.

There are no deck drains at the bridge.

Gravel has accumulated in the expansion joints.

Spalling was observed at the base of the barriers at the barrier joints.

The sealant between the barriers has failed at a few locations.

Spalling with efflorescence was observed at the south exterior face of the deck at the barrier joints.

Three full height medium cracks were observed at the east abutment. Delamination and gravel/disintegrated concrete accumulation was observed at the west abutment.

Severe spalling, delamination, and concrete disintegration was observed along the top of both ballast walls.

One wide crack was observed at the curb and gutter at the southeast corner of the site. Impact

and abrasion damage was observed at the curb and gutters at the southeast and southwest corners of the site.

Several timber spacers are rotated, and a few are broken behind the guide rail at the southwest approach.

The asphalt is worn in front of the base of the concrete barriers.

The asphalt aggregates are exposed on the surface over the entire deck.

Asphalt sealant is missing at the approach slab joints.

Sandbags have remained since 2022 to stabilize the base of the southeast and southwest embankments.

A few of the bearings contain horizontal edge cracks.

Spalling at the concrete curb was observed throughout.

Six timber guide rail posts were observed to have medium rot.

A few of the railing lights flicker.

3.0 Conclusions and Recommendations

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 Duke Street Bridge over Wabigoon River is 73. The BCI value of the bridge indicates the bridge is in good condition.

Although the deck expansion joint seals could not be directly inspected, the severe spalling observed at the top of the ballast walls indicates water has leaked through the seals onto the ballast walls, increasing the rate of deterioration. Therefore, we recommend the expansion joint seals be replaced.

We recommend the following remedial repairs be done within one year:

- Replace termination posts at ends of steel beam guide rails at three corners of the site.
- Replace light bulbs within railing.

We recommend the remaining repairs be done within the next 1-5 years:

- Replace the expansion joints seals, armouring and end dams.
- Replace asphalt and waterproofing system.
- Provide deck drains.
- Remove gravel from the deck joints.

- Repair the spalls at the base of the barriers.
- Replace the sealant at the barrier joints.
- Replace asphalt sealant at the approach slab joints.
- Repair the spalls at the south exterior face of the deck.
- Replace the bearings.
- Inject the cracks at the east abutment with epoxy.
- Repair the delamination and disintegrated concrete areas at the west abutment.
- Repair the spalled, delaminated and disintegrated areas at the ballast walls. Reconstruct the top of the ballast walls.
- Replace damaged sections of curb and gutter.
- Replace and/or re-plumb rotated offset blocks, and tighten loose bolts at the guide rails.
- Replace rotten guide rail posts.

We recommend the next bridge inspection be done in 2026.

4.0 Estimated Construction Costs

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

Replace guide rail termination posts	$ 3,000.00
Replace expansion joint assemblies, end dams and seals	$ 100,000.00
Replace asphalt and waterproofing system	$ 60,000.00
Provide deck drains	$ 8,000.00
Remove gravel from deck joints	$ 500.00
Repair spalls at barriers	$ 3,500.00
Replace sealant and backer rod at barriers	$ 2,500.00
Repair spalls at exterior face of deck	$ 4,500.00
Replace sealant at asphalt approach slab joints	$ 1,500.00
Replace bearings	$ 39,000.00
Inject the cracks at the east abutment	$ 6,500.00
Repair the west abutment delaminated areas	$ 6,500.00
Repair the ballast walls	$ 8,000.00
Reconstruct the top of the ballast walls	$ 16,500.00
Replace/re-plumb offset blocks, tighten loose bolts	$ 1,000.00
Replace damaged curb and gutter	$ 3,500.00
Replace rotten guide rail posts	$ 2,000.00
Subtotal	$ 266,500.00
Mob/Demob (20%)	$ 53,500.00
Engineering/Contingency (35%)	$ 93,000.00
Total Estimated Construction Cost	**$ 413,000.00 + HST**

Since there are significant costs required to complete all of the remedial repairs, we recommend the City of Dryden consider having a detailed deck condition survey and feasibility study done by a consultant prior to implementing these repairs. The purpose of this is to assess the condition of the top of the deck, and to review rehabilitation options (i.e. replace expansion joints vs semi-integral abutments, replace barrier walls with new system vs repair, etc.) to determine a feasible

rehabilitation solution.

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.

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Inventory Data:

Structure Name	Duke Street Bridge Over Wabigoon River		
Main Hwy/Road #	Hwy 594 On ☒ Under ☐	Crossing Type:	☒ Navig. Water ☐ Non-Navig. Water ☐ Rail ☐ Road ☐ Ped. ☐ Other
Hwy/Road Name	Highway 594/Duke Street		
Structure Location	2 km west of Hwy 594/Hwy 17 intersection		
Latitude	49° 46’ 55” N	Longitude	92° 50’ 35” W
Owner(s)	City of Dryden	Heritage Designation:	☒ Not Cons. ☐ Cons./not App. ☐ List/not Desig. ☐ Desig./not List ☐ Desig. & List
MTO Region	Northwestern	Road Class:	Freeway ☐ Arterial ☒ Collector ☐ Local ☐
MTO District	Thunder Bay	Posted Speed	50 No. of Lanes 2
Old County	Rainy River	AADT	% Trucks
Geographic Twp.	544	Inspection Route Sequence	
Structure Type	I-beam or Girders	Interchange Number	
Total Deck Length	24.93 (m)	Interchange Structure Number	
Overall Str. Width	11.0 (m)	Min. Vertical Clearance	(m)
Total Deck Area	274 (sq.m)	Special Routes:	☐ Transit ☒ Truck ☐ School ☐ Bicycle
Roadway Width	10.1 (m)	Detour Length Around Bridge	9 (km)
Skew Angle	0 (Degrees)	Direction of Structure	East / West
No. of Spans	1	Fill on Structure	(m)
Span Lengths	24.65 (m)		

Historical Data:

Year Built		Year of Last Major Rehab.	2002
Last OSIM Inspection	2022	Last Evaluation	
Last Enhanced OSIM Inspection		Current Load Limit	/ / (tonnes)
Enhanced Access Equipment (ladder, boat, lift, etc.)		Load Limit By-Law #	
Last Underwater Inspection		By-Law Expiry Date	
Last Condition Survey	1997		

Rehab History: (Date/description)

1997: Structural steel painted.
2002: Deck replacement and bridge widening/realignment.

Field Inspection Information:			
Date of Inspection:	October 9, 2024	Type of Inspection:	☒OSIM ☐ Enhanced OSIM
Inspector:	Mohamed Chehabeddine, EIT, JML Engineering		
Others in Party:	Lucas Sandberg, JML Engineering		
Access Equipment Used:	Boat		
Weather:	Sunny		
Temperature:	18° C		

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: Consider detailed deck condition survey since large rehabilitation scope of work is looming.			

Overall Structure Notes:	
Recommended Work on Structure:	☐ None ☐ Minor Rehab. ☒ Major Rehab. ☐ Replace
Timing of Recommended Work:	☒ 1 to 5 years ☐ 6 to 10 years
Overall Comments:	Consider a detailed deck condition survey. Replace guide rail end posts. Replace deck joint assemblies. Replace asphalt and waterproofing. Provide deck drains. Repair spalls at south face of deck and barriers. Seal joints between barriers. Remove gravel from joints and replace joint seals. Repair delamination and spalling at abutments and ballast walls. Inject cracks with epoxy at abutments. Replace bearings. Tighten loose guide rail bolts and reset offsets. Replace curb and gutter sections.
Date of Next Inspection:	2026

Suspected Performance Deficiencies

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

Maintenance Needs

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

Element Group:	**Decks**	**Length:**	24.93 m
Element Name:	**Wearing Surface**	**Width:**	10.1 m
Location:	Entire deck	**Height:**	0.1 m
Material:	Asphalt	**Count:**	
Element Type:		**Total Quantity:**	252 sq m
Environment:	**Benign / Moderate / (Severe)**	**Limited Inspection**	☐
Protection System:	None		

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	**Perform. Deficiencies**
	(m²) / m / each / % / all			249	2	08, 10

Comments:

Several patched potholes at east end. Drainage toward south side. No deck drains on bridge. Asphalt surface abrasion over most of deck.

Recommended Work:	☐Rehab ☒ Replace	**Maintenance Needs:**	
	☒1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☐ 2 year	
Provide deck drains. Replacing asphalt and waterproofing as part of future rehabilitation project.			

Element Group:	**Decks**	**Length:**	24.93 m
Element Name:	**Deck Top**	**Width:**	11 m
Location:	Entire deck	**Height:**	0.225 m
Material:	Cast-in-place concrete	**Count:**	
Element Type:	Cast-in -place conc on supports	**Total Quantity:**	274 sq m
Environment:	**Benign / (Moderate) / Severe**	**Limited Inspection**	☒
Protection System:	Asphalt		

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	**Perform. Deficiencies**
	(m²) / m / each / % / all		268	3	2	

Comments:

Unable to inspect deck top due to wearing surface.

Recommended Work:	☐Rehab ☐ Replace	**Maintenance Needs:**	
	☐1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☐ 2 year	

Element Group:	**Decks**	**Length:**	2 m
Element Name:	**Soffit – Thin Slab**	**Width:**	11.4 m
Location:	End	**Height:**	
Material:	Cast-in-place concrete	**Count:**	2 ends
Element Type:		**Total Quantity:**	46 sq m
Environment:	**Benign / (Moderate) / Severe**	**Limited Inspection**	☐
Protection System:	None		

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	**Perform. Deficiencies**
	(m²) / m / each / % / all		46			

Comments:

Recommended Work:	☐Rehab ☐ Replace	**Maintenance Needs:**	
	☐1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☐ 2 year	

Element Group:	**Decks**	**Length:**	20.93 m
Element Name:	**Soffit – Thin Slab**	**Width:**	1 m
Location:	Exterior	**Height:**	
Material:	Cast-in-place concrete	**Count:**	
Element Type:		**Total Quantity:**	21 sq m
Environment:	**Benign / (Moderate) / Severe**	**Limited Inspection**	☐
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies
	(m²) / m / each / % / all		21			

Comments:

Hairline cracks were observed. Spalling and efflorescence at south exterior face at barrier joints.

Recommended Work:	☒Rehab ☐ Replace	**Maintenance Needs:**	
	☒1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☐ 2 year	
Repair spalls.			

Element Group:	**Decks**	**Length:**	20.93 m
Element Name:	**Soffit – Thin Slab**	**Width:**	10.4 m
Location:	Interior	**Height:**	
Material:	Cast-in-place concrete	**Count:**	
Element Type:		**Total Quantity:**	218 sq m
Environment:	**(Benign) / Moderate / Severe**	**Limited Inspection**	☐
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies
	(m²) / m / each / % / all	26	192			00

Comments:

Recommended Work:	☐Rehab ☐ Replace	**Maintenance Needs:**	00
	☐1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☐ 2 year	

Element Group:	**Joints**	**Length:**	11.0 m
Element Name:	**Seals/Sealants**	**Width:**	
Location:	East and West joints	**Height:**	
Material:	Other	**Count:**	1 per joint
Element Type:	Compression seal	**Total Quantity:**	22 m
Environment:	**Benign / Moderate / (Severe)**	**Limited Inspection**	☒
Protection System:	Other		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies
	m² / (m) / each / % / all				22	07

Comments:

Granular material has accumulated in the joints. Spalling at the ballast walls suggest the seals may have failed.

Recommended Work:	☐Rehab ☒ Replace	**Maintenance Needs:**	02, 05
	☒1-5 years ☐ 6-10 years	☐ Urgent ☒ 1 year ☐ 2 year	
Replace joint seals.		Remove granular material.	

Element Group:	**Joints**	**Length:**	10.1 m
Element Name:	**Concrete End Dams**	**Width:**	0.3 m
Location:	East and West joints	**Height:**	
Material:	Cast-in-place concrete	**Count:**	2 per joint
Element Type:		**Total Quantity:**	12 sq m
Environment:	**Benign / Moderate / (Severe)**	**Limited Inspection**	☐
Protection System:	None		

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	**Perform. Deficiencies**
	(m²) / m / each / % / all			12		00

Comments:

Concrete surface contains abrasion damage with loss of cement and exposed aggregate at surface.

Recommended Work:	☒Rehab ☐ Replace	**Maintenance Needs:**	00
	☒1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☐ 2 year	
Replace or repair concrete end dams.			

Element Group:	**Joints**	**Length:**	10.1 m
Element Name:	**Armouring/Retaining Devices**	**Width:**	
Location:	East and West joints	**Height:**	
Material:	Steel	**Count:**	2 per joint
Element Type:		**Total Quantity:**	40 m
Environment:	**Benign / Moderate / (Severe)**	**Limited Inspection**	☐
Protection System:	Hot dip galvanizing		

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	**Perform. Deficiencies**
	m² / (m) / each / % / all			40		00

Comments:

West joint damaged by snow plow. Armouring is effective, but aged and corroding.

Recommended Work:	☒Rehab ☐ Replace	**Maintenance Needs:**	00
	☒1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☐ 2 year	
Replace deck joint assemblies.			

Element Group:	**Barriers**	**Length:**	40.65 m
Element Name:	**Barrier/Parapet Walls Interior Face**	**Width:**	0.275 m
Location:	North and south sides	**Height:**	0.80 m
Material:	Precast concrete	**Count:**	2
Element Type:	Parapet Wall with two rails	**Total Quantity:**	87 sq m
Environment:	**Benign / Moderate / (Severe)**	**Limited Inspection**	☐
Protection System:	None		

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	**Perform. Deficiencies**
	(m²) / m / each / % / all		83	2	2	16

Comments:

Spalling has occurred at the base of the interior barrier wall at all of the barrier joints. Several seals at the barrier joints have gaps.

Recommended Work:	☒Rehab ☐ Replace	**Maintenance Needs:**	
	☒1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☐ 2 year	
Repair spalled concrete and seal joints.			

Element Group:	**Barriers**	**Length:**	40.65 m
Element Name:	**Barrier/Parapet Walls Exterior Face**	**Width:**	0.275 m
Location:	North and south sides	**Height:**	0.80 m
Material:	Precast concrete	**Count:**	2
Element Type:	Parapet Wall with two rails	**Total Quantity:**	65 sq m
Environment:	**Benign / Moderate / (Severe)**	**Limited Inspection**	☐
Protection System:	None		

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	**Perform. Deficiencies**
	(m²) / m / each / % / all		57	4	4	00

Comments:

Effloresence observed at the exterior of the bridge deck where damaged joint seals are located. Spalls observed at barrier joints. Water is leaking out from the base of the barrier wall to the exterior face of the bridge soffit.

Recommended Work:	☒Rehab ☐ Replace	**Maintenance Needs:**	00
	☒1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☐ 2 year	
Repair spalls.			

Element Group:	**Barriers**	**Length:**	40.65 m
Element Name:	**Railing Systems**	**Width:**	
Location:	North and South side	**Height:**	0.53 m
Material:	Steel	**Count:**	2 per side
Element Type:	2 Rail Metal Railing - Steel	**Total Quantity:**	163 m
Environment:	**Benign / (Moderate) / Severe**	**Limited Inspection**	☐
Protection System:	Hot dip galvanizing		

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	**Perform. Deficiencies**
	m² / (m) / each / % / all		163			00

Comments:

Two - 90 mm diameter horizontal rails per side, panel lengths vary.

Recommended Work:	☐Rehab ☐ Replace	**Maintenance Needs:**	00
	☐1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☐ 2 year	

Element Group:	**Barriers**	**Length:**	0.09 m diameter
Element Name:	**Posts**	**Width:**	0.09 m
Location:	North and south side	**Height:**	0.53 m
Material:	Steel	**Count:**	10 each side
Element Type:		**Total Quantity:**	20
Environment:	**Benign / (Moderate) / Severe**	**Limited Inspection**	☐
Protection System:	Hot dip galvanizing		

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	**Perform. Deficiencies**
	m² / m / (each) / % / all		20			00

Comments:

Recommended Work:	☐Rehab ☐ Replace	**Maintenance Needs:**	00
	☐1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☐ 2 year	

Element Group:	**Beams/MLE's**	**Length:**	2.0 m
Element Name:	**Girders**	**Width:**	0.3 m
Location:	End	**Height:**	0.9 m
Material:	Steel	**Count:**	10
Element Type:	I-Type	**Total Quantity:**	27 sq m
Environment:	**Benign / (Moderate) / Severe**	**Limited Inspection**	☐
Protection System:	Paint		

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	**Perform. Deficiencies**
	(m²) / m / each / % / all		27			00

Comments:

Light corrosion at top flange tip at south face of exterior girder.

Recommended Work:	☐Rehab ☐ Replace	**Maintenance Needs:**	00
	☐1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☐ 2 year	

Element Group:	**Beams/MLE's**	**Length:**	20.65 m
Element Name:	**Girders**	**Width:**	0.3 m
Location:	Middle	**Height:**	0.9 m
Material:	Steel	**Count:**	5
Element Type:	I-Type	**Total Quantity:**	279 sq m
Environment:	**(Benign) / Moderate / Severe**	**Limited Inspection**	☐
Protection System:	Paint		

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	**Perform. Deficiencies**
	m² / m / (each) / % / all	34	245			00

Comments:

Light corrosion at top flange tip at south face of exterior girder.

Recommended Work:	☐Rehab ☐ Replace	**Maintenance Needs:**	00
	☐1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☐ 2 year	

Element Group:	**Beams/MLE's**	**Length:**	2.4 m
Element Name:	**Diaphragms**	**Width:**	
Location:	End	**Height:**	
Material:	Steel	**Count:**	4 per end
Element Type:	Channels	**Total Quantity:**	8
Environment:	**Benign / (Moderate) / Severe**	**Limited Inspection**	☐
Protection System:	Paint		

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	**Perform. Deficiencies**
	m² / m / (each) / % / all		8			00

Comments:

Recommended Work:	☐Rehab ☐ Replace	**Maintenance Needs:**	00
	☐1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☐ 2 year	

Element Group:	**Beams/MLE's**	**Length:**	2.4 m
Element Name:	**Diaphragms**	**Width:**	
Location:	Intermediate	**Height:**	
Material:	Steel	**Count:**	4 per bay
Element Type:	Channels	**Total Quantity:**	12
Environment:	**Benign / Moderate / Severe**	**Limited Inspection**	☐
Protection System:	Paint		

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	**Perform. Deficiencies**
	m^2 / m / each / % / all	4	8			00

Comments:

Recommended Work:	☐Rehab ☐ Replace	**Maintenance Needs:**	00
	☐1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☐ 2 year	

Element Group:	**Coatings**	**Length:**	
Element Name:	**Structural Steel**	**Width:**	
Location:	End	**Height:**	
Material:	Steel	**Count:**	
Element Type:		**Total Quantity:**	306 sq m
Environment:	**Benign / Moderate / Severe**	**Limited Inspection**	☐
Protection System:			

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	**Perform. Deficiencies**
	m^2 / m / each / % / all		304	1	1	00

Comments:

Light corrosion at top flange tip of south girder.

Recommended Work:	☐Rehab ☐ Replace	**Maintenance Needs:**	00
	☐1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☐ 2 year	

Element Group:	**Coatings**	**Length:**	
Element Name:	**Railing Systems/Hand Railings**	**Width:**	
Location:	North and South barriers	**Height:**	
Material:	Steel	**Count:**	
Element Type:		**Total Quantity:**	87.0 m
Environment:	**Benign / Moderate / Severe**	**Limited Inspection**	☐
Protection System:			

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	**Perform. Deficiencies**
	m^2 / m / each / % / all		87			00

Comments:

Recommended Work:	☐Rehab ☐ Replace	**Maintenance Needs:**	00
	☐1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☐ 2 year	

Element Group:	**Abutments**	**Length:**	
Element Name:	**Abutment Walls**	**Width:**	11.0 m
Location:	East and west abutments	**Height:**	2.4 m
Material:	Cast-in-place concrete	**Count:**	2
Element Type:	Gravity wall	**Total Quantity:**	53 sq m
Environment:	**(Benign) / Moderate / Severe**	**Limited Inspection**	☐
Protection System:	None		

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	**Perform. Deficiencies**
	(m²) / m / each / % / all		34	13	6	00

Comments:

6.0 sq m of delamination and gravel/disintegrated concrete accumulation at west abutment. Three full height medium cracks at east abutment.

Recommended Work:	☒Rehab ☐ Replace	**Maintenance Needs:**	02
	☒1-5 years ☐ 6-10 years	☐ Urgent ☒ 1 year ☐ 2 year	
Repair delaminated concrete. Inject cracks with epoxy.		Remove gravel.	

Element Group:	**Abutments**	**Length:**	
Element Name:	**Ballast Walls**	**Width:**	11.0 m
Location:	East and west abutments	**Height:**	2.0 m
Material:	Cast-in-place concrete	**Count:**	2
Element Type:		**Total Quantity:**	44.0 sq m
Environment:	**Benign / Moderate / (Severe)**	**Limited Inspection**	☐
Protection System:	None		

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	**Perform. Deficiencies**
	(m²) / m / each / % / all		20	12	12	00

Comments:

Severe spalling/concrete disintegration along top of both ballast walls and at south corner of west wall. Delamination at both walls.

Recommended Work:	☒Rehab ☐ Replace	**Maintenance Needs:**	00
	☒1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☐ 2 year	
Repair concrete.			

Element Group:	**Abutments**	**Length:**	4.0 m
Element Name:	**Wingwalls**	**Width:**	
Location:	Four corners of bridge	**Height:**	2.0 m
Material:	Cast-in-place concrete	**Count:**	4
Element Type:	Reinforced concrete	**Total Quantity:**	32.0 sq m
Environment:	**Benign / (Moderate) / Severe**	**Limited Inspection**	☐
Protection System:			

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	**Perform. Deficiencies**
	(m²) / m / each / % / all		32			00

Comments:

Recommended Work:	☐Rehab ☐ Replace	**Maintenance Needs:**	00
	☐1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☐ 2 year	

Element Group:	**Abutments**	**Length:**	
Element Name:	**Bearings**	**Width:**	
Location:	East and West abutment	**Height:**	
Material:	Other	**Count:**	5 each end
Element Type:	Elastomeric pad	**Total Quantity:**	10
Environment:	**Benign / (Moderate) / Severe**	**Limited Inspection**	☐
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies
	m^2 / m / (each) / % / all			10		00

Comments:

Bearings are cracked.

Recommended Work:	☐Rehab ☒ Replace	**Maintenance Needs:**	00
	☒1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☐ 2 year	
Replace bearings..			

Element Group:	**Foundations**	**Length:**	
Element Name:	**Foundation (below ground level)**	**Width:**	
Location:		**Height:**	
Material:		**Count:**	
Element Type:		**Total Quantity:**	
Environment:	**(Benign) / Moderate / Severe**	**Limited Inspection**	☐
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies
	m^2 / m / each / % / all	☐	☒	☐	☐	00

Comments:

Foundation appears to be stable.

Recommended Work:	☐Rehab ☐ Replace	**Maintenance Needs:**	00
	☐1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☐ 2 year	

Element Group:	**Embankments & Streams**	**Length:**	
Element Name:	**Streams & Waterways**	**Width:**	24.6 m at upstream face
Location:		**Height:**	
Material:		**Count:**	
Element Type:		**Total Quantity:**	
Environment:	**(Benign) / Moderate / Severe**	**Limited Inspection**	☐
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies
	m^2 / m / each / % / (all)	☒	☐	☐	☐	00

Comments:

Stream occupies full length of structure between abutments and is unobstructed. Water level was 2.3 m below top of deck at time of inspection. A floating boom is located upstream. A controlled dam structure is located downstream.

Recommended Work:	☐Rehab ☐ Replace	**Maintenance Needs:**	00
	☐1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☐ 2 year	

Element Group:	**Embankments & Streams**	**Length:**	
Element Name:	**Embankments**	**Width:**	
Location:	East and West embankments	**Height:**	
Material:	Gravel	**Count:**	
Element Type:	Vegetation	**Total Quantity:**	
Environment:	**(Benign) / Moderate / Severe**	**Limited Inspection** ☐	
Protection System:			**Perform. Deficiencies**

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	
	m^2 / m / each / % / (all)	☐	☒	☐	☐	00

Comments:

Embankments appear to be stable, covered in vegetation.

Recommended Work:	☐Rehab ☐ Replace	**Maintenance Needs:**	00
	☐1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☐ 2 year	

Element Group:	**Embankments & Streams**	**Length:**	
Element Name:	**Slope Protection**	**Width:**	
Location:	East and West embankments	**Height:**	
Material:	Other	**Count:**	
Element Type:	Vegetation	**Total Quantity:**	
Environment:	**(Benign) / Moderate / Severe**	**Limited Inspection** ☐	
Protection System:			**Perform. Deficiencies**

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	
	m^2 / m / each / % / (all)	☐	☒	☐	☐	00

Comments:

Stable vegetation growth at each embankment. In 2022 sandbags had been placed at southeast and southwest corners to protect against recent floods.

Recommended Work:	☐Rehab ☐ Replace	**Maintenance Needs:**	00
	☐1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☐ 2 year	

Element Group:	**Approaches**	**Length:**	4.0 m
Element Name:	**Wearing Surfaces**	**Width:**	10.1 m
Location:	East and west approaches	**Height:**	0.1 m
Material:	Asphalt	**Count:**	2
Element Type:		**Total Quantity:**	80.2 sq m
Environment:	**Benign / Moderate / (Severe)**	**Limited Inspection** ☐	
Protection System:	None		**Perform. Deficiencies**

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	
	(m^2) / m / each / % / all		77	3		00

Comments:

2 patched potholes at west approach, 3 at east approach. Asphalt appears worn due to abrasion and age of pavement.

Recommended Work:	☐Rehab ☒ Replace	**Maintenance Needs:**	00
	☒1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☐ 2 year	
Replace asphalt.			

Element Group:	**Approaches**	**Length:**	
Element Name:	**Curb/Gutters**	**Width:**	
Location:	East and West approaches	**Height:**	
Material:	Cast-in-place concete	**Count:**	6.0 m per corner
Element Type:		**Total Quantity:**	24.0 m
Environment:	**Benign / Moderate / (Severe)**	**Limited Inspection** ☐	
Protection System:	None		

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	**Perform. Deficiencies**
	m^2 / (m) / each / % / all		16	1	7	00

Comments:

Wide crack, impact and abrasion damage at base at southeast and southwest corners of the site.

Recommended Work: ☐Rehab ☐ Replace	**Maintenance Needs:** 18
☐1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☐ 2 year
	Repair damaged sections.

Element Group:	**Approaches**	**Length:**	62.1 m W, 81.5 m E sides
Element Name:	**Railing Systems**	**Width:**	
Location:	East and West approaches	**Height:**	0.53 m
Material:	Steel	**Count:**	
Element Type:	Steel Flex on wood post	**Total Quantity:**	144 m
Environment:	**Benign / Moderate / (Severe)**	**Limited Inspection** ☐	
Protection System:	Hot dip galvanizing		

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	**Perform. Deficiencies**
	m^2 / (m) / each / % / all		142	1	1	00

Comments:

Guide rail end termination broken off at last post at three corners. Some offset timbers rotated and others are rotten.

Recommended Work: ☒Rehab ☐ Replace	**Maintenance Needs:** 18
☒1-5 years ☐ 6-10 years	☐ Urgent ☒ 1 year ☐ 2 year
Provide new posts at end termination of guide rail at 3 corners of site.	Tighten loose bolts. Provide new, and realign other offset timbers.

Photo 1: East approach to bridge.

Photo 2: West approach to bridge.

Photo 3: Upstream elevation looking north.

Photo 4: Downstream elevation looking south.

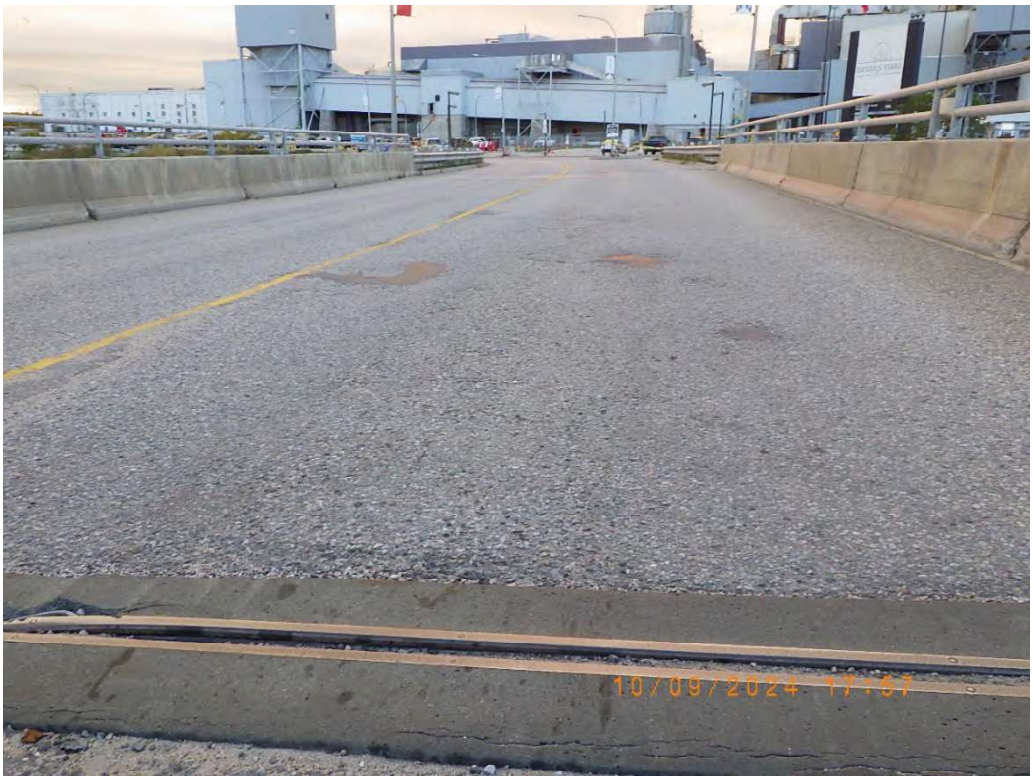

Photo 5: Deck cross-section.

Photo 6: Underside of bridge.

Photo 7: East abutment.

Photo 8: West abutment.

Photo 9: Downstream view from bridge.

Photo 10: Upstream view from bridge.

Photo 11: East expansion joint.


Photo 12: West expansion joint.

Photo 13: Northeast embankment.

Photo 14: Northwest embankment.

Photo 15: Southeast embankment.

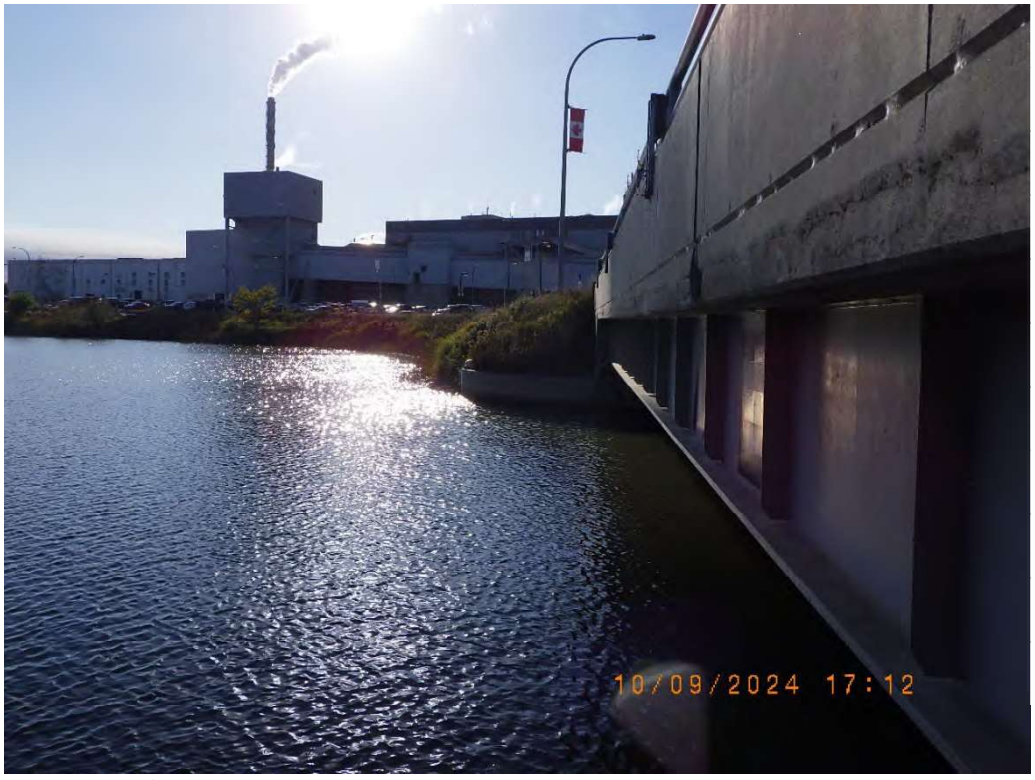

Photo 16: Southwest embankment.

Photo 17: Broken end post (typ. 3 locations).

Photo 18: Deteriorated concrete at end dams, corroded armouring, broken expansion joint, and gravel accumulation above seal at expansion joint (typ.).

Photo 19: Abrasion damage to asphalt on deck.

Photo 20: Abrasion damage to barriers and asphalt along side of deck (typ.).

Photo 21: Spalled concrete and missing sealant at barrier joint (typ.).

Photo 22: Poor sealant and asphalt along east approach slab joint (typ.).

Photo 23: Spall at south face of deck.

Photo 24: Bearing with horizontal cracks (typ.).

Photo 25: Narrow vertical crack at east abutment.

Photo 26: Delaminated concrete at west abutment.

Photo 27: Spalled ballast wall at southwest corner of bridge (typ.).

Photo 28: Abrasion damage to curb and gutter at southwest corner of site.

Photo 29: Sandbags at base of southeast embankment.