



MUNICIPALITY OF NORTHERN BRUCE PENINSULA

2022 STRUCTURE INSPECTION REPORT



WSP
SUITE 101
1450, 1ST AVENUE WEST
OWEN SOUND, ON, CANADA N4K 6W2

T +1 519 376-7612
wsp.com





2022 STRUCTURE INSPECTION REPORT

MUNICIPALITY OF NORTHERN BRUCE
PENINSULA

FINAL
PROJECT NO.: 201-01605-00
DATE: APRIL 03, 2023

WSP
SUITE 101
1450, 1ST AVENUE WEST
OWEN SOUND, ON, CANADA N4K 6W2

T: +1 519 376-7612
F: +1 519 376-8008
WSP.COM



TABLE OF CONTENTS

1	TABLE 1 – BRIDGE/CULVERT INVENTORY/RECOMMENDATION SUMMARY
2	TABLE 2 – BRIDGE CONDITION INDEX (BCI) VALUES
3	TABLE 3 – BRIDGE/CULVERT MAINTENANCE REQUIREMENTS SUMMARY
4	FIGURE 1 – BRIDGE AND CULVERT LOCATIONS
5	STRUCTURE INSPECTION REPORTS

Table 2
Bridge Condition Index (BCI) Values
Municipality of Northern Bruce Peninsula

April 2023

221-12948-00

Structure ID	Name	Age	BCI
1	Concession 4 Bridge	86	24
2	Sideroad 10 Bridge	83	22
3	Cherry Hill Road Bridge	83	37
4	Spring Creek (Ira Lake Road) Bridge	98	25
5	Copper Kettle (Stokes Bay Road) Bridge	73	60
6	Heron Point Road Bridge	71	31
8	Isthmus Bay Road Bridge	73	55
9	Cape Chin Culvert	15	47

Legend

Range	Colour	Recommendation
80-100	Excellent	Continue Monitoring and Maintenance
60-80	Good	Continue Monitoring and Maintenance
40-60	Fair	Initiate planning for future repairs
0-40	Poor	Schedule repairs in immediate future



BRIDGE/CULVERT NO.	NAME AND LOCATION
1	4TH CONC. BRIDGE S. OF BARROW BAY RD. (JUDGES CREEK)
2	10TH SIDEROAD CULVERT, LOT 10, CONC 2 E. (JUDGES CREEK)
3	CHERRY HILL ROAD BRIDGE, LOT 6, N. OF MONUMENT CORNERS, (CHIN CREEK)
4	SPRING CREEK BRIDGE, IRA LAKE ROAD (OLD HWY 6)
5	STOKES BAY ROAD/COPPER KETTLE BRIDGE, (STOKES RIVER)
6	HERON POINT ROAD BRIDGE, (STOKES RIVER)
7	LINDSAY ROAD 5 CULVERT, (STOKES RIVER)
8	ISTHMUS BAY ROAD BRIDGE, (SWAN LAKE DRAIN)
9	CAPE CHIN CULVERT, S. CAPE CHIN SIDEROAD, (CHIN CREEK)
10	LINDSAY ROAD 5 CULVERT (CHIN CREEK)
11	MYLES BAY SHORE ROAD BRIDGE (OLD WOMAN'S RIVER)
12	STOKES BAY ROAD CULVERT (OLD WOMAN'S RIVER)
13	BURY ROAD CULVERT, OLD WOMAN'S RIVER (FERN CREEK DRAIN)
14	EAST ROAD CULVERT, N. CAPE CHIN RD. 4, (STOKES RIVER)
15	CONC. 4 CULVERT, S. OF SIDEROAD 10, (JUDGES CREEK BR. DRAIN)
16	BARROW BAY ROAD CULVERT, CONC. 4, (JUDGES CREEK)
17	CONC. 4 CULVERT, N. OF BARROW BAY ROAD, (JUDGES CREEK BR. DRAIN)
18	10TH SIDEROAD CULVERT, (JUDGES CREEK BR. DRAIN)
19	PIKE BAY ROAD CULVERT, (JUDGES CREEK)

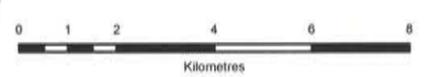
**MUNICIPALITY OF
NORTHERN BRUCE PENINSULA**

GEORGIAN BAY

LAKE HURON

**TOWN OF
SOUTH BRUCE PENINSULA**

LEGEND	
	BRIDGE/CULVERT LOCATION AND NUMBER
	PRIVATE ROAD
	MUNICIPAL ROAD
	COUNTY ROAD
	PROVINCIAL - HWY 6
	WATERCOURSE
	WATERBODY
	WETLAND AREA
	PROPERTY PARCEL



56 LINDSAY RD 5, RR #2
LION'S HEAD, ON N0H 1W0
519-793-3822

**BRIDGE AND CULVERT LOCATIONS
MUNICIPALITY OF
NORTHERN BRUCE PENINSULA**



1450 1st AVENUE WEST, SUITE 101
OWEN SOUND, ONTARIO CANADA N4K 6W2
PHONE: 519-376-7612 - FAX 519-376-8008 - WWW.WSP.COM

DRAWN:	JET
APPROVED:	KH/CW
DATE:	DEC 2018
SCALE:	1:150,000
FILE NO.:	181-03007-00
FIGURE:	1

Bridge/Culvert Inspection Report

Site Number	<input type="text" value="1"/>	Project Number	<input type="text" value="221-12948-00"/>	
Structure Name	<input type="text" value="4th Concession Bridge"/>	Municipality	<input type="text" value="Northern Bruce Peninsula"/>	
MTO Region Code	<input type="text" value="30"/>	County	<input type="text" value="Bruce"/>	Code <input type="text" value="02"/>
MTO District Code	<input type="text" value="33"/>	Geographic Twp Code	<input type="text" value="377"/>	



1450 - 1st Avenue West, Suite 101
Owen Sound, Ontario N4K 6W2

Tel: 519-376-7612
Fax: 519-376-8008
Website: www.wspgroup.com

Bridge/Culvert Inspection Report

Inventory Data

Structure Name	4th Concession Bridge	Site Number	1
County	Bruce	Road Name	4th Concession
Municipality	Northern Bruce Peninsula	Road Type	Rural Local - Gravel
Bridge or Culvert	Bridge	Owner	Northern Bruce Peninsula
Structure Type	Concrete Beam	AADT	100
Span (m)	7.6 No. 1	% Trucks	15%
Height (m)	2.6	Overall Structure Width (m)	6.4
Direction of Structure	East/West - 22° skew	Roadway Width (m)	5
Year Built/Rehabilitated	1937/1977	Total Deck Length (m)	8.3
Current Load Limit	12 t	Total Deck Area (s.m.)	48.64
Detour Length (km)	6	Heritage Des.	None
Waterway	Judges Creek		

Inspection Data

Date of Inspection	December 5, 2022	Photos: 1-1 - Title Page 1-2 - South abutment, soffit and foundation 1-3 - Abutment, girders and soffit with spalling and delamination 1-4 - North abutment, soffit and foundation 1-5 - Wingwall deterioration (typical) 1-6 - Structure barrier and excessive granular fill on deck 1-7 - Embankment erosion behind south footing and abutment 1-8 - Vegetation & debris accumulation along shoulders, potholes in wearing surface 1-9 - Structure elevation, exterior soffit, curb and barrier 1-10 - View of watercourse upstream 1-11 - View of watercourse downstream 1-12 - Abutment wall drain and wingwall	
Name of Inspector	Evan Montreuil, P.Eng.		
Equipment Used	Tape, pick, hammer		
Weather Conditions	Overcast		
Temperature	5°C		
Last Inspection	September 24, 2020		
Additional Investigation Required	Foundation inspection, load limit analysis and deck condition survey		
Total Rehabilitation	Place new approach and barrier protection. Complete concrete beam, soffit, and curb and wingwall repair. Place foundation erosion protection and repair. Place hazard signs and remove excess gravel off deck. (Replacement recommended)		
Total Rehabilitation Budget Costing	\$300,000	Next Inspection	December 2024
Justification	Due to the current condition of the structure, rehabilitation is no longer considered an economical solution. Complete replacement is recommended. Maintain the speed limit at 35 km/hr. as interim measure until barrier approach protection is in place. Maintain the load limit or reduce further following additional investigations recommended.		

Element Data**Structure:** 1

Element Group:	Decks		Length:	9.1 m			
Element Name:	Wearing Surface		Width:	5 m			
Location:			Height:				
Material:	Gravel		Count:				
Element Type:			Total Quantity:	45.5 m ²			
Environment:	Severe		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²			27.3	18.2	Yes	Yes
Comments:	The deck is flat (no grade) with poor drainage, debris accumulation on each side, and an excess of granular fill. Potholes have developed in the wheel path.						
Recommended Work:	None 6-10 Years		1-5 Years	<input checked="" type="checkbox"/> < 1 Year	Urgent		
	Grade and clear debris along curbs						

Element Data

Element Group:	Decks		Length:	9.1 m			
Element Name:	Deck Top		Width:	5.8 m			
Location:			Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:	52.78 m ²			
Environment:	Moderate		Limited Insp'n:	Yes			
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²			52.78			
Comments:	Limited inspection of the top deck condition due to cover with granular wearing surface.						
Recommended Work:	None 6-10 Years		1-5 Years	<input checked="" type="checkbox"/> < 1 Year	Urgent		
	Grade out excess gravel and inspect the condition of the concrete deck top.						

Element Data

Element Group:	Decks		Length:	7.6 m			
Element Name:	Soffit - Thick Slab		Width:	6.9 m			
Location:			Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:	48.64 m ²			
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²			38.91	9.73	Yes	Yes
Comments:	Exterior soffit concrete loss with exposed rebar was observed.						
Recommended Work:	None 6-10 Years		<input checked="" type="checkbox"/> 1-5 Years	< 1 Year	Urgent		
	Remove delaminated concrete, clean steel and replace concrete.						

Element Data**Structure:** 1

Element Group:	Decks		Length:				
Element Name:	Drainage		Width:				
Location:			Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:	2 (each side)			
Environment:	Severe		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each				2	Yes	Yes
Comments:	Flat through the length of the structure deck impeding the curb to shoulder drainage (each side). Debris and vegetation have accumulate along the curbs preventing drainage.						
Recommended Work:	None 6-10 Years 1-5 Years <input checked="" type="checkbox"/> < 1 Year Urgent Annual maintenance, clear debris and grade to achieve positive drainage.						

Element Data

Element Group:	Sidewalks/curbs		Length:	11.5 m			
Element Name:	Curbs		Width:	0.3 m			
Location:			Height:	0.16 m			
Material:	Concrete		Count:	2			
Element Type:			Total Quantity:	10.58 m ²			
Environment:	Severe		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²			4.23	6.35	Yes	Yes
Comments:	Severe surface spalling was observed.						
Recommended Work:	None 6-10 Years <input checked="" type="checkbox"/> 1-5 Years < 1 Year Urgent Remove poor concrete areas, clean reinforcing steel, and replace concrete.						

Element Data

Element Group:	Barriers		Length:	11.5 m			
Element Name:	Barrier/Parapet Walls		Width:	0.17 m			
Location:			Height:	1.07 m			
Material:	Concrete		Count:	2			
Element Type:			Total Quantity:	24.61 m ²			
Environment:	Severe		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²				24.61	Yes	Yes
Comments:	Section loss of vertical and horizontal elements. The concrete is severely delaminated with steel rebar exposed and with observed section loss. The current configuration does not meet code, and there is no approach protection, presenting a pedestrian and vehicle hazard.						
Recommended Work:	None 6-10 Years 1-5 Years <input checked="" type="checkbox"/> < 1 Year Urgent Remove and replace the barrier and add approach protection. Maintain the speed limit of 35 km/hr in the interim.						

Element Data**Structure:** 1

Element Group:	Barriers		Length:	0.17 m			
Element Name:	Posts		Width:	0.17 m			
Location:			Height:	1.07 m			
Material:	Concrete		Count:	12			
Element Type:			Total Quantity:	12			
Environment:	Severe		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each				12	Yes	
Comments:	Surface spalling and exposed rebar at the post bases were observed.						
Recommended Work:	None 6-10 Years 1-5 Years <input checked="" type="checkbox"/> < 1 Year Urgent Remove and replace the posts with the barrier and add approach protection.						

Element Data

Element Group:	Beam/MLE's		Length:	7.6 m			
Element Name:	Floor Beams		Width:	0.41 m			
Location:			Height:	0.61 m			
Material:	Concrete		Count:	4			
Element Type:			Total Quantity:	49.55 m ²			
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²			12.39	37.16	Yes	Yes
Comments:	Four concrete girders were poured with the deck on top of each abutment wall. The exterior beam concrete has spalled exposing the rebar. The interior beams have some exposed rebar and cracking at the abutments.						
Recommended Work:	None 6-10 Years <input checked="" type="checkbox"/> 1-5 Years < 1 Year Urgent Repair all poor concrete, clean reinforcing steel, and replace concrete.						

Element Data

Element Group:	Abutments		Length:				
Element Name:	Abutment Walls		Width:	7.62 m			
Location:			Height:	1.78 m			
Material:	Concrete		Count:	2			
Element Type:			Total Quantity:	27.13 m ²			
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²			18.99	8.14	Yes	Yes
Comments:	Surface cracking, spalling, and calcite deposits were observed. The north abutment has significant water staining and vertical cracking.						
Recommended Work:	None 6-10 Years <input checked="" type="checkbox"/> 1-5 Years < 1 Year Urgent Repair all poor concrete, clean reinforcing steel, and replace concrete.						

Element Data**Structure:** 1

Element Group:	Abutments		Length:	3.05			
Element Name:	Wingwalls		Width:				
Location:			Height:	1.83			
Material:	Concrete		Count:	4			
Element Type:			Total Quantity:	22.32 m ²			
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			11.16	11.16		Yes
Comments:	Surface spalling & cracking was observed at each wingwall.						
Recommended Work:	None 6-10 Years <input type="checkbox"/> 1-5 Years <input checked="" type="checkbox"/> < 1 Year Urgent Repair all poor concrete, clean reinforcing steel, and replace concrete.						

Element Data

Element Group:	Foundations		Length:				
Element Name:	Foundation (below ground level)		Width:				
Location:			Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:	√			
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
						Yes	Yes
Comments:	Limited inspection due to high water level. Previous reports indicated poor condition of concrete. See 2020 report for more information.						
Recommended Work:	None 6-10 Years <input type="checkbox"/> 1-5 Years <input checked="" type="checkbox"/> < 1 Year Urgent Repair all poor concrete and place erosion protection south side. Further investigation required.						

Element Data

Element Group:	Embankments & Streams		Length:				
Element Name:	Streams and Waterways		Width:				
Location:			Height:				
Material:	Earth / Stone		Count:				
Element Type:			Total Quantity:	All			
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	All			All			
Comments:	Low velocity stream/ municipal drain has been dredged in the past. The bed appears stable with no obstructions observed.						
Recommended Work:	<input checked="" type="checkbox"/> None <input type="checkbox"/> 6-10 Years <input type="checkbox"/> 1-5 Years <input type="checkbox"/> < 1 Year Urgent						

Element Data**Structure:** 1

Element Group:	Embankments & Streams		Length:				
Element Name:	Embankments		Width:				
Location:			Height:				
Material:	Earth / Stone		Count:				
Element Type:			Total Quantity:	6			
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each			4	2	Yes	Yes
Comments:	Stone and well vegetated Earth embankments with some erosion observed along the back of the wingwall.						
Recommended Work:	None 6-10 Years <input checked="" type="checkbox"/> 1-5 Years < 1 Year Urgent Stabilize the eroded slopes by adding rip rap and/or rock protection.						

Element Data

Element Group:	Embankments & Streams		Length:				
Element Name:	Slope Protection		Width:				
Location:			Height:				
Material:	Earth / Stone		Count:				
Element Type:			Total Quantity:	6			
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each			4	2	Yes	Yes
Comments:	Stone and well vegetated Earth embankments with some erosion observed along the back of the wingwall.						
Recommended Work:	None 6-10 Years <input checked="" type="checkbox"/> 1-5 Years < 1 Year Urgent Stabilize the eroded slopes by adding rip rap and/or rock protection.						

Element Data

Element Group:	Signs		Length:				
Element Name:	Signs		Width:				
Location:			Height:				
Material:	Steel		Count:				
Element Type:			Total Quantity:	4			
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			4		Yes	Yes
Comments:	Load limit, speed limit and narrow structure signs in place, but are not plumb and require straightening vertically.						
Recommended Work:	None 6-10 Years 1-5 Years <input checked="" type="checkbox"/> < 1 Year Urgent Place four end hazard signs and straighten existing signs.						

Element Data**Structure:** 1

Element Group:	Approaches		Length:	5 m			
Element Name:	Wearing Surface		Width:	5 m			
Location:			Height:				
Material:	Gravel		Count:	2			
Element Type:			Total Quantity:	50 m ²			
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²			50			Yes
Comments:	Shoulder vegetation has started to encroach on the roadway. Minor potholes and wheel path rutting have developed at each approach.						
Recommended Work:	None 6-10 Years 1-5 Years <input checked="" type="checkbox"/> < 1 Year Urgent Grade the shoulders and clear the encroaching vegetation.						

Element Data

Element Group:	Approaches		Length:				
Element Name:	Drainage		Width:				
Location:			Height:				
Material:	Gravel		Count:				
Element Type:			Total Quantity:	4			
Environment:	Severe		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each				4	Yes	Yes
Comments:	Shoulder vegetation has started to encroach on the roadway.						
Recommended Work:	None 6-10 Years 1-5 Years <input checked="" type="checkbox"/> < 1 Year Urgent Grade the shoulders and clear the encroaching vegetation.						



Photo 1-2: South abutment, soffit and exterior girder.



Photo 1-3: North abutment, girders and soffit with spalling and delamination

Date of Photos: Dec. 5, 2022



Photo 1-4: South abutment wall, soffit and girders



Photo 1-5: Wingwall deterioration (typ)

Date of Photos: Dec. 5, 2022



Photo 1-6 - Structure barrier and excessive granular fill on deck



Photo 1-7 - Embankment erosion behind south footing and abutment (Sept. 24, 2020)

Date of Photos: Dec. 5, 2022



Photo 1-8 - Vegetation and debris accumulation along shoulders, potholes in wearing surface



Photo 1-9 - Structure elevation, exterior soffit, curb and barrier

Date of Photos: Dec. 5, 2022



Photo 1-10 - View of watercourse upstream



Photo 1-11- View of watercourse downstream

Date of Photos: Dec. 5, 2022



Photo 1-12 - Abutment wall drain and wingwall

Date of Photos: Dec. 5, 2022

Bridge/Culvert Inspection Report

Site Number	<input type="text" value="2"/>	Project Number	<input type="text" value="221-12948-00"/>
Structure Name	<input type="text" value="10th Sideroad Bridge"/>	Municipality	<input type="text" value="Northern Bruce Peninsula"/>
MTO Region Code	<input type="text" value="30"/>	County	<input type="text" value="Bruce"/> Code <input type="text" value="02"/>
MTO District Code	<input type="text" value="33"/>	Geographic Twp Code	<input type="text" value="377"/>



1450 - 1st Avenue West, Suite 101
Owen Sound, Ontario N4K 6W2

Tel: 519-376-7612
Fax: 519-376-8008
Website: www.wspgroup.com

Bridge/Culvert Inspection Report

Inventory Data

Structure Name	10th Sideroad Bridge	Site Number	2
County	Bruce	Road Name	10th Sideroad
Municipality	Northern Bruce Peninsula	Road Type	Rural Local
Bridge or Culvert	Bridge	Owner	Northern Bruce Peninsula
Structure Type	Concrete Slab - Open Footing	AADT	150
Span (m)	6.2 No. 1	% Trucks	15%
Height (m)	2.7	Overall Structure Width (m)	6.75
Direction of Structure	North/South - 20° skew	Roadway Width (m)	6.1
Year Built/Rehabilitated	1940	Total Deck Length (m)	6.1
Current Load Limit	8 t	Total Deck Area (s.m.)	52
Detour Length (km)	6	Heritage Des.	None
Waterway	Judges Creek		

Inspection Data

Date of Inspection	December 5, 2022	Photos: 2-1 - Title Page 2-2 - Spalling of exterior curb 2-3 - Structure deck 2-4 - West abutment and south exterior soffit 2-5 - Structure elevation, wingwalls, exterior curb and soffit 2-6 - Extreme efflorescence at joints 2-7 - Erosion at structure footing, efflorescence of wingwall (typical) 2-8 - Delamination of soffit 2-9 - Load limit posting 2-10 - View of watercourse upstream 2-11 - View of watercourse downstream Photo 2-12: Wingwall, abutment wall and exterior soffit delamination.	
Name of Inspector	Evan Montreuil, P.Eng.		
Equipment Used	Tape, pick, hammer		
Weather Conditions	Overcast		
Temperature	5°C		
Last Inspection	October 30, 2020		
Additional Investigation Required	Undertake annual inspections - deck soffit and foundation, load limit analysis		
Total Rehabilitation	Install approach and barrier protection, complete concrete beam, soffit and curb repair and footing/foundation underpinning. Place foundation erosion protection. (Replacement recommended)		
Total Rehabilitation Budget Costing	\$300,000	Next Inspection	December 2023
Justification	Due to the age, poor condition, and load carrying capacity, complete replacement is recommended as being most cost effective for long term service life. Reduce the posted speed limit to 35 km/hr. until barrier protection installed. Maintain or further reduce the load limit following completion of additional investigations.		

Element Data**Structure:** 2

Element Group:	Decks		Length:	6.7 m			
Element Name:	Wearing Surface		Width:	6.1 m			
Location:			Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:	40.87 m ²			
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²			36.79	4.08		Yes
Comments:	Moderate surface wear observed throughout. Granulars and debris have accumulated along the curb.						
Recommended Work:	None		6-10 Years	1-5 Years	<input checked="" type="checkbox"/> < 1 Year	Urgent	
	Clear granulars and debris along curb and clean structure deck annually.						

Element Data

Element Group:	Decks		Length:	6.7 m			
Element Name:	Deck Top		Width:	6.1 m			
Location:			Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:	40.87 m ²			
Environment:	Severe		Limited Insp'n:	Yes			
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²			36.79	4.08	Yes	Yes
Comments:	Pitting of the concrete surface was observed throughout the deck length due to snow removal and grading of deck. Small delamination observed.						
Recommended Work:	None		6-10 Years	1-5 Years	<input checked="" type="checkbox"/> < 1 Year	Urgent	
	Clear granular debris along the curb annually and complete concrete repairs.						

Element Data

Element Group:	Decks		Length:	6.2 m			
Element Name:	Soffit - Thick Slab		Width:	6.75 m			
Location:			Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:	41.85 m ²			
Environment:	Benign		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²			16.74	25.11	Yes	Yes
Comments:	Cracking was observed between slab and abutment at the construction joint with rebar exposed and evidence of active corrosion. Heavy spalling and leachate were observed throughout the soffit.						
Recommended Work:	None		6-10 Years	<input checked="" type="checkbox"/> 1-5 Years	< 1 Year	Urgent	
	Remove the poor concrete, clean the reinforcing steel, and replace the concrete.						

Element Data**Structure:** 2

Element Group:	Curbs/Sidewalk		Length:	14 m			
Element Name:	Curbs		Width:	0.31 m			
Location:	Each Side		Height:	0.31 m			
Material:	Concrete		Count:	2			
Element Type:			Total Quantity:	2.69 m ²			
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²			1.08	1.61	Yes	Yes
Comments:	No barrier currently in place and the structure is debris covered. The exterior curb (south side) has heavy delaminations, the north side has some delamination. Reduce the speed limit to 35 km/hr until barrier protection is installed to Code.						
Recommended Work:	None	6-10 Years	1-5 Years (Replace)	< 1 Year	Urgent (Barrier Protection)		
	Install barrier to provide required vehicle safety, repair concrete and clear debris.						

Element Data

Element Group:	Abutments		Length:	6.75 m			
Element Name:	Abutment Walls		Width:				
Location:	Each Side		Height:	1.95 m			
Material:	Concrete		Count:	2			
Element Type:			Total Quantity:	26.32 m ²			
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²			13.16	13.16		
Comments:	Hairline cracks were observed at the cold joints in each quadrant. Vertical hairline cracks at approximately 6' are showing water staining.						
Recommended Work:	None	6-10 Years	1-5 Years	< 1 Year	Urgent		
	Replace the abutment walls when structure is replaced.						

Element Data

Element Group:	Foundations		Length:				
Element Name:	Foundation (below ground level)		Width:				
Location:	Each End		Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:	Yes			
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
						Yes	Yes
Comments:	Concrete spalling was observed underwater and the southeast and southwest corners are undermined.						
Recommended Work:	None	6-10 Years	1-5 Years	< 1 Year	Urgent		
	Provide erosion protection and underpin the foundation/footings with concrete. Replace foundations when the structure is replaced.						

Element Data**Structure:** 2

Element Group:	Embankments & Streams		Length:				
Element Name:	Streams and Waterways		Width:				
Location:			Height:				
Material:			Count:				
Element Type:			Total Quantity:	All			
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	All			All			
Comments:	Visible scour around concrete at southeast and northwest corners.						
Recommended Work:	None 6-10 Years <input checked="" type="checkbox"/> 1-5 Years < 1 Year Urgent Remove debris buildup and place rock protection to prevent further scour.						

Element Data

Element Group:	Embankments & Streams		Length:				
Element Name:	Embankments		Width:				
Location:	Each Corner		Height:				
Material:			Count:	4			
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each			6			Yes
Comments:	The embankments are heavily vegetated with some erosion evident at each quadrant.						
Recommended Work:	None 6-10 Years <input checked="" type="checkbox"/> 1-5 Years < 1 Year Urgent Place rip-rap erosion protection to repair and prevent further erosion of embankments.						

Element Data

Element Group:	Signs		Length:				
Element Name:	Signs		Width:				
Location:	Each Corner		Height:				
Material:	Steel		Count:	2			
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each			2		Yes	Yes
Comments:	Two 8 tonne load limit signs at approaches. No end hazard signs are present.						
Recommended Work:	None 6-10 Years 1-5 Years <input checked="" type="checkbox"/> < 1 Year Urgent Install end hazard and 35 km/hr speed limit signs to provide required vehicle safety.						

Element Data**Structure:** 2

Element Group:	Approaches		Length:	5 m			
Element Name:	Wearing Surface		Width:	3.9 m			
Location:	Each End		Height:				
Material:	Gravel		Count:	2			
Element Type:			Total Quantity	39 m ²			
Environment:	Severe		Limited Insp'n				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencie	Maint. Needs
	m ²			35.1	4.9	Yes	Yes
Comments:	Heavy vegetation was observed along the shoulder. Saturated road base observed due to poor drainage. Wheel path rutting was observed with small potholes starting to form.						
Recommended Work:	None	6-10 Years	1-5 Years	<input checked="" type="checkbox"/> < 1 Year	Urgent		
	Annual grading or the wearing surface and shoulders is recommended for drainage.						



Photo 2-2: Spalling of exterior curb



Photo 2-3: Structure deck

Date of Photos: Dec. 5, 2022



Photo 2-4: West abutment and south exterior soffit



Photo 2-5: Structure elevation, wingwalls, exterior curb and soffit

Date of Photos: Dec. 5, 2022



Photo 2-6: Extreme efflorescence at joints



Photo 2-7: Erosion at structure footing, efflorescence of wingwall (typ)

Date of Photos: Dec. 5, 2022



Photo 2-8: Delamination of soffit



Photo 2-9: Load limit posting

Date of Photos: Dec. 5, 2022



Photo 2-10: View of watercourse upstream



Photo 2-11: View of watercourse downstream

Date of Photos: Dec. 5, 2022



Photo 2-12: Wingwall, abutment wall and exterior soffit delamination.

Date of Photos: Dec. 5, 2022

Bridge/Culvert Inspection Report

Site Number	<input type="text" value="3"/>	Project Number	<input type="text" value="221-12948-00"/>
Structure Name	<input type="text" value="Cherry Hill Road Bridge"/>	Municipality	<input type="text" value="Northern Bruce Peninsula"/>
MTO Region Code	<input type="text" value="30"/>	County	<input type="text" value="Bruce"/> <input type="text" value="Code"/> <input type="text" value="02"/>
MTO District Code	<input type="text" value="33"/>	Geographic Twp Code	<input type="text" value="377"/>



1450 - 1st Avenue West, Suite 101
Owen Sound, Ontario N4K 6W2

Tel: 519-376-7612
Fax: 519-376-8008
Website: www.wspgroup.com

Bridge/Culvert Inspection Report

Inventory Data

Structure Name	Cherry Hill Road Bridge	Site Number	3
County	Bruce	Road Name	Cherry Hill
Municipality	Northern Bruce Peninsula	Road Type	Rural Local
Bridge or Culvert	Bridge	Owner	Northern Bruce Peninsula
Structure Type	Concrete Beam	AADT	50
Span (m)	6.1 No. 1	% Trucks	15%
Height (m)	1.4	Overall Structure Width (m)	5.5
Direction of Structure	East/West	Roadway Width (m)	5
Year Built/Rehabilitated	1940	Total Deck Length (m)	7.3
Current Load Limit	15 t	Total Deck Area (s.m.)	40
Detour Length (km)	N/A - Dead End	Heritage Des.	None
Waterway	Stokes/Chin Creek		

Inspection Data

Date of Inspection	December 6, 2022	Photos: 3-1 - Title Page - General 3-2 - View of structure from north approach 3-3 - View of upstream watercourse 3-4 - View of downstream watercourse 3-5 - Structure and approach wearing surface with wheel path rutting and encroaching vegetation 3-6 - East structure elevation, exterior girder and barrier wall 3-7 - Wingwall and exterior curb (typical) 3-8 - Exterior girder delamination and spalling 3-9 - View of concrete girders and soffits 3-10 - View of west structure elevation, exterior girder and barrier wall	
Name of Inspector	Evan Montreuil, P.Eng.		
Equipment Used	Tape, pick, hammer		
Weather Conditions	Overcast, partly sunny		
Temperature	5°C		
Last Inspection	September 24, 2020		
Additional Investigation Required	Deck condition survey, foundation inspection.		
Total Rehabilitation	Install approach protection and upgrade barrier protection to meet current code. Repair concrete girders, soffit and footings. Place foundation erosion protection. Place narrow structure, speed limit 35 km/hr sign and speed limit end hazard signs. Remove the excess granulars from the deck.		
Total Rehabilitation Budget Costing	\$160,000	Next Inspection	December 2024
Justification	Due to low traffic and fair condition, maintain the 15 tonne load limit and undertake rehabilitation to extend service life versus replacement. Reduce the speed limit to 35 km/hr. until barrier protection is upgraded and approach protection installed. Remove the excess granular fill and complete a deck condition inspection. Complete sub-structure investigation to determine extent of undercutting.		

Element Data**Structure:** 3

Element Group:	Decks		Length:	7.3			
Element Name:	Wearing Surface		Width:	5			
Location:			Height:				
Material:	Gravel		Count:				
Element Type:			Total Quantity:	36.5			
Environment:	Severe		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²			18.25	18.25	Yes	Yes
Comments:	Excess granular fill with wheel path rutting and heavily vegetated grass shoulders were observed.						
Recommended Work:	None 6-10 Years 1-5 Years <input checked="" type="checkbox"/> < 1 Year Urgent Annual grading, clear vegetation to achieve positive drainage. Reduce excess of granular fill on bridge.						

Element Data

Element Group:	Decks		Length:	7.3			
Element Name:	Deck Top		Width:	5			
Location:			Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:	36.5			
Environment:	Moderate		Limited Insp'n:	√			
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²			36.5		Yes	Yes
Comments:	The concrete deck is not visible for inspection due to cover with excessive granular fill, but is assumed to be in fair condition based on wearing surface observations.						
Recommended Work:	None 6-10 Years <input checked="" type="checkbox"/> 1-5 Years < 1 Year Urgent Remove excess granular fill and sound the structure deck to investigate condition.						

Element Data

Element Group:	Decks		Length:	7			
Element Name:	Soffit - Thick Slab		Width:	5.5			
Location:			Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:	28.47			
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²			25.62	2.85	Yes	Yes
Comments:	Some cracking and spalled surfaces were observed with more severe spalling of the exterior soffit.						
Recommended Work:	None 6-10 Years <input checked="" type="checkbox"/> 1-5 Years < 1 Year Urgent Remove all poor concrete areas, clean the reinforcing steel, and replace concrete.						

Element Data

Element Group:	Sidewalks/curbs	Length:	11.3				
Element Name:	Curbs	Width:	0.15				
Location:		Height:	0.4				
Material:	Concrete	Count:	2				
Element Type:		Total Quantity:	12.43				
Environment:	Severe	Limited Insp'n:	√				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²			9.94	2.49	Yes	Yes
Comments:	Surface spalling of the exterior curb was observed. Limited inspection of the interior curb due to granular fill and heavily vegetated curb line.						
Recommended Work:	None 6-10 Years <input checked="" type="checkbox"/> 1-5 Years < 1 Year Urgent Clear the vegetation along the curb face and repair all poor concrete areas.						

Element Data

Element Group:	Barriers	Length:	7.3				
Element Name:	Barrier/Parapet Walls	Width:	0.3				
Location:		Height:	0.8				
Material:	Concrete	Count:	2				
Element Type:		Total Quantity:	11.68				
Environment:	Severe	Limited Insp'n:					
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²			9.34	1.17	Yes	Yes
Comments:	Parapet wall has observed surface cracks, spalling, and damaged ends. The current height does not meet Code and there is no approach protection in place.						
Recommended Work:	None 6-10 Years <input checked="" type="checkbox"/> 1-5 Years < 1 Year Urgent Remove all areas of poor concrete, clean reinforcing steel, and replace concrete. Add a top rail and place approach barrier protection to meet current Code.						

Element Data

Element Group:	Beams/MLE's	Length:	7				
Element Name:	Girders	Width:	0.33				
Location:		Height:	0.48				
Material:	Concrete	Count:	4				
Element Type:		Total Quantity:	36.12				
Environment:	Moderate	Limited Insp'n:					
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²			27.09	9.03	Yes	Yes
Comments:	Poor concrete was observed at the abutment walls. The concrete at the bottom of the exterior girders has spalled exposing the rebar.						
Recommended Work:	None 6-10 Years <input checked="" type="checkbox"/> 1-5 Years < 1 Year Urgent Repair exterior girders remove delaminated concrete, clean the rebar, and pour new concrete.						

Element Data

Element Group:	Abutments		Length:				
Element Name:	Abutment Walls		Width:	5.5			
Location:			Height:	1.5			
Material:	Concrete		Count:	2			
Element Type:			Total Quantity:	16.5			
Environment:	Moderate		Limited Insp:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²			16.5			
Comments:	Some minor surface cracking & spalling were observed. There are 4 100 mm by 100 mm rectangular drain holes.						
Recommended Work:	None <input checked="" type="checkbox"/> 6-10 Years <input type="checkbox"/> 1-5 Years <input type="checkbox"/> < 1 Year <input type="checkbox"/> Urgent Remove all poor concrete, clean reinforcing steel, and replace concrete.						

Element Data

Element Group:	Abutments		Length:	2.5			
Element Name:	Wingwalls		Width:				
Location:			Height:	1.2			
Material:	Concrete		Count:	4			
Element Type:			Total Quantity:	12			
Environment:	Moderate		Limited Insp:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²			12			
Comments:	Minor surface spalling & cracking were observed.						
Recommended Work:	None <input checked="" type="checkbox"/> 6-10 Years <input type="checkbox"/> 1-5 Years <input type="checkbox"/> < 1 Year <input type="checkbox"/> Urgent Remove all poor concrete, clean reinforcing steel, and replace concrete.						

Element Data

Element Group:	Foundations		Length:				
Element Name:	Foundation (below ground level)		Width:				
Location:			Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp:	√			
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
						Yes	Yes
Comments:	Limited inspection - foundations are below water level. Visible portions of the north footing showing signs of significant erosion/undercutting.						
Recommended Work:	None <input type="checkbox"/> 6-10 Years <input checked="" type="checkbox"/> 1-5 Years <input type="checkbox"/> < 1 Year <input type="checkbox"/> Urgent Complete thorough inspection during low water conditions to determine extend of damage. Monitor erosion and conditions of foundations.						

Element Data

Element Group:	Embankments & Streams		Length:				
Element Name:	Streams and Waterways		Width:				
Location:			Height:				
Material:	Earth / Stone		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	All			All			
Comments:	The watercourse appears stable with no obstruction at the time of inspection.						
Recommended Work:	<input type="checkbox"/> None	<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent		

Element Data

Element Group:	Embankments & Streams		Length:				
Element Name:	Embankments		Width:				
Location:			Height:				
Material:	Earth / Stone		Count:	6			
Element Type:			Total Quantity:	6			
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each			6			
Comments:	The embankments are stone / earth (well vegetated) and appear stable.						
Recommended Work:	<input type="checkbox"/> None	<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent		

Element Data

Element Group:	Embankments & Streams		Length:				
Element Name:	Slope Protection		Width:				
Location:			Height:				
Material:	Earth / Stone		Count:	6			
Element Type:			Total Quantity:	6			
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each			6			
Comments:	The stone slope protection appears stable.						
Recommended Work:	<input type="checkbox"/> None	<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent		

Element Data

Element Group:	Signs		Length:				
Element Name:	Signs		Width:				
Location:			Height:				
Material:	Steel		Count:	1			
Element Type:			Total Quantity:	1			
Environment:	Severe		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each		2	1		Yes	Yes
Comments:	Only one load limit sign in place (south approach). No end hazard signs currently in place.						
Recommended Work:	None 6-10 Years 1-5 Years <input checked="" type="checkbox"/> < 1 Year Urgent Place four end hazard signs (one at each quadrant). Replace missing load limit sign at north approach. Place reduced speed limit of 35km/hr signs for increased road user safety until barrier protection is upgraded to meet current code. Straighten the south approach load limit sign.						

Element Data

Element Group:	Approaches		Length:	5			
Element Name:	Wearing Surface		Width:	5			
Location:			Height:				
Material:	Gravel		Count:	2			
Element Type:			Total Quantity:	50			
Environment:	Severe		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²			50			Yes
Comments:	Narrow granular surface approach is in fair condition with minor wheel path rutting observed. Heavily vegetated edge of shoulders are impeding drainage.						
Recommended Work:	None 6-10 Years 1-5 Years <input checked="" type="checkbox"/> < 1 Year Urgent Grade the approaches and shoulders annual to achieve positive drainage.						

Element Data

Element Group:	Approaches		Length:				
Element Name:	Drainage		Width:				
Location:			Height:				
Material:	Gravel		Count:				
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			50	50	Yes	Yes
Comments:	Heavy (grass) vegetation on shoulders should be cleared to improve drainage.						
Recommended Work:	None 6-10 Years 1-5 Years <input checked="" type="checkbox"/> < 1 Year Urgent Grade the shoulders annually to promote positive drainage.						



Photo 3-2: View of structure from the south approach



Photo 3-3: View of upstream watercourse

Date of Photos: Dec. 6, 2022



Photo 3-4: View of watercourse downstream



Photo 3-5: Structure and approach wearing surface with wheel path rutting and encroaching vegetation

Date of Photos: Dec. 6, 2022



Photo 3-6: East structure elevation, exterior girder and barrier wall



Photo 3-7: Wingwall and exterior curb (typical)

Date of Photos: Dec. 6, 2022



Photo 3-8: Exterior girder delamination and spalling

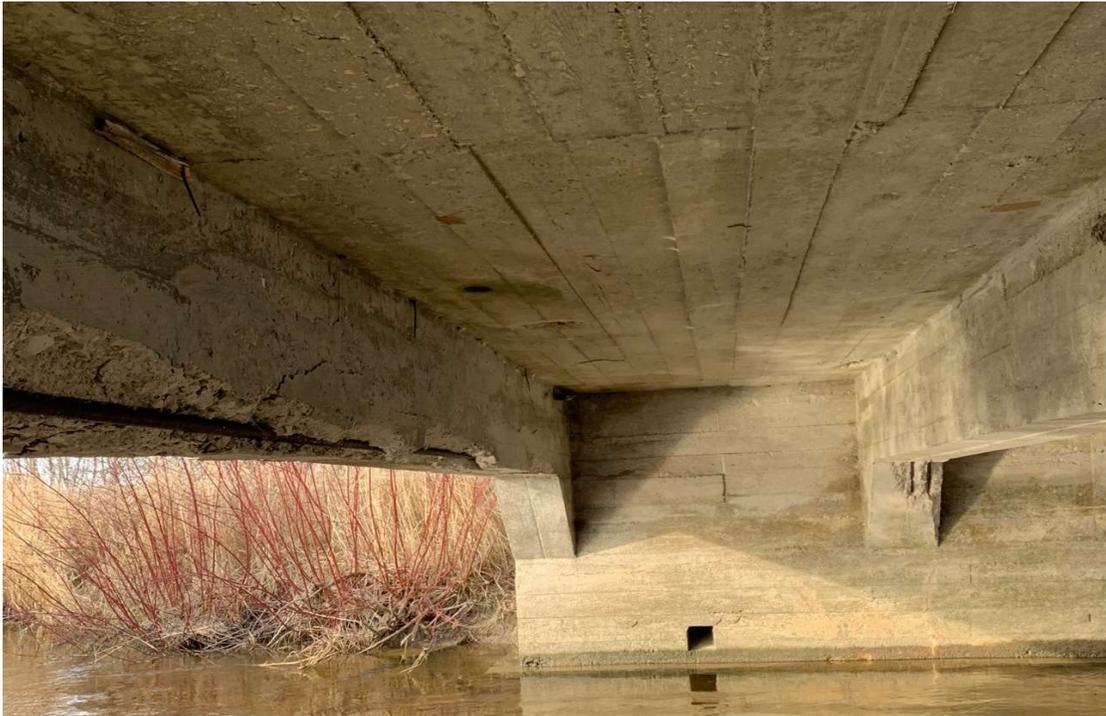


Photo 3-9: View of concrete girders and soffit

Date of Photos: Dec. 6, 2022



Photo 3-10: View of west structure elevation, exterior girder and barrier wall

Date of Photos: Dec. 6, 2022

Bridge/Culvert Inspection Report

Site Number	<input type="text" value="4"/>	Project Number	<input type="text" value="221-12948-00"/>	
Structure Name	<input type="text" value="Ira Lake Road Bridge"/>	Municipality	<input type="text" value="Northern Bruce Peninsula"/>	
MTO Region Code	<input type="text" value="30"/>	County	<input type="text" value="Bruce"/>	Code <input type="text" value="02"/>
MTO District Code	<input type="text" value="33"/>	Geographic Twp Code	<input type="text" value="377"/>	



1450 - 1st Avenue West, Suite 101
Owen Sound, Ontario N4K 6W2

Tel: 519-376-7612
Fax: 519-376-8008
Website: www.wspgroup.com

Bridge/Culvert Inspection Report

Inventory Data

Structure Name	Ira Lake Road Bridge	Site Number	4
County	Bruce	Road Name	Ira Lake (Old Hwy #6)
Municipality	Northern Bruce Peninsula	Road Type	Rural Local
Bridge or Culvert	Bridge	Owner	Northern Bruce Peninsula
Structure Type	Rigid Frame - Open Footing	AADT	150
Span (m)	4.5 No. 1	% Trucks	15%
Height (m)	1.2	Overall Structure Width (m)	5.7
Direction of Structure	East/West - 15° skew	Roadway Width (m)	3.3
Year Built/Rehabilitated	1925	Total Deck Length (m)	4.7
Current Load Limit	5 t	Total Deck Area (s.m.)	24
Detour Length (km)	16	Heritage Des.	None
Waterway	Spring Creek		

Inspection Data

Date of Inspection	December 6, 2022	Photos: 4-1 - Title Page - General 4-2 - View of east structure elevation, wingwalls, exterior curb and barrier 4-3 - View of soffit and abutment wall 4-4 - View of soffit 4-5 - Wearing surface deterioration 4-6 - View of south abutment wall 4-7 - View of west structure elevation, exterior soffit, curb and barrier 4-8 - View of watercourse upstream 4-9 - View of watercourse downstream	
Name of Inspector	Evan Montreuil, P.Eng.		
Equipment Used	Tape, pick, hammer		
Weather Conditions	Overcast		
Temperature	5°C		
Last Inspection	October 30, 2020		
Additional Investigation Required	Annual inspections, complete structural condition survey and load limit analysis if left in service.		
Total Rehabilitation	Replacement recommended versus rehabilitation.		
Total Rehabilitation Budget Costing	\$230,000	Next Inspection	December 2023
Justification	Due to the age and poor condition of the structure, replacement is recommended as being the most cost effective for long-term service life. Maintain load limit of 5t or reduce further following condition assessment, inspect annually and maintain speed limit of 35 km/hr. until structure is replaced or when approach and barrier protection is installed to Code.		

Element Data**Structure:** 4

Element Group:	Decks		Length:	4.1 m			
Element Name:	Deck Top		Width:	5.1 m			
Location:			Height:	0.3 m			
Material:	Concrete		Count:				
Element Type:			Total Quantity:	20.91 m ²			
Environment:	Moderate		Limited Insp'n:	√			
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²			15.68	5.23	Yes	Yes
Comments:	Limited inspection due to granular wearing surface cover, but where the deck is visible there is observed spalling and delamination.						
Recommended Work:	None 6-10 Years <input checked="" type="checkbox"/> 1-5 Years < 1 Year Urgent Clear the granular fill from the structure and remove all poor concrete, clean reinforcing steel, and replace concrete.						

Element Data

Element Group:	Decks		Length:	4.5 m			
Element Name:	Soffit - Thick Slab		Width:	5.7 m			
Location:			Height:	0.3 m			
Material:	Concrete		Count:				
Element Type:			Total Quantity:	25.65 m ²			
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²			18	7.65	Yes	Yes
Comments:	Spalling and severe delamination with exposed steel observed around drain holes and exterior soffit.						
Recommended Work:	None 6-10 Years 1-5 Years <input checked="" type="checkbox"/> < 1 Year Urgent Remove all poor concrete, clean reinforcing steel, and replace concrete.						

Element Data

Element Group:	Decks		Length:				
Element Name:	Drainage		Width:				
Location:			Height:				
Material:	Concrete		Count:	4			
Element Type:			Total Quantity:	4			
Environment:	Severe		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each				4	Yes	Yes
Comments:	Four 75 mm dia. holes through curb are plugged and ineffective.						
Recommended Work:	None 6-10 Years 1-5 Years <input checked="" type="checkbox"/> < 1 Year Urgent Patch the drain holes with concrete and grade structure to achieve positive drainage.						

Element Data**Structure:** 4

Element Group:	Sidewalks/curbs		Length:	5.1 m			
Element Name:	Curbs		Width:	0.46 m			
Location:			Height:	0.125 m			
Material:	Concrete		Count:	2			
Element Type:			Total Quantity:	5.97m ²			
Environment:	Severe		Limited Insp'n:	Yes			
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²			2.99	2.99	Yes	Yes
Comments:	Limited inspection due to cover with granular fill. Where visible for inspection (exterior curb) there is surface spalling and delamination.						
Recommended Work:	None 6-10 Years <input type="checkbox"/> 1-5 Years <input checked="" type="checkbox"/> < 1 Year <input type="checkbox"/> Urgent Clear granular fill, remove all poor concrete, clean reinforcing steel, and replace concrete.						

Element Data

Element Group:	Barriers		Length:	4.88 m			
Element Name:	Barrier/Parapet Walls		Width:				
Location:			Height:	0.81 m			
Material:	Concrete		Count:	2			
Element Type:			Total Quantity:	7.91 m ²			
Environment:	Severe		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²				7.91	Yes	
Comments:	The top concrete rail has observed delamination, surface spalling, and exposed reinforcing steel with section loss.						
Recommended Work:	None 6-10 Years <input type="checkbox"/> 1-5 Years <input type="checkbox"/> < 1 Year <input checked="" type="checkbox"/> Urgent Remove and replace the barrier and add approach barrier protection to meet current code requirements.						

Element Data

Element Group:	Barriers		Length:	0.16 m			
Element Name:	Posts		Width:	0.16 m			
Location:			Height:	0.81 m			
Material:	Concrete		Count:	22			
Element Type:			Total Quantity:	22			
Environment:	Severe		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	each				22	Yes	
Comments:	Surface spalling & exposed rebar was observed at the post bases. Loose connection between posts and deck. Nine interior posts are broken off and missing.						
Recommended Work:	None 6-10 Years <input type="checkbox"/> 1-5 Years <input type="checkbox"/> < 1 Year <input checked="" type="checkbox"/> Urgent Remove and replace with new barrier and add approach barrier protection to meet current code requirements.						

Element Data**Structure:** 4

Element Group:	Abutments		Length:				
Element Name:	Abutment Walls		Width:	5.69 m			
Location:			Height:	1.22 m			
Material:	Concrete		Count:	2			
Element Type:			Total Quantity:	6.94 m ²			
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²			0.69	6.25	Yes	Yes
Comments:	Surface cracking & severe spalling were observed on each abutment wall.						
Recommended Work:	None		6-10 Years	1-5 Years	<input checked="" type="checkbox"/> < 1 Year	Urgent	
	Remove all poor concrete, clean the reinforcing steel, and replace concrete.						

Element Data

Element Group:	Abutments		Length:	1.83 m			
Element Name:	Wingwalls		Width:	1.22 m			
Location:			Height:				
Material:	Concrete		Count:	4			
Element Type:			Total Quantity:	8.93 m ²			
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²			3.57	5.36	Yes	Yes
Comments:	Severe surface spalling, cracking, and section loss at top of footing were observed.						
Recommended Work:	None		6-10 Years	<input checked="" type="checkbox"/> 1-5 Years	< 1 Year	Urgent	
	Remove all poor concrete, clean the reinforcing steel, and replace concrete.						

Element Data

Element Group:	Foundations		Length:				
Element Name:	Foundation (below ground level)		Width:				
Location:			Height:	7.52			
Material:	Concrete		Count:	2			
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:	√			
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
						Yes	
Comments:	Limited inspection due to cover, however the top of footings are visibly exposed and under water with observed scaling and delamination of concrete.						
Recommended Work:	None		6-10 Years	<input checked="" type="checkbox"/> 1-5 Years	< 1 Year	Urgent	
	Remove all poor concrete, clean the reinforcing steel, and replace concrete.						

Element Data**Structure: 4**

Element Group:	Embankments & Streams		Length:				
Element Name:	Streams and Waterways		Width:				
Location:			Height:				
Material:	Earth / Stone / Bedrock		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiency	Maint. Needs
				All		Yes	Yes
Comments:	Scour at southeast corner and debris buildup at northeast corner.						
Recommended Work:	None		6-10 Years	<input checked="" type="checkbox"/> 1-5 Years	< 1 Year	Urgent	
	Place rock protection and clear debris buildup.						

Element Data

Element Group:	Embankments & Streams		Length:				
Element Name:	Embankments		Width:				
Location:			Height:				
Material:	Earth / Stone		Count:	4			
Element Type:			Total Quantity:	4			
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiency	Maint. Needs
	Each			4			
Comments:	Stone / Earth vegetated embankments are generally stable, with some minor bank erosion observed.						
Recommended Work:	None		6-10 Years	<input checked="" type="checkbox"/> 1-5 Years	< 1 Year	Urgent	
	Place rip rap erosion protection.						

Element Data

Element Group:	Signs		Length:				
Element Name:	Signs		Width:				
Location:			Height:				
Material:	Steel		Count:	7			
Element Type:			Total Quantity:	7			
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiency	Maint. Needs
	Each			6	1	Yes	Yes
Comments:	Load limit, narrow structure, and end hazard signs are in place but not plumb or facing traffic. The southeast end hazard sign is damaged and requires replacement. The South approach is missing load limit sign.						
Recommended Work:	None		6-10 Years	1-5 Years	<input checked="" type="checkbox"/> < 1 Year	Urgent	
	Maintain, straighten and align all signage with traffic. Replace the southwest end hazard sign. Replace south load limit sign. Place advanced load limit warning and reduced speed limit 35 km/hr signs.						

Element Data**Structure:** 4

Element Group:	Approaches		Length:	5 m			
Element Name:	Wearing Surface		Width:	3.96 m			
Location:			Height:				
Material:	Gravel		Count:	2			
Element Type:			Total Quantity:	39.6 m ²			
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²			29.7	9.9	Yes	Yes
Comments:	Wearing surface recently graded. Continue annual grading.						
Recommended Work:	None		6-10 Years	1-5 Years	<input checked="" type="checkbox"/> < 1 Year	Urgent	
	Grade approach and structure wearing surfaces annually.						

Element Data

Element Group:	Approaches		Length:				
Element Name:	Drainage		Width:				
Location:			Height:				
Material:	Earth/Gravel		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			100		Yes	Yes
Comments:	Shoulders heavy vegetated with grass which is impeding drainage.						
Recommended Work:	None		6-10 Years	<input checked="" type="checkbox"/> 1-5 Years	< 1 Year	Urgent	
	Clear vegetation off shoulders to achieve proper drainage.						



Photo 4-2: View of east structure elevation, wingwalls, exterior curb and barrier



Photo 4-3: View of soffit and abutment wall

Date of Photos: Dec. 6, 2022



Photo 4-4: View of soffit



Photo 4-5: Wearing surface deterioration

Date of Photos: Dec. 6, 2022



Photo 4-6: View of south abutment wall



Photo 4-7: View of west structure elevation, exterior soffit, curb and barrier

Date of Photos: Dec. 6, 2022



Photo 4-8: View of watercourse upstream



Photo 4-9: View of watercourse downstream

Date of Photos: Dec. 6, 2022

Bridge/Culvert Inspection Report

Site Number	5	Project Number	221-12948-00		
Structure Name	Stokes Bay Road/Copper Kettle Bridge	Municipality	Northern Bruce Peninsula		
MTO Region Code	30	County	Bruce	Code	02
MTO District Code	33	Geographic Twp Code	377		



1450 - 1st Avenue West, Suite 101
Owen Sound, Ontario N4K 6W2

Tel: 519-376-7612
Fax: 519-376-8008
Website: www.wspgroup.com

Bridge/Culvert Inspection Report

Inventory Data

Structure Name	Stokes Bay Road Bridge	Site Number	5
County	Bruce	Road Name	Stokes Bay Road
Municipality	Northern Bruce Peninsula	Road Type	Rural Coll.
Bridge or Culvert	Bridge	Owner	Northern Bruce Peninsula
Structure Type	Concrete - Rigid Frame	AADT	400
Span (m)	7.9 No. 1	% Trucks	10%
Height (m)	2		
Direction of Structure	East/West - 22° skew	Overall Structure Width (m)	10.7
Year Built/Rehabilitated	1950/1988	Roadway Width (m)	7.9
Current Load Limit	None	Total Deck Length (m)	7.9
Detour Length (km)	27	Total Deck Area (s.m.)	84.5
Waterway	Stokes River	Heritage Des.	None

Inspection Data

Date of Inspection	December 7, 2022	Photos: 5-1 - Title Page 5-2 - View of south structure elevation, exterior curb and soffit, wingwalls and slope protection 5-3 - Impact damage to southeast barrier protection 5-4 - Wooden barrier post rot (typical) 5-5 - Pedestrian (south side only) and structure barrier (typical) 5-6 - Southeast structure embankment erosion 5-7 - View of structure exterior soffit and curb 5-8 - View of structure soffit 5-9 - View of upstream watercourse 5-10 - View of downstream watercourse 5-11 - View of north structure elevation, exterior curb and soffit and northeast wingwall	
Name of Inspector	Evan Montreuil, P.Eng.		
Equipment Used	Tape, pick, hammer		
Weather Conditions	Overcast		
Temperature	4°C		
Last Inspection	October 30, 2020		
Additional Investigation Required	None		
Total Rehabilitation	Upgrade approach and barrier protection, sidewalk, and handrail. Complete foundation repair and place erosion protection. Repair soffit concrete at construction joint.		
Total Rehabilitation Budget Costing	\$150,000	Next Inspection	December 2024
Justification	Repair & rehabilitation recommended due to current good condition of structure to extend service life. Replace approach and barrier protection for road user safety.		

Element Data**Structure:** 5

Element Group:	Decks		Length:	7.4 m			
Element Name:	Wearing Surface		Width:	8.5 m			
Location:			Height:				
Material:	Asphalt		Count:				
Element Type:			Total Quantity:	62.9 m ²			
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²		62.9				
Comments:	The asphalt is in good condition.						
Recommended Work:	<input type="checkbox"/> None	<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent		

Element Data

Element Group:	Decks		Length:	7.4 m			
Element Name:	Deck Top		Width:	11.5 m			
Location:			Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:	85.1 m ²			
Environment:	Benign		Limited Insp'n:	Yes			
Protection System:	Wearing Surface						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²		85.1				
Comments:	Limited inspection due to wearing surface cover.						
Recommended Work:	<input type="checkbox"/> None	<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent		

Element Data

Element Group:	Decks		Length:	7.9 m			
Element Name:	Soffit - Thick Slab		Width:	10.7 m			
Location:			Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:	84.53 m ²			
Environment:	Benign		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²		59.17	17.02	8.45	Yes	Yes
Comments:	Cracking was observed at the base of the haunch at the construction joint and the construction cold joint extension section. There is leakage at the mid-span cold joint. An 8 m ² section of poor/delaminated concrete with significant corrosion of rebar was observed.						
Recommended Work:	<input type="checkbox"/> None	<input type="checkbox"/> 6-10 Years	<input checked="" type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent	Complete concrete repair at the mid-span cold joint.	

Element Data**Structure: 5**

Element Group:	Barrier		Length:	3.85 m			
Element Name:	Railing System		Width:				
Location:	Each Side		Height:				
Material:	Steel/Wood		Count:	16			
Element Type:	Flex Beam/Post		Total Quantity:	61.6 m			
Environment:	Severe		Limited Insp'n:				
Protection System:	Galvanized						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m			30.8	30.8	Yes	Yes
Comments:	The steel flex beam has observed impact damage to the southwest and southeast end sections. The wooden posts are showing signs of rot, with 50% of the posts having significant rot. The current configuration (the end termination) does not meet current code. There is a pedestrian barricade that does not meet code height for cyclists.						
Recommended Work:	None 6-10 Years <input checked="" type="checkbox"/> 1-5 Years < 1 Year Urgent Replace/install barrier to code to provide required vehicle safety.						

Element Data

Element Group:	Abutments		Length:	1.52 m			
Element Name:	Abutment Walls		Width:	10.7 m			
Location:	Each Side		Height:				
Material:	Concrete		Count:	2			
Element Type:			Total Quantity:	32.53 m ²			
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²		26.02	6.51			
Comments:	Hairline cracks were observed at the haunches in the cold joint. Vertical hairline cracks have observed water staining.						
Recommended Work:	<input checked="" type="checkbox"/> None 6-10 Years 1-5 Years < 1 Year Urgent						

Element Data

Element Group:	Abutments		Length:	1.55 m			
Element Name:	Wingwalls		Width:	1.57 m			
Location:			Height:				
Material:	Concrete		Count:	4			
Element Type:			Total Quantity:	9.74 m ²			
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²		3.2	4.6	1.94		Yes
Comments:	Hairline cracks with efflorescence were observed at the south wingwalls. Minor spalling and delamination's were observed at the southwest wingwall. The north wingwalls have moderate honeycombing.						
Recommended Work:	None <input checked="" type="checkbox"/> 6-10 Years 1-5 Years < 1 Year Urgent Remove all poor concrete, clean reinforcing steel, and replace concrete.						

Element Data**Structure:** 5

Element Group:	Foundations		Length:				
Element Name:	Foundation (below ground level)		Width:				
Location:	Each End		Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:	Yes			
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
Comments:	Not visible for inspection, however the structure appears stable and is founded on bedrock.						
Recommended Work:	<input type="checkbox"/> None	<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent		

Element Data

Element Group:	Embankments & Streams		Length:				
Element Name:	Streams and Waterways		Width:				
Location:			Height:				
Material:	Bedrock		Count:				
Element Type:			Total Quantity:	All			
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	All			All		Yes	Yes
Comments:	No signs of impedance to flow. Scour was observed around the concrete at the north inlet.						
Recommended Work:	<input type="checkbox"/> None	<input type="checkbox"/> 6-10 Years	<input checked="" type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent		
	Place rip rap slope protection to prevent further scour and repair the existing rip rap at the northwest quadrant.						

Element Data

Element Group:	Embankments & Streams		Length:				
Element Name:	Embankments		Width:				
Location:	Each Corner		Height:				
Material:	Stone/Earth		Count:				
Element Type:			Total Quantity:	4			
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each			2	4	Yes	Yes
Comments:	Heavily vegetated with rip rap and stone slope protection at the inlet and bedrock at the outlet. The northeast and southwest slopes have eroded and require repair and protection.						
Recommended Work:	<input type="checkbox"/> None	<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input checked="" type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent		
	Repair slopes and add additional rip rap/rock slope protection.						

Element Data**Structure:** 5

Element Group:	Signs		Length:				
Element Name:	Signs		Width:				
Location:	Each Corner		Height:				
Material:	Steel		Count:				
Element Type:			Total Quantity:	1			
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each		1			Yes	Yes
Comments:	The checkboard curve sign is in good condition. There are no end hazard marker signs currently in place.						
Recommended Work:	None		6-10 Years	1-5 Years	<input checked="" type="checkbox"/> < 1 Year	Urgent	
	Place new end marker hazard signs at each quadrant.						

Element Data

Element Group:	Approaches		Length:	5 m			
Element Name:	Wearing Surface		Width:	8.5 m			
Location:	Each End		Height:				
Material:	Asphalt		Count:	2			
Element Type:			Total Quantity:	85 m ²			
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²		75	10			
Comments:	The approach wearing surface is generally in good condition. Minor transverse cracking observed at each approach.						
Recommended Work:	<input checked="" type="checkbox"/> None		6-10 Years	1-5 Years	< 1 Year	Urgent	



Photo 5-2: View of south structure elevation, exterior curb and soffit, wingwalls and slope protection



Photo 5-3: Impact damage to southeast barrier protection

Date of Photos: Dec. 7, 2022



Photo 5-4: Wooden barrier post rot (typical)



Photo 5-5: Pedestrian (south side only) and structure barrier (typ)

Date of Photos: Dec. 7, 2022



Photo 5-6: Southeast structure embankment erosion



Photo 5-7: View of structure exterior soffit and curb

Date of Photos: Dec. 7, 2022



Photo 5-8: View of structure soffit



Photo 5-9: View of upstream watercourse

Date of Photos: Dec. 7, 2022



Photo 5-10: View of downstream watercourse



Photo 5-11: View of north structure elevation, exterior curb and soffit and northwest wingwall

Date of Photos: Dec. 7, 2022

Bridge/Culvert Inspection Report

Site Number	<input type="text" value="6"/>	Project Number	<input type="text" value="221-12948-00"/>		
Structure Name	<input type="text" value="Heron Point Road Bridge"/>	Municipality	<input type="text" value="Northern Bruce Peninsula"/>		
MTO Region Code	<input type="text" value="30"/>	County	<input type="text" value="Bruce"/>	Code	<input type="text" value="02"/>
MTO District Code	<input type="text" value="33"/>	Geographic Twp Code	<input type="text" value="377"/>		



1450 - 1st Avenue West, Suite 101
Owen Sound, Ontario N4K 6W2

Tel: 519-376-7612
Fax: 519-376-8008
Website: www.wspgroup.com

Bridge/Culvert Inspection Report

Inventory Data

Structure Name	Heron Point Road Bridge	Site Number	6
County	Bruce	Road Name	Heron Point Road
Municipality	Northern Bruce Peninsula	Road Type	Rural Local
Bridge or Culvert	Bridge	Owner	Northern Bruce Peninsula
Structure Type	Rigid Frame	AADT	200
Span (m)	7.1 No. 1	% Trucks	10%
Height (m)	2.5		
Direction of Structure	East/West - 15° skew	Overall Structure Width (m)	8.1
Year Built/Rehabilitated	1952	Roadway Width (m)	5.9
Current Load Limit	12 t	Total Deck Length (m)	8.3
Detour Length (km)	N/A - Dead Ends	Total Deck Area (s.m.)	67.2
Waterway	Stokes River	Heritage Des.	None

Inspection Data

Date of Inspection	December 7, 2022	Photos: 6-1 - Title Page 6-2 - View of structure deck with delamination and ponding 6-3 - View of structure from north approach 6-4 - View of west structure elevation, slope protection and exterior of parapet wall 6-5 - Damaged approach barrier flex beam and wood posts 6-6 - View of west structure elevation, wingwalls, exterior curb and parapet wall 6-7 - View of structure soffit 6-8 - View of foundation crack and abutment wall 6-9 - Differential foundation settlement 6-10 - View of watercourse downstream 6-11 - View of watercourse upstream 6-12 - Embankment and deficient barrier protection 6-13 - Differential foundation settlement 6-14 - View of wearing surface 6-15 - View of wingwall	
Name of Inspector	Evan Montreuil, P.Eng.		
Equipment Used	Tape, pick, hammer		
Weather Conditions	Overcast		
Temperature	4°C		
Last Inspection	July 3, 2020		
Additional Investigation Required	If the structure is to remain in service, a detailed investigation of the substructure and load limit analysis should be completed. In the interim, complete annual inspections and monitor the condition of the wingwalls and footing separation/scour frequently.		
Total Rehabilitation	Replacement or closure recommended as rehabilitation is no longer economically feasible.		
Total Rehabilitation Budget Costing	\$260,000	Next Inspection	December 2023
Justification	Due to the poor overall condition of the wingwalls and footings, it is recommended that replacement or permanent closure of the structure be completed. If the structure is to remain open and rehabilitation completed, a detailed structural evaluation and load carrying capacity analysis should be completed in order to confirm the extend of the repairs required and the safe load limit. Maintain the speed limit of 35 km/hr until approach barrier upgraded.		

Element Data**Structure:** 6

Element Group:	Decks		Length:	8.05 m			
Element Name:	Deck Top		Width:	5.9 m			
Location:			Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:	47.5 m ²			
Environment:	Severe		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²			35.6	11.9	Yes	Yes
Comments:	The structure deck has observed localized spalling and popouts, and is relatively flat allowing water to pond. Granulars have accumulated along south edge of the deck.						
Recommended Work:	None 6-10 Years <input checked="" type="checkbox"/> 1-5 Years < 1 Year Urgent Repair all poor and delaminated concrete, waterproof the structure deck, and place an asphalt wearing surface graded to achieve proper drainage.						

Element Data

Element Group:	Decks		Length:	7.41 m			
Element Name:	Soffit - Thick Slab		Width:	6.8 m			
Location:			Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:	50.39 m ²			
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²			45.35	5.04	Yes	Yes
Comments:	Observed spalling, cracking, and staining with effervescence of the soffit. The spalling is severe at all corners. The southeast haunch is in very poor condition.						
Recommended Work:	None 6-10 Years <input checked="" type="checkbox"/> 1-5 Years < 1 Year Urgent Remove all poor concrete, clean reinforcing steel and replace concrete.						

Element Data

Element Group:	Decks		Length:				
Element Name:	Drainage		Width:				
Location:			Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
						Yes	
Comments:	There are currently no deck drains in place and the grade is relatively flat allowing for water ponding.						
Recommended Work:	None 6-10 Years <input checked="" type="checkbox"/> 1-5 Years < 1 Year Urgent Following future deck rehabilitation, place a waterproofing membrane and asphalt wearing surface graded to achieve positive drainage.						

Element Data**Structure:** 6

Element Group:	Sidewalks/curbs		Length:	8.05			
Element Name:	Curbs		Width:	0.21			
Location:			Height:	0.21			
Material:	Concrete		Count:	2			
Element Type:			Total Quantity:	6.76 m ²			
Environment:	Severe		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²			5.41	1.35		
Comments:	The existing curbs have observed surface spalling and end chips. The northeast corner is severely spalled.						
Recommended Work:	None 6-10 Years <input checked="" type="checkbox"/> 1-5 Years < 1 Year Urgent Remove all poor concrete, clean reinforcing steel, and replace concrete.						

Element Data

Element Group:	Barriers		Length:	8.05			
Element Name:	Barrier/Parapet Walls		Width:	0.15			
Location:			Height:	1.15			
Material:	Concrete		Count:	2			
Element Type:			Total Quantity:	18.52 m ²			
Environment:	Severe		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²			16.67	1.85		
Comments:	Parapet wall with some spalling and end damage chips.						
Recommended Work:	None <input checked="" type="checkbox"/> 6-10 Years 1-5 Years < 1 Year Urgent Remove all poor concrete, clean reinforcing steel, and replace concrete.						

Element Data

Element Group:	Abutments		Length:				
Element Name:	Abutment Walls		Width:	7.8			
Location:			Height:	0.64			
Material:	Concrete		Count:	2			
Element Type:			Total Quantity:	9.98 m ²			
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²			8.98	1		
Comments:	Surface cracking & spalling observed throughout the abutment walls.						
Recommended Work:	None 6-10 Years <input checked="" type="checkbox"/> 1-5 Years < 1 Year Urgent Remove all poor concrete, clean reinforcing steel, and replace concrete.						

Element Data**Structure:** 6

Element Group:	Abutments		Length:				
Element Name:	Wingwalls		Width:	3.05			
Location:			Height:	0.6			
Material:	Concrete		Count:	2			
Element Type:			Total Quantity:	1.83 m ²			
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²				1.83	Yes	
Comments:	The northeast wingwall previously failed and was replaced with rock protection; however, severe scour was observed behind the rock protection and abutment wall/footing. The northwest wingwall is severely cracked and separating from the abutment wall connection.						
Recommended Work:	None 6-10 Years 1-5 Years < 1 Year <input type="checkbox"/> Urgent <input checked="" type="checkbox"/>						
	Monitor inlet conditions frequently. Replace wingwalls or place rock protection to prevent further scour/undercutting of abutment wall/footings.						

Element Data

Element Group:	Foundations		Length:				
Element Name:	Foundation (below ground level)		Width:	9.5			
Location:			Height:	0.85			
Material:	Concrete		Count:	2			
Element Type:			Total Quantity:	16.15			
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²				16.15	Yes	
Comments:	Footings are exhibiting severe spalling and delamination. Both footings are severely split longitudinally throughout, and are separating from the abutment walls. Damaged inlet wingwalls allowing water to flow through cracked sections causing concrete erosion and undermining the structure. Concrete between separation is very soft and unstable.						
Recommended Work:	None 6-10 Years 1-5 Years < 1 Year <input type="checkbox"/> Urgent <input checked="" type="checkbox"/>						
	Replace wingwalls and repair damaged/undermined footings to prevent further erosion and complete loss of structure stability.						

Element Data

Element Group:	Embankments & Streams		Length:				
Element Name:	Streams and Waterways		Width:				
Location:			Height:				
Material:	Earth / Stone / Rock		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	All			All			
Comments:	Bedrock streambed is stable and free of obstruction at the time of inspection.						
Recommended Work:	<input type="checkbox"/> None <input type="checkbox"/> 6-10 Years <input type="checkbox"/> 1-5 Years <input type="checkbox"/> < 1 Year <input type="checkbox"/> Urgent						

Element Data

Structure: 6

Element Group:	Embankments & Streams		Length:				
Element Name:	Embankments		Width:				
Location:			Height:				
Material:	Earth / Rock		Count:	4			
Element Type:			Total Quantity:	4			
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each			4			
Comments:	The embankments are a combination of rock and vegetated earth and appear generally stable with erosion observed at the structure inlet and outlet. Some corner erosion and settlement of the existing rock protection was observed. New rip rap placed in 2017 to protect the embankment exposed following the failure of the structure wingwall. (See wingwall notes)						
Recommended Work:	None 6-10 Years <input checked="" type="checkbox"/> 1-5 Years < 1 Year Urgent Place rip-rap and/or rock protection.						

Element Group:	Signs		Length:				
Element Name:	Signs		Width:				
Location:			Height:				
Material:	Steel / Wood		Count:				
Element Type:			Total Quantity:	10			
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each			10			
Comments:	Load limit (west), hazard, dead end, stop, narrow structure, and 35km/hr speed posting signs are all in fair condition.						
Recommended Work:	<input checked="" type="checkbox"/> None 6-10 Years 1-5 Years < 1 Year Urgent						

Element Data

Element Group:	Approaches		Length:	5 m			
Element Name:	Wearing Surface		Width:	5.9 m			
Location:			Height:				
Material:	Asphalt / Gravel		Count:	2			
Element Type:			Total Quantity:	59 m ²			
Environment:	Severe		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²			29.5	29.5		Yes
Comments:	The north approach is asphalt with observed stress cracking, and the south approach is a granular surface.						
Recommended Work:	None 6-10 Years <input checked="" type="checkbox"/> 1-5 Years < 1 Year Urgent Pave the south approach to reduce maintenance and improve drainage. In the interim, continue annual grading of the approach wearing surface and shoulders.						

Element Data**Structure:** 6

Element Group:	Approaches		Length:				
Element Name:	Drainage		Width:				
Location:			Height:				
Material:	Asphalt / Gravel		Count:				
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			50	50	Yes	
Comments:	Settlement (stress) and cracking of the north asphalt approach was observed.						
Recommended Work:	None 6-10 Years <input type="checkbox"/> 1-5 Years <input checked="" type="checkbox"/> < 1 Year Urgent Resurface the north side and pave south side. Provide a crown along the center line to achieve positive drainage.						

Element Data

Element Group:	Approaches		Length:				
Element Name:	Guiderail		Width:				
Location:			Height:				
Material:	Steel/Timber		Count:				
Element Type:	3 - Cable and Flex Beam		Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:	Galvanized						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			25	75	Yes	Yes
Comments:	The configuration of the flex beam on the north side of the structure does not meet Code. There are missing intermediate posts, improper connections to the structure parapet walls, and lack end protection. The 3-cable guiderail on the south approach is set too high, the cable is loose, several posts are broken, and the structure connection is not to code.						
Recommended Work:	None 6-10 Years <input type="checkbox"/> 1-5 Years <input checked="" type="checkbox"/> < 1 Year Urgent Upgrade the north approach barrier protection and structure connection to meet current code. Replace the 3-cable south side barrier with flex beam.						



Photo 6-2: View of structure deck with delamination



Photo 6-3: View of structure from south approach

Date of Photos: Dec. 7, 2022



Photo 6-4: View of west structure elevation, slope protection and exterior of parapet wall



Photo 6-5: View of approach barrier flex beam and wood posts

Date of Photos: Dec. 7, 2022



Photo 6-6: View of west structure elevation, wingwalls, exterior curb and parapet wall



Photo 6-7: View of structure soffit and footing/abutment wall.

Date of Photos: Dec. 7, 2022



Photo 6-8: View of foundation crack/separation and abutment wall



Photo 6-9: Foundation separation and concrete erosion.

Date of Photos: Dec. 7, 2022



Photo 6-10: View of watercourse downstream



Photo 6-11: View of watercourse upstream

Date of Photos: Dec. 7, 2022



Photo 6-12: Embankment and deficient barrier protection



Photo 6-13: Wingwall and footing separation.

Date of Photos: Dec. 7, 2022



Photo 6-14: View of wearing surface



Photo 6-15: View of abutment wall and footing spalling.

Date of Photos: Dec. 7, 2022

Bridge/Culvert Inspection Report

Site Number	<input type="text" value="7"/>	Project Number	<input type="text" value="221-12948-00"/>		
Structure Name	<input type="text" value="Lindsay Road 5 Culvert"/>	Municipality	<input type="text" value="Northern Bruce Peninsula"/>		
MTO Region Code	<input type="text" value="30"/>	County	<input type="text" value="Bruce"/>	Code	<input type="text" value="02"/>
MTO District Code	<input type="text" value="33"/>	Geographic Twp Code	<input type="text" value="377"/>		



1450 - 1st Avenue West, Suite 101
Owen Sound, Ontario N4K 6W2

Tel: 519-376-7612
Fax: 519-376-8008
Website: www.wspgroup.com

Bridge/Culvert Inspection Report

Inventory Data

Structure Name	Lindsay Road 5 Culvert	Site Number	7
County	Bruce	Road Name	Lindsay Road 5
Municipality	Northern Bruce Peninsula	Road Type	Rural Coll.
Bridge or Culvert	Culvert	Owner	Northern Bruce Peninsula
Structure Type	Rigid Frame	AADT	350
Span (m)	7.3 No. 1	% Trucks	15%
Height (m)	3.1	Overall Structure Width (m)	17.4
Direction of Structure	North/South	Roadway Width (m)	6.1
Year Built/Rehabilitated	1972	Total Deck Length (m)	8.4
Current Load Limit	None	Total Deck Area (s.m.)	146
Detour Length (km)	5.5	Heritage Des.	None
Waterway	Stokes River		

Inspection Data

Date of Inspection	September 24, 2020	Photos: 7-1 - Title Page 7-2 - View of watercourse upstream and upstream culvert end 7-3 - View of watercourse downstream and downstream culvert end 7-4 - Structure elevation 7-5 - Structure elevation 7-6 - View of soffit and abutment walls 7-7 - View of soffit	
Name of Inspector	Evan Montreuil, P.Eng.		
Equipment Used	Tape, pick, hammer		
Weather Conditions	Overcast		
Temperature	5°C		
Last Inspection	September 24, 2020		
Additional Investigation Required	None		
Total Rehabilitation	Install approach & barrier protection to Code. Repair soffit concrete. Seal the abutment cold joints. Repair bank erosion.		
Total Rehabilitation Budget Costing	\$58,000	Next Inspection	December 2024
Justification	The structure is in overall good condition. Construction of approach & barrier protection is justified for public safety and to meet code. Reduce the speed to 45 km/hr. until barrier protection is installed. Install end hazard signs to provide required vehicle safety.		

Element Data**Structure:** 7

Element Group:	Decks		Length:				
Element Name:	Wearing Surface		Width:				
Location:			Height:				
Material:	Surface Treatment		Count:				
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%	75	15	10			
Comments:	Asphalt wearing surface recently placed. Slight settlement was observed.						
Recommended Work:	<input type="checkbox"/> None <input type="checkbox"/> 6-10 Years <input type="checkbox"/> 1-5 Years <input type="checkbox"/> < 1 Year <input type="checkbox"/> Urgent						

Element Data

Element Group:	Decks		Length:				
Element Name:	Deck Top		Width:				
Location:			Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:				
Environment:	Benign		Limited Insp'n:	Yes			
Protection System:	Wearing Surface						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		95	5			
Comments:	The visible ends are in overall good condition with some minor spalling.						
Recommended Work:	<input type="checkbox"/> None <input type="checkbox"/> 6-10 Years <input type="checkbox"/> 1-5 Years <input type="checkbox"/> < 1 Year <input type="checkbox"/> Urgent						

Element Data

Element Group:	Decks		Length:				
Element Name:	Soffit - Thick Slab		Width:				
Location:			Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:				
Environment:	Benign		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		95		5		
Comments:	Honeycombing and exposed reinforcing steel observed at north end.						
Recommended Work:	<input type="checkbox"/> None <input type="checkbox"/> 6-10 Years <input type="checkbox"/> 1-5 Years <input type="checkbox"/> < 1 Year <input type="checkbox"/> Urgent						

Element Data**Structure:** 7

Element Group:	Abutments		Length:				
Element Name:	Abutment Walls		Width:				
Location:	Each Side		Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		80	20			
Comments:	Hairline cracks at cold joint in haunches and some spalling (honeycomb) on walls. Transverse cracking at cold joint, 1/3 way up from footing on each side. Minor spalling erosion from high water level down to footing.						
Recommended Work:	None <input type="checkbox"/> 6-10 Years <input checked="" type="checkbox"/> 1-5 Years <input type="checkbox"/> < 1 Year <input type="checkbox"/> Urgent <input type="checkbox"/> Concrete repairs, seal cold joint.						

Element Data

Element Group:	Foundations		Length:				
Element Name:	Foundation (below ground level)		Width:				
Location:	Each End		Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:	Yes			
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
Comments:	The foundations are not visible, but the structure appears stable.						
Recommended Work:	None <input type="checkbox"/> 6-10 Years <input type="checkbox"/> 1-5 Years <input type="checkbox"/> < 1 Year <input type="checkbox"/> Urgent <input type="checkbox"/>						

Element Data

Element Group:	Embankments & Streams		Length:				
Element Name:	Streams and Waterways		Width:				
Location:			Height:				
Material:	Earth / Rock		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100				
Comments:	No signs of impedance to flow at the time of inspection. Medium velocity watercourse.						
Recommended Work:	None <input type="checkbox"/> 6-10 Years <input type="checkbox"/> 1-5 Years <input type="checkbox"/> < 1 Year <input type="checkbox"/> Urgent <input type="checkbox"/>						

Element Data**Structure:** 7

Element Group:	Embankments & Streams		Length:				
Element Name:	Embankments		Width:				
Location:	Each Corner		Height:				
Material:	Earth / Rock		Count:	4			
Element Type:			Total Quantity:	4			
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each			4		Yes	Yes
Comments:	The embankments are heavily vegetated with rip rap protection on the slopes. The slopes are very steep, some moderate erosion observed.						
Recommended Work:	None		6-10 Years	1-5 Years	<input checked="" type="checkbox"/> < 1 Year	Urgent	
	Repair slope erosion protection.						

Element Data

Element Group:	Signs		Length:				
Element Name:	Signs		Width:				
Location:	Each Corner		Height:				
Material:			Count:				
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each					Yes	
Comments:	No end hazard signs at structure.						
Recommended Work:	None		6-10 Years	1-5 Years	<input checked="" type="checkbox"/> < 1 Year	Urgent	
	Install four end hazard signs to provide required vehicle safety.						

Element Data

Element Group:	Approaches		Length:				
Element Name:	Wearing Surface		Width:				
Location:	Each End		Height:				
Material:	Asphalt		Count:				
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		70	25	5		
Comments:	Slight settlement was observed at the deck ends. Alligator cracking observed along edge of eastbound lane. Transverse crack 5m east of deck.						
Recommended Work:	None		<input checked="" type="checkbox"/> 6-10 Years	1-5 Years	< 1 Year	Urgent	
	Repair road base prior to next scheduled road resurfacing.						



Photo 7-2: View of watercourse upstream and upstream culvert end



Photo 7-3: View of watercourse downstream and downstream culvert end

Date of Photos: Dec. 6, 2022



Photo 7-4: Structure Elevation



Photo 7-5: Wearing Surface

Date of Photos: Dec. 6, 2022



Photo 7-6: View of soffit and abutment walls



Photo 7-7: View of soffit

Date of Photos: Dec. 6, 2022

Bridge/Culvert Inspection Report

Site Number	<input type="text" value="8"/>	Project Number	<input type="text" value="221-12948-00"/>	
Structure Name	<input type="text" value="Isthmus Bay Road Bridge"/>	Municipality	<input type="text" value="Northern Bruce Peninsula"/>	
MTO Region Code	<input type="text" value="30"/>	County	<input type="text" value="Bruce"/>	Code <input type="text" value="02"/>
MTO District Code	<input type="text" value="33"/>	Geographic Twp Code	<input type="text" value="377"/>	



1450 - 1st Avenue West, Suite 101
Owen Sound, Ontario N4K 6W2

Tel: 519-376-7612
Fax: 519-376-8008
Website: www.wspgroup.com

Bridge/Culvert Inspection Report

Inventory Data

Structure Name	Isthmus Bay Road Bridge	Site Number	8
County	Bruce	Road Name	Isthmus Bay Road
Municipality	Northern Bruce Peninsula	Road Type	Rural Coll.
Bridge or Culvert	Bridge	Owner	Northern Bruce Peninsula
Structure Type	Concrete Slab	AADT	350
Span (m)	6.1 No. 1	% Trucks	10%
Height (m)	1.5	Overall Structure Width (m)	9.9
Direction of Structure	East/West	Roadway Width (m)	7.3
Year Built/Rehabilitated	1950/2000	Total Deck Length (m)	7.3
Current Load Limit	None	Total Deck Area (s.m.)	72
Detour Length (km)	14	Heritage Des.	None
Waterway	Swan Lake Drain		

Inspection Data

Date of Inspection	December 6, 2022	Photos: 8-1 - Title Page 8-2 - View of structure barrier, signage (typical) and encroaching vegetation 8-3 - View of watercourse upstream 8-4 - Deficient barrier termination and hazard signage 8-5 - View of watercourse downstream 8-6 - View of structure approach and deck wearing surface 8-7 - View of east structure elevation, wingwalls, exterior soffit and curb 8-8 - View of north abutment wall and bedrock streambed 8-9 - View of south abutment wall and soffit 8-10 - View of structure soffit 8-11 - View of east structure elevation, exterior barrier protection, curb and soffit 8-10 - View of abutment wall 8-11 - View of wingwall	
Name of Inspector	Evan Montreuil, P.Eng.		
Equipment Used	Tape, pick, hammer		
Weather Conditions	Overcast		
Temperature	5°C		
Last Inspection	September 24, 2020		
Additional Investigation Required	Deck condition survey		
Total Rehabilitation	Complete concrete repairs identified. Upgrade the barrier protection to meet Code. Replace damaged sign.		
Total Rehabilitation Budget Costing	\$80,000	Next Inspection	December 2024
Justification	Due to the good overall condition of the structure, undertake the rehabilitation and upgrade the barrier protection to extend the safe service life.		

Element Data**Structure:** 8

Element Group:	Decks		Length:	7.3			
Element Name:	Wearing Surface		Width:	6.4			
Location:			Height:				
Material:	Asphalt		Count:				
Element Type:			Total Quantity:	46.72			
Environment:	Severe		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²			42.05	4.67	Yes	Yes
Comments:	Flat grade creating poor drainage, gravel and vegetation build up at the edges retaining moisture. Settlement and potholes observed at each deck edge. Transverse cracking observed at approaches. Alligator cracking along east edge.						
Recommended Work:	None 6-10 Years <input checked="" type="checkbox"/> 1-5 Years < 1 Year Urgent Remove gravel and debris at bridge edges. Monitor settlement/cracking/potholes and patch as required until next resurfacing.						

Element Data

Element Group:	Decks		Length:	7.3			
Element Name:	Deck Top		Width:	9.4			
Location:			Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:	68.62			
Environment:	Moderate		Limited Insp'n:	Yes			
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²		68.62			Yes	Yes
Comments:	Limited inspection due to surface treatment wearing surface cover. The edges have granular and vegetation build up.						
Recommended Work:	None 6-10 Years <input checked="" type="checkbox"/> 1-5 Years < 1 Year Urgent Clear the granulars and vegetation along the sides. When the wearing surface is to be replaced, remove and inspect the condition of the top deck.						

Element Data

Element Group:	Decks		Length:	10.3			
Element Name:	Soffit - Thick Slab		Width:	6.1			
Location:			Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:	62.83			
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²		31.42	31.42			
Comments:	Some spalling was observed at the east end, but is in relatively good condition. The west portion is newer and in good condition.						
Recommended Work:	<input checked="" type="checkbox"/> None 6-10 Years 1-5 Years < 1 Year Urgent						

Element Data**Structure:** 8

Element Group:	Decks		Length:				
Element Name:	Drainage		Width:				
Location:			Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			100		Yes	Yes
Comments:	Graded to curbs that are debris covered.						
Recommended Work:	None 6-10 Years 1-5 Years <input checked="" type="checkbox"/> < 1 Year Urgent Clear the debris and gravel along the curb to achieve drainage.						

Element Data

Element Group:	Sidewalks/curbs		Length:	10.5			
Element Name:	Curbs		Width:	0.3			
Location:			Height:	0.25			
Material:	Concrete		Count:	2			
Element Type:			Total Quantity:	11.55			
Environment:	Severe		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²		8.66	2.89			
Comments:	The curbs have some surface spalling.						
Recommended Work:	None <input checked="" type="checkbox"/> 6-10 Years 1-5 Years < 1 Year Urgent Remove all poor concrete, clean reinforcing steel, and replace concrete.						

Element Data

Element Group:	Barriers		Length:	10.5			
Element Name:	Railing Systems		Width:				
Location:			Height:				
Material:	Steel		Count:	2			
Element Type:	Box Beam		Total Quantity:	21			
Environment:	Severe		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m			21		Yes	
Comments:	There is currently no approach barrier protection. The structure barrier protection does not meet Code (height).						
Recommended Work:	None 6-10 Years <input checked="" type="checkbox"/> 1-5 Years < 1 Year Urgent Install barrier protection to meet current Code.						

Element Data**Structure:** 8

Element Group:	Barriers		Length:				
Element Name:	Posts		Width:				
Location:			Height:				
Material:	Steel		Count:	12			
Element Type:	I-Beam		Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each		12			Yes	
Comments:	The structure barrier protection does not meet Code.						
Recommended Work:	None 6-10 Years <input checked="" type="checkbox"/> 1-5 Years < 1 Year Urgent Upgrade the barrier protection to Code.						

Element Data

Element Group:	Abutments		Length:	10.3			
Element Name:	Abutment Walls		Width:				
Location:			Height:	1.8			
Material:	Concrete		Count:	2			
Element Type:			Total Quantity:	37.08			
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²		18.54	18.54			
Comments:	Some surface cracking & spalling at east end. West end is newer and is in good condition.						
Recommended Work:	None <input checked="" type="checkbox"/> 6-10 Years 1-5 Years < 1 Year Urgent Remove and replace all poor concrete, clean reinforcing steel, and replace concrete.						

Element Data

Element Group:	Abutments		Length:	2.1			
Element Name:	Wingwalls		Width:				
Location:			Height:	1.5			
Material:	Concrete		Count:	4			
Element Type:			Total Quantity:	12.6			
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²		6.3	6.3			
Comments:	Some surface spalling & cracking was observed, specifically at the southeast corner. The west abutment is in good condition.						
Recommended Work:	None <input checked="" type="checkbox"/> 6-10 Years 1-5 Years < 1 Year Urgent Remove and replace all poor concrete, clean reinforcing steel, and replace concrete.						

Element Data**Structure:** 8

Element Group:	Foundations		Length:				
Element Name:	Foundation		Width:				
Location:			Height:				
Material:	Bedrock		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:	Yes			
Protection System:	Rip-Rap at West Corner						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
Comments:	Minor scour observed at base of abutment walls.						
Recommended Work:	<input type="checkbox"/> None		<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent	
	Continue to monitor conditions.						

Element Data

Element Group:	Embankments & Streams		Length:				
Element Name:	Slope Protection		Width:				
Location:			Height:				
Material:	Earth / Stone		Count:	6			
Element Type:			Total Quantity:	6			
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each		6				
Comments:	The slopes are well vegetated and appear stable.						
Recommended Work:	<input type="checkbox"/> None		<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent	

Element Data

Element Group:	Signs		Length:				
Element Name:	Signs		Width:				
Location:			Height:				
Material:	Steel		Count:	4			
Element Type:			Total Quantity:	4			
Environment:	Severe		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each			3	1	Yes	Yes
Comments:	Four end hazard signs are currently in place. The southeast sign is damaged and requires replacement.						
Recommended Work:	<input type="checkbox"/> None		<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input checked="" type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent	
	Replace the southeast hazard sign.						

Element Data**Structure:** 8

Element Group:	Approaches		Length:	5			
Element Name:	Wearing Surface		Width:	7.3			
Location:			Height:				
Material:	Surface Treatment		Count:	2			
Element Type:			Total Quantity:	73			
Environment:	Severe		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²			65.7	7.3	Yes	Yes
Comments:	Stress cracking, previous patches, settlement at bridge deck, and wheel path rutting were observed throughout the wearing surface.						
Recommended Work:	None 6-10 Years <input checked="" type="checkbox"/> 1-5 Years < 1 Year Urgent Replace the approach surface treatment.						

Element Data

Element Group:	Approaches		Length:				
Element Name:	Drainage		Width:				
Location:			Height:				
Material:	Asphalt		Count:				
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			90	10	Yes	Yes
Comments:	Poor drainage along shoulders signs of water ponding observed.						
Recommended Work:	None 6-10 Years <input checked="" type="checkbox"/> 1-5 Years < 1 Year Urgent Rehab - re-establish adequate platform crossfall during road resurfacing. Maintenance - clear shoulder debris and vegetation and grade for drainage						



Photo 8-2: View of structure barrier, signage (typ) and encroaching vegetation



Photo 8-3: View of watercourse upstream

Date of Photos: Dec. 6, 2022



Photo 8-4: Deficient barrier termination and hazard signage



Photo 8-5: View of watercourse downstream

Date of Photos: Dec. 6, 2022



Photo 8-6: View of structure approach and deck wearing surface



Photo 8-7: View of east structure elevation, wingwalls, exterior soffit and curb

Date of Photos: Dec. 6, 2022



Photo 8-8: View of north abutment wall and bedrock streambed



Photo 8-9: View of south abutment wall and soffit

Date of Photos: Dec. 6, 2022



Photo 8-10: View of structure soffit



Photo 8-11: View of structure elevation, exterior barrier protection, curb and soffit

Date of Photos: Dec. 6, 2022



Photo 8-12: View of abutment wall



Photo 8-13: View of wingwall

Date of Photos: Dec. 6, 2022

Bridge/Culvert Inspection Report

Site Number	<input type="text" value="9"/>	Project Number	<input type="text" value="221-12948-00"/>	
Structure Name	<input type="text" value="Cape Chin Culvert"/>	Municipality	<input type="text" value="Northern Bruce Peninsula"/>	
MTO Region Code	<input type="text" value="30"/>	County	<input type="text" value="Bruce"/>	Code <input type="text" value="02"/>
MTO District Code	<input type="text" value="33"/>	Geographic Twp Code	<input type="text" value="377"/>	



1450 - 1st Avenue West, Suite 101
Owen Sound, Ontario N4K 6W2

Tel: 519-376-7612
Fax: 519-376-8008
Website: www.wspgroup.com

Bridge/Culvert Inspection Report

Inventory Data

Structure Name	Cape Chin Culvert	Site Number	09
County	Bruce	Road Name	East Road
Municipality	Northern Bruce Peninsula	Road Type	Rural Coll.
Bridge or Culvert	Culvert	Owner	Northern Bruce Peninsula
Structure Type	Rigid Frame - Arch - Precast	AADT	350
Span (m)	4.3 No. 1	% Trucks	15%
Height (m)	1.8	Overall Structure Width (m)	15
Direction of Structure	East/West - 20° skew	Roadway Width (m)	7.5
Year Built/Rehabilitated	2008	Total Deck Length (m)	4.9
Current Load Limit	None	Total Deck Area (s.m.)	68.6
Detour Length (km)	32	Heritage Des.	None
Waterway	Chin Creek		

Inspection Data

Date of Inspection	December 6, 2022	Photos: 9-1 - Title Page 9-2 - View of structure inlet elevation and embankments 9-3 - View of structure outlet elevation and embankments 9-4 - View of pipe arch soffit and walls 9-5 - View of west 3 cable guiderail barrier protection with loose cable 9-6 - View of watercourse upstream 9-7 - View of watercourse downstream 9-8 - View of northeast deficient section of 3 cable guiderail (impact damage) 9-9 - View of structure wearing surface from approaching perspective 9-10 - HDPE pipe culvert downstream of main culvert		
Name of Inspector	Evan Montreuil, P.Eng.			
Equipment Used	Tape, pick, hammer			
Weather Conditions	Overcast			
Temperature	5°C			
Last Inspection	September 24, 2020			
Additional Investigation Required	None			
Total Rehabilitation	The cable guiderail needs tightening. Replace the rotten posts, repair damage and re-attach disconnected cables.			
Total Rehabilitation Budget Costing	\$7,000		Next Inspection	December 2024
Justification	Repair the barrier protection to ensure vehicle safety.			

Element Data**Structure: 9**

Element Group:	Culvert		Length:	15			
Element Name:	Barrels		Width:	4			
Location:			Height:	1.1			
Material:	Concrete		Count:	93			
Element Type:	Arch		Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencie	Maint. Needs
	m ²		93				
Comments:	The concrete arch is in good condition with no visible defects.						
Recommended Work:	<input type="checkbox"/> None		<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent	

Element Data

Element Group:	Culvert		Length:				
Element Name:	Inlet Components		Width:	4.3			
Location:			Height:	0.2			
Material:	Concrete		Count:	1			
Element Type:			Total Quantity:	1.34			
Environment:	Benign		Limited Insp'n:	Yes			
Protection System:	Wearing Surface						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencie	Maint. Needs
	m ²		1.34				
Comments:	The inlet embankments and slope protection appear stable and are unobstructed.						
Recommended Work:	<input type="checkbox"/> None		<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent	

Element Data

Element Group:	Culvert		Length:				
Element Name:	Outlet Components		Width:	4.3			
Location:			Height:	0.2			
Material:	Concrete		Count:	1			
Element Type:			Total Quantity:	1.34			
Environment:	Moderate		Limited Insp'n:				
Protection System:	Wearing Surface						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencie	Maint. Needs
	m ²		1.34				
Comments:	The outlet embankments and slope protection are stable. There is a HDPE pipe culvert which outlets just downstream of the main culvert.						
Recommended Work:	<input type="checkbox"/> None		<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent	

Element Data**Structure:** 9

Element Group:	Barriers		Length:	3.85			
Element Name:	Railing System		Width:				
Location:	Each Side		Height:				
Material:	Steel		Count:	35			
Element Type:	3-Cable on Wood Post		Total Quantity:	134.75			
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m				134.75	Yes	
Comments:	The 3-cable guiderail cables need tightening on both the east and west sides. The northeast quadrant has observed impact damage. Cables disconnected from posts at southwest quadrant.						
Recommended Work:	None 6-10 Years 1-5 Years <input checked="" type="checkbox"/> < 1 Year Urgent Tighten the west and east cables, repair the damaged northeast section and re-attach cables.						

Element Data

Element Group:	Barriers		Length:				
Element Name:	Posts		Width:				
Location:			Height:				
Material:	Wood		Count:	37			
Element Type:			Total Quantity:	37			
Environment:	Severe		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each		17	15	5	Yes	
Comments:	The cables need tightening on both sides. Five (5) posts require replacement at the northeast quadrant. Overall, the posts are showing signs of rot.						
Recommended Work:	None 6-10 Years 1-5 Years <input checked="" type="checkbox"/> < 1 Year Urgent Tighten each cable and replace damaged posts.						

Element Data

Element Group:	Deck		Length:	4.3			
Element Name:	Wearing Surface		Width:	6.9			
Location:			Height:				
Material:	Asphalt		Count:	1			
Element Type:			Total Quantity:	29.67			
Environment:	Severe		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²	29.67					
Comments:	The new asphalt wearing surface is in excellent condition.						
Recommended Work:	<input checked="" type="checkbox"/> None 6-10 Years 1-5 Years < 1 Year Urgent						

Element Data**Structure:** 9

Element Group:	Foundations		Length:				
Element Name:	Foundation (below ground level)		Width:				
Location:	Each End		Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:	Yes			
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%						
Comments:	Limited inspection due to high water level, however visible portions appear to be in good condition and the structure appears stable.						
Recommended Work:	<input type="checkbox"/> None	<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent		

Element Data

Element Group:	Embankments & Streams		Length:				
Element Name:	Streams and Waterways		Width:				
Location:			Height:				
Material:	Bedrock		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100				
Comments:	The watercourse is unobstructed and in good condition.						
Recommended Work:	<input type="checkbox"/> None	<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent		

Element Data

Element Group:	Embankments & Streams		Length:				
Element Name:	Embankments		Width:				
Location:	Each Corner		Height:				
Material:	Stone		Count:	4			
Element Type:			Total Quantity:	4			
Environment:	Moderate		Limited Insp'n:				
Protection System:	Rip Rap						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each		3	1			
Comments:	The embankments are in good condition with large rip rap slope protection. Some minor erosion was observed between the rip-rap.						
Recommended Work:	<input type="checkbox"/> None	<input checked="" type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent	Monitor erosion and repair if conditions worsen.	

Element Data**Structure:** 9

Element Group:	Signs		Length:				
Element Name:	Signs		Width:				
Location:	Each Corner		Height:				
Material:	Steel		Count:	4			
Element Type:			Total Quantity:	4			
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each			3	1	Yes	Yes
Comments:	Guiderail marker posts/sign in fair condition. Marker missing from post on SW approach. No end hazard signs.						
Recommended Work:	None 6-10 Years 1-5 Years <input checked="" type="checkbox"/> < 1 Year Urgent Install four end hazard signs and to increase vehicle safety. Replace missing guiderail marker.						

Element Data

Element Group:	Approaches		Length:	5			
Element Name:	Wearing Surface		Width:	6.9			
Location:	Each End		Height:				
Material:	Asphalt		Count:	2			
Element Type:			Total Quantity:	69			
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m ²	69					
Comments:	The new asphalt wearing surface is in excellent condition.						
Recommended Work:	<input checked="" type="checkbox"/> None 6-10 Years 1-5 Years < 1 Year Urgent						



Photo 9-2 - View of structure inlet elevation and embankment



Photo 9-3 - View of structure outlet elevation and embankments



Photo 9-4 - View of pipe arch soffit and walls



Photo 9-5 - View of 3 cable guiderail barrier protection with loose cable



Photo 9-6 - View of watercourse upstream



Photo 9-7 - View of watercourse downstream

Date: Dec. 6, 2022



Photo 9-8 - View of northeast deficient section of 3 cable guiderail (impact damage)



Photo 9-9 - View of structure wearing surface from approaching perspective

Date: Dec. 6, 2022

Bridge/Culvert Inspection Report

Site Number	<input type="text" value="10"/>	Project Number	<input type="text" value="221-12948-00"/>	
Structure Name	<input type="text" value="Lindsay Road 5 Culvert"/>	Municipality	<input type="text" value="Northern Bruce Peninsula"/>	
MTO Region Code	<input type="text" value="30"/>	County	<input type="text" value="Bruce"/>	Code <input type="text" value="02"/>
MTO District Code	<input type="text" value="33"/>	Geographic Twp Code	<input type="text" value="377"/>	



1450 - 1st Avenue West, Suite 101
Owen Sound, Ontario N4K 6W2

Tel: 519-376-7612
Fax: 519-376-8008
Website: www.wspgroup.com

Bridge/Culvert Inspection Report

Inventory Data

Structure Name	Lindsay Road 5 Culvert	Site Number	10
County	Bruce	Road Name	Lindsay Road 5
Municipality	Northern Bruce Peninsula	Road Type	Rural Coll.
Bridge or Culvert	Culvert	Owner	Northern Bruce Peninsula
Structure Type	Steel - SP - CSP - PA	AADT	350
Span (m)	4.4 No. 1	% Trucks	15%
Height (m)	2.8	Overall Structure Width (m)	18.3
Direction of Structure	North/South	Roadway Width (m)	6.1
Year Built/Rehabilitated	1970	Total Deck Length (m)	4.4
Current Load Limit	None	Total Deck Area (s.m.)	81
Detour Length (km)	5.5	Heritage Des.	None
Waterway	Chin Creek		

Inspection Data

Date of Inspection	December 6, 2022	Photos: 10-1 - Title Page 10-2 - View of watercourse upstream and inlet component 10-3 - View of watercourse downstream 10-4 - View of culvert barrel in elevation 10-5 - View of interior culvert barrel 10-6 - Localized corrosion with section loss 10-7 - View of embankment and culvert inlet interior	
Name of Inspector	Evan Montreuil, P.Eng.		
Equipment Used	Tape, pick, hammer		
Weather Conditions	Overcast		
Temperature	5°C		
Last Inspection	September 30, 2020		
Additional Investigation Required	None		
Total Rehabilitation	Install approach and barrier protection. Install end hazard signs.		
Total Rehabilitation Budget Costing	\$46,000	Next Inspection	December 2024
Justification	Due to the overall good condition of the culvert, undertake rehabilitation to extend the service life. Maintain the speed limit of 45 km/hr. as an interim measure until approach and barrier protection is installed.		

Element Data**Structure: 10**

Element Group:	Decks		Length:				
Element Name:	Wearing Surface		Width:				
Location:			Height:				
Material:	Surface Treatment		Count:				
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100				
Comments:	Asphalt wearing surface was recently replaced and is in good condition.						
Recommended Work:	<input type="checkbox"/> None <input type="checkbox"/> 6-10 Years <input type="checkbox"/> 1-5 Years <input type="checkbox"/> < 1 Year <input type="checkbox"/> Urgent						

Element Data

Element Group:	Culverts		Length:				
Element Name:	Inlet Component		Width:				
Location:	North End		Height:				
Material:	Stone and Earth		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100				
Comments:	Rip-rap slope protection in good condition.						
Recommended Work:	<input type="checkbox"/> None <input type="checkbox"/> 6-10 Years <input type="checkbox"/> 1-5 Years <input type="checkbox"/> < 1 Year <input type="checkbox"/> Urgent						

Element Data

Element Group:	Culverts		Length:				
Element Name:	Outlet Components		Width:				
Location:	South End		Height:				
Material:	Stone and Earth		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100				
Comments:	The culvert end is bent.						
Recommended Work:	<input type="checkbox"/> None <input type="checkbox"/> 6-10 Years <input type="checkbox"/> 1-5 Years <input type="checkbox"/> < 1 Year <input type="checkbox"/> Urgent						

Element Data**Structure:** 10

Element Group:	Culvert		Length:				
Element Name:	Barrel		Width:				
Location:			Height:				
Material:	Steel		Count:				
Element Type:	Multi Plate Pipe Arch		Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	Galvanized						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		40	50	10	Yes	Yes
Comments:	Moderate corrosion at water level with minor section loss observed. Minor localized deformations observed. 1m long section in base of culvert has failed due to complete section loss.						
Recommended Work:	None 6-10 Years <input checked="" type="checkbox"/> 1-5 Years < 1 Year Urgent Monitor the section loss and overall structure stability, consider repair vs replacement when section loss exceeds acceptable limits.						

Element Data

Element Group:	Streams/Embankments		Length:				
Element Name:	Streams and Waterways		Width:				
Location:			Height:				
Material:	Bedrock and Earth		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			100			
Comments:							
Recommended Work:	<input checked="" type="checkbox"/> None 6-10 Years 1-5 Years < 1 Year Urgent						

Element Data

Element Group:	Streams/Embankments		Length:				
Element Name:	Embankment		Width:				
Location:	Each Corner		Height:				
Material:			Count:	6			
Element Type:			Total Quantity:	6			
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each Corner		6				
Comments:	The embankments are in overall good condition.						
Recommended Work:	<input checked="" type="checkbox"/> None 6-10 Years 1-5 Years < 1 Year Urgent						

Element Data**Structure:** 10

Element Group:	Approaches		Length:				
Element Name:	Wearing Surface		Width:				
Location:	Each End		Height:				
Material:	Surface Treatment		Count:				
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100				
Comments:	Light transverse cracking observed at east approach.						
Recommended Work:	<input type="checkbox"/> None	<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent		
Element Group:	Accessories		Length:				
Element Name:	Signs		Width:				
Location:	Approaches		Height:				
Material:	Steel		Count:	2			
Element Type:			Total Quantity:	2			
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each		2			Yes	Yes
Comments:	The 45 km/hr and bump warning signs are in good condition.						
Recommended Work:	<input type="checkbox"/> None	<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input checked="" type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent	Install end hazard signs.	



Photo 10-2: View of watercourse upstream and inlet component



Photo 10-3: View of watercourse downstream

Date of Photos: Dec. 6, 2022



Photo 10-4: View of culvert barrel in elevation



Photo 10-5: View of interior culvert barrel

Date of Photos: Dec. 6, 2022



Photo 10-6: Localized failure with complete section loss in base of culvert.



Photo 10-7: View of embankment and culvert inlet interior

Date of Photos: Dec. 6, 2022

Bridge/Culvert Inspection Report

Site Number	<input type="text" value="11"/>	Project Number	<input type="text" value="221-12948-00"/>
Structure Name	<input type="text" value="Myles Bay Shore Road Bridge"/>	Municipality	<input type="text" value="Northern Bruce Peninsula"/>
MTO Region Code	<input type="text" value="30"/>	County	<input type="text" value="Bruce"/> Code <input type="text" value="02"/>
MTO District Code	<input type="text" value="33"/>	Geographic Twp Code	<input type="text" value="377"/>



1450 - 1st Avenue West, Suite 101
Owen Sound, Ontario N4K 6W2

Tel: 519-376-7612
Fax: 519-376-8008
Website: www.wspgroup.com

Bridge/Culvert Inspection Report

Inventory Data

Structure Name	Myles Bay Shore Road Bridge	Site Number	11
County	Bruce	Road Name	Myles Bay Shore Road
Municipality	Northern Bruce Peninsula	Road Type	Rural Local
Bridge or Culvert	Bridge	Owner	Northern Bruce Peninsula
Structure Type	Concrete - Rigid Frame	AADT	300
Span (m)	7.3 No. 1	% Trucks	5%
Height (m)	2.2	Overall Structure Width (m)	6.6
Direction of Structure	East/West	Roadway Width (m)	6
Year Built/Rehabilitated	2001	Total Deck Length (m)	8.4
Current Load Limit	None	Total Deck Area (s.m.)	50
Detour Length (km)	3	Heritage Des.	None
Waterway	Old Woman's River		

Inspection Data

Date of Inspection	December 7, 2022	Photos: 11-1 - Title Page 11-2 - View of east structure elevation, exterior soffit, barrier and embankments 11-3 - View of exterior barrier protection, soffit and wingwalls 11-4 - View of structure soffit 11-5 - Rock slope protection and geotextile failure at the southeast quadrant 11-6 - View of north abutment wall and soffit 11-7 - View of structure wearing surface, barrier protection and end hazard signage 11-8 - View of watercourse downstream 11-9 - View of watercourse upstream 11-10 - Minor erosion at the northwest structure quadrant 11-11 - Structure wearing surface	
Name of Inspector	Evan Montreuil, P.Eng.		
Equipment Used	Tape, pick, hammer		
Weather Conditions	Overcast		
Temperature	4°C		
Last Inspection	October 30, 2020		
Additional Investigation Required	Deck condition survey		
Total Rehabilitation	Upgrade the bridge barrier protection and install approach barrier protection to meet current Code. Reduce the posted speed to 35 km/hr. until proper barrier is installed. Complete the southwest quadrant embankment repair and place foundation erosion protection. Place tremmie concrete at the northwest foundation corner and provide protection. Consider waterproofing and paving the deck, and paving the approaches.		
Total Rehabilitation Budget Costing	\$75,000 or \$110,000 with waterproof and pave	Next Inspection	December 2024
Justification	Undertake rehabilitation to increase user safety and extend the service life of the structure.		

Element Data**Structure:** 11

Element Group:	Decks		Length:				
Element Name:	Wearing Surface		Width:				
Location:			Height:				
Material:	Surface Treatment		Count:				
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100				Yes
Comments:	The surface treatment is relatively new and in good condition.						
Recommended Work:	<input type="checkbox"/> None	<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent		

Element Data

Element Group:	Decks		Length:				
Element Name:	Deck Top		Width:				
Location:			Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:	√			
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100				
Comments:	Limited inspection due to cover by granulars (excessive depth) and surface treatment wearing surface.						
Recommended Work:	<input type="checkbox"/> None	<input checked="" type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent		
	When the surface treatment reaches the end of its lifecycle, remove and inspect the condition of the top deck. Consider placing a waterproofing membrane and paving the structure deck to maximize the service life of this high asset value structure.						

Element Data

Element Group:	Decks		Length:				
Element Name:	Thick Slab		Width:				
Location:			Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100				
Comments:	The soffit is in good condition with no visible defects.						
Recommended Work:	<input type="checkbox"/> None	<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent		

Element Data**Structure:** 11

Element Group:	Decks		Length:				
Element Name:	Drainage		Width:				
Location:			Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			100			
Comments:	Surface to slope drainage is adequate. There is very little crossfall grade to the wearing surface.						
Recommended Work:	<input type="checkbox"/> None		<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent	

Element Data

Element Group:	Sidewalks/curbs		Length:				
Element Name:	Curbs		Width:				
Location:			Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		93	5	2		
Comments:	The concrete is in good condition with some observed minor damage to ends from maintenance equipment.						
Recommended Work:	<input type="checkbox"/> None		<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent	

Element Data

Element Group:	Barriers		Length:				
Element Name:	Railing Systems		Width:				
Location:			Height:				
Material:	Steel		Count:				
Element Type:	Box Beam		Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		95	5		Yes	
Comments:	There is currently no approach protection in place and the ends of the structure barrier pose a vehicular hazard. The structure barrier is code deficient (does not meet height requirements) and has no pedestrian/cyclist handrail. Minor corrosion of the galvanized railing has started.						
Recommended Work:	<input type="checkbox"/> None		<input type="checkbox"/> 6-10 Years	<input checked="" type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent	
	Install bridge and approach barrier protection to Code.						

Element Data**Structure:** 11

Element Group:	Barriers		Length:				
Element Name:	Posts		Width:				
Location:			Height:				
Material:	Steel		Count:				
Element Type:	I-Beam		Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100			Yes	
Comments:	The end posts are unprotected and hazardous to road users. The current configuration does not meet code.						
Recommended Work:	None 6-10 Years <input checked="" type="checkbox"/> 1-5 Years < 1 Year Urgent Replace the structure barrier protection to meet current code and install approach barrier protection with proper end termination.						

Element Data

Element Group:	Abutments		Length:				
Element Name:	Abutment Walls		Width:				
Location:			Height:				
Material:	Concrete		Count:	2			
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100				
Comments:	Minor surface cracking was observed.						
Recommended Work:	<input checked="" type="checkbox"/> None 6-10 Years 1-5 Years < 1 Year Urgent						

Element Data

Element Group:	Abutments		Length:				
Element Name:	Wingwalls		Width:				
Location:			Height:				
Material:	Armour Stone / Field Stone		Count:	4			
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		50	25	25		
Comments:	The two wingwalls on west side are armour stone and are in good condition. The two wingwalls on the east side are fieldstone. The southeast wingwall has been eroded and is failing.						
Recommended Work:	None 6-10 Years 1-5 Years <input checked="" type="checkbox"/> < 1 Year Urgent Repair southeast wingwall.						

Element Data**Structure:** 11

Element Group:	Foundations		Length:				
Element Name:	Foundation (below ground level)		Width:				
Location:			Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:	Yes			
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
						Yes	Yes
Comments:	The south footings appear stable and are well protected. The northeast footing appears stable, but is poorly protected. The northwest footing is heavily undermined and poorly protected.						
Recommended Work:	None 6-10 Years 1-5 Years <input checked="" type="checkbox"/> < 1 Year Urgent Underpin and stabilize northwest footing and provide more rip-rap and rock protection to the northeast and northwest footings.						

Element Data

Element Group:	Embankments & Streams		Length:				
Element Name:	Streams and Waterways		Width:				
Location:			Height:				
Material:	Earth / Stone		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			100			
Comments:	The watercourse is stable with large stone (boulders) throughout.						
Recommended Work:	<input checked="" type="checkbox"/> None 6-10 Years 1-5 Years < 1 Year Urgent						

Element Data

Element Group:	Embankments & Streams		Length:				
Element Name:	Embankments		Width:				
Location:			Height:				
Material:	Earth / Stone		Count:	4			
Element Type:			Total Quantity:	4			
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each			3	1		
Comments:	The slopes are stone and vegetated earth. The southeast quadrant has erosion and failure of the geotextile and rock protection. The southwest quadrant has minor erosion of the embankment.						
Recommended Work:	None 6-10 Years <input checked="" type="checkbox"/> 1-5 Years < 1 Year Urgent Repair all erosion and place new geotextile and rip rap/rock slope protection.						

Element Data**Structure:** 11

Element Group:	Signs		Length:				
Element Name:	Signs		Width:				
Location:			Height:				
Material:	Steel		Count:				
Element Type:			Total Quantity:	4			
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each		2	2		No	No
Comments:	Four end hazard signs are in place and are in good condition.						
Recommended Work:	<input type="checkbox"/> None <input type="checkbox"/> 6-10 Years <input type="checkbox"/> 1-5 Years <input checked="" type="checkbox"/> < 1 Year <input type="checkbox"/> Urgent						

Element Data

Element Group:	Approaches		Length:				
Element Name:	Wearing Surface		Width:				
Location:			Height:				
Material:	Gravel		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100			Yes	Yes
Comments:	The approach wearing surface is surface treatment in fair condition. Cracking and settlement observed at each end of the structure w/ cold patch observed on the north end.						
Recommended Work:	None <input type="checkbox"/> 6-10 Years <input checked="" type="checkbox"/> 1-5 Years <input type="checkbox"/> < 1 Year <input type="checkbox"/> Urgent Monitor settlement and continue to patch as required. Consider replacing road base and paving deck and approaches.						



Photo 11-2: View of east structure elevation, exterior soffit, barrier and embankments



Photo 11-3: View of exterior barrier protection, soffit and wingwalls

Date of Photos: Dec. 7, 2022



11-4: View of structure soffit



11-5: Rock slope protection and geotextile failure at the southeast quadrant

Date of Photos: Dec. 7, 2022



11-6: View of north abutment wall and soffit



11-7: View of structure wearing surface, barrier protection and end hazard signage

Date of Photos: Dec. 7, 2022



11-8: View of watercourse downstream



11-7: View of watercourse upstream

Date of Photos: Dec. 7, 2022



11-10: Minor erosion at the northwest structure quadrant



11-11: Structure wearing surface

Date of Photos: Dec. 7, 2022

Bridge/Culvert Inspection Report

Site Number	<input type="text" value="12"/>	Project Number	<input type="text" value="221-12948-00"/>	
Structure Name	<input type="text" value="Stokes Bay Road Culvert"/>	Municipality	<input type="text" value="Northern Bruce Peninsula"/>	
MTO Region Code	<input type="text" value="30"/>	County	<input type="text" value="Bruce"/>	Code <input type="text" value="02"/>
MTO District Code	<input type="text" value="33"/>	Geographic Twp Code	<input type="text" value="377"/>	



1450 - 1st Avenue West, Suite 101
Owen Sound, Ontario N4K 6W2

Tel: 519-376-7612
Fax: 519-376-8008
Website: www.wspgroup.com

Bridge/Culvert Inspection Report

Inventory Data

Structure Name	Stokes Bay Road Culvert	Site Number	12
County	Bruce	Road Name	Stokes Bay Road
Municipality	Northern Bruce Peninsula	Road Type	Rural Coll.
Bridge or Culvert	Culvert	Owner	Northern Bruce Peninsula
Structure Type	Steel - SP - SCP - PA	AADT	350
Span (m)	4.7 No. 1	% Trucks	15%
Height (m)	3	Overall Structure Width (m)	22
Direction of Structure	East/West	Roadway Width (m)	6.1
Year Built/Rehabilitated	1970	Total Deck Length (m)	4.7
Current Load Limit	None	Total Deck Area (s.m.)	103
Detour Length (km)	4	Heritage Des.	None
Waterway	Old Woman's River (Fern Creek Drain)		

Inspection Data

Date of Inspection	December 7, 2022	Photos: 12-1 - Title Page 12-2 - View of culvert inlet in elevation (north perspective) 12-3 - View of culvert inlet in elevation (south perspective) 12-4 - View of surface treatment wearing surface 12-5 - View of culvert outlet in elevation 12-6 - View of watercourse downstream 12-7 - View of watercourse upstream 12-8 - View of culvert barrel interior 12-9 - View of culvert barrel corrosion at the waterline (typ)	
Name of Inspector	Evan Montreuil, P.Eng.		
Equipment Used	Tape, pick, hammer		
Weather Conditions	Overcast		
Temperature	4°C		
Last Inspection	October 30, 2020		
Additional Investigation Required	Complete annual inspections of the culvert barrel to monitor the deformation.		
Total Rehabilitation	Install approach and barrier protection to Code. Repair erosion and place rip-rap erosion protection. Install end hazard signs.		
Total Rehabilitation Budget Costing	\$50,000	Next Inspection	December 2023
Justification	Due to the age and fair condition of this structure, undertake the rehabilitation and place the barrier approach protection (for safety). Reduce the speed to 45 km/hr. until the barrier protection is installed.		

Element Data**Structure:** 12

Element Group:	Decks		Length:				
Element Name:	Wearing Surface		Width:				
Location:			Height:				
Material:	Surface Treatment		Count:				
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		75	25			
Comments:	The surface treatment wearing surface is in good to fair condition with minor settlement and wheel path rutting observed.						
Recommended Work:	None <input type="checkbox"/> 6-10 Years <input checked="" type="checkbox"/> 1-5 Years <input type="checkbox"/> < 1 Year <input type="checkbox"/> Urgent Replace the surface treatment with road resurfacing.						

Element Data

Element Group:	Barriers		Length:				
Element Name:	Barrier		Width:				
Location:	Each Side		Height:				
Material:			Count:				
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%					Yes	
Comments:	There is currently no barrier protection in place. The clear zone is approximately 3 m.						
Recommended Work:	None <input type="checkbox"/> 6-10 Years <input type="checkbox"/> 1-5 Years <input checked="" type="checkbox"/> < 1 Year <input type="checkbox"/> Urgent Install barrier protection to meet current code requirements. Reduce the posted speed limit to 45km/hr until barrier protection is installed.						

Element Data

Element Group:	Culverts		Length:				
Element Name:	Inlet Component		Width:				
Location:	East End		Height:				
Material:	Stone and Earth		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			100			
Comments:							
Recommended Work:	<input type="checkbox"/> None <input type="checkbox"/> 6-10 Years <input type="checkbox"/> 1-5 Years <input type="checkbox"/> < 1 Year <input type="checkbox"/> Urgent						

Element Data**Structure:** 12

Element Group:	Culverts		Length:				
Element Name:	Outlet Components		Width:				
Location:	West End		Height:				
Material:	Stone and Earth		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		30	60	10	Yes	Yes
Comments:	Some of the rip rap and rock slope protection has failed.						
Recommended Work:	None 6-10 Years <input checked="" type="checkbox"/> 1-5 Years < 1 Year Urgent Replace the missing stones and rip-rap.						

Element Data

Element Group:	Culvert		Length:				
Element Name:	Barrel		Width:				
Location:			Height:				
Material:	Steel		Count:				
Element Type:	Pipe Arch		Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	Galvanized						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		40	50	10	Yes	
Comments:	Deformations are visible at the obvert, with corrosion and swelling near the water level. Section loss is 10% at most.						
Recommended Work:	None 6-10 Years <input checked="" type="checkbox"/> 1-5 Years < 1 Year Urgent Monitor the deformations and section loss.						

Element Data

Element Group:	Foundation		Length:				
Element Name:	Foundation (below grade)		Width:				
Location:			Height:				
Material:	Granular		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:	Yes			
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
						Yes	
Comments:	Limited inspection of the foundation due to cover. Erosion was observed under the pipe inlet.						
Recommended Work:	None 6-10 Years <input checked="" type="checkbox"/> 1-5 Years < 1 Year Urgent Place rip-rap on geotextile erosion protection.						

Element Data**Structure:** 12

Element Group:	Streams/Embankments		Length:				
Element Name:	Streams and Waterways		Width:				
Location:			Height:				
Material:	Stone/Sand		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			100			
Comments:	Low velocity watercourse with no visible obstruction at the time of inspection.						
Recommended Work:	<input type="checkbox"/> None		<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent	

Element Data

Element Group:	Streams/Embankments		Length:				
Element Name:	Embankment		Width:				
Location:	Each Corner		Height:				
Material:	Stone / Earth		Count:	4			
Element Type:			Total Quantity:	4			
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each			2	2		
Comments:	Heavily vegetated with some minor erosion at the northeast and southeast quadrants.						
Recommended Work:	<input type="checkbox"/> None		<input type="checkbox"/> 6-10 Years	<input checked="" type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent	
	Place rip-rap erosion protection.						

Element Data

Element Group:	Signs		Length:				
Element Name:	Signs		Width:				
Location:	Each Corner		Height:				
Material:			Count:				
Element Type:			Total Quantity:	0			
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each					Yes	
Comments:	No signs present.						
Recommended Work:	<input type="checkbox"/> None		<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input checked="" type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent	
	Install required end hazard signage and speed limit signage.						

Element Data**Structure:** 12

Element Group:	Approaches		Length:				
Element Name:	Wearing Surface		Width:				
Location:	Each End		Height:				
Material:	Surface Treatment		Count:				
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		75	25			Yes
Comments:	The surface treatment is in good to fair condition with minor wheel path rutting observed.						
Recommended Work:	None <input checked="" type="checkbox"/> 6-10 Years 1-5 Years < 1 Year Urgent						
	Replace the surface treatment with road resurfacing.						



Photo 12-2: View of culvert inlet in elevation (north perspective)



Photo 12-3: View of culvert barrel interior

Date of Photos: Dec. 7, 2022



Photo 12-4: View of surface treatment wearing surface



Photo 12-5: View of culvert outlet

Date of Photos: Dec. 7, 2022



Photo 12-6: View of watercourse downstream



Photo 12-7: View of watercourse upstream

Date of Photos: Dec. 7, 2022



Photo 12-8: View of culvert barrel interior



Photo 12-9: View of culvert barrel corrosion at the waterline (typical)

Date of Photos: Dec. 7, 2022

Bridge/Culvert Inspection Report

Site Number	<input type="text" value="13"/>	Project Number	<input type="text" value="221-12948-00"/>	
Structure Name	<input type="text" value="Bury Road Culvert"/>	Municipality	<input type="text" value="Northern Bruce Peninsula"/>	
MTO Region Code	<input type="text" value="30"/>	County	<input type="text" value="Bruce"/>	Code <input type="text" value="02"/>
MTO District Code	<input type="text" value="33"/>	Geographic Twp Code	<input type="text" value="377"/>	



1450 - 1st Avenue West, Suite 101
Owen Sound, Ontario N4K 6W2

Tel: 519-376-7612
Fax: 519-376-8008
Website: www.wspgroup.com

Bridge/Culvert Inspection Report

Inventory Data

Structure Name	Bury Road Culvert	Site Number	13
County	Bruce	Road Name	Bury Road
Municipality	Northern Bruce Peninsula	Road Type	Rural Local
Bridge or Culvert	Bridge	Owner	Northern Bruce Peninsula
Structure Type	Concrete Slab	AADT	100
Span (m)	6.1 No. 1	% Trucks	15%
Height (m)	2	Overall Structure Width (m)	7.5
Direction of Structure	East/West	Roadway Width (m)	5.5
Year Built/Rehabilitated	1960	Total Deck Length (m)	6.4
Current Load Limit	15 t	Total Deck Area (s.m.)	48
Detour Length (km)	8	Heritage Des.	None
Waterway	Old Woman's River (Fern Creek Drain)		

Inspection Data

Date of Inspection	December 7, 2022	Photos: 13-1 - Title Page 13-2 - View of structure from the north approach 13-3 - View of curb 13-4 - Approach and structure wearing surface 13-5 - Southwest structure wingwall (typical) 13-6 - View of west structure elevation, exterior soffit and north abutment wall 13-7 - View of structure soffit and north abutment wall 13-8 - View of south abutment wall and exposed footing 13-9 - View of watercourse upstream 13-10 - View of watercourse downstream		
Name of Inspector	Evan Montreuil, P.Eng.			
Equipment Used	Tape, pick, hammer			
Weather Conditions	Overcast			
Temperature	4°C			
Last Inspection	October 30, 2020			
Additional Investigation Required	Inspect Annually - Deck Soffit and Foundations, deck condition survey			
Total Rehabilitation	Place approach and structure barrier protection to meet current Code. Complete the concrete soffit, footing and foundation erosion repairs.			
Total Rehabilitation Budget Costing	\$130,000		Next Inspection	December 2023
Justification	Due to the low traffic volumes and fair condition of the structure, maintain load limit of 15 tonnes. Undertake rehabilitation to extend the service life (short term) versus replacement. Reduce speed limit to 35 km/hr. as interim measure until barrier protection is installed to Code. Inspect the structure annually to monitor condition until rehabilitation.			

Element Data**Structure:** 13

Element Group:	Decks		Length:				
Element Name:	Deck Top		Width:				
Location:			Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:	Yes			
Protection System:	Wearing Surface						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			80	20		
Comments:	The visible ends are in fair condition, the majority of the deck top is debris/gravel covered and not visible for inspection. Remove the granular cover and inspect the condition of the top deck.						
Recommended Work:	None 6-10 Years <input checked="" type="checkbox"/> 1-5 Years < 1 Year Urgent Clear the debris and gravel along curb, perform a deck condition survey, and seal and waterproof deck top.						

Element Data

Element Group:	Decks		Length:				
Element Name:	Soffit - Thick Slab		Width:				
Location:			Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			30	70		
Comments:	Spalling and delaminated concrete with rebar exposed on both sides at abutment walls. An exterior soffit crack is developing (possibly a shear failure) at the northwest corner soffit exterior and trough curb.						
Recommended Work:	None 6-10 Years <input checked="" type="checkbox"/> 1-5 Years < 1 Year Urgent Remove the delaminated concrete, sand blast rebar and complete concrete repair. Waterproof the deck top to prevent further deterioration. Monitor the crack annually.						

Element Data

Element Group:	Barrier		Length:				
Element Name:	Railing System		Width:				
Location:	Each Side		Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%					Yes	
Comments:	No structure or approach barrier protection current in place.						
Recommended Work:	None 6-10 Years 1-5 Years <input checked="" type="checkbox"/> < 1 Year Urgent Install structure and approach barrier protection to provide required vehicle safety. Reduce the speed limit to 35km/hr in the interim.						

Element Data**Structure: 13**

Element Group:	Abutments		Length:				
Element Name:	Abutment Walls/Wingwalls		Width:				
Location:	Each Side		Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			50	50	Yes	Yes
Comments:	Spalling and delamination observed throughout. Hairline cracks at cold joint where abutment/wingwall meets the soffit at the northwest corner. Cracking observed at earth of the south quadrants. Surface spalling and calcite deposits were observed on each wingwall. Southwest wingwall deteriorating.						
Recommended Work:	None 6-10 Years <input checked="" type="checkbox"/> 1-5 Years < 1 Year Urgent Remove all poor concrete, clean the reinforcing steel, and replace concrete.						

Element Data

Element Group:	Foundations		Length:				
	Foundation (below ground level)		Width:				
Location:	Each End		Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:	Yes			
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%					Yes	Yes
Comments:	Some erosion surrounding the footing was observed at the downstream end and along south side and southwest corner. North side covered in silt.						
Recommended Work:	None 6-10 Years <input checked="" type="checkbox"/> 1-5 Years < 1 Year Urgent Place erosion protection along the base of the abutment walls/top of footings.						

Element Data

Element Group:	Embankments & Streams		Length:				
Element Name:	Streams and Waterways		Width:				
Location:			Height:				
Material:			Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			80	20	Yes	Yes
Comments:	Erosion and settlement were observed at the structure outlet. The flow has shifted against the south abutment/footing with a silt deposit along the north abutment.						
Recommended Work:	None 6-10 Years <input checked="" type="checkbox"/> 1-5 Years < 1 Year Urgent Place rip rap to prevent further erosion and clear the sediment deposit.						

Element Data**Structure: 13**

Element Group:	Embankments & Streams		Length:				
Element Name:	Embankments		Width:				
Location:	Each Corner		Height:				
Material:			Count:	4			
Element Type:			Total Quantity:	4			
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each		4				
Comments:	Heavily vegetated embankments appear stable.						
Recommended Work:	<input type="checkbox"/> None		<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input checked="" type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent	

Element Data

Element Group:	Approaches		Length:				
Element Name:	Wearing Surface		Width:				
Location:			Height:				
Material:	Gravel		Count:				
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			80	20	Yes	Yes
Comments:	Clear the debris and vegetation build along the edge of each shoulder to achieve drainage. The surface has minor potholes and wheel path rutting.						
Recommended Work:	<input type="checkbox"/> None		<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input checked="" type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent	
	Grade and clear the vegetation from the shoulder annually.						

Element Data

Element Group:	Accessories		Length:				
Element Name:	Signs		Width:				
Location:			Height:				
Material:	Steel		Count:	4			
Element Type:			Total Quantity:	4			
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each		4			Yes	Yes
Comments:	There are currently two narrow structure and two speed reduction signs in place. There are no end hazard signs currently in place. The two load limit signs are missing.						
Recommended Work:	<input type="checkbox"/> None		<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input checked="" type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent	
	Install end hazard signs and replace load limit signs.						



Photo 13-2: View of structure from the south approach



Photo 13-3: View of curb

Date of Photos: Dec. 7, 2022



Photo 13-4: Approach and structure wearing surface



Photo 13-5: Southwest structure wingwall (typical)

Date of Photos: Dec. 7, 2022



Photo 13-6: View of east structure elevation, exterior soffit and north abutment wall



Photo 13-7: View of structure soffit and north abutment wall

Date of Photos: Dec. 7, 2022



Photo 13-8: View of south abutment wall and exposed footing



Photo 13-9: View of watercourse upstream

Date of Photos: Dec. 7, 2022



Photo 13-10: View of watercourse downstream

Date of Photos: Dec. 7, 2022

Bridge/Culvert Inspection Report

Site Number	<input type="text" value="14"/>	Project Number	<input type="text" value="221-12948-00"/>
Structure Name	<input type="text" value="East Road Culvert"/>	Municipality	<input type="text" value="Northern Bruce Peninsula"/>
MTO Region Code	<input type="text" value="30"/>	County	<input type="text" value="Bruce"/> <input type="text" value="Code"/> <input type="text" value="02"/>
MTO District Code	<input type="text" value="33"/>	Geographic Twp Code	<input type="text" value="377"/>



1450 - 1st Avenue West, Suite 101
Owen Sound, Ontario N4K 6W2

Tel: 519-376-7612
Fax: 519-376-8008
Website: www.wspgroup.com

Bridge/Culvert Inspection Report

Inventory Data

Structure Name	East Road Culvert	Site Number	14
County	Bruce	Road Name	East Road
Municipality	Northern Bruce Peninsula	Road Type	Rural Coll.
Bridge or Culvert	Culvert	Owner	Northern Bruce Peninsula
Structure Type		AADT	350
Span (m)	3.7 No. 1	% Trucks	15%
Height (m)	2.8	Overall Structure Width (m)	20
Direction of Structure	East/West	Roadway Width (m)	5.5
Year Built/Rehabilitated	1975	Total Deck Length (m)	3.7
Current Load Limit	None	Total Deck Area (s.m.)	74
Detour Length (km)	32	Heritage Des.	None
Waterway	Stokes River		

Inspection Data

Date of Inspection	December 6, 2022	Photos: 14-1 - Title Page - View of structure from the south approach 14-2 - View of structure wearing surface 14-3 - View of watercourse downstream 14-4 - View of watercourse upstream 14-5 - View of culvert barrel interior, obvert 14-6 - View of culvert barrel interior 14-7 - View of slope protection 14-8 - View of barrier (typical) 14-9 - View of culvert interior	
Name of Inspector	Evan Montreuil, P.Eng.		
Equipment Used	Tape, pick, hammer		
Weather Conditions	Overcast		
Temperature	5°C		
Last Inspection	September 24, 2020		
Additional Investigation Required	None		
Total Rehabilitation	Tighten the barrier protection cables and repair the connection to the posts. Continue to monitor the corrosion of the barrel (especially at the inlet). Clear debris buildup at culvert inlet.		
Total Rehabilitation Budget Costing	\$3,000	Next Inspection	December 2024
Justification	Continued maintenance to extend service life and maintain user safety.		

Element Data**Structure:** 14

Element Group:	Decks		Length:				
Element Name:	Wearing Surface		Width:				
Location:			Height:				
Material:	Surface Treatment		Count:				
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100				
Comments:	The surface treatment is in good condition with minor wheel path rutting observed.						
Recommended Work:	<input type="checkbox"/> None		<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent	

Element Data

Element Group:	Barriers		Length:	230			
Element Name:	Barrier		Width:				
Location:			Height:				
Material:	Steel Cable/Wood Posts		Count:				
Element Type:	3-Cable Guiderail		Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			95	5	Yes	Yes
Comments:	The east cables are loose and detached at two posts. Some wooden posts are beginning to show signs of rot at bases.						
Recommended Work:	<input type="checkbox"/> None		<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input checked="" type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent	
	Tighten the cable guiderail and repair the post connections. Monitor the wooden post condition.						

Element Data

Element Group:	Culverts		Length:				
Element Name:	Inlet Component		Width:				
Location:	East End		Height:				
Material:	Stone		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100				
Comments:	The embankments and haunches are stable and rock protected.						
Recommended Work:	<input type="checkbox"/> None		<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent	

Element Data**Structure: 14**

Element Group:	Culverts		Length:				
Element Name:	Outlet Components		Width:				
Location:	West End		Height:				
Material:			Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100				
Comments:	The embankments and haunches are stable and rock protected.						
Recommended Work:	<input type="checkbox"/> None	<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent		

Element Data

Element Group:	Culvert		Length:				
Element Name:	Barrel		Width:				
Location:			Height:				
Material:	Steel		Count:				
Element Type:	Multiple Plate		Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	Galvanized						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		50	50			
Comments:	Rust and some corrosion were observed below the high water line. At the inlet end, minor section loss was observed not exceeding 5%. Monitor the section loss as it advances.						
Recommended Work:	<input type="checkbox"/> None	<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent		

Element Data

Element Group:	Streams/Embankments		Length:				
Element Name:	Streams and Waterways		Width:				
Location:			Height:				
Material:	Earth / Rock		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			100			
Comments:	Debris buildup at upstream end obstructing flow.						
Recommended Work:	<input type="checkbox"/> None	<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input checked="" type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent		
	Clear debris.						

Element Data**Structure:** 14

Element Group:	Streams/Embankments		Length:				
Element Name:	Embankment		Width:				
Location:	Each Corner		Height:				
Material:	Stone		Count:	6			
Element Type:			Total Quantity:	6			
Environment:			Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each Corner		6				
Comments:	The embankments appear stable with no sign of erosion or movement of the rock protection.						
Recommended Work:	<input type="checkbox"/> None	<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent		

Element Data

Element Group:	Signs		Length:				
Element Name:	Signs		Width:				
Location:	Corner		Height:				
Material:	Steel		Count:	4			
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each		4			Yes	Yes
Comments:	End of guiderail post marker signs are not plum or aligned with traffic.						
Recommended Work:	<input type="checkbox"/> None	<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input checked="" type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent		
	Straighten and align guiderail marker signs.						

Element Data

Element Group:	Approaches		Length:				
Element Name:	Wearing Surface		Width:				
Location:	Each End		Height:				
Material:	Surface Treatment		Count:				
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100				
Comments:	The surface treatment is in good condition with minor wheel path rutting observed.						
Recommended Work:	<input type="checkbox"/> None	<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent		



Photo 14-2: View of structure wearing surface



Photo 14-3: View of watercourse downstream

Date of Photos: Dec. 6, 2022



Photo 14-4: View of watercourse upstream



Photo 14-5: View of culvert barrel interior, obvert

Date of Photos: Dec. 6, 2022



Photo 14-6: View of culvert barrel interior



Photo 14-7: View of slope protection

Date of Photos: Dec. 6, 2022



Photo 14-8: View of barrier (typical)



Photo 14-9: View of culvert interior

Date of Photos: Dec. 6, 2022

Bridge/Culvert Inspection Report

Site Number	<input type="text" value="15"/>	Project Number	<input type="text" value="221-12948-00"/>
Structure Name	<input type="text" value="Concession 4 Culvert"/>	Municipality	<input type="text" value="Northern Bruce Peninsula"/>
MTO Region Code	<input type="text" value="30"/>	County	<input type="text" value="Bruce"/> <input type="text" value="Code"/> <input type="text" value="02"/>
MTO District Code	<input type="text" value="33"/>	Geographic Twp Code	<input type="text" value="377"/>



1450 - 1st Avenue West, Suite 101
Owen Sound, Ontario N4K 6W2

Tel: 519-376-7612
Fax: 519-376-8008
Website: www.wspgroup.com

Bridge/Culvert Inspection Report

Inventory Data

Structure Name	Concession 4 Culvert	Site Number	15
County	Bruce	Road Name	Concession 4
Municipality	Northern Bruce Peninsula	Road Type	Rural Local
Bridge or Culvert	Culvert	Owner	Northern Bruce Peninsula
Structure Type	Steel CSP (double)	AADT	50
Span (m)	2.8, 0.9 No. 2	% Trucks	10%
Height (m)	2.8 m, 0.6 m	Overall Structure Width (m)	6 m
Direction of Structure	East/West 45° skew	Roadway Width (m)	4 + wide shoulder
Year Built/Rehabilitated	2014	Total Deck Length (m)	
Current Load Limit	None	Total Deck Area (s.m.)	
Detour Length (km)	N/A (Dead End)	Heritage Des.	None
Waterway	Branch - Judges Creek		

Inspection Data

Date of Inspection	December 5, 2022	Photos: 15-1 - Title Page 15-2 - View of approach and structure wearing surface 15-3 - Rock protection at inlet end 15-4 - View of west culvert end 15-5 - View of east culvert end 15-6 - View of watercourse downstream 15-7 - View of culvert barrel interior		
Name of Inspector	Evan Montreuil, P.Eng.			
Equipment Used	Tape, pick, hammer			
Weather Conditions	Overcast			
Temperature	5°C			
Last Inspection	September 24, 2020			
Additional Investigation Required	None			
Total Rehabilitation	Install barrier protection and signage to code.			
Total Rehabilitation Budget Costing	\$65,000		Next Inspection	December 2024
Justification	Install barrier and approach protection for increased road user safety. In the interim, reduce the posted speed to 35 km/hr to improve vehicular safety and reduce liability.			

Element Data**Structure:** 15

Element Group:	Decks		Length:				
Element Name:	Wearing Surface		Width:				
Location:			Height:				
Material:	Gravel		Count:				
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:	Wearing Surface						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			100		Yes	Yes
Comments:	The granular wearing surface is uneven and requires grading to achieve drainage.						
Recommended Work:	None		6-10 Years	1-5 Years	<input checked="" type="checkbox"/> < 1 Year	Urgent	
	Grade annually and clear vegetation from shoulders.						

Element Data

Element Group:	Barrier		Length:				
Element Name:	Railing System		Width:				
Location:	Each Side		Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%					Yes	
Comments:							
Recommended Work:	None		6-10 Years	1-5 Years	< 1 Year	<input checked="" type="checkbox"/> Urgent	
	Install barrier protection to Code to provide required vehicle safety.						

Element Data

Element Group:	Culverts		Length:				
Element Name:	Inlet Component		Width:				
Location:	East End		Height:				
Material:	Stone and Earth		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100				
Comments:	The low level CSP pipe culvert is partially submerged underwater. There is some observed erosion of the embankments at the culvert inlet.						
Recommended Work:	None		6-10 Years	1-5 Years	<input checked="" type="checkbox"/> < 1 Year	Urgent	
	Repair erosion and add rip-rap slope protection.						

Element Data**Structure:** 15

Element Group:	Culverts		Length:				
Element Name:	Outlet Components		Width:				
Location:	West End		Height:				
Material:	Stone and Earth		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:	Yes			
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100				
Comments:	The low level CSP pipe culvert is partially submerged underwater.						
Recommended Work:	<input type="checkbox"/> None	<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent		

Element Data

Element Group:	Culvert		Length:				
Element Name:	Barrel		Width:				
Location:			Height:				
Material:	Steel		Count:				
Element Type:	Pipe Arch		Total Quantity:				
Environment:	Moderate		Limited Insp'n:	Yes			
Protection System:	Galvanized						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100				
Comments:	Low level culvert under water.						
Recommended Work:	<input type="checkbox"/> None	<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent		

Element Data

Element Group:	Embankments & Streams		Length:				
Element Name:	Streams and Waterways		Width:				
Location:			Height:				
Material:	Earth/Stone		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100				
Comments:							
Recommended Work:	<input type="checkbox"/> None	<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent		

Element Data**Structure:** 15

Element Group:	Embankments & Streams		Length:				
Element Name:	Embankments		Width:				
Location:	Each Corner		Height:				
Material:	Earth/Stone		Count:	4			
Element Type:			Total Quantity:	4			
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each			4			
Comments:	The slopes are partially vegetated with some rock protection. Rock protection has been placed at the inlet end. Embankments appear stable.						
Recommended Work:	<input type="checkbox"/> None	<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent		

Element Data

Element Group:	Signs		Length:				
Element Name:	Signs		Width:				
Location:			Height:				
Material:	Steel		Count:				
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:	Paint						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each					Yes	Yes
Comments:	There are no End Hazard signs currently in place.						
Recommended Work:	<input type="checkbox"/> None	<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input checked="" type="checkbox"/> Urgent		
	Install end hazard signs.						

Element Data

Element Group:	Approaches		Length:				
Element Name:	Wearing Surface		Width:				
Location:	Each End		Height:				
Material:	Gravel		Count:				
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100			Yes	Yes
Comments:	The granular wearing surface is uneven and requires grading to achieve drainage.						
Recommended Work:	<input type="checkbox"/> None	<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input checked="" type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent		
	Grade annually and clear vegetation from shoulders.						



Photo 15-2: View of approach and structure wearing surface



Photo 15-3: Rock protection at inlet end

Date of Photos: Dec. 5. 2022



Photo 15-4: View of west culvert end



Photo 15-5: View of east culvert end

Date of Photos: Dec. 5. 2022



Photo 15-6: View of watercourse downstream



Photo 15-7: View of culvert barrel interior

Date of Photos: Dec. 5, 2022

Bridge/Culvert Inspection Report

Site Number	<input type="text" value="16"/>	Project Number	<input type="text" value="221-12948-00"/>		
Structure Name	<input type="text" value="Barrow Bay Road Culvert"/>	Municipality	<input type="text" value="Northern Bruce Peninsula"/>		
MTO Region Code	<input type="text" value="30"/>	County	<input type="text" value="Bruce"/>	Code	<input type="text" value="02"/>
MTO District Code	<input type="text" value="33"/>	Geographic Twp Code	<input type="text" value="377"/>		



1450 - 1st Avenue West, Suite 101
Owen Sound, Ontario N4K 6W2

Tel: 519-376-7612
Fax: 519-376-8008
Website: www.wspgroup.com

Bridge/Culvert Inspection Report

Inventory Data

Structure Name	Barrow Bay Road Culvert	Site Number	16
County	Bruce	Road Name	Barrow Bay Road
Municipality	Northern Bruce Peninsula	Road Type	Rural Coll.
Bridge or Culvert	Culvert	Owner	Northern Bruce Peninsula
Structure Type	Steel - SP - CSP - PA multi-plate	AADT	350
Span (m)	7 No. 1	% Trucks	15%
Height (m)	3.8	Overall Structure Width (m)	21.8
Direction of Structure	North/South	Roadway Width (m)	6.1
Year Built/Rehabilitated	1980	Total Deck Length (m)	7
Current Load Limit	None	Total Deck Area (s.m.)	N/A
Detour Length (km)	6	Heritage Des.	None
Waterway	Judges Creek		

Inspection Data

Date of Inspection	December 5, 2022	Photos: 16-1 - Title Page - Upstream elevation 16-2 - View of culvert barrel in elevation (outlet end) 16-3 - View of culvert barrel in elevation (inlet end) 16-4 - View of watercourse upstream 16-5 - View of watercourse downstream 16-6 - Culvert barrel interior 16-7 - View of structure from approach 16-8 - Loose cable on barrier protection 16-9 - Wooden post (typical)	
Name of Inspector	Evan Montreuil, P.Eng.		
Equipment Used	Tape, pick, hammer		
Weather Conditions	Overcast		
Temperature	5°C		
Special Notes	November 12, 2020		
Additional Investigation Required	None		
Total Rehabilitation	Place erosion protection at south slope, replace rotten barrier and repair cable.		
Total Rehabilitation Budget Costing	\$9,000		Next Inspection: December 2024
Justification	Due to the good condition of this structure, improvements are recommended to maximise the safe service life.		

Element Data**Structure:** 16

Element Group:	Decks		Length:				
Element Name:	Wearing Surface		Width:				
Location:			Height:				
Material:	Surface Treatment		Count:				
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		85	10	5		
Comments:	Some minor cracking was observed on shoulders. Moderate cracks on south shoulder.						
Recommended Work:	<input type="checkbox"/> None <input type="checkbox"/> 6-10 Years <input type="checkbox"/> 1-5 Years <input type="checkbox"/> < 1 Year <input type="checkbox"/> Urgent						

Element Data

Element Group:	Barriers		Length:				
Element Name:	Barrier		Width:				
Location:	Each Side		Height:				
Material:	Steel/Wood		Count:	20 posts - 3 cable			
Element Type:	3-Cable Guiderail		Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Ea.		20			Yes	Yes
Comments:	The three cable guide barrier is in fair overall condition. Some of the wooden posts are experiencing moderate rot and should be replaced for vehicle safety. Loose cable on south side.						
Recommended Work:	None <input type="checkbox"/> 6-10 Years <input type="checkbox"/> 1-5 Years <input checked="" type="checkbox"/> < 1 Year <input type="checkbox"/> Urgent Replace the rotten barrier posts. Re-attach and tighten loose cables.						

Element Data

Element Group:	Culverts		Length:				
Element Name:	Inlet Component		Width:				
Location:	South End		Height:				
Material:	Stone		Count:				
Element Type:	Stone Head Wall		Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		50	40	10	Yes	Yes
Comments:	Some erosion was observed under the large block stones protecting the south slope.						
Recommended Work:	None <input type="checkbox"/> 6-10 Years <input checked="" type="checkbox"/> 1-5 Years <input type="checkbox"/> < 1 Year <input type="checkbox"/> Urgent Place additional stone blocks and rip-rap. Remove the debris at the inlet.						

Element Data**Structure:** 16

Element Group:	Culverts		Length:				
Element Name:	Outlet Components		Width:				
Location:	North End		Height:				
Material:	Stone/Rip-Rap/Earth		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			100			
Comments:	The outlet slopes are very steep, but appear stable.						
Recommended Work:	<input type="checkbox"/> None	<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent		

Element Data

Element Group:	Culvert		Length:				
Element Name:	Barrel		Width:				
Location:			Height:				
Material:	Steel		Count:				
Element Type:	Pipe Arch		Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	Galvanized						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			100			
Comments:	Corrosion and swelling were observed at water level. No section loss. Monitor the corrosion.						
Recommended Work:	<input type="checkbox"/> None	<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent		

Element Data

Element Group:	Foundation		Length:				
Element Name:	Foundation (below grade)		Width:				
Location:			Height:				
Material:	Stone/Gravel		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:	Yes			
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
Comments:	The foundation is not visible for inspection due to high water level, however the structure appears stable.						
Recommended Work:	<input type="checkbox"/> None	<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent		

Element Data**Structure: 16**

Element Group:	Streams/Embankments		Length:				
Element Name:	Streams and Waterways		Width:				
Location:			Height:				
Material:	Earth		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			100			
Comments:							
Recommended Work: <input type="checkbox"/> None 6-10 Years 1-5 Years < 1 Year Urgent							

Element Data

Element Group:	Streams/Embankments		Length:				
Element Name:	Embankment		Width:				
Location:	Each Corner		Height:				
Material:	Stone/Earth		Count:	6			
Element Type:			Total Quantity:	6			
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each		3	3		Yes	Yes
Comments: The embankments are heavily vegetated with minor signs of erosion.							
Recommended Work: None 6-10 Years <input checked="" type="checkbox"/> 1-5 Years < 1 Year Urgent Repair the embankment erosion and place rip rap slope protection.							

Element Data

Element Group:	Approaches		Length:				
Element Name:	Wearing Surface		Width:				
Location:	Each End		Height:				
Material:	Surface Treatment		Count:				
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			100			
Comments: Some minor to moderate cracking observed along shoulders and transverse cracks observed near each barrier end.							
Recommended Work: <input type="checkbox"/> None 6-10 Years 1-5 Years < 1 Year Urgent							



Photo 16-2: View of culvert barrel in elevation (outlet end)



Photo 16-3: View of culvert barrel in elevation (inlet end)

Date of Photos: Dec. 5, 2022



Photo 16-4: View of watercourse upstream



Photo 16-5: View of watercourse downstream

Date of Photos: Dec. 5, 2022



Photo 16-6: Culvert barrel interior



Photo 16-7: View of structure from approach

Date of Photos: Dec. 5, 2022



Photo 16-8: Loose cable on barrier protection



Photo 16-9: Wooden post (typical)

Date of Photos: Dec. 5, 2022

Bridge/Culvert Inspection Report

Site Number	<input type="text" value="17"/>	Project Number	<input type="text" value="221-12948-00"/>		
Structure Name	<input type="text" value="Concession 4 Culvert N. of Barrow Bay Road"/>	Municipality	<input type="text" value="Northern Bruce Peninsula"/>		
MTO Region Code	<input type="text" value="30"/>	County	<input type="text" value="Bruce"/>	Code	<input type="text" value="02"/>
MTO District Code	<input type="text" value="33"/>	Geographic Twp Code	<input type="text" value="377"/>		



1450 - 1st Avenue West, Suite 101
Owen Sound, Ontario N4K 6W2

Tel: 519-376-7612
Fax: 519-376-8008
Website: www.wspgroup.com

Bridge/Culvert Inspection Report

Inventory Data

Structure Name	Concession 4 Culvert	Site Number	17
County	Bruce	Road Name	Concession 4
Municipality	Northern Bruce Peninsula	Road Type	Rural Coll.
Bridge or Culvert	Culvert	Owner	Northern Bruce Peninsula
Structure Type	Steel - SP - CSP - PA	AADT	250
Span (m)	3.6 No. 1	% Trucks	15%
Height (m)	2.41	Overall Structure Width (m)	18.4
Direction of Structure	East/West	Roadway Width (m)	5.8
Year Built/Rehabilitated	1985	Total Deck Length (m)	3.8
Current Load Limit	None	Total Deck Area (s.m.)	N/A
Detour Length (km)	6	Heritage Des.	None
Waterway	Branch Judges Creek		

Inspection Data

Date of Inspection	December 5, 2022	Photos: 17-1 - Title Page 17-2 - View of structure and approach wearing surface 17-3 - View of watercourse upstream 17-4 - View of watercourse downstream and outlet culvert end 17-5 - View of culvert in elevation and inlet components 17-6 - View of embankment 17-7 - View of culvert barrel interior		
Name of Inspector	Evan Montreuil, P.Eng.			
Equipment Used	Tape, pick, hammer			
Weather Conditions	Overcast			
Temperature	5°C			
Last Inspection	September 24, 2020			
Additional Investigation Required	None			
Total Rehabilitation	Install barrier and approach protection to Code. Install end hazard signs and speed reduction signs (35 km/hr). Place rip-rap slope protection.			
Total Rehabilitation Budget Costing	\$65,000		Next Inspection	December 2024
Justification	Due to good condition, rehabilitation is recommended to extend the safe service life. Install barrier and approach protection. Maintain posted speed at 35 km/hr. until installed.			

Element Data**Structure:** 17

Element Group:	Decks		Length:				
Element Name:	Wearing Surface		Width:				
Location:			Height:				
Material:	Gravel		Count:				
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			85	15	Yes	Yes
Comments:	Some wheel path rutting was observed. Grade the wearing surface annually.						
Recommended Work:	None 6-10 Years		1-5 Years	<input checked="" type="checkbox"/> < 1 Year	Urgent		
	Grade the wearing surface annually.						

Element Data

Element Group:	Barriers		Length:				
Element Name:	Barrier		Width:				
Location:	Each Side		Height:				
Material:			Count:				
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%					Yes	
Comments:	No barrier protection						
Recommended Work:	None 6-10 Years		1-5 Years	< 1 Year	<input checked="" type="checkbox"/> Urgent		
	Install barrier to provide vehicle safety						

Element Data

Element Group:	Culverts		Length:				
Element Name:	Inlet Component		Width:				
Location:	End		Height:				
Material:	Stone and Earth		Count:				
Element Type:	Stone Head Wall and Steel Culvert		Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			100			Yes
Comments:	Minor erosion at corners.						
Recommended Work:	None 6-10 Years		1-5 Years	<input checked="" type="checkbox"/> < 1 Year	Urgent		
	Place rip-rap slope protection.						

Element Data**Structure:** 17

Element Group:	Culverts		Length:				
Element Name:	Outlet Components		Width:				
Location:	West End		Height:				
Material:	Stone and Earth		Count:				
Element Type:	Stone and Steel Culvert		Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			100			Yes
Comments:	Minor erosion at corners.						
Recommended Work:	None		6-10 Years	<input checked="" type="checkbox"/> 1-5 Years	< 1 Year	Urgent	
	Place rip-rap slope protection.						

Element Data

Element Group:	Culvert		Length:				
Element Name:	Barrel		Width:				
Location:			Height:				
Material:	Steel		Count:				
Element Type:	Pipe Arch		Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	Galvanized						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		50	50			
Comments:	The west side has a slight deformation.						
Recommended Work:	<input checked="" type="checkbox"/> None		6-10 Years	1-5 Years	< 1 Year	Urgent	

Element Data

Element Group:	Foundation		Length:				
Element Name:	Foundation (below grade)		Width:				
Location:			Height:				
Material:	Stone/Gravel		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:	Yes			
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
Comments:	The foundation is not visible for inspection, however the culvert appears stable.						
Recommended Work:	<input checked="" type="checkbox"/> None		6-10 Years	1-5 Years	< 1 Year	Urgent	

Element Data**Structure:** 17

Element Group:	Streams/Embankments		Length:				
Element Name:	Streams and Waterways		Width:				
Location:			Height:				
Material:			Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		50	50			
Comments:	Some silt deposits (outlet).						
Recommended Work:	<input type="checkbox"/> None	<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent		

Element Data

Element Group:	Streams/Embankments		Length:				
Element Name:	Embankment		Width:				
Location:	Each Corner		Height:				
Material:			Count:				
Element Type:			Total Quantity:				
Environment:			Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		50	50			
Comments:	Heavily vegetated with minor signs of erosion.						
Recommended Work:	<input type="checkbox"/> None	<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent		

Element Data

Element Group:	Signs		Length:				
Element Name:	Signs		Width:				
Location:	Each Corner		Height:				
Material:			Count:				
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each					Yes	
Comments:	No signs present at the time of the inspection.						
Recommended Work:	<input type="checkbox"/> None	<input type="checkbox"/> 6-10 Years	<input checked="" type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent	Install end hazard signs and speed limit signs prior to guiderail protection placement.	

Element Data**Structure:** 17

Element Group:	Approaches		Length:				
Element Name:	Wearing Surface		Width:				
Location:	Each End		Height:				
Material:	Gravel		Count:				
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100				Yes
Comments:	At the time of inspection, the wearing surface was in overall good condition. Continue annual grading.						
Recommended Work:	None	6-10 Years	1-5 Years	<input checked="" type="checkbox"/> < 1 Year	Urgent		
	Continue annual maintenance (annual grading).						



Photo 17-2: View of structure and approach wearing surface



Photo 17-3: View of watercourse upstream

Date of Photos: Dec. 5, 2022



Photo 17-4: View of watercourse downstream and outlet culvert end



Photo 17-5: View of culvert in elevation and inlet components

Date of Photos: Dec. 5, 2022



Photo 17-6: View of embankment



Photo 17-7: View of culvert barrel interior

Date of Photos: Dec. 5, 2022

Bridge/Culvert Inspection Report

Site Number	<input type="text" value="18"/>	Project Number	<input type="text" value="221-12948-00"/>	
Structure Name	<input type="text" value="10th Sideroad Culvert"/>	Municipality	<input type="text" value="Northern Bruce Peninsula"/>	
MTO Region Code	<input type="text" value="30"/>	County	<input type="text" value="Bruce"/>	Code <input type="text" value="02"/>
MTO District Code	<input type="text" value="33"/>	Geographic Twp Code	<input type="text" value="377"/>	



1450 - 1st Avenue West, Suite 101
Owen Sound, Ontario N4K 6W2

Tel: 519-376-7612
Fax: 519-376-8008
Website: www.wspgroup.com

Bridge/Culvert Inspection Report

Inventory Data

Structure Name	10th Sideroad Culvert	Site Number	18
County	Bruce	Road Name	10th Sideroad
Municipality	Northern Bruce Peninsula	Road Type	Rural Local
Bridge or Culvert	Culvert	Owner	Northern Bruce Peninsula
Structure Type	Twin Steel - CSP	AADT	150
Span (m)	1.5 No. 2	% Trucks	15%
Height (m)	1.5	Overall Structure Width (m)	11.1
Direction of Structure	North/South	Roadway Width (m)	4.6
Year Built/Rehabilitated	1990	Total Deck Length (m)	3.6
Current Load Limit	None	Total Deck Area (s.m.)	40
Detour Length (km)	6	Heritage Des.	None
Waterway	Branch Judges Creek		

Inspection Data

Date of Inspection	December 5, 2022	Photos: 18-1 - Title Page 18-2 - View of structure wearing surface 18-3 - View of culvert in elevation and outlet end components 18-4 - View of watercourse upstream and inlet ends 18-5 - View of watercourse downstream and outlet culvert ends 18-6 - View of erosion of embankment and between pipes 18-7 - Erosion at the haunch of the outlet pipe 18-8 - View of east culvert barrel interior 18-9 - View of west culvert barrel interior		
Name of Inspector	Evan Montreuil, P.Eng.			
Equipment Used	Tape, pick, hammer			
Weather Conditions	Overcast			
Temperature	5 °C			
Last Inspection	September 24, 2020			
Additional Investigation Required	None			
Total Rehabilitation	Install approach and barrier protection. Place inlet/outlet erosion protection and place non-shrinkable fill in the armourstone voids.			
Total Rehabilitation Budget Costing	\$70,000			Next Inspection
Justification	Repair and install approach/barrier protection recommended due to current good condition to extend the safe service life of the structure. Maintain posted speed of 35 km/hr. until approach/barrier protection is installed. Install end hazard signs and repair erosion at both inlet and outlet ends.			

Element Data**Structure:** 18

Element Group:	Decks		Length:				
Element Name:	Wearing Surface		Width:				
Location:			Height:				
Material:	Gravel		Count:				
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			100			Yes
Comments:	Minor wheel path rutting and beginning stages of pot holes were observed.						
Recommended Work:	None 6-10 Years		1-5 Years	<input checked="" type="checkbox"/> < 1 Year	Urgent		
	Grade the wearing surface annually.						

Element Data

Element Group:	Culverts		Length:				
Element Name:	Inlet Component		Width:				
Location:	South End		Height:				
Material:	Stone and Rip-Rap		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			80	20	Yes	Yes
Comments:	Erosion was observed between pipes and at southeast corner. There is observed medium corrosion of the barrel at the water line with no section loss.						
Recommended Work:	None 6-10 Years		1-5 Years	<input checked="" type="checkbox"/> < 1 Year	Urgent		
	Repair erosion and place rip rap slope protection.						

Element Data

Element Group:	Culverts		Length:				
Element Name:	Outlet Components		Width:				
Location:	North End		Height:				
Material:	Stone and Rip-Rap		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			80	20	Yes	
Comments:	Large rocks (blocks) and rip-rap protect the embankment. There is a void between the pipes, a scour developing at the culvert end, and a void beneath the culvert ends. Medium corrosion with no section loss was observed at the waterline.						
Recommended Work:	None 6-10 Years		1-5 Years	<input checked="" type="checkbox"/> < 1 Year	Urgent		
	Add rip-rap slope protection and fill the void between the pipes.						

Element Data**Structure: 18**

Element Group:	Culvert		Length:				
Element Name:	Barrel		Width:				
Location:			Height:				
Material:	Steel		Count:				
Element Type:	CSP (circular)		Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	Galvanized						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			100			
Comments:	Minor corrosion was observed near water level.						
Recommended Work:	<input type="checkbox"/> None		<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent	

Element Data

Element Group:	Foundation		Length:				
Element Name:	Foundation (below grade)		Width:				
Location:			Height:				
Material:	Stone		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:	Yes			
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
						Yes	Yes
Comments:	The culvert appears stable however the outlet end pipes are undermined with a void.						
Recommended Work:	<input type="checkbox"/> None		<input type="checkbox"/> 6-10 Years	<input checked="" type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent	
	Fill the void beneath the outlet pipes to protect from further erosion.						

Element Data

Element Group:	Streams/Embankments		Length:				
Element Name:	Streams and Waterways		Width:				
Location:			Height:				
Material:	Earth		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		30	40	30		
Comments:	Waterway bank erosion was observed.						
Recommended Work:	<input type="checkbox"/> None		<input type="checkbox"/> 6-10 Years	<input checked="" type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent	
	Provide erosion protection.						

Element Data**Structure:** 18

Element Group:	Streams/Embankments		Length:				
Element Name:	Embankment		Width:				
Location:	Each Corner		Height:				
Material:	Earth / Rip-Rap		Count:	6			
Element Type:			Total Quantity:	6			
Environment:			Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each			4	2	Yes	
Comments:	The embankments are heavily vegetated with signs of erosion upstream and downstream from culverts. There is erosion under the armour stone at the southeast quadrant, and between the north (outlet) culvert ends.						
Recommended Work:	None		6-10 Years	1-5 Years	< 1 Year	<input checked="" type="checkbox"/> Urgent	
	Add rip-rap to stabilize the embankment slope and non-shrink fill at the southeast corner under armour stone.						

Element Data

Element Group:	Approaches		Length:				
Element Name:	Wearing Surface		Width:				
Location:	Each End		Height:				
Material:	Gravel		Count:				
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			100			Yes
Comments:	Minor wheel path rutting and pot holes starting to develop at the time of inspection.						
Recommended Work:	None		6-10 Years	1-5 Years	<input checked="" type="checkbox"/> < 1 Year	Urgent	
	Continue annual grading of the wearing surface.						



Photo 18-2: View of structure wearing surface



Photo 18-3: View of culvert in elevation and outlet end components

Date of Photos: Dec. 5, 2022



Photo 18-4: View of watercourse upstream and inlet ends



Photo 18-5: View of watercourse downstream and outlet culvert ends

Date of Photos: Dec. 5, 2022



Photo 18-6: View of erosion of embankment and between pipes



Photo 18-7: Erosion at the haunch of the outlet pipe

Date of Photos: Dec. 5, 2022



Photo 18-8: View of east culvert barrel interior



Photo 18-9: View of west culvert barrel interior

Date of Photos: Dec. 5, 2022

Bridge/Culvert Inspection Report

Site Number	<input type="text" value="19"/>	Project Number	<input type="text" value="221-12948-00"/>
Structure Name	<input type="text" value="Pike Bay Road Culvert"/>	Municipality	<input type="text" value="Northern Bruce Peninsula"/>
MTO Region Code	<input type="text" value="30"/>	County	<input type="text" value="Bruce"/> Code <input type="text" value="02"/>
MTO District Code	<input type="text" value="33"/>	Geographic Twp Code	<input type="text" value="377"/>



1450 - 1st Avenue West, Suite 101
Owen Sound, Ontario N4K 6W2

Tel: 519-376-7612
Fax: 519-376-8008
Website: www.wspgroup.com

Bridge/Culvert Inspection Report

Inventory Data

Structure Name	Pike Bay Road Culvert	Site Number	19
County	Bruce	Road Name	Pike Bay Road
Municipality	Northern Bruce Peninsula	Road Type	Rural Coll.
Bridge or Culvert	Culvert	Owner	Northern Bruce Peninsula
Structure Type	Steel SP-CSP-PA	AADT	350
Span (m)	4.5 No. 1	% Trucks	15%
Height (m)	3	Overall Structure Width (m)	18.9
Direction of Structure	North/South	Roadway Width (m)	6.7
Year Built/Rehabilitated	1990	Total Deck Length (m)	4.5
Current Load Limit	None	Total Deck Area (s.m.)	N/A
Detour Length (km)	6	Heritage Des.	None
Waterway	Judges Creek		

Inspection Data

Date of Inspection	December 5, 2022	Photos: 19-1 - Title Page 19-2 - View of culvert in elevation and inlet components 19-3 - View of culvert in elevation and outlet components 19-4 - View of culvert barrel interior 19-5 - Impact damage to the northeast barrier protection post 19-6 - Structure embankment 19-7 - View of structure barrier protection (typical) 19-8 - View of watercourse upstream 19-9 - View of watercourse downstream 19-10 - View of structure and approach wearing surface	
Name of Inspector	Evan Montreuil, P.Eng.		
Equipment Used	Tape, pick, hammer		
Weather Conditions	Overcast		
Temperature	5°C		
Last Inspection	September 24, 2020		
Additional Investigation Required	None		
Total Rehabilitation	Repair the 3-cable guiderail and place rip-rap erosion protection. Realign and/or replace signage.		
Total Rehabilitation Budget Costing	\$18,000	Next Inspection	December 2024
Justification	Maintain safe barrier protection and realign signage for road user safety. Complete erosion repairs to maximize the lifespan of the culvert.		

Element Data**Structure: 19**

Element Group:	Decks		Length:				
Element Name:	Wearing Surface		Width:				
Location:			Height:				
Material:	Surface Treatment		Count:				
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		90	10		Yes	
Comments:	Minor ponding directly above the culverts. Recent surface treatment completed. Approx. 25m long alligator cracking along WB pavement edge.						
Recommended Work:	None <input type="checkbox"/> 6-10 Years <input checked="" type="checkbox"/> 1-5 Years <input type="checkbox"/> < 1 Year <input type="checkbox"/> Urgent <input type="checkbox"/> Regrade and compact the at next resurfacing to avoid ponding water. Consider installing a frost taper.						

Element Data

Element Group:	Barriers		Length:				
Element Name:	Barrier		Width:				
Location:	Each Side		Height:				
Material:			Count:	14 posts			
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			50	50	Yes	Yes
Comments:	3-cable guiderail barrier protection cable needs to be tightened. Broken and loose posts on north side.						
Recommended Work:	None <input type="checkbox"/> 6-10 Years <input type="checkbox"/> 1-5 Years <input type="checkbox"/> < 1 Year <input checked="" type="checkbox"/> Urgent <input type="checkbox"/> Repair the cable/post system.						

Element Data

Element Group:	Culverts		Length:				
Element Name:	Inlet Component		Width:				
Location:	South End		Height:				
Material:	Stone / Earth		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		50	50			
Comments:	Bevelled end, minor erosion. Minor corrosion at water line.						
Recommended Work:	None <input type="checkbox"/> 6-10 Years <input type="checkbox"/> 1-5 Years <input checked="" type="checkbox"/> < 1 Year <input type="checkbox"/> Urgent <input type="checkbox"/> Place rip-rap slope protection.						

Element Data**Structure: 19**

Element Group:	Culverts		Length:				
Element Name:	Outlet Components		Width:				
Location:	North End		Height:				
Material:	Stone and Earth		Count:				
Element Type:	Stone Head Wall and Steel Culvert		Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		50	50			
Comments:	Minor erosion was observed around the bevelled end, as well as minor corrosion of the barrel at the waterline.						
Recommended Work:	None 6-10 Years		<input checked="" type="checkbox"/> 1-5 Years	< 1 Year	Urgent		
	Place rip-rap slope protection.						

Element Data

Element Group:	Culvert		Length:				
Element Name:	Barrel		Width:				
Location:			Height:				
Material:	Steel		Count:				
Element Type:	Pipe Arch		Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	Galvanized						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		50	50			
Comments:	Minor corrosion was observed at the water line.						
Recommended Work:	<input checked="" type="checkbox"/> None 6-10 Years		1-5 Years	< 1 Year	Urgent		

Element Data

Element Group:	Foundation		Length:				
Element Name:	Foundation (below grade)		Width:				
Location:			Height:				
Material:	Gravel / Stone		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:	Yes			
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%						
Comments:	Limited inspection due to cover, however the structure appears stable.						
Recommended Work:	<input checked="" type="checkbox"/> None 6-10 Years		1-5 Years	< 1 Year	Urgent		

Element Data**Structure:** 19

Element Group:	Streams/Embankments		Length:				
Element Name:	Streams and Waterways		Width:				
Location:			Height:				
Material:			Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		50	50			
Comments:	Heavy vegetation of the stream embankments.						
Recommended Work:	<input type="checkbox"/> None		<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent	

Element Data

Element Group:	Streams/Embankments		Length:				
Element Name:	Embankment		Width:				
Location:	Each Corner		Height:				
Material:			Count:	6			
Element Type:			Total Quantity:	6			
Environment:			Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each		6				Yes
Comments:	Heavily vegetated with minor signs of erosion observed.						
Recommended Work:	<input type="checkbox"/> None		<input type="checkbox"/> 6-10 Years	<input checked="" type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent	
	Place rip-rap slope protection.						

Element Data

Element Group:	Signs		Length:				
Element Name:	Signs		Width:				
Location:	Each Corner		Height:				
Material:			Count:				
Element Type:			Total Quantity:	3			
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each			3		Yes	Yes
Comments:	Guiderail markers : 3 sign posts are loose and require straightening vertically and alignment with traffic, 1 sign is missing.						
Recommended Work:	<input type="checkbox"/> None		<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input checked="" type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent	
	Realign signage and replace missing sign. Consider replacing all 4.						

Element Data**Structure:** 19

Element Group:	Approaches		Length:				
Element Name:	Wearing Surface		Width:				
Location:	Each End		Height:				
Material:	Surface Treatment		Count:				
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100				
Comments:	Recently placed surface treatment is in good condition.						
Recommended Work:	<input type="checkbox"/> None	<input type="checkbox"/> 6-10 Years	<input type="checkbox"/> 1-5 Years	<input type="checkbox"/> < 1 Year	<input type="checkbox"/> Urgent		



Photo 19-2: View of culvert in elevation and inlet components



Photo 19-3: View of culvert in elevation and outlet components

Date of Photos: Dec 5, 2022



Photo 19-4: View of culvert barrel interior



Photo 19-5: Impact damage to the northeast barrier protection post

Date of Photos: Dec 5, 2022



Photo 19-6: Structure embankment



Photo 19-7: View of structure barrier protection (typical)

Date of Photos: Dec 5, 2022



Photo 19-8: View of watercourse upstream



Photo 19-9: View of structure downstream

Date of Photos: Dec 5, 2022



Photo 19-10: View of structure and approach wearing surface

Date of Photos: Dec 5, 2022