# 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.

### 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

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)

### 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.

- 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.

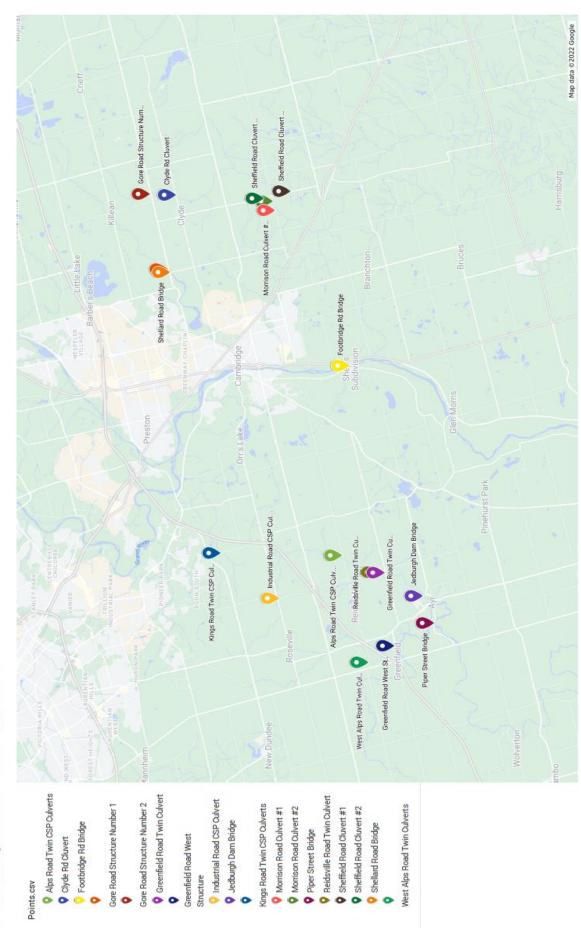
The inspection details have been noted where there is significant deterioration and required remedial work.

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**



Ontario Structure Inspecti	ion Manual - Inspec	tion Form		M	ITO Site Nu	ımber					
		Inv	ventory Data:								
Structure Name	B-1 Footbridge R	oad Bridge									
Main Hwy/Road#	Footbridge Road	On X Under	Crossing Type:	Navig. Non-Navig	Water X Water		Ped ther				
Hwy/Road Name	Footbridge Road						<b>一</b> 一 '				
Structure Location	Approximately 50m	West of Hig	ghway 24				一				
Northing	43°19'02.9" N		Easting	80°18'50.9'	"W	$\overline{}$					
Owners	Township of North	Dumfries	Heritage Designation:	Not Cons. X Desig./not L	Cons./not	ot App. List	t/not Desig.				
MTO Region	South-Western		Road Class:	Freeway	Arterial	Collector	Local X				
MTO District	London / Stratford		Posted Speed	50	1	No. of Lanes	2				
Old County	Waterloo,		AADT	-	o o	% Trucks					
Geographic Township	Township of North	Dumfries	Inspection Rou	ute Sequence							
Structure Type	Slab on I-Girder (St	ieel)	Interchange N	umber							
Total Deck Length (m)	122.5		Interchange St	tructure Number	ır [						
Overall Structure Width (m)	10.4		Min. Vertical	Clearance (m)							
Total Deck Area (sq. m.)	1274		Special Routes	s: Transit	Truck	School	Bicycle				
Roadway Width (m)	8.6		Detour Length	n Around Bridge	e (km)						
Skew Angle (degrees)	0		Direction of St	tructure	Ī	E/W					
No. of Spans	3		Fill on Structu	re (m)	7	7.8					
Span Lengths (m)	36.8,48.9, 36.8 (Tot	ial:122.5)	Deck Geodetic Elevation 228								
		His	storical Data:								
Year Built	1970		Year of Last M	/Jajor Rehab							
Last OSIM Inspection	2020		Last Evaluatio	on							
Last Enhanced OSIM Inspec	etion		Current Load 1	Limit (tonnes)			ĺ				
Enhanced Access Equipment (ladder, boat, lift, etc.)			Load Limit By	/-Law #							
Last Underwater Inspection			By-Law Expir	y Date			ĺ				
Last Condition Survey					<u> </u>		1				
Rehab History: (Date/Descri	iption)										



<b>Ontario Structure Inspection</b>	Manual - Inspection Form	MTO	Site Number
	Scheduled	Improvements:	
Regional Priority Number		Programmed Work Year	
Nature of Program Work:			
Appraisal Indices:		Comments	
Fatigue			
Seismic			
Scour			
Flood			
Geometrics			
Barrier			
Curb			



Load Capacity

Ontario Structure Inspection Ma	nual - Inspection Fo	rm			MT	o s	Site Number	
	Fiel	d In	spection Infor	mati	ion			
Date of Inspection	May 17, 2022, 12:3	0 PN	M	Тур	e of Inspection	:	OSIM X	Enhanced OSIM
Inspector:	J. Zohreh, P.Eng.						<u> </u>	<u></u>
Others in Party:	S. Mitra, EIT							
Access Equipment Used:	·							
Weather:	Sunny							
Temperature:	18°C							
	,						Priority	
Additional Investigations Require	ed		None			Normal	Urgent	
Material Condition Survey								
Detailed Deck Condition Surv	ey				X			
Non-destructive Delamination	Survey of Asphalt-C	ove	red Deck		X			
Concrete Substructure Conditi	on Survey				X			
Detailed Coating Condition Su	ırvey				X			
Detailed Timber Investigation					X			
Post-Tensioned Strand Investi	gation				X			
Underwater Investigation					X			
Fatigue Investigation			X					
Seismic Investigation			X					
Structure Evaluation			X					
Monitoring								
Monitoring of Deformations, S	Settlements and Move	emei	nts		X			
Monitoring Crack Widths								
Investigation Notes:	The structure is in a	ir co	ondition and					
	C	ver	all Structure N	lotes	S			
Recommended Work on Structure	None		Minor Rehab	X	Major Rehab		Replace	
Timing of Recommended Work	1 to 5 years	X	6 to 10 years					
Overall Comments:	See Elements inform	natio	on					
Date of Next Inspection:	2024							
Suspected Performance Deficiencies  11 Load carrying capacity 12 Excessive deformations (reflections & rota 13 Continuing settlement 14 Continuing movements 15 Seized bearings	06 07 ations) 08 09 10 11	Jamn Pede: Roug Surfa	ing not uniformly loa ned expansion joint strian/vehicular haza th riding surface nee ponding draining			12 13 14 15 16	Slippery Surfaces Flooding/channel b Undermining of fo Unstable embankn Other	undation
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 09 10 11	Repa Repa Baile Anim	ir to Structural Steel ir to Bridge Concrete ir of Bridge Timber by bridges - maintena nal/Pest Control ge Surface Repair			13 14 15 16 17 18	Erosion Control at Concrete Sealing Rout and Seal Bridge deck draina Scaling (loose cond Other	ge



### **Ontario Structure Inspection Manual - Inspection Form**

MTO	Site	Number
MIT	SILC	11 ullipei

Repair Rehabilitation	l		Pri	Estimated					
Element <sup>1</sup>	Repa	nir and Rehabilitation Requ	uired <sup>2</sup>	6 to 10 years	1 to 5 years	Within 1 year	Urgent	Construct	ion Cost
Deck, wearing surface			0		X			\$	1,000.00
Decks	Cost deper	ndent on method used and sea	ason			X		\$	1,000.00
Signs			0			X		\$	500.00
Estimated Rehab	ilitated or R	Replacement Structure Dimen						2 500 00	
Deck Length (m)	10.4	10	otai Stru	ctural Co	ost	\$	2,500.00		

<sup>1 -</sup> Indicate specific costs for structure replacement or for rehabilitation under the given headings.

<sup>3 -</sup> 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

<sup>4 -</sup> 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.

Justification



<sup>2 -</sup> Give a brief description of the rehabilitation work required.

<sup>5 -</sup> 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

Element Group	Abutments				Length (n	n)								
Element Name	Abutment v	walls			Width (m	)		9.46						
Location	East and We	est			Height (m	ı)		1.8						
Material	Cast-in-plac	e Concrete			Count			2						
Element Type	Convention	al Closed			Total Qty	$(m^2)$	)	34.06						
Environment	Benign	Moderate	e X Severe		Limited I			n						
<b>Protection System</b>											Performance			
Condition Data		nits	Exc		Good		Fai	ir	Poor	r	De	efic	iencies	
Condition Data		m <sup>2</sup>			29.31		2.5	5	2.25	i				
Comments	Height only	measures vis	ible area above	e fill.										
Recommended Wor	·k:	Rehab	Replace				Ma	intenar	nce Needs	s:				
Ur	gent 1 t	'S	None	X			Urgent		1 year		2 years			
Element Group	<b>Abutments</b>				Length (n Width (m			0.3						
Element Name								9.46						
Location	At Abutmer				Height (m	1)		1.6						
Material	Cast-in-plac				Count	. 2.		2 25.05						
Element Type	Reinforced	-	<del></del>		Total Qty			35.95	<del></del>					
Environment	Benign	Moderate	e X Severe		Limited I	nspe	ction	n	X		ī			
<b>Protection System</b>							——					rmance 		
Condition Data		nits	Exc		Good		Fai		Poor	r	Do	efic	iencies	
	]	m <sup>2</sup>		<u> </u>	17.95		18	}						
Comments	Height only	measures vis	ible area above	e fill.										
Recommended Wor	·k:	Rehab	Replace		Maintena				tenance Needs:					
Ur	gent 1 t	to 5 years	6 to 10 years	S	None	X			Urgent		1 year		2 years	
		_											_	
Element Group	Abutments				Length (n			0.28						
Element Name	<b>Bearings</b>	:=: 4 ==			Width (m			0.4						
Location		ent (Fixed En	.d)		Height (m	1)		0.04						
Material	Steel/ Neop				Count	. 2	$\dashv$	4						
Element Type	Elastomeric	=	<del></del>		Total Qty			4	<del></del>					
Environment	Benign	Moderate	e X Severe		Limited I	nspe	ction	n [						
<b>Protection System</b>			<del></del>									rmance		
<b>Condition Data</b>		nits	Exc	<u> </u>	Good		Fai	ir	Poor	r	De	efic	iencies	
	1	m <sup>2</sup>	[		0				4					
Comments	Narrow diag	onal crack at	all four corner	rs wh	nere the win	ngwa	ıll m	eets the	e deck.					
Recommended Wor	ecommended Work: Rehab Replace						Ma	intenar	nce Needs	s:				
Ur	gent 1 t	to 5 years	6 to 10 years	'S	None	X			Urgent	1	1 year		2 years	
											_			



Element Group	Abutments				Length (n	n)		0.28						
Element Name	Bearings				Width (m)			0.4						
Location	West Abutm	ent (Expansio	on End)		Height (m	ı)		0.12						
Material	Steel/ Neopr	ene			Count			4						
Element Type	Elastomeric	Pad			Total Qty	$(m^2)$	)	4						
Environment	Benign	Moderate	X Severe		Limited I			n						
<b>Protection System</b>											Performance			
Condition Data	Uı	nits	Exc		Good	Fai	ir	Poor	r	Deficiencies				
Condition Data	ea	ach					4			_				
Comments														
Recommended Wor	·k:	Rehab	Replace		_ 		Ma	intena	nce Needs	s:				
Ur	gent 1 to	o 5 years	6 to 10 year	·s	None	X			Urgent	1	1 year	2 years		
	<u> </u>		<u>-</u>						-			<u> </u>		
Element Group	Abutments				Length (n	n)		4.75						
Element Name	Wingwalls				Width (m									
Location	Corner of St	ructure			Height (m	ı)		1.5						
Material	Cast-in-place	e Concrete			Count			4						
Element Type	Reinforced (	Concrete			Total Qty	$(m^2)$	)	28.5						
Environment	Benign	Moderate	X Severe		Limited In	nspe	ction	n						
<b>Protection System</b>										4	formance			
Condition Data	Uı	nits	Exc		Good		Fai	ir	Poor	r	De	ficiencies		
Condition Data	ea	ach			28.5									
Comments														
Recommended Wor	·k:	Rehab	Replace				Ma	intena	nce Needs	s:	18			
Ur	gent 1 to	o 5 years	6 to 10 year	_	None	X			Urgent		1 year X	2 years		
Element Group	Accessories				Length (n	n)								
Element Name	Signs				Width (m)									
Location	At Approach	nes			Height (m	1)								
Material	Aluminium				Count			4						
Element Type					Total Qty	-		4						
Environment	Benign	Moderate	X Severe		Limited In	nspe	ction	n	X					
<b>Protection System</b>			•								1	formance		
Condition Data	Uı	nits	Exc		Good		Fai	ir	Poor	r	De	ficiencies		
Condition Dam	]	m			4									
Comments														
Recommended Wor	k:	Rehab	Replace				Ma	intena	nce Needs	s:				
Ur	gent 1 to	o 5 years	6 to 10 year	'S	None	X			Urgent		1 year X	2 years		



Element Group	Approac			Length (n			167.64											
Element Name	Barriers						Width (m)											
Location	At Appro	aches	S				Height (m	1)										
Material	Steel						Count											
Element Type	Timber I	Post a	nd Steel Pa	anel			<b>Total Qty</b>	$(m^2)$		167.64								
Environment	Benign		Moderate	5	Severe	X	Limited Inspection											
Protection System	_								on X Performance									
C 122 D . 4 .		Unit	ts .	E	Exc		Good Fair			ſ	Po	or	Deficiencies					
Condition Data		m <sup>2</sup>						16	67.6	54								
Comments																		
Recommended Wor	·k:	R	Rehab X	R	eplace			N	Mai	ntena	nce Nee	eds:						
Ur	gent	1 to 5	years X	6 to 1	10 year	rs	None				Urgen	t	1 year X 2 years					
												<del></del>	<u> </u>					
Element Group	Approac	hes					Length (n	1)		4.75								
Element Name Sidewalk/ Curb							Width (m		_	0.58								
Location	At Appro	aches	3				Height (m		(	0.2								
Material	Cast-in-p	lace C	Concrete				Count	,	4	4								
Element Type				Total Qty	(m <sup>2</sup> )		14.82											
Environment	Benign		Moderate	X	<b>Limited Inspection</b>													
Protection System							<u>!</u>						Performance					
		Unit	S	E	Exc		Good	ŀ	Fair	r	Po	or	Deficiencies					
Condition Data	m <sup>2</sup>						14.82											
Comments		_	linal and tra					at both	ap <sub>]</sub>	proach	es. Lig	ht ravel	ling and wheel rutting					
Recommended Wor	·k:	R	Rehab X	R	eplace	X	Mainter			intenance Needs:								
Ur	gent	1 to 5	years X	6 to 1	10 year	rs	None						1 year X 2 years					
							II											
Element Group  Element Name	Approac Wearing		2000				Length (n Width (m		_	6 8.62								
Location	East and		acc				Height (m		+	0.02								
Material	Asphalt						Count	.,		2								
Element Type							Total Qty	(m <sup>2</sup> )										
Environment Benign Moderate Severe					X	Limited I		_										
Protection System	z mgn					Noi		БРССС					Performance					
·		Unit	·s	F	Exc				Fair	. ]	Poor		Deficiencies					
Condition Data				<del>                                     </del>	ZAL .		93.44	1	Fair 6				Deficiencies					
Comments	At the NE/NW/SE/SW corners starting at the								he end of the jersey bar				parriers on top of the bridge. W-beam steel					



Recommended Wor	rk:	Rehab	Replace	9			Ma						
Ur	gent	1 to 5 years	6 to 10 yea	rs	None	X			Urgent		1 year		2 years
										•			
Element Group	Barriers	<u> </u>			Length (m)			132					
Element Name	Barrier/	Parapet wall			Width (m	-		0.26					
Location	North an				Height (n	1)		0.62					
Material	Cast-In-F	Place Concrete			Count 2								
Element Type	Parapet V	Wall with two ra	ails		Total Qty	)	396						
Environment	Benign	Modera	te Severe	X	Limited I			n					
<b>Protection System</b>					•						Pe	rfo	mance
Candition Data		Units	Exc		Good	Good Fair			Poo	or	D	efic	iencies
Condition Data		m			246		75	5	75	5			
Comments	Light to a scaling, o	on var	rious locati	on wi	th e	xposed	reinforce	ement	. Rust sta	inin	g, light		
Recommended Wor				Ma	intena	nce Need	ds:						
Ur	gent	1 to 5 years	None	X			Urgent		1 year		2 years		
Element Group	Barriers	<u> </u>			Length (r	n)		13					
Element Name	Hand Ra	ailings			Width (m	1)							
Location	North an	d South			Height (n	1)							
Material	Steel				Count			4					
Element Type	Double T	Tube Railing			<b>Total Qty</b>	$(m^2)$	)	524					
Environment	Benign	Moderat	te Severe	X	Limited I	nspe	ctio	n					
Protection System	·		(	- Galva	nized						Pe	rfo	mance
C 122 D . 4 .		Units	Exc		Good			ir	Poo	or	D	efic	iencies
Condition Data		m						4					
Comments	Localize	ed areas of seven	e corrosion. L	ight o	corrosion o	n anc	hor	bolts.					
Recommended Wor	rk:	Rehab	Replace		Maintena				nce Need	ds:			
Ur	gent	1 to 5 years 2	6 to 10 yea	rs	None				Urgent		1 year		2 years
Element Group	Beams/N	MLE's			Length (r	n)		2.6					
Element Name		gms , End			Width (m	1)		0.3					
Location	tion At Abutments/ Piers							1.22					
Material	Steel			Count			24						
Element Type	I-Type			Total Qty	(No	s)	24						
Environment	Benign		Limited I	nspe	ctio	n							
<b>Protection System</b>	n System Red lead primer/ alkyd										Pe	rfo	mance
Condition Data		Units	Exc		Good		Fai	ir	Poo	or	D	efic	iencies
Condition Data		Nos			21		3						
Comments	ble ba	barrier, 120 arrier, 55.3	m loi	ng									



Recommended Wor	·k:	Rehab	Replace						
Ur	gent	1 to 5 years	6 to 10 years	None	X		Urgent	1 year	2 years
	-		- ·	<del></del>			<u> </u>		
Element Group	Beams/N	MLE's		Length (n	1)				
Element Name	Diaphra	igms ,		Width (m	)				
Location	Intermed	liate		Height (m	<u> </u>				
Material	Steel			Count		60			
Element Type	Cross Ty	уре		Total Qty	(Nos)	60			
Environment	Benign	Moderate	e X Severe	Limited I	nspectio	on			
Protection System	Ü	<u></u>	Red lead	primer/ alkyd	 [	_		Pe	rformance
		Units	Exc	Good		air	Poor	D	eficiencies
Condition Data		Nos		60					
Comments	Localize	d light corrosion,	, overall in good	d					
Recommended Wor	·k:	Rehab	Replace		M	aintenan	aintenance Needs:		
Ur	gent	1 to 5 years	6 to 10 years	None	X	1	Urgent	1 year	2 years
Element Group	Beams/N	MLE's		Length (n	1)	2			
Element Name	Girders			Width (m	)	0.4			
Location	Ends (Ea	ast)		Height (m	1)	1.22			
Material	Steel			Count		4			
Element Type	I-Type			Total Qty	(m2)	29.12			
Environment	Benign	Moderate	e X Severe	Limited I	nspectio	on			
<b>Protection System</b>			Red lead	primer/ alkyc					rformance
Condition Data		Units	Exc	Good		air	Poor	D	eficiencies
Condition Data		m <sup>2</sup>			1	7	12.12		
Comments	coating.	n to severe corros	ion on exterior	girders. Light				ior girders	. Loss of
Recommended Wor	·k:	Rehab X			M	aintenan	ce Needs:		
Ur	gent	1 to 5 years X	6 to 10 year <u>s</u>	None			Urgent	1 year	2 years
Element Group	Beams/N	MLE 's		Length (n	1)	2			
Element Name	Girders			Width (m	)	0.4			
Location	Ends (W	est)		Height (m	1)	1.22			
Material	Steel			Count		4			
Element Type	I-Type			Total Qty	(Nos)	29.12			
Environment	Benign	<b>Moderate</b>	e X Severe	Limited I	nspectio	on	X		
<b>Protection System</b>		<u></u>	Red lead	primer/ alkyd	l			Pe	rformance



<b>Condition Data</b>		Units		EXC		G00a		F a	ır		Poor		De	enci	lencies	
Condition Data		m <sup>2</sup>						17	7		12.12					
Comments	ends allo	orrosion at su ws water to s d re-coating i	pill	out from the	decl	c onto the st	eel g	irde	rs unde	rneath						÷
Recommended Wo	rk:	Rehab	X	Replace				Ma	intena	nce N	leeds:					
Ur	gent X	1 to 5 years		6 to 10 year	_	None				Urge	ent	1 yea	r		2 years	3
						<b>-</b>						<b>-</b>				
Element Group	Beams/N	ILE 's				Length (r	n)		118.5							
Element Name	Girders					Width (m	1)		0.4							
Location	Intermed	iate				Height (n	1)		1.22							
Material	Steel					Count			4							
Element Type	I-Type					Total Qty	(m2	)	1725.3	36						
Environment	Benign	Mode	rate	X Severe		Limited I	nspe	ctio	n							
Protection System						•							Per	for	mance	
Condition Data		Units		Exc		Good		Fai	ir		Poor		De	fici	iencies	
Condition Data		m <sup>2</sup>				1695.12		30	)							
Comments  Recommended Wo		d re-coating i	s red	quired. Repa		maged deck	drai		intena	nce N	leeds:					
Uı	gent	1 to 5 years	X	6 to 10 year	_	None				Urge	ent	1 yea	r		2 years	,
Element Group	Coatings					Length (1			131							
Element Name		Systems/ Ha				Width (m										
Location		ube Hand Ra	ulın	qs		Height (n	1)									
Material	Other	G 1				Count	. 2		4							
Element Type		Galvanizing				Total Qty			524							
Environment	Benign	Mode	rate	Severe	X	Limited I	nspe	ctio	n							
<b>Protection System</b>		A:			_	~ .				1					mance	
Condition Data		Units		Exc		Good		Fai			Poor		<u>De</u>	tic	iencies	
		m <sup>2</sup>				419		10	5							
Comments		d loss of coats	_		s. Re	ecommende	l Wo	rk: I	Rehab							
Recommended Wo		Rehab		Replace				Ma	intena	nce N	eeds:					· <u></u>
Uı	gent	1 to 5 years		6 to 10 year	rs	None	X			Urge	ent	1 yea	r		2 years	3
		<u>.                                    </u>				•						<u>.                                    </u>				
Element Group	Coatings					Length (1	n)									
Element Name	Structur				Width (m	-										



Location	Girders (E	Ends)				Height (m	1)						
Material	Other					Count							
Element Type	Red Lead	Primer/ Alky	yd			<b>Total Qty</b>	$(m^2)$	58.2	24				
Environment	Benign	Moder	ate X	Severe		Limited I	nspect	ion					
<b>Protection System</b>				Red Lea	d Pri	mer/ Alky	d				P	erfo	rmance
Condition Data		Units		Exc		Good	I	air		Poor	Ι	)efic	eiencies
Condition Data		m <sup>2</sup>							5	8.24			
Comments		pating at ends re-coating.	S.										
Recommended Wor	rk:	Rehab	X	Replace			N	<b>Aainte</b>	nance N	eeds:			
Ur	gent	1 to 5 years	6	to 10 year	·s	None			Urge	nt	1 year	X	2 years
							S	Seal cra	icks in as	phalt			
Element Group	Coatings					Length (n	n)						
Element Name	Structura	ıl Steel				Width (m	)						
Location	Girders (I	ntermediate)				Height (m	1)						
Material	Other					Count							
Element Type	Red Lead	Primer/ Alky	yd			<b>Total Qty</b>	$(m^2)$	172	5.36				
Environment	Benign	X Moder	ate	Severe		Limited I	nspect	ion	X				
<b>Protection System</b>				Red Lea	d Pri	imer/ Alky	d				P	erfo	rmance
Condition Data		Units		Exc		Good Fair Poor			Ι	)efic	eiencies		
Condition Data		%			1	680.36		45					
Comments	Foundations not inspected, good cover in Based on condition of rest of bridge.				in all	l areas of th	e foun	dation.					
Recommended Wor	rk:	Rehab		Replace			N	<b>Aainte</b>	nance N	eeds:			
Ur	gent 1	1 to 5 years	6	to 10 year	·s	None	X		Urge	nt	1 year		2 years
											_		
Element Group	<b>Coatings</b>					Length (n							
Element Name	Structura					Width (m							
Location	Diaphraqı Other	ns (Ends)				Height (m Count	1)						
Material Element Type		Primer/ Alky	vd				(m <sup>2</sup> )	6					
Environment	Benign	Moder		Severe		Total Qty Limited I							
	Бешди	Miodei	ate A	Severe		Lilliteu I	nspect	1011				C-	
Protection System		Units		Exc		Good	I			Poor			rmance eiencies
Condition Data	m2 / m /	each / % / a	all	EXC		3	1	3	<u> </u>	1 001	1	CIR	Acticies
Comments	Loss of coating at few areas end diaphragic Clean and re-coating end diaphragms.						face co		n.				
Recommended Wor		re-coating e	nd dia <sub>l</sub>	phragms.  Replace			In	 Mainte	nance N	eeds:		18	



								Clear vege	etation und	er b	ridge and	on slopes.
Element Group	Decks					Length (n	1)	122.5				
Element Name	Deck Top	All				Width (m		10.4				
Location	All					Height (m						
Material	Cast-In-P	lace Concrete	2			Count		1				
Element Type						Total Qty	(m <sup>2</sup> )	1274				
Environment	Benign	Moder	ate	Severe	X	Limited I						
Protection System			<u>.                                    </u>			Svstem					Pei	formance
·		Units		Exc		Good		Fair	Poor	•	<b>-</b>	ficiencies
Condition Data	m2 / m	/ each / % / a	all			800		474				
Comments	Asphalt re	nal and trans	nme	nded.	sphal	lt observed.						
Recommended Wo		Rehab	X	Replace				Maintena	nce Needs	<u>;:                                    </u>		_
Ur	gent	1 to 5 years	X	6 to 10 year	'S	None			Urgent		1 year	2 years
									ndent on m	netho	od used an	d season
Element Group	Decks Length (m)											
Element Name	Drainage	System				Width (m	)					
Location	All					Height (m	1)					
Material	Steel					Count		8				
Element Type	Drain Pip	es with Basin	ıs			Total Qty						
Environment	Benign	Moder	ate	Severe	X	Limited I	nspe	ction				
<b>Protection System</b>					Noi							formance
Condition Data		Units		Exc		Good		Fair	Poor		De	ficiencies
		%							8			
Comments	Deck drain pipe size is 150mm diameter. Deck drains have light corrosion on top. Two drain pipes by ear pier are broken and dislocated from gutter system at top causing leakage of water and corrosion of girder 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.											
Recommended Wor	rk:	Rehab	X	Replace				Maintena	nce Needs	<b>}:</b>		
Ur	gent X	1 to 5 years		6 to 10 year	ears None Urgent 1 year 2						2 years	
Element Group	Decks					Length (n	1)	2				
Element Name	Soffit- Th	nin Slah		Width (m) 10.4								
	Ends	iii Siau						10.4				
Location		1 C	_			Height (m	ı <i>)</i>					
Material	Cast-In-Place Concrete					Count		2				



Element Type						Total Qty	(m <sup>2</sup> )	41.6				
Environment	Benign	Mo	oderate	Severe		Limited I		ion	X			
Protection System	_	<del></del>				•				<u>'</u>	Pe	rformance
Can dition Data		Units		Exc		Good	F	air		Poor	D	eficiencies
Condition Data	m2 / m	/ each / %	% / all			33.4	2	4.2		4		
Comments				of narrow tra			isolate	d areas o	f del	aminatio	n and spall	ing.
Recommended Wor	.l	Reha	.ь Г <u>у</u>	Replace			l,	<b>Taintena</b>	noo '	Noods.		
		1 to 5 yes		┥ .		None	——	Tamicna		gent	1 year	1 -voore
U1	gent	1 to 3 yea	ars A	6 to 10 year	'S	None	$\Lambda$		UIŞ	gent	1 year	2 years
Element Group	Decks					Length (n	n)	118.5				
Element Name	Soffit- T	hin Slab				Width (m		1.3				
Location	Exterior					Height (m	<u> </u>					
Material	Cast-In-P	Place Con	crete			Count		2				
Element Type						Total Qty	(m <sup>2</sup> )	308				
Environment	Benign	Mo	oderate	X Severe		Limited I		ion				
Protection System				· <del>····································</del>							Pe	rformance
Condition Data		Units		Exc		Good	F	air	air Poor			eficiencies
Condition Data		%				308						
Comments	Some ha	irline to n	iarrow c	cracks are obs	serve	d, isolated	areas o	f delamin	natio	n and spa	ılling.	
Recommended Wor	rk:	Reha	ıb	Replace			N	<b>Iaintena</b>	nce	Needs:		
Ur	gent	1 to 5 year	ars	6 to 10 year	rs	None	X		Urg	gent	1 year	2 years
										•		
								-				
Element Group	Decks					Length (n		118.5				
Element Name	Soffit- T	hin Slab				Width (m		7.8				
Location	Exterior					Height (m	1)	4.				
Material	Cast-In-P	Place Con	crete			Count		1				
Element Type	ļ .			<del> </del>		Total Qty		924.3	1			
Environment	Benign	X Mo	oderate	Severe	Ш	Limited I	nspecti	ion	X			
<b>Protection System</b>				1								rformance
Condition Data		Units		Exc		Good	F	Fair Poor			eficiencies	
	m2 / m	/ each / %	⁄₀ / all					4				



Comments	Comments: S	Some hairline	e to narrow cra	acks ar	e observe	ed, isola	ted areas	s of delamina	ation and sp	alling.
Recommended Wor	·k:	Rehab	Replace			M	aintena	nce Needs:		
Ur	gent 1 to	5 years	6 to 10 year	s	None	X		Urgent	1 year	2 years
Element Group	Decks			L	ength (n	1)	122.5			
Element Name	Soffit - Thin	Slab		V	Vidth (m	)	8.62			
Location	Exterior			E	leight (m	1)				
Material	Cast-In-Place	e Concrete			Count		1			
Element Type				Т	otal Qty	(m <sup>2</sup> )	1056			
Environment	Benign	Moderate	X Severe		imited I		on			
<b>Protection System</b>									Pe	rformance
C lition Data	Ur	nits	Exc	G	ood	Fa	air	Poor	D	eficiencies
Condition Data	0	<b>%</b>				6.5	56	400		
Recommended Wor	_	Rehab X	Replace 6 to 10 years	s	None		aintena	nce Needs: Urgent	1 year	2 years
Element Group	<b>Embankme</b> ı	nts and Strea	ams	I	ength (n	1)				
Element Name	Embankmei	nts		V	Vidth (m	)				
Location	At Abutment	ts		H	leight (m	1)				
Material	Other			C	Count		6			
Element Type				Т	otal Qty	(m <sup>2</sup> )	6			
Environment	Benign	Moderate	X Severe	$-\parallel^{\scriptscriptstyle \mathrm{L}}$	imited I	nspectio	on	X		
Protection System				•					Pe	rformance
Can dition Data	Ur	nits	Exc	G	ood	Fa	air	Poor	D	eficiencies
Condition Data	m2 / m / ea	ich / % / all			6					
Comments			· · · · · · · · · · · · · · · · · · ·		ected by				erosion in t	he NE quadrant.
Recommended Wor	·k·	Rehah	Renlace			M	aintena	nce Needs:		



Ur	gent 1 t	to 5 years	6 to 10 year	s None X				Urg	gent	1 year	2 years	
					_							
Element Group		ents and Strea	ms		Length (r	-						
Element Name	Slope Prote	ection			Width (m	.)						
Location	At Embankı	ments			Height (n	ı)						
Material	Other				Count		6					
Element Type					Total Qty	$(m^2)$	6					
Environment	Benign	Moderate	X Severe		Limited I		tion					
Protection System										Po	erformance	
Condition Data	U	nits	Exc		Good	]	Fair		Poor		eficiencies	
Condition Data		%			5		1					
Comments	Stream clear	r of debris and	vegetation.									
Recommended Wor	rk:	Rehab	Replace			N	Mainte	enance l	Needs:			
		•	•									
Ur	gent 1 t	to 5 years	6 to 10 year	S	None	X		Urg	gent	1 year	2 years	
		<del>!</del>							*			
						(	Clear v	egetatio	n under	bridge and	on slopes.	
Element Group	<b>Embankme</b>	ents and Strea	ms	Length (r	n)							
Element Name	Embankme	ents		Width (m	.)							
Location	At Abutmer	nts			Height (n	ı)						
Material	Other				Count		6					
Element Type					Total Qty	(m <sup>2</sup> )	6					
Environment	Benign	Moderate	X Severe		Limited I		tion					
Protection System		•		No	ne					Pe	erformance	
C . 122 . D . (	U	nits	Exc		Good	J	Fair		Poor	Γ	eficiencies	
Condition Data	m2 / m / e	ach / % / all			6							
Comments	quadrant.	bankments are	stable and w	ell p	rotected by	rocks	and ve	egetation	n . Light	erosion in	the NE	
Recommended Wor	rk:	Rehab	Replace	e Maintenance Needs:								
Ur	gent 1 t	to 5 years	6 to 10 year	rs	None	X		Urg	gent	1 year	2 years	
Element Group		ents and Strea	ms		Length (r	-						
Element Name	Slope Prote	ection			Width (m	.)						
Location	At Embankı	ments			Height (n	1)						
Material	Other				Count		6					
Element Type					Total Qty	(m <sup>2</sup> )	6					
Environment	Benign	Moderate	X Severe		Limited I	nspect	tion					
Protection System				Ere   Emitted Hispecti						Po	erformance	



Condition Data	<b>U</b> ı	nits	Exc		Good	F	air	P	oor	Deficiencies
Condition Data	•	%			5		1			
Comments	Embankmen	ts are stable, v	vell supporte	d by	rocks and t	fully co	vered w	ith vege	tation.	
Recommended Wor	rk:	Rehab X	Replace			M	laintena	ance Ne	eds:	
Ur	gent 1 to	o 5 years X	6 to 10 year	S	None			Urgen	nt	1 year 2 years
Element Group	<b>Embankme</b>	nts and Strea	ms		Length (n	n)				
Element Name	Streams and	d Waterways			Width (m	)				
Location	At structure				Height (m)					
Material	Other				Count		1			
Element Type					Total Qty	$(m^2)$	1			
Environment	Benign X	Moderate	Severe		Limited I	nspecti	on			
<b>Protection System</b>				No	ne					Performance
Condition Data		nits	Exc		Good	F	air	P	oor	Deficiencies
Condition Data	m2 / m / ea	ach / % / all			1					
Comments  No obstruction found.  East pier footing of east side is severely scoured.  Place large, angular rocks or concrete to prevent										
Recommended Wor		Rehab X o 5 years	Replace 6 to 10 year	X	None	<del></del> 1	Iaintena	ance Ne Urger	$\overline{}$	1 year 2 years

Element Group	<b>Joints</b>				Length (m)	10.4	
Element Name	Armouring	g/ Retaining Devi	ices		Width (m)		
Location	West end or	f Deck			Height (m)		
Material	Steel				Count	1	
Element Type					Total Qty (m <sup>2</sup> )	10.4	
Environment	Benign	Moderate	Severe	X	Limited Inspection	n	
<b>Protection System</b>	,			No	ne		Performance



C III D	Un	its	Exc		Good	Fa	ir	Poor	Deficiencies
Condition Data	m2 / m / ea	ch / % / all				10	.4		
Comments		, cover plate i						orrosion, scra	pe damage.
Recommended Wo	rk:	Rehab	Replace			Ma	aintenan	ce Needs:	
Ur	gent X 1 to	5 years	6 to 10 year	s	None			Urgent	1 year 2 years
								· —	
Element Group	<b>Joints</b>				Length (n	n)	8.62		
Element Name	Concrete En	d Dams			Width (m	1)	0.3		
Location	At Joints				Height (n	1)			
Material	Cast-In-Place	Concrete			Count		4		
Element Type					Total Qty	(m <sup>2</sup> )	10.35		
Environment	Benign	Moderate	Severe	X			n		
<b>Protection System</b>		,		No	ne				Performance
Condition Data	Un	nits	Exc		Good	Fa	ir	Poor	Deficiencies
Condition Data	m2 / m / ea	ch / % / all			5	4.3	35	1	
Comments	dams are not							am. Joints be	tween asphalt and end
Recommended Wo	rk:	Rehab	Replace	X		Ma	aintenan	ce Needs:	
Ur	gent X 1 to	5 years	6 to 10 year	·s	None			Urgent	1 year 2 years

Element Group	<b>Joints</b>					Length (m)	10.4		
Element Name	Seals/ Se	ealants				Width (m)			
Location	East and	West				Height (m)			
Material	Rubber					Count	4		
Element Type	Strip Sea	.1				Total Qty (m <sup>2</sup> )	10.4		
Environment	Benign	Modera	te	Severe	X	<b>Limited Inspectio</b>	n		
<b>Protection System</b>	No				No	ne			Performance



Candition Data	Units	Exc	Good	Fair	Poor	Deficiencies
Condition Data	m2 / m / each / % / all				10.4	
Comments	No seal observed at west of resulting leakage. Replace expansion joints		side expansion j	joint, seal is tor	n and damaged a	t numerous location
Recommended Wo Uı	rk: Rehab X rgent 1 to 5 years X	Replace 6 to 10 year	<u> </u>	<del></del>	ance Needs: Urgent	1 year 2 years

Element Group	<b>Piers</b>					Length (n	1)			
Element Name	Bearings					Width (m	)			
Location	All					Height (n	1)			
Material						Count		8		
Element Type	Total Qty (m <sup>2</sup> ) 8									
Environment	Benign	Moderate	X	Severe		Limited I	nspectio			
<b>Protection System</b>	None									Performance
Condition Data	Units			Exc		Good	Fa	ir	Poor	Deficiencies
Condition Data	m2 / m / eac	m2 / m / each / % / all						8		
Comments	Limited inspe Review condi		ngs d	luring re	habi	litation.				
Recommended Wo Uı		Rehab X 5 years		Replace 10 year	s	None	<del></del>	aintenanc U	e Needs: rgent	1 year 2 years

Element Group	Piers				Length (m)	0.8						
Element Name	Shafts/Colu	umns/Pile			Width (m)	10.4	10.4					
Location	All				Height (m)	4.8						
Material	Cast-In-Place	e Concrete			Count	2						
Element Type	Concrete Sha	aft Pier wall			Total Qty (m <sup>2</sup> )	215.04						
Environment	Benign X	Moderate	Severe		Limited Inspectio	n						
<b>Protection System</b>				No	ne				Performance			



Candition Data	Units	Exc	Good	Fair	Poor	Deficiencies
Condition Data	m2 / m / each / % / all			8		
Comments	Limited inspection due to stained cracks are observed	U	of flowing wate	r. Localized m	edium cracks, ho	oneycombing, narrow
Recommended Wor		Replace 6 to 10 year		——	ance Needs: Urgent	1 year 2 years

Element Group	Sidewalks	s/ Curbs			Length (n	1)	122.5					
Element Name	Curbs				Width (m	)	0.58					
Location	North and	South			Height (m	1)	0.2					
Material	Cast-In-Pl	ace Concrete			Count		2					
Element Type	Concrete S	Shaft Pier wall			Total Qty	(m <sup>2</sup> )	191.1					
Environment	Benign	Moderate	Severe	X	Limited I		n					
Protection System		•		No	ne		•	•	Performance			
C. P.C. D.A.		Units	Exc		Good	Fair		Poor	Deficiencies			
Condition Data	m2 / m /	' each / % / all			8							
Comments	Several na areas.	nrrow cracks, del	amination, l	ight s	caling are o	bserved.	. Overall in	n fair conditi	on. Repair poor concrete			
Recommended Wor Ur		Rehab X 1 to 5 years X	Replace 6 to 10 yea	$\vdash$	None		nintenanco Ui		1 year 2 years			



								Brid	ge Condition In	dex							
No.	Element Group	Element Description	Location	Length	Width	Height	Count	Total Qty	Replacement (Initial) Cost	Material	Total Replacement	Excellen	Good	Fair	Poor	Current Element	Element Condition
				(m)	(m)	(m)	#		(\$)	Cast-in-place	Value TRV (\$)	1	0.75	0.4	0	Value CEV (\$)	Index
B-1	Abutments	Abutment walls	East and West	0.00	9.46	1.80	2	34.06	\$ 1000.00	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/MLE'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/MLE'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/MLE'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/MLE '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/MLE '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	Diaphraqms (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

Ontario Structure Inspecti	ion Manual - Inspe	ction Form		M	ITO Site Nu	umber						
		Inv	ventory Data:									
Structure Name	B-2 Jedburgh Dar	m Bridge										
Main Hwy/Road #	Main Street	On X			. Water X		Ped					
171mii 1111 j. 220	Ividii 5.1.1	Under	Type:	Non-Navig	Water	Road Ot	ther					
Hwy/Road Name	Main Street											
Structure Location	Approximately 150	m North of So	cott Street									
Northing	43°17' 19.2" N		Easting	80°26'49.2'	."W		,——					
Owners	Township of North	Dumfries	Heritage Designation:	Not Cons. X Desig./not L	Cons./no	ot App. List	t/not Desig.					
MTO Region	South-Western		Road Class:	Freeway	Arterial	Collector	Local X					
MTO District	London / Stratford		Posted Speed	50		No. of Lanes	1					
Old County	Waterloo,		AADT	-		% Trucks						
Geographic Township	Township of North	1 Dumfries	Inspection Rou	ute Sequence	[							
Structure Type	Solid Slab		Interchange Nu	umber	[							
Total Deck Length (m)	8		Interchange St	tructure Number	er [							
Overall Structure Width (m)	5.2		Min. Vertical (	Clearance (m)	[							
Total Deck Area (sq. m.)	41.6		Special Routes	s: Transit	Truck	School	Bicycle					
Roadway Width (m)	4.9		Detour Length Around Bridge (km) 1.8									
Skew Angle (degrees)	0		Direction of St	tructure		N/S						
No. of Spans	2		Fill on Structur	re (m)		0						
Span Lengths (m)	4.9 / 1.7		Deck Geodetic	e Elevation		253						
		Hi	storical Data:									
Year Built	1940		Year of Last M	Лаjor Rehab			1					
Last OSIM Inspection	2020		Last Evaluation	n			j					
Last Enhanced OSIM Inspec	ction		Current Load I	Limit (tonnes)			j					
Enhanced Access Equipment (ladder, boat, lift, etc.)			Load Limit By	/-Law #								
Last Underwater Inspection		<del></del>	By-Law Expiry	y Date			ĺ					
Last Condition Survey		<del></del>	•	•			1					
Rehab History: (Date/Descri	iption)											
1	I											



<b>Ontario Structure Inspection</b>	Manual - Inspection Form	MTO	Site Number
	Scheduled	Improvements:	
Regional Priority Number		Programmed Work Year	
Nature of Program Work:			
Appraisal Indices:		Comments	
Fatigue			
Seismic			
Scour			
Flood			
Geometrics			
Barrier			
Curb			



Load Capacity

Ontario Structure Inspection Ma	nual - Inspection F		MTO Site Number							
	Fie	eld In	spection Infor	mati	ion					
Date of Inspection	May 17, 2022, 3:3	0 PM	-	Тур	e of Inspection	:	OSIM X	Enhanced OSIM		
Inspector:	J. Zohreh, P.Eng.									
Others in Party:	S. Mitra, EIT									
Access Equipment Used:	,									
Weather:	Sunny									
Temperature:	18°C									
Additional Investigations Requir	ed				None		<b>Priority</b> Normal	Urgent		
Material Condition Survey										
Detailed Deck Condition Surv					X					
Non-destructive Delamination	Survey of Asphalt-	Cove	red Deck		X					
Concrete Substructure Condit	ion Survey				X					
Detailed Coating Condition S	urvey				X					
Detailed Timber Investigation	L				X					
Post-Tensioned Strand Investi	gation				X					
Underwater Investigation					X					
Fatigue Investigation					X					
Seismic Investigation					X					
Structure Evaluation					X					
Monitoring										
Monitoring of Deformations,	Settlements and Mov	veme	nts		X					
Monitoring Crack Widths					X					
Investigation Notes:										
		Over	all Structure N	otes	3					
Recommended Work on Structure	Non	e	Minor Rehab		Major Rehab	X	Replace			
Timing of Recommended Work	1 to 5 year	s X	6 to 10 years							
Overall Comments:	This structure is in abutments have de damage and rehabit restriction pf 10 To	lamir ilitati	nation, spalling, on is reuired. Th	exp	osed reinforcen andrails also ne	nent eds	s and cracks. to be replaced	The concrete shows		
Date of Next Inspection:	2024									
Suspected Performance Deficiencies  11 Load carrying capacity 12 Excessive deformations (reflections & rot 13 Continuing settlement 14 Continuing movements 15 Seized bearings	06 07 (ations) 08 09 10	Jamr Pede Roug Surfa	ing not uniformly load ned expansion joint strian/vehicular hazan th riding surface ace ponding c draining			13 14 15	Slippery Surfaces Flooding/channel b Undermining of fo Unstable embankn Other	undation		
Maintenance Needs  1 Lift and Swing Bridge Maintenance  2 Bridge Cleaning  3 Bridge Handrail Maintenance  4 Painting Steel Bridge Structures	07 08 09 10	Repa Repa	ir to Structural Steel ir to Bridge Concrete ir of Bridge Timber by bridges - maintenan			14 15	Erosion Control at Concrete Sealing Rout and Seal Bridge deck drains	_		





## **Ontario Structure Inspection Manual - Inspection Form**

MTO	Site	Number
1111	$\mathcal{O}_{1}$	Tumber

Repair Rehabilitation	n Required	l			Prio		Est	imated	
Element <sup>1</sup>	Repa	air and Rehabilitation Requ	uired <sup>2</sup>	6 to 10 years	1 to 5 years	Within 1 year	Urgent	Constru	uction Cost
Deck, wearing surface			0		X			\$	1,000.00
0			0			X		\$	1,000.00
Railing System	Tighten fit	ting near bend in pipe to stra	ighten			X		\$	500.00
Estimated Rehab	ilitated or R	Replacement Structure Dimer	nsions <sup>3</sup>		. 10.	. 10		Φ.	2 500 00
Deck Length (m)	8	Structure Width (m)	5.2	Total Structural Cost \$ 2,50					

<sup>1 -</sup> Indicate specific costs for structure replacement or for rehabilitation under the given headings.

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

Associated Work <sup>4</sup>	Comments	<b>Estimated Cost</b>
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

<sup>4 -</sup> 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.

Justification



<sup>2 -</sup> Give a brief description of the rehabilitation work required.

<sup>5 -</sup> 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

Element Group	Abutmen	its				Length (m)									
Element Name	Abutmen	t walls				Width (m	ı)		5.5						
Location	North and	South				Height (n	n)		2.7						
Material	Cast-in-pl	lace Concrete	e			Count			2						
Element Type	Convention	onal Closed				Total Qty	$\sqrt{(m^2)}$		34.44						
Environment	Benign	X Modei	rate	Severe		Limited I			n	X					
<b>Protection System</b>					No	ne						J	Perf	ormance	
Candidian Data		Units		Exc		Good		Fai	r		Poor		Deficiencies		
Condition Data		m <sup>2</sup>				15		12			7.44				
Comments	noticed or	n abutment w	valls.	7 7		flowing wa		1	•			on and de	terio	oration	
Recommended Wor		Rehab	X			<u> </u>		Mai	intena	nce l	Needs:			•	
<u>Ur</u>	gent 1	1 to 5 years	X	6 to 10 year	'S	None				Urg	gent	1 year		2 years	
Element Group	Abutmen					Length (r			0.8						
Element Name	Wingwall					Width (m			0.3						
Location	NE. NW,					Height (n	1)		1						
Material		lace Concrete	e			Count			4						
Element Type	Reinforce	d Concrete		X Severe		Total Qty			5.72						
Environment	Benign	Modei		Limited I	nspec	ct <u>io</u> r	a								
<b>Protection System</b>					No	ne						I	Perf	ormance	
Condition Data		Units		Exc		Good		Fai	r		Poor		Defi	ciencies	
Condition Data		m <sup>2</sup>				3		2.72	2						
Comments	Narrow cr	acks are obs	erve	ed. Wingwalls	s are	e in fair con	dition	1.							
Recommended Wor		Rehab		Replace					intena		Needs:				
Ur	gent 1	1 to 5 years		6 to 10 year	's	None X Urge					gent	1 year		2 years	
Element Group	Accessori	ies				Length (r	<u>n)</u>						_		
Element Name	Siqns					Width (m	1)								
Location	At Approa					Height (n	a)								
Material	Aluminun	n			_	Count			8	_			_		
Element Type						Total Qty	$\sqrt{(m^2)}$	,	8						
Environment	Benign	Moder	rate	Severe	X				1						
<b>Protection System</b>			_										erf	ormance	
-		Units		Exc		Good		Fai	r		Poor	$\exists$	Defi	ciencies	
Condition Data	m <sup>2</sup>					8					0				
Comments	All hazard	•	are	present and a	are i	n good con	dition	ı . 'O	ne lane	e' sig	;n marke	rs are also	) pre	esent on both	
Recommended Wor	k: Rehab Replace														
Ur	gent 1				·s	None	X			Urg	gent	1 year		2 years	



Element Group	Accessori	es			Length (r	n)		32.39					
Element Name	Barriers				Width (m								
Location	At Approa	ches			Height (n								
Material	Steel				Count	,							
Element Type	Timber Po	st and Steel Pa	anel		Total Qty	(m)		32.39					
Environment	Benign	Moderat	te Severe	X	Limited I	nspec	ction	ı 🗀					
Protection System			<u> </u>	Noi		•					Р	erfo	rmance
_		Units	Exc		Good		Fair	r		Deficiencies			
Condition Data		each			10		10		12.39		1		
Comments	_	nel at SW end	is not connect	ed wit	th structure	÷.							
Recommended Wor	rk:	Rehab	Replace	•			Mai	intenance	e Needs	:			
Ur	gent X 1	to 5 years	6 to 10 yea	rs	None			U	rgent		1 year		2 years
Connect SBGR with	structure.												
Element Group	Approach	ies			Length (r	n)	(	6					
Element Name	Wearing S	Surface			Width (m	1)	4.9						
Location	North and	South			Height (n	1)							
Material	Asphalt			Count		,	2						
Element Type					Total Qty	$(m^2)$		58.8					
Environment	Benign	Moderat	te X Severe		Limited I			1					
Protection System				Noı	ne			P	erfo	rmance			
Condition Data		Units	Exc		Good Fair			r Poor			1	)efic	iencies
Condition Data		each			50.8		8						
Comments	Approach	asphalt is in o	verall good co	onditi	on.								
Recommended Wor	rk:	Rehab	Replace				Mai	intenance	e Needs	:		18	
Ur	gent 1	to 5 years	6 to 10 yea	$\overline{}$	None	X		U	rgent		1 year	X	2 years
	<u> </u>			<u> </u>					<u> </u>		ν <u></u>		, <u></u>
Element Group	Barriers				Length (r	n)		8.8					
Element Name	Railing Sy	ystem			Width (m								
Location	East and V	Vest			Height (n	1)	(	0.9					
Material	Steel				Count			2					
Element Type	3 Rail Met		Total Qty	(Nos	s) (	61.8							
Environment	Benign	X	Limited I	nspec	ction	ı							
Protection System		Moderat	Noi	ne			<u> </u>			Performan		rmance	
			Good		Fair	Poor		Deficiencies					
Condition Data	m						32		29.8				
Comments	and is in p	stem consists oor condition. nded Work: R	Rail posts are			-	osts (	on each s  Priority		ruct	ure. Pipe	es ar	e corroded



	_	_	_	г									
Recommended Wor		Rehab		Replace		Г		Ma		ce Needs:	1 .		
	gent X 1		_	to 10 year <u>s</u>		None				Urgent	1 year	X 2 ye	ars
Railing needs to be re	eplaced as p	er design sta	ndard	ds and insta	ıll co	onnection w	ith ,	Tig	hten fitt	ing near be	nd in pipe	to straigh	ten
structure.										8	1 1		
Element Group	Coating					Length (m) 61.68							
Element Name	Barrier Sy	stem/Hand	Railii	nqs		Width (m	)						
Location	Railinq Sys	tem				Height (m	1)						
Material	Other					Count			1				
Element Type	Timber Po	st and Steel	Pane	el		<b>Total Qty</b>	$(m^2)$		61.68				
Environment	Benign	Modera	ite	Severe		Limited I			n	X			
<b>Protection System</b>				I	Pain	ted						Performa	nce
Condition Data		Jnits		Exc		Good		Fai	ir	Poor		Deficienc	ies
Condition Data		m <sup>2</sup>						32	2	29.8			
Comments		handrail barı	ier sy	ystem is in	pooi	r condition.							
Recommended Wor	·k:	Rehab [	X	Replace				Ma	intenan	ce Needs:			
Ur	gent X 1	to 5 years	6 1	to 10 years	S	None				Urgent	1 year	X 2 ye	ars
		_	<del></del>	-	•	Þ				<u> </u>	<b>-</b>		<u></u>
Element Group	Decks					Length (n	1)		8				
Element Name	Deck Top					Width (m	)		5.2				
Location	All					Height (m	1)						
Material	Cast-in-plac	ce Concrete				Count 1							
Element Type	Reinforced	Concrete				Total Qty	Fotal Qty (m <sup>2</sup> ) 41.6						
Environment	Benign	Modera	te X	Severe		Limited In	nspec	ction	n				
<b>Protection System</b>				A	Aspl	nalt						Performa	nce
Condition Data		Jnits		Exc		Good		Fai	ir	Poor		Deficienc	ies
Condition Data		m <sup>2</sup>				35.6		4		2			
Comments	Deck top is	s covered wi			top	assumed to							
Recommended Wor			X	Replace		Г		Ma		ce Needs:	1		
Ur	gent 1	to 5 years	X 6 1	to 10 year <u>s</u>	\$	None				Urgent	1 year	X 2 ye	ars
Element Group	Decks		Length (n	1)		4.85							
Element Name	Soffit-Thic		Width (m) 5.2										
Location		vay (North S	pan)			Height (m) 0.4							
Material	Cast-in-plac	ce Concrete				Count			1				
Element Type	Reinforced	Concrete				<b>Total Qty</b>	$(m^2)$		29.1				
Environment	Benign	Modera	te X	Severe		Limited I			n [				
<b>Protection System</b>					No	ne				<u> </u>		Performa	nce



Condition Data	Units		Exc		Good		Fair		Poor		Deficiencies			
Condition Data		m				12		10	7.1					
Comments	Localize	ed delamination	on ol	oserved. Con	crete	e disintegrat	ion a	ınd r	narrow (	cracks				
Recommended Wor	·k:	Rehab	X	Replace				Ma	intenaı	ıce Need	s:			
	gent	1 to 5 years		6 to 10 year		None	Y	1,14		Urgent		1 year	1	2 years
01.	gent	1 to 3 years	21	o to 10 year	3	None	71			orgent		1 year		2 years
Element Group	Decks					Length (n	1)		8					
Element Name	Wearing	Surface				Width (m)	Width (m) 4.9							
Location	All					Height (m)								
Material	Asphalt					Count			1					
Element Type						<b>Total Qty</b>	$(m^2)$	)	39.2					
Environment	Benign	Moder	ate	Severe	X	Limited I	nspe	ctio	n [					
Protection System		•						Pe	erfo	rmance				
Can dition Data		Units		Exc		Good		Fai	ir	Poo	r	D	efic	iencies
Condition Data		m				20		14	ļ	5.2				
Comments	Longitudinal and transverse cracks on asphalt surface are observed.													
Recommended Wor	·k:	Rehab	X	Replace	X			Ma	intenaı	ice Need	s:			
Ur	gent	1 to 5 years	X	6 to 10 year	·s	None Urgent 1					1 year		2 years	
		•		•		•				_		_		
Element Group	Embank	ments and S	trea	ms		Length (n	1)							
Element Name	Embank	ments				Width (m)	)							
Location	At Abutr	nents				Height (m)								
Material	Other					Count		4						
Element Type						<b>Total Qty</b>	$(m^2)$	)	4					
Environment	Benign	Moder	ate	X Severe		Limited Inspection								
Protection System					No	ne						erfo	rmance	
C 1:4: D-4-		Units		Exc		Good		Fai	ir	Poo	r	D	efic	iencies
Condition Data		m				4								
Comments		ments are stab auge station le			•	•	•							
Recommended Wor	·k:	Rehab		Replace				Ma	intenai	ice Need	s:			
Ur	gent	1 to 5 years	X	6 to 10 year	·s	None				Urgent		1 year		2 years
						•				<u>-</u>		<u>-</u>		
Element Group	Embank		Length (m)											
Element Name	Slope Protection					Width (m)								
Location	At Embankments					Height (m	)							
Material	Other					Count			4					
Element Type						<b>Total Qty</b>	(No	s)	4					
Environment	Benign	Moder	ate	X Severe		Limited I	nspe	ctio	n [					
Protection System	None Performance													



<b>Condition Data</b>	n Data		Exc		Good		Fair	Poor		Deficiencies			
Condition Data		Nos			4								
Comments	Embank	ments are stable	e and in good	d condi	tion .			,		·			
Recommended Wor	rk:	Rehab	Repla	ce			Maint	enanc	e Needs:				
	gent	1 to 5 years	6 to 10 y		None	X			rgent	1 year		2 years	
	8	Jan Jan M		<u></u>	5.15225				8	J			
<b>Element Group</b>	Embanl	ments and Str	eams		Length (m)								
Element Name	Streams	and Waterwa	ys		Width (m)								
Location	At struct	ure			Height (n	1)							
Material	Other				Count 1								
Element Type					Total Qty	(No	s) 1						
Environment	Benign	Modera	Limited I	nspe	ction								
<b>Protection System</b>			ead pr	imer/ alkyo	l				P	erfo	rmance		
Condition Data		Good		Fair		Poor	]	Defic	ciencies				
Condition Data		Nos	1										
Comments	No obstruction found.  k: Rehab Replace Maintenance Needs:												
Recommended Wor	ce			Maint	enanc	e Needs:							
Ur	gent	1 to 5 years	6 to 10 y	ears	None	X		J	rgent	1 year		2 years	
												_	
Element Group	Piers				Length (n	n)	0.4	45					
Element Name	Shafts/C	Columns/Pile B	ents		Width (m) 5.2								
Location					Height (m) 2.7								
Material	Cast-in-1	olace Concrete			Count		1						
Element Type	Reinfor	ced Concrete			<b>Total Qty (m2)</b> 30.51								
Environment	Benign	Modera	te X Seve	re	Limited I	nspe	ction						
<b>Protection System</b>				No	one					P	erfo	rmance	
Condition Data		Units	Exc		Good		Fair		Poor	]	Defic	ciencies	
Condition Data		m <sup>2</sup>			20		5		5.1				
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 Wor	rk:	Rehab	ice			Maint	enand	e Needs:					
Ur	Urgent 1 to 5 years X 6 to 10 years							ι	rgent	1 year		2 years	$\Box$
										· - I		· <u>L</u>	
Element Group	Retainir	ng walls			Length (n	n)	2						
Element Name	Walls				Width (m		0.3	3					



Location	NE Quadrant						Height (m)			0.8							
Material	terial Cast-In-Place Concrete  ment Type Reinforced Concrete						Count			1							
Element Type	Reinforc	<b>Total Qty</b>	2.2														
Environment	Benign		Modera	ate X	Severe		Limited I	nspec	tioı	n	X						
Protection System					Red lea	ıd pri	mer/ alkyo	1						Per	formance	•	
Condition Data		Uni	its		Exc		Good Fa			air Poor				Deficiencies			
Condition Data		m	2			1.2	1										
Comments	around th	_		-			main structure. Som wall is in fair condi			ion.			ed. Ve	getation	is growin	ng	
Recommended Wor					Replace		Ma			intena	nce l	Veeds:					
Ur	gent 1 to 5 years		6 to	10 yea	rs	None X				Urg	ent	_ 1 y	year	2 years	s		
Element Group	Sidewall Curbs	ks/ C	urbs				Length (r		_	9.1							
Element Name					Width (m)			0.15									
Location	East and		t				Height (n	1)		0.2							
Material	Concrete	;					Count	( 2)		2							
Element Type	<b>.</b>				1	7.7	Total Qty			6.37							
Environment	Benign		Modera	ate	Severe	$\mathbf{X}$	Limited I	nspec	tioi	n					_		
<b>Protection System</b>		C 1	To:			1			Performance								
<b>Condition Data</b>	Units m <sup>2</sup>				Exc	+	<b>Good</b> 6.37	-	Fair			Poor		Deficiencies			
		m					0.37										
Comments				_			rved. Overa										
Recommended Wor	rk:		Rehab		Replace				Ma	intena	nce l	Veeds:	_		_		
Ur	gent 1 to 5 years			6 to	10 yea	rs	None X			Urgent			1 y	year	2 years	X	
	<u> </u>				1												
													ı				
						1					1		$\longrightarrow$				
						<u> </u>					<u> </u>						
	•																
		<u> </u>	<u>L</u>														



Bridge Condition Index																		
No.		Element Description	Location	Length	Width	Height	Count	Total Qty	Units	Replacement (Initial) Cost	Material	Total Replacement Value	Excellen t	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	Siqns	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 Railinqs	Railinq 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		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



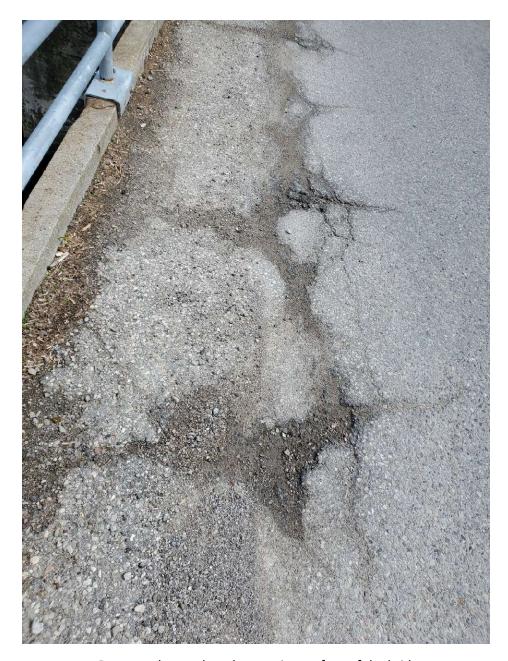
East Elevation/ Upstream view



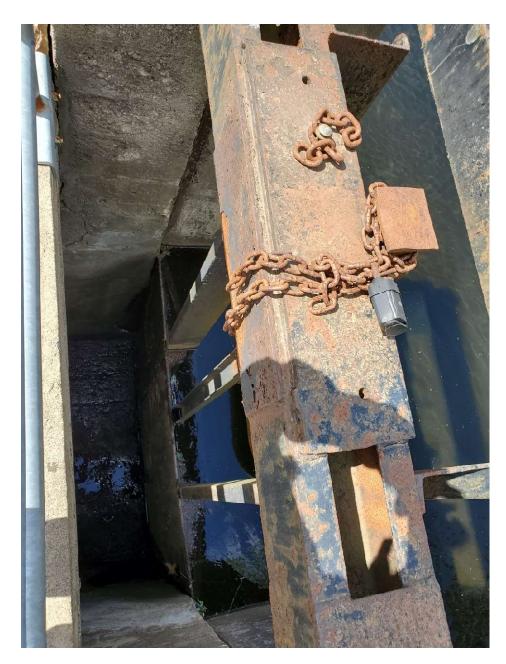
Downstream view



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

Ontario Structure Inspection	1 Manual - Inspection Forr	m MTO Site Number
		Inventory Data:
Structure Name	B-3 Piper Street Bridge	
Main Hwy/Road #	Piper Street Under	
Hwy/Road Name	Piper Street	
Structure Location	Approximately 100 m Wes	st of Northumberland Street
Northing	43°17'06.1" N	Easting 80°27'07.4"W
Owners	Township of North Dumf	Heritage Not Cons. X Cons./not App. List/not Desig.  Designation: Desig./not List Desig. & List
MTO Region	South-Western	Road Class: Freeway Arterial Collector Local X
MTO District	London / Stratford	Posted Speed 50 No. of Lanes 2
Old County	Waterloo,	AADT % Trucks
Geographic Township	Township of North Dumf	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 Truck School Bicycle
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)
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	on	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/Descript	cion)	<del>.</del>



<b>Ontario Structure Inspection</b>	Manual - Inspection Form	MTO	Site Number
	Scheduled	Improvements:	
Regional Priority Number		Programmed Work Year	
Nature of Program Work:			
Appraisal Indices:		Comments	
Fatigue			
Seismic			
Scour			
Flood			
Geometrics			
Barrier			
Curb			



Load Capacity

On	tario Structure Inspection Ma	nual - Inspection Fo		MTO Site Number								
		Fiel	d In	spection Infor	mati	ion						
Dat	e of Inspection	May 17, 2022, 4:40	PM		Тур	e of Inspection	:	OSIM X	Enhanced OSIM			
Insp	pector:	J. Zohreh, P.Eng.										
Oth	ers in Party:	S. Mitra, EIT										
Aco	cess Equipment Used:	·										
We	ather:	Sunny										
Ter	nperature:	18°C										
		,						Priority				
Ad	ditional Investigations Require	d				None		Normal	Urgent			
Ma	terial Condition Survey											
	Detailed Deck Condition Surv	ey				X						
	Non-destructive Delamination	Survey of Asphalt-C	Cove	red Deck		X						
	Concrete Substructure Conditi	on Survey				X						
	Detailed Coating Condition Su	irvey				X						
	Detailed Timber Investigation					X						
	Post-Tensioned Strand Investig	gation				X						
Uno	derwater Investigation											
Fati	igue Investigation					X						
Sei	smic Investigation					X						
Stru	acture Evaluation					X						
Mo	nitoring											
	Monitoring of Deformations, S	Settlements and Mov	emei	nts		X						
	Monitoring Crack Widths					X						
Inv	estigation Notes:			•		1						
		(	)ver	all Structure N	otes	S						
Rec	commended Work on Structure	None		Minor Rehab	X	Major Rehab		Replace				
Tin	ning of Recommended Work	1 to 5 years	X	6 to 10 years								
Ove	erall Comments:	The bridge is in fair	con	dition								
Dat	e of Next Inspection:	2024										
Susp 01 02 03 04 05	ected Performance Deficiencies Load carrying capacity Excessive deformations (reflections & rota Continuing settlement Continuing movements Seized bearings	06 07 08 09 10 11	ons) 07 Jammed ex 09 Pedestrian/ 09 Rough ridii 10 Surface poi			] ] ]	12 13 14 15 16	Slippery Surfaces Flooding/channel Undermining of fo Unstable embankr Other	oundation			
Main 01 02 03 04 05 06	tenance Needs Lift and Swing Bridge Maintenance Bridge Cleaning Bridge Handrail Maintenance Painting Steel Bridge Structures Bridge Deck Joint Repair Bridge Bearing Maintenance	07 08 09 10 11	Repa Repa Baile Anin	ir to Structural Steel ir to Bridge Concrete ir of Bridge Timber sy bridges - maintenar nal/Pest Control ge Surface Repair		] ] ] 1	13 14 15 16 17	Erosion Control at Concrete Sealing Rout and Seal Bridge deck drains Scaling (loose con Other	J			



## **Ontario Structure Inspection Manual - Inspection Form**

MTO	Site	Number
MIL	SILC	Mumber

Repair Rehabilitation	n Required	l		Prio	Estimated			
Element <sup>1</sup>	Repa	nir and Rehabilitation Requ	6 to 10 years	1 to 5 years	Within 1 year	Urgent	Construction Cost	
Deck, wearing surface			0		X			\$ 1,000.00
Decks			0			X		\$ 1,000.00
Approach Slabs			0			X		\$ 500.00
Estimated Rehab	ilitated or R	Replacement Structure Dimen	nsions <sup>3</sup>	75	. 10.	<b>4 2 5</b> 00 00		
Deck Length (m)	11.8	Total Structural Cost \$ 2,500						

<sup>1 -</sup> Indicate specific costs for structure replacement or for rehabilitation under the given headings.

<sup>3 -</sup> 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

<sup>4 -</sup> 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.

Justification



<sup>2 -</sup> Give a brief description of the rehabilitation work required.

<sup>5 -</sup> 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

Element Group	Abutments				Length (n	n)						
Element Name	Abutment w	alls		Width (m	1)		11					
Location	East and Wes	t			Height (m	3.4						
Material	Cast-in-place	Concrete			Count		2					
Element Type	Conventional	Closed			Total Qty	$(m^2)$	T	74.8				
Environment	Benign	Moderate	X Severe		Limited I			n				
Protection System			<del></del>	Nor	ne						Per	formance
	Un	its	Exc		Good	]	Fai	r	Po	or	Def	ficiencies
Condition Data	m	2			68.6		4.2	2	2	2	1	
Comments	Localized are delamination.									rous wa	ater stains	and
Recommended Wor	·k:	Rehab X	Replace			[	Mai	intena	nce Nee	ds:		
Ur	gent 1 to	5 years X	6 to 10 year	_	None				Urgent	t	1 year	2 years
Element Group	Abutments				Length (n							
Element Name	Bearings				Width (m		ightharpoonup					
Location	At Abutments				Height (m	1)						
Material	Steel/Neopre	ne			Count			18				
Element Type			<del></del>		Total Qty			18				
Environment	Benign	Moderate	X Severe		Limited Inspection				X			
<b>Protection System</b>							_				_	formance
Condition Data	Un		Exc		Good	ood Fa		r	Po	or	Def	ficiencies
Condition Data	m	12					18					
Comments	Bearings not	visible. Assu	ımed to be in	fair	condition							
Recommended Wor	·k:	Rehab	Replace		Mainte			intenance Needs:				
Ur	gent 1 to	5 years	6 to 10 year	'S	None X				Urgent	t	1 year	2 years
		_										
Element Group	Abutments				Length (n			8				_
Element Name	Wingwalls				Width (m							
Location	Northeast				Height (m	1)	ightharpoonup	1				
Material	Cast-in-place				Count		$\dashv$	1				
Element Type	Reinforced C		<del></del>	<del></del>	Total Qty			8				
Environment	Benign	Moderate	X Severe		Limited I	nspect	tion	n				
<b>Protection System</b>			-									formance
Condition Data	Un m		Exc		Good		Fai		Po		Deficiencies	
Condition Davis			7.2		0.4	1	0.	.4				
Comments	Patchwork at	poor concret	e areas as req	ųuireo	d.							
Recommended Wor	·k:	Rehab X	Replace			I	Mai	intena	nce Nee	ds:		
Ur	gent 1 to	5 years X	6 to 10 year	'S	None				Urgent	t	1 year	2 years



Element Group	Abutments				Length (n	n)		9					
Element Name	Wingwalls			Width (m	)								
Location	Southeast				Height (m	1)		2					
Material	Cast-in-place	Concrete			Count			1					
Element Type	Reinforced C	Concrete			Total Qty	$(m^2)$		18					
Environment	Benign	Moderate	X Severe		Limited I			n					
<b>Protection System</b>											Performance		
Condition Data	Ur	nits	Exc		Good		Fai	ir	Poor	r	Def	iciencies	
Condition Data	ea	ch			17.3		0.5	5	0.2				
Comments	Minor scaling is observed at wingwalls. Medium cracks, efflorescence, localized spalling Patchwork at poor concrete areas as required.									ing with ex	kposed rebar.		
Recommended Wor					Ma	intenar	nce Needs	s:					
Ur	·s	None				Urgent	1	1 year	2 years				
					- 11								
Element Group	Accessories				Length (n		$\dashv$						
Element Name	Signs				Width (m		$\dashv$						
Location	At Approach	es			Height (m	1)	$\dashv$	1					
Material	Aluminium				Count Total Oty	Nos		4					
Element Type	B	1 35 3		17	Total Qty	_		<u> </u>					
Environment	Benign	Moderate	Severe	X	Limited Inspection						<del></del>		
Protection System	<b>T</b> T	•.	- F		~ .			<u> </u>			1	formance	
<b>Condition Data</b>		nits	Exc		Good	<b>——</b>	Fai	ir	Poor	r	Det	iciencies	
	ea	ch							4				
Comments	No hazard m	narkers presen	it. Required	to ns	stall hazard	marke	ers s	signs at	corners o	of struc	cture.		
Recommended Wor	rk:	Rehab X	Replace			-	Ma	intenar	nce Needs	s:	18		
Ur	gent 1 to	5 years X	_		None	X			Urgent	1	1 year X	2 years	
	<u> </u>												
Element Group	Approaches				Length (n			6					
Element Name	Approach S				Width (m		$\blacksquare$	9.2					
Location	At Approach				Height (m	1)	$\dashv$						
Material	Cast-In-Place				Count	. 25		2					
Element Type	Reinforced (	•	<del></del>	_	Total Qty			110.4					
Environment	Benign	Moderate	X Severe		Limited I	nspec	ction	n [	X				
<b>Protection System</b>			<del> </del>								1	formance	
<b>Condition Data</b>		nits	Exc		Good	<b></b>	Fai	ir	Poor	r	Det	iciencies	
	n		110.4										
Comments		erse cracks obs	served at both	h end	ds.								
Recommended Wor	rk:	Rehab X	Replace				Ma	intenar	nce Needs	s:			
Ur	gent 1 to	5 years	6 to 10 year	X	None				Urgent	1	1 year X	2 years	



Element Group	Approach	ies				Length (r	n)	26.7	1				
Element Name	Barriers			Width (m	.)								
Location	Southwest				Height (m)								
Material	Steel Bean	n Guide Rai	1			Count 1							
Element Type	Timber P	ost and Ste	el Pa	anel		Total Qty (m <sup>2</sup> ) 26.7							
Environment	Benign	Mode	rate	Severe	X	Limited I		tion	X				
Protection System	_	<del></del>		•		*!				Per	formance		
C14: D-4-		Units		Exc		Good Fair Poor				De	ficiencies		
Condition Data		m <sup>2</sup>					2	26.7					
Comments	provided.								osts are missin	g. End treatn	nent is not		
Recommended Wor	rk:	Rehab	X	Replace			N	Mainte	nance Needs:				
Ur	gent 1	to 5 years	X	6 to 10 year	S	None			Urgent	1 year X	2 years		
								lo c s					
Element Group	Approach	ies				Length (r	-	26.7					
Element Name	Barriers					Width (m							
Location	Southeast	D '1'				Height (n	1)	1					
Material	Pedestrian					Count	, 2,	26.5	1				
Element Type	Steel Tub	<del>-</del>		<u> </u>		Total Qty (m <sup>2</sup> ) 26.7							
Environment	Benign	Mode	rate			Limited I	nspect	tion					
<b>Protection System</b>						nizing					formance		
<b>Condition Data</b>		Units		Exc		Good		Fair	Poor	De	ficiencies		
		m <sup>2</sup>					2	26.7					
Comments		•		base plate of plate of plate.	pede	strian railir	g. Bre	akdowi	n of protective	coating. Rep	air spalled		
Recommended Wor	rk:	Rehab	X	Replace			N	Mainte	nance Needs:				
Ur	gent X 1	to 5 years		6 to 10 year	S	None			Urgent	1 year X	2 years		
Element Group	Approach					Length (r		6					
Element Name	Sidewalk/					Width (m		1.5					
Location	At Approa					Height (n	1)						
Material		ace Concret				Count		2					
Element Type	_	d Concrete				Total Qty		18					
Environment	Benign	Mode	rate	Severe	X	Limited I	nspect	tion					
<b>Protection System</b>	No						formance						
Condition Data Units Exc						Good	I	Fair	Poor	De	ficiencies		
		17		1	0								
Comments	Sidewalk	is in good c	ond	ition but at th	e SE	corner it is	under	mined	causing crack	in pavement.			
Recommended Wor	rk:	Rehab	X	Replace		Ma			Maintenance Needs:				
Ur	gent V 1	to 5 years		6 to 10 year	·c	None			Urgent	1 vear	2 years		



Element Group	Approache	S			Length (n	1)	6	j					
Element Name	Wearing S				Width (m	9	0.2						
Location	East and W				Height (n								
Material	Asphalt				Count		2	2					
Element Type					Total Qty	$(m^2)$	1	10.4					
Environment	Benign	Moderate	Severe	X	Limited I								
Protection System				No	ne						Per	formance	<del></del>
·	U	nits	Exc		Good		Fair		Poor		De	ficiencies	
Condition Data		m			93.44		6		4				
Comments						d at both approaches. Wheel rutting, severe settle at west end.						e settlemei	nt of
Recommended Wor	rk:	Rehab X	Replace				Main	ntenanc	e Needs:				
Ur	gent 1	to 5 years X	6 to 10 year	rs	None			U	rgent	1 ye	ar	2 years	3
	orgene 1 to o years 11 o to 10 years												
Element Group	Barriers				Length (n	1)	6	57.2					
Element Name	Barrier/ Pa	rapet wall			Width (m	)	0	).25					
Location	North and S	South			Height (n	1)	0	0.6					
Material	Cast-In-Plac	ce Concrete			Count								
Element Type	Parapet Wa	ll with two Ra	ils		<b>Total Qty</b>	Total Qty (m <sup>2</sup> ) 194.88							
Environment	Benign	Moderate	Severe	X	Limited I	nspe	ction						
<b>Protection System</b>			G	alva	nized						Per	formance	
Condition Data	U	nits	Exc		Good		Fair		Poor		De	ficiencies	
Condition Data		m			179.48		7.7		7				
Comments		dium scaling, 1 s. Repair poor			observed o	n var	ious l	ocations	. Delami	ination a	at the	bottom of	•
Recommended Wor	rk:	Rehab X	Replace				Main	ntenanc	e Needs:				
Ur	gent 1	to 5 years X	6 to 10 year	rs	None			U	rgent	1 ye	ar	2 years	3
		,										·	
Element Group	Barriers				Length (n		6	57.2					
Element Name	Hand Raili				Width (m		_						
Location	North and S	outh			Height (n	1)							
Material	Steel	D :1:			Count	( )	4						
Element Type	Double Tub	<del></del>			Total Qty	` ′		268.8	_				
Environment	Benign	Moderate	X Severe		Limited I	nspe	ction						
Protection System Galvanized Units Exc					~ .							formance	
<b>Condition Data</b>	Exc		Good		Fair		Poor		De	ficiencies			
		Nos ts are missing a	nt favy logation	ng 1.	242	on or	13.4		13.4	tubo ===	1 io 22	proofed at	
Comments	few areas. F	of protective of	n of bottom r	ail w	ith post at S	SE co	rner.		•		1 18 u <sub>j</sub>	prooted at	а
Recommended Wor		Rehab X							e Needs:				
	Urgent 1 to 5 years X 6 to 10 ye								rgent	1 ye	ar	2 years	,



Element Group	Barriers				Length (n	n)		60				
Element Name	Railing System	Į.			Width (m)							
Location	South				Height (m	1)						
Material	Steel				Count			1				
Element Type	Splash Guard				<b>Total Qty</b>	(m)		60				
Environment	Benign	Moderate	X Severe		Limited I	nspec	ction	n				
<b>Protection System</b>	Galvanized								Perf	ormance		
Condition Data	Units		Good		Fai	ir	Poor	r	Defi	ciencies		
Condition Data	Nos						60					
Comments Localized light corrosion												
Recommended Wor	·k: Re	ehab X	Replace				Ma	intena	nce Needs	s:		
Ur	gent 1 to 5	years X	6 to 10 year		None				Urgent		1 year	2 years
			· ,	<u> </u>						<b>.</b>		
Element Group	Beams/MLE's				Length (n	n)		12				
Element Name	Girders				Width (m) 1.22							
Location	Ends				Height (m)							
Material	Pre-stressed Cor	ncrete			Count 9							
Element Type	Box Girders				Total Qty	(m2)	)	131.76	<u> </u>			
Environment	Benign	Moderate	X Severe		Limited I	nspec	ction	n				
Protection System		•	Red lead	d pri	mer/ alkyd	I					Perf	ormance
Condition Data	Units		Exc		Good Fair			ir	Poor	r	Defi	ciencies
Condition Data	m <sup>2</sup>				98.06		26.	2	7.5			
Comments	Several delamin units, some with chairs									_		_
Recommended Wor	·k: Re	ehab X	Replace				Ma	intena	nce Needs	s:		
Ur	gent 1 to 5	years X	6 to 10 year	S	None				Urgent		1 year	2 years
<b>Element Group</b>	Beams/MLE's				Length (n	n)		49				
Element Name	Girders		Width (m	)		1.22						
Location	Centre				Height (m	1)						
Material	Pre-stressed Cor	ncrete			Count			9				
Element Type	Box Girders				<b>Total Qty</b>	Oty (m2) 538.02						
Environment	Benign X	Moderate	Severe		Limited I	nspec	ction	n	X			
Protection System			Red lead	d pri	mer/ alkyd	I			_ <del></del>		Perf	ormance
Condition D-4-	Units		Exc		Good		Fai	ir	Poor	r	Defi	ciencies
Condition Data	m <sup>2</sup>			4	468.68		77.	6	8.26			



Comments	Spalling ,	rust staining	g, ha	irline stained	crac	ks, wide cr	ack v	vith	efflores	scenc	e leaka	ge bet	ween	uni	ts.	
Recommended Wor	·k:	Rehab	X	Replace				Ma	intena	nce N	leeds:					
Ur	gent	1 to 5 years	X	6 to 10 year	S	None				Urg	ent	1 y	ear		2 years	
							<u> </u>						<b>-</b>			
Element Group	Coatings					Length (r			66							
Element Name		ystems/ Ha				Width (m										
Location		ube Hand Ra	illin	qs		Height (n	1)									
Material	Other					Count	2		4							
Element Type	Hot Dip C	alvanizing				Total Qty			264							
Environment	Benign	Mode	rate	Severe	X	Limited I	nspe	ctio	n							
<b>Protection System</b>													Pe	erfo	rmance	:
Condition Data		Units		Exc		Good		Fa	ir		Poor		D	efic	iencies	
Condition Data		m <sup>2</sup>				264										
Comments  Recommended Wor		ed coating or	tub	e hand railing	g, is	in fair cond	lition	_		nce N	Veeds.					
			Λ	•	37	<b>3</b> .7	П	IVI	шиена			Т.		_	•	_
Ur	gent1	1 to 5 years		6 to 10 year	Λ	None				Urg	ent	1 y	ear		2 years	<u>                                     </u>
-						I			Leo							
Element Group	Decks					Length (1	-		60							
Element Name	Deck Top					Width (m			11.8							
Location	All					Height (n	1)		1							
Material	Precast Co	oncrete				Count	. 2		1							
Element Type		_				Total Qty			708							
Environment	Benign	Mode	rate	X Severe		Limited I	nspe	ctio	n							
<b>Protection System</b>					Aspl				,						rmance	i.
Condition Data		Units		Exc		Good		Fa	ir		Poor		D	efic	iencies	
		m <sup>2</sup>				708										
Comments																
Recommended Wor	·k:	Rehab		Replace				Ma	intena	nce N	leeds:					
Ur	gent 1	1 to 5 years		6 to 10 year	S	None	X			Urg	ent	1 y	ear		2 years	
	<u> </u>	·										<u>, , , , , , , , , , , , , , , , , , , </u>				
Element Group	Decks					Length (r	n)		67.2							
Element Name	Soffit- Th	in Slab				Width (m			0.46							
Location	Exterior					Height (n			0.3							
Material		ace concrete	,			Count	,		2							



Element Type					Total Qty	/ (m <sup>2</sup> )	) 1	102.2				
Environment	Benign X	Moderate	Severe		Limited I							
Protection System					mer/ Alky	⁄d						ormance
Condition Data	Uni		Exc		Good		Fair		Poor		Defi	ciencies
Condition Data	m	2			102.2							
	Overall in goo	od condition.										
Recommended Wor	k:	Rehab	Replace				Mair	ntenance	Needs:			
Urg	gent 1 to	5 years	6 to 10 year	·s	None	X		Ur	gent	1 y	vear X	2 years
<b>-</b>	Decks				Length (r							
	Soffit- Thin S	Slab			Width (m							
	Ends				Height (n	1)						
	Pre-cast Conc	rete			Count	, 1	+					
V I	Box Girders	3.7			Total Qty				7			
Environment	Benign X	Moderate		_	Limited I		ction	X		1	_	
Protection System	#T :	<b>:</b> 4s		,	mer/ Alky	d 	17. •	<del></del>	n.			ormance ciencies
Condition Data	Uni		Exc		Good		Fair		Poor		Deti	ciencies
Comments	Soffit is the b		hox girders	refer	to Reame/	MI F'	's eler	nent				
					<b>Do</b> uillo/.				Nos-1			
Recommended Wor		Rehab	Replace	-	**	<b>47</b> 1	ıvıair	ntenance		٦.		
Urş	gent 1 to	5 years	6 to 10 year	·S	None	X		<u>Ur</u>	gent	1 y	ear	2 years
<b>-</b>	Decks				Length (r							
	Soffit- Thin S	Slab			Width (m							
	Ends				Height (n	1)						
	Pre-cast Conc	rete			Count	, 1	+					
J 1	Box Girders	3.6			Total Qty				7			
Environment S. A.	Benign X	Moderate	Severe		Limited I	nspe	ction			ı	-	
<b>Protection System</b>	Uni	its	E		Cood		E-:		Dage			ormance ciencies
Condition Data	m2 / m / eac		Exc		Good 3		Fair 3	-+	Poor	-+	Den	Ciciicies
	/ III / Ca(	/ v / all			J	<u> </u>	J					
Comments	Soffit is the b	ottom of the	box girders-	refer	to Beams/	MLE'	's eler	nent.				
Recommended Wor	k:	Rehab X	Replace				Mair	ntenance	Needs:		18	
			6 to 10 year	·s	None		<del>-</del>		gent	1 1	ear X	2 years
			, , , , , , , , , , , , , , , , , , , ,						<u> </u>	_, ,		. · <u>        </u>
Element Group	Decks				Length (r	n)	6	50				



Element Name	Wearing Surface				<b>Width (m)</b> 9.3				9.3									
Location	All						Height (n	1)	I									
Material	Asphalt						Count		$\mathbf{I}$	1								
Element Type							<b>Total Qty</b>	$(m^2)$		558								
Environment	Benign	N	Ioderate	3	Severe	X	Limited I		ion									
<b>Protection System</b>	<del>-</del>				Asp	halt	Svstem			-					Perf	forma	nce	
Condition Data		Units		T	Exc		Good	F	air	r Poor				Def	icienc	ies_		
Condition Data	m2 / m	/ each /	% / all	1			465	5	53			43						
Comments	longi	itudinal cra							eriorati	on at	pier jo	int a	.nd					
Recommended Wor	rk:	Rel	hab X	F	Replace		·	M	Iai	ntenar	nce N	Need	ls:					
Ur	gent	1 to 5 y	ears X	6 to	10 year	rs	None				Urg	ent		1 yea	ır	2 ye	ars	
Replace wearing surf Install proper joint sy Needs:	ystem at ei				vertop of	f pier												
Element Group	Embank		nd Strea	ams			Length (r		4									
Element Name	Embank						Width (m		4									
Location	At Abutn	nents					Height (n	1)	$\dashv$									
Material	Other						Count 6											
Element Type	<u> </u>			<del></del>			Total Qty (m <sup>2</sup> ) 6											
Environment	Benign	N	Ioderate	e X	Severe	Ш	Limited Inspection											
<b>Protection System</b>						Nor										forma		_
Condition Data		Units		]	Exc	Щ.							r		Def	icienc	ies	
Condition 2 act		%				<u>l</u>	6											
Comments  Recommended Wor	Embankr			<del></del> -	Replace	<u> </u>		——————————————————————————————————————	<b>1</b> ai	ntenar	nga N	Naed	la.					
				_		_	None		lan		Urg	-	15.	1 yea		٦,,,,	- 740	$\overline{}$
	rk: Rehab X Replace rgent X 1 to 5 years 6 to 10 years						None				UIS	enc		1 yea		2 ye	ai s_	<u> </u>
Element Group	Embank	ments a	nd Strea	ams			Length (m)											
Element Name	Slope Pr	otection	1				Width (m		十									
Location	At Embankments						Height (n	1)	T									
Material	Other					Count			4									
Element Type	oe e					Total Qty	(m <sup>2</sup> )		4									
Environment	Benign Moderate X Severe					Limited I		ion										
Protection System															Per	forma	nce	
		Units Exc					Good Fa			air Poor					Def	icienc	ies	



CUHUHUUH DATA		ab / 9/ / all		Г	4							
	m2 / m / ea	nch / % / all		<u> </u>	4	<u> </u>		<u> </u>				
Comments		ent embankme th vegetation.	-	ed wit	th concrete	. Road	l em	nbankme	ents at corn	ers of str	ructure are well	
Recommended Wor		Rehab X	Replace			<del></del>	Mai		ce Needs:	٦ ,		
Ur	gent 1 to	5 years X	6 to 10 year	rs	None	Х		-	J <b>rgent</b>	1 year	r 2 years	
El	Embanlano	nts and Strea			T anoth (r	)	1					
Element Group  Element Name		d Waterways			Length (m	-	$\dashv$					
Location	At structure	I water ways			Height (m		$\dashv$					
Location Material	Other				Count	1)	$\dashv$	1				
Element Type	Outer					(m <sup>2</sup> )	$\dashv$	1				
Environment	Benign X	Moderate	Severe	П	Total Qty Limited I		tion	<u>,                                      </u>	1			
Protection System	Denign A	Moutian	Severe	Ш	Limiteu I	пэрсс	lion	1			Performance	
rrotection system	 	nits	Exc	T	Good		Fair	и	Poor	$\dashv$	<b>Deficiencies</b>	
Condition Data		/ <sub>0</sub>	LAC	╁	1	-	l'an	+	1 001	+		_
		Rehab	Replace 6 to 10 year	—	None	<del></del>	Mai		ce Needs: Urgent	1 year	r 2 years	
Remove tree debris. Place fill and protect	with large ro	ck at both pie	rs.									
<b>Element Group</b>	Joints				Length (n	~)		11.8				
Element Name	Seals/ Sealar	nte			Width (m		$\dashv$	11.6				
Location	Abutment an				Height (n		$\dashv$					
Material	Rubber	<u>u i icis</u>			Count	1)		4				
Element Type	Strip Seal				Total Qty	(m <sup>2</sup> )		47.2				
Environment	Benign	Moderate	Severe	X	Limited I				X			
Protection System	Denign	Moderate	50,010	<u>                                   </u>	Limites -	порос	110.		<u> </u>		Performance	
-	Ur	nits	Exc		Good		Fair	r	Poor	$\dashv$	<b>Deficiencies</b>	
Condition Data		nch / % / all	2.1.0	$\vdash$	Guta		A	<del>-</del>	47.2	_		
Comments	Joints are par	ved over with			akage is ob				ers and abu	tments.		
Recommended Wor	rk:	Rehab	Replace			I	Mai	intenan	ce Needs:			



Ur	gent 1 to	5 years	6 to 10 yea	rs	None	X		Urgent	1 year	2 years
	•					l				
Element Group	Piers				Length (1	n)				
Element Name	Bearings				Width (n	1)				
Location	All				Height (n	1)				
Material					Count	<u> </u>	36			
Element Type					Total Qty	(m <sup>2</sup> )	36			
Environment	Benign	Moderate	X Severe	e	Limited 1		n	X		
Protection System			!		!!			! !	Perf	ormance
-	Un	nits	Exc		Good	Fa	ir	Poor	→	iciencies
Condition Data		/ <sub>0</sub>		+		13		18		
Comments	Review cond	•			ilitation.	- lac				
Recommended Wor		Rehab 5 years X	Replace 6 to 10 yea		None	<del></del>	aintena	unce Needs: Urgent	1 year	2 years
							_			
Element Group	Piers				Length (1	-	0.6			
Element Name	Shafts/Colu	ımns/Pile			Width (m		· `	ottom) / 11 (top	p)	
Location	All				Height (n	1)	4.5			
Material	Cast-In-Place				Count		2			
Element Type	Concrete Sha	ıft, Pier wall	1		Total Qty		157.2			
Environment	Benign X	Moderate	Severe	e	Limited 1	nspectio	n	X		
Protection System					•				Perf	ormance
G III D	Un	nits	Exc		Good	Fa	ir	Poor	Def	iciencies
Condition Data	m2 / m / ea	ch / % / all			130.2	1:	5	12		
Comments	A few spalle cracks and lig		•				t pier. I	Delamination, s	palls, rust s	tains, vertical
Recommended Wor	rk:	Rehab X	Replace	e		Ma	aintena	nce Needs:		
Ur	gent 1 to	5 years X	6 to 10 yea	rs	None			Urgent	1 year	2 years
Patch repair poor cor	ncrete areas.	•							•	
Element Group	Sidewalks/ (	Curbs			Length (1	n)	67.2			



Element Name	Curbs				Width (m	1)	0.6					
Location	North				Height (n	1)	0.22					
Material	Cast-In-Plac	ce Concrete			Count		1					
Element Type					<b>Total Qty</b>	(m <sup>2</sup> )	55.1					
Environment	Benign	Moderat	e Severe	X	Limited I		n					
Protection System		•	•		-		•			Performance		
Condition Data	U	nits	Exc		Good	Fa	ir		Poor	Deficiencies		
Condition Data		%			51.1	2			2			
Comments	Few narrow	cracks, delar	nination , ligh	nt sca	ling, spall a	reas with	n expos	ed re	bar are ol	oserved.		
Recommended Wor	rk:	Rehab X	Replace	;		Ma	intena	nce l	Needs:			
Ur	gent 1 t	to 5 years	6 to 10 year	r X	None	X		Urg	ent	1 year 2 years		
Element Group	Sidewalks/	Curbs			Length (r	n)	67.2					
Element Name	Sidewalks				Width (m		1.5					
Location	South				Height (n		1.22					
Material	Cast-In-Plac	ce Concrete			Count	<u>′</u>	1					
Element Type					Total Qty	(m <sup>2</sup> )	115.5					
Environment	Benign	Moderat	e X Severe		Limited I		n					
Protection System			-!	No	ne					Performance		
Protection System	U	nits	Exc		ne Good	Fa	ir		Poor	Performance Deficiencies		
·		nits ach / % / all	+ +			Fa 5			Poor 7			
Condition Data	m2 / m / e	each / % / all	Exc	No.	Good 103.5	5 edium cra	icks and	-	7			
Protection System  Condition Data  Comments  Recommended Wor	m2 / m / e  Delaminations	each / % / all	Exc vere scaling, a	No:	Good 103.5	5 edium cra	icks and	rip h	7 Il areas w azard.	Deficiencies		
Condition Data  Comments  Recommended Wor	m2 / m / e  Delamination observed. Joseph construction observed.	on, light to se	Exc vere scaling, a	No:	Good 103.5	edium cra	icks and	rip h	7 Il areas wazard.	Deficiencies		
Condition Data  Comments  Recommended Wor	m2 / m / e  Delamination observed. Journal rk: gent 1 to	on, light to se bint at east pice.  Rehab X to 5 years	Exc  vere scaling, per has no seal  Replace 6 to 10 year	No:	Good 103.5 staining, mess open crea	edium cra	icks and	rip ha	7 Il areas wazard.	Deficiencies ith exposed rebars are		
Condition Data  Comments  Recommended Wor	m2 / m / e  Delamination observed. Journal rk: gent 1 to	on, light to se pint at east pice.  Rehab X to 5 years	Exc  vere scaling, per has no seal  Replace 6 to 10 year	No:	Good 103.5 staining, mess open crea	edium cra	ncks and sssible t	rip ha	7 Il areas wazard.	Deficiencies ith exposed rebars are		
Condition Data  Comments  Recommended Work Ur Repair poor concrete  Element Group	m2 / m / e  Delamination observed. Journal rk: gent 1 to areas and in	on, light to se pint at east pice.  Rehab X to 5 years	Exc  vere scaling, per has no seal  Replace 6 to 10 year	No:	Good 103.5 staining, mess open creates None	edium cra ting a po	icks and	rip ha	7 Il areas wazard.	Deficiencies ith exposed rebars are		
Condition Data  Comments  Recommended Word  Ur  Repair poor concrete	m2 / m / e  Delamination observed. Journal rk: gent 1 to areas and in  Retaining V Walls	on, light to se bint at east pied.  Rehab X to 5 years  estall seal at east at east pied.	Exc  vere scaling, per has no seal  Replace 6 to 10 year ast pier.	No:	Good 103.5 staining, me s open crea None Length (r	dium crating a po	ssible ti	rip ha	7 Il areas wazard.	Deficiencies ith exposed rebars are		
Condition Data  Comments  Recommended Work Ur Repair poor concrete  Element Group	m2 / m / e  Delamination observed. Journal obser	nach / % / all  on, light to second at east pictors  Rehab X  to 5 years  astall seal at east  Walls  und Southwes	Exc  vere scaling, per has no seal  Replace 6 to 10 year ast pier.	No:	Cood 103.5 staining, me s open crea None Length (r Width (m Height (n	dium crating a po	sintena	rip ha	7 Il areas wazard.	Deficiencies ith exposed rebars are		
Condition Data  Comments  Recommended Wor  Ur  Repair poor concrete  Element Group  Element Name	m2 / m / e  Delamination observed. Journal obser	on, light to second at east pictors at east pictors at east pictors at east pictors at east at	Exc  vere scaling, per has no seal  Replace 6 to 10 year ast pier.	No:	None Length (r Width (m Height (n	Ma  X  Ma  Ma  Ma  Ma  Ma  Ma  Ma  Ma  M	ssible to	rip ha	7 Il areas wazard.	Deficiencies ith exposed rebars are		
Condition Data  Comments  Recommended Wor  Ur  Repair poor concrete  Element Group  Element Name  Location  Material  Element Type	m2 / m / e  Delamination observed. Journal obser	nach / % / all  on, light to second at east pictors  Rehab X to 5 years  estall seal at east  Walls  und Southwest ce Concrete  Concrete	Exc  vere scaling, per has no seal  Replace 6 to 10 years ast pier.	rust s and i	None  Length (r Width (m Height (n Total Qty	dium cranting a po	5.2 2 2 20.8	rip ha	7 Il areas wazard.	Deficiencies ith exposed rebars are		
Condition Data  Comments  Recommended Wor  Ur  Repair poor concrete  Element Group  Element Name  Location  Material  Element Type  Environment	m2 / m / e  Delamination observed. Journal obser	nach / % / all  on, light to second at east pictors  Rehab X to 5 years  estall seal at east  Walls  und Southwest ce Concrete  Concrete	Exc  vere scaling, per has no seal  Replace 6 to 10 years ast pier.	rust s and i	None Length (r Width (m Height (n	dium cranting a po	5.2 2 2 20.8	rip ha	7 Il areas wazard.	Deficiencies ith exposed rebars are		
Condition Data  Comments  Recommended Work Ur Repair poor concrete  Element Group Element Name Location	Delamination observed. Joseph Telamination observed. Joseph Telami	non, light to second at east pictors at east pictors at east pictors at east pictors at east a	Exc  vere scaling, per has no seal  Replace 6 to 10 year ast pier.	rust s and i	None  Length (r Width (m Height (n Count Total Qty Limited I	Ma  X  Ma  (m)  (m²)  nspectio	5.2 2 20.8 n	rip ha	7 Il areas wazard. Needs:	Deficiencies  ith exposed rebars are  1 year 2 years  Performance		
Condition Data  Comments  Recommended Wor  Ur  Repair poor concrete  Element Group  Element Name  Location  Material  Element Type  Environment	m2 / m / e  Delamination observed. Journal obser	nach / % / all  on, light to second at east pictors  Rehab X to 5 years  estall seal at east  Walls  und Southwest ce Concrete  Concrete	Exc  vere scaling, per has no seal  Replace 6 to 10 years ast pier.	rust s and i	None  Length (r Width (m Height (n Total Qty	dium cranting a po	5.2 2 20.8 n	rip ha	7 Il areas wazard.	Deficiencies  ith exposed rebars are  1 year 2 years		



	Bridge Condition Index																	
No.	Element Group	Element Description	Location	Length (m)	Width (m)	Height (m)	Count	Total Qty	Units	Replacement (Initial) Cost	Material	Total Replacement Value TRV (\$)	Excellen t	Good 0.75	Fair	Poor 0	Current Element Value CEV (\$)	Element Condition Index
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 Railinq	\$ 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/MLE'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/MLE'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	6.7 (hottoni) / 11 (top)	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

Ontario Structure Inspecti	on Manual - Inspection	ı Form		N	ITO Site N	umber	
		Inv	entory Data:				
Structure Name	B-4 Shellard Road Br	idge					
Main Hwy/Road #	Shellard Sideroad	On X Under	Crossing Type:	Navig. Non-Navig	. Water X		Pedther
Hwy/Road Name	Shellard Sideroad (Side	road 17)					
Structure Location	Approximately 50m Sou	uth of Go	re Road				
Northing	43°23'16.3" N		Easting	80°15'37.3	"W		
Owners	Township of North Dun	nfries	Heritage Designation:	Not Cons. X Desig./not I	Cons./no	ot App. List	/not Desig.
MTO Region	South-Western		Road Class:	Freeway	Arterial	Collector	Local X
MTO District	London / Stratford		Posted Speed	80		No. of Lanes	2
Old County	Waterloo,		AADT	-		% Trucks	
Geographic Township	Township of North Du	mfries	Inspection Rou	ite Sequence			
Structure Type	Slab on I-Girder (Steel)		Interchange Nu	ımber			
Total Deck Length (m)	8.6		Interchange Str	ructure Numbe	er		
Overall Structure Width (m)	7.42		Min. Vertical C	Clearance (m)	ļ		
Total Deck Area (sq. m.)	63.812		Special Routes	s: Transit	Truck	School	Bicycle
Roadway Width (m)	6.8		Detour Length	Around Bridg	e (km)		
Skew Angle (degrees)	0		Direction of Str	ructure		N/S	
No. of Spans	1		Fill on Structur	re (m)	[	7.8	
Span Lengths (m)	7.3		Deck Geodetic	Elevation		228	
		His	storical Data:				
Year Built	1940		Year of Last M	Iajor Rehab			
Last OSIM Inspection	2020		Last Evaluation	n			j
Last Enhanced OSIM Inspec	tion		Current Load L	Limit (tonnes)			j
Enhanced Access Equipment (ladder, boat, lift, etc.)			Load Limit By-	-Law#			
Last Underwater Inspection			By-Law Expiry	y Date			
Last Condition Survey					<del>-</del>		•
Rehab History: (Date/Descri	ption)						



Ontario Structure Inspection	Manual - Inspection Form	MTO	Site Number
	Scheduled	Improvements:	
Regional Priority Number		Programmed Work Year	
Nature of Program Work:			
Appraisal Indices:		Comments	
Fatigue			
Seismic			
Scour			
Flood 			
Geometrics			
Barrier			
Curb			



Load Capacity

Ontario Structure Inspection Ma		MTO	Site	Number				
	Fiel	ld In	spection Infor	mati	ion			
Date of Inspection	May 16, 2022, 4:30	PM	-	Тур	e of Inspection:	О	SIM X	Enhanced OSIM
Inspector:	J. Zohreh, P.Eng.							
Others in Party:	S. Mitra, EIT							
Access Equipment Used:								
Weather:	Sunny							
Temperature:	15°C							
Additional Investigations Require	ed				None		<b>Priority</b> Normal	Urgent
Material Condition Survey								
Detailed Deck Condition Surv	ey				X			
Non-destructive Delamination	Survey of Asphalt-C	Cove	red Deck		X			
Concrete Substructure Conditi	on Survey				X			
Detailed Coating Condition Su	ırvey				X			
Detailed Timber Investigation					X			
Post-Tensioned Strand Investi	gation				X			
Underwater Investigation					X			
Fatigue Investigation					X			
Seismic Investigation					X			
Structure Evaluation					X			
Monitoring								
Monitoring of Deformations, S	Settlements and Mov	emei	nts		X			
Monitoring Crack Widths					X			
Investigation Notes:	The structure is in §	good	condition		,			•
	(	)ver	all Structure N	lotes	S			
Recommended Work on Structure	None		Minor Rehab	X	Major Rehab		Replace	
Timing of Recommended Work	1 to 5 years	X	6 to 10 years					
Overall Comments:	See Elements infor	matio	on					
Date of Next Inspection:	2024							
Suspected Performance Deficiencies  11 Load carrying capacity 12 Excessive deformations (reflections & rota 13 Continuing settlement 14 Continuing movements 15 Seized bearings  Maintenance Needs  15 Life and Swing Bridge Maintenance	09 10 11	Jamn Pede Roug Surfa Deck	ing not uniformly loa ned expansion joint strian/vehicular haza th riding surface ace ponding t draining		13 14 15 16	3 Flo 4 Ur 5 Ur 6 Ot	ppery Surfaces poding/channel adermining of fo istable embanki her	blockage oundation ments
<ul> <li>Lift and Swing Bridge Maintenance</li> <li>Bridge Cleaning</li> <li>Bridge Handrail Maintenance</li> <li>Painting Steel Bridge Structures</li> </ul>	07 08 09 10	Repa Repa	air to Structural Steel air to Bridge Concrete air of Bridge Timber by bridges - maintena		13 14 15 16	4 Co 5 Ro	osion Control at oncrete Sealing out and Seal idge deck drain	

11

Animal/Pest Control

Bridge Surface Repair

17

18

Other

Scaling (loose concrete or ACR steel)



Bridge Deck Joint Repair

Bridge Bearing Maintenance

05

## **Ontario Structure Inspection Manual - Inspection Form**

MTO	Site	Number
MIL	SILC	Mumber

Repair Rehabilitation	n Required	l e			Prio	ority		Estimated Construction Cost		
Element <sup>1</sup>	Repa	nir and Rehabilitation Requ	uired <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		
Hand Railings			0			\$ 500.00				
Estimated Rehab	ilitated or R	Replacement Structure Dimen	nsions <sup>3</sup>	75	4.104	. 10		\$ 2,500.00		
Deck Length (m)	8.6	Structure Width (m)	7.42	Total Structural Cost \$						

<sup>1 -</sup> Indicate specific costs for structure replacement or for rehabilitation under the given headings.

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

Associated Work <sup>4</sup>	Comments	<b>Estimated Cost</b>
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

<sup>4 -</sup> 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.

Justification



<sup>2 -</sup> Give a brief description of the rehabilitation work required.

<sup>5 -</sup> 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

Element Group	Abutments				Length (n	n)						
Element Name	Abutment v	valls			Width (m	ı)		6.62				
Location	North and S	outh			Height (m	1)		1.1				
Material	Cast-in-plac	e Concrete			Count			2				
Element Type	Conventiona	al Closed			Total Qty	$(m^2)$	)	14.56				
Environment	Benign X	Moderat	te Severe	e	Limited I			n	X			
Protection System	_			No	ne				<u></u>	P	erformanc	e e
	U	nits	Exc		Good		Fai	ir	Poor		eficiencie:	S
Condition Data	I	m <sup>2</sup>		1			14.5	56				
Comments	Abutments a	appear to be i	in fair condition	on. A	few scaling	g, stai	ins a	and cra	cks are prese	ent.		
Recommended Wor	rk:	Rehab	Replace	e			Ma	iintena	nce Needs:			
Ur	gent 1 t	to 5 years	6 to 10 yea	ırs	None	X			Urgent	1 year	2 year	rs
					- u (			12.2				
Element Group	Abutments				Length (n			3.3				
Element Name	Winqwalls	1			Width (m			0.75				
Location	Corners of s				Height (m	1)		0.75				
Material	Cast-in-plac Reinforced				Count	2	$\overline{}$	9.9				
Element Type	_	_	. V.		Total Qty				<del></del>			
Environment	Benign	Moderat	te X Severe	-	Limited I	nspec	ctioi	n		<del></del>		
Protection System	ļ		<del></del>	No				-	<del></del>		erformanc	
Condition Data		nits	Exc	₩	Good		Fai		Poor	<u>n</u>	Deficiencie:	S
	]	m <sup>2</sup>		Щ			9.9	9				
Comments	Wingwalls a	ıre in fair cor	ndition. Few n	1arrow	v cracks are	pres	ent v	with so	me stains.			
Recommended Wor	rk:	Rehab	Replace	e			Ma	intena	nce Needs:			
Ur	gent 1 t	to 5 years	6 to 10 yea	ırs	None	X			Urgent	1 year	2 year	rs
									· ·			
Element Group	Approache	S			Length (n			19.05				
Element Name	Barriers				Width (m			<u> </u>				
Location	At Approach	nes			Height (n	<u>ı)</u>		<del> </del>				
Material	Steel	·~ · · ·			Count			4				
Element Type	_	nd Steel Pane	_		Total Qty		_	76.2	<del></del>			
Environment	Benign	Moderat			Limited I	nspec	ctio	n				
<b>Protection System</b>				Galva							erformanc	
Condition Data		nits	Exc	⊥_	Good		Fai	ir	Poor	D	<b>Deficiencie</b>	S
Condition David		m <sup>2</sup>			60.96				15.24			
Comments	Steel beam s	guiderail is ir	n fair conditio	on. Ex	truder end t	reatm	nent	at NW	' is severely	damaged.		
Recommended Wor	rk:	Rehab	Replace	e			Ma	intena	nce Needs:			
Ur	gent X 1 t	to 5 years	6 to 10 yea		None				Urgent	1 year	2 year	rs
Replacement of extru	ıder end trea	tment at NW	end.			Replace extruder end treatment at NV				NW side.		



Element Group	Approaches				Length (m)				6						
<b>Element Name</b>	Wearing Sur	rface				Width (m	)		6.6						
Location	North and So	outh				Height (m	1)								
Material	Asphalt					Count			2						
Element Type						Total Qty	$(m^2)$		81.6						
Environment	Benign	Modera	te	Severe	X				n						
Protection System					No								Pei	formance	
	Un	nits		Exc	_	Good		Fai	ir		Poor	r		ficiencies	
Condition Data	ea					68					13.6				
Comments	Minor asphal	t cracking	notice	d at appro	oach.								•		
Recommended Wor	r <b>k:</b>	Rehab	X	Replace				Ma	intena	nce I	Need	s:			
Ur	gent 1 to	5 years	X 6 to	10 year	S	None				Urg	ent		1 year	2 years	
	<u> </u>	, <u> </u>									<u> </u>		, <u> </u>		
Element Group	Barriers					Length (n	n)		13.9						
Element Name	Barriers/ Pa	ranet Wal				Width (m			0.26						
Location	East and Wes					Height (m	_		0.8						
Material	Cast-in-place	concrete				Count	,		2						
Element Type	Parapet Wall		e Raili	ing		Total Qty	(Nos	s)	51.71						
Environment	Benign	Modera		Severe	X	Limited I			n						
Protection System		1/104014		Jevere	No								Per	formance	
	Un	nits		Exc		Good		Fai	ir		Pool		-4	ficiencies	
Condition Data	ea					51.71									
Comments	Concrete barr	rier is in go	od coi	ndition. A	A few	cracks on	barrie	ers					•		
Recommended Wor	rk:	Rehab		Replace				Ma	intena	nce l	Need	s:	18	3	
Ur	gent 1 to	5 years	_	o 10 year	s	None	X			Urg	ent		1 year 2	2 years	
				v	'		-								
Element Group	Barriers					Length (n			12.9						
Element Name	Hand Railin	gs				Width (m	)								
Location	East and Wes	st				Height (m	1)								
Material	Aluminum					Count			2						
Element Type	Single Tube l	Railing				Total Qty	(Nos	s)	25.8						
Environment	Benign	Modera	te	Severe	X	Limited I	nspec	ction	n						
<b>Protection System</b>		Noi	ne							Per	formance				
Condition Data	Un	its		Exc		Good		Fai	ir		Poor	r	De	ficiencies	
Condition Data	n	n				12.9		12.	9						
Comments	East side sing	gle tube rai	ing is	in good o	condi	ition. West	side 1	raili	ng is m	iissin	g.				
Recommended Wor	r <b>k:</b>	Rehab	X	Replace				Ma	intena	nce l	Need	s:			
Ur	gent X 1 to	5 years	6 to	o 10 year	·s	None				Urg	ent		1 year 2	2 years	
Urgent Installation o	f West side sin	ngle tube ra	iling.											_	



Element Group	Beams/	MLE's			Length (n							
Element Name	Girders	}			Width (m	)		0.2				
Location	All				Height (m	1)		0.31				
Material	Steel				Count			5				
Element Type	I-type				<b>Total Qty</b>	$(m^2)$	)	48.4				
Environment	Benign	X Moderat	e Severe		Limited I			n	X			
Protection System			Red lead	l pr	imer/ alkyd	l					Perf	ormance
C 122 D . 4 .		Units	Exc		Good		Fai	ir	Poor		Def	iciencies
Condition Data		m <sup>2</sup>	48.4									
Comments	Girders	appear in excelle	nt condition									
Recommended Wor	rk:	Rehab	Replace				Ma	intena	nce Needs	:		
Ur	gent	1 to 5 years	6 to 10 years	S	None	X			Urgent	1	year X	2 years
	<u> </u>	<u> </u>							<u>-</u>		<u> </u>	, , , , , , , , , , , , , , , , , , , ,
Element Group	Beams/				Length (n			1.5				
Element Name	Diaphra	agms			Width (m							
Location	All				Height (m	1)						
Material	Steel				Count	(D.)	,	4				
Element Type	I-type	<del></del>		Total Qty	_		4					
Environment	Benign	X Moderate			Limited I	nspe	ctio	n		1		
<b>Protection System</b>				Aspl	halt							ormance
Condition Data		Units	Exc		Good Fair Poor				Def	iciencies		
Condition Data		m <sup>2</sup>	3		1							
Comments												
Recommended Wor	rk:	Rehab X	Replace				Ma	intena	nce Needs	:		
Ur	gent	1 to 5 years X	6 to 10 years	S	None				Urgent	1	year X	2 years
									-	<del>_</del>		
Element Group	Coating				Length (n	_						
Element Name		ral Steel			Width (m							
Location		Diaphragms			Height (m	1)						
Material	Other	15: / 41	-		Count	. 2.		40.4				
Element Type		ad Primer/ Alky			Total Qty			48.4				
Environment	Benign	Moderate Moderate	e X Severe		Limited I	nspe	ctio	n				
<b>Protection System</b>			<del>, , , , , , , , , , , , , , , , , , , </del>	No					1			ormance
<b>Condition Data</b>		Units	Exc		Good		Fai	ir	Poor	•	Def	iciencies
		m			42.4		3		3			
Comments	Paint co	ating on girder ar	nd diaphragms	in g	generally go	od co	ondit	tion.				
Recommended Wor	rk:	Rehab X	Replace				Ma	intena	nce Needs	:		
Ur	gent	1 to 5 years	6 to 10 year	X	None				Urgent	1	year	2 years
Re-apply coating at i	solated le	ocations.	<del>-</del>							<del></del>		



Element Group	Decks				Length (n	n)		8.53				
Element Name	Deck top				Width (m	ı)		7.42				
Location	All				Height (m	1)						
Material	Concrete				Count			1				
Element Type	Precast slabs	S			Total Qty	( <u>m</u> <sup>2</sup> )		63.3				
Environment	Benign	Moderate	Severe	X	Limited I			n				
<b>Protection System</b>											Per	formance
Condition Data	Un	its	Exc		Good		Fai	ir	Po	or	Def	ficiencies
Condition Data	n	1	58		5.3							
Comments	Deck top in g	enerally exc	ellent conditi	on.								
Recommended Wor	:k:	Rehab	Replace				Ma	intena	nce Nee	ds:		
Ur	gent 1 to	5 years	6 to 10 year	rs	None	X			Urgent		1 year	2 years
	<u> </u>	<u> </u>	<u>-</u>	<u> </u>	· · · · · · · · ·						<u> </u>	_ <u> </u>
El	Decks				I angth (r			7.3				
Element Group	Decks Soffit- Thin S	Clab			Length (n			7.3				
Element Name Location	All	Slad			Width (m			7.43				
Location Material	Other				Height (m	1)		1				
Element Type	Precast conc	rata			Total Qty	(m <sup>2</sup> )		54.24				
Environment			Savara	$\overline{}$	Limited I							
	Benign X	Moderate	Severe	-	l I	nspec	Ctioi	n			D	•
<b>Protection System</b>	Un	•4	T E	No			To:		Do	- ==	4	formance Ticiencies
Condition Data	Un m		<b>Exc</b> 54.24	├	Good	Fair Poor Deficienc				iciencies		
Comments	Soffit is in ex		_						~7	-		
Recommended Wor		Rehab	Replace	_			Ma	intena	nce Nee			, <u> </u>
Ur	gent 1 to	5 years X	6 to 10 year	rs	None	X			Urgent		1 year	2 years
Element Group	Decks				Length (n	n)		5.83				
Element Name	Wearing Sur	face			Width (m	ı)		6.8				
Location	All				Height (m	ı)						
Material	Cast-in-place				Count			1				
Element Type	Concrete To	pping			Total Qty	$(m^2)$	)	58				
Environment	Benign	Moderate	X Severe		Limited I	nspec	ctio	n		_	_	
<b>Protection System</b>	None										Per	formance
Condition Data	Un	its	Exc		Good		Fai	ir	Po	or	Def	iciencies
Condition Data	No	os			41		8.5	5	8.	5		
Comments	Some patches	and overlay	ing of concre	ete. C	Cracks are o	bserv	red a	nt NW (	corner.			
Recommended Wor	·k:	Rehab X	Replace				Ma	intena	nce Nee	ds:		
Ur	gent 1 to	5 years X	6 to 10 year	rs	None	X			Urgent		1 year	2 years
			<del></del>									



Element Group	Embank	ments and St	reams			Length (n	_								
Element Name	Embank	ments				Width (m	)								
Location						Height (m	1)								
Material	Other					Count			4						
Element Type						<b>Total Qty</b>	(No:	s)	4						
Environment	Benign	Modera	ate X	Severe		Limited I	nspe	ctio	n						
Protection System	_		, <u></u>		No	ne							Pe	erfo	rmance
		Units		Exc		Good		Fai	ir		Poor	r	D	efi	ciencies
Condition Data		Nos				4									
Comments	Embankr	nents are stabl	e.												
Recommended Wor	·k:	Rehab		Replace				Ma	intenan	ce N	Need:	s:			
Ur	gent	1 to 5 years	6 to	o 10 year	·s	None	X		Ţ	Urg	ent		1 year		2 years
	<u>°</u>	<u> </u>		· ·						-					
Element Group	Embank	ments and St	reams			Length (n	1)								
Element Name	Slope Pr	otection				Width (m	)								
Location	At Emba	nkments				Height (m	1)								
Material	Other					Count			4						
Element Type						<b>Total Qty</b>	(No:	s)	4						
Environment	Benign	Modera	ate X	Severe		Limited I	nspe	ctio	n						
Protection System				-	No	None Perform							rmance		
J		Units		Exc		Good Fair Poor						Deficiencies			
Condition Data		m <sup>2</sup>				4									
Comments	Embankr	nents are secu	red by	rocks.		•			•						
Recommended Wor	·k:	Rehab	X	Replace				Ma	intenan	ce N	Veeds	s:			
Ur	gent	1 to 5 years	X 6 to	o 10 year	·s	None			Ţ	Urg	ent		1 year		2 years
		_													
Element Group	Embank	ments and St	reams			Length (n	1)								
Element Name	Streams	and Waterwa	ays			Width (m	)								
Location	At structu	ıre				Height (m	1)								
Material	Other					Count			1						
Element Type	_					Total Qty	(No:	s)	1						
Environment	Benign	X Modera	ate	Severe		Limited I	nspe	ctio	n _						
<b>Protection System</b>					No	ne							Pe	erfo	rmance
Condition Data		Units		Exc		Good		Fai	ir		Poor	r	D	efi	ciencies
Condition Data		m <sup>2</sup>				1									
Comments	No obstri	action.													
Recommended Wor	·k:	Rehab		Replace				Ma	intenan	ce N	Need:	s:			
Ur	gent	1 to 5 years	6 to	o 10 year	·s	None	X		Ţ	Urg	ent		1 year		2 years
		_													



	Bridge Condition Index																	
No.		Element Description	Location	Length	Width	Height	Count	Total Qty	Units	Replacement (Initial) Cost	Material	Total Replacement Value	Excellen t	Good	Fair	Poor	Current Element Value	Element Condition Index
				(m)	(m)	(m)	#			<b>(S)</b>		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	Winqwalls	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/MLE'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/MLE'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		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 detoriation observed at the abutment

Ontario Structure Insp	pection Manual - In	spection For	m					L		
Inventory Data:										
Structure Name	C-1 Alps Twin C	ulvert	_						]	
Main Hwy/Road#	Alps Road	On Under	$\vdash$	Crossing Type:	Navig. V Non-Navig V		Rail Road	<b>=</b>		
Hwy/Road Name	Alps Road		<u> </u>				<u>                                      </u>		┼ '	
Structure Location	Approximately 930	m East of Re	idsv	/ille Road					j '	
Northing	43.320157		$\overline{]}$	Easting	-80.425768				<b>-</b>	
Owners	Township of North	Dumfries		Heritage Designation:	Not Cons. X  Desig./not Lis	Cons./no	ot App.	<u> </u>	not Desig.	
MTO Region	South-Western		j	Road Class:	Freeway	Arterial	Cc	ollector	Local X	
MTO District	London/Stratford		j	Posted Speed	50		No. of I	Lanes 2		
Old County	Waterloo		]	AADT			% Trucl	ks		
Geographic Township	North Dumfries			Inspection Rou	ite Sequence					
Structure Type	C. Steel plate pipe a	arch	j	Interchange Nu	ımber	1				
Total Culvert Length (m)	10.6			Interchange Str	ructure Number					
Maximum Culvert Width (m)	7.2			Min. Vertical C	Clearance (m)					
Culvert Height (m)	1.9		]	Special Routes:	s: Transit	Truck		School	Bicycle	
Roadway Width (m)	7		]	Detour Length	Around Bridge	(km)				
Skew Angle (degrees)	75			Direction of Str	ructure		N/S			
No. of Spans	2		j	Fill on Structure	re (m)	1	0.3			
Span Lengths (m)	3.4		<u>j</u>	Deck Geodetic	Elevation		256			
			Hi	istorical Data:						
Year Built			1	Year of Last M	lajor Rehab					
Last OSIM Inspection	-		j	Last Evaluation	n					
Last Enhanced OSIM In	ispectic		j	Current Load L	Limit (tonnes)	-				
Enhanced Access Equipment (ladder, boat, lift, etc.)				Load Limit By-	-Law #	- 				
Last Underwater Inspect	tion		j	By-Law Expiry	/ Date					
Last Condition Survey Rehab History: (Date/Description)			<u>]                                    </u>							



<b>Ontario Structure Inspection</b>	Manual - Inspection Form	MTO	Site Number
	Scheduled 1	Improvements:	
Regional Priority Number		Programmed Work Year	
Nature of Program Work:		1	
Appraisal Indices:		Comments	
Fatigue			
Seismic			
Scour			
Flood			
Geometrics			
Barrier			
Curb			



Load Capacity

	Fiel	ld In	spection Infor	mati	ion			
Date of Inspection	May 16, 2020, 2:30	0PM		Тур	e of Inspection:	OSIM	X I	Enhanced OSIM
Inspector:	J. Zohreh, P.Eng.					-		
Others in Party:	S. Mitra, EIT							
Access Equipment Used:	Tapes, Hammer, Cl	nain,	Ladder, Camer	a, Sa	afety Equipment			
Weather:	Sunny							
Temperature:	15°C							
						Duion	:4	
Additional Investigations Requir	red				None	Norma		Urgent
Material Condition Survey								
Detailed Deck Condition Sur	vey				X			
Non-destructive Delaminatio	n Survey of Asphalt-C	Cove	red Deck		X			
Concrete Substructure Condi	tion Survey				X			
Detailed Coating Condition S	Survey				X			
Detailed Timber Investigation	n				X			
Post-Tensioned Strand Invest	tigation				X			
Underwater Investigation					X			
Fatigue Investigation					X			
Seismic Investigation					X			
Structure Evaluation					X			
Monitoring								
Monitoring of Deformations,	Settlements and Mov	emer	nts			X		
Monitoring Crack Widths						X		
Investigation Notes:					'			
	(	)ver	all Structure N	otes	3			
Recommended Work on Structure	None		Minor Rehab	X	Major Rehab	Repla	ace	
Timing of Recommended Work	1 to 5 years	X	6 to 10 years					
Overall Comments:	See maintenance sh Monitor deformation		top profile at b	olt li	ine.			
Date of Next Inspection:	2022							
Suspected Performance Deficiencies  11 Load carrying capacity 12 Excessive deformations (reflections & recommon of the continuing settlement) 13 Continuing movements 14 Continuing movements 15 Seized bearings 16 Maintenance Needs	06 07 otations) 08 09 10	Jamn Pedes Roug Surfa	ing not uniformly load ned expansion joint strian/vehicular hazar th riding surface the ponding draining		12 13 14 15 16	Flooding/ch Undermining Unstable er	nannel blo	ndation
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 09 10 11	Repa Repa Baile Anim	ir to Structural Steel ir to Bridge Concrete ir of Bridge Timber y bridges - maintenan nal/Pest Control		13 14 15 16 17	Concrete Se Rout and Se Bridge deck Scaling (loc	ealing eal c drainag	_

**MTO Site Number** 



**Ontario Structure Inspection Manual - Inspection Form** 

## **Ontario Structure Inspection Manual - Inspection Form**

MTO	Site	Number

Repair Rehabilitation	n Required	l		Pric	ority		Estimated			
Element <sup>1</sup>	Repa	nir and Rehabilitation Requ	iired <sup>2</sup>	6 to 10 years	1 to 5 years	Within 1 year	Urgent	<b>Construction Cost</b>		
Barrel	Monitor de	eformation of top profile at bo	olt line.		X			\$	500.00	
Embankments	Ŭ	tation and soil buildup aroun ndent on method used for aba			X			\$	1,500.00	
Estimated Rehab	sions <sup>3</sup>	T	4 1 04	4 10		Ф	2 000 00			
Deck Length (m)	10.6	Structure Width (m)	7.2	Т	otal Stru	\$	2,000.00			

- 1 Indicate specific costs for structure replacement or for rehabilitation under the given headings.
- $\boldsymbol{2}$  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	<b>Estimated Cost</b>
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

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

Justification	



<sup>5 -</sup> 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

	Bridge Condition Index																	
No.		Element Description		3		Ö		Total Qty	Units	(Initial) Cost	Material	Replacement Value	Excellen t	Good		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 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-1	Culverts	Outlet Compor	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 Protectio	0	0	0	0	4	4.00	each	\$ -	0	\$ -	0.00	4.00	0.00	0.00	\$ -	-
C-1	Embankments	Streams & War	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	V-CEV-BCI)									\$ 33,216.40					\$ 20,401.16	61.4



Element Group	Culverts					Length (r	m)	7	7.2						
Element Name	Barrel					Width (m	1)	3	3.2						
Location	West Pipe					Height (n	n)	1	.9						
Material	Corrugated s	steel pipe	bolted	arch		Count 1									
Element Type	CSP Arch					Total Qty	y (m <sup>2</sup> )	) 4	16.0						
Environment	Benign	Mode	rate	X Severe		Limited Inspection									
<b>Protection System</b>													Perf	ormance	
Condition Data		nits		Exc		Good		Fair	•		Poor		Defi	ciencies	
Condition Data	r	n <sup>2</sup>				27.6		18.4							
	* *			alculation based			-								
Comments		le length a				~~~									
	rus	t on the bo	ttom	ì											
Recommended Wor		Rehab		Replace				Maiı	ntenai	nce N	eeds:				_
Ur	gent 1 t	o 5 years	6	to 10 years		None	X			Urge	ent	1 year	r	2 years 2	(
								Mon	itor de	form	ation of	top pro	file a	t bolt line.	
Element Group	Culverts					Length (r	m)								
Element Name	Inlet Comp	onents				Width (m	<b>1</b> )								
Location	East end of o	culvert				Height (n	n)								
Material	Soil					Count		1							
Element Type						Total Qty	y (m <sup>2</sup> )	)							
Environment	Benign	Mode	rate	X Severe		Limited I	Inspe	ction	[						
<b>Protection System</b>													Perf	ormance	
Condition Data		nits		Exc		Good		Fair	•		Poor		Defi	ciencies	
Condition Data	r	$n^2$				1									
Comments	Good stabili	ty in area	around	d culvert.											
Recommended Wor	rk:	Rehab		Replace				Maiı	ntenai	nce N	eeds:				
Ur	gent 1 to	o 5 years	6	to 10 years		None	X			Urge	ent	1 year	r	2 years	
				_											
Element Group	Culverts					Length (r	m)								
Element Name	Outlet Com	ponents				Width (m									
Location	West end of	culvert				Height (n	n)								
Material	Soil					Count		1							
Element Type						Total Qty	y (m <sup>2</sup> )	)							
Environment	Benign	Mode	rate	X Severe		Limited I									
Protection System													Perf	ormance	
Condition Data	<b>U</b> 1	nits		Exc		Good		Fair	•		Poor		Defi	ciencies	
Condition Data	r	n <sup>2</sup>				1									
Comments	Good stabili	ty in area	around	d culvert.											
Recommended Wor	rk:	Rehab		Replace				Maiı	ntenai	nce N	eeds:				_
Ur	gent 1 t	o 5 years	6	to 10 years		None	X			Urge	ent	1 year	r	2 years	
		•													



Element Group	Decks				Lengt	h (m)		7						
Element Name	Wearing	g Surface			Widtl	n (m)		7						
Location	On top of	f culvert			Heigh	t (m)								
Material	Tar and o	chip			Coun	t		1						
Element Type					Total	Qty (m <sup>2</sup>	2)	49						
Environment	Benign	Mode	rate	X Severe		ed Inspe		n						
Protection System				<u>_</u>								Perf	ormance	
		Units		Exc	Good		Fai	ir		Poor		Def	iciencies	
Condition Data		m <sup>2</sup>			49									
Comments			•			·					·			
Recommended Wor	rk:	Rehab		Replace			Ma	intena	nce l	Needs:				
Ur	gent	1 to 5 years	6	to 10 years	N	one X			Urg	ent	1 yea	r	2 years	
					<u> </u>								<u> </u>	
Element Group	Foundat	ions			Lengt	h (m)								
Element Name		ions (below ;	groun	d level)	Widtl									
Location		` ` `	<u> </u>	,	Heigh									
Material					Coun			100						
Element Type					Total	Qty (m <sup>2</sup>	2)							
Environment	Benign	Mode	rate	Severe		ed Inspe		n						
Protection System					<del></del>							Perf	ormance	
		Units		Exc	Good		Fai	ir		Poor			iciencies	
Condition Data		%		-	100									
Comments	No scour	through the	pipe. N	No significant S	Soil buildu <sub>l</sub>	).					·			
Recommended Wor	rk:	Rehab		Replace			Ma	intena	nce l	Needs:				
Ur	gent	1 to 5 years	6	to 10 years	N	one X			Urg	ent	1 yea	r	2 years	
Element Group	Embank	monta		- <u>-</u>	Lengt	h (m)					•			
Element Name	Embank				Widtl									
Location	Linoani				Heigh	• •								
Material					Coun			4						
Element Type						Qty (m <sup>2</sup>	<u>'</u>							
Environment	Benign	Mode	rate	X Severe		ed Inspe		n						
Protection System	2 0	112000		50,020		<b>F</b>						Perf	ormance	
		Units		Exc	Good		Fai	ir		Poor			iciencies	
Condition Data		each		Zac	3004		4			1 001				
Comments				l		l					<u> </u>			
Recommended Wor	 r <b>k:</b>	Rehab		Replace			Ma	intena	nce l	Needs:				
	gent	1 to 5 years	6	to 10 years	N	one			Urg		1 yea	r X	2 years	
				- <u>L</u>			Cle	ar vege	tatio	n aroun	d pipe.		<u> </u>	



Element Group	Embankments			Length (r	m)						
Element Name	Slope Protection			Width (m	1)						
Location				Height (n	n)						
Material				Count			4				
Element Type				Total Qty	Total Qty (m <sup>2</sup> )						
Environment	Benign Mo	derate	X Severe	Limited I	Limited Inspection			X			
<b>Protection System</b>				•						Perf	ormance
Condition Data	Units		Exc	Good		Fair	r	Poor		Def	iciencies
Condition Data	each			4							
Comments	Limited inspection	due to	high vegetation.								
Recommended Wor	rk: Reha	)	Replace			Mai	intena	nce Needs:			
Ur	gent 1 to 5 year	rs	6 to 10 years	None	X			Urgent	1 ye	ear	2 years
Element Group	Embankments			Length (r	m)						
Element Name	Streams & Water	vays		Width (m	1)						
Location				Height (n	n)						
Material				Count			100				
Element Type				Total Qty			100				
Environment	Benign Mo	derate	X Severe	Limited I	Inspec	tion	1				
<b>Protection System</b>										Perf	ormance
Condition Data	Units		Exc	Good		Fair	r	Poor		Def	iciencies
Condition Data	%			100							
Comments											
Recommended Wor	k: Reha	)	Replace			Mai	intena	nce Needs:			
Ur	gent 1 to 5 year	rs	6 to 10 years	None	X			Urgent	1 ye	ear	2 years
		•								•	
Element Group	Culverts			Length (r	m)		7.2				
Element Name	Barrel			Width (m	1)		3.2				
Location	East Pipe			Height (n	n)		1.9				
Material	Corrugated steel pi	e bolt	ted arch	Count			1				
Element Type	CSP Arch			Total Qty	y (m <sup>2</sup> )		46.0				
Environment	Benign Mo	Limited I	Inspec	ction	1						
Protection System											ormance
C	Units		Exc	Good Fai		Fair Poor		Deficiencies			
Condition Data	m <sup>2</sup>			27.6	27.6 18.4			18.4 01			
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. Moderate rust on the bottom part of the CSP										



Recommended Work:	Rehab	Replace		Maintenance Needs:	18
Urgent	1 to 5 years 6 to	0 10 years	None X	Urgent	1 year 2 years X
				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

Ontario Structure Inspection	Manual - Inspection Fo	Form MTO Site Number
		Inventory Data:
Structure Name	C-2 Industrial Road Cu	Culvert
Main Hwy/Road #	Roseville Rd	On Crossing Navig. Water Rail Ped der X Type: Non-Navig Water X Road Other
Hwy/Road Name	Industrial Road	
Structure Location	Approximately 20m Sout	outh of Roseville Rd
Northing	43.345	Easting -80.448333
Owners	Township of North Dumfries	Heritage Not Cons. X Cons./not App. List/not Desig.  Designation: Desig./not List Desig. & List
MTO Region	South-Western	Road Class: Freeway Arterial Collector Local X
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 Truck School Bicycle
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)
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	on	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		<u></u>
Rehab History: (Date/Descripti	ion)	<del></del>



<b>Ontario Structure Inspection</b>	Manual - Inspection Form	MTO	Site Number
	Scheduled 1	Improvements:	
Regional Priority Number		Programmed Work Year	
Nature of Program Work:		1	
Appraisal Indices:		Comments	
Fatigue			
Seismic			
Scour			
Flood			
Geometrics			
Barrier			
Curb			



Load Capacity

Ontario Structure Inspection Ma	nual - Inspection Fo		MTO Site Number								
	Fiel	d In	spection Infor	mati	ion						
Date of Inspection	May 16, 2020, 3:30	)PM		Тур	e of Inspection:	OSIM X SII	M				
Inspector:	J. Zohreh, P.Eng.										
Others in Party:	S. Mitra, EIT										
Access Equipment Used:	Tapes, Hammer, Cl	nain,	Ladder, Camer	a, S	afety Equipment						
Weather:	Sunny										
Temperature:	15°C										
						Priority					
Additional Investigations Require	ed				None	Normal	Urgent				
Material Condition Survey											
Detailed Deck Condition Surv	rey				X						
Non-destructive Delamination	Survey of Asphalt-C	Cove	red Deck		X						
Concrete Substructure Conditi	on Survey				X						
Detailed Coating Condition St	ırvey				X						
Detailed Timber Investigation					X						
Post-Tensioned Strand Investi	gation				X						
Underwater Investigation					X						
Fatigue Investigation					X						
Seismic Investigation					X						
Structure Evaluation					X						
Monitoring											
Monitoring of Deformations,	Settlements and Mov	emei	nts		X						
Monitoring Crack Widths					X						
Investigation Notes:											
	(	)ver	all Structure N	otes	3						
Recommended Work on Structure	None	X	Minor Rehab		Major Rehab	Replace					
Timing of Recommended Work	1 to 5 years	X	6 to 10 years								
Overall Comments:	See maintenance sh Monitor deformation		top profile at b	olt li	ine.						
Date of Next Inspection:	2022										
Suspected Performance Deficiencies  11 Load carrying capacity 12 Excessive deformations (reflections & rot 13 Continuing settlement 14 Continuing movements 15 Seized bearings	06 07 ations) 08 09 10 11	Jamn Pede: Roug Surfa	ing not uniformly load ned expansion joint strian/vehicular hazad th riding surface ace ponding draining		12 13 14 15 16	Flooding/channel by Undermining of fou Unstable embankment	indation				
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 09 10 11	Repa Repa Baile Anin	ir to Structural Steel ir to Bridge Concrete ir of Bridge Timber by bridges - maintenantal/Pest Control ge Surface Repair		13 14 15 16 17 18	Rout and Seal Bridge deck drainag Scaling (loose conc	ge				



## **Ontario Structure Inspection Manual - Inspection Form**

MTO	Site	Number
14111	17111	TAUTHOCE

Repair Rehabilitation	n Required	1			Pric		Estimated		
Element <sup>1</sup>	Repa	air and Rehabilitation Requ	ired <sup>2</sup>	6 to 10 years	1 to 5 years	Within 1 year	Urgent	Construct	ion Cost
Barrel	_	tation around pipe. ndent on method used for abat	tement and		X			\$	1,500.00
Estimated Rehab	ilitated or R	Replacement Structure Dimens	sions <sup>3</sup>	<b>T</b> D	4 104	4 10		Ф	1.500.00
Deck Length (m)	18.3	Structure Width (m)	3.2	To	otai Stru	ctural Co	ost	\$	1,500.00

<sup>1 -</sup> 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	<b>Estimated Cost</b>
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 - It	nelud	es o	ther constructi	on costs associated	with the structure.	Engineeri	ng fees	for reports.	. environmental	studies.	designs.	project r	nanagement an	d contingencies	are not in	ncluded	as associa	ted w	ork.
							-6		,	,	,	FJ							

Jus	stification			



<sup>5 -</sup> 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

Bridge Condition Index																		
No.		Element Description	Location	Length	Width	Height	Count	Total Qty	Units	Replacement (Initial) Cost	Material	Total Replacement Value	Excellen t	Good	Fair	Poor	Current Flement 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 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-2	Culverts	Outlet Compor	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 & War	0	0	0	0	100	100.00	%	\$ -	0	\$ -	0.00	0.00	0.00	#####	\$ -	-
C-2 TOTALS (TRV-CEV-BCI) \$ 38,388.70 71.6											71.6							



Element Group	Culverts				Length (r	n)		18.3							
Element Name	Barrel				Width (m	1)	3.2								
Location	North Pipe				Height (n	1)		1.9							
Material	Corrugated s	teel plate			Count			1							
Element Type	CSP Arch				Total Qty	(m <sup>2</sup> )	)	149.0							
Environment	Benign	Moderat	e X	Severe	Limited I	nspe	ction	ւ [							
Protection System			<u> </u>	<u> </u>	<b>→</b> 1						I	Perf	rmance		
	Un	its		Exc	Good		Fai	r	P	oor	7 :	Defi	ciencies		
Condition Data	n	$\mathbf{n}^2$			134.1	134.1 14.9						01			
Comments		as sagged th	rough	ulation based on almost the whon.		-		line.							
Recommended Wor	·k:	Rehab		Replace			Mai	intenan	ce Ne	eds:					
Ur	gent 1 to	5 years	6 to	10 years	None	X		Ţ	Urger	nt	1 year	X	2 years		
							Moi	nitor def	orma	tion of	top prof	ile at	bolt line.		
Element Group	Culverts				Length (r										
Element Name	Inlet Compo				Width (m										
Location	East end of c	ulvert			Height (n	1)		4							
Material	Soil				Count	, 2,		1							
Element Type			T		Total Qty				_						
Environment	Benign	Moderat	e X	Severe	Limited I	Inspection									
Protection System						rad Dan					_	Performance Deficiencies			
Condition Data	Un			Exc	Good		Fai	r	P	oor		Defi	ciencies		
	n	<u>1</u>			1										
Comments	Good stabilit	y in area aro	und c	eulvert.											
Recommended Wor	·k:	Rehab		Replace	Maintenance Needs:					eds:					
Ur	gent 1 to	5 years	6 to	10 years	None	X		Į	Urger	nt	1 year		2 years		
Element Comm	Culverts				Length (r	<u> </u>									
Element Group Element Name	Outlet Com	nonents			Width (m										
Location	West end of				Height (n										
Material	Soil	divert			Count	1)		1							
Element Type	2011				Total Qty	/ (m <sup>2</sup>	,	<u>-                                      </u>							
Environment	Benign	Moderat	e X	Severe	Limited I			ı [							
Protection System	Demgn	Moderat	- 11	Severe	]							Perf	rmance		
· ·	Units Exc							r	P	oor			ciencies		
Condition Data	2200	Good 1		1 41			-								
Comments	n Good stabilit		und c	ulvert.											
Recommended Wor	·k:	Rehab		Replace			Mai	intenan	ce Ne	eds:					
Ur	gent 1 to	5 years	6 to	10 years	None	X		Ţ	Urger	nt	1 year		2 years		
		<u> </u>		- <u> </u>	•								<u> -</u>		



Element Group	Decks					Length (n	n)	18.3								
Element Name	Wearing	Surface				Width (m	l)		7							
Location	On top of	culvert				Height (m	<b>1</b> )									
Material	Tar and cl	nip				Count			1							
Element Type						<b>Total Qty</b>	$(m^2)$	)	128.1							
Environment	Benign	Mode	rate	X Severe		Limited I			ı							
Protection System		<del></del>	<u> </u>	<del></del>					<u></u>	<b>-</b>	P	erfo	rmance			
G 1141 D 4		Units		Exc	(	Good		Fai	r	Poor	ı	Defi	ciencies			
Condition Data		m <sup>2</sup>				128.1										
Comments						•										
Recommended Wor	·k:	Rehab		Replace				Mai	intenan	ce Needs:						
Ur	gent 1	to 5 years	6	to 10 years		None	X		Ţ	J <b>rgent</b>	1 year		2 years			
		•				•					•					
	E 1-4					T 41- (	-)									
Element Group Element Name	Foundation	ons ons (below g	TPOIN	d lovel)		Length (n Width (m										
Location	roundan	ons (below §	gi Ouiic	u ievei)		Height (m										
Material						Count	1)		100							
Element Type						Total Qty	(m <sup>2</sup> )		100							
Environment	Donian	Mode	roto	Severe		Limited I										
	Benign	Model	rate	Severe		Lillitea I	nspe	CHOI	1							
Protection System		Units		Evo		Cood		Eo:		Door			rmance ciencies			
Condition Data		\frac{\text{Units}}{\psi}		Exc	'	<b>Good</b> 100		Fai	r	Poor	-	Jen	ciencies			
Comments									<b>.</b>		'					
Recommended Wor	·k:	Rehab		Replace				Mai	intenan	ce Needs:						
Ur	gent 1	to 5 years	6	to 10 years		None	X		Ţ	J <b>rgent</b>	1 year		2 years			
Element Group	Embankn					Length (n										
Element Name	Embankn	nents				Width (m										
Location						Height (m	ı)									
Material						Count			4							
Element Type						Total Qty		-								
Environment	Benign	Modei	rate	X Severe		Limited I	nspe	ctior	1 <u> </u>							
<b>Protection System</b>				-		Good							rmance			
Condition Data	tion Data Units Exc							Fai	r	Poor	<u> </u>	Defi	ciencies			
		4														
Comments																
Recommended Wor	·k:	Rehab		Replace	Maintenance Needs: 18											
Ur	gent 1	to 5 years	6	to 10 years		None		Urgent 1 year 2 year					2 years X			
				Clea	ar vegeta	ation around	pipe.									



Element Group	Embankmei	nts	]	Length (n											
Element Name	Slope Protec	ction			,	Width (m									
Location					]	Height (n	1)								
Material					(	Count			4						
Element Type					,	Total Qty	$(m^2)$	)							
Environment	Benign	Modera	ate X	Severe		Limited I			1	X					
Protection System		4		<u>L</u>									Perf	ormanc	<u>-</u>
	Uı	nits		Exc	(	Good		Fai	r		Poor	1		iciencies	
Condition Data	<b>-</b>	ıch				4									
Comments	Limited insp	ection due	to high	vegetation.			ļ								
Recommended Wor	rk:	Rehab		Replace		N		Ma	intena	nce N	leeds:				
Ur	gent 1 to	5 years	6 to	10 years		None X				Urg	ent	1 ye	ar	2 year	s
	<u> </u>	<u>-</u>		<u>.</u>			<u></u>						<u> </u>	4	
Element Group	Embankmei	nts				Length (n	n)								
Element Name	Streams & V		<u>s</u>			Width (m									
Location						Height (n									
Material						Count			100						
Element Type						Total Qty	$(\mathbf{m}^2)$	)	100						
Environment	Benign		Limited Inspection												
Protection System	g	Modera		<u>.</u>									Perf	ormanc	e
· ·	Uı	nits		Exc	(	Good		Fai	r		Poor			iciencies	
Condition Data	0	<del>/</del> 0									100				
Comments	completely b	locked.										·			
Recommended Wor	·k:	Rehab		Replace		Maintenance Needs:									
Ur	gent 1 to	5 years	6 to	10 years		None X				Urg	ent X	1 ye	ar	2 year	rs
		<u>-</u>			•									4	
Element Group	Culverts					Length (n	n)		18.3						
Element Name	Barrel					Width (m			3.2						
Location	South Pipe					Height (n			1.9						
Material	Corrugated s	teel plate				Count			1						
Element Type	CSP Arch	1				Total Qty	(m <sup>2</sup> )	,	149.0						
Environment	Benign Moderate X Severe					Limited I									
Protection System													Perf	ormanc	e
Condition Date	Condition Data Units Exc				(	Good		Fair		Fair Poor			Defi	iciencies	S
Condition Data	n	$\overline{\mathbf{n}^2}$			1	134.1		14.	9					01	
Comments	Approximate surface area calculation based of						-					-			
Top profile has sagged through almost the who					whole	e length at	t the }	odt.	lıne						
Recommended Wor	Replace		Maintenance Needs:				Veeds:								



Urgent 1 to 5 years 6 to 10 years None X	Urgent 1 year X 2 years
	Monitor deformation of top profile at bolt line.



## Industrial Road CSP Culvert



Approach looking East



Upstream view



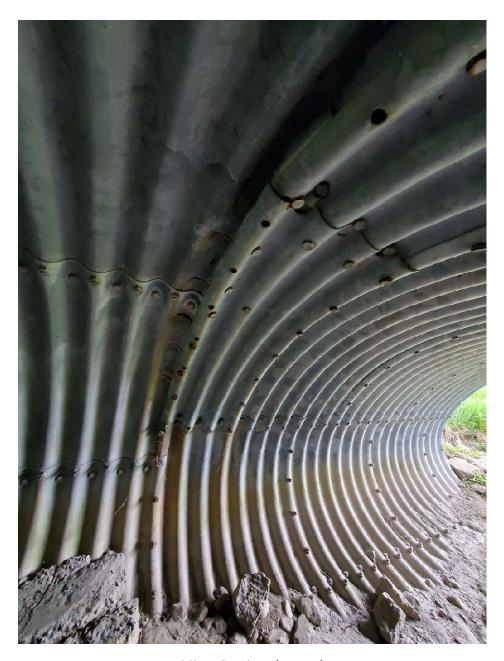
Downstream view



Elevation view 1



Elevation view 2



Minor Rusting observed

Ontario Structure Inspection	Manual - Inspection For	m MTO Site Number
		Inventory Data:
Structure Name	C-3 Kings Road Twin C	Culvert
Main Hwy/Road #	GreenField Road Under	
Hwy/Road Name	Kings Road	
Structure Location	Approximately 570m Sout	th of New Dundee Road
Northing	43.368056	Easting -80.422222
Owners	Township of North Dumfries	Heritage Not Cons. X Cons./not App. List/not Desig.  Designation: Desig./not List Desig. & List
MTO Region	South-Western	Road Class: Freeway Arterial Collector Local X
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 Truck School Bicycle
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) 03
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	on	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		<u></u>
Rehab History: (Date/Descripti	ion)	<u>4</u>



<b>Ontario Structure Inspection</b>	Manual - Inspection Form	MTO	Site Number
	Scheduled 1	Improvements:	
Regional Priority Number		Programmed Work Year	
Nature of Program Work:		1	
Appraisal Indices:		Comments	
Fatigue			
Seismic			
Scour			
Flood			
Geometrics			
Barrier			
Curb			



Load Capacity

Ontario Structure Inspection Ma	nual - Inspection Fo		MTO	Site Num	ber				
	Fiel	d Inspection Info	rmation						
Date of Inspection	May 16, 2020, 4:3	0PM	Type of Inspe	ection:	OSIM	X SIM	X SIM		
Inspector:	J. Zohreh, P.Eng.								
Others in Party:	S. Mitra, EIT								
Access Equipment Used:	Tapes, Hammer, Cl	nain, Ladder, Cam	era, Safety Equ	ipment					
Weather:	Sunny	,,	<u> </u>	<u> </u>					
Temperature:	15°C								
			_		Dwie	ni 4 - 1			
Additional Investigations Requir	ed		None		Prion Norm				
Material Condition Survey									
Detailed Deck Condition Surv	rey		X						
Non-destructive Delamination	Survey of Asphalt-C	Covered Deck	X						
Concrete Substructure Condit	ion Survey		X						
Detailed Coating Condition S	urvey		X						
Detailed Timber Investigation			X						
Post-Tensioned Strand Investi	gation		X						
Underwater Investigation			X						
Fatigue Investigation			X						
Seismic Investigation			X						
Structure Evaluation			X						
Monitoring									
Monitoring of Deformations,	Settlements and Mov	ements			X				
Monitoring Crack Widths					X				
Investigation Notes:				,					
	(	Overall Structure	Notes						
Recommended Work on Structure	None	X Minor Reha	b Major Ro	ehab	Rep	lace			
Timing of Recommended Work	1 to 5 years	X 6 to 10 year	s						
Overall Comments:	See maintenance sh Monitor deformation		bolt line.						
Date of Next Inspection:	2022								
Suspected Performance Deficiencies  01 Load carrying capacity  02 Excessive deformations (reflections & rot  03 Continuing settlement  04 Continuing movements  05 Seized bearings	06 07 ations) 08 09 10	Bearing not uniformly I Jammed expansion join Pedestrian/vehicular har Rough riding surface Surface ponding Deck draining	t	12 13 14 15 16	Undermin	furfaces channel block ing of founda embankments	ation		
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 09 10 11	Repair to Structural Ste Repair to Bridge Concre Repair of Bridge Timbe Bailey bridges - mainter Animal/Pest Control Bridge Surface Repair	ete r	13 14 15 16 17 18	Concrete S Rout and S Bridge dec	Seal ck drainage	dges e or ACR steel)		



## **Ontario Structure Inspection Manual - Inspection Form**

MTO	Site	Number
1411()	SILC	Number

Repair Rehabilitation	n Required			Pric	ority		E	stimated	
Element <sup>1</sup>	Repa	nir and Rehabilitation Requ	iired <sup>2</sup>	6 to 10 1 to 5 Within years years 1 year				Const	ruction Cost
Barrel	Monitor de	eformation of top profile at be	olt line.		X			\$	500.00
		tation around pipe. Ident on method used for aba	tement and		X			\$	1,000.00
Estimated Rehab	T	-4-1 C4	ctural Co	4	\$	1.500.00			
Deck Length (m)	12	Structure Width (m)	7.4	To	1,500.00				

- 1 Indicate specific costs for structure replacement or for rehabilitation under the given headings.
- 2  $\mbox{\sc Give}$  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	<b>Estimated Cost</b>
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

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 worl

Justification	



<sup>5 -</sup> 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

								I	Bridge C	ondition Index								
No.		Element Description	Location	Length	Width	Height	Count	Total Qty	Units	Replacement (Initial) Cost	Material	Total Replacement Value		Good	Fair	Poor	Current Flement 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 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-3	Culverts	Outlet Compor	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 & War	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



Element Group	Culverts					Length (n	n)		12								
Element Name	Barrel					Width (m	1)		3.2								
Location	East Pipe					Height (n	<b>1</b> )		1.9								
Material	Corrugated s	teel plate				Count			1								
Element Type	CSP Arch					Total Qty	$(m^2)$	)	97.7								
Environment	Benign	Modera	te X	Severe		Limited I			1								
Protection System				<u>.                                      </u>		•							Performance				
Can dition Data		nits		Exc		Good		Fai	r	Poor				Deficiencies			
Condition Data	n	m <sup>2</sup>				73.3	4										
Comments	Approximate Top profile h Continue to 1	e surface are nas sagged t	hrough	h almost the			-	oolt									
Recommended Wor	·k:	Rehab		Replace				Ma	intena	nce ]	Needs:			_			
Element Group	Culverts					Length (n	n)										
Element Name	Inlet Compo	onents				Width (m	1)										
Location	East end of c	ulvert				Height (n	<b>1</b> )										
Material	Soil					Count			1								
Element Type						<b>Total Qty</b>	$(m^2)$	)									
Environment	Benign	Modera	te X	Severe		Limited I			ı								
Protection System		-		-		•							Performance				
Condition Data		nits	$\top$	Exc (		Good		Fai	r		Poor		_ <b>D</b>	efic	ciencies		
Condition Data	n	n <sup>2</sup>				1											
Comments	Good stabilit	y in area ar	ound c	culvert.													
Recommended Wor	·k:	Rehab	$\overline{1}$	Replace				Ma	intena	nce ]	Needs:						
Ur	gent 1 to	o 5 years	6 to	10 years		None X				Urg	gent	1 ye	ar		2 years		
	G 1 4					Ι <sub>ν</sub> 4Ι. (	`										
Element Group	Culverts	4				Length (n								—			
Element Name	Outlet Com					Width (m)											
Location	West end of	culvert				Height (n	1)		1								
Material	Soil					Count	. 2.		1								
Element Type		1		T 1	—	Total Qty											
Environment	Benign	Modera	te X	Severe		Limited I	nspe	ction	1		<u> </u>						
<b>Protection System</b>															rmance		
Condition Data		nits		Exc		Good		Fai	r		Poor		D	efic	ciencies		
	n	m <sup>2</sup>				1											
Comments	Good stabilit	y in area ar	ound c	culvert.													
Recommended Wor	·k:	Rehab		Replace				Ma	intena	nce l	Needs:						
Ur	gent 1 to	5 years	6 to	10 years		None	X			Urg	gent	1 ye	ar		2 years		
	<u>~</u>	<u> </u>										<u>, , , , , , , , , , , , , , , , , , , </u>			J		



Element Group	Decks					Length (n	n)	ſ	7.4								
Element Name	Wearing	Surface				Width (m	)	1	7								
Location	On top of	culvert				Height (m	1)										
Material	Chip and	tar				Count			1								
Element Type						Total Qty	$(m^2)$	) .	51.8								
Environment	Benign	Modei	ate	X Severe		Limited I											
Protection System	_							Performan									
Candition Data		Units		Exc		Good		Fair		]	Poor		Defi	ciencies			
Condition Data		m <sup>2</sup>				25.9		25.9	)								
Comments																	
Recommended Wor	·k:	Rehab		Replace				Mai	ntenan	ce N	eeds:						
Ur	Urgent 1 to 5 years 6 to 10 years									Urge	nt	1 year		2 years X			
			t	,			•										
Element Group	Foundati	ons				Length (n	n)										
Element Name		ons (below s	groun	d level)		Width (m											
Location		` `	,	,		Height (m											
Material						Count			100								
Element Type						<b>Total Qty</b>	(m <sup>2</sup> )	)									
Environment	Benign	Modei	ate	Severe		Limited I											
Protection System													Perf	ormance			
		Units		Exc		Good		Fair	. 1	]	Poor			ciencies			
Condition Data		%				100						+					
Comments	No scour	through the p	oipe. S	Soil buildup ald	ong t	he east and	l wes	t wal	1.								
Recommended Wor	·k:	Rehab		Replace		Maintenance Needs:											
Ur	gent	1 to 5 years	6	to 10 years		None	X		:	Urge	nt	1 year		2 years			
		-												<u> </u>			
Element Group	Embankı					Length (n											
Element Name	Embankı	ments				Width (m											
Location						Height (m	ı)		4								
Material						Count	. 2.		4								
Element Type		_		<del></del>		Total Qty			г	_							
Environment	Benign	Moder	rate 2	X Severe		Limited I	nspe	ction									
Protection System				Ī										ormance			
Condition Data		Units		Exc		Good		Fair	•	]	Poor		Defi	ciencies			
		each						4									
Comments																	
Recommended Wor	·k:	Rehab		Replace				Mai	ntenan	ice N	eeds:		18				
Ur	gent	1 to 5 years	6	to 10 years		None				Urge	nt	1 year	X	2 years			
								Clea	r veget	ation	around	pipe.					



Element Group	<b>Embankments</b> I			Length (r	n)										
Element Name				Width (m	1)										
Location	<u> </u>			Height (m)											
Material	<u> </u>			Count 4											
Element Type						Total Qty (m <sup>2</sup> )									
Environment	Benign	Mode	rate X	Severe		Limited I			n	X					
Protection System	_					•							Pe	rforma	ance
C 122 D . 4 .		Units		Exc		Good		Fai	ir	Poor			D	eficien	cies
Condition Data		each				4									
Comments	Limited inspection due to high vegetation.														
Recommended Wor	·k:	Rehab		Replace				Ma	intena	nce N	leeds:				
Ur	gent	1 to 5 years	6 t	to 10 years		None	X			Urg	ent	1	year	2 y	ears
Element Group	Embank					Length (r									
Element Name	Streams	& Waterwa	ys			Width (m									
Location						Height (n	n)		100						
Material					Count										
Element Type					Total Qty (m <sup>2</sup> ) 100										
Environment	Benign	Mode	rate X	Severe		Limited I	nspe	ction	n						
Protection System					1					1		_		rforma	
Condition Data		Units		Exc		Good		Fair			Poor	$\dashv$	De	eficien	cies
		%						100	0						
Comments	Vegetatio	on enroachin	g on wa	terway.											
Recommended Wor	·k:	Rehab		Replace				Ma	intena	nce N	leeds:				
Ur	gent	1 to 5 years	6 t	to 10 years		None	X			Urg	ent	1	year	2 y	ears
				•											
Element Group	Culverts					Length (r	n)		12						
Element Name	Barrel					Width (m	1)		3.2						
Location	West Pip	e				Height (n	n)		1.9						
Material	Corrugate	ed steel plate	:			Count			1						
Element Type	CSP Arch				Total Qty (m <sup>2</sup> ) 97.7										
Environment	Benign Moderate X Severe Limited Inspection														
Protection System													Pe	rforma	ance
-		Units		Exc		Good Fair		ir		Poor	ヿ	D	eficien	cies	
Condition Data		m <sup>2</sup>	$\neg \uparrow$			73.3		24.				$\dashv$			
Comments	Top profi		d throug	culation basegh almost the tion.			-		line.						



Recommended Work:	Rehab Replace		Maintenance Needs:
Urgent	1 to 5 years 6 to 10 years	None X	Urgent 1 year 2 years X
			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

Ontario Structure Inspection	Manual - Inspection For	rm MTO Site Number					
		Inventory Data:					
Structure Name	C-4 Morrison Culvert 1						
Main Hwy/Road #	N Dumfries Twp Rd 3E Under	Type: Non-Navig Water X Road Other					
Hwy/Road Name	N Dumfries Twp Rd 3E -	· Morisson Road					
Structure Location	Approximately 700m Wes	est of Sheffield road					
Northing		Easting					
Owners	Township of North Dumfries	Heritage Not Cons. X Cons./not App. List/not Desig.  Designation: Desig./not List Desig. & List					
MTO Region	South-Western	Road Class: Freeway Arterial Collector Local X					
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 Truck School Bicycle					
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)					
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	on	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		<u></u>					
Rehab History: (Date/Description	ion)						



<b>Ontario Structure Inspection</b>	Manual - Inspection Form	MTO	Site Number						
	Scheduled Improvements:								
Regional Priority Number		Programmed Work Year							
Nature of Program Work:		1							
Appraisal Indices:		Comments							
Fatigue									
Seismic									
Scour									
Flood									
Geometrics									
Barrier									
Curb									



Load Capacity

Ontario Structure Inspection Ma	nual - Inspection Fo	orm		MTO	Site Num	ber		
	Fiel	d Inspection Info	rmation					
Date of Inspection	May 16, 2020, 5:3	0PM	Type of Inspe	ection:	OSIM	X SIM		
Inspector:	J. Zohreh, P.Eng.							
Others in Party:	S. Mitra, EIT							
Access Equipment Used:	Tapes, Hammer, Cl	nain, Ladder, Cam	era, Safety Equ	ipment				
Weather:	Sunny	,,	<u> </u>	Г .				
Temperature:	15°C							
			_		Dwie	4:4-v		
Additional Investigations Requir	ed		None		Prion Norm		Urgent	
Material Condition Survey								
Detailed Deck Condition Surv	rey		X					
Non-destructive Delamination	Survey of Asphalt-C	Covered Deck	X					
Concrete Substructure Condit	ion Survey		X					
Detailed Coating Condition S	urvey		X					
Detailed Timber Investigation			X					
Post-Tensioned Strand Investi	gation		X					
Underwater Investigation			X					
Fatigue Investigation			X					
Seismic Investigation			X					
Structure Evaluation			X					
Monitoring								
Monitoring of Deformations,	Settlements and Mov	ements			X			
Monitoring Crack Widths					X			
Investigation Notes:								
	(	Overall Structure	Notes					
Recommended Work on Structure	None	X Minor Reha	b Major R	ehab	Rep	lace		
Timing of Recommended Work	1 to 5 years	X 6 to 10 year	s					
Overall Comments:	See maintenance sh Monitor deformation		bolt line.					
Date of Next Inspection:	2022							
Suspected Performance Deficiencies  11 Load carrying capacity 12 Excessive deformations (reflections & rot 13 Continuing settlement 14 Continuing movements 15 Seized bearings	06 07 ations) 08 09 10	Bearing not uniformly I Jammed expansion join Pedestrian/vehicular har Rough riding surface Surface ponding Deck draining	t	12 13 14 15 16	Undermin	ourfaces channel block ing of founda embankments	ation	
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 09 10 11	Repair to Structural Ste Repair to Bridge Concre Repair of Bridge Timbe Bailey bridges - mainter Animal/Pest Control Bridge Surface Repair	ete r	13 14 15 16 17 18	Concrete S Rout and S Bridge dec	Seal ck drainage	dges e or ACR steel)	



Ontario Structure In		M					
Repair Rehabilitation Required			Pric	Estimated			
Element <sup>1</sup>	Repair and Rehabilitation Required <sup>2</sup>	6 to 10 years	1 to 5 years	Urgent		<b>Construction Cost</b>	
Embankments	Clear vegetation around pipe.  Cost dependent on method used for abatement and season		X			\$ 1,000.00	

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.

10.3

Deck Length (m)

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

Estimated Rehabilitated or Replacement Structure Dimensions<sup>3</sup>

Structure Width (m)

Associated Work <sup>4</sup>	Comments	<b>Estimated Cost</b>
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

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	or minor changes in horizontal or vertical al	ignment and for barrier end treatments at the structure
--	---	---

Justification	



\$

**Total Structural Cost** 

1,000.00

	Bridge Condition Index																	
No.		Element Description	Location	Length	Width	Height	Count	Total Qty	Units	Replacement (Initial) Cost Material		Total Replacement Value	Excellen t	Good	Fair	Poor	Current Element Value	Element Condition Index
				(m)	(m)	(m)	#			(\$)	TRV (\$) 1		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 \$ 29,792.00 0.00		0.00	76.61	8.51	0.00	\$ 21,301.28	71.5
C-4	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-4	Culverts	Outlet Compor	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 & Wa	0	0	0	0	100	100.00	%	\$ -	0	\$ -	0.00	0.00	100.00	0.00	\$ -	-
C-4		TOTALS (TRV	V-CEV-BCI)									\$ 30,639.36					\$ 21,907.56	71.5



Element Group	Culverts	}			Length (m) 20.2											
Element Name	Barrel				Width (n	n)		3.8								
Location					Height (r	n)	4	2.2								
Material	Concrete	Rigid Frame			Count			1								
Element Type	Box				Total Qt	y (m <sup>2</sup> )	)	85.1								
Environment	Benign	Mode	rate X	Severe	Limited 1			1								
Protection System			·									Pe	rfo	rmanc	e	
Condition Data		Units		Exc	Good		Fair	r		Poor		D	efic	iencies	š	
Condition Data		$m^2$			76.6		8.5									
Comments																
Recommended Wor	·k:	Rehab		Replace		Maintenance Needs:										
Ur	gent	1 to 5 years	6 1	to 10 years	None	None X Urgent				ent	1 y	ear		2 year	's X	
			-									,				
Element Group	Culverts	}			Length (	m)										
Element Name	Inlet Co	mponents			Width (n	n)										
Location	East end	of culvert			Height (r	n)										
Material	Soil				Count			1								
Element Type					Total Qt	y (m <sup>2</sup> )	)									
Environment	Benign	Mode	rateX	Severe	Limited 1	Inspe	ction									
<b>Protection System</b>												Performance				
Condition Data		Units		Exc	Good		Faiı	r		Poor		D	efic	iencies	S	
Condition Data		m <sup>2</sup>			1											
Comments	Good sta	bility in area	around	culvert.												
Recommended Wor	·k:	Rehab		Replace			Mai	ntenar	ice N	Needs:						
Ur	gent	1 to 5 years	6 1	to 10 years	None	X			Urg	ent	1 y	ear		2 year	's	
				_							_					
Element Group	Culverts				Length (											
Element Name		components			Width (n											
Location		l of culvert			Height (r	n)										
Material	Soil				Count	2		1								
Element Type				<del></del>	Total Qt		-									
Environment	Benign	Mode	rate X	Severe	Limited 1	Inspe	ction	l <u> </u>								
Protection System														rmanc		
Condition Data		Units		Exc	Good		Fair	r		Poor	_	D	efic	iencies	<u>s</u>	
		m <sup>2</sup>			1						ļ					
Comments	Good sta	bility in area	around	culvert.												
Recommended Wor			Mai	ntenar	ice I	Needs:										
Ur	None	X			Urg	ent	1 y	ear		2 year	's					
		1 to 5 years		<u>.</u>						<u> </u>						



Element Group	Decks					Length (n	· ·								
Element Name	Wearing Su	rface				Width (m	1)		6.2						
Location	On top of cul	lvert				Height (n	1)								
Material	Chip and tar					Count			1						
Element Type						Total Qty	(m <sup>2</sup> )	)	23.56						
Environment	Benign	Modera	ate X	Severe		Limited I			ı						
Protection System		1	<u> </u>									Perf	ormance		
	Ur	nits		Exc		Good		Fai	r	Poor		Def	iciencies		
Condition Data	n	$\mathbf{n}^2$				11.78		11.7	<b>'</b> 8						
Comments			<u>'</u>						,		•				
Recommended Wor	rk:	Rehab		Replace				Ma	intenan	ce Needs:	:				
Ur	gent 1 to	5 years	6 to	10 years		None	X			Urgent	1	year	2 years		
							<u> </u>						<b>-</b>		
Element Group	Foundations	8				Length (m)									
Element Name	Foundations	s (below gr	round l	level)		Width (m	1)								
Location						Height (n	1)								
Material						Count			100						
Element Type						Total Qty	/ (m <sup>2</sup> )	)	_						
Environment	Benign	Modera	ate	Severe		Limited I	d Inspection								
<b>Protection System</b>											Perf	ormance			
Condition Data	Ur	nits		Exc		Good Fair			r	Poor		Def	iciencies		
Condition Data	0	<b>6</b>				100									
Comments															
Recommended Wor	·k:	Rehab		Replace				Ma	intenan	ce Needs:	:				
Ur	gent 1 to	5 years	6 to	10 years		None X Urgent				1	year	2 years			
		<u>-</u>		·									_		
Element Group	Embankmei					Length (n									
Element Name	Embankmei	nts				Width (m									
Location						Height (n	<b>1</b> )								
Material						Count			4						
Element Type		1		7 .		Total Qty									
Environment	Benign	Modera	ate X	Severe		Limited I	nspe	ctior	1						
<b>Protection System</b>													ormance		
Condition Data		nits		Exc		Good		Fai	r	Poor		Def	iciencies		
	ea	ch						4							
Comments															
Recommended Wor	-k:			Maintenance Needs:											
Ur	ommended Work: Rehab Replace Urgent 1 to 5 years 6 to 10 years							Urgent 1 year X				2 years			
	Urgent 1 to 5 years 6 to 10 years								ar veget	ation arou	nd pip	oe.			



Element Group	Embankme	nts			Length (r	m)									
Element Name	Slope Prote	ction			Width (m	<u>n)</u>									
Location					Height (n	n)									
Material					Count			4							
Element Type					Total Qty	$y (m^2)$									
Environment	Benign	Modera	ate X	Severe	Limited I			1	X						
Protection System					<u>1</u>						Performance				
	Uı	nits		Exc	Good	Good Fair Poo					Τ	)efic	eiencies		
Condition Data	ea	ach			4						1				
Comments	Limited insp	ection due	to high	vegetation.											
Recommended Wor	·k:	Rehab		Replace			Mai	intenar	nce Nee	ds:					
Ur	gent 1 to	o 5 years	6 to	10 years	None	X			Urgent		1 year		2 years		
Element Group	Embankme	nts			Length (r	n)									
Element Group Element Name	Embankmer		S		Length (r										
			S			1)									
Element Name			s		Width (m	1)		100							
Element Name Location			S		Width (m Height (n Count	n) n)		100 100							
Element Name Location Material				Severe	Width (m Height (n	n) n) y (m²)		100							
Element Name Location Material Element Type	Streams & V	Waterways		Severe	Width (m Height (n Count Total Qty	n) n) y (m²)		100				erfo	rmance		
Element Name Location Material Element Type Environment Protection System	Streams & V Benign	Waterways		Severe Exc	Width (m Height (n Count Total Qty	n) m) y (m²) Inspec		100	Po	Dr		-	rmance		
Element Name Location Material Element Type Environment	Streams & V Benign U1	Waterways Modera			Width (m Height (n Count Total Qty Limited I	n) y (m²) Inspec	ction	100 n [	Po	or		-			
Element Name Location Material Element Type Environment Protection System	Streams & V Benign U1	Waterways  Modera	ate X	Exc	Width (m Height (n Count Total Qty Limited I	n) y (m²) Inspec	ction Fair	100 n [	Po	or		-			
Element Name Location Material Element Type Environment Protection System Condition Data	Benign Un	Waterways  Modera	ate X	Exc	Width (m Height (n Count Total Qty Limited I	n) n) y (m²) Inspec	Fair 100	100 n [	Po-			-			
Element Name Location Material Element Type Environment Protection System Condition Data  Comments Recommended Wor	Benign Un Vegetation e	Modera nits nroaching	on wate	Exc erway.	Width (m Height (n Count Total Qty Limited I	n) n) y (m²) Inspec	Fair 100	100 r l				Defic			



## 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

Ontario Structure Inspection	Manual - Inspection For	m MTO Site Number
		Inventory Data:
Structure Name	C-5 Morrison Culvert 2	
Main Hwy/Road #	N Dumfries Twp On Rd 3E Under	Navig. Water Rail Ped Type: Non-Navig Water X Road Other
Hwy/Road Name	N Dumfries Twp Rd 3E -	Morisson Road
Structure Location	Approximately 270m Wes	st of Sheffield road
Northing	43.3475	Easting -80.219444
Owners	Township of North Dumfries	Heritage Not Cons. X Cons./not App. List/not Desig.  Designation: Desig./not List Desig. & List
MTO Region	South-Western	Road Class: Freeway Arterial Collector Local X
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 Truck School Bicycle
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	on	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/Descripti	ion)	



<b>Ontario Structure Inspection</b>	Manual - Inspection Form	MTO	Site Number
	Scheduled 1	Improvements:	
Regional Priority Number		Programmed Work Year	
Nature of Program Work:		1	
Appraisal Indices:		Comments	
Fatigue			
Seismic			
Scour			
Flood			
Geometrics			
Barrier			
Curb			



Load Capacity

Ontario Structure Inspection Ma	nual - Inspection Fo			МТО	Site 1	Number							
	Fiel	d In	spection Infor	mati	ion								
Date of Inspection	May 17, 2020, 8:00	[	Тур	e of Inspection:	OS	SIM X SIM							
Inspector:	J. Zohreh, P.Eng.												
Others in Party:	S. Mitra, EIT												
Access Equipment Used:	Tapes, Hammer, Cl	nain,	Ladder, Camer	a, Sa	afety Equipment								
Weather:	Sunny												
Temperature:	15°C												
				Priority									
Additional Investigations Require	ed				None		Normal	Urgent					
Material Condition Survey													
Detailed Deck Condition Surv	rey				X								
Non-destructive Delamination	Survey of Asphalt-C	Cove	red Deck		X								
Concrete Substructure Conditi	on Survey				X								
Detailed Coating Condition St	ırvey				X								
Detailed Timber Investigation					X								
Post-Tensioned Strand Investi	gation				X								
Underwater Investigation					X								
Fatigue Investigation					X								
Seismic Investigation					X								
Structure Evaluation					X								
Monitoring													
Monitoring of Deformations,	Settlements and Mov	emer	nts				X						
Monitoring Crack Widths							X						
Investigation Notes:													
	(	)ver	all Structure N	otes	S								
Recommended Work on Structure	None	X	Minor Rehab		Major Rehab		Replace						
Timing of Recommended Work	1 to 5 years	X	6 to 10 years										
Overall Comments:	See maintenance sh Monitor deformation		top profile at b	olt li	ine.								
Date of Next Inspection:	2022												
Suspected Performance Deficiencies  11 Load carrying capacity 12 Excessive deformations (reflections & rot 13 Continuing settlement 14 Continuing movements 15 Seized bearings	06 07 ations) 08 09 10 11	ing not uniformly load ned expansion joint strian/vehicular hazar th riding surface ace ponding draining		12 13 14 15 16	Floo Und Uns	pery Surfaces oding/channel block: lermining of foundar table embankments er							
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 09 10 11	Repa Repa Baile Anim	ir to Structural Steel ir to Bridge Concrete ir of Bridge Timber by bridges - maintenantal/Pest Control ge Surface Repair		13 14 15 16 17 18	Con Rou Bric Sca	sion Control at Bridgerete Sealing at and Seal dge deck drainage ling (loose concrete er	-					



Ontario Structur	e Inspection Manual - Inspection Form		M	Number			
Repair Rehabilita	ation Required		Pri	Estimated			
Element <sup>1</sup>	Repair and Rehabilitation Required <sup>2</sup>	6 to 10 years	1 to 5 years	Within 1 year	Urgent	Con	struction Cost
Embankments	Clear vegetation around pipe. Cost dependent on method used for abatement and season		X			\$	1,000.00

**Total Structural Cost** 

\$

1,000.00

Deck Length (m)

10.4

Estimated Rehabilitated or Replacement Structure Dimensions<sup>3</sup>

Structure Width (m)

Associated Work <sup>4</sup>	Comments	<b>Estimated Cost</b>
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

<sup>4 -</sup> 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.

Justification	



<sup>1</sup> - Indicate specific costs for structure replacement or for rehabilitation under the given headings.

<sup>2</sup> - Give a brief description of the rehabilitation work required.

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

<sup>5 -</sup> 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

	Bridge Condition Index																	
No.		Element Description	Location	Length	Width	Height	Count	Total Qty	Units	Replacement (Initial) Cost	Material	Total Replacement Value	Excellen t	Good	Fair	Poor	Current Flement Value	Element Condition Index
				(m)	(m)	(m)	#			(\$)	TRV (\$) 1		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		0.00	76.61	8.51	0.00	\$ 21,301.28	71.5
C-5	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-5	Culverts	Outlet Compor	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 & Wa	0	0	0	0	100	100.00	%	\$ -	0	\$ -	0.00	0.00	100.00	0.00	\$ -	-
C-5		TOTALS (TRV	V-CEV-BCI)									\$ 30,639.36					\$ 21,924.88	71.6



Element Group	Culvert	S			Length (m) 20.2											
Element Name	Barrel				Width (n	n)		3.8								
Location					Height (r	n)		2.2								
Material	Concret	e Rigid Frame	;		Count			1								
Element Type	Box				Total Qt	y (m <sup>2</sup>	)	85.1								
Environment	Benign	Mode	rate X	Severe	Limited 1			1								
Protection System				<u></u>	<del></del> ,						$\Box$	Per	rfor	mance		
Can 114 an Da4a		Units		Exc	Good		Fai	r		Poor		De	efici	encies		
Condition Data		m <sup>2</sup>			76.6		8.5									
Comments	Minor s	palling	•								-					
Recommended Wor	·k:	Rehab		Replace		Maintenance Needs:										
Ur	gent	1 to 5 years	6 t	o 10 years	None	X						ar	7	2 years	X	
						l .				<u> </u>						
Element Group	Culvert	S			Length (	(m)										
Element Name	Inlet Co	omponents				Width (m)										
Location		d of culvert			Height (r	,										
Material	Soil				Count	,		1								
Element Type					Total Qt	y (m <sup>2</sup>	)									
Environment	Benign	Mode	rate X	Severe	Limited 1			1								
Protection System	Š				!							Performance				
		Units		Exc	Good		Fair Poor							encies		
Condition Data		m <sup>2</sup>			1		1 002									
Comments	Good st	ability in area	around	culvert.												
Recommended Wor	:k:	Rehab		Replace			Mai	intena	nce l	Needs:						
Ur	gent	1 to 5 years	6 t	o 10 years	None	X			Urg	ent	1 ye	ar	<b>T</b> :	2 years	;	
		-		, <u> </u>									<u>-</u> -			
Element Group	Culvert				Length (i											
Element Name Location		d of culvert			Height (r											
Location Material	Soil	u or curvert			Count	11)		1								
Element Type	3011				Total Qt	(m²	`	1								
Environment	Benign	Mode	rate X	Severe	Limited											
	beingi	I Wlode	Tate A	Severe	Limited	шърс	CHOI	1			$\overline{}$	Do:	-for	mance		
Protection System		Units		Exc	Good		Fai	r	l	Poor	$\dashv$			mance encies		
Condition Data		m <sup>2</sup>		EXC	1	1	T al	1		1 001	+			ciicics		
Comments	Good st	ability in area	around	culvert.		ļ										
Recommended Wor	ecommended Work: Rehab Replace						Mai	intena	nce l	Needs:						
Urgent 1 to 5 years 6 to 10 years						X			Urg		1 ye	ar	1	2 years	;	
					-											



Element Group	Decks				Leng	th (m)		3.8										
Element Name	Wearing	Surface			Widt	h (m)		6.2										
Location	On top of	culvert			Heig	nt (m)												
Material	Chip and	tar			Cour	ıt		1										
Element Type					Total	Qty (r	<b>n</b> <sup>2</sup> )	23.56										
Environment	Benign	Mode	rate	X Severe		ted Ins		n										
Protection System					•							Perf	ormance					
Condition Data		Units		Exc	Good		Fa	ir		Poor		Def	iciencies					
Condition Data		m <sup>2</sup>			20.026	026 3.534												
Comments																		
Recommended Wor	·k:	Rehab		Replace			Ma	intena	ice N	leeds:								
Ur	gent	1 to 5 years	6	to 10 years	N	one X			Urg	ent	1 ye	ar	2 years					
					<del></del>	<u> </u>	_				-		<del>-</del>					
Element Group	Foundati	ions			Leno	th (m)												
Element Name		ions (below	graiin	nd level)		h (m)												
Location	1 ounder	ions (below)	51 0 411			nt (m)												
Material					Cour			100										
Element Type						Qty (r	n <sup>2</sup> )					-						
Environment	Benign	Mode	rate	Severe		ted Ins		n l										
Protection System				2311323							I	Perf	ormance					
Ţ.		Units		Exc	Good		Fa	ir		Poor			iciencies					
Condition Data		%			100													
Comments			·								•							
Recommended Wor	·k:	Rehab		Replace			Ma	intena	ice N	leeds:								
Ur	gent	1 to 5 years	6	to 10 years	N	one X					1 ye	ar	2 years					
	-																	
Element Group	Embank					Length (m)												
Element Name	Embank	ments				h (m)												
Location					ŭ	nt (m)												
Material					Cour		2	4										
Element Type						Qty (r		<u> </u>										
Environment	Benign	Mode	rate	X Severe	Limi	ted Ins	pectio	n										
<b>Protection System</b>						ī							ormance					
Condition Data		Units		Exc	Good	Good Fair Poor D					Def	iciencies						
		each					4											
Comments																		
Recommended Wor	·k:	Rehab		Replace		Maintenance Needs:												
Ur	gent	1 to 5 years	6	to 10 years	N	one	]	<del>,</del>					2 years					
			_ <del></del>				Cle	ar vege	tatio	n aroun	d pipe.							



Element Group	Embankme	nts			Length (r	Length (m)									
Element Name	Slope Prote	ction			Width (m	<u>n)</u>									
Location					Height (n	n)									
Material					Count			4							
Element Type					Total Qty	Total Qty (m <sup>2</sup> )									
Environment	Benign	Modera	ate X	Severe		Limited Inspection X									
Protection System					<u>1</u>						ТР	erfo	rmance		
	Uı	nits		Exc	Good	1	Fair	r	Po	or	Τ	)efic	eiencies		
Condition Data	ea	ach			4						1				
Comments	Limited insp	mited inspection due to high vegetation.													
Recommended Wor	·k:	Rehab		Replace			Mai	intenar	nce Nee	ds:					
Ur	gent 1 to	o 5 years	6 to	10 years	None	None X			Urgent		1 year		2 years		
	Embanhmanta I anoth (m)														
Element Group	Embankme	nts			Length (r	n)									
Element Group Element Name	Embankmer		S		Length (r										
			S			1)									
Element Name			s		Width (m	1)		100							
Element Name Location			S		Width (m Height (n Count	n) n)		100 100							
Element Name Location Material				Severe	Width (m Height (n	n) n) y (m²)		100							
Element Name Location Material Element Type	Streams & V	Waterways		Severe	Width (m Height (n Count Total Qty	n) n) y (m²)		100				erfo	rmance		
Element Name Location Material Element Type Environment Protection System	Streams & V Benign	Waterways		Severe Exc	Width (m Height (n Count Total Qty	n) m) y (m²) Inspec		100	Po	Dr		-	rmance		
Element Name Location Material Element Type Environment	Streams & V Benign U1	Waterways Modera			Width (m Height (n Count Total Qty Limited I	n) y (m²) Inspec	ction	100 n [	Po	or		-			
Element Name Location Material Element Type Environment Protection System	Streams & V Benign U1	Waterways  Modera	ate X	Exc	Width (m Height (n Count Total Qty Limited I	n) y (m²) Inspec	ction Fair	100 n [	Po	or		-			
Element Name Location Material Element Type Environment Protection System Condition Data	Benign Un	Waterways  Modera	ate X	Exc	Width (m Height (n Count Total Qty Limited I	n) n) y (m²) Inspec	Fair 100	100 n [	Po-			-			
Element Name Location Material Element Type Environment Protection System Condition Data  Comments Recommended Wor	Benign Un Vegetation e	Modera nits nroaching	on wate	Exc erway.	Width (m Height (n Count Total Qty Limited I	n) n) y (m²) Inspec	Fair 100	100 r l				Defic			



## 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

Ontario Structure Inspection	Manual - Inspection Forr	m MTO Site Number
		Inventory Data:
Structure Name	C-6 Reidsville Twin Cul	lvert
Main Hwy/Road #	Greenfield Rd Under	
Hwy/Road Name	Reidsville Road	
Structure Location	Approximately 125m North	th of Greenfield Rd
Northing	43.305833	Easting -80.433333
Owners	Township of North Dumfries	Heritage Not Cons. X Cons./not App. List/not Desig.  Designation: Desig./not List Desig. & List
MTO Region	South-Western	Road Class: Freeway Arterial Collector Local X
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 Truck School Bicycle
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)
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	on	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	ion)	



<b>Ontario Structure Inspection</b>	Manual - Inspection Form	MTO	Site Number
	Scheduled 1	Improvements:	
Regional Priority Number		Programmed Work Year	
Nature of Program Work:		1	
Appraisal Indices:		Comments	
Fatigue			
Seismic			
Scour			
Flood			
Geometrics			
Barrier			
Curb			



Load Capacity

Ontario Structure Inspection Ma	nual - Inspection Fo	MTO Site Number											
	Fiel	d Inspection Infor	mation										
Date of Inspection	May 17, 2020, 9:0	OAM	Type of Inspec	tion:	OSIM X	Enhanced OSIM							
Inspector:	J. Zohreh, P.Eng.					<u> </u>							
Others in Party:	S. Mitra, EIT												
Access Equipment Used:	Tapes, Hammer, Cl	nain, Ladder, Camer	a, Safety Equip	ment									
Weather:	Sunny		, , ,										
Temperature:	15°C												
			Priority										
Additional Investigations Require	ed		None		Normal	Urgent							
Material Condition Survey													
Detailed Deck Condition Surv	rey		X										
Non-destructive Delamination	Survey of Asphalt-C	Covered Deck	X										
Concrete Substructure Conditi	ion Survey		X										
Detailed Coating Condition St	urvey		X										
Detailed Timber Investigation			X										
Post-Tensioned Strand Investi	gation		X										
Underwater Investigation			X										
Fatigue Investigation			X										
Seismic Investigation			X										
Structure Evaluation			X										
Monitoring													
Monitoring of Deformations,	Settlements and Mov	ements			X								
Monitoring Crack Widths			X										
Investigation Notes:		•											
	(	Overall Structure N	otes										
Recommended Work on Structure	None	X Minor Rehab	Major Rel	nab	Replace								
Timing of Recommended Work	1 to 5 years	X 6 to 10 years											
Overall Comments:	See maintenance sh Monitor deformation	neet. on of top profile at b	olt line.										
Date of Next Inspection:	2022												
Suspected Performance Deficiencies  1 Load carrying capacity 2 Excessive deformations (reflections & rot 3 Continuing settlement 4 Continuing movements 5 Seized bearings  Maintenance Needs 1 Lift and Swing Bridge Maintenance	09 10 11	Bearing not uniformly load Jammed expansion joint Pedestrian/vehicular hazar Rough riding surface Surface ponding Deck draining	d	12 13 14 15 16	Slippery Surfaces Flooding/channel to Undermining of fo Unstable embankn Other	undation nents							
02 Bridge Cleaning 03 Bridge Handrail Maintenance 04 Painting Steel Bridge Structures 05 Bridge Deck Joint Repair 06 Bridge Respine Maintenance	08 09 10 11	Repair to Bridge Concrete Repair of Bridge Timber Bailey bridges - maintenar Animal/Pest Control		14 15 16 17	Concrete Sealing Rout and Seal Bridge deck drains Scaling (loose conc	ige crete or ACR steel)							



Repair Rehabilitation	n Required			Pric	ority	Estimated			
Element <sup>1</sup>	_	air and Rehabilitation Req	quired <sup>2</sup>	6 to 10 years	1 to 5 years	Within 1 year	Urgent	Construction Cost	,
Embankments	_	tation around pipe. Ident on method used for ab	patement and		X			\$ 1,000.00	0
Estimated Rehab	eplacement Structure Dime	To	otal Stru	ctural Co	nst	\$ 1,000.00	0		
Deck Length (m)	18.5	Structure Width (m)	8.5	1	Juli Stru		,,,,	1,000.00	J

- 1 Indicate specific costs for structure replacement or for rehabilitation under the given headings.
- 2  $\mbox{\sc Give}$  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	<b>Estimated Cost</b>
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

- 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	



								I	Bridge C	ondition Index								
No.		Element Description	Location	Length	Width	Height	Count	Total Qty		Replacement (Initial) Cost Material		Total Replacement Value	Excellen t	Good Fair		Poor	Current Flement 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 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-6	Culverts	Outlet Compor	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 & War	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



Element Group	Culvert	S				Length (1	m)		18.5									
Element Name	Barrel					Width (n	n)		3.2									
Location	West Pip	pe				Height (n	n)		1.9									
Material	Corruga	ted steel pla	te			Count			1									
Element Type	CSP Arc	ch				Total Qty	y (m <sup>2</sup>	)	150.6									
Environment	Benign	Mod	erate	X	Severe	Limited 1			n									
Protection System		<del></del>				-							P	erfo	rmance	;		
C 122 D . 4		Units			Exc	Good		Fai	ir		Poor		]	Defi	ciencies			
Condition Data		$\mathbf{m}^2$				140.0		10.	5						01			
Comments	Top pro	mate surfac file has sagg e to monitor	ed thr	ough	almost the		-		line.									
Recommended Wor	·k:	Rehab			Replace	Maintena					Needs:		18					
Ur	gent	1 to 5 year	rs	6 to	10 years	None X				Urş	gent	1	year		2 years	X		
			Mo	nitor d	efori	nation o	of top	profi	le at	bolt line	<b>.</b>							
Element Group	Culvert	S				Length (1	m)											
Element Name	Inlet Co	mponents				Width (n	n)											
Location	East end	of culvert				Height (n	n)											
Material	Soil					Count		1										
Element Type						Total Qty	y (m <sup>2</sup>	$(\mathbf{m}^2)$										
Environment	Benign	Moc	erate	X	Severe	Limited 1	Inspe	ectio	n									
<b>Protection System</b>													P	erfo	rmance			
Condition Data		Units			Exc	Good		Fai	ir		Poor		]	Defi	ciencies			
Condition Data		m <sup>2</sup>				1												
Comments	Good sta	ability in are	a arou	ınd cı	ulvert.													
Recommended Wor	·k:	Rehab			Replace			Ma	intena	nce	Needs:							
Ur	gent	1 to 5 year	'S	6 to	10 years	None	X			Urg	gent	1	year		2 years			
			<b>\</b>	1	, <u>, , , , , , , , , , , , , , , , , , </u>													
Element Group	Culvert					Length (1												
Element Name		Component	8			Width (n												
Location		d of culvert				Height (n	n)		1									
Material	Soil					Count	, 2		1									
Element Type		<del></del>		7.7	<u>а</u> Г	Total Qty					1							
Environment	Benign	Moc	erate	X	Severe	Limited 1	ınspe	ectio	n									
Protection System		TT *4			Exc	<u> </u>		Т.	,						rmance ciencies	!		
<b>Condition Data</b>		Units m <sup>2</sup>	Good Fair Poor					-		Den	ciencies							
Comments	Good sta	<b>m</b> ability in are	a arou	I ınd cı	ulvert.	1												
Recommended Wor	·k:	Rehab			Replace			Ma	intena	nce	Needs:							
Ur	gent	1 to 5 year	rs	6 to	10 years	None	X			Urg	gent	1	year		2 years	,		
		• ·	<u>-</u>	•	- <b>L</b>													



Element Group	Decks	Length (n	8.5														
Element Name	Wearing	Width (m		7													
Location	On top of	Height (m)															
Material	Chip and	Count	1														
Element Type		Total Qty	59.5														
Environment	Benign Moderate X Severe					Limited Inspecti			ı								
Protection System	_	<del></del>			•		Performance										
C 1:4: D - 4 -		Good Fa			r		Poor		Defi	ciencies							
Condition Data	$m^2$ 41.65					17.85											
Comments																	
Recommended Wor	commended Work: Rehab Replace						intenar	nce l	Needs:	eds:							
Ur	gent 1	l to 5 years	6	to 10 years		None	X			Urg	ent	1 year		2 years			
Element Group	Foundation	ons				Length (n	Length (m)										
Element Name	Foundation	Width (m															
Location		Height (m	1)														
Material		Count	5														
Element Type		<b>Total Qty</b>	Total Qty (m <sup>2</sup> )														
Environment	Benign	Limited I			ı												
Protection System	Benign Moderate Severe Limited Inspection Performance											ormance					
·	Units Exc					Good Fa			r		Poor		Deficiencies				
Condition Data	%					100											
Comments No scour through the pipe. Soil buildup along the wall.																	
Recommended Work: Rehab Replace								Mai	Maintenance Needs:								
Ur	gent 1	to 5 years	6	to 10 years		None X				Urg	ent	1 year		2 years			
Element Group	Embankr	Length (n	_														
Element Name	Embankn	Width (m															
Location		Height (m	ı)														
Material			Count 4														
Element Type		Total Qty (m <sup>2</sup> )															
Environment	Benign	Limited I	nspe	ction	1 [												
Protection System														ormance			
Condition Data						Good Fa			r		Poor		Deficiencies				
		each						4									
Comments																	
Recommended Work: Rehab Replace								Mai	intenar	ance Needs: 18							
Ur	gent 1	to 5 years	6	to 10 years		None				Urg	ent	1 year	X	2 years			
									Clear vegetation around pipe.								



Element Group	Embankm	Length (n															
Element Name	Slope Protection					Width (m)											
Location						Height (m											
Material						Count	4										
Element Type						Total Qty (m <sup>2</sup> )											
Environment	Benign Moderate X Severe					Limited I			n	X							
<b>Protection System</b>													Performance				
Condition Data	Units Exc					Good		Fai	ir		Poor		Deficiencies				
Condition Data	each					4											
Comments	Limited inspection due to high vegetation.																
Recommended Wor	·k:	Rehab		Replace			Maintenance Needs:										
Ur	gent 1	to 5 years	6 to	o 10 years		None		Urg	ent	1	year		2 year	's			
Element Group	Embankm					Length (n											
Element Name	Streams &	: Waterwa	ys			Width (m)											
Location						Height (m	1)										
Material			Count			100											
Element Type	<u> </u>		Total Qty (m <sup>2</sup> ) 100														
Environment	Benign Moderate X Severe Limited Inspection																
Protection System										ormanc							
Condition Data	Units			Exc		Good	<u> </u>	Fai			Poor		Deficiencies				
	0/0							100	0								
Comments Vegetation enroaching on waterway.																	
Recommended Work: Rehab Replace								Ma	intena	nce N	leeds:						
Ur	gent 1	to 5 years	6 to	o 10 years		None X				Urg	ent	1	1 year 2 year			·s	
												_					
Element Group	Culverts					Length (n	n)		18.5								
Element Name	Barrel		Width (m	1)		3.2											
Location	East Pipe					Height (m	1)		1.9								
Material	Corrugated	Count			1												
Element Type	CSP Arch	Total Qty (m <sup>2</sup> ) 150.6															
Environment	Benign	Limited Inspection															
Protection System													P	erfo	ormanc	:e	
Condition Data		Units		Exc	(	Good		Fai	ir		Poor		Deficiencies			S	
		m <sup>2</sup>				140.0		10.	5						01		
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.																



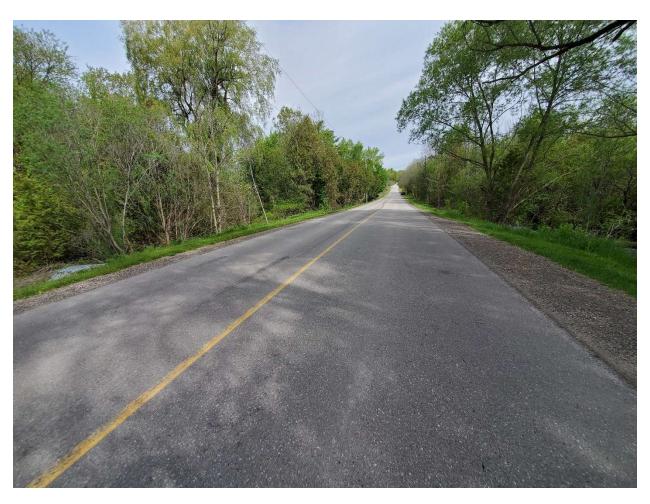
Recommended Work:	Rehab Replace		Maintenance Needs:
Urgent	1 to 5 years 6 to 10 years	None X	Urgent 1 year 2 years X
			Monitor deformation of top profile at bolt line.



### 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

Ontario Structure Inspection	Manual - Inspection For	m MTO Site Number
		Inventory Data:
Structure Name	C-7 Sheffield Road Twi	in Culvet 2
Main Hwy/Road #	Sheffield Road Under	Crossing -
Hwy/Road Name	Sheffield Road	<u></u>
Structure Location	Approximately 400m Nor	th of Morrison road
Northing	43.351111	Easting -80.217778
Owners	Township of North Dumfries	Heritage Not Cons. X Cons./not App. List/not Desig.  Designation: Desig./not List Desig. & List
MTO Region	South-Western	Road Class: Freeway Arterial Collector Local X
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 Truck School Bicycle
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)
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	on	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		<del></del>
Rehab History: (Date/Descripti	ion)	<u>-</u>



<b>Ontario Structure Inspection</b>	Manual - Inspection Form	MTO	Site Number
	Scheduled 1	Improvements:	
Regional Priority Number		Programmed Work Year	
Nature of Program Work:		1	
Appraisal Indices:		Comments	
Fatigue			
Seismic			
Scour			
Flood			
Geometrics			
Barrier			
Curb			



Load Capacity

Ontario Structure Inspection Ma	nual - Inspection Fo		MTO	Site Num	ber			
	Fiel	ld Inspection Inf	ormation					
Date of Inspection	May 17, 2020, 10:	00AM	Type of Ir	spection:	OSIM	X SIM		
Inspector:	J. Zohreh, P.Eng.							
Others in Party:	S. Mitra, EIT							
Access Equipment Used:	Tapes, Hammer, Cl	hain, Ladder, Car	nera, Safety I	Equipment				
Weather:	Sunny	, ,		1 1				
Temperature:	15°C							
					Prio	eitv		
Additional Investigations Requir	ed		Noi	ne	Norm	Ī	Urgent	
Material Condition Survey								
Detailed Deck Condition Surv	rey		X					
Non-destructive Delamination	Survey of Asphalt-C	Covered Deck	X					
Concrete Substructure Condit	ion Survey		X					
Detailed Coating Condition S	urvey		X					
Detailed Timber Investigation			X					
Post-Tensioned Strand Investi	gation		X					
Underwater Investigation			X					
Fatigue Investigation			X					
Seismic Investigation			X					
Structure Evaluation			X					
Monitoring								
Monitoring of Deformations,	Settlements and Mov	ements			X			
Monitoring Crack Widths					X			
Investigation Notes:								
	(	Overall Structure	e Notes					
Recommended Work on Structure	None	X Minor Reh	ab Majo	r Rehab	Rep	lace		
Timing of Recommended Work	1 to 5 years	6 to 10 year	urs					
Overall Comments:	See maintenance sh Monitor deformation		t bolt line.					
Date of Next Inspection:	2022							
Suspected Performance Deficiencies  11 Load carrying capacity 12 Excessive deformations (reflections & rot 13 Continuing settlement 14 Continuing movements 15 Seized bearings	06 07 ations) 08 09 10	Bearing not uniformly Jammed expansion joi Pedestrian/vehicular h Rough riding surface Surface ponding Deck draining	nt	12 13 14 15	Undermin	ourfaces channel block ing of founda embankments	ation	
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 09 10 11	Repair to Structural St Repair to Bridge Conc Repair of Bridge Timb Bailey bridges - maint Animal/Pest Control Bridge Surface Repair	rete er	13 14 15 16 17	Concrete S Rout and S Bridge de	Seal ck drainage	dges	



### **Ontario Structure Inspection Manual - Inspection Form**

MTO	Site	Number

Repair Rehabilitation	n Required	l .		Pric	ority		Estimated		
Element <sup>1</sup>	Repa	air and Rehabilitation Requ	ired <sup>2</sup>	6 to 10 years	1 to 5 years	Within 1 year	Urgent	<b>Construction Cost</b>	
Barrel	Monitor de	eformation of top profile at bo	olt line.		X			\$	500.00
Embankments	_	tation around pipe.  Ident on method used for abat	tement and		X			\$	1,000.00
Estimated Rehab	ilitated or R	Replacement Structure Dimen	T	-4-1 C4	-41 C	-4	¢	1 500 00	
Deck Length (m)	15	Structure Width (m)	8.6	10	otai Stru	ctural Co	ost	\$	1,500.00

- 1 Indicate specific costs for structure replacement or for rehabilitation under the given headings.
- $\boldsymbol{2}$  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	<b>Estimated Cost</b>
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 worl

Justification	



<sup>5 -</sup> 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

								I	Bridge C	ondition Index								
No.		Element Description	Location			Height	Count	Total Qty	Units	Replacement (Initial) Cost	Material	Replacement Value	t	Good		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 Compor	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 & War	0	0	0	0	100	100.00	%	\$ -	0	\$ -	0.00	0.00	100.00	0.00	\$ -	-
C-7		TOTALS (TRV	V-CEV-BCI)									\$ 43,802.20					\$ 30,590.92	69.8



														_
Element Group	Culverts					Length (r	n)	15						
Element Name	Barrel					Width (m	1)	3.2	,					
Location	North Pipe					Height (n	n)	1.9	)					
Material	Corrugated	steel plate				Count		1						
Element Type	CSP Arch					Total Qty	y (m <sup>2</sup> )	) 122	2.1					
Environment	Benign	Mode	rate X	Severe		Limited I	nspe	ction						
<b>Protection System</b>												Per	formance	;
Condition Data	l	J <b>nits</b>		Exc	(	Good	Fai			Poor		Def	ficiencies	
Condition Data		m <sup>2</sup>				103.8		18.3						
	* *			culation based			-							
Comments	Top profile has sagged through almost the whole length at the bolt line.  Continue to monitor deformation.													
		Rehab	eformat	ion.  Replace				1						
Recommended Wor				Mainte		Needs:	_							
Ur	gent 1	to 5 years	6 t	o 10 years		None	X		Uı	gent	1 ye	ar	2 years	X
								Monito	or defo	rmation o	f top pi	ofile :	at bolt line	<b>.</b>
Element Group	Culverts					Length (r	n)							
Element Name	Inlet Com	ponents				Width (m	ı)							
Location	East end of	culvert				Height (n	n)							
Material	Soil					Count		1						
Element Type						Total Qty	y (m <sup>2</sup> )	)		_				
Environment	Benign	Mode	rate X	Severe		Limited I	Inspe	ction						
<b>Protection System</b>	•											Per	formance	,
Condition Data	ı	J <b>nits</b>		Exc	(	Good		Fair		Poor		Def	ficiencies	
Condition Data		m <sup>2</sup>				1								
Comments	Good stabi	lity in area	around	culvert.										
Recommended Wor	rk:	Rehab		Replace				Mainte	enance	Needs:				
Ur	gent 1	to 5 years	6 t	o 10 years		None	X		Uı	gent	1 ye	ar	2 years	;
	<u> </u>	<u> </u>		·								<u> </u>	·	
Element Group	Culverts					Length (r	n)							
Element Name	Outlet Cor	nponents				Width (m	1)							
Location	West end o	of culvert				Height (n	n)							
Material	Soil					Count		1						
Element Type						Total Qty	y (m <sup>2</sup> )	)						
Environment	Benign	Mode	rate X	Severe		Limited I	Inspe	ction						
<b>Protection System</b>	_		,									Per	formance	
Condition Data	1	J <b>nits</b>		Exc	(	Good		Fair		Poor		Def	ficiencies	
Condition Data		m <sup>2</sup>				1								
Comments	Good stabi	lity in area	around	culvert.										
Recommended Wor	rk:	Rehab		Replace				Mainte	enance	Needs:				
Ur	gent 1	to 5 years	6 t	o 10 years		None	X		Uı	gent	1 ye	ar	2 years	;
				- <u>F</u>						<u> </u>	<b>-</b>		<u> </u>	
								I						



Element Group	Decks					Length (n	n)	8	8.6						
Element Name	Wearing	Surface				Width (m	l)	1	7						
Location	On top of	culvert				Height (m	<b>1</b> )								
Material	Chip and	tar				Count			1						
Element Type						Total Qty	$(m^2)$	) (	60.2						
Environment	Benign	Modei	ate	X Severe		Limited I									
Protection System	_	<del></del>				•							Performance		
C . 122 D . 4		Units		Exc		Good		Fair	•		Poor		Defi	ciencies	
Condition Data		m <sup>2</sup>				54.18		6.02	2						
Comments															
Recommended Wor	·k:	Rehab		Replace				Mai	ntenar	ice I	Needs:				
Ur	gent 1	l to 5 years	6	to 10 years		None	X			Urg	ent	1 year	•	2 years	
				•							<u> </u>				
Element Group	Foundati	ons				Length (n	n)								
Element Name	Foundati	ons (below g	groun	d level)		Width (m	1)								
Location						Height (m	1)								
Material						Count			100						
Element Type						Total Qty	$(m^2)$	)							
Environment	Benign	Modei	ate	Severe		Limited I									
Protection System			<u> </u>						•	<u>'</u>			Perf	ormance	
		Units		Exc		Good		Fair	•		Poor		Defi	ciencies	
Condition Data		%				100									
Comments	No scour	through the p	pipe. S	Soil buildup al	ong t	the north wa	all.								
Recommended Wor	·k:	Rehab		Replace				Mai	ntenan	ice I	Needs:				
Ur	gent 1	l to 5 years	6	to 10 years		None	X			Urg	ent	1 year	•	2 years	
		· .		,								-	<b>-</b>		
Element Group	Embankr					Length (n									
Element Name	Embankn	nents				Width (m									
Location						Height (m	ı)								
Material						Count			4						
Element Type						Total Qty									
Environment	Benign	Modei	rate 🖸	X Severe		Limited I	nspe	ction							
<b>Protection System</b>		Units		-								ormance			
Condition Data		Good		Fair	:		Poor		Deficiencies						
		each						4							
Comments															
Recommended Wor	·k:	Rehab		Replace		Maintenance Needs: 18									
Ur	gent 1	l to 5 years	6	to 10 years		None		Urgent 1 year X 2 year				2 years			
								Clea	r veget	atio	n around	l pipe.			



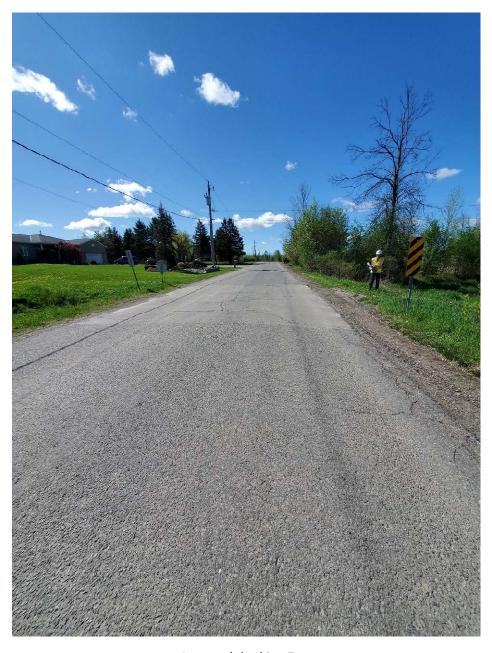
Element Group	Embank	ments			Length (r	n)										
Element Name	Slope Pr	otection			Width (m	1)										
Location					Height (n	n)										
Material					Count			4								
Element Type					Total Qty	y (m <sup>2</sup> )	)									
Environment	Benign	Mode	rate X	Severe	Limited I			n	X							
Protection System												Performance				
Condition Data		Units		Exc	Good		Fai	ir		Poor		D	efic	iencies	S	
Condition Data		each			4											
Comments	Limited i	nspection du	e to hig	h vegetation.												
Recommended Wor	rk:	Rehab		Replace			Ma	intena	nce N	leeds:						
Ur	gent	1 to 5 years	6 t	to 10 years	None	X			Urg	ent	1	year		2 year	·s	
				,												
Element Group	Embank				Length (r											
Element Name	Streams	& Waterwa	ys		Width (m											
Location					Height (n	n)										
Material					Count		100									
Element Type				_	Total Qty			100								
Environment	Benign	Mode	rate X	Severe	Limited I	Inspe	ctio	n								
Protection System			•											rmanc		
Condition Data		Units		Exc	Good		Fai			Poor		D	efic	iencies	S	
		%					100	0								
Comments	Vegetatio	on enroachin	g on wa	terway.												
Recommended Wor	rk:	Rehab		Replace			Ma	intena	nce N	leeds:						
Ur	gent	1 to 5 years	6 t	o 10 years	None		Urgent 1 year 2 years							·s		
			_	•								_				
Element Group	Culverts				Length (r	n)		15								
Element Name	Barrel				Width (m	1)		3.2								
Location	South Pip	pe			Height (n	n)		1.9								
Material	Corrugate	ed steel plate	;		Count			1								
Element Type	CSP Arcl	h			Total Qty	$y(m^2)$	)	122.1								
Environment	Benign	Mode	rateX	Severe	Limited Inspection											
Protection System												Performance				
G IV B		Units		Exc	Good		Fai	ir		Poor		Deficiencie		iencies	S	
Condition Data		m <sup>2</sup>			103.8		18.	3			$\dashv$					
Comments	Top profi		d throug	culation basegh almost the tion.		-		line.			•					



Recommended Work:	Rehab Replace		Maintenance Needs:
Urgent	1 to 5 years 6 to 10 years	None X	Urgent 1 year 2 years X
			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

Ontario Structure Inspection	Manual - Inspection Form	m MTO Site Number
		Inventory Data:
Structure Name	C-8 West Alps Road Tw	vin Culvert
Main Hwy/Road #	Alps Road W Under	
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. X Cons./not App. List/not Desig.  Designation: Desig./not List Desig. & List
MTO Region	South-Western	Road Class: Freeway Arterial Collector Local X
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 Truck School Bicycle
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)
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	on	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/Descripti	ion)	



<b>Ontario Structure Inspection</b>	Manual - Inspection Form	MTO	Site Number
	Scheduled 1	Improvements:	
Regional Priority Number		Programmed Work Year	
Nature of Program Work:		1	
Appraisal Indices:		Comments	
Fatigue			
Seismic			
Scour			
Flood			
Geometrics			
Barrier			
Curb			



Load Capacity

Ontario Structure Inspection Man	nual - Inspection Fo	rm		MTO	Site Number						
	Fiel	d Inspectio	on Informa	tion							
Date of Inspection	May 16, 2020, 11:0	00AM	Ту	pe of Inspection:	OSIM X SIM						
Inspector:	J. Zohreh, P.Eng.										
Others in Party:	S. Mitra, EIT										
Access Equipment Used:	Tapes, Hammer, Cl	nain, Ladde	r, Camera,	Safety Equipmen	t						
Weather:	Sunny										
Temperature:	15°C										
			Priority								
Additional Investigations Require	ed			None	Normal	Urgent					
Material Condition Survey											
Detailed Deck Condition Surv	ey			X							
Non-destructive Delamination	Survey of Asphalt-C	overed Dec	ck	X							
Concrete Substructure Conditi	on Survey			X							
Detailed Coating Condition Su	ırvey			X							
Detailed Timber Investigation				X							
Post-Tensioned Strand Investig	gation			X							
Underwater Investigation				X							
Fatigue Investigation				X							
Seismic Investigation				X							
Structure Evaluation				X							
Monitoring											
Monitoring of Deformations, S	Settlements and Mov	ements			X						
Monitoring Crack Widths					X						
Investigation Notes:											
	C	verall Str	icture Not	es							
Recommended Work on Structure	None	X Mino	r Rehab	Major Rehab	Replace						
Timing of Recommended Work	1 to 5 years	X 6 to	10 years								
Overall Comments:	See maintenance sh Monitor deformation		ofile at bolt	line.							
Date of Next Inspection:	2022										
Suspected Performance Deficiencies  11 Load carrying capacity  12 Excessive deformations (reflections & rotal  13 Continuing settlement  14 Continuing movements  15 Seized bearings	06 07 08 09 10	Bearing not ur Jammed expar Pedestrian/veh Rough riding s Surface pondin Deck draining	icular hazard surface	/unstable 1 1 1. 1 1	Flooding/channel bloc Undermining of found Unstable embankment	lation					
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 09 10 11	Repair to Struc Repair to Brid Repair of Brid Bailey bridges Animal/Pest C Bridge Surface	ge Concrete ge Timber - maintenance ontrol	1 1. 1 1 1	Concrete Sealing Rout and Seal Bridge deck drainage Scaling (loose concrete or ACR steel)						



### **Ontario Structure Inspection Manual - Inspection Form**

MTO	Site	Number

Repair Rehabilitation	n Required	l		Pric	ority		Estimated		
Element <sup>1</sup>	Repa	air and Rehabilitation Requ	ired <sup>2</sup>	6 to 10 years	1 to 5 years	Within 1 year	Urgent	<b>Construction Cost</b>	
Barrel	Monitor de	eformation of top profile at bo	olt line.		X			\$ 500.0	00
Embankments	Ŭ	tation around pipe. Ident on method used for abat	tement and				X	\$ 3,000.0	00
Estimated Rehab	m	4-1-04	.41.0	4					
Deck Length (m)	11.3	Structure Width (m)	7.6	10	otai Stru	ctural Co	ost	\$ 3,500.0	JU

- 1 Indicate specific costs for structure replacement or for rehabilitation under the given headings.
- $\boldsymbol{2}$  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	<b>Estimated Cost</b>
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

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 worl

Justification	



<sup>5 -</sup> 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

									Bridge	Condition Inde	x							
No.		Element Description	Location	Length	Width	Height	('ount	Total Qty		Replacement (Initial) Cost	Material	Total Replacement Value	Excellen t	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 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-8	Culverts	Outlet Compor	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 & War	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



Element Group	Culverts				Length (1	n)		11.3							
Element Name	Barrel				Width (n	/		3.2							
Location	West Pipe				Height (n	n)		1.9							
Material	Corrugated s	teel plate			Count			1							
Element Type	CSP Arch				Total Qty	y (m <sup>2</sup> )	)	92.0							
Environment	Benign	Moderat	e X	Severe	Limited 1	Inspe	ctio	n							
Protection System	<u></u>	<b>-</b>	<u>,                                    </u>	<u> </u>	<del></del> !							Pe	rform	ance	
C 1:4: D-4-	Uı	nits		Exc	Good		Fai	ir		Poor		D	eficien	ncies	
Condition Data	n	$n^2$			69.0		23.	0							
Comments		nas sagged th	rough	almost the v	on a half an ellipse. whole length at the bolt line.										
Recommended Wor	·k:	Rehab		Replace			Ma	intena	nce ]	Needs:					
Ur	gent 1 to	5 years	6 to	10 years	None	X			Urg	ent	1 ye	ar	2 y	years X	
Element Group	Culverts		•		Length (1	n)	•						·		
Element Name	Inlet Compo	onents			Width (n	1)									
Location	East end of c	ulvert			Height (n	n)									
Material	Soil				Count			1							
Element Type					Total Qty	y (m <sup>2</sup> )	)								
Environment	Benign	Moderat	e X	Severe		Limited Inspection									
Protection System	<u></u>	-	<u>,                                      </u>	<u> </u>								Pe	rform	ance	
Can dition Data	Uı	nits		Exc	Good		Fai	ir		Poor		D	eficien	ncies	
Condition Data	n	$n^2$			1										
Comments	Good stabilit	y in area arc	ound c	ulvert.											
Recommended Wor	·k:	Rehab		Replace			Ma	intena	nce ]	Needs:					
Ur	gent 1 to	5 years	6 to	10 years	None	None X			Urgent				year 2 years		
			<u>.</u>			_							·		
Element Group	Culverts				Length (m)										
Element Name	Outlet Com	<u> </u>			Width (m)										
Location	West end of	culvert				Height (m)									
Material	Soil				Count	. 2.		1							
Element Type		1		Г "	Total Qty										
Environment	Benign	Moderat	e X	Severe	Limited 1	nspe	ctio	n							
Protection System		•4	1	<u> </u>	<i>C</i> :	1		, 1					rform		
Condition Data		nits 2		Exc	Good		Fai	ır		Poor		D	eficien	icies	
	n	m <sup>2</sup>			1										
Comments	Good stabilit	ty in area arc	ound c												
Recommended Wor	·k:	Rehab		Replace		l In		intena	nce	Needs:					
Ur	gent 1 to	5 years	6 to	10 years	None	None X			Urg	ent	1 ye	ar	2 y	years	
														<u> </u>	
Element Group	Decks				Length (1	n)		3.8							
Element Name	Wearing Su	rface				Width (m) 6.2									



Location	On top of culvert						Height (n	Height (m)										
Material	Chip and tar					Count			1									
Element Type						<b>Total Qty</b>	tal Qty (m <sup>2</sup> ) 23.56											
Environment	Benign Moderate X Severe				Limited I	n												
<b>Protection System</b>							,							Performance				
Condition Data					Exc		Good	Good Fai				Poor		Deficiencies				
	m <sup>2</sup>						20.026 3.53			34								
Comments																		
Recommended Wor	rk: Rehab				Replace	M		Ma	intena	nce ]	Needs:							
Ur	gent 1 to 5 years			6 to	10 years	None X				Urg	gent	year	2	years				
Element Group	Foundati						Length (n											
Element Name	Foundati	ions (bel	ow gro	und I	level)		Width (m											
Location							Height (n	1)		100								
Material							Count 100 Total Qty (m²)											
Element Type	Donion		a d a wate		Corrore		Limited I		tio	<u> </u>								
Environment	Benign Moderate Severe						Limited 1	nspec	uo	11			-	Da				
Protection System	Units Exc						Good	l ·	Fair Poor					Performance Deficiencies				
Condition Data	Units %				EXC		100		га	Hr Poor			_	Deficiencies				
Comments Soil buildup along the wall.																		
Recommended Wor		Rehab Replace							intena							_		
Ur	gent	t 1 to 5 years 6 to 10 years				None X				Urg	gent X	1	year	2	years			
Element Group	Embankments						Length (n											
Element Name	Embankments						Width (m											
Location	<del> </del>						Height (n	Count 4										
Material Element Type							Total Qty (m <sup>2</sup> )											
Environment	Benign Moderate X Severe						Limited Inspection											
Protection System	Denign		Limited 1	nspec	uo	Ш				Do								
	Units Exc						Good	Good Fai				Poor		Performance Deficiencies				
Condition Data	each					Good		4			1 001	+		<u> </u>	neres			
Comments																		
Recommended Work: Rehab Replace								Ma	intena	Needs:		18						
Urgent 1 to 5 years 6 to 10 years							None			Urg	gent	1	year 2	X 2	years			
									Cle	ar vege	tatio	n around	d pip	e.				
Element Group	Embank	ments					Length (n	n)										
Element Name	Slope Protection						Width (m	idth (m)										



Location						Height (n	m)									
Material						Count 4			4							
Element Type						<b>Total Qty</b>	$(\mathbf{m}^2)$	$(\mathbf{m}^2)$								
Environment	Benign Moderate X Severe					Limited Inspection										
Protection System			•										P	erfo	rmance	
Condition Data	Units Exc					Good		Fai	ir	Poor		Ι	)efi	ciencies		
Condition Data	each					4										
Comments	Limited insp	ection due	to hig	th vegetation.												
Recommended Wor		Replace	Ma			intena	nce	Needs:								
Ur	gent 1 to 5 years		6	6 to 10 years		None X				gent	1 1	year		2 years		
	In	,				<b>I</b> T										
Element Group Element Name	Embankme Streams & '		7.0			Length (m) Width (m)										
Location	Streams &	waterway	'S			Height (n										
Material						Count										
Element Type							$ \begin{array}{c c} \hline \text{otal Qty (m}^2) & 100 \end{array} $									
Environment	Benign		Limited I													
Protection System		Moder		Severe								Т	P	erfa	rmance	
Condition Data	Units			Exc		Good		Fair		Poor			Deficiencies			
	•						100									
Comments	Vegetation e	nroaching	on wa	nterway.												
Recommended Wor	rk: Rehab			Replace		<b>N</b>		Ma	faintenance Needs:							
Ur	gent 1 to 5 years			6 to 10 years		None X				Urg	gent X	1	year		2 years	
	la i					<b>.</b>	,		11.0							
Element Group	Culverts					Length (m)			11.3							
Element Name	Barrel					Width (m	` ′									
Location	East Pipe	Height (n	(m) 1.9													
Material	Corrugated s	Count 1														
Element Type	CSP Arch					Total Qty	$(\mathbf{m}^2)$	)	92.0							
Environment	Benign Moderate X Severe Limited Inspection															
Protection System													P	erfo	rmance	
C I'd D	Units			Exc		Good Fa		Fai	ir Poor				Deficiencies			
Condition Data	r	69.0 23.0														
Comments		nas sagged	throug	lculation base gh almost the tion.			-		line.							
Recommended Wor	rk:	Rehab [		Replace				Ma	intena	nce	Needs:					



Urgent 1 to 5 years 6 to 10 years None	Urgent 1 year 2 years X
	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

Ontario Structure Inspection	Manual - Inspection Forr	m MTO Site Number
		Inventory Data:
Structure Name	C-9 Sheffield Road Thre	ee-Cell Culvet 1
Main Hwy/Road #	Sheffield Road Under	
Hwy/Road Name	Sheffield Road	
Structure Location	Approximately 842m South	th of Morrison road
Northing	43°20"26.9"	Easting 80°12"49.9"
Owners	Township of North Dumfries	Heritage Not Cons. X Cons./not App. List/not Desig.  Designation: Desig./not List Desig. & List
MTO Region	South-Western	Road Class: Freeway Arterial Collector Local X
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 Truck School Bicycle
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)
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	on	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		<u>-</u>
Rehab History: (Date/Descripti	ion)	<u>·</u>



<b>Ontario Structure Inspection</b>	Manual - Inspection Form	MTO	Site Number
	Scheduled 1	Improvements:	
Regional Priority Number		Programmed Work Year	
Nature of Program Work:		1	
Appraisal Indices:		Comments	
Fatigue			
Seismic			
Scour			
Flood			
Geometrics			
Barrier			
Curb			



Load Capacity

Ontario Structure Inspection Ma	nual - Inspection Fo	rm			МТО	Site Number	
	Fiel	d In	spection Infor	mati	ion		
Date of Inspection	May 17, 2020, 1:0	OPM		Тур	e of Inspection:	OSIM X SI	M
Inspector:	J. Zohreh, P.Eng.						
Others in Party:	S. Mitra, EIT						
Access Equipment Used:	Tapes, Hammer, Cl	nain,	Ladder, Camer	a, Sa	afety Equipment		
Weather:	Sunny						
Temperature:	15°C						
						Priority	
Additional Investigations Require	ed				None	Normal	Urgent
Material Condition Survey							
Detailed Deck Condition Surv	rey				X		
Non-destructive Delamination	Survey of Asphalt-C	Cove	red Deck		X		
Concrete Substructure Conditi	on Survey				X		
Detailed Coating Condition St	ırvey				X		
Detailed Timber Investigation					X		
Post-Tensioned Strand Investi	gation				X		
Underwater Investigation					X		
Fatigue Investigation					X		
Seismic Investigation					X		
Structure Evaluation					X		
Monitoring							
Monitoring of Deformations,	Settlements and Mov	emei	nts		X		
Monitoring Crack Widths					X		
Investigation Notes:							
	(	)ver	all Structure N	otes	5		
Recommended Work on Structure	None	X	Minor Rehab		Major Rehab	Replace	
Timing of Recommended Work	1 to 5 years	X	6 to 10 years				
Overall Comments:	See maintenance sh Monitor deformation		top profile at b	olt li	ine.		
Date of Next Inspection:	2022						
Suspected Performance Deficiencies  11 Load carrying capacity 12 Excessive deformations (reflections & rot 13 Continuing settlement 14 Continuing movements 15 Seized bearings	06 07 ations) 08 09 10 11	Jamn Pede: Roug Surfa	ing not uniformly load ned expansion joint strian/vehicular hazar th riding surface ace ponding draining		12 13 14 15 16	Flooding/channel b Undermining of for Unstable embankm	undation
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 09 10 11	Repa Repa Baile Anin	ir to Structural Steel ir to Bridge Concrete ir of Bridge Timber by bridges - maintenantal/Pest Control ge Surface Repair		13 14 15 16 17 18	Rout and Seal Bridge deck draina Scaling (loose cond	ge



## **Ontario Structure Inspection Manual - Inspection Form**

MTO	Site	Number
1411()	SILC	Number

Repair Rehabilitation	n Required	l .			Pric	ority		Estim	nated
Element <sup>1</sup>	Repa	air and Rehabilitation Requ	ired <sup>2</sup>	6 to 10 years	1 to 5 years	Within 1 year	Urgent	Construc	tion Cost
Barrel	Monitor de	eformation of top profile at bo	lt line.		X			\$	500.00
Embankments	_	tation around pipe. Ident on method used for abat	ement and		X			\$	1,000.00
Estimated Rehab	ilitated or R	Replacement Structure Dimens	sions <sup>3</sup>	T	-4-1 C4	-41 C	-4	¢	1 500 00
Deck Length (m)	15	Structure Width (m)	7	10	otai Stru	ctural Co	OST	\$	1,500.00

- 1 Indicate specific costs for structure replacement or for rehabilitation under the given headings.
- $\boldsymbol{2}$  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	<b>Estimated Cost</b>
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 rep	orts, environmental studies, design	s, project management and	d contingencies are not incl	luded as associated work.

Justification	



<sup>5 -</sup> 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

									Bridge	Condition Ind	ex							
No.		Element Description	Location	Length	Width	Height	('ount	Total Qty	Units	Replacement (Initial) Cost	Material	cement Excellen t		Fair	Poor	Current Flement 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 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-9	Culverts	Outlet Compor	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 & War	0	0	0	0	100	100.00	%	\$ -	0	\$ -	0.00	0.00	100.00	0.00	\$ -	-
C-9		TOTALS (TRV	V-CEV-BCI)									\$ 129,650.20					\$ 95,064.22	73.3



Element Group	Culverts				Length (r	n)		15					
Element Name	Barrel				Width (m	<b>1</b> )		7					
Location	North Pipe				Height (n	n)		1.3					
Material	Corrugated s	teel plate			Count			3					
Element Type	CSP Arch				Total Qty	y (m <sup>2</sup> )	)	367.4					
Environment	Benign	Moderate	X	Severe	Limited I	Inspe	ction	ո [					
<b>Protection System</b>				<u></u>	<u>== 1</u>			<u>-</u>	<del></del>	P	erf	ormance	
	ment Name cation North Pipe deficial Corrugated steel plate coment Type Vironment Deficition System Indition Data  Moderate  Approximate surface area calculation Top profile has sagged through almore Continue to monitor deformation.  Commended Work: Rehab Re Urgent I to 5 years  Continue to monitor deformation.  Commended Work: Rehab Re Rement Name Inlet Components Cation East end of culvert Cation Benign Moderate X S S Otection System Indition Data  Condition Data  Conditi						Fai	r	Poor		Defi	ciencies	
Condition Data		349.0		18.4	4								
Comments	Top profile h	almost the wh	•										
Recommended Wor	·k:	Rehab		Replace			Mai	intenanc	e Needs:				
Ur	gent 1 to	5 years	6 to	10 years	None	X		U	rgent	1 year		2 years X	
							Moi	nitor defo	ormation of	f top profi	le a	bolt line.	
Element Group					Length (r								
Element Name					Width (m								
Location		ulvert			Height (n	n)		1					
Material	Soil				Count	. 2.		1					
1 -			T		Total Qty				_				
Environment	Benign	Moderate	X	Severe	Limited I	nspe	ction	1					
Protection System		_										ormance	
Condition Data				Exc	Good		Fai	r	Poor		Deficiencies		
	n	<u>1</u>			1								
Comments	Good stabilit	y in area aro	und c	eulvert.									
Recommended Wor	rk:	Rehab		Replace			Mai	intenanc	e Needs:				
Ur	gent 1 to	5 years	6 to	10 years	None	X		U	rgent	1 year		2 years	
Element Comm	Culvanta				Length (r						_		
		ononte			Width (m								
Location					Height (n								
Material		Zurvert			Count	· · ·		1					
Element Type	2011				Total Qty	/ (m <sup>2</sup>	,						
Environment	Benign	Moderate	X	Severe	Limited I			. Г					
Protection System	24	1,1000100		50,010	<u></u>	1				Р		ormance	
•	Ur	nits		Exc	Good		Fair	r	Poor			ciencies	
Condition Data		$\mathbf{n}^2$			1								
Comments	Good stabilit		und c	ulvert.		ı		<u>,</u>					
Recommended Wor	rk:	Rehab		Replace			Mai	intenanc	e Needs:				
Ur	gent 1 to	5 years	6 to	10 years	None	X		U	rgent	1 year		2 years	
		<u> </u>	<del></del>	- <b>L</b>	-	<del></del>				-		<u> </u>	



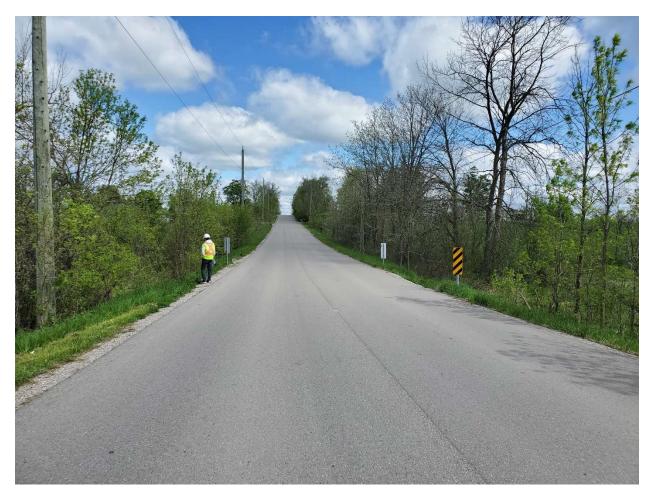
Element Group	Decks					Length (n	n)	:	8.6					
Element Name	Wearing	Surface				Width (m	l)	,	7					
Location	On top of	culvert				Height (m	<b>1</b> )							
Material	Chip and t	tar				Count			1					
Element Type						Total Qty	$(m^2)$	)	60.2					
Environment	Benign	Modei	rate 2	X Severe		Limited I			1					
Protection System			<u></u>									P	erfo	rmance
G 1141 D 4		Units		Exc		Good		Fair	r	Poo	r	1 r	efic	eiencies
Condition Data	ement Name cation On top of culvert Chip and tar  ement Type vironment Definition Data  Commended Work:  Commended Work:  Comment Name Comment Name Cotion Cotion Comment Cotion Comment Cotion Comment Cotion Cotio													
Comments														
Recommended Wor	·k:	Rehab		Replace				Mai	intenan	ce Need	ls:			
Ur	gent 1	l to 5 years	6	to 10 years		None	X		l	U <b>rgent</b>		1 year		2 years
					•							<u> </u>		
Element Group	Foundation	ons				Length (n	n)							
Element Name	Foundation	ons (below g	ground	d level)		Width (m	)							
Location						Height (m	1)							
Material						Count			100					
Element Type					<b>Total Qty</b>	$(m^2)$	)							
Environment	Benign	Modei	rate	Severe		Limited I			ı					
Protection System			<u> </u>									P	erfo	rmance
·		Units		Exc		Good		Fair	r	Poo	4		eiencies	
Condition Data		%				100								
Comments	No scour t	through the p	pipe. S	oil buildup al	ong t	the north wa	all.							
Recommended Wor	·k:	Rehab		Replace				Mai	ntenan	ce Need	ls:			
Ur	gent 1	to 5 years	6	to 10 years		None	X		1	U <b>rgent</b>		1 year		2 years
		· ·		·								<u> </u>		
Element Group						Length (n								
Element Name	Embankn	nents				Width (m								
Location						Height (m	ı)							
Material						Count			4					
Element Type						Total Qty								
Environment	Benign	Modei	rate \(\frac{1}{2}\)	X Severe		Limited I	nspe	ction				_		
<b>Protection System</b>												-		rmance
Condition Data		Units		Exc		Good		Fair	r	Poo	r		efic	eiencies
		each						4						
Comments														
Recommended Wor	·k:	Rehab		Replace				Mai	ntenan	ce Need	ls:		18	
Ur	gent 1	to 5 years	6	to 10 years		None			1	U <b>rgent</b>		1 year	X	2 years
								Clea	ır veget	ation are	ound p	oipe.		



Element Group	Embankme	nts			Length (r	m)								
Element Name	Slope Prote	ction			Width (m	<u>n)</u>								
Location					Height (n	n)								
Material					Count			4						
Element Type					Total Qty	$y (m^2)$								
Environment	Benign	Modera	ate X	Severe	Limited I			1	X					
Protection System					<u>1</u>						ТР	erfo	rmance	
	Uı	nits		Exc	Good	1	Fair	r	Po	or	Τ	)efic	eiencies	
Condition Data	ea	ach			4						1			
Comments	Limited insp	ection due	to high	vegetation.										
Recommended Wor	·k:	Rehab		Replace			Mai	intenar	nce Nee	ds:				
Ur	gent 1 to	o 5 years	6 to	10 years	None	X			Urgent		1 year		2 years	
Element Group	Embankme	nts			Length (r	n)								
Element Group Element Name	Embankmer		S		Length (r									
			S			1)								
Element Name			s		Width (m	1)		100						
Element Name Location			S		Width (m Height (n Count	n) n)		100 100						
Element Name Location Material				Severe	Width (m Height (n	n) n) y (m²)		100						
Element Name Location Material Element Type	Streams & V	Waterways		Severe	Width (m Height (n Count Total Qty	n) n) y (m²)		100				erfo	rmance	
Element Name Location Material Element Type Environment Protection System	Streams & V Benign	Waterways		Severe Exc	Width (m Height (n Count Total Qty	n) m) y (m²) Inspec		100	Po	Dr		-	rmance	
Element Name Location Material Element Type Environment	Streams & V Benign U1	Waterways Modera			Width (m Height (n Count Total Qty Limited I	n) y (m²) Inspec	ction	100 n [	Po	or		-		
Element Name Location Material Element Type Environment Protection System	Streams & V Benign U1	Waterways  Modera	ate X	Exc	Width (m Height (n Count Total Qty Limited I	n) y (m²) Inspec	ction Fair	100 n [	Po	or		-		
Element Name Location Material Element Type Environment Protection System Condition Data	Benign Un	Waterways  Modera	ate X	Exc	Width (m Height (n Count Total Qty Limited I	n) n) y (m²) Inspec	Fair 100	100 n [	Po-			-		
Element Name Location Material Element Type Environment Protection System Condition Data  Comments Recommended Wor	Benign Un Vegetation e	Modera nits nroaching	on wate	Exc erway.	Width (m Height (n Count Total Qty Limited I	n) n) y (m²) Inspec	Fair 100	100 r l				Defic		



## Sheffield Road Culvert # 1



Approach looking East



Approach looking West



Upstream view



Downstream view



View inside the culvert



Elevation view of the culvert

Ontario Structure Inspection	Manual - Inspection Forr	m MTO Site Number
		Inventory Data:
Structure Name	C-10 Clyde Road Culvert	t
Main Hwy/Road #	N Dumfries Twp On Rd 3E Under	
Hwy/Road Name	Clyde Road	
Structure Location	Approximately 960m east of	of N Dumfries Rd 27A
Northing	43.385556	Easting -80.215833
Owners	Township of North Dumfries	Heritage Not Cons. X Cons./not App. List/not Desig.  Designation: Desig./not List Desig. & List
MTO Region	South-Western	Road Class: Freeway Arterial Collector Local X
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 Truck School Bicycle
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	on	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		j
Rehab History: (Date/Descripti	ion)	<u>:</u>



<b>Ontario Structure Inspection</b>	Manual - Inspection Form	MTO	Site Number
	Scheduled 1	Improvements:	
Regional Priority Number		Programmed Work Year	
Nature of Program Work:		1	
Appraisal Indices:		Comments	
Fatigue			
Seismic			
Scour			
Flood			
Geometrics			
Barrier			
Curb			



Load Capacity

Ontario Structure Inspection Ma	nual - Inspection F	orm		MTO	Site Number				
	Fie	eld Inspection Ir	formation						
Date of Inspection	May 17, 2020, 2:0	00PM	Type of I	nspection:	OSIM X	Enhanced OSIM			
Inspector:	J. Zohreh, P.Eng.		<u>.                                    </u>						
Others in Party:	S. Mitra, EIT								
Access Equipment Used:	Tapes, Hammer, C	Chain, Ladder, Ca	mera, Safety	Equipment					
Weather:	Sunny		•						
Temperature:	15°C								
					Priority				
Additional Investigations Requir	ed		No	ne	Normal	Urgent			
Material Condition Survey									
Detailed Deck Condition Surv	vey		X	ζ.					
Non-destructive Delamination	Survey of Asphalt-	Covered Deck	Σ	ζ.					
Concrete Substructure Condit	ion Survey		Χ	ζ.					
Detailed Coating Condition S	urvey		Χ	K .					
Detailed Timber Investigation	l		X	X					
Post-Tensioned Strand Investi	igation		Х	ζ.					
Underwater Investigation			X	X					
Fatigue Investigation			Х	ζ.					
Seismic Investigation			X	X					
Structure Evaluation			Х	ζ.					
Monitoring									
Monitoring of Deformations,	Settlements and Mov	vements			X				
Monitoring Crack Widths					X				
Investigation Notes:			<b>!</b>	,					
		Overall Structu	re Notes						
Recommended Work on Structure	Non	e X Minor Re	nab Majo	or Rehab	Replace				
Timing of Recommended Work	1 to 5 year	s X 6 to 10 ye	ears						
Overall Comments:	See maintenance s Monitor deformati		at bolt line.						
Date of Next Inspection:	2022								
Suspected Performance Deficiencies  01 Load carrying capacity  02 Excessive deformations (reflections & rot)  03 Continuing settlement  04 Continuing movements  05 Seized bearings  Maintenance Needs  01 Lift and Swing Bridge Maintenance  02 Bridge Cleaning	09 10 11	Bearing not uniform Jammed expansion je Pedestrian/vehicular Rough riding surface Surface ponding Deck draining	oint hazard Steel	12 13 14 15 16	13 Flooding/channel blockage 14 Undermining of foundation 15 Unstable embankments 16 Other				
02 Bridge Cleaning 03 Bridge Handrail Maintenance 04 Painting Steel Bridge Structures 05 Bridge Deck Joint Repair 06 Bridge Regging Maintenance	08 09 10 11	Repair to Bridge Con Repair of Bridge Tin Bailey bridges - main Animal/Pest Control	aber atenance	14 15 16 17	Concrete Sealing Rout and Seal Bridge deck drain Scaling (loose cor	age crete or ACR steel)			



## **Ontario Structure Inspection Manual - Inspection Form**

MTO	Site	Number

Repair Rehabilitation	n Required				Pric	ority		Estimated			
Element <sup>1</sup>	Repa	nir and Rehabilitation Requ	iired <sup>2</sup>	6 to 10 years	1 to 5 years	Within 1 year	Urgent	<b>Construction Cost</b>			
Barrel	Repare As	phalt on Deck			X			\$	1,500.00		
Embankments	_	tation around pipe. Ident on method used for aba	tement and		X			\$	1,000.00		
Estimated Rehab	ilitated or R	eplacement Structure Dimen	isions <sup>3</sup>	T	4-1-04	-41 C	4	¢.	2.500.00		
Deck Length (m)	2 + 9.5	Structure Width (m)	1.9 / 2.5	Total Structural Cost \$ 2,500.00							

- 1 Indicate specific costs for structure replacement or for rehabilitation under the given headings.
- $\boldsymbol{2}$  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	<b>Estimated Cost</b>
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

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 worl

Justification	



<sup>5 -</sup> 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

								I	Bridge C	ondition Index								
No.		Element Description	Location	Length	Width	Height	Count	Total Qty	Units	Replacement (Initial) Cost	Material	Total Replacement Value	Excellen t	Good	Fair	Poor	Current Flement 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 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-10	Culverts	Outlet Compor	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 & Wa	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



Element Group	Culvert	S						Length (n	n)		9.5							_
Element Name	Barrel							Width (m			2.5							
Location								Height (n			1							_
Material	Concrete	e						Count			1							_
Element Type	Concrete	e Rigi	d Frame					Total Qty	$(m^2)$	)	42.8							
Environment	Benign		Mode	ate	X	Severe		Limited I			ı							
Protection System				L				<u> </u>							Per	for	mance	
		Uni	its			Exc		Good		Fai	r		Poor		De	fici	encies	
Condition Data		m	2					36.3		6.4								
Comments			surface a				d on	a half an e	llipse	e.								
Recommended Wor	·k:		Rehab			Replace				Mai	intenaı	ice l	Needs:					
Ur	gent	1 to	5 years		6 to 1	0 years		None	X			Urg	ent	1 ye	ar	2	2 years	X
	<u> </u>		·			<i>y</i>				_			<u> </u>			_		_
										Rus	t on bo	ttom	profile o	close to	) wate	er I	ine.	
Element Group	Culvert	s						Length (n	n)									_
Element Name	Inlet Co	mpo	nents					Width (m	1)									
Location	East end	l of cu	ılvert					Height (n	1)									
Material	Soil							Count			1							
Element Type								Total Qty	$(m^2)$	)								
Environment	Benign		Mode	ate	X	Severe		Limited I	nspe	ctior	ı							
Protection System															Per	for	mance	
Candition Data		Uni	its			Exc		Good		Fai	r		Poor		Def	fici	encies	
Condition Data		m	2					1										
Comments	Good sta	ability	in area	arou	nd cul	lvert.												
Recommended Wor	rk:		Rehab			Replace				Mai	intenaı	nce l	Needs:					_
Ur	gent	1 to	5 years		6 to 1	0 years		None	None X Urgent 1 year			ar	12	2 years	П			
						U												_
Element Group	Culvert	s						Length (n	n)									
Element Name	Outlet (	Comp	onents					Width (m	1)									
Location	West en	d of c	ulvert					Height (n	<b>1</b> )									
Material	Soil							Count			1							
Element Type								Total Qty	$(m^2)$	)								
Environment	Benign		Mode	ate	X	Severe		Limited I	nspe	ctior	ı [							
Protection System															Per	for	mance	
Condition Data		Uni				Exc		Good		Fai	r		Poor		De	fici	encies	
Condition Data		m	2					1										
Comments	Good sta	ability	in area	arou	nd cul	lvert.												
Recommended Wor	·k:		Rehab			Replace				Mai	intenaı	nce l	Needs:					
Ur	gent	1 to	5 years		6 to 1	0 years		None	X			Urg	gent	1 ye	ar	2	2 years	٦



Element Group	Decks							Length (r	n)		3						
Element Name	Wearing	g Sur	face					Width (m	1)		7						
Location	On top o	of cul	vert					Height (n	n)								
Material	Tar and	chip						Count			1						
Element Type								Total Qty	/ (m <sup>2</sup> )	)	21						
Environment	Benign		Mode	rate	X	Severe		Limited I			n						
<b>Protection System</b>								•							Pe	rfo	rmance
Condition Data		Un				Exc		Good		Fai	r		Poor		De	efic	iencies
Condition Data		m	12					5		16	· )						
Comments	Rough riding surface since it is a gravel road. Adequate coverage of gravel, light rutting.																
Recommended Wor	rk:		Rehab			Replace				Ma	intena	nce l	Needs:				
Ur	gent	1 to	5 years		6 to	10 years		None	X			Urg	gent	1 yea	r	T	2 years
			-			·											
Element Group	Founda	tions						Length (r	n)								
Element Name	Founda	tions	(below	grou	ınd l	level)		Width (m	1)								
Location								Height (n	n)								
Material								Count			100						
Element Type								Total Qty	/ (m <sup>2</sup> )	)							
Environment	Benign		Mode	rate		Severe		Limited I			n						
Protection System						<u>I</u>		!							Pe	rfo	rmance
		Un	its			Exc		Good		Fai	r		Poor				iencies
Condition Data		9/	<u>′</u> о					100									
Comments	No scou	r thro	ough the	pipe	. Soi	l buildup al	ong t	the north w	all.					•			
Recommended Wor	rk:		Rehab			Replace				Ma	intena	nce l	Needs:				
Ur	gent	1 to	5 years		6 to	10 years		None	X			Urg	ent	1 yea	r	П	2 years
	<u> </u>	4				v							,	•			
Element Group	Embanl	kmen	its					Length (r	n)								
Element Name	Embanl	kmen	its					Width (m	<b>1</b> )								
Location								Height (n	n)								
Material								Count			4						
Element Type								Total Qty	/ (m <sup>2</sup> )	)							
Environment	Benign		Mode	rate	X	Severe		Limited I	nspe	ctio	n						
<b>Protection System</b>															Pe	rfo	rmance
Condition Data		Un	its			Exc		Good		Fai	r		Poor		De	efic	iencies
Condition Data		eac	ch							4							
Comments														·			
Recommended Wor	rk:		Rehab			Replace	Maintenance Needs:										
Ur	gent	1 to	5 years		6 to	10 years		None				Urg	gent	1 yea	r Z	X	2 years



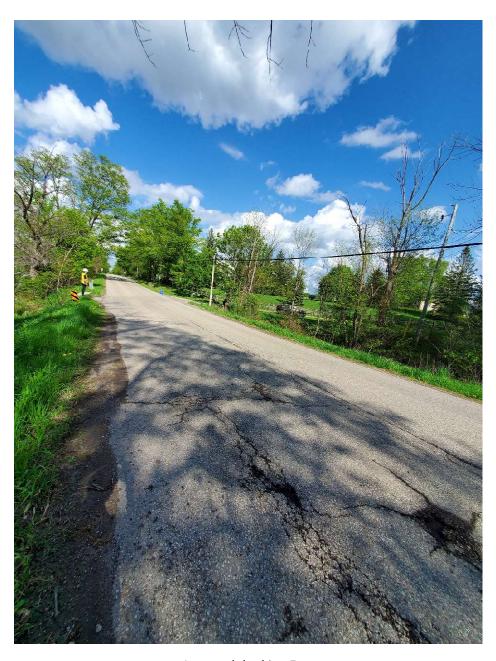
			Cle	ar vege	etatio	n around	l pipe.									
Element Group	Embank	ments				]	Length (n	n)								
Element Name	Slope Pr	rotection					Width (m	n)								
Location						]	Height (n	n)								
Material							Count 4									
Element Type							Total Qty (m <sup>2</sup> )									
Environment	Benign	Mod		Limited I	nspe	ction	n	X								
Protection System														Perf	ormance	
Condition Data		Units	(	Good		Fai	r		Poor		Def	iciencies				
Collumbil Data		each		4												
Comments	Limited i	inspection	lue to	high	vegetation.											
Recommended Wor	·k:	Rehal	)		Replace				Ma	intena	nce l	Needs:				
Ur	gent	1 to 5 yea	rs	6 to	10 years		None	X			Urg	gent	1 year		2 years	
Element Group	Embank						Length (n									
Element Name	Streams	& Watery	vays				Width (m									
Location							Height (n	n)								
Material							Count			100						
Element Type	<u> </u>				<del></del>		Total Qty			100						
Environment	Benign	Mo	derate	X	Severe		Limited I	nspe	ctio	n						
Protection System								_		_	_				ormance	
Condition Data		Units		<u> </u>	Exc	(	Good		Fai	r		Poor		Defi	iciencies	
Condition 2 am		%					40		60							
Comments	Vegetatio	on enroach	ing on	wate	rway.											
Recommended Wor	·k <u>:</u>	Rehal	) <u> </u>		Replace				Ma	i <u>ntena</u>	nce l	Needs:				
Ur	gent	1 to 5 yea	rs	6 to	10 years		None	X			Urg	gent	1 year		2 years	
				,												



## Clyde Road Culvert



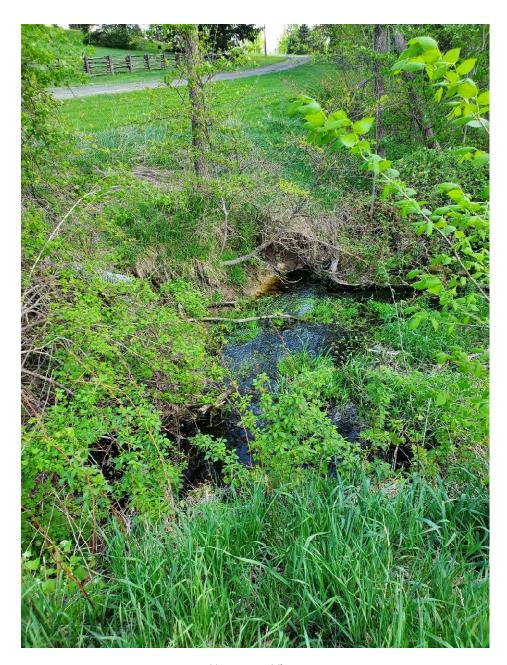
Approach looking West



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

Ontario Structure Inspection	Manual - Inspection For	m MTO Site Number
		Inventory Data:
Structure Name	C-11 GreenField Road Tv	win Culvert
Main Hwy/Road #	GreenField Road Under	Closing
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. X Cons./not App. List/not Desig.  Designation: Desig./not List Desig. & List
MTO Region	South-Western	Road Class: Freeway Arterial Collector Local X
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 Truck School Bicycle
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)
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	on	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		<u></u>
Rehab History: (Date/Descripti	ion)	<u></u>



<b>Ontario Structure Inspection</b>	Manual - Inspection Form	MTO	Site Number
	Scheduled 1	Improvements:	
Regional Priority Number		Programmed Work Year	
Nature of Program Work:		1	
Appraisal Indices:		Comments	
Fatigue			
Seismic			
Scour			
Flood			
Geometrics			
Barrier			
Curb			



Load Capacity

	Fi	eld In	spection Infor	matio	n			
Date of Inspection	May 17, 2020, 3:3	30PM	[	Туре	of Inspection:	OSIM	X	Enhanced OSIM
Inspector:	J. Zohreh, P.Eng.							
Others in Party:	S. Mitra, EIT							
Access Equipment Used:	Tapes, Hammer, C	Chain,	Ladder, Camer	ra, Saf	ety Equipment			
Weather:	Sunny							
Temperature:	15°C							-
						Prio	rity	
Additional Investigations Requir	ed				None	Norm		Urgent
Material Condition Survey								
Detailed Deck Condition Sur	vey				X			
Non-destructive Delamination	1 Survey of Asphalt-	Cove	red Deck		X			
Concrete Substructure Condit	ion Survey				X			
Detailed Coating Condition S	urvey				X			
Detailed Timber Investigation	1				X			
Post-Tensioned Strand Invest	igation				X			
Underwater Investigation					X			
Fatigue Investigation					X			
Seismic Investigation					X			
Structure Evaluation					X			
Monitoring								
Monitoring of Deformations,	Settlements and Mo	veme	nts			X		
Monitoring Crack Widths						X		1
Investigation Notes:					•			
		Over	all Structure N	lotes				
Recommended Work on Structure	Non	ie	Minor Rehab	X	Major Rehab	Rep	lace	
Timing of Recommended Work	1 to 5 year	rs X	6 to 10 years					
Overall Comments:	See maintenance s Monitor deformati		top profile at b	olt lin	e.			
Date of Next Inspection:	2022							
Suspected Performance Deficiencies  11 Load carrying capacity 12 Excessive deformations (reflections & ro 13 Continuing settlement 14 Continuing movements 15 Seized bearings  Maintenance Needs 16 Lift and Swing Bridge Maintenance 17 Bridge Cleaning 18 Bridge Handrail Maintenance	06 07 tations) 08 09 10 11	Jamr Pede Roug Surfa Deck Repa Repa	ing not uniformly loa med expansion joint estrian/vehicular haza gh riding surface ace ponding c draining uir to Structural Steel air to Bridge Concrete air of Bridge Timber	rd	12 13 14 15 16 13 14 15 16 15 16	Flooding/c Undermin Unstable e Other	channel b ing of fou embankm ontrol at	undation lents
04 Painting Steel Bridge Structures 05 Bridge Deck Joint Repair 06 Bridge Bearing Maintenance	10 11 12	Baile Anin	ur of Bridge Timber ey bridges - maintena nal/Pest Control ge Surface Renair	nce	13 16 17 18	Bridge dec Scaling (lo	ck draina	ge crete or ACR steel)

MTO Site Number



**Ontario Structure Inspection Manual - Inspection Form** 

## **Ontario Structure Inspection Manual - Inspection Form**

MTO	Site	Number

Repair Rehabilitation	n Required				Pric	ority		Estimated		
Element <sup>1</sup>	Repa	nir and Rehabilitation Req	uired <sup>2</sup>	6 to 10 years	1 to 5 years	Within 1 year	l Urgent I		ection Cost	
Barrel	_	etation blocking the stream. eformation of top profile at b	oolt line.		X			\$	1,000.00	
Embankments		tation around pipe. Ident on method used for aba	atement and		X			\$	1,500.00	
Estimated Rehab	ilitated or R	eplacement Structure Dimer	nsions <sup>3</sup>	Т	-4-1 C4	-41 C	4	¢	2.500.00	
Deck Length (m)	12	Structure Width (m)	6.7	10	otai Stru	ctural Co	ost	\$	2,500.00	

- 1 Indicate specific costs for structure replacement or for rehabilitation under the given headings.
- 2  $\mbox{\sc Give}$  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	<b>Estimated Cost</b>
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

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 worl

Justification	



<sup>5 -</sup> 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

								I	Bridge C	ondition Index								
No.		Element Description	Location	Length	Width	Height	Count	Total Qty		Replacement (Initial) Cost	Material	Total Replacement Value	Excellen t	Good	Fair Poor Current Element V.		Current Flement 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 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-11	Culverts	Outlet Compor	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 & Wa	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



Element Group	Culverts	3			Length (n	n)		12							
Element Name	Barrel				Width (m	1)	(	3.2							
Location	West				Height (n	<b>1</b> )		1.9							
Material	Corrugat	ed steel plate			Count			1							
Element Type	CSP Arc	h		<b>Total Qty</b>	/ (m <sup>2</sup>	) 9	92.4								
Environment	Benign	Mode	rate	X Severe	Limited I	nspe	ction	l	Performance Poor Deficiencies  I year X 2 years egetation blocking the stream. deformation of top profile at bolt line Performance Poor Deficiencies  ance Needs:						
Protection System	,	<u> </u>										P	erfo	rmance	
		Units		Exc	Good		Fair	r		Poor		Ι	)efi	ciencies	
Condition Data		m <sup>2</sup>			65.4		27.0	)							
Comments	Top prof		d throu	alculation base ugh almost the ation.		-		ine.			-				
Recommended Wo	rk:	Rehab		Replace			Mai	ntena	nce ]	Needs:					
Ur	gent	1 to 5 years	6	to 10 years	None	X			Urg	gent	1	year	X	2 years	
								_			_				
Element Group	Culverts	1			Length (n	n)									=
Element Name		mponents			Width (m										
Location		of culvert			Height (n										
Material	Soil	01 001,010			Count	· <b>-</b> )		1							
Element Type	2011				Total Qty	/ (m <sup>2</sup>	7								
Environment	Benign	Mode	rata	X Severe	Limited I										
Protection System	Denign	Midde	late	A Severe	Limited 1	пърс	Ction						ou Co		
r rotection system		Units		Exc	Good		Fair	.		Poor					
Condition Data		m <sup>2</sup>		EAC	1		1 an			1 001			-	cicircies	
Comments	Good sta	bility in area	aroun	d culvert.			1				-				
Recommended Wor		Rehab		Replace				ntena	nce l	Needs:					
Ur	gent	1 to 5 years	6	to 10 years	None	X			Urg	gent	1	year		2 years	
Element Group	Culverts	3			Length (n	n)									_
Element Name	Outlet C	Components			Width (m	1)									
Location	West end	d of culvert			Height (n	n)									
Material	Soil				Count			1							
Element Type					<b>Total Qty</b>	/ (m <sup>2</sup>	)								
Environment	Benign	Mode	rate	X Severe	Limited I			l							
Protection System												P	erfo	rmance	
· ·		Units		Exc	Good		Fair	r		Poor				ciencies	
Condition Data		m <sup>2</sup>			1										
Comments	Good sta	bility in area	aroun	d culvert.							•				
Recommended Wo	rk:	Rehab		Replace			Mai	ntena	nce	Needs:					
Ur	gent	1 to 5 years	6	to 10 years	None	X	t		Urg	gent	1	year		2 years	
	~	1		<b>J</b>			<del>                                     </del>					<u>- L</u>		· <u> </u>	



Element Group	Decks					Length (n	n)		3.8					
Element Name	Wearing Su	rface				Width (m	1)		6.2					
Location	On top of cul	vert				Height (n	1)							
Element Name   Wearing Surface   Width (m)   6.2														
Element Name														
Environment	Benign	Moderate	e X	Severe	Width (m)   6.2   Height (m)   Count   1   Total Qty (m²)   23.56   E   Limited Inspection   Performance   Good   Fair   Poor   Deficiencies   23.56									
Protection System		ı		<u> </u>						<b>-</b>	Pe	erformance		
Element Name		eficiencies												
Element Name		23.56												
Comments	Rough riding	surface since	ce it is	a gravel roa	ad. <i>A</i>	Adequate co	overa	ige o	f gravel	, light rutting	g.			
Recommended Wor	·k:	Rehab		Replace				Ma	intenan	ce Needs:				
Ur	gent 1 to	5 years	6 to	10 years		None	X			Urgent	1 year	2 years		
				_										
						<u> </u>								
	Foundations	(below gro	und l	evel)		`								
							1)		100					
							. 2		100					
Environment	Benign	Moderate	e	Severe		Limited I	nspe	ction	1					
<b>Protection System</b>			T				ı				_			
Condition Data				Exc				Fai	r	Poor	D	eficiencies		
	9,	<u>′o</u>				100								
Comments	No scour thro	ough the pip	e. Soil	l buildup alo	ng t	the north w	all.							
Recommended Wor	·k:	Rehab		Replace				Ma	intenan	ce Needs:				
Ur	gent 1 to	5 years	6 to	10 years		None	X			Urgent	1 year	2 years		
				<u> </u>	<u>'</u>						_			
							_							
	Embankmer	nts				`								
						-	1)							
						_			4					
		I						_						
Environment	Benign	Moderate	e X	Severe		Limited I	nspe	ction	1 <u> </u>					
Protection System			-											
Condition Data				Exc		Good			r	Poor	D	eficiencies		
	ea	ch						4						
Comments														
Recommended Wor	·k:	Rehab		Replace				Ma	intenan	ce Needs:				
Ur	gent 1 to	5 years	6 to	10 years		None			1	Urgent	1 year	X 2 years		
				_				Cle	ar veget	ation around	l pipe.			



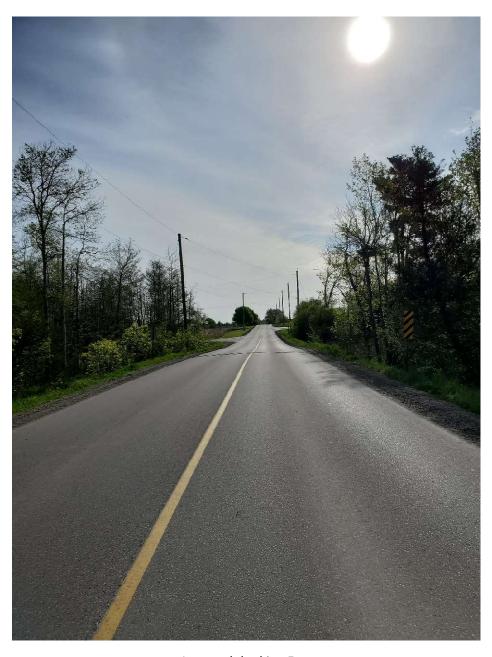
Element Group	Embankme	ents				Length (n	n)							
Element Name	Embankments Slope Protection  Benign Moderate X					Width (m	1)							
Location						Height (m	<b>1</b> )							
Material						Count		4						
Element Type						Total Qty	$(m^2)$					Performance Deficiencies  Performance Deficiencies  Performance Deficiencies		
Environment	Benign	Mode	rate X	Severe		Limited I	nspect	ion	X			year 2 years  Performance Deficiencies		
Protection System			·			•						Perf	ormance	
Condition Data	U	nits		Exc		Good	air		Poor		Defi	ciencies		
Condition Data	e	ach				4								
Comments	Limited insp	pection due	e to high	vegetation.				aintenance Needs:  Urgent 1 year 2 years						
Recommended Wor	rk:	Rehab		Replace			N	Iaintena	nce I	Needs:				
Ur	gent 1 t	to 5 years	6 to	10 years		None	X		Urg	gent	1 year	r	2 years	
Element Group	Embankme	ents				Length (n	n)							
Element Name	Streams &	Waterway	ys			Width (m								
Location						Height (m	1)							
Material						Count								
Element Type						<b>Total Qty</b>	$(m^2)$	100						
Environment	Benign	Modei	rate X	Severe		Limited I		ion						
Protection System			•							Performanc				
·	U	nits		Exc		Good	F	'air		Poor		Defi	ciencies	
Condition Data		%					1	.00						
Comments	Vegetation of	enroaching	g on wate	erway.										
Recommended Wor	rk:	Rehab		Replace			N	Iaintena	nce l	Needs:				
Ur	gent 1 t	to 5 years	6 to	10 years		None	X		Urg	gent	1 year	r	2 years	
Element Group	Culverts					Length (n	n)	12						
Element Name	Barrel					Width (m	1)	3.2						
Location	East					Height (m	1)	1.9						
Material	Corrugated	steel plate				Count	<u> </u>	1						
Element Type						(m <sup>2</sup> )	92.4							
Environment														
Protection System											Performance			
i rotection system												Perf	ormance	
Condition Data	U	nits		Exc		Good	F	air		Poor			ormance iciencies	



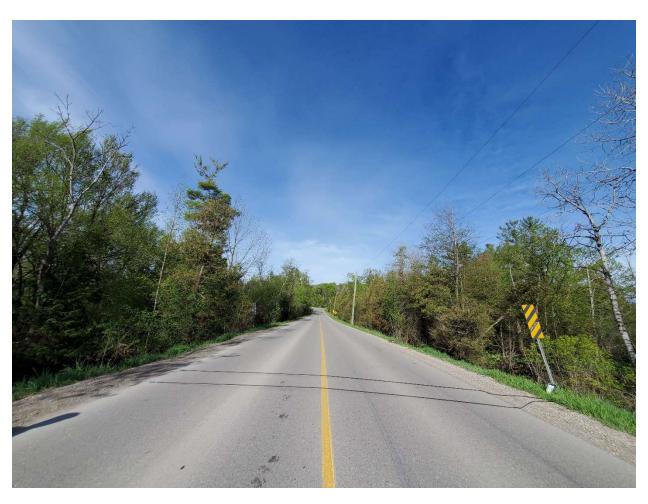
Comments	Approximate surface area calculation based on a half an ellipse Top profile has sagged through almost the whole length at the becomes to monitor deformation.	
Recommended Wo	rk: Rehab Replace	Maintenance Needs:
Ur	gent 1 to 5 years 6 to 10 years None X	Urgent 1 year X 2 years



## 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

Ontario Structure Inspection	Manual - Inspection Form	m MTO Site Number
		Inventory Data:
Structure Name	C-12 GreenField Road W	Vest Twin Culvert
Main Hwy/Road #	GreenField Road Under	
Hwy/Road Name	GreenField Road West	
Structure Location	Approximately 700m Wes	st 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. X Cons./not App. List/not Desig.  Designation: Desig./not List Desig. & List
MTO Region	South-Western	Road Class: Freeway Arterial Collector Local X
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 Truck School Bicycle
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)
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	on	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		<u></u>
Rehab History: (Date/Descripti	ion)	<u>-</u>



<b>Ontario Structure Inspection</b>	Manual - Inspection Form	MTO	Site Number
	Scheduled 1	Improvements:	
Regional Priority Number		Programmed Work Year	
Nature of Program Work:		1	
Appraisal Indices:		Comments	
Fatigue			
Seismic			
Scour			
Flood			
Geometrics			
Barrier			
Curb			



Load Capacity

		Fiel	spection Infor	mati	on					
Date of Inspection	May 17	ay 17, 2020, 4:30PM Type of Inspection: OSIM								Enhanced OSIM
Inspector:	J. Zohre	eh, P.Eng.								
Others in Party:	S. Mitra	ı, EIT								
Access Equipment Used:	Tapes,	Hammer, Cl	nain,	, Ladder, Camer	ra, Sa	afety Equipmen	nt			
Weather:	Sunny									
Temperature:	15°C									
								Prio	rity	
Additional Investigations Rec	quired					None		Norm		Urgent
Material Condition Survey										
Detailed Deck Condition	Survey					X				
Non-destructive Delamin	red Deck		X							
Concrete Substructure Co			X							
Detailed Coating Condition			X							
Detailed Timber Investiga			X							
Post-Tensioned Strand In		X								
Underwater Investigation		X								
Fatigue Investigation		X								
Seismic Investigation						X				
Structure Evaluation						X				
Monitoring										
Monitoring of Deformation	ons, Settlemer	ts and Mov	eme	nts				X		
Monitoring Crack Widths	S							X		
Investigation Notes:										
		(	)ver	all Structure N	lotes					
Recommended Work on Struct	ture	None		Minor Rehab	X	Major Rehab		Rep	lace	
Timing of Recommended Wor	k	1 to 5 years	X	6 to 10 years						
Overall Comments:	top profile at b	olt li	ne.							
Date of Next Inspection: 2022										
Suspected Performance Deficiencies  11 Load carrying capacity 12 Excessive deformations (reflections 13 Continuing settlement 14 Continuing movements 15 Seized bearings  Maintenance Needs 11 Lift and Swing Bridge Maintenance 16 Bridge Cleaning 17 Bridge Handrail Maintenance 18 Bridge Handrail Maintenance		06 07 08 09 10 11	ing not uniformly loa med expansion joint estrian/vehicular hazar gh riding surface ace ponding c draining air to Structural Steel air to Bridge Concrete air of Bridge Timber	13 14 15 16 11 13 14 15 15 16 15 16 15 15 16			Flooding/channel blockage Undermining of foundation Unstable embankments Other  Erosion Control at Bridges Concrete Sealing Rout and Seal			
04 Painting Steel Bridge Structures 05 Bridge Deck Joint Repair 06 Bridge Regging Maintenance		10 11	Anin	ey bridges - maintenar nal/Pest Control	nce		16 17	Bridge de Scaling (le		nage ncrete or ACR steel)

**MTO Site Number** 



**Ontario Structure Inspection Manual - Inspection Form** 

	<b>Ontario Structure</b>	Inspection	Manual -	Inspection	Forn
--	--------------------------	------------	----------	------------	------

MTO	Site	Number

Repair Rehabilitation	n Required				Pric		Estimated			
Element <sup>1</sup>	Repa	ir and Rehabilitation Requ	uired <sup>2</sup>	6 to 10 years	1 to 5 years	Within 1 year	Urgent	<b>Construction Cost</b>		
Barrel		acks on top of the pipe. formation of top profile.			X			\$ 1,000.00		
Estimated Rehab	T.	-4-1 C4	-41 C	4	\$ 1,000.00					
Deck Length (m)	11.5	Structure Width (m)	6.2	Total Structural Cost \$ 1,0						

- 1 Indicate specific costs for structure replacement or for rehabilitation under the given headings.
- $\boldsymbol{2}$  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	<b>Estimated Cost</b>
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

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 worl

Justification		



<sup>5 -</sup> 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

								I	Bridge C	ondition Index								
No.		Element Description	Location	Length	Width	Height	Count	Total Qty	Units	Replacement (Initial) Cost	Material	Total Replacement Value		Good	Fair	Poor	Current Flement Value	Element Condition Index
				(m)	(m)	(m)	#			(\$)		TRV (\$)	1	0.75	0.4	0	CEV (\$)	
C-12	Culverts	Barrel	North	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-12	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-12	Culverts	Outlet Compor	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-12	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-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 & Wa	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



Element Group	Culverts	S				Length (n	ength (m) 12									
Element Name	Barrel					Width (m	1)	3	3.2							
Location	North					Height (m	<b>1</b> )		1.9							
Material	Corrugat	ed steel plate				Count			1							
Element Type	CSP Arc	h				Total Qty	(m <sup>2</sup>	) 9	92.4							
Environment	Benign	Mode	rate	X Severe		Limited I	nspe	ction								
Protection System		<u> </u>							•				Pe	erfo	rmance	_
		Units		Exc		Good		Fair	•		Poor		D	efic	ciencies	
Condition Data		m <sup>2</sup>				65.4		27.0								
Comments	Top prof		throu	alculation base gh almost the vation.			•		e.							
Recommended Wo	rk:	Rehab		Replace				Mai	ntenai	ice l	Needs:					
Ur	gent	1 to 5 years	6	to 10 years		None	X			Urg	gent	1 1	year	X	2 years	
											s on top					
Element Group	Culverts					Length (n	n)						-			=
Element Name		mponents				Width (m										
Location 1		of culvert				Height (m										
Material	Soil	or curvert		Count	1)		1									
Element Type	DOII		Total Qty	(m <sup>2</sup>	,											
Environment	Benign	Mode		Limited I			-									
	Denign	Mode	rate	X Severe		Limited 1	nspe	cuon						c		
Protection System		TIm:4a	1	Ewa		Cood		Eo:	. 1		Door				rmance ciencies	
Condition Data		Units m <sup>2</sup>		Exc		Good		Fair			Poor		<u> </u>	епс	ciencies	
Comments	Good sta	bility in area	aroun	d culvert.												
Recommended Wor		Rehab		Replace					Maintenance Needs:							
Ur	gent	1 to 5 years	6	to 10 years		None	X			Urg	gent	1 1	year		2 years	
Element Group	Culverts	S				Length (n	n)									
Element Name	Outlet C	Components				Width (m	1)									
Location	West end	d of culvert				Height (m	1)									
Material	Soil					Count		1	1							
Element Type						Total Qty	(m <sup>2</sup>	)								
Environment	Benign	Mode	rate	X Severe		Limited I	nspe	ction								
Protection System													Pe	erfo	rmance	_
· ·	Units Exc					Good Fair					Poor		D	efic	ciencies	
Condition Data		m <sup>2</sup>				1										
Comments	Good sta	bility in area	aroun	d culvert.		•										
Recommended Wo	rk:	Rehab		Replace				Mai	ntenai	ıce ]	Needs:					
Ur	gent	1 to 5 years	6	to 10 years		None	X	t		Urg	gent	1 1	year		2 years	
	~	<u> </u>		<u> </u>		-		+							<u> </u>	_



Element Group	Decks				Length (n	n)	3.8						
Element Name	Wearing Surface				Width (m)			6.2					
Location	On top of culvert				Height (m)								
Material	Tar and chip				Count 1								
Element Type					<b>Total Qty (m<sup>2</sup>)</b> 23.50			23.56					
Environment	Benign	Moderate	e X	Severe		Limited I			ı				
Protection System		ı		<u> </u>						<b>-</b>	Pe	erformance	_
	Un	nits		Exc		Good		Fai	r	Poor	D	eficiencies	
Condition Data	n	$\mathbf{n}^2$				23.56							
Comments													
Recommended Wor	·k:	Rehab		Replace				Ma	intenan	ce Needs:			
Ur	gent 1 to	5 years	6 to	10 years		None	X		Urgent			2 years	1
			_	_							_		_
Element Group	Foundations					Length (n							
Element Name	Foundations	(below gro	und l	evel)		Width (m							_
Location						Height (n	1)		100				_
Material						Count	. 2		100				_
Element Type				· · ·	_	Total Qty							_
Environment	Benign	Moderate	e	Severe		Limited I	nspe	ction	1		_		
Protection System			1				r				_	erformance	
Condition Data		nits		Exc		Good		Fai	r	Poor	D	eficiencies	
	9,	<u>′o</u>				100							
Comments	No scour thro	ough the pip	e. Soil	l buildup alc	ng t	the north w	all.						
Recommended Wor	·k:	Rehab		Replace				Ma	intenan	ce Needs:			
Ur	gent 1 to	5 years	6 to	10 years		None	X		Urgent 1 year 2 years				1
				<u> </u>	<u>'</u>						_		_
Element Group	Embankmer					Length (n	_						
Element Name	Embankmer	nts				Width (m							
Location						Height (n	1)						_
Material						Count			4				
Element Type		I				Total Qty							_
Environment	Benign	Moderate	e X	Severe		Limited I	nspe	ction	1 <u> </u>				
Protection System												erformance	
Condition Data		nits		Exc		Good		Fai	r	Poor	D	eficiencies	_
	ea	ch						4					
Comments													
Recommended Wor	Recommended Work: Rehab Replace						Ma	intenan	ce Needs:			_	
Ur	gent 1 to	5 years	6 to	10 years		None			1	Urgent	1 year	X 2 years	J
				_				Cle	ar veget	ation around	l pipe.		



Element Group	Embankments				Length (m)											
Element Name	Slope Protection				Width (m	1)										
Location					Height (m)											
Material					Count	Count 4										
Element Type						Total Qty	$(m^2)$	)								
Environment	Benign	Modera	ate X	Severe		Limited I			1	X						
Protection System						•							P	erfo	rmance	
Condition Data	U	nits		Exc		Good		Fai	r		Poor		Γ	)efic	ciencies	
Condition Data	e	ach				4										
Comments	Limited inspection due to high vegetation.															
Recommended Wor	rk:	Rehab		Replace				Ma	intena	nce l	Veeds:					
Ur	gent 1	to 5 years	6 to	10 years		None	X			Urg	ent	1	year		2 years	
		_											_			
Element Group	Embankme	ents				Length (n	n)									
Element Name	Streams &	Waterway	'S			Width (m	1)									
Location					Height (m	1)										
Material						Count			100							
Element Type						Total Qty	$(m^2)$	)	100							
Environment	Benign Moderate X Severe					Limited I			1							
Protection System						Performance										
•	Units Exc					Good Fair			r		Poor		Γ	)efic	ciencies	
Condition Data	%					100										
Comments																
Recommended Wor	rk:	Rehab		Replace				Ma	intenance Needs:							
Ur	gent 1	to 5 years	6 to	10 years		None	X			Urg	ent	1	year		2 years	
Element Group	Culverts					Length (n	n)	12								
Element Name	Barrel	Barrel				Width (m	1)	3.2								
Location	South				Height (n	1)	1.9									
Material	Corrugated steel plate				Count		1									
Element Type	CSP Arch				Total Qty (m <sup>2</sup> ) 92.4											
Environment	Benign Moderate X Severe				Limited Inspection											
<b>Protection System</b>													P	erfo	rmance	
	U	nits		Exc		Good		Fai	r		Poor	$\neg$	Γ	)efic	ciencies	
Condition Data		2			l	65.4		27								



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.								
Recommended Wo	ork: Rehab Replace		Maintenance Needs:					
U	rgent 1 to 5 years 6 to 10 years	None X	Urgent 1 year X 2 years  Wontor Cracks on top of the pipe.					
			Manifer defensed in top of the pipe.					



## 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

<b>Ontario Structure Inspection</b>	Manual - Inspection Forr	m MTO Site Number
		Inventory Data:
Structure Name	C-13 Gore Culvert 1	
Main Hwy/Road #	N/A On Under	
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 Not Cons. X Cons./not App. List/not Desig.  Designation: Desig./not List Desig. & List
MTO Region	South-Western	Road Class: Freeway Arterial Collector Local X
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 Truck School Bicycle
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)
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	on	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/Descripti	ion)	<u>·</u>



<b>Ontario Structure Inspection</b>	Manual - Inspection Form	MTO Site Number					
	Scheduled 1	Improvements:					
Regional Priority Number		Programmed Work Year					
Nature of Program Work:		1					
Appraisal Indices:		Comments					
Fatigue							
Seismic							
Scour							
Flood							
Geometrics							
Barrier							
Curb							



Load Capacity

Ontar	rio Structure Inspection Ma	nual - Inspection Fo	rm			МТО	Site Number	
		Fiel	d In	spection Inforn	nati	on		
Date o	of Inspection	May 18, 2020, 8:30	)PM	· .	Гуре	e of Inspection:	OSIM X SII	M
Inspec	etor:	J. Zohreh, P.Eng.						
-	s in Party:	S. Mitra, EIT						
	s Equipment Used:	Tapes, Hammer, Cl	nain,	Ladder, Camera	ı, Sa	fety Equipment		
Weath		Sunny		· · · · · · · · · · · · · · · · · · ·	•	7 1 1		
Tempe	erature:	15°C						
		<u> </u>					D	
Addit	ional Investigations Require	ed		-		None	<b>Priority</b> Normal	Urgent
Mater	ial Condition Survey							
Ι	Detailed Deck Condition Surv	ey				X		
N	Non-destructive Delamination	Survey of Asphalt-C	love	red Deck		X		
(	Concrete Substructure Conditi	on Survey				X		
Ι	Detailed Coating Condition Su	ırvey				X		
Ι	Detailed Timber Investigation					X		
F	Post-Tensioned Strand Investig	gation				X		
Under	water Investigation					X		
Fatigu	e Investigation					X		
Seism	ic Investigation					X		
Struct	ure Evaluation					X		
Monit	oring							
N	Monitoring of Deformations, S	Settlements and Mov	eme	nts			X	
N	Monitoring Crack Widths						X	
Invest	igation Notes:			•				•
		C	)ver	all Structure No	otes			
Recon	nmended Work on Structure	None	X	Minor Rehab		Major Rehab	Replace	
Timin	g of Recommended Work	1 to 5 years	X	6 to 10 years				
Overa	ll Comments:	See maintenance sh Monitor deformation		top profile at bo	lt li	ne.		
Date o	of Next Inspection:	2022						
01 L 02 E 03 C 04 C 05 S	ed Performance Deficiencies Load carrying capacity Excessive deformations (reflections & rota Continuing settlement Continuing movements leized bearings	06 07 08 09 10	Jamr Pede Roug Surfa	ing not uniformly loade ned expansion joint strian/vehicular hazard th riding surface ace ponding draining		stable 12 13 14 15 16	Slippery Surfaces Flooding/channel b Undermining of fou Unstable embankm Other	indation
01 L 02 B 03 B 04 P 05 B	ance Needs ift and Swing Bridge Maintenance bridge Cleaning bridge Handrail Maintenance lainting Steel Bridge Structures bridge Deck Joint Repair bridge Bearing Maintenance	07 08 09 10 11	Repa Repa Baile Anin	ir to Structural Steel iir to Bridge Concrete iir of Bridge Timber by bridges - maintenand nal/Pest Control ge Surface Repair	ce	13 14 15 16 17 18	Rout and Seal Bridge deck drainag Scaling (loose conc	ge



06

Ontario Structure II	spection Manual - Inspection Form		M			
Repair Rehabilitatio	•		Pric	Estimated		
Element <sup>1</sup>	Repair and Rehabilitation Required <sup>2</sup>	6 to 10 years	1 to 5 years	Within 1 year	Urgent	Construction Cost
Embankments	Clear vegetation around pipe.		v			\$ 1,000,00

							Estimated		
Element <sup>1</sup>	Rep	pair and Rehabilitation R	equired <sup>2</sup>	6 to 10 years	1 to 5 years	Within 1 year	Urgent	Const	ruction Cost
Embankments	· · · ·	retation around pipe.  Rendent on method used for	abatement and		X			\$	1,000.00
Estimated Reha	bilitated or	Replacement Structure Dir	mensions <sup>3</sup>		. 10.	. 10		Φ	1 000 00
Deck Length (m)	13.45	Structure Width (m)	8.45	Total Structural Cost				\$	1,000.00
1 - Indicate specific costs for str	ucture replaceme	nt or for rehabilitation under the given he	eadings.						

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

Associated Work <sup>4</sup>	Comments	<b>Estimated Cost</b>
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

<sup>4 -</sup> 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.

Justification	



 $<sup>\</sup>boldsymbol{2}$  - Give a brief description of the rehabilitation work required.

<sup>5 -</sup> 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

	Bridge Condition Index																	
No.		Element Description	Location	Length	Width	Height	Count	Total Qty	Units	Replacement (Initial) Cost	Material	Total Replacement Value	Excellen t	Good	Poor Current Element V		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 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-13	Culverts	Outlet Compor	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 & Wa	0	0	0	0	100	100.00	%	\$ -	0	\$ -	0.00	80.00	20.00	0.00	\$ -	-
C-13		TOTALS (TRV	V-CEV-BCI)									\$ 41,512.99					\$ 27,564.58	66.4



Element Group	Culvert	S				Length (n	n)		13.45							
Element Name	Barrel					Width (m	1)	8	3.45							
Location						Height (n	<b>1</b> )	(	0.3							
Material	Concrete	e Rigid Frame	;			Count		2	2							
Element Type	Box					Total Qty	(m <sup>2</sup> )	) [	116.2							
Environment	Benign	Mode	rate	X Severe		Limited I										
<b>Protection System</b>									_				Pei	rfo	rmance	•
Condition Data		Units		Exc	(	Good		Fair	•		Poor		De	efic	iencies	
Condition Data		$m^2$				87.1		29.0	)							
Comments																
Recommended Wor	rk:	Rehab		Replace				Mai	ntenan	ce l	Needs:					
Ur	gent	1 to 5 years	6	to 10 years		None	X		Ţ	Jrg	ent	1 yea	r		2 years	X
Element Group	Culvert					Length (n										
Element Name	Inlet Co	omponents				Width (m	1)									
Location	East end	l of culvert				Height (n	1)									
Material	Soil					Count			1							
Element Type						Total Qty	(m <sup>2</sup> )	)								
Environment	Benign	Mode	rate \( \)	X Severe		Limited I	nspe	ction								
<b>Protection System</b>															rmance	)
Condition Data	Units Exc					Good		Fair	•		Poor		De	efic	iencies	
		m <sup>2</sup>				1										
Comments	Good sta	ability in area	around	l culvert.												
Recommended Wor	rk:	Rehab		Replace				Mai	ntenan	ce l	Needs:					
Ur	gent	1 to 5 years	6	to 10 years		None	X		Ţ	Jrg	ent	1 yea	ır		2 years	S
	_			_		·	-									
Element Group	Culvert	s				Length (n	n)									
Element Name		Components				Width (m										
Location		d of culvert				Height (n	<b>1</b> )									
Material	Soil					Count		- 1	1							
Element Type						Total Qty				_						
Environment	Benign	Mode	rate 2	X Severe		Limited I	nspe	ction								
Protection System							Performance					•				
<b>Condition Data</b>		Units		Exc	(	Good		Fair	•		Poor			efic	iencies	
		m <sup>2</sup>				1										
Comments	Good sta	ability in area	around	l culvert.												
Recommended Wor	rk:	Rehab		Replace		Maintenance Needs:										
Ur	gent	1 to 5 years	6	to 10 years		None	X		Ţ	Jrg	ent	1 yea	r	П	2 years	S



Element Group	Decks							Length (r	n)		3.8							
Element Name	Wearing	g Sur	face					Width (m	ı)		6.2							
Location	On top o	f cul	vert					Height (n	n)									
Material	Chip and	l tar						Count			1							
Element Type								Total Qty	/ (m <sup>2</sup>	)	23.56							
Environment	Benign		Moder	ate	X	Severe		Limited I			n							
Protection System								!							Performance			
C 122 D . 4		Un	its			Exc		Good		Fai	r		Poor	Deficiencies				
Condition Data		m	2				,	20.026		3.53	34							
Comments														·				
Recommended Wor	·k:		Rehab			Replace				Ma	intena	nce l	Needs:					
Ur	gent	1 to	5 years		6 to	10 years		None	X			Urg	gent	1 ye	ar	2	2 years	
			<u> </u>			v							<u> </u>					
Element Group	Foundat	tions						Length (r	n)						·			
Element Name	Foundat	tions	(below g	grou	nd l	evel)		Width (m	<b>1</b> )									
Location								Height (n	n)									
Material			Count			100												
Element Type								Total Qty	/ (m <sup>2</sup>	)								
Environment Benign Moderate Severe								Limited I	nspe	ctio	n							
<b>Protection System</b>							-	•							Per	for	mance	
Condition Data		Un	its		Exc					Fai	r		Poor		De	fici	encies	
Condition Data		9/	o O					100										
Comments																		
Recommended Wor	·k:		Rehab			Replace				Ma	intena	nce ]	Needs:					
Ur	gent	1 to	5 years		6 to	10 years		None	X	Urgent			1 ye	ar	1	2 years		
		ı	, ,														<u> </u>	
Element Group	Embank	men	ts					Length (r	n)									
Element Name	Embank	men	ts					Width (m	ı)									
Location								Height (n	n)									
Material								Count			4							
Element Type								Total Qty	/ (m <sup>2</sup>	)								
Environment	Benign		Moder	ate	X	Severe		Limited I	nspe	ctio	n							
Protection System								•							Per	for	mance	
Condition Data		Un	its			Exc		Good	ood Fair Poor D				De	fici	encies			
Condition Data		eac	ch							4								
Comments						,												
Recommended Wor	·k:		Rehab			Replace			Maintenance Needs:									
	gent		5 years		6 to	10 years		None				Urg	gent	1 ye	ar X		2 years	П



							Cle	ar veg	etatio	n around	l pipe.			
Element Group	Embankı	ments		<del></del>	Length (r	n)					<del>_</del>		<del></del>	
Element Name	Slope Pro	otection			Width (m	ı)								
Location					Height (n	n)								
Material					Count			4						
Element Type					Total Qty	$(\mathbf{m}^2)$								
Environment	Benign	Moder	rate X	Severe	Limited I			1	X					
Protection System											Po	erfo	rmance	
Condition Data	Units Exc				Good		Fai	r		Poor		)efi	ciencies	
Conuntion Data		each			4									
Comments	Limited in	nspection due	e to high	vegetation.										
Recommended Work: Rehab Replace Maintenance Needs:														
Ur	gent	1 to 5 years	6 to	10 years	None	X			Urg	ent	1 year		2 years	
Element Group	Embankı				Length (r	-								
Element Name	Streams	& Waterway	ys		Width (m									
Location					Height (n	1)								
Material					Count			100						
Element Type					Total Qty	$(m^2)$		100						
Environment	Benign	Moder	rate X	Severe	Limited I			1						
<b>Protection System</b>											Po	erfa	rmance	
Condition Data		Units		Exc	Good		Fai	r		Poor		)efi	ciencies	
Condition Data		%			80		20							
Comments	Vegetatio	n enroaching	on wate	erway.										
Recommended Wor	·k:	Rehab		Replace			Ma	intena	nce I	Veeds:				
Ur	gent	1 to 5 years	6 to	o 10 years	None	X			Urg	ent	1 year		2 years	
					<del></del>					<u> </u>				



## Gore Road Structure #1



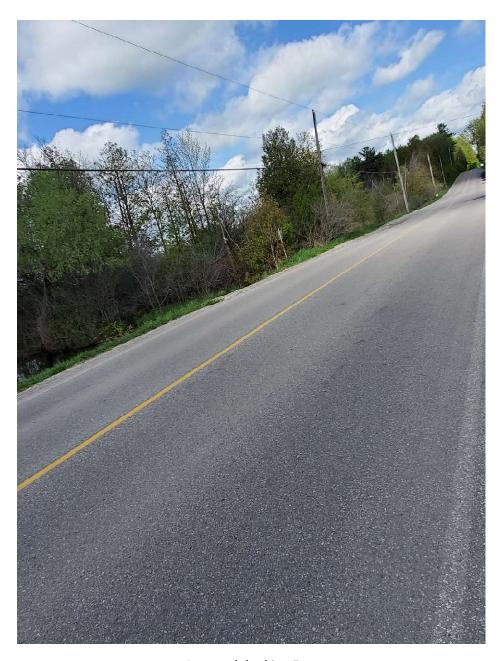
Upstream view



Downstream view



Approach looking West



Approach looking East



Water obstruction



Exposed rebar on the top of the box culvert



Water obstruction

<b>Ontario Structure Inspection</b>	Manual - Inspection Form	n MTO Site Number
		Inventory Data:
Structure Name	C-14 Gore Culvert 2	
Main Hwy/Road #	N/A On Under	X Crossing Navig. Water Rail Ped Type: Non-Navig Water X Road Other
Hwy/Road Name	Gore Road	<u> </u>
Structure Location	360m East of Puslinch Side	eroad 10 South
Northing	43°23 '44.8"	Easting 80°12'55.5"
Owners	Township of North Dumfries	Heritage Not Cons. X Cons./not App. List/not Desig.  Designation: Desig./not List Desig. & List
MTO Region	South-Western	Road Class: Freeway Arterial Collector Local X
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 Elliptica	cal 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 Truck School Bicycle
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	on	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	ion)	



<b>Ontario Structure Inspection</b>	Manual - Inspection Form	MTO	Site Number
	Scheduled 1	Improvements:	
Regional Priority Number		Programmed Work Year	
Nature of Program Work:		1	
Appraisal Indices:		Comments	
Fatigue			
Seismic			
Scour			
Flood			
Geometrics			
Barrier			
Curb			



Load Capacity

Ontario Structure Inspection Ma	nual - Inspection Fo	rm			МТО	Site Number	
	Fiel	d In	spection Infor	mati	ion		
Date of Inspection	May 18, 2020, 9:30	)PM		Тур	e of Inspection:	OSIM X SI	M
Inspector:	J. Zohreh, P.Eng.						
Others in Party:	S. Mitra, EIT						
Access Equipment Used:	Tapes, Hammer, Cl	nain,	Ladder, Camer	a, S	afety Equipment		
Weather:	Sunny				• • •		
Temperature:	15°C						
						Priority	
Additional Investigations Require	ed				None	Normal	Urgent
Material Condition Survey							
Detailed Deck Condition Surv	rey				X		
Non-destructive Delamination	Survey of Asphalt-C	Cove	red Deck		X		
Concrete Substructure Conditi	on Survey				X		
Detailed Coating Condition St	ırvey				X		
Detailed Timber Investigation				X			
Post-Tensioned Strand Investi	gation				X		
Underwater Investigation					X		
Fatigue Investigation					X		
Seismic Investigation					X		
Structure Evaluation					X		
Monitoring							
Monitoring of Deformations,	Settlements and Mov	emei	nts		X		
Monitoring Crack Widths					X		
Investigation Notes:							
	(	)ver	all Structure N	otes	S		
Recommended Work on Structure	None	X	Minor Rehab		Major Rehab	Replace	
Timing of Recommended Work	1 to 5 years	X	6 to 10 years				
Overall Comments:	See maintenance sh Monitor deformation		top profile at b	olt li	ine.		
Date of Next Inspection:	2022						
Suspected Performance Deficiencies  11 Load carrying capacity 12 Excessive deformations (reflections & rot 13 Continuing settlement 14 Continuing movements 15 Seized bearings	06 07 ations) 08 09 10 11	Jamn Pede Roug Surfa	ing not uniformly load ned expansion joint strian/vehicular hazar th riding surface ace ponding draining		12 13 14 15 16	Slippery Surfaces Flooding/channel b Undermining of fo Unstable embankir Other	undation
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 09 10 11	Repa Repa Baile Anin	ir to Structural Steel ir to Bridge Concrete ir of Bridge Timber by bridges - maintenantal/Pest Control ge Surface Repair		13 14 15 16 17 18	Erosion Control at Concrete Sealing Rout and Seal Bridge deck draina Scaling (loose cond Other	ge



Ontario Structur	e Inspection Manual - Inspection Form		N	ITO Site	Number		
Repair Rehabilita	ation Required		Pri	]	Estimated		
Element <sup>1</sup>	Repair and Rehabilitation Required <sup>2</sup>	6 to 10 years	1 to 5 years	Within 1 year	Urgent	Con	struction Cost
Embankments	Clear vegetation around pipe.  Cost dependent on method used for abatement and season		X			\$	1,000.00
Estimated Re	habilitated or Replacement Structure Dimensions <sup>3</sup>	т	otol Stm	ctural C	ogt	•	1,000.00
	1	j 19	บเลเ อเก็น	iciurai C	บรเ	φ	1,000.00

1.5

- 1 Indicate specific costs for structure replacement or for rehabilitation under the given headings.
- $\boldsymbol{2}$  Give a brief description of the rehabilitation work required.

12.2

Deck Length (m)

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

Structure Width (m)

Associated Work <sup>4</sup>	Comments	<b>Estimated Cost</b>
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

4 -	- includes other	construction cos	is associated	with the stru	cture. Engi	neering .	lees for rep	orts, enviro	iiiientai sti	udies, desig	gns, proje	ect manageme	and conting	gencies are i	iot iliciuded as asso	ocialed work.
~	A 1 .	1 / (*11			\ · · · · · · · · · · · · · · · · · · ·	1 11	1						. 10	1 1 1		

Justification	



<sup>5 -</sup> 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

								I	Bridge C	ondition Index								
No.		Element Description	Location	Length	Width	Height	Count	Total Qty	Units	Replacement (Initial) Cost	Material	Total Replacement Value	Excellen t	Good	Fair	Poor	Current Flement 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 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-14	Culverts	Outlet Compor	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 & Wa	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



Element Group	Culverts				Length	(m)	1	2.5					
Element Name	Barrel				Width (	(m)	1	.5					
Location					Height	( <b>m</b> )	1	.5					
Material	Concrete 1	Rigid Frame			Count		1						
Element Type	Box				Total Q	ty (m <sup>2</sup>	) 5	8.9					
Environment	Benign	Mode	rate X	Severe	Limited								
Protection System	_				<del></del> !							Per	ormance
Condition Data		Units		Exc	Good		Fair		]	Poor		Def	iciencies
Condition Data		m <sup>2</sup>			53.0		5.9						
Comments			·										
Recommended Wor	·k:	Rehab		Replace			Mair	itenan	ce N	eeds:			
Ur	gent 1	l to 5 years	6 t	o 10 years	Nor	e X		1	Urge	ent	1 yea	ır	2 years X
				-									
Element Group	Culverts				Length	` '							
Element Name	Inlet Con	_			Width (								
Location	East end o	of culvert			Height	(m)	1						
Material	Soil				Count	2	1						
Element Type				7 ~ [	Total Q				_				
Environment	Benign	Mode	rate X	Severe	Limited	Inspe	ection						
Protection System			1			ı							ormance
Condition Data		Units		Exc	Good		Fair		]	Poor		Def	iciencies
		m <sup>2</sup>			1								
Comments	Good stab	ility in area	around	culvert.									
Recommended Wor	·k:	Rehab		Replace			Mair	itenan	ce N	eeds:			
Ur	gent 1	l to 5 years	6 t	o 10 years	Nor	e X		1	Urge	ent	1 yea	ır	2 years
										·			
Element Group	Culverts				Length								
Element Name		omponents			Width (								
Location	West end	of culvert			Height	(m)	- 1						
Material	Soil				Count	2	1						
Element Type		<del></del>		7 ~ [	Total Q				_				
Environment	Benign	Mode	rate X	Severe	Limited	Inspe	ction						
Protection System					~ -								ormance
Condition Data		Units		Exc	Good		Fair			Poor		Def	iciencies
Comments	Good stab	m <sup>2</sup> sility in area	around	culvert.	1								
Recommended Wor	·k:	Rehab		Replace			Mair	itenan	ce N	eeds:			
Ur	gent 1	l to 5 years	6 to	o 10 years	Nor	e X		I	Urge	ent	1 yea	r	2 years
				- <b>-</b>		<u> </u>							<u> </u>



Element Group	Decks					Length (n	n)		3.8						
Element Name	Wearing	Surface				Width (m	<b>1</b> )		6.2						
Location	On top of	culvert				Height (n	1)								
Material	Chip and	tar				Count			1						
Element Type						<b>Total Qty</b>	$(m^2)$	)	23.56						
Environment	Benign	Mode	rate 3	K Severe		Limited I			ı						
<b>Protection System</b>	_	<del></del>	<u> </u>			•							Perf	ormanc	e
C 122 D . 4 .		Units		Exc		Good		Fai	r		Poor		Def	iciencie	S
Condition Data		m <sup>2</sup>				20.026		3.53	34						
Comments			·									İ			
Recommended Wor	·k:	Rehab		Replace				Ma	intenan	ice N	Veeds:				
Ur	gent	1 to 5 years	6	to 10 years		None	X			Urg	ent	1 ye	ar	2 year	's
				<u> </u>											
Element Group	Foundati	ions				Length (n	n)								
Element Name	Foundati	ions (below g	ground	l level)		Width (m	n)								
Location						Height (n	1)								
Material						Count			100						
Element Type						Total Qty	$(\mathbf{m}^2)$	)							
Environment	Benign	Mode	rate	Severe		Limited I			ı						
Protection System				<u> </u>	•								Perf	ormano	e
		Units		Exc		Good		Fai	r		Poor			iciencie	
Condition Data		%				100									
Comments															
Recommended Wor	·k:	Rehab		Replace				Ma	intenan	ce N	Veeds:				
Ur	gent	1 to 5 years	6	to 10 years		None	X		:	Urg	ent	1 ye	ar	2 year	's
	<u> </u>	· ·					<u>,                                      </u>				<u> </u>		<u> </u>	<u></u> -	
Element Group	Embank	ments				Length (n	n)								
Element Name	Embank					Width (m									
Location						Height (n									-
Material						Count			4						
Element Type						Total Qty	( <b>m</b> <sup>2</sup> )	)							
Environment	Benign	Mode	rate \( \)	K Severe		Limited I			1						
Protection System				<u></u>					_				Perf	ormano	e
		Units		Exc		Good		Fai	r		Poor		Def	iciencie	S
Condition Data		each						4							
Comments			•						•			•			
Recommended Wor	·k:	Rehab		Replace				Ma	intenan	ce N	Veeds:				
Ur	gent	1 to 5 years	6	to 10 years		None				Urg	ent	1 ye	ar X	2 year	's
		•						Cle	ar veget	atio	n around	l pipe.	-	_	



	-														
Element Group	Embank	ments			Length (r	n)									
Element Name	Slope Pr	otection			Width (m	1)									
Location					Height (n	n)									
Material					Count		4	4							
Element Type					Total Qty	$\sqrt{(\mathbf{m}^2)}$									
Environment	Benign	Mode	rate X	Severe	Limited I		tion		X						
Protection System				<u>-</u>	<u></u>							P	erfo	rmanc	e
		Units		Exc	Good	Good Fair Poor					r	<b>□</b> 1	Defi	ciencies	S
Condition Data		each			4										
Comments	Limited i	nspection due	e to high	vegetation.											
Recommended Wor	·k:	Rehab		Replace		N	Mai	ntena	nce N	eed	s:				
Ur	gent	1 to 5 years	6 to	10 years	None	X			Urge	ent		1 year		2 year	rs
							_								
Element Group	Embank				Length (r										
Element Name		ments & Waterwa	ys		Width (m	ı)									
Element Name Location			ys		Width (m Height (n	ı)									
Element Name Location Material			ys		Width (m Height (n Count	n) n)		100							
Element Name Location		& Waterway			Width (m Height (n Count Total Qty	n) n) y (m <sup>2</sup> )		100							
Element Name Location Material		& Waterway	ys rate X	Severe	Width (m Height (n Count	n) n) y (m <sup>2</sup> )		100							
Element Name Location Material Element Type	Streams	& Waterway		Severe	Width (m Height (n Count Total Qty	n) n) y (m <sup>2</sup> )		100						ormanc	
Element Name Location Material Element Type Environment Protection System	Streams	& Waterway  Moder  Units		Severe Exc	Width (m Height (n Count Total Qty	n) n) y (m²) Inspect		100		Poor	r			ormanc	
Element Name Location Material Element Type Environment	Streams	& Waterway			Width (m Height (n Count Total Qty Limited I	n) n) y (m²) Inspect	tion	100		Poor	r				
Element Name Location Material Element Type Environment Protection System	Streams	& Waterway  Moder  Units	rate X	Exc	Width (m Height (n Count Total Qty Limited I	n) n) y (m²) Inspect	tion Fair	100		Poor	r				
Element Name Location Material Element Type Environment Protection System Condition Data	Benign Vegetation	& Waterway  Model  Units	rate X	Exc	Width (m Height (n Count Total Qty Limited I	n) y (m²) Inspect	tion Fair 100	100							
Element Name Location Material Element Type Environment Protection System Condition Data  Comments Recommended Wor	Benign Vegetation	Model Units % on enroaching	rate X	Exc erway.	Width (m Height (n Count Total Qty Limited I	n) y (m²) Inspect	tion Fair 100	ntena		eed					5



## Gore Road Structure #2



Approach from East



Approach from West



Upstream view



Downstream view



Elevation of the culvert (Some water obstruction observed)