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# 2022 OSIM Inspections for Municipal Bridges and Culverts larger than 3 meters

For

Township of North Dumfries



Prepared by



**MEDA Engineering and Technical Services**

**31 May 2022**

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## **1. Executive Summary**

### **1.1 Footbridge Road Bridge**

This structure is a three (3) span (approx. 36.8m, 36.8m, 48.9m) structural steel girder bridge with a cast-in-place concrete deck and an asphalt wearing surface. This bridge is in overall fair condition with deterioration of various elements and a BCI value of 67.2

The OSIM report contains the recommendations for rehabilitation of the bridge at an estimated cost of \$1,773,568.

Below are the recommendations based on OSIM inspection:

- The abutment walls show cracks at various location and requires patchwork
- Girders shows some rusting and require repair and recoating at various locations.
- The bearings at abutment require replacement.
- Deck surface has cracks and requires repair.
- Concrete barrier wall exhibits spalling at various locations and requires rehabilitation and patching work.
- Deck drain assembly is leaking towards girders and supports. The deck drains assembly needs rehabilitation/replacement.
- Deck soffit has spalling and exposed rebar at multiple locations and needs to be repaired

### **1.2 Jedburgh Dam Bridge**

This structure is a two (2) span (4.9m, 1.7m) concrete solid slab bridge with a cast-in-place concrete deck and an asphalt wearing surface. This structure is in overall fair condition with deterioration of various elements and BCI value of 51.7.

The OSIM report contains the recommendations for rehabilitation of the dam bridge at an estimated cost of \$121,080.

Below are the recommendations based on OSIM inspection:

- This structure requires major rehabilitation works and some components needs to be scheduled for replacement.
- Patchwork for abutments for delamination, spalling, exposed reinforcement, and cracks.
- Concrete patchwork for soffit.
- Replace asphalt wearing surface.
- Rust protection at the lock gate

### **1.3 Piper Street Bridge**

This structure is located on Piper Street is a three (3) span (approx. 20.m, 19.8m, 20.m) pre-cast concrete box beam girder bridge with a reinforced cast-in-place concrete deck and an asphalt wearing surface. The bridge is overall in fair condition with deterioration of various concrete elements and BCI value of 71.3.

The OSIM report contains the recommendations for rehabilitation of the bridge at an estimated cost of \$780,630.

Below are the recommendations based on OSIM inspection:

- Repair the wearing surface of the deck
- Patch repair the abutments and wingwalls.
- Install hazard marker signs.
- Repair the deck soffit for spalling and exposed rebar at multiple locations.
- Repair spalled concrete at piers

### **1.4 Shellard Road Bridge**

This structure is in generally in good condition overall. This bridge is a single span (approx. 7.3m) steel girder bridge with a cast-in-place concrete deck.

The OSIM report contains the recommendations for rehabilitation of the bridge at an estimated cost of \$79,300. The BCI value of this structure is 79.6

Below are the recommendations based on OSIM inspection:

- Replacement of barrier extruder end treatment at NW end.
- Install the missing handrailing on West side.

- Asphalt replacement at both the approaches is recommended.
- Seal cracks in deck overlay concrete.

### **1.5 Culvert-Gore Road Structure #1**

This structure is two-cell rigid frame culvert, exhibits concrete deterioration and exposed reinforcement. This culvert structure is in fair to poor condition overall with BCI value of 66.4

The OSIM report contains the recommendations for rehabilitation of the culvert at an estimated cost of \$14,000

Below are the recommendations based on OSIM inspection:

- Remove excessive vegetation.
- Install SBGR on both sides of culvert.
- Reconstruct both ends of culvert.
- Install scour protection at embankments.

### **1.6 Culvert-Gore Road Structure #2**

This structure is an elliptical concrete pipe and is in overall good condition with BCI value of 71.6.

The OSIM report contains the recommendations for rehabilitation of the culvert at an estimated cost of \$6,100.

Below are the recommendations based on OSIM inspection:

- This culvert requires general maintenance, removal of vegetation so the hazard markers are clearly visible.

### **1.7 Greenfield Road West Culvert**

This structure is two CSP culvert with concrete headwalls at both ends. This structure is in generally fair condition with BCI value of 65.

The OSIM report contains the recommendations for rehabilitation of the culvert

at an estimated cost of \$11,608.

Below are the recommendations based on OSIM inspection:

- Remove excessive vegetation at SW.
- Install SBGR barriers overtop of structure.
- Replace the concrete headwall at North end.
- Place fill material behind North headwall.
- Place rocks at embankments to prevent erosion.

### **1.8 Sheffield Road Culvert #1**

The structure is a C. Steel plate pipe arch structure. This structure is in good condition with BCI value of 73.3 and requires \$34,585 as its rehabilitation cost.

### **1.9 Sheffield Road Culvert #2**

The structure is a C. Steel plate pipe arch structure. This structure is in good condition with BCI value of 69.8 and requires \$13,211 as its rehabilitation cost.

### **1.10 Greenfield Road West Culvert #2**

The structure is a C. Steel plate pipe arch structure. This structure is in fair condition with BCI value of 65 and requires \$11,608 as its rehabilitation cost.

### **1.11 Morrison Road Culvert #1**

The structure is a C. Steel plate pipe arch structure. This structure is in

good condition with BCI value of 71.5 and requires \$8,731 as its rehabilitation cost.

### **1.12 Morrison Road Culvert #2**

The structure is a Concrete rigid frame structure. This structure is in good condition with BCI value of 71.6 and requires \$8,714 as its rehabilitation cost.

### **1.13 Alps Road Twin CSP Culverts**

The structure is a C. Steel plate pipe arch structure. This structure is in fair condition with BCI value of 61.4 and requires \$12,815 as its rehabilitation cost.

### **1.14 Clyde Road Culvert**

The structure is a CSP/ Concrete Rigid Frame structure. This structure is in good condition with BCI value of 69.8 and requires \$4,766 as its rehabilitation cost.

### **1.15 Industrial Road CSP Culvert**

The structure is a C. Steel plate pipe arch structure. This structure is in good condition with BCI value of 71.6 and requires \$15,235 as its rehabilitation cost.



### **1.16 Kings Road Twin Culvert**

The structure is a C. Steel plate pipe arch structure. This structure is in fair condition with BCI value of 66.3 and requires \$11,853 as its rehabilitation cost.

### **1.17 Reidsville Road twin Culvert**

The structure is a C. Steel plate pipe arch structure. This structure is in good condition with BCI value of 72.7 and requires \$14,675 as its rehabilitation cost.

### **1.18 West Alps Road Twin culvert**

The structure is a C. Steel plate pipe arch structure. This structure is in good condition with BCI value of 66.4 and requires \$11,089 as its rehabilitation cost.

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## **2. Introduction**

The Township of North Dumfries has appointed MEDA Engineering and Technical services. to conduct the inspection of four (4) bridges and fourteen (14) culverts consistent with Ontario Structure Inspection Manual (OSIM), located within The Township of North Dumfries. The assignment is intended to document the condition of the structures and to provide recommendations for rehabilitation and/or replacement of the structures/ structural components.

### **2.1 Company History**

MEDA (Modern Engineering Design Associates) Engineering and Technical services was founded in 1970 by Melvyn and Carole Lawn to be the “class act” of engineering design firms in Windsor, ON. Since this time, MEDA Limited (MEDA) has grown to include offices in Southfield, MI and New Braunfels, TX. MEDA provides technical and professional staffing / contract engineering services in the areas of manufacturing, quality, and lean engineering as well as consulting and design services in civil and structural engineering. MEDA has developed a specialized engineering department centered on the civil and structural engineering disciplines. Municipal infrastructure projects have been the focus of our engineering department in recent years. Our engineering staff have advanced degrees in structural engineering and focus on the research and development of various innovative infrastructure rehabilitation and construction solutions in collaboration with the University of Windsor. Our smaller size works to our clients’ advantage because our engineers perform project tasks directly and are not passed off to less qualified staff. This means projects are handled from start to finish by the engineers listed herein and not merely reviewed by them at the end of the project. At MEDA we focus on completing a project to the satisfaction of the client in a timely manner. Our core values of customer satisfaction, excellence, and integrity have resulted in clients continuing to call on MEDA for design and technical support for their projects.

### **2.2 Firm Stability & Reputation**

MEDA has been in operation since October of 1970; this alone is a clear testament to the stability of the firm. MEDA is an incorporated company in good standing

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with Professional Engineers Ontario and a holder of a Certificate of Authorization to provide engineering services to the public. Excellence is at the core of MEDA's values; we strive to provide innovative solutions to our clients' needs on time, on budget, and with integrity. We do not believe compromising integrity is a requirement of doing business today. MEDA places the principles of business ahead of commerce. These practices have kept customers returning to MEDA and have undoubtedly contributed greatly to the longevity of the company.

## **2.3 General Methodology**

The engineer will take pictures of the general area around the structure (bridge or culvert) and all components of the structure including any deficiencies and areas of concern. The general information on the OSIM report will be verified such as the location, crossing type, posted speed, and number of lanes. The pavement markings, guiderails, curbs, sidewalks, signage, load limits, and all other visible above ground assets will be reviewed at the site.

At a minimum, the following photos will be collected at each structure site type and additional photos will be collected in the case of special features, poor condition states, and maintenance/rehabilitation issues.

### **Bridges:**

- Deck cross-section and features, including number of traffic lanes, curbs, sidewalks, barriers/railing system and approach guiderail (showing end treatments).
- Elevation of the structure clearly showing the number of spans and superstructure type
- Soffit, showing type and number of main superstructure elements
- Each expansion joint, taken along the length of the joint
- All deteriorated areas (poor condition state)
- Guiderail connections, transitions, and end treatments

### **Culverts:**

- Features of the highway, including road surface, barriers, guiderails (complete with end treatments)
- End of the culvert (elevations)
- Views of the interior of the barrel
- All construction joints
- All deteriorated areas (poor condition state)

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## 2.4 Visual Inspection and Data Collection

In accordance with the terms of reference, the inspection addressed mainly the condition of the components of the bridge. The field work for the investigations was undertaken on 16<sup>th</sup> May 2022. The engineers assigned to the fieldwork component of this project are experienced with bridge inspections in the Province of Ontario.

A detailed "close-up" visual inspection of the structure was completed to assess the condition of all members, components, assemblies, and connections. The scope of the inspection program consisted of the following:

- Provide a complete, thorough and comprehensive inspection and assessment for the structure in accordance with the requirements of the Ontario Structure Inspection Manual (OSIM).
- Carry out a visual site inspection of the existing structure. Identify, measure and document site conditions and bridge components. Complete the provided General Inspection or Culvert Inspection forms indicating all associated elements, visual defects associated with those elements for all primary and secondary components.

MEDA Engineering and Technical services undertook a visual inspection for all components i.e., Stringers, Deck, Piers (if any), Abutments, Culvert barrel, Wearing surface, Railing and Curbs, Approaches, etc. wherever visible or accessible. Condition and physical dimensions of each elements are documented. The components are inspected specifically for:

- The structural steel was inspected for evidence of rust, paint peeling, deformation, or other signs of physical distress, if any.

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- The timber components were examined for evidence of rot, decay, splits, or other signs of physical distress, if any.
  - All accessible concrete components were inspected for evidence of spalling, erosion, cracks, exposed reinforcing steel, delamination, and other structural deficiencies if any.
  - Road approach and side slopes were inspected for erosion, pothole, loss of fill material, and integrity.
  - Nonstructural items such as approach, signage, guide rails, and curb were inspected for integrity and availability.
  - Riverbank and stream flow is inspected for type of bed material, flow characteristics, growth of vegetation on bank, evidence of scour, and water levels.

The inspection details have been noted where there is significant deterioration and required remedial work.

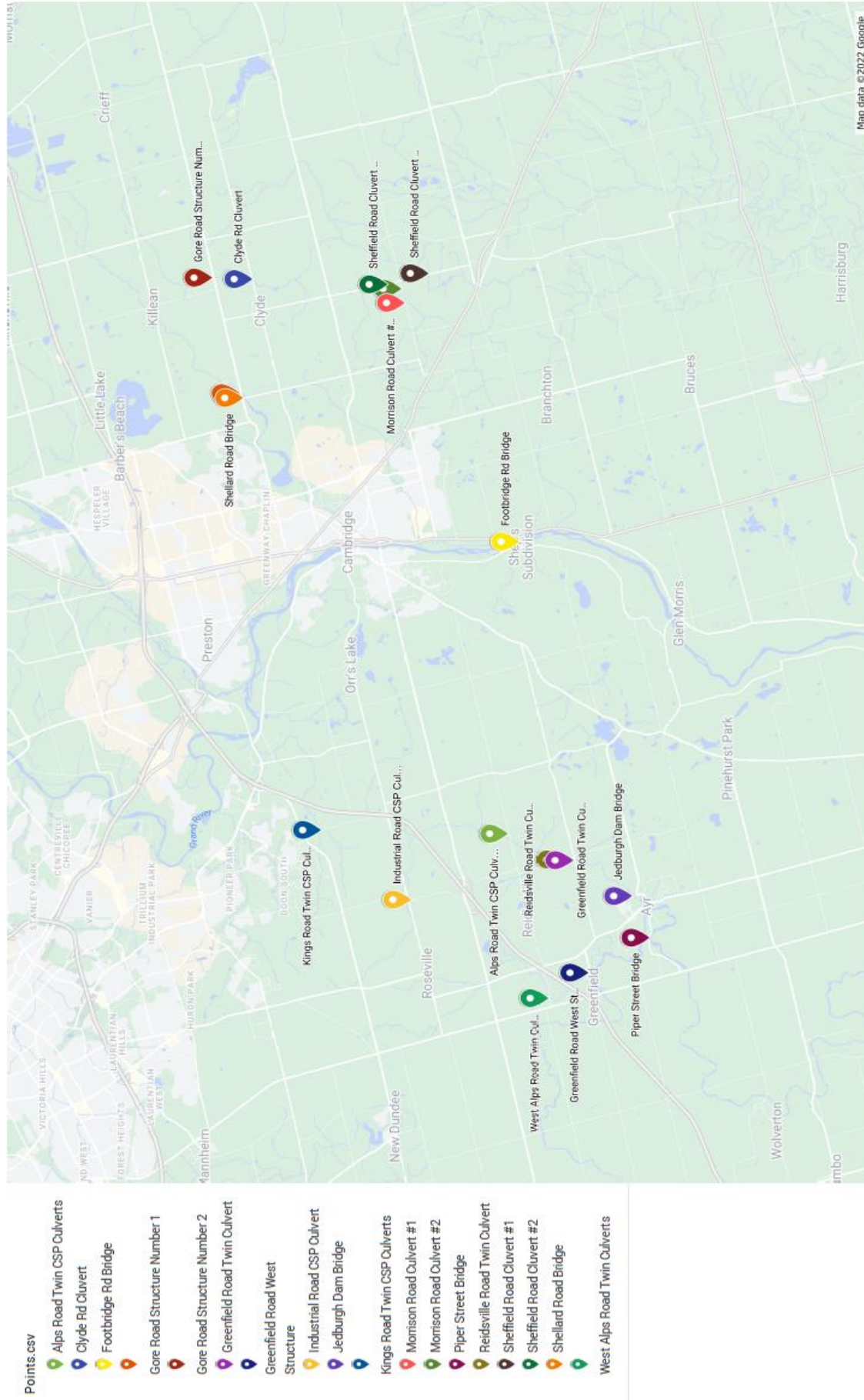
All the data was recorded on the OSIM Inspection Forms. Equipment like camera, tape measure, hammer, shovel, string, scale, vernier caliper, etc., were used during bridge inspection. Hand sketch was prepared on site to understand bridge geometry.

## **2.5 Cost Estimation**

The cost estimates for remedial repairs and/or replacement was established by a combination of MEDA's experience over several years, discussions with local contractors, and good engineering judgment. The pricing may vary depending upon timing of the year with respect to weather, regional economies of scale, raw material costs, available skilled labor forces etc. Even though the estimate is carefully prepared, it is recommended to obtain three quotations before proceeding with the repair work.



# Township of North Dumfries



## Inventory Data:

Structure Name	B-1 Footbridge Road Bridge		
Main Hwy/Road #	Footbridge Road	On <input checked="" type="checkbox"/> Under <input type="checkbox"/>	Crossing Type: 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 <input type="checkbox"/>
Hwy/Road Name	Footbridge Road		
Structure Location	Approximately 50m West of Highway 24		
Northing	43°19'02.9" N	Easting	80°18'50.9"W
Owners	Township of North Dumfries	Heritage Designation:	Not Cons. <input checked="" type="checkbox"/> Cons./not App. <input type="checkbox"/> List/not Desig. <input type="checkbox"/> Desig./not List <input type="checkbox"/> Desig. & List <input type="checkbox"/>
MTO Region	South-Western	Road Class:	Freeway <input type="checkbox"/> Arterial <input type="checkbox"/> Collector <input type="checkbox"/> Local <input checked="" type="checkbox"/>
MTO District	London / Stratford	Posted Speed	50 No. of Lanes 2
Old County	Waterloo,	AADT	- % Trucks
Geographic Township	Township of North Dumfries	Inspection Route Sequence	
Structure Type	Slab on I-Girder (Steel)	Interchange Number	
Total Deck Length (m)	122.5	Interchange Structure Number	
Overall Structure Width (m)	10.4	Min. Vertical Clearance (m)	
Total Deck Area (sq. m.)	1274	Special Routes:	Transit <input type="checkbox"/> Truck <input type="checkbox"/> School <input type="checkbox"/> Bicycle <input type="checkbox"/>
Roadway Width (m)	8.6	Detour Length Around Bridge (km)	
Skew Angle (degrees)	0	Direction of Structure	E/W
No. of Spans	3	Fill on Structure (m)	7.8
Span Lengths (m)	36.8, 48.9, 36.8 (Total: 122.5)	Deck Geodetic Elevation	228

## Historical Data:

Year Built	1970	Year of Last Major Rehab	
Last OSIM Inspection	2020	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			
Rehab History: (Date/Description)			

**Scheduled Improvements:**

Regional Priority Number

Programmed Work Year

Nature of Program Work:

Appraisal Indices:		Comments
Fatigue		
Seismic		
Scour		
Flood		
Geometrics		
Barrier		
Curb		
Load Capacity		

## Field Inspection Information

Date of Inspection	May 17, 2022, 12:30 PM	Type of Inspection:	OSIM <input checked="" type="checkbox"/>	Enhanced OSIM <input type="checkbox"/>
Inspector:	J. Zohreh, P.Eng.			
Others in Party:	S. Mitra, EIT			
Access Equipment Used:				
Weather:	Sunny			
Temperature:	18°C			

Additional Investigations Required		Priority		
		None	Normal	Urgent
Material Condition Survey				
<input type="checkbox"/>	Detailed Deck Condition Survey	X		
<input type="checkbox"/>	Non-destructive Delamination Survey of Asphalt-Covered Deck	X		
<input type="checkbox"/>	Concrete Substructure Condition Survey	X		
<input type="checkbox"/>	Detailed Coating Condition Survey	X		
<input type="checkbox"/>	Detailed Timber Investigation	X		
<input type="checkbox"/>	Post-Tensioned Strand Investigation	X		
Underwater Investigation		X		
Fatigue Investigation		X		
Seismic Investigation		X		
Structure Evaluation		X		
Monitoring				
<input type="checkbox"/>	Monitoring of Deformations, Settlements and Movements	X		
<input type="checkbox"/>	Monitoring Crack Widths	X		
Investigation Notes:	The structure is in air condition and			

## Overall Structure Notes

Recommended Work on Structure	None <input type="checkbox"/>	Minor Rehab <input checked="" type="checkbox"/>	Major Rehab <input type="checkbox"/>	Replace <input type="checkbox"/>
Timing of Recommended Work	1 to 5 years <input checked="" type="checkbox"/>	6 to 10 years <input type="checkbox"/>		
Overall Comments:	See Elements information			
Date of Next Inspection:	2024			

## Suspected Performance Deficiencies

- 01 Load carrying capacity
- 02 Excessive deformations (reflections & rotations)
- 03 Continuing settlement
- 04 Continuing movements
- 05 Seized bearings

06

- 07 Bearing not uniformly loaded/unstable
- 08 Jammed expansion joint
- 09 Pedestrian/vehicular hazard
- 10 Rough riding surface
- 11 Surface ponding
- 12 Deck draining

12

- 13 Slippery Surfaces
- 14 Flooding/channel blockage
- 15 Undermining of foundation
- 16 Unstable embankments
- 17 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

- 08 Repair to Structural Steel
- 09 Repair to Bridge Concrete
- 10 Repair of Bridge Timber
- 11 Bailey bridges - maintenance
- 12 Animal/Pest Control
- 13 Bridge Surface Repair

13

- 14 Erosion Control at Bridges
- 15 Concrete Sealing
- 16 Rout and Seal
- 17 Bridge deck drainage
- 18 Scaling (loose concrete or ACR steel)
- 19 Other

Repair Rehabilitation Required				Priority				Estimated Construction Cost
Element <sup>1</sup>	Repair and Rehabilitation Required <sup>2</sup>			6 to 10 years	1 to 5 years	Within 1 year	Urgent	
Deck, wearing surface	0				X			\$ 1,000.00
Decks	Cost dependent on method used and season					X		\$ 1,000.00
Signs	0					X		\$ 500.00
Estimated Rehabilitated or Replacement Structure Dimensions <sup>3</sup>				Total Structural Cost				\$ 2,500.00
Deck Length (m)	122.5	Structure Width (m)	10.4					

1 - Indicate specific costs for structure replacement or for rehabilitation under the given headings.

2 - Give a brief description of the rehabilitation work required.

3 - Estimated structure dimensions after completion of the proposed work - if it is expected to change.

Associated Work <sup>4</sup>	Comments	Estimated Cost
Approaches <sup>5</sup>		
Detours		
Traffic Control		
Utilities		
Right of Way		
Environment Study		
Other		
Contingencies		
Total Associated Work Cost		\$ -

Total Construction Cost	\$ 2,500.00
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4 - Includes other construction costs associated with the structure. Engineering fees for reports, environmental studies, designs, project management and contingencies are not included as associated work.

5 - Approach costs is for work (fill, pavement, guiderail, etc.) immediately adjacent to the structure for minor changes in horizontal or vertical alignment and for barrier end treatments at the structure

Justification



Element Group	Abutments				Length (m)					
Element Name	Abutment walls				Width (m)	9.46				
Location	East and West				Height (m)	1.8				
Material	Cast-in-place Concrete				Count	2				
Element Type	Conventional Closed				Total Qty (m <sup>2</sup> )	34.06				
Environment	Benign	<input type="checkbox"/>	Moderate	<input checked="" type="checkbox"/>	Severe	<input type="checkbox"/>	Limited Inspection	<input type="checkbox"/>		
Protection System							Performance Deficiencies			
Condition Data	Units		Exc		Good					Fair
	m <sup>2</sup>				29.31		2.5		2.25	
Comments	Height only measures visible area above fill.									
Recommended Work: Rehab <input type="checkbox"/> Replace <input type="checkbox"/>										
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>										
Maintenance Needs: Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>										

Element Group	Abutments				Length (m)	0.3				
Element Name	Ballast Walls				Width (m)	9.46				
Location	At Abutments				Height (m)	1.6				
Material	Cast-in-place Concrete				Count	2				
Element Type	Reinforced Concrete				Total Qty (m <sup>2</sup> )	35.95				
Environment	Benign	<input type="checkbox"/>	Moderate	<input checked="" type="checkbox"/>	Severe	<input type="checkbox"/>	Limited Inspection	<input checked="" type="checkbox"/>		
Protection System							Performance Deficiencies			
Condition Data	Units		Exc		Good					Fair
	m <sup>2</sup>				17.95		18			
Comments	Height only measures visible area above fill.									
Recommended Work: Rehab <input type="checkbox"/> Replace <input type="checkbox"/>										
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>										
Maintenance Needs: Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>										

Element Group	Abutments				Length (m)	0.28				
Element Name	Bearings				Width (m)	0.4				
Location	East Abutment (Fixed End)				Height (m)	0.04				
Material	Steel/ Neoprene				Count	4				
Element Type	Elastomeric Pad				Total Qty (m <sup>2</sup> )	4				
Environment	Benign	<input type="checkbox"/>	Moderate	<input checked="" type="checkbox"/>	Severe	<input type="checkbox"/>	Limited Inspection	<input type="checkbox"/>		
Protection System							Performance Deficiencies			
Condition Data	Units		Exc		Good					Fair
	m <sup>2</sup>				0				4	
Comments	Narrow diagonal crack at all four corners where the wingwall meets the deck.									
Recommended Work: Rehab <input type="checkbox"/> Replace <input type="checkbox"/>										
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>										
Maintenance Needs: Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>										

Element Group	Abutments				Length (m)	0.28				
Element Name	Bearings				Width (m)	0.4				
Location	West Abutment (Expansion End)				Height (m)	0.12				
Material	Steel/ Neoprene				Count	4				
Element Type	Elastomeric Pad				Total Qty (m <sup>2</sup> )	4				
Environment	Benign	<input type="checkbox"/>	Moderate	<input checked="" type="checkbox"/>	Severe	<input type="checkbox"/>	Limited Inspection	<input type="checkbox"/>		
Protection System							Performance Deficiencies			
Condition Data	Units each		Exc		Good			Fair	4	Poor
Comments										
Recommended Work:										
Rehab <input type="checkbox"/> Replace <input type="checkbox"/>										
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>										
Maintenance Needs:										
Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>										

Element Group	Abutments				Length (m)	4.75				
Element Name	Wingwalls				Width (m)					
Location	Corner of Structure				Height (m)	1.5				
Material	Cast-in-place Concrete				Count	4				
Element Type	Reinforced Concrete				Total Qty (m <sup>2</sup> )	28.5				
Environment	Benign	<input type="checkbox"/>	Moderate	<input checked="" type="checkbox"/>	Severe	<input type="checkbox"/>	Limited Inspection	<input type="checkbox"/>		
Protection System							Performance Deficiencies			
Condition Data	Units each		Exc		Good	28.5		Fair		Poor
Comments										
Recommended Work:										
Rehab <input type="checkbox"/> Replace <input type="checkbox"/>										
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>										
Maintenance Needs:										
18 Urgent <input type="checkbox"/> 1 year <input checked="" type="checkbox"/> 2 years <input type="checkbox"/>										

Element Group	Accessories				Length (m)					
Element Name	Signs				Width (m)					
Location	At Approaches				Height (m)					
Material	Aluminium				Count	4				
Element Type					Total Qty (Nos)	4				
Environment	Benign	<input type="checkbox"/>	Moderate	<input checked="" type="checkbox"/>	Severe	<input type="checkbox"/>	Limited Inspection	<input checked="" type="checkbox"/>		
Protection System							Performance Deficiencies			
Condition Data	Units m		Exc		Good	4		Fair		Poor
Comments										
Recommended Work:										
Rehab <input type="checkbox"/> Replace <input type="checkbox"/>										
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>										
Maintenance Needs:										
Urgent <input type="checkbox"/> 1 year <input checked="" type="checkbox"/> 2 years <input type="checkbox"/>										

Element Group	Approaches				Length (m)	167.64						
Element Name	Barriers				Width (m)							
Location	At Approaches				Height (m)							
Material	Steel				Count							
Element Type	Timber Post and Steel Panel				Total Qty (m <sup>2</sup> )	167.64						
Environment	Benign	<input type="checkbox"/>	Moderate	<input type="checkbox"/>	Severe	<input checked="" type="checkbox"/>	Limited Inspection	<input checked="" type="checkbox"/>				
Protection System							Performance Deficiencies					
Condition Data	Units		Exc		Good			Fair		Poor		
	m <sup>2</sup>						167.64					
Comments												
Recommended Work: Rehab <input checked="" type="checkbox"/> Replace <input type="checkbox"/>											Maintenance Needs:	
Urgent <input type="checkbox"/> 1 to 5 years <input checked="" type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input type="checkbox"/>											Urgent <input type="checkbox"/> 1 year <input checked="" type="checkbox"/> 2 years <input type="checkbox"/>	

Element Group	Approaches				Length (m)	4.75						
Element Name	Sidewalk/ Curb				Width (m)	0.58						
Location	At Approaches				Height (m)	0.2						
Material	Cast-in-place Concrete				Count	4						
Element Type					Total Qty (m <sup>2</sup> )	14.82						
Environment	Benign	<input type="checkbox"/>	Moderate	<input type="checkbox"/>	Severe	<input checked="" type="checkbox"/>	Limited Inspection	<input type="checkbox"/>				
Protection System							Performance Deficiencies					
Condition Data	Units		Exc		Good			Fair		Poor		
	m <sup>2</sup>					14.82						
Comments	A few longitudinal and transverse cracks are observed at both approaches. Light ravelling and wheel rutting are observed. Replace approach wearing surface.											
Recommended Work: Rehab <input checked="" type="checkbox"/> Replace <input checked="" type="checkbox"/>											Maintenance Needs:	
Urgent <input type="checkbox"/> 1 to 5 years <input checked="" type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input type="checkbox"/>											Urgent <input type="checkbox"/> 1 year <input checked="" type="checkbox"/> 2 years <input type="checkbox"/>	

Element Group	Approaches				Length (m)	6				
Element Name	Wearing Surface				Width (m)	8.62				
Location	East and West				Height (m)					
Material	Asphalt				Count	2				
Element Type					Total Qty (m <sup>2</sup> )	103.44				
Environment	Benign	<input type="checkbox"/>	Moderate	<input type="checkbox"/>	Severe	<input checked="" type="checkbox"/>	Limited Inspection	<input type="checkbox"/>		
Protection System	None						Performance Deficiencies			
Condition Data	Units		Exc		Good			Fair		Poor
	m					93.44		6		4
Comments	At the NE/NW/SE/SW corners starting at the end of the jersey barriers on top of the bridge. W-beam steel guiderail 28.4 m long at each corner with steel barrel at the end of each (extended approach area).									

Recommended Work:		Rehab	<input type="checkbox"/>	Replace	<input type="checkbox"/>	Maintenance Needs:								
Urgent		<input type="checkbox"/>	1 to 5 years	<input type="checkbox"/>	6 to 10 years	<input type="checkbox"/>	None	<input checked="" type="checkbox"/>	Urgent	<input type="checkbox"/>	1 year	<input type="checkbox"/>	2 years	<input type="checkbox"/>

Element Group	Barriers			Length (m)	132			
Element Name	Barrier/ Parapet wall			Width (m)	0.26			
Location	North and South			Height (m)	0.62			
Material	Cast-In-Place Concrete			Count	2			
Element Type	Parapet Wall with two rails			Total Qty (m <sup>2</sup> )	396			
Environment	Benign	<input type="checkbox"/>	Moderate	<input type="checkbox"/>	Severe	<input checked="" type="checkbox"/>	Limited Inspection	<input type="checkbox"/>
Protection System							Performance Deficiencies	
Condition Data	Units	Exc	Good	Fair	Poor			
	m		246	75	75			
Comments	Light to medium spalling is observed on various location with exposed reinforcement. Rust staining, light scaling, delamination and cracks.							

Recommended Work:		Rehab	<input type="checkbox"/>	Replace	<input type="checkbox"/>	Maintenance Needs:								
Urgent		<input type="checkbox"/>	1 to 5 years	<input type="checkbox"/>	6 to 10 years	<input type="checkbox"/>	None	<input checked="" type="checkbox"/>	Urgent	<input type="checkbox"/>	1 year	<input type="checkbox"/>	2 years	<input type="checkbox"/>

Element Group	Barriers			Length (m)	13			
Element Name	Hand Railings			Width (m)				
Location	North and South			Height (m)				
Material	Steel			Count	4			
Element Type	Double Tube Railing			Total Qty (m <sup>2</sup> )	524			
Environment	Benign	<input type="checkbox"/>	Moderate	<input type="checkbox"/>	Severe	<input checked="" type="checkbox"/>	Limited Inspection	<input type="checkbox"/>
Protection System	Galvanized						Performance Deficiencies	
Condition Data	Units	Exc	Good	Fair	Poor			
	m			524				
Comments	Localized areas of severe corrosion. Light corrosion on anchor bolts.							

Recommended Work:		Rehab	<input type="checkbox"/>	Replace	<input type="checkbox"/>	Maintenance Needs:								
Urgent		<input type="checkbox"/>	1 to 5 years	<input checked="" type="checkbox"/>	6 to 10 years	<input type="checkbox"/>	None	<input type="checkbox"/>	Urgent	<input type="checkbox"/>	1 year	<input type="checkbox"/>	2 years	<input type="checkbox"/>

Element Group	Beams/MLE's			Length (m)	2.6			
Element Name	Diaphragms , End			Width (m)	0.3			
Location	At Abutments/ Piers			Height (m)	1.22			
Material	Steel			Count	24			
Element Type	I-Type			Total Qty (Nos)	24			
Environment	Benign	<input type="checkbox"/>	Moderate	<input checked="" type="checkbox"/>	Severe	<input type="checkbox"/>	Limited Inspection	<input type="checkbox"/>
Protection System	Red lead primer/ alkyd						Performance Deficiencies	
Condition Data	Units	Exc	Good	Fair	Poor			
	Nos		21	3				
Comments	NW - 31 wood posts with triple steel cable barrier, 120 m long SE - 13 wood posts with triple steel cable barrier, 55.3 m long SW - 20 wood posts with triple steel cable barrier, 80.3 m long							

Recommended Work:		Rehab	<input type="checkbox"/>	Replace	<input type="checkbox"/>	Maintenance Needs:								
Urgent		<input type="checkbox"/>	1 to 5 years	<input type="checkbox"/>	6 to 10 years	<input type="checkbox"/>	None	<input checked="" type="checkbox"/>	Urgent	<input type="checkbox"/>	1 year	<input type="checkbox"/>	2 years	<input type="checkbox"/>
Element Group	Beams/MLE's				Length (m)									
Element Name	Diaphragms ,				Width (m)									
Location	Intermediate				Height (m)									
Material	Steel				Count		60							
Element Type	Cross Type				Total Qty (Nos)		60							
Environment	Benign	<input type="checkbox"/>	Moderate	<input checked="" type="checkbox"/>	Severe	<input type="checkbox"/>	Limited Inspection		<input type="checkbox"/>					
Protection System	Red lead primer/ alkyd									Performance Deficiencies				
Condition Data	Units		Exc		Good		Fair		Poor					
	Nos				60									
Comments	Localized light corrosion, overall in good													

Recommended Work:		Rehab	<input type="checkbox"/>	Replace	<input type="checkbox"/>	Maintenance Needs:								
Urgent		<input type="checkbox"/>	1 to 5 years	<input type="checkbox"/>	6 to 10 years	<input type="checkbox"/>	None	<input checked="" type="checkbox"/>	Urgent	<input type="checkbox"/>	1 year	<input type="checkbox"/>	2 years	<input type="checkbox"/>
Element Group	Beams/MLE's				Length (m)		2							
Element Name	Girders				Width (m)		0.4							
Location	Ends (East)				Height (m)		1.22							
Material	Steel				Count		4							
Element Type	I-Type				Total Qty (m2)		29.12							
Environment	Benign	<input type="checkbox"/>	Moderate	<input checked="" type="checkbox"/>	Severe	<input type="checkbox"/>	Limited Inspection		<input type="checkbox"/>					
Protection System	Red lead primer/ alkyd									Performance Deficiencies				
Condition Data	Units		Exc		Good		Fair		Poor					
	m <sup>2</sup>						17		12.12					
Comments	Medium to severe corrosion on exterior girders. Light to medium corrosion on interior girders. Loss of coating.													

Recommended Work:		Rehab	<input checked="" type="checkbox"/>	Replace	<input type="checkbox"/>	Maintenance Needs:								
Urgent		<input type="checkbox"/>	1 to 5 years	<input checked="" type="checkbox"/>	6 to 10 years	<input type="checkbox"/>	None	<input type="checkbox"/>	Urgent	<input type="checkbox"/>	1 year	<input type="checkbox"/>	2 years	<input type="checkbox"/>
Element Group	Beams/MLE 's				Length (m)		2							
Element Name	Girders				Width (m)		0.4							
Location	Ends (West)				Height (m)		1.22							
Material	Steel				Count		4							
Element Type	I-Type				Total Qty (Nos)		29.12							
Environment	Benign	<input type="checkbox"/>	Moderate	<input checked="" type="checkbox"/>	Severe	<input type="checkbox"/>	Limited Inspection		<input checked="" type="checkbox"/>					
Protection System	Red lead primer/ alkyd									Performance				



Condition Data	Units	Exc	Good	Fair	Poor	Deficiencies
	m <sup>2</sup>			17	12.12	
Comments	Severe corrosion at supports and some perforation at the bottom of the webs. Open joint framework at the ends allows water to spill out from the deck onto the steel girders underneath. Loss of coating observed. Clean and re-coating is required. Clean abutment top and bearing seats.					
Recommended Work: Rehab <input checked="" type="checkbox"/> Replace <input type="checkbox"/>						
Maintenance Needs:						
Urgent <input checked="" type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>						

Element Group	Beams/MLE 's		Length (m)	118.5		
Element Name	Girders		Width (m)	0.4		
Location	Intermediate		Height (m)	1.22		
Material	Steel		Count	4		
Element Type	I-Type		Total Qty (m2)	1725.36		
Environment	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	Limited Inspection <input type="checkbox"/>		
Protection System						Performance Deficiencies
Condition Data	Units	Exc	Good	Fair	Poor	
	m <sup>2</sup>		1695.12	30		
Comments	Exterior girders bottom flange have light surface corrosion due to seepage from damaged deck drains. Loss of coating. Clean and re-coating is required. Repair damaged deck drain.					
Recommended Work: Rehab <input checked="" type="checkbox"/> Replace <input type="checkbox"/>						
Maintenance Needs:						
Urgent <input type="checkbox"/> 1 to 5 years <input checked="" type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>						

Element Group	Coatings		Length (m)	131		
Element Name	Barrier Systems/ Hand Railings		Width (m)			
Location	Double Tube Hand Railings		Height (m)			
Material	Other		Count	4		
Element Type	Hot Dip Galvanizing		Total Qty (m <sup>2</sup> )	524		
Environment	Benign <input type="checkbox"/>	Moderate <input type="checkbox"/>	Severe <input checked="" type="checkbox"/>	Limited Inspection <input type="checkbox"/>		
Protection System						Performance Deficiencies
Condition Data	Units	Exc	Good	Fair	Poor	
	m <sup>2</sup>		419	105		
Comments	Localized loss of coating in some areas. Recommended Work: Rehab Recoat parapet tube railing.					
Recommended Work: Rehab <input type="checkbox"/> Replace <input type="checkbox"/>						
Maintenance Needs:						
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>						

Element Group	Coatings		Length (m)			
Element Name	Structural Steel		Width (m)			

Location	Girders (Ends)			Height (m)		
Material	Other			Count		
Element Type	Red Lead Primer/ Alkyd			Total Qty (m <sup>2</sup> )	58.24	
Environment	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	Limited Inspection	<input type="checkbox"/>	
Protection System	Red Lead Primer/ Alkyd					Performance Deficiencies
Condition Data	Units m <sup>2</sup>	Exc	Good	Fair	Poor	
					58.24	
Comments	Loss of coating at ends. Clean and re-coating.					

Recommended Work:	Rehab <input checked="" type="checkbox"/>	Replace <input type="checkbox"/>	Maintenance Needs:		
	Urgent <input type="checkbox"/>	1 to 5 years <input type="checkbox"/>	6 to 10 years <input type="checkbox"/>	None <input type="checkbox"/>	
				Urgent <input type="checkbox"/>	1 year <input checked="" type="checkbox"/> 2 years <input type="checkbox"/>
	Seal cracks in asphalt				

Element Group	Coatings			Length (m)		
Element Name	Structural Steel			Width (m)		
Location	Girders (Intermediate)			Height (m)		
Material	Other			Count		
Element Type	Red Lead Primer/ Alkyd			Total Qty (m <sup>2</sup> )	1725.36	
Environment	Benign <input checked="" type="checkbox"/>	Moderate <input type="checkbox"/>	Severe <input type="checkbox"/>	Limited Inspection	<input checked="" type="checkbox"/>	
Protection System	Red Lead Primer/ Alkyd					Performance Deficiencies
Condition Data	Units %	Exc	Good	Fair	Poor	
			1680.36	45		
Comments	Foundations not inspected, good cover in all areas of the foundation. Based on condition of rest of bridge.					

Recommended Work:	Rehab <input type="checkbox"/>	Replace <input type="checkbox"/>	Maintenance Needs:		
	Urgent <input type="checkbox"/>	1 to 5 years <input type="checkbox"/>	6 to 10 years <input type="checkbox"/>	None <input checked="" type="checkbox"/>	
				Urgent <input type="checkbox"/>	1 year <input type="checkbox"/> 2 years <input type="checkbox"/>

Element Group	Coatings			Length (m)		
Element Name	Structural Steel			Width (m)		
Location	Diaphragms (Ends)			Height (m)		
Material	Other			Count		
Element Type	Red Lead Primer/ Alkyd			Total Qty (m <sup>2</sup> )	6	
Environment	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	Limited Inspection	<input type="checkbox"/>	
Protection System						Performance Deficiencies
Condition Data	Units m <sup>2</sup> / m / each / % / all	Exc	Good	Fair	Poor	
			3	3		
Comments	Loss of coating at few areas end diaphragms due to surface corrosion. Clean and re-coating end diaphragms.					

Recommended Work:	Rehab <input checked="" type="checkbox"/>	Replace <input type="checkbox"/>	Maintenance Needs:		
	Urgent <input type="checkbox"/>	1 to 5 years <input checked="" type="checkbox"/>	6 to 10 years <input type="checkbox"/>	None <input type="checkbox"/>	
				Urgent <input type="checkbox"/>	1 year <input checked="" type="checkbox"/> 2 years <input type="checkbox"/>
	18				

					Clear vegetation under bridge and on slopes.					
<b>Element Group</b>	<b>Decks</b>				<b>Length (m)</b>	122.5				
<b>Element Name</b>	<b>Deck Top All</b>				<b>Width (m)</b>	10.4				
<b>Location</b>	All				<b>Height (m)</b>					
<b>Material</b>	Cast-In-Place Concrete				<b>Count</b>	1				
<b>Element Type</b>					<b>Total Qty (m<sup>2</sup>)</b>	1274				
<b>Environment</b>	Benign	<input type="checkbox"/>	Moderate	<input type="checkbox"/>	Severe	<input checked="" type="checkbox"/>	<b>Limited Inspection</b>			<input type="checkbox"/>
<b>Protection System</b>	<b>Asphalt Svsstem</b>								<b>Performance Deficiencies</b>	
<b>Condition Data</b>	<b>Units</b>		<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>				
	m2 / m / each / % / all			800	474					
<b>Comments</b>	Longitudinal and transverse cracks in asphalt observed. Asphalt repaving recommended.									
<b>Recommended Work:</b>					<b>Maintenance Needs:</b>					
Rehab <input checked="" type="checkbox"/> Replace <input type="checkbox"/>					Urgent <input type="checkbox"/> 1 to 5 years <input checked="" type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input type="checkbox"/>					
					Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>					
					Cost dependent on method used and season					

<b>Element Group</b>	<b>Decks</b>				<b>Length (m)</b>					
<b>Element Name</b>	<b>Drainage System</b>				<b>Width (m)</b>					
<b>Location</b>	All				<b>Height (m)</b>					
<b>Material</b>	Steel				<b>Count</b>	8				
<b>Element Type</b>	Drain Pipes with Basins				<b>Total Qty (m<sup>2</sup>)</b>	8				
<b>Environment</b>	Benign	<input type="checkbox"/>	Moderate	<input type="checkbox"/>	Severe	<input checked="" type="checkbox"/>	<b>Limited Inspection</b>			<input type="checkbox"/>
<b>Protection System</b>	<b>None</b>								<b>Performance Deficiencies</b>	
<b>Condition Data</b>	<b>Units</b>		<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>				
	%					8				
<b>Comments</b>	Deck drain pipe size is 150mm diameter. Deck drains have light corrosion on top. Two drain pipes by east pier are broken and dislocated from gutter system at top causing leakage of water and corrosion of girders. Water leakage is also observed at drain on north side by west pier. Urgent Repair leaking drains. Complete steel repairs to existing deck drain assemblies.									
<b>Recommended Work:</b>					<b>Maintenance Needs:</b>					
Rehab <input checked="" type="checkbox"/> Replace <input type="checkbox"/>					Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input type="checkbox"/>					
					Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>					

<b>Element Group</b>	<b>Decks</b>				<b>Length (m)</b>	2			
<b>Element Name</b>	<b>Soffit- Thin Slab</b>				<b>Width (m)</b>	10.4			
<b>Location</b>	Ends				<b>Height (m)</b>				
<b>Material</b>	Cast-In-Place Concrete				<b>Count</b>	2			

Element Type					Total Qty (m <sup>2</sup> )	41.6
Environment	Benign <input type="checkbox"/>	Moderate <input type="checkbox"/>	Severe <input type="checkbox"/>	Limited Inspection <input checked="" type="checkbox"/>		
Protection System						Performance Deficiencies
Condition Data	Units	Exc	Good	Fair	Poor	
	m2 / m / each / % / all		33.4	4.2	4	
Comments	Soffit exhibits some areas of narrow transverse cracks, isolated areas of delamination and spalling. Patchwork at poor areas of concrete as required.					
Recommended Work:				Maintenance Needs:		
Rehab <input checked="" type="checkbox"/> Replace <input type="checkbox"/> Urgent <input type="checkbox"/> 1 to 5 years <input checked="" type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>		

Element Group	Decks				Length (m)	118.5
Element Name	Soffit- Thin Slab				Width (m)	1.3
Location	Exterior				Height (m)	
Material	Cast-In-Place Concrete				Count	2
Element Type					Total Qty (m <sup>2</sup> )	308
Environment	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	Limited Inspection <input type="checkbox"/>		
Protection System						Performance Deficiencies
Condition Data	Units	Exc	Good	Fair	Poor	
	%		308			
Comments	Some hairline to narrow cracks are observed, isolated areas of delamination and spalling.					
Recommended Work:				Maintenance Needs:		
Rehab <input type="checkbox"/> Replace <input type="checkbox"/> Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>		

Element Group	Decks				Length (m)	118.5
Element Name	Soffit- Thin Slab				Width (m)	7.8
Location	Exterior				Height (m)	
Material	Cast-In-Place Concrete				Count	1
Element Type					Total Qty (m <sup>2</sup> )	924.3
Environment	Benign <input checked="" type="checkbox"/>	Moderate <input type="checkbox"/>	Severe <input type="checkbox"/>	Limited Inspection <input checked="" type="checkbox"/>		
Protection System						Performance Deficiencies
Condition Data	Units	Exc	Good	Fair	Poor	
	m2 / m / each / % / all			4		

<b>Comments</b>	Comments: Some hairline to narrow cracks are observed, isolated areas of delamination and spalling.				
<b>Recommended Work:</b>	<b>Rehab</b>	<input type="checkbox"/>	<b>Replace</b>	<input type="checkbox"/>	<b>Maintenance Needs:</b>
<b>Urgent</b> <input type="checkbox"/> <b>1 to 5 years</b> <input type="checkbox"/> <b>6 to 10 years</b> <input type="checkbox"/> <b>None</b> <input checked="" type="checkbox"/>					<b>Urgent</b> <input type="checkbox"/> <b>1 year</b> <input type="checkbox"/> <b>2 years</b> <input type="checkbox"/>

<b>Element Group</b>	<b>Decks</b>					<b>Length (m)</b>	122.5	
<b>Element Name</b>	<b>Soffit - Thin Slab</b>					<b>Width (m)</b>	8.62	
<b>Location</b>	Exterior					<b>Height (m)</b>		
<b>Material</b>	Cast-In-Place Concrete					<b>Count</b>	1	
<b>Element Type</b>						<b>Total Qty (m<sup>2</sup>)</b>	1056	
<b>Environment</b>	<b>Benign</b>	<input type="checkbox"/>	<b>Moderate</b>	<input checked="" type="checkbox"/>	<b>Severe</b>	<input type="checkbox"/>	<b>Limited Inspection</b>	<input type="checkbox"/>
<b>Protection System</b>							<b>Performance Deficiencies</b>	
<b>Condition Data</b>	<b>Units</b>		<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>		
	<b>%</b>				656	400		
<b>Comments</b>	Various narrow to wide transverse and longitudinal cracks. Light ravelling also observed. Replace wearing surface.							
<b>Recommended Work:</b>	<b>Rehab</b>	<input checked="" type="checkbox"/>	<b>Replace</b>	<input type="checkbox"/>	<b>Maintenance Needs:</b>			
<b>Urgent</b> <input type="checkbox"/> <b>1 to 5 years</b> <input checked="" type="checkbox"/> <b>6 to 10 years</b> <input type="checkbox"/> <b>None</b> <input checked="" type="checkbox"/>					<b>Urgent</b> <input type="checkbox"/> <b>1 year</b> <input type="checkbox"/> <b>2 years</b> <input type="checkbox"/>			

<b>Element Group</b>	<b>Embankments and Streams</b>					<b>Length (m)</b>		
<b>Element Name</b>	<b>Embankments</b>					<b>Width (m)</b>		
<b>Location</b>	At Abutments					<b>Height (m)</b>		
<b>Material</b>	Other					<b>Count</b>	6	
<b>Element Type</b>						<b>Total Qty (m<sup>2</sup>)</b>	6	
<b>Environment</b>	<b>Benign</b>	<input type="checkbox"/>	<b>Moderate</b>	<input checked="" type="checkbox"/>	<b>Severe</b>	<input type="checkbox"/>	<b>Limited Inspection</b>	<input checked="" type="checkbox"/>
<b>Protection System</b>							<b>Performance Deficiencies</b>	
<b>Condition Data</b>	<b>Units</b>		<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>		
	<b>m2 / m / each / % / all</b>			6				
<b>Comments</b>	Overall embankments are stable and well protected by rocks and vegetation . Light erosion in the NE quadrant.							
<b>Recommended Work:</b>	<b>Rehab</b>	<input type="checkbox"/>	<b>Replace</b>	<input type="checkbox"/>	<b>Maintenance Needs:</b>			

Urgent ☐ 1 to 5 years ☐ 6 to 10 years ☐ None ☒ Urgent ☐ 1 year ☐ 2 years ☐

Element Group	Embankments and Streams					Length (m)			
Element Name	Slope Protection					Width (m)			
Location	At Embankments					Height (m)			
Material	Other					Count	6		
Element Type						Total Qty (m <sup>2</sup> )	6		
Environment	Benign	<input type="checkbox"/>	Moderate	X	Severe	<input type="checkbox"/>	Limited Inspection	<input type="checkbox"/>	
Protection System							Performance Deficiencies		
Condition Data	Units		Exc	Good	Fair	Poor			
	%			5	1				
Comments	Stream clear of debris and vegetation.								
Recommended Work:	Rehab	<input type="checkbox"/>	Replace	<input type="checkbox"/>		Maintenance Needs:			
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>						Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>			
						Clear vegetation under bridge and on slopes.			

Element Group	Embankments and Streams					Length (m)			
Element Name	Embankments					Width (m)			
Location	At Abutments					Height (m)			
Material	Other					Count	6		
Element Type						Total Qty (m <sup>2</sup> )	6		
Environment	Benign	<input type="checkbox"/>	Moderate	X	Severe	<input type="checkbox"/>	Limited Inspection	<input type="checkbox"/>	
Protection System	None						Performance Deficiencies		
Condition Data	Units		Exc	Good	Fair	Poor			
	m2 / m / each / % / all			6					
Comments	Overall embankments are stable and well protected by rocks and vegetation . Light erosion in the NE quadrant.								
Recommended Work:	Rehab	<input type="checkbox"/>	Replace	<input type="checkbox"/>		Maintenance Needs:			
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>						Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>			

Element Group	Embankments and Streams					Length (m)			
Element Name	Slope Protection					Width (m)			
Location	At Embankments					Height (m)			
Material	Other					Count	6		
Element Type						Total Qty (m <sup>2</sup> )	6		
Environment	Benign	<input type="checkbox"/>	Moderate	X	Severe	<input type="checkbox"/>	Limited Inspection	<input type="checkbox"/>	
Protection System							Performance		

Condition Data	Units	Exc	Good	Fair	Poor	Deficiencies									
	%		5	1											
Comments	Embankments are stable, well supported by rocks and fully covered with vegetation.														
Recommended Work:		Rehab	<input checked="" type="checkbox"/>	Replace	<input type="checkbox"/>	Maintenance Needs:									
		Urgent	<input type="checkbox"/>	1 to 5 years	<input checked="" type="checkbox"/>		6 to 10 years	<input type="checkbox"/>	None	<input type="checkbox"/>	Urgent	<input type="checkbox"/>	1 year	<input type="checkbox"/>	2 years

Element Group	Embankments and Streams										Length (m)				
Element Name	Streams and Waterways										Width (m)				
Location	At structure										Height (m)				
Material	Other										Count	1			
Element Type											Total Qty (m <sup>2</sup> )	1			
Environment	Benign	<input checked="" type="checkbox"/>	Moderate	<input type="checkbox"/>	Severe	<input type="checkbox"/>	Limited Inspection			<input type="checkbox"/>					
Protection System	None										Performance Deficiencies				
Condition Data	Units		Exc	Good	Fair	Poor									
	m2 / m / each / % / all			1											
Comments	No obstruction found. East pier footing of east side is severely scoured. Place large, angular rocks or concrete to prevent														
Recommended Work:		Rehab	<input checked="" type="checkbox"/>	Replace	<input type="checkbox"/>	Maintenance Needs:									
		Urgent	<input type="checkbox"/>	1 to 5 years	<input type="checkbox"/>	6 to 10 year	<input checked="" type="checkbox"/>	None	<input checked="" type="checkbox"/>	Urgent	<input type="checkbox"/>	1 year	<input type="checkbox"/>	2 years	<input type="checkbox"/>

Element Group	Joints										Length (m)	10.4
Element Name	Armouring/ Retaining Devices										Width (m)	
Location	West end of Deck										Height (m)	
Material	Steel										Count	1
Element Type											Total Qty (m <sup>2</sup> )	10.4
Environment	Benign	<input type="checkbox"/>	Moderate	<input type="checkbox"/>	Severe	<input checked="" type="checkbox"/>	Limited Inspection			<input type="checkbox"/>		
Protection System	None										Performance	

Condition Data	Units	Exc	Good	Fair	Poor	Deficiencies
	m2 / m / each / % / all			10.4		
Comments	At north side, cover plate is not connected to curb. Numerous surface corrosion, scrape damage. Replace expansion joints to stop water to reach the girders below.					
Recommended Work: Rehab <input type="checkbox"/> Replace <input type="checkbox"/> Urgent <input checked="" type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input type="checkbox"/> Maintenance Needs: Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>						

Element Group	Joints				Length (m)	8.62	
Element Name	Concrete End Dams				Width (m)	0.3	
Location	At Joints				Height (m)		
Material	Cast-In-Place Concrete				Count	4	
Element Type					Total Qty (m <sup>2</sup> )	10.35	
Environment	Benign		Moderate		Severe	X	Limited Inspection
Protection System	None					Performance Deficiencies	
Condition Data	Units	Exc	Good	Fair	Poor		
	m2 / m / each / % / all		5	4.35	1		
Comments	Delamination, asphalt patches, medium to severe scaling at East end Dam. Joints between asphalt and end dams are not sealed. Replace expansion joints to prevent water reaching the girders below.						
Recommended Work: Rehab <input type="checkbox"/> Replace <input checked="" type="checkbox"/> Urgent <input checked="" type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input type="checkbox"/> Maintenance Needs: Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>							

Element Group	Joints				Length (m)	10.4	
Element Name	Seals/ Sealants				Width (m)		
Location	East and West				Height (m)		
Material	Rubber				Count	4	
Element Type	Strip Seal				Total Qty (m <sup>2</sup> )	10.4	
Environment	Benign		Moderate		Severe	X	Limited Inspection
Protection System	None					Performance	



Condition Data	Units	Exc	Good	Fair	Poor	Deficiencies
	m2 / m / each / % / all				10.4	
Comments	No seal observed at west end. At east side expansion joint, seal is torn and damaged at numerous location resulting leakage . Replace expansion joints seal.					
Recommended Work:         Rehab <input checked="" type="checkbox"/> Replace <input type="checkbox"/> Urgent <input type="checkbox"/> 1 to 5 years <input checked="" type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input type="checkbox"/> Maintenance Needs:         Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>						

Element Group	Piers				Length (m)		
Element Name	Bearings				Width (m)		
Location	All				Height (m)		
Material					Count	8	
Element Type					Total Qty (m <sup>2</sup> )	8	
Environment	Benign		Moderate	<input checked="" type="checkbox"/>	Severe		Limited Inspection
Protection System	None						Performance Deficiencies
Condition Data	Units	Exc	Good	Fair	Poor		
	m2 / m / each / % / all			8			
Comments	Limited inspection. Review condition of bearings during rehabilitation.						
Recommended Work:         Rehab <input checked="" type="checkbox"/> Replace <input type="checkbox"/> Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/> Maintenance Needs:         Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>							

Element Group	Piers				Length (m)	0.8	
Element Name	Shafts/Columns/Pile				Width (m)	10.4	
Location	All				Height (m)	4.8	
Material	Cast-In-Place Concrete				Count	2	
Element Type	Concrete Shaft Pier wall				Total Qty (m <sup>2</sup> )	215.04	
Environment	Benign	<input checked="" type="checkbox"/>	Moderate		Severe		Limited Inspection
Protection System	None						Performance

Condition Data	Units	Exc	Good	Fair	Poor	Deficiencies
	m2 / m / each / % / all			8		
Comments	Limited inspection due to high volume of flowing water. Localized medium cracks, honeycombing, narrow stained cracks are observed.					
Recommended Work: <div> Rehab <input type="checkbox"/> Replace <input type="checkbox"/> None <input checked="" type="checkbox"/> </div> <div> Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> </div>						
Maintenance Needs: <div> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/> </div>						

Element Group	Sidewalks/ Curbs				Length (m)	122.5
Element Name	Curbs				Width (m)	0.58
Location	North and South				Height (m)	0.2
Material	Cast-In-Place Concrete				Count	2
Element Type	Concrete Shaft Pier wall				Total Qty (m <sup>2</sup> )	191.1
Environment	Benign		Moderate		Severe	X
Protection System	None					Limited Inspection
Condition Data	Units	Exc	Good	Fair	Poor	Performance Deficiencies
	m2 / m / each / % / all			8		
Comments	Several narrow cracks, delamination, light scaling are observed. Overall in fair condition. Repair poor concrete areas.					
Recommended Work: <div> Rehab <input checked="" type="checkbox"/> Replace <input type="checkbox"/> None <input checked="" type="checkbox"/> </div> <div> Urgent <input type="checkbox"/> 1 to 5 years <input checked="" type="checkbox"/> 6 to 10 years <input type="checkbox"/> </div>						
Maintenance Needs: <div> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/> </div>						

Bridge Condition Index																	
No.	Element Group	Element Description	Location	Length	Width	Height	Count	Total Qty	Replacement (Initial) Cost	Material	Total Replacement Value	Excellent	Good	Fair	Poor	Current Element Value	Element Condition Index
				(m)	(m)	(m)	#		(\$)		TRV (\$)	1	0.75	0.4	0	CEV (\$)	
B-1	Abutments	Abutment walls	East and West	0.00	9.46	1.80	2	34.06	\$ 1000.00	Cast-in-place Concrete	\$ 34,060.00	0.00	29.31	2.50	2.25	\$ 22,982.50	67.5
B-1	Abutments	Ballast Walls	At Abutments	0.30	9.46	1.60	2	35.95	\$ 1000.00	Cast-in-place Concrete	\$ 35,950.00	0.00	17.95	18.00	0.00	\$ 20,662.50	57.5
B-1	Abutments	Bearings	East Abutment (Fixed End)	0.28	0.40	0.04	4	4.00	\$ 350.00	Steel/ Neoprene	\$ 1,400.00	0.00	0.00	0.00	4.00	\$ 0.00	0.0
B-1	Abutments	Bearings	West Abutment (Expansion End)	0.28	0.40	0.12	4	4.00	\$ 350.00	Steel/ Neoprene	\$ 1,400.00	0.00	0.00	4.00	0.00	\$ 560.00	40.0
B-1	Abutments	Wingwalls	Corner of Structure	4.75	0.00	1.50	4	28.50	\$ 1000.00	Reinforced Concrete	\$ 28,500.00	0.00	28.50	0.00	0.00	\$ 21,375.00	75.0
B-1	Accessories	Signs	At Approaches	0.00	0.00	0.00	4	4.00	\$ 500.00	Aluminium	\$ 2,000.00	0.00	4.00	0.00	0.00	\$ 1,500.00	75.0
B-1	Approaches	Barriers	At Approaches	167.64	0.00	0.00	0	167.64	\$ 300.00	Timber Post and Steel Panel	\$ 50,292.00	0.00	0.00	167.64	0.00	\$ 20,116.80	40.0
B-1	Approaches	Sidewalk/ Curb	At Approaches	4.75	0.58	0.20	4	14.82	\$ 1000.00	Cast-in-place Concrete	\$ 14,820.00	0.00	14.82	0.00	0.00	\$ 11,115.00	75.0
B-1	Approaches	Wearing Surface	East and West	6.00	8.62	0.00	2	103.44	\$ 500.00	Asphalt	\$ 51,720.00	0.00	93.44	6.00	4.00	\$ 36,240.00	70.1
B-1	Barriers	Barrier/ Parapet wall	North and South	132.00	0.26	0.62	2	396.00	\$ 1000.00	Cast-In-Place Concrete	\$ 396,000.00	0.00	246.00	75.00	75.00	\$ 214,500.00	54.2
B-1	Barriers	Hand Railings	North and South	13.00	0.00	0.00	4	524.00	\$ 300.00	Steel	\$ 157,200.00	0.00	0.00	524.00	0.00	\$ 62,880.00	40.0
B-1	Beams/ML's	Diaphragms , End	At Abutments/ Piers	2.60	0.30	1.22	24	24.00	\$ 1200.00	Steel	\$ 28,800.00	0.00	21.00	3.00	0.00	\$ 20,340.00	70.6
B-1	Beams/ML's	Diaphragms ,	Intermediate	0.00	0.00	0.00	60	60.00	\$ 1200.00	Steel	\$ 72,000.00	0.00	60.00	0.00	0.00	\$ 54,000.00	75.0
B-1	Beams/ML's	Girders	Ends (East)	2.00	0.40	1.22	4	29.12	\$ 1500.00	Steel	\$ 43,680.00	0.00	0.00	17.00	12.12	\$ 10,200.00	23.4
B-1	Beams/ML's	Girders	Ends (West)	2.00	0.40	1.22	4	29.12	\$ 1500.00	Steel	\$ 43,680.00	0.00	0.00	17.00	12.12	\$ 10,200.00	23.4
B-1	Beams/ML's	Girders	Intermediate	118.50	0.40	1.22	4	1725.36	\$ 1500.00	Steel	\$ 2,588,040.00	0.00	1695.12	30.00	0.00	\$ 1,925,010.00	74.4
B-1	Coatings	Barrier Systems/ Hand Railings	Double Tube Hand Railings	131.00	0.00	0.00	4	524.00	\$ 250.00	Other	\$ 131,000.00	0.00	419.00	105.00	0.00	\$ 89,062.50	68.0
B-1	Coatings	Structural Steel	Girders (Ends)	0.00	0.00	0.00	0	58.24	\$ 250.00	Red Lead Primer/ Alkyd	\$ 14,560.00	0.00	0.00	0.00	58.24	\$ 0.00	0.0
B-1	Coatings	Structural Steel	Girders (Intermediate)	0.00	0.00	0.00	0	1725.36	\$ 250.00	Red Lead Primer/ Alkyd	\$ 431,340.00	0.00	1680.36	45.00	0.00	\$ 319,567.50	74.1
B-1	Coatings	Structural Steel	Diaphragms (Ends)	0.00	0.00	0.00	0	6.00	\$ 250.00	Red Lead Primer/ Alkyd	\$ 1,500.00	0.00	3.00	3.00	0.00	\$ 862.50	57.5
B-1	Decks	Deck Top All	All	122.50	10.40	0.00	1	1274.00	\$ 1000.00	Cast-In-Place Concrete	\$ 1,274,000.00	0.00	800.00	474.00	0.00	\$ 789,600.00	62.0
B-1	Decks	Drainage System	All	0.00	0.00	0.00	8	8.00	\$ 300.00	Drain Pipes with Basins	\$ 2,400.00	0.00	0.00	0.00	8.00	\$ 0.00	0.0
B-1	Decks	Soffit- Thin Slab	Ends	2.00	10.40	0.00	2	41.60	\$ 1000.00	Cast-In-Place Concrete	\$ 41,600.00	0.00	33.40	4.20	4.00	\$ 26,730.00	64.3
B-1	Decks	Soffit- Thin Slab	Exterior	118.50	1.30	0.00	2	308.00	\$ 1000.00	Cast-In-Place Concrete	\$ 308,000.00	0.00	308.00	0.00	0.00	\$ 231,000.00	75.0
B-1	Decks	Soffit- Thin Slab	Exterior	118.50	7.80	0.00	1	924.30	\$ 1000.00	Cast-In-Place Concrete	\$ 924,300.00	0.00	0.00	4.00	0.00	\$ 1,600.00	0.2
B-1	Decks	Soffit - Thin Slab	Exterior	122.50	8.62	0.00	1	1056.00	\$ 1000.00	Cast-In-Place Concrete	\$ 1,056,000.00	0.00	0.00	656.00	400.00	\$ 262,400.00	24.8
B-1	Embankments and Streams	Embankments	At Abutments	0.00	0.00	0.00	6	6.00	\$ 100.00	Other	\$ 600.00	0.00	6.00	0.00	0.00	\$ 450.00	75.0
B-1	Embankments and Streams	Slope Protection	At Embankments	0.00	0.00	0.00	6	6.00	\$ 100.00	Other	\$ 600.00	0.00	5.00	1.00	0.00	\$ 415.00	69.2
B-1	Embankments and Streams	Embankments	At Abutments	0.00	0.00	0.00	6	6.00	\$ 100.00	Other	\$ 600.00	0.00	6.00	0.00	0.00	\$ 450.00	75.0
B-1	Embankments and Streams	Slope Protection	At Embankments	0.00	0.00	0.00	6	6.00	\$ 100.00	Other	\$ 600.00	0.00	5.00	1.00	0.00	\$ 415.00	69.2
B-1	Embankments and Streams	Streams and Waterways	At structure	0.00	0.00	0.00	1	1.00	\$ 100.00	Other	\$ 100.00	0.00	1.00	0.00	0.00	\$ 75.00	75.0
B-1	Joints	Armouring/ Retaining Devices	West end of Deck	10.40	0.00	0.00	1	10.40	\$ 200.00	Steel	\$ 2,080.00	0.00	0.00	10.40	0.00	\$ 832.00	40.0

B-1	Joints	Concrete End Dams	At Joints	8.62	0.30	0.00	4	10.35	\$ 200.00	Cast-In-Place Concrete	\$ 2,070.00	0.00	5.00	4.35	1.00	\$ 1,098.00	53.0
B-1	Joints	Seals/ Sealants	East and West	10.40	0.00	0.00	4	10.40	\$ 200.00	Strip Seal	\$ 2,080.00	0.00	0.00	0.00	10.40	\$ 0.00	0.0
B-1	Piers	Bearings	All	0.00	0.00	0.00	8	8.00	\$ 500.00	0	\$ 4,000.00	0.00	0.00	8.00	0.00	\$ 1,600.00	40.0
B-1	Piers	Shafts/Columns/ Pile	All	0.80	10.40	4.80	2	215.04	\$ 1000.00	Concrete Shaft Pier wall	\$ 215,040.00	0.00	0.00	8.00	0.00	\$ 3,200.00	1.5
B-1	Sidewalks/ Curbs	Curbs	North and South	122.50	0.58	0.20	2	191.10	\$ 1000.00	Concrete Shaft Pier wall	\$ 191,100.00	0.00	0.00	8.00	0.00	\$ 3,200.00	1.7
		TOTALS (TRV-CEV-BCI)									\$ 5,404,342.00					\$ 3,630,774.30	67.2

## Footbridge Road Bridge



Approach from West





Approach from West



Approach from East





Waterway to the left of the structure





Waterway to the right of the structure





Expansion joints at the West Approach



Expansion joints at the East Approach





North Elevation





South Elevation



Underside of East Abutment





Pier East Side



Pier West Side





Pier 2 East side



Rusting observed at the abutment





Soffit of the bridge deck



Rusting observed in one of the bridge girders





Rusting observed at the steel girders at the abutment



Damaged drain pipe and corrosion in the surrounding area





Spalling of concrete/ Exposed Rebar observed in Soffit



Spalling of concrete observed in Soffit

## Inventory Data:

Structure Name	B-2 Jedburgh Dam Bridge		
Main Hwy/Road #	Main Street	On <input checked="" type="checkbox"/> Under <input type="checkbox"/>	Crossing Type: 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 <input type="checkbox"/>
Hwy/Road Name	Main Street		
Structure Location	Approximately 150m North of Scott Street		
Northing	43°17' 19.2" N	Easting	80°26'49.2"W
Owners	Township of North Dumfries	Heritage Designation:	Not Cons. <input checked="" type="checkbox"/> Cons./not App. <input type="checkbox"/> List/not Desig. <input type="checkbox"/> Desig./not List <input type="checkbox"/> Desig. & List <input type="checkbox"/>
MTO Region	South-Western	Road Class:	Freeway <input type="checkbox"/> Arterial <input type="checkbox"/> Collector <input type="checkbox"/> Local <input checked="" type="checkbox"/>
MTO District	London / Stratford	Posted Speed	50 No. of Lanes 1
Old County	Waterloo,	AADT	- % Trucks
Geographic Township	Township of North Dumfries	Inspection Route Sequence	
Structure Type	Solid Slab	Interchange Number	
Total Deck Length (m)	8	Interchange Structure Number	
Overall Structure Width (m)	5.2	Min. Vertical Clearance (m)	
Total Deck Area (sq. m.)	41.6	Special Routes:	Transit <input type="checkbox"/> Truck <input type="checkbox"/> School <input type="checkbox"/> Bicycle <input type="checkbox"/>
Roadway Width (m)	4.9	Detour Length Around Bridge (km)	1.8
Skew Angle (degrees)	0	Direction of Structure	N/S
No. of Spans	2	Fill on Structure (m)	0
Span Lengths (m)	4.9 / 1.7	Deck Geodetic Elevation	253

## Historical Data:

Year Built	1940	Year of Last Major Rehab	
Last OSIM Inspection	2020	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			
Rehab History: (Date/Description)			

## Scheduled Improvements:

Regional Priority Number

Programmed Work Year

Nature of Program Work:

Appraisal Indices:		Comments
Fatigue		
Seismic		
Scour		
Flood		
Geometrics		
Barrier		
Curb		
Load Capacity		



Field Inspection Information	
Date of Inspection	May 17, 2022, 3:30 PM
Type of Inspection:	OSIM <input checked="" type="checkbox"/> Enhanced OSIM <input type="checkbox"/>
Inspector:	J. Zohreh, P.Eng.
Others in Party:	S. Mitra, EIT
Access Equipment Used:	
Weather:	Sunny
Temperature:	18°C

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

Overall Structure Notes	
Recommended Work on Structure	None <input type="checkbox"/> Minor Rehab <input type="checkbox"/> Major Rehab <input checked="" type="checkbox"/> Replace <input type="checkbox"/>
Timing of Recommended Work	1 to 5 years <input checked="" type="checkbox"/> 6 to 10 years <input type="checkbox"/>
Overall Comments:	This structure is in overall fair condition with few deterioration at various locations. The abutments have delamination, spalling, exposed reinforcements and cracks. The concrete shows damage and rehabilitation is required. The handrails also need to be replaced. The max road restriction of 10 Tonnes needs to be continued at Jedburgh Dam
Date of Next Inspection:	2024

## Suspected Performance Deficiencies

- 01 Load carrying capacity
- 02 Excessive deformations (reflections & 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 draining

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

07

Repair to Structural Steel

08

Repair to Bridge Concrete

09

Repair of Bridge Timber

10

Bailey bridges - maintenance

13

Erosion Control at Bridges

14

Concrete Sealing

15

Rout and Seal

16

Bridge deck drainage

05 Bridge Deck Joint Repair  
06 Bridge Bearing Maintenance

11 Animal/Pest Control  
12 Bridge Surface Repair

17 Scaling (loose concrete or ACR steel)  
18 Other

Repair Rehabilitation Required				Priority				Estimated Construction Cost
Element <sup>1</sup>	Repair and Rehabilitation Required <sup>2</sup>			6 to 10 years	1 to 5 years	Within 1 year	Urgent	
Deck, wearing surface	0				X			\$ 1,000.00
0	0					X		\$ 1,000.00
Railing System	Tighten fitting near bend in pipe to straighten					X		\$ 500.00
Estimated Rehabilitated or Replacement Structure Dimensions <sup>3</sup>				Total Structural Cost				\$ 2,500.00
Deck Length (m)	8	Structure Width (m)	5.2					

1 - Indicate specific costs for structure replacement or for rehabilitation under the given headings.

2 - Give a brief description of the rehabilitation work required.

3 - Estimated structure dimensions after completion of the proposed work - if it is expected to change.

Associated Work <sup>4</sup>	Comments	Estimated Cost
Approaches <sup>5</sup>		
Detours		
Traffic Control		
Utilities		
Right of Way		
Environment Study		
Other		
Contingencies		
Total Associated Work Cost		\$ -

Total Construction Cost	\$ 2,500.00
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4 - Includes other construction costs associated with the structure. Engineering fees for reports, environmental studies, designs, project management and contingencies are not included as associated work.

5 - Approach costs is for work (fill, pavement, guiderail, etc.) immediately adjacent to the structure for minor changes in horizontal or vertical alignment and for barrier end treatments at the structure

Justification

<b>Element Group</b>	<b>Abutments</b>			<b>Length (m)</b>					
<b>Element Name</b>	<b>Abutment walls</b>			<b>Width (m)</b>	5.5				
<b>Location</b>	North and South			<b>Height (m)</b>	2.7				
<b>Material</b>	Cast-in-place Concrete			<b>Count</b>	2				
<b>Element Type</b>	Conventional Closed			<b>Total Qty (m<sup>2</sup>)</b>	34.44				
<b>Environment</b>	<b>Benign</b> <input checked="" type="checkbox"/>	<b>Moderate</b> <input type="checkbox"/>	<b>Severe</b> <input type="checkbox"/>	<b>Limited Inspection</b>	<input checked="" type="checkbox"/>				
<b>Protection System</b>	<b>None</b>				<b>Performance Deficiencies</b>				
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>					
	m <sup>2</sup>		15	12	7.44				
<b>Comments</b>	Limited area for inspection due to speed of flowing water . A few spalls, delamination and deterioration noticed on abutment walls.								
<b>Recommended Work:</b>			<b>Rehab</b> <input checked="" type="checkbox"/>	<b>Replace</b> <input type="checkbox"/>	<b>Maintenance Needs:</b>				
			<b>Urgent</b> <input type="checkbox"/>	<b>1 to 5 years</b> <input checked="" type="checkbox"/>	<b>6 to 10 years</b> <input type="checkbox"/>	<b>None</b> <input type="checkbox"/>	<b>Urgent</b> <input type="checkbox"/>	<b>1 year</b> <input type="checkbox"/>	<b>2 years</b> <input type="checkbox"/>

<b>Element Group</b>	<b>Abutments</b>			<b>Length (m)</b>	0.8				
<b>Element Name</b>	<b>Wingwalls</b>			<b>Width (m)</b>	0.3				
<b>Location</b>	NE. NW, SW, SE			<b>Height (m)</b>	1				
<b>Material</b>	Cast-in-place Concrete			<b>Count</b>	4				
<b>Element Type</b>	Reinforced Concrete			<b>Total Qty (m<sup>2</sup>)</b>	5.72				
<b>Environment</b>	<b>Benign</b> <input type="checkbox"/>	<b>Moderate</b> <input checked="" type="checkbox"/>	<b>Severe</b> <input type="checkbox"/>	<b>Limited Inspection</b>	<input type="checkbox"/>				
<b>Protection System</b>	<b>None</b>				<b>Performance Deficiencies</b>				
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>					
	m <sup>2</sup>		3	2.72					
<b>Comments</b>	Narrow cracks are observed. Wingwalls are in fair condition .								
<b>Recommended Work:</b>			<b>Rehab</b> <input type="checkbox"/>	<b>Replace</b> <input type="checkbox"/>	<b>Maintenance Needs:</b>				
			<b>Urgent</b> <input type="checkbox"/>	<b>1 to 5 years</b> <input type="checkbox"/>	<b>6 to 10 years</b> <input type="checkbox"/>	<b>None</b> <input checked="" type="checkbox"/>	<b>Urgent</b> <input type="checkbox"/>	<b>1 year</b> <input type="checkbox"/>	<b>2 years</b> <input type="checkbox"/>

<b>Element Group</b>	<b>Accessories</b>			<b>Length (m)</b>					
<b>Element Name</b>	<b>Signs</b>			<b>Width (m)</b>					
<b>Location</b>	At Approaches			<b>Height (m)</b>					
<b>Material</b>	Aluminum			<b>Count</b>	8				
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>	8				
<b>Environment</b>	<b>Benign</b> <input type="checkbox"/>	<b>Moderate</b> <input type="checkbox"/>	<b>Severe</b> <input checked="" type="checkbox"/>	<b>Limited Inspection</b>	<input type="checkbox"/>				
<b>Protection System</b>					<b>Performance Deficiencies</b>				
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>					
	m <sup>2</sup>		8		0				
<b>Comments</b>	All hazard sign boards are present and are in good condition . 'One lane' sign markers are also present on both ends of the bridge.								
<b>Recommended Work:</b>			<b>Rehab</b> <input type="checkbox"/>	<b>Replace</b> <input type="checkbox"/>	<b>Maintenance Needs:</b>				
			<b>Urgent</b> <input type="checkbox"/>	<b>1 to 5 years</b> <input type="checkbox"/>	<b>6 to 10 years</b> <input type="checkbox"/>	<b>None</b> <input checked="" type="checkbox"/>	<b>Urgent</b> <input type="checkbox"/>	<b>1 year</b> <input type="checkbox"/>	<b>2 years</b> <input type="checkbox"/>

Element Group	Accessories	Length (m)	32.39
Element Name	Barriers	Width (m)	
Location	At Approaches	Height (m)	
Material	Steel	Count	
Element Type	Timber Post and Steel Panel	Total Qty (m)	32.39
Environment	Benign <input type="checkbox"/> Moderate <input type="checkbox"/> Severe <input checked="" type="checkbox"/>	Limited Inspection	<input type="checkbox"/>
Protection System	None		
Condition Data	Units	Exc	Good
	each		10
			10
			12.39
Comments	SBGR panel at SW end is not connected with structure.		
Recommended Work:	Rehab <input type="checkbox"/>	Replace <input type="checkbox"/>	Maintenance Needs:
	Urgent <input checked="" type="checkbox"/> 1 to 5 years <input type="checkbox"/>	6 to 10 years <input type="checkbox"/>	None <input type="checkbox"/>
			Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>
Connect SBGR with structure.			

Element Group	Approaches	Length (m)	6
Element Name	Wearing Surface	Width (m)	4.9
Location	North and South	Height (m)	
Material	Asphalt	Count	2
Element Type		Total Qty (m <sup>2</sup> )	58.8
Environment	Benign <input type="checkbox"/> Moderate <input checked="" type="checkbox"/> Severe <input type="checkbox"/>	Limited Inspection	<input type="checkbox"/>
Protection System	None		
Condition Data	Units	Exc	Good
	each		50.8
			8
Comments	Approach asphalt is in overall good condition.		
Recommended Work:	Rehab <input type="checkbox"/>	Replace <input type="checkbox"/>	Maintenance Needs: 18
	Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/>	6 to 10 years <input type="checkbox"/>	None <input checked="" type="checkbox"/>
			Urgent <input type="checkbox"/> 1 year <input checked="" type="checkbox"/> 2 years <input type="checkbox"/>

Element Group	Barriers	Length (m)	8.8
Element Name	Railing System	Width (m)	
Location	East and West	Height (m)	0.9
Material	Steel	Count	2
Element Type	3 Rail Metal Railing- Steel	Total Qty (Nos)	61.8
Environment	Benign <input type="checkbox"/> Moderate <input type="checkbox"/> Severe <input checked="" type="checkbox"/>	Limited Inspection	<input type="checkbox"/>
Protection System	None		
Condition Data	Units	Exc	Good
	m		32
			29.8
Comments	Barrier system consists of 3 rails (50mm Diameter) and 5 posts on each side of structure. Pipes are corroded and is in poor condition. Rail posts are broken at NE end. Recommended Work : Replace Priority: <1 Y		

<b>Recommended Work:</b> Rehab <input type="checkbox"/> Replace <input checked="" type="checkbox"/>	<b>Maintenance Needs:</b>
Urgent <input checked="" type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input type="checkbox"/>	Urgent <input type="checkbox"/> 1 year <input checked="" type="checkbox"/> 2 years <input type="checkbox"/>
Railing needs to be replaced as per design standards and install connection with structure.	Tighten fitting near bend in pipe to straighten

<b>Element Group</b>	<b>Coating</b>	<b>Length (m)</b>	61.68			
<b>Element Name</b>	<b>Barrier System/Hand Railings</b>	<b>Width (m)</b>				
<b>Location</b>	Railing System	<b>Height (m)</b>				
<b>Material</b>	Other	<b>Count</b>	1			
<b>Element Type</b>	<b>Timber Post and Steel Panel</b>	<b>Total Qty (m<sup>2</sup>)</b>	61.68			
<b>Environment</b>	Benign <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Severe <input type="checkbox"/>	Limited Inspection <input checked="" type="checkbox"/>				
<b>Protection System</b>	<b>Painted</b>				<b>Performance Deficiencies</b>	
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>		<b>Poor</b>
	m <sup>2</sup>			32		29.8
<b>Comments</b>	Coating of handrail barrier system is in poor condition.					

<b>Recommended Work:</b> Rehab <input checked="" type="checkbox"/> Replace <input type="checkbox"/>	<b>Maintenance Needs:</b>
Urgent <input checked="" type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input type="checkbox"/>	Urgent <input type="checkbox"/> 1 year <input checked="" type="checkbox"/> 2 years <input type="checkbox"/>

<b>Element Group</b>	<b>Decks</b>	<b>Length (m)</b>	8			
<b>Element Name</b>	<b>Deck Top</b>	<b>Width (m)</b>	5.2			
<b>Location</b>	All	<b>Height (m)</b>				
<b>Material</b>	Cast-in-place Concrete	<b>Count</b>	1			
<b>Element Type</b>	<b>Reinforced Concrete</b>	<b>Total Qty (m<sup>2</sup>)</b>	41.6			
<b>Environment</b>	Benign <input type="checkbox"/> Moderate <input checked="" type="checkbox"/> Severe <input type="checkbox"/>	Limited Inspection <input type="checkbox"/>				
<b>Protection System</b>	<b>Asphalt</b>				<b>Performance Deficiencies</b>	
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>		<b>Poor</b>
	m <sup>2</sup>		35.6	4		2
<b>Comments</b>	Deck top is covered with asphalt. Deck top assumed to be in fair condition.					

<b>Recommended Work:</b> Rehab <input checked="" type="checkbox"/> Replace <input type="checkbox"/>	<b>Maintenance Needs:</b>
Urgent <input type="checkbox"/> 1 to 5 years <input checked="" type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input type="checkbox"/>	Urgent <input type="checkbox"/> 1 year <input checked="" type="checkbox"/> 2 years <input type="checkbox"/>

<b>Element Group</b>	<b>Decks</b>	<b>Length (m)</b>	4.85		
<b>Element Name</b>	<b>Soffit-Thick Slab</b>	<b>Width (m)</b>	5.2		
<b>Location</b>	Main Spillway (North Span)	<b>Height (m)</b>	0.4		
<b>Material</b>	Cast-in-place Concrete	<b>Count</b>	1		
<b>Element Type</b>	<b>Reinforced Concrete</b>	<b>Total Qty (m<sup>2</sup>)</b>	29.1		
<b>Environment</b>	Benign <input type="checkbox"/> Moderate <input checked="" type="checkbox"/> Severe <input type="checkbox"/>	Limited Inspection <input type="checkbox"/>			
<b>Protection System</b>	<b>None</b>				<b>Performance</b>

Condition Data	Units	Exc	Good	Fair	Poor	Deficiencies
	m		12	10	7.1	
Comments	Localized delamination observed. Concrete disintegration and narrow cracks					
Recommended Work:		Rehab <input checked="" type="checkbox"/>	Replace <input type="checkbox"/>	Maintenance Needs:		
Urgent <input type="checkbox"/>		1 to 5 years <input checked="" type="checkbox"/>	6 to 10 years <input type="checkbox"/>	None <input checked="" type="checkbox"/>	Urgent <input type="checkbox"/>	1 year <input type="checkbox"/> 2 years <input type="checkbox"/>

Element Group	Decks	Length (m)	8			
Element Name	Wearing Surface	Width (m)	4.9			
Location	All	Height (m)				
Material	Asphalt	Count	1			
Element Type		Total Qty (m <sup>2</sup> )	39.2			
Environment	Benign <input type="checkbox"/> Moderate <input type="checkbox"/> Severe <input checked="" type="checkbox"/>	Limited Inspection	<input type="checkbox"/>			
Protection System						Performance Deficiencies
Condition Data	Units	Exc	Good	Fair	Poor	
	m		20	14	5.2	
Comments	Longitudinal and transverse cracks on asphalt surface are observed.					
Recommended Work:		Rehab <input checked="" type="checkbox"/>	Replace <input checked="" type="checkbox"/>	Maintenance Needs:		
Urgent <input type="checkbox"/>		1 to 5 years <input checked="" type="checkbox"/>	6 to 10 years <input type="checkbox"/>	None <input type="checkbox"/>	Urgent <input type="checkbox"/>	1 year <input type="checkbox"/> 2 years <input type="checkbox"/>

Element Group	Embankments and Streams	Length (m)				
Element Name	Embankments	Width (m)				
Location	At Abutments	Height (m)				
Material	Other	Count	4			
Element Type		Total Qty (m <sup>2</sup> )	4			
Environment	Benign <input type="checkbox"/> Moderate <input checked="" type="checkbox"/> Severe <input type="checkbox"/>	Limited Inspection	<input type="checkbox"/>			
Protection System	None					Performance Deficiencies
Condition Data	Units	Exc	Good	Fair	Poor	
	m		4			
Comments	Embankments are stable, well supported by asphalt. GRCA gauge station located at Southeast embankment.					
Recommended Work:		Rehab <input type="checkbox"/>	Replace <input type="checkbox"/>	Maintenance Needs:		
Urgent <input type="checkbox"/>		1 to 5 years <input checked="" type="checkbox"/>	6 to 10 years <input type="checkbox"/>	None <input type="checkbox"/>	Urgent <input type="checkbox"/>	1 year <input type="checkbox"/> 2 years <input type="checkbox"/>

Element Group	Embankments and Streams	Length (m)				
Element Name	Slope Protection	Width (m)				
Location	At Embankments	Height (m)				
Material	Other	Count	4			
Element Type		Total Qty (Nos)	4			
Environment	Benign <input type="checkbox"/> Moderate <input checked="" type="checkbox"/> Severe <input type="checkbox"/>	Limited Inspection	<input type="checkbox"/>			
Protection System	None					Performance

Condition Data	Units	Exc	Good	Fair	Poor	Deficiencies
	Nos		4			
Comments	Embankments are stable and in good condition .					
Recommended Work:		Rehab <input type="checkbox"/>	Replace <input type="checkbox"/>	Maintenance Needs:		
Urgent <input type="checkbox"/>		1 to 5 years <input type="checkbox"/>	6 to 10 years <input type="checkbox"/>	None <input checked="" type="checkbox"/>	Urgent <input type="checkbox"/>	1 year <input type="checkbox"/> 2 years <input type="checkbox"/>
Element Group	Embankments and Streams		Length (m)			
Element Name	Streams and Waterways		Width (m)			
Location	At structure		Height (m)			
Material	Other		Count	1		
Element Type			Total Qty (Nos)	1		
Environment	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	Limited Inspection <input type="checkbox"/>		
Protection System	Red lead primer/ alkyd					Performance Deficiencies
Condition Data	Units	Exc	Good	Fair	Poor	
	Nos		1			
Comments	No obstruction found.					
Recommended Work:		Rehab <input type="checkbox"/>	Replace <input type="checkbox"/>	Maintenance Needs:		
Urgent <input type="checkbox"/>		1 to 5 years <input type="checkbox"/>	6 to 10 years <input type="checkbox"/>	None <input checked="" type="checkbox"/>	Urgent <input type="checkbox"/>	1 year <input type="checkbox"/> 2 years <input type="checkbox"/>
Element Group	Piers		Length (m)	0.45		
Element Name	Shafts/Columns/Pile Bents		Width (m)	5.2		
Location			Height (m)	2.7		
Material	Cast-in-place Concrete		Count	1		
Element Type	Reinforced Concrete		Total Qty (m2)	30.51		
Environment	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	Limited Inspection <input type="checkbox"/>		
Protection System	None					Performance Deficiencies
Condition Data	Units	Exc	Good	Fair	Poor	
	m <sup>2</sup>		20	5	5.1	
Comments	Narrow cracks, efflorescence staining and scaling observed. Pier was repaired earlier at steel plate but steel plate is not high enough to accommodate typical water streaming over the dam.					
Recommended Work:		Rehab <input checked="" type="checkbox"/>	Replace <input type="checkbox"/>	Maintenance Needs:		
Urgent <input type="checkbox"/>		1 to 5 years <input checked="" type="checkbox"/>	6 to 10 years <input type="checkbox"/>	None <input type="checkbox"/>	Urgent <input type="checkbox"/>	1 year <input type="checkbox"/> 2 years <input type="checkbox"/>
Element Group	Retaining walls		Length (m)	2		
Element Name	Walls		Width (m)	0.3		



Location	NE Quadrant			Height (m)	0.8		
Material	Cast-In-Place Concrete			Count	1		
Element Type	Reinforced Concrete			Total Qty (Nos)	2.2		
Environment	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	Limited Inspection	<input checked="" type="checkbox"/>		
Protection System	Red lead primer/ alkyd					Performance Deficiencies	
Condition Data	Units m <sup>2</sup>	Exc	Good	Fair	Poor		
			1.2	1			
Comments	Retaining wall appears separated from the main structure. Some cracks are observed. Vegetation is growing around the retaining wall. Overall retaining wall is in fair condition.						
Recommended Work:		Rehab <input type="checkbox"/>	Replace <input type="checkbox"/>	Maintenance Needs:			
Urgent <input type="checkbox"/>		1 to 5 years <input type="checkbox"/>	6 to 10 years <input type="checkbox"/>	None <input checked="" type="checkbox"/>	Urgent <input type="checkbox"/>		
					1 year <input type="checkbox"/>		
					2 years <input type="checkbox"/>		
Element Group	Sidewalks/ Curbs			Length (m)	9.1		
Element Name	Curbs			Width (m)	0.15		
Location	East and West			Height (m)	0.2		
Material	Concrete			Count	2		
Element Type				Total Qty (m2)	6.37		
Environment	Benign <input type="checkbox"/>	Moderate <input type="checkbox"/>	Severe <input checked="" type="checkbox"/>	Limited Inspection	<input type="checkbox"/>		
Protection System						Performance Deficiencies	
Condition Data	Units m <sup>2</sup>	Exc	Good	Fair	Poor		
			6.37				
Comments	Several vertical cracks, light scaling is observed. Overall in good condition.						
Recommended Work:		Rehab <input type="checkbox"/>	Replace <input type="checkbox"/>	Maintenance Needs:			
Urgent <input type="checkbox"/>		1 to 5 years <input type="checkbox"/>	6 to 10 years <input type="checkbox"/>	None <input checked="" type="checkbox"/>	Urgent <input type="checkbox"/>		
					1 year <input type="checkbox"/>		
					2 years <input checked="" type="checkbox"/>		
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Bridge Condition Index																		
No.	Element Group	Element Description	Location	Length	Width	Height	Count	Total Qty	Units	Replacement (Initial) Cost	Material	Total Replacement Value	Excellent	Good	Fair	Poor	Current Element Value	Element Condition Index
				(m)	(m)	(m)	#			(\$)		TRV (\$)	1	0.75	0.4	0	CEV (\$)	
B-1	Abutments	Abutment walls	North and South	0.00	5.50	2.70	2	34.44	m2	\$ 1000.00	Cast-in-place Concrete	\$ 34,440.00	0.00	15.00	12.00	7.44	\$ 16,050.00	46.6
B-1	Abutments	Wingwalls	NE, NW, SW, SE	0.80	0.30	1.00	4	5.72	m2	\$ 1000.00	Cast-in-place Concrete	\$ 5,720.00	0.00	3.00	2.72	0.00	\$ 3,338.00	58.4
B-1	Accessories	Signs	At Approaches	0.00	0.00	0.00	8	8.00	m2	\$ 500.00	Aluminum	\$ 4,000.00	0.00	8.00	0.00	0.00	\$ 3,000.00	75.0
B-1	Accessories	Barriers	At Approaches	32.39	0.00	0.00	0	32.39	each	\$ 300.00	Steel	\$ 9,717.00	0.00	10.00	10.00	12.39	\$ 3,450.00	35.5
B-1	Approaches	Wearing Surface	North and South	6.00	4.90	0.00	2	58.80	each	\$ 500.00	Asphalt	\$ 29,400.00	0.00	50.80	8.00	0.00	\$ 20,650.00	70.2
B-1	Barriers	Railing System	East and West	8.80	0.00	0.90	2	61.80	m	\$ 300.00	Steel	\$ 18,540.00	0.00	0.00	32.00	29.80	\$ 3,840.00	20.7
B-1	Coating	Barrier System/Hand Railings	Railing System	61.68	0.00	0.00	1	61.68	m2	\$ 300.00	Timber Post and Steel Panel	\$ 18,504.00	0.00	0.00	32.00	29.80	\$ 3,840.00	20.8
B-1	Decks	Deck Top	All	8.00	5.20	0.00	1	41.60	m2	\$ 1000.00	Cast-in-place Concrete	\$ 41,600.00	0.00	35.60	4.00	2.00	\$ 28,300.00	68.0
B-1	Decks	Soffit-Thick Slab	Main Spillway (North Span)	4.85	5.20	0.40	1	29.10	m	\$ 1000.00	Cast-in-place Concrete	\$ 29,100.00	0.00	12.00	10.00	7.10	\$ 13,000.00	44.7
B-1	Decks	Wearing Surface	All	8.00	4.90	0.00	1	39.20	each	\$ 500.00	Asphalt	\$ 19,600.00	0.00	20.00	14.00	5.20	\$ 10,300.00	52.6
B-1	Embankments and Streams	Embankments	At Abutments	0.00	0.00	0.00	4	4.00	each	\$ 100.00	Other	\$ 400.00	0.00	4.00	0.00	0.00	\$ 300.00	75.0
B-1	Embankments and Streams	Slope Protection	At Embankments	0.00	0.00	0.00	4	4.00	m	\$ 100.00	Other	\$ 400.00	0.00	4.00	0.00	0.00	\$ 300.00	75.0
B-1	Embankments and Streams	Streams and Waterways	At structure	0.00	0.00	0.00	1	1.00	each	\$ 100.00	Other	\$ 100.00	0.00	1.00	0.00	0.00	\$ 75.00	75.0
B-1	Piers	Shafts/Columns/Pile Bents	0	0.45	5.20	2.70	1	30.51	m2	\$ 1000.00	Cast-in-place Concrete	\$ 30,510.00	0.00	20.00	5.00	5.10	\$ 17,000.00	55.7
B-1	Retaining walls	Walls	NE Quadrant	2.00	0.30	0.80	1	2.20	m2	\$ 1000.00	Cast-In-Place Concrete	\$ 2,200.00	0.00	1.20	1.00	0.00	\$ 1,300.00	59.1
B-1	Sidewalks/ Curbs	Curbs	East and West	9.10	0.15	0.20	2	6.37	each	\$ 1000.00	Concrete	\$ 6,370.00	0.00	6.37	0.00	0.00	\$ 4,777.50	75.0
		TOTALS (TRV-CEV-BCI)										\$ 250,601.00					\$ 129,520.50	51.7

# Jedburgh Dam Bridge



Approach looking towards North





Approach looking towards South



West Elevation





East Elevation/ Upstream view





Downstream view





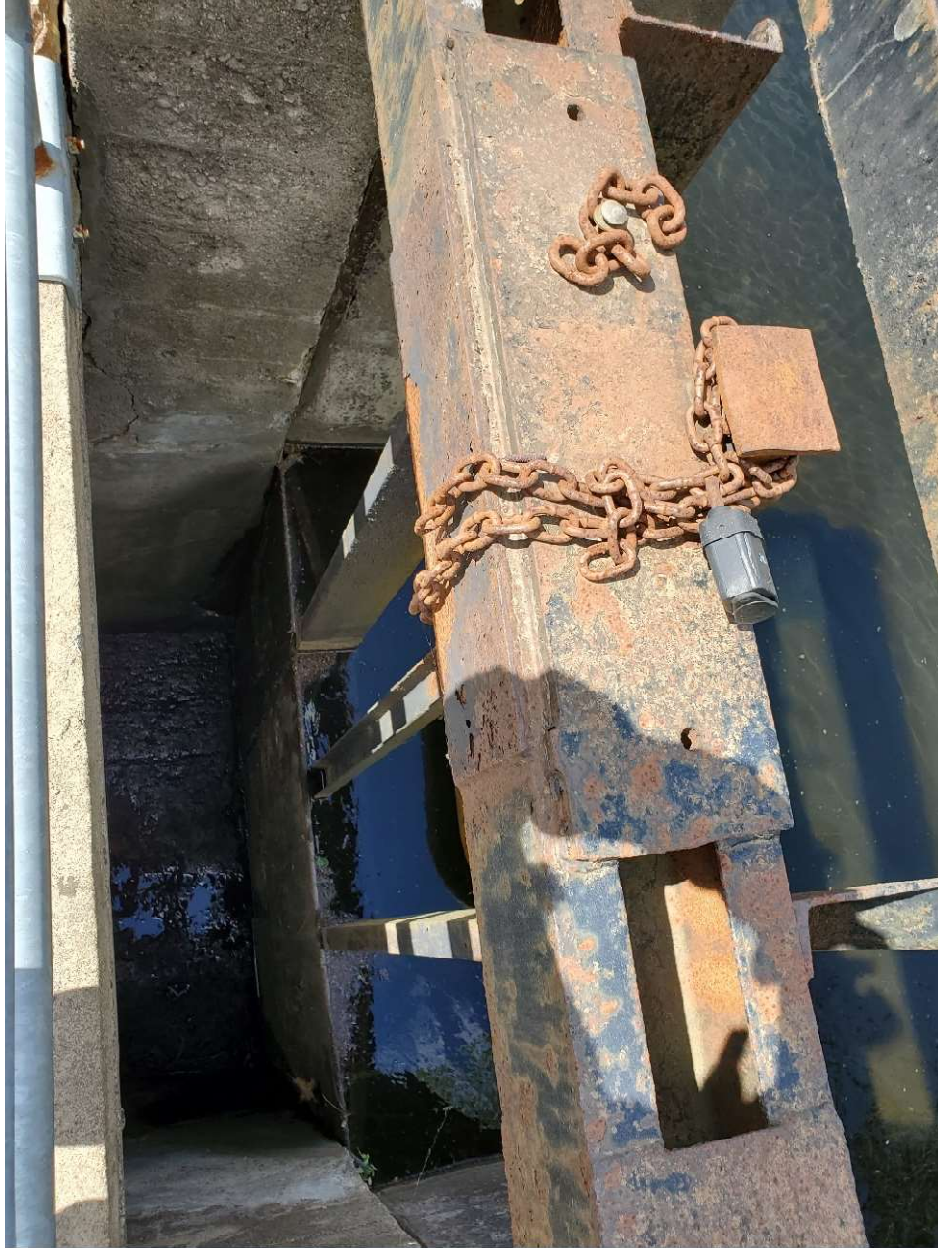
Damage observed on the slab of the bridge





Damage observed on the wearing surface of the bridge





Rusting observed on the lock gate



Crack and spalling observed in the concrete slab

## Inventory Data:

Structure Name	B-3 Piper Street Bridge		
Main Hwy/Road #	Piper Street	On <input checked="" type="checkbox"/> Under <input type="checkbox"/>	Crossing Type: 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 <input type="checkbox"/>
Hwy/Road Name	Piper Street		
Structure Location	Approximately 100 m West of Northumberland Street		
Northing	43°17'06.1" N	Easting	80°27'07.4"W
Owners	Township of North Dumfries	Heritage Designation:	Not Cons. <input checked="" type="checkbox"/> Cons./not App. <input type="checkbox"/> List/not Desig. <input type="checkbox"/> Desig./not List <input type="checkbox"/> Desig. & List <input type="checkbox"/>
MTO Region	South-Western	Road Class:	Freeway <input type="checkbox"/> Arterial <input type="checkbox"/> Collector <input type="checkbox"/> Local <input checked="" type="checkbox"/>
MTO District	London / Stratford	Posted Speed	50 No. of Lanes 2
Old County	Waterloo,	AADT	% Trucks
Geographic Township	Township of North Dumfries	Inspection Route Sequence	
Structure Type	Rectangular Voided Slab	Interchange Number	
Total Deck Length (m)	60	Interchange Structure Number	
Overall Structure Width (m)	11.8	Min. Vertical Clearance (m)	
Total Deck Area (sq. m.)	708	Special Routes:	Transit <input type="checkbox"/> Truck <input type="checkbox"/> School <input type="checkbox"/> Bicycle <input type="checkbox"/>
Roadway Width (m)	9.2	Detour Length Around Bridge (km)	7.6
Skew Angle (degrees)	0	Direction of Structure	E-W
No. of Spans	3	Fill on Structure (m)	0
Span Lengths (m)	20.1, 19.8, 20.1 (Total = 60)	Deck Geodetic Elevation	242

## Historical Data:

Year Built	1967	Year of Last Major Rehab	
Last OSIM Inspection	2020	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			
Rehab History: (Date/Description)			



**Scheduled Improvements:**

Regional Priority Number

Programmed Work Year

Nature of Program Work:

Appraisal Indices:		Comments
Fatigue		
Seismic		
Scour		
Flood		
Geometrics		
Barrier		
Curb		
Load Capacity		

## Field Inspection Information

Date of Inspection	May 17, 2022, 4:40 PM	Type of Inspection:	OSIM <input checked="" type="checkbox"/>	Enhanced OSIM <input type="checkbox"/>
Inspector:	J. Zohreh, P.Eng.			
Others in Party:	S. Mitra, EIT			
Access Equipment Used:				
Weather:	Sunny			
Temperature:	18°C			

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

## Overall Structure Notes

Recommended Work on Structure	None <input type="checkbox"/>	Minor Rehab <input checked="" type="checkbox"/>	Major Rehab <input type="checkbox"/>	Replace <input type="checkbox"/>
Timing of Recommended Work	1 to 5 years <input checked="" type="checkbox"/>	6 to 10 years <input type="checkbox"/>		
Overall Comments:	The bridge is in fair condition			
Date of Next Inspection:	2024			

## Suspected Performance Deficiencies

- 01 Load carrying capacity
- 02 Excessive deformations (reflections & rotations)
- 03 Continuing settlement
- 04 Continuing movements
- 05 Seized bearings

06

- 07 Bearing not uniformly loaded/unstable
- 08 Jammed expansion joint
- 09 Pedestrian/vehicular hazard
- 10 Rough riding surface
- 11 Surface ponding
- 12 Deck draining

12

- 13 Slippery Surfaces
- 14 Flooding/channel blockage
- 15 Undermining of foundation
- 16 Unstable embankments
- 17 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

- 08 Repair to Structural Steel
- 09 Repair to Bridge Concrete
- 10 Repair of Bridge Timber
- 11 Bailey bridges - maintenance
- 12 Animal/Pest Control
- 13 Bridge Surface Repair

13

- 14 Erosion Control at Bridges
- 15 Concrete Sealing
- 16 Rout and Seal
- 17 Bridge deck drainage
- 18 Scaling (loose concrete or ACR steel)
- 19 Other

Repair Rehabilitation Required				Priority				Estimated Construction Cost
Element <sup>1</sup>	Repair and Rehabilitation Required <sup>2</sup>			6 to 10 years	1 to 5 years	Within 1 year	Urgent	
Deck, wearing surface	0				X			\$ 1,000.00
Decks	0					X		\$ 1,000.00
Approach Slabs	0					X		\$ 500.00
Estimated Rehabilitated or Replacement Structure Dimensions <sup>3</sup>				Total Structural Cost				\$ 2,500.00
Deck Length (m)	60	Structure Width (m)	11.8					

1 - Indicate specific costs for structure replacement or for rehabilitation under the given headings.

2 - Give a brief description of the rehabilitation work required.

3 - Estimated structure dimensions after completion of the proposed work - if it is expected to change.

Associated Work <sup>4</sup>	Comments	Estimated Cost
Approaches <sup>5</sup>		
Detours		
Traffic Control		
Utilities		
Right of Way		
Environment Study		
Other		
Contingencies		
Total Associated Work Cost		\$ -

Total Construction Cost	\$ 2,500.00
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4 - Includes other construction costs associated with the structure. Engineering fees for reports, environmental studies, designs, project management and contingencies are not included as associated work.

5 - Approach costs is for work (fill, pavement, guiderail, etc.) immediately adjacent to the structure for minor changes in horizontal or vertical alignment and for barrier end treatments at the structure

Justification

<b>Element Group</b>	<b>Abutments</b>				<b>Length (m)</b>														
<b>Element Name</b>	<b>Abutment walls</b>				<b>Width (m)</b>	11													
<b>Location</b>	East and West				<b>Height (m)</b>	3.4													
<b>Material</b>	Cast-in-place Concrete				<b>Count</b>	2													
<b>Element Type</b>	Conventional Closed				<b>Total Qty (m<sup>2</sup>)</b>	74.8													
<b>Environment</b>	<b>Benign</b>	<input type="checkbox"/>	<b>Moderate</b>	<input checked="" type="checkbox"/>	<b>Severe</b>	<input type="checkbox"/>	<b>Limited Inspection</b>	<input type="checkbox"/>											
<b>Protection System</b>	None						<b>Performance Deficiencies</b>												
<b>Condition Data</b>	<b>Units</b>		<b>Exc</b>		<b>Good</b>					<b>Fair</b>		<b>Poor</b>							
	m <sup>2</sup>				68.6		4.2		2										
<b>Comments</b>	Localized areas of narrow cracks and vertical cracks on both abutments. Numerous water stains and delamination. Abutment walls have rust staining and are covered with graffiti.																		
<b>Recommended Work:</b>										<b>Maintenance Needs:</b>									
<b>Rehab</b> <input checked="" type="checkbox"/> <b>Replace</b> <input type="checkbox"/>										<b>Urgent</b> <input type="checkbox"/> <b>1 to 5 years</b> <input checked="" type="checkbox"/> <b>6 to 10 years</b> <input type="checkbox"/> <b>None</b> <input type="checkbox"/>									
										<b>Urgent</b> <input type="checkbox"/> <b>1 year</b> <input type="checkbox"/> <b>2 years</b> <input type="checkbox"/>									

<b>Element Group</b>	<b>Abutments</b>				<b>Length (m)</b>														
<b>Element Name</b>	<b>Bearings</b>				<b>Width (m)</b>														
<b>Location</b>	At Abutments				<b>Height (m)</b>														
<b>Material</b>	Steel/Neoprene				<b>Count</b>	18													
<b>Element Type</b>					<b>Total Qty (m<sup>2</sup>)</b>	18													
<b>Environment</b>	<b>Benign</b>	<input type="checkbox"/>	<b>Moderate</b>	<input checked="" type="checkbox"/>	<b>Severe</b>	<input type="checkbox"/>	<b>Limited Inspection</b>	<input checked="" type="checkbox"/>											
<b>Protection System</b>							<b>Performance Deficiencies</b>												
<b>Condition Data</b>	<b>Units</b>		<b>Exc</b>		<b>Good</b>					<b>Fair</b>		<b>Poor</b>							
	m <sup>2</sup>						18												
<b>Comments</b>	Bearings not visible. Assumed to be in fair condition																		
<b>Recommended Work:</b>										<b>Maintenance Needs:</b>									
<b>Rehab</b> <input type="checkbox"/> <b>Replace</b> <input type="checkbox"/>										<b>Urgent</b> <input type="checkbox"/> <b>1 to 5 years</b> <input type="checkbox"/> <b>6 to 10 years</b> <input type="checkbox"/> <b>None</b> <input checked="" type="checkbox"/>									
										<b>Urgent</b> <input type="checkbox"/> <b>1 year</b> <input type="checkbox"/> <b>2 years</b> <input type="checkbox"/>									

<b>Element Group</b>	<b>Abutments</b>				<b>Length (m)</b>	8													
<b>Element Name</b>	<b>Wingwalls</b>				<b>Width (m)</b>														
<b>Location</b>	Northeast				<b>Height (m)</b>	1													
<b>Material</b>	Cast-in-place Concrete				<b>Count</b>	1													
<b>Element Type</b>	Reinforced Concrete				<b>Total Qty (m<sup>2</sup>)</b>	8													
<b>Environment</b>	<b>Benign</b>	<input type="checkbox"/>	<b>Moderate</b>	<input checked="" type="checkbox"/>	<b>Severe</b>	<input type="checkbox"/>	<b>Limited Inspection</b>	<input type="checkbox"/>											
<b>Protection System</b>							<b>Performance Deficiencies</b>												
<b>Condition Data</b>	<b>Units</b>		<b>Exc</b>		<b>Good</b>					<b>Fair</b>		<b>Poor</b>							
	m <sup>2</sup>				7.2		0.4		0.4										
<b>Comments</b>	Patchwork at poor concrete areas as required.																		
<b>Recommended Work:</b>										<b>Maintenance Needs:</b>									
<b>Rehab</b> <input checked="" type="checkbox"/> <b>Replace</b> <input type="checkbox"/>										<b>Urgent</b> <input type="checkbox"/> <b>1 to 5 years</b> <input checked="" type="checkbox"/> <b>6 to 10 years</b> <input type="checkbox"/> <b>None</b> <input type="checkbox"/>									
										<b>Urgent</b> <input type="checkbox"/> <b>1 year</b> <input type="checkbox"/> <b>2 years</b> <input type="checkbox"/>									

<b>Element Group</b>	<b>Abutments</b>			<b>Length (m)</b>	9				
<b>Element Name</b>	<b>Wingwalls</b>			<b>Width (m)</b>					
<b>Location</b>	Southeast			<b>Height (m)</b>	2				
<b>Material</b>	Cast-in-place Concrete			<b>Count</b>	1				
<b>Element Type</b>	Reinforced Concrete			<b>Total Qty (m<sup>2</sup>)</b>	18				
<b>Environment</b>	<b>Benign</b> <input type="checkbox"/>	<b>Moderate</b> <input checked="" type="checkbox"/>	<b>Severe</b> <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>					
<b>Protection System</b>						<b>Performance Deficiencies</b>			
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>				
	each		17.3	0.5	0.2				
<b>Comments</b>	Minor scaling is observed at wingwalls. Medium cracks, efflorescence, localized spalling with exposed rebar. Patchwork at poor concrete areas as required.								
<b>Recommended Work:</b>				<b>Rehab</b> <input checked="" type="checkbox"/>	<b>Replace</b> <input type="checkbox"/>	<b>Maintenance Needs:</b>			
<b>Urgent</b> <input type="checkbox"/>				<b>1 to 5 years</b> <input checked="" type="checkbox"/>	<b>6 to 10 years</b> <input type="checkbox"/>	<b>None</b> <input type="checkbox"/>	<b>Urgent</b> <input type="checkbox"/>	<b>1 year</b> <input type="checkbox"/>	<b>2 years</b> <input type="checkbox"/>

<b>Element Group</b>	<b>Accessories</b>			<b>Length (m)</b>					
<b>Element Name</b>	<b>Signs</b>			<b>Width (m)</b>					
<b>Location</b>	At Approaches			<b>Height (m)</b>					
<b>Material</b>	Aluminium			<b>Count</b>	4				
<b>Element Type</b>				<b>Total Qty (Nos)</b>	4				
<b>Environment</b>	<b>Benign</b> <input type="checkbox"/>	<b>Moderate</b> <input type="checkbox"/>	<b>Severe</b> <input checked="" type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>					
<b>Protection System</b>						<b>Performance Deficiencies</b>			
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>				
	each				4				
<b>Comments</b>	No hazard markers present. Required to install hazard markers signs at corners of structure.								
<b>Recommended Work:</b>				<b>Rehab</b> <input checked="" type="checkbox"/>	<b>Replace</b> <input type="checkbox"/>	<b>Maintenance Needs:</b> 18			
<b>Urgent</b> <input type="checkbox"/>				<b>1 to 5 years</b> <input checked="" type="checkbox"/>	<b>6 to 10 years</b> <input type="checkbox"/>	<b>None</b> <input checked="" type="checkbox"/>	<b>Urgent</b> <input type="checkbox"/>	<b>1 year</b> <input checked="" type="checkbox"/>	<b>2 years</b> <input type="checkbox"/>

<b>Element Group</b>	<b>Approaches</b>			<b>Length (m)</b>	6				
<b>Element Name</b>	<b>Approach Slabs</b>			<b>Width (m)</b>	9.2				
<b>Location</b>	At Approaches			<b>Height (m)</b>					
<b>Material</b>	Cast-In-Place Concrete			<b>Count</b>	2				
<b>Element Type</b>	Reinforced Concrete			<b>Total Qty (m<sup>2</sup>)</b>	110.4				
<b>Environment</b>	<b>Benign</b> <input type="checkbox"/>	<b>Moderate</b> <input checked="" type="checkbox"/>	<b>Severe</b> <input type="checkbox"/>	<b>Limited Inspection</b> <input checked="" type="checkbox"/>					
<b>Protection System</b>						<b>Performance Deficiencies</b>			
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>				
	m		110.4						
<b>Comments</b>	Light transverse cracks observed at both ends.								
<b>Recommended Work:</b>				<b>Rehab</b> <input checked="" type="checkbox"/>	<b>Replace</b> <input type="checkbox"/>	<b>Maintenance Needs:</b>			
<b>Urgent</b> <input type="checkbox"/>				<b>1 to 5 years</b> <input type="checkbox"/>	<b>6 to 10 years</b> <input checked="" type="checkbox"/>	<b>None</b> <input type="checkbox"/>	<b>Urgent</b> <input type="checkbox"/>	<b>1 year</b> <input checked="" type="checkbox"/>	<b>2 years</b> <input type="checkbox"/>



<b>Element Group</b>	<b>Approaches</b>	<b>Length (m)</b>	26.7												
<b>Element Name</b>	<b>Barriers</b>	<b>Width (m)</b>													
<b>Location</b>	Southwest	<b>Height (m)</b>													
<b>Material</b>	Steel Beam Guide Rail	<b>Count</b>	1												
<b>Element Type</b>	<b>Timber Post and Steel Panel</b>	<b>Total Qty (m<sup>2</sup>)</b>	26.7												
<b>Environment</b>	Benign <input type="checkbox"/> Moderate <input type="checkbox"/> Severe <input checked="" type="checkbox"/>	<b>Limited Inspection</b>	<input checked="" type="checkbox"/>												
<b>Protection System</b>						<b>Performance Deficiencies</b>									
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>										
	m <sup>2</sup>			26.7											
<b>Comments</b>	7 panels of SBGR are present. The height of SBGR is low. A few posts are missing. End treatment is not provided.														
<b>Recommended Work:</b>		<b>Rehab</b>	<input checked="" type="checkbox"/>	<b>Replace</b>	<input type="checkbox"/>	<b>Maintenance Needs:</b>									
		<b>Urgent</b>	<input type="checkbox"/>	<b>1 to 5 years</b>	<input checked="" type="checkbox"/>	<b>6 to 10 years</b>	<input type="checkbox"/>	<b>None</b>	<input type="checkbox"/>	<b>Urgent</b>	<input type="checkbox"/>	<b>1 year</b>	<input checked="" type="checkbox"/>	<b>2 years</b>	<input type="checkbox"/>

<b>Element Group</b>	<b>Approaches</b>	<b>Length (m)</b>	26.7												
<b>Element Name</b>	<b>Barriers</b>	<b>Width (m)</b>													
<b>Location</b>	Southeast	<b>Height (m)</b>													
<b>Material</b>	Pedestrian Railing	<b>Count</b>	1												
<b>Element Type</b>	<b>Steel Tubing</b>	<b>Total Qty (m<sup>2</sup>)</b>	26.7												
<b>Environment</b>	Benign <input type="checkbox"/> Moderate <input type="checkbox"/> Severe <input checked="" type="checkbox"/>	<b>Limited Inspection</b>	<input type="checkbox"/>												
<b>Protection System</b>	<b>Galvanizing</b>					<b>Performance Deficiencies</b>									
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>										
	m <sup>2</sup>			26.7											
<b>Comments</b>	Concrete is spalled at the base plate of pedestrian railing. Breakdown of protective coating. Repair spalled concrete. Re-apply protective coating.														
<b>Recommended Work:</b>		<b>Rehab</b>	<input checked="" type="checkbox"/>	<b>Replace</b>	<input type="checkbox"/>	<b>Maintenance Needs:</b>									
		<b>Urgent</b>	<input checked="" type="checkbox"/>	<b>1 to 5 years</b>	<input type="checkbox"/>	<b>6 to 10 years</b>	<input type="checkbox"/>	<b>None</b>	<input type="checkbox"/>	<b>Urgent</b>	<input type="checkbox"/>	<b>1 year</b>	<input checked="" type="checkbox"/>	<b>2 years</b>	<input type="checkbox"/>

<b>Element Group</b>	<b>Approaches</b>	<b>Length (m)</b>	6												
<b>Element Name</b>	<b>Sidewalk/ Curb</b>	<b>Width (m)</b>	1.5												
<b>Location</b>	At Approaches	<b>Height (m)</b>													
<b>Material</b>	Cast-In-Place Concrete	<b>Count</b>	2												
<b>Element Type</b>	<b>Reinforced Concrete</b>	<b>Total Qty (m<sup>2</sup>)</b>	18												
<b>Environment</b>	Benign <input type="checkbox"/> Moderate <input type="checkbox"/> Severe <input checked="" type="checkbox"/>	<b>Limited Inspection</b>	<input type="checkbox"/>												
<b>Protection System</b>	<b>None</b>					<b>Performance Deficiencies</b>									
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>										
	m		17	1	0										
<b>Comments</b>	Sidewalk is in good condition but at the SE corner it is undermined causing crack in pavement.														
<b>Recommended Work:</b>		<b>Rehab</b>	<input checked="" type="checkbox"/>	<b>Replace</b>	<input type="checkbox"/>	<b>Maintenance Needs:</b>									
		<b>Urgent</b>	<input checked="" type="checkbox"/>	<b>1 to 5 years</b>	<input type="checkbox"/>	<b>6 to 10 years</b>	<input type="checkbox"/>	<b>None</b>	<input type="checkbox"/>	<b>Urgent</b>	<input type="checkbox"/>	<b>1 year</b>	<input type="checkbox"/>	<b>2 years</b>	<input type="checkbox"/>

<b>Element Group</b>	<b>Approaches</b>			<b>Length (m)</b>	6		
<b>Element Name</b>	<b>Wearing Surface</b>			<b>Width (m)</b>	9.2		
<b>Location</b>	East and West			<b>Height (m)</b>			
<b>Material</b>	Asphalt			<b>Count</b>	2		
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>	110.4		
<b>Environment</b>	<b>Benign</b> <input type="checkbox"/>	<b>Moderate</b> <input type="checkbox"/>	<b>Severe</b> <input checked="" type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>			
<b>Protection System</b>	None					<b>Performance Deficiencies</b>	
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>		
	m		93.44	6	4		
<b>Comments</b>	A few longitudinal and transverse cracks are observed at both approaches. Wheel rutting, severe settlement of asphalt at east approach. Severe cracks around manhole at west end.						
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>			
<b>Rehab</b> <input checked="" type="checkbox"/> <b>Replace</b> <input type="checkbox"/> <b>Urgent</b> <input type="checkbox"/> <b>1 to 5 years</b> <input checked="" type="checkbox"/> <b>6 to 10 years</b> <input type="checkbox"/> <b>None</b> <input type="checkbox"/>				<b>Urgent</b> <input type="checkbox"/> <b>1 year</b> <input type="checkbox"/> <b>2 years</b> <input type="checkbox"/>			

<b>Element Group</b>	<b>Barriers</b>			<b>Length (m)</b>	67.2		
<b>Element Name</b>	<b>Barrier/ Parapet wall</b>			<b>Width (m)</b>	0.25		
<b>Location</b>	North and South			<b>Height (m)</b>	0.6		
<b>Material</b>	Cast-In-Place Concrete			<b>Count</b>	2		
<b>Element Type</b>	Parapet Wall with two Rails			<b>Total Qty (m<sup>2</sup>)</b>	194.88		
<b>Environment</b>	<b>Benign</b> <input type="checkbox"/>	<b>Moderate</b> <input type="checkbox"/>	<b>Severe</b> <input checked="" type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>			
<b>Protection System</b>	Galvanized					<b>Performance Deficiencies</b>	
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>		
	m		179.48	7.7	7		
<b>Comments</b>	Light to medium scaling, narrow cracks are observed on various locations . Delamination at the bottom of barrier walls. Repair poor concrete areas.						
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>			
<b>Rehab</b> <input checked="" type="checkbox"/> <b>Replace</b> <input type="checkbox"/> <b>Urgent</b> <input type="checkbox"/> <b>1 to 5 years</b> <input checked="" type="checkbox"/> <b>6 to 10 years</b> <input type="checkbox"/> <b>None</b> <input type="checkbox"/>				<b>Urgent</b> <input type="checkbox"/> <b>1 year</b> <input type="checkbox"/> <b>2 years</b> <input type="checkbox"/>			

<b>Element Group</b>	<b>Barriers</b>			<b>Length (m)</b>	67.2		
<b>Element Name</b>	<b>Hand Railings</b>			<b>Width (m)</b>			
<b>Location</b>	North and South			<b>Height (m)</b>			
<b>Material</b>	Steel			<b>Count</b>	4		
<b>Element Type</b>	Double Tube Railing			<b>Total Qty (m)</b>	268.8		
<b>Environment</b>	<b>Benign</b> <input type="checkbox"/>	<b>Moderate</b> <input checked="" type="checkbox"/>	<b>Severe</b> <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>			
<b>Protection System</b>	Galvanized					<b>Performance Deficiencies</b>	
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>		
	Nos		242	13.4	13.4		
<b>Comments</b>	Anchor bolts are missing at few locations, light corrosion on anchor bolts. Parapet tube rail is uprooted at a few areas. Poor connection of bottom rail with post at SE corner. Breakdown of protective coating. Install and replace missing and corroded anchor bolts.						
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>			
<b>Rehab</b> <input checked="" type="checkbox"/> <b>Replace</b> <input type="checkbox"/> <b>Urgent</b> <input type="checkbox"/> <b>1 to 5 years</b> <input checked="" type="checkbox"/> <b>6 to 10 years</b> <input type="checkbox"/> <b>None</b> <input type="checkbox"/>				<b>Urgent</b> <input type="checkbox"/> <b>1 year</b> <input type="checkbox"/> <b>2 years</b> <input type="checkbox"/>			

Element Group	Barriers			Length (m)	60		
Element Name	Railing System			Width (m)			
Location	South			Height (m)			
Material	Steel			Count	1		
Element Type	Splash Guard			Total Qty (m)	60		
Environment	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	Limited Inspection <input type="checkbox"/>			
Protection System	Galvanized					Performance Deficiencies	
Condition Data	Units	Exc	Good	Fair	Poor		
	Nos			60			
Comments	Localized light corrosion						

Recommended Work:				Maintenance Needs:			
Rehab <input checked="" type="checkbox"/>	Replace <input type="checkbox"/>			Urgent <input type="checkbox"/>	1 year <input type="checkbox"/>	2 years <input type="checkbox"/>	
Urgent <input type="checkbox"/>	1 to 5 years <input checked="" type="checkbox"/>	6 to 10 years <input type="checkbox"/>	None <input type="checkbox"/>	Urgent <input type="checkbox"/>	1 year <input type="checkbox"/>	2 years <input type="checkbox"/>	

Element Group	Beams/MLE's			Length (m)	12		
Element Name	Girders			Width (m)	1.22		
Location	Ends			Height (m)			
Material	Pre-stressed Concrete			Count	9		
Element Type	Box Girders			Total Qty (m2)	131.76		
Environment	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	Limited Inspection <input type="checkbox"/>			
Protection System	Red lead primer/ alkyd					Performance Deficiencies	
Condition Data	Units	Exc	Good	Fair	Poor		
	m <sup>2</sup>		98.06	26.2	7.5		
Comments	Several delamination and spall with exposed reinforcement on both ends. Ends of girder have leakage between units, some with efflorescence. Some wide longitudinal cracks, rust staining at locations of reinforcement steel chairs						

Recommended Work:				Maintenance Needs:			
Rehab <input checked="" type="checkbox"/>	Replace <input type="checkbox"/>			Urgent <input type="checkbox"/>	1 year <input type="checkbox"/>	2 years <input type="checkbox"/>	
Urgent <input type="checkbox"/>	1 to 5 years <input checked="" type="checkbox"/>	6 to 10 years <input type="checkbox"/>	None <input type="checkbox"/>	Urgent <input type="checkbox"/>	1 year <input type="checkbox"/>	2 years <input type="checkbox"/>	

Element Group	Beams/MLE's			Length (m)	49		
Element Name	Girders			Width (m)	1.22		
Location	Centre			Height (m)			
Material	Pre-stressed Concrete			Count	9		
Element Type	Box Girders			Total Qty (m2)	538.02		
Environment	Benign <input checked="" type="checkbox"/>	Moderate <input type="checkbox"/>	Severe <input type="checkbox"/>	Limited Inspection <input checked="" type="checkbox"/>			
Protection System	Red lead primer/ alkyd					Performance Deficiencies	
Condition Data	Units	Exc	Good	Fair	Poor		
	m <sup>2</sup>		468.68	77.6	8.26		

<b>Comments</b>	Spalling , rust staining, hairline stained cracks, wide crack with efflorescence leakage between units.										
<b>Recommended Work:</b>		Rehab <input checked="" type="checkbox"/>		Replace <input type="checkbox"/>		<b>Maintenance Needs:</b>					
Urgent <input type="checkbox"/>		1 to 5 years <input checked="" type="checkbox"/>		6 to 10 years <input type="checkbox"/>		None <input type="checkbox"/>		Urgent <input type="checkbox"/>		1 year <input type="checkbox"/> 2 years <input type="checkbox"/>	

<b>Element Group</b>	Coatings			<b>Length (m)</b>	66		
<b>Element Name</b>	Barrier Systems/ Hand Railings			<b>Width (m)</b>			
<b>Location</b>	Double Tube Hand Railings			<b>Height (m)</b>			
<b>Material</b>	Other			<b>Count</b>	4		
<b>Element Type</b>	Hot Dip Galvanizing			<b>Total Qty (m<sup>2</sup>)</b>	264		
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input type="checkbox"/>	Severe <input checked="" type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>			
<b>Protection System</b>						<b>Performance Deficiencies</b>	
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>		
	m <sup>2</sup>		264				
<b>Comments</b>	Galvanized coating on tube hand railing, is in fair condition.						

<b>Recommended Work:</b>		Rehab <input checked="" type="checkbox"/>		Replace <input type="checkbox"/>		<b>Maintenance Needs:</b>					
Urgent <input type="checkbox"/>		1 to 5 years <input type="checkbox"/>		6 to 10 year <input checked="" type="checkbox"/>		None <input type="checkbox"/>		Urgent <input type="checkbox"/>		1 year <input type="checkbox"/> 2 years <input type="checkbox"/>	

<b>Element Group</b>	Decks			<b>Length (m)</b>	60		
<b>Element Name</b>	Deck Top			<b>Width (m)</b>	11.8		
<b>Location</b>	All			<b>Height (m)</b>			
<b>Material</b>	Precast Concrete			<b>Count</b>	1		
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>	708		
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>			
<b>Protection System</b>	Asphalt					<b>Performance Deficiencies</b>	
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>		
	m <sup>2</sup>		708				
<b>Comments</b>							

<b>Recommended Work:</b>		Rehab <input type="checkbox"/>		Replace <input type="checkbox"/>		<b>Maintenance Needs:</b>					
Urgent <input type="checkbox"/>		1 to 5 years <input type="checkbox"/>		6 to 10 years <input type="checkbox"/>		None <input checked="" type="checkbox"/>		Urgent <input type="checkbox"/>		1 year <input type="checkbox"/> 2 years <input type="checkbox"/>	

<b>Element Group</b>	Decks			<b>Length (m)</b>	67.2		
<b>Element Name</b>	Soffit- Thin Slab			<b>Width (m)</b>	0.46		
<b>Location</b>	Exterior			<b>Height (m)</b>	0.3		
<b>Material</b>	Cast-In-Place concrete			<b>Count</b>	2		

Element Type					Total Qty (m <sup>2</sup> )	102.2
Environment	Benign <input checked="" type="checkbox"/>	Moderate <input type="checkbox"/>	Severe <input type="checkbox"/>	Limited Inspection <input type="checkbox"/>		
Protection System	Red Lead Primer/ Alkyd					Performance Deficiencies
Condition Data	Units	Exc	Good	Fair	Poor	
	m <sup>2</sup>		102.2			
Comments	Overall in good condition.					
<b>Recommended Work:</b> Rehab <input type="checkbox"/> Replace <input type="checkbox"/>						
<b>Maintenance Needs:</b> Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input checked="" type="checkbox"/> 2 years <input type="checkbox"/>						

Element Group	Decks	Length (m)	
Element Name	Soffit- Thin Slab	Width (m)	
Location	Ends	Height (m)	
Material	Pre-cast Concrete	Count	
Element Type	Box Girders	Total Qty (m <sup>2</sup> )	
Environment	Benign <input checked="" type="checkbox"/>	Moderate <input type="checkbox"/>	Severe <input type="checkbox"/>
Protection System	Red Lead Primer/ Alkyd		Limited Inspection <input checked="" type="checkbox"/>
Condition Data	Units	Exc	Good
	%		
Comments	Soffit is the bottom of the box girders- refer to Beams/MLE's element.		
<b>Recommended Work:</b> Rehab <input type="checkbox"/> Replace <input type="checkbox"/>			
<b>Maintenance Needs:</b> Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>			

Element Group	Decks	Length (m)	
Element Name	Soffit- Thin Slab	Width (m)	
Location	Ends	Height (m)	
Material	Pre-cast Concrete	Count	
Element Type	Box Girders	Total Qty (m <sup>2</sup> )	
Environment	Benign <input checked="" type="checkbox"/>	Moderate <input type="checkbox"/>	Severe <input type="checkbox"/>
Protection System	Red Lead Primer/ Alkyd		Limited Inspection <input type="checkbox"/>
Condition Data	Units	Exc	Good
	m2 / m / each / % / all		3
Comments	Soffit is the bottom of the box girders- refer to Beams/MLE's element.		
<b>Recommended Work:</b> Rehab <input checked="" type="checkbox"/> Replace <input type="checkbox"/>			
<b>Maintenance Needs:</b> Urgent <input type="checkbox"/> 1 to 5 years <input checked="" type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input checked="" type="checkbox"/> 2 years <input type="checkbox"/>			

Element Group	Decks	Length (m)	60
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<b>Element Name</b>	<b>Wearing Surface</b>	<b>Width (m)</b>	9.3			
<b>Location</b>	All	<b>Height (m)</b>				
<b>Material</b>	Asphalt	<b>Count</b>	1			
<b>Element Type</b>		<b>Total Qty (m<sup>2</sup>)</b>	558			
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input type="checkbox"/>	Severe <input checked="" type="checkbox"/>	Limited Inspection <input type="checkbox"/>		
<b>Protection System</b>	Asphalt System					<b>Performance Deficiencies</b>
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>	
	m <sup>2</sup> / m / each / % / all		465	53	43	
<b>Comments</b>	Various narrow to wide transverse and longitudinal cracks at both ends. Asphalt deterioration at pier joint and each end of bridge.					
<b>Recommended Work:</b>		Rehab <input checked="" type="checkbox"/>	Replace <input type="checkbox"/>	<b>Maintenance Needs:</b>		
Urgent <input type="checkbox"/>		1 to 5 years <input checked="" type="checkbox"/>	6 to 10 years <input type="checkbox"/>	None <input type="checkbox"/>	Urgent <input type="checkbox"/>	1 year <input type="checkbox"/> 2 years <input type="checkbox"/>
Replace wearing surface. Install proper joint system at ends of structure and overtop of piers. Maintenance Needs:						

<b>Element Group</b>	<b>Embankments and Streams</b>	<b>Length (m)</b>				
<b>Element Name</b>	<b>Embankments</b>	<b>Width (m)</b>				
<b>Location</b>	At Abutments	<b>Height (m)</b>				
<b>Material</b>	Other	<b>Count</b>	6			
<b>Element Type</b>		<b>Total Qty (m<sup>2</sup>)</b>	6			
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	Limited Inspection <input type="checkbox"/>		
<b>Protection System</b>	None					<b>Performance Deficiencies</b>
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>	
	%		6			
<b>Comments</b>	Embankments are stable.					
<b>Recommended Work:</b>		Rehab <input checked="" type="checkbox"/>	Replace <input type="checkbox"/>	<b>Maintenance Needs:</b>		
Urgent <input checked="" type="checkbox"/>		1 to 5 years <input type="checkbox"/>	6 to 10 years <input type="checkbox"/>	None <input type="checkbox"/>	Urgent <input type="checkbox"/>	1 year <input type="checkbox"/> 2 years <input type="checkbox"/>

<b>Element Group</b>	<b>Embankments and Streams</b>	<b>Length (m)</b>				
<b>Element Name</b>	<b>Slope Protection</b>	<b>Width (m)</b>				
<b>Location</b>	At Embankments	<b>Height (m)</b>				
<b>Material</b>	Other	<b>Count</b>	4			
<b>Element Type</b>		<b>Total Qty (m<sup>2</sup>)</b>	4			
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	Limited Inspection <input type="checkbox"/>		
<b>Protection System</b>						<b>Performance Deficiencies</b>
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>	

Condition Data	m2 / m / each / % / all		4		
Comments	East abutment embankment is protected with concrete. Road embankments at corners of structure are well protected with vegetation.				
Recommended Work:			Maintenance Needs:		
Rehab <input checked="" type="checkbox"/> Replace <input type="checkbox"/> Urgent <input type="checkbox"/> 1 to 5 years <input checked="" type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>			Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>		

Element Group	Embankments and Streams				Length (m)	
Element Name	Streams and Waterways				Width (m)	
Location	At structure				Height (m)	
Material	Other				Count	1
Element Type					Total Qty (m <sup>2</sup> )	1
Environment	Benign	<input checked="" type="checkbox"/>	Moderate	<input type="checkbox"/>	Severe	<input type="checkbox"/>
Protection System	Limited Inspection					<input type="checkbox"/>
Condition Data	Units		Exc	Good	Fair	Poor
	%			1		
Comments	Tree debris at east pier.					
Recommended Work:			Maintenance Needs:			
Rehab <input type="checkbox"/> Replace <input type="checkbox"/> Urgent <input type="checkbox"/> 1 to 5 years <input checked="" type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input type="checkbox"/>			Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>			
Remove tree debris. Place fill and protect with large rock at both piers.						

Element Group	Joints				Length (m)	11.8
Element Name	Seals/ Sealants				Width (m)	
Location	Abutment and Piers				Height (m)	
Material	Rubber				Count	4
Element Type	Strip Seal				Total Qty (m <sup>2</sup> )	47.2
Environment	Benign	<input type="checkbox"/>	Moderate	<input type="checkbox"/>	Severe	<input checked="" type="checkbox"/>
Protection System	Limited Inspection					<input checked="" type="checkbox"/>
Condition Data	Units		Exc	Good	Fair	Poor
	m2 / m / each / % / all					47.2
Comments	Joints are paved over with asphalt. Water leakage is observed at both piers and abutments.					
Recommended Work:			Maintenance Needs:			
Rehab <input type="checkbox"/> Replace <input type="checkbox"/>						

Urgent ☐ 1 to 5 years ☐ 6 to 10 years ☐ None ☒

Urgent ☐ 1 year ☐ 2 years ☐

Element Group	Piers				Length (m)		
Element Name	Bearings				Width (m)		
Location	All				Height (m)		
Material					Count	36	
Element Type					Total Qty (m <sup>2</sup> )	36	
Environment	Benign		Moderate	X	Severe		
Protection System	Limited Inspection					X	
Condition Data	Units		Exc	Good	Fair	Poor	Performance Deficiencies
	%				18	18	
Comments	Review condition of bearings during rehabilitation.						
Recommended Work:					Maintenance Needs:		
Rehab <input type="checkbox"/> 1 to 5 years <input checked="" type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input type="checkbox"/>					Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>		

Element Group	Piers				Length (m)	0.6	
Element Name	Shafts/Columns/Pile				Width (m)	6.7 (bottom) / 11 (top)	
Location	All				Height (m)	4.5	
Material	Cast-In-Place Concrete				Count	2	
Element Type	Concrete Shaft, Pier wall				Total Qty (m <sup>2</sup> )	157.2	
Environment	Benign	X	Moderate		Severe		
Protection System	Limited Inspection					X	
Condition Data	Units		Exc	Good	Fair	Poor	Performance Deficiencies
	m2 / m / each / % / all			130.2	15	12	
Comments	A few spalled, light scaling, and delamination observed at west pier. Delamination, spalls, rust stains, vertical cracks and light to severe scaling observed at East Pier						
Recommended Work:					Maintenance Needs:		
Rehab <input checked="" type="checkbox"/> 1 to 5 years <input checked="" type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input type="checkbox"/>					Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>		
Patch repair poor concrete areas.							

Element Group	Sidewalks/ Curbs	Length (m)	67.2
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<b>Element Name</b>	Curbs				<b>Width (m)</b>	0.6					
<b>Location</b>	North				<b>Height (m)</b>	0.22					
<b>Material</b>	Cast-In-Place Concrete				<b>Count</b>	1					
<b>Element Type</b>					<b>Total Qty (m<sup>2</sup>)</b>	55.1					
<b>Environment</b>	<b>Benign</b>	<input type="checkbox"/>	<b>Moderate</b>	<input type="checkbox"/>	<b>Severe</b>	<input checked="" type="checkbox"/>	<b>Limited Inspection</b>				
<b>Protection System</b>							<b>Performance Deficiencies</b>				
<b>Condition Data</b>	<b>Units</b>		<b>Exc</b>	<b>Good</b>		<b>Fair</b>					
	<b>%</b>			51.1		2	2				
<b>Comments</b>	Few narrow cracks, delamination , light scaling, spall areas with exposed rebar are observed.										
<b>Recommended Work:</b>		<b>Rehab</b>	<input checked="" type="checkbox"/>	<b>Replace</b>	<input type="checkbox"/>	<b>Maintenance Needs:</b>					
		<b>Urgent</b>	<input type="checkbox"/>	<b>1 to 5 years</b>	<input type="checkbox"/>	<b>6 to 10 year</b>	<input checked="" type="checkbox"/>	<b>None</b>	<input checked="" type="checkbox"/>		
		<b>Urgent</b>	<input type="checkbox"/>	<b>1 year</b>	<input type="checkbox"/>	<b>2 years</b>	<input type="checkbox"/>				

<b>Element Group</b>	Sidewalks/ Curbs				<b>Length (m)</b>	67.2					
<b>Element Name</b>	Sidewalks				<b>Width (m)</b>	1.5					
<b>Location</b>	South				<b>Height (m)</b>	1.22					
<b>Material</b>	Cast-In-Place Concrete				<b>Count</b>	1					
<b>Element Type</b>					<b>Total Qty (m<sup>2</sup>)</b>	115.5					
<b>Environment</b>	<b>Benign</b>	<input type="checkbox"/>	<b>Moderate</b>	<input checked="" type="checkbox"/>	<b>Severe</b>	<input type="checkbox"/>	<b>Limited Inspection</b>				
<b>Protection System</b>	None						<b>Performance Deficiencies</b>				
<b>Condition Data</b>	<b>Units</b>		<b>Exc</b>	<b>Good</b>		<b>Fair</b>					
	<b>m2 / m / each / % / all</b>			103.5		5	7				
<b>Comments</b>	Delamination, light to severe scaling, rust staining, medium cracks and spall areas with exposed rebars are observed. Joint at east pier has no seal and is open creating a possible trip hazard.										
<b>Recommended Work:</b>		<b>Rehab</b>	<input checked="" type="checkbox"/>	<b>Replace</b>	<input type="checkbox"/>	<b>Maintenance Needs:</b>					
		<b>Urgent</b>	<input type="checkbox"/>	<b>1 to 5 years</b>	<input type="checkbox"/>	<b>6 to 10 years</b>	<input type="checkbox"/>	<b>None</b>	<input checked="" type="checkbox"/>		
		<b>Urgent</b>	<input type="checkbox"/>	<b>1 year</b>	<input type="checkbox"/>	<b>2 years</b>	<input type="checkbox"/>				

Repair poor concrete areas and install seal at east pier.

<b>Element Group</b>	Retaining Walls				<b>Length (m)</b>	5.2			
<b>Element Name</b>	Walls				<b>Width (m)</b>				
<b>Location</b>	Northwest and Southwest				<b>Height (m)</b>	2			
<b>Material</b>	Cast-In-Place Concrete				<b>Count</b>	2			
<b>Element Type</b>	Reinforced Concrete				<b>Total Qty (m<sup>2</sup>)</b>	20.8			
<b>Environment</b>	<b>Benign</b>	<input checked="" type="checkbox"/>	<b>Moderate</b>	<input type="checkbox"/>	<b>Severe</b>	<input type="checkbox"/>	<b>Limited Inspection</b>		
<b>Protection System</b>							<b>Performance Deficiencies</b>		
<b>Condition Data</b>	<b>Units</b>		<b>Exc</b>	<b>Good</b>		<b>Fair</b>			
	<b>%</b>			20.8					



Bridge Condition Index																		
No.	Element Group	Element Description	Location	Length	Width	Height	Count	Total Qty	Units	Replacement (Initial) Cost	Material	Total Replacement Value	Excellent	Good	Fair	Poor	Current Element Value	Element Condition Index
				(m)	(m)	(m)	#			(\$)		TRV (\$)	1	0.75	0.4	0	CEV (\$)	
B-1	Abutments	Abutment walls	East and West	0.00	11.00	3.40	2	74.80	m2	\$ 1000.00	Cast-in-place Concrete	\$ 74,800.00	0.00	68.60	4.20	2.00	\$ 53,130.00	71.0
B-1	Abutments	Bearings	At Abutments	0.00	0.00	0.00	18	18.00	m2	\$ 350.00	Steel/Neoprene	\$ 6,300.00	0.00	0.00	18.00	0.00	\$ 2,520.00	40.0
B-1	Abutments	Wingwalls	Northeast	8.00	0.00	1.00	1	8.00	m2	\$ 1000.00	Cast-in-place Concrete	\$ 8,000.00	0.00	7.20	0.40	0.40	\$ 5,560.00	69.5
B-1	Abutments	Wingwalls	Southeast	9.00	0.00	2.00	1	18.00	each	\$ 1000.00	Cast-in-place Concrete	\$ 18,000.00	0.00	17.30	0.50	0.20	\$ 13,175.00	73.2
B-1	Accessories	Signs	At Approaches	0.00	0.00	0.00	4	4.00	each	\$ 500.00	Aluminium	\$ 2,000.00	0.00	0.00	0.00	4.00	\$ 0.00	0.0
B-1	Approaches	Approach Slabs	At Approaches	6.00	9.20	0.00	2	110.40	m	\$ 1000.00	Cast-In-Place Concrete	\$ 110,400.00	0.00	110.40	0.00	0.00	\$ 82,800.00	75.0
B-1	Approaches	Barriers	Southwest	26.70	0.00	0.00	1	26.70	m2	\$ 300.00	Timber Post and Steel Panel	\$ 8,010.00	0.00	0.00	26.70	0.00	\$ 3,204.00	40.0
B-1	Approaches	Barriers	Southeast	26.70	0.00	0.00	1	26.70	m2	\$ 300.00	Pedestrian Railing	\$ 8,010.00	0.00	0.00	26.70	0.00	\$ 3,204.00	40.0
B-1	Approaches	Sidewalk/ Curb	At Approaches	6.00	1.50	0.00	2	18.00	m	\$ 1000.00	Cast-In-Place Concrete	\$ 18,000.00	0.00	17.00	1.00	0.00	\$ 13,150.00	73.1
B-1	Approaches	Wearing Surface	East and West	6.00	9.20	0.00	2	110.40	each	\$ 500.00	Asphalt	\$ 55,200.00	0.00	93.44	6.00	4.00	\$ 36,240.00	65.7
B-1	Barriers	Barrier/ Parapet wall	North and South	67.20	0.25	0.60	2	194.88	each	\$ 1000.00	Cast-In-Place Concrete	\$ 194,880.00	0.00	179.48	7.70	7.00	\$ 137,690.00	70.7
B-1	Barriers	Hand Railings	North and South	67.20	0.00	0.00	4	268.80	m	\$ 300.00	Steel	\$ 80,640.00	0.00	242.00	13.40	13.40	\$ 56,058.00	69.5
B-1	Barriers	Railing System	South	60.00	0.00	0.00	1	60.00	each	\$ 300.00	Steel	\$ 18,000.00	0.00	0.00	60.00	0.00	\$ 7,200.00	40.0
B-1	Beams/ML's	Girders	Ends	12.00	1.22	0.00	9	131.76	m2	\$ 1200.00	Pre-stressed Concrete	\$ 158,112.00	0.00	98.06	26.20	7.50	\$ 100,830.00	63.8
B-1	Beams/ML's	Girders	Centre	49.00	1.22	0.00	9	538.02	m2	\$ 1200.00	Pre-stressed Concrete	\$ 645,624.00	0.00	468.68	77.60	8.26	\$ 459,060.00	71.1
B-1	Coatings	Barrier Systems/ Hand Railings	Double Tube Hand Railings	66.00	0.00	0.00	4	264.00	each	\$ 300.00	Other	\$ 79,200.00	0.00	264.00	0.00	0.00	\$ 59,400.00	75.0
B-1	Decks	Deck Top	All	60.00	11.80	0.00	1	708.00	m2	\$ 1200.00	Precast Concrete	\$ 849,600.00	0.00	708.00	0.00	0.00	\$ 637,200.00	75.0
B-1	Decks	Soffit- Thin Slab	Exterior	67.20	0.46	0.30	2	102.20	m2	\$ 1000.00	Cast-In-Place concrete	\$ 102,200.00	0.00	102.20	0.00	0.00	\$ 76,650.00	75.0
B-1	Decks	Soffit- Thin Slab	Ends	0.00	0.00	0.00	0	0.00	%	\$ 1000.00	Box Girders	\$ 0.00	0.00	0.00	0.00	0.00	\$ 0.00	#DIV/0!
B-1	Decks	Soffit- Thin Slab	Ends	0.00	0.00	0.00	0	0.00	each	\$ 1000.00	Box Girders	\$ 0.00	0.00	3.00	3.00	0.00	\$ 3,450.00	#DIV/0!
B-1	Decks	Wearing Surface	All	60.00	9.30	0.00	1	558.00	each	\$ 500.00	Asphalt	\$ 279,000.00	0.00	465.00	53.00	43.00	\$ 184,975.00	66.3
B-1	Embankments and Streams	Embankments	At Abutments	0.00	0.00	0.00	6	6.00	%	\$ 100.00	Other	\$ 600.00	0.00	6.00	0.00	0.00	\$ 450.00	75.0
B-1	Embankments and Streams	Slope Protection	At Embankments	0.00	0.00	0.00	4	4.00	%	\$ 100.00	Other	\$ 400.00	0.00	4.00	0.00	0.00	\$ 300.00	75.0
B-1	Embankments and Streams	Streams and Waterways	At structure	0.00	0.00	0.00	1	1.00	%	\$ 100.00	Other	\$ 100.00	0.00	1.00	0.00	0.00	\$ 75.00	75.0
B-1	Joints	Seals/ Sealants	Abutment and Piers	11.80	0.00	0.00	4	47.20	%	\$ 200.00	Rubber	\$ 9,440.00	0.00	0.00	0.00	47.20	\$ 0.00	0.0
B-1	Piers	Bearings	All	0.00	0.00	0.00	36	36.00	%	\$ 500.00	0	\$ 18,000.00	0.00	0.00	18.00	18.00	\$ 3,600.00	20.0
B-1	Piers	Shafts/Columns/ Pile	All	0.60	4.50	4.50	2	157.20	%	\$ 1000.00	Cast-In-Place Concrete	\$ 157,200.00	0.00	130.20	15.00	12.00	\$ 103,650.00	65.9
B-1	Sidewalks/ Curbs	Curbs	North	67.20	0.60	0.22	1	55.10	%	\$ 1000.00	Cast-In-Place Concrete	\$ 55,100.00	0.00	51.10	2.00	2.00	\$ 39,125.00	71.0
B-1	Sidewalks/ Curbs	Sidewalks	South	67.20	1.50	1.22	1	115.50	%	\$ 1000.00	Cast-In-Place Concrete	\$ 115,500.00	0.00	103.50	5.00	7.00	\$ 79,625.00	68.9
B-1	Retaining Walls	Walls	Northwest and Southwest	5.20	0.00	2.00	2	20.80	%	\$ 1000.00	Cast-In-Place Concrete	\$ 20,800.00	0.00	20.80	0.00	0.00	\$ 15,600.00	75.0
		TOTALS (TRV-CEV-BCI)										\$ 2,716,576.00					\$ 1,935,946.00	71.3

## Piper Street Bridge



Approach looking East





Approach looking West



Upstream view





Downstream view



South Elevation





North Elevation



Bridge Underside East Abutment





Bridge Underside West Abutment



Exposed reinforcement and spalling at the East pier





Exposed reinforcement and spalling at the West pier



Tree debris at the East Pier





Soffit view



Damages observed at the soffit



Damages observed at the soffit





Damages observed at the Abutment





Deterioration the deck surface

## Inventory Data:

Structure Name	B-4 Shellard Road Bridge		
Main Hwy/Road #	Shellard Sideroad	On <input checked="" type="checkbox"/> Under <input type="checkbox"/>	Crossing Type: Navig. Water <input checked="" type="checkbox"/> Non-Navig Water <input type="checkbox"/> Rail <input type="checkbox"/> Road <input checked="" type="checkbox"/> Ped <input type="checkbox"/> Other <input type="checkbox"/>
Hwy/Road Name	Shellard Sideroad (Side road 17)		
Structure Location	Approximately 50m South of Gore Road		
Northing	43°23'16.3" N	Easting	80°15'37.3"W
Owners	Township of North Dumfries	Heritage Designation:	Not Cons. <input checked="" type="checkbox"/> Cons./not App. <input type="checkbox"/> List/not Desig. <input type="checkbox"/> Desig./not List <input type="checkbox"/> Desig. & List <input type="checkbox"/>
MTO Region	South-Western	Road Class:	Freeway <input type="checkbox"/> Arterial <input type="checkbox"/> Collector <input type="checkbox"/> Local <input checked="" type="checkbox"/>
MTO District	London / Stratford	Posted Speed	80 No. of Lanes 2
Old County	Waterloo,	AADT	- % Trucks
Geographic Township	Township of North Dumfries	Inspection Route Sequence	
Structure Type	Slab on I-Girder (Steel)	Interchange Number	
Total Deck Length (m)	8.6	Interchange Structure Number	
Overall Structure Width (m)	7.42	Min. Vertical Clearance (m)	
Total Deck Area (sq. m.)	63.812	Special Routes:	Transit <input type="checkbox"/> Truck <input type="checkbox"/> School <input type="checkbox"/> Bicycle <input type="checkbox"/>
Roadway Width (m)	6.8	Detour Length Around Bridge (km)	
Skew Angle (degrees)	0	Direction of Structure	N/S
No. of Spans	1	Fill on Structure (m)	7.8
Span Lengths (m)	7.3	Deck Geodetic Elevation	228

## Historical Data:

Year Built	1940	Year of Last Major Rehab	
Last OSIM Inspection	2020	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			
Rehab History: (Date/Description)			

**Scheduled Improvements:**

Regional Priority Number

Programmed Work Year

Nature of Program Work:

Appraisal Indices:		Comments
Fatigue		
Seismic		
Scour		
Flood		
Geometrics		
Barrier		
Curb		
Load Capacity		

## Field Inspection Information

Date of Inspection	May 16, 2022, 4:30 PM	Type of Inspection:	OSIM <input checked="" type="checkbox"/>	Enhanced OSIM <input type="checkbox"/>
Inspector:	J. Zohreh, P.Eng.			
Others in Party:	S. Mitra, EIT			
Access Equipment Used:				
Weather:	Sunny			
Temperature:	15°C			

Additional Investigations Required		Priority		
		None	Normal	Urgent
Material Condition Survey				
<input type="checkbox"/>	Detailed Deck Condition Survey	X		
<input type="checkbox"/>	Non-destructive Delamination Survey of Asphalt-Covered Deck	X		
<input type="checkbox"/>	Concrete Substructure Condition Survey	X		
<input type="checkbox"/>	Detailed Coating Condition Survey	X		
<input type="checkbox"/>	Detailed Timber Investigation	X		
<input type="checkbox"/>	Post-Tensioned Strand Investigation	X		
Underwater Investigation		X		
Fatigue Investigation		X		
Seismic Investigation		X		
Structure Evaluation		X		
Monitoring				
<input type="checkbox"/>	Monitoring of Deformations, Settlements and Movements	X		
<input type="checkbox"/>	Monitoring Crack Widths	X		
Investigation Notes:	The structure is in good condition			

## Overall Structure Notes

Recommended Work on Structure	None <input type="checkbox"/>	Minor Rehab <input checked="" type="checkbox"/>	Major Rehab <input type="checkbox"/>	Replace <input type="checkbox"/>
Timing of Recommended Work	1 to 5 years <input checked="" type="checkbox"/>	6 to 10 years <input type="checkbox"/>		
Overall Comments:	See Elements information			
Date of Next Inspection:	2024			

## Suspected Performance Deficiencies

- 01 Load carrying capacity
- 02 Excessive deformations (reflections & rotations)
- 03 Continuing settlement
- 04 Continuing movements
- 05 Seized bearings

06

- 07 Bearing not uniformly loaded/unstable
- 08 Jammed expansion joint
- 09 Pedestrian/vehicular hazard
- 10 Rough riding surface
- 11 Surface ponding
- 12 Deck draining

12

- 13 Slippery Surfaces
- 14 Flooding/channel blockage
- 15 Undermining of foundation
- 16 Unstable embankments
- 17 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

- 08 Repair to Structural Steel
- 09 Repair to Bridge Concrete
- 10 Repair of Bridge Timber
- 11 Bailey bridges - maintenance
- 12 Animal/Pest Control
- 13 Bridge Surface Repair

13

- 14 Erosion Control at Bridges
- 15 Concrete Sealing
- 16 Rout and Seal
- 17 Bridge deck drainage
- 18 Scaling (loose concrete or ACR steel)
- 19 Other



Repair Rehabilitation Required				Priority				Estimated Construction Cost
Element <sup>1</sup>	Repair and Rehabilitation Required <sup>2</sup>			6 to 10 years	1 to 5 years	Within 1 year	Urgent	
Deck, wearing surface	0				X			\$ 1,000.00
	0					X		\$ 1,000.00
Hand Railings	0					X		\$ 500.00
Estimated Rehabilitated or Replacement Structure Dimensions <sup>3</sup>				Total Structural Cost				\$ 2,500.00
Deck Length (m)	8.6	Structure Width (m)	7.42					

1 - Indicate specific costs for structure replacement or for rehabilitation under the given headings.

2 - Give a brief description of the rehabilitation work required.

3 - Estimated structure dimensions after completion of the proposed work - if it is expected to change.

Associated Work <sup>4</sup>	Comments	Estimated Cost
Approaches <sup>5</sup>		
Detours		
Traffic Control		
Utilities		
Right of Way		
Environment Study		
Other		
Contingencies		
Total Associated Work Cost		\$ -

Total Construction Cost	\$ 2,500.00
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4 - Includes other construction costs associated with the structure. Engineering fees for reports, environmental studies, designs, project management and contingencies are not included as associated work.

5 - Approach costs is for work (fill, pavement, guiderail, etc.) immediately adjacent to the structure for minor changes in horizontal or vertical alignment and for barrier end treatments at the structure

Justification

<b>Element Group</b>	<b>Abutments</b>			<b>Length (m)</b>										
<b>Element Name</b>	<b>Abutment walls</b>			<b>Width (m)</b>	6.62									
<b>Location</b>	North and South			<b>Height (m)</b>	1.1									
<b>Material</b>	Cast-in-place Concrete			<b>Count</b>	2									
<b>Element Type</b>	Conventional Closed			<b>Total Qty (m<sup>2</sup>)</b>	14.56									
<b>Environment</b>	<b>Benign</b>	<input checked="" type="checkbox"/>	<b>Moderate</b>	<input type="checkbox"/>	<b>Severe</b>	<input type="checkbox"/>	<b>Limited Inspection</b>	<input checked="" type="checkbox"/>						
<b>Protection System</b>	None						<b>Performance Deficiencies</b>							
<b>Condition Data</b>	<b>Units</b>		<b>Exc</b>		<b>Good</b>			<b>Fair</b>		<b>Poor</b>				
	<b>m<sup>2</sup></b>							14.56						
<b>Comments</b>	Abutments appear to be in fair condition. A few scaling, stains and cracks are present.													
<b>Recommended Work:</b>											<b>Maintenance Needs:</b>			
<b>Rehab</b> <input type="checkbox"/> <b>Replace</b> <input type="checkbox"/> <b>Urgent</b> <input type="checkbox"/> <b>1 to 5 years</b> <input type="checkbox"/> <b>6 to 10 years</b> <input type="checkbox"/> <b>None</b> <input checked="" type="checkbox"/>											<b>Urgent</b> <input type="checkbox"/> <b>1 year</b> <input type="checkbox"/> <b>2 years</b> <input type="checkbox"/>			

<b>Element Group</b>	<b>Abutments</b>			<b>Length (m)</b>	3.3									
<b>Element Name</b>	<b>Wingwalls</b>			<b>Width (m)</b>										
<b>Location</b>	Corners of structure			<b>Height (m)</b>	0.75									
<b>Material</b>	Cast-in-place Concrete			<b>Count</b>	4									
<b>Element Type</b>	Reinforced Concrete			<b>Total Qty (m<sup>2</sup>)</b>	9.9									
<b>Environment</b>	<b>Benign</b>	<input type="checkbox"/>	<b>Moderate</b>	<input checked="" type="checkbox"/>	<b>Severe</b>	<input type="checkbox"/>	<b>Limited Inspection</b>	<input type="checkbox"/>						
<b>Protection System</b>	None						<b>Performance Deficiencies</b>							
<b>Condition Data</b>	<b>Units</b>		<b>Exc</b>		<b>Good</b>			<b>Fair</b>		<b>Poor</b>				
	<b>m<sup>2</sup></b>							9.9						
<b>Comments</b>	Wingwalls are in fair condition. Few narrow cracks are present with some stains.													
<b>Recommended Work:</b>											<b>Maintenance Needs:</b>			
<b>Rehab</b> <input type="checkbox"/> <b>Replace</b> <input type="checkbox"/> <b>Urgent</b> <input type="checkbox"/> <b>1 to 5 years</b> <input type="checkbox"/> <b>6 to 10 years</b> <input type="checkbox"/> <b>None</b> <input checked="" type="checkbox"/>											<b>Urgent</b> <input type="checkbox"/> <b>1 year</b> <input type="checkbox"/> <b>2 years</b> <input type="checkbox"/>			

<b>Element Group</b>	<b>Approaches</b>			<b>Length (m)</b>	19.05									
<b>Element Name</b>	<b>Barriers</b>			<b>Width (m)</b>										
<b>Location</b>	At Approaches			<b>Height (m)</b>										
<b>Material</b>	Steel			<b>Count</b>	4									
<b>Element Type</b>	Steel Post and Steel Panel			<b>Total Qty (m)</b>	76.2									
<b>Environment</b>	<b>Benign</b>	<input type="checkbox"/>	<b>Moderate</b>	<input type="checkbox"/>	<b>Severe</b>	<input checked="" type="checkbox"/>	<b>Limited Inspection</b>	<input type="checkbox"/>						
<b>Protection System</b>	Galvanized						<b>Performance Deficiencies</b>							
<b>Condition Data</b>	<b>Units</b>		<b>Exc</b>		<b>Good</b>			<b>Fair</b>		<b>Poor</b>				
	<b>m<sup>2</sup></b>					60.96				15.24				
<b>Comments</b>	Steel beam guiderail is in fair condition. Extruder end treatment at NW is severely damaged.													
<b>Recommended Work:</b>											<b>Maintenance Needs:</b>			
<b>Rehab</b> <input type="checkbox"/> <b>Replace</b> <input type="checkbox"/> <b>Urgent</b> <input checked="" type="checkbox"/> <b>1 to 5 years</b> <input type="checkbox"/> <b>6 to 10 years</b> <input type="checkbox"/> <b>None</b> <input type="checkbox"/>											<b>Urgent</b> <input type="checkbox"/> <b>1 year</b> <input type="checkbox"/> <b>2 years</b> <input type="checkbox"/>			
Replacement of extruder end treatment at NW end.											Replace extruder end treatment at NW side.			

<b>Element Group</b>	<b>Approaches</b>	<b>Length (m)</b>	6			
<b>Element Name</b>	<b>Wearing Surface</b>	<b>Width (m)</b>	6.6			
<b>Location</b>	North and South	<b>Height (m)</b>				
<b>Material</b>	Asphalt	<b>Count</b>	2			
<b>Element Type</b>		<b>Total Qty (m<sup>2</sup>)</b>	81.6			
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input type="checkbox"/>	Severe <input checked="" type="checkbox"/>	Limited Inspection <input type="checkbox"/>		
<b>Protection System</b>	None					<b>Performance Deficiencies</b>
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>	
	each		68		13.6	
<b>Comments</b>	Minor asphalt cracking noticed at approach.					
<b>Recommended Work:</b>						
Rehab <input checked="" type="checkbox"/> Replace <input type="checkbox"/>						
Urgent <input type="checkbox"/> 1 to 5 years <input checked="" type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input type="checkbox"/>						
Maintenance Needs:						
Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>						

<b>Element Group</b>	<b>Barriers</b>	<b>Length (m)</b>	13.9			
<b>Element Name</b>	<b>Barriers/ Parapet Wall</b>	<b>Width (m)</b>	0.26			
<b>Location</b>	East and West	<b>Height (m)</b>	0.8			
<b>Material</b>	Cast-in-place concrete	<b>Count</b>	2			
<b>Element Type</b>	Parapet Wall with Single Railing	<b>Total Qty (Nos)</b>	51.71			
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input type="checkbox"/>	Severe <input checked="" type="checkbox"/>	Limited Inspection <input type="checkbox"/>		
<b>Protection System</b>	None					<b>Performance Deficiencies</b>
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>	
	each		51.71			
<b>Comments</b>	Concrete barrier is in good condition. A few cracks on barriers					
<b>Recommended Work:</b>						
Rehab <input type="checkbox"/> Replace <input type="checkbox"/>						
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>						
Maintenance Needs:						
18						
Urgent <input type="checkbox"/> 1 year <input checked="" type="checkbox"/> 2 years <input type="checkbox"/>						

<b>Element Group</b>	<b>Barriers</b>	<b>Length (m)</b>	12.9			
<b>Element Name</b>	<b>Hand Railings</b>	<b>Width (m)</b>				
<b>Location</b>	East and West	<b>Height (m)</b>				
<b>Material</b>	Aluminum	<b>Count</b>	2			
<b>Element Type</b>	Single Tube Railing	<b>Total Qty (Nos)</b>	25.8			
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input type="checkbox"/>	Severe <input checked="" type="checkbox"/>	Limited Inspection <input type="checkbox"/>		
<b>Protection System</b>	None					<b>Performance Deficiencies</b>
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>	
	m		12.9	12.9		
<b>Comments</b>	East side single tube railing is in good condition. West side railing is missing.					
<b>Recommended Work:</b>						
Rehab <input checked="" type="checkbox"/> Replace <input type="checkbox"/>						
Urgent <input checked="" type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input type="checkbox"/>						
Maintenance Needs:						
Urgent <input type="checkbox"/> 1 year <input checked="" type="checkbox"/> 2 years <input type="checkbox"/>						
Urgent Installation of West side single tube railing.						

Element Group	Beams/MLE's	Length (m)	8		
Element Name	Girders	Width (m)	0.2		
Location	All	Height (m)	0.31		
Material	Steel	Count	5		
Element Type	I-type	Total Qty (m <sup>2</sup> )	48.4		
Environment	Benign <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Severe <input type="checkbox"/>	Limited Inspection	<input checked="" type="checkbox"/>		
Protection System	Red lead primer/ alkyd		Performance Deficiencies		
Condition Data	Units m <sup>2</sup>	Exc		Good	Fair
		48.4			
Comments	Girders appear in excellent condition				
Recommended Work:	Rehab <input type="checkbox"/> Replace <input type="checkbox"/>	Maintenance Needs:			
	Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>	Urgent <input type="checkbox"/> 1 year <input checked="" type="checkbox"/> 2 years <input type="checkbox"/>			

Element Group	Beams/MLE's	Length (m)	1.5		
Element Name	Diaphragms	Width (m)			
Location	All	Height (m)			
Material	Steel	Count	4		
Element Type	I-type	Total Qty (Nos)	4		
Environment	Benign <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Severe <input type="checkbox"/>	Limited Inspection	<input type="checkbox"/>		
Protection System	Asphalt		Performance Deficiencies		
Condition Data	Units m <sup>2</sup>	Exc		Good	Fair
		3	1		
Comments					
Recommended Work:	Rehab <input checked="" type="checkbox"/> Replace <input type="checkbox"/>	Maintenance Needs:			
	Urgent <input type="checkbox"/> 1 to 5 years <input checked="" type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input type="checkbox"/>	Urgent <input type="checkbox"/> 1 year <input checked="" type="checkbox"/> 2 years <input type="checkbox"/>			

Element Group	Coating	Length (m)			
Element Name	Structural Steel	Width (m)			
Location	Girder/ Diaphragms	Height (m)			
Material	Other	Count			
Element Type	Red Lead Primer/ Alkyd	Total Qty (m <sup>2</sup> )	48.4		
Environment	Benign <input type="checkbox"/> Moderate <input checked="" type="checkbox"/> Severe <input type="checkbox"/>	Limited Inspection	<input type="checkbox"/>		
Protection System	None		Performance Deficiencies		
Condition Data	Units m	Exc		Good	Fair
			42.4	3	3
Comments	Paint coating on girder and diaphragms in generally good condition.				
Recommended Work:	Rehab <input checked="" type="checkbox"/> Replace <input type="checkbox"/>	Maintenance Needs:			
	Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 year <input checked="" type="checkbox"/> None <input type="checkbox"/>	Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>			
Re-apply coating at isolated locations.					



Element Group	Decks	Length (m)	8.53			
Element Name	Deck top	Width (m)	7.42			
Location	All	Height (m)				
Material	Concrete	Count	1			
Element Type	Precast slabs	Total Qty (m <sup>2</sup> )	63.3			
Environment	Benign <input type="checkbox"/>	Moderate <input type="checkbox"/>	Severe <input checked="" type="checkbox"/>	Limited Inspection <input type="checkbox"/>		
Protection System						Performance Deficiencies
Condition Data	Units m	Exc 58	Good 5.3	Fair	Poor	
Comments	Deck top in generally excellent condition.					
Recommended Work:		Rehab <input type="checkbox"/>	Replace <input type="checkbox"/>	Maintenance Needs:		
Urgent <input type="checkbox"/>		1 to 5 years <input type="checkbox"/>	6 to 10 years <input type="checkbox"/>	None <input checked="" type="checkbox"/>	Urgent <input type="checkbox"/>	
					1 year <input type="checkbox"/>	2 years <input type="checkbox"/>

Element Group	Decks	Length (m)	7.3			
Element Name	Soffit- Thin Slab	Width (m)	7.43			
Location	All	Height (m)				
Material	Other	Count	1			
Element Type	Precast concrete	Total Qty (m <sup>2</sup> )	54.24			
Environment	Benign <input checked="" type="checkbox"/>	Moderate <input type="checkbox"/>	Severe <input type="checkbox"/>	Limited Inspection <input type="checkbox"/>		
Protection System	None					Performance Deficiencies
Condition Data	Units m	Exc 54.24	Good	Fair	Poor	
Comments	Soffit is in excellent condition.					
Recommended Work:		Rehab <input type="checkbox"/>	Replace <input type="checkbox"/>	Maintenance Needs:		
Urgent <input type="checkbox"/>		1 to 5 years <input checked="" type="checkbox"/>	6 to 10 years <input type="checkbox"/>	None <input checked="" type="checkbox"/>	Urgent <input type="checkbox"/>	
					1 year <input type="checkbox"/>	2 years <input type="checkbox"/>

Element Group	Decks	Length (m)	5.83			
Element Name	Wearing Surface	Width (m)	6.8			
Location	All	Height (m)				
Material	Cast-in-place concrete	Count	1			
Element Type	Concrete Topping	Total Qty (m <sup>2</sup> )	58			
Environment	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	Limited Inspection <input type="checkbox"/>		
Protection System	None					Performance Deficiencies
Condition Data	Units Nos	Exc	Good 41	Fair 8.5	Poor 8.5	
Comments	Some patches and overlaying of concrete. Cracks are observed at NW corner.					
Recommended Work:		Rehab <input checked="" type="checkbox"/>	Replace <input type="checkbox"/>	Maintenance Needs:		
Urgent <input type="checkbox"/>		1 to 5 years <input checked="" type="checkbox"/>	6 to 10 years <input type="checkbox"/>	None <input checked="" type="checkbox"/>	Urgent <input type="checkbox"/>	
					1 year <input type="checkbox"/>	2 years <input type="checkbox"/>

Element Group	Embankments and Streams	Length (m)				
Element Name	Embankments	Width (m)				
Location		Height (m)				
Material	Other	Count	4			
Element Type		Total Qty (Nos)	4			
Environment	Benign <input type="checkbox"/> Moderate <input checked="" type="checkbox"/> Severe <input type="checkbox"/>	Limited Inspection	<input type="checkbox"/>			
Protection System	None				Performance Deficiencies	
Condition Data	Units	Exc	Good	Fair		Poor
	Nos		4			
Comments	Embankments are stable.					

Recommended Work:	Rehab <input type="checkbox"/>	Replace <input type="checkbox"/>	Maintenance Needs:		
	Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/>	6 to 10 years <input type="checkbox"/>	None <input checked="" type="checkbox"/>	Urgent <input type="checkbox"/> 1 year <input type="checkbox"/>	2 years <input type="checkbox"/>

Element Group	Embankments and Streams	Length (m)				
Element Name	Slope Protection	Width (m)				
Location	At Embankments	Height (m)				
Material	Other	Count	4			
Element Type		Total Qty (Nos)	4			
Environment	Benign <input type="checkbox"/> Moderate <input checked="" type="checkbox"/> Severe <input type="checkbox"/>	Limited Inspection	<input type="checkbox"/>			
Protection System	None				Performance Deficiencies	
Condition Data	Units	Exc	Good	Fair		Poor
	m <sup>2</sup>		4			
Comments	Embankments are secured by rocks.					

Recommended Work:	Rehab <input checked="" type="checkbox"/>	Replace <input type="checkbox"/>	Maintenance Needs:		
	Urgent <input type="checkbox"/> 1 to 5 years <input checked="" type="checkbox"/>	6 to 10 years <input type="checkbox"/>	None <input type="checkbox"/>	Urgent <input type="checkbox"/> 1 year <input type="checkbox"/>	2 years <input type="checkbox"/>

Element Group	Embankments and Streams	Length (m)				
Element Name	Streams and Waterways	Width (m)				
Location	At structure	Height (m)				
Material	Other	Count	1			
Element Type		Total Qty (Nos)	1			
Environment	Benign <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Severe <input type="checkbox"/>	Limited Inspection	<input type="checkbox"/>			
Protection System	None				Performance Deficiencies	
Condition Data	Units	Exc	Good	Fair		Poor
	m <sup>2</sup>		1			
Comments	No obstruction .					

Recommended Work:	Rehab <input type="checkbox"/>	Replace <input type="checkbox"/>	Maintenance Needs:		
	Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/>	6 to 10 years <input type="checkbox"/>	None <input checked="" type="checkbox"/>	Urgent <input type="checkbox"/> 1 year <input type="checkbox"/>	2 years <input type="checkbox"/>

Bridge Condition Index																		
No.	Element Group	Element Description	Location	Length	Width	Height	Count	Total Qty	Units	Replacement (Initial) Cost	Material	Total Replacement Value	Excellent	Good	Fair	Poor	Current Element Value	Element Condition Index
				(m)	(m)	(m)	#			(\$)		TRV (\$)	1	0.75	0.4	0	CEV (\$)	
B-1	Abutments	Abutment walls	North and South	0.00	6.62	1.10	2	14.56	m2	\$ 1000.00	Cast-in-place Concrete	\$ 14,560.00	0.00	0.00	14.56	0.00	\$ 5,824.00	40.0
B-1	Abutments	Wingwalls	Corners of structure	3.30	0.00	0.75	4	9.90	m2	\$ 1000.00	Cast-in-place Concrete	\$ 9,900.00	0.00	0.00	9.90	0.00	\$ 3,960.00	40.0
B-1	Approaches	Barriers	At Approaches	19.05	0.00	0.00	4	76.20	m2	\$ 300.00	Steel	\$ 22,860.00	0.00	60.96	0.00	15.24	\$ 13,716.00	60.0
B-1	Approaches	Wearing Surface	North and South	6.00	6.60	0.00	2	81.60	each	\$ 500.00	Asphalt	\$ 40,800.00	0.00	68.00	0.00	13.60	\$ 25,500.00	62.5
B-1	Barriers	Barriers/ Parapet Wall	East and West	13.90	0.26	0.80	2	51.71	each	\$ 300.00	Parapet Wall with Single Railing	\$ 15,513.00	0.00	51.71	0.00	0.00	\$ 11,634.75	75.0
B-1	Barriers	Hand Railings	East and West	12.90	0.00	0.00	2	25.80	m	\$ 500.00	Aluminum	\$ 12,900.00	0.00	12.90	12.90	0.00	\$ 7,417.50	57.5
B-1	Beams/ML's	Girders	All	8.00	0.20	0.31	5	48.40	m2	\$ 1500.00	I-type	\$ 72,600.00	48.40	0.00	0.00	0.00	\$ 72,600.00	100.0
B-1	Beams/ML's	Diaphragms	All	1.50	0.00	0.00	4	4.00	m2	\$ 1500.00	Steel	\$ 6,000.00	3.00	1.00	0.00	0.00	\$ 5,625.00	93.8
B-1	Coating	Structural Steel	Girder/ Diaphragms	0.00	0.00	0.00	0	48.40	m	\$ 250.00	Other	\$ 12,100.00	0.00	42.40	3.00	3.00	\$ 8,250.00	68.2
B-1	Decks	Deck top	All	8.53	7.42	0.00	1	63.30	each	\$ 1000.00	Concrete	\$ 63,300.00	58.00	5.30	0.00	0.00	\$ 61,975.00	97.9
B-1	Decks	Soffit- Thin Slab	All	7.30	7.43	0.00	1	54.24	each	\$ 1000.00	Other	\$ 54,240.00	54.24	0.00	0.00	0.00	\$ 54,240.00	100.0
B-1	Decks	Wearing Surface	All	5.83	6.80	0.00	1	58.00	m	\$ 1000.00	Cast-in-place concrete	\$ 58,000.00	0.00	41.00	8.50	8.50	\$ 34,150.00	58.9
B-1	Embankments and Streams	Embankments	0	0.00	0.00	0.00	4	4.00	each	\$ 100.00	Other	\$ 400.00	0.00	4.00	0.00	0.00	\$ 300.00	75.0
B-1	Embankments and Streams	Slope Protection	At Embankments	0.00	0.00	0.00	4	4.00	m2	\$ 100.00	Other	\$ 400.00	0.00	4.00	0.00	0.00	\$ 300.00	75.0
B-1	Embankments and Streams	Streams and Waterways	At structure	0.00	0.00	0.00	1	1.00	m2	\$ 100.00	Other	\$ 100.00	0.00	1.00	0.00	0.00	\$ 75.00	75.0
B-1	Joints	Armouring/ Retaining Devices	Ends of Deck	6.80	0.00	0.00	2	13.60	each	\$ 350.00	Steel	\$ 4,760.00	0.00	13.60	0.00	0.00	\$ 3,570.00	75.0
		TOTALS (TRV-CEV-BCI)										\$ 388,433.00					\$ 309,137.25	79.6

## Shellard Bridge



Approach from South





Approach from North



Downstream looking West





Upstream looking East



Bridge underside North Embankment





Bridge underside North Embankment





Southwest Embankment



Northeast Embankment





Undeneath the bridge deck



Rusting observed at the girder ends





Steel girders underneath the bridge



Some concrete deterioration observed at the abutment

## Inventory Data:

Structure Name	C-1 Alps Twin Culvert		
Main Hwy/Road #	Alps Road	On <input type="checkbox"/> Under <input checked="" type="checkbox"/>	Crossing Type: Navig. Water <input type="checkbox"/> Rail <input type="checkbox"/> Ped <input type="checkbox"/> Non-Navig Water <input checked="" type="checkbox"/> Road <input checked="" type="checkbox"/> Other <input type="checkbox"/>
Hwy/Road Name	Alps Road		
Structure Location	Approximately 930m East of Reidsville Road		
Northing	43.320157	Easting	-80.425768
Owners	Township of North Dumfries	Heritage Designation:	Not Cons. <input checked="" type="checkbox"/> Cons./not App. <input type="checkbox"/> List/not Desig. <input type="checkbox"/> Desig./not List <input type="checkbox"/> Desig. & List <input type="checkbox"/>
MTO Region	South-Western	Road Class:	Freeway <input type="checkbox"/> Arterial <input type="checkbox"/> Collector <input type="checkbox"/> Local <input checked="" type="checkbox"/>
MTO District	London/Stratford	Posted Speed	50 No. of Lanes 2
Old County	Waterloo	AADT	% Trucks
Geographic Township	North Dumfries	Inspection Route Sequence	
Structure Type	C. Steel plate pipe arch	Interchange Number	
Total Culvert Length (m)	10.6	Interchange Structure Number	
Maximum Culvert Width (m)	7.2	Min. Vertical Clearance (m)	
Culvert Height (m)	1.9	Special Routes:	Transit <input type="checkbox"/> Truck <input type="checkbox"/> School <input type="checkbox"/> Bicycle <input type="checkbox"/>
Roadway Width (m)	7	Detour Length Around Bridge (km)	
Skew Angle (degrees)	75	Direction of Structure	N/S
No. of Spans	2	Fill on Structure (m)	0.3
Span Lengths (m)	3.4	Deck Geodetic Elevation	256

## Historical Data:

Year Built	-	Year of Last Major Rehab	
Last OSIM Inspection	-	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			
Rehab History: (Date/Description)			

**Scheduled Improvements:**

Regional Priority Number

Programmed Work Year

Nature of Program Work:

Appraisal Indices:		Comments
Fatigue		
Seismic		
Scour		
Flood		
Geometrics		
Barrier		
Curb		
Load Capacity		

## Field Inspection Information

Date of Inspection	May 16, 2020 , 2:30PM	Type of Inspection:	OSIM <input checked="" type="checkbox"/>	Enhanced OSIM <input type="checkbox"/>
Inspector:	J. Zohreh, P.Eng.			
Others in Party:	S. Mitra, EIT			
Access Equipment Used:	Tapes, Hammer, Chain, Ladder, Camera, Safety Equipment			
Weather:	Sunny			
Temperature:	15°C			

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

## Overall Structure Notes

Recommended Work on Structure	None <input type="checkbox"/>	Minor Rehab <input checked="" type="checkbox"/>	Major Rehab <input type="checkbox"/>	Replace <input type="checkbox"/>
Timing of Recommended Work	1 to 5 years <input checked="" type="checkbox"/>	6 to 10 years <input type="checkbox"/>		
Overall Comments:	See maintenance sheet. Monitor deformation of top profile at bolt line.			
Date of Next Inspection:	2022			

## Suspected Performance Deficiencies

- 01 Load carrying capacity
- 02 Excessive deformations (reflections & rotations)
- 03 Continuing settlement
- 04 Continuing movements
- 05 Seized bearings

06

- 07 Bearing not uniformly loaded/unstable
- 08 Jammed expansion joint
- 09 Pedestrian/vehicular hazard
- 10 Rough riding surface
- 11 Surface ponding
- 12 Deck draining

12

- 13 Slippery Surfaces
- 14 Flooding/channel blockage
- 15 Undermining of foundation
- 16 Unstable embankments
- 17 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

- 08 Repair to Structural Steel
- 09 Repair to Bridge Concrete
- 10 Repair of Bridge Timber
- 11 Bailey bridges - maintenance
- 12 Animal/Pest Control
- 13 Bridge Surface Repair

13

- 14 Erosion Control at Bridges
- 15 Concrete Sealing
- 16 Rout and Seal
- 17 Bridge deck drainage
- 18 Scaling (loose concrete or ACR steel)
- 19 Other



Repair Rehabilitation Required		Priority				Estimated Construction Cost
Element <sup>1</sup>	Repair and Rehabilitation Required <sup>2</sup>	6 to 10 years	1 to 5 years	Within 1 year	Urgent	
Barrel	Monitor deformation of top profile at bolt line.		X			\$ 500.00
Embankments	Clear vegetation and soil buildup around pipe. Cost dependent on method used for abatement and season		X			\$ 1,500.00
Estimated Rehabilitated or Replacement Structure Dimensions <sup>3</sup>		Total Structural Cost				\$ 2,000.00
Deck Length (m)	10.6					
Structure Width (m)	7.2					

1 - Indicate specific costs for structure replacement or for rehabilitation under the given headings.

2 - Give a brief description of the rehabilitation work required.

3 - Estimated structure dimensions after completion of the proposed work - if it is expected to change.

Associated Work <sup>4</sup>	Comments	Estimated Cost
Approaches <sup>5</sup>		
Detours		
Traffic Control		
Utilities		
Right of Way		
Environment Study		
Other		
Contingencies		
Total Associated Work Cost		\$ -

Total Construction Cost	\$ 2,000.00
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4 - Includes other construction costs associated with the structure. Engineering fees for reports, environmental studies, designs, project management and contingencies are not included as associated work.

5 - Approach costs is for work (fill, pavement, guiderail, etc.) immediately adjacent to the structure for minor changes in horizontal or vertical alignment and for barrier end treatments at the structure

### Justification

Bridge Condition Index																		
No.		Element Description	Location	Length	Width	Height	Count	Total Qty	Units	Replacement (Initial) Cost	Material	Total Replacement Value	Excellent	Good	Fair	Poor	Current Element Value	Element Condition Index
				(m)	(m)	(m)	#			(\$)		TRV (\$)	1	0.75	0.4	0	CEV (\$)	
C-1	Culverts	Barrel	West Pipe	7.2	3.2	1.9	1	46.03	m2	\$ 350.00	Corrugated steel pipe bolted arch	\$ 16,111.20	0.00	27.62	18.41	0.00	\$ 9,827.83	61.0
C-1	Culverts	Inlet Component	East end of culvert	0	0	0	1	1.00	m2	\$ 350.00	Soil	\$ 350.00	0.00	1.00	0.00	0.00	\$ 262.50	75.0
C-1	Culverts	Outlet Component	West end of culvert	0	0	0	1	1.00	m2	\$ 350.00	Soil	\$ 350.00	0.00	1.00	0.00	0.00	\$ 262.50	75.0
C-1	Decks	Wearing Surface	On top of culvert	7	7	0	1	49.00	m2	\$ 6.00	Tar and chip	\$ 294.00	0.00	49.00	0.00	0.00	\$ 220.50	75.0
C-1	Foundations	Foundations (b	0	0	0	0	100	100.00	%	\$ -	0	\$ -	0.00	100.00	0.00	0.00	\$ -	-
C-1	Embankments	Embankments	0	0	0	0	4	4.00	each	\$ -	0	\$ -	0.00	0.00	4.00	0.00	\$ -	-
C-1	Embankments	Slope Protection	0	0	0	0	4	4.00	each	\$ -	0	\$ -	0.00	4.00	0.00	0.00	\$ -	-
C-1	Embankments	Streams & Waterways	0	0	0	0	100	100.00	%	\$ -	0	\$ -	0.00	100.00	0.00	0.00	\$ -	-
C-1	Culverts	Barrel	East Pipe	7.2	3.2	1.9	1	46.03	m2	\$ 350.00	Corrugated steel pipe bolted arch	\$ 16,111.20	0.00	27.62	18.41	0.00	\$ 9,827.83	61.0
C-1		TOTALS (TRV-CEV-BCI)										\$ 33,216.40					\$ 20,401.16	61.4

<b>Element Group</b>	Culverts	<b>Length (m)</b>	7.2					
<b>Element Name</b>	Barrel	<b>Width (m)</b>	3.2					
<b>Location</b>	West Pipe	<b>Height (m)</b>	1.9					
<b>Material</b>	Corrugated steel pipe bolted arch	<b>Count</b>	1					
<b>Element Type</b>	CSP Arch	<b>Total Qty (m<sup>2</sup>)</b>	46.0					
<b>Environment</b>	Benign <input type="checkbox"/> Moderate <input checked="" type="checkbox"/> Severe <input type="checkbox"/>	<b>Limited Inspection</b>	<input type="checkbox"/>					
<b>Protection System</b>						<b>Performance Deficiencies</b>		
<b>Condition Data</b>	<b>Units</b> m <sup>2</sup>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>			
			27.6	18.4				
<b>Comments</b>	Approximate surface area calculation based on a half an ellipse. Top profile has sagged through almost the whole length at the bolt line. Continue to monitor deformation.Moderate rust on the bottom part of the CSP							
<b>Recommended Work:</b>		<b>Rehab</b> <input type="checkbox"/>	<b>Replace</b> <input type="checkbox"/>	<b>Maintenance Needs:</b>				
		<b>Urgent</b> <input type="checkbox"/>	<b>1 to 5 years</b> <input type="checkbox"/>	<b>6 to 10 years</b> <input type="checkbox"/>	<b>None</b> <input checked="" type="checkbox"/>	<b>Urgent</b> <input type="checkbox"/>	<b>1 year</b> <input type="checkbox"/>	<b>2 years</b> <input checked="" type="checkbox"/>
							Monitor deformation of top profile at bolt line.	

<b>Element Group</b>	Culverts	<b>Length (m)</b>						
<b>Element Name</b>	Inlet Components	<b>Width (m)</b>						
<b>Location</b>	East end of culvert	<b>Height (m)</b>						
<b>Material</b>	Soil	<b>Count</b>	1					
<b>Element Type</b>		<b>Total Qty (m<sup>2</sup>)</b>						
<b>Environment</b>	Benign <input type="checkbox"/> Moderate <input checked="" type="checkbox"/> Severe <input type="checkbox"/>	<b>Limited Inspection</b>	<input type="checkbox"/>					
<b>Protection System</b>						<b>Performance Deficiencies</b>		
<b>Condition Data</b>	<b>Units</b> m <sup>2</sup>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>			
			1					
<b>Comments</b>	Good stability in area around culvert.							
<b>Recommended Work:</b>		<b>Rehab</b> <input type="checkbox"/>	<b>Replace</b> <input type="checkbox"/>	<b>Maintenance Needs:</b>				
		<b>Urgent</b> <input type="checkbox"/>	<b>1 to 5 years</b> <input type="checkbox"/>	<b>6 to 10 years</b> <input type="checkbox"/>	<b>None</b> <input checked="" type="checkbox"/>	<b>Urgent</b> <input type="checkbox"/>	<b>1 year</b> <input type="checkbox"/>	<b>2 years</b> <input type="checkbox"/>

<b>Element Group</b>	Culverts	<b>Length (m)</b>						
<b>Element Name</b>	Outlet Components	<b>Width (m)</b>						
<b>Location</b>	West end of culvert	<b>Height (m)</b>						
<b>Material</b>	Soil	<b>Count</b>	1					
<b>Element Type</b>		<b>Total Qty (m<sup>2</sup>)</b>						
<b>Environment</b>	Benign <input type="checkbox"/> Moderate <input checked="" type="checkbox"/> Severe <input type="checkbox"/>	<b>Limited Inspection</b>	<input type="checkbox"/>					
<b>Protection System</b>						<b>Performance Deficiencies</b>		
<b>Condition Data</b>	<b>Units</b> m <sup>2</sup>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>			
			1					
<b>Comments</b>	Good stability in area around culvert.							
<b>Recommended Work:</b>		<b>Rehab</b> <input type="checkbox"/>	<b>Replace</b> <input type="checkbox"/>	<b>Maintenance Needs:</b>				
		<b>Urgent</b> <input type="checkbox"/>	<b>1 to 5 years</b> <input type="checkbox"/>	<b>6 to 10 years</b> <input type="checkbox"/>	<b>None</b> <input checked="" type="checkbox"/>	<b>Urgent</b> <input type="checkbox"/>	<b>1 year</b> <input type="checkbox"/>	<b>2 years</b> <input type="checkbox"/>

<b>Element Group</b>	Decks	<b>Length (m)</b>	7			
<b>Element Name</b>	Wearing Surface	<b>Width (m)</b>	7			
<b>Location</b>	On top of culvert	<b>Height (m)</b>				
<b>Material</b>	Tar and chip	<b>Count</b>	1			
<b>Element Type</b>		<b>Total Qty (m<sup>2</sup>)</b>	49			
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b>	<input type="checkbox"/>	
<b>Protection System</b>					<b>Performance Deficiencies</b>	
<b>Condition Data</b>	<b>Units</b> m <sup>2</sup>	<b>Exc</b>	<b>Good</b> 49	<b>Fair</b>		<b>Poor</b>
<b>Comments</b>						
<b>Recommended Work:</b>		<b>Rehab</b> <input type="checkbox"/>	<b>Replace</b> <input type="checkbox"/>	<b>Maintenance Needs:</b>		
		<b>Urgent</b> <input type="checkbox"/>	<b>1 to 5 years</b> <input type="checkbox"/>	<b>6 to 10 years</b> <input type="checkbox"/>	<b>None</b> <input checked="" type="checkbox"/>	
				<b>Urgent</b> <input type="checkbox"/>	<b>1 year</b> <input type="checkbox"/>	<b>2 years</b> <input type="checkbox"/>

<b>Element Group</b>	Foundations	<b>Length (m)</b>				
<b>Element Name</b>	Foundations (below ground level)	<b>Width (m)</b>				
<b>Location</b>		<b>Height (m)</b>				
<b>Material</b>		<b>Count</b>	100			
<b>Element Type</b>		<b>Total Qty (m<sup>2</sup>)</b>				
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b>	<input type="checkbox"/>	
<b>Protection System</b>					<b>Performance Deficiencies</b>	
<b>Condition Data</b>	<b>Units</b> %	<b>Exc</b>	<b>Good</b> 100	<b>Fair</b>		<b>Poor</b>
<b>Comments</b>	No scour through the pipe. No significant Soil buildup.					
<b>Recommended Work:</b>		<b>Rehab</b> <input type="checkbox"/>	<b>Replace</b> <input type="checkbox"/>	<b>Maintenance Needs:</b>		
		<b>Urgent</b> <input type="checkbox"/>	<b>1 to 5 years</b> <input type="checkbox"/>	<b>6 to 10 years</b> <input type="checkbox"/>	<b>None</b> <input checked="" type="checkbox"/>	
				<b>Urgent</b> <input type="checkbox"/>	<b>1 year</b> <input type="checkbox"/>	<b>2 years</b> <input type="checkbox"/>

<b>Element Group</b>	Embankments	<b>Length (m)</b>				
<b>Element Name</b>	Embankments	<b>Width (m)</b>				
<b>Location</b>		<b>Height (m)</b>				
<b>Material</b>		<b>Count</b>	4			
<b>Element Type</b>		<b>Total Qty (m<sup>2</sup>)</b>				
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b>	<input type="checkbox"/>	
<b>Protection System</b>					<b>Performance Deficiencies</b>	
<b>Condition Data</b>	<b>Units</b> each	<b>Exc</b>	<b>Good</b>	<b>Fair</b> 4		<b>Poor</b>
<b>Comments</b>						
<b>Recommended Work:</b>		<b>Rehab</b> <input type="checkbox"/>	<b>Replace</b> <input type="checkbox"/>	<b>Maintenance Needs:</b>		
		<b>Urgent</b> <input type="checkbox"/>	<b>1 to 5 years</b> <input type="checkbox"/>	<b>6 to 10 years</b> <input type="checkbox"/>	<b>None</b> <input type="checkbox"/>	
				<b>Urgent</b> <input type="checkbox"/>	<b>1 year</b> <input checked="" type="checkbox"/>	<b>2 years</b> <input type="checkbox"/>
		Clear vegetation around pipe.				



<b>Element Group</b>	Embankments			<b>Length (m)</b>			
<b>Element Name</b>	Slope Protection			<b>Width (m)</b>			
<b>Location</b>				<b>Height (m)</b>			
<b>Material</b>				<b>Count</b>	4		
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>			
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input checked="" type="checkbox"/>			
<b>Protection System</b>						<b>Performance Deficiencies</b>	
<b>Condition Data</b>	<b>Units</b> each	<b>Exc</b>	<b>Good</b> 4	<b>Fair</b>	<b>Poor</b>		
<b>Comments</b>	Limited inspection due to high vegetation.						
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>			
Rehab <input type="checkbox"/> Replace <input type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>			
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>			

<b>Element Group</b>	Embankments			<b>Length (m)</b>			
<b>Element Name</b>	Streams & Waterways			<b>Width (m)</b>			
<b>Location</b>				<b>Height (m)</b>			
<b>Material</b>				<b>Count</b>	100		
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>	100		
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>			
<b>Protection System</b>						<b>Performance Deficiencies</b>	
<b>Condition Data</b>	<b>Units</b> %	<b>Exc</b>	<b>Good</b> 100	<b>Fair</b>	<b>Poor</b>		
<b>Comments</b>							
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>			
Rehab <input type="checkbox"/> Replace <input type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>			
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>			

<b>Element Group</b>	Culverts			<b>Length (m)</b>	7.2		
<b>Element Name</b>	Barrel			<b>Width (m)</b>	3.2		
<b>Location</b>	East Pipe			<b>Height (m)</b>	1.9		
<b>Material</b>	Corrugated steel pipe bolted arch			<b>Count</b>	1		
<b>Element Type</b>	CSP Arch			<b>Total Qty (m<sup>2</sup>)</b>	46.0		
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>			
<b>Protection System</b>						<b>Performance Deficiencies</b>	
<b>Condition Data</b>	<b>Units</b> m <sup>2</sup>	<b>Exc</b>	<b>Good</b> 27.6	<b>Fair</b> 18.4	<b>Poor</b>		
<b>Comments</b>	Approximate surface area calculation based on a half an ellipse. Top profile has sagged through almost the whole length at the bolt line. Continue to monitor deformation.Moderate rust on the bottom part of the CSP						

<b>Recommended Work:</b> Rehab <input type="checkbox"/> Replace <input type="checkbox"/>	<b>Maintenance Needs:</b> 18
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>	Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input checked="" type="checkbox"/>
	Monitor deformation of top profile at bolt line.

## Alps Road Twin CSP Culverts



Approach looking West





Approach looking East





Upstream View





Downstream View





View from North





View from South 1





View from South 2



Rusting observed at Culvert joints





Rusting observed at Culvert joints



Rusting observed at Culvert joints





Rusting observed at Culvert bottom portion





Rusting observed at Culvert bottom portion

## Inventory Data:

Structure Name	C-2 Industrial Road Culvert		
Main Hwy/Road #	Roseville Rd	On <input type="checkbox"/> Crossing	Navig. Water <input type="checkbox"/> Rail <input type="checkbox"/> Ped <input type="checkbox"/>
		Under <input checked="" type="checkbox"/> Type:	Non-Navig Water <input checked="" type="checkbox"/> Road <input type="checkbox"/> Other <input type="checkbox"/>
Hwy/Road Name	Industrial Road		
Structure Location	Approximately 20m South of Roseville Rd		
Northing	43.345	Easting	-80.448333
Owners	Township of North Dumfries	Heritage Not Cons. <input checked="" type="checkbox"/> Cons./not App. <input type="checkbox"/> List/not Desig. <input type="checkbox"/>	
		Designation: Desig./not List <input type="checkbox"/> Desig. & List <input type="checkbox"/>	
MTO Region	South-Western	Road Class: Freeway <input type="checkbox"/> Arterial <input type="checkbox"/> Collector <input type="checkbox"/> Local <input checked="" type="checkbox"/>	
MTO District	London/Stratford	Posted Speed 60 km/hr	No. of Lanes 2
Old County	Waterloo	AADT	% Trucks
Geographic Township	North Dumfries	Inspection Route Sequence	
Structure Type	C. Steel plate pipe arch	Interchange Number	
Total Culvert Length (m)	18.3	Interchange Structure Number	
Maximum Culvert Width (m)	3.2	Min. Vertical Clearance (m)	
Culvert Height (m)	1.9	Special Routes: Transit <input type="checkbox"/> Truck <input type="checkbox"/> School <input type="checkbox"/> Bicycle <input type="checkbox"/>	
Roadway Width (m)	8	Detour Length Around Bridge (km)	
Skew Angle (degrees)	90	Direction of Structure	E/W
No. of Spans	1	Fill on Structure (m)	0.3
Span Lengths (m)	3.2	Deck Geodetic Elevation	273

## Historical Data:

Year Built		Year of Last Major Rehab	
Last OSIM Inspection		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			
Rehab History: (Date/Description)			

**Scheduled Improvements:**

Regional Priority Number

Programmed Work Year

Nature of Program Work:

Appraisal Indices:		Comments
Fatigue		
Seismic		
Scour		
Flood		
Geometrics		
Barrier		
Curb		
Load Capacity		



Field Inspection Information	
Date of Inspection	May 16, 2020 , 3:30PM
Type of Inspection:	OSIM <input checked="" type="checkbox"/> SIM <input type="checkbox"/>
Inspector:	J. Zohreh, P.Eng.
Others in Party:	S. Mitra, EIT
Access Equipment Used:	Tapes, Hammer, Chain, Ladder, Camera, Safety Equipment
Weather:	Sunny
Temperature:	15°C

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

Overall Structure Notes	
Recommended Work on Structure	None <input checked="" type="checkbox"/> Minor Rehab <input type="checkbox"/> Major Rehab <input type="checkbox"/> Replace <input type="checkbox"/>
Timing of Recommended Work	1 to 5 years <input checked="" type="checkbox"/> 6 to 10 years <input type="checkbox"/>
Overall Comments:	See maintenance sheet. Monitor deformation of top profile at bolt line.
Date of Next Inspection:	2022

## Suspected Performance Deficiencies

- 01 Load carrying capacity
- 02 Excessive deformations (reflections & rotations)
- 03 Continuing settlement
- 04 Continuing movements
- 05 Seized bearings

06

- 07 Bearing not uniformly loaded/unstable
- 08 Jammed expansion joint
- 09 Pedestrian/vehicular hazard
- 10 Rough riding surface
- 11 Surface ponding
- 12 Deck draining

12

- 13 Slippery Surfaces
- 14 Flooding/channel blockage
- 15 Undermining of foundation
- 16 Unstable embankments
- 17 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

- 08 Repair to Structural Steel
- 09 Repair to Bridge Concrete
- 10 Repair of Bridge Timber
- 11 Bailey bridges - maintenance
- 12 Animal/Pest Control
- 13 Bridge Surface Repair

13

- 14 Erosion Control at Bridges
- 15 Concrete Sealing
- 16 Rout and Seal
- 17 Bridge deck drainage
- 18 Scaling (loose concrete or ACR steel)
- 19 Other

Repair Rehabilitation Required				Priority				Estimated Construction Cost
Element <sup>1</sup>	Repair and Rehabilitation Required <sup>2</sup>			6 to 10 years	1 to 5 years	Within 1 year	Urgent	
Barrel	Clear vegetation around pipe. Cost dependent on method used for abatement and season				X			\$ 1,500.00
Estimated Rehabilitated or Replacement Structure Dimensions <sup>3</sup>				Total Structural Cost				\$ 1,500.00
Deck Length (m)	18.3	Structure Width (m)	3.2					

1 - Indicate specific costs for structure replacement or for rehabilitation under the given headings.

2 - Give a brief description of the rehabilitation work required.

3 - Estimated structure dimensions after completion of the proposed work - if it is expected to change.

Associated Work <sup>4</sup>	Comments	Estimated Cost
Approaches <sup>5</sup>		
Detours		
Traffic Control		
Utilities		
Right of Way		
Environment Study		
Other		
Contingencies		
Total Associated Work Cost		\$ -

Total Construction Cost	\$ 1,500.00
-------------------------	-------------

4 - Includes other construction costs associated with the structure. Engineering fees for reports, environmental studies, designs, project management and contingencies are not included as associated work.

5 - Approach costs is for work (fill, pavement, guiderail, etc.) immediately adjacent to the structure for minor changes in horizontal or vertical alignment and for barrier end treatments at the structure

Justification

Bridge Condition Index																		
No.		Element Description	Location	Length	Width	Height	Count	Total Qty	Units	Replacement (Initial) Cost	Material	Total Replacement Value	Excellent	Good	Fair	Poor	Current Element Value	Element Condition Index
				(m)	(m)	(m)	#			(\$)		TRV (\$)	1	0.75	0.4	0	CEV (\$)	
C-2	Culverts	Barrel	North Pipe	18.3	3.2	1.9	1	149.00	m2	\$ 350.00	Corrugated steel plate	\$ 52,150.00	0.00	134.10	14.90	0.00	\$ 37,287.25	71.5
C-2	Culverts	Inlet Component	East end of culvert	0	0	0	1	1.00	m2	\$ 350.00	Soil	\$ 350.00	0.00	1.00	0.00	0.00	\$ 262.50	75.0
C-2	Culverts	Outlet Component	West end of culvert	0	0	0	1	1.00	m2	\$ 350.00	Soil	\$ 350.00	0.00	1.00	0.00	0.00	\$ 262.50	75.0
C-2	Decks	Wearing Surface	On top of culvert	18.3	7	0	1	128.10	m2	\$ 6.00	Tar and chip	\$ 768.60	0.00	128.10	0.00	0.00	\$ 576.45	75.0
C-2	Foundations	Foundations (b	0	0	0	0	100	100.00	%	\$ -	0	\$ -	0.00	100.00	0.00	0.00	\$ -	-
C-2	Embankments	Embankments	0	0	0	0	4	4.00	each	\$ -	0	\$ -	0.00	4.00	0.00	0.00	\$ -	-
C-2	Embankments	Slope Protection	0	0	0	0	4	4.00	each	\$ -	0	\$ -	0.00	4.00	0.00	0.00	\$ -	-
C-2	Embankments	Streams & Water	0	0	0	0	100	100.00	%	\$ -	0	\$ -	0.00	0.00	0.00	#####	\$ -	-
C-2		TOTALS (TRV-CEV-BCI)										\$ 53,624.60					\$ 38,388.70	71.6

<b>Element Group</b>	Culverts			<b>Length (m)</b>	18.3	
<b>Element Name</b>	Barrel			<b>Width (m)</b>	3.2	
<b>Location</b>	North Pipe			<b>Height (m)</b>	1.9	
<b>Material</b>	Corrugated steel plate			<b>Count</b>	1	
<b>Element Type</b>	CSP Arch			<b>Total Qty (m<sup>2</sup>)</b>	149.0	
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	Limited Inspection <input type="checkbox"/>		
<b>Protection System</b>						<b>Performance Deficiencies</b>
<b>Condition Data</b>	Units m <sup>2</sup>	Exc	Good	Fair	Poor	
			134.1	14.9		01
<b>Comments</b>	Approximate surface area calculation based on a half an ellipse. Top profile has sagged through almost the whole length at the bolt line. Continue to monitor deformation.					
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>		
Rehab <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> Replace <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input checked="" type="checkbox"/> 2 years <input type="checkbox"/>		
				Monitor deformation of top profile at bolt line.		

<b>Element Group</b>	Culverts			<b>Length (m)</b>		
<b>Element Name</b>	Inlet Components			<b>Width (m)</b>		
<b>Location</b>	East end of culvert			<b>Height (m)</b>		
<b>Material</b>	Soil			<b>Count</b>	1	
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>		
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	Limited Inspection <input type="checkbox"/>		
<b>Protection System</b>						<b>Performance Deficiencies</b>
<b>Condition Data</b>	Units m <sup>2</sup>	Exc	Good	Fair	Poor	
			1			
<b>Comments</b>	Good stability in area around culvert.					
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>		
Rehab <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> Replace <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>		

<b>Element Group</b>	Culverts			<b>Length (m)</b>		
<b>Element Name</b>	Outlet Components			<b>Width (m)</b>		
<b>Location</b>	West end of culvert			<b>Height (m)</b>		
<b>Material</b>	Soil			<b>Count</b>	1	
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>		
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	Limited Inspection <input type="checkbox"/>		
<b>Protection System</b>						<b>Performance Deficiencies</b>
<b>Condition Data</b>	Units m <sup>2</sup>	Exc	Good	Fair	Poor	
			1			
<b>Comments</b>	Good stability in area around culvert.					
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>		
Rehab <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> Replace <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>		



<b>Element Group</b>	Decks			<b>Length (m)</b>	18.3		
<b>Element Name</b>	Wearing Surface			<b>Width (m)</b>	7		
<b>Location</b>	On top of culvert			<b>Height (m)</b>			
<b>Material</b>	Tar and chip			<b>Count</b>	1		
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>	128.1		
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>			
<b>Protection System</b>						<b>Performance Deficiencies</b>	
<b>Condition Data</b>	Units m <sup>2</sup>	Exc	Good	Fair	Poor		
			128.1				
<b>Comments</b>							
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>			
Rehab <input type="checkbox"/> Replace <input type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>			
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>			

<b>Element Group</b>	Foundations			<b>Length (m)</b>			
<b>Element Name</b>	Foundations (below ground level)			<b>Width (m)</b>			
<b>Location</b>				<b>Height (m)</b>			
<b>Material</b>				<b>Count</b>	100		
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>			
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>			
<b>Protection System</b>						<b>Performance Deficiencies</b>	
<b>Condition Data</b>	Units %	Exc	Good	Fair	Poor		
			100				
<b>Comments</b>							
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>			
Rehab <input type="checkbox"/> Replace <input type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>			
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>			

<b>Element Group</b>	Embankments			<b>Length (m)</b>			
<b>Element Name</b>	Embankments			<b>Width (m)</b>			
<b>Location</b>				<b>Height (m)</b>			
<b>Material</b>				<b>Count</b>	4		
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>			
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>			
<b>Protection System</b>						<b>Performance Deficiencies</b>	
<b>Condition Data</b>	Units each	Exc	Good	Fair	Poor		
			4				
<b>Comments</b>							
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>			
Rehab <input type="checkbox"/> Replace <input type="checkbox"/>				18			
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input checked="" type="checkbox"/>			
				Clear vegetation around pipe.			

<b>Element Group</b>	Embankments			<b>Length (m)</b>					
<b>Element Name</b>	Slope Protection			<b>Width (m)</b>					
<b>Location</b>				<b>Height (m)</b>					
<b>Material</b>				<b>Count</b>	4				
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>					
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b>	<input checked="" type="checkbox"/>				
<b>Protection System</b>					<b>Performance Deficiencies</b>				
<b>Condition Data</b>	<b>Units each</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>					
			4						
<b>Comments</b>	Limited inspection due to high vegetation.								
<b>Recommended Work:</b>			<b>Rehab</b> <input type="checkbox"/>	<b>Replace</b> <input type="checkbox"/>	<b>Maintenance Needs:</b>				
			<b>Urgent</b> <input type="checkbox"/>	<b>1 to 5 years</b> <input type="checkbox"/>	<b>6 to 10 years</b> <input type="checkbox"/>	<b>None</b> <input checked="" type="checkbox"/>	<b>Urgent</b> <input type="checkbox"/>	<b>1 year</b> <input type="checkbox"/>	<b>2 years</b> <input type="checkbox"/>

<b>Element Group</b>	Embankments			<b>Length (m)</b>					
<b>Element Name</b>	Streams & Waterways			<b>Width (m)</b>					
<b>Location</b>				<b>Height (m)</b>					
<b>Material</b>				<b>Count</b>	100				
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>	100				
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b>	<input type="checkbox"/>				
<b>Protection System</b>					<b>Performance Deficiencies</b>				
<b>Condition Data</b>	<b>Units %</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>					
					100				
<b>Comments</b>	completely blocked.								
<b>Recommended Work:</b>			<b>Rehab</b> <input type="checkbox"/>	<b>Replace</b> <input type="checkbox"/>	<b>Maintenance Needs:</b>				
			<b>Urgent</b> <input type="checkbox"/>	<b>1 to 5 years</b> <input type="checkbox"/>	<b>6 to 10 years</b> <input type="checkbox"/>	<b>None</b> <input checked="" type="checkbox"/>	<b>Urgent</b> <input checked="" type="checkbox"/>	<b>1 year</b> <input type="checkbox"/>	<b>2 years</b> <input type="checkbox"/>

<b>Element Group</b>	Culverts			<b>Length (m)</b>	18.3
<b>Element Name</b>	Barrel			<b>Width (m)</b>	3.2
<b>Location</b>	South Pipe			<b>Height (m)</b>	1.9
<b>Material</b>	Corrugated steel plate			<b>Count</b>	1
<b>Element Type</b>	CSP Arch			<b>Total Qty (m<sup>2</sup>)</b>	149.0
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b>	<input type="checkbox"/>
<b>Protection System</b>					<b>Performance Deficiencies</b>
<b>Condition Data</b>	<b>Units m<sup>2</sup></b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	
			134.1	14.9	01
<b>Comments</b>	Approximate surface area calculation based on a half an ellipse. Top profile has sagged through almost the whole length at the bolt line.				
<b>Recommended Work:</b>			<b>Rehab</b> <input type="checkbox"/>	<b>Replace</b> <input type="checkbox"/>	<b>Maintenance Needs:</b>

Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>	Urgent <input type="checkbox"/> 1 year <input checked="" type="checkbox"/> 2 years <input type="checkbox"/>
	Monitor deformation of top profile at bolt line.

## Industrial Road CSP Culvert



Approach looking East





Upstream view



Downstream view





Elevation view 1



Elevation view 2





Minor Rusting observed

## Inventory Data:

Structure Name	C-3 Kings Road Twin Culvert		
Main Hwy/Road #	GreenField Road	On <input type="checkbox"/> Crossing	Navig. Water <input type="checkbox"/> Rail <input type="checkbox"/> Ped <input type="checkbox"/> Under <input checked="" type="checkbox"/> Type: Non-Navig Water <input checked="" type="checkbox"/> Road <input type="checkbox"/> Other <input type="checkbox"/>
Hwy/Road Name	Kings Road		
Structure Location	Approximately 570m South of New Dundee Road		
Northing	43.368056	Easting	-80.422222
Owners	Township of North Dumfries	Heritage	Not Cons. <input checked="" type="checkbox"/> Cons./not App. <input type="checkbox"/> List/not Desig. <input type="checkbox"/>
		Designation:	Desig./not List <input type="checkbox"/> Desig. & List <input type="checkbox"/>
MTO Region	South-Western	Road Class:	Freeway <input type="checkbox"/> Arterial <input type="checkbox"/> Collector <input type="checkbox"/> Local <input checked="" type="checkbox"/>
MTO District	London/Stratford	Posted Speed	50 km/hr No. of Lanes 2
Old County	Waterloo	AADT	% Trucks
Geographic Township	North Dumfries	Inspection Route Sequence	
Structure Type	C. Steel plate pipe arch	Interchange Number	
Total Culvert Length (m)	12	Interchange Structure Number	
Maximum Culvert Width (m)	7.4	Min. Vertical Clearance (m)	
Culvert Height (m)	1.9	Special Routes:	Transit <input type="checkbox"/> Truck <input type="checkbox"/> School <input type="checkbox"/> Bicycle <input type="checkbox"/>
Roadway Width (m)	7	Detour Length Around Bridge (km)	
Skew Angle (degrees)	60	Direction of Structure	E/W
No. of Spans	2	Fill on Structure (m)	0..3
Span Lengths (m)	3.2	Deck Geodetic Elevation	255

## Historical Data:

Year Built		Year of Last Major Rehab	
Last OSIM Inspection		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			
Rehab History: (Date/Description)			

**Scheduled Improvements:**

Regional Priority Number

Programmed Work Year

Nature of Program Work:

Appraisal Indices:		Comments
Fatigue		
Seismic		
Scour		
Flood		
Geometrics		
Barrier		
Curb		
Load Capacity		

Field Inspection Information	
Date of Inspection	May 16, 2020 , 4:30PM
Type of Inspection:	OSIM <input checked="" type="checkbox"/> SIM <input type="checkbox"/>
Inspector:	J. Zohreh, P.Eng.
Others in Party:	S. Mitra, EIT
Access Equipment Used:	Tapes, Hammer, Chain, Ladder, Camera, Safety Equipment
Weather:	Sunny
Temperature:	15°C

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

Overall Structure Notes	
Recommended Work on Structure	None <input checked="" type="checkbox"/> Minor Rehab <input type="checkbox"/> Major Rehab <input type="checkbox"/> Replace <input type="checkbox"/>
Timing of Recommended Work	1 to 5 years <input checked="" type="checkbox"/> 6 to 10 years <input type="checkbox"/>
Overall Comments:	See maintenance sheet. Monitor deformation of top profile at bolt line.
Date of Next Inspection:	2022

## Suspected Performance Deficiencies

- 01 Load carrying capacity
- 02 Excessive deformations (reflections & rotations)
- 03 Continuing settlement
- 04 Continuing movements
- 05 Seized bearings

06

- 07 Bearing not uniformly loaded/unstable
- 08 Jammed expansion joint
- 09 Pedestrian/vehicular hazard
- 10 Rough riding surface
- 11 Surface ponding
- 12 Deck draining

12

- 13 Slippery Surfaces
- 14 Flooding/channel blockage
- 15 Undermining of foundation
- 16 Unstable embankments
- 17 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

- 08 Repair to Structural Steel
- 09 Repair to Bridge Concrete
- 10 Repair of Bridge Timber
- 11 Bailey bridges - maintenance
- 12 Animal/Pest Control
- 13 Bridge Surface Repair

13

- 14 Erosion Control at Bridges
- 15 Concrete Sealing
- 16 Rout and Seal
- 17 Bridge deck drainage
- 18 Scaling (loose concrete or ACR steel)
- 19 Other



Repair Rehabilitation Required		Priority				Estimated Construction Cost
Element <sup>1</sup>	Repair and Rehabilitation Required <sup>2</sup>	6 to 10 years	1 to 5 years	Within 1 year	Urgent	
Barrel	Monitor deformation of top profile at bolt line.		X			\$ 500.00
Embankments	Clear vegetation around pipe. Cost dependent on method used for abatement and season		X			\$ 1,000.00
Estimated Rehabilitated or Replacement Structure Dimensions <sup>3</sup>		Total Structural Cost				\$ 1,500.00
Deck Length (m)	12					
Structure Width (m)	7.4					

1 - Indicate specific costs for structure replacement or for rehabilitation under the given headings.

2 - Give a brief description of the rehabilitation work required.

3 - Estimated structure dimensions after completion of the proposed work - if it is expected to change.

Associated Work <sup>4</sup>	Comments	Estimated Cost
Approaches <sup>5</sup>		
Detours		
Traffic Control	No hazard signs at bridge, not necessary since culvert edge is >3 m from edge of roadway.	
Utilities		
Right of Way		
Environment Study		
Other		
Contingencies		
Total Associated Work Cost		\$ -

Total Construction Cost	\$ 1,500.00
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4 - Includes other construction costs associated with the structure. Engineering fees for reports, environmental studies, designs, project management and contingencies are not included as associated work.

5 - Approach costs is for work (fill, pavement, guiderail, etc.) immediately adjacent to the structure for minor changes in horizontal or vertical alignment and for barrier end treatments at the structure

### Justification

Bridge Condition Index																		
No.		Element Description	Location	Length	Width	Height	Count	Total Qty	Units	Replacement (Initial) Cost	Material	Total Replacement Value	Excellent	Good	Fair	Poor	Current Element Value	Element Condition Index
				(m)	(m)	(m)	#			(\$)		TRV (\$)	1	0.75	0.4	0	CEV (\$)	
C-3	Culverts	Barrel	East Pipe	12	3.2	1.9	1	97.70	m2	\$ 350.00	Corrugated steel plate	\$ 34,195.00	0.00	73.28	24.43	0.00	\$ 22,654.19	66.3
C-3	Culverts	Inlet Component	East end of culvert	0	0	0	1	1.00	m2	\$ 350.00	Soil	\$ 350.00	0.00	1.00	0.00	0.00	\$ 262.50	75.0
C-3	Culverts	Outlet Component	West end of culvert	0	0	0	1	1.00	m2	\$ 350.00	Soil	\$ 350.00	0.00	1.00	0.00	0.00	\$ 262.50	75.0
C-3	Decks	Wearing Surface	On top of culvert	7.4	7	0	1	51.80	m2	\$ 6.00	Chip and tar	\$ 310.80	0.00	25.90	25.90	0.00	\$ 178.71	57.5
C-3	Foundations	Foundations (b	0	0	0	0	100	100.00	%	\$ -	0	\$ -	0.00	100.00	0.00	0.00	\$ -	-
C-3	Embankments	Embankments	0	0	0	0	4	4.00	each	\$ -	0	\$ -	0.00	0.00	4.00	0.00	\$ -	-
C-3	Embankments	Slope Protection	0	0	0	0	4	4.00	each	\$ -	0	\$ -	0.00	4.00	0.00	0.00	\$ -	-
C-3	Embankments	Streams & Water	0	0	0	0	100	100.00	%	\$ -	0	\$ -	0.00	0.00	100.00	0.00	\$ -	-
C-3		TOTALS (TRV-CEV-BCI)										\$ 35,211.80					\$ 23,357.90	66.3

<b>Element Group</b>	<b>Culverts</b>	<b>Length (m)</b>	12			
<b>Element Name</b>	<b>Barrel</b>	<b>Width (m)</b>	3.2			
<b>Location</b>	East Pipe	<b>Height (m)</b>	1.9			
<b>Material</b>	Corrugated steel plate	<b>Count</b>	1			
<b>Element Type</b>	CSP Arch	<b>Total Qty (m<sup>2</sup>)</b>	97.7			
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>		
<b>Protection System</b>						<b>Performance Deficiencies</b>
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>	
	m <sup>2</sup>		73.3	24.4		
<b>Comments</b>	Approximate surface area calculation based on a half an ellipse. Top profile has sagged through almost the whole length at the bolt line. Continue to monitor deformation.					
<b>Recommended Work:</b> Rehab <input type="checkbox"/> Replace <input type="checkbox"/> <b>Maintenance Needs:</b>						

<b>Element Group</b>	<b>Culverts</b>	<b>Length (m)</b>				
<b>Element Name</b>	<b>Inlet Components</b>	<b>Width (m)</b>				
<b>Location</b>	East end of culvert	<b>Height (m)</b>				
<b>Material</b>	Soil	<b>Count</b>	1			
<b>Element Type</b>		<b>Total Qty (m<sup>2</sup>)</b>				
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>		
<b>Protection System</b>						<b>Performance Deficiencies</b>
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>	
	m <sup>2</sup>		1			
<b>Comments</b>	Good stability in area around culvert.					
<b>Recommended Work:</b> Rehab <input type="checkbox"/> Replace <input type="checkbox"/> <b>Maintenance Needs:</b>						
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>						

<b>Element Group</b>	<b>Culverts</b>	<b>Length (m)</b>				
<b>Element Name</b>	<b>Outlet Components</b>	<b>Width (m)</b>				
<b>Location</b>	West end of culvert	<b>Height (m)</b>				
<b>Material</b>	Soil	<b>Count</b>	1			
<b>Element Type</b>		<b>Total Qty (m<sup>2</sup>)</b>				
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>		
<b>Protection System</b>						<b>Performance Deficiencies</b>
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>	
	m <sup>2</sup>		1			
<b>Comments</b>	Good stability in area around culvert.					
<b>Recommended Work:</b> Rehab <input type="checkbox"/> Replace <input type="checkbox"/> <b>Maintenance Needs:</b>						
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>						

<b>Element Group</b>	Decks			<b>Length (m)</b>	7.4		
<b>Element Name</b>	Wearing Surface			<b>Width (m)</b>	7		
<b>Location</b>	On top of culvert			<b>Height (m)</b>			
<b>Material</b>	Chip and tar			<b>Count</b>	1		
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>	51.8		
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>			
<b>Protection System</b>						<b>Performance Deficiencies</b>	
<b>Condition Data</b>	Units m <sup>2</sup>	Exc	Good	Fair	Poor		
			25.9	25.9			
<b>Comments</b>							
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>			
Rehab <input type="checkbox"/> Replace <input type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input checked="" type="checkbox"/>			
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input checked="" type="checkbox"/>			

<b>Element Group</b>	Foundations			<b>Length (m)</b>			
<b>Element Name</b>	Foundations (below ground level)			<b>Width (m)</b>			
<b>Location</b>				<b>Height (m)</b>			
<b>Material</b>				<b>Count</b>	100		
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>			
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>			
<b>Protection System</b>						<b>Performance Deficiencies</b>	
<b>Condition Data</b>	Units %	Exc	Good	Fair	Poor		
			100				
<b>Comments</b>	No scour through the pipe. Soil buildup along the east and west wall.						
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>			
Rehab <input type="checkbox"/> Replace <input type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>			
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>			

<b>Element Group</b>	Embankments			<b>Length (m)</b>			
<b>Element Name</b>	Embankments			<b>Width (m)</b>			
<b>Location</b>				<b>Height (m)</b>			
<b>Material</b>				<b>Count</b>	4		
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>			
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>			
<b>Protection System</b>						<b>Performance Deficiencies</b>	
<b>Condition Data</b>	Units each	Exc	Good	Fair	Poor		
				4			
<b>Comments</b>							
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>			
Rehab <input type="checkbox"/> Replace <input type="checkbox"/>				18			
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input checked="" type="checkbox"/> 2 years <input type="checkbox"/>			
				Clear vegetation around pipe.			



<b>Element Group</b>	Embankments			<b>Length (m)</b>					
<b>Element Name</b>	Slope Protection			<b>Width (m)</b>					
<b>Location</b>				<b>Height (m)</b>					
<b>Material</b>				<b>Count</b>	4				
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>					
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b>	<input checked="" type="checkbox"/>				
<b>Protection System</b>					<b>Performance Deficiencies</b>				
<b>Condition Data</b>	<b>Units each</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>					
			4						
<b>Comments</b>	Limited inspection due to high vegetation.								
<b>Recommended Work:</b>			<b>Rehab</b> <input type="checkbox"/>	<b>Replace</b> <input type="checkbox"/>	<b>Maintenance Needs:</b>				
			<b>Urgent</b> <input type="checkbox"/>	<b>1 to 5 years</b> <input type="checkbox"/>	<b>6 to 10 years</b> <input type="checkbox"/>	<b>None</b> <input checked="" type="checkbox"/>	<b>Urgent</b> <input type="checkbox"/>	<b>1 year</b> <input type="checkbox"/>	<b>2 years</b> <input type="checkbox"/>

<b>Element Group</b>	Embankments			<b>Length (m)</b>					
<b>Element Name</b>	Streams & Waterways			<b>Width (m)</b>					
<b>Location</b>				<b>Height (m)</b>					
<b>Material</b>				<b>Count</b>	100				
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>	100				
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b>	<input type="checkbox"/>				
<b>Protection System</b>					<b>Performance Deficiencies</b>				
<b>Condition Data</b>	<b>Units %</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>					
				100					
<b>Comments</b>	Vegetation encroaching on waterway.								
<b>Recommended Work:</b>			<b>Rehab</b> <input type="checkbox"/>	<b>Replace</b> <input type="checkbox"/>	<b>Maintenance Needs:</b>				
			<b>Urgent</b> <input type="checkbox"/>	<b>1 to 5 years</b> <input type="checkbox"/>	<b>6 to 10 years</b> <input type="checkbox"/>	<b>None</b> <input checked="" type="checkbox"/>	<b>Urgent</b> <input type="checkbox"/>	<b>1 year</b> <input type="checkbox"/>	<b>2 years</b> <input type="checkbox"/>

<b>Element Group</b>	Culverts			<b>Length (m)</b>	12
<b>Element Name</b>	Barrel			<b>Width (m)</b>	3.2
<b>Location</b>	West Pipe			<b>Height (m)</b>	1.9
<b>Material</b>	Corrugated steel plate			<b>Count</b>	1
<b>Element Type</b>	CSP Arch			<b>Total Qty (m<sup>2</sup>)</b>	97.7
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b>	<input type="checkbox"/>
<b>Protection System</b>					<b>Performance Deficiencies</b>
<b>Condition Data</b>	<b>Units m<sup>2</sup></b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	
			73.3	24.4	
<b>Comments</b>	Approximate surface area calculation based on a half an ellipse. Top profile has sagged through almost the whole length at the bolt line. Continue to monitor deformation.				

<b>Recommended Work:</b> Rehab <input type="checkbox"/> Replace <input type="checkbox"/>	<b>Maintenance Needs:</b>
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>	Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input checked="" type="checkbox"/>
	Monitor deformation of top profile at bolt line.

## Kings Road Twin Culvert



Approach looking East





Approach looking West





Downstream view





Upstream view





Elevation of the culvert



Some rusting observed in the culvert



## Inventory Data:

Structure Name	C-4 Morrison Culvert 1		
Main Hwy/Road #	N Dumfries Twp Rd 3E	On <input checked="" type="checkbox"/> Under <input type="checkbox"/>	Crossing Type: Navig. Water <input type="checkbox"/> Rail <input type="checkbox"/> Ped <input type="checkbox"/> Non-Navig Water <input checked="" type="checkbox"/> Road <input type="checkbox"/> Other <input type="checkbox"/>
Hwy/Road Name	N Dumfries Twp Rd 3E - Morisson Road		
Structure Location	Approximately 700m West of Sheffield road		
Northing		Easting	
Owners	Township of North Dumfries	Heritage Designation:	Not Cons. <input checked="" type="checkbox"/> Cons./not App. <input type="checkbox"/> List/not Desig. <input type="checkbox"/> Desig./not List <input type="checkbox"/> Desig. & List <input type="checkbox"/>
MTO Region	South-Western	Road Class:	Freeway <input type="checkbox"/> Arterial <input type="checkbox"/> Collector <input type="checkbox"/> Local <input checked="" type="checkbox"/>
MTO District	London/Stratford	Posted Speed	50 km/hr No. of Lanes 2
Old County	Waterloo	AADT	% Trucks
Geographic Township	North Dumfries	Inspection Route Sequence	
Structure Type	Concrete Rigid Frame	Interchange Number	
Total Culvert Length (m)	10.3	Interchange Structure Number	
Maximum Culvert Width (m)	3.1	Min. Vertical Clearance (m)	
Culvert Height (m)	1.5	Special Routes:	Transit <input type="checkbox"/> Truck <input type="checkbox"/> School <input type="checkbox"/> Bicycle <input type="checkbox"/>
Roadway Width (m)	7	Detour Length Around Bridge (km)	
Skew Angle (degrees)	90	Direction of Structure	N/S
No. of Spans	1	Fill on Structure (m)	0.3
Span Lengths (m)	2.4	Deck Geodetic Elevation	227

## Historical Data:

Year Built		Year of Last Major Rehab	
Last OSIM Inspection		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			
Rehab History: (Date/Description)			

**Scheduled Improvements:**

Regional Priority Number

Programmed Work Year

Nature of Program Work:

Appraisal Indices:		Comments
Fatigue		
Seismic		
Scour		
Flood		
Geometrics		
Barrier		
Curb		
Load Capacity		

## Field Inspection Information

Date of Inspection	May 16, 2020 , 5:30PM	Type of Inspection:	OSIM <input checked="" type="checkbox"/> SIM <input type="checkbox"/>
Inspector:	J. Zohreh, P.Eng.		
Others in Party:	S. Mitra, EIT		
Access Equipment Used:	Tapes, Hammer, Chain, Ladder, Camera, Safety Equipment		
Weather:	Sunny		
Temperature:	15°C		

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

## Overall Structure Notes

Recommended Work on Structure	None <input checked="" type="checkbox"/> Minor Rehab <input type="checkbox"/> Major Rehab <input type="checkbox"/> Replace <input type="checkbox"/>
Timing of Recommended Work	1 to 5 years <input checked="" type="checkbox"/> 6 to 10 years <input type="checkbox"/>
Overall Comments:	See maintenance sheet. Monitor deformation of top profile at bolt line.
Date of Next Inspection:	2022

## Suspected Performance Deficiencies

- 01 Load carrying capacity
- 02 Excessive deformations (reflections & rotations)
- 03 Continuing settlement
- 04 Continuing movements
- 05 Seized bearings

06

- 07 Bearing not uniformly loaded/unstable
- 08 Jammed expansion joint
- 09 Pedestrian/vehicular hazard
- 10 Rough riding surface
- 11 Surface ponding
- 12 Deck draining

12

- 13 Slippery Surfaces
- 14 Flooding/channel blockage
- 15 Undermining of foundation
- 16 Unstable embankments
- 17 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

- 08 Repair to Structural Steel
- 09 Repair to Bridge Concrete
- 10 Repair of Bridge Timber
- 11 Bailey bridges - maintenance
- 12 Animal/Pest Control
- 13 Bridge Surface Repair

13

- 14 Erosion Control at Bridges
- 15 Concrete Sealing
- 16 Rout and Seal
- 17 Bridge deck drainage
- 18 Scaling (loose concrete or ACR steel)
- 19 Other

Repair Rehabilitation Required				Priority				Estimated Construction Cost
Element <sup>1</sup>	Repair and Rehabilitation Required <sup>2</sup>			6 to 10 years	1 to 5 years	Within 1 year	Urgent	
Embankments	Clear vegetation around pipe. Cost dependent on method used for abatement and season				X			\$ 1,000.00
Estimated Rehabilitated or Replacement Structure Dimensions <sup>3</sup>				Total Structural Cost				\$ 1,000.00
Deck Length (m)	10.3	Structure Width (m)	3.1					

1 - Indicate specific costs for structure replacement or for rehabilitation under the given headings.

2 - Give a brief description of the rehabilitation work required.

3 - Estimated structure dimensions after completion of the proposed work - if it is expected to change.

Associated Work <sup>4</sup>	Comments	Estimated Cost
Approaches <sup>5</sup>		
Detours		
Traffic Control		
Utilities		
Right of Way		
Environment Study		
Other		
Contingencies		
Total Associated Work Cost		\$ -

Total Construction Cost	\$ 1,000.00
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4 - Includes other construction costs associated with the structure. Engineering fees for reports, environmental studies, designs, project management and contingencies are not included as associated work.

5 - Approach costs is for work (fill, pavement, guiderail, etc.) immediately adjacent to the structure for minor changes in horizontal or vertical alignment and for barrier end treatments at the structure

Justification



Bridge Condition Index																		
No.		Element Description	Location	Length	Width	Height	Count	Total Qty	Units	Replacement (Initial) Cost	Material	Total Replacement Value	Excellent	Good	Fair	Poor	Current Element Value	Element Condition Index
				(m)	(m)	(m)	#			(\$)		TRV (\$)	1	0.75	0.4	0	CEV (\$)	
C-4	Culverts	Barrel	0	20.2	3.8	2.2	1	85.12	m2	\$ 350.00	Concrete Rigid Frame	\$ 29,792.00	0.00	76.61	8.51	0.00	\$ 21,301.28	71.5
C-4	Culverts	Inlet Component	East end of culvert	0	0	0	1	1.00	m2	\$ 350.00	Soil	\$ 350.00	0.00	1.00	0.00	0.00	\$ 262.50	75.0
C-4	Culverts	Outlet Component	West end of culvert	0	0	0	1	1.00	m2	\$ 350.00	Soil	\$ 350.00	0.00	1.00	0.00	0.00	\$ 262.50	75.0
C-4	Decks	Wearing Surface	On top of culvert	3.8	6.2	0	1	23.56	m2	\$ 6.00	Chip and tar	\$ 141.36	0.00	11.78	11.78	0.00	\$ 81.28	57.5
C-4	Foundations	Foundations (b	0	0	0	0	100	100.00	%	\$ -	0	\$ -	0.00	100.00	0.00	0.00	\$ -	-
C-4	Embankments	Embankments	0	0	0	0	4	4.00	each	\$ -	0	\$ -	0.00	0.00	4.00	0.00	\$ -	-
C-4	Embankments	Slope Protection	0	0	0	0	4	4.00	each	\$ -	0	\$ -	0.00	4.00	0.00	0.00	\$ -	-
C-4	Embankments	Streams & Waterways	0	0	0	0	100	100.00	%	\$ -	0	\$ -	0.00	0.00	100.00	0.00	\$ -	-
C-4		TOTALS (TRV-CEV-BCI)										\$ 30,639.36					\$ 21,907.56	71.5

<b>Element Group</b>	Culverts	<b>Length (m)</b>	20.2			
<b>Element Name</b>	Barrel	<b>Width (m)</b>	3.8			
<b>Location</b>		<b>Height (m)</b>	2.2			
<b>Material</b>	Concrete Rigid Frame	<b>Count</b>	1			
<b>Element Type</b>	Box	<b>Total Qty (m<sup>2</sup>)</b>	85.1			
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>		
<b>Protection System</b>						<b>Performance Deficiencies</b>
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>	
	m <sup>2</sup>		76.6	8.5		
<b>Comments</b>						
<b>Recommended Work:</b>		Rehab <input type="checkbox"/>	Replace <input type="checkbox"/>	<b>Maintenance Needs:</b>		
Urgent <input type="checkbox"/>		1 to 5 years <input type="checkbox"/>	6 to 10 years <input type="checkbox"/>	None <input checked="" type="checkbox"/>	Urgent <input type="checkbox"/>	
					1 year <input type="checkbox"/>	
					2 years <input checked="" type="checkbox"/>	

<b>Element Group</b>	Culverts	<b>Length (m)</b>				
<b>Element Name</b>	Inlet Components	<b>Width (m)</b>				
<b>Location</b>	East end of culvert	<b>Height (m)</b>				
<b>Material</b>	Soil	<b>Count</b>	1			
<b>Element Type</b>		<b>Total Qty (m<sup>2</sup>)</b>				
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>		
<b>Protection System</b>						<b>Performance Deficiencies</b>
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>	
	m <sup>2</sup>		1			
<b>Comments</b>	Good stability in area around culvert.					
<b>Recommended Work:</b>		Rehab <input type="checkbox"/>	Replace <input type="checkbox"/>	<b>Maintenance Needs:</b>		
Urgent <input type="checkbox"/>		1 to 5 years <input type="checkbox"/>	6 to 10 years <input type="checkbox"/>	None <input checked="" type="checkbox"/>	Urgent <input type="checkbox"/>	
					1 year <input type="checkbox"/>	
					2 years <input type="checkbox"/>	

<b>Element Group</b>	Culverts	<b>Length (m)</b>				
<b>Element Name</b>	Outlet Components	<b>Width (m)</b>				
<b>Location</b>	West end of culvert	<b>Height (m)</b>				
<b>Material</b>	Soil	<b>Count</b>	1			
<b>Element Type</b>		<b>Total Qty (m<sup>2</sup>)</b>				
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>		
<b>Protection System</b>						<b>Performance Deficiencies</b>
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>	
	m <sup>2</sup>		1			
<b>Comments</b>	Good stability in area around culvert.					
<b>Recommended Work:</b>		Rehab <input type="checkbox"/>	Replace <input type="checkbox"/>	<b>Maintenance Needs:</b>		
Urgent <input type="checkbox"/>		1 to 5 years <input type="checkbox"/>	6 to 10 years <input type="checkbox"/>	None <input checked="" type="checkbox"/>	Urgent <input type="checkbox"/>	
					1 year <input type="checkbox"/>	
					2 years <input type="checkbox"/>	

<b>Element Group</b>	Decks	<b>Length (m)</b>	3.8			
<b>Element Name</b>	Wearing Surface	<b>Width (m)</b>	6.2			
<b>Location</b>	On top of culvert	<b>Height (m)</b>				
<b>Material</b>	Chip and tar	<b>Count</b>	1			
<b>Element Type</b>		<b>Total Qty (m<sup>2</sup>)</b>	23.56			
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>		
<b>Protection System</b>						<b>Performance Deficiencies</b>
<b>Condition Data</b>	<b>Units</b> m <sup>2</sup>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>	
			11.78	11.78		
<b>Comments</b>						
<b>Recommended Work:</b>		Rehab <input type="checkbox"/>	Replace <input type="checkbox"/>	<b>Maintenance Needs:</b>		
Urgent <input type="checkbox"/>		1 to 5 years <input type="checkbox"/>	6 to 10 years <input type="checkbox"/>	None <input checked="" type="checkbox"/>	Urgent <input type="checkbox"/>	1 year <input type="checkbox"/> 2 years <input type="checkbox"/>

<b>Element Group</b>	Foundations	<b>Length (m)</b>				
<b>Element Name</b>	Foundations (below ground level)	<b>Width (m)</b>				
<b>Location</b>		<b>Height (m)</b>				
<b>Material</b>		<b>Count</b>	100			
<b>Element Type</b>		<b>Total Qty (m<sup>2</sup>)</b>				
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>		
<b>Protection System</b>						<b>Performance Deficiencies</b>
<b>Condition Data</b>	<b>Units</b> %	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>	
			100			
<b>Comments</b>						
<b>Recommended Work:</b>		Rehab <input type="checkbox"/>	Replace <input type="checkbox"/>	<b>Maintenance Needs:</b>		
Urgent <input type="checkbox"/>		1 to 5 years <input type="checkbox"/>	6 to 10 years <input type="checkbox"/>	None <input checked="" type="checkbox"/>	Urgent <input type="checkbox"/>	1 year <input type="checkbox"/> 2 years <input type="checkbox"/>

<b>Element Group</b>	Embankments	<b>Length (m)</b>				
<b>Element Name</b>	Embankments	<b>Width (m)</b>				
<b>Location</b>		<b>Height (m)</b>				
<b>Material</b>		<b>Count</b>	4			
<b>Element Type</b>		<b>Total Qty (m<sup>2</sup>)</b>				
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>		
<b>Protection System</b>						<b>Performance Deficiencies</b>
<b>Condition Data</b>	<b>Units</b> each	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>	
				4		
<b>Comments</b>						
<b>Recommended Work:</b>		Rehab <input type="checkbox"/>	Replace <input type="checkbox"/>	<b>Maintenance Needs:</b>		
Urgent <input type="checkbox"/>		1 to 5 years <input type="checkbox"/>	6 to 10 years <input type="checkbox"/>	None <input type="checkbox"/>	Urgent <input type="checkbox"/>	1 year <input checked="" type="checkbox"/> 2 years <input type="checkbox"/>
						Clear vegetation around pipe.

<b>Element Group</b>	Embankments			<b>Length (m)</b>					
<b>Element Name</b>	Slope Protection			<b>Width (m)</b>					
<b>Location</b>				<b>Height (m)</b>					
<b>Material</b>				<b>Count</b>	4				
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>					
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b>	<input checked="" type="checkbox"/>				
<b>Protection System</b>					<b>Performance Deficiencies</b>				
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>					
	each		4						
<b>Comments</b>	Limited inspection due to high vegetation.								
<b>Recommended Work:</b>			<b>Rehab</b> <input type="checkbox"/>	<b>Replace</b> <input type="checkbox"/>	<b>Maintenance Needs:</b>				
			<b>Urgent</b> <input type="checkbox"/>	<b>1 to 5 years</b> <input type="checkbox"/>	<b>6 to 10 years</b> <input type="checkbox"/>	<b>None</b> <input checked="" type="checkbox"/>	<b>Urgent</b> <input type="checkbox"/>	<b>1 year</b> <input type="checkbox"/>	<b>2 years</b> <input type="checkbox"/>

<b>Element Group</b>	Embankments			<b>Length (m)</b>					
<b>Element Name</b>	Streams & Waterways			<b>Width (m)</b>					
<b>Location</b>				<b>Height (m)</b>					
<b>Material</b>				<b>Count</b>	100				
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>	100				
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b>	<input type="checkbox"/>				
<b>Protection System</b>					<b>Performance Deficiencies</b>				
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>					
	%			100					
<b>Comments</b>	Vegetation enroaching on waterway.								
<b>Recommended Work:</b>			<b>Rehab</b> <input type="checkbox"/>	<b>Replace</b> <input type="checkbox"/>	<b>Maintenance Needs:</b>				
			<b>Urgent</b> <input type="checkbox"/>	<b>1 to 5 years</b> <input type="checkbox"/>	<b>6 to 10 years</b> <input type="checkbox"/>	<b>None</b> <input checked="" type="checkbox"/>	<b>Urgent</b> <input type="checkbox"/>	<b>1 year</b> <input type="checkbox"/>	<b>2 years</b> <input type="checkbox"/>



## Morrison Road Culvert # 1



Approach looking East





Approach looking West





Downstream view





Upstream view





Elevation view 1





Elevation view2



View inside the culvert





Concrete damages inside the culvert





Some cracks observed in the wearing surface of the road

## Inventory Data:

Structure Name	C-5 Morrison Culvert 2		
Main Hwy/Road #	N Dumfries Twp Rd 3E	On <input checked="" type="checkbox"/> Under <input type="checkbox"/>	Crossing Type: Navig. Water <input type="checkbox"/> Rail <input type="checkbox"/> Ped <input type="checkbox"/> Non-Navig Water <input checked="" type="checkbox"/> Road <input type="checkbox"/> Other <input type="checkbox"/>
Hwy/Road Name	N Dumfries Twp Rd 3E - Morisson Road		
Structure Location	Approximately 270m West of Sheffield road		
Northing	43.3475	Easting	-80.219444
Owners	Township of North Dumfries	Heritage Designation:	Not Cons. <input checked="" type="checkbox"/> Cons./not App. <input type="checkbox"/> List/not Desig. <input type="checkbox"/> Desig./not List <input type="checkbox"/> Desig. & List <input type="checkbox"/>
MTO Region	South-Western	Road Class:	Freeway <input type="checkbox"/> Arterial <input type="checkbox"/> Collector <input type="checkbox"/> Local <input checked="" type="checkbox"/>
MTO District	London/Stratford	Posted Speed	50 km/hr No. of Lanes 2
Old County	Waterloo	AADT	% Trucks
Geographic Township	North Dumfries	Inspection Route Sequence	
Structure Type	Concrete Rigid Frame	Interchange Number	
Total Culvert Length (m)	10.4	Interchange Structure Number	
Maximum Culvert Width (m)	2.7	Min. Vertical Clearance (m)	
Culvert Height (m)	1.2	Special Routes:	Transit <input type="checkbox"/> Truck <input type="checkbox"/> School <input type="checkbox"/> Bicycle <input type="checkbox"/>
Roadway Width (m)	7	Detour Length Around Bridge (km)	
Skew Angle (degrees)	90	Direction of Structure	N/S
No. of Spans	1	Fill on Structure (m)	0.2
Span Lengths (m)	2.7	Deck Geodetic Elevation	223

## Historical Data:

Year Built		Year of Last Major Rehab	
Last OSIM Inspection		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			
Rehab History: (Date/Description)			

**Scheduled Improvements:**

Regional Priority Number

Programmed Work Year

Nature of Program Work:

Appraisal Indices:		Comments
Fatigue		
Seismic		
Scour		
Flood		
Geometrics		
Barrier		
Curb		
Load Capacity		

## Field Inspection Information

Date of Inspection	May 17, 2020 , 8:00AM	Type of Inspection:	OSIM <input checked="" type="checkbox"/> SIM <input type="checkbox"/>
Inspector:	J. Zohreh, P.Eng.		
Others in Party:	S. Mitra, EIT		
Access Equipment Used:	Tapes, Hammer, Chain, Ladder, Camera, Safety Equipment		
Weather:	Sunny		
Temperature:	15°C		

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

## Overall Structure Notes

Recommended Work on Structure	None <input checked="" type="checkbox"/> Minor Rehab <input type="checkbox"/> Major Rehab <input type="checkbox"/> Replace <input type="checkbox"/>
Timing of Recommended Work	1 to 5 years <input checked="" type="checkbox"/> 6 to 10 years <input type="checkbox"/>
Overall Comments:	See maintenance sheet. Monitor deformation of top profile at bolt line.
Date of Next Inspection:	2022

Suspected Performance Deficiencies	06	Bearing not uniformly loaded/unstable	12	Slippery Surfaces
01 Load carrying capacity	07	Jammed expansion joint	13	Flooding/channel blockage
02 Excessive deformations (reflections & rotations)	08	Pedestrian/vehicular hazard	14	Undermining of foundation
03 Continuing settlement	09	Rough riding surface	15	Unstable embankments
04 Continuing movements	10	Surface ponding	16	Other
05 Seized bearings	11	Deck draining		
Maintenance Needs				
01 Lift and Swing Bridge Maintenance	07	Repair to Structural Steel	13	Erosion Control at Bridges
02 Bridge Cleaning	08	Repair to 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



Repair Rehabilitation Required				Priority				Estimated Construction Cost
Element <sup>1</sup>	Repair and Rehabilitation Required <sup>2</sup>			6 to 10 years	1 to 5 years	Within 1 year	Urgent	
Embankments	Clear vegetation around pipe. Cost dependent on method used for abatement and season				X			\$ 1,000.00
Estimated Rehabilitated or Replacement Structure Dimensions <sup>3</sup>				Total Structural Cost				\$ 1,000.00
Deck Length (m)	10.4	Structure Width (m)	2.7					

1 - Indicate specific costs for structure replacement or for rehabilitation under the given headings.

2 - Give a brief description of the rehabilitation work required.

3 - Estimated structure dimensions after completion of the proposed work - if it is expected to change.

Associated Work <sup>4</sup>	Comments	Estimated Cost
Approaches <sup>5</sup>		
Detours		
Traffic Control		
Utilities		
Right of Way		
Environment Study		
Other		
Contingencies		
Total Associated Work Cost		\$ -

Total Construction Cost	\$ 1,000.00
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4 - Includes other construction costs associated with the structure. Engineering fees for reports, environmental studies, designs, project management and contingencies are not included as associated work.

5 - Approach costs is for work (fill, pavement, guiderail, etc.) immediately adjacent to the structure for minor changes in horizontal or vertical alignment and for barrier end treatments at the structure

Justification

Bridge Condition Index																		
No.		Element Description	Location	Length	Width	Height	Count	Total Qty	Units	Replacement (Initial) Cost	Material	Total Replacement Value	Excellent	Good	Fair	Poor	Current Element Value	Element Condition Index
				(m)	(m)	(m)	#			(\$)		TRV (\$)	1	0.75	0.4	0	CEV (\$)	
C-5	Culverts	Barrel	0	20.2	3.8	2.2	1	85.12	m2	\$ 350.00	Concrete Rigid Frame	\$ 29,792.00	0.00	76.61	8.51	0.00	\$ 21,301.28	71.5
C-5	Culverts	Inlet Component	East end of culvert	0	0	0	1	1.00	m2	\$ 350.00	Soil	\$ 350.00	0.00	1.00	0.00	0.00	\$ 262.50	75.0
C-5	Culverts	Outlet Component	West end of culvert	0	0	0	1	1.00	m2	\$ 350.00	Soil	\$ 350.00	0.00	1.00	0.00	0.00	\$ 262.50	75.0
C-5	Decks	Wearing Surface	On top of culvert	3.8	6.2	0	1	23.56	m2	\$ 6.00	Chip and tar	\$ 141.36	0.00	20.03	3.53	0.00	\$ 98.60	69.8
C-5	Foundations	Foundations (b	0	0	0	0	100	100.00	%	\$ -	0	\$ -	0.00	100.00	0.00	0.00	\$ -	-
C-5	Embankments	Embankments	0	0	0	0	4	4.00	each	\$ -	0	\$ -	0.00	0.00	4.00	0.00	\$ -	-
C-5	Embankments	Slope Protection	0	0	0	0	4	4.00	each	\$ -	0	\$ -	0.00	4.00	0.00	0.00	\$ -	-
C-5	Embankments	Streams & Water	0	0	0	0	100	100.00	%	\$ -	0	\$ -	0.00	0.00	100.00	0.00	\$ -	-
C-5		TOTALS (TRV-CEV-BCI)										\$ 30,639.36					\$ 21,924.88	71.6

<b>Element Group</b>	Culverts	<b>Length (m)</b>	20.2			
<b>Element Name</b>	Barrel	<b>Width (m)</b>	3.8			
<b>Location</b>		<b>Height (m)</b>	2.2			
<b>Material</b>	Concrete Rigid Frame	<b>Count</b>	1			
<b>Element Type</b>	Box	<b>Total Qty (m<sup>2</sup>)</b>	85.1			
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>		
<b>Protection System</b>						<b>Performance Deficiencies</b>
<b>Condition Data</b>	<b>Units</b> m <sup>2</sup>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>	
			76.6	8.5		
<b>Comments</b>	Minor spalling					
<b>Recommended Work:</b>		<b>Rehab</b> <input type="checkbox"/>	<b>Replace</b> <input type="checkbox"/>	<b>Maintenance Needs:</b>		
<b>Urgent</b> <input type="checkbox"/>		<b>1 to 5 years</b> <input type="checkbox"/>	<b>6 to 10 years</b> <input type="checkbox"/>	<b>None</b> <input checked="" type="checkbox"/>	<b>Urgent</b> <input type="checkbox"/>	
					<b>1 year</b> <input type="checkbox"/>	<b>2 years</b> <input checked="" type="checkbox"/>

<b>Element Group</b>	Culverts	<b>Length (m)</b>				
<b>Element Name</b>	Inlet Components	<b>Width (m)</b>				
<b>Location</b>	East end of culvert	<b>Height (m)</b>				
<b>Material</b>	Soil	<b>Count</b>	1			
<b>Element Type</b>		<b>Total Qty (m<sup>2</sup>)</b>				
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>		
<b>Protection System</b>						<b>Performance Deficiencies</b>
<b>Condition Data</b>	<b>Units</b> m <sup>2</sup>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>	
			1			
<b>Comments</b>	Good stability in area around culvert.					
<b>Recommended Work:</b>		<b>Rehab</b> <input type="checkbox"/>	<b>Replace</b> <input type="checkbox"/>	<b>Maintenance Needs:</b>		
<b>Urgent</b> <input type="checkbox"/>		<b>1 to 5 years</b> <input type="checkbox"/>	<b>6 to 10 years</b> <input type="checkbox"/>	<b>None</b> <input checked="" type="checkbox"/>	<b>Urgent</b> <input type="checkbox"/>	
					<b>1 year</b> <input type="checkbox"/>	<b>2 years</b> <input type="checkbox"/>

<b>Element Group</b>	Culverts	<b>Length (m)</b>				
<b>Element Name</b>	Outlet Components	<b>Width (m)</b>				
<b>Location</b>	West end of culvert	<b>Height (m)</b>				
<b>Material</b>	Soil	<b>Count</b>	1			
<b>Element Type</b>		<b>Total Qty (m<sup>2</sup>)</b>				
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>		
<b>Protection System</b>						<b>Performance Deficiencies</b>
<b>Condition Data</b>	<b>Units</b> m <sup>2</sup>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>	
			1			
<b>Comments</b>	Good stability in area around culvert.					
<b>Recommended Work:</b>		<b>Rehab</b> <input type="checkbox"/>	<b>Replace</b> <input type="checkbox"/>	<b>Maintenance Needs:</b>		
<b>Urgent</b> <input type="checkbox"/>		<b>1 to 5 years</b> <input type="checkbox"/>	<b>6 to 10 years</b> <input type="checkbox"/>	<b>None</b> <input checked="" type="checkbox"/>	<b>Urgent</b> <input type="checkbox"/>	
					<b>1 year</b> <input type="checkbox"/>	<b>2 years</b> <input type="checkbox"/>



<b>Element Group</b>	Decks			<b>Length (m)</b>	3.8		
<b>Element Name</b>	Wearing Surface			<b>Width (m)</b>	6.2		
<b>Location</b>	On top of culvert			<b>Height (m)</b>			
<b>Material</b>	Chip and tar			<b>Count</b>	1		
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>	23.56		
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>			
<b>Protection System</b>						<b>Performance Deficiencies</b>	
<b>Condition Data</b>	<b>Units</b> m <sup>2</sup>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>		
			20.026	3.534			
<b>Comments</b>							
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>			
Rehab <input type="checkbox"/> Replace <input type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>			
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>			

<b>Element Group</b>	Foundations			<b>Length (m)</b>			
<b>Element Name</b>	Foundations (below ground level)			<b>Width (m)</b>			
<b>Location</b>				<b>Height (m)</b>			
<b>Material</b>				<b>Count</b>	100		
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>			
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>			
<b>Protection System</b>						<b>Performance Deficiencies</b>	
<b>Condition Data</b>	<b>Units</b> %	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>		
			100				
<b>Comments</b>							
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>			
Rehab <input type="checkbox"/> Replace <input type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>			
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>			

<b>Element Group</b>	Embankments			<b>Length (m)</b>			
<b>Element Name</b>	Embankments			<b>Width (m)</b>			
<b>Location</b>				<b>Height (m)</b>			
<b>Material</b>				<b>Count</b>	4		
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>			
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>			
<b>Protection System</b>						<b>Performance Deficiencies</b>	
<b>Condition Data</b>	<b>Units</b> each	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>		
				4			
<b>Comments</b>							
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>			
Rehab <input type="checkbox"/> Replace <input type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input checked="" type="checkbox"/> 2 years <input type="checkbox"/>			
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input checked="" type="checkbox"/> 2 years <input type="checkbox"/>			
				Clear vegetation around pipe.			

<b>Element Group</b>	Embankments			<b>Length (m)</b>					
<b>Element Name</b>	Slope Protection			<b>Width (m)</b>					
<b>Location</b>				<b>Height (m)</b>					
<b>Material</b>				<b>Count</b>	4				
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>					
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b>	<input checked="" type="checkbox"/>				
<b>Protection System</b>					<b>Performance Deficiencies</b>				
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>					
	each		4						
<b>Comments</b>	Limited inspection due to high vegetation.								
<b>Recommended Work:</b>			<b>Rehab</b> <input type="checkbox"/>	<b>Replace</b> <input type="checkbox"/>	<b>Maintenance Needs:</b>				
			<b>Urgent</b> <input type="checkbox"/>	<b>1 to 5 years</b> <input type="checkbox"/>	<b>6 to 10 years</b> <input type="checkbox"/>	<b>None</b> <input checked="" type="checkbox"/>	<b>Urgent</b> <input type="checkbox"/>	<b>1 year</b> <input type="checkbox"/>	<b>2 years</b> <input type="checkbox"/>

<b>Element Group</b>	Embankments			<b>Length (m)</b>					
<b>Element Name</b>	Streams & Waterways			<b>Width (m)</b>					
<b>Location</b>				<b>Height (m)</b>					
<b>Material</b>				<b>Count</b>	100				
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>	100				
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b>	<input type="checkbox"/>				
<b>Protection System</b>					<b>Performance Deficiencies</b>				
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>					
	%			100					
<b>Comments</b>	Vegetation enroaching on waterway.								
<b>Recommended Work:</b>			<b>Rehab</b> <input type="checkbox"/>	<b>Replace</b> <input type="checkbox"/>	<b>Maintenance Needs:</b>				
			<b>Urgent</b> <input type="checkbox"/>	<b>1 to 5 years</b> <input type="checkbox"/>	<b>6 to 10 years</b> <input type="checkbox"/>	<b>None</b> <input checked="" type="checkbox"/>	<b>Urgent</b> <input type="checkbox"/>	<b>1 year</b> <input type="checkbox"/>	<b>2 years</b> <input type="checkbox"/>

## Morrison Road Culvert #2



Approach looking East





Upstream view





Upstream view





Elevation view of the culvert



View inside the culvert





Concrete honeycomb and spalling observed inside the culvert



Some cracks observed in the wearing surface of the road



## Inventory Data:

Structure Name	C-6 Reidsville Twin Culvert		
Main Hwy/Road #	Greenfield Rd	On <input type="checkbox"/> Crossing	Navig. Water <input type="checkbox"/> Rail <input type="checkbox"/> Ped <input type="checkbox"/> Under <input checked="" type="checkbox"/> Type: Non-Navig Water <input checked="" type="checkbox"/> Road <input type="checkbox"/> Other <input type="checkbox"/>
Hwy/Road Name	Reidsville Road		
Structure Location	Approximately 125m North of Greenfield Rd		
Northing	43.305833	Easting	-80.433333
Owners	Township of North Dumfries	Heritage	Not Cons. <input checked="" type="checkbox"/> Cons./not App. <input type="checkbox"/> List/not Desig. <input type="checkbox"/>
		Designation:	Desig./not List <input type="checkbox"/> Desig. & List <input type="checkbox"/>
MTO Region	South-Western	Road Class:	Freeway <input type="checkbox"/> Arterial <input type="checkbox"/> Collector <input type="checkbox"/> Local <input checked="" type="checkbox"/>
MTO District	London/Stratford	Posted Speed	50 km/hr No. of Lanes 2
Old County	Waterloo	AADT	% Trucks
Geographic Township	North Dumfries	Inspection Route Sequence	
Structure Type	C. Steel plate pipe arch	Interchange Number	
Total Culvert Length (m)	18.5	Interchange Structure Number	
Maximum Culvert Width (m)	8.5	Min. Vertical Clearance (m)	
Culvert Height (m)	1.9	Special Routes:	Transit <input type="checkbox"/> Truck <input type="checkbox"/> School <input type="checkbox"/> Bicycle <input type="checkbox"/>
Roadway Width (m)	7	Detour Length Around Bridge (km)	
Skew Angle (degrees)	60	Direction of Structure	N/S
No. of Spans	2	Fill on Structure (m)	0.5
Span Lengths (m)	3.2	Deck Geodetic Elevation	249

## Historical Data:

Year Built		Year of Last Major Rehab	
Last OSIM Inspection		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			
Rehab History: (Date/Description)			



**Scheduled Improvements:**

Regional Priority Number

Programmed Work Year

Nature of Program Work:

Appraisal Indices:		Comments
Fatigue		
Seismic		
Scour		
Flood		
Geometrics		
Barrier		
Curb		
Load Capacity		

## Field Inspection Information

Date of Inspection	May 17, 2020 , 9:00AM	Type of Inspection:	OSIM <input checked="" type="checkbox"/>	Enhanced OSIM <input type="checkbox"/>
Inspector:	J. Zohreh, P.Eng.			
Others in Party:	S. Mitra, EIT			
Access Equipment Used:	Tapes, Hammer, Chain, Ladder, Camera, Safety Equipment			
Weather:	Sunny			
Temperature:	15°C			

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

## Overall Structure Notes

Recommended Work on Structure	None <input checked="" type="checkbox"/>	Minor Rehab <input type="checkbox"/>	Major Rehab <input type="checkbox"/>	Replace <input type="checkbox"/>
Timing of Recommended Work	1 to 5 years <input checked="" type="checkbox"/>	6 to 10 years <input type="checkbox"/>		
Overall Comments:	See maintenance sheet. Monitor deformation of top profile at bolt line.			
Date of Next Inspection:	2022			

## Suspected Performance Deficiencies

- 01 Load carrying capacity
- 02 Excessive deformations (reflections & rotations)
- 03 Continuing settlement
- 04 Continuing movements
- 05 Seized bearings

06

- 07 Bearing not uniformly loaded/unstable
- 08 Jammed expansion joint
- 09 Pedestrian/vehicular hazard
- 10 Rough riding surface
- 11 Surface ponding
- 12 Deck draining

12

- 13 Slippery Surfaces
- 14 Flooding/channel blockage
- 15 Undermining of foundation
- 16 Unstable embankments
- 17 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

- 08 Repair to Structural Steel
- 09 Repair to Bridge Concrete
- 10 Repair of Bridge Timber
- 11 Bailey bridges - maintenance
- 12 Animal/Pest Control
- 13 Bridge Surface Repair

13

- 14 Erosion Control at Bridges
- 15 Concrete Sealing
- 16 Rout and Seal
- 17 Bridge deck drainage
- 18 Scaling (loose concrete or ACR steel)
- 19 Other

Repair Rehabilitation Required				Priority				Estimated Construction Cost
Element <sup>1</sup>	Repair and Rehabilitation Required <sup>2</sup>			6 to 10 years	1 to 5 years	Within 1 year	Urgent	
Embankments	Clear vegetation around pipe. Cost dependent on method used for abatement and season				X			\$ 1,000.00
Estimated Rehabilitated or Replacement Structure Dimensions <sup>3</sup>				Total Structural Cost				\$ 1,000.00
Deck Length (m)	18.5	Structure Width (m)	8.5					

1 - Indicate specific costs for structure replacement or for rehabilitation under the given headings.

2 - Give a brief description of the rehabilitation work required.

3 - Estimated structure dimensions after completion of the proposed work - if it is expected to change.

Associated Work <sup>4</sup>	Comments	Estimated Cost
Approaches <sup>5</sup>		
Detours		
Traffic Control		
Utilities		
Right of Way		
Environment Study		
Other		
Contingencies		
Total Associated Work Cost		\$ -

Total Construction Cost	\$ 1,000.00
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4 - Includes other construction costs associated with the structure. Engineering fees for reports, environmental studies, designs, project management and contingencies are not included as associated work.

5 - Approach costs is for work (fill, pavement, guiderail, etc.) immediately adjacent to the structure for minor changes in horizontal or vertical alignment and for barrier end treatments at the structure

Justification



Bridge Condition Index																		
No.		Element Description	Location	Length	Width	Height	Count	Total Qty	Units	Replacement (Initial) Cost	Material	Total Replacement Value	Excellent	Good	Fair	Poor	Current Element Value	Element Condition Index
				(m)	(m)	(m)	#			(\$)		TRV (\$)	1	0.75	0.4	0	CEV (\$)	
C-6	Culverts	Barrel	West Pipe	18.5	3.2	1.9	1	150.59	m2	\$ 350.00	Corrugated steel plate	\$ 52,706.50	0.00	140.05	10.54	0.00	\$ 38,238.57	72.6
C-6	Culverts	Inlet Component	East end of culvert	0	0	0	1	1.00	m2	\$ 350.00	Soil	\$ 350.00	0.00	1.00	0.00	0.00	\$ 262.50	75.0
C-6	Culverts	Outlet Component	West end of culvert	0	0	0	1	1.00	m2	\$ 350.00	Soil	\$ 350.00	0.00	1.00	0.00	0.00	\$ 262.50	75.0
C-6	Decks	Wearing Surface	On top of culvert	8.5	7	0	1	59.50	m2	\$ 6.00	Chip and tar	\$ 357.00	41.65	17.85	0.00	0.00	\$ 330.23	92.5
C-6	Foundations	Foundations (b	0	0	0	0	100	100.00	%	\$ -	0	\$ -	0.00	100.00	0.00	0.00	\$ -	-
C-6	Embankments	Embankments	0	0	0	0	4	4.00	each	\$ -	0	\$ -	0.00	0.00	4.00	0.00	\$ -	-
C-6	Embankments	Slope Protection	0	0	0	0	4	4.00	each	\$ -	0	\$ -	0.00	4.00	0.00	0.00	\$ -	-
C-6	Embankments	Streams & Water	0	0	0	0	100	100.00	%	\$ -	0	\$ -	0.00	0.00	100.00	0.00	\$ -	-
C-6		TOTALS (TRV-CEV-BCI)										\$ 53,769.50					\$ 39,093.79	72.7

<b>Element Group</b>	<b>Culverts</b>	<b>Length (m)</b>	18.5			
<b>Element Name</b>	<b>Barrel</b>	<b>Width (m)</b>	3.2			
<b>Location</b>	West Pipe	<b>Height (m)</b>	1.9			
<b>Material</b>	Corrugated steel plate	<b>Count</b>	1			
<b>Element Type</b>	CSP Arch	<b>Total Qty (m<sup>2</sup>)</b>	150.6			
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b>	<input type="checkbox"/>	
<b>Protection System</b>					<b>Performance Deficiencies</b>	
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>		<b>Poor</b>
	m <sup>2</sup>		140.0	10.5		01
<b>Comments</b>	Approximate surface area calculation based on a half an ellipse. Top profile has sagged through almost the whole length at the bolt line. Continue to monitor deformation.					
<b>Recommended Work:</b>	<b>Rehab</b> <input type="checkbox"/>	<b>Replace</b> <input type="checkbox"/>	<b>Maintenance Needs:</b> 18			
	<b>Urgent</b> <input type="checkbox"/>	<b>1 to 5 years</b> <input type="checkbox"/>	<b>6 to 10 years</b> <input type="checkbox"/>	<b>None</b> <input checked="" type="checkbox"/>	<b>Urgent</b> <input type="checkbox"/> <b>1 year</b> <input type="checkbox"/> <b>2 years</b> <input checked="" type="checkbox"/>	
				Monitor deformation of top profile at bolt line.		

<b>Element Group</b>	<b>Culverts</b>	<b>Length (m)</b>				
<b>Element Name</b>	<b>Inlet Components</b>	<b>Width (m)</b>				
<b>Location</b>	East end of culvert	<b>Height (m)</b>				
<b>Material</b>	Soil	<b>Count</b>	1			
<b>Element Type</b>		<b>Total Qty (m<sup>2</sup>)</b>				
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b>	<input type="checkbox"/>	
<b>Protection System</b>					<b>Performance Deficiencies</b>	
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>		<b>Poor</b>
	m <sup>2</sup>		1			
<b>Comments</b>	Good stability in area around culvert.					
<b>Recommended Work:</b>	<b>Rehab</b> <input type="checkbox"/>	<b>Replace</b> <input type="checkbox"/>	<b>Maintenance Needs:</b>			
	<b>Urgent</b> <input type="checkbox"/>	<b>1 to 5 years</b> <input type="checkbox"/>	<b>6 to 10 years</b> <input type="checkbox"/>	<b>None</b> <input checked="" type="checkbox"/>	<b>Urgent</b> <input type="checkbox"/> <b>1 year</b> <input type="checkbox"/> <b>2 years</b> <input type="checkbox"/>	

<b>Element Group</b>	<b>Culverts</b>	<b>Length (m)</b>				
<b>Element Name</b>	<b>Outlet Components</b>	<b>Width (m)</b>				
<b>Location</b>	West end of culvert	<b>Height (m)</b>				
<b>Material</b>	Soil	<b>Count</b>	1			
<b>Element Type</b>		<b>Total Qty (m<sup>2</sup>)</b>				
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b>	<input type="checkbox"/>	
<b>Protection System</b>					<b>Performance Deficiencies</b>	
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>		<b>Poor</b>
	m <sup>2</sup>		1			
<b>Comments</b>	Good stability in area around culvert.					
<b>Recommended Work:</b>	<b>Rehab</b> <input type="checkbox"/>	<b>Replace</b> <input type="checkbox"/>	<b>Maintenance Needs:</b>			
	<b>Urgent</b> <input type="checkbox"/>	<b>1 to 5 years</b> <input type="checkbox"/>	<b>6 to 10 years</b> <input type="checkbox"/>	<b>None</b> <input checked="" type="checkbox"/>	<b>Urgent</b> <input type="checkbox"/> <b>1 year</b> <input type="checkbox"/> <b>2 years</b> <input type="checkbox"/>	

<b>Element Group</b>	Decks			<b>Length (m)</b>	8.5		
<b>Element Name</b>	Wearing Surface			<b>Width (m)</b>	7		
<b>Location</b>	On top of culvert			<b>Height (m)</b>			
<b>Material</b>	Chip and tar			<b>Count</b>	1		
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>	59.5		
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>			
<b>Protection System</b>						<b>Performance Deficiencies</b>	
<b>Condition Data</b>	Units m <sup>2</sup>	Exc 41.65	Good 17.85	Fair	Poor		
<b>Comments</b>							
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>			
Rehab <input type="checkbox"/> 1 to 5 years <input type="checkbox"/>				Replace <input type="checkbox"/> 6 to 10 years <input type="checkbox"/>			
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/>				None <input checked="" type="checkbox"/>			
				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>			

<b>Element Group</b>	Foundations			<b>Length (m)</b>			
<b>Element Name</b>	Foundations (below ground level)			<b>Width (m)</b>			
<b>Location</b>				<b>Height (m)</b>			
<b>Material</b>				<b>Count</b>	100		
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>			
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>			
<b>Protection System</b>						<b>Performance Deficiencies</b>	
<b>Condition Data</b>	Units %	Exc	Good 100	Fair	Poor		
<b>Comments</b>	No scour through the pipe. Soil buildup along the wall.						
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>			
Rehab <input type="checkbox"/> 1 to 5 years <input type="checkbox"/>				Replace <input type="checkbox"/> 6 to 10 years <input type="checkbox"/>			
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/>				None <input checked="" type="checkbox"/>			
				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>			

<b>Element Group</b>	Embankments			<b>Length (m)</b>			
<b>Element Name</b>	Embankments			<b>Width (m)</b>			
<b>Location</b>				<b>Height (m)</b>			
<b>Material</b>				<b>Count</b>	4		
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>			
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>			
<b>Protection System</b>						<b>Performance Deficiencies</b>	
<b>Condition Data</b>	Units each	Exc	Good	Fair 4	Poor		
<b>Comments</b>							
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>			
Rehab <input type="checkbox"/> 1 to 5 years <input type="checkbox"/>				Replace <input type="checkbox"/> 6 to 10 years <input type="checkbox"/>			
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/>				None <input type="checkbox"/>			
				Urgent <input type="checkbox"/> 1 year <input checked="" type="checkbox"/> 2 years <input type="checkbox"/>			
				Clear vegetation around pipe.			



<b>Element Group</b>	Embankments			<b>Length (m)</b>			
<b>Element Name</b>	Slope Protection			<b>Width (m)</b>			
<b>Location</b>				<b>Height (m)</b>			
<b>Material</b>				<b>Count</b>	4		
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>			
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b>			<input checked="" type="checkbox"/>
<b>Protection System</b>						<b>Performance Deficiencies</b>	
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>		
	each		4				
<b>Comments</b>	Limited inspection due to high vegetation.						
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>			
Rehab <input type="checkbox"/> 1 to 5 years <input type="checkbox"/>				Replace <input type="checkbox"/> 6 to 10 years <input type="checkbox"/>			
Urgent <input type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>			

<b>Element Group</b>	Embankments			<b>Length (m)</b>			
<b>Element Name</b>	Streams & Waterways			<b>Width (m)</b>			
<b>Location</b>				<b>Height (m)</b>			
<b>Material</b>				<b>Count</b>	100		
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>	100		
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b>			<input type="checkbox"/>
<b>Protection System</b>						<b>Performance Deficiencies</b>	
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>		
	%			100			
<b>Comments</b>	Vegetation enroaching on waterway.						
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>			
Rehab <input type="checkbox"/> 1 to 5 years <input type="checkbox"/>				Replace <input type="checkbox"/> 6 to 10 years <input type="checkbox"/>			
Urgent <input type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>			

<b>Element Group</b>	Culverts			<b>Length (m)</b>	18.5		
<b>Element Name</b>	Barrel			<b>Width (m)</b>	3.2		
<b>Location</b>	East Pipe			<b>Height (m)</b>	1.9		
<b>Material</b>	Corrugated steel plate			<b>Count</b>	1		
<b>Element Type</b>	CSP Arch			<b>Total Qty (m<sup>2</sup>)</b>	150.6		
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b>			<input type="checkbox"/>
<b>Protection System</b>						<b>Performance Deficiencies</b>	
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>		
	m <sup>2</sup>		140.0	10.5		01	
<b>Comments</b>	Approximate surface area calculation based on a half an ellipse. Top profile has sagged through almost the whole length at the bolt line. Continue to monitor deformation.						

<b>Recommended Work:</b> Rehab <input type="checkbox"/> Replace <input type="checkbox"/>	<b>Maintenance Needs:</b>
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>	Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input checked="" type="checkbox"/>
	Monitor deformation of top profile at bolt line.

## Reidsville Road twin Culvert



Approach looking East





Approach looking West





Upstream view





Downstream view





Elevation view 1 of the culvert





Elevation view 2 of the culvert

## Inventory Data:

Structure Name	C-7 Sheffield Road Twin Culvet 2		
Main Hwy/Road #	Sheffield Road	On <input type="checkbox"/> Crossing	Navig. Water <input type="checkbox"/> Rail <input type="checkbox"/> Ped <input type="checkbox"/> Under <input checked="" type="checkbox"/> Type: Non-Navig Water <input checked="" type="checkbox"/> Road <input type="checkbox"/> Other <input type="checkbox"/>
Hwy/Road Name	Sheffield Road		
Structure Location	Approximately 400m North of Morrison road		
Northing	43.351111	Easting	-80.217778
Owners	Township of North Dumfries	Heritage	Not Cons. <input checked="" type="checkbox"/> Cons./not App. <input type="checkbox"/> List/not Desig. <input type="checkbox"/>
		Designation:	Desig./not List <input type="checkbox"/> Desig. & List <input type="checkbox"/>
MTO Region	South-Western	Road Class:	Freeway <input type="checkbox"/> Arterial <input type="checkbox"/> Collector <input type="checkbox"/> Local <input checked="" type="checkbox"/>
MTO District	London/Stratford	Posted Speed	60 km/hr No. of Lanes 2
Old County	Waterloo	AADT	% Trucks
Geographic Township	North Dumfries	Inspection Route Sequence	
Structure Type	C. Steel plate pipe arch	Interchange Number	
Total Culvert Length (m)	15	Interchange Structure Number	
Maximum Culvert Width (m)	8.6	Min. Vertical Clearance (m)	
Culvert Height (m)	1.3	Special Routes:	Transit <input type="checkbox"/> Truck <input type="checkbox"/> School <input type="checkbox"/> Bicycle <input type="checkbox"/>
Roadway Width (m)	7	Detour Length Around Bridge (km)	
Skew Angle (degrees)	90	Direction of Structure	E/W
No. of Spans	2	Fill on Structure (m)	0.5
Span Lengths (m)	2	Deck Geodetic Elevation	250

## Historical Data:

Year Built		Year of Last Major Rehab	
Last OSIM Inspection		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			
Rehab History: (Date/Description)			



**Scheduled Improvements:**

Regional Priority Number

Programmed Work Year

Nature of Program Work:

Appraisal Indices:		Comments
Fatigue		
Seismic		
Scour		
Flood		
Geometrics		
Barrier		
Curb		
Load Capacity		

## Field Inspection Information

Date of Inspection	May 17, 2020 , 10:00AM	Type of Inspection:	OSIM <input checked="" type="checkbox"/> SIM <input type="checkbox"/>
Inspector:	J. Zohreh, P.Eng.		
Others in Party:	S. Mitra, EIT		
Access Equipment Used:	Tapes, Hammer, Chain, Ladder, Camera, Safety Equipment		
Weather:	Sunny		
Temperature:	15°C		

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

## Overall Structure Notes

Recommended Work on Structure	None <input checked="" type="checkbox"/> Minor Rehab <input type="checkbox"/> Major Rehab <input type="checkbox"/> Replace <input type="checkbox"/>
Timing of Recommended Work	1 to 5 years <input checked="" type="checkbox"/> 6 to 10 years <input type="checkbox"/>
Overall Comments:	See maintenance sheet. Monitor deformation of top profile at bolt line.
Date of Next Inspection:	2022

## Suspected Performance Deficiencies

- 01 Load carrying capacity
- 02 Excessive deformations (reflections & rotations)
- 03 Continuing settlement
- 04 Continuing movements
- 05 Seized bearings

06

- 07 Bearing not uniformly loaded/unstable
- 08 Jammed expansion joint
- 09 Pedestrian/vehicular hazard
- 10 Rough riding surface
- 11 Surface ponding
- 12 Deck draining

12

- 13 Slippery Surfaces
- 14 Flooding/channel blockage
- 15 Undermining of foundation
- 16 Unstable embankments
- 17 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

- 08 Repair to Structural Steel
- 09 Repair to Bridge Concrete
- 10 Repair of Bridge Timber
- 11 Bailey bridges - maintenance
- 12 Animal/Pest Control
- 13 Bridge Surface Repair

13

- 14 Erosion Control at Bridges
- 15 Concrete Sealing
- 16 Rout and Seal
- 17 Bridge deck drainage
- 18 Scaling (loose concrete or ACR steel)
- 19 Other

Repair Rehabilitation Required		Priority				Estimated Construction Cost
Element <sup>1</sup>	Repair and Rehabilitation Required <sup>2</sup>	6 to 10 years	1 to 5 years	Within 1 year	Urgent	
Barrel	Monitor deformation of top profile at bolt line.		X			\$ 500.00
Embankments	Clear vegetation around pipe. Cost dependent on method used for abatement and season		X			\$ 1,000.00
Estimated Rehabilitated or Replacement Structure Dimensions <sup>3</sup>		Total Structural Cost				\$ 1,500.00
Deck Length (m)	15					
Structure Width (m)	8.6					

1 - Indicate specific costs for structure replacement or for rehabilitation under the given headings.

2 - Give a brief description of the rehabilitation work required.

3 - Estimated structure dimensions after completion of the proposed work - if it is expected to change.

Associated Work <sup>4</sup>	Comments	Estimated Cost
Approaches <sup>5</sup>		
Detours		
Traffic Control		
Utilities		
Right of Way		
Environment Study		
Other		
Contingencies		
Total Associated Work Cost		\$ -

Total Construction Cost	\$ 1,500.00
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4 - Includes other construction costs associated with the structure. Engineering fees for reports, environmental studies, designs, project management and contingencies are not included as associated work.

5 - Approach costs is for work (fill, pavement, guiderail, etc.) immediately adjacent to the structure for minor changes in horizontal or vertical alignment and for barrier end treatments at the structure

### Justification



Bridge Condition Index																		
No.		Element Description	Location	Length	Width	Height	Count	Total Qty	Units	Replacement (Initial) Cost	Material	Total Replacement Value	Excellent	Good	Fair	Poor	Current Element Value	Element Condition Index
				(m)	(m)	(m)	#			(\$)		TRV (\$)	1	0.75	0.4	0	CEV (\$)	
C-7	0	0	0	0.00	0.00	0.00	0	1.00	0	\$ 6.00	0	\$ 6.00	0.00	0.00	0.00	0.00	\$ -	0.0
C-7	Culverts	Barrel	North Pipe	15	3.2	1.9	1	122.10	m2	\$ 350.00	Corrugated steel plate	\$ 42,735.00	0.00	103.79	18.32	0.00	\$ 29,807.66	69.8
C-7	Culverts	Inlet Compone	East end of culvert	0	0	0	1	1.00	m2	\$ 350.00	Soil	\$ 350.00	0.00	1.00	0.00	0.00	\$ 262.50	75.0
C-7	Culverts	Outlet Compone	West end of culvert	0	0	0	1	1.00	m2	\$ 350.00	Soil	\$ 350.00	0.00	1.00	0.00	0.00	\$ 262.50	75.0
C-7	Decks	Wearing Surface	On top of culvert	8.6	7	0	1	60.20	m2	\$ 6.00	Chip and tar	\$ 361.20	0.00	54.18	6.02	0.00	\$ 258.26	71.5
C-7	Foundations	Foundations (b	0	0	0	0	100	100.00	%	\$ -	0	\$ -	0.00	100.00	0.00	0.00	\$ -	-
C-7	Embankments	Embankments	0	0	0	0	4	4.00	each	\$ -	0	\$ -	0.00	0.00	4.00	0.00	\$ -	-
C-7	Embankments	Slope Protectio	0	0	0	0	4	4.00	each	\$ -	0	\$ -	0.00	4.00	0.00	0.00	\$ -	-
C-7	Embankments	Streams & Wa	0	0	0	0	100	100.00	%	\$ -	0	\$ -	0.00	0.00	100.00	0.00	\$ -	-
C-7		TOTALS (TRV-CEV-BCI)										\$ 43,802.20					\$ 30,590.92	69.8

<b>Element Group</b>	Culverts			<b>Length (m)</b>	15	
<b>Element Name</b>	Barrel			<b>Width (m)</b>	3.2	
<b>Location</b>	North Pipe			<b>Height (m)</b>	1.9	
<b>Material</b>	Corrugated steel plate			<b>Count</b>	1	
<b>Element Type</b>	CSP Arch			<b>Total Qty (m<sup>2</sup>)</b>	122.1	
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	Limited Inspection <input type="checkbox"/>		
<b>Protection System</b>						<b>Performance Deficiencies</b>
<b>Condition Data</b>	Units m <sup>2</sup>	Exc	Good	Fair	Poor	
			103.8	18.3		
<b>Comments</b>	Approximate surface area calculation based on a half an ellipse. Top profile has sagged through almost the whole length at the bolt line. Continue to monitor deformation.					
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>		
Rehab <input type="checkbox"/> 1 to 5 years <input type="checkbox"/>				Replace <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>		
Urgent <input type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input checked="" type="checkbox"/>		
				Monitor deformation of top profile at bolt line.		

<b>Element Group</b>	Culverts			<b>Length (m)</b>		
<b>Element Name</b>	Inlet Components			<b>Width (m)</b>		
<b>Location</b>	East end of culvert			<b>Height (m)</b>		
<b>Material</b>	Soil			<b>Count</b>	1	
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>		
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	Limited Inspection <input type="checkbox"/>		
<b>Protection System</b>						<b>Performance Deficiencies</b>
<b>Condition Data</b>	Units m <sup>2</sup>	Exc	Good	Fair	Poor	
			1			
<b>Comments</b>	Good stability in area around culvert.					
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>		
Rehab <input type="checkbox"/> 1 to 5 years <input type="checkbox"/>				Replace <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>		
Urgent <input type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>		

<b>Element Group</b>	Culverts			<b>Length (m)</b>		
<b>Element Name</b>	Outlet Components			<b>Width (m)</b>		
<b>Location</b>	West end of culvert			<b>Height (m)</b>		
<b>Material</b>	Soil			<b>Count</b>	1	
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>		
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	Limited Inspection <input type="checkbox"/>		
<b>Protection System</b>						<b>Performance Deficiencies</b>
<b>Condition Data</b>	Units m <sup>2</sup>	Exc	Good	Fair	Poor	
			1			
<b>Comments</b>	Good stability in area around culvert.					
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>		
Rehab <input type="checkbox"/> 1 to 5 years <input type="checkbox"/>				Replace <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>		
Urgent <input type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>		

<b>Element Group</b>	Decks			<b>Length (m)</b>	8.6		
<b>Element Name</b>	Wearing Surface			<b>Width (m)</b>	7		
<b>Location</b>	On top of culvert			<b>Height (m)</b>			
<b>Material</b>	Chip and tar			<b>Count</b>	1		
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>	60.2		
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>			
<b>Protection System</b>						<b>Performance Deficiencies</b>	
<b>Condition Data</b>	Units m <sup>2</sup>	Exc	Good	Fair	Poor		
			54.18	6.02			
<b>Comments</b>							
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>			
Rehab <input type="checkbox"/> Replace <input type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>			
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>			

<b>Element Group</b>	Foundations			<b>Length (m)</b>			
<b>Element Name</b>	Foundations (below ground level)			<b>Width (m)</b>			
<b>Location</b>				<b>Height (m)</b>			
<b>Material</b>				<b>Count</b>	100		
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>			
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>			
<b>Protection System</b>						<b>Performance Deficiencies</b>	
<b>Condition Data</b>	Units %	Exc	Good	Fair	Poor		
			100				
<b>Comments</b>	No scour through the pipe. Soil buildup along the north wall.						
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>			
Rehab <input type="checkbox"/> Replace <input type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>			
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>			

<b>Element Group</b>	Embankments			<b>Length (m)</b>			
<b>Element Name</b>	Embankments			<b>Width (m)</b>			
<b>Location</b>				<b>Height (m)</b>			
<b>Material</b>				<b>Count</b>	4		
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>			
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>			
<b>Protection System</b>						<b>Performance Deficiencies</b>	
<b>Condition Data</b>	Units each	Exc	Good	Fair	Poor		
				4			
<b>Comments</b>							
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>			
Rehab <input type="checkbox"/> Replace <input type="checkbox"/>				18			
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input checked="" type="checkbox"/> 2 years <input type="checkbox"/>			
				Clear vegetation around pipe.			



<b>Element Group</b>	Embankments			<b>Length (m)</b>					
<b>Element Name</b>	Slope Protection			<b>Width (m)</b>					
<b>Location</b>				<b>Height (m)</b>					
<b>Material</b>				<b>Count</b>	4				
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>					
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b>	<input checked="" type="checkbox"/>				
<b>Protection System</b>					<b>Performance Deficiencies</b>				
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>					
	each		4						
<b>Comments</b>	Limited inspection due to high vegetation.								
<b>Recommended Work:</b>			<b>Rehab</b> <input type="checkbox"/>	<b>Replace</b> <input type="checkbox"/>	<b>Maintenance Needs:</b>				
			<b>Urgent</b> <input type="checkbox"/>	<b>1 to 5 years</b> <input type="checkbox"/>	<b>6 to 10 years</b> <input type="checkbox"/>	<b>None</b> <input checked="" type="checkbox"/>	<b>Urgent</b> <input type="checkbox"/>	<b>1 year</b> <input type="checkbox"/>	<b>2 years</b> <input type="checkbox"/>

<b>Element Group</b>	Embankments			<b>Length (m)</b>					
<b>Element Name</b>	Streams & Waterways			<b>Width (m)</b>					
<b>Location</b>				<b>Height (m)</b>					
<b>Material</b>				<b>Count</b>	100				
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>	100				
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b>	<input type="checkbox"/>				
<b>Protection System</b>					<b>Performance Deficiencies</b>				
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>					
	%			100					
<b>Comments</b>	Vegetation enroaching on waterway.								
<b>Recommended Work:</b>			<b>Rehab</b> <input type="checkbox"/>	<b>Replace</b> <input type="checkbox"/>	<b>Maintenance Needs:</b>				
			<b>Urgent</b> <input type="checkbox"/>	<b>1 to 5 years</b> <input type="checkbox"/>	<b>6 to 10 years</b> <input type="checkbox"/>	<b>None</b> <input checked="" type="checkbox"/>	<b>Urgent</b> <input type="checkbox"/>	<b>1 year</b> <input type="checkbox"/>	<b>2 years</b> <input type="checkbox"/>

<b>Element Group</b>	Culverts			<b>Length (m)</b>	15
<b>Element Name</b>	Barrel			<b>Width (m)</b>	3.2
<b>Location</b>	South Pipe			<b>Height (m)</b>	1.9
<b>Material</b>	Corrugated steel plate			<b>Count</b>	1
<b>Element Type</b>	CSP Arch			<b>Total Qty (m<sup>2</sup>)</b>	122.1
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b>	<input type="checkbox"/>
<b>Protection System</b>					<b>Performance Deficiencies</b>
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	
	m <sup>2</sup>		103.8	18.3	
<b>Comments</b>	Approximate surface area calculation based on a half an ellipse. Top profile has sagged through almost the whole length at the bolt line. Continue to monitor deformation.				

<b>Recommended Work:</b> Rehab <input type="checkbox"/> Replace <input type="checkbox"/>	<b>Maintenance Needs:</b>
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>	Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input checked="" type="checkbox"/>
	Monitor deformation of top profile at bolt line.

## Sheffield Road Culvert #2



Approach looking East





Approach looking West





Upstream view





Downstream view





Elevation view 1 of the culvert/ Obstruction observed at the culvert





Elevation view 2 of the culvert





View inside the culvert





Some cracks observed in the wearing surface of the road

## Inventory Data:

Structure Name	C-8 West Alps Road Twin Culvert		
Main Hwy/Road #	Alps Road W	On <input type="checkbox"/> Crossing	Navig. Water <input type="checkbox"/> Rail <input type="checkbox"/> Ped <input type="checkbox"/> Under <input checked="" type="checkbox"/> Type: Non-Navig Water <input checked="" type="checkbox"/> Road <input checked="" type="checkbox"/> Other <input type="checkbox"/>
Hwy/Road Name	Alps Road W		
Structure Location	Approximately 280m East of Trussler Road		
Northing	43.31	Easting	-80.485278
Owners	Township of North Dumfries	Heritage	Not Cons. <input checked="" type="checkbox"/> Cons./not App. <input type="checkbox"/> List/not Desig. <input type="checkbox"/>
		Designation:	Desig./not List <input type="checkbox"/> Desig. & List <input type="checkbox"/>
MTO Region	South-Western	Road Class:	Freeway <input type="checkbox"/> Arterial <input type="checkbox"/> Collector <input type="checkbox"/> Local <input checked="" type="checkbox"/>
MTO District	London/Stratford	Posted Speed	50 km/hr No. of Lanes 2
Old County	Waterloo	AADT	% Trucks
Geographic Township	North Dumfries	Inspection Route Sequence	
Structure Type	C. Steel plate pipe arch	Interchange Number	
Total Culvert Length (m)	11.3	Interchange Structure Number	
Maximum Culvert Width (m)	7.6	Min. Vertical Clearance (m)	
Culvert Height (m)	1.9	Special Routes:	Transit <input type="checkbox"/> Truck <input type="checkbox"/> School <input type="checkbox"/> Bicycle <input type="checkbox"/>
Roadway Width (m)	7	Detour Length Around Bridge (km)	
Skew Angle (degrees)	90	Direction of Structure	N/S
No. of Spans	2	Fill on Structure (m)	0.3
Span Lengths (m)	3.2	Deck Geodetic Elevation	

## Historical Data:

Year Built		Year of Last Major Rehab	
Last OSIM Inspection		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			
Rehab History: (Date/Description)			

**Scheduled Improvements:**

Regional Priority Number

Programmed Work Year

Nature of Program Work:

Appraisal Indices:		Comments
Fatigue		
Seismic		
Scour		
Flood		
Geometrics		
Barrier		
Curb		
Load Capacity		



## Field Inspection Information

Date of Inspection	May 16, 2020 , 11:00AM	Type of Inspection:	OSIM <input checked="" type="checkbox"/> SIM <input type="checkbox"/>
Inspector:	J. Zohreh, P.Eng.		
Others in Party:	S. Mitra, EIT		
Access Equipment Used:	Tapes, Hammer, Chain, Ladder, Camera, Safety Equipment		
Weather:	Sunny		
Temperature:	15°C		

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

## Overall Structure Notes

Recommended Work on Structure	None <input checked="" type="checkbox"/> Minor Rehab <input type="checkbox"/> Major Rehab <input type="checkbox"/> Replace <input type="checkbox"/>
Timing of Recommended Work	1 to 5 years <input checked="" type="checkbox"/> 6 to 10 years <input type="checkbox"/>
Overall Comments:	See maintenance sheet. Monitor deformation of top profile at bolt line.
Date of Next Inspection:	2022

## Suspected Performance Deficiencies

- 01 Load carrying capacity
- 02 Excessive deformations (reflections & rotations)
- 03 Continuing settlement
- 04 Continuing movements
- 05 Seized bearings

06

- 07 Bearing not uniformly loaded/unstable
- 08 Jammed expansion joint
- 09 Pedestrian/vehicular hazard
- 10 Rough riding surface
- 11 Surface ponding
- 12 Deck draining

12

- 13 Slippery Surfaces
- 14 Flooding/channel blockage
- 15 Undermining of foundation
- 16 Unstable embankments
- 17 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

- 08 Repair to Structural Steel
- 09 Repair to Bridge Concrete
- 10 Repair of Bridge Timber
- 11 Bailey bridges - maintenance
- 12 Animal/Pest Control
- 13 Bridge Surface Repair

13

- 14 Erosion Control at Bridges
- 15 Concrete Sealing
- 16 Rout and Seal
- 17 Bridge deck drainage
- 18 Scaling (loose concrete or ACR steel)
- 19 Other

Repair Rehabilitation Required				Priority				Estimated Construction Cost
Element <sup>1</sup>	Repair and Rehabilitation Required <sup>2</sup>			6 to 10 years	1 to 5 years	Within 1 year	Urgent	
Barrel	Monitor deformation of top profile at bolt line.				X			\$ 500.00
Embankments	Clear vegetation around pipe. Cost dependent on method used for abatement and season						X	\$ 3,000.00
Estimated Rehabilitated or Replacement Structure Dimensions <sup>3</sup>				Total Structural Cost				\$ 3,500.00
Deck Length (m)	11.3	Structure Width (m)	7.6					

1 - Indicate specific costs for structure replacement or for rehabilitation under the given headings.

2 - Give a brief description of the rehabilitation work required.

3 - Estimated structure dimensions after completion of the proposed work - if it is expected to change.

Associated Work <sup>4</sup>	Comments	Estimated Cost
Approaches <sup>5</sup>		
Detours		
Traffic Control	No hazard signs at bridge, not necessary since culvert edge is >3 m from edge of roadway.	
Utilities		
Right of Way		
Environment Study		
Other		
Contingencies		
Total Associated Work Cost		\$ -

Total Construction Cost	\$ 3,500.00
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4 - Includes other construction costs associated with the structure. Engineering fees for reports, environmental studies, designs, project management and contingencies are not included as associated work.

5 - Approach costs is for work (fill, pavement, guiderail, etc.) immediately adjacent to the structure for minor changes in horizontal or vertical alignment and for barrier end treatments at the structure

Justification

Bridge Condition Index																		
No.		Element Description	Location	Length	Width	Height	Count	Total Qty	Units	Replacement (Initial) Cost	Material	Total Replacement Value	Excellent	Good	Fair	Poor	Current Element Value	Element Condition Index
				(m)	(m)	(m)	#			(\$)		TRV (\$)	1	0.75	0.4	0	CEV (\$)	
C-8	Culverts	Barrel	West Pipe	11.3	3.2	1.9	1	91.98	m2	\$ 350.00	Corrugated steel plate	\$ 32,193.70	0.00	68.99	23.00	0.00	\$ 21,328.33	66.3
C-8	Culverts	Inlet Component	East end of culvert	0	0	0	1	1.00	m2	\$ 350.00	Soil	\$ 350.00	0.00	1.00	0.00	0.00	\$ 262.50	75.0
C-8	Culverts	Outlet Component	West end of culvert	0	0	0	1	1.00	m2	\$ 350.00	Soil	\$ 350.00	0.00	1.00	0.00	0.00	\$ 262.50	75.0
C-8	Decks	Wearing Surface	On top of culvert	3.8	6.2	0	1	23.56	m2	\$ 6.00	Chip and tar	\$ 141.36	0.00	20.03	3.53	0.00	\$ 98.60	69.8
C-8	Foundations	Foundations (b	0	0	0	0	100	100.00	%	\$ -	0	\$ -	0.00	100.00	0.00	0.00	\$ -	-
C-8	Embankments	Embankments	0	0	0	0	4	4.00	each	\$ -	0	\$ -	0.00	0.00	4.00	0.00	\$ -	-
C-8	Embankments	Slope Protection	0	0	0	0	4	4.00	each	\$ -	0	\$ -	0.00	4.00	0.00	0.00	\$ -	-
C-8	Embankments	Streams & Waterways	0	0	0	0	100	100.00	%	\$ -	0	\$ -	0.00	0.00	0.00	100.00	\$ -	-
C-8		TOTALS (TRV-CEV-BCI)										\$ 33,041.06					\$ 21,951.92	66.4



<b>Element Group</b>	Culverts	<b>Length (m)</b>	11.3				
<b>Element Name</b>	Barrel	<b>Width (m)</b>	3.2				
<b>Location</b>	West Pipe	<b>Height (m)</b>	1.9				
<b>Material</b>	Corrugated steel plate	<b>Count</b>	1				
<b>Element Type</b>	CSP Arch	<b>Total Qty (m<sup>2</sup>)</b>	92.0				
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b>	<input type="checkbox"/>		
<b>Protection System</b>					<b>Performance Deficiencies</b>		
<b>Condition Data</b>	<b>Units</b> m <sup>2</sup>	<b>Exc</b>	<b>Good</b> 69.0	<b>Fair</b> 23.0		<b>Poor</b>	
<b>Comments</b>	Approximate surface area calculation based on a half an ellipse. Top profile has sagged through almost the whole length at the bolt line. Continue to monitor deformation.						
<b>Recommended Work:</b>		Rehab <input type="checkbox"/>	Replace <input type="checkbox"/>	<b>Maintenance Needs:</b>			
Urgent <input type="checkbox"/>		1 to 5 years <input type="checkbox"/>	6 to 10 years <input type="checkbox"/>	None <input checked="" type="checkbox"/>	Urgent <input type="checkbox"/>	1 year <input type="checkbox"/>	2 years <input checked="" type="checkbox"/>

<b>Element Group</b>	Culverts	<b>Length (m)</b>					
<b>Element Name</b>	Inlet Components	<b>Width (m)</b>					
<b>Location</b>	East end of culvert	<b>Height (m)</b>					
<b>Material</b>	Soil	<b>Count</b>	1				
<b>Element Type</b>		<b>Total Qty (m<sup>2</sup>)</b>					
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b>	<input type="checkbox"/>		
<b>Protection System</b>					<b>Performance Deficiencies</b>		
<b>Condition Data</b>	<b>Units</b> m <sup>2</sup>	<b>Exc</b>	<b>Good</b> 1	<b>Fair</b>		<b>Poor</b>	
<b>Comments</b>	Good stability in area around culvert.						
<b>Recommended Work:</b>		Rehab <input type="checkbox"/>	Replace <input type="checkbox"/>	<b>Maintenance Needs:</b>			
Urgent <input type="checkbox"/>		1 to 5 years <input type="checkbox"/>	6 to 10 years <input type="checkbox"/>	None <input checked="" type="checkbox"/>	Urgent <input type="checkbox"/>	1 year <input type="checkbox"/>	2 years <input type="checkbox"/>

<b>Element Group</b>	Culverts	<b>Length (m)</b>					
<b>Element Name</b>	Outlet Components	<b>Width (m)</b>					
<b>Location</b>	West end of culvert	<b>Height (m)</b>					
<b>Material</b>	Soil	<b>Count</b>	1				
<b>Element Type</b>		<b>Total Qty (m<sup>2</sup>)</b>					
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b>	<input type="checkbox"/>		
<b>Protection System</b>					<b>Performance Deficiencies</b>		
<b>Condition Data</b>	<b>Units</b> m <sup>2</sup>	<b>Exc</b>	<b>Good</b> 1	<b>Fair</b>		<b>Poor</b>	
<b>Comments</b>	Good stability in area around culvert.						
<b>Recommended Work:</b>		Rehab <input type="checkbox"/>	Replace <input type="checkbox"/>	<b>Maintenance Needs:</b>			
Urgent <input type="checkbox"/>		1 to 5 years <input type="checkbox"/>	6 to 10 years <input type="checkbox"/>	None <input checked="" type="checkbox"/>	Urgent <input type="checkbox"/>	1 year <input type="checkbox"/>	2 years <input type="checkbox"/>

<b>Element Group</b>	Decks	<b>Length (m)</b>	3.8		
<b>Element Name</b>	Wearing Surface	<b>Width (m)</b>	6.2		

Location	On top of culvert			Height (m)			
Material	Chip and tar			Count	1		
Element Type				Total Qty (m <sup>2</sup> )	23.56		
Environment	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	Limited Inspection	<input type="checkbox"/>		
Protection System						Performance Deficiencies	
Condition Data	Units m <sup>2</sup>	Exc	Good	Fair	Poor		
			20.026	3.534			
Comments							
Recommended Work:				Maintenance Needs:			
Rehab <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>			

Element Group	Foundations		Length (m)			
Element Name	Foundations (below ground level)		Width (m)			
Location			Height (m)			
Material			Count	100		
Element Type			Total Qty (m <sup>2</sup> )			
Environment	Benign <input type="checkbox"/>	Moderate <input type="checkbox"/>	Severe <input type="checkbox"/>	Limited Inspection	<input type="checkbox"/>	
Protection System						Performance Deficiencies
Condition Data	Units %	Exc	Good	Fair	Poor	
			100			
Comments	Soil buildup along the wall.					
Recommended Work:				Maintenance Needs:		
Rehab <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>				Urgent <input checked="" type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>		

Element Group	Embankments		Length (m)			
Element Name	Embankments		Width (m)			
Location			Height (m)			
Material			Count	4		
Element Type			Total Qty (m <sup>2</sup> )			
Environment	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	Limited Inspection	<input type="checkbox"/>	
Protection System						Performance Deficiencies
Condition Data	Units each	Exc	Good	Fair	Poor	
				4		
Comments						
Recommended Work:				Maintenance Needs:		
Rehab <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input type="checkbox"/>				18 Urgent <input type="checkbox"/> 1 year <input checked="" type="checkbox"/> 2 years <input type="checkbox"/>		
				Clear vegetation around pipe.		

Element Group	Embankments		Length (m)			
Element Name	Slope Protection		Width (m)			

Location				Height (m)			
Material				Count	4		
Element Type				Total Qty (m <sup>2</sup> )			
Environment	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	Limited Inspection	<input checked="" type="checkbox"/>		
Protection System						Performance Deficiencies	
Condition Data	Units each	Exc	Good	Fair	Poor		
			4				
Comments	Limited inspection due to high vegetation.						
Recommended Work:				Maintenance Needs:			
Rehab <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> Replace <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>			

Element Group	Embankments			Length (m)			
Element Name	Streams & Waterways			Width (m)			
Location				Height (m)			
Material				Count	100		
Element Type				Total Qty (m <sup>2</sup> )	100		
Environment	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	Limited Inspection	<input type="checkbox"/>		
Protection System						Performance Deficiencies	
Condition Data	Units %	Exc	Good	Fair	Poor		
					100		
Comments	Vegetation enroaching on waterway.						
Recommended Work:				Maintenance Needs:			
Rehab <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> Replace <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>				Urgent <input checked="" type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>			

Element Group	Culverts			Length (m)	11.3		
Element Name	Barrel			Width (m)	3.2		
Location	East Pipe			Height (m)	1.9		
Material	Corrugated steel plate			Count	1		
Element Type	CSP Arch			Total Qty (m <sup>2</sup> )	92.0		
Environment	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	Limited Inspection	<input type="checkbox"/>		
Protection System						Performance Deficiencies	
Condition Data	Units m <sup>2</sup>	Exc	Good	Fair	Poor		
			69.0	23.0			
Comments	Approximate surface area calculation based on a half an ellipse. Top profile has sagged through almost the whole length at the bolt line. Continue to monitor deformation.						

Recommended Work:				Maintenance Needs:			
Rehab <input type="checkbox"/> Replace <input type="checkbox"/>							



Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>	Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input checked="" type="checkbox"/>
	Monitor deformation of top profile at bolt line.

## West Alps Road Twin culvert



Upstream view





Downstream view





Approach looking East





Approach looking West





Elevation view 1





Elevation view 2





Elevation view 3

## Inventory Data:

Structure Name	C-9 Sheffield Road Three-Cell Culvet 1		
Main Hwy/Road #	Sheffield Road	On <input type="checkbox"/> Crossing	Navig. Water <input type="checkbox"/> Rail <input type="checkbox"/> Ped <input type="checkbox"/>
		Under <input checked="" type="checkbox"/> Type:	Non-Navig Water <input checked="" type="checkbox"/> Road <input type="checkbox"/> Other <input type="checkbox"/>
Hwy/Road Name	Sheffield Road		
Structure Location	Approximately 842m South of Morrison road		
Northing	43°20'26.9"	Easting	80°12'49.9"
Owners	Township of North Dumfries	Heritage Not Cons. <input checked="" type="checkbox"/> Cons./not App. <input type="checkbox"/> List/not Desig. <input type="checkbox"/>	
		Designation: Desig./not List <input type="checkbox"/> Desig. & List <input type="checkbox"/>	
MTO Region	South-Western	Road Class: Freeway <input type="checkbox"/> Arterial <input type="checkbox"/> Collector <input type="checkbox"/> Local <input checked="" type="checkbox"/>	
MTO District	London/Stratford	Posted Speed 60 km/hr	No. of Lanes 2
Old County	Waterloo	AADT	% Trucks
Geographic Township	North Dumfries	Inspection Route Sequence	
Structure Type	C. Steel plate pipe arch	Interchange Number	
Total Culvert Length (m)	15	Interchange Structure Number	
Maximum Culvert Width (m)	7	Min. Vertical Clearance (m)	
Culvert Height (m)	1.3	Special Routes: Transit <input type="checkbox"/> Truck <input type="checkbox"/> School <input type="checkbox"/> Bicycle <input type="checkbox"/>	
Roadway Width (m)	6.7	Detour Length Around Bridge (km)	
Skew Angle (degrees)	90	Direction of Structure	E/W
No. of Spans	3	Fill on Structure (m)	0.5
Span Lengths (m)	2	Deck Geodetic Elevation	250

## Historical Data:

Year Built		Year of Last Major Rehab	
Last OSIM Inspection		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			
Rehab History: (Date/Description)			



**Scheduled Improvements:**

Regional Priority Number

Programmed Work Year

Nature of Program Work:

Appraisal Indices:		Comments
Fatigue		
Seismic		
Scour		
Flood		
Geometrics		
Barrier		
Curb		
Load Capacity		

## Field Inspection Information

Date of Inspection	May 17, 2020 , 1:00PM	Type of Inspection:	OSIM <input checked="" type="checkbox"/> SIM <input type="checkbox"/>
Inspector:	J. Zohreh, P.Eng.		
Others in Party:	S. Mitra, EIT		
Access Equipment Used:	Tapes, Hammer, Chain, Ladder, Camera, Safety Equipment		
Weather:	Sunny		
Temperature:	15°C		

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

## Overall Structure Notes

Recommended Work on Structure	None <input checked="" type="checkbox"/> Minor Rehab <input type="checkbox"/> Major Rehab <input type="checkbox"/> Replace <input type="checkbox"/>
Timing of Recommended Work	1 to 5 years <input checked="" type="checkbox"/> 6 to 10 years <input type="checkbox"/>
Overall Comments:	See maintenance sheet. Monitor deformation of top profile at bolt line.
Date of Next Inspection:	2022

Suspected Performance Deficiencies	06	Bearing not uniformly loaded/unstable	12	Slippery Surfaces
01 Load carrying capacity	07	Jammed expansion joint	13	Flooding/channel blockage
02 Excessive deformations (reflections & rotations)	08	Pedestrian/vehicular hazard	14	Undermining of foundation
03 Continuing settlement	09	Rough riding surface	15	Unstable embankments
04 Continuing movements	10	Surface ponding	16	Other
05 Seized bearings	11	Deck draining		
Maintenance Needs				
01 Lift and Swing Bridge Maintenance	07	Repair to Structural Steel	13	Erosion Control at Bridges
02 Bridge Cleaning	08	Repair to 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

Repair Rehabilitation Required		Priority				Estimated Construction Cost
Element <sup>1</sup>	Repair and Rehabilitation Required <sup>2</sup>	6 to 10 years	1 to 5 years	Within 1 year	Urgent	
Barrel	Monitor deformation of top profile at bolt line.		X			\$ 500.00
Embankments	Clear vegetation around pipe. Cost dependent on method used for abatement and season		X			\$ 1,000.00
Estimated Rehabilitated or Replacement Structure Dimensions <sup>3</sup>		Total Structural Cost				\$ 1,500.00
Deck Length (m)	15					
Structure Width (m)	7					

1 - Indicate specific costs for structure replacement or for rehabilitation under the given headings.

2 - Give a brief description of the rehabilitation work required.

3 - Estimated structure dimensions after completion of the proposed work - if it is expected to change.

Associated Work <sup>4</sup>	Comments	Estimated Cost
Approaches <sup>5</sup>		
Detours		
Traffic Control		
Utilities		
Right of Way		
Environment Study		
Other		
Contingencies		
Total Associated Work Cost		\$ -

Total Construction Cost	\$ 1,500.00
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4 - Includes other construction costs associated with the structure. Engineering fees for reports, environmental studies, designs, project management and contingencies are not included as associated work.

5 - Approach costs is for work (fill, pavement, guiderail, etc.) immediately adjacent to the structure for minor changes in horizontal or vertical alignment and for barrier end treatments at the structure

### Justification



Bridge Condition Index																		
No.		Element Description	Location	Length	Width	Height	Count	Total Qty	Units	Replacement (Initial) Cost	Material	Total Replacement Value	Excellent	Good	Fair	Poor	Current Element Value	Element Condition Index
				(m)	(m)	(m)	#			(\$)		TRV (\$)	1	0.75	0.4	0	CEV (\$)	
C-9	Culverts	Barrel	North Pipe	15	7	1.3	3	367.38	m2	\$ 350.00	Corrugated steel plate	\$ 128,583.00	0.00	349.01	18.37	0.00	\$ 94,187.05	73.3
C-9	Culverts	Inlet Component	East end of culvert	0	0	0	1	1.00	m2	\$ 350.00	Soil	\$ 350.00	0.00	1.00	0.00	0.00	\$ 262.50	75.0
C-9	Culverts	Outlet Component	West end of culvert	0	0	0	1	1.00	m2	\$ 350.00	Soil	\$ 350.00	0.00	1.00	0.00	0.00	\$ 262.50	75.0
C-9	Decks	Wearing Surface	On top of culvert	8.6	7	0	1	60.20	m2	\$ 6.00	Chip and tar	\$ 361.20	54.18	6.02	0.00	0.00	\$ 352.17	97.5
C-9	Foundations	Foundations (b	0	0	0	0	100	100.00	%	\$ -	0	\$ -	0.00	100.00	0.00	0.00	\$ -	-
C-9	Embankments	Embankments	0	0	0	0	4	4.00	each	\$ -	0	\$ -	0.00	0.00	4.00	0.00	\$ -	-
C-9	Embankments	Slope Protection	0	0	0	0	4	4.00	each	\$ -	0	\$ -	0.00	4.00	0.00	0.00	\$ -	-
C-9	Embankments	Streams & Water	0	0	0	0	100	100.00	%	\$ -	0	\$ -	0.00	0.00	100.00	0.00	\$ -	-
C-9		TOTALS (TRV-CEV-BCI)										\$ 129,650.20					\$ 95,064.22	73.3

<b>Element Group</b>	Culverts			<b>Length (m)</b>	15	
<b>Element Name</b>	Barrel			<b>Width (m)</b>	7	
<b>Location</b>	North Pipe			<b>Height (m)</b>	1.3	
<b>Material</b>	Corrugated steel plate			<b>Count</b>	3	
<b>Element Type</b>	CSP Arch			<b>Total Qty (m<sup>2</sup>)</b>	367.4	
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	Limited Inspection <input type="checkbox"/>		
<b>Protection System</b>						<b>Performance Deficiencies</b>
<b>Condition Data</b>	Units m <sup>2</sup>	Exc	Good	Fair	Poor	
			349.0	18.4		
<b>Comments</b>	Approximate surface area calculation based on a average width of the deck. Top profile has sagged through almost the whole length at the bolt line. Continue to monitor deformation.					
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>		
Rehab <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> Replace <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input checked="" type="checkbox"/>		
				Monitor deformation of top profile at bolt line.		

<b>Element Group</b>	Culverts			<b>Length (m)</b>		
<b>Element Name</b>	Inlet Components			<b>Width (m)</b>		
<b>Location</b>	East end of culvert			<b>Height (m)</b>		
<b>Material</b>	Soil			<b>Count</b>	1	
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>		
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	Limited Inspection <input type="checkbox"/>		
<b>Protection System</b>						<b>Performance Deficiencies</b>
<b>Condition Data</b>	Units m <sup>2</sup>	Exc	Good	Fair	Poor	
			1			
<b>Comments</b>	Good stability in area around culvert.					
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>		
Rehab <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> Replace <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>		

<b>Element Group</b>	Culverts			<b>Length (m)</b>		
<b>Element Name</b>	Outlet Components			<b>Width (m)</b>		
<b>Location</b>	West end of culvert			<b>Height (m)</b>		
<b>Material</b>	Soil			<b>Count</b>	1	
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>		
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	Limited Inspection <input type="checkbox"/>		
<b>Protection System</b>						<b>Performance Deficiencies</b>
<b>Condition Data</b>	Units m <sup>2</sup>	Exc	Good	Fair	Poor	
			1			
<b>Comments</b>	Good stability in area around culvert.					
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>		
Rehab <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> Replace <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>		

<b>Element Group</b>	Decks			<b>Length (m)</b>	8.6		
<b>Element Name</b>	Wearing Surface			<b>Width (m)</b>	7		
<b>Location</b>	On top of culvert			<b>Height (m)</b>			
<b>Material</b>	Chip and tar			<b>Count</b>	1		
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>	60.2		
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>			
<b>Protection System</b>						<b>Performance Deficiencies</b>	
<b>Condition Data</b>	Units m <sup>2</sup>	Exc 54.18	Good 6.02	Fair	Poor		
<b>Comments</b>							
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>			
Rehab <input type="checkbox"/> 1 to 5 years <input type="checkbox"/>				Replace <input type="checkbox"/> 6 to 10 years <input type="checkbox"/>			
Urgent <input type="checkbox"/>				None <input checked="" type="checkbox"/>			
				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>			

<b>Element Group</b>	Foundations			<b>Length (m)</b>			
<b>Element Name</b>	Foundations (below ground level)			<b>Width (m)</b>			
<b>Location</b>				<b>Height (m)</b>			
<b>Material</b>				<b>Count</b>	100		
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>			
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>			
<b>Protection System</b>						<b>Performance Deficiencies</b>	
<b>Condition Data</b>	Units %	Exc	Good 100	Fair	Poor		
<b>Comments</b>	No scour through the pipe. Soil buildup along the north wall.						
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>			
Rehab <input type="checkbox"/> 1 to 5 years <input type="checkbox"/>				Replace <input type="checkbox"/> 6 to 10 years <input type="checkbox"/>			
Urgent <input type="checkbox"/>				None <input checked="" type="checkbox"/>			
				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>			

<b>Element Group</b>	Embankments			<b>Length (m)</b>			
<b>Element Name</b>	Embankments			<b>Width (m)</b>			
<b>Location</b>				<b>Height (m)</b>			
<b>Material</b>				<b>Count</b>	4		
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>			
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>			
<b>Protection System</b>						<b>Performance Deficiencies</b>	
<b>Condition Data</b>	Units each	Exc	Good	Fair 4	Poor		
<b>Comments</b>							
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>			
Rehab <input type="checkbox"/> 1 to 5 years <input type="checkbox"/>				Replace <input type="checkbox"/> 6 to 10 years <input type="checkbox"/>			
Urgent <input type="checkbox"/>				None <input type="checkbox"/>			
				Urgent <input type="checkbox"/> 1 year <input checked="" type="checkbox"/> 2 years <input type="checkbox"/>			
				Clear vegetation around pipe.			



<b>Element Group</b>	Embankments			<b>Length (m)</b>					
<b>Element Name</b>	Slope Protection			<b>Width (m)</b>					
<b>Location</b>				<b>Height (m)</b>					
<b>Material</b>				<b>Count</b>	4				
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>					
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b>	<input checked="" type="checkbox"/>				
<b>Protection System</b>					<b>Performance Deficiencies</b>				
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>					
	each		4						
<b>Comments</b>	Limited inspection due to high vegetation.								
<b>Recommended Work:</b>			<b>Rehab</b> <input type="checkbox"/>	<b>Replace</b> <input type="checkbox"/>	<b>Maintenance Needs:</b>				
			<b>Urgent</b> <input type="checkbox"/>	<b>1 to 5 years</b> <input type="checkbox"/>	<b>6 to 10 years</b> <input type="checkbox"/>	<b>None</b> <input checked="" type="checkbox"/>	<b>Urgent</b> <input type="checkbox"/>	<b>1 year</b> <input type="checkbox"/>	<b>2 years</b> <input type="checkbox"/>

<b>Element Group</b>	Embankments			<b>Length (m)</b>					
<b>Element Name</b>	Streams & Waterways			<b>Width (m)</b>					
<b>Location</b>				<b>Height (m)</b>					
<b>Material</b>				<b>Count</b>	100				
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>	100				
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b>	<input type="checkbox"/>				
<b>Protection System</b>					<b>Performance Deficiencies</b>				
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>					
	%			100					
<b>Comments</b>	Vegetation enroaching on waterway.								
<b>Recommended Work:</b>			<b>Rehab</b> <input type="checkbox"/>	<b>Replace</b> <input type="checkbox"/>	<b>Maintenance Needs:</b>				
			<b>Urgent</b> <input type="checkbox"/>	<b>1 to 5 years</b> <input type="checkbox"/>	<b>6 to 10 years</b> <input type="checkbox"/>	<b>None</b> <input checked="" type="checkbox"/>	<b>Urgent</b> <input type="checkbox"/>	<b>1 year</b> <input type="checkbox"/>	<b>2 years</b> <input type="checkbox"/>

## Sheffield Road Culvert # 1



Approach looking East





Approach looking West





Upstream view





Downstream view





View inside the culvert





Elevation view of the culvert

## Inventory Data:

Structure Name	C-10 Clyde Road Culvert		
Main Hwy/Road #	N Dumfries Twp Rd 3E	On <input type="checkbox"/> Under <input checked="" type="checkbox"/>	Crossing Type: Navig. Water <input type="checkbox"/> Non-Navig Water <input checked="" type="checkbox"/> Rail <input type="checkbox"/> Road <input type="checkbox"/> Ped <input type="checkbox"/> Other <input type="checkbox"/>
Hwy/Road Name	Clyde Road		
Structure Location	Approximately 960m east of N Dumfries Rd 27A		
Northing	43.385556	Easting	-80.215833
Owners	Township of North Dumfries	Heritage Designation:	Not Cons. <input checked="" type="checkbox"/> Cons./not App. <input type="checkbox"/> List/not Desig. <input type="checkbox"/> Desig./not List <input type="checkbox"/> Desig. & List <input type="checkbox"/>
MTO Region	South-Western	Road Class:	Freeway <input type="checkbox"/> Arterial <input type="checkbox"/> Collector <input type="checkbox"/> Local <input checked="" type="checkbox"/>
MTO District	London/Stratford	Posted Speed	50 km/hr No. of Lanes 2
Old County	Waterloo	AADT	% Trucks
Geographic Township	North Dumfries	Inspection Route Sequence	
Structure Type	CSP/ Concrete Rigid Frame	Interchange Number	
Total Culvert Length (m)	2 + 9.5	Interchange Structure Number	
Maximum Culvert Width (m)	1.9 / 2.5	Min. Vertical Clearance (m)	
Culvert Height (m)	1.9 / 1	Special Routes:	Transit <input type="checkbox"/> Truck <input type="checkbox"/> School <input type="checkbox"/> Bicycle <input type="checkbox"/>
Roadway Width (m)	7	Detour Length Around Bridge (km)	
Skew Angle (degrees)	90	Direction of Structure	N/S
No. of Spans	1	Fill on Structure (m)	0.3 / 1.5
Span Lengths (m)	1.9 / 2.5	Deck Geodetic Elevation	293

## Historical Data:

Year Built		Year of Last Major Rehab	
Last OSIM Inspection		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			
Rehab History: (Date/Description)			

**Scheduled Improvements:**

Regional Priority Number

Programmed Work Year

Nature of Program Work:

Appraisal Indices:		Comments
Fatigue		
Seismic		
Scour		
Flood		
Geometrics		
Barrier		
Curb		
Load Capacity		



## Field Inspection Information

Date of Inspection	May 17, 2020 , 2:00PM	Type of Inspection:	OSIM <input checked="" type="checkbox"/>	Enhanced OSIM <input type="checkbox"/>
Inspector:	J. Zohreh, P.Eng.			
Others in Party:	S. Mitra, EIT			
Access Equipment Used:	Tapes, Hammer, Chain, Ladder, Camera, Safety Equipment			
Weather:	Sunny			
Temperature:	15°C			

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

## Overall Structure Notes

Recommended Work on Structure	None <input checked="" type="checkbox"/>	Minor Rehab <input type="checkbox"/>	Major Rehab <input type="checkbox"/>	Replace <input type="checkbox"/>
Timing of Recommended Work	1 to 5 years <input checked="" type="checkbox"/>	6 to 10 years <input type="checkbox"/>		
Overall Comments:	See maintenance sheet. Monitor deformation of top profile at bolt line.			
Date of Next Inspection:	2022			

Suspected Performance Deficiencies	06	Bearing not uniformly loaded/unstable	12	Slippery Surfaces
01 Load carrying capacity	07	Jammed expansion joint	13	Flooding/channel blockage
02 Excessive deformations (reflections & rotations)	08	Pedestrian/vehicular hazard	14	Undermining of foundation
03 Continuing settlement	09	Rough riding surface	15	Unstable embankments
04 Continuing movements	10	Surface ponding	16	Other
05 Seized bearings	11	Deck draining		
Maintenance Needs				
01 Lift and Swing Bridge Maintenance	07	Repair to Structural Steel	13	Erosion Control at Bridges
02 Bridge Cleaning	08	Repair to 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

Repair Rehabilitation Required		Priority				Estimated Construction Cost
Element <sup>1</sup>	Repair and Rehabilitation Required <sup>2</sup>	6 to 10 years	1 to 5 years	Within 1 year	Urgent	
Barrel	Repair Asphalt on Deck		X			\$ 1,500.00
Embankments	Clear vegetation around pipe. Cost dependent on method used for abatement and season		X			\$ 1,000.00
Estimated Rehabilitated or Replacement Structure Dimensions <sup>3</sup>		Total Structural Cost				\$ 2,500.00
Deck Length (m)	2 + 9.5					
Structure Width (m)	1.9 / 2.5					

1 - Indicate specific costs for structure replacement or for rehabilitation under the given headings.

2 - Give a brief description of the rehabilitation work required.

3 - Estimated structure dimensions after completion of the proposed work - if it is expected to change.

Associated Work <sup>4</sup>	Comments	Estimated Cost
Approaches <sup>5</sup>		
Detours		
Traffic Control		
Utilities		
Right of Way		
Environment Study		
Other		
Contingencies		
Total Associated Work Cost		\$ -

Total Construction Cost	\$ 2,500.00
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4 - Includes other construction costs associated with the structure. Engineering fees for reports, environmental studies, designs, project management and contingencies are not included as associated work.

5 - Approach costs is for work (fill, pavement, guiderail, etc.) immediately adjacent to the structure for minor changes in horizontal or vertical alignment and for barrier end treatments at the structure

### Justification

Bridge Condition Index																		
No.		Element Description	Location	Length	Width	Height	Count	Total Qty	Units	Replacement (Initial) Cost	Material	Total Replacement Value	Excellent	Good	Fair	Poor	Current Element Value	Element Condition Index
				(m)	(m)	(m)	#			(\$)		TRV (\$)	1	0.75	0.4	0	CEV (\$)	
C-10	Culverts	Barrel	0	9.5	2.5	1	1	42.75	m2	\$ 350.00	Concrete	\$ 14,962.50	0.00	36.34	6.41	0.00	\$ 10,436.34	69.8
C-10	Culverts	Inlet Component	East end of culvert	0	0	0	1	1.00	m2	\$ 350.00	Soil	\$ 350.00	0.00	1.00	0.00	0.00	\$ 262.50	75.0
C-10	Culverts	Outlet Component	West end of culvert	0	0	0	1	1.00	m2	\$ 350.00	Soil	\$ 350.00	0.00	1.00	0.00	0.00	\$ 262.50	75.0
C-10	Decks	Wearing Surface	On top of culvert	3	7	0	1	21.00	m2	\$ 6.00	Tar and chip	\$ 126.00	0.00	5.00	16.00	0.00	\$ 60.90	48.3
C-10	Foundations	Foundations (b	0	0	0	0	100	100.00	%	\$ -	0	\$ -	0.00	100.00	0.00	0.00	\$ -	-
C-10	Embankments	Embankments	0	0	0	0	4	4.00	each	\$ -	0	\$ -	0.00	0.00	4.00	0.00	\$ -	-
C-10	Embankments	Slope Protection	0	0	0	0	4	4.00	each	\$ -	0	\$ -	0.00	4.00	0.00	0.00	\$ -	-
C-10	Embankments	Streams & Water	0	0	0	0	100	100.00	%	\$ -	0	\$ -	0.00	40.00	60.00	0.00	\$ -	-
C-10		TOTALS (TRV-CEV-BCI)										\$ 15,788.50					\$ 11,022.24	69.8



<b>Element Group</b>	<b>Culverts</b>				<b>Length (m)</b>		9.5		
<b>Element Name</b>	<b>Barrel</b>				<b>Width (m)</b>		2.5		
<b>Location</b>					<b>Height (m)</b>		1		
<b>Material</b>	Concrete				<b>Count</b>		1		
<b>Element Type</b>	Concrete Rigid Frame				<b>Total Qty (m<sup>2</sup>)</b>		42.8		
<b>Environment</b>	<b>Benign</b> <input type="checkbox"/>	<b>Moderate</b> <input checked="" type="checkbox"/>	<b>Severe</b> <input type="checkbox"/>		<b>Limited Inspection</b>		<input type="checkbox"/>		
<b>Protection System</b>							<b>Performance Deficiencies</b>		
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>				
	m <sup>2</sup>		36.3	6.4					
<b>Comments</b>	Approximate surface area calculation based on a half an ellipse. Continue to monitor deformation.								
<b>Recommended Work:</b>					<b>Maintenance Needs:</b>				
<b>Rehab</b> <input type="checkbox"/> <b>Replace</b> <input type="checkbox"/>					<b>Urgent</b> <input type="checkbox"/> <b>1 to 5 years</b> <input type="checkbox"/> <b>6 to 10 years</b> <input type="checkbox"/> <b>None</b> <input checked="" type="checkbox"/>				
					<b>Urgent</b> <input type="checkbox"/> <b>1 year</b> <input type="checkbox"/> <b>2 years</b> <input checked="" type="checkbox"/>				
					Rust on bottom profile close to water line.				

<b>Element Group</b>	<b>Culverts</b>				<b>Length (m)</b>				
<b>Element Name</b>	<b>Inlet Components</b>				<b>Width (m)</b>				
<b>Location</b>	East end of culvert				<b>Height (m)</b>				
<b>Material</b>	Soil				<b>Count</b>		1		
<b>Element Type</b>					<b>Total Qty (m<sup>2</sup>)</b>				
<b>Environment</b>	<b>Benign</b> <input type="checkbox"/>	<b>Moderate</b> <input checked="" type="checkbox"/>	<b>Severe</b> <input type="checkbox"/>		<b>Limited Inspection</b>		<input type="checkbox"/>		
<b>Protection System</b>							<b>Performance Deficiencies</b>		
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>				
	m <sup>2</sup>		1						
<b>Comments</b>	Good stability in area around culvert.								
<b>Recommended Work:</b>					<b>Maintenance Needs:</b>				
<b>Rehab</b> <input type="checkbox"/> <b>Replace</b> <input type="checkbox"/>					<b>Urgent</b> <input type="checkbox"/> <b>1 to 5 years</b> <input type="checkbox"/> <b>6 to 10 years</b> <input type="checkbox"/> <b>None</b> <input checked="" type="checkbox"/>				
					<b>Urgent</b> <input type="checkbox"/> <b>1 year</b> <input type="checkbox"/> <b>2 years</b> <input type="checkbox"/>				

<b>Element Group</b>	<b>Culverts</b>				<b>Length (m)</b>				
<b>Element Name</b>	<b>Outlet Components</b>				<b>Width (m)</b>				
<b>Location</b>	West end of culvert				<b>Height (m)</b>				
<b>Material</b>	Soil				<b>Count</b>		1		
<b>Element Type</b>					<b>Total Qty (m<sup>2</sup>)</b>				
<b>Environment</b>	<b>Benign</b> <input type="checkbox"/>	<b>Moderate</b> <input checked="" type="checkbox"/>	<b>Severe</b> <input type="checkbox"/>		<b>Limited Inspection</b>		<input type="checkbox"/>		
<b>Protection System</b>							<b>Performance Deficiencies</b>		
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>				
	m <sup>2</sup>		1						
<b>Comments</b>	Good stability in area around culvert.								
<b>Recommended Work:</b>					<b>Maintenance Needs:</b>				
<b>Rehab</b> <input type="checkbox"/> <b>Replace</b> <input type="checkbox"/>					<b>Urgent</b> <input type="checkbox"/> <b>1 to 5 years</b> <input type="checkbox"/> <b>6 to 10 years</b> <input type="checkbox"/> <b>None</b> <input checked="" type="checkbox"/>				
					<b>Urgent</b> <input type="checkbox"/> <b>1 year</b> <input type="checkbox"/> <b>2 years</b> <input type="checkbox"/>				

<b>Element Group</b>	Decks			<b>Length (m)</b>	3		
<b>Element Name</b>	Wearing Surface			<b>Width (m)</b>	7		
<b>Location</b>	On top of culvert			<b>Height (m)</b>			
<b>Material</b>	Tar and chip			<b>Count</b>	1		
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>	21		
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>			
<b>Protection System</b>							<b>Performance Deficiencies</b>
<b>Condition Data</b>	Units m <sup>2</sup>	Exc	Good	Fair	Poor		
<b>Comments</b>	Rough riding surface since it is a gravel road. Adequate coverage of gravel, light rutting.						
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>			
Rehab <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>			

<b>Element Group</b>	Foundations			<b>Length (m)</b>			
<b>Element Name</b>	Foundations (below ground level)			<b>Width (m)</b>			
<b>Location</b>				<b>Height (m)</b>			
<b>Material</b>				<b>Count</b>	100		
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>			
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>			
<b>Protection System</b>							<b>Performance Deficiencies</b>
<b>Condition Data</b>	Units %	Exc	Good	Fair	Poor		
<b>Comments</b>	No scour through the pipe. Soil buildup along the north wall.						
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>			
Rehab <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>			

<b>Element Group</b>	Embankments			<b>Length (m)</b>			
<b>Element Name</b>	Embankments			<b>Width (m)</b>			
<b>Location</b>				<b>Height (m)</b>			
<b>Material</b>				<b>Count</b>	4		
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>			
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>			
<b>Protection System</b>							<b>Performance Deficiencies</b>
<b>Condition Data</b>	Units each	Exc	Good	Fair	Poor		
<b>Comments</b>							
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>			
Rehab <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input checked="" type="checkbox"/> 2 years <input type="checkbox"/>			

					Clear vegetation around pipe.												
Element Group	Embankments				Length (m)												
Element Name	Slope Protection				Width (m)												
Location					Height (m)												
Material					Count		4										
Element Type					Total Qty (m <sup>2</sup> )												
Environment	Benign	<input type="checkbox"/>	Moderate	<input checked="" type="checkbox"/>	Severe	<input type="checkbox"/>	Limited Inspection		<input checked="" type="checkbox"/>								
Protection System							Performance Deficiencies										
Condition Data	Units		Exc	Good	Fair	Poor											
	each			4													
Comments	Limited inspection due to high vegetation.																
Recommended Work:					Rehab	<input type="checkbox"/>	Replace	<input type="checkbox"/>	Maintenance Needs:								
Urgent					<input type="checkbox"/>	1 to 5 years	<input type="checkbox"/>	6 to 10 years	<input type="checkbox"/>	None	<input checked="" type="checkbox"/>	Urgent	<input type="checkbox"/>	1 year	<input type="checkbox"/>	2 years	<input type="checkbox"/>

Element Group	Embankments				Length (m)												
Element Name	Streams & Waterways				Width (m)												
Location					Height (m)												
Material					Count		100										
Element Type					Total Qty (m <sup>2</sup> )		100										
Environment	Benign	<input type="checkbox"/>	Moderate	<input checked="" type="checkbox"/>	Severe	<input type="checkbox"/>	Limited Inspection		<input type="checkbox"/>								
Protection System							Performance Deficiencies										
Condition Data	Units		Exc	Good	Fair	Poor											
	%			40	60												
Comments	Vegetation enroaching on waterway.																
Recommended Work:					Rehab	<input type="checkbox"/>	Replace	<input type="checkbox"/>	Maintenance Needs:								
Urgent					<input type="checkbox"/>	1 to 5 years	<input type="checkbox"/>	6 to 10 years	<input type="checkbox"/>	None	<input checked="" type="checkbox"/>	Urgent	<input type="checkbox"/>	1 year	<input type="checkbox"/>	2 years	<input type="checkbox"/>

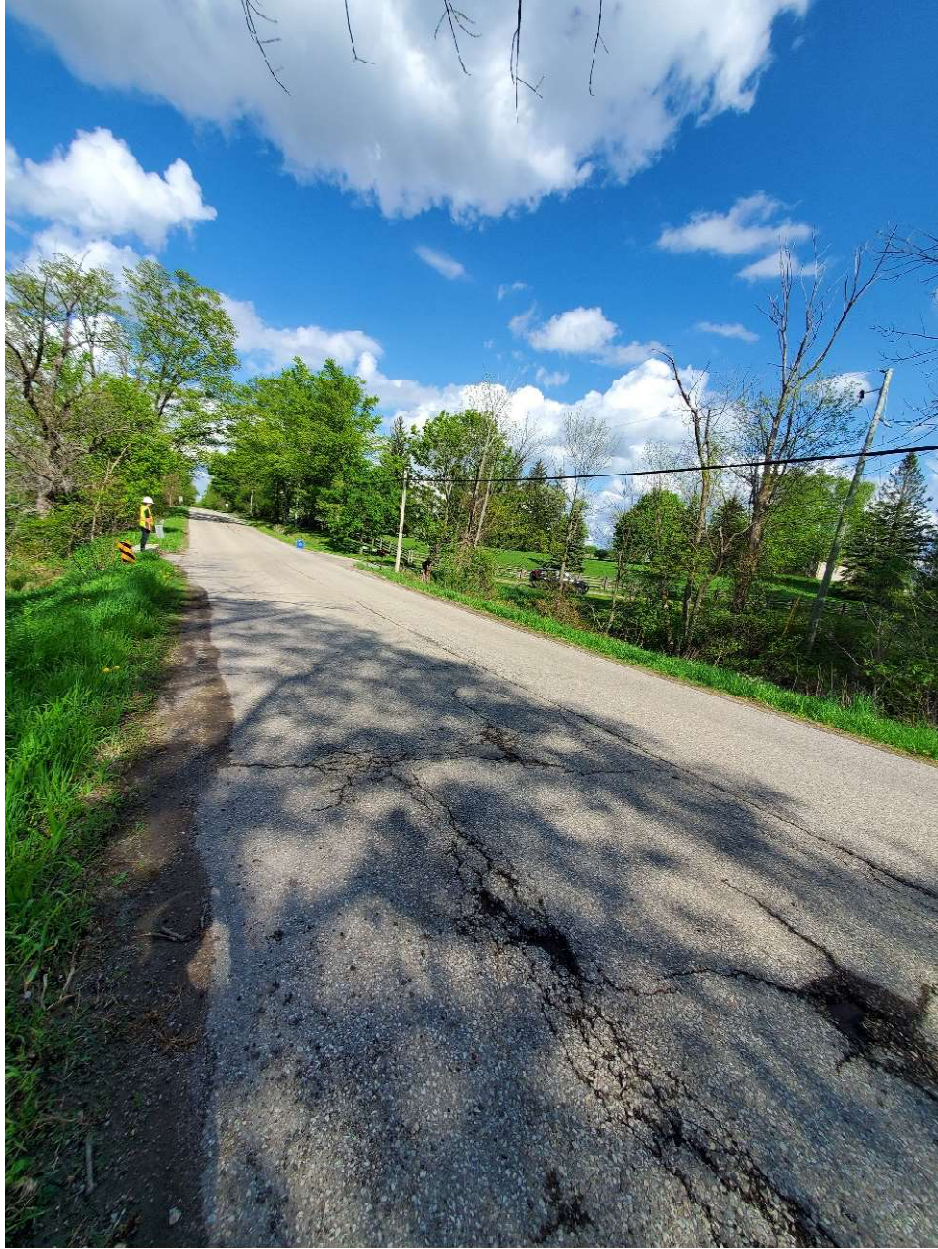


## Clyde Road Culvert



Approach looking West





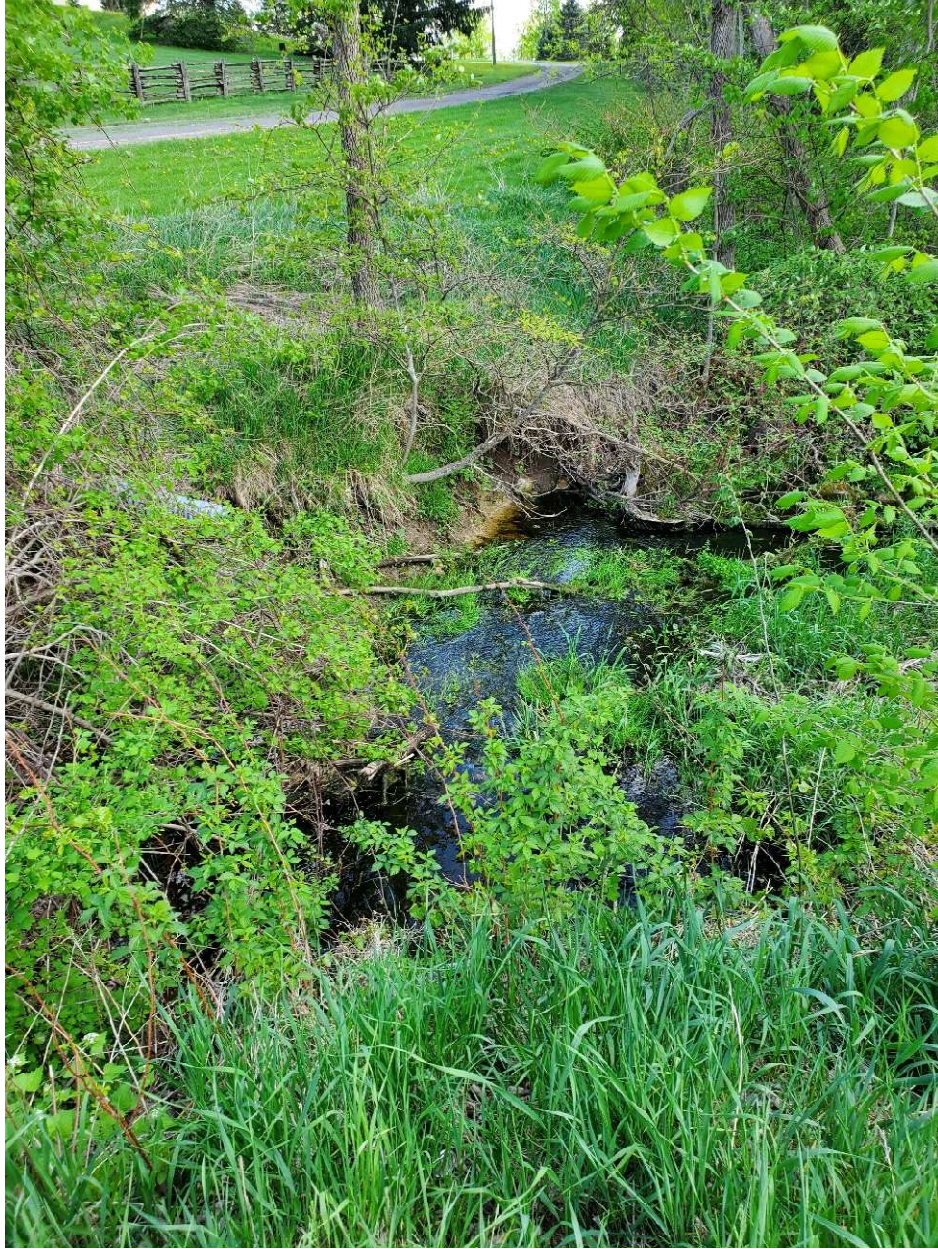
Approach looking East





Downstream View





Upstream View





View from North





View from South





Rusting observed at the culvert bottom



Crack observed at the road surface





Some spalling of concrete observed at the box culvert





Concrete deterioration/wearing at the culvert top

## Inventory Data:

Structure Name	C-11 GreenField Road Twin Culvert		
Main Hwy/Road #	GreenField Road	On <input type="checkbox"/> Crossing	Navig. Water <input type="checkbox"/> Rail <input type="checkbox"/> Ped <input type="checkbox"/>
		Under <input checked="" type="checkbox"/> Type:	Non-Navig Water <input checked="" type="checkbox"/> Road <input type="checkbox"/> Other <input type="checkbox"/>
Hwy/Road Name	GreenField Road		
Structure Location	Approximately 70m West of Reidsville road		
Northing	43.303611	Easting	-80.433611
Owners	Township of North Dumfries	Heritage Not Cons. <input checked="" type="checkbox"/> Cons./not App. <input type="checkbox"/> List/not Desig. <input type="checkbox"/>	
		Designation: Desig./not List <input type="checkbox"/> Desig. & List <input type="checkbox"/>	
MTO Region	South-Western	Road Class: Freeway <input type="checkbox"/> Arterial <input type="checkbox"/> Collector <input type="checkbox"/> Local <input checked="" type="checkbox"/>	
MTO District	London/Stratford	Posted Speed 50 km/hr	No. of Lanes 2
Old County	Waterloo	AADT	% Trucks
Geographic Township	North Dumfries	Inspection Route Sequence	
Structure Type	C. Steel plate pipe arch	Interchange Number	
Total Culvert Length (m)	12	Interchange Structure Number	
Maximum Culvert Width (m)	6.7	Min. Vertical Clearance (m)	
Culvert Height (m)	1.9	Special Routes: Transit <input type="checkbox"/> Truck <input type="checkbox"/> School <input type="checkbox"/> Bicycle <input type="checkbox"/>	
Roadway Width (m)	7	Detour Length Around Bridge (km)	
Skew Angle (degrees)	90	Direction of Structure	N/S
No. of Spans	2	Fill on Structure (m)	0..3
Span Lengths (m)	3.2	Deck Geodetic Elevation	255

## Historical Data:

Year Built		Year of Last Major Rehab	
Last OSIM Inspection		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			
Rehab History: (Date/Description)			

**Scheduled Improvements:**

Regional Priority Number

Programmed Work Year

Nature of Program Work:

Appraisal Indices:		Comments
Fatigue		
Seismic		
Scour		
Flood		
Geometrics		
Barrier		
Curb		
Load Capacity		



## Field Inspection Information

Date of Inspection	May 17, 2020 , 3:30PM	Type of Inspection:	OSIM <input checked="" type="checkbox"/>	Enhanced OSIM <input type="checkbox"/>
Inspector:	J. Zohreh, P.Eng.			
Others in Party:	S. Mitra, EIT			
Access Equipment Used:	Tapes, Hammer, Chain, Ladder, Camera, Safety Equipment			
Weather:	Sunny			
Temperature:	15°C			

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

## Overall Structure Notes

Recommended Work on Structure	None <input type="checkbox"/>	Minor Rehab <input checked="" type="checkbox"/>	Major Rehab <input type="checkbox"/>	Replace <input type="checkbox"/>
Timing of Recommended Work	1 to 5 years <input checked="" type="checkbox"/>	6 to 10 years <input type="checkbox"/>		
Overall Comments:	See maintenance sheet. Monitor deformation of top profile at bolt line.			
Date of Next Inspection:	2022			

## Suspected Performance Deficiencies

- 01 Load carrying capacity
- 02 Excessive deformations (reflections & rotations)
- 03 Continuing settlement
- 04 Continuing movements
- 05 Seized bearings

06

- 07 Bearing not uniformly loaded/unstable
- 08 Jammed expansion joint
- 09 Pedestrian/vehicular hazard
- 10 Rough riding surface
- 11 Surface ponding
- 12 Deck draining

12

- 13 Slippery Surfaces
- 14 Flooding/channel blockage
- 15 Undermining of foundation
- 16 Unstable embankments
- 17 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

- 08 Repair to Structural Steel
- 09 Repair to Bridge Concrete
- 10 Repair of Bridge Timber
- 11 Bailey bridges - maintenance
- 12 Animal/Pest Control
- 13 Bridge Surface Repair

13

- 14 Erosion Control at Bridges
- 15 Concrete Sealing
- 16 Rout and Seal
- 17 Bridge deck drainage
- 18 Scaling (loose concrete or ACR steel)
- 19 Other

Repair Rehabilitation Required		Priority				Estimated Construction Cost
Element <sup>1</sup>	Repair and Rehabilitation Required <sup>2</sup>	6 to 10 years	1 to 5 years	Within 1 year	Urgent	
Barrel	Clear Vegetation blocking the stream. Monitor deformation of top profile at bolt line.		X			\$ 1,000.00
Embankments	Clear vegetation around pipe. Cost dependent on method used for abatement and season		X			\$ 1,500.00
Estimated Rehabilitated or Replacement Structure Dimensions <sup>3</sup>		Total Structural Cost				\$ 2,500.00
Deck Length (m)	12					
Structure Width (m)	6.7					

1 - Indicate specific costs for structure replacement or for rehabilitation under the given headings.

2 - Give a brief description of the rehabilitation work required.

3 - Estimated structure dimensions after completion of the proposed work - if it is expected to change.

Associated Work <sup>4</sup>	Comments	Estimated Cost
Approaches <sup>5</sup>		
Detours		
Traffic Control		
Utilities		
Right of Way		
Environment Study		
Other		
Contingencies		
Total Associated Work Cost		\$ -

Total Construction Cost	\$ 2,500.00
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4 - Includes other construction costs associated with the structure. Engineering fees for reports, environmental studies, designs, project management and contingencies are not included as associated work.

5 - Approach costs is for work (fill, pavement, guiderail, etc.) immediately adjacent to the structure for minor changes in horizontal or vertical alignment and for barrier end treatments at the structure

### Justification

Bridge Condition Index																		
No.		Element Description	Location	Length	Width	Height	Count	Total Qty	Units	Replacement (Initial) Cost	Material	Total Replacement Value	Excellent	Good	Fair	Poor	Current Element Value	Element Condition Index
				(m)	(m)	(m)	#			(\$)		TRV (\$)	1	0.75	0.4	0	CEV (\$)	
C-11	Culverts	Barrel	West	12	3.2	1.9	1	92.40	m2	\$ 350.00	Corrugated steel plate	\$ 32,340.00	0.00	65.40	27.00	0.00	\$ 20,947.50	64.8
C-11	Culverts	Inlet Component	East end of culvert	0	0	0	1	1.00	m2	\$ 350.00	Soil	\$ 350.00	0.00	1.00	0.00	0.00	\$ 262.50	75.0
C-11	Culverts	Outlet Component	West end of culvert	0	0	0	1	1.00	m2	\$ 350.00	Soil	\$ 350.00	0.00	1.00	0.00	0.00	\$ 262.50	75.0
C-11	Decks	Wearing Surface	On top of culvert	3.8	6.2	0	1	23.56	m2	\$ 6.00	Tar and chip	\$ 141.36	0.00	23.56	0.00	0.00	\$ 106.02	75.0
C-11	Foundations	Foundations (b	0	0	0	0	100	100.00	%	\$ -	0	\$ -	0.00	100.00	0.00	0.00	\$ -	-
C-11	Embankments	Embankments	0	0	0	0	4	4.00	each	\$ -	0	\$ -	0.00	0.00	4.00	0.00	\$ -	-
C-11	Embankments	Slope Protection	0	0	0	0	4	4.00	each	\$ -	0	\$ -	0.00	4.00	0.00	0.00	\$ -	-
C-11	Embankments	Streams & Water	0	0	0	0	100	100.00	%	\$ -	0	\$ -	0.00	0.00	100.00	0.00	\$ -	-
C-11		TOTALS (TRV-CEV-BCI)										\$ 33,187.36					\$ 21,578.52	65.0



<b>Element Group</b>	Culverts	<b>Length (m)</b>	12			
<b>Element Name</b>	Barrel	<b>Width (m)</b>	3.2			
<b>Location</b>	West	<b>Height (m)</b>	1.9			
<b>Material</b>	Corrugated steel plate	<b>Count</b>	1			
<b>Element Type</b>	CSP Arch	<b>Total Qty (m<sup>2</sup>)</b>	92.4			
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>		
<b>Protection System</b>						<b>Performance Deficiencies</b>
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>	
	m <sup>2</sup>		65.4	27.0		
<b>Comments</b>	Approximate surface area calculation based on a half an ellipse. Top profile has sagged through almost the whole length at the bolt line. Continue to monitor deformation.					
<b>Recommended Work:</b>		Rehab <input type="checkbox"/>	Replace <input type="checkbox"/>	<b>Maintenance Needs:</b>		
Urgent <input type="checkbox"/>		1 to 5 years <input type="checkbox"/>	6 to 10 years <input type="checkbox"/>	None <input checked="" type="checkbox"/>	Urgent <input type="checkbox"/>	
					1 year <input checked="" type="checkbox"/>	
					2 years <input type="checkbox"/>	
				Clear Vegetation blocking the stream. Monitor deformation of top profile at bolt line.		

<b>Element Group</b>	Culverts	<b>Length (m)</b>				
<b>Element Name</b>	Inlet Components	<b>Width (m)</b>				
<b>Location</b>	East end of culvert	<b>Height (m)</b>				
<b>Material</b>	Soil	<b>Count</b>	1			
<b>Element Type</b>		<b>Total Qty (m<sup>2</sup>)</b>				
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>		
<b>Protection System</b>						<b>Performance Deficiencies</b>
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>	
	m <sup>2</sup>		1			
<b>Comments</b>	Good stability in area around culvert.					
<b>Recommended Work:</b>		Rehab <input type="checkbox"/>	Replace <input type="checkbox"/>	<b>Maintenance Needs:</b>		
Urgent <input type="checkbox"/>		1 to 5 years <input type="checkbox"/>	6 to 10 years <input type="checkbox"/>	None <input checked="" type="checkbox"/>	Urgent <input type="checkbox"/>	
					1 year <input type="checkbox"/>	
					2 years <input type="checkbox"/>	

<b>Element Group</b>	Culverts	<b>Length (m)</b>				
<b>Element Name</b>	Outlet Components	<b>Width (m)</b>				
<b>Location</b>	West end of culvert	<b>Height (m)</b>				
<b>Material</b>	Soil	<b>Count</b>	1			
<b>Element Type</b>		<b>Total Qty (m<sup>2</sup>)</b>				
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>		
<b>Protection System</b>						<b>Performance Deficiencies</b>
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>	
	m <sup>2</sup>		1			
<b>Comments</b>	Good stability in area around culvert.					
<b>Recommended Work:</b>		Rehab <input type="checkbox"/>	Replace <input type="checkbox"/>	<b>Maintenance Needs:</b>		
Urgent <input type="checkbox"/>		1 to 5 years <input type="checkbox"/>	6 to 10 years <input type="checkbox"/>	None <input checked="" type="checkbox"/>	Urgent <input type="checkbox"/>	
					1 year <input type="checkbox"/>	
					2 years <input type="checkbox"/>	

<b>Element Group</b>	Decks			<b>Length (m)</b>	3.8		
<b>Element Name</b>	Wearing Surface			<b>Width (m)</b>	6.2		
<b>Location</b>	On top of culvert			<b>Height (m)</b>			
<b>Material</b>	Tar and chip			<b>Count</b>	1		
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>	23.56		
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>			
<b>Protection System</b>						<b>Performance Deficiencies</b>	
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>		
	m <sup>2</sup>		23.56				
<b>Comments</b>	Rough riding surface since it is a gravel road. Adequate coverage of gravel, light rutting.						
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>			
Rehab <input type="checkbox"/> Replace <input type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>			
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>			

<b>Element Group</b>	Foundations			<b>Length (m)</b>			
<b>Element Name</b>	Foundations (below ground level)			<b>Width (m)</b>			
<b>Location</b>				<b>Height (m)</b>			
<b>Material</b>				<b>Count</b>	100		
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>			
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>			
<b>Protection System</b>						<b>Performance Deficiencies</b>	
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>		
	%		100				
<b>Comments</b>	No scour through the pipe. Soil buildup along the north wall.						
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>			
Rehab <input type="checkbox"/> Replace <input type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>			
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>			

<b>Element Group</b>	Embankments			<b>Length (m)</b>			
<b>Element Name</b>	Embankments			<b>Width (m)</b>			
<b>Location</b>				<b>Height (m)</b>			
<b>Material</b>				<b>Count</b>	4		
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>			
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>			
<b>Protection System</b>						<b>Performance Deficiencies</b>	
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>		
	each			4			
<b>Comments</b>							
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>			
Rehab <input type="checkbox"/> Replace <input type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input checked="" type="checkbox"/> 2 years <input type="checkbox"/>			
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input checked="" type="checkbox"/> 2 years <input type="checkbox"/>			
				Clear vegetation around pipe.			

<b>Element Group</b>	Embankments			<b>Length (m)</b>					
<b>Element Name</b>	Slope Protection			<b>Width (m)</b>					
<b>Location</b>				<b>Height (m)</b>					
<b>Material</b>				<b>Count</b>	4				
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>					
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	Limited Inspection	<input checked="" type="checkbox"/>				
<b>Protection System</b>					<b>Performance Deficiencies</b>				
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>					
	each		4						
<b>Comments</b>	Limited inspection due to high vegetation.								
<b>Recommended Work:</b>			<b>Rehab</b> <input type="checkbox"/>	<b>Replace</b> <input type="checkbox"/>	<b>Maintenance Needs:</b>				
			<b>Urgent</b> <input type="checkbox"/>	<b>1 to 5 years</b> <input type="checkbox"/>	<b>6 to 10 years</b> <input type="checkbox"/>	<b>None</b> <input checked="" type="checkbox"/>	<b>Urgent</b> <input type="checkbox"/>	<b>1 year</b> <input type="checkbox"/>	<b>2 years</b> <input type="checkbox"/>

<b>Element Group</b>	Embankments			<b>Length (m)</b>					
<b>Element Name</b>	Streams & Waterways			<b>Width (m)</b>					
<b>Location</b>				<b>Height (m)</b>					
<b>Material</b>				<b>Count</b>	100				
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>	100				
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	Limited Inspection	<input type="checkbox"/>				
<b>Protection System</b>					<b>Performance Deficiencies</b>				
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>					
	%			100					
<b>Comments</b>	Vegetation enroaching on waterway.								
<b>Recommended Work:</b>			<b>Rehab</b> <input type="checkbox"/>	<b>Replace</b> <input type="checkbox"/>	<b>Maintenance Needs:</b>				
			<b>Urgent</b> <input type="checkbox"/>	<b>1 to 5 years</b> <input type="checkbox"/>	<b>6 to 10 years</b> <input type="checkbox"/>	<b>None</b> <input checked="" type="checkbox"/>	<b>Urgent</b> <input type="checkbox"/>	<b>1 year</b> <input type="checkbox"/>	<b>2 years</b> <input type="checkbox"/>

<b>Element Group</b>	Culverts			<b>Length (m)</b>	12
<b>Element Name</b>	Barrel			<b>Width (m)</b>	3.2
<b>Location</b>	East			<b>Height (m)</b>	1.9
<b>Material</b>	Corrugated steel plate			<b>Count</b>	1
<b>Element Type</b>	CSP Arch			<b>Total Qty (m<sup>2</sup>)</b>	92.4
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	Limited Inspection	<input type="checkbox"/>
<b>Protection System</b>					<b>Performance Deficiencies</b>
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	
	m <sup>2</sup>		65.4	27.0	



<b>Comments</b>	Approximate surface area calculation based on a half an ellipse. Top profile has sagged through almost the whole length at the bolt line. Continue to monitor deformation.	
<b>Recommended Work:</b> Rehab <input type="checkbox"/> Replace <input type="checkbox"/>		<b>Maintenance Needs:</b>
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>		Urgent <input type="checkbox"/> 1 year <input checked="" type="checkbox"/> 2 years <input type="checkbox"/>

## Greenfield road twin culvert



Approach looking East



Approach looking West





Upstream View





Downstream View





Elevation view 1





Elevation view 2



Some rusting observed at the culvert joints

## Inventory Data:

Structure Name	C-12 GreenField Road West Twin Culvert		
Main Hwy/Road #	GreenField Road	On <input type="checkbox"/> Crossing	Navig. Water <input type="checkbox"/> Rail <input type="checkbox"/> Ped <input type="checkbox"/>
		Under <input checked="" type="checkbox"/> Type:	Non-Navig Water <input checked="" type="checkbox"/> Road <input type="checkbox"/> Other <input type="checkbox"/>
Hwy/Road Name	GreenField Road West		
Structure Location	Approximately 700m West of Northumberland Street ( Waterloo Region Road 58)		
Northing	41°17'59.5"	Easting	80°28'32.6"
Owners	Township of North Dumfries	Heritage Not Cons. <input checked="" type="checkbox"/> Cons./not App. <input type="checkbox"/> List/not Desig. <input type="checkbox"/>	
		Designation: Desig./not List <input type="checkbox"/> Desig. & List <input type="checkbox"/>	
MTO Region	South-Western	Road Class: Freeway <input type="checkbox"/> Arterial <input type="checkbox"/> Collector <input type="checkbox"/> Local <input checked="" type="checkbox"/>	
MTO District	London/Stratford	Posted Speed 50 km/hr	No. of Lanes 2
Old County	Waterloo	AADT	% Trucks
Geographic Township	North Dumfries	Inspection Route Sequence	
Structure Type	C. Steel plate pipe arch	Interchange Number	
Total Culvert Length (m)	11.5	Interchange Structure Number	
Maximum Culvert Width (m)	6.2	Min. Vertical Clearance (m)	
Culvert Height (m)	1.9	Special Routes: Transit <input type="checkbox"/> Truck <input type="checkbox"/> School <input type="checkbox"/> Bicycle <input type="checkbox"/>	
Roadway Width (m)	6.7	Detour Length Around Bridge (km)	
Skew Angle (degrees)	15	Direction of Structure	E/W
No. of Spans	2	Fill on Structure (m)	0.5
Span Lengths (m)	3.2	Deck Geodetic Elevation	255

## Historical Data:

Year Built		Year of Last Major Rehab	
Last OSIM Inspection		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			
Rehab History: (Date/Description)			



**Scheduled Improvements:**

Regional Priority Number

Programmed Work Year

Nature of Program Work:

Appraisal Indices:		Comments
Fatigue		
Seismic		
Scour		
Flood		
Geometrics		
Barrier		
Curb		
Load Capacity		

## Field Inspection Information

Date of Inspection	May 17, 2020 , 4:30PM	Type of Inspection:	OSIM <input checked="" type="checkbox"/>	Enhanced OSIM <input type="checkbox"/>
Inspector:	J. Zohreh, P.Eng.			
Others in Party:	S. Mitra, EIT			
Access Equipment Used:	Tapes, Hammer, Chain, Ladder, Camera, Safety Equipment			
Weather:	Sunny			
Temperature:	15°C			

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

## Overall Structure Notes

Recommended Work on Structure	None <input type="checkbox"/>	Minor Rehab <input checked="" type="checkbox"/>	Major Rehab <input type="checkbox"/>	Replace <input type="checkbox"/>
Timing of Recommended Work	1 to 5 years <input checked="" type="checkbox"/>	6 to 10 years <input type="checkbox"/>		
Overall Comments:	See maintenance sheet. Monitor deformation of top profile at bolt line.			
Date of Next Inspection:	2022			

## Suspected Performance Deficiencies

- 01 Load carrying capacity
- 02 Excessive deformations (reflections & rotations)
- 03 Continuing settlement
- 04 Continuing movements
- 05 Seized bearings

06

- 07 Bearing not uniformly loaded/unstable
- 08 Jammed expansion joint
- 09 Pedestrian/vehicular hazard
- 10 Rough riding surface
- 11 Surface ponding
- 12 Deck draining

12

- 13 Slippery Surfaces
- 14 Flooding/channel blockage
- 15 Undermining of foundation
- 16 Unstable embankments
- 17 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

- 08 Repair to Structural Steel
- 09 Repair to Bridge Concrete
- 10 Repair of Bridge Timber
- 11 Bailey bridges - maintenance
- 12 Animal/Pest Control
- 13 Bridge Surface Repair

13

- 14 Erosion Control at Bridges
- 15 Concrete Sealing
- 16 Rout and Seal
- 17 Bridge deck drainage
- 18 Scaling (loose concrete or ACR steel)
- 19 Other

Repair Rehabilitation Required				Priority				Estimated Construction Cost
Element <sup>1</sup>	Repair and Rehabilitation Required <sup>2</sup>			6 to 10 years	1 to 5 years	Within 1 year	Urgent	
Barrel	Monitor Cracks on top of the pipe. Monitor deformation of top profile.				X			\$ 1,000.00
Estimated Rehabilitated or Replacement Structure Dimensions <sup>3</sup>				Total Structural Cost				\$ 1,000.00
Deck Length (m)	11.5	Structure Width (m)	6.2					

1 - Indicate specific costs for structure replacement or for rehabilitation under the given headings.

2 - Give a brief description of the rehabilitation work required.

3 - Estimated structure dimensions after completion of the proposed work - if it is expected to change.

Associated Work <sup>4</sup>	Comments	Estimated Cost
Approaches <sup>5</sup>		
Detours		
Traffic Control		
Utilities		
Right of Way		
Environment Study		
Other		
Contingencies		
Total Associated Work Cost		\$ -

Total Construction Cost	\$ 1,000.00
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4 - Includes other construction costs associated with the structure. Engineering fees for reports, environmental studies, designs, project management and contingencies are not included as associated work.

5 - Approach costs is for work (fill, pavement, guiderail, etc.) immediately adjacent to the structure for minor changes in horizontal or vertical alignment and for barrier end treatments at the structure

Justification



Bridge Condition Index																		
No.		Element Description	Location	Length	Width	Height	Count	Total Qty	Units	Replacement (Initial) Cost	Material	Total Replacement Value	Excellent	Good	Fair	Poor	Current Element Value	Element Condition Index
				(m)	(m)	(m)	#			(\$)		TRV (\$)	1	0.75	0.4	0	CEV (\$)	
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C-12	Culverts	Inlet Component	East end of culvert	0	0	0	1	1.00	m2	\$ 350.00	Soil	\$ 350.00	0.00	1.00	0.00	0.00	\$ 262.50	75.0
C-12	Culverts	Outlet Component	West end of culvert	0	0	0	1	1.00	m2	\$ 350.00	Soil	\$ 350.00	0.00	1.00	0.00	0.00	\$ 262.50	75.0
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C-12	Foundations	Foundations (b	0	0	0	0	100	100.00	%	\$ -	0	\$ -	0.00	100.00	0.00	0.00	\$ -	-
C-12	Embankments	Embankments	0	0	0	0	4	4.00	each	\$ -	0	\$ -	0.00	0.00	4.00	0.00	\$ -	-
C-12	Embankments	Slope Protection	0	0	0	0	4	4.00	each	\$ -	0	\$ -	0.00	4.00	0.00	0.00	\$ -	-
C-12	Embankments	Streams & Water	0	0	0	0	100	100.00	%	\$ -	0	\$ -	0.00	100.00	0.00	0.00	\$ -	-
C-12		TOTALS (TRV-CEV-BCI)										\$ 33,187.36					\$ 21,578.52	65.0

<b>Element Group</b>	Culverts	<b>Length (m)</b>	12													
<b>Element Name</b>	Barrel	<b>Width (m)</b>	3.2													
<b>Location</b>	North	<b>Height (m)</b>	1.9													
<b>Material</b>	Corrugated steel plate	<b>Count</b>	1													
<b>Element Type</b>	CSP Arch	<b>Total Qty (m<sup>2</sup>)</b>	92.4													
<b>Environment</b>	Benign <input type="checkbox"/> Moderate <input checked="" type="checkbox"/> Severe <input type="checkbox"/>	<b>Limited Inspection</b>	<input type="checkbox"/>													
<b>Protection System</b>	<table border="1"> <tr> <td><b>Units</b></td><td><b>Exc</b></td><td><b>Good</b></td><td><b>Fair</b></td><td><b>Poor</b></td><td rowspan="2"><b>Performance Deficiencies</b></td></tr> <tr> <td><b>m<sup>2</sup></b></td><td></td><td>65.4</td><td>27.0</td><td></td></tr> </table>					<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>	<b>Performance Deficiencies</b>	<b>m<sup>2</sup></b>		65.4	27.0	
<b>Units</b>						<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>	<b>Performance Deficiencies</b>						
<b>m<sup>2</sup></b>		65.4	27.0													
<b>Condition Data</b>																
<b>Comments</b>	Approximate surface area calculation based on a half an ellipse. Top profile has Crack through almost the whole length at the top line. Continue to monitor deformation.															
<b>Recommended Work:</b>		Rehab <input type="checkbox"/> Replace <input type="checkbox"/>		<b>Maintenance Needs:</b>												
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input checked="" type="checkbox"/> 2 years <input type="checkbox"/>												
		Monitor Cracks on top of the pipe. Monitor deformation of top profile.														

<b>Element Group</b>	Culverts	<b>Length (m)</b>														
<b>Element Name</b>	Inlet Components	<b>Width (m)</b>														
<b>Location</b>	East end of culvert	<b>Height (m)</b>														
<b>Material</b>	Soil	<b>Count</b>	1													
<b>Element Type</b>		<b>Total Qty (m<sup>2</sup>)</b>														
<b>Environment</b>	Benign <input type="checkbox"/> Moderate <input checked="" type="checkbox"/> Severe <input type="checkbox"/>	<b>Limited Inspection</b>	<input type="checkbox"/>													
<b>Protection System</b>	<table border="1"> <tr> <td><b>Units</b></td><td><b>Exc</b></td><td><b>Good</b></td><td><b>Fair</b></td><td><b>Poor</b></td><td rowspan="2"><b>Performance Deficiencies</b></td></tr> <tr> <td><b>m<sup>2</sup></b></td><td></td><td>1</td><td></td><td></td></tr> </table>					<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>	<b>Performance Deficiencies</b>	<b>m<sup>2</sup></b>		1		
<b>Units</b>						<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>	<b>Performance Deficiencies</b>						
<b>m<sup>2</sup></b>		1														
<b>Condition Data</b>																
<b>Comments</b>	Good stability in area around culvert.															
<b>Recommended Work:</b>		Rehab <input type="checkbox"/> Replace <input type="checkbox"/>		<b>Maintenance Needs:</b>												
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>												

<b>Element Group</b>	Culverts	<b>Length (m)</b>														
<b>Element Name</b>	Outlet Components	<b>Width (m)</b>														
<b>Location</b>	West end of culvert	<b>Height (m)</b>														
<b>Material</b>	Soil	<b>Count</b>	1													
<b>Element Type</b>		<b>Total Qty (m<sup>2</sup>)</b>														
<b>Environment</b>	Benign <input type="checkbox"/> Moderate <input checked="" type="checkbox"/> Severe <input type="checkbox"/>	<b>Limited Inspection</b>	<input type="checkbox"/>													
<b>Protection System</b>	<table border="1"> <tr> <td><b>Units</b></td><td><b>Exc</b></td><td><b>Good</b></td><td><b>Fair</b></td><td><b>Poor</b></td><td rowspan="2"><b>Performance Deficiencies</b></td></tr> <tr> <td><b>m<sup>2</sup></b></td><td></td><td>1</td><td></td><td></td></tr> </table>					<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>	<b>Performance Deficiencies</b>	<b>m<sup>2</sup></b>		1		
<b>Units</b>						<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>	<b>Performance Deficiencies</b>						
<b>m<sup>2</sup></b>		1														
<b>Condition Data</b>																
<b>Comments</b>	Good stability in area around culvert.															
<b>Recommended Work:</b>		Rehab <input type="checkbox"/> Replace <input type="checkbox"/>		<b>Maintenance Needs:</b>												
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>												

<b>Element Group</b>	Decks	<b>Length (m)</b>	3.8												
<b>Element Name</b>	Wearing Surface	<b>Width (m)</b>	6.2												
<b>Location</b>	On top of culvert	<b>Height (m)</b>													
<b>Material</b>	Tar and chip	<b>Count</b>	1												
<b>Element Type</b>		<b>Total Qty (m<sup>2</sup>)</b>	23.56												
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b>	<input type="checkbox"/>										
<b>Protection System</b>															
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>	<b>Performance Deficiencies</b>									
	m <sup>2</sup>		23.56												
<b>Comments</b>	Rough riding surface since it is a gravel road. Adequate coverage of gravel, light rutting.														
<b>Recommended Work:</b>		<b>Rehab</b>	<input type="checkbox"/>	<b>Replace</b>	<input type="checkbox"/>	<b>Maintenance Needs:</b>									
		<b>Urgent</b>	<input type="checkbox"/>	<b>1 to 5 years</b>	<input type="checkbox"/>	<b>6 to 10 years</b>	<input type="checkbox"/>	<b>None</b>	<input checked="" type="checkbox"/>	<b>Urgent</b>	<input type="checkbox"/>	<b>1 year</b>	<input type="checkbox"/>	<b>2 years</b>	<input type="checkbox"/>

<b>Element Group</b>	Foundations	<b>Length (m)</b>													
<b>Element Name</b>	Foundations (below ground level)	<b>Width (m)</b>													
<b>Location</b>		<b>Height (m)</b>													
<b>Material</b>		<b>Count</b>	100												
<b>Element Type</b>		<b>Total Qty (m<sup>2</sup>)</b>													
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b>	<input type="checkbox"/>										
<b>Protection System</b>															
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>	<b>Performance Deficiencies</b>									
	%		100												
<b>Comments</b>	No scour through the pipe. Soil buildup along the north wall.														
<b>Recommended Work:</b>		<b>Rehab</b>	<input type="checkbox"/>	<b>Replace</b>	<input type="checkbox"/>	<b>Maintenance Needs:</b>									
		<b>Urgent</b>	<input type="checkbox"/>	<b>1 to 5 years</b>	<input type="checkbox"/>	<b>6 to 10 years</b>	<input type="checkbox"/>	<b>None</b>	<input checked="" type="checkbox"/>	<b>Urgent</b>	<input type="checkbox"/>	<b>1 year</b>	<input type="checkbox"/>	<b>2 years</b>	<input type="checkbox"/>

<b>Element Group</b>	Embankments	<b>Length (m)</b>													
<b>Element Name</b>	Embankments	<b>Width (m)</b>													
<b>Location</b>		<b>Height (m)</b>													
<b>Material</b>		<b>Count</b>	4												
<b>Element Type</b>		<b>Total Qty (m<sup>2</sup>)</b>													
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b>	<input type="checkbox"/>										
<b>Protection System</b>															
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>	<b>Performance Deficiencies</b>									
	each			4											
<b>Comments</b>															
<b>Recommended Work:</b>		<b>Rehab</b>	<input type="checkbox"/>	<b>Replace</b>	<input type="checkbox"/>	<b>Maintenance Needs:</b>									
		<b>Urgent</b>	<input type="checkbox"/>	<b>1 to 5 years</b>	<input type="checkbox"/>	<b>6 to 10 years</b>	<input type="checkbox"/>	<b>None</b>	<input type="checkbox"/>	<b>Urgent</b>	<input type="checkbox"/>	<b>1 year</b>	<input checked="" type="checkbox"/>	<b>2 years</b>	<input type="checkbox"/>
						Clear vegetation around pipe.									



<b>Element Group</b>	Embankments			<b>Length (m)</b>					
<b>Element Name</b>	Slope Protection			<b>Width (m)</b>					
<b>Location</b>				<b>Height (m)</b>					
<b>Material</b>				<b>Count</b>	4				
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>					
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b>	<input checked="" type="checkbox"/>				
<b>Protection System</b>					<b>Performance Deficiencies</b>				
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>					
	each		4						
<b>Comments</b>	Limited inspection due to high vegetation.								
<b>Recommended Work:</b>			<b>Rehab</b> <input type="checkbox"/>	<b>Replace</b> <input type="checkbox"/>	<b>Maintenance Needs:</b>				
			<b>Urgent</b> <input type="checkbox"/>	<b>1 to 5 years</b> <input type="checkbox"/>	<b>6 to 10 years</b> <input type="checkbox"/>	<b>None</b> <input checked="" type="checkbox"/>	<b>Urgent</b> <input type="checkbox"/>	<b>1 year</b> <input type="checkbox"/>	<b>2 years</b> <input type="checkbox"/>

<b>Element Group</b>	Embankments			<b>Length (m)</b>					
<b>Element Name</b>	Streams & Waterways			<b>Width (m)</b>					
<b>Location</b>				<b>Height (m)</b>					
<b>Material</b>				<b>Count</b>	100				
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>	100				
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b>	<input type="checkbox"/>				
<b>Protection System</b>					<b>Performance Deficiencies</b>				
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>					
	%		100						
<b>Comments</b>									
<b>Recommended Work:</b>			<b>Rehab</b> <input type="checkbox"/>	<b>Replace</b> <input type="checkbox"/>	<b>Maintenance Needs:</b>				
			<b>Urgent</b> <input type="checkbox"/>	<b>1 to 5 years</b> <input type="checkbox"/>	<b>6 to 10 years</b> <input type="checkbox"/>	<b>None</b> <input checked="" type="checkbox"/>	<b>Urgent</b> <input type="checkbox"/>	<b>1 year</b> <input type="checkbox"/>	<b>2 years</b> <input type="checkbox"/>

<b>Element Group</b>	Culverts			<b>Length (m)</b>	12
<b>Element Name</b>	Barrel			<b>Width (m)</b>	3.2
<b>Location</b>	South			<b>Height (m)</b>	1.9
<b>Material</b>	Corrugated steel plate			<b>Count</b>	1
<b>Element Type</b>	CSP Arch			<b>Total Qty (m<sup>2</sup>)</b>	92.4
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b>	<input type="checkbox"/>
<b>Protection System</b>					<b>Performance Deficiencies</b>
<b>Condition Data</b>	<b>Units</b>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	
	m <sup>2</sup>		65.4	27.0	

<b>Comments</b>	Approximate surface area calculation based on a half an ellipse. Top profile has Crack through almost the whole length at the top line. Continue to monitor deformation.	
<b>Recommended Work:</b> Rehab <input type="checkbox"/> Replace <input type="checkbox"/>		<b>Maintenance Needs:</b>
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>		Urgent <input type="checkbox"/> 1 year <input checked="" type="checkbox"/> 2 years <input type="checkbox"/>
		Monitor Cracks on top of the pipe. Monitor deformation of top profile

## Green field road twin Culvert # 2



Approach looking West





Approach looking East





South Elevation



North Elevation





Large crack observed on the concrete





Upstream View





Downstream view





Multiple cracks observed in the concrete



Cracks observed on the road surface



## Inventory Data:

Structure Name	C-13 Gore Culvert 1		
Main Hwy/Road #	N/A	On <input checked="" type="checkbox"/> Under <input type="checkbox"/>	Crossing Type: Navig. Water <input type="checkbox"/> Rail <input type="checkbox"/> Ped <input type="checkbox"/> Non-Navig Water <input checked="" type="checkbox"/> Road <input type="checkbox"/> Other <input type="checkbox"/>
Hwy/Road Name	Gore Road		
Structure Location	Approximately 170m East of Shellard Road		
Northing	43° 23' 19.6"	Easting	80° 15' 31.2"
Owners	Township of North Dumfries	Heritage Designation:	Not Cons. <input checked="" type="checkbox"/> Cons./not App. <input type="checkbox"/> List/not Desig. <input type="checkbox"/> Desig./not List <input type="checkbox"/> Desig. & List <input type="checkbox"/>
MTO Region	South-Western	Road Class:	Freeway <input type="checkbox"/> Arterial <input type="checkbox"/> Collector <input type="checkbox"/> Local <input checked="" type="checkbox"/>
MTO District	London/Stratford	Posted Speed	60 km/hr No. of Lanes 2
Old County	Waterloo	AADT	% Trucks
Geographic Township	North Dumfries	Inspection Route Sequence	
Structure Type	Concrete Rigid Frame	Interchange Number	
Total Culvert Length (m)	13.45	Interchange Structure Number	
Maximum Culvert Width (m)	8.45	Min. Vertical Clearance (m)	
Culvert Height (m)	0.5	Special Routes:	Transit <input type="checkbox"/> Truck <input type="checkbox"/> School <input type="checkbox"/> Bicycle <input type="checkbox"/>
Roadway Width (m)	6.9	Detour Length Around Bridge (km)	
Skew Angle (degrees)	90	Direction of Structure	N/S
No. of Spans	2	Fill on Structure (m)	0.6
Span Lengths (m)	2.4	Deck Geodetic Elevation	227

## Historical Data:

Year Built		Year of Last Major Rehab	
Last OSIM Inspection		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			
Rehab History: (Date/Description)			



**Scheduled Improvements:**

Regional Priority Number

Programmed Work Year

Nature of Program Work:

Appraisal Indices:		Comments
Fatigue		
Seismic		
Scour		
Flood		
Geometrics		
Barrier		
Curb		
Load Capacity		

## Field Inspection Information

Date of Inspection	May 18, 2020 , 8:30PM	Type of Inspection:	OSIM <input checked="" type="checkbox"/> SIM <input type="checkbox"/>
Inspector:	J. Zohreh, P.Eng.		
Others in Party:	S. Mitra, EIT		
Access Equipment Used:	Tapes, Hammer, Chain, Ladder, Camera, Safety Equipment		
Weather:	Sunny		
Temperature:	15°C		

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

## Overall Structure Notes

Recommended Work on Structure	None <input checked="" type="checkbox"/> Minor Rehab <input type="checkbox"/> Major Rehab <input type="checkbox"/> Replace <input type="checkbox"/>
Timing of Recommended Work	1 to 5 years <input checked="" type="checkbox"/> 6 to 10 years <input type="checkbox"/>
Overall Comments:	See maintenance sheet. Monitor deformation of top profile at bolt line.
Date of Next Inspection:	2022

## Suspected Performance Deficiencies

- 01 Load carrying capacity
- 02 Excessive deformations (reflections & rotations)
- 03 Continuing settlement
- 04 Continuing movements
- 05 Seized bearings

06

- 07 Bearing not uniformly loaded/unstable
- 08 Jammed expansion joint
- 09 Pedestrian/vehicular hazard
- 10 Rough riding surface
- 11 Surface ponding
- 12 Deck draining

12

- 13 Slippery Surfaces
- 14 Flooding/channel blockage
- 15 Undermining of foundation
- 16 Unstable embankments
- 17 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

- 08 Repair to Structural Steel
- 09 Repair to Bridge Concrete
- 10 Repair of Bridge Timber
- 11 Bailey bridges - maintenance
- 12 Animal/Pest Control
- 13 Bridge Surface Repair

13

- 14 Erosion Control at Bridges
- 15 Concrete Sealing
- 16 Rout and Seal
- 17 Bridge deck drainage
- 18 Scaling (loose concrete or ACR steel)
- 19 Other

Repair Rehabilitation Required				Priority				Estimated Construction Cost
Element <sup>1</sup>	Repair and Rehabilitation Required <sup>2</sup>			6 to 10 years	1 to 5 years	Within 1 year	Urgent	
Embankments	Clear vegetation around pipe. Cost dependent on method used for abatement and season				X			\$ 1,000.00
Estimated Rehabilitated or Replacement Structure Dimensions <sup>3</sup>				Total Structural Cost				\$ 1,000.00
Deck Length (m)	13.45	Structure Width (m)	8.45					

1 - Indicate specific costs for structure replacement or for rehabilitation under the given headings.

2 - Give a brief description of the rehabilitation work required.

3 - Estimated structure dimensions after completion of the proposed work - if it is expected to change.

Associated Work <sup>4</sup>	Comments	Estimated Cost
Approaches <sup>5</sup>		
Detours		
Traffic Control		
Utilities		
Right of Way		
Environment Study		
Other		
Contingencies		
Total Associated Work Cost		\$ -

Total Construction Cost	\$ 1,000.00
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4 - Includes other construction costs associated with the structure. Engineering fees for reports, environmental studies, designs, project management and contingencies are not included as associated work.

5 - Approach costs is for work (fill, pavement, guiderail, etc.) immediately adjacent to the structure for minor changes in horizontal or vertical alignment and for barrier end treatments at the structure

Justification



Bridge Condition Index																		
No.		Element Description	Location	Length	Width	Height	Count	Total Qty	Units	Replacement (Initial) Cost	Material	Total Replacement Value	Excellent	Good	Fair	Poor	Current Element Value	Element Condition Index
				(m)	(m)	(m)	#			(\$)		TRV (\$)	1	0.75	0.4	0	CEV (\$)	
C-13	Culverts	Barrel	0	13.45	8.45	0.3	2	116.19	m2	\$ 350.00	Concrete Rigid Frame	\$ 40,665.63	0.00	87.14	29.05	0.00	\$ 26,940.98	66.3
C-13	Culverts	Inlet Component	East end of culvert	0	0	0	1	1.00	m2	\$ 350.00	Soil	\$ 350.00	0.00	1.00	0.00	0.00	\$ 262.50	75.0
C-13	Culverts	Outlet Component	West end of culvert	0	0	0	1	1.00	m2	\$ 350.00	Soil	\$ 350.00	0.00	1.00	0.00	0.00	\$ 262.50	75.0
C-13	Decks	Wearing Surface	On top of culvert	3.8	6.2	0	1	23.56	m2	\$ 6.00	Chip and tar	\$ 141.36	0.00	20.03	3.53	0.00	\$ 98.60	69.8
C-13	Foundations	Foundations (b	0	0	0	0	100	100.00	%	\$ -	0	\$ -	0.00	100.00	0.00	0.00	\$ -	-
C-13	Embankments	Embankments	0	0	0	0	4	4.00	each	\$ -	0	\$ -	0.00	0.00	4.00	0.00	\$ -	-
C-13	Embankments	Slope Protection	0	0	0	0	4	4.00	each	\$ -	0	\$ -	0.00	4.00	0.00	0.00	\$ -	-
C-13	Embankments	Streams & Water	0	0	0	0	100	100.00	%	\$ -	0	\$ -	0.00	80.00	20.00	0.00	\$ -	-
C-13		TOTALS (TRV-CEV-BCI)										\$ 41,512.99					\$ 27,564.58	66.4

<b>Element Group</b>	Culverts			<b>Length (m)</b>	13.45	
<b>Element Name</b>	Barrel			<b>Width (m)</b>	8.45	
<b>Location</b>				<b>Height (m)</b>	0.3	
<b>Material</b>	Concrete Rigid Frame			<b>Count</b>	2	
<b>Element Type</b>	Box			<b>Total Qty (m<sup>2</sup>)</b>	116.2	
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>		
<b>Protection System</b>						<b>Performance Deficiencies</b>
<b>Condition Data</b>	Units m <sup>2</sup>	Exc	Good	Fair	Poor	
			87.1	29.0		
<b>Comments</b>						
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>		
Rehab <input type="checkbox"/> Replace <input type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input checked="" type="checkbox"/>		
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input checked="" type="checkbox"/>		

<b>Element Group</b>	Culverts			<b>Length (m)</b>		
<b>Element Name</b>	Inlet Components			<b>Width (m)</b>		
<b>Location</b>	East end of culvert			<b>Height (m)</b>		
<b>Material</b>	Soil			<b>Count</b>	1	
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>		
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>		
<b>Protection System</b>						<b>Performance Deficiencies</b>
<b>Condition Data</b>	Units m <sup>2</sup>	Exc	Good	Fair	Poor	
			1			
<b>Comments</b>	Good stability in area around culvert.					
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>		
Rehab <input type="checkbox"/> Replace <input type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>		
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>		

<b>Element Group</b>	Culverts			<b>Length (m)</b>		
<b>Element Name</b>	Outlet Components			<b>Width (m)</b>		
<b>Location</b>	West end of culvert			<b>Height (m)</b>		
<b>Material</b>	Soil			<b>Count</b>	1	
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>		
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>		
<b>Protection System</b>						<b>Performance Deficiencies</b>
<b>Condition Data</b>	Units m <sup>2</sup>	Exc	Good	Fair	Poor	
			1			
<b>Comments</b>	Good stability in area around culvert.					
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>		
Rehab <input type="checkbox"/> Replace <input type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>		
Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>		

<b>Element Group</b>	Decks				<b>Length (m)</b>	3.8					
<b>Element Name</b>	Wearing Surface				<b>Width (m)</b>	6.2					
<b>Location</b>	On top of culvert				<b>Height (m)</b>						
<b>Material</b>	Chip and tar				<b>Count</b>	1					
<b>Element Type</b>					<b>Total Qty (m<sup>2</sup>)</b>	23.56					
<b>Environment</b>	Benign	<input type="checkbox"/>	Moderate	<input checked="" type="checkbox"/>	Severe	<input type="checkbox"/>	<b>Limited Inspection</b>				<input type="checkbox"/>
<b>Protection System</b>							<b>Performance Deficiencies</b>				
<b>Condition Data</b>	<b>Units</b>		<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>					
	m <sup>2</sup>			20.026	3.534						
<b>Comments</b>											
<b>Recommended Work:</b>					<b>Maintenance Needs:</b>						
Rehab <input type="checkbox"/> Replace <input type="checkbox"/>					Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>						
					Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>						

<b>Element Group</b>	Foundations				<b>Length (m)</b>						
<b>Element Name</b>	Foundations (below ground level)				<b>Width (m)</b>						
<b>Location</b>					<b>Height (m)</b>						
<b>Material</b>					<b>Count</b>	100					
<b>Element Type</b>					<b>Total Qty (m<sup>2</sup>)</b>						
<b>Environment</b>	Benign	<input type="checkbox"/>	Moderate	<input type="checkbox"/>	Severe	<input type="checkbox"/>	<b>Limited Inspection</b>				<input type="checkbox"/>
<b>Protection System</b>							<b>Performance Deficiencies</b>				
<b>Condition Data</b>	<b>Units</b>		<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>					
	%			100							
<b>Comments</b>											
<b>Recommended Work:</b>					<b>Maintenance Needs:</b>						
Rehab <input type="checkbox"/> Replace <input type="checkbox"/>					Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>						
					Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>						

<b>Element Group</b>	Embankments				<b>Length (m)</b>						
<b>Element Name</b>	Embankments				<b>Width (m)</b>						
<b>Location</b>					<b>Height (m)</b>						
<b>Material</b>					<b>Count</b>	4					
<b>Element Type</b>					<b>Total Qty (m<sup>2</sup>)</b>						
<b>Environment</b>	Benign	<input type="checkbox"/>	Moderate	<input checked="" type="checkbox"/>	Severe	<input type="checkbox"/>	<b>Limited Inspection</b>				<input type="checkbox"/>
<b>Protection System</b>							<b>Performance Deficiencies</b>				
<b>Condition Data</b>	<b>Units</b>		<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>					
	each				4						
<b>Comments</b>											
<b>Recommended Work:</b>					<b>Maintenance Needs:</b>						
Rehab <input type="checkbox"/> Replace <input type="checkbox"/>					Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input type="checkbox"/>						
					Urgent <input type="checkbox"/> 1 year <input checked="" type="checkbox"/> 2 years <input type="checkbox"/>						



					Clear vegetation around pipe.				
Element Group	Embankments				Length (m)				
Element Name	Slope Protection				Width (m)				
Location					Height (m)				
Material					Count		4		
Element Type					Total Qty (m <sup>2</sup> )				
Environment	Benign	<input type="checkbox"/>	Moderate	<input checked="" type="checkbox"/>	Severe	<input type="checkbox"/>	Limited Inspection		<input checked="" type="checkbox"/>
Protection System							Performance Deficiencies		
Condition Data	Units		Exc	Good	Fair	Poor			
	each			4					
Comments	Limited inspection due to high vegetation.								
Recommended Work:					Maintenance Needs:				
Rehab <input type="checkbox"/> Replace <input type="checkbox"/>					Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>				
					Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>				

Element Group	Embankments				Length (m)				
Element Name	Streams & Waterways				Width (m)				
Location					Height (m)				
Material					Count		100		
Element Type					Total Qty (m <sup>2</sup> )		100		
Environment	Benign	<input type="checkbox"/>	Moderate	<input checked="" type="checkbox"/>	Severe	<input type="checkbox"/>	Limited Inspection		<input type="checkbox"/>
Protection System							Performance Deficiencies		
Condition Data	Units		Exc	Good	Fair	Poor			
	%			80	20				
Comments	Vegetation enroaching on waterway.								
Recommended Work:					Maintenance Needs:				
Rehab <input type="checkbox"/> Replace <input type="checkbox"/>					Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>				
					Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>				

## Gore Road Structure #1



Upstream view



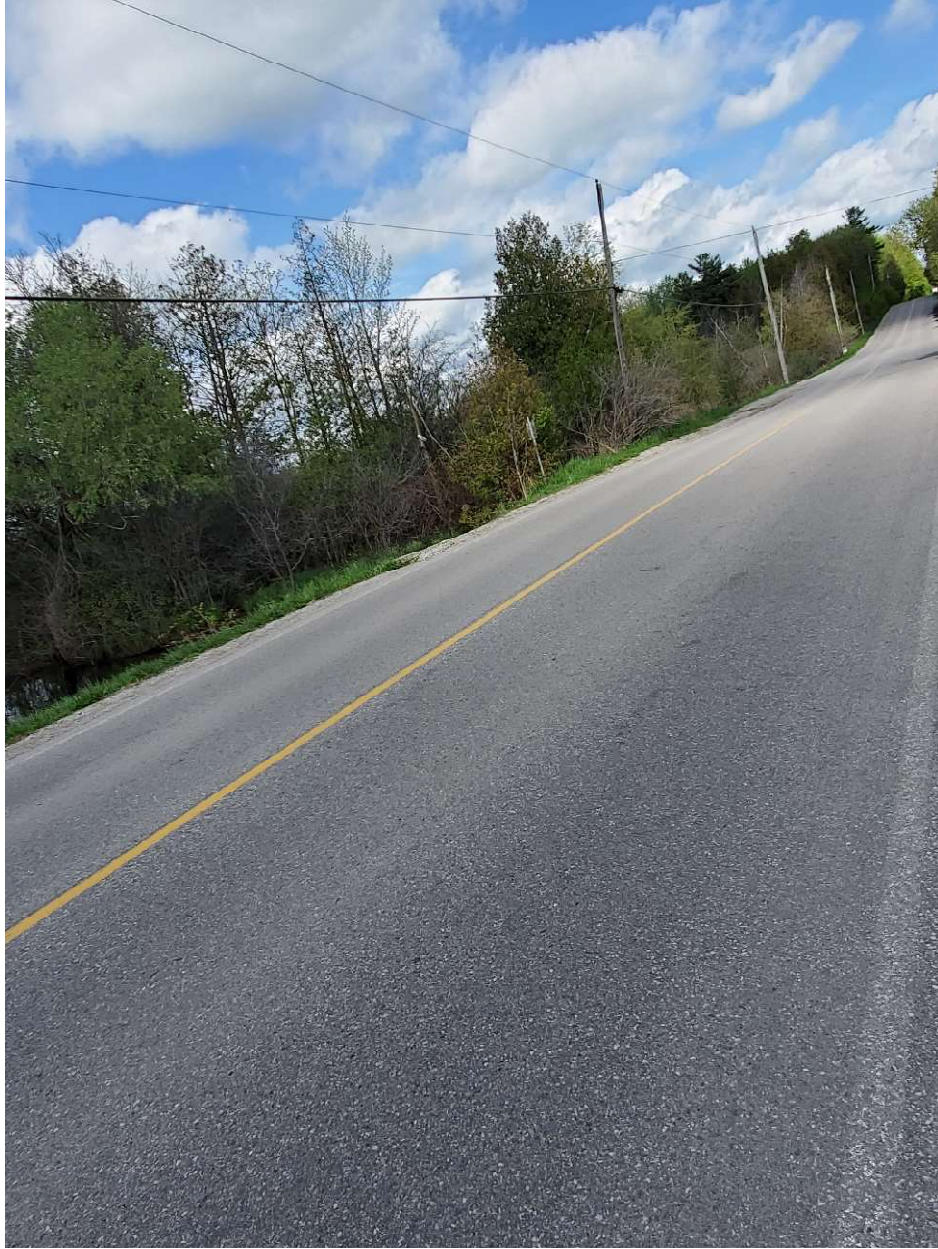


Downstream view





Approach looking West



Approach looking East





Water obstruction





Exposed rebar on the top of the box culvert





Water obstruction

## Inventory Data:

Structure Name	C-14 Gore Culvert 2		
Main Hwy/Road #	N/A	On <input checked="" type="checkbox"/> Under <input type="checkbox"/>	Crossing Type: Navig. Water <input type="checkbox"/> Rail <input type="checkbox"/> Ped <input type="checkbox"/> Non-Navig Water <input checked="" type="checkbox"/> Road <input type="checkbox"/> Other <input type="checkbox"/>
Hwy/Road Name	Gore Road		
Structure Location	360m East of Puslinch Sideroad 10 South		
Northing	43°23 '44.8"	Easting	80°12'55.5"
Owners	Township of North Dumfries	Heritage Designation:	Not Cons. <input checked="" type="checkbox"/> Cons./not App. <input type="checkbox"/> List/not Desig. <input type="checkbox"/> Desig./not List <input type="checkbox"/> Desig. & List <input type="checkbox"/>
MTO Region	South-Western	Road Class:	Freeway <input type="checkbox"/> Arterial <input type="checkbox"/> Collector <input type="checkbox"/> Local <input checked="" type="checkbox"/>
MTO District	London/Stratford	Posted Speed	60 km/hr No. of Lanes 2
Old County	Waterloo	AADT	% Trucks
Geographic Township	North Dumfries	Inspection Route Sequence	
Structure Type	Reinforced Concrete Elliptical	Interchange Number	
Total Culvert Length (m)	12.2	Interchange Structure Number	
Maximum Culvert Width (m)	1.5	Min. Vertical Clearance (m)	
Culvert Height (m)	1.5	Special Routes:	Transit <input type="checkbox"/> Truck <input type="checkbox"/> School <input type="checkbox"/> Bicycle <input type="checkbox"/>
Roadway Width (m)	7	Detour Length Around Bridge (km)	
Skew Angle (degrees)	90	Direction of Structure	N/S
No. of Spans	1	Fill on Structure (m)	0.3
Span Lengths (m)	1.5	Deck Geodetic Elevation	224

## Historical Data:

Year Built		Year of Last Major Rehab	
Last OSIM Inspection		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			
Rehab History: (Date/Description)			



**Scheduled Improvements:**

Regional Priority Number

Programmed Work Year

Nature of Program Work:

Appraisal Indices:		Comments
Fatigue		
Seismic		
Scour		
Flood		
Geometrics		
Barrier		
Curb		
Load Capacity		

Field Inspection Information		
Date of Inspection	May 18, 2020 , 9:30PM	Type of Inspection: OSIM <input checked="" type="checkbox"/> SIM <input type="checkbox"/>
Inspector:	J. Zohreh, P.Eng.	
Others in Party:	S. Mitra, EIT	
Access Equipment Used:	Tapes, Hammer, Chain, Ladder, Camera, Safety Equipment	
Weather:	Sunny	
Temperature:	15°C	

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

Overall Structure Notes	
Recommended Work on Structure	None <input checked="" type="checkbox"/> Minor Rehab <input type="checkbox"/> Major Rehab <input type="checkbox"/> Replace <input type="checkbox"/>
Timing of Recommended Work	1 to 5 years <input checked="" type="checkbox"/> 6 to 10 years <input type="checkbox"/>
Overall Comments:	See maintenance sheet. Monitor deformation of top profile at bolt line.
Date of Next Inspection:	2022

## Suspected Performance Deficiencies

- 01 Load carrying capacity
- 02 Excessive deformations (reflections & rotations)
- 03 Continuing settlement
- 04 Continuing movements
- 05 Seized bearings

06

- 07 Bearing not uniformly loaded/unstable
- 08 Jammed expansion joint
- 09 Pedestrian/vehicular hazard
- 10 Rough riding surface
- 11 Surface ponding
- 12 Deck draining

12

- 13 Slippery Surfaces
- 14 Flooding/channel blockage
- 15 Undermining of foundation
- 16 Unstable embankments
- 17 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

- 08 Repair to Structural Steel
- 09 Repair to Bridge Concrete
- 10 Repair of Bridge Timber
- 11 Bailey bridges - maintenance
- 12 Animal/Pest Control
- 13 Bridge Surface Repair

13

- 14 Erosion Control at Bridges
- 15 Concrete Sealing
- 16 Rout and Seal
- 17 Bridge deck drainage
- 18 Scaling (loose concrete or ACR steel)
- 19 Other

Repair Rehabilitation Required				Priority				Estimated Construction Cost
Element <sup>1</sup>	Repair and Rehabilitation Required <sup>2</sup>			6 to 10 years	1 to 5 years	Within 1 year	Urgent	
Embankments	Clear vegetation around pipe. Cost dependent on method used for abatement and season				X			\$ 1,000.00
Estimated Rehabilitated or Replacement Structure Dimensions <sup>3</sup>				Total Structural Cost				\$ 1,000.00
Deck Length (m)	12.2	Structure Width (m)	1.5					

1 - Indicate specific costs for structure replacement or for rehabilitation under the given headings.

2 - Give a brief description of the rehabilitation work required.

3 - Estimated structure dimensions after completion of the proposed work - if it is expected to change.

Associated Work <sup>4</sup>	Comments	Estimated Cost
Approaches <sup>5</sup>		
Detours		
Traffic Control		
Utilities		
Right of Way		
Environment Study		
Other		
Contingencies		
Total Associated Work Cost		\$ -

Total Construction Cost	\$ 1,000.00
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4 - Includes other construction costs associated with the structure. Engineering fees for reports, environmental studies, designs, project management and contingencies are not included as associated work.

5 - Approach costs is for work (fill, pavement, guiderail, etc.) immediately adjacent to the structure for minor changes in horizontal or vertical alignment and for barrier end treatments at the structure

Justification



Bridge Condition Index																		
No.		Element Description	Location	Length	Width	Height	Count	Total Qty	Units	Replacement (Initial) Cost	Material	Total Replacement Value	Excellent	Good	Fair	Poor	Current Element Value	Element Condition Index
				(m)	(m)	(m)	#			(\$)		TRV (\$)	1	0.75	0.4	0	CEV (\$)	
C-14	Culverts	Barrel	0	12.5	1.5	1.5	1	58.88	m2	\$ 350.00	Concrete Rigid Frame	\$ 20,606.25	0.00	52.99	5.89	0.00	\$ 14,733.47	71.5
C-14	Culverts	Inlet Component	East end of culvert	0	0	0	1	1.00	m2	\$ 350.00	Soil	\$ 350.00	0.00	1.00	0.00	0.00	\$ 262.50	75.0
C-14	Culverts	Outlet Component	West end of culvert	0	0	0	1	1.00	m2	\$ 350.00	Soil	\$ 350.00	0.00	1.00	0.00	0.00	\$ 262.50	75.0
C-14	Decks	Wearing Surface	On top of culvert	3.8	6.2	0	1	23.56	m2	\$ 6.00	Chip and tar	\$ 141.36	0.00	20.03	3.53	0.00	\$ 98.60	69.8
C-14	Foundations	Foundations (b	0	0	0	0	100	100.00	%	\$ -	0	\$ -	0.00	100.00	0.00	0.00	\$ -	-
C-14	Embankments	Embankments	0	0	0	0	4	4.00	each	\$ -	0	\$ -	0.00	0.00	4.00	0.00	\$ -	-
C-14	Embankments	Slope Protection	0	0	0	0	4	4.00	each	\$ -	0	\$ -	0.00	4.00	0.00	0.00	\$ -	-
C-14	Embankments	Streams & Water	0	0	0	0	100	100.00	%	\$ -	0	\$ -	0.00	0.00	100.00	0.00	\$ -	-
C-14		TOTALS (TRV-CEV-BCI)										\$ 21,453.61					\$ 15,357.07	71.6

<b>Element Group</b>	Culverts	<b>Length (m)</b>	12.5			
<b>Element Name</b>	Barrel	<b>Width (m)</b>	1.5			
<b>Location</b>		<b>Height (m)</b>	1.5			
<b>Material</b>	Concrete Rigid Frame	<b>Count</b>	1			
<b>Element Type</b>	Box	<b>Total Qty (m<sup>2</sup>)</b>	58.9			
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>		
<b>Protection System</b>						<b>Performance Deficiencies</b>
<b>Condition Data</b>	<b>Units</b> m <sup>2</sup>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>	
			53.0	5.9		
<b>Comments</b>						
<b>Recommended Work:</b>		Rehab <input type="checkbox"/>	Replace <input type="checkbox"/>	<b>Maintenance Needs:</b>		
Urgent <input type="checkbox"/>		1 to 5 years <input type="checkbox"/>	6 to 10 years <input type="checkbox"/>	None <input checked="" type="checkbox"/>	Urgent <input type="checkbox"/>	
					1 year <input type="checkbox"/>	
					2 years <input checked="" type="checkbox"/>	

<b>Element Group</b>	Culverts	<b>Length (m)</b>				
<b>Element Name</b>	Inlet Components	<b>Width (m)</b>				
<b>Location</b>	East end of culvert	<b>Height (m)</b>				
<b>Material</b>	Soil	<b>Count</b>	1			
<b>Element Type</b>		<b>Total Qty (m<sup>2</sup>)</b>				
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>		
<b>Protection System</b>						<b>Performance Deficiencies</b>
<b>Condition Data</b>	<b>Units</b> m <sup>2</sup>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>	
			1			
<b>Comments</b>	Good stability in area around culvert.					
<b>Recommended Work:</b>		Rehab <input type="checkbox"/>	Replace <input type="checkbox"/>	<b>Maintenance Needs:</b>		
Urgent <input type="checkbox"/>		1 to 5 years <input type="checkbox"/>	6 to 10 years <input type="checkbox"/>	None <input checked="" type="checkbox"/>	Urgent <input type="checkbox"/>	
					1 year <input type="checkbox"/>	
					2 years <input type="checkbox"/>	

<b>Element Group</b>	Culverts	<b>Length (m)</b>				
<b>Element Name</b>	Outlet Components	<b>Width (m)</b>				
<b>Location</b>	West end of culvert	<b>Height (m)</b>				
<b>Material</b>	Soil	<b>Count</b>	1			
<b>Element Type</b>		<b>Total Qty (m<sup>2</sup>)</b>				
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b> <input type="checkbox"/>		
<b>Protection System</b>						<b>Performance Deficiencies</b>
<b>Condition Data</b>	<b>Units</b> m <sup>2</sup>	<b>Exc</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>	
			1			
<b>Comments</b>	Good stability in area around culvert.					
<b>Recommended Work:</b>		Rehab <input type="checkbox"/>	Replace <input type="checkbox"/>	<b>Maintenance Needs:</b>		
Urgent <input type="checkbox"/>		1 to 5 years <input type="checkbox"/>	6 to 10 years <input type="checkbox"/>	None <input checked="" type="checkbox"/>	Urgent <input type="checkbox"/>	
					1 year <input type="checkbox"/>	
					2 years <input type="checkbox"/>	

<b>Element Group</b>	Decks	<b>Length (m)</b>	3.8		
<b>Element Name</b>	Wearing Surface	<b>Width (m)</b>	6.2		
<b>Location</b>	On top of culvert	<b>Height (m)</b>			
<b>Material</b>	Chip and tar	<b>Count</b>	1		
<b>Element Type</b>		<b>Total Qty (m<sup>2</sup>)</b>	23.56		
<b>Environment</b>	Benign <input type="checkbox"/> Moderate <input checked="" type="checkbox"/> Severe <input type="checkbox"/>	<b>Limited Inspection</b>	<input type="checkbox"/>		
<b>Protection System</b>					<b>Performance Deficiencies</b>
<b>Condition Data</b>	Units m <sup>2</sup>	Exc	Good	Fair	
			20.026	3.534	
<b>Comments</b>					
<b>Recommended Work:</b>		Rehab <input type="checkbox"/>	Replace <input type="checkbox"/>	<b>Maintenance Needs:</b>	
		Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>	Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>		

<b>Element Group</b>	Foundations	<b>Length (m)</b>			
<b>Element Name</b>	Foundations (below ground level)	<b>Width (m)</b>			
<b>Location</b>		<b>Height (m)</b>			
<b>Material</b>		<b>Count</b>	100		
<b>Element Type</b>		<b>Total Qty (m<sup>2</sup>)</b>			
<b>Environment</b>	Benign <input type="checkbox"/> Moderate <input type="checkbox"/> Severe <input type="checkbox"/>	<b>Limited Inspection</b>	<input type="checkbox"/>		
<b>Protection System</b>					<b>Performance Deficiencies</b>
<b>Condition Data</b>	Units %	Exc	Good	Fair	
			100		
<b>Comments</b>					
<b>Recommended Work:</b>		Rehab <input type="checkbox"/>	Replace <input type="checkbox"/>	<b>Maintenance Needs:</b>	
		Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input checked="" type="checkbox"/>	Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>		

<b>Element Group</b>	Embankments	<b>Length (m)</b>			
<b>Element Name</b>	Embankments	<b>Width (m)</b>			
<b>Location</b>		<b>Height (m)</b>			
<b>Material</b>		<b>Count</b>	4		
<b>Element Type</b>		<b>Total Qty (m<sup>2</sup>)</b>			
<b>Environment</b>	Benign <input type="checkbox"/> Moderate <input checked="" type="checkbox"/> Severe <input type="checkbox"/>	<b>Limited Inspection</b>	<input type="checkbox"/>		
<b>Protection System</b>					<b>Performance Deficiencies</b>
<b>Condition Data</b>	Units each	Exc	Good	Fair	
				4	
<b>Comments</b>					
<b>Recommended Work:</b>		Rehab <input type="checkbox"/>	Replace <input type="checkbox"/>	<b>Maintenance Needs:</b>	
		Urgent <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> None <input type="checkbox"/>	Urgent <input type="checkbox"/> 1 year <input checked="" type="checkbox"/> 2 years <input type="checkbox"/>		
		Clear vegetation around pipe.			



<b>Element Group</b>	Embankments			<b>Length (m)</b>			
<b>Element Name</b>	Slope Protection			<b>Width (m)</b>			
<b>Location</b>				<b>Height (m)</b>			
<b>Material</b>				<b>Count</b>	4		
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>			
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b>			<input checked="" type="checkbox"/>
<b>Protection System</b>						<b>Performance Deficiencies</b>	
<b>Condition Data</b>	Units each	Exc	Good	Fair	Poor		
			4				
<b>Comments</b>	Limited inspection due to high vegetation.						
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>			
Rehab <input type="checkbox"/> 1 to 5 years <input type="checkbox"/>				Replace <input type="checkbox"/> 6 to 10 years <input type="checkbox"/>			
Urgent <input type="checkbox"/>				None <input checked="" type="checkbox"/>			
				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>			

<b>Element Group</b>	Embankments			<b>Length (m)</b>			
<b>Element Name</b>	Streams & Waterways			<b>Width (m)</b>			
<b>Location</b>				<b>Height (m)</b>			
<b>Material</b>				<b>Count</b>	100		
<b>Element Type</b>				<b>Total Qty (m<sup>2</sup>)</b>	100		
<b>Environment</b>	Benign <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Severe <input type="checkbox"/>	<b>Limited Inspection</b>			<input type="checkbox"/>
<b>Protection System</b>						<b>Performance Deficiencies</b>	
<b>Condition Data</b>	Units %	Exc	Good	Fair	Poor		
				100			
<b>Comments</b>	Vegetation encroaching on waterway.						
<b>Recommended Work:</b>				<b>Maintenance Needs:</b>			
Rehab <input type="checkbox"/> 1 to 5 years <input type="checkbox"/>				Replace <input type="checkbox"/> 6 to 10 years <input type="checkbox"/>			
Urgent <input type="checkbox"/>				None <input checked="" type="checkbox"/>			
				Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/>			

## Gore Road Structure #2



Approach from East





Approach from West





Upstream view





Downstream view





Elevation of the culvert (Some water obstruction observed)