

# Bridge Inspection Report

## Andrewsville Bridge

Road Name: *Andrewsville Main St*  
Site ID: *B40*  
Structure Type: *Truss-Through*  
Owner: *County of Lanark*  
Built: *1915*  
Length: *47.7 m*  
Width: *5.1 m*  
Spans: *1*  
Spans Arrange: *38.5 (truss) 9.2 (girder)*  
Feature Under: *Water*  
Crossing: *Rideau River*  
Location: *500m west of County Rd 23*

Inspection Date: *September-18-17*  
Inspector: *Harold Kleywegt, P.Eng.*  
Assistant: *Milena Tresnak*

### Comments:

*This bridge has a 5 tonne load limit. It has a very high local value. A historical plaque was added by local residents in 2017. The bridge has outlived its normal service life. Bigger concerns are the stability of the dry stone walls on the approaches, perforated stringers at the south end, and severe decay to the timber curbs on the truss. The railing in the NE quadrant is mangled. Additional vigilance warranted. Need a plan to deal with partial collapse of dry stone wall. Bridge should be closed in winter months. Approach barriers and bridge railings*

### Recommended Investigations:

*No special investigations have been recommended*

### Recommended Capital Works:

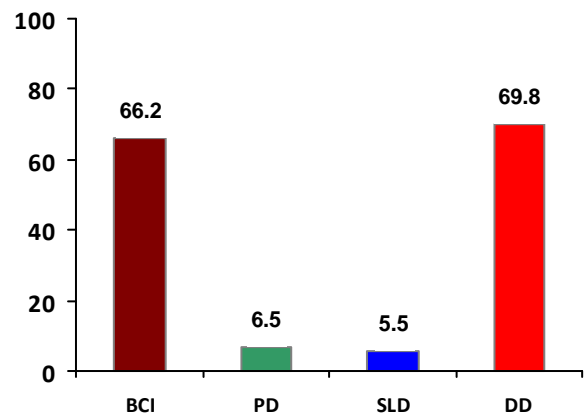
*Timber Curbs, Stringer Repl, Misc Rep*

**Estimated Replacement Value: \$3,280,000**  
*Estimated replacement value is based on replacement in kind*  
**Estimated Remaining Service Life: 0 Years**  
**Rehabilitation Year and Estimated Cost: 2019 \$84,000**



AADT: *300* Latitude: *44.95115000*  
Lanes: *1* Longitude: *-75.81913300*  
Skew: *0 °* Orientation: *N-S*  
Speed: *20 km/h* Road Width: *4.4 m*  
Trucks Load Posting *5*

Bridge Condition



BCI = Bridge Condition Index MTO Calculation

PD = Parabolic Depreciation  
% of remaining life expectancy

SLD = Straight Line Depreciation  
% of remaining life expectancy

DD = % of Defects and Damage



## Component Inspection Information

|  |  |
|--|--|
| <b>Timber-Laminated (1)</b><br><b>Approach Deck Surface</b>  | Defects <b>0.0%</b><br>Damage <b>0.0%</b><br>Maintenance <b>None</b><br>Capital Rec. <b>None</b><br><i>Good condition.</i>   |
| Length: 9.2 m<br>Width: 5.5 m<br>Height: 0.15 m              |  |
| <b>Timber-Laminated (1)</b><br><b>Truss Deck Surface</b>     | Defects <b>0.0%</b><br>Damage <b>0.0%</b><br>Maintenance <b>None</b><br>Capital Rec. <b>None</b><br><i>Good condition.</i>   |
| Length: 38.6 m<br>Width: 4.22 m<br>Height: 0.15 m            |  |
| <b>Timber-Sawn ()</b><br><b>Running boards</b>               | Defects <b>20.0%</b> <b>Moderate UV Weathering, Moderate Checking</b><br>Damage <b>2.0%</b> <b>Moderate Breakage</b><br>Maintenance <b>Local repair</b><br>Capital Rec. <b>None</b><br><i>The running boards at the pier have sustained some minor damage. Well secured.</i>   |
| Length: 47.7 m<br>Width: 4.9 m<br>Height:                    |  |
| <b>Timber Curb (2)</b><br><b>Curbs</b>                       | Defects <b>0.0%</b><br>Damage <b>10.0%</b> <b>Major Decay</b><br>Maintenance <b>Local repair</b><br>Capital Rec. <b>Replace in 2 years</b><br><i>Significant decay noted in several areas in 2017. Some curb timbers completely decayed and require replacement. Entire curb system will require replacement in a few years.</i> |
| Length: 47.7 m<br>Width: 0.13 m<br>Height: 0.13 m            |  |
| <b>Steel Pipe Ped Barrier (2)</b><br><b>Approach Barrier</b> | Defects <b>0.0%</b><br>Damage <b>20.0%</b> <b>Major Deformation, Moderate Impact</b><br>Maintenance <b>Repair Minor Damage</b><br>Capital Rec. <b>None</b><br><b>Perf Def: Weakened</b><br><i>Significant damage and settlement on north approach, east side. Settlement and tilting on south side.</i>                          |
| Length: 100 m<br>Width:<br>Height:                           |  |
| <b>Steel-Fabricated (2)</b><br><b>I-type - Girder</b>        | Defects <b>20.0%</b> <b>Moderate Corrosion</b><br>Damage <b>5.0%</b> <b>Minor Section Loss</b><br>Maintenance <b>None</b><br>Capital Rec. <b>None</b><br><b>Partial Inspection</b><br><i>Much of coating is lost, with rust blisters on the lower flanges.</i>   |
| Length: 9.2 m<br>Width: 0.2 m<br>Height: 0.46 m              |  |



## Component Inspection Information

|                                  |   |                           |
|----------------------------------|---|---------------------------|
| <b>Top Chord (2)</b>             | Defects <b>20.0%</b> <b>Minor Corrosion</b>   |                           |
| <b>Top chords</b>                | Damage <b>0.0%</b>  |                           |
| Length: <b>38.5 m</b>            | Maintenance <b>None</b>   |                           |
| Width: <b>0.33 m</b>             | Capital Rec. <b>None</b>  |                           |
| Height:                          | <i>Relatively benign environment means minimal section loss despite loss of coating.</i>  |                           |
| <b>Bottom Chord (2)</b>          | Defects <b>30.0%</b> <b>Minor Corrosion</b>   |                           |
| <b>Bottom Chords</b>             | Damage <b>5.0%</b> <b>Minor Section Loss</b>  |                           |
| Length: <b>38.5 m</b>            | Maintenance <b>None</b>   |                           |
| Width: <b>0.33 m</b>             | Capital Rec. <b>None</b>  |                           |
| Height:                          | <i>Significant coating failure. Bottom chord in NW corner strengthened in 2013. Wading inspection in 2016.</i>  |                           |
| <b>Diagonal/Post/Hanger (30)</b> | Defects <b>20.0%</b> <b>Minor Corrosion</b>   |                           |
| <b>Verticals/diagonals</b>       | Damage <b>0.0%</b>  |                           |
| Length: <b>4 m</b>               | Maintenance <b>None</b>   |                           |
| Width: <b>0.15 m</b>             | Capital Rec. <b>None</b>  |                           |
| Height: <b>0.15 m</b>            | <i>Tie plates added to many of the diagonals in 2013.</i>   |                           |
| <b>Steel Floor Beam (6)</b>      | Defects <b>5.0%</b> <b>Minor Corrosion, Moderate Corrosion</b>  |                           |
| <b>I-type - Floor Beams</b>      | Damage <b>0.0%</b>  |                           |
| Length: <b>5 m</b>               | Maintenance <b>None</b>   | <b>Partial Inspection</b> |
| Width: <b>0.2 m</b>              | Capital Rec. <b>None</b>  |                           |
| Height: <b>0.5 m</b>             | <i>See wading inspection report of 2016. Little change observed in 2017.</i>  |                           |
| <b>Stringers (5)</b>             | Defects <b>50.0%</b> <b>Moderate Corrosion</b>  |                           |
| <b>I-type - Stringers</b>        | Damage <b>10.0%</b> <b>Major Perforation, Moderate Section Loss</b>   |                           |
| Length: <b>47.7 m</b>            | Maintenance <b>None</b>   | <b>Partial Inspection</b> |
| Width: <b>0.2 m</b>              | Capital Rec. <b>Repair in 2 years</b>   |                           |
| Height: <b>0.3 m</b>             | <i>Some stringer ends have been repaired with bolted extensions. Stringers at the west abutment replaced in 2016. Large perforations in stringer 2 from west on south approach span and south end of truss.</i> |                           |
| <b>RC Abutment Wall (1)</b>      | Defects <b>30.0%</b> <b>Moderate Leaching/Seepage, Moderate Scaling, Moderate AAR Cracking</b>  |                           |
| <b>Abutment Stem</b>             | Damage <b>10.0%</b> <b>Major Disintegration</b>   |                           |
| Length:                          | Maintenance <b>None</b>   |                           |
| Width: <b>7 m</b>                | Capital Rec. <b>None</b>  |                           |
| Height: <b>2.2 m</b>             | <i>AAR related disintegration with leach staining and scaling.</i>  |                           |



## Component Inspection Information

|                                     |        |  |  |
|-------------------------------------|--------|--|--|
| <b>RC Ballast Wall (1)</b>          |        | Defects <b>0.0%</b>  |  |
| <b>Ballast Walls</b>                |        | Damage <b>0.0%</b>   |  |
| Length:                             |        | Maintenance <b>None</b>  | Partial Inspection   |
| Width:                              | 7 m    | Capital Rec. <b>None</b>   |  |
| Height:                             | 0.6 m  | <i>Nop concerns noted.</i>   |  |
| <b>RC Wing Walls (2)</b>            |        | Defects <b>50.0%</b>   | Moderate Leaching Cracks, Moderate AAR Cracking              |
| <b>RC wingwall</b>                  |        | Damage <b>0.0%</b>   |  |
| Length:                             | 2.5 m  | Maintenance <b>None</b>  | Partial Inspection   |
| Width:                              |        | Capital Rec. <b>None</b>   |  |
| Height:                             | 1.25 m | <i>Serviceable.</i>  |  |
| <b>Entire Pier (1)</b>              |        | Defects <b>20.0%</b>   | Major AAR Cracking, Moderate Efflorescence, Moderate Scaling |
| <b>River Pier</b>                   |        | Damage <b>5.0%</b>   | Major Disintegration   |
| Length:                             | 2 m    | Maintenance <b>None</b>  | Partial Inspection   |
| Width:                              | 8 m    | Capital Rec. <b>None</b>   |  |
| Height:                             | 2.2 m  | <i>Not possible to inspect most surfaces. Top is experiencing severe disintegration especially at nosing.</i>                          |  |
| <b>Steel Sliding Plate (2)</b>      |        | Defects <b>0.0%</b>  |  |
| <b>Bearings</b>                     |        | Damage <b>20.0%</b>  | Moderate Section Loss  |
| Length:                             |        | Maintenance <b>None</b>  | Partial Inspection   |
| Width:                              |        | Capital Rec. <b>None</b>   |  |
| Height:                             |        | <i>Historically corroded.</i>  |  |
| <b>Rocker or Roller Bearing (4)</b> |        | Defects <b>80.0%</b>   | Moderate Corrosion, Checking                                 |
| <b>Roller bearing</b>               |        | Damage <b>20.0%</b>  | Moderate Seizing   |
| Length:                             |        | Maintenance <b>Power Wash</b>  |  |
| Width:                              |        | Capital Rec. <b>Replace in 1 year</b>  | Perf Def: Seizing  |
| Height:                             |        | <i>Bearings are covered in debris at pier and should be power washed. Nested roller bearings at north abutment are heavily rusted.</i> |  |
| <b>Headwall (2)</b>                 |        | Defects <b>0.0%</b>  |  |
| <b>Dry Stone Walls</b>              |        | Damage <b>20.0%</b>  |  |
| Length:                             | 100 m  | Maintenance <b>None</b>  |  |
| Width:                              |        | Capital Rec. <b>Repair in 5 years</b>  | Perf Def: Bulging  |
| Height:                             | 2.5 m  | <i>See Embankment comments.</i>  |  |



## Component Inspection Information

|                              |   |
|------------------------------|---|
| <b>Water Channel (1)</b>     | Defects <b>0.0%</b>   |
| <b>Streams and Waterways</b> | Damage <b>0.0%</b>  |
| Length:                      | Maintenance <b>None</b>   |
| Width:                       | Capital Rec. <b>None</b>  |
| Height:                      | <i>Rapid current under bridge. Dam upstream. Boulderrey bottom that has some localized scour.</i> |

|   |                                      |                                   |
|---|--------------------------------------|-----------------------------------|
| <b>Embankment (1)</b>   | Defects <b>0.0%</b>                  |                                   |
| <b>Embankments</b>  | Damage <b>15.0%</b>                  | <b>Critical Local Instability</b> |
|   | Maintenance <b>Slope revetment</b>   |                                   |
|   | Capital Rec. <b>Repair in 1 year</b> | <b>Perf Def: Unstable</b>         |
| <i>There is significant flow penetrating through the causeway on the south approach. The dry stone walls on the sides of the embankment have bulged on the east side. Frost action has loosened and disintegrated some of the stonework to a depth of 0.3 m. There is a strong possibility of partial collapse of in particular the east side of the causeway. This collapse could occur with little or no warning. Severe bulging of dry stone wall at NE quadrant, and is in serious condition. Water has partly undercut portions of wall on south approach. See images.</i> |                                      |                                   |

|                         |  |
|-------------------------|--|
| <b>Load Posting (4)</b> | Defects <b>0.0%</b>  |
| <b>Signs</b>            | Damage <b>0.0%</b>   |
| Length:                 | Maintenance <b>None</b>  |
| Width:                  | Capital Rec. <b>None</b>   |
| Height:                 | <i>Posting signs of 5 tonnes on both approaches. In 2013 clearance portals were installed at both approaches to restrict vehicles with a height more than 2.4 m from driving onto the bridge. The portal at the north end has already been struck several times.</i> |

## Recommended Investigations

X denotes not required

| Deck<br>Condon<br>Survey | Enhanced<br>Inspection | Underwater<br>Investigation | Ice<br>Inspection | Boat<br>Inspection | Structure<br>Evaluation | Load<br>Posting | Planning<br>Study |
|--------------------------|------------------------|-----------------------------|-------------------|--------------------|-------------------------|-----------------|-------------------|
| X                        | X                      | X                           | X                 | X                  | X                       | X               | X                 |



## Capital Needs Cost Estimate Break-Down

| Item                            | Req'd | Units          | Quantity | Unit Price \$ | Estimated Cost |
|---------------------------------|-------|----------------|----------|---------------|----------------|
| <i>Misc Concrete Repairs</i>    | X     | m <sup>2</sup> | 0.0      | \$500         | \$0            |
| <i>Deck Concrete Overlay</i>    | X     | m <sup>2</sup> | 243.3    | \$350         | \$0            |
| <i>Deck Replacement</i>         | X     | m <sup>2</sup> | 243.3    | \$2,000       | \$0            |
| <i>Barrier Wall Replacement</i> | X     | m              | 71.7     | \$1,500       | \$0            |
| <i>Expansion Joint</i>          | X     | m              | 10.2     | \$3,000       | \$0            |
| <i>Waterproof &amp; Pave</i>    | X     | m <sup>2</sup> | 243.3    | \$200         | \$0            |
| <i>Bearing Replacement</i>      | X     | Count          | 4.0      | \$5,000       | \$0            |
| <i>Approach Guiderail</i>       | X     | m              | 80.0     | \$200         | \$0            |

### Other Work

*Timber Curbs, Stringer Repl, Misc Rep* \$50,000

|   |                 |
|---|-----------------|
| <b>Structural Items Subtotal</b>                      | <b>\$50,000</b> |
| <b>Mobilization General Sitework 10%</b>              | <b>\$10,000</b> |
| <b>Estimated Traffic Management &amp; Civil Items</b> | <b>\$10,000</b> |
| <b>Contract Admin &amp; Contingencies 20%</b>         | <b>\$14,000</b> |
| <b>Total Rehabilitation Cost Estimate</b>             | <b>\$84,000</b> |

### Recommended Capital Work Summary

*Timber Curbs, Stringer Repl, Misc Rep*

**Recommended Capital Year** **2019**

### Inspection Comments

*This bridge has a 5 tonne load limit. It has a very high local value. A historical plaque was added by local residents in 2017. The bridge has outlived its normal service life. Biggerst concerns are the stability of the dry stone walls on the approaches, perforated stringers at the south end, and severe decay to the timber curbs on the truss, The railing in the NE quadrant is mangled. Additional vigilance warranted. Need a plan to deal with partial collapse of dry stone wall. Bridge should be closed in winter months. Approach barriers and bridge railings deficient to current standards.*





Image 136



West elevation

Image 134



Damaged pipe railing NE quadrant

Image 135



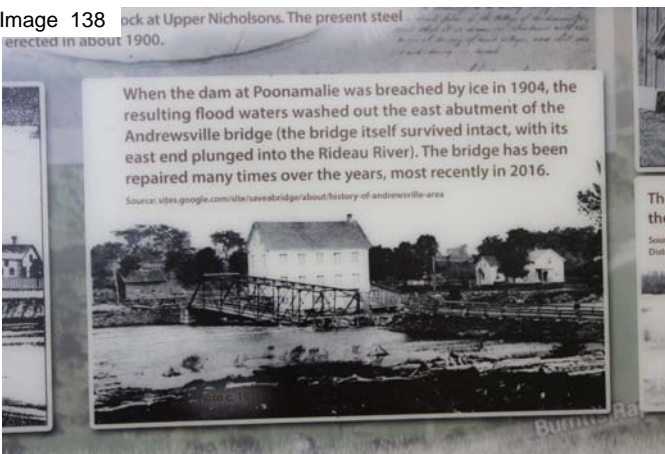
North approach

Image 137



Plaque in NW quadrant added in 2017

Image 138



Plaque detail

Image 139



Running boards and deck on truss





Image 140



Decay in curb timber

Image 142



Under-cut rail post foundation SE quadrant

Image 144



Dry stone embankment wall SE quadrant

Image 141



South approach

Image 143



600 mm under-cut SE quadrant

Image 145



Sagged rail at under-cut location





Image 146



Curb timber decay on truss

Image 147



North abutment wall

Image 148



Truss soffit looking south

Image 149



New stringer at north abutment

Image 150



Nested roller bearing NW truss corner

Image 151



Bulging dry stone embankment wall NE quadrant





Image 152



Disintegrating pier nosing

Image 153



Disintegrating south abutment west side

Image 154



Under-cut dry stone wall SE quadrant

Image 155



Peforation stringer 2 approach span south end

Image 156



Slab rust on east girder of south approach span

Image 157



South approach span soffit



Image 158



Dry stone wall SE quadrant





