

Photo 7 Collision damage noted on steel beam at north barrier



Photo 8 Moderate corrosion noted along bottom of barrel



Photo 9 Typical view of interior barrel looking south



Photo 10 Accumulation of branches noted at south end of culvert.

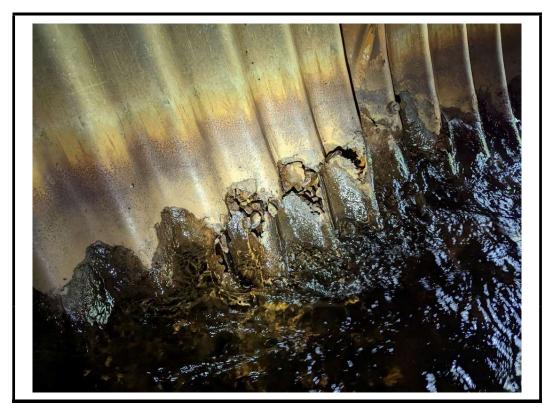


Photo 11 Localized perforation at bottom of barrel, near north end of barrel

# **Structure Condition Summary Form**

Structure Name Boundry Road Culvert

**Structure Number** 05

Date of InspectionJune 03, 2022Project No.22035

Consultant HP Engineering Inc.

Element Group	Element Name	Unit (Qty.)	Unit Price (MTO)	Total Element Quantity	Element Qty. in Excellent Condition (1.00)	Good	Element Quantity in Fair Condition (0.4)	Element Quantity in Poor Condition (0)	Total Replacement Value (TRV)	Current Element Value (CEV)	Element Condition Index	Performance Deficiency	Maintenance Need
Approaches	Wearing Surface	Sq.m	6.00	372.00	0.00	372.00	0.00	0.00	2232	1674	75	00	00
Culvert	Barrel	Sq.m	350.00	112.16	0.00	92.16	20.00	0.00	39256	26992	69	00	00
									41488	28666			

Bridge Condition Index (BCI)	69	
_		
l <sub>t</sub>	0	Importance Factor for Traffic
I <sub>c</sub>	0	Importance Factor for Economic Impacts
I <sub>w</sub>	0	Importance Factor for Bridge Width
I <sub>p</sub>	0	Importance Factor for Bridge Profile or Alignment
Bridge Sufficiency Index (BSI)	69	

:								
Boundary Road Culvert								
		Crossing	Navigable Wat	ter 🗆	Non- Navigal	ole Water		
O1	n ■ Under □	Type:	Rail 🗆	Road	Ped □	Other $\square$		
Boundary Road								
1.3 km west of boundary	road (3.5 km south	h of grand desert rd	l)					
46° 11' 36	.6" N	Longitude		79° 1' 46.9" W				
Township of Bonfield		_ Heritage	Not Cons.	Cons./Not A	.pp. 🗆 List/l	Not Desig.		
		Designation	Desig./not List	: 🗆	Desig. & List	: 🗆		
Northeastern		Road Class:	Freeway $\square$	Arterial	Collector	Local		
Sudbury		_ Posted Speed	50 km/h	No. of I	anes	1		
Nipissing		AADT		% Truck	κs			
Bonfield		_ Special Routes	Transit 🗆	Truck $\square$	School	Bicycle		
Circular CSP		Datour Longth Around						
		Structure Structure				_(km)		
1.5	(m)	Fill on Structur	Fill on Structure		).6	_(m)		
11.9	(m)	Skew Angle	Skew Angle		0	_(Degrees)		
17.85	(m <sup>2</sup> )	Direction of Str	Direction of Structure		-W	_		
6.2	(m)	No. of Spans			2	_(m)		
1.5, 1.5	(m)							
	) (est)	Last Bi	ennial Inspection	1	Au	gust 7, 2020		
		Last Ev	aluation					
			•	tion				
e	(n	n) Last Co	ondition Survey					
y: (Date / Description)								
	Boundary Road Culvert  On Boundary Road  1.3 km west of boundary  46° 11' 36.  Township of Bonfield  Northeastern Sudbury Nipissing Bonfield Circular CSP  1.5  11.9  17.85  6.2  1.5, 1.5	Boundary Road Culvert  On Under Description of Boundary Road  1.3 km west of boundary road (3.5 km south 46° 11' 36.6" N  Township of Bonfield  Northeastern Sudbury Nipissing Bonfield Circular CSP  1.5 (m) 11.9 (m) 17.85 (m²) 6.2 (m) 1.5, 1.5 (m)	Boundary Road Culvert  On Under Crossing Type:  Boundary Road  1.3 km west of boundary road (3.5 km south of grand desert road to 1.7 and to 1.5 km south of grand desert road to 1.5 km south of grand desered road to 1.5 km south of grand desert road to 1.5 km south of g	Boundary Road Culvert  On Under Crossing Type:  Boundary Road  1.3 km west of boundary road (3.5 km south of grand desert rd)  46° 11' 36.6" N Longitude  Township of Bonfield Heritage Designation  Northeastern Road Class: Freeway Designation  Sudbury Posted Speed 50 km/h  Nipissing AADT  Bonfield Special Routes Transit Crossing Transit Crossing Northeastern  1.5 (m) Fill on Structure  1.5 (m) Fill on Structure  1.7.85 (m²) Direction of Structure  6.2 (m) No. of Spans  1.5, 1.5 (m)  1980 (est) Last Biennial Inspection Last Underwater Inspected Last Underwater	Boundary Road Culvert  On Under Crossing Type:  Rail Road  Boundary Road  1.3 km west of boundary road (3.5 km south of grand desert rd)  46° 11' 36 6" N  Longitude  Township of Bonfield  Heritage Designation  Northeastern  Road Class: Freeway Arterial Desig./not List Condition  Northeastern  Sudbury  Posted Speed  50 km/h  No. of I  No. of I  Special Routes  Transit Transit Truck Condition  Circular CSP  Detour Length Around  Structure  1.5 (m)  Fill on Structure  1.5 (m)  Skew Angle  17.85 (m²)  Direction of Structure  6.2 (m)  No. of Spans  1.5, 1.5 (m)  Last Biennial Inspection  Last Evaluation  Last Underwater Inspection  Last Underwater Inspection	Boundary Road Culvert    Crossing Type: Rail   Road   Road   Ped		

**CULVERT** Site No.: 05

FIELD INSPECTION II	FIELD INSPECTION INFORMATION					
Date of Inspection:	June 03, 2022					
Inspector:	Tashi Dwivedi, P.Eng., HP Engineering					
Others in Party:	Nicholas Brown, HP Engineering					
Equipment Used:	Digital camera, measuring tape, hammer					
Weather:	Sunny					
Temperature:	21 ℃					

ADDITIONAL INVESTIGATION DECLIDED		Priority				
ADDITIONAL INVESTIGATION REQUIRED	None	Normal	Urgent	Cost		
Detailed Deck Condition Survey:	X			\$		
Bridge Rehabilitation / Replacement Study:		X		\$ 5,000.00		
Detailed Coating Condition Survey:	X			\$		
Underwater Investigation:	X			\$		
Fatigue Investigation:	X			\$		
Seismic Investigation:	X			\$		
Structural Evaluation:	X			\$		
Load Posting - Estimated Load			Total Cost	\$ 5,000.00		

#### Special Notes:

 $Rehabilitation/replacement\ study\ is\ for\ traffic\ barrier\ only.$ 

No barrier was present at the time of inspection; a code compliant barrier with end treatments should be installed.

Beaver dam observed at inlets of east barrel and local moderate corrosion noted below waterline. Vegetation at upstream and some rocks at outlet causing minor flow obstruction.

Next Detailed Inspection:	June 2024

00	None	06	Bearing not uniformly loaded/unstable	12	Slippery surfaces
01	Load carrying capacity	07	Jammed expansion joint	13	Flooding/channel blockage
02	Excessive deformations (deflections & rotation)	08	Pedestrian/vehicular hazard	14	Undermining of foundation
03	Continuing settlement	09	Rough riding surface	15	Unstable embankments
04	Continuing movements	10	Surface ponding	16	Other
05	Seized bearings	11	Deck drainage		

#### Maintenance Needs

01	Lift and swing bridge maintenance	07	Repair of structural steel	13	Erosion control at bridges
02	Bridge cleaning	08	Repair of bridge concrete	14	Concrete sealing
03	Bridge handrail maintenance	09	Repair of bridge timber	15	Rout and seal
04	Painting steel bridge structures	10	Bailey bridges maintenance	16	Bridge deck drainage
05	Bridge deck joint repair	11	Animal/pest control	17	Other
06	Bridge bearing maintenance	12	Bridge surface repair		

ELEMENT DATA									
Element Group:	Approaches			Length	1:	-			
Element Name:	Barrier			Width:		-			
Location:	NE, NW, SE, & SV	V of Structure		Height:					
Material:	None			Count:		-			
Element Type:	None		Total Q	Quantity:	-				
Environment:	Severe			Not Ins	spected:				
Protection System	None						Performance	Maintenance	
Units	Excellent	Excellent Good Fair			Poor		Deficiencies	Needs	
m <sup>2</sup>	-	-	-		<u>-</u>		-	-	
Comments: No l	barrier was present at	the time of inspection; a	code compliant	barrier sh	ould be installed.				
None □		1 − 5 years		< 1 y	year <b>T</b>		Urgent □		
-									
Element Group:	Approaches			Length		30 m			
Element Name:	Wearing Surface			Width:		6.2 m			
Location:	East & West of Str	ucture		Height:		0.2 11			
Material:	Gravel	- Court		Count: 2					
Element Type:	Wearing Surface				Quantity:	372 r			
Environment:	Severe				spected:	3721			
Protection System	None			110t Inspected.					
Units	Excellent	Good	Fair	Poor			Performance Deficiencies	Maintenance Needs	
m <sup>2</sup>	Extenent _	372	ran	Poor			-	_	
	erally in good condit	ion with some loose grave		-					
	cially in good condi-		er noted.						
None		1 − 5 years		< 1 y	year 🗌		Urgent		
Element Group:	Culvert			Length	ı <b>:</b>	11.9 m			
Element Name:	Barrel			Width:		1.5 m	n .		
Location:	Below Roadway			Height:	:	1.5 m	n		
Material:	Corrugated Steel			Count:		2			
Element Type:	Corrugated Steel Pr	ipe		Total C	Quantity:	112.1	16 m <sup>2</sup>		
Environment:	Benign			Not Ins	spected:				
Protection System	Hot-Dip Galvanize	d					Performance	Maintenance	
Units	Excellent	Good	Fair		Poor		Deficiencies	Needs	
m <sup>2</sup>	-	92.16	20		-		-	-	
	nt corrosion at and be	low water line. Light rus	st stains on a few	joints. Be	eaver dam observe	d at inl	lets of east barrel and le	ocal moderate	
None	osion noted below wa	1 − 5 years   □		< 1 y	year 🔲		Urgent		

Element Group:	Foundations				:	-				
Element Name:	Foundations (below	v ground level)		Width:		-				
Location:	Below Structure			Height	:	-				
Material:	Unknown			Count: -						
Element Type:	Unknown				Quantity:	-	-			
Environment:	Benign			Not Ins	spected:					
Protection System	Unknown						Performance	Maintenance		
Units	Excellent Good Fair				Poor		Deficiencies	Needs		
N/A	-	-	-		-		-	-		
Comments: No	evidence of instability	7.								
None <b>•</b>		1 − 5 years		< 1	year 🔲		Urgent			
Element Group:	Embankment and S	Streams		Length	:	-				
Element Name:	Embankments			Width:		-				
Location:	NE, NW, SE, & SV	V of Structure		Height	1	-	-			
Material:	Native			Count: 4			4			
Element Type:	Embankment			Total Quantity: 4						
	Benign									
Environment:	Benign			Not Ins	spected:					
Environment:  Protection System	Benign None			Not Ins	spected:		Performance	Maintenance		
		Good	Fair	Not Ins	spected:		Performance Deficiencies	Maintenance Needs		
Protection System	None	Good 4	Fair	Not Ins						
Protection System Units Each	None  Excellent		-		Poor -		Deficiencies -	Needs		
Protection System Units Each	None  Excellent	4 etated and stable. Small	-		Poor - nents and between		Deficiencies -	Needs		
Protection System Units Each Comments: Mod	None  Excellent	4	-	embankm	Poor - nents and between		Deficiencies - p barrels.	Needs		
Protection System Units Each Comments: Mod	None  Excellent	4 etated and stable. Small: 1 – 5 years	-	embankm	Poor - tents and between		Deficiencies - p barrels.	Needs		
Protection System  Units  Each  Comments: Moon	None  Excellent  - derate slope, well veg	4 etated and stable. Small 1 − 5 years □	-	embankm	Poor - nents and between year  ::	the two	Deficiencies - p barrels.	Needs		
Protection System  Units  Each  Comments: Mone  None	None  Excellent  - derate slope, well veg	4 etated and stable. Small 1 − 5 years □	-	embankm < 1 y	Poor - nents and between year  ::	the two	Deficiencies - p barrels.	Needs		
Protection System  Units  Each  Comments: Model  None  Element Group:  Element Name:	None  Excellent  - derate slope, well veg  Embankment and S  Streams and Water	4 etated and stable. Small 1 − 5 years □	-	embankm < 1 y	Poor - nents and between year  - ::	the two	Deficiencies - p barrels.	Needs		
Protection System  Units  Each  Comments: Mone  None  Element Group:  Element Name:  Location:	None  Excellent  - derate slope, well veg  Embankment and S  Streams and Water  Under Structure	4 etated and stable. Small 1 − 5 years □	-	embankm <1 y  Length Width: Height Count:	Poor - nents and between year  - ::	the two	Deficiencies - p barrels.	Needs		
Protection System  Units  Each  Comments: Model  None  Element Group:  Element Name:  Location:  Material:	None  Excellent  - derate slope, well veg  Embankment and S  Streams and Water  Under Structure  Native	4 etated and stable. Small 1 − 5 years □	-	Length Width: Height Count:	Poor - nents and between year  :		Deficiencies - p barrels.	Needs		
Protection System  Units  Each  Comments: Model  None  Element Group:  Element Name:  Location:  Material:  Element Type:	Embankment and S Streams and Water Under Structure Native Stream	4 etated and stable. Small 1 − 5 years □	-	Length Width: Height Count:	Poor - nents and between year  :: ::	the two	Deficiencies  - Deficiencies  - Deficiencies	Needs -		
Protection System  Units  Each  Comments: Mone  None  Element Group:  Element Name:  Location:  Material:  Element Type:  Environment:	Embankment and S Streams and Water Under Structure Native Stream Benign	4 etated and stable. Small 1 − 5 years □	-	Length Width: Height Count:	Poor - nents and between year  :: ::	the two	Deficiencies - p barrels.	Needs		
Protection System  Units  Each  Comments: Mone  None  Element Group:  Element Name:  Location:  Material:  Element Type:  Environment:  Protection System	Excellent  - derate slope, well veg  Embankment and S  Streams and Water  Under Structure  Native  Stream  Benign  None	4 etated and stable. Small:  1 – 5 years   Streams  ways	- rocks present at	Length Width: Height Count:	Poor - nents and between year  : : : : : : : : : : : spected:	the two	Deficiencies  - barrels.  Urgent   Performance	Needs - Maintenance		
Protection System  Units  Each  Comments: Mone  None  Element Group:  Element Name:  Location:  Material:  Element Type:  Environment:  Protection System  Units  All  Comments: Mone	Excellent  - derate slope, well veg  Embankment and S  Streams and Water  Under Structure  Native  Stream  Benign  None  Excellent  - derate to high volume	4 etated and stable. Small:  1 – 5 years   Greams  ways  Good	Fair - to north. Veget	Length Width: Height Count: Total (	Poor - nents and between year  : : : : : : : : : : : : : Poor -	the two	Performance Deficiencies	Needs  -  Maintenance Needs -		

REPAIR AND REHABILIT	ATION REQUIRED	Priority				stimated		
Element	Repair and Rehabilitation Required	d Rehabilitation Required 6-10 Years 1-5 Years <1 year				Cost		
Barrier	Install code compliant barrier			X	\$	57,000.00		
				Total Cost	s	57,000.00		

ASSOCIATED WORK	Comments	Estimated Cost
Approaches		
Detours		
Traffic Control		
Utilities		
Right of Way		
Environmental Study		
Other		
Contingencies		
	Total Cost	\$

JUSTIFICATION	



Photo 1 Structure from east approach



Photo 2 Structure from west approach



Photo 3 East approach from centre of structure



Photo 4 West approach from centre of structure

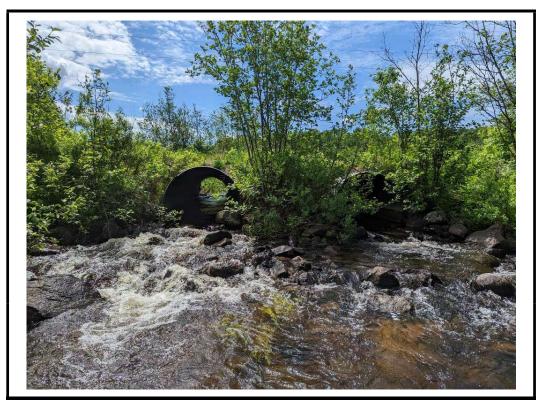


Photo 5 North elevation



Photo 6 South elevation



Photo 7 Typical view of east interior barrel looking south



Photo 8 Light to moderate corrosion noted below waterline



Photo 9 Beaver dam observed at south end of east barrel



Photo 10 Localized moderate corrosion noted above waterline.

# **Structure Condition Summary Form**

Structure Name Boxwell Road Culvert

Structure Number 06

**Date of Inspection** June 03, 2022

Project No. 22035

**Consultant** HP Engineering Inc.

Element Group	Element Name	Unit (Qty.)	Unit Price (MTO)	Total Element Quantity	Element Qty. in Excellent Condition (1.00)	Good	Element Quantity in Fair Condition (0.4)	Element Quantity in Poor Condition (0)	Total Replacement Value (TRV)	Current Element Value (CEV)	Element Condition Index	Performance Deficiency	Maintenance Need
Approaches	Wearing Surface	Sq.m	6.00	420.00	0.00	420.00	0.00	0.00	2520	1890	75	00	00
Culvert	Barrel	Sq.m	350.00	129.84	0.00	0.00	64.92	64.92	45444	9089	20	01	00
Culvert	Inlet Components	Sq.m	350.00	4.00	0.00	2.50	1.00	0.50	1400	796	57	00	08
												-	
									49364	11775			

Bridge Condition Index (BCI)	24	
I <sub>t</sub>	0	Importance Factor for Traffic
$I_c$	0	Importance Factor for Economic Impacts
I <sub>w</sub>	0	Importance Factor for Bridge Width
Ip	0	Importance Factor for Bridge Profile or Alignment
Bridge Sufficiency Index (BSI)	24	

INVENTORY DATA:						
Structure Name	Boxwell Road Culvert					
		Crossing	Navigable Wa	ter 🗆	Non- Naviga	ble Water
Main Hwy/Road #	On Under	□ Type:	Rail 🗆	Road	Ped □	Other $\square$
Road Name:	Boxwell Road					
Structure Location	500 m west of farmers line, Lot 29, Con	n 4 Bonfield Ontario o	over Sparks Creek			
Latitude	46° 13' 52.0" N	Longitude		79° 2	' 11.3" W	
Owner(s)	Township of Bonfield		Not Cons.	Cons./Not A	pp. 🗆 List/	Not Desig.
		Designation	Desig./not List	t 🗆	Desig. & Lis	t 🗆
MTO Region	Northeastern	Road Class:	Freeway	Arterial	Collector	Local
MTO District	Sudbury	Posted Speed	50 km/h	No. of L	anes	2
Old County	Nipissing	AADT		% Truck		
Geographic Twp.	Bonfield	Special Route	S Transit □	Truck $\square$	School $\square$	Bicycle
Structure Type	Horizontal Ellipse CSP	Detour Length	. A warrand			
		Structure	l Around			(km)
Total Deck Length	(m)	Fill on Structu	re	0.3	- 0.6	(m)
Overall Str. Width	(m)	Skew Angle			0	_(Degrees)
Total Deck Area	(m <sup>2</sup> )	Direction of S	tructure	N	I-S	_
Roadway Width	(m)	No. of Spans			1	(m)
Span Lengths	(m)					
HISTORICAL DATA						
Year Built	1970 (est)	Last B	iennial Inspection	1	Au	igust 7, 2020
Current Load Limit		_(tonnes) Last B	ridge Master Insp	ection		
Load Limit By-Law#		_	valuation			
By-Law Expiry Date		_	Inderwater Inspec	tion		
Min. Vertical Clearance	e	_(m) Last C	ondition Survey			
Rehabilitation History	y: (Date / Description)					

**CULVERT** Site No.: 06

FIELD INSPECTION I	FIELD INSPECTION INFORMATION					
Date of Inspection:	June 03, 2022					
Inspector:	Tashi Dwivedi, P.Eng., HP Engineering					
Others in Party:	Sagar Chhayani, HP Engineering					
Equipment Used:	Digital camera, measuring tape, hammer					
Weather:	Sunny					
Temperature:	22 °C					

ADDITIONAL INVESTIGATION REQUIRED		Priority				
ADDITIONAL INVESTIGATION REQUIRED	None	Normal	Urgent	Cost		
Detailed Deck Condition Survey:	X			\$		
Bridge Rehabilitation / Replacement Study:		X		\$ 20,000.00		
Detailed Coating Condition Survey:	X			\$		
Underwater Investigation:	X			\$		
Fatigue Investigation:	X			\$		
Seismic Investigation:	X			\$		
Structural Evaluation:	X			\$		
Load Posting - Estimated Load			Total Cost	\$ 20,000.00		

#### Special Notes:

Rehabilitation/replacement study is for culvert barrel and barrier.

No approach barrier presents at structure. A code compliant approach barrier and end treatment should be installed.

Culvert Barrel has splitting at bolt locations and localized deformations; it is recommended that the barrel be replaced in 1 – 5 years. Light to localized moderate corrosion form middle of barrel to below waterline. It is recommended to monitor the barrel movement.

Next Detailed Inspection:	June 2024

Susp	pected Performance Deficiencies				
00	None	06	Bearing not uniformly loaded/unstable	12	Slippery surfaces
01	Load carrying capacity	07	Jammed expansion joint	13	Flooding/channel blockage
02	Excessive deformations (deflections & rotation)	08	Pedestrian/vehicular hazard	14	Undermining of foundation
03	Continuing settlement	09	Rough riding surface	15	Unstable embankments
04	Continuing movements	10	Surface ponding	16	Other
05	Seized bearings	11	Deck drainage		
Mai	ntenance Needs				
01	Lift and swing bridge maintenance	07	Repair of structural steel	13	Erosion control at bridges
02	Bridge cleaning	08	Repair of bridge concrete	14	Concrete sealing
03	Bridge handrail maintenance	09	Repair of bridge timber	15	Rout and seal
04	Painting steel bridge structures	10	Bailey bridges maintenance	16	Bridge deck drainage
05	Bridge deck joint repair	11	Animal/pest control	17	Other
06	Bridge bearing maintenance	12	Bridge surface repair		

ELEMENT DATA									
Element Group:	Approaches			Length	:	-			
Element Name:	Barrier			Width:	:	-			
Location:	-			Height	•	-			
Material:	-			Count:		-			
Element Type:	-			Total (	Quantity:	-			
Environment:	-			Not Ins	spected:				
Protection System	-						Performance	Maintenance	
Units	Excellent	Good	Fair	_	Poor		Deficiencies	Needs	
m	-	-	-		-		08	-	
Comments: No b	barrier present at the	time of the inspection. It i	is recommended	that a coo	de compliant barri	er be in	stalled.		
None □		1 − 5 years		< 1 y	year <b>T</b>		Urgent □		
					<u> </u>		<u> </u>		
Element Group:	Approaches			Length		30 m			
Element Name:	Wearing Surface			Width:		7 m			
Location:	East & West of Str	noture		Height:		- 111			
Material:	Gravel	ucture		_	Count: 2				
Element Type:	Wearing Surface				Quantity:	420 r	m <sup>2</sup>		
Environment:	Severe						<u></u>		
Protection System	Severe			Not Inspected:					
Units	- Excellent	Good	Fair	Poor		Performance Deficiencies	Maintenance Needs		
m <sup>2</sup>	Excenent _	420	rair -		Poor		_	_	
1		ion with loose gravel accu		daes of w	- veoring surface		-	_	
Comments. Gen	erany in good condi-		ulliuiaicu ai inc c	uges or w	vearing surrace.				
None		1 − 5 years		< 1 y	year 🔲		Urgent		
Element Group:	Culvert			Length	:	-			
Element Name:	Inlet Components			Width:		-			
Location:	South of Structure			Height	<b>:</b>	-			
Material:	Concrete			Count:		-			
Element Type:	Cast-in-Place Conc	erete		Total C	Quantity:	4 m <sup>2</sup>			
Environment:	Moderate			Not Ins	spected:				
Protection System	None						Performance	Maintenance	
Units	Excellent	Good	Fair		Poor		Deficiencies	Needs	
m <sup>2</sup>	-	2.5	1		0.5		-	08	
Comments: Visi	ble portion is in good	I condition with moderate	e scaling and sma	all spalls.	Fence attached to	either s	side of south end of cul	vert.	
None		1 – 5 years		< 1 y	year 🔲		Urgent		

Element Group:	Culvert			Length	i:	14.1	m	
Element Name:	Barrel			Width:		4.6 m	n	
Location:	Below Roadway			Height:	:	3.5 m	1	
Material:	Corrugated Steel			Count:		1		
Element Type:	Structural Plate CS	,P		Total (	Quantity:	129.8	84 m <sup>2</sup>	
Environment:	Benign			Not Ins	spected:			
Protection System	Hot-Dip Galvanize	:d					Performance	Maintenance
Units	Excellent	Good	Fair		Poor		Deficiencies	Needs
m <sup>2</sup>	-	-	64.92		64.92		01	-
also	observed along with	ate corrosion form middle splitting along 2/3 bolt lir r the barrel movement.  1 – 5 years	of barrel to belo ne at east side of	ow waterli f barrel. It	is recommended t	oolts an	and seams throughout. Morrel be replaced in 1 – 5	finor deflection 5 years. It is
		1 5 yours		- ,			0.50	
	1					T		
Element Name	Foundations (helev			Length		-		
Element Name:	Foundations (below	√ ground level)		Width:		-		
Location:	Below Structure			Height:		-		
Material:	Unknown			Count:		-		
Element Type: Environment:	Unknown				Quantity:	-		
Protection System	Benign Unknown			Not Inspected:				
Units	Excellent	Good	Fair		Poor		Performance Deficiencies	Maintenance Needs
N/A	Excellent -	Good -	rair -		- Poor		-	-
		ected due to splitting and d		ral			-	-
	illic motatines ocop-		lenection or our					
None		1 − 5 years		< 1 y	year 🗌		Urgent	
	<del></del>					,		
Element Group:	Embankment and S	Streams		Length		-		
Element Name:	Embankments			Width:	:	-		
Location:	NE, NW, SE, & SV	W of Structure		Height:	:	-		
Material:	Native			Count:		-		
Element Type:	Embankment			Total C	Quantity:	4		
Environment:	Benign			Not Ins	spected:		•	
Protection System	None	<del>-</del>	<del>_</del>				Performance	Maintenance
Units	Excellent	Good	Fair		Poor		Deficiencies	Needs
1		(=		- roor				Γ.
Each		4	-		-		-	-
	ankments noted mod	4 derately sloped, well veget	tated and appear	stable at	the time of inspect	tion.	-	-

Element Group:	Embankment and	Embankment and Streams				-			
Element Name:	Streams and Water	ways		Width:	:	-			
Location:	Under Roadway			Height	:	-			
Material:	Native	Native				-			
Element Type:	Streams	Streams				All			
Environment:	Benign	Benign				Not Inspected:			
Protection System	None						Performance	Maintenance	
Units	Excellent	Good	Fair		Poor		Deficiencies	Needs	
All	-	-	All		-		-	18	
Comments: Mo	derate volume and flo	ow from south to north. D	am in centre of	barrel to l	be removed.				
None		1 − 5 years		< 1	year <b>—</b>		Urgent 🔲		

REPAIR AND REHA	REPAIR AND REHABILITATION REQUIRED			Priority			
Element	Repair and Rehabilitation Required	6 - 10 Years	1 - 5 Years	< 1 year	Cost		
Approaches	Install a code compliant barrier			X	\$ -		
Barrel	Replace Culvert Barrel		X		\$ 358,000.00		
					\$ -		
					\$ -		
					\$ -		
					\$ -		
					\$ -		
					\$ -		
					\$ -		
	Total Cost						

ASSOCIATED WORK Comments				
Approaches				
Detours			\$	100,000.00
Traffic Control			\$	60,000.00
Utilities				
Right of Way				
Environmental Study			\$	10,000.00
Other				
Contingencies				
		Total Cost	\$	170,000.00

JUSTIFICATION		



Photo 1 Structure from east approach



Photo 2 Structure from west approach



Photo 3 East approach from centre of structure



Photo 4 West approach from centre of structure



Photo 5 North elevation



Photo 6 South elevation



Photo 7 Debris noted in middle of barrel obstructing stream flow



Photo 8 Light to localized moderate corrosion noted at and below waterline



Photo 9 Medium cracking noted along bolt line



Photo 10 Light to moderate scaling noted on concrete inlet at south end

# **Structure Condition Summary Form**

Structure Name McNutt Road Culvert

Structure Number 09

**Date of Inspection** June 03, 2022

Project No. 22035

**Consultant** HP Engineering Inc.

Element Group	Element Name	Unit (Qty.)	Unit Price (MTO)	Total Element Quantity	Excellent	Good	Fair	Element Quantity in Poor Condition (0)	Total Replacement Value (TRV)	Current Element Value (CEV)	Element Condition Index	Performance Deficiency	Maintenance Need
Approaches	Wearing Surface	Sq.m	6.00	510.00	0.00	510.00	0.00	0.00	3060	2295	75	00	00
Culvert	Barrel	Sq.m	350.00	262.69	0.00	212.69	50.00	0.00	91942	62831	68	00	00
												_	
									95002	65126			

Bridge Condition Index (BCI)	69	
I <sub>t</sub>	0	Importance Factor for Traffic
I <sub>c</sub>	0	Importance Factor for Economic Impacts
I <sub>w</sub>	0	Importance Factor for Bridge Width
I <sub>p</sub>	0	Importance Factor for Bridge Profile or Alignment
Bridge Sufficiency Index (BSI)	69	

Main Hwy/Road #  Road Name: McN  Structure Location 400 n	utt Road Culvert  (utt Road		Under □	Crossir Type:		Navigable Wat	ner 🗆	Non- Navigal	ole Water ■
Road Name: McN Structure Location 400 m		On ■	Under □	Type:		Navigable Wat	ter 🗆	Non- Navigal	ble Water
Road Name: McN Structure Location 400 m		On ■	Under $\square$	Type:					
Structure Location 400 n	utt Road					Rail 🗆	Road	Ped □	Other $\square$
	m north of develop	pment roac	<u>1, Lot 31, (</u>	Con 7 Bonf	field Onta	rio over Sharpes	s Creek		
Latitude	46° 15' 9	9.8" N		_ Longitu	tude		79° 2'	'31.1" W	
Owner(s) Town	nship of Bonfield			_ Heritag	ge .	Not Cons.	Cons./Not Ap	ρp. □ List/I	Not Desig.
				Design	ıation	Desig./not List	; <b>-</b>	Desig. & List	; 🗆
MTO Region North	heastern			_ Road C	Class:	Freeway	Arterial	Collector	Local
MTO District Sudb	oury			_ Posted	d Speed	50 km/h	No. of L	anes	2
Old County Nipis	sing			_ AADT	î		% Truck	.s	
Geographic Twp. Bonfi	ield			_ Specia	al Routes	Transit 🗆	Truck 🗆	School $\square$	Bicycle $\square$
Structure Type Horiz	zontal Ellipse CSP			Detour Structu	r Length A ure	Around			_(km)
Total Deck Length	3.6	(	(m)	Fill on	n Structure	ė	1	.2	_(m)
Overall Str. Width	16.4	(	(m)	Skew A	Angle			0	_(Degrees)
Total Deck Area	59.0	(	$(m^2)$	Directi	tion of Stru	ucture	North	- South	_
Roadway Width	8.5	(	(m)	No. of	? Spans			2	_(m)
Span Lengths	3.6, 3.6	(	(m)						
HISTORICAL DATA  Year Built		1989			T ant Die			An	-4.7. 2020
Year Built Current Load Limit	1		· (·			ennial Inspection idge Master Inspe			gust 7, 2020
Load Limit By-Law#			`	Omres,	Last Eva		20110.1.		
By-Law Expiry Date					Last Una	derwater Inspect	tion		
Min. Vertical Clearance			(n	m)	Last Cor	ndition Survey			

**CULVERT** Site No.: 09

FIELD INSPECTION INFORMATION					
une 03, 2022					
Sashi Dwivedi, P.Eng., HP Engineering					
Vicholas Brown, HP Engineering					
Digital camera, measuring tape, hammer					
Partly Cloudy					
3 °C					
1					

ADDITIONAL INVESTIGATION REQUIRED		Estimated		
ADDITIONAL INVESTIGATION REQUIRED	None	Normal	Urgent	Cost
Detailed Deck Condition Survey:	X			\$
Bridge Rehabilitation / Replacement Study:		X		\$ 5,000.00
Detailed Coating Condition Survey:	X			\$
Underwater Investigation:	X			\$
Fatigue Investigation:	X			\$
Seismic Investigation:	X			\$
Structural Evaluation:	X			\$
Load Posting - Estimated Load			Total Cost	\$ 5,000.00

#### Special Notes:

Rehabilitation/replacement study is for traffic barrier only.

Barrier buried end treatments are substandard and should be replaced with code compliant end treatments.

Limited inspection due to dams and fences installed at inlet. Light corrosion noted at and below water line at both barrels and some missing bolts. Beaver dam and fallen tree obstructing the waterway should be removed.

Next Detailed Inspection:	June 2024

Susp 00 01 02 03 04 05	Decited Performance Deficiencies None Load carrying capacity Excessive deformations (deflections & rotation) Continuing settlement Continuing movements Seized bearings	06 07 08 09 10	Bearing not uniformly loaded/unstable Jammed expansion joint Pedestrian/vehicular hazard Rough riding surface Surface ponding Deck drainage	12 13 14 15 16	Slippery surfaces Flooding/channel blockage Undermining of foundation Unstable embankments Other
Mai	ntenance Needs				
01	Lift and swing bridge maintenance	07	Repair of structural steel	13	Erosion control at bridges
02	Bridge cleaning	08	Repair of bridge concrete	14	Concrete sealing
03	Bridge handrail maintenance	09	Repair of bridge timber	15	Rout and seal
04	Painting steel bridge structures	10	Bailey bridges maintenance	16	Bridge deck drainage
05	Bridge deck joint repair	11	Animal/pest control	17	Other
06	Bridge bearing maintenance	12	Bridge surface repair		

ELEMENT DATA									
Element Group:	Approaches			Length	:	24 m			
Element Name:	Barrier			Width:	:	-			
Location:	NE, NW, SE, & SV	V of Structure		Height	:	-			
Material:	Steel			Count:		2			
Element Type:	Steel Beam Guider	ail on Wood Posts		Total Quantity: 48 n					
Environment:	Moderate			Not Inspected:					
Protection System	-			,			Performance	Maintenance	
Units	Excellent	Good	Fair		Poor		Deficiencies	Needs	
m	-	40 8			-		08	-	
Comments: Wood posts are weathered with some checks and rot. Rating is based on condition only. Barrier buried end treatments are substandard and should be replaced with code compliant end treatments. Impact damage noted at southeast corner. Some rotated spacer observed on approach barrier.									
None		1 − 5 years		< 1 y	year		Urgent		
	<del></del>					1			
Element Group:	Approaches			Length	1:	30 m			
Element Name:	Wearing Surface			<b>Width:</b> 8.5 m			5 m		
Location:	North & South of S	Structure		Height: -					
Material:	Gravel			Count:		2			
Element Type:	Wearing Surface			Total Quantity: 510 m <sup>2</sup>					
Environment:	Severe			Not Inspected:					
Protection System	-				Performance Maintenance				
Units	Excellent	Good	Fair		Poor		Deficiencies	Needs	
m²	<del>-</del>	510	-		-		-	-	
Comments: Gen	erally in good conditi	ion with some loose grave	el observed in w	earing sur	rface at approaches	S.			
None		1 − 5 years		< 1 y	year 🔲		Urgent		
Element Group:	Culvert			Length	ı:	16.4	m		
Element Name:	Barrel			Width:		3.6 m	1		
Location:	Below Roadway			Height	<u> </u>	3.2 m	1		
Material:	Corrugated Steel			Count:		2			
Element Type:	Structural Plate CS	P		Total (	Quantity:	262.6	59 m <sup>2</sup>		
Environment:	Benign			Not Ins	spected:				
Protection System	Hot-Dip Galvanize	d					Performance	Maintenance	
Units	Excellent	Good	Fair		Poor		Deficiencies	Needs	
m <sup>2</sup>	_	212.69	50		-		-	-	
	nited inspection due to s. Beaver dam at inlet	dams and fences installe	ed at inlet. Light	corrosion	noted at and below	w wate:	r line at both barrels an	nd some missing	
None ■	3. Deaver dam at finet	1 – 5 years		< 1 1	vear 🗆		Urgent □		

Element Group:	Foundations			Length: -					
Element Name:	Foundations (below	v ground level)		Width:		-			
Location:	Below Barrels			Height	:	-			
Material:	Unknown			Count:		-			
Element Type:	Unknown			Total (	Quantity:	-			
Environment:	Benign			Not Ins	spected:				
Protection System	-						Performance	Maintenance	
Units	Excellent Good Fair				Poor		Deficiencies	Needs	
N/A					-		-	-	
Comments: No	visible evidence of fo	ved at the time of	of inspect	ion.					
None	1 − 5 years								
<u> </u>									
Element Group:	Embankment and S	Streams		Length	:	_			
Element Name:	Embankments			Width:		-			
Location:	NE, NW, SE, & SV	W of Structure		Height		-			
Material:	Native					4	4		
Element Type:	Embankment			Total (	Quantity:	4			
Environment:	Benign			Not Ins	spected:				
Protection System	-						Performance	Maintenance	
Units	Excellent	Good	Fair	Poor		Deficiencies	Needs		
Each	-	4	-	-			-	-	
Comments: Em	bankments are moder	ate to steeply sloped, heav	vily vegetated an	ıd appear	stable.				
None		1 − 5 years		< 1 y	year □		Urgent □		
<u> </u>		<u>,                                    </u>							
Element Group:									
Element Group.	Embankment and S	Streams		Length	:	_			
Element Name:	Embankment and S			Length Width:		-			
<del>-</del>									
Element Name:	Streams and Water			Width:	:	-			
Element Name: Location:	Streams and Water Under Roadway			Width: Height: Count:	:	-			
Element Name: Location: Material:	Streams and Water Under Roadway Native			Width: Height: Count: Total C	:	- - - all			
Element Name: Location: Material: Element Type:	Streams and Water Under Roadway Native Stream			Width: Height: Count: Total C	: Quantity:	-	Performance	Maintenance	
Element Name: Location: Material: Element Type: Environment:	Streams and Water Under Roadway Native Stream Benign		Fair	Width: Height: Count: Total C	: Quantity:	- - - all	Performance Deficiencies	Maintenance Needs	
Element Name: Location: Material: Element Type: Environment: Protection System	Streams and Water Under Roadway Native Stream Benign	ways	F <b>air</b> all	Width: Height: Count:	: Quantity: spected:	- - - all		Needs 18 - Remove	
Element Name: Location: Material: Element Type: Environment: Protection System Units all	Streams and Water Under Roadway Native Stream Benign - Excellent	ways Good	all	Width: Height: Count: Total C	: Quantity: spected: Poor	- - - all	Deficiencies	Needs	
Element Name: Location: Material: Element Type: Environment: Protection System Units all	Streams and Water Under Roadway Native Stream Benign - Excellent	Good -	all	Width: Height: Count: Total C	:  Poor  inlet of both barre	- - - all	Deficiencies	Needs 18 - Remove	

REPAIR AND REHABI	ILITATION REQUIRED		Priority		E	stimated
Element	Repair and Rehabilitation Required	6 - 10 Years	1 - 5 Years	< 1 year		Cost
Approach Barrier	Install code compliant end treatments			X	\$	24,000.00
·				·		
				Total Cost	s	24,000.00

ASSOCIATED WORK	Comments	Estimated Cost
Approaches		
Detours		
Traffic Control		
Utilities		
Right of Way		
Environmental Study		
Other		
Contingencies		
	Total Cost	S

JUSTIFICATION	



Photo 1 Structure from north approach



Photo 2 Structure from south approach



Photo 3 North approach from centre of structure



Photo 4 South approach from centre of structure



Photo 5 East elevation



Photo 6 West elevation



Photo 7 Rot, splits and checks on timber barrier posts



Photo 8 Substandard buried end treatment at approach barrier



Photo 9 Gravel approach wearing surface



Photo 10 Obstruction at west end of north culvert.



Photo 11 Typical view of south culvert barrel looking west



Photo 12 Light corrosion noted at waterline in north culvert barrel (Typical)

# **Structure Condition Summary Form**

Structure Name Grand Desert Road Culvert

Structure Number 11

Date of InspectionJune 03, 2022Project No.22035

**Consultant** HP Engineering Inc.

Element Group	Element Name	Unit (Qty.)	Unit Price (MTO)	Total Element Quantity	Element Qty. in Excellent Condition (1.00)	Good	Fair	Element Quantity in Poor Condition (0)	Total Replacement Value (TRV)	Current Element Value (CEV)	Element Condition Index	Performance Deficiency	Maintenance Need
Approaches	Wearing Surface	Sq.m	6.00	384.00	0.00	373.00	10.00	1.00	2304	1703	74	00	00
Culvert	Barrel	Sq.m	350.00	26.40	0.00	0.00	13.20	13.20	9240	1848	20	01	00
	_								11544	3551			

Bridge Condition Index (BCI)	31	
I <sub>t</sub>	0	Importance Factor for Traffic
I <sub>c</sub>	0	Importance Factor for Economic Impacts
$I_{\rm w}$	0	Importance Factor for Bridge Width
I <sub>p</sub>	0	Importance Factor for Bridge Profile or Alignment
Bridge Sufficiency Index (BSI)	31	

INVENTORY DATA	:						
Structure Name	Grand Desert Road Culvert						
			Crossing	Navigable Wat	er 🗆	Non- Navigal	ole Water
Main Hwy/Road #	On <b>I</b>	Under □	Type:	Rail 🗆	Road	Ped □	Other $\square$
Road Name:	Grand Desert Road						
Structure Location	1.1km east of Bluesea Road, Lot	13, Con 5 I	Bonfield Ontario o	ver Blueseal Cree	ek		
Latitude	46° 12' 33" N		Longitude		79° 6	5' 56" W	
Owner(s)	Township of Bonfield		Heritage	Not Cons.	Cons./Not Ap	op. 🗆 List/ì	Not Desig.
			Designation	Desig./not List		Desig. & List	
MTO Region	Northeastern		Road Class:	Freeway	Arterial	Collector	Local
MTO District	Sudbury		Posted Speed	40 km/h	No. of L	anes	2
Old County	Nipissing		AADT		% Truck	s	<u>-</u>
Geographic Twp.	Bonfield		Special Routes	Transit 🗆	Truck $\square$	School	Bicycle $\square$
Structure Type	Twin Circular CSP		Dataum Lamath	A A			
			Detour Length . Structure	Arouna -		-	_(km)
Total Deck Length	(m)		Fill on Structure	Fill on Structure		).4	_(m)
Overall Str. Width	8.5	m)	Skew Angle	Skew Angle		)	_(Degrees)
Total Deck Area	8.5	m <sup>2</sup> )	Direction of Str	Direction of Structure			_
Roadway Width	6.5	m)	No. of Spans	-		1	_(m)
Span Lengths	1.0	m)					
HISTORICAL DATA	1						
Year Built	<u>-</u>		Last Bio	ennial Inspection		Auş	gust 7, 2020
Current Load Limit		(to	onnes) Last Br	idge Master Insp	ection		
Load Limit By-Law#			Last Ev	aluation			
By-Law Expiry Date				derwater Inspect	ion		
Min. Vertical Clearanc		(m	ı) Last Co	ndition Survey			
Rehabilitation Histor	y: (Date / Description):						

CULVERT Site No.: 11

FIELD INSPECTION I	FIELD INSPECTION INFORMATION							
Date of Inspection:	June 03, 2022							
Inspector:	Tashi Dwivedi, P.Eng., HP Engineering							
Others in Party:	Nicholas Brown, HP Engineering							
Equipment Used:	Digital camera, measuring tape, hammer							
Weather:	Sunny							
Temperature:	20 °C							

ADDITIONAL INVESTIGATION DECUMED		Priority				
ADDITIONAL INVESTIGATION REQUIRED	None	Normal	Urgent	Cost		
Detailed Deck Condition Survey:	X			\$		
Bridge Rehabilitation / Replacement Study:		X		\$ 20,000.00		
Detailed Coating Condition Survey:	X			\$		
Underwater Investigation:	X			\$		
Fatigue Investigation:	X			\$		
Seismic Investigation:	X			\$		
Structural Evaluation:	X			\$		
Load Posting - Estimated Load			Total Cost	\$ 20,000.00		

#### Special Notes:

Rehabilitation/replacement study is recommended for the structure. Limited inspection of barrel due to barrel size. Moderate corrosion was observed at and below water line and dents at south and north ends of barrel were also observed. It is recommended that the structure be replaced in 1 - 5 years. Apparent deformation noted inside barrel. No barrier is present at the structure; it is recommended that code compliant barrier with end treatments be installed.

Next Detailed Inspection:	June 2024

Suspected Performance Deficiencie	nance Deficiencies	Suspected Performance
-----------------------------------	--------------------	-----------------------

	ceteu i errormunee Berrerenees				
00	None	06	Bearing not uniformly loaded/unstable	12	Slippery surfaces
01	Load carrying capacity	07	Jammed expansion joint	13	Flooding/channel blockage
02	Excessive deformations (deflections & rotation)	08	Pedestrian/vehicular hazard	14	Undermining of foundation
03	Continuing settlement	09	Rough riding surface	15	Unstable embankments
04	Continuing movements	10	Surface ponding	16	Other

03	Continuing settlement	09	Rough riding surface	15	Unstable embankments
04	Continuing movements	10	Surface ponding	16	Other
05	Seized bearings	11	Deck drainage		
Mai	intenance Needs				
01	Lift and swing bridge maintenance	07	Repair of structural steel	13	Erosion control at bridges
02	Bridge cleaning	08	Repair of bridge concrete	14	Concrete sealing
03	Bridge handrail maintenance	09	Repair of bridge timber	15	Rout and seal
04	Painting steel bridge structures	10	Bailey bridges maintenance	16	Bridge deck drainage
05	Bridge deck joint repair	11	Animal/pest control	17	Scaling (loose Concrete or ACR Steel)
06	Bridge bearing maintenance	12	Bridge surface repair	18	Other

ELEMENT DATA												
Element Group:	Approaches			Length	:	-						
Element Name:	Barriers			Width: -		-						
Location:	NE, NW, SE & SW	√ of Structure		Height: -								
Material:	-			Count:		-						
Element Type:	-			Total (	Quantity:	-						
Environment:	-			Not Ins	spected:							
Protection System	-						Performance	Maintenance				
Units	Excellent	Good	Fair	_	Poor		Deficiencies	Needs				
m²	<u>-</u>	-	-		- -		08	-				
Comments: No approach barrier observed at time of inspection. Code compliant traffic barrier including end treatments should be installed.												
None ☐ 1 – 5 years ☐ <1 year ■ Urgent ☐												
		<u> </u>										
Element Group: Approaches Length: 30 m												
Element Name:	Wearing Surface			Width:		6.4 n						
Location:	East & West of Str	noture		Height		0.4 11	1					
Material:	Gravel Count: 2											
Element Type:	Wearing Surface			Quantity:	384 r	m <sup>2</sup>						
Environment:	Severe				- •		<u> </u>					
	None			Not Inspected:								
Protection System Units	Excellent	Good	Fair	Poor			Performance Deficiencies	Maintenance Needs				
m <sup>2</sup>	Excenent	373	10		1		_	_				
	erally in good condit	ion with light tire rutting.		sted at the		otholes						
Comments.	ciany in good condit		Loose graver no	itu ai iii	euges. Meurum p	Ulliorea		oacii.				
None		1 − 5 years		< 1 y	year 🗌		Urgent					
Element Group:	Culvert			Length	:	8.4 n	1					
Element Name:	Barrel			Width:		1.0 n	ı					
Location:	Below Roadway			Height	• • • • • • • • • • • • • • • • • • •	1.0 n	1					
Material:	Corrugated Steel			Count:		1						
Element Type:	Corrugated Steel P	ipe		Total (	Quantity:	26.4	m <sup>2</sup>					
Environment:	Benign			Not Ins	spected:							
Protection System	Hot-Dip Galvanize	d					Performance	Maintenance				
Units	Excellent	Good	Fair		Poor		Deficiencies	Needs				
m <sup>2</sup>		-	13.2		13.2		01	-				
		rel due to barrel size. Mod. It is recommended that										
None	ei weie also observed	1. It is recommended that 1 − 5 years	. the shucture be	< 1 y		Jai Cili C	Urgent	ie barrer.				

ELEMENT DATA												
Element Group:	Foundations			Length	1:	-						
Element Name:	Foundations (below	v ground level)		Width:	;	-						
Location:	Below Barrel			Height	:	-						
Material:	Unknown			Count:		-						
Element Type:	Unknown			Total C	Quantity:	-						
Environment:	Benign			Not Ins	spected:							
Protection System	Unknown						Performance	Maintenance				
Units	Excellent	Good	Fair		Poor		Deficiencies	Needs				
N/A	<u> </u>	-	-		-		-	-				
<b>Comments:</b> No visible evidence of foundation instability observed at time of inspection.												
None ■ 1 – 5 years □ < 1 year □ Urgent □												
Element Group:	Embankment and S	Streams		Length		_						
Element Name:	Embankments			Lengtn: -								
Location:	NE, NW, SE & SW	V of Structure		Height: -								
Material:	Native Native	7 Of Structure		Count:		4						
Element Type:	Embankment			Quantity:	4							
Environment:	Benign				spected:							
Protection System	None			140t Ins	specieu.							
Units	Excellent	Good	Fair	Poor			Performance Deficiencies	Maintenance Needs				
each	-	1	2		1		_	13				
		 ell vegetated appear stabl		noted at				1.5				
	teratery stoped and		IC. WIIIOI CIOSICI									
None		1 − 5 years		< 1 y	year		Urgent					
Element Group:	Embankment and S	Streams		Length	ı <b>:</b>	-						
Element Name:	Streams and Water	ways		Width:	;	-						
Location:	NE, NW, SE & SW	V of Structure		Height	:	-						
Material:	Native			Count:		1						
Element Type:	Stream			Total (	Quantity:	All						
Environment:	Benign		<del>_</del>	Not Ins	spected:							
Protection System	None						Performance	Maintenance				
Units	Excellent	Good	Fair		Poor		Deficiencies	Needs				
All	_	All	-				-	-				
Comments: Low	v volume and flow fro	om south to north with no	visible obstructi	ion noted	in the stream at th	ie time (	of inspection.					
None		1 − 5 years		< 1 y	year 🔲		Urgent 🔲					

REPAIR AND REHABILITATION REQUIRED Priority								
Element	Repair and Rehabilitation Required	6-10 Years	6-10 Years 1-5 Years <1 year			Cost		
Approaches	Install code compliant guiderail			X	\$	-		
Barrel	Replace barrel	X			\$	120,000.00		
					\$	-		
					\$	-		
					\$	-		
					\$	-		
					\$	-		
					\$	-		
					\$	-		
				Total Cost	\$	120,000.00		

ASSOCIATED WORK	ATED WORK Comments		
Approaches			
Detours	Culvert Replacement	\$ 100,000.00	
Traffic Control	Culvert Replacement	\$ 60,000.00	
Utilities			
Right of Way			
Environmental Study	Culvert Replacement	\$ 10,000.00	
Other			
Contingencies			
		<b>Total Cost</b> \$ 170,000.00	

JUSTIFICATION					



Photo 1 Structure from east approach



Photo 2 Structure from west approach



Photo 3 East approach from centre of structure



Photo 4 West approach from centre of structure



Photo 5 Heavy vegetation grown at north side of barrel



Photo 6 South elevation



Photo 7 Several small potholes on west approach



Photo 8 Minor erosion of embankment noted at south end of structure



Photo 9 Dents noted at south end of barrel



Photo 10 Apparent deformation noted inside barrel

# **Structure Condition Summary Form**

Structure Name Trunk Road Culvert

**Structure Number** 13

Date of InspectionJune 3, 2022Project No.22035

Consultant HP Engineering Inc.

Element Group	Element Name	Unit (Qty.)	Unit Price (MTO)	Total Element Quantity	Element Qty. in Excellent Condition (1.00)	Element Quantity in Good Condition (0.75)	Fair	Element Quantity in Poor Condition (0)	Total Replacement Value (TRV)	Current Element Value (CEV)	Element Condition Index	Performance Deficiency	Maintenance Need
Approaches	Wearing Surface	Sq.m	6.00	498.00	0.00	96.00	398.00	2.00	2988	1387	46	09	00
Culvert	Barrel	Sq.m	350.00	335.12	0.00	335.12	0.00	0.00	117292	87969	75	00	00
Retaining Walls	Walls	Sq.m	350.00	27.00	0.00	27.00	0.00	0.00	9450	7088	75	00	00
									129730	96444			

Bridge Condition Index (BCI)	74	
I <sub>t</sub>	0	Importance Factor for Traffic
I <sub>c</sub>	0	Importance Factor for Economic Impacts
I <sub>w</sub>	0	Importance Factor for Bridge Width
l <sub>p</sub>	0	Importance Factor for Bridge Profile or Alignment
Bridge Sufficiency Index (BSI)	74	