



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 |

**TABLE 3**  
**2022 Bridge/Culvert Maintenance Requirements Summary**  
**Municipality of Northern Bruce Peninsula**

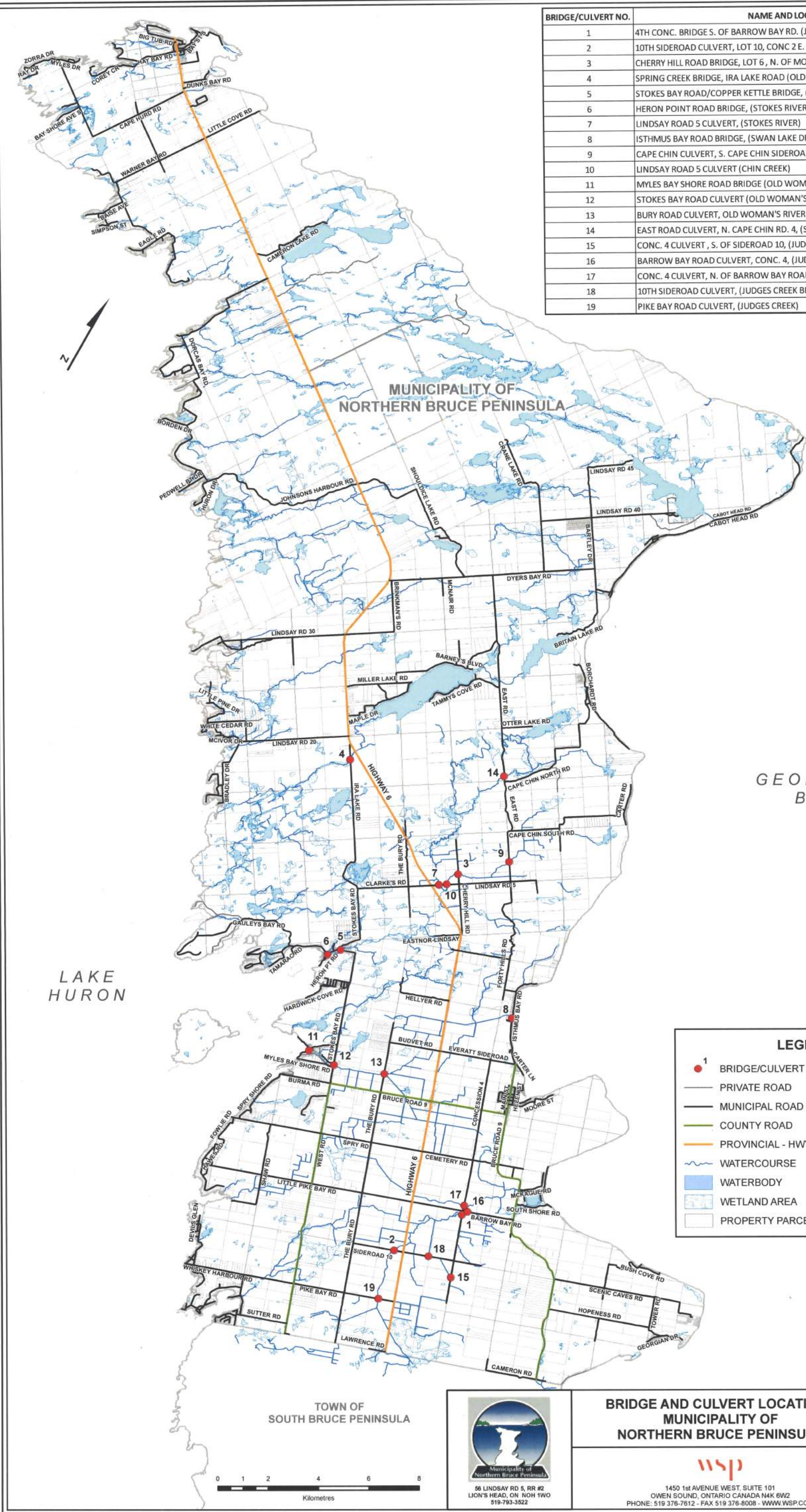
April 2023

221-12948-00

| No. | Name/Location  | Bridge / Culvert | Type                        | Condition | Maintenance Requirement   | Time (Years) |
|-----|--|------------------|-----------------------------|-----------|---|--------------|
| 1   | 4th Conc. Bridge S. of Barrow Bay Rd. (Judges Creek)                       | Bridge           | Concrete Beam               | Fair/Poor | <ul style="list-style-type: none"> <li>Grade the wearing surface for drainage</li> <li>Grade the shoulders and clear vegetation for drainage</li> <li>Clear debris along curbs for drainage</li> <li>Place four (4) End Hazard signs</li> <li>Align existing signs vertically and with traffic</li> </ul>   | 0-1          |
| 2   | 10th Sideroad Bridge, Lot 10, Conc 2 E (Judges Creek)                      | Bridge           | Concrete, Open Footing      | Poor      | <ul style="list-style-type: none"> <li>Grade the wearing surface for drainage</li> <li>Grade the shoulders and clear vegetation for drainage</li> <li>Clear debris along curbs for drainage</li> <li>Place four (4) End Hazard signs</li> <li>Place two (2) 35km/hr warning signs at each approach</li> </ul>   | 0-1          |
| 3   | Cherry Hill Road Bridge, Lot 6 (N. Monument Corners) (Stokes - Chin Creek) | Bridge           | Concrete Beam               | Fair      | <ul style="list-style-type: none"> <li>Grade the wearing surface for drainage</li> <li>Grade the shoulders and clear vegetation for drainage</li> <li>Clear debris along curbs for drainage</li> <li>Place four (4) End Hazard signs</li> <li>Place two (2) 35km/hr warning signs at each approach</li> </ul>   | 1-5          |
| 4   | Spring Creek Bridge, Ira Lake Road (Old Hwy 6)                             | Bridge           | Concrete Rigid Frame        | Poor      | <ul style="list-style-type: none"> <li>Grade the wearing surface for drainage</li> <li>Grade the shoulders and clear vegetation for drainage</li> <li>Clear debris along curbs for drainage</li> <li>Align existing signs vertically and with traffic</li> <li>Place two (2) 35km/hr warning signs at each approach</li> <li>Place two (2) advanced load limit restriction warning signs at each approach</li> <li>Replace the damaged southwest End Hazard sign</li> </ul> | 0-1          |
| 5   | Stokes Bay Road Bridge (Copper Kettle) (Stokes Sideroad)                   | Bridge           | Concrete Rigid Frame        | Fair/Good | <ul style="list-style-type: none"> <li>Grade the shoulders and clear vegetation for drainage</li> <li>Place four (4) End Hazard signs</li> </ul>  | 0-1          |
| 6   | Heron Point Road Bridge, Stokes River                                      | Bridge           | Concrete Rigid Frame        | Poor      | <ul style="list-style-type: none"> <li>Grade the south approach wearing surface for drainage</li> </ul>   | 0-1          |
| 7   | Lindsay Road 5 Culvert, Stokes River                                       | Bridge           | Concrete Rigid Frame        | Good      | <ul style="list-style-type: none"> <li>Place four (4) End Hazard signs</li> <li>Place reduced speed limit 45 km/hr signage at each approach (or install barrier protection)</li> </ul>  | 0-1          |
| 8   | Isthmus Bay Road Bridge, Swan Lake Drain                                   | Bridge           | Concrete Rigid Frame        | Good      | <ul style="list-style-type: none"> <li>Grade the approach shoulders and clear vegetation for drainage</li> <li>Clear debris along curbs for drainage</li> <li>Replace the southeast End Hazard sign</li> </ul>  | 1-5          |
| 9   | Cape Chin Culvert (S. Cape Chin Sideroad), Chin Creek                      | Culvert          | Concrete Rigid Frame (Arch) | Good      | <ul style="list-style-type: none"> <li>Place four (4) End Hazard signs</li> <li>Replace missing guiderail marker sign on SW approach</li> </ul>   | 0-1          |
| 10  | Lindsay Road 5 Culvert (Chin Creek)  | Culvert          | Steel MPPA                  | Fair      | <ul style="list-style-type: none"> <li>Place four (4) End Hazard signs</li> </ul>   | 0-1          |
| 11  | Myles Bay Shore Road Bridge  | Bridge           | Concrete Rigid Frame        | Good      | <ul style="list-style-type: none"> <li>Straighten northwest End Hazard sign</li> <li>Place two (2) 35km/hr warning signs at each approach (or install barrier protection)</li> </ul>  | 0-1          |
| 12  | Stokes Bay Road Culvert (Old Woman's River)                                | Culvert          | Steel MPPA                  | Fair      | <ul style="list-style-type: none"> <li>Place four (4) End Hazard signs</li> <li>Place reduced speed limit 45 km/hr signage at each approach (or install barrier protection)</li> </ul>  | 0-1          |
| 13  | Bury Road Culvert, Old Woman's River (Fern Creek Drain)                    | Culvert          | Concrete Open Footing       | Fair      | <ul style="list-style-type: none"> <li>Grade the wearing surface for drainage</li> <li>Grade the shoulders and clear vegetation for drainage</li> <li>Clear debris along curbs for drainage</li> <li>Replace missing load limit signs</li> <li>Place two (2) 35km/hr warning signs at each approach (or install barrier protection)</li> <li>Place four (4) End Hazard signs</li> </ul>   | 1-5          |
| 14  | East Road Culvert (N. Cape Chin Rd. 4) (Chin Creek - Stokes Road)          | Culvert          | Steel MPPA                  | Good/Fair | <ul style="list-style-type: none"> <li>Clear debris from inlet</li> <li>Align guiderail marker signs vertically and with traffic</li> </ul>   | 0-1          |
| 15  | Conc. 4 Culvert (S. of Sideroad 10)  | Culvert          | Steel CSP                   | Good      | <ul style="list-style-type: none"> <li>Grade the wearing surface for drainage</li> <li>Grade the shoulders and clear vegetation for drainage</li> <li>Place four (4) End Hazard signs</li> <li>Place two (2) 35km/hr warning signs at each approach (or install barrier protection)</li> </ul>  | 0-1          |
| 16  | Barrow Bay Road Culvert, E. of Conc. 4, Judges Creek                       | Culvert          | Steel MPPA                  | Fair      | <ul style="list-style-type: none"> <li>Place four (4) End Hazard signs</li> </ul>   | 1-5          |
| 17  | Conc. 4 Culvert (N. Barrow Bay Road)                                       | Culvert          | Steel MPPA                  | Good      | <ul style="list-style-type: none"> <li>Grade the wearing surface for drainage</li> <li>Grade the shoulders and clear vegetation for drainage</li> <li>Place four (4) End Hazard signs</li> <li>Place two (2) 35km/hr warning signs at each approach (or install barrier protection)</li> </ul>  | 0-1          |
| 18  | 10th Sideroad, Judges Creek, Br. Drain                                     | Culvert          | Steel CSP                   | Good      | <ul style="list-style-type: none"> <li>Grade the wearing surface for drainage</li> <li>Grade the shoulders and clear vegetation for drainage</li> <li>Place four (4) End Hazard signs</li> </ul>  | 0-1          |
| 19  | Pike Bay Road, Judges Creek  | Culvert          | Steel MPPA                  | Good      | <ul style="list-style-type: none"> <li>Align existing signs vertically and with traffic</li> <li>Replace missing load limit sign</li> </ul>   | 0-1          |



| 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)                                |



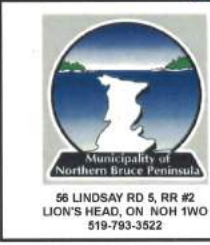
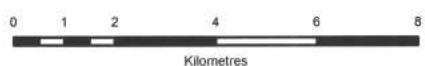
**MUNICIPALITY OF  
NORTHERN BRUCE PENINSULA**

GEORGIAN BAY

LAKE HURON

TOWN OF  
SOUTH BRUCE PENINSULA

| LEGEND                               |                                    |
|--------------------------------------|------------------------------------|
| <span style="color: red;">●</span> 1 | BRIDGE/CULVERT LOCATION AND NUMBER |
| — (thin grey)                        | PRIVATE ROAD                       |
| — (black)                            | MUNICIPAL ROAD                     |
| — (green)                            | COUNTY ROAD                        |
| — (orange)                           | PROVINCIAL - HWY 6                 |
| ~ (blue wavy)                        | WATERCOURSE                        |
| ■ (light blue)                       | WATERBODY                          |
| ■ (light blue with dots)             | WETLAND AREA                       |
| □ (white with black border)          | PROPERTY PARCEL                    |



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

**wsp**  
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](http://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  | <b>Photos:</b><br>1-1 - Title Page<br>1-2 - South abutment, soffit and foundation<br>1-3 - Abutment, girders and soffit with spalling and delamination<br>1-4 - North abutment, soffit and foundation<br>1-5 - Wingwall deterioration (typical)<br>1-6 - Structure barrier and excessive granular fill on deck<br>1-7 - Embankment erosion behind south footing and abutment<br>1-8 - Vegetation & debris accumulation along shoulders, potholes in wearing surface<br>1-9 - Structure elevation, exterior soffit, curb and barrier<br>1-10 - View of watercourse upstream<br>1-11 - View of watercourse downstream<br>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 <sup>2</sup>                          |        |                       |              |
| Environment:             | Severe   |      | Limited Insp'n: |  |        |                       |              |
| Protection System:       |  |      |                 |  |        |                       |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good            | Fair   | Poor   | Perform. Deficiencies | Maint. Needs |
|                          | m <sup>2</sup>   |      |                 | 27.3   | 18.2   | Yes                   | Yes          |
| <b>Comments:</b>         | 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. |      |                 |  |        |                       |              |
| <b>Recommended Work:</b> | 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 <sup>2</sup>                         |        |                       |              |
| Environment:             | Moderate   |      | Limited Insp'n: | Yes  |        |                       |              |
| Protection System:       |  |      |                 |  |        |                       |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good            | Fair   | Poor   | Perform. Deficiencies | Maint. Needs |
|                          | m <sup>2</sup>   |      |                 | 52.78  |        |                       |              |
| <b>Comments:</b>         | Limited inspection of the top deck condition due to cover with granular wearing surface. |      |                 |  |        |                       |              |
| <b>Recommended Work:</b> | 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 <sup>2</sup> |        |                       |              |
| Environment:             | Moderate   |      | Limited Insp'n:                               |                      |        |                       |              |
| Protection System:       |  |      |   |                      |        |                       |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good  | Fair                 | Poor   | Perform. Deficiencies | Maint. Needs |
|                          | m <sup>2</sup>   |      |   | 38.91                | 9.73   | Yes                   | Yes          |
| <b>Comments:</b>         | Exterior soffit concrete loss with exposed rebar was observed. |      |   |                      |        |                       |              |
| <b>Recommended Work:</b> | 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:       |  |      |                 |               |      |                       |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good            | Fair          | Poor | Perform. Deficiencies | Maint. Needs |
|                          | Each   |      |                 |               | 2    | Yes                   | Yes          |
| <b>Comments:</b>         | 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. |      |                 |               |      |                       |              |
| <b>Recommended Work:</b> | None 6-10 Years 1-5 Years <input checked="" type="checkbox"/> < 1 Year Urgent<br>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 <sup>2</sup> |      |                       |              |
| Environment:             | Severe   |      | Limited Insp'n: |                      |      |                       |              |
| Protection System:       |  |      |                 |                      |      |                       |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good            | Fair                 | Poor | Perform. Deficiencies | Maint. Needs |
|                          | m <sup>2</sup>   |      |                 | 4.23                 | 6.35 | Yes                   | Yes          |
| <b>Comments:</b>         | Severe surface spalling was observed.  |      |                 |                      |      |                       |              |
| <b>Recommended Work:</b> | None 6-10 Years <input type="checkbox"/> 1-5 Years <input checked="" type="checkbox"/> < 1 Year Urgent<br>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 <sup>2</sup> |       |                       |              |
| Environment:             | Severe   |      | Limited Insp'n: |                      |       |                       |              |
| Protection System:       |  |      |                 |                      |       |                       |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good            | Fair                 | Poor  | Perform. Deficiencies | Maint. Needs |
|                          | m <sup>2</sup>   |      |                 |                      | 24.61 | Yes                   | Yes          |
| <b>Comments:</b>         | 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. |      |                 |                      |       |                       |              |
| <b>Recommended Work:</b> | None 6-10 Years 1-5 Years <input checked="" type="checkbox"/> < 1 Year Urgent<br>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:       |   |      |                 |        |      |                       |              |
| <b>Condition Data:</b>   | Units   | Exc. | Good            | Fair   | Poor | Perform. Deficiencies | Maint. Needs |
|                          | Each  |      |                 |        | 12   | Yes                   |              |
| <b>Comments:</b>         | Surface spalling and exposed rebar at the post bases were observed.   |      |                 |        |      |                       |              |
| <b>Recommended Work:</b> | None 6-10 Years 1-5 Years <input checked="" type="checkbox"/> < 1 Year Urgent<br>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 <sup>2</sup> |       |                       |              |
| Environment:             | Moderate   |      | Limited Insp'n: |                      |       |                       |              |
| Protection System:       |  |      |                 |                      |       |                       |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good            | Fair                 | Poor  | Perform. Deficiencies | Maint. Needs |
|                          | m <sup>2</sup>   |      |                 | 12.39                | 37.16 | Yes                   | Yes          |
| <b>Comments:</b>         | 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. |      |                 |                      |       |                       |              |
| <b>Recommended Work:</b> | None 6-10 Years <input checked="" type="checkbox"/> 1-5 Years < 1 Year Urgent<br>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 <sup>2</sup> |      |                       |              |
| Environment:             | Moderate  |      | Limited Insp'n: |                      |      |                       |              |
| Protection System:       |   |      |                 |                      |      |                       |              |
| <b>Condition Data:</b>   | Units   | Exc. | Good            | Fair                 | Poor | Perform. Deficiencies | Maint. Needs |
|                          | m <sup>2</sup>  |      |                 | 18.99                | 8.14 | Yes                   | Yes          |
| <b>Comments:</b>         | Surface cracking, spalling, and calcite deposits were observed. The north abutment has significant water staining and vertical cracking.                  |      |                 |                      |      |                       |              |
| <b>Recommended Work:</b> | None 6-10 Years <input checked="" type="checkbox"/> 1-5 Years < 1 Year Urgent<br>Repair all poor concrete, clean reinforcing steel, and replace concrete. |      |                 |                      |      |                       |              |

**Element Data****Structure:** 1

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

**Element Data**

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

**Element Data**

|                          |  |      |                 |      |      |                       |              |
|--------------------------|--|------|-----------------|------|------|-----------------------|--------------|
| <b>Element Group:</b>    | Embankments & Streams  |      | Length:         |      |      |                       |              |
| <b>Element Name:</b>     | Streams and Waterways  |      | Width:          |      |      |                       |              |
| Location:                |  |      | Height:         |      |      |                       |              |
| Material:                | Earth / Stone  |      | Count:          |      |      |                       |              |
| Element Type:            |  |      | Total Quantity: | All  |      |                       |              |
| Environment:             | Moderate   |      | Limited Insp'n: |      |      |                       |              |
| Protection System:       |  |      |                 |      |      |                       |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good            | Fair | Poor | Perform. Deficiencies | Maint. Needs |
|                          | All  |      |                 | All  |      |                       |              |
| <b>Comments:</b>         | Low velocity stream/ municipal drain has been dredged in the past. The bed appears stable with no obstructions observed.                                 |      |                 |      |      |                       |              |
| <b>Recommended Work:</b> | <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

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

**Element Data**

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

**Element Data**

|                          |  |      |                 |      |      |                       |              |
|--------------------------|--|------|-----------------|------|------|-----------------------|--------------|
| <b>Element Group:</b>    | Signs  |      | Length:         |      |      |                       |              |
| <b>Element Name:</b>     | Signs  |      | Width:          |      |      |                       |              |
| Location:                |  |      | Height:         |      |      |                       |              |
| Material:                | Steel  |      | Count:          |      |      |                       |              |
| Element Type:            |  |      | Total Quantity: | 4    |      |                       |              |
| Environment:             | Moderate   |      | Limited Insp'n: |      |      |                       |              |
| Protection System:       |  |      |                 |      |      |                       |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good            | Fair | Poor | Perform. Deficiencies | Maint. Needs |
|                          | %  |      |                 | 4    |      | Yes                   | Yes          |
| <b>Comments:</b>         | Load limit, speed limit and narrow structure signs in place, but are not plumb and require straightening vertically.                                 |      |                 |      |      |                       |              |
| <b>Recommended Work:</b> | None    6-10 Years    1-5 Years <input checked="" type="checkbox"/> < 1 Year    Urgent<br>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 <sup>2</sup> |      |                       |              |
| Environment:             | Moderate   |      | Limited Insp'n: |                   |      |                       |              |
| Protection System:       |  |      |                 |                   |      |                       |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good            | Fair              | Poor | Perform. Deficiencies | Maint. Needs |
|                          | m <sup>2</sup>   |      |                 | 50                |      |                       | Yes          |
| <b>Comments:</b>         | Shoulder vegetation has started to encroach on the roadway. Minor potholes and wheel path rutting have developed at each approach.         |      |                 |                   |      |                       |              |
| <b>Recommended Work:</b> | None 6-10 Years 1-5 Years <input checked="" type="checkbox"/> < 1 Year Urgent<br>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:       |  |      |                 |      |      |                       |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good            | Fair | Poor | Perform. Deficiencies | Maint. Needs |
|                          | Each   |      |                 |      | 4    | Yes                   | Yes          |
| <b>Comments:</b>         | Shoulder vegetation has started to encroach on the roadway.  |      |                 |      |      |                       |              |
| <b>Recommended Work:</b> | None 6-10 Years 1-5 Years <input checked="" type="checkbox"/> < 1 Year Urgent<br>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](http://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   | <b>Photos:</b><br>2-1 - Title Page<br>2-2 - Spalling of exterior curb<br>2-3 - Structure deck<br>2-4 - West abutment and south exterior soffit<br>2-5 - Structure elevation, wingwalls, exterior curb and soffit<br>2-6 - Extreme efflorescence at joints<br>2-7 - Erosion at structure footing, efflorescence of wingwall (typical)<br>2-8 - Delamination of soffit<br>2-9 - Load limit posting<br>2-10 - View of watercourse upstream<br>2-11 - View of watercourse downstream<br>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

|                           |  |      |                        |                      |  |                       |              |
|---------------------------|--|------|------------------------|----------------------|--|-----------------------|--------------|
| <b>Element Group:</b>     | Decks  |      | <b>Length:</b>         | 6.7 m                |  |                       |              |
| <b>Element Name:</b>      | Wearing Surface  |      | <b>Width:</b>          | 6.1 m                |  |                       |              |
| <b>Location:</b>          |  |      | <b>Height:</b>         |                      |  |                       |              |
| <b>Material:</b>          | Concrete   |      | <b>Count:</b>          |                      |  |                       |              |
| <b>Element Type:</b>      |  |      | <b>Total Quantity:</b> | 40.87 m <sup>2</sup> |  |                       |              |
| <b>Environment:</b>       | Severe   |      | <b>Limited Insp'n:</b> |                      |  |                       |              |
| <b>Protection System:</b> | None   |      |                        |                      |  |                       |              |
| <b>Condition Data:</b>    | Units  | Exc. | Good                   | Fair                 | Poor   | Perform. Deficiencies | Maint. Needs |
|                           | m <sup>2</sup>   |      |                        | 36.79                | 4.08   |                       | Yes          |
| <b>Comments:</b>          | Moderate surface wear observed throughout. Granulars and debris have accumulated along the curb. |      |                        |                      |  |                       |              |
| <b>Recommended Work:</b>  | 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**

|                           |   |      |                        |                      |  |                       |              |
|---------------------------|---|------|------------------------|----------------------|--|-----------------------|--------------|
| <b>Element Group:</b>     | Decks   |      | <b>Length:</b>         | 6.7 m                |  |                       |              |
| <b>Element Name:</b>      | Deck Top  |      | <b>Width:</b>          | 6.1 m                |  |                       |              |
| <b>Location:</b>          |   |      | <b>Height:</b>         |                      |  |                       |              |
| <b>Material:</b>          | Concrete  |      | <b>Count:</b>          |                      |  |                       |              |
| <b>Element Type:</b>      |   |      | <b>Total Quantity:</b> | 40.87 m <sup>2</sup> |  |                       |              |
| <b>Environment:</b>       | Severe  |      | <b>Limited Insp'n:</b> | Yes                  |  |                       |              |
| <b>Protection System:</b> |   |      |                        |                      |  |                       |              |
| <b>Condition Data:</b>    | Units   | Exc. | Good                   | Fair                 | Poor   | Perform. Deficiencies | Maint. Needs |
|                           | m <sup>2</sup>  |      |                        | 36.79                | 4.08   | Yes                   | Yes          |
| <b>Comments:</b>          | Pitting of the concrete surface was observed throughout the deck length due to snow removal and grading of deck. Small delamination observed. |      |                        |                      |  |                       |              |
| <b>Recommended Work:</b>  | 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**

|                           |   |      |                        |   |          |                       |              |
|---------------------------|---|------|------------------------|---|----------|-----------------------|--------------|
| <b>Element Group:</b>     | Decks   |      | <b>Length:</b>         | 6.2 m   |          |                       |              |
| <b>Element Name:</b>      | Soffit - Thick Slab   |      | <b>Width:</b>          | 6.75 m  |          |                       |              |
| <b>Location:</b>          |   |      | <b>Height:</b>         |   |          |                       |              |
| <b>Material:</b>          | Concrete  |      | <b>Count:</b>          |   |          |                       |              |
| <b>Element Type:</b>      |   |      | <b>Total Quantity:</b> | 41.85 m <sup>2</sup>                          |          |                       |              |
| <b>Environment:</b>       | Benign  |      | <b>Limited Insp'n:</b> |   |          |                       |              |
| <b>Protection System:</b> | None  |      |                        |   |          |                       |              |
| <b>Condition Data:</b>    | Units   | Exc. | Good                   | Fair  | Poor     | Perform. Deficiencies | Maint. Needs |
|                           | m <sup>2</sup>  |      |                        | 16.74   | 25.11    | Yes                   | Yes          |
| <b>Comments:</b>          | 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. |      |                        |   |          |                       |              |
| <b>Recommended Work:</b>  | 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

|                           |  |            |                        |                     |                             |                       |              |
|---------------------------|--|------------|------------------------|---------------------|-----------------------------|-----------------------|--------------|
| <b>Element Group:</b>     | Curbs/Sidewalk   |            | <b>Length:</b>         | 14 m                |                             |                       |              |
| <b>Element Name:</b>      | Curbs  |            | <b>Width:</b>          | 0.31 m              |                             |                       |              |
| <b>Location:</b>          | Each Side  |            | <b>Height:</b>         | 0.31 m              |                             |                       |              |
| <b>Material:</b>          | Concrete   |            | <b>Count:</b>          | 2                   |                             |                       |              |
| <b>Element Type:</b>      |  |            | <b>Total Quantity:</b> | 2.69 m <sup>2</sup> |                             |                       |              |
| <b>Environment:</b>       | Severe   |            | <b>Limited Insp'n:</b> |                     |                             |                       |              |
| <b>Protection System:</b> | None   |            |                        |                     |                             |                       |              |
| <b>Condition Data:</b>    | Units  | Exc.       | Good                   | Fair                | Poor                        | Perform. Deficiencies | Maint. Needs |
|                           | m <sup>2</sup>   |            |                        | 1.08                | 1.61                        | Yes                   | Yes          |
| <b>Comments:</b>          | 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. |            |                        |                     |                             |                       |              |
| <b>Recommended Work:</b>  | 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**

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

**Element Data**

|                           |  |            |                        |          |        |                       |              |
|---------------------------|--|------------|------------------------|----------|--------|-----------------------|--------------|
| <b>Element Group:</b>     | Foundations  |            | <b>Length:</b>         |          |        |                       |              |
| <b>Element Name:</b>      | Foundation (below ground level)  |            | <b>Width:</b>          |          |        |                       |              |
| <b>Location:</b>          | Each End   |            | <b>Height:</b>         |          |        |                       |              |
| <b>Material:</b>          | Concrete   |            | <b>Count:</b>          |          |        |                       |              |
| <b>Element Type:</b>      |  |            | <b>Total Quantity:</b> |          |        |                       |              |
| <b>Environment:</b>       | Moderate   |            | <b>Limited Insp'n:</b> | Yes      |        |                       |              |
| <b>Protection System:</b> | None   |            |                        |          |        |                       |              |
| <b>Condition Data:</b>    | Units  | Exc.       | Good                   | Fair     | Poor   | Perform. Deficiencies | Maint. Needs |
|                           |  |            |                        |          |        | Yes                   | Yes          |
| <b>Comments:</b>          | Concrete spalling was observed underwater and the southeast and southwest corners are undermined.                                  |            |                        |          |        |                       |              |
| <b>Recommended Work:</b>  | 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

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

**Element Data**

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

**Element Data**

|                          |   |      |                 |      |      |                       |              |
|--------------------------|---|------|-----------------|------|------|-----------------------|--------------|
| <b>Element Group:</b>    | Signs   |      | Length:         |      |      |                       |              |
| <b>Element Name:</b>     | Signs   |      | Width:          |      |      |                       |              |
| Location:                | Each Corner   |      | Height:         |      |      |                       |              |
| Material:                | Steel   |      | Count:          | 2    |      |                       |              |
| <b>Element Type:</b>     |   |      | Total Quantity: |      |      |                       |              |
| Environment:             | Severe  |      | Limited Insp'n: |      |      |                       |              |
| Protection System:       | None  |      |                 |      |      |                       |              |
| <b>Condition Data:</b>   | Units   | Exc. | Good            | Fair | Poor | Perform. Deficiencies | Maint. Needs |
|                          | Each  |      |                 | 2    |      | Yes                   | Yes          |
| <b>Comments:</b>         | Two 8 tonne load limit signs at approaches. No end hazard signs are present.  |      |                 |      |      |                       |              |
| <b>Recommended Work:</b> | None    6-10 Years    1-5 Years <input checked="" type="checkbox"/> < 1 Year    Urgent<br>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 <sup>2</sup>                            |        |                      |              |
| Environment:             | Severe   |            | Limited Insp'n |  |        |                      |              |
| Protection System:       | None   |            |                |  |        |                      |              |
| <b>Condition Data:</b>   | Units  | Exc.       | Good           | Fair   | Poor   | Perform. Deficiencie | Maint. Needs |
|                          | m <sup>2</sup>   |            |                | 35.1   | 4.9    | Yes                  | Yes          |
| <b>Comments:</b>         | 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. |            |                |  |        |                      |              |
| <b>Recommended Work:</b> | 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"/> 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](http://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  | <b>Photos:</b><br>3-1 - Title Page - General<br>3-2 - View of structure from north approach<br>3-3 - View of upstream watercourse<br>3-4 - View of downstream watercourse<br>3-5 - Structure and approach wearing surface with wheel path rutting and encroaching vegetation<br>3-6 - East structure elevation, exterior girder and barrier wall<br>3-7 - Wingwall and exterior curb (typical)<br>3-8 - Exterior girder delamination and spalling<br>3-9 - View of concrete girders and soffits<br>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 <sup>2</sup>  |      |                 | 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<br>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 <sup>2</sup>   |      |                 | 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<br>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 <sup>2</sup>  |      |                 | 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<br>Remove all poor concrete areas, clean the reinforcing steel, and replace concrete. |      |                 |       |      |                       |              |



**Element Data**

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

**Element Data**

|                           |  |                        |       |      |      |                       |              |
|---------------------------|--|------------------------|-------|------|------|-----------------------|--------------|
| <b>Element Group:</b>     | Barriers   | <b>Length:</b>         | 7.3   |      |      |                       |              |
| <b>Element Name:</b>      | Barrier/Parapet Walls  | <b>Width:</b>          | 0.3   |      |      |                       |              |
| <b>Location:</b>          |  | <b>Height:</b>         | 0.8   |      |      |                       |              |
| <b>Material:</b>          | Concrete   | <b>Count:</b>          | 2     |      |      |                       |              |
| <b>Element Type:</b>      |  | <b>Total Quantity:</b> | 11.68 |      |      |                       |              |
| <b>Environment:</b>       | Severe   | <b>Limited Insp'n:</b> |       |      |      |                       |              |
| <b>Protection System:</b> |  |                        |       |      |      |                       |              |
| <b>Condition Data:</b>    | Units  | Exc.                   | Good  | Fair | Poor | Perform. Deficiencies | Maint. Needs |
|                           | m <sup>2</sup>   |                        |       | 9.34 | 1.17 | Yes                   | Yes          |
| <b>Comments:</b>          | 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.  |                        |       |      |      |                       |              |
| <b>Recommended Work:</b>  | None    6-10 Years <input checked="" type="checkbox"/> 1-5 Years    < 1 Year    Urgent<br>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**

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

**Element Data**

|                          |   |      |                 |      |      |                       |              |
|--------------------------|---|------|-----------------|------|------|-----------------------|--------------|
| <b>Element Group:</b>    | Abutments   |      | Length:         |      |      |                       |              |
| <b>Element Name:</b>     | 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:       |   |      |                 |      |      |                       |              |
| <b>Condition Data:</b>   | Units   | Exc. | Good            | Fair | Poor | Perform. Deficiencies | Maint. Needs |
|                          | m <sup>2</sup>  |      |                 | 16.5 |      |                       |              |
| <b>Comments:</b>         | Some minor surface cracking & spalling were observed. There are 4 100 mm by 100 mm rectangular drain holes.   |      |                 |      |      |                       |              |
| <b>Recommended Work:</b> | None <input type="checkbox"/> <input checked="" type="checkbox"/> 6-10 Years <input type="checkbox"/> 1-5 Years <input type="checkbox"/> < 1 Year <input type="checkbox"/> Urgent<br>Remove all poor concrete, clean reinforcing steel, and replace concrete. |      |                 |      |      |                       |              |

**Element Data**

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

**Element Data**

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

**Element Data**

|                          |   |                                     |                                    |                                   |                                 |                       |              |
|--------------------------|---|-------------------------------------|------------------------------------|-----------------------------------|---------------------------------|-----------------------|--------------|
| <b>Element Group:</b>    | Embankments & Streams   |                                     | Length:                            |                                   |                                 |                       |              |
| <b>Element Name:</b>     | Streams and Waterways   |                                     | Width:                             |                                   |                                 |                       |              |
| Location:                |   |                                     | Height:                            |                                   |                                 |                       |              |
| Material:                | Earth / Stone   |                                     | Count:                             |                                   |                                 |                       |              |
| Element Type:            |   |                                     | Total Quantity:                    |                                   |                                 |                       |              |
| Environment:             | Moderate  |                                     | Limited Insp'n:                    |                                   |                                 |                       |              |
| Protection System:       |   |                                     |                                    |                                   |                                 |                       |              |
| <b>Condition Data:</b>   | Units   | Exc.                                | Good                               | Fair                              | Poor                            | Perform. Deficiencies | Maint. Needs |
|                          | All   |                                     |                                    | All                               |                                 |                       |              |
| <b>Comments:</b>         | The watercourse appears stable with no obstruction at the time of inspection. |                                     |                                    |                                   |                                 |                       |              |
| <b>Recommended Work:</b> | <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**

|                          |   |                                     |                                    |                                   |                                 |                       |              |
|--------------------------|---|-------------------------------------|------------------------------------|-----------------------------------|---------------------------------|-----------------------|--------------|
| <b>Element Group:</b>    | Embankments & Streams   |                                     | Length:                            |                                   |                                 |                       |              |
| <b>Element Name:</b>     | Embankments   |                                     | Width:                             |                                   |                                 |                       |              |
| Location:                |   |                                     | Height:                            |                                   |                                 |                       |              |
| Material:                | Earth / Stone   |                                     | Count:                             | 6                                 |                                 |                       |              |
| Element Type:            |   |                                     | Total Quantity:                    | 6                                 |                                 |                       |              |
| Environment:             | Moderate  |                                     | Limited Insp'n:                    |                                   |                                 |                       |              |
| Protection System:       |   |                                     |                                    |                                   |                                 |                       |              |
| <b>Condition Data:</b>   | Units   | Exc.                                | Good                               | Fair                              | Poor                            | Perform. Deficiencies | Maint. Needs |
|                          | Each  |                                     |                                    | 6                                 |                                 |                       |              |
| <b>Comments:</b>         | The embankments are stone / earth (well vegetated) and appear stable. |                                     |                                    |                                   |                                 |                       |              |
| <b>Recommended Work:</b> | <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**

|                          |  |                                     |                                    |                                   |                                 |                       |              |
|--------------------------|--|-------------------------------------|------------------------------------|-----------------------------------|---------------------------------|-----------------------|--------------|
| <b>Element Group:</b>    | Embankments & Streams                      |                                     | Length:                            |                                   |                                 |                       |              |
| <b>Element Name:</b>     | Slope Protection                           |                                     | Width:                             |                                   |                                 |                       |              |
| Location:                |  |                                     | Height:                            |                                   |                                 |                       |              |
| Material:                | Earth / Stone                              |                                     | Count:                             | 6                                 |                                 |                       |              |
| Element Type:            |  |                                     | Total Quantity:                    | 6                                 |                                 |                       |              |
| Environment:             | Moderate                                   |                                     | Limited Insp'n:                    |                                   |                                 |                       |              |
| Protection System:       |  |                                     |                                    |                                   |                                 |                       |              |
| <b>Condition Data:</b>   | Units                                      | Exc.                                | Good                               | Fair                              | Poor                            | Perform. Deficiencies | Maint. Needs |
|                          | Each                                       |                                     |                                    | 6                                 |                                 |                       |              |
| <b>Comments:</b>         | The stone slope protection appears stable. |                                     |                                    |                                   |                                 |                       |              |
| <b>Recommended Work:</b> | <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**

|                          |  |      |                 |      |      |                       |              |
|--------------------------|--|------|-----------------|------|------|-----------------------|--------------|
| <b>Element Group:</b>    | Signs  |      | Length:         |      |      |                       |              |
| <b>Element Name:</b>     | Signs  |      | Width:          |      |      |                       |              |
| Location:                |  |      | Height:         |      |      |                       |              |
| Material:                | Steel  |      | Count:          | 1    |      |                       |              |
| Element Type:            |  |      | Total Quantity: | 1    |      |                       |              |
| Environment:             | Severe   |      | Limited Insp'n: |      |      |                       |              |
| Protection System:       |  |      |                 |      |      |                       |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good            | Fair | Poor | Perform. Deficiencies | Maint. Needs |
|                          | Each   |      | 2               | 1    |      | Yes                   | Yes          |
| <b>Comments:</b>         | Only one load limit sign in place (south approach). No end hazard signs currently in place.  |      |                 |      |      |                       |              |
| <b>Recommended Work:</b> | None    6-10 Years    1-5 Years <input checked="" type="checkbox"/> < 1 Year    Urgent<br>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**

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

**Element Data**

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

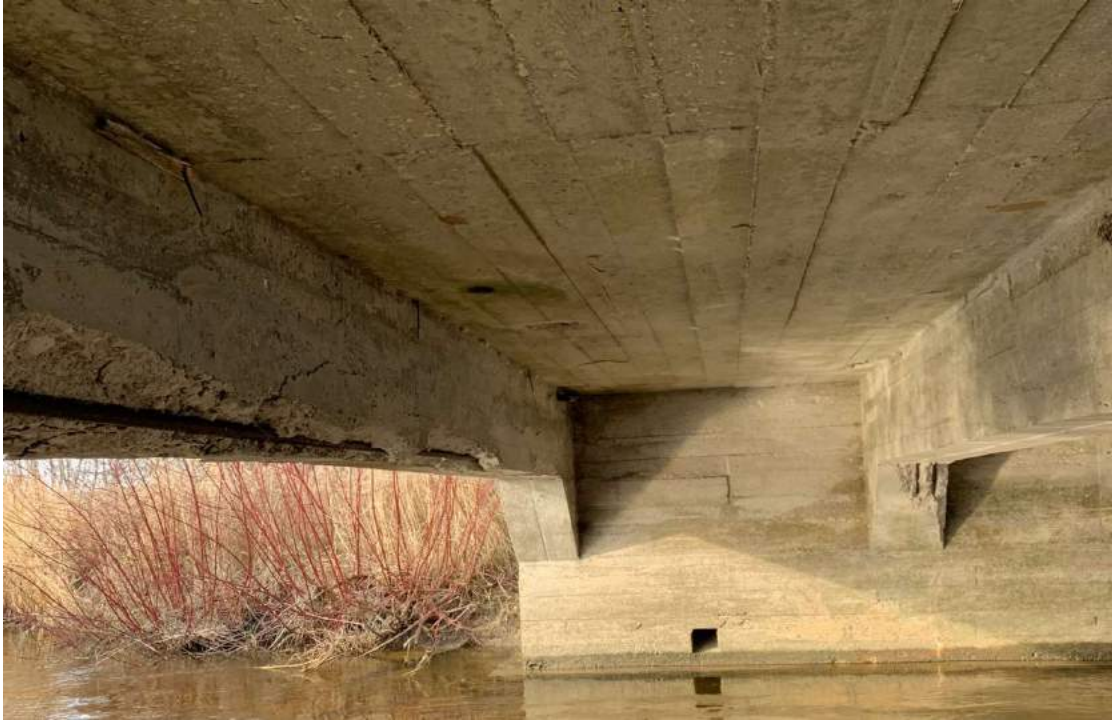


Photo 3-9: View of concrete girders and soffit

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](http://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   | <b>Photos:</b><br>4-1 - Title Page - General<br>4-2 - View of east structure elevation, wingwalls, exterior curb and barrier<br>4-3 - View of soffit and abutment wall<br>4-4 - View of soffit<br>4-5 - Wearing surface deterioration<br>4-6 - View of south abutment wall<br>4-7 - View of west structure elevation, exterior soffit, curb and barrier<br>4-8 - View of watercourse upstream<br>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 <sup>2</sup> |      |                       |              |
| Environment:             | Moderate  |      | Limited Insp'n: | √                    |      |                       |              |
| Protection System:       |   |      |                 |                      |      |                       |              |
| <b>Condition Data:</b>   | Units   | Exc. | Good            | Fair                 | Poor | Perform. Deficiencies | Maint. Needs |
|                          | m <sup>2</sup>  |      |                 | 15.68                | 5.23 | Yes                   | Yes          |
| <b>Comments:</b>         | Limited inspection due to granular wearing surface cover, but where the deck is visible there is observed spalling and delamination.  |      |                 |                      |      |                       |              |
| <b>Recommended Work:</b> | None    6-10 Years <input checked="" type="checkbox"/> 1-5 Years    < 1 Year    Urgent<br>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 <sup>2</sup> |      |                       |              |
| Environment:             | Moderate   |      | Limited Insp'n: |                      |      |                       |              |
| Protection System:       |  |      |                 |                      |      |                       |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good            | Fair                 | Poor | Perform. Deficiencies | Maint. Needs |
|                          | m <sup>2</sup>   |      |                 | 18                   | 7.65 | Yes                   | Yes          |
| <b>Comments:</b>         | Spalling and severe delamination with exposed steel observed around drain holes and exterior soffit.   |      |                 |                      |      |                       |              |
| <b>Recommended Work:</b> | None    6-10 Years    1-5 Years <input checked="" type="checkbox"/> < 1 Year    Urgent<br>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:       |   |      |                 |      |      |                       |              |
| <b>Condition Data:</b>   | Units   | Exc. | Good            | Fair | Poor | Perform. Deficiencies | Maint. Needs |
|                          | Each  |      |                 |      | 4    | Yes                   | Yes          |
| <b>Comments:</b>         | Four 75 mm dia. holes through curb are plugged and ineffective.   |      |                 |      |      |                       |              |
| <b>Recommended Work:</b> | None    6-10 Years    1-5 Years <input checked="" type="checkbox"/> < 1 Year    Urgent<br>Patch the drain holes with concrete and grade structure to achieve positive drainage. |      |                 |      |      |                       |              |

**Element Data****Structure:** 4

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

**Element Data**

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

**Element Data**

|                          |   |      |                 |        |      |                       |              |
|--------------------------|---|------|-----------------|--------|------|-----------------------|--------------|
| <b>Element Group:</b>    | Barriers  |      | Length:         | 0.16 m |      |                       |              |
| <b>Element Name:</b>     | 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:       |   |      |                 |        |      |                       |              |
| <b>Condition Data:</b>   | Units   | Exc. | Good            | Fair   | Poor | Perform. Deficiencies | Maint. Needs |
|                          | each  |      |                 |        | 22   | Yes                   |              |
| <b>Comments:</b>         | Surface spalling & exposed rebar was observed at the post bases. Loose connection between posts and deck. Nine interior posts are broken off and missing.                                   |      |                 |        |      |                       |              |
| <b>Recommended Work:</b> | None 6-10 Years 1-5 Years <input checked="" type="checkbox"/> < 1 Year Urgent<br>Remove and replace with new barrier and add approach barrier protection to meet current code requirements. |      |                 |        |      |                       |              |

**Element Data****Structure:** 4

|                          |  |      |                 |                     |  |                       |              |
|--------------------------|--|------|-----------------|---------------------|--|-----------------------|--------------|
| <b>Element Group:</b>    | Abutments  |      | Length:         |                     |  |                       |              |
| <b>Element Name:</b>     | Abutment Walls   |      | Width:          | 5.69 m              |  |                       |              |
| Location:                |  |      | Height:         | 1.22 m              |  |                       |              |
| Material:                | Concrete   |      | Count:          | 2                   |  |                       |              |
| Element Type:            |  |      | Total Quantity: | 6.94 m <sup>2</sup> |  |                       |              |
| Environment:             | Moderate   |      | Limited Insp'n: |                     |  |                       |              |
| Protection System:       |  |      |                 |                     |  |                       |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good            | Fair                | Poor   | Perform. Deficiencies | Maint. Needs |
|                          | m <sup>2</sup>   |      |                 | 0.69                | 6.25   | Yes                   | Yes          |
| <b>Comments:</b>         | Surface cracking & severe spalling were observed on each abutment wall.      |      |                 |                     |  |                       |              |
| <b>Recommended Work:</b> | 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**

|                          |  |      |                 |   |          |                       |              |
|--------------------------|--|------|-----------------|---|----------|-----------------------|--------------|
| <b>Element Group:</b>    | Abutments  |      | Length:         | 1.83 m  |          |                       |              |
| <b>Element Name:</b>     | Wingwalls  |      | Width:          | 1.22 m  |          |                       |              |
| Location:                |  |      | Height:         |   |          |                       |              |
| Material:                | Concrete   |      | Count:          | 4   |          |                       |              |
| Element Type:            |  |      | Total Quantity: | 8.93 m <sup>2</sup>                           |          |                       |              |
| Environment:             | Moderate   |      | Limited Insp'n: |   |          |                       |              |
| Protection System:       |  |      |                 |   |          |                       |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good            | Fair  | Poor     | Perform. Deficiencies | Maint. Needs |
|                          | m <sup>2</sup>   |      |                 | 3.57  | 5.36     | Yes                   | Yes          |
| <b>Comments:</b>         | Severe surface spalling, cracking, and section loss at top of footing were observed. |      |                 |   |          |                       |              |
| <b>Recommended Work:</b> | 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**

|                          |  |      |                 |   |          |                       |              |
|--------------------------|--|------|-----------------|---|----------|-----------------------|--------------|
| <b>Element Group:</b>    | Foundations  |      | Length:         |   |          |                       |              |
| <b>Element Name:</b>     | Foundation (below ground level)  |      | Width:          |   |          |                       |              |
| Location:                |  |      | Height:         | 7.52  |          |                       |              |
| Material:                | Concrete   |      | Count:          | 2   |          |                       |              |
| Element Type:            |  |      | Total Quantity: |   |          |                       |              |
| Environment:             | Moderate   |      | Limited Insp'n: | √   |          |                       |              |
| Protection System:       |  |      |                 |   |          |                       |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good            | Fair  | Poor     | Perform. Deficiencies | Maint. Needs |
|                          |  |      |                 |   |          | Yes                   |              |
| <b>Comments:</b>         | Limited inspection due to cover, however the top of footings are visibly exposed and under water with observed scaling and delamination of concrete. |      |                 |   |          |                       |              |
| <b>Recommended Work:</b> | 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**

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

**Element Data**

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

**Element Data**

|                          |  |      |                 |           |  |                     |              |
|--------------------------|--|------|-----------------|-----------|--|---------------------|--------------|
| <b>Element Group:</b>    | Signs  |      | Length:         |           |  |                     |              |
| <b>Element Name:</b>     | Signs  |      | Width:          |           |  |                     |              |
| Location:                |  |      | Height:         |           |  |                     |              |
| Material:                | Steel  |      | Count:          | 7         |  |                     |              |
| Element Type:            |  |      | Total Quantity: | 7         |  |                     |              |
| Environment:             | Moderate   |      | Limited Insp'n: |           |  |                     |              |
| Protection System:       |  |      |                 |           |  |                     |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good            | Fair      | Poor   | Perform. Deficiency | Maint. Needs |
|                          | Each   |      |                 | 6         | 1  | Yes                 | Yes          |
| <b>Comments:</b>         | 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. |      |                 |           |  |                     |              |
| <b>Recommended Work:</b> | 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 <sup>2</sup> |  |                       |              |
| Environment:             | Moderate  |      | Limited Insp'n: |                     |  |                       |              |
| Protection System:       |   |      |                 |                     |  |                       |              |
| <b>Condition Data:</b>   | Units   | Exc. | Good            | Fair                | Poor   | Perform. Deficiencies | Maint. Needs |
|                          | m <sup>2</sup>  |      |                 | 29.7                | 9.9  | Yes                   | Yes          |
| <b>Comments:</b>         | Wearing surface recently graded. Continue annual grading. |      |                 |                     |  |                       |              |
| <b>Recommended Work:</b> | 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:       |  |      |                 |   |          |                       |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good            | Fair  | Poor     | Perform. Deficiencies | Maint. Needs |
|                          | %  |      |                 | 100   |          | Yes                   | Yes          |
| <b>Comments:</b>         | Shoulders heavy vegetated with grass which is impeding drainage. |      |                 |   |          |                       |              |
| <b>Recommended Work:</b> | 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

---

|                          |   |                            |  |
|--------------------------|---|----------------------------|--|
| <b>Site Number</b>       | <input type="text" value="5"/>                                    | <b>Project Number</b>      | <input type="text" value="221-12948-00"/>                                      |
| <b>Structure Name</b>    | <input type="text" value="Stokes Bay Road/Copper Kettle Bridge"/> | <b>Municipality</b>        | <input type="text" value="Northern Bruce Peninsula"/>                          |
| <b>MTO Region Code</b>   | <input type="text" value="30"/>                                   | <b>County</b>              | <input type="text" value="Bruce"/> <b>Code</b> <input type="text" value="02"/> |
| <b>MTO District Code</b> | <input type="text" value="33"/>                                   | <b>Geographic Twp Code</b> | <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](http://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  | <b>Photos:</b><br>5-1 - Title Page<br>5-2 - View of south structure elevation, exterior curb and soffit, wingwalls and slope protection<br>5-3 - Impact damage to southeast barrier protection<br>5-4 - Wooden barrier post rot (typical)<br>5-5 - Pedestrian (south side only) and structure barrier (typical)<br>5-6 - Southeast structure embankment erosion<br>5-7 - View of structure exterior soffit and curb<br>5-8 - View of structure soffit<br>5-9 - View of upstream watercourse<br>5-10 - View of downstream watercourse<br>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 <sup>2</sup>               |                                 |                       |              |
| Environment:             | Severe                            |                                     | Limited Insp'n:                    |                                   |                                 |                       |              |
| Protection System:       | None                              |                                     |                                    |                                   |                                 |                       |              |
| <b>Condition Data:</b>   | Units                             | Exc.                                | Good                               | Fair                              | Poor                            | Perform. Deficiencies | Maint. Needs |
|                          | m <sup>2</sup>                    |                                     | 62.9                               |                                   |                                 |                       |              |
| <b>Comments:</b>         | The asphalt is in good condition. |                                     |                                    |                                   |                                 |                       |              |
| <b>Recommended Work:</b> | <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 <sup>2</sup>               |                                 |                       |              |
| Environment:             | Benign   |                                     | Limited Insp'n:                    | Yes                               |                                 |                       |              |
| Protection System:       | Wearing Surface                                  |                                     |                                    |                                   |                                 |                       |              |
| <b>Condition Data:</b>   | Units  | Exc.                                | Good                               | Fair                              | Poor                            | Perform. Deficiencies | Maint. Needs |
|                          | m <sup>2</sup>                                   |                                     | 85.1                               |                                   |                                 |                       |              |
| <b>Comments:</b>         | Limited inspection due to wearing surface cover. |                                     |                                    |                                   |                                 |                       |              |
| <b>Recommended Work:</b> | <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 <sup>2</sup>              |                                 |  |              |
| Environment:             | Benign   |                                     | Limited Insp'n:                               |                                   |                                 |  |              |
| Protection System:       | None   |                                     |   |                                   |                                 |  |              |
| <b>Condition Data:</b>   | Units  | Exc.                                | Good  | Fair                              | Poor                            | Perform. Deficiencies                                | Maint. Needs |
|                          | m <sup>2</sup>   |                                     | 59.17   | 17.02                             | 8.45                            | Yes  | Yes          |
| <b>Comments:</b>         | 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 <sup>2</sup> section of poor/delaminated concrete with significant corrosion of rebar was observed. |                                     |   |                                   |                                 |  |              |
| <b>Recommended Work:</b> | <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**

|                          |   |      |                 |        |      |                       |              |
|--------------------------|---|------|-----------------|--------|------|-----------------------|--------------|
| <b>Element Group:</b>    | Barrier   |      | Length:         | 3.85 m |      |                       |              |
| <b>Element Name:</b>     | 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  |      |                 |        |      |                       |              |
| <b>Condition Data:</b>   | Units   | Exc. | Good            | Fair   | Poor | Perform. Deficiencies | Maint. Needs |
|                          | m   |      |                 | 30.8   | 30.8 | Yes                   | Yes          |
| <b>Comments:</b>         | 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. |      |                 |        |      |                       |              |
| <b>Recommended Work:</b> | None    6-10 Years <input checked="" type="checkbox"/> 1-5 Years    < 1 Year    Urgent<br>Replace/install barrier to code to provide required vehicle safety.   |      |                 |        |      |                       |              |

**Element Data**

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

**Element Data**

|                          |   |      |                 |                     |      |                       |              |
|--------------------------|---|------|-----------------|---------------------|------|-----------------------|--------------|
| <b>Element Group:</b>    | Abutments   |      | Length:         | 1.55 m              |      |                       |              |
| <b>Element Name:</b>     | Wingwalls   |      | Width:          | 1.57 m              |      |                       |              |
| Location:                |   |      | Height:         |                     |      |                       |              |
| Material:                | Concrete  |      | Count:          | 4                   |      |                       |              |
| Element Type:            |   |      | Total Quantity: | 9.74 m <sup>2</sup> |      |                       |              |
| Environment:             | Moderate  |      | Limited Insp'n: |                     |      |                       |              |
| Protection System:       |   |      |                 |                     |      |                       |              |
| <b>Condition Data:</b>   | Units   | Exc. | Good            | Fair                | Poor | Perform. Deficiencies | Maint. Needs |
|                          | m <sup>2</sup>  |      | 3.2             | 4.6                 | 1.94 |                       | Yes          |
| <b>Comments:</b>         | 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. |      |                 |                     |      |                       |              |
| <b>Recommended Work:</b> | None <input checked="" type="checkbox"/> 6-10 Years    1-5 Years    < 1 Year    Urgent<br>Remove all poor concrete, clean reinforcing steel, and replace concrete.                                  |      |                 |                     |      |                       |              |

**Element Data****Structure:** 5

|                          |   |                                     |                                    |                                   |                                 |                       |              |
|--------------------------|---|-------------------------------------|------------------------------------|-----------------------------------|---------------------------------|-----------------------|--------------|
| <b>Element Group:</b>    | Foundations   |                                     | Length:                            |                                   |                                 |                       |              |
| <b>Element Name:</b>     | 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  |                                     |                                    |                                   |                                 |                       |              |
| <b>Condition Data:</b>   | Units   | Exc.                                | Good                               | Fair                              | Poor                            | Perform. Deficiencies | Maint. Needs |
|                          |   |                                     |                                    |                                   |                                 |                       |              |
| <b>Comments:</b>         | Not visible for inspection, however the structure appears stable and is founded on bedrock. |                                     |                                    |                                   |                                 |                       |              |
| <b>Recommended Work:</b> | <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**

|                          |  |                                     |   |                                   |                                 |                       |              |
|--------------------------|--|-------------------------------------|---|-----------------------------------|---------------------------------|-----------------------|--------------|
| <b>Element Group:</b>    | Embankments & Streams  |                                     | Length:                                       |                                   |                                 |                       |              |
| <b>Element Name:</b>     | Streams and Waterways  |                                     | Width:  |                                   |                                 |                       |              |
| Location:                |  |                                     | Height:                                       |                                   |                                 |                       |              |
| Material:                | Bedrock  |                                     | Count:  |                                   |                                 |                       |              |
| Element Type:            |  |                                     | Total Quantity:                               | All                               |                                 |                       |              |
| Environment:             | Moderate   |                                     | Limited Insp'n:                               |                                   |                                 |                       |              |
| Protection System:       | None   |                                     |   |                                   |                                 |                       |              |
| <b>Condition Data:</b>   | Units  | Exc.                                | Good  | Fair                              | Poor                            | Perform. Deficiencies | Maint. Needs |
|                          | All  |                                     |   | All                               |                                 | Yes                   | Yes          |
| <b>Comments:</b>         | No signs of impedance to flow. Scour was observed around the concrete at the north inlet.                          |                                     |   |                                   |                                 |                       |              |
| <b>Recommended Work:</b> | <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**

|                          |   |                                     |                                    |  |                                 |                       |              |
|--------------------------|---|-------------------------------------|------------------------------------|--|---------------------------------|-----------------------|--------------|
| <b>Element Group:</b>    | Embankments & Streams   |                                     | Length:                            |  |                                 |                       |              |
| <b>Element Name:</b>     | Embankments   |                                     | Width:                             |  |                                 |                       |              |
| Location:                | Each Corner   |                                     | Height:                            |  |                                 |                       |              |
| Material:                | Stone/Earth   |                                     | Count:                             |  |                                 |                       |              |
| Element Type:            |   |                                     | Total Quantity:                    | 4  |                                 |                       |              |
| Environment:             | Moderate  |                                     | Limited Insp'n:                    |  |                                 |                       |              |
| Protection System:       | None  |                                     |                                    |  |                                 |                       |              |
| <b>Condition Data:</b>   | Units   | Exc.                                | Good                               | Fair   | Poor                            | Perform. Deficiencies | Maint. Needs |
|                          | Each  |                                     |                                    | 2  | 4                               | Yes                   | Yes          |
| <b>Comments:</b>         | 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. |                                     |                                    |  |                                 |                       |              |
| <b>Recommended Work:</b> | <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   |      |                 |           |  |                       |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good            | Fair      | Poor   | Perform. Deficiencies | Maint. Needs |
|                          | Each   |      | 1               |           |  | Yes                   | Yes          |
| <b>Comments:</b>         | The checkboard curve sign is in good condition. There are no end hazard marker signs currently in place. |      |                 |           |  |                       |              |
| <b>Recommended Work:</b> | 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 <sup>2</sup> |          |                       |              |
| Environment:             | Severe  |      | Limited Insp'n: |                   |          |                       |              |
| Protection System:       | None  |      |                 |                   |          |                       |              |
| <b>Condition Data:</b>   | Units   | Exc. | Good            | Fair              | Poor     | Perform. Deficiencies | Maint. Needs |
|                          | m <sup>2</sup>  |      | 75              | 10                |          |                       |              |
| <b>Comments:</b>         | The approach wearing surface is generally in good condition. Minor transverse cracking observed at each approach. |      |                 |                   |          |                       |              |
| <b>Recommended Work:</b> | <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](http://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       | <b>Photos:</b><br>6-1 - Title Page<br>6-2 - View of structure deck with delamination and ponding<br><br>6-3 - View of structure from north approach<br>6-4 - View of west structure elevation, slope protection and exterior of parapet wall<br>6-5 - Damaged approach barrier flex beam and wood posts<br>6-6 - View of west structure elevation, wingwalls, exterior curb and parapet wall<br>6-7 - View of structure soffit<br>6-8 - View of foundation crack and abutment wall<br>6-9 - Differential foundation settlement<br>6-10 - View of watercourse downstream<br>6-11 - View of watercourse upstream<br>6-12 - Embankment and deficient barrier protection<br>6-13 - Differential foundation settlement<br>6-14 - View of wearing surface<br>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 <sup>2</sup> |      |                       |              |
| Environment:       | Severe   |      | Limited Insp'n: |                     |      |                       |              |
| Protection System: |  |      |                 |                     |      |                       |              |
| Condition Data:    | Units  | Exc. | Good            | Fair                | Poor | Perform. Deficiencies | Maint. Needs |
|                    | m <sup>2</sup>   |      |                 | 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<br>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 <sup>2</sup> |      |                       |              |
| Environment:       | Moderate   |      | Limited Insp'n: |                      |      |                       |              |
| Protection System: |  |      |                 |                      |      |                       |              |
| Condition Data:    | Units  | Exc. | Good            | Fair                 | Poor | Perform. Deficiencies | Maint. Needs |
|                    | m <sup>2</sup>   |      |                 | 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<br>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<br>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 <sup>2</sup> |      |                       |              |
| Environment:             | Severe   |      | Limited Insp'n: |                     |      |                       |              |
| Protection System:       |  |      |                 |                     |      |                       |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good            | Fair                | Poor | Perform. Deficiencies | Maint. Needs |
|                          | m <sup>2</sup>   |      |                 | 5.41                | 1.35 |                       |              |
| <b>Comments:</b>         | The existing curbs have observed surface spalling and end chips. The northeast corner is severely spalled.   |      |                 |                     |      |                       |              |
| <b>Recommended Work:</b> | None    6-10 Years <input checked="" type="checkbox"/> 1-5 Years    < 1 Year    Urgent<br>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 <sup>2</sup> |      |                       |              |
| Environment:             | Severe   |      | Limited Insp'n: |                      |      |                       |              |
| Protection System:       |  |      |                 |                      |      |                       |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good            | Fair                 | Poor | Perform. Deficiencies | Maint. Needs |
|                          | m <sup>2</sup>   |      |                 | 16.67                | 1.85 |                       |              |
| <b>Comments:</b>         | Parapet wall with some spalling and end damage chips.  |      |                 |                      |      |                       |              |
| <b>Recommended Work:</b> | None <input checked="" type="checkbox"/> 6-10 Years    1-5 Years    < 1 Year    Urgent<br>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 <sup>2</sup> |      |                       |              |
| Environment:             | Moderate   |      | Limited Insp'n: |                     |      |                       |              |
| Protection System:       |  |      |                 |                     |      |                       |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good            | Fair                | Poor | Perform. Deficiencies | Maint. Needs |
|                          | m <sup>2</sup>   |      |                 | 8.98                | 1    |                       |              |
| <b>Comments:</b>         | Surface cracking & spalling observed throughout the abutment walls.  |      |                 |                     |      |                       |              |
| <b>Recommended Work:</b> | None    6-10 Years <input checked="" type="checkbox"/> 1-5 Years    < 1 Year    Urgent<br>Remove all poor concrete, clean reinforcing steel, and replace concrete. |      |                 |                     |      |                       |              |

**Element Data****Structure:** 6

|                          |   |      |                 |                     |      |                       |              |
|--------------------------|---|------|-----------------|---------------------|------|-----------------------|--------------|
| <b>Element Group:</b>    | Abutments   |      | Length:         |                     |      |                       |              |
| <b>Element Name:</b>     | Wingwalls   |      | Width:          | 3.05                |      |                       |              |
| Location:                |   |      | Height:         | 0.6                 |      |                       |              |
| Material:                | Concrete  |      | Count:          | 2                   |      |                       |              |
| Element Type:            |   |      | Total Quantity: | 1.83 m <sup>2</sup> |      |                       |              |
| Environment:             | Moderate  |      | Limited Insp'n: |                     |      |                       |              |
| Protection System:       |   |      |                 |                     |      |                       |              |
| <b>Condition Data:</b>   | Units   | Exc. | Good            | Fair                | Poor | Perform. Deficiencies | Maint. Needs |
|                          | m <sup>2</sup>  |      |                 |                     | 1.83 | Yes                   |              |
| <b>Comments:</b>         | 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. |      |                 |                     |      |                       |              |
| <b>Recommended Work:</b> | 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**

|                          |  |      |                 |       |       |                       |              |
|--------------------------|--|------|-----------------|-------|-------|-----------------------|--------------|
| <b>Element Group:</b>    | Foundations  |      | Length:         |       |       |                       |              |
| <b>Element Name:</b>     | 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:       |  |      |                 |       |       |                       |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good            | Fair  | Poor  | Perform. Deficiencies | Maint. Needs |
|                          | m <sup>2</sup>   |      |                 |       | 16.15 | Yes                   |              |
| <b>Comments:</b>         | 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. |      |                 |       |       |                       |              |
| <b>Recommended Work:</b> | 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**

|                          |   |      |                 |      |      |                       |              |
|--------------------------|---|------|-----------------|------|------|-----------------------|--------------|
| <b>Element Group:</b>    | Embankments & Streams   |      | Length:         |      |      |                       |              |
| <b>Element Name:</b>     | Streams and Waterways   |      | Width:          |      |      |                       |              |
| Location:                |   |      | Height:         |      |      |                       |              |
| Material:                | Earth / Stone / Rock  |      | Count:          |      |      |                       |              |
| Element Type:            |   |      | Total Quantity: |      |      |                       |              |
| Environment:             | Moderate  |      | Limited Insp'n: |      |      |                       |              |
| Protection System:       |   |      |                 |      |      |                       |              |
| <b>Condition Data:</b>   | Units   | Exc. | Good            | Fair | Poor | Perform. Deficiencies | Maint. Needs |
|                          | All   |      |                 | All  |      |                       |              |
| <b>Comments:</b>         | Bedrock streambed is stable and free of obstruction at the time of inspection.  |      |                 |      |      |                       |              |
| <b>Recommended Work:</b> | <input checked="" 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**

|                          |  |      |   |          |        |                       |              |
|--------------------------|--|------|---|----------|--------|-----------------------|--------------|
| <b>Element Group:</b>    | Embankments & Streams  |      | Length:                                       |          |        |                       |              |
| <b>Element Name:</b>     | Embankments  |      | Width:  |          |        |                       |              |
| Location:                |  |      | Height:                                       |          |        |                       |              |
| Material:                | Earth / Rock   |      | Count:  | 4        |        |                       |              |
| Element Type:            |  |      | Total Quantity:                               | 4        |        |                       |              |
| Environment:             | Moderate   |      | Limited Insp'n:                               |          |        |                       |              |
| Protection System:       |  |      |   |          |        |                       |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good  | Fair     | Poor   | Perform. Deficiencies | Maint. Needs |
|                          | Each   |      |   | 4        |        |                       |              |
| <b>Comments:</b>         | 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) |      |   |          |        |                       |              |
| <b>Recommended Work:</b> | None 6-10 Years  |      | <input checked="" type="checkbox"/> 1-5 Years | < 1 Year | Urgent |                       |              |
|                          | Place rip-rap and/or rock protection.  |      |   |          |        |                       |              |

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

**Element Data**

|                          |  |      |   |                   |        |                       |              |
|--------------------------|--|------|---|-------------------|--------|-----------------------|--------------|
| <b>Element Group:</b>    | Approaches   |      | Length:                                       | 5 m               |        |                       |              |
| <b>Element Name:</b>     | Wearing Surface  |      | Width:  | 5.9 m             |        |                       |              |
| Location:                |  |      | Height:                                       |                   |        |                       |              |
| Material:                | Asphalt / Gravel   |      | Count:  | 2                 |        |                       |              |
| Element Type:            |  |      | Total Quantity:                               | 59 m <sup>2</sup> |        |                       |              |
| Environment:             | Severe   |      | Limited Insp'n:                               |                   |        |                       |              |
| Protection System:       |  |      |   |                   |        |                       |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good  | Fair              | Poor   | Perform. Deficiencies | Maint. Needs |
|                          | m <sup>2</sup>   |      |   | 29.5              | 29.5   |                       | Yes          |
| <b>Comments:</b>         | The north approach is asphalt with observed stress cracking, and the south approach is a granular surface.   |      |   |                   |        |                       |              |
| <b>Recommended Work:</b> | 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:       |   |      |                 |      |      |                       |              |
| <b>Condition Data:</b>   | Units   | Exc. | Good            | Fair | Poor | Perform. Deficiencies | Maint. Needs |
|                          | %   |      |                 | 50   | 50   | Yes                   |              |
| <b>Comments:</b>         | Settlement (stress) and cracking of the north asphalt approach was observed.  |      |                 |      |      |                       |              |
| <b>Recommended Work:</b> | None    6-10 Years <input checked="" type="checkbox"/> 1-5 Years    < 1 Year    Urgent<br>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  |      |                 |      |      |                       |              |
| <b>Condition Data:</b>   | Units   | Exc. | Good            | Fair | Poor | Perform. Deficiencies | Maint. Needs |
|                          | %   |      |                 | 25   | 75   | Yes                   | Yes          |
| <b>Comments:</b>         | 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. |      |                 |      |      |                       |              |
| <b>Recommended Work:</b> | None    6-10 Years    1-5 Years <input checked="" type="checkbox"/> < 1 Year    Urgent<br>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](http://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   | <b>Photos:</b><br>7-1 - Title Page<br>7-2 - View of watercourse upstream and upstream culvert end<br>7-3 - View of watercourse downstream and downstream culvert end<br>7-4 - Structure elevation<br>7-5 - Structure elevation<br>7-6 - View of soffit and abutment walls<br>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

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

|                          |  |      |                 |      |      |                       |              |
|--------------------------|--|------|-----------------|------|------|-----------------------|--------------|
| <b>Element Group:</b>    | Decks  |      | Length:         |      |      |                       |              |
| <b>Element Name:</b>     | Deck Top   |      | Width:          |      |      |                       |              |
| Location:                |  |      | Height:         |      |      |                       |              |
| Material:                | Concrete   |      | Count:          |      |      |                       |              |
| Element Type:            |  |      | Total Quantity: |      |      |                       |              |
| Environment:             | Benign   |      | Limited Insp'n: | Yes  |      |                       |              |
| Protection System:       | Wearing Surface  |      |                 |      |      |                       |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good            | Fair | Poor | Perform. Deficiencies | Maint. Needs |
|                          | %  |      | 95              | 5    |      |                       |              |
| <b>Comments:</b>         | The visible ends are in overall good condition with some minor spalling.   |      |                 |      |      |                       |              |
| <b>Recommended Work:</b> | <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**

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

|                          |  |      |                 |      |      |                       |              |
|--------------------------|--|------|-----------------|------|------|-----------------------|--------------|
| <b>Element Group:</b>    | Abutments  |      | Length:         |      |      |                       |              |
| <b>Element Name:</b>     | Abutment Walls   |      | Width:          |      |      |                       |              |
| Location:                | Each Side  |      | Height:         |      |      |                       |              |
| Material:                | Concrete   |      | Count:          |      |      |                       |              |
| Element Type:            |  |      | Total Quantity: |      |      |                       |              |
| Environment:             | Moderate   |      | Limited Insp'n: |      |      |                       |              |
| Protection System:       |  |      |                 |      |      |                       |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good            | Fair | Poor | Perform. Deficiencies | Maint. Needs |
|                          | %  |      | 80              | 20   |      |                       |              |
| <b>Comments:</b>         | Hairline cracks at cold joint in haunches and some spalling (honeycomb) on walls.<br>Transverse cracking at cold joint, 1/3 way up from footing on each side.<br>Minor spalling erosion from high water level down to footing. |      |                 |      |      |                       |              |
| <b>Recommended Work:</b> | 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"/><br>Concrete repairs, seal cold joint.        |      |                 |      |      |                       |              |

**Element Data**

|                          |  |      |                 |      |      |                       |              |
|--------------------------|--|------|-----------------|------|------|-----------------------|--------------|
| <b>Element Group:</b>    | Foundations  |      | Length:         |      |      |                       |              |
| <b>Element Name:</b>     | 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   |      |                 |      |      |                       |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good            | Fair | Poor | Perform. Deficiencies | Maint. Needs |
|                          |  |      |                 |      |      |                       |              |
| <b>Comments:</b>         | The foundations are not visible, but the structure appears stable.   |      |                 |      |      |                       |              |
| <b>Recommended Work:</b> | 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**

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

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

**Element Data**

|                          |   |      |                 |           |  |                       |              |
|--------------------------|---|------|-----------------|-----------|--|-----------------------|--------------|
| <b>Element Group:</b>    | Signs   |      | Length:         |           |  |                       |              |
| <b>Element Name:</b>     | Signs   |      | Width:          |           |  |                       |              |
| Location:                | Each Corner   |      | Height:         |           |  |                       |              |
| Material:                |   |      | Count:          |           |  |                       |              |
| Element Type:            |   |      | Total Quantity: |           |  |                       |              |
| Environment:             | Severe  |      | Limited Insp'n: |           |  |                       |              |
| Protection System:       | None  |      |                 |           |  |                       |              |
| <b>Condition Data:</b>   | Units   | Exc. | Good            | Fair      | Poor   | Perform. Deficiencies | Maint. Needs |
|                          | Each  |      |                 |           |  | Yes                   |              |
| <b>Comments:</b>         | No end hazard signs at structure.                                 |      |                 |           |  |                       |              |
| <b>Recommended Work:</b> | 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**

|                          |  |      |  |           |          |                       |              |
|--------------------------|--|------|--|-----------|----------|-----------------------|--------------|
| <b>Element Group:</b>    | Approaches   |      | Length:  |           |          |                       |              |
| <b>Element Name:</b>     | Wearing Surface  |      | Width:   |           |          |                       |              |
| Location:                | Each End   |      | Height:  |           |          |                       |              |
| Material:                | Asphalt  |      | Count:   |           |          |                       |              |
| Element Type:            |  |      | Total Quantity:                                |           |          |                       |              |
| Environment:             | Severe   |      | Limited Insp'n:                                |           |          |                       |              |
| Protection System:       | None   |      |  |           |          |                       |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good   | Fair      | Poor     | Perform. Deficiencies | Maint. Needs |
|                          | %  |      | 70   | 25        | 5        |                       |              |
| <b>Comments:</b>         | Slight settlement was observed at the deck ends. Alligator cracking observed along edge of eastbound lane. Transverse crack 5m east of deck. |      |  |           |          |                       |              |
| <b>Recommended Work:</b> | 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](http://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   | <b>Photos:</b><br>8-1 - Title Page<br>8-2 - View of structure barrier, signage (typical) and encroaching vegetation<br>8-3 - View of watercourse upstream<br>8-4 - Deficient barrier termination and hazard signage<br>8-5 - View of watercourse downstream<br>8-6 - View of structure approach and deck wearing surface<br>8-7 - View of east structure elevation, wingwalls, exterior soffit and curb<br>8-8 - View of north abutment wall and bedrock streambed<br>8-9 - View of south abutment wall and soffit<br>8-10 - View of structure soffit<br>8-11 - View of east structure elevation, exterior barrier protection, curb and soffit<br>8-10 - View of abutment wall<br>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

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

**Element Data**

|                           |   |      |                        |       |      |                       |              |
|---------------------------|---|------|------------------------|-------|------|-----------------------|--------------|
| <b>Element Group:</b>     | Decks   |      | <b>Length:</b>         | 7.3   |      |                       |              |
| <b>Element Name:</b>      | Deck Top  |      | <b>Width:</b>          | 9.4   |      |                       |              |
| <b>Location:</b>          |   |      | <b>Height:</b>         |       |      |                       |              |
| <b>Material:</b>          | Concrete  |      | <b>Count:</b>          |       |      |                       |              |
| <b>Element Type:</b>      |   |      | <b>Total Quantity:</b> | 68.62 |      |                       |              |
| <b>Environment:</b>       | Moderate  |      | <b>Limited Insp'n:</b> | Yes   |      |                       |              |
| <b>Protection System:</b> |   |      |                        |       |      |                       |              |
| <b>Condition Data:</b>    | Units   | Exc. | Good                   | Fair  | Poor | Perform. Deficiencies | Maint. Needs |
|                           | m <sup>2</sup>  |      | 68.62                  |       |      | Yes                   | Yes          |
| <b>Comments:</b>          | Limited inspection due to surface treatment wearing surface cover. The edges have granular and vegetation build up.   |      |                        |       |      |                       |              |
| <b>Recommended Work:</b>  | None    6-10 Years <input checked="" type="checkbox"/> 1-5 Years    < 1 Year    Urgent<br>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**

|                           |   |      |                        |       |      |                       |              |
|---------------------------|---|------|------------------------|-------|------|-----------------------|--------------|
| <b>Element Group:</b>     | Decks   |      | <b>Length:</b>         | 10.3  |      |                       |              |
| <b>Element Name:</b>      | Soffit - Thick Slab   |      | <b>Width:</b>          | 6.1   |      |                       |              |
| <b>Location:</b>          |   |      | <b>Height:</b>         |       |      |                       |              |
| <b>Material:</b>          | Concrete  |      | <b>Count:</b>          |       |      |                       |              |
| <b>Element Type:</b>      |   |      | <b>Total Quantity:</b> | 62.83 |      |                       |              |
| <b>Environment:</b>       | Moderate  |      | <b>Limited Insp'n:</b> |       |      |                       |              |
| <b>Protection System:</b> |   |      |                        |       |      |                       |              |
| <b>Condition Data:</b>    | Units   | Exc. | Good                   | Fair  | Poor | Perform. Deficiencies | Maint. Needs |
|                           | m <sup>2</sup>  |      | 31.42                  | 31.42 |      |                       |              |
| <b>Comments:</b>          | Some spalling was observed at the east end, but is in relatively good condition. The west portion is newer and in good condition. |      |                        |       |      |                       |              |
| <b>Recommended Work:</b>  | <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:       |   |      |                 |      |      |                       |              |
| <b>Condition Data:</b>   | Units   | Exc. | Good            | Fair | Poor | Perform. Deficiencies | Maint. Needs |
|                          | %   |      |                 | 100  |      | Yes                   | Yes          |
| <b>Comments:</b>         | Graded to curbs that are debris covered.  |      |                 |      |      |                       |              |
| <b>Recommended Work:</b> | None    6-10 Years    1-5 Years <input checked="" type="checkbox"/> < 1 Year    Urgent<br>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:       |  |      |                 |       |      |                       |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good            | Fair  | Poor | Perform. Deficiencies | Maint. Needs |
|                          | m <sup>2</sup>   |      | 8.66            | 2.89  |      |                       |              |
| <b>Comments:</b>         | The curbs have some surface spalling.  |      |                 |       |      |                       |              |
| <b>Recommended Work:</b> | None <input checked="" type="checkbox"/> 6-10 Years    1-5 Years    < 1 Year    Urgent<br>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:       |  |      |                 |      |      |                       |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good            | Fair | Poor | Perform. Deficiencies | Maint. Needs |
|                          | m  |      |                 | 21   |      | Yes                   |              |
| <b>Comments:</b>         | There is currently no approach barrier protection. The structure barrier protection does not meet Code (height).                           |      |                 |      |      |                       |              |
| <b>Recommended Work:</b> | None    6-10 Years <input checked="" type="checkbox"/> 1-5 Years    < 1 Year    Urgent<br>Install barrier protection to meet current Code. |      |                 |      |      |                       |              |

**Element Data****Structure:** 8

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

**Element Data**

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

**Element Data**

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

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

**Element Data**

|                          |  |      |                 |      |      |                       |              |
|--------------------------|--|------|-----------------|------|------|-----------------------|--------------|
| <b>Element Group:</b>    | Approaches   |      | Length:         |      |      |                       |              |
| <b>Element Name:</b>     | Drainage   |      | Width:          |      |      |                       |              |
| Location:                |  |      | Height:         |      |      |                       |              |
| Material:                | Asphalt  |      | Count:          |      |      |                       |              |
| Element Type:            |  |      | Total Quantity: |      |      |                       |              |
| Environment:             | Severe   |      | Limited Insp'n: |      |      |                       |              |
| Protection System:       |  |      |                 |      |      |                       |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good            | Fair | Poor | Perform. Deficiencies | Maint. Needs |
|                          | %  |      |                 | 90   | 10   | Yes                   | Yes          |
| <b>Comments:</b>         | Poor drainage along shoulders signs of water ponding observed.   |      |                 |      |      |                       |              |
| <b>Recommended Work:</b> | None    6-10 Years <input checked="" type="checkbox"/> 1-5 Years    < 1 Year    Urgent<br>Rehab - re-establish adequate platform crossfall during road resurfacing.<br>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](http://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                        |
| Height (m)               | 1.8                          | % Trucks                    | 15%                      |
| Direction of Structure   | East/West - 20° skew         | Overall Structure Width (m) | 15                       |
| Year Built/Rehabilitated | 2008                         | Roadway Width (m)           | 7.5                      |
| Current Load Limit       | None                         | Total Deck Length (m)       | 4.9                      |
| Detour Length (km)       | 32                           | Total Deck Area (s.m.)      | 68.6                     |
| Waterway                 | Chin Creek                   | Heritage Des.               | None                     |

## Inspection Data

|                                     |  |  |                 |               |
|-------------------------------------|--|--|-----------------|---------------|
| Date of Inspection                  | December 6, 2022   | <b>Photos:</b><br>9-1 - Title Page<br>9-2 - View of structure inlet elevation and embankments<br>9-3 - View of structure outlet elevation and embankments<br>9-4 - View of pipe arch soffit and walls<br>9-5 - View of west 3 cable guiderail barrier protection with loose cable<br>9-6 - View of watercourse upstream<br>9-7 - View of watercourse downstream<br>9-8 - View of northeast deficient section of 3 cable guiderail (impact damage)<br>9-9 - View of structure wearing surface from approaching perspective<br>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

|                          |   |      |                                     |                                    |                                   |                                 |              |
|--------------------------|---|------|-------------------------------------|------------------------------------|-----------------------------------|---------------------------------|--------------|
| <b>Element Group:</b>    | Culvert   |      | Length:                             | 15                                 |                                   |                                 |              |
| <b>Element Name:</b>     | Barrels   |      | Width:                              | 4                                  |                                   |                                 |              |
| Location:                |   |      | Height:                             | 1.1                                |                                   |                                 |              |
| Material:                | Concrete  |      | Count:                              | 93                                 |                                   |                                 |              |
| Element Type:            | Arch  |      | Total Quantity:                     |                                    |                                   |                                 |              |
| Environment:             | Moderate  |      | Limited Insp'n:                     |                                    |                                   |                                 |              |
| Protection System:       | None  |      |                                     |                                    |                                   |                                 |              |
| <b>Condition Data:</b>   | Units   | Exc. | Good                                | Fair                               | Poor                              | Perform. Deficiencie            | Maint. Needs |
|                          | m <sup>2</sup>  |      | 93                                  |                                    |                                   |                                 |              |
| <b>Comments:</b>         | The concrete arch is in good condition with no visible defects. |      |                                     |                                    |                                   |                                 |              |
| <b>Recommended Work:</b> | <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**

|                          |  |      |                                     |                                    |                                   |                                 |              |
|--------------------------|--|------|-------------------------------------|------------------------------------|-----------------------------------|---------------------------------|--------------|
| <b>Element Group:</b>    | Culvert  |      | Length:                             |                                    |                                   |                                 |              |
| <b>Element Name:</b>     | 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  |      |                                     |                                    |                                   |                                 |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good                                | Fair                               | Poor                              | Perform. Deficiencie            | Maint. Needs |
|                          | m <sup>2</sup>   |      | 1.34                                |                                    |                                   |                                 |              |
| <b>Comments:</b>         | The inlet embankments and slope protection appear stable and are unobstructed. |      |                                     |                                    |                                   |                                 |              |
| <b>Recommended Work:</b> | <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**

|                          |   |      |                                     |                                    |                                   |                                 |              |
|--------------------------|---|------|-------------------------------------|------------------------------------|-----------------------------------|---------------------------------|--------------|
| <b>Element Group:</b>    | Culvert   |      | Length:                             |                                    |                                   |                                 |              |
| <b>Element Name:</b>     | 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   |      |                                     |                                    |                                   |                                 |              |
| <b>Condition Data:</b>   | Units   | Exc. | Good                                | Fair                               | Poor                              | Perform. Deficiencie            | Maint. Needs |
|                          | m <sup>2</sup>  |      | 1.34                                |                                    |                                   |                                 |              |
| <b>Comments:</b>         | The outlet embankments and slope protection are stable. There is a HDPE pipe culvert which outlets just downstream of the main culvert. |      |                                     |                                    |                                   |                                 |              |
| <b>Recommended Work:</b> | <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

|                          |  |      |                 |        |        |                       |              |
|--------------------------|--|------|-----------------|--------|--------|-----------------------|--------------|
| <b>Element Group:</b>    | Barriers   |      | Length:         | 3.85   |        |                       |              |
| <b>Element Name:</b>     | 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   |      |                 |        |        |                       |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good            | Fair   | Poor   | Perform. Deficiencies | Maint. Needs |
|                          | m  |      |                 |        | 134.75 | Yes                   |              |
| <b>Comments:</b>         | 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. |      |                 |        |        |                       |              |
| <b>Recommended Work:</b> | None    6-10 Years    1-5 Years <input checked="" type="checkbox"/> < 1 Year    Urgent<br>Tighten the west and east cables, repair the damaged northeast section and re-attach cables. |      |                 |        |        |                       |              |

**Element Data**

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

**Element Data**

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



**Element Data****Structure:** 9

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

|                           |  |                                     |                                    |                                   |                                 |                       |              |
|---------------------------|--|-------------------------------------|------------------------------------|-----------------------------------|---------------------------------|-----------------------|--------------|
| <b>Element Group:</b>     | Embankments & Streams                                  |                                     | <b>Length:</b>                     |                                   |                                 |                       |              |
| <b>Element Name:</b>      | Streams and Waterways                                  |                                     | <b>Width:</b>                      |                                   |                                 |                       |              |
| <b>Location:</b>          |  |                                     | <b>Height:</b>                     |                                   |                                 |                       |              |
| <b>Material:</b>          | Bedrock  |                                     | <b>Count:</b>                      |                                   |                                 |                       |              |
| <b>Element Type:</b>      |  |                                     | <b>Total Quantity:</b>             |                                   |                                 |                       |              |
| <b>Environment:</b>       | Moderate   |                                     | <b>Limited Insp'n:</b>             |                                   |                                 |                       |              |
| <b>Protection System:</b> | None   |                                     |                                    |                                   |                                 |                       |              |
| <b>Condition Data:</b>    | Units  | Exc.                                | Good                               | Fair                              | Poor                            | Perform. Deficiencies | Maint. Needs |
|                           | %  |                                     | 100                                |                                   |                                 |                       |              |
| <b>Comments:</b>          | The watercourse is unobstructed and in good condition. |                                     |                                    |                                   |                                 |                       |              |
| <b>Recommended Work:</b>  | <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**

|                           |   |  |                                    |                                   |                                 |  |              |
|---------------------------|---|--|------------------------------------|-----------------------------------|---------------------------------|--|--------------|
| <b>Element Group:</b>     | Embankments & Streams   |  | <b>Length:</b>                     |                                   |                                 |  |              |
| <b>Element Name:</b>      | Embankments   |  | <b>Width:</b>                      |                                   |                                 |  |              |
| <b>Location:</b>          | Each Corner   |  | <b>Height:</b>                     |                                   |                                 |  |              |
| <b>Material:</b>          | Stone   |  | <b>Count:</b>                      | 4                                 |                                 |  |              |
| <b>Element Type:</b>      |   |  | <b>Total Quantity:</b>             | 4                                 |                                 |  |              |
| <b>Environment:</b>       | Moderate  |  | <b>Limited Insp'n:</b>             |                                   |                                 |  |              |
| <b>Protection System:</b> | Rip Rap   |  |                                    |                                   |                                 |  |              |
| <b>Condition Data:</b>    | Units   | Exc.   | Good                               | Fair                              | Poor                            | Perform. Deficiencies                            | Maint. Needs |
|                           | Each  |  | 3                                  | 1                                 |                                 |  |              |
| <b>Comments:</b>          | The embankments are in good condition with large rip rap slope protection. Some minor erosion was observed between the rip-rap. |  |                                    |                                   |                                 |  |              |
| <b>Recommended Work:</b>  | <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  |      |                 |      |      |                       |              |
| <b>Condition Data:</b>   | Units   | Exc. | Good            | Fair | Poor | Perform. Deficiencies | Maint. Needs |
|                          | Each  |      |                 | 3    | 1    | Yes                   | Yes          |
| <b>Comments:</b>         | Guiderail marker posts/sign in fair condition. Marker missing from post on SW approach.<br>No end hazard signs.   |      |                 |      |      |                       |              |
| <b>Recommended Work:</b> | None      6-10 Years      1-5 Years <input checked="" type="checkbox"/> < 1 Year      Urgent<br>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  |      |                 |      |      |                       |              |
| <b>Condition Data:</b>   | Units   | Exc. | Good            | Fair | Poor | Perform. Deficiencies | Maint. Needs |
|                          | m <sup>2</sup>  | 69   |                 |      |      |                       |              |
| <b>Comments:</b>         | The new asphalt wearing surface is in excellent condition.  |      |                 |      |      |                       |              |
| <b>Recommended Work:</b> | <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

---

|                          |   |                            |   |             |                                 |
|--------------------------|---|----------------------------|---|-------------|---------------------------------|
| <b>Site Number</b>       | <input type="text" value="10"/>                     | <b>Project Number</b>      | <input type="text" value="221-12948-00"/>             |             |                                 |
| <b>Structure Name</b>    | <input type="text" value="Lindsay Road 5 Culvert"/> | <b>Municipality</b>        | <input type="text" value="Northern Bruce Peninsula"/> |             |                                 |
| <b>MTO Region Code</b>   | <input type="text" value="30"/>                     | <b>County</b>              | <input type="text" value="Bruce"/>                    | <b>Code</b> | <input type="text" value="02"/> |
| <b>MTO District Code</b> | <input type="text" value="33"/>                     | <b>Geographic Twp Code</b> | <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](http://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   | <b>Photos:</b><br>10-1 - Title Page<br>10-2 - View of watercourse upstream and inlet component<br>10-3 - View of watercourse downstream<br>10-4 - View of culvert barrel in elevation<br>10-5 - View of interior culvert barrel<br>10-6 - Localized corrosion with section loss<br>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  |                                     |                                    |                                   |                                 |                       |              |
| <b>Condition Data:</b>   | Units   | Exc.                                | Good                               | Fair                              | Poor                            | Perform. Deficiencies | Maint. Needs |
|                          | %   |                                     | 100                                |                                   |                                 |                       |              |
| <b>Comments:</b>         | Asphalt wearing surface was recently replaced and is in good condition. |                                     |                                    |                                   |                                 |                       |              |
| <b>Recommended Work:</b> | <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  |                                     |                                    |                                   |                                 |                       |              |
| <b>Condition Data:</b>   | Units                                       | Exc.                                | Good                               | Fair                              | Poor                            | Perform. Deficiencies | Maint. Needs |
|                          | %   |                                     | 100                                |                                   |                                 |                       |              |
| <b>Comments:</b>         | Rip-rap slope protection in good condition. |                                     |                                    |                                   |                                 |                       |              |
| <b>Recommended Work:</b> | <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                          |                                     |                                    |                                   |                                 |                       |              |
| <b>Condition Data:</b>   | Units                         | Exc.                                | Good                               | Fair                              | Poor                            | Perform. Deficiencies | Maint. Needs |
|                          | %                             |                                     | 100                                |                                   |                                 |                       |              |
| <b>Comments:</b>         | The culvert end is bent.      |                                     |                                    |                                   |                                 |                       |              |
| <b>Recommended Work:</b> | <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

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

**Element Data**

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

**Element Data**

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

**Element Data****Structure:** 10

|                          |  |                                     |                                    |  |                                 |                       |              |
|--------------------------|--|-------------------------------------|------------------------------------|--|---------------------------------|-----------------------|--------------|
| <b>Element Group:</b>    | Approaches   |                                     | Length:                            |  |                                 |                       |              |
| <b>Element Name:</b>     | Wearing Surface  |                                     | Width:                             |  |                                 |                       |              |
| Location:                | Each End   |                                     | Height:                            |  |                                 |                       |              |
| Material:                | Surface Treatment  |                                     | Count:                             |  |                                 |                       |              |
| Element Type:            |  |                                     | Total Quantity:                    |  |                                 |                       |              |
| Environment:             | Severe   |                                     | Limited Insp'n:                    |  |                                 |                       |              |
| Protection System:       | None   |                                     |                                    |  |                                 |                       |              |
| <b>Condition Data:</b>   | Units  | Exc.                                | Good                               | Fair   | Poor                            | Perform. Deficiencies | Maint. Needs |
|                          | %  |                                     | 100                                |  |                                 |                       |              |
| <b>Comments:</b>         | Light transverse cracking observed at east approach.       |                                     |                                    |  |                                 |                       |              |
| <b>Recommended Work:</b> | <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 |                       |              |
| <b>Element Group:</b>    | Accessories  |                                     | Length:                            |  |                                 |                       |              |
| <b>Element Name:</b>     | Signs  |                                     | Width:                             |  |                                 |                       |              |
| Location:                | Approaches   |                                     | Height:                            |  |                                 |                       |              |
| Material:                | Steel  |                                     | Count:                             | 2  |                                 |                       |              |
| Element Type:            |  |                                     | Total Quantity:                    | 2  |                                 |                       |              |
| Environment:             | Severe   |                                     | Limited Insp'n:                    |  |                                 |                       |              |
| Protection System:       | None   |                                     |                                    |  |                                 |                       |              |
| <b>Condition Data:</b>   | Units  | Exc.                                | Good                               | Fair   | Poor                            | Perform. Deficiencies | Maint. Needs |
|                          | Each   |                                     | 2                                  |  |                                 | Yes                   | Yes          |
| <b>Comments:</b>         | The 45 km/hr and bump warning signs are in good condition. |                                     |                                    |  |                                 |                       |              |
| <b>Recommended Work:</b> | <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](http://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  | <b>Photos:</b><br>11-1 - Title Page<br>11-2 - View of east structure elevation, exterior soffit, barrier and embankments<br>11-3 - View of exterior barrier protection, soffit and wingwalls<br>11-4 - View of structure soffit<br>11-5 - Rock slope protection and geotextile failure at the southeast quadrant<br>11-6 - View of north abutment wall and soffit<br>11-7 - View of structure wearing surface, barrier protection and end hazard signage<br>11-8 - View of watercourse downstream<br>11-9 - View of watercourse upstream<br>11-10 - Minor erosion at the northwest structure quadrant<br>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

|                          |  |                                     |                                    |                                   |                                 |                       |              |
|--------------------------|--|-------------------------------------|------------------------------------|-----------------------------------|---------------------------------|-----------------------|--------------|
| <b>Element Group:</b>    | Decks  |                                     | Length:                            |                                   |                                 |                       |              |
| <b>Element Name:</b>     | Wearing Surface  |                                     | Width:                             |                                   |                                 |                       |              |
| Location:                |  |                                     | Height:                            |                                   |                                 |                       |              |
| Material:                | Surface Treatment  |                                     | Count:                             |                                   |                                 |                       |              |
| Element Type:            |  |                                     | Total Quantity:                    |                                   |                                 |                       |              |
| Environment:             | Severe   |                                     | Limited Insp'n:                    |                                   |                                 |                       |              |
| Protection System:       |  |                                     |                                    |                                   |                                 |                       |              |
| <b>Condition Data:</b>   | Units  | Exc.                                | Good                               | Fair                              | Poor                            | Perform. Deficiencies | Maint. Needs |
|                          | %  |                                     | 100                                |                                   |                                 |                       | Yes          |
| <b>Comments:</b>         | The surface treatment is relatively new and in good condition. |                                     |                                    |                                   |                                 |                       |              |
| <b>Recommended Work:</b> | <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**

|                          |   |  |                                    |                                   |                                 |                       |              |
|--------------------------|---|--|------------------------------------|-----------------------------------|---------------------------------|-----------------------|--------------|
| <b>Element Group:</b>    | Decks   |  | Length:                            |                                   |                                 |                       |              |
| <b>Element Name:</b>     | Deck Top  |  | Width:                             |                                   |                                 |                       |              |
| Location:                |   |  | Height:                            |                                   |                                 |                       |              |
| Material:                | Concrete  |  | Count:                             |                                   |                                 |                       |              |
| Element Type:            |   |  | Total Quantity:                    |                                   |                                 |                       |              |
| Environment:             | Moderate  |  | Limited Insp'n:                    | √                                 |                                 |                       |              |
| Protection System:       |   |  |                                    |                                   |                                 |                       |              |
| <b>Condition Data:</b>   | Units   | Exc.   | Good                               | Fair                              | Poor                            | Perform. Deficiencies | Maint. Needs |
|                          | %   |  | 100                                |                                   |                                 |                       |              |
| <b>Comments:</b>         | Limited inspection due to cover by granulars (excessive depth) and surface treatment wearing surface.   |  |                                    |                                   |                                 |                       |              |
| <b>Recommended Work:</b> | <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**

|                          |  |                                     |                                    |                                   |                                 |                       |              |
|--------------------------|--|-------------------------------------|------------------------------------|-----------------------------------|---------------------------------|-----------------------|--------------|
| <b>Element Group:</b>    | Decks  |                                     | Length:                            |                                   |                                 |                       |              |
| <b>Element Name:</b>     | Thick Slab   |                                     | Width:                             |                                   |                                 |                       |              |
| Location:                |  |                                     | Height:                            |                                   |                                 |                       |              |
| Material:                | Concrete   |                                     | Count:                             |                                   |                                 |                       |              |
| Element Type:            |  |                                     | Total Quantity:                    |                                   |                                 |                       |              |
| Environment:             | Moderate   |                                     | Limited Insp'n:                    |                                   |                                 |                       |              |
| Protection System:       |  |                                     |                                    |                                   |                                 |                       |              |
| <b>Condition Data:</b>   | Units  | Exc.                                | Good                               | Fair                              | Poor                            | Perform. Deficiencies | Maint. Needs |
|                          | %  |                                     | 100                                |                                   |                                 |                       |              |
| <b>Comments:</b>         | The soffit is in good condition with no visible defects. |                                     |                                    |                                   |                                 |                       |              |
| <b>Recommended Work:</b> | <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

|                          |   |      |                                     |                                    |                                   |                                 |              |
|--------------------------|---|------|-------------------------------------|------------------------------------|-----------------------------------|---------------------------------|--------------|
| <b>Element Group:</b>    | Decks   |      | Length:                             |                                    |                                   |                                 |              |
| <b>Element Name:</b>     | Drainage  |      | Width:                              |                                    |                                   |                                 |              |
| Location:                |   |      | Height:                             |                                    |                                   |                                 |              |
| Material:                | Concrete  |      | Count:                              |                                    |                                   |                                 |              |
| Element Type:            |   |      | Total Quantity:                     |                                    |                                   |                                 |              |
| Environment:             | Severe  |      | Limited Insp'n:                     |                                    |                                   |                                 |              |
| Protection System:       |   |      |                                     |                                    |                                   |                                 |              |
| <b>Condition Data:</b>   | Units   | Exc. | Good                                | Fair                               | Poor                              | Perform. Deficiencies           | Maint. Needs |
|                          | %   |      |                                     | 100                                |                                   |                                 |              |
| <b>Comments:</b>         | Surface to slope drainage is adequate. There is very little crossfall grade to the wearing surface. |      |                                     |                                    |                                   |                                 |              |
| <b>Recommended Work:</b> | <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**

|                          |   |      |                                     |                                    |                                   |                                 |              |
|--------------------------|---|------|-------------------------------------|------------------------------------|-----------------------------------|---------------------------------|--------------|
| <b>Element Group:</b>    | Sidewalks/curbs   |      | Length:                             |                                    |                                   |                                 |              |
| <b>Element Name:</b>     | Curbs   |      | Width:                              |                                    |                                   |                                 |              |
| Location:                |   |      | Height:                             |                                    |                                   |                                 |              |
| Material:                | Concrete  |      | Count:                              |                                    |                                   |                                 |              |
| Element Type:            |   |      | Total Quantity:                     |                                    |                                   |                                 |              |
| Environment:             | Severe  |      | Limited Insp'n:                     |                                    |                                   |                                 |              |
| Protection System:       |   |      |                                     |                                    |                                   |                                 |              |
| <b>Condition Data:</b>   | Units   | Exc. | Good                                | Fair                               | Poor                              | Perform. Deficiencies           | Maint. Needs |
|                          | %   |      | 93                                  | 5                                  | 2                                 |                                 |              |
| <b>Comments:</b>         | The concrete is in good condition with some observed minor damage to ends from maintenance equipment. |      |                                     |                                    |                                   |                                 |              |
| <b>Recommended Work:</b> | <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**

|                          |  |      |                                     |   |                                   |                                 |              |
|--------------------------|--|------|-------------------------------------|---|-----------------------------------|---------------------------------|--------------|
| <b>Element Group:</b>    | Barriers   |      | Length:                             |   |                                   |                                 |              |
| <b>Element Name:</b>     | Railing Systems  |      | Width:                              |   |                                   |                                 |              |
| Location:                |  |      | Height:                             |   |                                   |                                 |              |
| Material:                | Steel  |      | Count:                              |   |                                   |                                 |              |
| Element Type:            | Box Beam   |      | Total Quantity:                     |   |                                   |                                 |              |
| Environment:             | Severe   |      | Limited Insp'n:                     |   |                                   |                                 |              |
| Protection System:       |  |      |                                     |   |                                   |                                 |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good                                | Fair  | Poor                              | Perform. Deficiencies           | Maint. Needs |
|                          | %  |      | 95                                  | 5   |                                   | Yes                             |              |
| <b>Comments:</b>         | 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. |      |                                     |   |                                   |                                 |              |
| <b>Recommended Work:</b> | <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

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

**Element Data**

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

**Element Data**

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

**Element Data****Structure:** 11

|                          |   |      |                 |      |      |                       |              |
|--------------------------|---|------|-----------------|------|------|-----------------------|--------------|
| <b>Element Group:</b>    | Signs   |      | Length:         |      |      |                       |              |
| <b>Element Name:</b>     | Signs   |      | Width:          |      |      |                       |              |
| Location:                |   |      | Height:         |      |      |                       |              |
| Material:                | Steel   |      | Count:          |      |      |                       |              |
| Element Type:            |   |      | Total Quantity: | 4    |      |                       |              |
| Environment:             | Moderate  |      | Limited Insp'n: |      |      |                       |              |
| Protection System:       |   |      |                 |      |      |                       |              |
| <b>Condition Data:</b>   | Units   | Exc. | Good            | Fair | Poor | Perform. Deficiencies | Maint. Needs |
|                          | Each  |      | 2               | 2    |      | No                    | No           |
| <b>Comments:</b>         | Four end hazard signs are in place and are in good condition.   |      |                 |      |      |                       |              |
| <b>Recommended Work:</b> | <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**

|                          |  |      |                 |      |      |                       |              |
|--------------------------|--|------|-----------------|------|------|-----------------------|--------------|
| <b>Element Group:</b>    | Approaches   |      | Length:         |      |      |                       |              |
| <b>Element Name:</b>     | Wearing Surface  |      | Width:          |      |      |                       |              |
| Location:                |  |      | Height:         |      |      |                       |              |
| Material:                | Gravel   |      | Count:          |      |      |                       |              |
| Element Type:            |  |      | Total Quantity: |      |      |                       |              |
| Environment:             | Moderate   |      | Limited Insp'n: |      |      |                       |              |
| Protection System:       |  |      |                 |      |      |                       |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good            | Fair | Poor | Perform. Deficiencies | Maint. Needs |
|                          | %  |      | 100             |      |      | Yes                   | Yes          |
| <b>Comments:</b>         | The approach wearing surface is surface treatment in fair condition.<br>Cracking and settlement observed at each end of the structure w/ cold patch observed on the north end.   |      |                 |      |      |                       |              |
| <b>Recommended Work:</b> | None <input type="checkbox"/> 6-10 Years <input checked="" type="checkbox"/> 1-5 Years <input type="checkbox"/> < 1 Year <input type="checkbox"/> Urgent<br>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](http://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   | <b>Photos:</b><br>12-1 - Title Page<br>12-2 - View of culvert inlet in elevation (north perspective)<br>12-3 - View of culvert inlet in elevation (south perspective)<br>12-4 - View of surface treatment wearing surface<br>12-5 - View of culvert outlet in elevation<br>12-6 - View of watercourse downstream<br>12-7 - View of watercourse upstream<br>12-8 - View of culvert barrel interior<br>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

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

**Element Data**

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

**Element Data**

|                          |  |      |                 |      |      |                       |              |
|--------------------------|--|------|-----------------|------|------|-----------------------|--------------|
| <b>Element Group:</b>    | Culverts   |      | Length:         |      |      |                       |              |
| <b>Element Name:</b>     | Inlet Component  |      | Width:          |      |      |                       |              |
| Location:                | East End   |      | Height:         |      |      |                       |              |
| Material:                | Stone and Earth  |      | Count:          |      |      |                       |              |
| Element Type:            |  |      | Total Quantity: |      |      |                       |              |
| Environment:             | Moderate   |      | Limited Insp'n: |      |      |                       |              |
| Protection System:       | None   |      |                 |      |      |                       |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good            | Fair | Poor | Perform. Deficiencies | Maint. Needs |
|                          | %  |      |                 | 100  |      |                       |              |
| <b>Comments:</b>         |  |      |                 |      |      |                       |              |
| <b>Recommended Work:</b> | <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

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

**Element Data**

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

**Element Data**

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



**Element Data****Structure:** 12

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

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

**Element Data**

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

**Element Data****Structure:** 12

|                           |  |      |                 |      |      |                       |              |
|---------------------------|--|------|-----------------|------|------|-----------------------|--------------|
| <b>Element Group:</b>     | Approaches   |      | Length:         |      |      |                       |              |
| <b>Element Name:</b>      | Wearing Surface  |      | Width:          |      |      |                       |              |
| <b>Location:</b>          | Each End   |      | Height:         |      |      |                       |              |
| <b>Material:</b>          | Surface Treatment  |      | Count:          |      |      |                       |              |
| <b>Element Type:</b>      |  |      | Total Quantity: |      |      |                       |              |
| <b>Environment:</b>       | Severe   |      | Limited Insp'n: |      |      |                       |              |
| <b>Protection System:</b> | None   |      |                 |      |      |                       |              |
| <b>Condition Data:</b>    | Units  | Exc. | Good            | Fair | Poor | Perform. Deficiencies | Maint. Needs |
|                           | %  |      | 75              | 25   |      |                       | Yes          |
| <b>Comments:</b>          | The surface treatment is in good to fair condition with minor wheel path rutting observed. |      |                 |      |      |                       |              |
| <b>Recommended Work:</b>  | 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"/> <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](http://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<br>(Fern Creek Drain) |                             |                          |

## Inspection Data

|                                     |  |  |                 |               |
|-------------------------------------|--|--|-----------------|---------------|
| Date of Inspection                  | December 7, 2022   | <b>Photos:</b><br>13-1 - Title Page<br>13-2 - View of structure from the north approach<br>13-3 - View of curb<br>13-4 - Approach and structure wearing surface<br>13-5 - Southwest structure wingwall (typical)<br>13-6 - View of west structure elevation, exterior soffit and north abutment wall<br>13-7 - View of structure soffit and north abutment wall<br>13-8 - View of south abutment wall and exposed footing<br>13-9 - View of watercourse upstream<br>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

|                          |  |      |                 |      |      |                       |              |
|--------------------------|--|------|-----------------|------|------|-----------------------|--------------|
| <b>Element Group:</b>    | Decks  |      | Length:         |      |      |                       |              |
| <b>Element Name:</b>     | Deck Top   |      | Width:          |      |      |                       |              |
| Location:                |  |      | Height:         |      |      |                       |              |
| Material:                | Concrete   |      | Count:          |      |      |                       |              |
| Element Type:            |  |      | Total Quantity: |      |      |                       |              |
| Environment:             | Moderate   |      | Limited Insp'n: | Yes  |      |                       |              |
| Protection System:       | Wearing Surface  |      |                 |      |      |                       |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good            | Fair | Poor | Perform. Deficiencies | Maint. Needs |
|                          | %  |      |                 | 80   | 20   |                       |              |
| <b>Comments:</b>         | 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.   |      |                 |      |      |                       |              |
| <b>Recommended Work:</b> | None    6-10 Years <input checked="" type="checkbox"/> 1-5 Years    < 1 Year    Urgent<br>Clear the debris and gravel along curb, perform a deck condition survey, and seal and waterproof deck top. |      |                 |      |      |                       |              |

**Element Data**

|                          |   |      |                 |      |      |                       |              |
|--------------------------|---|------|-----------------|------|------|-----------------------|--------------|
| <b>Element Group:</b>    | Decks   |      | Length:         |      |      |                       |              |
| <b>Element Name:</b>     | Soffit - Thick Slab   |      | Width:          |      |      |                       |              |
| Location:                |   |      | Height:         |      |      |                       |              |
| Material:                | Concrete  |      | Count:          |      |      |                       |              |
| Element Type:            |   |      | Total Quantity: |      |      |                       |              |
| Environment:             | Moderate  |      | Limited Insp'n: |      |      |                       |              |
| Protection System:       | None  |      |                 |      |      |                       |              |
| <b>Condition Data:</b>   | Units   | Exc. | Good            | Fair | Poor | Perform. Deficiencies | Maint. Needs |
|                          | %   |      |                 | 30   | 70   |                       |              |
| <b>Comments:</b>         | 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.  |      |                 |      |      |                       |              |
| <b>Recommended Work:</b> | None    6-10 Years <input checked="" type="checkbox"/> 1-5 Years    < 1 Year    Urgent<br>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**

|                          |   |      |                 |      |      |                       |              |
|--------------------------|---|------|-----------------|------|------|-----------------------|--------------|
| <b>Element Group:</b>    | Barrier   |      | Length:         |      |      |                       |              |
| <b>Element Name:</b>     | Railing System  |      | Width:          |      |      |                       |              |
| Location:                | Each Side   |      | Height:         |      |      |                       |              |
| Material:                | Concrete  |      | Count:          |      |      |                       |              |
| Element Type:            |   |      | Total Quantity: |      |      |                       |              |
| Environment:             | Severe  |      | Limited Insp'n: |      |      |                       |              |
| Protection System:       | None  |      |                 |      |      |                       |              |
| <b>Condition Data:</b>   | Units   | Exc. | Good            | Fair | Poor | Perform. Deficiencies | Maint. Needs |
|                          | %   |      |                 |      |      | Yes                   |              |
| <b>Comments:</b>         | No structure or approach barrier protection current in place.   |      |                 |      |      |                       |              |
| <b>Recommended Work:</b> | None    6-10 Years    1-5 Years <input checked="" type="checkbox"/> < 1 Year    Urgent<br>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**

|                          |   |      |                 |      |      |                       |              |
|--------------------------|---|------|-----------------|------|------|-----------------------|--------------|
| <b>Element Group:</b>    | Abutments   |      | Length:         |      |      |                       |              |
| <b>Element Name:</b>     | Abutment Walls/Wingwalls  |      | Width:          |      |      |                       |              |
| Location:                | Each Side   |      | Height:         |      |      |                       |              |
| Material:                | Concrete  |      | Count:          |      |      |                       |              |
| Element Type:            |   |      | Total Quantity: |      |      |                       |              |
| Environment:             | Moderate  |      | Limited Insp'n: |      |      |                       |              |
| Protection System:       |   |      |                 |      |      |                       |              |
| <b>Condition Data:</b>   | Units   | Exc. | Good            | Fair | Poor | Perform. Deficiencies | Maint. Needs |
|                          | %   |      |                 | 50   | 50   | Yes                   | Yes          |
| <b>Comments:</b>         | 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. |      |                 |      |      |                       |              |
| <b>Recommended Work:</b> | None      6-10 Years <input checked="" type="checkbox"/> 1-5 Years      < 1 Year      Urgent<br>Remove all poor concrete, clean the reinforcing steel, and replace concrete.  |      |                 |      |      |                       |              |

**Element Data**

|                          |  |      |                 |      |      |                       |              |
|--------------------------|--|------|-----------------|------|------|-----------------------|--------------|
| <b>Element Group:</b>    | 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   |      |                 |      |      |                       |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good            | Fair | Poor | Perform. Deficiencies | Maint. Needs |
|                          | %  |      |                 |      |      | Yes                   | Yes          |
| <b>Comments:</b>         | Some erosion surrounding the footing was observed at the downstream end and along south side and southwest corner. North side covered in silt.                                 |      |                 |      |      |                       |              |
| <b>Recommended Work:</b> | None      6-10 Years <input checked="" type="checkbox"/> 1-5 Years      < 1 Year      Urgent<br>Place erosion protection along the base of the abutment walls/top of footings. |      |                 |      |      |                       |              |

**Element Data**

|                          |  |      |                 |      |      |                       |              |
|--------------------------|--|------|-----------------|------|------|-----------------------|--------------|
| <b>Element Group:</b>    | Embankments & Streams  |      | Length:         |      |      |                       |              |
| <b>Element Name:</b>     | Streams and Waterways  |      | Width:          |      |      |                       |              |
| Location:                |  |      | Height:         |      |      |                       |              |
| Material:                |  |      | Count:          |      |      |                       |              |
| Element Type:            |  |      | Total Quantity: |      |      |                       |              |
| Environment:             | Moderate   |      | Limited Insp'n: |      |      |                       |              |
| Protection System:       | None   |      |                 |      |      |                       |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good            | Fair | Poor | Perform. Deficiencies | Maint. Needs |
|                          | %  |      |                 | 80   | 20   | Yes                   | Yes          |
| <b>Comments:</b>         | 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.      |      |                 |      |      |                       |              |
| <b>Recommended Work:</b> | None      6-10 Years <input checked="" type="checkbox"/> 1-5 Years      < 1 Year      Urgent<br>Place rip rap to prevent further erosion and clear the sediment deposit. |      |                 |      |      |                       |              |

**Element Data****Structure: 13**

|                          |  |      |                                     |                                    |  |                                 |              |
|--------------------------|--|------|-------------------------------------|------------------------------------|--|---------------------------------|--------------|
| <b>Element Group:</b>    | Embankments & Streams                        |      | Length:                             |                                    |  |                                 |              |
| <b>Element Name:</b>     | Embankments                                  |      | Width:                              |                                    |  |                                 |              |
| Location:                | Each Corner                                  |      | Height:                             |                                    |  |                                 |              |
| Material:                |  |      | Count:                              | 4                                  |  |                                 |              |
| Element Type:            |  |      | Total Quantity:                     | 4                                  |  |                                 |              |
| Environment:             | Moderate                                     |      | Limited Insp'n:                     |                                    |  |                                 |              |
| Protection System:       | None   |      |                                     |                                    |  |                                 |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good                                | Fair                               | Poor   | Perform. Deficiencies           | Maint. Needs |
|                          | Each   |      | 4                                   |                                    |  |                                 |              |
| <b>Comments:</b>         | Heavily vegetated embankments appear stable. |      |                                     |                                    |  |                                 |              |
| <b>Recommended Work:</b> | <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**

|                          |   |      |                                     |                                    |  |                                 |              |
|--------------------------|---|------|-------------------------------------|------------------------------------|--|---------------------------------|--------------|
| <b>Element Group:</b>    | Approaches  |      | Length:                             |                                    |  |                                 |              |
| <b>Element Name:</b>     | Wearing Surface   |      | Width:                              |                                    |  |                                 |              |
| Location:                |   |      | Height:                             |                                    |  |                                 |              |
| Material:                | Gravel  |      | Count:                              |                                    |  |                                 |              |
| Element Type:            |   |      | Total Quantity:                     |                                    |  |                                 |              |
| Environment:             | Severe  |      | Limited Insp'n:                     |                                    |  |                                 |              |
| Protection System:       | None  |      |                                     |                                    |  |                                 |              |
| <b>Condition Data:</b>   | Units   | Exc. | Good                                | Fair                               | Poor   | Perform. Deficiencies           | Maint. Needs |
|                          | %   |      |                                     | 80                                 | 20   | Yes                             | Yes          |
| <b>Comments:</b>         | Clear the debris and vegetation build along the edge of each shoulder to achieve drainage. The surface has minor potholes and wheel path rutting. |      |                                     |                                    |  |                                 |              |
| <b>Recommended Work:</b> | <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**

|                          |  |      |                                     |                                    |  |                                 |              |
|--------------------------|--|------|-------------------------------------|------------------------------------|--|---------------------------------|--------------|
| <b>Element Group:</b>    | Accessories  |      | Length:                             |                                    |  |                                 |              |
| <b>Element Name:</b>     | Signs  |      | Width:                              |                                    |  |                                 |              |
| Location:                |  |      | Height:                             |                                    |  |                                 |              |
| Material:                | Steel  |      | Count:                              | 4                                  |  |                                 |              |
| Element Type:            |  |      | Total Quantity:                     | 4                                  |  |                                 |              |
| Environment:             | Severe   |      | Limited Insp'n:                     |                                    |  |                                 |              |
| Protection System:       | None   |      |                                     |                                    |  |                                 |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good                                | Fair                               | Poor   | Perform. Deficiencies           | Maint. Needs |
|                          | Each   |      | 4                                   |                                    |  | Yes                             | Yes          |
| <b>Comments:</b>         | 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. |      |                                     |                                    |  |                                 |              |
| <b>Recommended Work:</b> | <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"/>                    | 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](http://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  | <b>Photos:</b><br>14-1 - Title Page - View of structure from the south approach<br>14-2 - View of structure wearing surface<br>14-3 - View of watercourse downstream<br>14-4 - View of watercourse upstream<br>14-5 - View of culvert barrel interior, obvert<br>14-6 - View of culvert barrel interior<br>14-7 - View of slope protection<br>14-8 - View of barrier (typical)<br>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

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

|                          |   |      |                                     |                                    |  |                                 |              |
|--------------------------|---|------|-------------------------------------|------------------------------------|--|---------------------------------|--------------|
| <b>Element Group:</b>    | Barriers  |      | Length:                             | 230                                |  |                                 |              |
| <b>Element Name:</b>     | 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  |      |                                     |                                    |  |                                 |              |
| <b>Condition Data:</b>   | Units   | Exc. | Good                                | Fair                               | Poor   | Perform. Deficiencies           | Maint. Needs |
|                          | %   |      |                                     | 95                                 | 5  | Yes                             | Yes          |
| <b>Comments:</b>         | The east cables are loose and detached at two posts. Some wooden posts are beginning to show signs of rot at bases. |      |                                     |                                    |  |                                 |              |
| <b>Recommended Work:</b> | <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**

|                          |   |      |                                     |                                    |  |                                 |              |
|--------------------------|---|------|-------------------------------------|------------------------------------|--|---------------------------------|--------------|
| <b>Element Group:</b>    | Culverts  |      | Length:                             |                                    |  |                                 |              |
| <b>Element Name:</b>     | Inlet Component   |      | Width:                              |                                    |  |                                 |              |
| Location:                | East End  |      | Height:                             |                                    |  |                                 |              |
| Material:                | Stone   |      | Count:                              |                                    |  |                                 |              |
| Element Type:            |   |      | Total Quantity:                     |                                    |  |                                 |              |
| Environment:             | Moderate  |      | Limited Insp'n:                     |                                    |  |                                 |              |
| Protection System:       | None  |      |                                     |                                    |  |                                 |              |
| <b>Condition Data:</b>   | Units   | Exc. | Good                                | Fair                               | Poor   | Perform. Deficiencies           | Maint. Needs |
|                          | %   |      | 100                                 |                                    |  |                                 |              |
| <b>Comments:</b>         | The embankments and haunches are stable and rock protected. |      |                                     |                                    |  |                                 |              |
| <b>Recommended Work:</b> | <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****Structure: 14**

|                          |   |                                     |                                    |                                   |                                 |                       |              |
|--------------------------|---|-------------------------------------|------------------------------------|-----------------------------------|---------------------------------|-----------------------|--------------|
| <b>Element Group:</b>    | Culverts  |                                     | Length:                            |                                   |                                 |                       |              |
| <b>Element Name:</b>     | Outlet Components   |                                     | Width:                             |                                   |                                 |                       |              |
| Location:                | West End  |                                     | Height:                            |                                   |                                 |                       |              |
| Material:                |   |                                     | Count:                             |                                   |                                 |                       |              |
| Element Type:            |   |                                     | Total Quantity:                    |                                   |                                 |                       |              |
| Environment:             | Moderate  |                                     | Limited Insp'n:                    |                                   |                                 |                       |              |
| Protection System:       | None  |                                     |                                    |                                   |                                 |                       |              |
| <b>Condition Data:</b>   | Units   | Exc.                                | Good                               | Fair                              | Poor                            | Perform. Deficiencies | Maint. Needs |
|                          | %   |                                     | 100                                |                                   |                                 |                       |              |
| <b>Comments:</b>         | The embankments and haunches are stable and rock protected. |                                     |                                    |                                   |                                 |                       |              |
| <b>Recommended Work:</b> | <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**

|                          |   |                                     |                                    |                                   |                                 |                       |              |
|--------------------------|---|-------------------------------------|------------------------------------|-----------------------------------|---------------------------------|-----------------------|--------------|
| <b>Element Group:</b>    | Culvert   |                                     | Length:                            |                                   |                                 |                       |              |
| <b>Element Name:</b>     | Barrel  |                                     | Width:                             |                                   |                                 |                       |              |
| Location:                |   |                                     | Height:                            |                                   |                                 |                       |              |
| Material:                | Steel   |                                     | Count:                             |                                   |                                 |                       |              |
| Element Type:            | Multiple Plate  |                                     | Total Quantity:                    |                                   |                                 |                       |              |
| Environment:             | Moderate  |                                     | Limited Insp'n:                    |                                   |                                 |                       |              |
| Protection System:       | Galvanized  |                                     |                                    |                                   |                                 |                       |              |
| <b>Condition Data:</b>   | Units   | Exc.                                | Good                               | Fair                              | Poor                            | Perform. Deficiencies | Maint. Needs |
|                          | %   |                                     | 50                                 | 50                                |                                 |                       |              |
| <b>Comments:</b>         | 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. |                                     |                                    |                                   |                                 |                       |              |
| <b>Recommended Work:</b> | <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**

|                          |  |                                     |                                    |  |                                 |                       |              |
|--------------------------|--|-------------------------------------|------------------------------------|--|---------------------------------|-----------------------|--------------|
| <b>Element Group:</b>    | Streams/Embankments                              |                                     | Length:                            |  |                                 |                       |              |
| <b>Element Name:</b>     | Streams and Waterways                            |                                     | Width:                             |  |                                 |                       |              |
| Location:                |  |                                     | Height:                            |  |                                 |                       |              |
| Material:                | Earth / Rock                                     |                                     | Count:                             |  |                                 |                       |              |
| Element Type:            |  |                                     | Total Quantity:                    |  |                                 |                       |              |
| Environment:             | Moderate   |                                     | Limited Insp'n:                    |  |                                 |                       |              |
| Protection System:       | None   |                                     |                                    |  |                                 |                       |              |
| <b>Condition Data:</b>   | Units  | Exc.                                | Good                               | Fair   | Poor                            | Perform. Deficiencies | Maint. Needs |
|                          | %  |                                     |                                    | 100  |                                 |                       |              |
| <b>Comments:</b>         | Debris buildup at upstream end obstructing flow. |                                     |                                    |  |                                 |                       |              |
| <b>Recommended Work:</b> | <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

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

|                          |  |                                     |                                    |  |                                 |  |              |
|--------------------------|--|-------------------------------------|------------------------------------|--|---------------------------------|--|--------------|
| <b>Element Group:</b>    | Signs  |                                     | Length:                            |  |                                 |  |              |
| <b>Element Name:</b>     | Signs  |                                     | Width:                             |  |                                 |  |              |
| Location:                | Corner   |                                     | Height:                            |  |                                 |  |              |
| Material:                | Steel  |                                     | Count:                             | 4  |                                 |  |              |
| Element Type:            |  |                                     | Total Quantity:                    |  |                                 |  |              |
| Environment:             | Severe   |                                     | Limited Insp'n:                    |  |                                 |  |              |
| Protection System:       | None   |                                     |                                    |  |                                 |  |              |
| <b>Condition Data:</b>   | Units  | Exc.                                | Good                               | Fair   | Poor                            | Perform. Deficiencies                        | Maint. Needs |
|                          | Each   |                                     | 4                                  |  |                                 | Yes  | Yes          |
| <b>Comments:</b>         | End of guiderail post marker signs are not plum or aligned with traffic. |                                     |                                    |  |                                 |  |              |
| <b>Recommended Work:</b> | <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**

|                          |  |                                     |                                    |                                   |                                 |                       |              |
|--------------------------|--|-------------------------------------|------------------------------------|-----------------------------------|---------------------------------|-----------------------|--------------|
| <b>Element Group:</b>    | Approaches   |                                     | Length:                            |                                   |                                 |                       |              |
| <b>Element Name:</b>     | Wearing Surface  |                                     | Width:                             |                                   |                                 |                       |              |
| Location:                | Each End   |                                     | Height:                            |                                   |                                 |                       |              |
| Material:                | Surface Treatment  |                                     | Count:                             |                                   |                                 |                       |              |
| Element Type:            |  |                                     | Total Quantity:                    |                                   |                                 |                       |              |
| Environment:             | Severe   |                                     | Limited Insp'n:                    |                                   |                                 |                       |              |
| Protection System:       | None   |                                     |                                    |                                   |                                 |                       |              |
| <b>Condition Data:</b>   | Units  | Exc.                                | Good                               | Fair                              | Poor                            | Perform. Deficiencies | Maint. Needs |
|                          | %  |                                     | 100                                |                                   |                                 |                       |              |
| <b>Comments:</b>         | The surface treatment is in good condition with minor wheel path rutting observed. |                                     |                                    |                                   |                                 |                       |              |
| <b>Recommended Work:</b> | <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](http://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  | <b>Photos:</b><br>15-1 - Title Page<br>15-2 - View of approach and structure wearing surface<br>15-3 - Rock protection at inlet end<br>15-4 - View of west culvert end<br>15-5 - View of east culvert end<br>15-6 - View of watercourse downstream<br>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

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

**Element Data**

|                           |  |      |                        |           |          |  |              |
|---------------------------|--|------|------------------------|-----------|----------|--|--------------|
| <b>Element Group:</b>     | Barrier  |      | <b>Length:</b>         |           |          |  |              |
| <b>Element Name:</b>      | Railing System   |      | <b>Width:</b>          |           |          |  |              |
| <b>Location:</b>          | Each Side  |      | <b>Height:</b>         |           |          |  |              |
| <b>Material:</b>          | Concrete   |      | <b>Count:</b>          |           |          |  |              |
| <b>Element Type:</b>      |  |      | <b>Total Quantity:</b> |           |          |  |              |
| <b>Environment:</b>       | Severe   |      | <b>Limited Insp'n:</b> |           |          |  |              |
| <b>Protection System:</b> | None   |      |                        |           |          |  |              |
| <b>Condition Data:</b>    | Units  | Exc. | Good                   | Fair      | Poor     | Perform. Deficiencies                      | Maint. Needs |
|                           | %  |      |                        |           |          | Yes  |              |
| <b>Comments:</b>          |  |      |                        |           |          |  |              |
| <b>Recommended Work:</b>  | 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**

|                           |   |      |                        |           |  |                       |              |
|---------------------------|---|------|------------------------|-----------|--|-----------------------|--------------|
| <b>Element Group:</b>     | Culverts  |      | <b>Length:</b>         |           |  |                       |              |
| <b>Element Name:</b>      | Inlet Component   |      | <b>Width:</b>          |           |  |                       |              |
| <b>Location:</b>          | East End  |      | <b>Height:</b>         |           |  |                       |              |
| <b>Material:</b>          | Stone and Earth   |      | <b>Count:</b>          |           |  |                       |              |
| <b>Element Type:</b>      |   |      | <b>Total Quantity:</b> |           |  |                       |              |
| <b>Environment:</b>       | Moderate  |      | <b>Limited Insp'n:</b> |           |  |                       |              |
| <b>Protection System:</b> | None  |      |                        |           |  |                       |              |
| <b>Condition Data:</b>    | Units   | Exc. | Good                   | Fair      | Poor   | Perform. Deficiencies | Maint. Needs |
|                           | %   |      | 100                    |           |  |                       |              |
| <b>Comments:</b>          | The low level CSP pipe culvert is partially submerged underwater. There is some observed erosion of the embankments at the culvert inlet. |      |                        |           |  |                       |              |
| <b>Recommended Work:</b>  | 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

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

|                          |   |                                     |                                    |                                   |                                 |                       |              |
|--------------------------|---|-------------------------------------|------------------------------------|-----------------------------------|---------------------------------|-----------------------|--------------|
| <b>Element Group:</b>    | Signs   |                                     | Length:                            |                                   |                                 |                       |              |
| <b>Element Name:</b>     | Signs   |                                     | Width:                             |                                   |                                 |                       |              |
| Location:                |   |                                     | Height:                            |                                   |                                 |                       |              |
| Material:                | Steel   |                                     | Count:                             |                                   |                                 |                       |              |
| Element Type:            |   |                                     | Total Quantity:                    |                                   |                                 |                       |              |
| Environment:             | Severe  |                                     | Limited Insp'n:                    |                                   |                                 |                       |              |
| Protection System:       | Paint   |                                     |                                    |                                   |                                 |                       |              |
| <b>Condition Data:</b>   | Units   | Exc.                                | Good                               | Fair                              | Poor                            | Perform. Deficiencies | Maint. Needs |
|                          | Each  |                                     |                                    |                                   |                                 | Yes                   | Yes          |
| <b>Comments:</b>         | There are no End Hazard signs currently in place. |                                     |                                    |                                   |                                 |                       |              |
| <b>Recommended Work:</b> | <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 |                       |              |
|                          | Install end hazard signs.                         |                                     |                                    |                                   |                                 |                       |              |

**Element Data**

|                          |  |                                     |                                    |                                   |                                 |                       |              |
|--------------------------|--|-------------------------------------|------------------------------------|-----------------------------------|---------------------------------|-----------------------|--------------|
| <b>Element Group:</b>    | Approaches   |                                     | Length:                            |                                   |                                 |                       |              |
| <b>Element Name:</b>     | Wearing Surface  |                                     | Width:                             |                                   |                                 |                       |              |
| Location:                | Each End   |                                     | Height:                            |                                   |                                 |                       |              |
| Material:                | Gravel   |                                     | Count:                             |                                   |                                 |                       |              |
| Element Type:            |  |                                     | Total Quantity:                    |                                   |                                 |                       |              |
| Environment:             | Severe   |                                     | Limited Insp'n:                    |                                   |                                 |                       |              |
| Protection System:       | None   |                                     |                                    |                                   |                                 |                       |              |
| <b>Condition Data:</b>   | Units  | Exc.                                | Good                               | Fair                              | Poor                            | Perform. Deficiencies | Maint. Needs |
|                          | %  |                                     | 100                                |                                   |                                 | Yes                   | Yes          |
| <b>Comments:</b>         | The granular wearing surface is uneven and requires grading to achieve drainage. |                                     |                                    |                                   |                                 |                       |              |
| <b>Recommended Work:</b> | <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 |                       |              |
|                          | 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

---

|                          |  |                            |   |   |
|--------------------------|--|----------------------------|---|---|
| <b>Site Number</b>       | <input type="text" value="16"/>                      | <b>Project Number</b>      | <input type="text" value="221-12948-00"/>             |   |
| <b>Structure Name</b>    | <input type="text" value="Barrow Bay Road Culvert"/> | <b>Municipality</b>        | <input type="text" value="Northern Bruce Peninsula"/> |   |
| <b>MTO Region Code</b>   | <input type="text" value="30"/>                      | <b>County</b>              | <input type="text" value="Bruce"/>                    | <b>Code</b> <input type="text" value="02"/> |
| <b>MTO District Code</b> | <input type="text" value="33"/>                      | <b>Geographic Twp Code</b> | <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](http://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   | <b>Photos:</b><br>16-1 - Title Page - Upstream elevation<br>16-2 - View of culvert barrel in elevation (outlet end)<br>16-3 - View of culvert barrel in elevation (inlet end)<br>16-4 - View of watercourse upstream<br>16-5 - View of watercourse downstream<br>16-6 - Culvert barrel interior<br>16-7 - View of structure from approach<br>16-8 - Loose cable on barrier protection<br>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

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

|                           |   |      |                        |                    |      |                       |              |
|---------------------------|---|------|------------------------|--------------------|------|-----------------------|--------------|
| <b>Element Group:</b>     | Barriers  |      | <b>Length:</b>         |                    |      |                       |              |
| <b>Element Name:</b>      | Barrier   |      | <b>Width:</b>          |                    |      |                       |              |
| <b>Location:</b>          | Each Side   |      | <b>Height:</b>         |                    |      |                       |              |
| <b>Material:</b>          | Steel/Wood  |      | <b>Count:</b>          | 20 posts - 3 cable |      |                       |              |
| <b>Element Type:</b>      | 3-Cable Guiderail   |      | <b>Total Quantity:</b> |                    |      |                       |              |
| <b>Environment:</b>       | Severe  |      | <b>Limited Insp'n:</b> |                    |      |                       |              |
| <b>Protection System:</b> | None  |      |                        |                    |      |                       |              |
| <b>Condition Data:</b>    | Units   | Exc. | Good                   | Fair               | Poor | Perform. Deficiencies | Maint. Needs |
|                           | Ea.   |      | 20                     |                    |      | Yes                   | Yes          |
| <b>Comments:</b>          | 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.  |      |                        |                    |      |                       |              |
| <b>Recommended Work:</b>  | None <input type="checkbox"/> 6-10 Years <input type="checkbox"/> 1-5 Years <input checked="" type="checkbox"/> < 1 Year <input type="checkbox"/> Urgent<br>Replace the rotten barrier posts. Re-attach and tighten loose cables. |      |                        |                    |      |                       |              |

**Element Data**

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



**Element Data****Structure:** 16

|                          |  |                                     |                                    |                                   |                                 |                       |              |
|--------------------------|--|-------------------------------------|------------------------------------|-----------------------------------|---------------------------------|-----------------------|--------------|
| <b>Element Group:</b>    | Culverts   |                                     | Length:                            |                                   |                                 |                       |              |
| <b>Element Name:</b>     | 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   |                                     |                                    |                                   |                                 |                       |              |
| <b>Condition Data:</b>   | Units  | Exc.                                | Good                               | Fair                              | Poor                            | Perform. Deficiencies | Maint. Needs |
|                          | %  |                                     |                                    | 100                               |                                 |                       |              |
| <b>Comments:</b>         | The outlet slopes are very steep, but appear stable. |                                     |                                    |                                   |                                 |                       |              |
| <b>Recommended Work:</b> | <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**

|                          |  |                                     |                                    |                                   |                                 |                       |              |
|--------------------------|--|-------------------------------------|------------------------------------|-----------------------------------|---------------------------------|-----------------------|--------------|
| <b>Element Group:</b>    | Culvert  |                                     | Length:                            |                                   |                                 |                       |              |
| <b>Element Name:</b>     | Barrel   |                                     | Width:                             |                                   |                                 |                       |              |
| Location:                |  |                                     | Height:                            |                                   |                                 |                       |              |
| Material:                | Steel  |                                     | Count:                             |                                   |                                 |                       |              |
| Element Type:            | Pipe Arch  |                                     | Total Quantity:                    |                                   |                                 |                       |              |
| Environment:             | Moderate   |                                     | Limited Insp'n:                    |                                   |                                 |                       |              |
| Protection System:       | Galvanized   |                                     |                                    |                                   |                                 |                       |              |
| <b>Condition Data:</b>   | Units  | Exc.                                | Good                               | Fair                              | Poor                            | Perform. Deficiencies | Maint. Needs |
|                          | %  |                                     |                                    | 100                               |                                 |                       |              |
| <b>Comments:</b>         | Corrosion and swelling were observed at water level. No section loss. Monitor the corrosion. |                                     |                                    |                                   |                                 |                       |              |
| <b>Recommended Work:</b> | <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**

|                          |   |                                     |                                    |                                   |                                 |                       |              |
|--------------------------|---|-------------------------------------|------------------------------------|-----------------------------------|---------------------------------|-----------------------|--------------|
| <b>Element Group:</b>    | Foundation  |                                     | Length:                            |                                   |                                 |                       |              |
| <b>Element Name:</b>     | Foundation (below grade)  |                                     | Width:                             |                                   |                                 |                       |              |
| Location:                |   |                                     | Height:                            |                                   |                                 |                       |              |
| Material:                | Stone/Gravel  |                                     | Count:                             |                                   |                                 |                       |              |
| Element Type:            |   |                                     | Total Quantity:                    |                                   |                                 |                       |              |
| Environment:             | Moderate  |                                     | Limited Insp'n:                    | Yes                               |                                 |                       |              |
| Protection System:       | None  |                                     |                                    |                                   |                                 |                       |              |
| <b>Condition Data:</b>   | Units   | Exc.                                | Good                               | Fair                              | Poor                            | Perform. Deficiencies | Maint. Needs |
|                          |   |                                     |                                    |                                   |                                 |                       |              |
| <b>Comments:</b>         | The foundation is not visible for inspection due to high water level, however the structure appears stable. |                                     |                                    |                                   |                                 |                       |              |
| <b>Recommended Work:</b> | <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  |      |                       |              |
| <b>Comments:</b>  |                       |      |                 |      |      |                       |              |
| <b>Recommended Work:</b> <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          |
| <b>Comments:</b> The embankments are heavily vegetated with minor signs of erosion.  |                     |      |                 |      |      |                       |              |
| <b>Recommended Work:</b> None      6-10 Years <input checked="" type="checkbox"/> 1-5 Years      < 1 Year      Urgent<br>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  |      |                       |              |
| <b>Comments:</b> Some minor to moderate cracking observed along shoulders and transverse cracks observed near each barrier end. |                   |      |                 |      |      |                       |              |
| <b>Recommended Work:</b> <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

---

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



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

Tel: 519-376-7612  
Fax: 519-376-8008  
Website: [www.wspgroup.com](http://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   | <b>Photos:</b><br>17-1 - Title Page<br>17-2 - View of structure and approach wearing surface<br>17-3 - View of watercourse upstream<br>17-4 - View of watercourse downstream and outlet culvert end<br>17-5 - View of culvert in elevation and inlet components<br>17-6 - View of embankment<br>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

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

**Element Data**

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

**Element Data**

|                          |                                   |      |                 |  |        |                       |              |
|--------------------------|-----------------------------------|------|-----------------|--|--------|-----------------------|--------------|
| <b>Element Group:</b>    | Culverts                          |      | Length:         |  |        |                       |              |
| <b>Element Name:</b>     | 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                              |      |                 |  |        |                       |              |
| <b>Condition Data:</b>   | Units                             | Exc. | Good            | Fair   | Poor   | Perform. Deficiencies | Maint. Needs |
|                          | %                                 |      |                 | 100  |        |                       | Yes          |
| <b>Comments:</b>         | Minor erosion at corners.         |      |                 |  |        |                       |              |
| <b>Recommended Work:</b> | 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                            |      |                 |   |          |                       |              |
| <b>Condition Data:</b>   | Units                           | Exc. | Good            | Fair  | Poor     | Perform. Deficiencies | Maint. Needs |
|                          | %                               |      |                 | 100   |          |                       | Yes          |
| <b>Comments:</b>         | Minor erosion at corners.       |      |                 |   |          |                       |              |
| <b>Recommended Work:</b> | 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                               |      |                 |           |          |                       |              |
| <b>Condition Data:</b>   | Units                                    | Exc. | Good            | Fair      | Poor     | Perform. Deficiencies | Maint. Needs |
|                          | %  |      | 50              | 50        |          |                       |              |
| <b>Comments:</b>         | The west side has a slight deformation.  |      |                 |           |          |                       |              |
| <b>Recommended Work:</b> | <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  |      |                 |           |          |                       |              |
| <b>Condition Data:</b>   | Units   | Exc. | Good            | Fair      | Poor     | Perform. Deficiencies | Maint. Needs |
|                          |   |      |                 |           |          |                       |              |
| <b>Comments:</b>         | The foundation is not visible for inspection, however the culvert appears stable. |      |                 |           |          |                       |              |
| <b>Recommended Work:</b> | <input checked="" type="checkbox"/> None  |      | 6-10 Years      | 1-5 Years | < 1 Year | Urgent                |              |

**Element Data****Structure:** 17

|                          |                               |                                     |                                    |                                   |                                 |                       |              |
|--------------------------|-------------------------------|-------------------------------------|------------------------------------|-----------------------------------|---------------------------------|-----------------------|--------------|
| <b>Element Group:</b>    | Streams/Embankments           |                                     | Length:                            |                                   |                                 |                       |              |
| <b>Element Name:</b>     | Streams and Waterways         |                                     | Width:                             |                                   |                                 |                       |              |
| Location:                |                               |                                     | Height:                            |                                   |                                 |                       |              |
| Material:                |                               |                                     | Count:                             |                                   |                                 |                       |              |
| Element Type:            |                               |                                     | Total Quantity:                    |                                   |                                 |                       |              |
| Environment:             | Moderate                      |                                     | Limited Insp'n:                    |                                   |                                 |                       |              |
| Protection System:       | None                          |                                     |                                    |                                   |                                 |                       |              |
| <b>Condition Data:</b>   | Units                         | Exc.                                | Good                               | Fair                              | Poor                            | Perform. Deficiencies | Maint. Needs |
|                          | %                             |                                     | 50                                 | 50                                |                                 |                       |              |
| <b>Comments:</b>         | Some silt deposits (outlet).  |                                     |                                    |                                   |                                 |                       |              |
| <b>Recommended Work:</b> | <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**

|                          |  |                                     |                                    |                                   |                                 |                       |              |
|--------------------------|--|-------------------------------------|------------------------------------|-----------------------------------|---------------------------------|-----------------------|--------------|
| <b>Element Group:</b>    | Streams/Embankments                            |                                     | Length:                            |                                   |                                 |                       |              |
| <b>Element Name:</b>     | Embankment                                     |                                     | Width:                             |                                   |                                 |                       |              |
| Location:                | Each Corner                                    |                                     | Height:                            |                                   |                                 |                       |              |
| Material:                |  |                                     | Count:                             |                                   |                                 |                       |              |
| Element Type:            |  |                                     | Total Quantity:                    |                                   |                                 |                       |              |
| Environment:             |  |                                     | Limited Insp'n:                    |                                   |                                 |                       |              |
| Protection System:       | None   |                                     |                                    |                                   |                                 |                       |              |
| <b>Condition Data:</b>   | Units  | Exc.                                | Good                               | Fair                              | Poor                            | Perform. Deficiencies | Maint. Needs |
|                          | %  |                                     | 50                                 | 50                                |                                 |                       |              |
| <b>Comments:</b>         | Heavily vegetated with minor signs of erosion. |                                     |                                    |                                   |                                 |                       |              |
| <b>Recommended Work:</b> | <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**

|                          |   |                                     |   |                                   |                                 |   |              |
|--------------------------|---|-------------------------------------|---|-----------------------------------|---------------------------------|---|--------------|
| <b>Element Group:</b>    | Signs   |                                     | Length:                                       |                                   |                                 |   |              |
| <b>Element Name:</b>     | Signs   |                                     | Width:  |                                   |                                 |   |              |
| Location:                | Each Corner                                     |                                     | Height:                                       |                                   |                                 |   |              |
| Material:                |   |                                     | Count:  |                                   |                                 |   |              |
| Element Type:            |   |                                     | Total Quantity:                               |                                   |                                 |   |              |
| Environment:             | Severe  |                                     | Limited Insp'n:                               |                                   |                                 |   |              |
| Protection System:       | None  |                                     |   |                                   |                                 |   |              |
| <b>Condition Data:</b>   | Units   | Exc.                                | Good  | Fair                              | Poor                            | Perform. Deficiencies   | Maint. Needs |
|                          | Each  |                                     |   |                                   |                                 | Yes   |              |
| <b>Comments:</b>         | No signs present at the time of the inspection. |                                     |   |                                   |                                 |   |              |
| <b>Recommended Work:</b> | <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

|                           |  |            |                 |  |        |                       |              |
|---------------------------|--|------------|-----------------|--|--------|-----------------------|--------------|
| <b>Element Group:</b>     | Approaches   |            | Length:         |  |        |                       |              |
| <b>Element Name:</b>      | Wearing Surface  |            | Width:          |  |        |                       |              |
| <b>Location:</b>          | Each End   |            | Height:         |  |        |                       |              |
| <b>Material:</b>          | Gravel   |            | Count:          |  |        |                       |              |
| <b>Element Type:</b>      |  |            | Total Quantity: |  |        |                       |              |
| <b>Environment:</b>       | Severe   |            | Limited Insp'n: |  |        |                       |              |
| <b>Protection System:</b> | None   |            |                 |  |        |                       |              |
| <b>Condition Data:</b>    | Units  | Exc.       | Good            | Fair   | Poor   | Perform. Deficiencies | Maint. Needs |
|                           | %  |            | 100             |  |        |                       | Yes          |
| <b>Comments:</b>          | At the time of inspection, the wearing surface was in overall good condition. Continue annual grading. |            |                 |  |        |                       |              |
| <b>Recommended Work:</b>  | 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](http://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   | <b>Photos:</b><br>18-1 - Title Page<br>18-2 - View of structure wearing surface<br>18-3 - View of culvert in elevation and outlet end components<br>18-4 - View of watercourse upstream and inlet ends<br>18-5 - View of watercourse downstream and outlet culvert ends<br>18-6 - View of erosion of embankment and between pipes<br>18-7 - Erosion at the haunch of the outlet pipe<br>18-8 - View of east culvert barrel interior<br>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 | December 2024 |
| 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

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

**Element Data**

|                          |  |      |                 |  |        |                       |              |
|--------------------------|--|------|-----------------|--|--------|-----------------------|--------------|
| <b>Element Group:</b>    | Culverts   |      | Length:         |  |        |                       |              |
| <b>Element Name:</b>     | 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   |      |                 |  |        |                       |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good            | Fair   | Poor   | Perform. Deficiencies | Maint. Needs |
|                          | %  |      |                 | 80   | 20     | Yes                   | Yes          |
| <b>Comments:</b>         | 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. |      |                 |  |        |                       |              |
| <b>Recommended Work:</b> | None 6-10 Years  |      | 1-5 Years       | <input checked="" type="checkbox"/> < 1 Year | Urgent |                       |              |
|                          | Repair erosion and place rip rap slope protection.   |      |                 |  |        |                       |              |

**Element Data**

|                          |  |      |                 |  |        |                       |              |
|--------------------------|--|------|-----------------|--|--------|-----------------------|--------------|
| <b>Element Group:</b>    | Culverts   |      | Length:         |  |        |                       |              |
| <b>Element Name:</b>     | 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   |      |                 |  |        |                       |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good            | Fair   | Poor   | Perform. Deficiencies | Maint. Needs |
|                          | %  |      |                 | 80   | 20     | Yes                   |              |
| <b>Comments:</b>         | 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. |      |                 |  |        |                       |              |
| <b>Recommended Work:</b> | 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                                     |      |                                     |                                    |                                   |                                 |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good                                | Fair                               | Poor                              | Perform. Deficiencies           | Maint. Needs |
|                          | %  |      |                                     | 100                                |                                   |                                 |              |
| <b>Comments:</b>         | Minor corrosion was observed near water level. |      |                                     |                                    |                                   |                                 |              |
| <b>Recommended Work:</b> | <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  |      |                                     |   |                                   |                                 |              |
| <b>Condition Data:</b>   | Units   | Exc. | Good                                | Fair  | Poor                              | Perform. Deficiencies           | Maint. Needs |
|                          |   |      |                                     |   |                                   | Yes                             | Yes          |
| <b>Comments:</b>         | The culvert appears stable however the outlet end pipes are undermined with a void. |      |                                     |   |                                   |                                 |              |
| <b>Recommended Work:</b> | <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                                |      |                                     |   |                                   |                                 |              |
| <b>Condition Data:</b>   | Units                               | Exc. | Good                                | Fair  | Poor                              | Perform. Deficiencies           | Maint. Needs |
|                          | %                                   |      | 30                                  | 40  | 30                                |                                 |              |
| <b>Comments:</b>         | Waterway bank erosion was observed. |      |                                     |   |                                   |                                 |              |
| <b>Recommended Work:</b> | <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**

|                           |  |      |                 |           |          |  |              |
|---------------------------|--|------|-----------------|-----------|----------|--|--------------|
| <b>Element Group:</b>     | Streams/Embankments  |      | Length:         |           |          |  |              |
| <b>Element Name:</b>      | Embankment   |      | Width:          |           |          |  |              |
| <b>Location:</b>          | Each Corner  |      | Height:         |           |          |  |              |
| <b>Material:</b>          | Earth / Rip-Rap  |      | Count:          | 6         |          |  |              |
| <b>Element Type:</b>      |  |      | Total Quantity: | 6         |          |  |              |
| <b>Environment:</b>       |  |      | Limited Insp'n: |           |          |  |              |
| <b>Protection System:</b> | None   |      |                 |           |          |  |              |
| <b>Condition Data:</b>    | Units  | Exc. | Good            | Fair      | Poor     | Perform. Deficiencies                      | Maint. Needs |
|                           | Each   |      |                 | 4         | 2        | Yes  |              |
| <b>Comments:</b>          | 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. |      |                 |           |          |  |              |
| <b>Recommended Work:</b>  | 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**

|                           |   |      |                 |           |  |                       |              |
|---------------------------|---|------|-----------------|-----------|--|-----------------------|--------------|
| <b>Element Group:</b>     | Approaches  |      | Length:         |           |  |                       |              |
| <b>Element Name:</b>      | Wearing Surface   |      | Width:          |           |  |                       |              |
| <b>Location:</b>          | Each End  |      | Height:         |           |  |                       |              |
| <b>Material:</b>          | Gravel  |      | Count:          |           |  |                       |              |
| <b>Element Type:</b>      |   |      | Total Quantity: |           |  |                       |              |
| <b>Environment:</b>       | Severe  |      | Limited Insp'n: |           |  |                       |              |
| <b>Protection System:</b> | None  |      |                 |           |  |                       |              |
| <b>Condition Data:</b>    | Units   | Exc. | Good            | Fair      | Poor   | Perform. Deficiencies | Maint. Needs |
|                           | %   |      |                 | 100       |  |                       | Yes          |
| <b>Comments:</b>          | Minor wheel path rutting and pot holes starting to develop at the time of inspection. |      |                 |           |  |                       |              |
| <b>Recommended Work:</b>  | 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

---

|                          |  |                            |  |
|--------------------------|--|----------------------------|--|
| <b>Site Number</b>       | <input type="text" value="19"/>                    | <b>Project Number</b>      | <input type="text" value="221-12948-00"/>                                      |
| <b>Structure Name</b>    | <input type="text" value="Pike Bay Road Culvert"/> | <b>Municipality</b>        | <input type="text" value="Northern Bruce Peninsula"/>                          |
| <b>MTO Region Code</b>   | <input type="text" value="30"/>                    | <b>County</b>              | <input type="text" value="Bruce"/> <b>Code</b> <input type="text" value="02"/> |
| <b>MTO District Code</b> | <input type="text" value="33"/>                    | <b>Geographic Twp Code</b> | <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](http://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   | <b>Photos:</b><br>19-1 - Title Page<br>19-2 - View of culvert in elevation and inlet components<br>19-3 - View of culvert in elevation and outlet components<br>19-4 - View of culvert barrel interior<br>19-5 - Impact damage to the northeast barrier protection post<br>19-6 - Structure embankment<br>19-7 - View of structure barrier protection (typical)<br>19-8 - View of watercourse upstream<br>19-9 - View of watercourse downstream<br>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

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

**Element Data**

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

**Element Data**

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



**Element Data****Structure: 19**

|                          |  |      |   |          |        |                       |              |
|--------------------------|--|------|---|----------|--------|-----------------------|--------------|
| <b>Element Group:</b>    | Culverts   |      | Length:                                       |          |        |                       |              |
| <b>Element Name:</b>     | 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   |      |   |          |        |                       |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good  | Fair     | Poor   | Perform. Deficiencies | Maint. Needs |
|                          | %  |      | 50  | 50       |        |                       |              |
| <b>Comments:</b>         | Minor erosion was observed around the bevelled end, as well as minor corrosion of the barrel at the waterline. |      |   |          |        |                       |              |
| <b>Recommended Work:</b> | None 6-10 Years  |      | <input checked="" type="checkbox"/> 1-5 Years | < 1 Year | Urgent |                       |              |
|                          | Place rip-rap slope protection.  |      |   |          |        |                       |              |

**Element Data**

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

**Element Data**

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

**Element Data****Structure:** 19

|                          |   |      |                                     |                                    |                                   |                                 |              |
|--------------------------|---|------|-------------------------------------|------------------------------------|-----------------------------------|---------------------------------|--------------|
| <b>Element Group:</b>    | Streams/Embankments                         |      | Length:                             |                                    |                                   |                                 |              |
| <b>Element Name:</b>     | Streams and Waterways                       |      | Width:                              |                                    |                                   |                                 |              |
| Location:                |   |      | Height:                             |                                    |                                   |                                 |              |
| Material:                |   |      | Count:                              |                                    |                                   |                                 |              |
| Element Type:            |   |      | Total Quantity:                     |                                    |                                   |                                 |              |
| Environment:             | Moderate                                    |      | Limited Insp'n:                     |                                    |                                   |                                 |              |
| Protection System:       | None  |      |                                     |                                    |                                   |                                 |              |
| <b>Condition Data:</b>   | Units                                       | Exc. | Good                                | Fair                               | Poor                              | Perform. Deficiencies           | Maint. Needs |
|                          | %   |      | 50                                  | 50                                 |                                   |                                 |              |
| <b>Comments:</b>         | Heavy vegetation of the stream embankments. |      |                                     |                                    |                                   |                                 |              |
| <b>Recommended Work:</b> | <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**

|                          |   |      |                                     |   |                                   |                                 |              |
|--------------------------|---|------|-------------------------------------|---|-----------------------------------|---------------------------------|--------------|
| <b>Element Group:</b>    | Streams/Embankments                                     |      | Length:                             |   |                                   |                                 |              |
| <b>Element Name:</b>     | Embankment  |      | Width:                              |   |                                   |                                 |              |
| Location:                | Each Corner   |      | Height:                             |   |                                   |                                 |              |
| Material:                |   |      | Count:                              | 6   |                                   |                                 |              |
| Element Type:            |   |      | Total Quantity:                     | 6   |                                   |                                 |              |
| Environment:             |   |      | Limited Insp'n:                     |   |                                   |                                 |              |
| Protection System:       | None  |      |                                     |   |                                   |                                 |              |
| <b>Condition Data:</b>   | Units   | Exc. | Good                                | Fair  | Poor                              | Perform. Deficiencies           | Maint. Needs |
|                          | Each  |      | 6                                   |   |                                   |                                 | Yes          |
| <b>Comments:</b>         | Heavily vegetated with minor signs of erosion observed. |      |                                     |   |                                   |                                 |              |
| <b>Recommended Work:</b> | <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**

|                          |  |      |                                     |                                    |  |                                 |              |
|--------------------------|--|------|-------------------------------------|------------------------------------|--|---------------------------------|--------------|
| <b>Element Group:</b>    | Signs  |      | Length:                             |                                    |  |                                 |              |
| <b>Element Name:</b>     | Signs  |      | Width:                              |                                    |  |                                 |              |
| Location:                | Each Corner  |      | Height:                             |                                    |  |                                 |              |
| Material:                |  |      | Count:                              |                                    |  |                                 |              |
| Element Type:            |  |      | Total Quantity:                     | 3                                  |  |                                 |              |
| Environment:             | Severe   |      | Limited Insp'n:                     |                                    |  |                                 |              |
| Protection System:       | None   |      |                                     |                                    |  |                                 |              |
| <b>Condition Data:</b>   | Units  | Exc. | Good                                | Fair                               | Poor   | Perform. Deficiencies           | Maint. Needs |
|                          | Each   |      |                                     | 3                                  |  | Yes                             | Yes          |
| <b>Comments:</b>         | Guiderail markers : 3 sign posts are loose and require straightening vertically and alignment with traffic, 1 sign is missing. |      |                                     |                                    |  |                                 |              |
| <b>Recommended Work:</b> | <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  |                                     |                                    |                                   |                                 |                       |              |
| <b>Condition Data:</b>   | Units   | Exc.                                | Good                               | Fair                              | Poor                            | Perform. Deficiencies | Maint. Needs |
|                          | %   |                                     | 100                                |                                   |                                 |                       |              |
| <b>Comments:</b>         | Recently placed surface treatment is in good condition. |                                     |                                    |                                   |                                 |                       |              |
| <b>Recommended Work:</b> | <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