

| Inventory Data:              |  |
|------------------------------|--|
| Structure Name               | #30 East Red Bridge, Elzevir   |
| Main Hwy/Road#               | <input type="text"/> On <input checked="" type="checkbox"/> Under            |
| Hwy/Road Name                | Black River Road   |
| Structure Location           | 1.36 km N of North Hawkins Bay Road  |
| Latitude                     | 44.536558°N  |
| Longitude                    | 77.370116°W  |
| Owner(s)                     | Municipality of Tweed  |
| Heritage Designation:        | Not Cons. <input checked="" type="checkbox"/> Cons./not App. List/not Desig. |
| MTO Region                   | Eastern  |
| Road Class:                  | Freeway Arterial Collector Local <input checked="" type="checkbox"/>         |
| MTO District                 | Kingston   |
| Posted Speed                 | 80   |
| No. of Lanes                 | 1  |
| Old County                   | <input type="text"/>   |
| AADT                         | <input type="text"/>   |
| % Trucks                     | <input type="text"/>   |
| Geographic Twp.              | <input type="text"/>   |
| Inspection Route Sequence    | <input type="text"/>   |
| Structure Type               | T-Beam   |
| Interchange Number           | <input type="text"/>   |
| Total Deck Length            | 8.5 (m)  |
| Interchange Structure Number | <input type="text"/>   |
| Overall Str. Width           | 5.4 (m)  |
| Min. Vertical Clearance      | <input type="text"/> (m)   |
| Total Deck Area              | 39.1 (sq.m)  |
| Special Routes               | Transit Truck School Bicycle   |
| Roadway Width                | 4.2 (m)  |
| Detour Length Around Bridge  | 3 (km)   |
| Skew Angle                   | 0 (Deg.)   |
| Direction of Structure       | East-West  |
| No. of Spans                 | 1  |
| Fill on Structure            | 0 (m)  |
| Span Lengths                 | 7.6 (m)  |

| Historical Data:             |                      |
|------------------------------|----------------------|
| Year Built                   | 1930                 |
| Last Evaluation              | <input type="text"/> |
| Last Biennial Inspection     | 2020-09-10           |
| Current Load Limit           | 13 (tonnes)          |
| Last BridgeMaster Inspection | <input type="text"/> |
| Load Limit By-Law#           | 2020-67              |
| Last Condition Survey        | <input type="text"/> |
| By-Law Expiry Date           | <input type="text"/> |
| Last Underwater Inspection   | <input type="text"/> |

Rehab History: (Date/description)

**Scheduled Improvements:**

Regional Priority Number  Programmed Work Year

Nature of Program Work:

| Appraisal Indices: |  | Comments |
|--------------------|--|----------|
| Fatigue            |  |          |
| Seismic            |  |          |
| Scour              |  |          |
| Flood              |  |          |
| Geometrics         |  |          |
| Barrier            |  |          |
| Curb               |  |          |
| Load Capacity      |  |          |

| Field Inspection Information: |                       |
|-------------------------------|-----------------------|
| Date of Inspection:           | May 17, 2022          |
| Inspector:                    | Abdul Rahman Stott    |
| Others in Party:              | Cody Chambers         |
| Equipment Used:               | Camera and Hand Tools |
| Weather:                      | Sun and Cloud         |
| Temperature:                  | 13°C                  |

| Additional Investigations Required:                          | Priority |        |        |
|--|----------|--------|--------|
|  | None     | Normal | Urgent |
| Detailed Deck Condition Survey:                              | X        |        |        |
| Non-destructive Delamination Survey of Asphalt-Covered Deck: | X        |        |        |
| Substructure Condition Survey:                               | X        |        |        |
| Detailed Coating Condition Survey:                           | X        |        |        |
| Underwater Investigation:                                    | X        |        |        |
| Fatigue Investigation:                                       | X        |        |        |
| Seismic Investigation:                                       | X        |        |        |
| Structure Evaluation:  |          | X      |        |
| Monitoring of Deformations, Settlements and Movements:       | X        |        |        |

The structure is generally in poor condition on account of deterioration of major substructure and superstructure elements.

Recommended actions:

- Complete major rehabilitation (1-5 yrs.), consisting of:
  - Abutment refacing and patch repairs
  - Deck soffit patch repairs and deck top overlay or patch repairs
  - T-beam patch repairs
  - Barrier wall removal and replacement with guiderail system
  - Rehabilitation and re-stabilization of retaining walls
- Implement approach guiderail (NOW)

BCI (2020): 27.83

BCI (2022): 24.27

Justification for significant BCI change: Deterioration of various structural elements

|                                  |      |
|----------------------------------|------|
| Next Detailed Visual Inspection: | 2024 |
|----------------------------------|------|

Suspected Performance Deficiencies

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

Maintenance Needs

|                                      |                                 |                               |
|--------------------------------------|---------------------------------|-------------------------------|
| 01 Lift and Swing Bridge Maintenance | 07 Repair of Structural Steel   | 13 Erosion Control at Bridges |
| 02 Bridge Cleaning                   | 08 Repair of Bridge Concrete    | 14 Concrete Sealing           |
| 03 Bridge Handrail Maintenance       | 09 Repair of Bridge Timber      | 15 Rout and Seal              |
| 04 Painting Steel Bridge Structures  | 10 Bailey bridges – Maintenance | 16 Bridge Deck Drainage       |
| 05 Bridge Deck Joint Repair          | 11 Animal/Pest Control          | 17 Other                      |
| 06 Bridge Bearing Maintenance        | 12 Bridge Surface Repair        |                               |

Element Data

|  |                         |                    |                          |            |                          |                       |                                     |         |                          |        |                          |
|--|-------------------------|--------------------|--------------------------|------------|--------------------------|-----------------------|-------------------------------------|---------|--------------------------|--------|--------------------------|
| Element Group:   | Abutments               | Length             | N/A                      |            |                          |                       |                                     |         |                          |        |                          |
| Element Name:  | Abutment Walls          | Width              | 6.2m                     |            |                          |                       |                                     |         |                          |        |                          |
| Location:  | Either end of structure | Height             | 2.5m                     |            |                          |                       |                                     |         |                          |        |                          |
| Material:  | Cast-in-place Concrete  | Count              | 2                        |            |                          |                       |                                     |         |                          |        |                          |
| Element Type:  | Conventional Closed     | Total Quantity:    | 31m <sup>2</sup>         |            |                          |                       |                                     |         |                          |        |                          |
| Environment:   | Benign                  | Limited Inspection | <input type="checkbox"/> |            |                          |                       |                                     |         |                          |        |                          |
| Protection System:   | None                    |                    |                          |            |                          | Perform. Deficiencies | Maint. Needs                        |         |                          |        |                          |
| Condition  | Units                   | Exc.               | Good                     | Fair       | Poor*                    |                       |                                     |         |                          |        |                          |
| Data:  | m <sup>2</sup>          | 0                  | 0                        | 9          | 22                       | 00                    |                                     |         |                          |        |                          |
| Comments: Light to severe scaling and honeycombing. Severe undermining of both abutments. Wide horizontal cracks. Wide full-height crack in east abutment. |                         |                    |                          |            |                          |                       |                                     |         |                          |        |                          |
| Recommended Work: Complete abutment refacing as part of major rehabilitation   |                         |                    |                          |            |                          |                       |                                     |         |                          |        |                          |
|  |                         | None               | <input type="checkbox"/> | 6-10 years | <input type="checkbox"/> | 1-5 years             | <input checked="" type="checkbox"/> | <1 year | <input type="checkbox"/> | Urgent | <input type="checkbox"/> |

|  |                        |                    |                          |            |                          |                       |                                     |         |                          |        |                          |
|--|------------------------|--------------------|--------------------------|------------|--------------------------|-----------------------|-------------------------------------|---------|--------------------------|--------|--------------------------|
| Element Group:   | Abutments              | Length             | 1m                       |            |                          |                       |                                     |         |                          |        |                          |
| Element Name:  | Wingwalls              | Width              | N/A                      |            |                          |                       |                                     |         |                          |        |                          |
| Location:  | All four quadrants     | Height             | 2.1m                     |            |                          |                       |                                     |         |                          |        |                          |
| Material:  | Cast-in-place Concrete | Count              | 4                        |            |                          |                       |                                     |         |                          |        |                          |
| Element Type:  |                        | Total Quantity:    | 8.4m <sup>2</sup>        |            |                          |                       |                                     |         |                          |        |                          |
| Environment:   | Moderate               | Limited Inspection | <input type="checkbox"/> |            |                          |                       |                                     |         |                          |        |                          |
| Protection System:   | None                   |                    |                          |            |                          | Perform. Deficiencies | Maint. Needs                        |         |                          |        |                          |
| Condition  | Units                  | Exc.               | Good                     | Fair       | Poor*                    |                       |                                     |         |                          |        |                          |
| Data:  | m <sup>2</sup>         | 0                  | 0                        | 3.4        | 5                        | 00                    |                                     |         |                          |        |                          |
| Comments: Light to severe scaling. Cracking at construction joints, and wide stained cracks. |                        |                    |                          |            |                          |                       |                                     |         |                          |        |                          |
| Recommended Work: Complete patch repairs to wingwalls.                                       |                        |                    |                          |            |                          |                       |                                     |         |                          |        |                          |
|  |                        | None               | <input type="checkbox"/> | 6-10 years | <input type="checkbox"/> | 1-5 years             | <input checked="" type="checkbox"/> | <1 year | <input type="checkbox"/> | Urgent | <input type="checkbox"/> |

|  |                            |                    |                          |            |                          |                       |                                     |         |                          |        |                          |
|--|----------------------------|--------------------|--------------------------|------------|--------------------------|-----------------------|-------------------------------------|---------|--------------------------|--------|--------------------------|
| Element Group:   | Retaining Walls            | Length             | 4m                       |            |                          |                       |                                     |         |                          |        |                          |
| Element Name:  | Walls                      | Width              |                          |            |                          |                       |                                     |         |                          |        |                          |
| Location:  | All four quadrants         | Height             | 1m                       |            |                          |                       |                                     |         |                          |        |                          |
| Material:  | Masonry                    | Count              | 4                        |            |                          |                       |                                     |         |                          |        |                          |
| Element Type:  | Stacked Stone Gravity Wall | Total Quantity:    | 16m <sup>2</sup>         |            |                          |                       |                                     |         |                          |        |                          |
| Environment:   | Moderate                   | Limited Inspection | <input type="checkbox"/> |            |                          |                       |                                     |         |                          |        |                          |
| Protection System:   | None                       |                    |                          |            |                          | Perform. Deficiencies | Maint. Needs                        |         |                          |        |                          |
| Condition  | Units                      | Exc.               | Good                     | Fair       | Poor*                    |                       |                                     |         |                          |        |                          |
| Data:  | m <sup>2</sup>             | 0                  | 0                        | 8          | 8                        | 00                    |                                     |         |                          |        |                          |
| Comments: Outward shifting of stones. Soil/engineered fill washout above retaining walls. Southeast wall exhibits loss of backfill. Southwest wall is failing and exhibits loss of backfill. |                            |                    |                          |            |                          |                       |                                     |         |                          |        |                          |
| Recommended Work: Reinstate retaining walls as part of major rehabilitation  |                            |                    |                          |            |                          |                       |                                     |         |                          |        |                          |
|  |                            | None               | <input type="checkbox"/> | 6-10 years | <input type="checkbox"/> | 1-5 years             | <input checked="" type="checkbox"/> | <1 year | <input type="checkbox"/> | Urgent | <input type="checkbox"/> |

|  |                    |                    |                          |      |       |                       |              |
|--|--------------------|--------------------|--------------------------|------|-------|-----------------------|--------------|
| Element Group:   | Approaches         | Length             | 6m                       |      |       |                       |              |
| Element Name:  | Wearing Surface    | Width              | 4.2m                     |      |       |                       |              |
| Location:  | Either end of deck | Height             |                          |      |       |                       |              |
| Material:  | Gravel             | Count              | 2                        |      |       |                       |              |
| Element Type:  |                    | Total Quantity:    | 50.4m <sup>2</sup>       |      |       |                       |              |
| Environment:   | Severe             | Limited Inspection | <input type="checkbox"/> |      |       |                       |              |
| Protection System:   | None               |                    |                          |      |       | Perform. Deficiencies | Maint. Needs |
| Condition  | Units              | Exc.               | Good                     | Fair | Poor* |                       |              |
| Data:  | m <sup>2</sup>     | 0                  | 49.65                    | 0    | 0.75  | 00                    |              |
| Comments: Erosion of wearing surface over retaining walls. Localized pothole formation.  |                    |                    |                          |      |       |                       |              |
| Recommended Work: None <input checked="" type="checkbox"/> 6-10 years <input type="checkbox"/> 1-5 years <input type="checkbox"/> <1 year <input type="checkbox"/> Urgent <input type="checkbox"/> |                    |                    |                          |      |       |                       |              |

|  |                        |                    |                          |      |       |                       |              |
|--|------------------------|--------------------|--------------------------|------|-------|-----------------------|--------------|
| Element Group:   | Barriers               | Length             | 8.5m                     |      |       |                       |              |
| Element Name:  | Barriers/Parapet Walls | Width              | 0.2m                     |      |       |                       |              |
| Location:  | Along deck edges       | Height             | 1.2m                     |      |       |                       |              |
| Material:  | Cast-in-place Concrete | Count              | 2                        |      |       |                       |              |
| Element Type:  |                        | Total Quantity:    | 44.2 <sup>2</sup>        |      |       |                       |              |
| Environment:   | Severe                 | Limited Inspection | <input type="checkbox"/> |      |       |                       |              |
| Protection System:   | None                   |                    |                          |      |       | Perform. Deficiencies | Maint. Needs |
| Condition  | Units                  | Exc.               | Good                     | Fair | Poor* |                       |              |
| Data:  | m <sup>2</sup>         | 0                  | 28.2                     | 8    | 8     | 00                    |              |
| Comments: Wide cracks and spalling on posts. Southwest post is spalled. Severe scaling on north wall and along base of walls. Localized spalling. Severe erosion at base of north wall. Moderate to severe AAR. Northeast post is partially scaled.                  |                        |                    |                          |      |       |                       |              |
| Recommended Work: Remove and replace barrier walls with code-compliant rail system. None <input type="checkbox"/> 6-10 years <input type="checkbox"/> 1-5 years <input checked="" type="checkbox"/> <1 year <input type="checkbox"/> Urgent <input type="checkbox"/> |                        |                    |                          |      |       |                       |              |

|  |                        |                    |                          |      |       |                       |              |
|--|------------------------|--------------------|--------------------------|------|-------|-----------------------|--------------|
| Element Group:   | Beams/MLEs             | Length             | 8.5m                     |      |       |                       |              |
| Element Name:  | Girders                | Width              | 0.3m                     |      |       |                       |              |
| Location:  | Underside of deck      | Height             | 0.55m                    |      |       |                       |              |
| Material:  | Cast-in-place Concrete | Count              | 4                        |      |       |                       |              |
| Element Type:  | T-Type                 | Total Quantity:    | 47.6m <sup>2</sup>       |      |       |                       |              |
| Environment:   | Severe                 | Limited Inspection | <input type="checkbox"/> |      |       |                       |              |
| Protection System:   | None                   |                    |                          |      |       | Perform. Deficiencies | Maint. Needs |
| Condition  | Units                  | Exc.               | Good                     | Fair | Poor* |                       |              |
| Data:  | m <sup>2</sup>         | 0                  | 18                       | 19.6 | 2     | 00                    |              |
| Comments: Medium to severe scaling on exterior beams. Typical scaling and disintegration. Localized delamination, spalling, and wide horizontal cracks.  |                        |                    |                          |      |       |                       |              |
| Recommended Work: Complete patch repair of t-beams as part of major rehabilitation. None <input type="checkbox"/> 6-10 years <input type="checkbox"/> 1-5 years <input checked="" type="checkbox"/> <1 year <input type="checkbox"/> Urgent <input type="checkbox"/> |                        |                    |                          |      |       |                       |              |

|  |                            |                    |                  |      |       |                       |              |
|--|----------------------------|--------------------|------------------|------|-------|-----------------------|--------------|
| Element Group:   | Decks                      | Length             | 8.5m             |      |       |                       |              |
| Element Name:  | Deck Top – Thin Slab       | Width              | 5.4m             |      |       |                       |              |
| Location:  | Spanning between abutments | Height             |                  |      |       |                       |              |
| Material:  | Cast-in-place Concrete     | Count              |                  |      |       |                       |              |
| Element Type:  |                            | Total Quantity:    | 46m <sup>2</sup> |      |       |                       |              |
| Environment:   | Severe                     | Limited Inspection |                  |      |       |                       |              |
| Protection System:   | None                       |                    |                  |      |       | Perform. Deficiencies | Maint. Needs |
| Condition  | Units                      | Exc.               | Good             | Fair | Poor* |                       |              |
| Data:  | m <sup>2</sup>             | 0                  | 0                | 23.9 | 22    | 09                    |              |
| Comments: Deck is mostly covered with debris. Pothole formation with ponding, localized severe scaling.  |                            |                    |                  |      |       |                       |              |
| Recommended Work: Resurface deck as part of major rehabilitation      None <input type="checkbox"/> 6-10 years <input type="checkbox"/> 1-5 years <input checked="" type="checkbox"/> <1 year <input type="checkbox"/> Urgent <input type="checkbox"/> |                            |                    |                  |      |       |                       |              |

|  |                        |                    |                          |      |       |                       |              |
|--|------------------------|--------------------|--------------------------|------|-------|-----------------------|--------------|
| Element Group:   | Deck                   | Length             | 8.5m                     |      |       |                       |              |
| Element Name:  | Soffit – Thick Slab    | Width              | 5.4m                     |      |       |                       |              |
| Location:  | Underside of deck      | Height             |                          |      |       |                       |              |
| Material:  | Cast-in-place Concrete | Count              | 1                        |      |       |                       |              |
| Element Type:  |                        | Total Quantity:    | 46m <sup>2</sup>         |      |       |                       |              |
| Environment:   | Benign                 | Limited Inspection | <input type="checkbox"/> |      |       |                       |              |
| Protection System:   | None                   |                    |                          |      |       | Perform. Deficiencies | Maint. Needs |
| Condition  | Units                  | Exc.               | Good                     | Fair | Poor* |                       |              |
| Data:  | m <sup>2</sup>         | 0                  | 0                        | 35   | 11    | 00                    |              |
| Comments: Transverse cracking with corrosion staining. Efflorescence deposits at abutments. Localized spalls and severe scaling with exposed and corroded rebar near bored areas   |                        |                    |                          |      |       |                       |              |
| Recommended Work: Complete patch repairs as part of major rehabilitation      None <input type="checkbox"/> 6-10 years <input type="checkbox"/> 1-5 years <input checked="" type="checkbox"/> <1 year <input type="checkbox"/> Urgent <input type="checkbox"/> |                        |                    |                          |      |       |                       |              |

|   |                          |                    |                          |      |       |                       |              |
|---|--------------------------|--------------------|--------------------------|------|-------|-----------------------|--------------|
| Element Group:  | Embankments & Streams    | Length             | N/A                      |      |       |                       |              |
| Element Name:   | Embankments              | Width              | N/A                      |      |       |                       |              |
| Location:   | Side slopes of abutments | Height             | N/A                      |      |       |                       |              |
| Material:   |                          | Count              | 4                        |      |       |                       |              |
| Element Type:   |                          | Total Quantity:    | 4                        |      |       |                       |              |
| Environment:  |                          | Limited Inspection | <input type="checkbox"/> |      |       |                       |              |
| Protection System:  | None                     |                    |                          |      |       | Perform. Deficiencies | Maint. Needs |
| Condition   | Units                    | Exc.               | Good                     | Fair | Poor* |                       |              |
| Data:   | Each                     | 0                  | 4                        | 0    | 0     | 00                    |              |
| Comments:   |                          |                    |                          |      |       |                       |              |
| Recommended Work:      None <input checked="" type="checkbox"/> 6-10 years <input type="checkbox"/> 1-5 years <input type="checkbox"/> <1 year <input type="checkbox"/> Urgent <input type="checkbox"/> |                          |                    |                          |      |       |                       |              |



**BRIDGE PHOTOGRAPHS**

Owner: Municipality Of Tweed

Hwy/Road Name: Black River Road

Structure Name: East Red Bridge

Location: 1.36 km north of North Hawkins Bay Road



*Photo 1: Pothole Formation on Deck Top Looking East*



*Photo 2: South Interior Barrier Wall*

**BRIDGE PHOTOGRAPHS**

Owner: Municipality Of Tweed

Structure Name: East Red Bridge

Hwy/Road Name: Black River Road

Location: 1.36 km north of North Hawkins Bay Road



*Photo 3: North Elevation*



*Photo 4: East Abutment Wall*

**BRIDGE PHOTOGRAPHS**

Owner: Municipality Of Tweed

Structure Name: East Red Bridge

Hwy/Road Name: Black River Road

Location: 1.36 km north of North Hawkins Bay Road



*Photo 5: Interior Girders and Soffit Looking West*



*Photo 6: Erosion on West Abutment Wall*

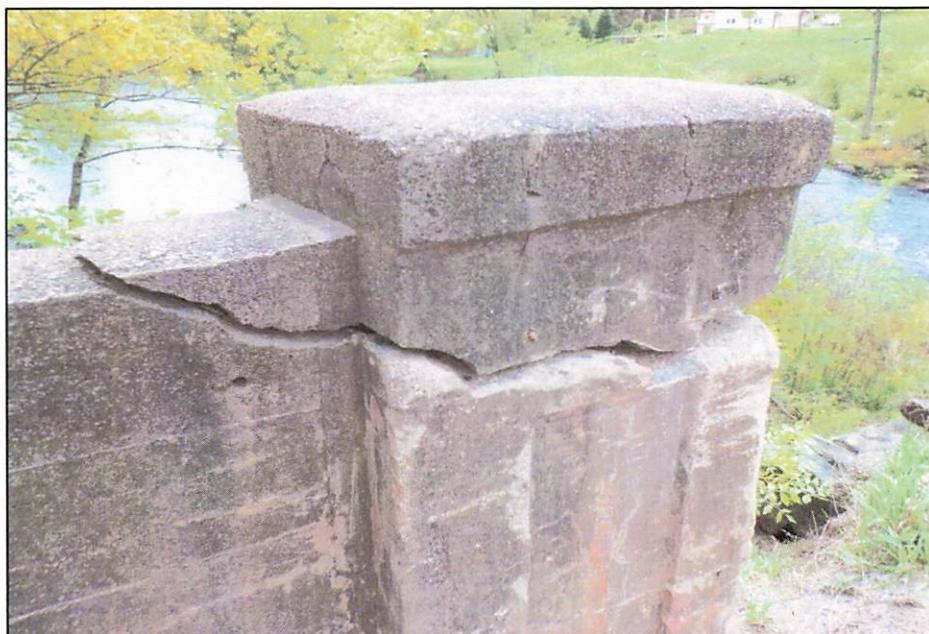
**BRIDGE PHOTOGRAPHS**

Owner: Municipality Of Tweed  
Hwy/Road Name: Black River Road

Structure Name: East Red Bridge  
Location: 1.36 km north of North Hawkins Bay Road



*Photo 7: Spalling with Corrosion Staining in Soffit*



*Photo 8: Spalled Southwest Barrier Post*

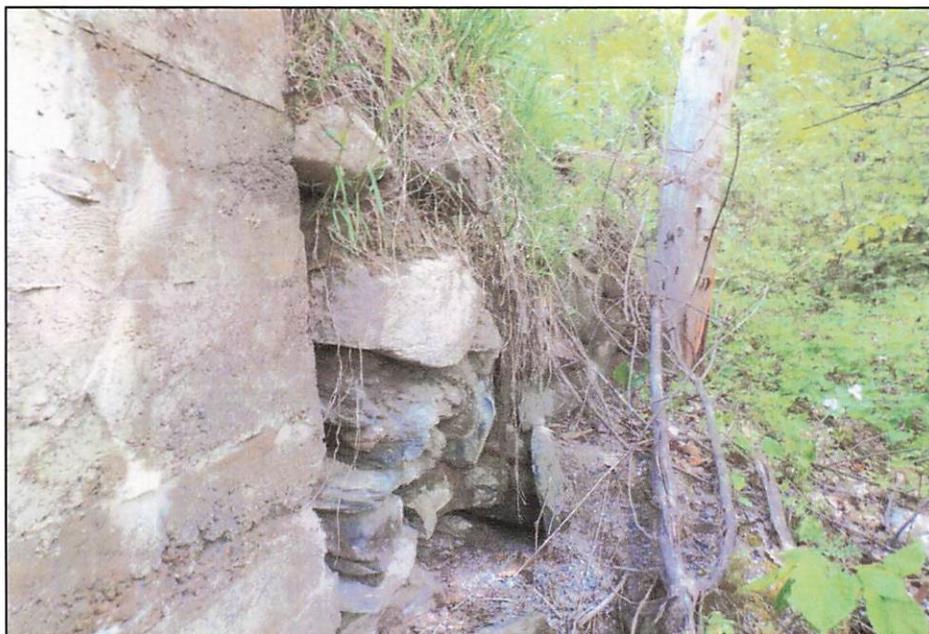
**BRIDGE PHOTOGRAPHS**

Owner: Municipality Of Tweed  
Hwy/Road Name: Black River Road

Structure Name: East Red Bridge  
Location: 1.36 km north of North Hawkins Bay Road



*Photo 9: Scaling on North Exterior T-Beam*



*Photo 11: Outward Rotation of Northwest Retaining Wall*

| Inventory Data:                               |   |   |   |                   |   |                       |       |                       |       |
|---|---|---|---|-------------------|---|-----------------------|-------|-----------------------|-------|
| Structure Name                                | <span style="border: 1px solid black; padding: 2px;">#31 West Red Bridge, Elzevir</span>  |   |   |                   |   |                       |       |                       |       |
| Main Hwy/Road#                                | <table style="width: 100%; border: none;"> <tr> <td style="border: 1px solid black; width: 10%;"></td> <td style="padding: 0 10px;">On <input checked="" type="checkbox"/></td> <td style="padding: 0 10px;">Under</td> <td style="padding: 0 10px;">Crossing Type</td> <td style="padding: 0 10px;">Navig. Water Rail</td> <td style="padding: 0 10px;">Road</td> <td style="padding: 0 10px;">Non-Navig. Water Ped.</td> <td style="padding: 0 10px;">Other</td> </tr> </table> |   | On <input checked="" type="checkbox"/>    | Under             | Crossing Type                             | Navig. Water Rail     | Road  | Non-Navig. Water Ped. | Other |
|   | On <input checked="" type="checkbox"/>  | Under   | Crossing Type                             | Navig. Water Rail | Road                                      | Non-Navig. Water Ped. | Other |                       |       |
| Hwy/Road Name                                 | <span style="border: 1px solid black; padding: 2px;">Black River Road</span>  |   |   |                   |   |                       |       |                       |       |
| Structure Location                            | <span style="border: 1px solid black; padding: 2px;">1.38 km W of North Hawkins Bay Road</span>   |   |   |                   |   |                       |       |                       |       |
| Latitude                                      | <span style="border: 1px solid black; padding: 2px;">44.536632°N</span>   |   |   |                   |   |                       |       |                       |       |
| Longitude                                     | <span style="border: 1px solid black; padding: 2px;">77.370358°W</span>   |   |   |                   |   |                       |       |                       |       |
| Owner(s)                                      | <span style="border: 1px solid black; padding: 2px;">Municipality of Tweed</span>   |   |   |                   |   |                       |       |                       |       |
| Heritage Designation:                         | <table style="width: 100%; border: none;"> <tr> <td style="padding: 0 10px;">Not Cons. <input checked="" type="checkbox"/></td> <td style="padding: 0 10px;">Cons./not App.</td> <td style="padding: 0 10px;">List/not Desig.</td> </tr> <tr> <td style="padding: 0 10px;">Desig./not List</td> <td colspan="2" style="padding: 0 10px;">Desig. &amp; List</td> </tr> </table>  | Not Cons. <input checked="" type="checkbox"/> | Cons./not App.                            | List/not Desig.   | Desig./not List                           | Desig. & List         |       |                       |       |
| Not Cons. <input checked="" type="checkbox"/> | Cons./not App.  | List/not Desig.                               |   |                   |   |                       |       |                       |       |
| Desig./not List                               | Desig. & List   |   |   |                   |   |                       |       |                       |       |
| MTO Region                                    | <span style="border: 1px solid black; padding: 2px;">Eastern</span>   |   |   |                   |   |                       |       |                       |       |
| Road Class:                                   | <table style="width: 100%; border: none;"> <tr> <td style="padding: 0 10px;">Freeway</td> <td style="padding: 0 10px;">Arterial</td> <td style="padding: 0 10px;">Collector</td> <td style="padding: 0 10px;">Local <input checked="" type="checkbox"/></td> </tr> </table>   | Freeway                                       | Arterial                                  | Collector         | Local <input checked="" type="checkbox"/> |                       |       |                       |       |
| Freeway                                       | Arterial  | Collector                                     | Local <input checked="" type="checkbox"/> |                   |   |                       |       |                       |       |
| MTO District                                  | <span style="border: 1px solid black; padding: 2px;">Kingston</span>  |   |   |                   |   |                       |       |                       |       |
| Posted Speed                                  | <span style="border: 1px solid black; padding: 2px;">80</span>  |   |   |                   |   |                       |       |                       |       |
| No. of Lanes                                  | <span style="border: 1px solid black; padding: 2px;">1</span>   |   |   |                   |   |                       |       |                       |       |
| Old County                                    | <span style="border: 1px solid black; padding: 2px;"></span>  |   |   |                   |   |                       |       |                       |       |
| AADT  | <span style="border: 1px solid black; padding: 2px;"></span>  |   |   |                   |   |                       |       |                       |       |
| % Trucks                                      | <span style="border: 1px solid black; padding: 2px;"></span>  |   |   |                   |   |                       |       |                       |       |
| Geographic Twp.                               | <span style="border: 1px solid black; padding: 2px;"></span>  |   |   |                   |   |                       |       |                       |       |
| Inspection Route Sequence                     | <span style="border: 1px solid black; padding: 2px;"></span>  |   |   |                   |   |                       |       |                       |       |
| Structure Type                                | <span style="border: 1px solid black; padding: 2px;">T-beam</span>  |   |   |                   |   |                       |       |                       |       |
| Interchange Number                            | <span style="border: 1px solid black; padding: 2px;"></span>  |   |   |                   |   |                       |       |                       |       |
| Total Deck Length                             | <span style="border: 1px solid black; padding: 2px;">14.6</span> (m)  |   |   |                   |   |                       |       |                       |       |
| Interchange Structure Number                  | <span style="border: 1px solid black; padding: 2px;"></span>  |   |   |                   |   |                       |       |                       |       |
| Overall Str. Width                            | <span style="border: 1px solid black; padding: 2px;">5.4</span> (m)   |   |   |                   |   |                       |       |                       |       |
| Min. Vertical Clearance                       | <span style="border: 1px solid black; padding: 2px;">2</span> (m)   |   |   |                   |   |                       |       |                       |       |
| Total Deck Area                               | <span style="border: 1px solid black; padding: 2px;">79</span> (sq.m)   |   |   |                   |   |                       |       |                       |       |
| Special Routes                                | <input type="checkbox"/>  |   |   |                   |   |                       |       |                       |       |
| Transit                                       | <input type="checkbox"/>  |   |   |                   |   |                       |       |                       |       |
| Truck   | <input type="checkbox"/>  |   |   |                   |   |                       |       |                       |       |
| School  | <input type="checkbox"/>  |   |   |                   |   |                       |       |                       |       |
| Bicycle                                       | <input type="checkbox"/>  |   |   |                   |   |                       |       |                       |       |
| Roadway Width                                 | <span style="border: 1px solid black; padding: 2px;">4.2</span> (m)   |   |   |                   |   |                       |       |                       |       |
| Detour Length Around Bridge                   | <span style="border: 1px solid black; padding: 2px;">3</span> (km)  |   |   |                   |   |                       |       |                       |       |
| Skew Angle                                    | <span style="border: 1px solid black; padding: 2px;">0</span> (Deg.)  |   |   |                   |   |                       |       |                       |       |
| Direction of Structure                        | <span style="border: 1px solid black; padding: 2px;">E-W</span>   |   |   |                   |   |                       |       |                       |       |
| No. of Spans                                  | <span style="border: 1px solid black; padding: 2px;">1</span>   |   |   |                   |   |                       |       |                       |       |
| Fill on Structure                             | <span style="border: 1px solid black; padding: 2px;">0</span> (m)   |   |   |                   |   |                       |       |                       |       |
| Span Lengths                                  | <span style="border: 1px solid black; padding: 2px;">13.7</span> (m)  |   |   |                   |   |                       |       |                       |       |

| Historical Data:             |   |
|------------------------------|---|
| Year Built                   | <span style="border: 1px solid black; padding: 2px;">1930</span>        |
| Last Evaluation              | <span style="border: 1px solid black; padding: 2px;"></span>            |
| Last Biennial Inspection     | <span style="border: 1px solid black; padding: 2px;">2020-09-10</span>  |
| Current Load Limit           | <span style="border: 1px solid black; padding: 2px;">13</span> (tonnes) |
| Last BridgeMaster Inspection | <span style="border: 1px solid black; padding: 2px;"></span>            |
| Load Limit By-Law#           | <span style="border: 1px solid black; padding: 2px;">2020-68</span>     |
| Last Condition Survey        | <span style="border: 1px solid black; padding: 2px;"></span>            |
| By-Law Expiry Date           | <span style="border: 1px solid black; padding: 2px;"></span>            |
| Last Underwater Inspection   | <span style="border: 1px solid black; padding: 2px;"></span>            |

Rehab History: (Date/description)

**Scheduled Improvements:**

Regional Priority Number  Programmed Work Year

Nature of Program Work:

| Appraisal Indices: |  | Comments |
|--------------------|--|----------|
| Fatigue            |  |          |
| Seismic            |  |          |
| Scour              |  |          |
| Flood              |  |          |
| Geometrics         |  |          |
| Barrier            |  |          |
| Curb               |  |          |
| Load Capacity      |  |          |

| Field Inspection Information: |                       |
|-------------------------------|-----------------------|
| Date of Inspection:           | May 17, 2022          |
| Inspector:                    | Abdul Rahman Stott    |
| Others in Party:              | Cody Chambers         |
| Equipment Used:               | Camera and hand tools |
| Weather:                      | Sun and Cloud         |
| Temperature:                  | 13°C                  |

| Additional Investigations Required:                          | Priority |        |        |
|--|----------|--------|--------|
|  | None     | Normal | Urgent |
| Detailed Deck Condition Survey:                              | X        |        |        |
| Non-destructive Delamination Survey of Asphalt-Covered Deck: | X        |        |        |
| Substructure Condition Survey:                               | X        |        |        |
| Detailed Coating Condition Survey:                           | X        |        |        |
| Underwater Investigation:                                    | X        |        |        |
| Fatigue Investigation:                                       | X        |        |        |
| Seismic Investigation:                                       | X        |        |        |
| Structure Evaluation:  |          | X      |        |
| Monitoring of Deformations, Settlements and Movements:       | X        |        |        |

The structure is generally in fair condition on account of deterioration of major substructure and superstructure elements.

Recommended actions:

- Complete major rehabilitation (1-5 yrs.), consisting of:
  - Abutment refacing and patch repairs
  - Deck soffit patch repairs and deck top overlay or patch repairs
  - T-beam patch repairs
  - Barrier wall removal and replacement with guiderail system
  - Rehabilitation and re-stabilization of retaining walls
- Implement approach guiderail (NOW)

BCI (2020): 49.47  
 BCI (2022): 41.54

Justification for significant BCI change: General deterioration of all structural elements

Next Detailed Visual Inspection: 2024

Suspected Performance Deficiencies

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

Maintenance Needs

|                                      |                                 |                               |
|--------------------------------------|---------------------------------|-------------------------------|
| 01 Lift and Swing Bridge Maintenance | 07 Repair of Structural Steel   | 13 Erosion Control at Bridges |
| 02 Bridge Cleaning                   | 08 Repair of Bridge Concrete    | 14 Concrete Sealing           |
| 03 Bridge Handrail Maintenance       | 09 Repair of Bridge Timber      | 15 Rout and Seal              |
| 04 Painting Steel Bridge Structures  | 10 Bailey bridges – Maintenance | 16 Bridge Deck Drainage       |
| 05 Bridge Deck Joint Repair          | 11 Animal/Pest Control          | 17 Other                      |
| 06 Bridge Bearing Maintenance        | 12 Bridge Surface Repair        |                               |

Element Data

|  |                |                         |      |                    |       |                          |  |              |
|--|----------------|-------------------------|------|--------------------|-------|--------------------------|--|--------------|
| Element Group:   |                | Abutments               |      | Length             |       | N/A                      |  |              |
| Element Name:  |                | Abutment Walls          |      | Width              |       | 6.2m                     |  |              |
| Location:  |                | Either end of structure |      | Height             |       | 1m                       |  |              |
| Material:  |                | Cast-in-place Concrete  |      | Count              |       | 2                        |  |              |
| Element Type:  |                |                         |      | Total Quantity:    |       | 12.4m <sup>2</sup>       |  |              |
| Environment:   |                | Benign                  |      | Limited Inspection |       | <input type="checkbox"/> |  |              |
| Protection System:   |                | None                    |      |                    |       | Perform. Deficiencies    |  | Maint. Needs |
| Condition  | Units          | Exc.                    | Good | Fair               | Poor* |                          |  |              |
| Data:  | m <sup>2</sup> | 0                       | 2.4  | 9                  | 1     | 00                       |  |              |
| Comments: Vertical full height crack in west abutment. Localized delamination. Separation at construction joints at the edges of the walls. Medium to severe erosion and light to medium scaling.  |                |                         |      |                    |       |                          |  |              |
| Recommended Work: None <input checked="" type="checkbox"/> 6-10 years <input type="checkbox"/> 1-5 years <input type="checkbox"/> <1 year <input type="checkbox"/> Urgent <input type="checkbox"/> |                |                         |      |                    |       |                          |  |              |

|  |                |                        |      |                    |       |                          |  |              |
|--|----------------|------------------------|------|--------------------|-------|--------------------------|--|--------------|
| Element Group:   |                | Abutments              |      | Length             |       | 1m                       |  |              |
| Element Name:  |                | Wingwalls              |      | Width              |       | N/A                      |  |              |
| Location:  |                | All four quadrants     |      | Height             |       | 2.1m                     |  |              |
| Material:  |                | Cast-in-place Concrete |      | Count              |       | 4                        |  |              |
| Element Type:  |                |                        |      | Total Quantity:    |       | 8.4m <sup>2</sup>        |  |              |
| Environment:   |                | Moderate               |      | Limited Inspection |       | <input type="checkbox"/> |  |              |
| Protection System:   |                | None                   |      |                    |       | Perform. Deficiencies    |  | Maint. Needs |
| Condition  | Units          | Exc.                   | Good | Fair               | Poor* |                          |  |              |
| Data:  | m <sup>2</sup> | 0                      | 2    | 3.4                | 3     | 00                       |  |              |
| Comments: Wide cracks and disintegration at construction joints. Full-width separatory cracking at southwest abutment due to retaining wall bearing.   |                |                        |      |                    |       |                          |  |              |
| Recommended Work: Complete patch repairs and reinstatement of wingwalls None <input type="checkbox"/> 6-10 years <input type="checkbox"/> 1-5 years <input checked="" type="checkbox"/> <1 year <input type="checkbox"/> Urgent <input type="checkbox"/> |                |                        |      |                    |       |                          |  |              |

|  |                |                            |      |                    |       |                          |  |              |
|--|----------------|----------------------------|------|--------------------|-------|--------------------------|--|--------------|
| Element Group:   |                | Retaining Walls            |      | Length             |       | 6m                       |  |              |
| Element Name:  |                | Walls                      |      | Width              |       |                          |  |              |
| Location:  |                | All four quadrants         |      | Height             |       | 1.5m                     |  |              |
| Material:  |                | Masonry                    |      | Count              |       | 4                        |  |              |
| Element Type:  |                | Stacked Stone Gravity Wall |      | Total Quantity:    |       | 36m <sup>2</sup>         |  |              |
| Environment:   |                | Moderate                   |      | Limited Inspection |       | <input type="checkbox"/> |  |              |
| Protection System:   |                | None                       |      |                    |       | Perform. Deficiencies    |  | Maint. Needs |
| Condition  | Units          | Exc.                       | Good | Fair               | Poor* |                          |  |              |
| Data:  | m <sup>2</sup> | 0                          | 0    | 9                  | 27    | 02/03/04                 |  |              |
| Comments: Northeast, northwest, and southeast walls is failing with washouts on shoulders above and loss of backfill material. All walls are rotating outwards   |                |                            |      |                    |       |                          |  |              |
| Recommended Work: Reinstatate retaining walls as part of major rehabilitation None <input type="checkbox"/> 6-10 years <input type="checkbox"/> 1-5 years <input checked="" type="checkbox"/> <1 year <input type="checkbox"/> Urgent <input type="checkbox"/> |                |                            |      |                    |       |                          |  |              |



|  |                            |                    |                                     |            |                          |                       |                                     |
|--|----------------------------|--------------------|-------------------------------------|------------|--------------------------|-----------------------|-------------------------------------|
| Element Group:   | Decks                      | Length             | 14.6m                               |            |                          |                       |                                     |
| Element Name:  | Deck Top – Thin Slab       | Width              | 5.4m                                |            |                          |                       |                                     |
| Location:  | Spanning between abutments | Height             |                                     |            |                          |                       |                                     |
| Material:  | Cast-in-place Concrete     | Count              | 1                                   |            |                          |                       |                                     |
| Element Type:  |                            | Total Quantity:    | 79m <sup>2</sup>                    |            |                          |                       |                                     |
| Environment:   | Severe                     | Limited Inspection | <input checked="" type="checkbox"/> |            |                          |                       |                                     |
| Protection System:   | None                       |                    |                                     |            |                          | Perform. Deficiencies | Maint. Needs                        |
| Condition Data:  | Units                      | Exc.               | Good                                | Fair       | Poor*                    |                       |                                     |
|  | m <sup>2</sup>             | 0                  | 0                                   | 63.8       | 15                       | 09                    | 02                                  |
| Comments: Medium to severe scaling and spalling. Significant accumulation of debris  |                            |                    |                                     |            |                          |                       |                                     |
| Recommended Work: Clean bridge deck as part of regular maintenance. Complete patch repairs as part of major rehabilitation |                            |                    |                                     |            |                          |                       |                                     |
|  |                            | None               | <input type="checkbox"/>            | 6-10 years | <input type="checkbox"/> | 1-5 years             | <input checked="" type="checkbox"/> |
|  |                            |                    |                                     |            |                          | <1 year               | <input type="checkbox"/>            |
|  |                            |                    |                                     |            |                          |                       | Urgent <input type="checkbox"/>     |

|  |                        |                    |                          |            |                          |                       |                                     |
|--|------------------------|--------------------|--------------------------|------------|--------------------------|-----------------------|-------------------------------------|
| Element Group:   | Decks                  | Length             | 14.6m                    |            |                          |                       |                                     |
| Element Name:  | Soffit – Thin Slab     | Width              | 5.4m                     |            |                          |                       |                                     |
| Location:  | Underside of deck      | Height             |                          |            |                          |                       |                                     |
| Material:  | Cast-in-place Concrete | Count              | 1                        |            |                          |                       |                                     |
| Element Type:  |                        | Total Quantity:    | 79m <sup>2</sup>         |            |                          |                       |                                     |
| Environment:   | Benign                 | Limited Inspection | <input type="checkbox"/> |            |                          |                       |                                     |
| Protection System:   | None                   |                    |                          |            |                          | Perform. Deficiencies | Maint. Needs                        |
| Condition Data:  | Units                  | Exc.               | Good                     | Fair       | Poor*                    |                       |                                     |
|  | m <sup>2</sup>         | 0                  | 44.8                     | 17         | 17                       | 00                    |                                     |
| Comments: Localized light to medium scaling and delamination. Localized spalls with exposed and corroded rebar. Transverse cracking with efflorescence and corrosion staining. Moisture accumulation at south end with efflorescence |                        |                    |                          |            |                          |                       |                                     |
| Recommended Work: Complete patch repairs as part of major rehabilitation   |                        |                    |                          |            |                          |                       |                                     |
|  |                        | None               | <input type="checkbox"/> | 6-10 years | <input type="checkbox"/> | 1-5 years             | <input checked="" type="checkbox"/> |
|  |                        |                    |                          |            |                          | <1 year               | <input type="checkbox"/>            |
|  |                        |                    |                          |            |                          |                       | Urgent <input type="checkbox"/>     |

|                    |                           |                    |                                     |            |                          |                       |                                 |
|--------------------|---------------------------|--------------------|-------------------------------------|------------|--------------------------|-----------------------|---------------------------------|
| Element Group:     | Embankments & Streams     | Length             | N/A                                 |            |                          |                       |                                 |
| Element Name:      | Embankments               | Width              | N/A                                 |            |                          |                       |                                 |
| Location:          | Slide slopes of abutments | Height             | N/A                                 |            |                          |                       |                                 |
| Material:          |                           | Count              | 4                                   |            |                          |                       |                                 |
| Element Type:      |                           | Total Quantity:    | 4                                   |            |                          |                       |                                 |
| Environment:       |                           | Limited Inspection | <input type="checkbox"/>            |            |                          |                       |                                 |
| Protection System: | None                      |                    |                                     |            |                          | Perform. Deficiencies | Maint. Needs                    |
| Condition Data:    | Units                     | Exc.               | Good                                | Fair       | Poor*                    |                       |                                 |
|                    | Each                      | 0                  | 4                                   | 0          | 0                        | 00                    |                                 |
| Comments:          |                           |                    |                                     |            |                          |                       |                                 |
| Recommended Work:  |                           |                    |                                     |            |                          |                       |                                 |
|                    |                           | None               | <input checked="" type="checkbox"/> | 6-10 years | <input type="checkbox"/> | 1-5 years             | <input type="checkbox"/>        |
|                    |                           |                    |                                     |            |                          | <1 year               | <input type="checkbox"/>        |
|                    |                           |                    |                                     |            |                          |                       | Urgent <input type="checkbox"/> |



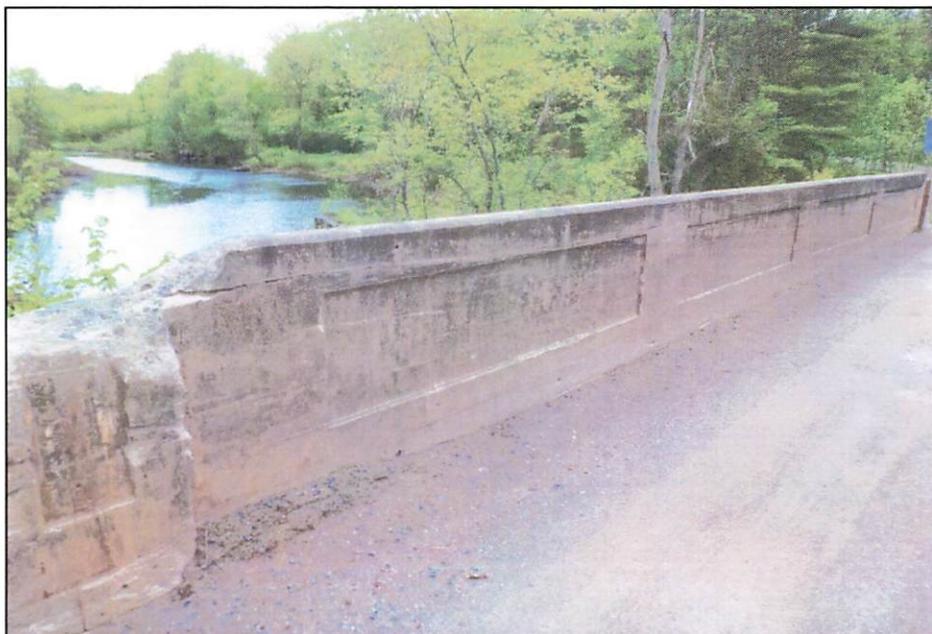
**BRIDGE PHOTOGRAPHS**

Owner: Municipality Of Tweed  
Hwy/Road Name: Black River Road

Structure Name: West Red Bridge  
Location: 1.38 km north of North Hawkins Bay Road



*Photo 1: Pothole Formation on Deck Top Looking East*

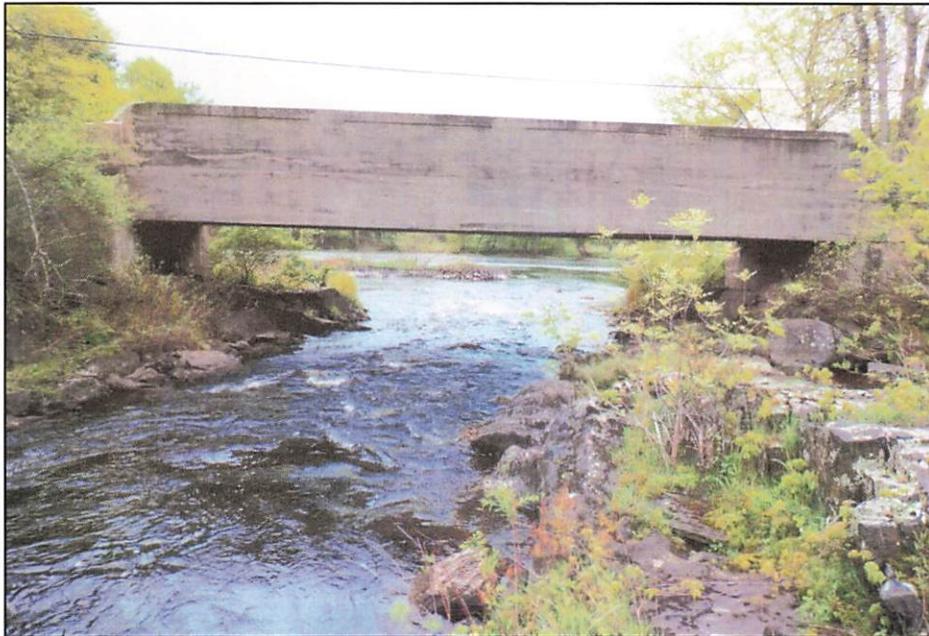


*Photo 2: North Interior Barrier Wall*

**BRIDGE PHOTOGRAPHS**

Owner: Municipality Of Tweed  
Hwy/Road Name: Black River Road

Structure Name: West Red Bridge  
Location: 1.38 km north of North Hawkins Bay Road



*Photo 3: North Elevation*



*Photo 4: West Abutment Wall*

**BRIDGE PHOTOGRAPHS**

Owner: Municipality Of Tweed  
Hwy/Road Name: Black River Road

Structure Name: West Red Bridge  
Location: 1.38 km north of North Hawkins Bay Road



*Photo 5: Interior T-Beams and Soffit Looking East*



*Photo 6: Spalling and Delamination on Exterior T-Beam*

**BRIDGE PHOTOGRAPHS**

Owner: Municipality Of Tweed

Structure Name: West Red Bridge

Hwy/Road Name: Black River Road

Location: 1.38 km north of North Hawkins Bay Road



*Photo 7: Bulging of Retaining Wall and Seperatory Cracking on Wingwall at Southwest Quadrant*



*Photo 8: West Abutment Wall*

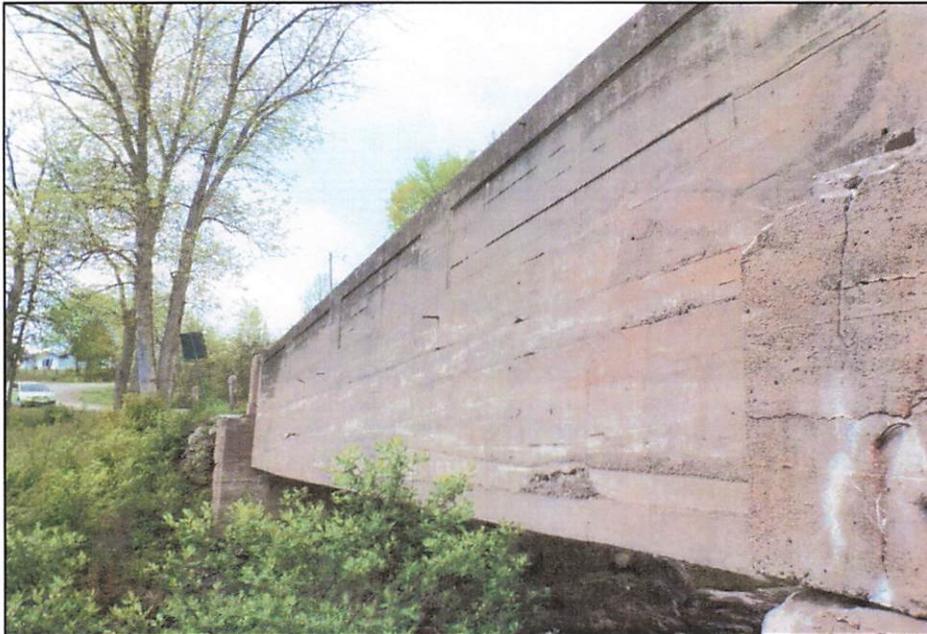
**BRIDGE PHOTOGRAPHS**

Owner: Municipality Of Tweed

Structure Name: West Red Bridge

Hwy/Road Name: Black River Road

Location: 1.38 km north of North Hawkins Bay Road



*Photo 9: South Exterior Fascia and Barrier Wall Looking West*



*Photo 10: Spall on Northeast Barrier Wall*

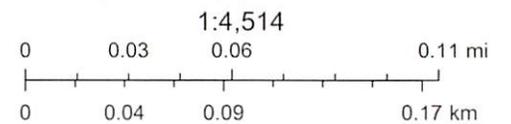
# Red Bridges E & W Locations



2/8/2023, 3:47:25 PM

Civic Addresses

Property Information

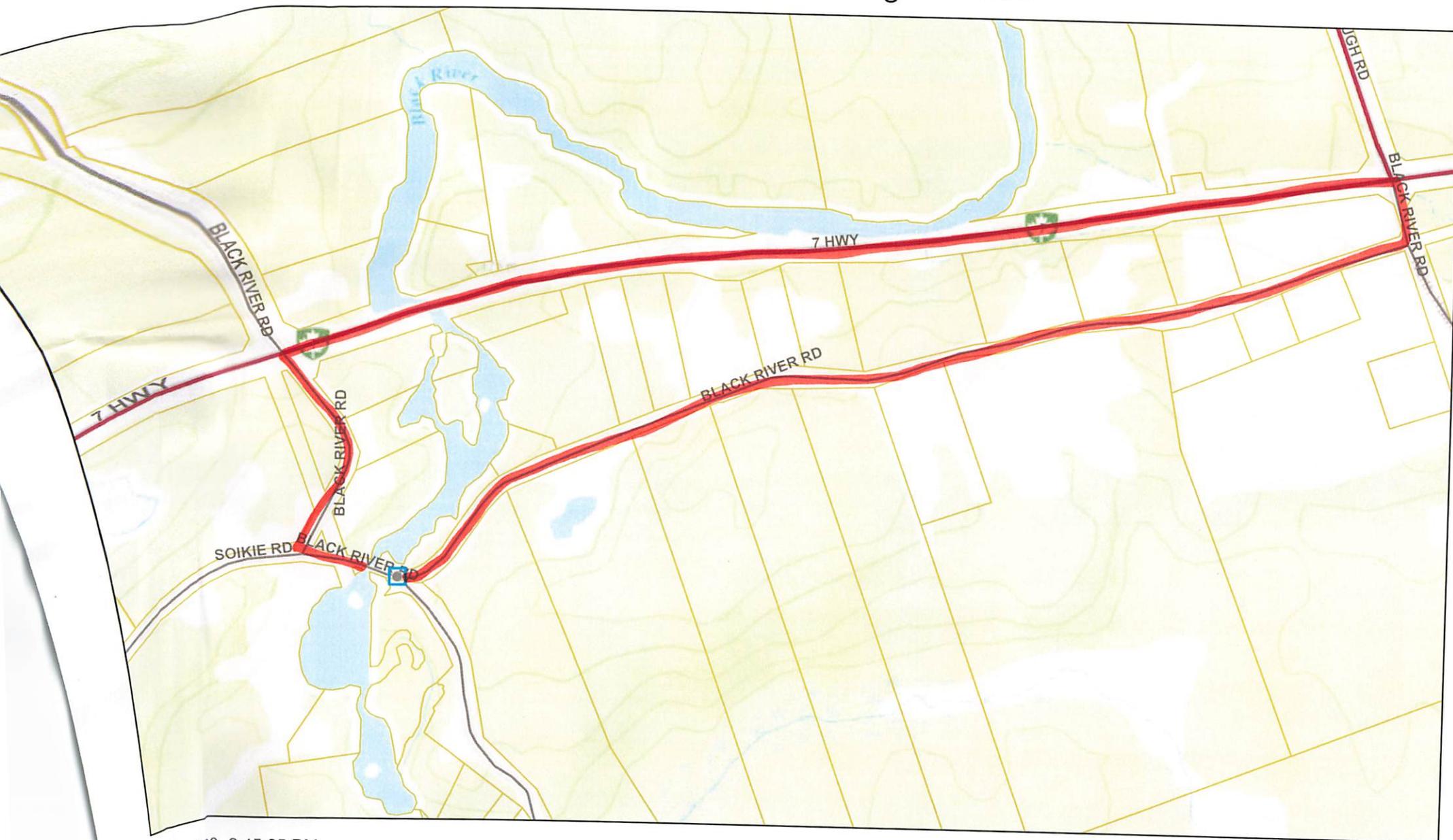


Hastings County, Province of Ontario, Ontario MNR, Esri Canada, Esri, HERE, Garmin, INCREMENT P, USGS, EPA, USDA, AAFC, NRCan

Hastings County GIS

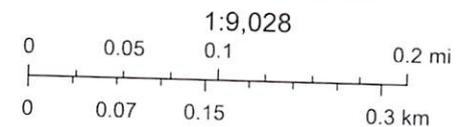
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# East & West Red Bridges Detour



8/29/2023, 2:45:35 PM

Property Information



Hastings County, Province of Ontario, Ontario MNR, Esri Canada, Esri, HERE, Garmin, INCREMENT P, Intermap, USGS, METI/NASA, EPA, USDA,

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