Biennial Bridge Inspection Report

Niska Road Over Speed River Bridge No. 00001

August-29-12

Prepared By: Engineered Management Systems Inc.

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IMPORTANT

Limitations of a Bridge Inspection Report

Data presented in this report is essentially a snapshot of value, condition, needs and their associated cost as per the date of inspection. Replacement costs, remaining service life assessments, condition Indices and AADT projections continually change over time. Continued deterioration, inflation and, to a lesser extent, increasing traffic volumes, create a dynamic environment that must be effectively modeled before any long range planning is possible.

While the information contained herein provides a critical starting point for network analysis and prioritization, it is only useful if coupled with a comprehensive management system that continually updates these findings not only between inspection cycles but over a long term analysis period as well.

Urgencies

Throughout this report the reader will see reference to the term "Urgencies". These are essentially time frames that the inspector must attempt to predict, on-site, on an element-by-element basis, as to how long the recommended work can wait to be addressed before it becomes critical.

It is not possible to manage an inventory based on this information. First, it would be entirely unmanageable and extremely costly to continually revisit a structure to address issues separately only as they become urgent. Secondly, waiting for an issue to become urgent before addressing it is entirely counter productive to the concept of proactive asset management. This almost ensures that the most costly ultimate solution will be applied. The summary of these urgencies in Sections 2 and 3 of this report are only intended to illustrate the mounting backlog of work that will accumulate over time if this structure is left unattended.

Urgencies are essentially included as a requirment of the OSIM guidelines. We apply a similar evaluation called Remaining Service Life. It is a more flexible system as it provides, in many cases, more than one time frame depending on the agency's in-house capabilities to carry out basic maintenance of their inventory. RSL's do NOT drive the management process nor do they participate in optimization except as fail safe points beyond which certain issues must be addressed during scheduling.

Once any component's RSL has reached a value of zero, the component must have its deficiencies addressed <u>immediately</u> even if it must be done in isolation of other needs of the structure. The only exception would occur if total failure of the component would not result in any conceivable threat to public safety. A summary of RSL's for this structure is included in Sections 2 and 3 of this report.

Respectfully Submitted:

engineered management systems inc.

1.3.6 Truss

The following defects were noted in the elements comprising this component: The truss consist of 25 tonnes of steel. In total, an estimated 1% exhibits severe general deterioration and replacement is warranted. The estimated remaining service life is 5 years.

1.3.7 Floor Beams

The following defects were noted in the elements comprising this component: The floor beams consist of 4.4 tonnes of timber. In total, an estimated 5% exhibits light general deterioration and replacement is warranted. The estimated remaining service life is 20 years.

1.3.8 Stringers

The following defects were noted in the elements comprising this component: The stringers consist of 4.5 tonnes of steel. In total, an estimated 8% exhibits medium general deterioration and replacement is warranted. The estimated remaining service life is 15 years.

1.3.9 Bracing

No significant defects were noted.

1.3.10 East Abutment

The following defects were noted in the elements comprising this component: The abutment consists of 46 tonnes of masonry. In total, an estimated 5% exhibits severe general deterioration and replacement is warranted. The estimated remaining service life is 5 years.

1.3.11 West Abutment

The following defects were noted in the elements comprising this component: The abutment consists of 46 tonnes of masonry. In total, an estimated 4% exhibits severe general deterioration and replacement is warranted. The estimated remaining service life is 1 years.

1.3.12 East Retaining Wall

The following defects were noted in the elements comprising this component: The south retaining wall consists of 33.41 tonnes of masonry. In total, an estimated 40% exhibits severe general deterioration and replacement is warranted. The estimated remaining service life is 5 years. The north retaining wall consists of 36.72 tonnes of masonry. In total, an estimated 5% exhibits severe general deterioration and replacement is warranted. The estimated remaining service life is 10 years.

1.3.13 West Retaining Wall

The following defects were noted in the elements comprising this component: The north exterior retaining wall consists of 18.29 tonnes of mass concrete. In total, an estimated 20% exhibits medium general deterioration. The estimated remaining service life is 5 years. The entire component will undergo ancillary replacement.The south retaining wall consists of 26.88 tonnes of other. In total, an estimated 5% exhibits severe general deterioration and replacement is warranted. The estimated remaining service life is 5 years. The north retaining wall consists of 26.88 tonnes of masonry. The entire element exhibits medium general deterioration and replacement is warranted. The estimated remaining service life is 10 years.

1.3.14 East Embankment

No significant defects were noted, however, the entire component will undergo ancillary replacement.

1.3.15 West Embankment

No significant defects were noted, however, the entire component will undergo ancillary replacement.

1.3.16 Foundation

The following defects were noted in the elements comprising this component: The north foundation consists of 11.5 square metres of compacted fill. In total, an estimated 20% exhibits moderate erosion and requires reinstallation. The estimated remaining service life is 1 years.

1.3.17 Watercourse

No significant defects were noted.

1.4 Conclusions and Further Investigation

Overall the structure is in very poor condition with an aggregate condition index of 1.4. The major concerns at this site are the traffic constriction, absence of a CHBDC compliant barrier, undermining of the northwest retaining wall, progressive deterioration of masonry retaining walls, bearings showing severe corrosion, disintegration affecting bearing seats and west truss verticals being bent and severely corroded.

1.4.1 Rehabilitative

The structure has rehabilitative needs of $1,300,590:

West Approach	
Ancillary Replacement	$6,541
East Approach	
Ancillary Replacement	$6,541
Deck	
Replacement	$18,315
Sidewalk/Curb/Median - South	
Ancillary Replacement	$6,541
Signage	
Ancillary Replacement	$6,025
Truss	
Replacement	$500,793
Floor Beams	
Replacement	$7,555
Stringers	
Replacement	$49,820
Bracing	
Replacement	$9,225

West Abutment	
Replacement	$157,965
East Abutment	
Replacement	$157,965
West Retaining Wall - North Exterior	
Ancillary Replacement	$9,092
West Retaining Wall - South	
Replacement	$42,512
West Retaining Wall - North	
Replacement	$56,683
East Retaining Wall - South	
Replacement	$70,453
East Retaining Wall - North	
Replacement	$77,434
West Embankment	
Ancillary Replacement	$6,025
East Embankment	
Ancillary Replacement	$6,025
Foundation	
Reinstallation	$89,284
Foundation - North	
Reinstallation	$15,797

1.4.2 Maintenance

On going maintenance procedures should be part of an annual regimen. Often these operations can be carried out by municipal staff however cost estimates are provided in cases where it must be contracted out. The following program is highly recommended at a total annual cost of $900

Truss - Verticals	
Minor Repair	$300
West Abutment - Ballast Wall	
Minor Repair	$300
Foundation - North	
Scour Protection	$300

1.4.3 Further Investigation

The next biennial inspection should be scheduled no later than August, 2014. At some point during the next year a monitoring program for deformations, settlements & movements is also recommended.

2. Component Summary

			Rehabilitation Needs				
	Replacement	**RSL**	**None\>10 yrs**	**6 - 10 years**	**1 - 5years**	**< 1 year**	**Urgent**
East Approach	$1,328	10		$6,541			
West Approach	$1,328	10		$6,541			
Deck	$18,290	10		$18,315			
Sidewalk/Curb/Median	$457	10		$6,541			
Signage	$2,744	10		$6,025			
Truss	$500,113	5			$500,793		
Floor Beams	$7,544	20	$7,555				
Stringers	$54,012	15	$49,820				
Bracing	$10,003	15	$9,225				
East Abutment	$157,749	5			$157,965		
West Abutment	$157,749	1				$157,965	
East Retaining Wall	$160,332	5			$147,887		
West Retaining Wall	$120,089	5			$108,287		
East Embankment	$2,571	10		$6,025			
West Embankment	$2,571	10		$6,025			
Foundation	$104,938	1				$105,081	
Watercourse	$17,196	20					
Total Replacement Cost:	**$1,319,014**	**1**	**$66,600**	**$56,013**	**$914,932**	**$263,046**	**$0**
					Total Rehabilitative Cost:		**$1,300,591**

3. Element Summary

			Rehabilitation Needs				
	Focus	RSL	None\>10 yrs	6 - 10 years	1 - 5years	< 1 year	Urgent
West Approach	All	10		$6,541			
Slab	All	15					
Wearing Surface	All	10					
East Approach	All	10		$6,541			
Slab	All	15					
Wearing Surface	All	10					
Deck	All	10		$18,315			
Top Surface	All	10					
Soffit Ends	Both	10					
Interior Soffit	Interior	10					
Sidewalk/Curb/Median - South	All	10		$6,541			
North Curb	All	10					
Signage	All	10		$6,025			
Truss	All	5			$500,793		
Top Chords	Top	15					
Bottom Chords	Bottom	10					
Verticals	All	5					
Connections	All	15					
Diagonals	All	20					
Floor Beams	All	20	$7,555				
Floor Beam Ends	End	20					
Intermediate Floor Beams	Interior	20					
Stringers	All	15	$49,820				
Intermediate	Interior	15					
Bracing	All	15	$9,225				

3. Element Summary (cont.)

			Rehabilitation Needs				
	Focus	RSL	None\>10 yrs	6 - 10 years	1 - 5years	< 1 year	Urgent
West End Bracing	End	15					
East End Bracing	End	15					
Intermediate Bracing	All	15					
West Abutment	All	1				$157,965	
Bearings	All	5					
Bearing Seats	All	5					
Ballast Wall	All	1					
Abutment Wall	All	10					
East Abutment	All	5			$157,965		
Bearings	All	5					
Bearing Seats	All	5					
Ballast Wall	All	10					
Abutment Wall	All	10					
West Retaining Wall - North Exterior	All	5			$9,092		
Vertical Surface	All	10					
West Retaining Wall - South	All	5			$42,512		
South Vertical Surface	All	5					
West Retaining Wall - North	All	10		$56,683			
North Vertical Surface	All	5					
East Retaining Wall - South	All	5			$70,453		
South Vertical Surface	All	5					
East Retaining Wall - North	All	10		$77,434			
North Vertical Surface	All	10					
West Embankment	All	10		$6,025			
Slope Protection	All	10					

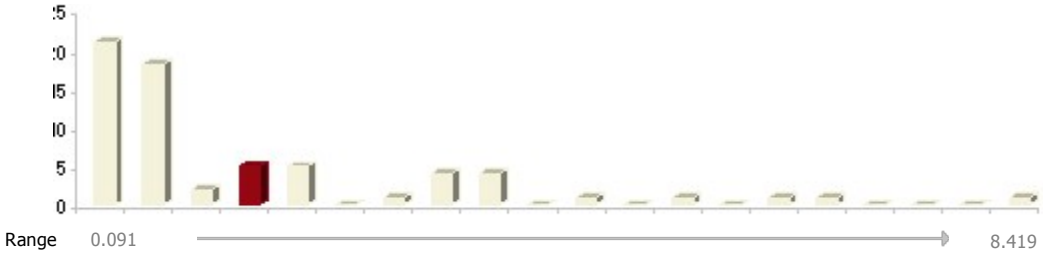
3. Element Summary (cont.)

			Rehabilitation Needs				
	Focus	RSL	None\>10 yrs	6 - 10 years	1 - 5years	< 1 year	Urgent
East Embankment	All	10		$6,025			
Slope Protection	All	10					
Foundation	All	15	$89,284				
Foundation - North	West	1				$15,797	
Watercourse	All	20					
Bottom	All	20					
Upstream Section	All	20					
Downstream Section	All	20					
		1	**$155,884**	**$190,130**	**$780,815**	**$173,762**	**$0**
					Total Rehabilitative Cost:		**$1,300,591**

4. Ranking Summary

Replacement Value (millions)

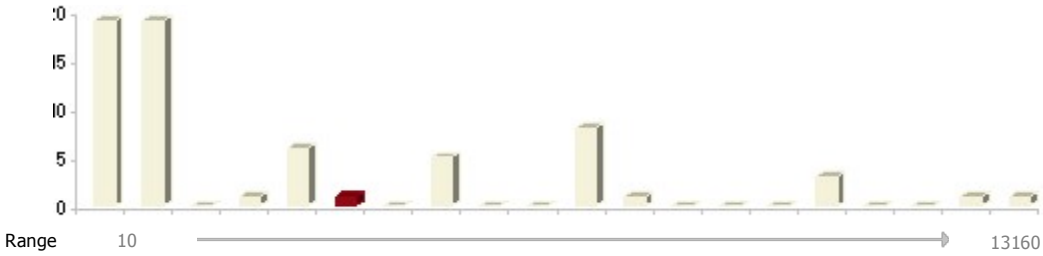
This Structure: $1,319,016 Rank: 24 / 65



Range 0.091 8.419

AADT

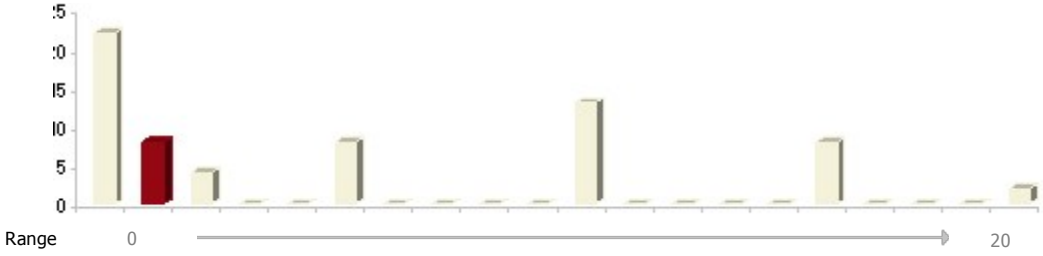
This Structure: 3700 Rank: 20 / 65



Range 10 13160

Minimum SC Remaining Service Life

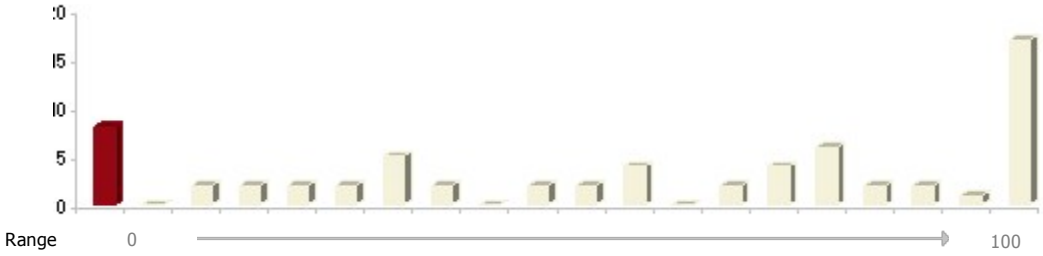
This Structure: 1 Rank: 36 / 65



Range 0 20

Condition Index

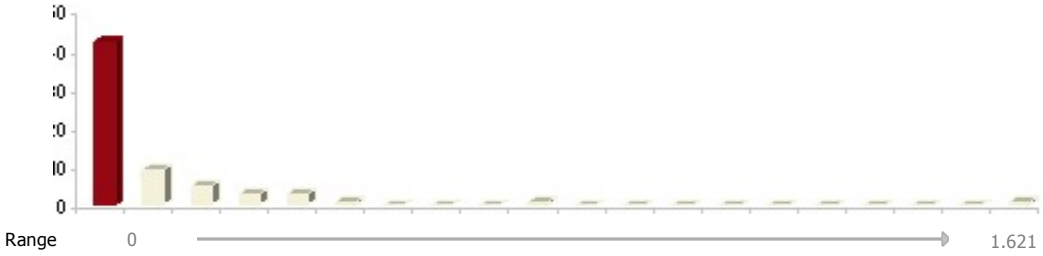
This Structure: 1.4 Rank: 61 / 65



Range 0 100

10 Year Deferral Cost (millions)

This Structure: $0 Rank: 57 / 65



Range 0 1.621

Notes:

Data calculated at time of inspection.

Rankings are higest in category.

Histograms illustrate distribution of all structures in inventory from the low to high ranges indicated.

Vertical axis = number of structures.

Red columns represent category in which this structure resides.

5. OSIM Reporting

5.1 Inventory Data

Structure Name	Niska Road Over Speed River			**Site Number**	00001
Main Hwy/Road #	N/A	**On** ☑	**Under** ☐	**Crossing Type:**	**Navigable Water** ☑ **Non-Navig. Water** ☐
Hwy/Road Name	Niska Road			**Rail** ☐ **Road** ☐ **Ped.** ☐ **Other** ☐	
Structure Location	0.64 km West of Pioneer Trail				
Latitude	4816872		**Longitude**	17560310	
Owner(s)	City of Guelph		**Heritage Designation:**	**Not Cons.** ☑ **Cons./Not App.** ☐ **List/Not Desig.** ☐ **Desig./Not List** ☐ **Desig. & List** ☐	
MTO Region	SouthWestern		**Road Class:**	**Freeway** ☐ **Arterial** ☐ **Collector** ☐ **Local** ☑	
MTO District	London/Stratford		**Posted Speed**	50	**No. of Lanes** 1
Old County	Wellington		**AADT**	3700	**No. of Trucks** 7
Geographic Twp.	City of Guelph		**Inspection Route Sequence**	Unknown	
Structure Type	Truss		**Interchange Number**	Unknown	
Total Deck Length	24.6 (m)		**Interchange Structure Number**	Unknown	
Overall Str. Width	5.5 (m)		**Minimum Vertical Clearance**	2 (m)	
Total Deck Area	91 (sq.m)		**Special Routes:**	**Transit** ☑ **Truck** ☐ **School** ☐ **Bicycle** ☐	
Roadway Width	3.44 (m)		**Detour Length Around Bridge**	5 (km)	
Skew Angle	0 (Degrees)		**Direction of Structure**	West-East	
No. of Spans	1		**Fill on Structure**	0 (m)	
Span Lengths	24.6 (m)				

5.2 Historical Data

Year Built	1974	**Year of Last Major Rehab.**	
Last OSIM Inspection	2010	**Last Evaluation**	Unknown
Last Enhanced OSIM Inspection	Unknown	**Current Load Limit**	5 (tonnes)
Enhanced Access Equipment			
Last Underwater Inspection	Unknown	**Load Limit By-Law #**	Not Applicable/Unknown
Last Condition Survey	Unknown	**By-Law Expiry Date**	Not Applicable/Unknown
Rehabilitation History	1974 - Bridge collapsed on September 23 and was replaced with aBailey Bridge loaned from MTO in October 1974. 1996- Stringers and timber deck replaced. 2003 - Raker Bolts, timber wearing surface, transoms, sway bracing replaced - Partial replacement of timber curb.		

5.3 Scheduled Improvements

Regional Priority Number		**Programmed Work Year**	
Nature of Program Work			

5.4 Appraisal Indices

		Comments
Fatigue		
Seismic		
Scour		
Flood		
Geometrics		
Barrier		
Curb		
Load Capacity		

5. OSIM Reporting (cont.)

5.5 Field Inspection Information

Date of Inspection	August-29-12	**Type of Inspection**	☑ OSIM ☐ Enhanced OSIM
Inspector	John Schaefer		
Others in Party	None		
All Equipment Used	Hammer, Camera		
Weather	Sunny		
Temperature	20 to 25 **C**		

5.6 Additional Investigations Required

	None	Normal	Urgent	Est. Cost
Detailed Deck Condition Survey	X			
Non-Destructive Delamination Survey of Asphalt Covered Deck	X			
Concrete Substructure Condition Survey	X			
Detailed Coating Condition Survey	X			
Detailed Timber Investigation	X			
Post-Tensioned Strand Investigation	X			
Underwater Investigation	X			
Fatigue Investigation	X			
Seismic Investigation	X			
Structure Evaluation	X			
Monitoring of Deformations, Settlements and Movements		X		
Other* **None**	X			
Next Detailed Visual Inspection August, 2014			**Total Est. Cost**	

The major concerns at this site are the traffic constriction, absence of a CHBDC compliant barrier, undermining of the northwest retaining wall, progressive deterioration of masonry retaining walls, bearings showing severe corrosion, disintegration affecting bearing seats and west truss verticals being bent and severely corroded.

Suspected Performance Deficiencies

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

Maintenance Needs

00 None
01 Lift and Swing Bridge Maintenance
02 Bridge Cleaning
03 Bridge Handrail Maintenance
04 Painting Steel Bridge Structures
05 Bridge Deck Joint Repair
06 Bridge Bearing Maintenance
07 Repair to Structural Steel
08 Repair of Bridge Concrete
09 Repair of Bridge Timber
10 Bailey bridges - Maintenance
11 Animal/Pest Control
12 Bridge Surface Repair
13 Erosion Control at Bridges
14 Concrete Sealing
15 Rout and Seal
16 Bridge Deck Drainage
17 Other

* eg. monitoring crack widths, trip hazards, issues impacting pedestrian or vehicular control

5.7 Element Data

5.7.1 Overall Structure - Structure

Element Group:	**Overall Structure**				**Length:**	**N/A**	
Element Name:	**Structure**				**Width:**	**N/A**	
Location:	**Single Element**				**Height:**	**N/A**	
Material:	**Any**				**Count:**	**N/A**	
Element Type:	**Bridge**				**Total Quantity:**	**1**	
Environment:	**Severe**				**Limited Inspection**	☐	
Protection System:	**See Individual Elements**					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	count	**0**	**0.88**	**0.06**	**0.06**	**16**	**17**
Comments:	Consider replacement of structure to eliminate road constriction.						
Urgency :	**None** ☐	**6-10 years** ☐	**1-5 years** ☑	**< 1 year** ☐	**Urgent** ☐		
Recommended Work :	**Defer to Element Level**						

South Elevation.

5.7 Element Data (cont.)

5.7.2 West Approach - Approach

Element Group:	West Approach				**Length:**	N/A	
Element Name:	Approach				**Width:**	N/A	
Location:	Single Element				**Height:**	N/A	
Material:	Asphalt				**Count:**	N/A	
Element Type:	Primary Element				**Total Quantity:**	5.81	
Environment:	Severe				**Limited Inspection**	☐	
Protection System:	Edge Sealing					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	tonnes	0	5.81	0	0	00	00
Comments: None							
Urgency :	**None** ☐	**6-10 years** ☑	**1-5 years** ☐	**< 1 year** ☐	**Urgent** ☐		
Recommended Work :	Ancillary Replacement	Estimated Cost: $6,541					

Overall View.

5.7 Element Data (cont.)

5.7.3 West Approach - Slab

Element Group:	West Approach			**Length:**	6		
Element Name:	Slab			**Width:**	3.6		
Location:	Single Element			**Height:**	0.12		
Material:	Asphalt			**Count:**	1		
Element Type:	Any			**Total Quantity:**	21.6		
Environment:	Severe			**Limited Inspection**	☐		
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	m2	0	21.6	0	0	00	00
Comments:	None						
Urgency :	**None** ☑	**6-10 years** ☐	**1-5 years** ☐	**< 1 year** ☐	**Urgent** ☐		
Recommended Work :	See Primary Element						

Overall View.

5.7 Element Data (cont.)

5.7.4 West Approach - Wearing Surface

Element Group:	West Approach			**Length:**	6		
Element Name:	Wearing Surface			**Width:**	3.6		
Location:	Single Element			**Height:**	0.15		
Material:	Asphalt			**Count:**	1		
Element Type:	Any			**Total Quantity:**	21.6		
Environment:	Severe			**Limited Inspection**	☐		
Protection System:	Edge Sealing					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	m2	0	21.6	0	0	00	00
Comments: None							
Urgency :	**None** ☐	**6-10 years** ☑	**1-5 years** ☐	**< 1 year** ☐	**Urgent** ☐		
Recommended Work :	See Primary Element						

Overall View.

5.7 Element Data (cont.)

5.7.5 East Approach - Approach

Element Group:	East Approach				**Length:**	N/A	
Element Name:	Approach				**Width:**	N/A	
Location:	Single Element				**Height:**	N/A	
Material:	Asphalt				**Count:**	N/A	
Element Type:	Primary Element				**Total Quantity:**	5.81	
Environment:	Severe				**Limited Inspection**	☐	
Protection System:	Edge Sealing					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	tonnes	0	5.81	0	0	00	00
Comments: None							
Urgency :	**None** ☐	**6-10 years** ☑	**1-5 years** ☐	**< 1 year** ☐	**Urgent** ☐		
Recommended Work :	Ancillary Replacement	Estimated Cost: $6,541					

Overall View.

5.7 Element Data (cont.)

5.7.6 East Approach - Slab

Element Group:	East Approach				**Length:**	6	
Element Name:	Slab				**Width:**	3.6	
Location:	Single Element				**Height:**	0.12	
Material:	Asphalt				**Count:**	1	
Element Type:	Any				**Total Quantity:**	21.6	
Environment:	Severe				**Limited Inspection**	☐	
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	m2	0	21.6	0	0	00	00
Comments:	None						
Urgency :	**None** ☑	**6-10 years** ☐	**1-5 years** ☐	**< 1 year** ☐	**Urgent** ☐		
Recommended Work :	See Primary Element						

Overall View.

5.7 Element Data (cont.)

5.7.7 East Approach - Wearing Surface

Element Group:	East Approach				**Length:**	6	
Element Name:	Wearing Surface				**Width:**	3.6	
Location:	Single Element				**Height:**	0.15	
Material:	Asphalt				**Count:**	1	
Element Type:	Any				**Total Quantity:**	21.6	
Environment:	Severe				**Limited Inspection**	☐	
Protection System:	Edge Sealing					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	m2	0	21.6	0	0	00	00
Comments: None							
Urgency :	**None** ☐	**6-10 years** ☑	**1-5 years** ☐	**< 1 year** ☐	**Urgent** ☐		
Recommended Work :	See Primary Element						

Overall View.

5.7 Element Data (cont.)

5.7.8 Deck - Deck

Element Group:	Deck				**Length:**	N/A	
Element Name:	Deck				**Width:**	N/A	
Location:	Single Element				**Height:**	N/A	
Material:	Timber				**Count:**	N/A	
Element Type:	Primary Element				**Total Quantity:**	8	
Environment:	Severe				**Limited Inspection**	☐	
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	tonnes	0	8	0	0	00	00
Comments:	none						
Urgency :	**None** ☐	**6-10 years** ☑	**1-5 years** ☐	**< 1 year** ☐	**Urgent** ☐		
Recommended Work :	**Replacement**	**Estimated Cost: $18,315**					

Overall View.

5.7 Element Data (cont.)

5.7.9 Deck - Top Surface

Element Group:	Deck			**Length:**	24.6		
Element Name:	Top Surface			**Width:**	3.44		
Location:	Single Element			**Height:**	0.14		
Material:	Timber			**Count:**	1		
Element Type:	Any			**Total Quantity:**	84.6		
Environment:	Severe			**Limited Inspection**	☐		
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	m2	0	84.6	0	0	00	00
Comments:	none						
Urgency :	**None** ☐	**6-10 years** ☑	**1-5 years** ☐	**< 1 year** ☐	**Urgent** ☐		
Recommended Work :	See Primary Element						

.

5.7 Element Data (cont.)

5.7.10 Deck - Soffit Ends

Element Group:	Deck			**Length:**	2		
Element Name:	Soffit Ends			**Width:**	3.44		
Location:	Single Element			**Height:**	N/A		
Material:	Timber			**Count:**	2		
Element Type:	Any			**Total Quantity:**	13.8		
Environment:	Severe			**Limited Inspection**	☐		
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	m2	0	13.8	0	0	00	00
Comments:	None						
Urgency :	**None** ☐	**6-10 years** ☑	**1-5 years** ☐	**< 1 year** ☐	**Urgent** ☐		
Recommended Work :	See Primary Element						

South End. Showing typical fair condition

5.7 Element Data (cont.)

5.7.11 Deck - Interior Soffit

Element Group:	Deck				**Length:**	20.6	
Element Name:	Interior Soffit				**Width:**	2.24	
Location:	Single Element				**Height:**	N/A	
Material:	Timber				**Count:**	1	
Element Type:	Any				**Total Quantity:**	46.1	
Environment:	Moderate				**Limited Inspection**	☐	
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	m2	0	46.1	0	0	00	00
Comments:	None						
Urgency :	**None** ☐	**6-10 years** ☑	**1-5 years** ☐	**< 1 year** ☐	**Urgent** ☐		
Recommended Work :	See Primary Element						

.

5.7 Element Data (cont.)

5.7.12 Sidewalk/Curb/Median - SouthSidewalk/Curb/Median

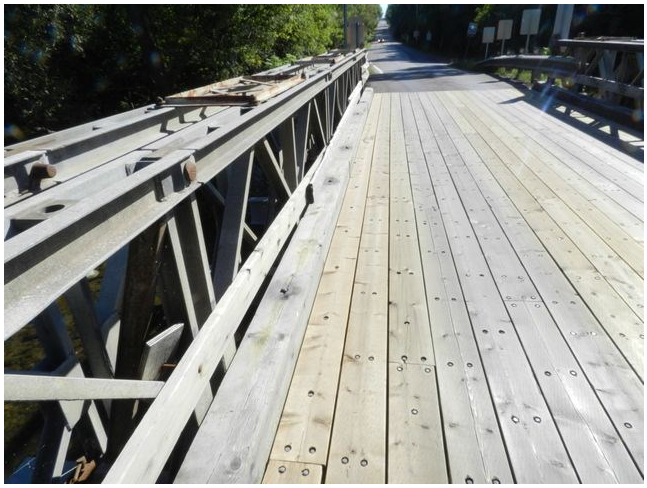
Element Group:	Sidewalk/Curb/Median			**Length:**	N/A		
Element Name:	SouthSidewalk/Curb/Median			**Width:**	N/A		
Location:	South			**Height:**	N/A		
Material:	Timber			**Count:**	N/A		
Element Type:	Primary Element			**Total Quantity:**	0.5		
Environment:	Severe			**Limited Inspection**	☐		
Protection System:	None				**Performance Deficiencies**	**Maintenance Needs**	
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	tonnes	0	0.42	0.08	0	00	00
Comments:	None						
Urgency :	**None** ☐	**6-10 years** ☑	**1-5 years** ☐	**< 1 year** ☐	**Urgent** ☐		
Recommended Work :	Ancillary Replacement	Estimated Cost: $6,541					

Overall Surface. Showing generally good condition

5.7 Element Data (cont.)

5.7.13 Sidewalk/Curb/Median - North Curb

Element Group:	Sidewalk/Curb/Median			**Length:**	24.6		
Element Name:	North Curb			**Width:**	0.19		
Location:	North			**Height:**	0.19		
Material:	Timber			**Count:**	2		
Element Type:	Any			**Total Quantity:**	18.6		
Environment:	Severe			**Limited Inspection**	☐		
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	m2	0	15.81	2.79	0	00	00
Comments:	None						
Urgency :	**None** ☐	**6-10 years** ☑	**1-5 years** ☐	**< 1 year** ☐	**Urgent** ☐		
Recommended Work :	See Primary Element						



North Surface. Showing generally fair condition

5.7 Element Data (cont.)

5.7.14 Signage - Signage

Element Group:	Signage				**Length:**	N/A	
Element Name:	Signage				**Width:**	N/A	
Location:	Single Element				**Height:**	N/A	
Material:	Aluminum				**Count:**	6	
Element Type:	Primary Element				**Total Quantity:**	6	
Environment:	Severe				**Limited Inspection**	☐	
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	all	0	6	0	0	00	00
Comments:	None						
Urgency :	**None** ☐	**6-10 years** ☑	**1-5 years** ☐	**< 1 year** ☐	**Urgent** ☐		
Recommended Work :	**Ancillary Replacement**	**Estimated Cost: $6,025**					

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5.7 Element Data (cont.)

5.7.15 Truss - Truss

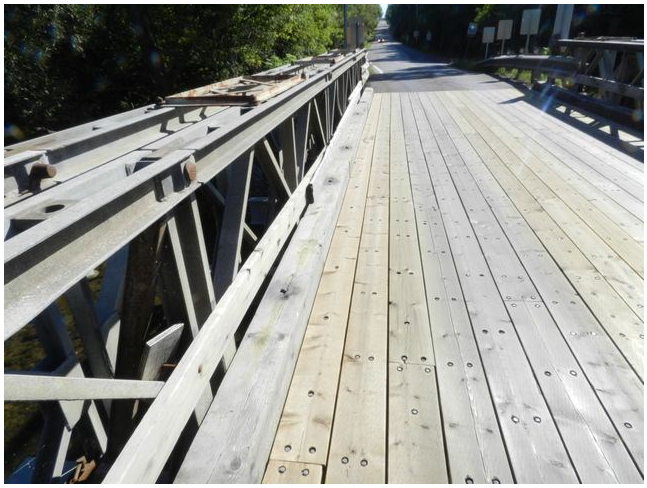
Element Group:	Truss				**Length:**	N/A	
Element Name:	Truss				**Width:**	N/A	
Location:	Single Element				**Height:**	N/A	
Material:	Steel				**Count:**	N/A	
Element Type:	Primary Element				**Total Quantity:**	25	
Environment:	Severe				**Limited Inspection**	☐	
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	tonnes	0	23.5	1.25	0.25	00	00
Comments:	End verticals showing severe corrosion should be replaced.						
Urgency :	**None** ☐	**6-10 years** ☐	**1-5 years** ☑	**< 1 year** ☐	**Urgent** ☐		
Recommended Work :	**Replacement**	**Estimated Cost: $500,793**					

South Side.

5.7 Element Data (cont.)

5.7.16 Truss - Top Chords

Element Group:	Truss			**Length:**	24.4		
Element Name:	Top Chords			**Width:**	0.05		
Location:	Single Element			**Height:**	0.1		
Material:	Steel			**Count:**	8		
Element Type:	Any			**Total Quantity:**	80.5		
Environment:	Benign			**Limited Inspection**	☐		
Protection System:	Epoxy Coating					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	m2	0	80.5	0	0	00	00
Comments: None							
Urgency :	**None** ☑	**6-10 years** ☐	**1-5 years** ☐	**< 1 year** ☐	**Urgent** ☐		
Recommended Work :	See Primary Element						



North Surface. Showing generally moderate corrosion

South Surface. Showing widespread medium corrosion

5.7 Element Data (cont.)

5.7.17 Truss - Bottom Chords

Element Group:	Truss				**Length:**	24.4		
Element Name:	Bottom Chords				**Width:**	0.05		
Location:	Single Element				**Height:**	0.1		
Material:	Steel				**Count:**	8		
Element Type:	Any				**Total Quantity:**	78.1		
Environment:	Severe				**Limited Inspection**	☐		
Protection System:	None						**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**			
	N/A	0	74.98	1.56	1.56		00	00
Comments:	There are isolated areas showing severe corrosion.							
Urgency :	None ☐	6-10 years ☑	1-5 years ☐	< 1 year ☐	Urgent ☐			
Recommended Work :	See Primary Element							

South Surface. Showing generally good condition

Underside View. Showing isolated severe corrosion.

5.7 Element Data (cont.)

5.7.18 Truss - Verticals

Element Group:	Truss				**Length:**	1.55	
Element Name:	Verticals				**Width:**	0.1	
Location:	Single Element				**Height:**	0.05	
Material:	Steel				**Count:**	96	
Element Type:	Any				**Total Quantity:**	38.4	
Environment:	Severe				**Limited Inspection**	☐	
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	m2	0	36.86	0.77	0.77	16	07
Comments:	End verticals showing severe corrosion and bent flanges should be replaced.						
Urgency :	None ☐	6-10 years ☐	1-5 years ☑	< 1 year ☐	Urgent ☐		
Recommended Work :	See Primary Element						

.

West End.

5.7 Element Data (cont.)

5.7.19 Truss - Connections

Element Group:	Truss				**Length:**	N/A	
Element Name:	Connections				**Width:**	N/A	
Location:	Single Element				**Height:**	N/A	
Material:	High Strength Steel				**Count:**	190	
Element Type:	Bolted				**Total Quantity:**	190	
Environment:	Severe				**Limited Inspection**	☐	
Protection System:	Galvanized Steel					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	each	0	190	0	0	00	00
Comments:	None						
Urgency :	**None** ☑	**6-10 years** ☐	**1-5 years** ☐	**< 1 year** ☐	**Urgent** ☐		
Recommended Work :	See Primary Element						

North Side.

Overall View.

5.7 Element Data (cont.)

5.7.20 Truss - Diagonals

Element Group:	Truss			**Length:**	1		
Element Name:	Diagonals			**Width:**	0.1		
Location:	Single Element			**Height:**	0.05		
Material:	Steel			**Count:**	256		
Element Type:	Any			**Total Quantity:**	105		
Environment:	Severe			**Limited Inspection**	☐		
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	m2	0	105	0	0	00	00
Comments:	None						
Urgency :	**None** ☑	**6-10 years** ☐	**1-5 years** ☐	**< 1 year** ☐	**Urgent** ☐		
Recommended Work :	See Primary Element						

Overall View.

5.7 Element Data (cont.)

5.7.21 Floor Beams - Floor Beams

Element Group:	Floor Beams			**Length:**	3.85		
Element Name:	Floor Beams			**Width:**	0.12		
Location:	Single Element			**Height:**	0.26		
Material:	Timber			**Count:**	19		
Element Type:	Primary Element			**Total Quantity:**	73.2		
Environment:	Severe			**Limited Inspection**	☐		
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	m2	0	71	2.2	0	00	00
Comments:	None						
Urgency :	**None** ☑	**6-10 years** ☐	**1-5 years** ☐	**< 1 year** ☐	**Urgent** ☐		
Recommended Work :	**Replacement**	**Estimated Cost: $7,555**					

Overall .

5.7 Element Data (cont.)

5.7.22 Floor Beams - Floor Beam Ends

Element Group:	Floor Beams				**Length:**	3.85	
Element Name:	Floor Beam Ends				**Width:**	0.12	
Location:	Single Element				**Height:**	0.26	
Material:	Steel				**Count:**	2	
Element Type:	Any				**Total Quantity:**	11.2	
Environment:	Moderate				**Limited Inspection**	☑	
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	m2	0	10.86	0.34	0	00	00
Comments:	None						
Urgency :	**None** ☑	**6-10 years** ☐	**1-5 years** ☐	**< 1 year** ☐	**Urgent** ☐		
Recommended Work :	See Primary Element						

West End. Showing generally good condition

5.7 Element Data (cont.)

5.7.23 Floor Beams - Intermediate Floor Beams

Element Group:	Floor Beams				**Length:**	3.85	
Element Name:	Intermediate Floor Beams				**Width:**	0.12	
Location:	Single Element				**Height:**	0.26	
Material:	Steel				**Count:**	17	
Element Type:	Any				**Total Quantity:**	62	
Environment:	Moderate				**Limited Inspection**	☐	
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	m2	0	60.14	1.86	0	00	00
Comments:	None						
Urgency :	**None** ☑	**6-10 years** ☐	**1-5 years** ☐	**< 1 year** ☐	**Urgent** ☐		
Recommended Work :	See Primary Element						

Overall View.

5.7 Element Data (cont.)

5.7.24 Stringers - Stringers

Element Group:	Stringers				**Length:**	24.4	
Element Name:	Stringers				**Width:**	0.05	
Location:	Single Element				**Height:**	0.1	
Material:	Steel				**Count:**	15	
Element Type:	Primary Element				**Total Quantity:**	15	
Environment:	Moderate				**Limited Inspection**	☐	
Protection System:	Galvanized Steel					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	each	0	13.65	1.35	0	00	00
Comments:	Stringers show medium corrosion on the top and bottom flange.						
Urgency :	None ☑	6-10 years ☐	1-5 years ☐	< 1 year ☐	Urgent ☐		
Recommended Work :	Replacement	Estimated Cost: $49,820					

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5.7 Element Data (cont.)

5.7.25 Stringers - Intermediate

Element Group:	Stringers				**Length:**	24.4	
Element Name:	Intermediate				**Width:**	0.05	
Location:	Single Element				**Height:**	0.1	
Material:	Steel				**Count:**	15	
Element Type:	Any				**Total Quantity:**	15	
Environment:	Benign				**Limited Inspection**	☐	
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	each	0	13.35	1.65	0	00	00
Comments:	Stringers show medium corrosion on the top and bottom flange.						
Urgency :	None ☑	6-10 years ☐	1-5 years ☐	< 1 year ☐	Urgent ☐		
Recommended Work :	See Primary Element						

Underside Surface. Showing isolated medium corrosion.

5.7 Element Data (cont.)

5.7.26 Bracing - Bracing

Element Group:	Bracing			**Length:**	5.2		
Element Name:	Bracing			**Width:**	N/A		
Location:	Single Element			**Height:**	N/A		
Material:	Steel			**Count:**	24		
Element Type:	Primary Element			**Total Quantity:**	24		
Environment:	Benign			**Limited Inspection**	☑		
Protection System:	Galvanized Steel					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	each	0	24	0	0	00	00
Comments:	none						
Urgency :	None ☑	6-10 years ☐	1-5 years ☐	< 1 year ☐	Urgent ☐		
Recommended Work :	Replacement	Estimated Cost: $9,225					

Overall View.

5.7 Element Data (cont.)

5.7.27 Bracing - West End Bracing

Element Group:	Bracing				**Length:**	5.2	
Element Name:	West End Bracing				**Width:**	0.05	
Location:	West				**Height:**	0.1	
Material:	Steel				**Count:**	2	
Element Type:	Any				**Total Quantity:**	2	
Environment:	Benign				**Limited Inspection**	☐	
Protection System:	Galvanized Steel					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	each	0	2	0	0	00	00
Comments:	None						
Urgency :	**None** ☑	**6-10 years** ☐	**1-5 years** ☐	**< 1 year** ☐	**Urgent** ☐		
Recommended Work :	See Primary Element						

West End. Showing generally good condition

5.7 Element Data (cont.)

5.7.28 Bracing - East End Bracing

Element Group:	Bracing				**Length:**	5.2	
Element Name:	East End Bracing				**Width:**	0.05	
Location:	East				**Height:**	0.1	
Material:	Steel				**Count:**	2	
Element Type:	Any				**Total Quantity:**	2	
Environment:	Benign				**Limited Inspection**	☐	
Protection System:	Galvanized Steel					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	each	0	2	0	0	00	00
Comments:	none						
Urgency :	None ☑	6-10 years ☐	1-5 years ☐	< 1 year ☐	Urgent ☐		
Recommended Work :	See Primary Element						

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5.7 Element Data (cont.)

5.7.29 Bracing - Intermediate Bracing

Element Group:	Bracing				**Length:**	5.2	
Element Name:	Intermediate Bracing				**Width:**	N/A	
Location:	Single Element				**Height:**	N/A	
Material:	Steel				**Count:**	20	
Element Type:	Any				**Total Quantity:**	20	
Environment:	Benign				**Limited Inspection**	☑	
Protection System:	Galvanized Steel					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	each	0	20	0	0	00	00
Comments:	None						
Urgency :	**None** ☑	**6-10 years** ☐	**1-5 years** ☐	**< 1 year** ☐	**Urgent** ☐		
Recommended Work :	See Primary Element						

Underside Surface. Showing generally good condition

5.7 Element Data (cont.)

5.7.30 West Abutment - Abutment

Element Group:	**West Abutment**			**Length:**		**N/A**	
Element Name:	**Abutment**			**Width:**		**N/A**	
Location:	**Single Element**			**Height:**		**N/A**	
Material:	**Masonry**			**Count:**		**N/A**	
Element Type:	**Primary Element**			**Total Quantity:**		**46**	
Environment:	**Benign**			**Limited Inspection**	☐		
Protection System:	**None**					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	tonnes	**0**	**30.36**	**13.8**	**1.84**	**16**	**17**
Comments:	There is medium to severe mortar loss between the blocks at the waterline, most noticeable on the west abutment and also medium to severe isolated spalling. Bearings show severe corrosion and bearing seats show severe disintegration.						
Urgency :	**None** ☐	**6-10 years** ☐	**1-5 years** ☐	**< 1 year** ☑	**Urgent** ☐		
Recommended Work :	**Replacement**	**Estimated Cost: $157,965**					

.

5.7 Element Data (cont.)

5.7.31 West Abutment - Bearings

Element Group:	West Abutment				**Length:**	N/A	
Element Name:	Bearings				**Width:**	N/A	
Location:	Single Element				**Height:**	N/A	
Material:	Any				**Count:**	2	
Element Type:	Plate				**Total Quantity:**	2	
Environment:	Severe				**Limited Inspection**	☐	
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	each	0	0	1	1	05	17
Comments:	Bearings show severe corrosion.						
Urgency :	None ☐	6-10 years ☐	1-5 years ☑	< 1 year ☐	Urgent ☐		
Recommended Work :	See Primary Element						

Overall View. Showing severe corrosion.

5.7 Element Data (cont.)

5.7.32 West Abutment - Bearing Seats

Element Group:	West Abutment				**Length:**	N/A	
Element Name:	Bearing Seats				**Width:**	N/A	
Location:	Single Element				**Height:**	N/A	
Material:	Cast-In-Place Concrete				**Count:**	N/A	
Element Type:	Ledge				**Total Quantity:**	2	
Environment:	Moderate				**Limited Inspection**	☐	
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	count	0	0	0.58	1.42	03	17
Comments:	Bearing seats are in poor condition which will result in settlement of the structure.						
Urgency :	None ☐	6-10 years ☐	1-5 years ☑	< 1 year ☐	Urgent ☐		
Recommended Work :	See Primary Element						

.

5.7 Element Data (cont.)

5.7.33 West Abutment - Ballast Wall

Element Group:	West Abutment				**Length:**	N/A	
Element Name:	Ballast Wall				**Width:**	5.9	
Location:	Single Element				**Height:**	0.5	
Material:	Timber				**Count:**	1	
Element Type:	Any				**Total Quantity:**	3	
Environment:	Benign				**Limited Inspection**	☐	
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	m2	0	1.5	0.75	0.75	16	17
Comments:	The west side shows severe deterioration.						
Urgency :	**None** ☐	**6-10 years** ☐	**1-5 years** ☐	**< 1 year** ☑	**Urgent** ☐		
Recommended Work :	See Primary Element						

Side. Showing severe deterioration.

5.7 Element Data (cont.)

5.7.34 West Abutment - Abutment Wall

Element Group:	West Abutment				**Length:**	N/A	
Element Name:	Abutment Wall				**Width:**	5.9	
Location:	Single Element				**Height:**	2.2	
Material:	Masonry				**Count:**	1	
Element Type:	Any				**Total Quantity:**	13	
Environment:	Benign				**Limited Inspection**	☐	
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	m2	0	10.14	2.34	0.52	00	17
Comments:	There are some spalled areas at the base and also some loss of mortar.						
Urgency :	**None** ☐	**6-10 years** ☑	**1-5 years** ☐	**< 1 year** ☐	**Urgent** ☐		
Recommended Work :	See Primary Element						

Side.

5.7 Element Data (cont.)

5.7.35 East Abutment - Abutment

Element Group:	East Abutment				**Length:**	N/A	
Element Name:	Abutment				**Width:**	N/A	
Location:	Single Element				**Height:**	N/A	
Material:	Masonry				**Count:**	N/A	
Element Type:	Primary Element				**Total Quantity:**	46	
Environment:	Benign				**Limited Inspection**	☐	
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	tonnes	0	29.44	14.72	1.84	16	17
Comments:	There is medium to severe mortar loss between the blocks at the waterline, and also medium to severe isolated spalling. Bearings show severe corrosion and bearing seats show severe disintegration.						
Urgency :	**None** ☐	**6-10 years** ☐	**1-5 years** ☑	**< 1 year** ☐	**Urgent** ☐		
Recommended Work :	**Replacement**	**Estimated Cost: $157,965**					

East Side.

5.7 Element Data (cont.)

5.7.36 East Abutment - Bearings

Element Group:	East Abutment				**Length:**	N/A	
Element Name:	Bearings				**Width:**	N/A	
Location:	Single Element				**Height:**	N/A	
Material:	Any				**Count:**	2	
Element Type:	Plate				**Total Quantity:**	2	
Environment:	Severe				**Limited Inspection**	☐	
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	each	0	0	1	1	05	17
Comments:	Bearings show severe corrosion.						
Urgency :	None ☐	6-10 years ☐	1-5 years ☑	< 1 year ☐	Urgent ☐		
Recommended Work :	See Primary Element						

East Side. Showing severe corrosion.

5.7 Element Data (cont.)

5.7.37 East Abutment - Bearing Seats

Element Group:	East Abutment				**Length:**	N/A	
Element Name:	Bearing Seats				**Width:**	N/A	
Location:	Single Element				**Height:**	N/A	
Material:	Cast-In-Place Concrete				**Count:**	N/A	
Element Type:	Ledge				**Total Quantity:**	2	
Environment:	Moderate				**Limited Inspection**	☐	
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	count	0	0	0.5	1.5	03	17
Comments:	Bearing seats seem to be made out of a kind of mortar and are in poor condition. This will further produce settlement of the structure.						
Urgency :	None ☐	6-10 years ☐	1-5 years ☑	< 1 year ☐	Urgent ☐		
Recommended Work :	See Primary Element						

East Side. Showing poor condition.

5.7 Element Data (cont.)

5.7.38 East Abutment - Ballast Wall

Element Group:	East Abutment			**Length:**	N/A		
Element Name:	Ballast Wall			**Width:**	5.9		
Location:	Single Element			**Height:**	0.5		
Material:	Timber			**Count:**	1		
Element Type:	Any			**Total Quantity:**	3		
Environment:	Benign			**Limited Inspection**	☐		
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	m2	0	3	0	0	00	00
Comments:	None						
Urgency :	**None** ☐	**6-10 years** ☑	**1-5 years** ☐	**< 1 year** ☐	**Urgent** ☐		
Recommended Work :	See Primary Element						

East Side.

5.7 Element Data (cont.)

5.7.39 East Abutment - Abutment Wall

Element Group:	East Abutment				**Length:**	N/A	
Element Name:	Abutment Wall				**Width:**	5.9	
Location:	Single Element				**Height:**	2.2	
Material:	Masonry				**Count:**	1	
Element Type:	Any				**Total Quantity:**	13	
Environment:	Benign				**Limited Inspection**	☐	
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	m2	0	10.27	2.21	0.52	00	17
Comments:	There are some spalled areas at the base and also some loss of mortar.						
Urgency :	None ☐	6-10 years ☑	1-5 years ☐	< 1 year ☐	Urgent ☐		
Recommended Work :	See Primary Element						

East Side. Showing isolated severe spalling.

5.7 Element Data (cont.)

5.7.40 West Retaining Wall - North ExteriorRetaining Wall

Element Group:	West Retaining Wall				**Length:**	N/A	
Element Name:	North ExteriorRetaining Wall				**Width:**	N/A	
Location:	North Exterior				**Height:**	N/A	
Material:	Mass Concrete				**Count:**	N/A	
Element Type:	Gravity				**Total Quantity:**	18.29	
Environment:	Benign				**Limited Inspection**	☐	
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	tonnes	0	14.63	3.66	0	03	17
Comments:	Continuing settlement expected due to undermining.						
Urgency :	None ☐	6-10 years ☐	1-5 years ☑	< 1 year ☐	Urgent ☐		
Recommended Work :	Ancillary Replacement	Estimated Cost: $9,092					

Northwest Side.

5.7 Element Data (cont.)

5.7.41 West Retaining Wall - Vertical Surface

Element Group:	West Retaining Wall				**Length:**	8	
Element Name:	Vertical Surface				**Width:**	N/A	
Location:	Single Element				**Height:**	1.75	
Material:	Masonry				**Count:**	1	
Element Type:	Any				**Total Quantity:**	14	
Environment:	Benign				**Limited Inspection**	☐	
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	m2	0	0	14	0	16	17
Comments:	None						
Urgency :	**None** ☐	**6-10 years** ☑	**1-5 years** ☐	**< 1 year** ☐	**Urgent** ☐		
Recommended Work :	See Primary Element						

Northwest Side.

5.7 Element Data (cont.)

5.7.42 West Retaining Wall - SouthRetaining Wall

Element Group:	West Retaining Wall				**Length:**	N/A	
Element Name:	SouthRetaining Wall				**Width:**	N/A	
Location:	South				**Height:**	N/A	
Material:	Other				**Count:**	N/A	
Element Type:	Gravity				**Total Quantity:**	26.88	
Environment:	Benign				**Limited Inspection**	☐	
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	tonnes	0	11.29	14.25	1.34	16	17
Comments:	Some loss of w all at top and also loss of mortar.						
Urgency :	None ☐	6-10 years ☐	1-5 years ☑	< 1 year ☐	Urgent ☐		
Recommended Work :	Replacement	Estimated Cost: $42,512					

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5.7 Element Data (cont.)

5.7.43 West Retaining Wall - South Vertical Surface

Element Group:	West Retaining Wall				**Length:**	8	
Element Name:	South Vertical Surface				**Width:**	N/A	
Location:	South				**Height:**	1.75	
Material:	Masonry				**Count:**	1	
Element Type:	Any				**Total Quantity:**	14	
Environment:	Benign				**Limited Inspection**	☐	
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	m2	0	5.88	7.42	0.7	16	17
Comments:	Some loss of wall at top and also loss of mortar.						
Urgency :	**None** ☐	**6-10 years** ☐	**1-5 years** ☑	**< 1 year** ☐	**Urgent** ☐		
Recommended Work :	**See Primary Element**						

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5.7 Element Data (cont.)

5.7.44 West Retaining Wall - NorthRetaining Wall

Element Group:	West Retaining Wall				**Length:**	N/A	
Element Name:	NorthRetaining Wall				**Width:**	N/A	
Location:	North				**Height:**	N/A	
Material:	Masonry				**Count:**	N/A	
Element Type:	Gravity				**Total Quantity:**	26.88	
Environment:	Benign				**Limited Inspection**	☐	
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	tonnes	0	0	26.88	0	16	17
Comments:	None						
Urgency :	**None** ☐	**6-10 years** ☑	**1-5 years** ☐	**< 1 year** ☐	**Urgent** ☐		
Recommended Work :	**Replacement**	**Estimated Cost: $56,683**					

Northwest Side.

5.7 Element Data (cont.)

5.7.45 West Retaining Wall - North Vertical Surface

Element Group:	West Retaining Wall				**Length:**	9.8	
Element Name:	North Vertical Surface				**Width:**	N/A	
Location:	North				**Height:**	1.3	
Material:	Mass Concrete				**Count:**	1	
Element Type:	Any				**Total Quantity:**	12.7	
Environment:	Benign				**Limited Inspection**	☐	
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	m2	0	10.16	2.54	0	03	17
Comments:	Continuing settlement expected due to undermining.						
Urgency :	**None** ☐	**6-10 years** ☐	**1-5 years** ☑	**< 1 year** ☐	**Urgent** ☐		
Recommended Work :	**See Primary Element**						

Northwest Side.

5.7 Element Data (cont.)

5.7.46 East Retaining Wall - SouthRetaining Wall

Element Group:	East Retaining Wall				**Length:**	N/A	
Element Name:	SouthRetaining Wall				**Width:**	N/A	
Location:	South				**Height:**	N/A	
Material:	Masonry				**Count:**	N/A	
Element Type:	Gravity				**Total Quantity:**	33.41	
Environment:	Benign				**Limited Inspection**	☐	
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	tonnes	0	18.38	9.69	5.35	16	17
Comments:	There is severe loss of mortar how ever this does not appear to affect performance significantly.						
Urgency :	None ☐	6-10 years ☐	1-5 years ☑	< 1 year ☐	Urgent ☐		
Recommended Work :	Replacement	Estimated Cost: $70,453					

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5.7 Element Data (cont.)

5.7.47 East Retaining Wall - South Vertical Surface

Element Group:	East Retaining Wall			**Length:**		8.7	
Element Name:	South Vertical Surface			**Width:**		N/A	
Location:	South			**Height:**		2	
Material:	Masonry			**Count:**		1	
Element Type:	Any			**Total Quantity:**		17.4	
Environment:	Benign			**Limited Inspection**	☐		
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	m2	0	9.57	5.05	2.78	16	17
Comments:	There is severe loss of mortar how ever this does not appear to affect performance significantly.						
Urgency :	**None** ☐	**6-10 years** ☐	**1-5 years** ☑	**< 1 year** ☐	**Urgent** ☐		
Recommended Work :	See Primary Element						

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5.7 Element Data (cont.)

5.7.48 East Retaining Wall - NorthRetaining Wall

Element Group:	East Retaining Wall			**Length:**	N/A		
Element Name:	NorthRetaining Wall			**Width:**	N/A		
Location:	North			**Height:**	N/A		
Material:	Masonry			**Count:**	N/A		
Element Type:	Gravity			**Total Quantity:**	36.72		
Environment:	Benign			**Limited Inspection**	☐		
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	tonnes	0	23.87	11.02	1.84	00	17
Comments:	There is loss of mortar at the base of the retaining wall.						
Urgency :	None ☐	6-10 years ☑	1-5 years ☐	< 1 year ☐	Urgent ☐		
Recommended Work :	Replacement	Estimated Cost: $77,434					

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5.7 Element Data (cont.)

5.7.49 East Retaining Wall - North Vertical Surface

Element Group:	East Retaining Wall				**Length:**	11.6	
Element Name:	North Vertical Surface				**Width:**	N/A	
Location:	North				**Height:**	2.2	
Material:	Masonry				**Count:**	1	
Element Type:	Any				**Total Quantity:**	25.5	
Environment:	Benign				**Limited Inspection**	☐	
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	m2	0	14.54	9.69	1.27	03	17
Comments:	There is loss of mortar at the base of the retaining wall.						
Urgency :	**None** ☐	**6-10 years** ☑	**1-5 years** ☐	**< 1 year** ☐	**Urgent** ☐		
Recommended Work :	See Primary Element						

Side. Showing deterioration.

5.7 Element Data (cont.)

5.7.50 West Embankment - Embankment

Element Group:	West Embankment			**Length:**	N/A		
Element Name:	Embankment			**Width:**	N/A		
Location:	Single Element			**Height:**	N/A		
Material:	Soil			**Count:**	1		
Element Type:	Primary Element			**Total Quantity:**	1		
Environment:	Severe			**Limited Inspection**	☐		
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	all	0	1	0	0	00	00
Comments:	None						
Urgency :	**None** ☐	**6-10 years** ☑	**1-5 years** ☐	**< 1 year** ☐	**Urgent** ☐		
Recommended Work :	**Ancillary Replacement**	**Estimated Cost: $6,025**					

Overall View.

5.7 Element Data (cont.)

5.7.51 West Embankment - Slope Protection

Element Group:	West Embankment				**Length:**	N/A		
Element Name:	Slope Protection				**Width:**	N/A		
Location:	Single Element				**Height:**	N/A		
Material:	Foliation				**Count:**	1		
Element Type:	Any				**Total Quantity:**	1		
Environment:	Severe				**Limited Inspection**	☐		
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**	
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**			
	all	0	1	0	0	00	00	
Comments:	None							
Urgency :	**None** ☐	**6-10 years** ☑	**1-5 years** ☐	**< 1 year** ☐	**Urgent** ☐			
Recommended Work :	See Primary Element							

Southwest Side.

5.7 Element Data (cont.)

5.7.52 East Embankment - Embankment

Element Group:	East Embankment				**Length:**	N/A	
Element Name:	Embankment				**Width:**	N/A	
Location:	Single Element				**Height:**	N/A	
Material:	Soil				**Count:**	1	
Element Type:	Primary Element				**Total Quantity:**	1	
Environment:	Severe				**Limited Inspection**	☐	
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	all	0	1	0	0	00	00
Comments:	None						
Urgency :	**None** ☐	**6-10 years** ☑	**1-5 years** ☐	**< 1 year** ☐	**Urgent** ☐		
Recommended Work :	**Ancillary Replacement**	**Estimated Cost: $6,025**					

East Side.

5.7 Element Data (cont.)

5.7.53 East Embankment - Slope Protection

Element Group:	East Embankment			**Length:**	N/A		
Element Name:	Slope Protection			**Width:**	N/A		
Location:	Single Element			**Height:**	N/A		
Material:	Foliation			**Count:**	1		
Element Type:	Any			**Total Quantity:**	1		
Environment:	Severe			**Limited Inspection**	☐		
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	all	0	1	0	0	00	00
Comments:	None						
Urgency :	**None** ☐	**6-10 years** ☑	**1-5 years** ☐	**< 1 year** ☐	**Urgent** ☐		
Recommended Work :	See Primary Element						

East Side.

5.7 Element Data (cont.)

5.7.54 Foundation - Foundation

Element Group:	Foundation				**Length:**	N/A	
Element Name:	Foundation				**Width:**	N/A	
Location:	Single Element				**Height:**	N/A	
Material:	Compacted Fill				**Count:**	1	
Element Type:	Primary Element				**Total Quantity:**	1	
Environment:	Benign				**Limited Inspection**	☑	
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	each	0	1	0	0	00	00
Comments: None							
Urgency : None ☑	6-10 years ☐	1-5 years ☐	< 1 year ☐	Urgent ☐			
Recommended Work : Reinstallation	Estimated Cost: $89,284						

South View.

5.7 Element Data (cont.)

5.7.55 Foundation - NorthFoundation

Element Group:	Foundation				**Length:**	N/A	
Element Name:	NorthFoundation				**Width:**	N/A	
Location:	North				**Height:**	N/A	
Material:	Compacted Fill				**Count:**	1	
Element Type:	Primary Element				**Total Quantity:**	1	
Environment:	Benign				**Limited Inspection**	☑	
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	each	0	0.77	0.03	0.2	16	13
Comments:	Undermining of the north west concrete retaining wall may further affect the stability of the retaining wall.						
Urgency :	**None** ☐	**6-10 years** ☐	**1-5 years** ☐	**< 1 year** ☑	**Urgent** ☐		
Recommended Work :	**Reinstallation**	**Estimated Cost: $15,797**					

Northwest Side.

5.7 Element Data (cont.)

5.7.56 Watercourse - Watercourse

Element Group:	Watercourse			**Length:**	N/A		
Element Name:	Watercourse			**Width:**	N/A		
Location:	Single Element			**Height:**	N/A		
Material:	Any			**Count:**	1		
Element Type:	Straight			**Total Quantity:**	1		
Environment:	Benign			**Limited Inspection**	☐		
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	all	0	1	0	0	00	00
Comments:	None						
Urgency :	**None** ☑	**6-10 years** ☐	**1-5 years** ☐	**< 1 year** ☐	**Urgent** ☐		
Recommended Work :	Defer to Element Level						

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5.7 Element Data (cont.)

5.7.57 Watercourse - Bottom

Element Group:	Watercourse			**Length:**	N/A		
Element Name:	Bottom			**Width:**	N/A		
Location:	Single Element			**Height:**	N/A		
Material:	Soil			**Count:**	N/A		
Element Type:	Natural			**Total Quantity:**	120.54		
Environment:	Benign			**Limited Inspection**	☐		
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	m2	0	120.54	0	0	00	00
Comments:	None						
Urgency :	**None** ☑	**6-10 years** ☐	**1-5 years** ☐	**< 1 year** ☐	**Urgent** ☐		
Recommended Work :	None						

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5.7 Element Data (cont.)

5.7.58 Watercourse - Upstream Section

Element Group:	Watercourse			**Length:**	N/A		
Element Name:	Upstream Section			**Width:**	N/A		
Location:	Single Element			**Height:**	N/A		
Material:	Soil			**Count:**	N/A		
Element Type:	Uncontrolled			**Total Quantity:**	60.27		
Environment:	Benign			**Limited Inspection**	☐		
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	m2	0	60.27	0	0	00	00
Comments:	None						
Urgency :	**None** ☑	**6-10 years** ☐	**1-5 years** ☐	**< 1 year** ☐	**Urgent** ☐		
Recommended Work :	None						

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5.7 Element Data (cont.)

5.7.59 Watercourse - Downstream Section

Element Group:	Watercourse			**Length:**	N/A		
Element Name:	Downstream Section			**Width:**	N/A		
Location:	Single Element			**Height:**	N/A		
Material:	Soil			**Count:**	N/A		
Element Type:	Uncontrolled			**Total Quantity:**	60.27		
Environment:	Benign			**Limited Inspection**	☐		
Protection System:	None					**Performance Deficiencies**	**Maintenance Needs**
Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**		
	m2	0	60.27	0	0	00	00
Comments:	None						
Urgency :	**None** ☑	**6-10 years** ☐	**1-5 years** ☐	**< 1 year** ☐	**Urgent** ☐		
Recommended Work :	None						

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6. Glossary

Abutment

A substructure unit which supports the end of the structure and retains the approach fill.

Asset

A collection of Components that are most economically and/or practically replaced, rehabilitated or maintained together under a single contract or initiative. The timing of such an initiative is weighed against the timing of treating other Assets.

Asset Value Contribution

The portion of the total replacement value attributable to a particular component.

Auxiliary Components

Any component which does not share in the load carrying capacity of the structure.

Benign

Not exposed. e.g. girders, pier caps (unless joints are leaking)

Bridge

A structure which provides a roadway or walkway for the passage of vehicles across an obstruction, gap or facility and which is greater than 3 m in span.

Chord

The upper and lower main longitudinal component in trusses or arches extending the full length of the structure.

Coating

The generic term for paint, lacquer, enamel, sealers, galvanizing, metallizing, etc.

Component

A major feature of an Asset that performs a particular function. Often in multiple occurrences.

Condition Index

See Net Asset Salvage Value (NASV).

Critical Quantity

The single quantity that defines the Element for costing purposes.

Culvert

Any bridge that is embedded in fill and is used to convey water, pedestrians or animals through it.

Deck Condition Survey

A detailed inspection of a concrete deck in accordance with The Structure Rehabilitation Manual.

Defect

An identifiable, unwanted condition that was not part of the original intent of design.

Detailed Visual Inspection

An element by element visual assessment of material defects, performance deficiencies and maintenance needs of a structure.

Deterioration

A defect that has occurred over a period of time.

Diagonals

Component which spans between the top and bottom chord of a truss or arch in a diagonal direction.

Distress

A defect produced by loading.

Element

A feature of a Component distinguished in terms of condition, material, base of measurement or unit cost of repair.

Engineer

A member or licensee of the Professional Engineers of Ontario.

Environment

An element's exposure to chloride contamination and freeze-thaw cycling

Estimated Remaining Service Life

The Remaining Service Life (RSL) is an estimate, in years, over which an element may remain in service without repair or replacement. It is assumed that the conditions to which the element has been exposed will not change significantly and is based solely on visual observation.

Estimated Remaining Service Life (ERSL)

This is an estimate, in years, as to how long an element can be expected to continue to perform satisfactorily without the predominant deficiency being addressed. In the case of a Primary Element, it is the time remaining before the element must be addressed ata Primary Element Level if nothing is done. It is based on judgment and experience and is tempered by the need to control liability of our clients. In cases where no physical testing results are available, ERSL's will tend to be more conservative. The ESRL assigned to a compoment represents the minimum ERSL assigned to any element comprising that component.

Evaluation

The determination of the load carrying capacity of structures in accordance with the requirements of the Ontario Highway Bridge Design Code or the Canadian Highway Bridge Design Code, when implemented.

Floor Beam

Transverse beams that span between trusses, arches or girders and transmit loads from the deck and stringers to the trusses, arches or girders.

Focus

At the element level, focus refers to the portion of the element in question. In most cases the focus is simply stated as "All" or, in other words, the entire element is being reported on under one designation. As elements deteriorate over time it is often desirable to differentiate between areas that are deteriorating more rapidly or differently. In other cases, elements are comprised of different materials and would be repaired differently as a result. These too should be separated and referred to by their focus. The focus of a primary element is always set to "All".

Highway

A common and public thoroughfare including street, avenue, parkway, driveway, square, place, bridge, designed and intended for, or used by, the general public for passage of vehicles, pedestrians or animals.

Lateral Bracing

Bracing which lies in the plane of the top or bottom chords or flanges and provides lateral stability and resistance to wind loads.

Maintenance

Any action which is aimed at preventing the development of defects or preventing deterioration of a structure or its components.

Masonry

Structure made up of natural stones separated by mortar joints, usually in uniform courses. Masonry in existing structures is usually in retaining walls, abutments, piers or arches.

Masonry Ashlar

Stone worked to a square shape or cut square with uniform coursing height and vertical joints staggered. The stone has a minimum course height of 200 mm set in joints with an average thickness of 10 mm or less.

Masonry Rubble

Stone masonry constructed with rough field stones or only roughly squared stones set in mortar joints with average thickness greater than 20 mm. Also any squared stone masonry in which the joints are greater than 20 mm, but less than 30 mm in thickness.

Masonry Squared Stone

Stone in natural bed thicknesses or roughly squared stones with course height less than 200 mm and joints greater than 10mm but not over 20mm.

Moderate

Exposed but element protected e.g. asphalt covered and waterproofed deck

Net Asset Salvage Value (NASV)

The current NASV of an asset is equal to its original dollar value minus the estimated cost of rehabilitating the asset back to its original condition. NASV changes continually with time, diminishing in step with the continued deterioration of the asset. It is important to recognize that whether a component such as a bridge deck is replaced or fully repaired it will still be reset to its full Asset Value Contribution. Recognition of the difference in longevity of the two startegies will be revealed by the subesquent behaviour of the post-rehabilitation performance curve. Expressed as a percentage it forms the rationale for the overall Condition Index of the asset.

Owner

An agency having jurisdiction and control over the bridge.

Performance Curve

A plot of Condition Index over time. The vertical scale represents Condition Index from 0 to 100, the horizontal scale represents time in years. The plot will reflect the Condition Index of the Asset since original construction to the present and from the present to the end of the analysis period. The impact of rehabilitative work (already carried out since construction as well as that planned for the future) will be reflected in the curve as will the anticipated subsequent performance of that Rehabilitation.

Person

An individual, board, commission, partnership or corporation, including a municipal corporation, and employees, agents, successors and assigns of any of them.

Plans

All drawings, descriptions and specifications, being parts of the contract, and all drawings and descriptions produced by the constructor for the erection of a bridge or structure, and all revisions thereto.

Portal Bracing

Overhead bracing at the ends of a through truss or arch and provides lateral stability and shear transfer between trusses.

Primary Components

The main load carrying components of the structure.

Primary Element

The elemental equivalent of the component it comprises. For example, an Abutment consists of the elements, Wngwalls, Abutment Wall, Ballast Wall, Bearings. It also has an element called "Abutment". This element is needed so that costing (which is carried out at the element level) can account for replacement of the entire component. This element is referred to as the Primary Element.

Rehabilitation

Any modification, alteration, retrofitting or improvement to a structure sub-system or to the structure which is aimed at correcting existing defects or deficiencies. May involve repair of exisiting elements or complete replacement.

Repair

Any modification, alteration, retrofitting or improvement to a component of the structure which is aimed at correcting existing defects or deficiencies.

Replacement Cost

Replacement Cost is the expenditure required to build, on a new site, or replace at an existing site, a bridge that meets all present and projected requirements of the site, community and current codes.

Replacement Value

Traditionally, Replacement Value refers to the cost in today's dollars for the identical replacement of an existing bridge. In other words, it is the value of the existing installation.

Retaining Wall

Any structure that holds back fill and is not connected to a bridge.

Secondary Components

Any component which helps to distribute loads to primary components, or carries wind loads, or stabilizes primary components.

Severe

Exposed and element not protected e.g. Exposed concrete deck, Barrier Wall

Sign Support

A metal, concrete or timber structure, including supporting brackets, service walks and mechanical devices where present, which support a luminaire, sign or traffic signal and which span or extend over a highway.

Span

The horizontal distance between adjacent supports of the superstructure of a bridge, or the longest horizontal dimension of the cross-section of a culvert or tunnel taken perpendicular to the walls.

Stringers

Stringers span between floor beams and provide the support for the deck above.

Structure

Bridge, culvert, tunnel, retaining wall or sign support.

Suspected Performance Deficiency

A Suspected Performance Deficiency should be recorded during an inspection, if an element's ability to perform its intended function is in question, and one or more performance defects exist.

Sway Bracing

Vertical bracing spanning between through trusses or arches, or outside of half-through trusses or arches and providing lateral stability and shear transfer between the trusses or arches.

Tunnel

Any bridge that is constructed through existing ground, and is used to convey highway or railway traffic through it.

Utility

Refers to a local utility such as hydro, gas, telephone etc. not part of the structure itself but rather utilizing it to provide passage. Typically carried between girders or hanging from the underside of the deck. Of significance only because the integrity of its connection to the structure impacts public safety.

Verticals

Components which span between the top and bottom chords of a truss or arch in the vertical direction.

Whisker Graphs

Simple frequency distribution charts that are intended, at a glance, to convey a comparative reference. They are shown on the Structure Summary to give the reader an immediatesense of how the bridge compares to the rest of the network based on various criteria.