BACKGROUND

- The Town initiated a Class Environmental Assessment at two bridge sites. Bridge No.’s 2 & 3 on Side Road 6 just west of 10th Line, and at Bridge No. 13 on Main Street in Heathcote.

- A problem statement was developed for each site.

- A notice of study commencement was issued to the public and agency stakeholders on April 11th, 2019.

- Minimal comments were received, and alternative solutions to address the problem statement were developed and evaluated. A preliminary preferred solution was identified.

- A Public Information Centre was held July 9th, 2019 to review the problem statements, alternative solutions, and preliminary solutions at each site with the public. Various comments were received from the public.

- At the November 18th, 2019 Council meeting related to the review of Progress Report 2, which included evaluation of alternative prior to comments received at or following the Public Information Centre, Council tasked Town Staff to review the Town’s legal responsibilities and provide additional information regarding the preliminary costing.

- The alternative solutions have been re-evaluated to confirm a preferred solution based on the comments received following the Public Information Centre and a draft Project File Report has been compiled.
MUNICIPAL ACT, 2001 AS AMENDED 2019

Maintenance:

- Section 44 (1) The municipality that has jurisdiction over a highway or bridge shall keep it in a state of repair that is reasonable in the circumstances, including the character and location of the highway or bridge.

- (2) A municipality that defaults in complying with subsection (1) is, subject to the Negligence Act, liable for all damages any person sustains because of the default.

- (3) Despite subsection (2), a municipality is not liable for failing to keep a highway or bridge in a reasonable state of repair if,

  (a) it did not know and could not reasonably have been expected to have known about the state of repair of the highway or bridge;

  (b) it took reasonable steps to prevent the default from arising; or

  (c) at the time the cause of action arose, minimum standards established under subsection (4) applied to the highway or bridge and to the alleged default and those standards have been met.

- (4) The Minister of Transportation may make regulations establishing minimum standards of repair for highways and bridges or any class of them.

O.Reg. 239/02 as amended by O.Reg. 366/18 dictates the minimum maintenance standards for municipal highways based on class of roadway (does not apply to Class 6 highways) – Side Road 6 is a Class 6 highway

TOTBM winter maintenance guidelines classify Side Road 6 as Class 5 based on AADT > 50
MUNICIPAL ACT, 2001 AS AMENDED 2019

Highway closing procedures:

- Section 34 (1) A by-law permanently closing a highway does not take effect until a certified copy of the by-law is registered in the proper land registry office.

Restricting common law right of passage:

- Section 35 Without limiting sections 9, 10 and 11, a municipality may pass by-laws removing or restricting the common law right of passage by the public over a highway and the common law right of access to the highway by an owner of land abutting a highway.

Powers of a natural person

- Section 9 A municipality has the capacity, rights, powers and privileges of a natural person for the purpose of exercising its authority under this or any other Act.

It is understood the procedures to remove or restrict the common law right of passage remains similar to the procedures laid out in the 2006 version of the Act for highway closing procedures. However, if highway closure is to be considered it is recommended the Town consult with legal counsel.

Bridges 2 & 3: Closure does not restrict motor vehicle access to any person’s land
Bridge 13: Closure results in restriction of motor vehicle access to all or part of 3 properties
Highway Closing Procedures:

- Section 34 (1) Before passing a by-law for permanently closing a highway, a municipality shall give public notice of its intention to pass the by-law.

- (2) Before passing a by-law for permanently altering a highway, if the alteration is likely to deprive any person of the sole means of motor vehicle access to and from the person’s land over any highway, a municipality shall give public notice of its intention to pass the by-law.

- (7) A by-law permanently closing or altering a highway is not valid if it would result in a person having no motor vehicle access to and from the person’s land over any highway, unless the person agrees to the by-law.

- (8) Despite subsection (7), if a person fails to agree to a by-law under that subsection within 30 days after public notice is given of the municipality’s intention to pass the by-law, the municipality may apply to the Ontario Municipal Board and the Board, after hearing the parties, may confirm, vary or rescind the by-law and may impose limitations and conditions respecting the closing or altering of the highway, which may include the payment of compensation to the owner and the provision of an alternate means of access to the land.

- (9) If the Board imposes limitations or conditions on the closing or altering of a highway, the by-law closing or altering the highway is not valid unless the limitations and conditions are met.

In December 2006, the Municipal Act was amended, and the highway closing requirements were repealed and reference to common law rights was inserted.
# MUNICIPAL CLASS EA PROCESS

- A Class EA schedule is based on the type of work, potential impacts & $ value
- A Schedule B Process, includes completion of Phases 1-2
- Upon completion of the Class EA and adoption of the preferred solution, the Town can proceed to design
- Preliminary design will evaluate alternative designs and structure types for the preferred solution

<table>
<thead>
<tr>
<th>PHASE 1</th>
<th>PHASE 2</th>
<th>PHASE 3</th>
<th>PHASE 4</th>
<th>PHASE 5</th>
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<tbody>
<tr>
<td>PROBLEM OR OPPORTUNITY</td>
<td>ALTERNATIVE SOLUTIONS</td>
<td>ALTERNATIVE DESIGN CONCEPTS FOR PREFERRED SOLUTION</td>
<td>ENVIRONMENTAL STUDY REPORT</td>
<td>IMPLEMENTATION</td>
</tr>
<tr>
<td>1. Identify problem or opportunity</td>
<td>1. Identity alternative solution to problem or opportunity</td>
<td>1. Identity alternative design concepts for preferred solution</td>
<td>1. Complete environmental study report (ESR)</td>
<td>1. Complete contract drawings &amp; tender documents</td>
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<tr>
<td>2. Discretionary public consultation to review problem or opportunity</td>
<td>2. Select Schedule</td>
<td>2. Schedule A / A+</td>
<td>2. Complete environmental study report (ESR) placed on public record</td>
<td>2. Proceed to construction &amp; operation</td>
</tr>
</tbody>
</table>

- We are here: Bridges 2 & 3
- We are here: Schedule B

- Indicates possible events
- Decision points on choice of schedule
- Indicates mandatory events
- Optional
- Indicates probable events
- Part II order
BRIDGES 2 & 3 – EXISTING CONDITIONS

Bridges 2 & 3 (Mitchell’s Creek Bridges) are located on Side Road 6

2019 OSIM

- 50% of the girders are in poor condition
- 20% of the deck is in poor condition (Bridge 2)
- 40% of the deck is in poor condition (Bridge 3)
- 100% of the railing is in poor condition
- 100% of the abutments are in poor condition
- 30% of the abutments are in poor condition
- 50% of the wingwalls are in poor condition (Bridge 2)
- 100% of the wingwalls are in poor condition (Bridge 3)
BRIDGES 2 & 3

Existing conditions:

- designated as a rural local road
- bridges load capacity at 10 tonnes - no fire truck, snow plow, or school bus access
- travel width of 4.75 m
- Average Daily Traffic = 63 vehicles per day (traffic counts conducted in January, May, & August 2019)
- maximum daily traffic count = 110 vehicles per day
- posted speed limit = 50 km/hr
- farm vehicles utilize bridge for access to fields
- barriers are substandard
- no cultural heritage value
- extensive invertebrate and trout spawning habitat within the creek bed
- Potential habitat for species of conservation concern in the proximity is primarily located within the large swamp community located to the south of 6th Sideroad

PROBLEM STATEMENT: “Town of The Blue Mountains Bridges 2 & 3 show signs of deterioration and have been posted with a 10 tonne load limit. The Town has identified the need to assess alternative solutions for this crossing to provide an improved crossing or alternative route that will be most safe and cost effective, while minimizing impacts to the surrounding residents and environments.”

Alternative Solutions:

- Do Nothing
- Permanently Close and Remove Bridges
- Repurpose Bridges to Non-Vehicle Traffic
- Rehabilitate Bridges
- Replace Bridges with Single Lane Bridges
- Replace Bridges with Two Lane Bridges
BRIDGES 2 & 3 - SUMMARY OF ALTERNATIVES

Alternative A: Do Nothing

- Does not address the problem statement. No safety improvements are made, bridge will continue to deteriorate and eventually will require replacement or closure. Least impact to natural environment and least capital cost.

Alternative B: Permanently Close and Remove Bridges

- Addresses the problem statement. Safety concerns are eliminated, future maintenance requirements are eliminated, however a permanent detour for residents is required, including significant impacts to farm equipment movements. Minor impacts to the natural environment to remove the existing bridges, will eliminate the hydraulic constriction of the watercourse,

Alternative C: Repurpose Bridges to Non-Vehicular Traffic

- Addresses the problem statement. Bridge will remain in place similar to Clendenan Bridge, it will continue to deteriorate however the reduced load capacity will remain sufficient for pedestrian use for some time. Improvements to the barriers should be considered. A permanent detour for residents is required including significant impacts to farm equipment movements. No impact to natural environment, large impact to social environment.

Alternative D: Rehabilitate the Bridges

- Does not fully address the problem statement. Safety concerns are eliminated, future maintenance requirements remain, and the load capacity of the structure will remain restricted. The bridges were designed in the 1930's and were only ever meant to carry 10-15 tons (9-13.6 tonnes) maximum vehicle weight. Repairs will not remove the need for a load restriction. There will be minor impacts to the natural environment that can be mitigated through protection measures.
BRIDGES 2 & 3 - SUMMARY OF ALTERNATIVES

Alternative E1: Replace Bridges with Single Lane Bridges

- Fully addresses the problem statement. Minor increases in travel width can be obtained with minimal or no increase to environmental footprint, load capacity restrictions would be eliminated, snowplow, school bus, farm vehicles less than 16 feet (4.88 m) wide and fire trucks would be able to use the bridge.

Alternative E2: Replace Bridges with Two Lane Bridges

- Fully addresses the problem statement. Load capacity restrictions would be eliminated, snowplow, school bus, farm vehicles, and fire trucks would be able to use the bridge. However the additional width is not required based on traffic volumes and sight lines. It will also result in significantly greater impacts to the environment as the bridge footprint would double within the watercourse. This area is habitat for fish and other species, and within the Niagara escarpment protection zone.

Preferred Alternative - E1 Replace Bridges with Single Lane Bridges

Design Objectives:
- Maximize single lane width of 4.9 m
- Minimize footprint of disturbance
- Increase load capacity
- Maintain hydraulic capacity
- Install roadside safety measures

Next Steps to be completed:
- Notice of Study Completion
- Geotechnical Investigation
- Archeological Stage 2 Investigation (provisional)
- Preliminary and Final Design
- Construction

Structure type and details to be confirmed during preliminary and detail design phase.
Structure Types

Modular Bridges:

- Examples are Lessard Welding Municipal Bridges or Bailey Type such as MABEY Compact 200 Bridges
- Both still require the replacement of the abutments and wingwalls and the associated environmental protection and dewatering measures associated with the construction
- Lessard bridge width options are limited to 4.2 m, 6.1 m, and 7.5 m. Span options are limited to 6 m, 9.1 m, 12.2 m, 15.24 m, and 18.3 m.
- MABEY Compact 200 bridge width options are limited to 4.2 m or 7.35 m. Span options are based on 3.05 m long panels, maximum span for single lane with single truss is 27.43 m.

Prefabricated Truss Bridges;

- Manufacturers such as Algonquin Bridge or Iron Bridge
- Width and span can be customized. More flexibility with deck type than a modular bridge.
- Still requires the replacement of the abutments and wingwalls and the associated environmental protection and dewatering measures associated with the construction.
Structure Types

Concrete Rigid Frame Bridges:

- Can be precast to reduce construction duration
- Width and span can be customized with a shallow depth of cross section (generally less than 0.5 m).
- Can be buried with gravel wearing surface
- Long service life with minimal maintenance requirements

Deck on Girder Bridges:

- Can be concrete or steel girders
- Wearing surface would generally be paved, however could be designed for gravel wearing surface
- Long service life with moderate maintenance requirements
- Width and span can be customized. However depth of cross section will be large (generally greater than 1.0 m) and will impact the hydraulic opening and/or will require significant changes to the road profile and grading.
Structure Types

Concrete Box Culvert:

- Required span is too large for two single cell box culverts
- Recently Highway 407 work included custom large span clam shell concrete box culverts
- Long service life with minimal maintenance requirements
- Increased environmental impact within the watercourse
- Soil condition and bearing capacity to be confirmed

Corrugated Steel Plate Culverts:

- Will require multiple culverts to achieve equivalent hydraulic capacity or large open bottom arch
- Requires minimum cover over the culverts
- Increased environmental impact within the watercourse for closed bottom culverts
- Generally lower service life than concrete box
- Greater probability of debris build up and required maintenance to keep clear with multiple culverts
### BRIDGES 2 & 3 – STRUCTURE TYPES

<table>
<thead>
<tr>
<th></th>
<th>Prefabricated / Modular Truss Bridges</th>
<th>Concrete Rigid Frame Bridges</th>
<th>Deck on Girder Bridges</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Design Life</strong></td>
<td>Lowest</td>
<td>Highest</td>
<td>High</td>
</tr>
<tr>
<td><strong>Capital Cost</strong></td>
<td>Lowest</td>
<td>Moderate</td>
<td>Highest</td>
</tr>
<tr>
<td><strong>Maintenance</strong></td>
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<td>Lowest</td>
<td>Moderate</td>
</tr>
<tr>
<td><strong>Suitability</strong></td>
<td>High</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td><strong>Single Lane Width</strong></td>
<td>4.2 m or custom</td>
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<td>4.9</td>
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<tr>
<td><strong>Hydraulic Capacity</strong></td>
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<td>Reduced</td>
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<td>$1.7M</td>
<td>$2.5M</td>
</tr>
</tbody>
</table>

Geotechnical investigation required to confirm the foundation requirements: shallow vs deep
BRIDGE 13 - STUDY AREA

Bridge 13 (Heathcote Bridge) is located on Main Street

2019 OSIM

- 10% of the deck is in poor condition
- 100% of the ballast wall is in poor condition
- 15% of the wingwalls are in poor condition
- No barrier installed
- Concrete poured at approach corners is not connected to beams
- Loss of road approach granular and stability
- Scour at southwest corner of abutment
- Erosion occurring at embankments
BRIDGE 13

Existing conditions:

- designated as a rural local road
- bridge load capacity at 5 tonnes – no fire truck, snow plow, or school bus access
- travel width of 4.5 m
- Average Daily Traffic = 4 vehicles per day
  (traffic counts conducted in January, May, & August 2019)
- maximum daily traffic count = 16 vehicles per day
  (January count west of bridge)
- posted speed limit = 50 km/hr
- farm vehicles utilize bridge for access to fields
- barriers are non-existent
- site has local cultural heritage value
- The watercourse is a coolwater community that often dries up completely in the summer
- Low potential for the bridge or adjacent areas to provide habitat for Species of Conservation Concern

PROBLEM STATEMENT: “Town of The Blue Mountains has identified the need to evaluate alternative solutions for the improvement of the Bridge 13 crossing in order to improve safety at the bridge. The existing bridge is considered to be deficient with respect to barrier protection, load capacity and signage."

Alternative Solutions:

- Do Nothing
- Permanently Close and Remove the Existing Bridge
- Repurpose Bridge to Non-Vehicular Traffic
- Rehabilitate the Existing Bridge
- Replace the Bridge with a Single Lane Bridge
- Replace the Bridge with a Two Lane Bridge
- Rehabilitate and Download Bridge
BRIDGE 13 - SUMMARY OF ALTERNATIVES

Alternative A: Do Nothing
- Does not address the problem statement. No safety improvements are made, bridge will continue to deteriorate and eventually the deck will require replacement and more embankment material will be lost. The least impact to natural environment and least capital cost.

Alternative B: Permanently Close and Remove Bridge
- Not a viable alternative. Access to three properties is eliminated including access for farm equipment.

Alternative C: Repurpose Bridges to Non-Vehicular Traffic
- Not a viable alternative. Access to three properties is eliminated including access for farm equipment.

Alternative D: Rehabilitate the Existing Bridge
- Does not fully address the problem statement. Safety concerns are eliminated, future maintenance requirements are reduced, however the load capacity of the structure will remain restricted. The foundation conditions remain unknown, some improvement to the load restriction may be possible with replacement of the deck and possible strengthening of the girders. Minor impacts to the natural environment.

Alternative E1: Replace the Bridge with a Single Lane Bridge
- Fully addresses the problem statement. Minor increases in travel width can be obtained with minimal or no increase to environmental footprint, load capacity restrictions would be eliminated, snowplow, school bus, farm vehicles less than 16 feet wide (4.88 m) and fire trucks would be able to use the bridge.
BRIDGES 13 - SUMMARY OF ALTERNATIVES

Alternative E2: Replace the Bridge with a Two Lane Bridge

- Fully addresses the problem statement. Load capacity restrictions would be eliminated, snowplow, school bus, farm vehicles, and fire trucks would be able to use the bridge. However the additional width is not required based on traffic volumes and sight lines. It will also result in significantly greater impacts to the environment as the bridge footprint would double within the watercourse.

Alternative F: Rehabilitate and Download the Bridge

- Fully addresses the problem statement. Load capacity restrictions could be improved, Town maintenance requirements would be eliminated. Property transfer related to the municipal right of way and by-laws related to the common law right of access would be required. Three properties would no longer have access. These property owners are not interested in owning and maintaining the bridge. Legal counsel would need to be consulted.

Preferred Alternative – E1 Replace Bridge with Single Lane Bridge

Design Objectives:
- Maximize single lane width of 4.9 m
- Minimize footprint of disturbance
- Increase load capacity
- Maintain hydraulic capacity
- Install roadside safety measures

Next Steps to be completed:
- Notice of Study Completion
- Geotechnical Investigation
- Archeological Stage 2 Investigation (provisional)
- Preliminary and Final Design
- Construction

Structure type and details to be confirmed during preliminary and detail design phase
Structure Types

Modular Bridges:

- Examples are Lessard Welding Municipal Bridges or Bailey Type such as MABEY Compact 200 Bridges.

- Both still require the replacement of the abutments and wingwalls and the associated environmental protection and dewatering measures associated with the construction.

- Lessard bridge width options are limited to 4.2 m, 6.1 m, and 7.5 m. Span options are limited to 6 m, 9.1 m, 12.2 m, 15.24 m, and 18.3 m.

- MABEY Compact 200 bridge width options are limited to 4.2 m or 7.35 m. Span options are based on 3.05 m long panels, maximum span for single lane with single truss is 27.43 m.

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- Manufacturers such as Algonquin Bridge or Iron Bridge

- Width and span can be customized. More flexibility with deck type than a modular bridge.

- Still requires the replacement of the abutments and wingwalls and the associated environmental protection and dewatering measures associated with the construction.
Structure Types

Concrete Rigid Frame Bridges:

- Can be precast to reduce construction duration.
- Width and span can be customized with a shallow depth of cross section (generally less than 0.5 m).
- Can be buried with gravel wearing surface.
- Long service life with minimal maintenance requirements.

Deck on Girder Bridge:

- Timber deck on girder best preserves heritage aesthetic.
- Wearing surface would remain timber and require continued maintenance.
- Moderate service life with high maintenance requirements.
- Width and span can be customized.
Structure Types

Concrete Box Culvert:

- Required span is too large for a single cell box culvert
- Recently Highway 407 work included custom large span clam shell concrete box culverts
- Long service life with minimal maintenance requirements
- Increased environmental impact within the watercourse
- Soil condition and bearing capacity to be confirmed

Corrugated Steel Plate Culverts:

- Will require multiple culverts to achieve equivalent hydraulic capacity or large open bottom arch
- Requires minimum cover over the culverts
- Increased environmental impact within the watercourse for closed bottom culverts
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- Greater probability of debris build up and required maintenance to keep clear with multiple culverts
## BRIDGE 13 – STRUCTURE TYPES

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<th>Prefabricated / Modular Bridge</th>
<th>Twin Concrete Box Culverts</th>
<th>Concrete Rigid Frame Bridge</th>
<th>Timber Deck on Girder Bridge</th>
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<tbody>
<tr>
<td><strong>Design Life</strong></td>
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<td>$575,000</td>
<td>$750,000</td>
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*Box culvert sizing and suitability will need to be confirmed during preliminary design to maintain hydraulics*

*Geotechnical investigation required to confirm the foundation requirements: shallow vs deep*
NEXT STEPS

- Adoption of the preferred alternative by Council
- Finalize the Project File Reports
- Issue Notice of Completion
- 30 Day Review Period for Public and Stakeholders
- Complete a Geotechnical Investigation to Confirm Ground Conditions
- Engage an Engineer to Complete the Preliminary and Final Design
  - Structure Type to be Confirmed During Preliminary Design
  - Budgets to be Refined at Preliminary Design Stage
  - Final Design and Updated Budget to be Approved at Council
- Tender the Work for Construction