



08.18.2016



BIENNIAL BRIDGE INSPECTIONS

FINAL INSPECTION REPORT
Municipality of Dysart et al

October 2016

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1. INTRODUCTION

Tulloch Engineering Inc. was retained by the Township of Dysart et al to undertake detailed visual inspections of the municipally owned bridges and structural culverts within their Municipal jurisdiction. In accordance with Ontario Regulation 104/97 – Standards for Bridges, the structural integrity, safety and condition of every bridge shall be determined through the performance of at least one inspection in every second calendar year under the direction of a professional engineer (O. Reg. 472/10, s. 2). The Township's requirement was that the inspections be in accordance with the Ontario Structure Inspection Manual (OSIM).

The goal of the inspections is to ensure that an acceptable standard is being maintained for each bridge in terms of public safety, comfort, and convenience. The objectives of the inspections are as follows:

- To identify critical maintenance, rehabilitation, and/or replacement needs of the structures;
- To protect and prolong the useful life of the structures; and,
- To provide a basis for scheduling and funding of the maintenance, rehabilitation repairs, or replacement of the structures.

This report contains completed OSIM inspection forms, relevant photographs, suggested maintenance and capital repairs, and estimated capital costs for major repairs at each site.

The structures inspected as part of this assignment are shown on the key map provided in Figure 1.

2. INSPECTION PROCEDURES

Detailed visual inspections were completed in accordance with OSIM and involved a review of each primary structural element. The structural elements are identified by primary groupings and sub-groupings of each element. The condition of each element is quantified and assessed with a rating of 'excellent', 'good', 'fair', or 'poor'. The condition ratings are quantified for either a portion of the total structural element, or the entirety of the structural element. A glossary of definitions is given in Appendix A.

3. INSPECTION SUMMARIES

The results of the detailed visual inspections are recorded using standard Ontario Structure Inspection Manual (OSIM) forms. The forms provide a report of existing data and conditions at the time of the inspection for each bridge. Results of the previous inspections completed in 2014 were used as a starting-point template for this current round of inspections. Updated OSIM forms are located in Appendix B.

The reports identify additional recommended inspections, recommended maintenance work and recommended capital repair or rehabilitation work to address deficiencies along with estimated costs and schedule for such repairs. Each set of OSIM forms is preceded by a summary with key pictures to describe the observed conditions and results from each structure inspection. A brief summary for each structure follows.

3.1 Paddy's Pond (Bay) Bridge

Capital Improvements:

- A design remedy should be provided to repair or replace the damaged girder(s) and deck. Rehabilitation work as a minimum is required to repair damaged girder. Depending on the outcome of the structural evaluation it may be required to replace all girders.
- The deck and approach wearing surfaces, and the wing wall /retaining walls, are in poor to fair condition and should be replaced within 1-5 years or at time of girder replacement.

Guiderail Improvements:

- Installation of approach guiderails and end treatments in accordance with the Ontario Provincial Standards for bridge and highway design at all four quadrants.

Maintenance:

- None.

Additional Investigations:

- It is recommended that a structural evaluation be conducted and appropriate load ratings enforced, lane restrictions enforced and/or temporary structure installed (completed in September 2016).

3.2 Kennisis Lake Narrows Bridge

Capital Improvements:

- The wearing surface should be replaced within 1-5 years.

Guiderail Improvements:

- Installation of approach guiderails and end treatments in accordance with the Ontario Provincial Standards for bridge and highway design at all four quadrants.

Maintenance:

- Maintenance should be undertaken to repair the loose railing / guiderail.
- Bridge cleaning of the deck and deck drains under the curb should be conducted immediately to alleviate surface ponding issues.

Additional Investigations:

- It is recommended that the main longitudinal beam and soffit areas undergo an enhanced visual inspection with boat or barge due to limited access and detailed structural analysis be performed for potential load posting.

3.3 Barry's Bridge

Capital Improvements:

- It is recommended the structure undergo a minor rehabilitation in 1 - 5 years to repair the ballast walls, damaged beam, rebuild the approaches and replace the deck wearing surface.

Guiderail Improvements:

- Installation of approach guiderails and end treatments in accordance with the Ontario Provincial Standards for bridge and highway design at all four quadrants.

Maintenance:

- Repair ballast wall timbers.
- Repair / replace damaged guiderail post.
- Clean the bridge deck and deck drains under the curb.
- Debris should be cleaned from stream in northwest quadrant.

Additional Investigations:

- None

3.4 Redstone Brook Bridge

Capital Improvements:

- It is recommended that the structure undergo a minor rehabilitation in 1-5 years to repair the ballast walls, embankments, pad and resurface the approaches, deck wearing surface and replace the railing over the structure.
- The undermined east approach wearing surface should be investigated further and repaired immediately as a matter of safety (this could be capital or maintenance depending on root cause).

Guiderail Improvements:

- Installation of approach guiderails and end treatments in accordance with the Ontario Provincial Standards for bridge and highway design at all four quadrants.

Maintenance:

- The undermined east approach wearing surface should be investigated further and repaired immediately as a matter of safety.
- Maintenance should be undertaken to repair the loose guiderail posts.
- Clean the bridge deck and deck drains.
- The tree and other debris should be removed from under the structure to prevent damage to the structure and to allow for unimpeded flow under the structure.

Additional Investigations:

- It is highly recommended that the root cause of the hole at the east approach be investigated.

3.5 Guilford Pine Lake Bridge

Capital Improvements:

- None.

Guiderail Improvements:

- None.

Maintenance:

- Repair the damaged guiderail.
- Minor concrete repairs to the parapet walls.
- The deck should be swept to remove debris and sand to promote positive drainage.
- Install hazard signage.

Additional Investigations:

- None.

3.6 Guilford Cranberry Lake Bridge

Capital Improvements:

- None.

Guiderail Improvements:

- None.

Maintenance:

- Address erosion of shoulders near deck ends.
- Route and seal transverse cracks.
- Install hazard signage.

Additional Investigations:

- None.

3.7 Oblong Lake Narrows Bridge

Capital Improvements:

- The substructure; excluding piles and capping beams, and superstructure; excluding possibly wood soffit, require major rehabilitation. The structure requires major rehabilitation including repair / replacement of abutments, deck, soffit, wearing surface and guiderails. This work should be undertaken in 1-5 years.

Guiderail Improvements:

- Installation of approach guiderails and end treatments in accordance with the Ontario Provincial Standards for bridge and highway design at all four quadrants.

Maintenance:

- Repair guiderail in SE corner.
- Erosion control and slope protection.

Additional Investigations:

- A detailed deck condition survey should be conducted prior to major rehabilitation work to establish actual deck conditions between composite materials.
- It is also recommended that an enhanced visual inspection of center bents be conducted at that time to ensure the integrity of major structural pier components.

3.8 South Bay Bridge

Capital Improvements:

- The structure requires a minor rehabilitation including installation of erosion protection on the approach embankments, rebuilding and resurfacing of the approaches and repairs to the deck. This work should be completed in the 6-10 year period.

Guiderail Improvements:

- Installation of approach guiderails and end treatments in accordance with the Ontario Provincial Standards for bridge and highway design at all four quadrants.

Maintenance:

- Repair (patch) abutment ballast wall boards.
- Tighten capping beam nuts.
- Patch potholes.
- Route and seal longitudinal cracks.

Additional Investigations:

- None.

3.9 Koshlong Lake Bridge

Capital Improvements:

- The structure requires a minor rehabilitation within a 1-5 year period including: rebuilding of eroded embankments and installation of erosion protection on approach side slopes, stabilization of embankments at deck ends with gabion baskets, replacement of the surface treated wearing surface and address guiderail height.

Guiderail Improvements:

- Installation of approach guiderails and end treatments in accordance with the Ontario Provincial Standards for bridge and highway design at all four quadrants.

Maintenance:

- Repairs to bridge driving surface if not replaced.
- Replace the missing guiderail post and tighten loose connections.
- Clean the bridge deck to promote proper drainage.
- Erosion control at abutments.

Additional Investigations:

- None

3.10 Kelly Lake Bridge

Capital Improvements:

- The structure requires rip-rap erosion protection around both abutments to prevent further scour of the foundations and to provide embankment protection.

Guiderail Improvements:

- Installation of approach guiderails and end treatments in accordance with the Ontario Provincial Standards for bridge and highway design at all four quadrants.

Maintenance:

- The build-up of debris on the deck should be removed.
- Vegetation removal.
- Clear waterway of debris.

Additional Investigations:

- None.

3.11 Burnt River Bridge

Capital Improvements:

- None.

Guiderail Improvements:

- None.

Maintenance:

- Re-install missing bolts in baseplates of railing system.
- Replace damaged south expansion joint seal.

Additional Investigations:

- None.

3.12 Coleman Lake Bridge

Capital Improvements:

- The structure requires a minor rehabilitation to repair undermined abutments and wing walls, especially at the Northeast quadrant.
- Installation of erosion protection at the abutment faces.

- Repair of concrete abutments.
- Replacement of surface treated wearing surface.
- This work should be completed in 1-5 years.

Guiderail Improvements:

- None.

Maintenance:

- Maintenance is required to repair the damaged guiderail and posts.
- Fill potholes.
- Clear vegetation and sand build-up on approaches to improve drainage.
- Clear vegetation around signs.

Additional Investigations:

- None.

3.13 Eagle Lake Bridge

Capital Improvements:

- The bridge should have major rehabilitation, be replaced or be closed.
- Work will have to be coordinated with the Trent Severn waterway as the bridge and dam are connected.
- Consideration should be given to closing the structure to vehicular traffic as it has reached the end of its service life, as opposed to replacing or rehabilitating the structure. If the structure were closed, the detour is approximately 400 m.

Guiderail Improvements:

- None.

Maintenance:

- Remove vegetation and granular build-up at railings.

Additional Investigations:

- The structure requires a detailed structural evaluation. The structural investigation should include a load rating or closure.
- Detailed deck condition survey and underwater inspection of foundations if bridge is not closed and/or as part of major rehabilitation.

- Should it be decided to keep the bridge, a cost-benefit analysis should be undertaken after structural investigation to evaluate if rehabilitation or replacement will provide the lowest life-cycle cost to the Municipality.

3.14 Pelaw River Bridge

Capital Improvements:

- The structure requires a minor rehabilitation to repair the abutment faces and wing walls, and stabilize the piles with wood blocking. This should be undertaken in 1-5 years.

Guiderail Improvements:

- None.

Maintenance:

- Repair the loose/damaged guiderail posts.
- Clear vegetation at wing walls, along shoulder of approaches and guiderails.

Additional Investigations:

- None.

3.15 Drag River Bridge

Capital Improvements:

- The structure requires minor rehabilitation to repair concrete soffit, sidewalk, curb and end posts.
- Full depth crack repair should be completed at the deck ends to prevent water penetration.
- For aesthetics reasons, the steel railing system could be re-coated.

Guiderail Improvements:

- None.

Maintenance:

- Place erosion protection at the retaining wall in the NE quadrant to prevent erosion.
- Hazard signage to Provincial Standards should be installed at the terminations of the guiderail.

Additional Investigations:

- None.

3.16 Highland Street Culvert

Capital Improvements:

- The structure requires minor rehabilitation to the roadway curbs to address the deterioration of the concrete. This should be undertaken within a year to prevent further deterioration of sidewalk and to promote water flow to catch basins.
- Deck surface area requires routing and sealing of transverse cracks.

Guiderail Improvements:

- None.

Maintenance:

- Repair / replace damaged guiderail posts and blocks.
- Route and seal cracks and patch potholes.
- Clear debris and vegetation at railing to promote drainage.
- Install caps on railing posts.

Additional Investigations:

- Enhanced investigation of the condition of the culvert barrel is required to confirm condition. Due to high water levels and flows (downstream dam) this area could not be inspected during the OSIM inspection and will require as a minimum an enhanced investigation with small boat or possibly underwater investigation.

3.17 West Shore Kennisis Lake Culvert

Capital Improvements:

- None.

Guiderail Improvements:

- Installation of approach guiderails and end treatments in accordance with the Ontario Provincial Standards for bridge and highway design at all four quadrants.

Maintenance:

- None.

Additional Investigations:

- None.

4. SUMMARY OF CAPITAL IMPROVEMENTS

The table below summarizes the estimated capital cost of repair or rehabilitation to address the deficiencies identified through the inspection process. Cost estimates for the repairs and rehabilitation are outlined in the OSIM forms in Appendix B. For the purpose of this report, capital improvements are any significant work that will preserve or extend the life of the structure. This work is typically beyond the normal maintenance activities performed by the Municipality. This information along with the BCI and BSI is used to prioritize the improvements and develop a capital plan.

ID	Structure Name	Urgent	<1 Yr	1-5 Yr	6-10 Yr	BCI	BSI	RSL
DY-1	Paddy's Pond Bridge	\$135,000*				58	47	20 Years
DY-2	Kennisis Lake Narrows Bridge			\$32,500*		66	62	20 Years (age unknown)
DY-3	Barry's Bridge	\$2,000	\$10,000	\$105,000*		64	61	14 Years
DY-4	Redstone Brook Bridge		\$85,000	\$60,000*		61	58	14 Years
DY-5	Pine Lake Bridge			\$2,000		90	87	62 Years
DY-6	Cranberry Lake Bridge					99	97	67 Years
DY-7	Oblong Lake Narrows Bridge			\$726,000*		42	33	18 Years
DY-8	South Bay Bridge			\$25,000	\$70,000*	68	65	14 Years
DY-9	Koshlong Lake Bridge			\$25,000	\$140,000*	68	66	14 Years
DY-10	Kelly Lake Bridge			\$35,000*		71	68	24 Years
DY-11	Burnt River Bridge		\$2,500			76	74	62 Years
DY-12	Coleman		\$15,000	\$20,000	\$20,000	73	70	60 Years

	Lake Bridge							
DY-13	Eagle Lake Bridge			\$50,000** (\$700,000)		53	49	0 Years (age unknown)
DY-14	Pelaw River Bridge			\$110,000		67	53	33 Years
DY-15	Drag River Bridge		\$5,000	\$58,000		70	66	23 Years
DY-16	Highland Street Culvert			\$20,000		72	69	10 Years (age unknown)
DY-17	West Shore Kennisis Lake Culvert				\$10,000*	96	93	70 Years (age unknown)
TOTAL		\$137,000	\$117,500	\$1,268,500	\$240,000	Avg.70	Avg.66	Avg. 37

BCI: Bridge Condition Index

BSI: Bridge Sufficiency Index

RSL: Remaining Service Life

* Includes guiderail installation.

** It is recommended that the Eagle Lake Bridge be closed and removed unless passed following a detailed structural analysis.

5. 5-YEAR CAPITAL PLAN

The table below summarizes a proposed 5-year capital plan.

Name	2017	2018	2019	2020	2021
Paddy's Pond Bridge	\$135,000				
Oblong Lake Narrows Bridge	\$726,000				
Eagle Lake Narrow Bridge	\$50,000*				
Barry's Bridge	\$2,000		\$115,000		
Burnt River Bridge	\$2,500				
Coleman Lake Bridge	\$15,000				\$40,000
Redstone Brook Bridge		\$145,000			
Pine Lake Bridge		\$2,000			
Kennisis Lake Narrows Bridge			\$32,500		
Pelaw River Bridge					\$110,000
South Bay Bridge				\$95,000	
Drag River Bridge			\$63,000		
Kelly Lake Bridge				\$35,000	
Highland Street Culvert					\$20,000
TOTAL	\$930,500	\$147,000	\$210,500	\$130,000	\$170,000

* It is recommended that the Eagle Lake Bridge be closed and removed unless passed following a detailed structural analysis.

6. CONCLUSIONS AND RECOMMENDATIONS

Upon completion of the biennial structure inspections, a number of recommendations have been identified for maintenance and capital improvement for both short and long term replacement and/or rehabilitation planning with municipal structures. The recommendations are summarized in the report along with cost estimates and schedule for planning purposes.

The municipal bridges and structural culverts in the Municipality of Dysart et al are in overall fair condition with an average BCI of 70. There are 7 of 17 structures rated as good. However, there are 7 of 17 structures rated as fair and 3 of 17 rated as poor indicating that about 60% of the structures should be scheduled for major rehabilitation or replacement within the next 1 to 5 years.

We trust that the contents of this report sufficiently outline the requirements for bridge and structural culvert maintenance, repair and replacement. Should you have any questions or comments on the contents of this report, please do not hesitate to contact the undersigned.

Respectfully submitted,
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APPENDIX A

Glossary of Definitions

Abutment - A substructure unit which supports the end of the structure and retains the approach fill.

Auxiliary Components - Any component which does not share in the load carrying capacity of the structure.

Biennial Structure Inspection - An inspection performed in every second calendar year to assess the condition of the structure, in accordance with the methodology described in OSIM.

Bridge - A structure which provides a roadway or walkway for the passage of vehicles, pedestrians or cyclists across an obstruction, gap or facility and is greater than or equal to 3 m in span.

Bridge Condition Index (BCI) - The BCI rating is a planning tool developed by the Ontario Ministry of Transportation that helps schedule maintenance and rehabilitation work. The BCI is not used to rate or indicate the safety of a bridge. The BCI result is organized into ranges from 0 to 100. To calculate the BCI rating, the current dollar value of the bridge is divided by the replacement cost of the bridge. The replacement value is based on the cost to reconstruct a new bridge. Using this formula enables the Owner to make an informed decision about the amount of work a bridge requires and whether or not to pursue replacement over repair in the near future.

Rating	Maintenance Schedule
Good: BCI Range 70 -100	Maintenance is not usually required within the next five years
Fair: BCI Range 60 -70	Maintenance work is usually scheduled within the next five years. This is the ideal time to schedule major bridge repairs to get the most out of bridge spending.
Poor: BCI Less than 60	Maintenance work is usually scheduled within one year.

Bridge Sufficiency Index (BSI) – The BSI rating is a planning tool developed by the Ontario Ministry of Transportation. The BSI is calculated using the BCI rating less ratings for Importance Factors including Traffic, Economic Implications, Bridge Width and Bridge Profile or Alignment. It is a planning tool with a range of 0 to 100 and helps prioritize maintenance and rehabilitation work, and replacement, with bridges of equal BCI but lower BSI having importance over bridges with higher BSI.

Chord - The upper and lower main longitudinal component in trusses or arches extending the full length of the structure.

Coating - The generic term for paint, lacquer, enamel, sealers, galvanizing, metallizing, etc.

Concrete Deck Condition Survey - A detailed inspection of a concrete deck in accordance with The Structure Rehabilitation Manual.

Culvert (Structural) - A Structure that forms an opening through soil and has a span of 3 metres or more

Defect - An identifiable, unwanted condition that was not part of the original intent of design.

- **Scaling** - Scaling is the local flaking, or loss of the surface portion of concrete or mortar as a result of the freeze-thaw deterioration of concrete. Scaling is common in non air-entrained concrete, but can also occur in air-entrained concrete in the fully saturated condition. Scaling is prone to occur in poorly finished or overworked concrete where too many fines and not enough entrained air is found near the surface.
- **Disintegration** - Disintegration is the physical deterioration or breaking down of the concrete into small fragments or particles. The deterioration usually starts in the form of scaling and, if allowed to progress beyond the level of very severe scaling is considered as disintegration. Disintegration may be caused by de-icing chemicals, sulphates, chlorides or by frost action.
- **Erosion** - Erosion is the deterioration of concrete brought about by water-borne sand and gravel particles scrubbing against concrete surfaces. Similar, damage may be caused by flowing ice. Erosion is sometimes combined with the chemical action of air and water-borne pollutants which accelerate the breakdown of the concrete. Erosion is generally an indication that the concrete is not durable enough for the environment in which it has been placed.
- **Corrosion of Reinforcement** - Corrosion is the deterioration of reinforcement by electrolysis. The alkali content in concrete protects the reinforcement from corrosion. However, when chloride ions above a certain concentration are dissolved in water and penetrate through the concrete to the reinforcement this protection breaks down and corrosion starts. In the initial stages, corrosion may appear as a rust-stain on the concrete surface. In the advanced stages, the surface concrete above the reinforcement cracks, delaminates and spalls off exposing heavily rusted reinforcement.
- **Delamination** - Delamination is defined as a discontinuity of the surface concrete which is substantially separated but not completely detached from concrete below or above it. Visibly, it may appear as a solid surface but can be identified as a hollow sound by tapping or chain dragging. Delamination begins with the corrosion of reinforcement and subsequent cracking of the concrete. Delamination or debonding may also occur in concrete that has been patched or overlaid due to the continued deterioration of the older concrete. This may happen even in the absence of any rusting of reinforcing steel.
- **Spalling** - A spall is a fragment, which has been detached from a larger concrete mass. Spalling is a continuation of the delamination process whereby the actions of external loads, pressure exerted by the corrosion of reinforcement or by the formation of ice in the delaminated area results in the breaking off of the delaminated concrete.

- **Cracking** - A crack is a linear fracture in concrete which extends partly or completely through the member. Cracks in concrete occur as a result of tensile stresses introduced in the concrete. Tensile stresses are initially carried by the concrete and reinforcement until the level of the tensile stresses exceeds the tensile capacity of the concrete. After this point the concrete cracks and the tensile force is transferred completely to the steel reinforcement. The crack widths and distribution is controlled by the reinforcement in reinforced and prestressed concrete, whereas in plain concrete there is no such control.
- **Alkali-Aggregate Reaction** - In Ontario, there exists several sources of aggregates that react adversely with the alkalis in cement to produce a highly expansive gel. Currently, these sources of reactive aggregates are generally avoided, but they do exist in many existing structures and still may occur in newer structures. The two general types of reactions in Ontario are alkali-carbonate and alkali-silica reaction. The expansion of the gel and aggregates occurs due to hydroxyl ions in the concrete pore solution, which under moist conditions, leads to cracking and deterioration of the concrete.
- **Surface Defects** - Surface defects are not necessarily serious in themselves; however, they are indicative of a potential weakness in the concrete, and their presence should be noted but not classified as to severity, except for honeycombing and pop-outs.
 - **STRATIFICATION** is the separation of the concrete components into horizontal layers in over-wetted or over vibrated concrete. Water, laitance, mortar and coarse aggregates occupy successively lower positions. A layered structure in concrete will also result from the placing of successive batches that differ in appearance.
 - **SEGREGATION** is the differential concentration of the components of mixed concrete resulting in nonuniform proportions in the mass. Segregation is caused by concrete falling from a height, with the coarse aggregates settling to the bottom and the fines on top. Another form of segregation occurs where reinforcing bars prevent the uniform flow of concrete between them.
 - **COLD JOINTS** are produced if there is a delay between the placement of successive pours of concrete, and if an incomplete bond develops at the joint due to the partial setting of the concrete in the first pour.
 - **DEPOSITS** are often left behind where water percolates through the concrete and dissolves or leaches chemicals from it and deposits them on the surface.
 - **HONEYCOMBING** is produced due to the improper or incomplete vibration of the concrete which results in voids being left in the concrete where the mortar failed to completely fill the spaces between the coarse aggregate particles.
 - **POP-OUTS** are shallow, typically conical depressions, resulting from the breaking away of small portions of the concrete surface, due to the expansion of some aggregates or due to frost action. The shattered aggregate particle may be found at the bottom of the depression, with a part of the aggregate still adhering to the pop-out cone.
 - **ABRASION** is the deterioration of concrete brought about by vehicles or snow-plough blades scraping against concrete surfaces, such as, decks, curbs, barrier walls or piers.

- **WEAR** is usually the result of dynamic and/or frictional forces generated by vehicular traffic, coupled with the abrasive influx of sand, dirt and debris. It can also result from the friction of ice or water-borne particles against partly or completely submerged members. The surface of the concrete appears polished.
- **SLIPPERY CONCRETE SURFACES** may result from the polishing of the concrete deck surface by the action of repetitive vehicular traffic.

Detailed Visual Inspection - An element by element visual assessment of material defects, performance deficiencies and maintenance needs of a structure.

Deterioration - A defect that has occurred over a period of time.

Distress - A defect produced by loading.

Elements - The individual parts of a structure defined for inspection purposes. Several bridge components may be grouped together to form one bridge element for inspection purposes

Environment - An element's exposure to salt spray:

- Benign - Not exposed (e.g. River Pier)
- Moderate - Exposed but element protected (e.g. Asphalt covered and waterproofed deck)
- Severe - Exposed and element not protected (e.g. Exposed concrete deck, Barrier Wall)

Evaluation - The determination of the load carrying capacity of structures in accordance with the requirements of the Canadian Highway Bridge Design Code.

Maintenance - Any action which is aimed at preventing the development of defects or preventing deterioration of a structure or its components.

Primary Components - The main load carrying components of the structure.

Rehabilitation - Any modification, alteration, retrofitting or improvement to a structure subsystem or to the structure which is aimed at correcting existing defects or deficiencies.

Remaining Service Life - Remaining Service Life is an estimate of the useful remaining life of the structure and is based on the year of construction or major rehabilitation and a service life of 50 years for culverts that are not plastic, polymer coated or concrete and a service life of 70 years for other structures.

Repair - Any modification, alteration, retrofitting or improvement to a component of the structure which is aimed at correcting existing defects or deficiencies.

Retaining Wall - Any structure that holds back fill and is not connected to a bridge.

Secondary Components - Any component which helps to distribute loads to primary components, or carries wind loads, or stabilizes primary components.

Sign Support - A metal, concrete or timber structure, including supporting brackets, service walks and mechanical devices where present, which support a luminaire, sign or traffic signal and which span or extend over a highway.

Span - The horizontal distance between adjacent supports of the superstructure of a bridge, or the longest horizontal dimension of the cross-section of a culvert or tunnel taken perpendicular to the walls.

Stringers - Stringers span between floor beams and provide the support for the deck above.

Structure - Bridge, culvert, tunnel, retaining wall or sign support.

Suspected Performance Deficiency - A Suspected Performance Deficiency should be recorded during an inspection, if an element's ability to perform its intended function is in question, and one or more performance defects exist.

APPENDIX B

OSIM Forms

Municipality of Dysart et al
2016 Bridge and Structure
Inspections

Key Plan

Legend

★ Structure Location

MTO Structure ID:Structure Name

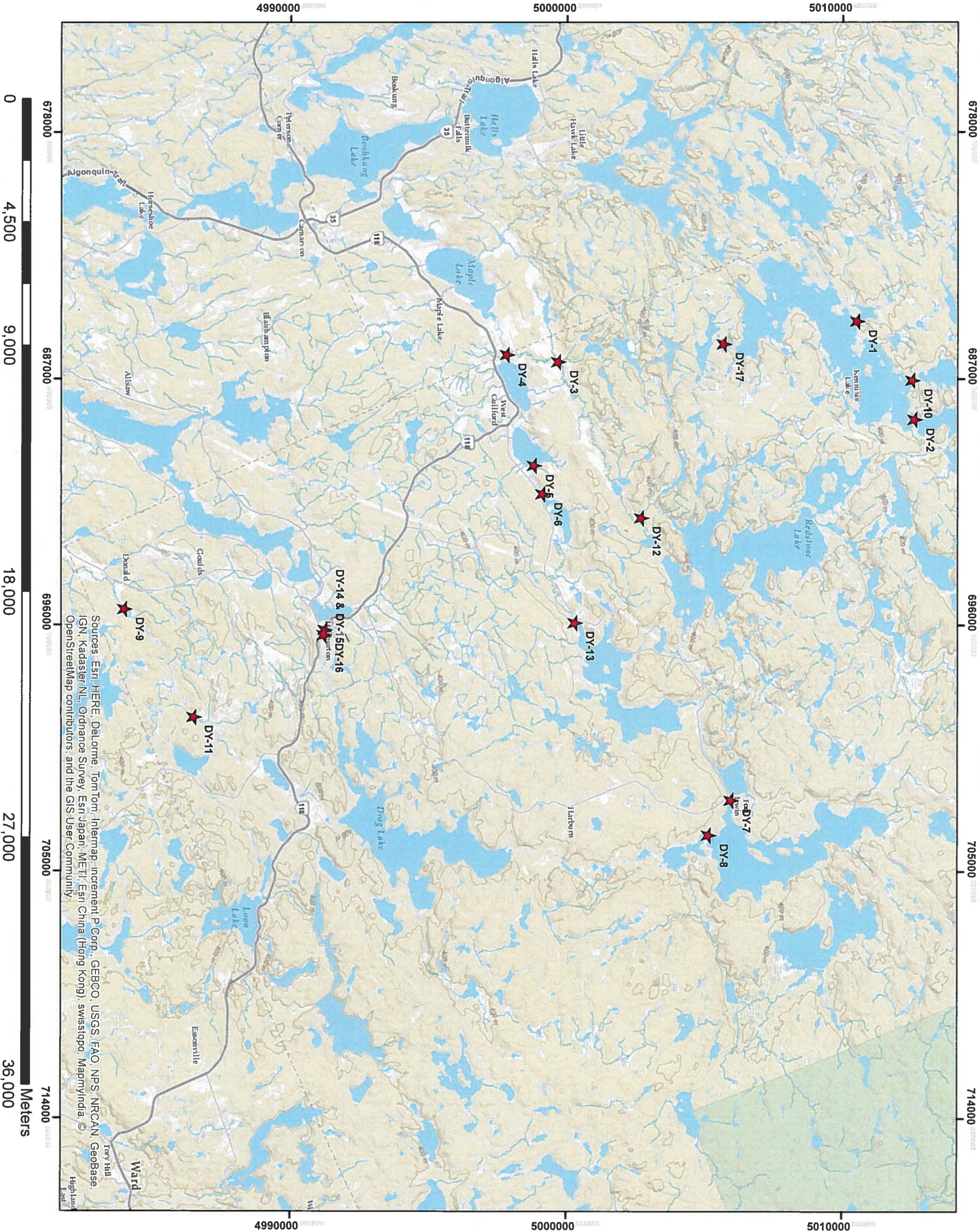
- DY-1: Paddys Pond Bridge
- DY-2: Kennis Lake Narrows Bridge
- DY-3: Barry's Bridge
- DY-4: Redstone Brook Bridge
- DY-5: Guilford Pine Lake Bridge
- DY-6: Guilford Cranberry Lake Bridge
- DY-7: Oblong Lake Narrows Bridge
- DY-8: South Bay Bridge
- DY-9: Koshlong Lake Bridge
- DY-10: Kelly Lake Bridge
- DY-11: Burnt River Bridge
- DY-12: Coleman Lake Bridge
- DY-13: Eagle Lake Road Bridge
- DY-14: Pelaw River Bridge
- DY-15: Drag River Bridge
- DY-16: Highland Street Culvert
- DY-17: West Shore Kennis Lake Culvert

PROJECT: 16-4017 Figure 1

SCALE: 1:140,000 DATE: October 2016

Datum: NAD83
Projection: UTM Zone 17N

Topographic Base Imagery:
Obtained from ESRI Basemaps
(c) DigitalGlobe



Municipality of Dysart et al
2016 Bridge and Structure
Inspections

Key Plan

Legend

★ Structure Location

MTO Structure ID:Structure Name

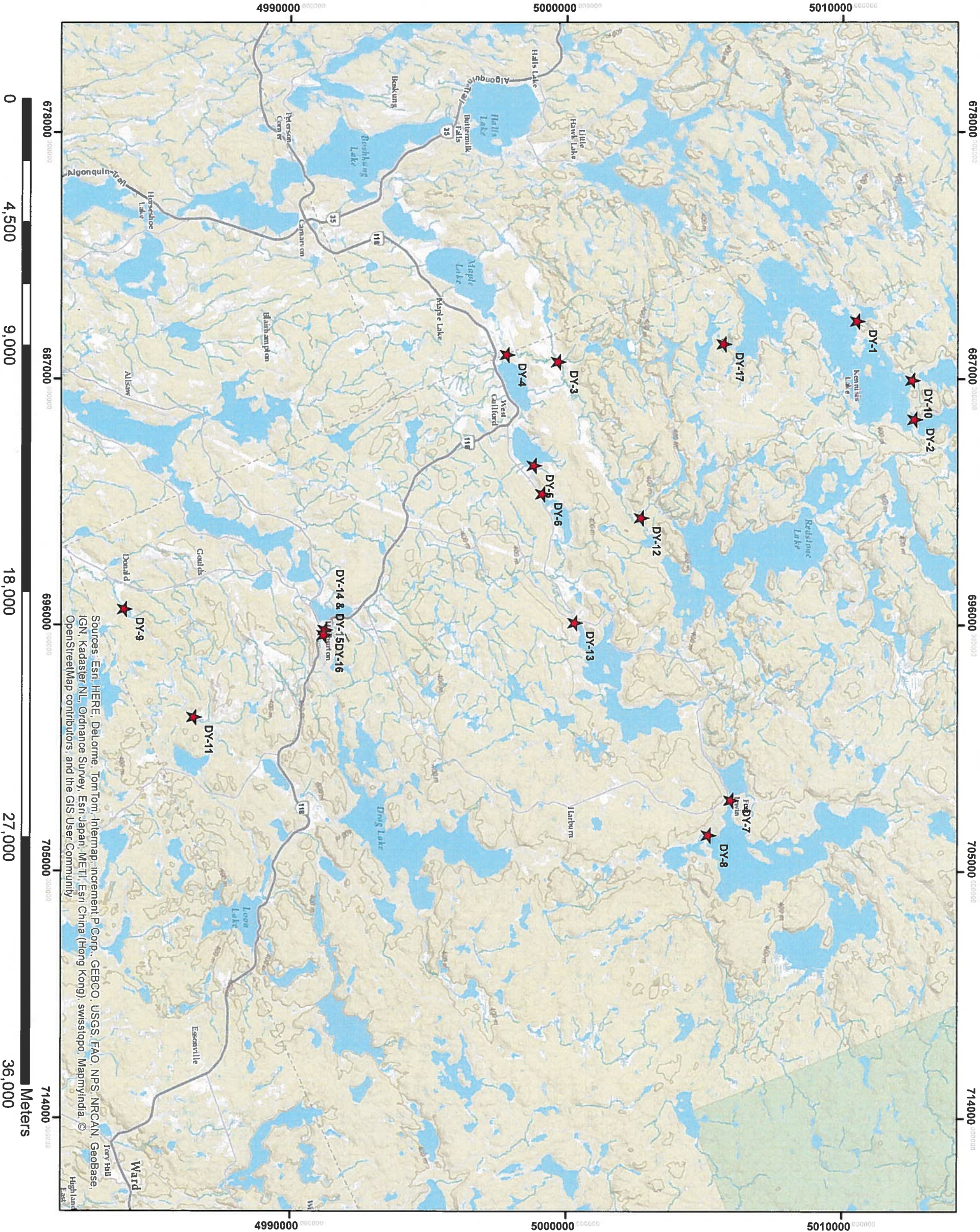
- DY-1: Paddys Pond Bridge
- DY-2: Kennis Lake Narrows Bridge
- DY-3: Barry's Bridge
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- DY-16: Highland Street Culvert
- DY-17: West Shore Kennis Lake Culvert

PROJECT: 16-4017 Figure 1

SCALE: 1:140,000 DATE: October 2016

Datum: NAD83
Projection: UTM Zone 17N

Topographic Base Imagery:
Obtained from ESRI Basemaps
(c) DigitalGlobe



Structure No: DY-1

Paddy's Pond Bridge

Structure Description

Paddy's Pond Bridge is located on North Kennisis Lake Road, approximately 5 km west of Kennisis Lake Narrows. The bridge was constructed in 1966 and is a 6.1 m single span, two-lane structure with a deck supported by timber piers and abutments. The bridge has an overall deck width of 6.7 m and 6.2 m wide surface treated wearing surface with timber curbs. There is steel beam guiderail across the structure but no guiderail on the approaches.

Structure Condition

The structure is in poor overall condition with a BCI of 58 and BSI of 47. The abutments are in fair condition with isolated locations of minor splitting of the ballast wall. The wing walls are in fair condition with considerable displacement noted; the northeast wing wall continues to fail. As noted from previous inspections, the northeast wing wall should be repaired to prevent further washout of backfill on approaches. The deck wearing surface is in fair to poor condition showing potholing and alligator cracking; the wearing surface should be replaced to protect the wooden deck. One of the wood girders and deck above has failed due to overloading - severe cracking and splitting of the 4th beam from the north face. Significant amount of deflection was also observed under loading of tandem axle dump truck.

The guiderail does not comply with the bridge code; the post spacing over the structure is insufficient and there are no guiderail or end treatments on the approaches.

Recommendation

It is recommended that a structural evaluation be conducted and appropriate load ratings enforced, lane restrictions enforced and/or temporary structure installed. A design remedy should be provided to repair or replace the damaged girder(s) and deck. Rehabilitation work as a minimum is required to repair damaged girder. Depending on the outcome of the structural evaluation it may be required to replace all girders. The deck and approach wearing surfaces, and the wing wall /retaining walls are in poor to fair condition and should be replaced within 1-5 years or at time of girder replacement. Guiderail extension on the approaches should be installed at time of rehabilitation.

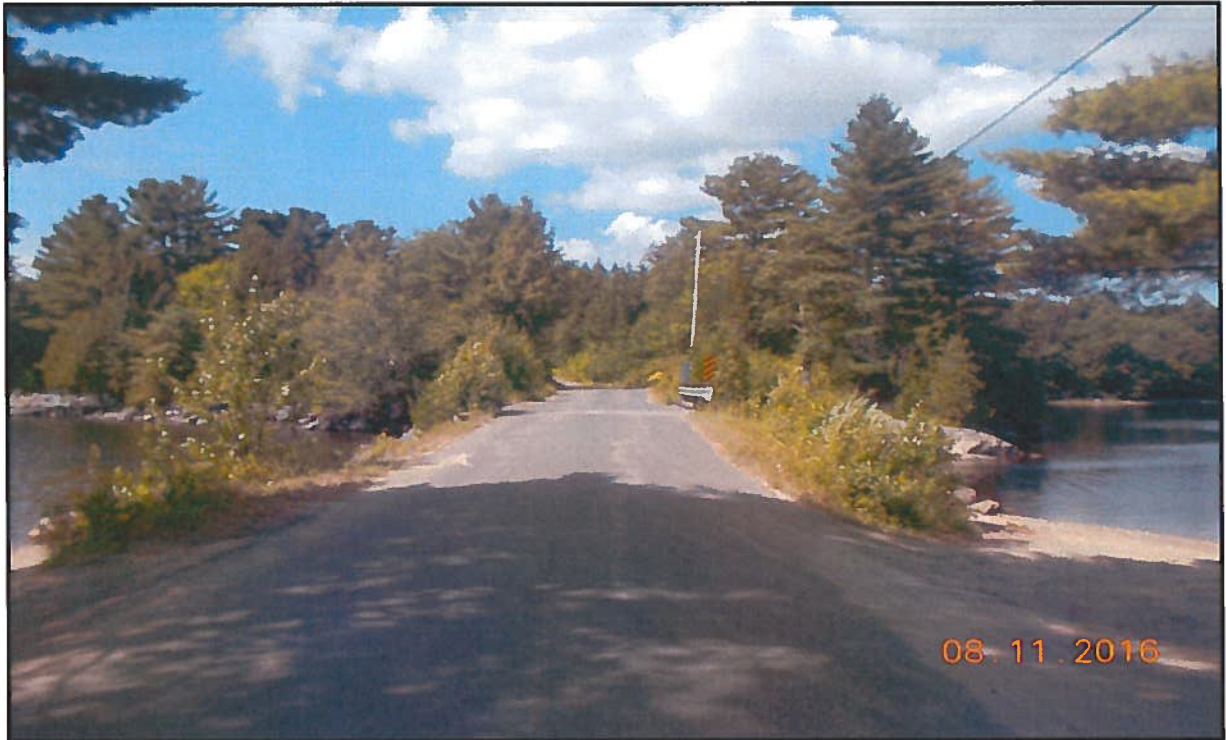


Photo 1: General Arrangement – Looking West



Photo 2: General Arrangement – Looking East



Photo 3: General Arrangement – Southeast Elevation



Photo 4: General Arrangement – Southeast Embankment



Photo 5: General Arrangement – West Abutment



Photo 6: Splintering of Wood Beam (4th from North face) – Looking West



Photo 7: Splintering of Wood Beam (4th from North face) – Close Up View



Photo 8: Longitudinal Cracking of Wood Beam (4th from North face) – Close Up View



Photo 9: Northeast Abutment Wing Wall – Looking Southwest

Inventory Data:

Structure Name	Paddy's Bay (Pond) Bridge				
Main Hwy/Road #		On ☒ Under	Crossing Type:	Navig. Water ☒ Rail Non-Navig. Water ☐ Road Ped. Other	
Road Name	North Kennisis Lake Road				
Structure Location	0.3 km West of Paddy's Court				
Latitude	45.224000	Longitude	-78.644800		
Owner(s)	Municipality of Dysart et al	Heritage Designation:	Not Cons. ☒ Cons./not App. Design./Not List List/not Desig. Desig. & List		
MTO Region *		Road Class:	Freeway Arterial Collector Local ☒		
MTO District *		Posted Speed	50	No. of Lanes 2	
Old County *		AADT		% Trucks	
Geographic Twp. *		Special Routes:	Transit Truck School Bicycle		
Structure Type *	Bridge	Detour Length Around Bridge		(km)	
Total Deck Length	7.0	(m)	Fill on Structure	0 (m)	
Overall Str. Width	6.7	(m)	Skew Angle	0 (degrees)	
Total Deck Area	46.9	(sq.m)	Direction of Structure	N to S	
Roadway Width	6.2	(m)	No. of Spans	1	
Span Lengths	6.1			(m)	

Historical Data:

Year Built	1966	Last Biennial Inspection	2014
Current Load Limit	N/A/ / (tonnes)	Last BridgeMaster Inspection	N/A
Load Limit Bylaw #	N/A	Last Evaluation	N/A
Bylaw Expiry Date	N/A	Last Underwater Inspection	N/A
Min. Vertical Clearance	- (m)	Last Condition Survey	N/A

Rehab. History: (Date/description)

Field Inspection Information:	
Date of Inspection:	August 11, 2016
Inspector:	Robert Brooks – Tulloch Engineering
Others in Party:	Elizabeth Perry – Tulloch Engineering
Equipment Used:	Camera, Hammer, Tape Measure
Weather:	Sun
Temperature:	+29°C

Additional Investigations Required:	Priority			Estimated Cost
	None	Normal	Urgent	
Detailed Deck Condition Survey:	X			
DART Survey:	X			
Detailed Coating Condition Survey:	X			
Underwater Investigation:	X			
Fatigue Investigation:	X			
Seismic Investigation:	X			
Structure Evaluation:			X	10,000.00
Load Posting – Estimated Load	No Limit	Total Cost		\$10,000
Special Notes: Laminated wood deck to be included as part of structure evaluation.				
Next Detailed Inspection:			2018	

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 to 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	

Municipal Structure Inspection Form

MTO Site Number:

DY - 1

Element Data

Element Group:	Abutments		Length:		(m)
Element Name:	Ballast Walls		Width:	7.2	(m)
Location:			Height:	2.8	(m)
Material:	Wood		Count:	2	(items)
Element Type:			Total Quantity:	40.3	(m ²)
Environment:	Benign <u>Moderate</u> / Severe		Limited Insp'n:	☐	
Protection System:	Creosote		Performance Deficiencies		
Condition Data:	Units <u>m²</u> / m / each / % / all	Exc.			
			25.3	15.0	
Comments:					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		
Comments:					

Element Group:	Abutments		Length:	3.0	(m)
Element Name:	Wingwalls		Width:		(m)
Location:	NE/SW/NW/SE		Height:	2.8	(m)
Material:	Wood		Count:	4	(items)
Element Type:	Wood Piles and Lagging		Total Quantity:	33.6	(m ²)
Environment:	Benign <u>Moderate</u> / Severe		Limited Insp'n:	☐	
Protection System:	Creosote		Performance Deficiencies		
Condition Data:	Units <u>m²</u> / m / each / % / all	Exc.			
			10.2	15	8.4
Comments: Wingwall at Northwest quadrant has failed due to severe rot and decay. Pile support for wing wall has also rotted and offers no structural load carrying capacity for wing wall at this area.					
Performance Deficiencies: Load carrying capacity.					
Recommended Work:	☐ Minor Rehab ☒ Replace		☒ Major Rehab ☐ None		Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		
Comments: Replace and/or major rehab. ballast wing walls.					

Element Group:	Barriers		Length:	8.0	(m)
Element Name:	Railing Systems		Width:		(m)
Location:			Height:	0.5	(m)
Material:	Steel		Count:	2	(items)
Element Type:	Flex Beam on Wood Post		Total Quantity:	16.0	(m)
Environment:	Benign / Moderate <u>Severe</u>		Limited Insp'n:	☐	
Protection System:	Galvanizing / Creosote (or Pressure Treat)		Performance Deficiencies		
Condition Data:	Units <u>m / m</u> each / % / all	Exc.			
			16.0		
Comments: Guiderail in good condition with minor rust in localized areas. Guiderail system does not comply with bridge code; guiderail should be extended on all four quadrants with proper end treatments. Wood posts have light to medium splits and checks throughout.					
Performance Deficiencies: Pedestrian / vehicle hazard					
Recommended Work:	☐ Minor Rehab ☒ Replace		☐ Major Rehab ☐ None		Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		
Comments: Provide new guiderail system as part of bridge rehab.					

Municipal Structure Inspection Form

MTO Site Number:

DY - 1

Element Data

Element Group:	Beam/ MLE	Length:	8.8	(m)
Element Name:	Girders	Width:	0.31	(m)
Location:	N/S	Height:	0.31	(m)
Material:	Wood	Count:	8	(items)
Element Type:	Rectangular-solid	Total Quantity:	65.5	(m ²)
Environment:	Benign <u>Moderate</u> Severe	Limited Insp'n:	☐	
Protection System:	Creosote	Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc.	Good	Poor
			17.5	32
			16	01
Comments: Minor checking and moderate longitudinal cracking throughout all members. The 4th and 5th beam girders, from the North elevation, have severe long. cracking migrating to bearing support location on East abutment. Visible deflection in 4th and 5th beam girders was observed under loading of tandem axle dump truck. Severe delamination and lateral cracking observed in 4th beam from North elevation.				
Performance Deficiencies: Load carrying capacity				
Recommended Work:	☐ Minor Rehab ☒ Replace	☐ Major Rehab ☐ None	Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year	
Timeframe:	☒ 1 - 5 Years ☐ 6 - 10 Years			
Comments: Structural evaluation recommended. Load rate bridge. Replace failed girder(s) and deck.				

Element Group:	Deck	Length:	7.0	(m)
Element Name:	Wearing Surface	Width:	6.2	(m)
Location:	Deck Top	Height:	0.04	(m)
Material:	Asphalt	Count:	1	(items)
Element Type:		Total Quantity:	43.4	(m ²)
Environment:	Benign / Moderate <u>Severe</u>	Limited Insp'n:	☐	
Protection System:		Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc.	Good	Poor
			18.0	25.4
			09	
Comments: Surface treated wearing surface has moderate to severe alligator cracking throughout. Some recent patching has been done. Severe cracking and potholes throughout the surface is creating a rough riding surface and allowing water through.				
Performance Deficiencies: Rough riding surface				
Recommended Work:	☐ Minor Rehab ☒ Replace	☐ Major Rehab ☐ None	Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year	
Timeframe:	☒ 1 - 5 Years ☐ 6 - 10 Years			
Comments: Provide new asphalt wearing surface as part of bridge rehab.				

Element Group:	Pier	Length (avg):	0.30	(m)
Element Name:	Pier Bearings	Width:	0.30	(m)
Location:	NE/SW	Height:	0.21	(m)
Material:	Wood	Count:	16	(items)
Element Type:	Creosote	Total Quantity:	16.0	(ea)
Environment:	Benign <u>Moderate</u> Severe	Limited Insp'n:	☐	
Protection System:		Performance Deficiencies		
Condition Data:	Units m ² / m / <u>each</u> / % / all	Exc.	Good	Poor
			16.0	
			00	
Comments:				
Performance Deficiencies: None				
Recommended Work:	☐ Minor Rehab ☐ Replace	☐ Major Rehab ☒ None	Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year	
Timeframe:	☐ 1 - 5 Years ☐ 6 - 10 Years			
Comments:				

Municipal Structure Inspection Form

MTO Site Number:

DY - 1

Element Data

Element Group:	Pier	Length:	7.0	(m)
Element Name:	Caps	Width:	0.30	(m)
Location:	N/S	Height:	0.30	(m)
Material:	Wood	Count:	3	(items)
Element Type:		Total Quantity:	18.9	(m ²)
Environment:	Benign / <u>Moderate</u> / Severe	Limited Insp'n:	☒	
Protection System:	Creosote			
Condition	Units	Exc.	Good	Fair
Data:	<u>m</u> / m / each / % / all		18.9	
Performance Deficiencies				
00				
Comments: Pile caps in good condition; light to medium splitting and checking at ends.				
Performance Deficiencies: None				
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None	
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years	
Comments:				
Maintenance Needs: -				
☐ Urgent ☐ 1 Year ☐ 2 Year				

Element Group:	Pier	Length:		(m)
Element Name:	Pile Bents	Width:	0.30	(m)
Location:	N/S	Height:	2.0	(m)
Material:	Wood	Count:	12	(items)
Element Type:	Timber Piles with Capping Beam	Total Quantity:	22.6	(m ²)
Environment:	Benign / <u>Moderate</u> / Severe	Limited Insp'n:	☐	
Protection System:	Creosote			
Condition	Units	Exc.	Good	Fair
Data:	<u>m</u> / m / each / % / all		13.6	9.0
Performance Deficiencies				
00				
Comments: Light checking above waterline. No displacement noted.				
Performance Deficiencies: None				
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None	
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years	
Comments:				
Maintenance Needs: -				
☐ Urgent ☐ 1 Year ☐ 2 Year				

Element Group:	Retaining Wall	Length:	8	(m)
Element Name:	Walls	Width:	2	(m)
Location:	East Quadrant	Height:	0.5	(m)
Material:	Gabion Basket	Count:	4	(items)
Element Type:		Total Quantity:	4	(each)
Environment:	Benign / Moderate / <u>Severe</u>	Limited Insp'n:	☐	
Protection System:	Galvanized			
Condition	Units	Exc.	Good	Fair
Data:	m ² / m / <u>each</u> / % / all			1.0
Performance Deficiencies				
03,04				
Comments: Toppling over due to settlement and ground movement.				
Performance Deficiencies: Continuing settlement and movement				
Recommended Work:	☐ Minor Rehab ☒ Replace		☐ Major Rehab ☐ None	
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years	
Comments:	Stabalization required for toppling gabion basket retaining wall			
Maintenance Needs: -				
☐ Urgent ☐ 1 Year ☐ 2 Year				

Municipal Structure Inspection Form

MTO Site Number:

DY - 1

Element Data

Element Group:	Sidewalks/Curbs				Length:	8.0	(m)
Element Name:	Curbs				Width:	0.20	(m)
Location:	NW/SE				Height:	0.20	(m)
Material:	Wood				Count:	2	(items)
Element Type:	Creosote				Total Quantity:	9.6	(m ²)
Environment:	Benign / Moderate / Severe				Limited Insp'n:	☐	
Protection System:					Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor		
Data:	m / m / each / % / all			9.6		00	
Comments: Minor splits and checks, curbs should be replaced as part of bridge rehab.							
Performance Deficiencies: None							
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: -		
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year		
Comments:							

Element Group:	Approaches				Length:	6	(m)
Element Name:	Approach Wearing Surface				Width:	6.2	(m)
Location:	N/S				Height:	0.04	(m)
Material:	Asphalt				Count:	2	(items)
Element Type:					Total Quantity:	74.4	(m ²)
Environment:	Benign / Moderate / Severe				Limited Insp'n:	☐	
Protection System:					Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor		
Data:	m / m / each / % / all		32	28.0	14.0	03, 09	
Comments: Light to medium wheel rutting and uneven surface. Continuing settlement causing uneven riding surface in West quadrant.							
Performance Deficiencies: Settlement and rough riding surface							
Recommended Work:	☐ Minor Rehab ☐ Replace		☒ Major Rehab ☐ None		Maintenance Needs: -		
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year		
Comments: Remove overgrown vegetation. Provide proper drainage at all four quadrants as part of rehab work.							

Element Group:	Deck				Length:	7.0	(m)
Element Name:	Soffit - Thin Slab				Width:	6.7	(m)
Location:					Height:		(m)
Material:	Laminated Wood Deck				Count:	1	(items)
Element Type:					Total Quantity:	48.0	(m ²)
Environment:	Benign / Moderate / Severe				Limited Insp'n:	☐	
Protection System:	Creosote, Surface Treatment				Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor		
Data:	m / m / each / % / all		48.0			01	
Comments: Medium to severe water staining throughout.							
Performance Deficiencies: Load carrying capacity							
Recommended Work:	☐ Minor Rehab ☒ Replace		☐ Major Rehab ☐ None		Maintenance Needs: -		
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year		
Comments: Deck has failed where beam / girder has failed							

Municipal Structure Inspection Form

MTO Site Number:

DY - 1

Element Data

Element Group:	Embankments & Streams		Length:		(m)
Element Name:	Embankments		Width:		(m)
Location:	NE/NW/SE/SW		Height:		(m)
Material:		Count:	4	(items)	
Element Type:		Total Quantity:	4	(ea)	
Environment:	Benign / <u>Moderate</u> / Severe		Limited Insp'n:	☐	
Protection System:					
Condition	Units	Exc.	Good	Fair	Poor
Data:	m ² / m / <u>each</u> / % / all			2.0	2.0
Performance Deficiencies: 15					
Comments:					
Performance Deficiencies: Unstable embankments					
Recommended Work:		☐ Minor Rehab ☒ Replace		☐ Major Rehab ☐ None	
Timeframe:		☒ 1 - 5 Years ☐ 6 - 10 Years		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year	
Comments: Repair unstable embankments					

Element Group:	Embankments & Streams		Length:		(m)
Element Name:	Slope Protection		Width:		(m)
Location:	NE/NW/SE/SW		Height:		(m)
Material:	Rip Rap		Count:	4	(items)
Element Type:		Total Quantity:	4.0	(ea)	
Environment:	Benign / <u>Moderate</u> / Severe		Limited Insp'n:	☐	
Protection System:					
Condition	Units	Exc.	Good	Fair	Poor
Data:	m ² / m / <u>each</u> / % / all			1.0	3.0
Performance Deficiencies: 15					
Comments:					
Performance Deficiencies: Unstable embankment					
Recommended Work:		☐ Minor Rehab ☒ Replace		☐ Major Rehab ☐ None	
Timeframe:		☒ 1 - 5 Years ☐ 6 - 10 Years		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year	
Comments: Provide slope protection to all quadrants after embankment rehab.					

Element Group:	Embankments & Streams		Length:		(m)
Element Name:	Streams & Waterways		Width:		(m)
Location:			Height:		(m)
Material:		Count:	1	(items)	
Element Type:		Total Quantity:	1.0	(ea)	
Environment:	<u>Benign</u> / Moderate / Severe		Limited Insp'n:	☐	
Protection System:					
Condition	Units	Exc.	Good	Fair	Poor
Data:	m ² / m / <u>each</u> / % / all		1.0		
Performance Deficiencies: 00					
Comments:					
Performance Deficiencies: None					
Recommended Work:		☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None	
Timeframe:		☐ 1 - 5 Years ☐ 6 - 10 Years		Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year	
Comments:					

Municipal Structure Inspection Form
MTO Site Number:
DY - 1

Repair and Rehabilitation Required:		Priority				Estimated Construction Cost
Element	Repair and Rehabilitation Required	6 to 10 years	1 to 5 years	Within 1 year	Urgent	
Bridge	Replace MLE (Wood Beams)				X	\$26,500
Wingwalls	Replace Wingwall / Retaining Walls				X	\$55,000
Wearing Surface (Decks)	Replace deck wearing surface.				X	\$7,250
Wearing Surface (Approaches)	Replace approach wearing surfaces.				X	\$2,250
Sidewalk/Curbs	Replace curbs as part of bridge rehab				X	\$2,000
Total Cost						\$93,000

Associated Work:	Comments	Estimated Cost
Approaches:	Install guiderail and end treatment	\$25,000
Detours:		
Traffic Control:		
Utilities:		
Right of Way:		
Environmental Study:		
Other:	Engineering	\$7,500
Contingencies:		\$9,500
Total Cost		\$42,000

Justification:

Structure No: DY-2

Kennisis Lake Narrows Bridge

Structure Description

Kennisis Lake Narrows Bridge is located on North Kennisis Lake Road, at Kennisis Lake Narrows, approximately 400 m west of Watts Road. The bridge was constructed in 1966 and is a 7 m single span, two lane structure with a timber deck, timber beams and timber abutments. The bridge has an overall 6.8 m deck width with 6.2 m wide surface treated wearing surface with timber curbs. There is steel beam guiderail with hazard markers across the structure but no guiderail on the approaches.

Structure Condition

The structure is in fair overall condition with a BCI of 66 and a BSI of 62. The abutments are in good condition with no deficiencies noted above the waterline. The timber beams and deck appear to be in good condition with minor cracking and checking observed. It should be noted that moderate deflection was observed under loading by a tandem axle dump truck. The surface treated wearing surface is in fair condition exhibiting slippage cracking and sections of the wooden deck are visible through the surface treatment. The approaches are in good condition; however, there is evidence of erosion on the approach embankments. There was a large amount of sand and debris on the bridge deck and blocking the deck drains at the time of inspection.

The guiderail over the structure is in good condition with localized corrosion and minor collision damage. The guiderail should be extended on all approaches with proper end treatments.

Recommendation

It is recommended that the main longitudinal beam and soffit areas undergo an enhanced visual inspection with boat or barge due to limited access and detailed structural analysis be performed for potential load posting. The wearing surface should be replaced within 1-5 years and maintenance should be undertaken to repair the loose guiderail. Bridge cleaning of the deck and deck drains under the curb should be conducted immediately to alleviate surface ponding issues. It is recommended that the guiderail extensions with end treatments be addressed in the future when the structure undergoes a major rehabilitation.



Photo 1: General View – Looking West



Photo 2: General View – Looking East

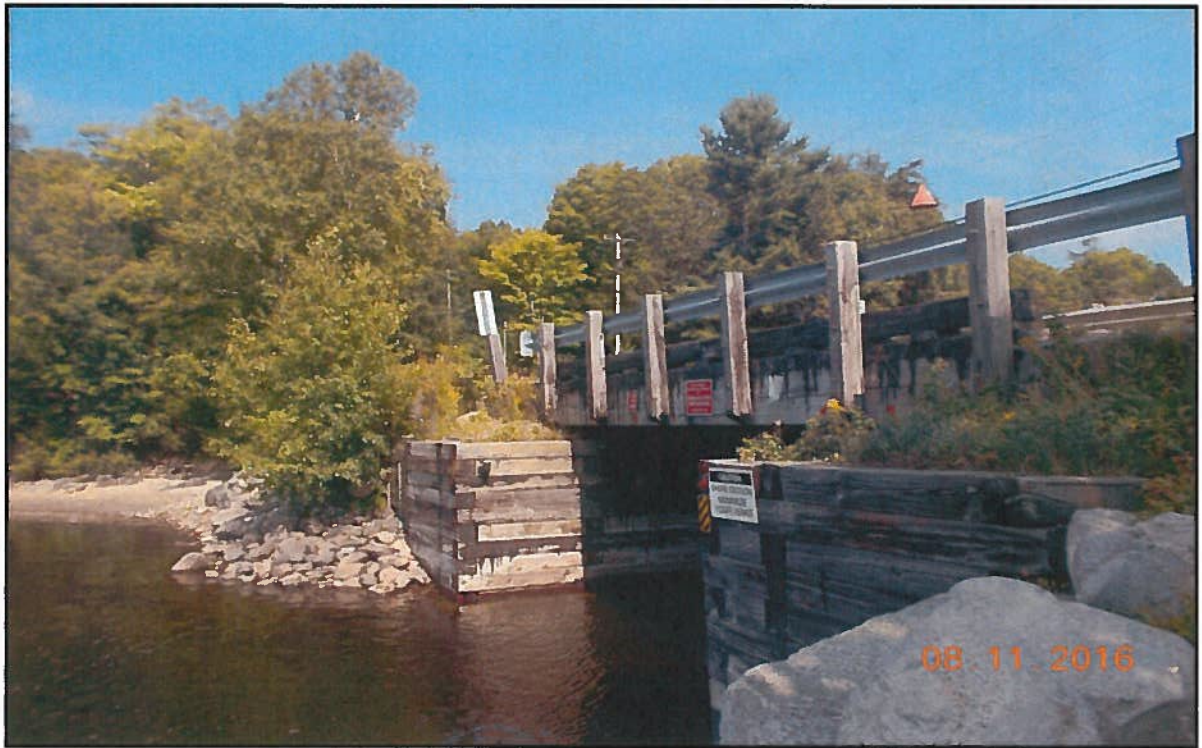


Photo 3: General View – Southeast Elevation



Photo 4: Deck Wearing Surface – Looking West



Photo 5: Loss of Bond & Map Cracking in Deck– Northwest Quadrant



Photo 6: General View – West Abutment

Inventory Data:

Structure Name	Kennisis Lake Narrows Bridge				
Main Hwy/Road #		On ☒ Under	Crossing Type:	Navig. Water ☒ Non-Navig. Water Rail Road Ped. Other	
Road Name	Kennisis Lake Road				
Structure Location	0.4 km West of Watts Road				
Latitude	45.241800	Longitude	-78.598200		
Owner(s)	Municipality of Dysart et al	Heritage Designation:	Not Cons. ☒ Cons./not App. List/not Desig. Desig./Not List Desig. & List		
MTO Region *		Road Class:	Freeway Arterial Collector Local ☒		
MTO District *		Posted Speed	50	No. of Lanes	
Old County *		AADT		% Trucks	
Geographic Twp. *		Special Routes:	Transit Truck School Bicycle		
Structure Type *	Bridge	Detour Length Around Bridge		(km)	
Total Deck Length	13.8	(m)	Fill on Structure	0 (m)	
Overall Str. Width	6.8	(m)	Skew Angle	0 (degrees)	
Total Deck Area	94.0	(sq.m)	Direction of Structure	E to W	
Roadway Width	6.2	(m)	No. of Spans	1	
Span Lengths	7.0			(m)	

Historical Data:

Year Built		Last Biennial Inspection	2014
Current Load Limit	N/A / (tonnes)	Last BridgeMaster Inspection	N/A
Load Limit Bylaw #	N/A	Last Evaluation	N/A
Bylaw Expiry Date	N/A	Last Underwater Inspection	N/A
Min. Vertical Clearance	- (m)	Last Condition Survey	N/A

 Rehab. History: (Date/description)

Field Inspection Information:	
Date of Inspection:	August 11, 2016
Inspector:	Robert Brooks – Tulloch Engineering
Others in Party:	Elizabeth Perry – Tulloch Engineering
Equipment Used:	Camera, Hammer, Tape Measure
Weather:	Sun
Temperature:	+28°C

Additional Investigations Required:	Priority			Estimated Cost
	None	Normal	Urgent	
Detailed Deck Condition Survey:	X			
DART Survey:	X			
Detailed Coating Condition Survey:	X			
Underwater Investigation:	X			
Fatigue Investigation:	X			
Seismic Investigation:	X			
Structure Evaluation:		X		\$10,000
Load Posting – Estimated Load			Total Cost	\$10,000
Special Notes: Enhanced visual inspection of main longitudinal elements with boat or barge is recommended and Structural Evaluation for Possible Load Posting given evidence of deflection during loading by tandem truck.				
Next Detailed Inspection:	2018			

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 to 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 | |

Municipal Structure Inspection Form

MTO Site Number:

DY - 2

Element Data

Element Group:	Abutments		Length:		(m)
Element Name:	Abutment Walls		Width:	9.8	(m)
Location:	East / West		Height:	2.5	(m)
Material:	Wood		Count:	2	(items)
Element Type:			Total Quantity:	49.0	(m ²)
Environment:	Benign / <u>Moderate</u> / Severe		Limited Insp'n:	☐	
Protection System:	Creosote		Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	m ² / m / each / % / all		49.0		
00					
Comments:					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs:
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments:					

Element Group:	Abutments		Length:		(m)
Element Name:	Wingwalls		Width:	2.5	(m)
Location:	NE/NW/SE/SW		Height:	2.50	(m)
Material:	Wood		Count:	4	(items)
Element Type:	Wood Crib		Total Quantity:	25.0	(m ²)
Environment:	Benign / <u>Moderate</u> / Severe		Limited Insp'n:	☐	
Protection System:	Creosote		Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	m ² / m / each / % / all		19	4	2
00					
Comments: Minor checking in wood beams. Cracking, splintering end post at S/W quadrant.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs:
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments:					

Element Group:	Barriers		Length:	16.0	(m)
Element Name:	Railing Systems		Width:		(m)
Location:	Across structure only		Height:		(m)
Material:	Steel		Count:	2	(items)
Element Type:	Steel Flex Beam on Wood Post		Total Quantity:	32	(m)
Environment:	Benign / Moderate / <u>Severe</u>		Limited Insp'n:	☐	
Protection System:	Galvanized / Creosote (or Pressure Treat)		Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	m / m / each / % / all			32	
00					
Comments: Existing guiderail in fair condition with missing bolts at end post locations in the NE and SE quadrants. Guiderail should be extended with proper end treatments in accordance with Ontario Provincial Standards.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: 03
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☒ 1 Year ☐ 2 Year
Comments: Bridge and Handrail Maintenance.					

Municipal Structure Inspection Form

MTO Site Number:

DY - 2

Element Data

Element Group:	Beam / MLE		Length:	8.8	(m)
Element Name:	Girders		Width:	0.250	(m)
Location:	E/W		Height:	0.60	(m)
Material:	Wood		Count:	9	(items)
Element Type:	Rectangular-solid		Total Quantity:	114.8	(m ²)
Environment:	Benign Moderate / Severe		Limited Insp'n:	☒	
Protection System:	Creosote		Performance Deficiencies		
Condition Data:	Units	Exc.	Good	Fair	Poor
	m ² / m / each / % / all		92.8	20	2
02					
Comments: Moderate to severe checking along North girder. Deflection of beam girders, at center span, was observed under loading of passing tandem axel dump truck. Limited inspection access only.					
Performance Deficiencies: Excessive deformations (deflection)					
Recommended Work:		☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None	
Timeframe:		☐ 1 - 5 Years ☐ 6 - 10 Years		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year	
Comments: Enhanced visual and structural inspection is recommended.					

Element Group:	Deck		Length:	13.8	(m)
Element Name:	Deck Top		Width:	6.8	(m)
Location:			Height:		(m)
Material:	Wood		Count:	1	(items)
Element Type:	Laminated Wood Decking - transverse		Total Quantity:	94.0	(m ²)
Environment:	Benign Moderate / Severe		Limited Insp'n:	☒	
Protection System:	Creosote / Surface Treatment		Performance Deficiencies		
Condition Data:	Units	Exc.	Good	Fair	Poor
	m ² / m / each / % / all		94.0		
00					
Comments: Good overall condition; no loose or rotten deck boards observed.					
Performance Deficiencies: None					
Recommended Work:		☐ Minor Rehab ☒ Replace		☐ Major Rehab ☒ None	
Timeframe:		☐ 1 - 5 Years ☐ 6 - 10 Years		Maintenance Needs: 02 ☐ Urgent ☒ 1 Year ☐ 2 Year	
Comments: Remove sand build-up.					

Element Group:	Deck		Length:	13.8	(m)
Element Name:	Wearing Surface (Decks)		Width:	6.20	(m)
Location:			Height:		(m)
Material:	Surface Treatment		Count:		(items)
Element Type:			Total Quantity:	85.6	(m ²)
Environment:	Benign / Moderate Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units	Exc.	Good	Fair	Poor
	m ² / m / each % all		10.4	37.6	37.6
10					
Comments: Alligator map cracking with localized potholes observed. Deck requires cleaning/sweeping to promote drainage and preserve wood deck and curbs. Asphalt deterioration and loss of bond in SE quadrant.					
Performance Deficiencies: Surface ponding					
Recommended Work:		☐ Minor Rehab ☒ Replace		☐ Major Rehab ☐ None	
Timeframe:		☒ 1 - 5 Years ☐ 6 - 10 Years		Maintenance Needs: 02, 12 ☐ Urgent ☒ 1 Year ☐ 2 Year	
Comments: Bridge Cleaning & surface repair in NE quadrant.					

Municipal Structure Inspection Form

MTO Site Number:

DY - 2

Element Data

Element Group:	Retaining Walls		Length:	3.0	(m)	
Element Name:	Walls		Width:	2.0	(m)	
Location:	NW Quadrant		Height:	0.5	(m)	
Material:	Other		Count:	2	(items)	
Element Type:	Gabions		Total Quantity:	3	(m ²)	
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐		
Protection System:	Galvanized		Performance Deficiencies			
Condition	Units	Exc.				Good
Data:	m ² / m / each / % / all			3.0		00
Comments: Retaining walls show signs of previous settlement, no signs of continued settlement observed.						
Performance Deficiencies: None						
Recommended Work:	☐ Minor Rehab		☐ Major Rehab		Maintenance Needs: -	
	☐ Replace		☒ None			
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year	
Comments:						

Element Group:	Sidewalks / Curbs		Length:	13.0	(m)	
Element Name:	Curbs		Width:	0.30	(m)	
Location:	N / S		Height:	0.30	(m)	
Material:	Wood		Count:	2	(items)	
Element Type:			Total Quantity:	15.6	(m ²)	
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐		
Protection System:	Creosote		Performance Deficiencies			
Condition	Units	Exc.				Good
Data:	m ² / m / each / % / all		1.6	10.0	5.0	00
Comments: Minor plow/vehicle damage to curbs; some rot/section loss at ends. Accumulated sand/sediment against curb significant - needs cleaning to promote drainage and prevent rot. Longitudinal splits throughout members.						
Performance Deficiencies: None						
Recommended Work:	☐ Minor Rehab		☐ Major Rehab		Maintenance Needs: 02	
	☐ Replace		☒ None			
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☒ 1 Year ☐ 2 Year	
Comments: Bridge cleaning						

Element Group:	Approaches		Length:	6	(m)	
Element Name:	Wearing Surface		Width:	6.2	(m)	
Location:	East and West		Height:		(m)	
Material:	Asphalt		Count:	2	(items)	
Element Type:			Total Quantity:	74.4	(m ²)	
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐		
Protection System:			Performance Deficiencies			
Condition	Units	Exc.				Good
Data:	m ² / m / each / % / all		68	4	2	00
Comments: Provide adequate means for drainage at all four quadrants.						
Performance Deficiencies: None						
Recommended Work:	☒ Minor Rehab		☐ Major Rehab		Maintenance Needs: 02	
	☐ Replace		☐ None			
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☒ 1 Year ☐ 2 Year	
Comments: Provide proper drainage all Quadrants.						

Municipal Structure Inspection Form

MTO Site Number:

DY - 2

Repair and Rehabilitation Required:		Priority				Estimated Construction Cost
Element	Repair and Rehabilitation Required	6 to 10 years	1 to 5 years	Within 1 year	Urgent	
Wearing Surface (Decks)	Resurface with double surface treatment to protect wooden deck		X			\$7,500
Total Cost						\$7,500

Associated Work:	Comments	Estimated Cost
Approaches:	Extend guiderail on approaches and add end treatments.	\$25,000
Detours:		
Traffic Control:		
Utilities:		
Right of Way:		
Environmental Study:		
Other:		
Contingencies:		
Total Cost		\$25,000

Justification:

Structure No: DY-3

Barry's Bridge

Structure Description

Barry's Bridge is located on Barry Line Road, 1 km west of Kennisis Lake Road. The bridge was constructed in 1960 and is an 18.7 m three-span, two-lane structure with a timber deck, timber piers and timber abutments. The bridge crosses a non-navigable watercourse on an east/west tangential alignment. The bridge has a 7.4 m overall deck width with a 6.8 m wide surface treated wearing surface with timber curbs. There is steel beam guiderail across the structure but no guiderail on the approaches.

Structure Condition

The structure is in fair overall condition with a BCI of 64 and a BSI of 61. The wooden ballast walls are in fair condition with some loose and cracked boards; there is evidence of material loss from behind the abutments. There is evidence of backfill material washing out from behind the ballast walls and scour at the base. The timber piles and caps are in good condition with minor checking observed. The timber deck is in good condition with minor cracking and no evidence of water penetration. The wearing surface is in poor to fair condition exhibiting severe potholing, alligator cracking with sections of the deck visible. There was a large amount of sand and debris on the bridge deck and blocking the deck drains at the time in inspection and of previous inspections.

The guiderail over the structure is in good condition with localized corrosion and minor collision damage. The post in the north east corner has been damaged and is loose. The guiderail should be extended on all approaches with proper end treatments.

Recommendations

It is recommended the structure undergo a minor rehabilitation in 1-5 years to repair the ballast walls, damaged beam, rebuild the approaches, install guiderail with end treatments and replace the deck wearing surface. Maintenance should be undertaken to repair/replace the damaged guiderail post and clean the bridge deck and deck drains under the curb. Guiderail extension on the approaches should be undertaken in the future when the structure undergoes a major rehabilitation. Debris should be cleaned from stream in northwest quadrant at time of bridge cleaning.



Photo 1: General Arrangement – Looking North



Photo 2: General Arrangement – West Elevation



Photo 3: General Arrangement – South Ballast Wall



Photo 4: General Arrangement – North Ballast Wall

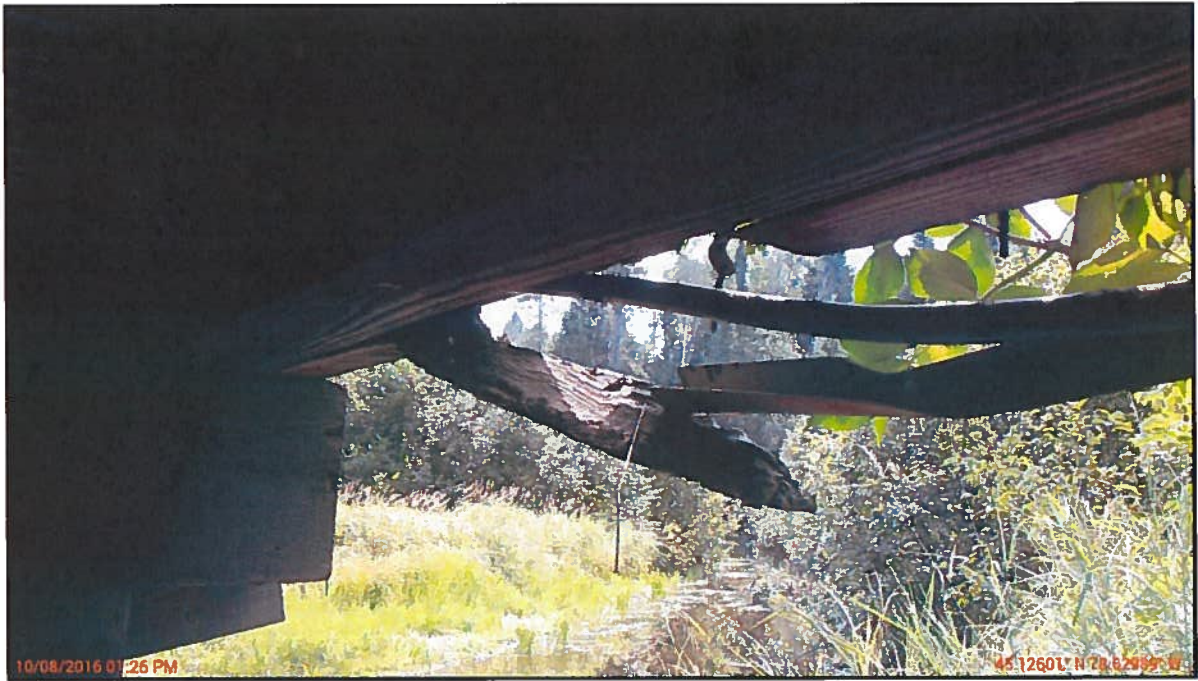


Photo 5: Damaged Exterior Wood Beam – Northwest Quadrant

Inventory Data:

Structure Name	Barry's Bridge				
Main Hwy/Road #		On ☒ Under	Crossing Type:	Navig. Water Rail Road	Non-Navig. Water ☒ Ped. Other
Road Name	Barry Line Road				
Structure Location	0.05 km East of Binscrath Trail				
Latitude	45.126200	Longitude	-78.630000		
Owner(s)	Municipality of Dysart et al	Heritage Designation:	Not Cons. Design./Not List	Cons./not App. Design. & List	List/not Desig. & List
MTO Region *		Road Class:	Freeway	Arterial	Collector Local ☒
MTO District *		Posted Speed	50	No. of Lanes	2
Old County *		AADT		% Trucks	
Geographic Twp. *		Special Routes:	Transit	Truck	School Bicycle
Structure Type *	Bridge	Detour Length Around Bridge		(km)	
Total Deck Length	18.7	(m)	Fill on Structure	0	(m)
Overall Str. Width	7.3	(m)	Skew Angle	0	(degrees)
Total Deck Area	137.0	(sq.m)	Direction of Structure	N to S	
Roadway Width	6.8	(m)	No. of Spans	3	
Span Lengths	6.2				(m)

Historical Data:

Year Built	1960	Last Biennial Inspection	2014
Current Load Limit	N/A / (tonnes)	Last BridgeMaster Inspection	N/A
Load Limit Bylaw #	N/A	Last Evaluation	N/A
Bylaw Expiry Date	N/A	Last Underwater Inspection	N/A
Min. Vertical Clearance	- (m)	Last Condition Survey	N/A

Rehab. History: (Date/description)

Field Inspection Information:	
Date of Inspection:	August 10, 2016
Inspector:	Robert Brooks – Tulloch Engineering
Others in Party:	Elizabeth Perry – Tulloch Engineering
Equipment Used:	Camera, Hammer, Tape Measure
Weather:	Sun
Temperature:	+29°C

Additional Investigations Required:		Priority			Estimated Cost
		None	Normal	Urgent	
Detailed Deck Condition Survey:		X			
DART Survey:		X			
Detailed Coating Condition Survey:		X			
Underwater Investigation:		X			
Fatigue Investigation:		X			
Seismic Investigation:		X			
Structure Evaluation:		X			
Load Posting – Estimated Load		Total Cost			\$0
Special Notes:					
Next Detailed Inspection:		2018			

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 to 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 | |

Municipal Structure Inspection Form

MTO Site Number:

DY - 3

Element Data

Element Group:	Abutments		Length:		(m)	
Element Name:	Ballast Walls		Width:	7.0	(m)	
Location:	N / S		Height:	2.0	(m)	
Material:	Timber		Count:	2	(items)	
Element Type:			Total Quantity:	28.0	(m ²)	
Environment:	Benign <u>Moderate</u> / Severe		Limited Insp'n:	☐		
Protection System:	Creosote		Performance Deficiencies			
Condition Data:	Units m ² / m / each / % / all	Exc.				Good
			22	4	2	00
Comments: Ballast walls in good to fair condition with localized deformations of several segments of timber causing material washout.						
Performance Deficiencies: None						
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: 09 ☐ Urgent ☒ 1 Year ☐ 2 Year repair ballast wall timbers	
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years			
Comments:						

Element Group:	Approaches		Length:	6.0	(m)	
Element Name:	Wearing Surface		Width:	7.5	(m)	
Location:	N / S		Height:		(m)	
Material:	Asphalt		Count:	2	(items)	
Element Type:			Total Quantity:	90.0	(m ²)	
Environment:	Benign / Moderate <u>Severe</u>		Limited Insp'n:	☐		
Protection System:			Performance Deficiencies			
Condition Data:	Units m ² / m / each / % / all	Exc.				Good
				22.5	67.5	09
Comments: Significant patching observed at approaches, as well as potholes and cracking, rutting and rippling.						
Performance Deficiencies: None						
Recommended Work:	☐ Minor Rehab ☒ Replace		☐ Major Rehab ☐ None		Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year	
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years			
Comments: Replace asphalt wearing surface.						

Element Group:	Barriers		Length:	19.0	(m)	
Element Name:	Railing Systems		Width:		(m)	
Location:	E / W		Height:		(m)	
Material:	Steel Flex Beam on Wood Post		Count:	2	(items)	
Element Type:			Total Quantity:	38.0	(m)	
Environment:	Benign / Moderate <u>Severe</u>		Limited Insp'n:	☐		
Protection System:	Galvanized / Creosote (Pressure Treat)		Performance Deficiencies			
Condition Data:	Units m / m each / % / all	Exc.				Good
			15.0	18.0	5.0	00
Comments: Damage to guiderail and end post in N/E corner; minor collision damage mid-span. No guiderail on approaches.						
Performance Deficiencies: None						
Recommended Work:	☒ Minor Rehab ☐ Replace		☐ Major Rehab ☐ None		Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year	
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years			
Comments:						

Municipal Structure Inspection Form

MTO Site Number:

DY - 3

Element Data

Element Group:	Beam /MLE	Length:	18.7	(m)		
Element Name:	Girders	Width:	0.250	(m)		
Location:	N/ S	Height:	0.60	(m)		
Material:	Wood	Count:	9	(items)		
Element Type:	Rectangular-solid	Total Quantity:	328.0	(m ²)		
Environment:	Benign <u>Moderate</u> / Severe	Limited Insp'n:	☐			
Protection System:	Creosote	Performance Deficiencies				
Condition Data:	Units: m ² / m / each / % / all				Exc.	Good
			200.0	127	1	01
Comments: Beams in general good condition with minor checking and splits. A severe longitudinal split was observed at the Northwest quadrant; this area should be monitored.						
Performance Deficiencies: Load carrying capacity						
Recommended Work:		☐ Minor Rehab ☒ Replace		☐ Major Rehab ☐ None		
Timeframe:		☒ 1 - 5 Years ☐ 6 - 10 Years				
Comments: Replace damaged girder at Northwest quadrant as part of bridge rehabilitation.						
Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year						

Element Group:	Deck	Length:	18.7	(m)		
Element Name:	Deck Top	Width:	7.3	(m)		
Location:	Under Asphalt	Height:		(m)		
Material:	Wood	Count:	1	(items)		
Element Type:	Laminated Wood Decking - transverse	Total Quantity:	137.0	(m ²)		
Environment:	Benign <u>Moderate</u> / Severe	Limited Insp'n:	☒			
Protection System:	Creosote	Performance Deficiencies				
Condition Data:	Units: m / m / each / % / all				Exc.	Good
			137.0			00
Comments: Deck appears to be in good condition with light to moderate signs of water penetration on underside.						
Performance Deficiencies: None						
Recommended Work:		☐ Minor Rehab ☐ Replace		☐ Major Rehab ☐ None		
Timeframe:		☐ 1 - 5 Years ☐ 6 - 10 Years				
Comments:						
Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year						

Element Group:	Deck	Length (avg):	18.7	(m)		
Element Name:	Wearing Surface	Width:	6.80	(m)		
Location:	Deck Top	Height:		(m)		
Material:	Asphalt	Count:	1	(items)		
Element Type:		Total Quantity:	127.2	(m ²)		
Environment:	Benign / Moderate <u>Severe</u>	Limited Insp'n:	☐			
Protection System:		Performance Deficiencies				
Condition Data:	Units: m ² / m / each / % / all				Exc.	Good
				31.3	95.9	09
Comments: Deck in poor condition. Extensive patching and alligator map cracking. Ravelling along edges with severe transverse crack throughout. Deck has no drains; therefore, water is penetrating into the wood deck below.						
Performance Deficiencies: Rough riding surface						
Recommended Work:		☐ Minor Rehab ☒ Replace		☐ Major Rehab ☐ None		
Timeframe:		☒ 1 - 5 Years ☐ 6 - 10 Years				
Comments: Replace asphalt wearing surface						
Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year						

Municipal Structure Inspection Form

MTO Site Number:

DY - 3

Element Data

Element Group:	Pier	Length:	2.0	(m)
Element Name:	Shaft / Columns / Pile Bents	Width:	0.30	(m)
Location:	4 Bents	Height:	2.00	(m)
Material:	Wood	Count:	24	(items)
Element Type:	Timber Piles with Capping Beam	Total Quantity:	45.2	(m ²)
Environment:	Benign <u>Moderate</u> / Severe	Limited Insp'n:	☐	
Protection System:	Creosote			
Condition	Units	Exc.	Good	Fair
Data:	<u>m²</u> / m / each / % / all			45.2
		Poor	Performance Deficiencies	
			00	
Comments:				
Performance Deficiencies: None				
Recommended Work:	☐ Minor Rehab	☐ Major Rehab		Maintenance Needs: -
	☐ Replace	☒ None		
Timeframe:	☐ 1 - 5 Years	☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments:				

Element Group:	Sidewalk / Curbs	Length:	18.7	(m)
Element Name:	Curbs	Width:	0.30	(m)
Location:	East / West	Height:	0.30	(m)
Material:	Wood	Count:	2	(items)
Element Type:		Total Quantity:	22.4	(m ²)
Environment:	Benign / Moderate / <u>Severe</u>	Limited Insp'n:	☐	
Protection System:	Creosote			
Condition	Units	Exc.	Good	Fair
Data:	<u>m²</u> / m / each / % / all		8.4	10.0
		Poor	Performance Deficiencies	
			00	
Comments: Minor damage to curbs. Significant accumulation of sand and debris at and under curbs, obstructing drainage. Splits throughout with rot and signs of light insect infestation in rotted areas.				
Performance Deficiencies: None				
Recommended Work:	☐ Minor Rehab	☐ Major Rehab		Maintenance Needs: -02
	☒ Replace	☐ None		
Timeframe:	☒ 1 - 5 Years	☐ 6 - 10 Years		☒ Urgent ☐ 1 Year ☐ 2 Year
Comments: Replace timber curbs				

Element Group:	Stream & Embankments	Length:		(m)
Element Name:	Embankments	Width:		(m)
Location:	NE/NW/SE/SW	Height:		(m)
Material:		Count:		(items)
Element Type:		Total Quantity:	4.0	(ea)
Environment:	<u>Benign</u> / Moderate / Severe	Limited Insp'n:	☐	
Protection System:				
Condition	Units	Exc.	Good	Fair
Data:	m ² / m <u>each</u> / % / all		4.0	
		Poor	Performance Deficiencies	
			00	
Comments:				
Performance Deficiencies: None				
Recommended Work:	☐ Minor Rehab	☐ Major Rehab		Maintenance Needs: 02
	☐ Replace	☐ None		
Timeframe:	☐ 1 - 5 Years	☐ 6 - 10 Years		☐ Urgent ☒ 1 Year ☐ 2 Year
Comments: Remove granular material from stream				

Municipal Structure Inspection Form

MTO Site Number:

DY - 3

Element Data

Element Group:	Streams & Embankments		Length:		(m)
Element Name:	Slope Protection		Width:		(m)
Location:	NE/SW/SE/SW		Height:		(m)
Material:			Count:	4	(items)
Element Type:			Total Quantity:	4	(ea)
Environment:	<u>Benign</u> Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	m ² / m <u>each</u> / % / all			4.0	
Comments: No slope protection					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		
Comments:					

Element Group:	Streams & Embankments		Length:		(m)
Element Name:	Streams & Waterways		Width:		(m)
Location:	Upstream /Downstream		Height:		(m)
Material:			Count:	2	(items)
Element Type:			Total Quantity:	2.0	(ea)
Environment:	<u>Benign</u> Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	m ² / m <u>each</u> / % / all		1.0	1.0	
Comments: Vegetation partially obstructing waterway at Northwest quadrant.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: 17 ☐ Urgent ☒ 1 Year ☐ 2 Year
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		Clear debris.
Comments:					

Element Group:	Pier		Length:	7.3	(m)
Element Name:	Caps		Width:	0.3	(m)
Location:	Capping Beams		Height:	0.3	(m)
Material:	Wood		Count:	4	(items)
Element Type:			Total Quantity:	26.3	(m ²)
Environment:	<u>Benign</u> Moderate / Severe		Limited Insp'n:	☒	
Protection System:	Creosote		Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	<u>m²</u> / m / each / % / all		26.3		
Comments:					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		
Comments:					

Municipal Structure Inspection Form

MTO Site Number:

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Repair and Rehabilitation Required:		Priority				Estimated Construction Cost
Element	Repair and Rehabilitation Required	6 to 10 years	1 to 5 years	Within 1 year	Urgent	
MLE	Replace damaged girder			X		\$10,000
Curbs	Replace		X			\$5,000
Ballast Walls	Rebuild abutment walls to prevent washout of backfill.		X			\$60,000
Wearing Surface (Approaches)	Rebuild and resurface approaches		X			\$5,000
Railing System	Repair guiderail and end post				X	\$2,000
Wearing Surface (Decks)	Resurface deck with double surface treatment		X			\$5,000
Total Cost						\$87,000

Associated Work:	Comments	Estimated Cost
Approaches:	Extend guiderail on approaches and add end treatments.	\$25,000
Detours:		
Traffic Control:		\$5,000
Utilities:		
Right of Way:		
Environmental Study:		
Other:		
Contingencies:		
	Total Cost	\$30,000

Justification:

Structure No: DY-4

Redstone Brook Bridge

Structure Description

The Redstone Brook Bridge is located on Green Lake Road, 2 km west of Kennisis Lake Road. The bridge was constructed in 1960 and is a 16.3 m three-span, two-lane structure with a timber and concrete composite deck, timber piers and timber abutments. The bridge crosses a non-navigable watercourse on an east/west tangential alignment. The bridge has an 8.5 m overall deck width with a 7.4 m wide surface treated wearing surface with concrete curbs. There is steel beam guiderail across the structure but no guiderail on the approaches.

Structure Condition

The structure is in fair overall condition with a BCI of 61 and a BSI of 58. The wooden ballast walls are in fair to poor condition with severe erosion / scour at the southwest ballast wingwall causing continued settlement and movement causing the embankment to become unstable. There is significant evidence of backfill material washing out from behind the southeast ballast wall, which has undermined the approach. There is a sinkhole in the east approach and there is evidence of undermining of the east approach. The approaches show evidence of settlement with significant asphalt padding. The timber piles and caps are in good condition with minor checking observed. The timber deck is in good condition with minor cracking and evidence of water penetration at localized areas. The wearing surface is in fair condition exhibiting moderate potholing, and edge breaks. The concrete curbs are in good condition with minor spalls and snowplow / vehicle damage.

The guiderail over the structure is in fair condition with localized corrosion and minor collision damage. The spacing between support posts for the guiderail is excessive and may not provide adequate protect in the event of a collision. Several supports posts were observed to be deteriorated and/or loose. The guiderail should be extended on all approaches with proper end treatments.

Recommendations

It is recommended that the structure undergo a minor rehabilitation in 1-5 years to repair the ballast walls, embankments, pad and resurface the approaches, deck wearing surface and replace the guiderail over the structure. It is highly recommended that the root cause of the hole at the east approach be investigated. The undermined east approach wearing surface should be investigated further and repaired immediately as a matter of safety. Maintenance should be undertaken to repair the loose guiderail posts and clean the bridge deck and deck drains. The tree and other debris should be removed from under the structure to prevent damage to the structure and to allow for proper flow under the structure. Guiderail extension on the approaches should be undertaken in the future when the structure undergoes a major rehabilitation.



Photo 1 : General Arrangement – Looking East



Photo 2 : General Arrangement – Looking West



Photo 3: General Arrangement – North Elevation



Photo 4: Deck Wearing Surface – Looking West



Photo 5: East Approach Wearing Surface – Undermined Asphalt Zone (Sinkhole)



Photo 6: Undermined Ballast Wing Wall – Southwest Quadrant

Inventory Data:

Structure Name	Redstone Brook Bridge				
Main Hwy/Road #		On ☒ Under	Crossing Type:	Navig. Water Rail Road	Non-Navig. Water ☒ Ped. Other
Road Name	Green Lake Road				
Structure Location	1.0 km East of Stanhope Airport Road				
Latitude	45.109500	Longitude	-78.634000		
Owner(s)	Municipality of Dysart et al	Heritage Designation:	Not Cons. Design./Not List	Cons./not App. Design. & List	List/not Desig. & List
MTO Region *		Road Class:	Freeway	Arterial	Collector Local ☒
MTO District *		Posted Speed	50	No. of Lanes	2
Old County *		AADT		% Trucks	
Geographic Twp. *		Special Routes:	Transit	Truck	School Bicycle
Structure Type *	Bridge	Detour Length Around Bridge		(km)	
Total Deck Length	16.3	Fill on Structure		(m)	
Overall Str. Width	8.5	Skew Angle	0	(degrees)	
Total Deck Area	139.0	Direction of Structure	E to W		
Roadway Width	7.4	No. of Spans	3		
Span Lengths	5.4 (m)				

Historical Data:

Year Built	1960	Last Biennial Inspection	2014
Current Load Limit	N/A / (tonnes)	Last BridgeMaster Inspection	N/A
Load Limit Bylaw #	N/A	Last Evaluation	N/A
Bylaw Expiry Date	N/A	Last Underwater Inspection	N/A
Min. Vertical Clearance	- (m)	Last Condition Survey	N/A

Rehab. History: (Date/description)

Field Inspection Information:	
Date of Inspection:	August 10, 2016
Inspector:	Robert Brooks – Tulloch Engineering
Others in Party:	Elizabeth Perry – Tulloch Engineering
Equipment Used:	Camera, Hammer, Tape Measure
Weather:	Sun
Temperature:	+29°C

Additional Investigations Required:	Priority			Estimated Cost
	None	Normal	Urgent	
Detailed Deck Condition Survey:	X			
DART Survey:	X			
Detailed Coating Condition Survey:	X			
Underwater Investigation:	X			
Fatigue Investigation:	X			
Seismic Investigation:	X			
Structure Evaluation:	X			
Load Posting – Estimated Load			Total Cost	\$0
Special Notes:				
Next Detailed Inspection:			2018	

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 to 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 | |

Municipal Structure Inspection Form

MTO Site Number:

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Element Data

Element Group:	Abutments	Length:	7	(m)
Element Name:	Ballast Walls	Width:		(m)
Location:	East / West	Height:	1.5	(m)
Material:	Wood Timber	Count:	2	(items)
Element Type:		Total Quantity:	21	(m²)
Environment:	Benign / <u>Moderate</u> / Severe	Limited Insp'n:	☐	
Protection System:	Creosote / Pressure Treat			
Condition	Units	Exc.	Good	Fair
Data:	m² / m / each / % / all		11	10
		Poor	Performance Deficiencies	
			14	
Comments: Evidence of material loss from behind east abutment ballast wall resulting in large cavity below asphalt wearing surface - repair required to prevent subsidence and further erosion.				
Performance Deficiencies: Undermining of foundation				
Recommended Work:	☐ Minor Rehab	☒ Major Rehab		Maintenance Needs: 13
	☐ Replace	☐ None		
Timeframe:	☒ 1 - 5 Years	☐ 6 - 10 Years		☒ Urgent ☐ 1 Year ☐ 2 Year
Comments: Repair undermining of east ballast wall.				Repair eroded cavity behind East abutment wall.

Element Group:	Abutments	Length:	2.0	(m)
Element Name:	Wing Wall	Width:		(m)
Location:	NE/NW/SE/SW	Height:	1.50	(m)
Material:	Wood Timber	Count:	4	(items)
Element Type:		Total Quantity:	12.0	(m²)
Environment:	Benign / <u>Moderate</u> / Severe	Limited Insp'n:	☐	
Protection System:	Creosote / pressure treat			
Condition	Units	Exc.	Good	Fair
Data:	m / m / each / % / all		4.5	5
		Poor	Performance Deficiencies	
			03,04,15	
Comments: Southwest wing wall has severe erosion with continuing settlement and movement.				
Performance Deficiencies: Continuing settlement, movement is causing the embankment to become unstable.				
Recommended Work:	☐ Minor Rehab	☐ Major Rehab		Maintenance Needs:
	☒ Replace	☐ None		
Timeframe:	☒ 1 - 5 Years	☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments: Replace Southwest wing wall.				

Element Group:	Barriers	Length:	15.0	(m)
Element Name:	Railing Systems	Width:		(m)
Location:		Height:		(m)
Material:	Steel	Count:	2	(items)
Element Type:	Steel Flex Beam over Other Railing	Total Quantity:	30.0	(m)
Environment:	Benign / Moderate / <u>Severe</u>	Limited Insp'n:	☐	
Protection System:				
Condition	Units	Exc.	Good	Fair
Data:	m / m / each / % / all		20.0	10.0
		Poor	Performance Deficiencies	
			00	
Comments: Guiderail in fair condition with slight corrosion. Post spacing is insufficient. Post anchors loose in places. No guiderail on approaches.				
Performance Deficiencies: None				
Recommended Work:	☐ Minor Rehab	☐ Major Rehab		Maintenance Needs:
	☒ Replace	☐ None		
Timeframe:	☒ 1 - 5 Years	☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments: Provide new guardrail system at time of rehabilitation				

Municipal Structure Inspection Form

MTO Site Number:

DY - 4

Element Data

Element Group:	Deck		Length:		(m)
Element Name:	Drainage (Decks)		Width:		(m)
Location:	North / South		Height:		(m)
Material:	Steel		Count:	6	(items)
Element Type:	Metal Drain Pipes		Total Quantity:	6	(each)
Environment:	Benign / Moderate Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m each / % / all	Exc.	Good 6	Fair	Poor
Comments:					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		
Comments:					

Element Group:	Deck		Length:	16.3	(m)
Element Name:	Deck Top		Width:	8.5	(m)
Location:			Height:		(m)
Material:	Wood		Count:	1	(items)
Element Type:	Laminated Wood Decking - Longitudinal		Total Quantity:	139.0	(m ²)
Environment:	Benign Moderate / Severe		Limited Insp'n:	☒	
Protection System:			Performance Deficiencies		
Condition Data:	Units m / m / each / % / all	Exc.	Good 139.0	Fair	Poor 00
Comments: Some deflection noted with evidence of water leakage through deck.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		
Comments:					

Element Group:	Deck		Length:	16.3	(m)
Element Name:	Wearing Surface (Decks)		Width:	7.4	(m)
Location:			Height:		(m)
Material:	Asphalt		Count:	1	(items)
Element Type:			Total Quantity:	121.0	(m ²)
Environment:	Benign Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m² / m / each / % / all	Exc.	Good 73.7	Fair 31.0	Poor 16.3
Comments: Wearing surface in fair condition; some potholes and cracking. Missing asphalt on edges with poor bondage and raveling of concrete at Southwest quadrant.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☒ Replace		☐ Major Rehab ☐ None		Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		
Comments:					

Municipal Structure Inspection Form

MTO Site Number:

DY - 4

Element Data

Element Group:	Approaches		Length:	10.0	(m)
Element Name:	Wearing Surface (Approaches)		Width:	7.5	(m)
Location:			Height:		(m)
Material:	Surface Treatment		Count:	2	(items)
Element Type:			Total Quantity:	150.0	(m ²)
Environment:	Benign / Moderate Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc.	Good	Fair	Poor
			116.0	30.0	4
Comments: East approach has a small pothole/washout under asphalt surface (approximately 600mm deep) undermining surface treatment. Severe raveling with loose surface bonading along South approach.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☒ Replace		☐ Major Rehab ☐ None		Maintenance Needs: 12
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		☒ Urgent ☐ 1 Year ☐ 2 Year
Comments: Resurface wearing surface at time of rehabilitation.					Repair pot hole in East approach and replace erroded material.

Element Group:	Pier		Length:		(m)
Element Name:	Shaft / Columns / Pile Bents		Width:	0.30	(m)
Location:			Height:	1.75	(m)
Material:	Wood		Count:	28	(items)
Element Type:	Timber Piles with Capping Beam		Total Quantity:	46.2	(m ²)
Environment:	Benign Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc.	Good	Fair	Poor
			26	20	
Comments:					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: -
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments:					

Element Group:	Sidewalk / Curbs		Length:	16.0	(m)
Element Name:	Curbs		Width:		(m)
Location:			Height:		(m)
Material:	Cast-in-place Concrete		Count:	2	(items)
Element Type:			Total Quantity:	32	(m)
Environment:	Benign / Moderate Severe		Limited Insp'n:	☐	
Protection System:	Creosote		Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc.	Good	Fair	Poor
			22	10	
Comments: Some scaling and isolated minor spalling and abrasion.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: -
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments:					

Municipal Structure Inspection Form

MTO Site Number:

DY - 4

Element Data

Element Group:	Embankments & Streams		Length:		(m)
Element Name:	Embankments		Width:		(m)
Location:	NE/NW/SE/SW		Height:		(m)
Material:			Count:	4	(items)
Element Type:			Total Quantity:	4.0	(ea)
Environment:	Benign Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m each / % / all	Exc.	Good	Fair	Poor
			3.0	0	1
15					
Comments: Southwest embankment is severely eroded.					
Performance Deficiencies: Unstable embankment					
Recommended Work:	☐ Minor Rehab ☒ Replace		☐ Major Rehab ☐ None		Maintenance Needs:
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments: Provide stable embankment with new retaining / wingwall system as part of rehabilitation of Southwest embankment.					

Element Group:	Embankments & Streams		Length:		(m)
Element Name:	Slope Protection		Width:		(m)
Location:	NE/NW/SE/SW		Height:		(m)
Material:			Count:		(items)
Element Type:			Total Quantity:		(ea)
Environment:	Benign Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m each / % / all	Exc.	Good	Fair	Poor
00					
Comments: No slope protection present.					
Performance Deficiencies: None					
Recommended Work:	☒ Minor Rehab ☐ Replace		☐ Major Rehab ☐ None		Maintenance Needs:
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments: Provide slope protection to Southwest and Northwest quadrants as part of rehabilitation work.					

Element Group:	Embankments & Streams		Length:		(m)
Element Name:	Streams & Waterways		Width:		(m)
Location:	Upstream / Downstream		Height:		(m)
Material:			Count:	2	(items)
Element Type:			Total Quantity:	2	(ea)
Environment:	Benign Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m each / % / all	Exc.	Good	Fair	Poor
			2		
00					
Comments:					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs:
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☒ 1 Year ☐ 2 Year
Comments: Remove debris					

Municipal Structure Inspection Form

MTO Site Number:

DY - 4

Repair and Rehabilitation Required:		Priority				Estimated Construction Cost
Element	Repair and Rehabilitation Required	6 to 10 years	1 to 5 years	Within 1 year	Urgent	
Ballast Wingwall	Repair/rebuild abutment wing wall			X		\$5,000
Ballast Walls	Rebuild ballast walls to prevent washout of material			X		\$80,000
Railing System	Replace guiderail on structure		X			\$15,000
Wearing Surface (Decks)	Resurface deck with double surface treatment		X			\$5,000
Total Cost						\$105,000

Associated Work:	Comments	Estimated Cost
Approaches:	Resurface approaches and extend guiderail with end treatments	\$35,000
Detours:		\$5,000
Traffic Control:		
Utilities:		
Right of Way:		
Environmental Study:		
Other:		
Contingencies:		
	Total Cost	\$40,000

Justification:	
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Structure No: DY-5

Guilford Pine Lake

Structure Description

Guilford Pine Lake Bridge is located on Pine Lake Road, 0.5 km north of Eagle Lake Road. The bridge was constructed in 2008 and is an 18 m single span, two-lane structure with a concrete deck supported by steel girders on concrete abutments. The structure has a combination of sheet pile and armour stone wing walls. The bridge crosses a navigable waterway on a north/south alignment. The bridge has an overall 9.0 m wide concrete deck and 7.0 m wide driving surface with concrete parapet walls and steel railing. There is steel beam guiderail on the approaches with proper end treatments.

Structure Condition

The structure is in good condition with a BCI of 90 and BSI of 87. The concrete abutments and soffit are in excellent condition with no signs of distress. The exposed concrete deck is in good condition with minor spalling and loss of aggregate. The concrete parapet walls are in good condition with minor localized damage and vertical shrinkage cracking. The wing walls and erosion protection at the waterline are in excellent condition. The approaches appear to be in good condition.

The barrier over the structure and the guiderail on the approaches is in good condition with minor collision damage to the guiderail in the northwest corner.

Recommendations

The structure does not require any improvements at this time. Maintenance is required to repair the damaged guiderail and minor concrete repairs to the parapet walls could be undertaken at the same time. The deck should be swept to remove debris and sand to promote positive drainage.



Photo 1 : General Arrangement – Looking South



Photo 2 : General Arrangement – Looking North



Photo 3 : General Arrangement – Upstream View



Photo 4 : General Arrangement – Downstream View

Inventory Data:

Structure Name	Guilford Pine Lake Bridge				
Main Hwy/Road #		On ☒ Under	Crossing Type:	Navig. Water ☒ Non-Navig. Water Rail Road Ped. Other	
Road Name	Pine Lake Road				
Structure Location	0.45 km North of Eagle Lake Road				
Latitude	45.117300	Longitude	-78.582000		
Owner(s)	Municipality of Dysart et al	Heritage Designation:	Not Cons. Cons./not App. List/not Desig.	Desig./Not List Desig. & List	
MTO Region *		Road Class:	Freeway Arterial Collector Local ☒		
MTO District *		Posted Speed	50	No. of Lanes 2	
Old County *		AADT		% Trucks	
Geographic Twp. *		Special Routes:	Transit Truck School Bicycle		
Structure Type *	Concrete Deck on Steel Girder	Detour Length Around Bridge		(km)	
Total Deck Length	20.0	(m)	Fill on Structure	0	
Overall Str. Width	9.0	(m)	Skew Angle	0	
Total Deck Area	180.0	(sq.m)	Direction of Structure	N to S	
Roadway Width	7.0	(m)	No. of Spans	1	
Span Lengths	18.0			(m)	

Historical Data:

Year Built	2008	Last Biennial Inspection	2014
Current Load Limit	N/A / (tonnes)	Last BridgeMaster Inspection	N/A
Load Limit Bylaw #	N/A	Last Evaluation	N/A
Bylaw Expiry Date	N/A	Last Underwater Inspection	N/A
Min. Vertical Clearance	- (m)	Last Condition Survey	N/A

Rehab. History: (Date/description)

Field Inspection Information:	
Date of Inspection:	August 10, 2016
Inspector:	Robert Brooks – Tulloch Engineering
Others in Party:	Elizabeth Perry – Tulloch Engineering
Equipment Used:	Camera, Hammer, Tape Measure
Weather:	Sun
Temperature:	+28°C

Additional Investigations Required:		Priority			Estimated Cost			
		None	Normal	Urgent				
Detailed Deck Condition Survey:		X						
DART Survey:		X						
Detailed Coating Condition Survey:		X						
Underwater Investigation:		X						
Fatigue Investigation:		X						
Seismic Investigation:		X						
Structure Evaluation:		X						
Load Posting – Estimated Load		Total Cost			\$0			
Special Notes:								
Next Detailed Inspection:		2018						

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 to 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 | |

Municipal Structure Inspection Form

MTO Site Number:

DY - 5

Element Data

Element Group:	Abutments		Length:		(m)
Element Name:	Ballast Walls		Width:	9.0	(m)
Location:			Height:	1.5	(m)
Material:	Corrugated Steel		Count:	2	(items)
Element Type:	Steel Sheet Pile		Total Quantity:	27.0	(m ²)
Environment:	Benign <u>Moderate</u> / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc. 27	Good	Fair	Poor
					00
Comments:					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs:
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments:					

Element Group:	Abutments		Length:	6.0	(m)
Element Name:	Wingwalls		Width:		(m)
Location:			Height:	1.5	(m)
Material:	Corrugated Steel		Count:	4	(items)
Element Type:	Steel Sheet Piles		Total Quantity:	36.0	(m ²)
Environment:	Benign <u>Moderate</u> / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc. 36	Good	Fair	Poor
					00
Comments: Light corrosion and surface staining, light weathering.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs:
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments:					

Element Group:	Barriers		Length:	18.0	(m)
Element Name:	Barrier / Parapet Wall		Width:	0.20	(m)
Location:			Height:	1.2	(m)
Material:	Cast-in-place Concrete		Count:	2	(items)
Element Type:	Parapet Wall with Two Rails		Total Quantity:	43.0	(m ²)
Environment:	Benign / Moderate <u>Severe</u>		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc. 43	Good	Fair	Poor
					00
Comments: Minor shrinkage cracking; isolated spalls, collision damage to parapet wall.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs:
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments:					

Municipal Structure Inspection Form

MTO Site Number:

DY - 5

Element Data

Element Group:	Approaches	Length:	75	(m)		
Element Name:	Guiderail	Width:		(m)		
Location:		Height:		(m)		
Material:	Steel	Count:	2	(items)		
Element Type:	Steel Flex Beam on Steel Post	Total Quantity:	150.0	(m)		
Environment:	Benign / Moderate Severe	Limited Insp'n:	☐			
Protection System:	Galvanized	Performance Deficiencies				
Condition Data:	Units m ² / m each / % / all				Exc.	Good
			145.0	5		00
Comments: Collision damage to guiderail on NW corner.						
Performance Deficiencies: None						
Recommended Work:	☒ Minor Rehab ☐ Replace		☐ Major Rehab ☐ None		Maintenance Needs: -	
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year	
Comments:						

Element Group:	Beam / MLE	Length:	19.0	(m)		
Element Name:	Girders	Width:	0.20	(m)		
Location:	N / S	Height:	0.50	(m)		
Material:	Steel	Count:	4	(items)		
Element Type:	I-type	Total Quantity:	91.2	(m ²)		
Environment:	Benign / Moderate / Severe	Limited Insp'n:	☒			
Protection System:		Performance Deficiencies				
Condition Data:	Units m ² / m / each / % / all				Exc.	Good
		91.2				00
Comments:						
Performance Deficiencies: None						
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs:	
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year	
Comments:						

Element Group:	Deck	Length:	20	(m)		
Element Name:	Deck Top	Width:	9.0	(m)		
Location:		Height:		(m)		
Material:	Cast-in-place Concrete	Count:	1	(items)		
Element Type:	Cast-in-place Concrete on Supports	Total Quantity:	180.0	(m ²)		
Environment:	Benign / Moderate Severe	Limited Insp'n:	☐			
Protection System:		Performance Deficiencies				
Condition Data:	Units m ² / m / each / % / all				Exc.	Good
			180.0			00
Comments: Minor spalling of concrete deck.						
Performance Deficiencies: None						
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: -	
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year	
Comments:						

Municipal Structure Inspection Form

MTO Site Number:

DY - 5

Element Data

Element Group:	Embankments & Streams		Length:		(m)
Element Name:	Slope Protection		Width:		(m)
Location:			Height:		(m)
Material:	Other		Count:	4	(items)
Element Type:	Rip Rap		Total Quantity:	4	(each)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc. 4	Good	Fair	Poor
					00
Comments: Rip rap protection in good condition.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: -
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments:					

Element Group:	Approaches		Length:	6.0	(m)
Element Name:	Wearing Surface		Width:	7.00	(m)
Location:			Height:		(m)
Material:	Asphalt		Count:	2	(items)
Element Type:			Total Quantity:	84	(m ²)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc.	Good 72	Fair 12.0	Poor
					00
Comments: Raveling of concrete along edges with loss of bond.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: -
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments:					

Element Group:	Accessories		Length:		(m)
Element Name:	Signs		Width:		(m)
Location:	NE/NW/SE/SW		Height:		(m)
Material:	Steel		Count:	2	(items)
Element Type:			Total Quantity:	2	(each)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc.	Good 2	Fair	Poor
					00
Comments: Missing hazard signs at end of guardrails on NE/NW quadrants (2 missing).					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: 17
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☒ 1 Year ☐ 2 Year
Comments: Install hazard signs					

Municipal Structure Inspection Form

MTO Site Number:

DY - 5

Element Data

Element Group:	Beam / MLE		Length:		(m)	
Element Name:	Stringers		Width:		(m)	
Location:	E/W		Height:		(m)	
Material:	Steel		Count:	4	(items)	
Element Type:			Total Quantity:	4	(each)	
Environment:	Benign <u>Moderate</u> / Severe		Limited Insp'n:	☐		
Protection System:			Performance Deficiencies			
Condition	Units	Exc.				Good
Data:	m ² / m / <u>each</u> / % / all	4				00
Comments:						
Performance Deficiencies: None						
Recommended Work:	☐ Minor Rehab		☐ Major Rehab		Maintenance Needs: -	
	☐ Replace		☒ None			
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year	
Comments:						

Municipal Structure Inspection Form

MTO Site Number:

DY - 5

Repair and Rehabilitation Required:		Priority				Estimated Construction Cost
Element	Repair and Rehabilitation Required	6 to 10 years	1 to 5 years	Within 1 year	Urgent	
Railing System	Minor repair to guidrail		X			\$2,000
					Total Cost	\$2,000

Associated Work:	Comments	Estimated Cost
Approaches:		
Detours:		
Traffic Control:		
Utilities:		
Right of Way:		
Environmental Study:		
Other:		
Contingencies:		
Total Cost		\$0

Justification:

Structure No: DY-6

Guilford Cranberry Lake Bridge

Structure Description

Guilford Cranberry Lake Bridge is located on Cranberry Lake Drive, 0.5 km north of Eagle Lake Road. The bridge was constructed in 2013 and is a 26 m single span, two-lane structure with a steel deck supported by steel girders on concrete bearing slabs with corrugated steel ballast walls. The structure crosses a navigable waterway on an east/west alignment. The structure has a deck width of 5.3 m with an asphalt wearing surface and no curbs; drainage is by sheet flow over the deck edge. There is steel beam guiderail across the structure and on the approaches.

Structure Condition

The structure and all individual elements are in good condition with a BCI of 99 and BSI of 97. The bridge wearing surface and approaches have recently been upgraded with hot mix asphalt wearing surfaces. The only deficiency noted was erosion and wash-out of the shoulders and wearing surface near the deck ends.

Recommendations

The structure does not require any improvements at this time. Maintenance should be undertaken to address erosion of shoulders near deck ends.



Photo 1 : General Arrangement - Looking North



Photo 2 : General Arrangement – West Elevation



Photo 3 : South Approach Wearing Surface



Photo 4 : Asphalt Wearing Surface Edge of Pavement – Southwest Quadrant



Photo 5 : Guiderrail Impact Damage - Southeast Quadrant



Photo 6 : General Arrangement – North Abutment Wall

Inventory Data:

Structure Name	Guilford Cranberry Lake Bridge				
Main Hwy/Road #		On ☒ Under	Crossing Type:	Navig. Water ☒ Non-Navig. Water Rail Road Ped. Other	
Road Name	Cranberry Lake Road				
Structure Location	0.08 km North of Eagle Lake Road				
Latitude	45.119800	Longitude	-78.568700		
Owner(s)	Municipality of Dysart et al	Heritage Designation:	Not Cons. ☒ Cons./not App. List/not Desig.	Desig./Not List Desig. & List	
MTO Region *		Road Class:	Freeway Arterial Collector Local ☒		
MTO District *		Posted Speed	50	No. of Lanes 1	
Old County *		AADT		% Trucks	
Geographic Twp. *		Special Routes:	Transit Truck School Bicycle		
Structure Type *	Bridge	Detour Length Around Bridge		(km)	
Total Deck Length	26.0	(m)	Fill on Structure	0 (m)	
Overall Str. Width	5.3	(m)	Skew Angle	0 (degrees)	
Total Deck Area	138.0	(sq.m)	Direction of Structure	N to S	
Roadway Width	5.2	(m)	No. of Spans	1	
Span Lengths	26.0			(m)	

Historical Data:

Year Built	2013	Last Biennial Inspection	2014
Current Load Limit	N/A / (tonnes)	Last BridgeMaster Inspection	N/A
Load Limit Bylaw #	N/A	Last Evaluation	N/A
Bylaw Expiry Date	N/A	Last Underwater Inspection	N/A
Min. Vertical Clearance	- (m)	Last Condition Survey	N/A

Rehab. History: (Date/description)

Field Inspection Information:	
Date of Inspection:	August 10, 2016
Inspector:	Robert Brooks – Tulloch Engineering
Others in Party:	Elizabeth Perry – Tulloch Engineering
Equipment Used:	Camera, Hammer, Tape Measure
Weather:	Sun
Temperature:	+27°C

Additional Investigations Required:	Priority			Estimated Cost		
	None	Normal	Urgent			
Detailed Deck Condition Survey:	X					
DART Survey:	X					
Detailed Coating Condition Survey:	X					
Underwater Investigation:	X					
Fatigue Investigation:	X					
Seismic Investigation:	X					
Structure Evaluation:	X					
Load Posting – Estimated Load		Total Cost		\$0		
Special Notes:						
Next Detailed Inspection:			2018			

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 to 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 | |

Municipal Structure Inspection Form

MTO Site Number:

DY - 6

Element Data

Element Group:	Abutments		Length:		(m)
Element Name:	Abutment Walls		Width:	9.0	(m)
Location:	N/S		Height:	2.0	(m)
Material:	Corrugated Steel		Count:	2	(items)
Element Type:	Retained Soil Systems		Total Quantity:	36.0	(m ²)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:	Galvanized		Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	m ² / m / each / % / all	36			
Comments:					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs:
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments:					

Element Group:	Approaches		Length:	6.0	(m)
Element Name:	Wearing Surface (Approaches)		Width:	7.0	(m)
Location:	N/S		Height:		(m)
Material:	Asphalt		Count:	2	(items)
Element Type:			Total Quantity:	84.0	(m ²)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	m ² / m / each / % / all		80	4	
Comments: SW quadrant has minor surface erosion.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: 17
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☒ 1 Year ☐ 2 Year
Comments: Provide drain locations on SW quadrant to properly channel water and offer embankment protection from erosion.					

Element Group:	Barriers		Length:	58.0	(m)
Element Name:	Railing Systems		Width:		(m)
Location:	E/W		Height:		(m)
Material:	Steel		Count:	2	(items)
Element Type:	Steel Flex Beam on Steel Post		Total Quantity:	116	(m)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:	Galvanized		Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	m / m each / % / all	113	3		
Comments: Appears to have longitudinal scrape damage from passing vehicle.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs:
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments:					

Municipal Structure Inspection Form

MTO Site Number:

DY - 6

Element Data

Element Group:	Beam / MLE	Length:	26.0	(m)
Element Name:	Girders	Width:	0.30	(m)
Location:	N/S	Height:	1.0	(m)
Material:	Steel	Count:	4	(items)
Element Type:	I-type	Total Quantity:	166.4	(m ²)
Environment:	Benign <u>Moderate</u> / Severe	Limited Insp'n:	☐	
Protection System:				
Condition	Units	Exc.	Good	Fair
Data:	<u>m</u> / m / each / % / all	166.4		
Performance Deficiencies				
00				
Comments: New in 2013. Light to moderate corrosion, petina flaking, no section loss.				
Performance Deficiencies: None				
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None	
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years	
Comments:			Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year	

Element Group:	Deck	Length:	26.0	(m)
Element Name:	Deck Top	Width:	5.3	(m)
Location:		Height:		(m)
Material:	Corrugated Steel	Count:	1	(items)
Element Type:		Total Quantity:	138.0	(m ²)
Environment:	Benign <u>Moderate</u> / Severe	Limited Insp'n:	☐	
Protection System:				
Condition	Units	Exc.	Good	Fair
Data:	<u>m</u> / m / each / % / all	131.1		6.9
Performance Deficiencies				
00				
Comments:				
Performance Deficiencies: None				
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None	
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years	
Comments:			Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year	

Element Group:	Deck	Length (avg):	26.0	(m)
Element Name:	Wearing Surface (Decks)	Width:	5.30	(m)
Location:		Height:		(m)
Material:	Asphalt	Count:	1	(items)
Element Type:		Total Quantity:	138.0	(m ²)
Environment:	Benign / Moderate <u>Severe</u>	Limited Insp'n:	☐	
Protection System:				
Condition	Units	Exc.	Good	Fair
Data:	<u>m</u> / m / each / % / all	131.1		6.9
Performance Deficiencies				
00				
Comments: Minor rutting, transverse cracks throughout width of roadway at North and South abutments.				
Performance Deficiencies: None				
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None	
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years	
Comments:			Maintenance Needs: 15 ☐ Urgent ☒ 1 Year ☐ 2 Year Rout and seal transverse cracks.	

Municipal Structure Inspection Form

MTO Site Number:

DY - 6

Element Data

Element Group:	Embankments & Streams		Length:		(m)
Element Name:	Embankments		Width:		(m)
Location:	NE/NW/SE/SW		Height:		(m)
Material:	Rock/Boulder		Count:	4	(items)
Element Type:	Rip Rap		Total Quantity:	4	(each)
Environment:	Benign / <u>Moderate</u> / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m <u>each</u> / % / all	Exc. 4	Good	Fair	Poor
00					
Comments:					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace ☐ 1 - 5 Years		☐ Major Rehab ☒ None ☐ 6 - 10 Years		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:					
Comments:					

Element Group:	Accessories		Length:		(m)
Element Name:	Signs		Width:		(m)
Location:	NE/NW/SE/SW		Height:		(m)
Material:	Steel		Count:	2	(items)
Element Type:			Total Quantity:	2.0	(ea)
Environment:	Benign / Moderate / <u>Severe</u>		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m <u>each</u> / % / all	Exc.	Good	Fair 2.0	Poor
00					
Comments: Raise hazard signs. Install narrow structure signage and one lane only when used by narrow trucks signage.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace ☐ 1 - 5 Years		☐ Major Rehab ☒ None ☐ 6 - 10 Years		Maintenance Needs: - ☒ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:					
Comments:	Install formentioned signage				

Element Group:	MLE's		Length:	0.975	(m)
Element Name:	Diaphragms		Width:	0.165	(m)
Location:	E/W		Height:	0.425	(m)
Material:	Steel		Count:	18	(items)
Element Type:			Total Quantity:	17.8	(m ²)
Environment:	Benign / <u>Moderate</u> / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units <u>m</u> / m / each / % / all	Exc. 17.8	Good	Fair	Poor
00					
Comments: Light to moderate corrosion and patina flaking, no section loss.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace ☐ 1 - 5 Years		☐ Major Rehab ☒ None ☐ 6 - 10 Years		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:					
Comments:					

Municipal Structure Inspection Form

MTO Site Number:

DY - 6

Element Data

Element Group:	Piers	Length:		(m)
Element Name:	Bearings	Width:		(m)
Location:	Abutments	Height:		(m)
Material:	Elastomeric Rubber	Count:	8	(items)
Element Type:		Total Quantity:	8	(each)
Environment:	Benign Moderate / Severe	Limited Insp'n:	☐	
Protection System:				
Condition	Units	Exc.	Good	Fair
	m ² / m each / % / all	8		
Performance Deficiencies				
00				
Comments:				
Performance Deficiencies: None				
Recommended Work	☐ Minor Rehab	☐ Major Rehab	Maintenance Needs: -	
	☐ Replace	☒ None	☐ Urgent ☐ 1 Year ☐ 2 Year	
Timeframe:	☐ 1 - 5 Years	☐ 6 - 10 Years		
Comments:				

Municipal Structure Inspection Form

MTO Site Number:

DY - 6

Repair and Rehabilitation Required:		Priority				Estimated Construction Cost
Element	Repair and Rehabilitation Required	6 to 10 years	1 to 5 years	Within 1 year	Urgent	
Total Cost						

Associated Work:	Comments	Estimated Cost
Approaches:		
Detours:		
Traffic Control:		
Utilities:		
Right of Way:		
Environmental Study:		
Other:		
Contingencies:		
Total Cost		\$0

Justification:

Structure No: DY-7

Oblong Lake Narrows Bridge

Structure Description

The Oblong Lake Narrows Bridge is located on Haliburton Lake Road, immediately North of the intersection of Haliburton Lake Road and Harburn Road, in the hamlet of Fort Irwin. The bridge was constructed in 1964 and is an 18.6 m triple span, two lane structure with a composite wood/concrete deck, supported by timber piles and pile caps with timber ballast wall abutments. The structure crosses a navigable watercourse (Oblong Lake) on a North/South tangential alignment. The bridge has an 8.5 m wide concrete deck with an asphaltic wearing surface and concrete curbs. There is a steel barrier over the structure with concrete end posts and one steel beam guiderail on the Southeast approach. The bridge is currently load posted / limited to 20 / 32 / 40 tonnes.

Structure Condition

The overall structure is in poor condition with a BCI of 42 and BSI of 33. The substructure is in good to fair condition given its age; however, the superstructure including deck, curbs, sidewalk and railings are in poor condition and require replacement. The timber piles and pile caps are in good condition with minor checking and cracking noted at end bent locations. It should be noted the two center bents have limited inspection due to accessibility. The timber abutments are in fair condition; however, the gabion wing walls have been displaced and require replacement and stabilization with proper slope protection in all four quadrants. The concrete deck, curbs and sidewalk are in poor condition with extensive spalling of the soffit and curb areas revealing localized exposed rebar. The longitudinal wooden deck shows signs of water penetration. The wearing surface is in good to poor condition with extensive potholes and patching evident. The steel barrier over the structure is in fair to poor condition with severe corrosion, isolated collision damage and severe deterioration of the concrete end posts. The barrier does not comply with the bridge code and likely would not provide sufficient protection in the event of a collision. The steel beam guiderail on the Southeast approach is in poor condition with visible impact damage and is not connected to the structure. The other three approach quadrants have no steel beam guiderail system.

Recommendations

The substructure; excluding piles and capping beams, and superstructure; excluding possible wood soffit, require major rehabilitation. The structure requires major rehabilitation including repair/replacement of abutments, deck, soffit, wearing surface and guiderails. A detailed deck condition survey should be conducted prior to major rehabilitation work to establish actual deck conditions between composite materials. It is also recommended that an enhanced visual inspection of center bents be conducted at that time to ensure the integrity of major structural pier components. This work should be undertaken in 1-5 years.



Photo 1 : General Arrangement - Looking North



Photo 2 : General Arrangement - Looking West

Structure No: DY-1

Paddy's Pond Bridge

Structure Description

Paddy's Pond Bridge is located on North Kennisis Lake Road, approximately 5 km west of Kennisis Lake Narrows. The bridge was constructed in 1966 and is a 6.1 m single span, two-lane structure with a deck supported by timber piers and abutments. The bridge has an overall deck width of 6.7 m and 6.2 m wide surface treated wearing surface with timber curbs. There is steel beam guiderail across the structure but no guiderail on the approaches.

Structure Condition

The structure is in poor overall condition with a BCI of 58 and BSI of 47. The abutments are in fair condition with isolated locations of minor splitting of the ballast wall. The wing walls are in fair condition with considerable displacement noted; the northeast wing wall continues to fail. As noted from previous inspections, the northeast wing wall should be repaired to prevent further washout of backfill on approaches. The deck wearing surface is in fair to poor condition showing potholing and alligator cracking; the wearing surface should be replaced to protect the wooden deck. One of the wood girders and deck above has failed due to overloading - severe cracking and splitting of the 4th beam from the north face. Significant amount of deflection was also observed under loading of tandem axle dump truck.

The guiderail does not comply with the bridge code; the post spacing over the structure is insufficient and there are no guiderail or end treatments on the approaches.

Recommendation

It is recommended that a structural evaluation be conducted and appropriate load ratings enforced, lane restrictions enforced and/or temporary structure installed. A design remedy should be provided to repair or replace the damaged girder(s) and deck. Rehabilitation work as a minimum is required to repair damaged girder. Depending on the outcome of the structural evaluation it may be required to replace all girders. The deck and approach wearing surfaces, and the wing wall /retaining walls are in poor to fair condition and should be replaced within 1-5 years or at time of girder replacement. Guiderail extension on the approaches should be installed at time of rehabilitation.

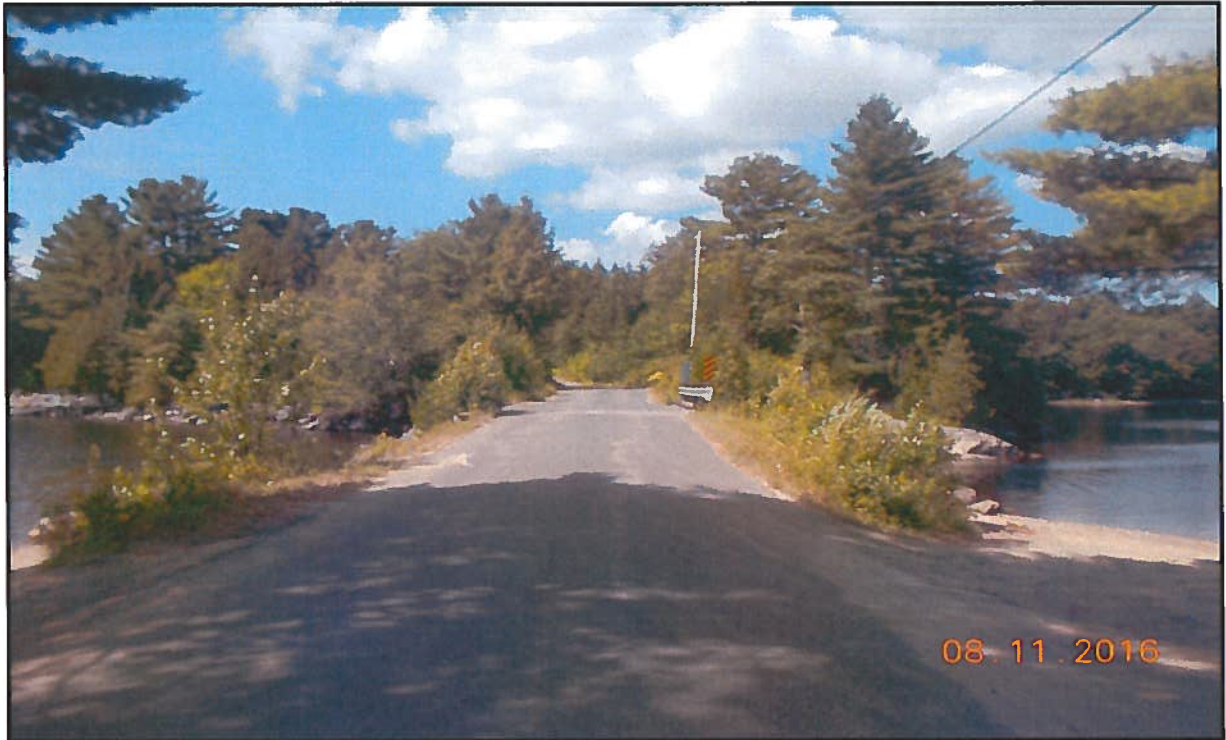


Photo 1: General Arrangement – Looking West



Photo 2: General Arrangement – Looking East



Photo 3: General Arrangement – Southeast Elevation



Photo 4: General Arrangement – Southeast Embankment



Photo 5: General Arrangement – West Abutment



Photo 6: Splintering of Wood Beam (4th from North face) – Looking West



Photo 7: Splintering of Wood Beam (4th from North face) – Close Up View



Photo 8: Longitudinal Cracking of Wood Beam (4th from North face) – Close Up View



Photo 9: Northeast Abutment Wing Wall – Looking Southwest

Inventory Data:

Structure Name	Paddy's Bay (Pond) Bridge				
Main Hwy/Road #		On ☒ Under	Crossing Type:	Navig. Water ☒ Rail Non-Navig. Water ☐ Road Ped. Other	
Road Name	North Kennisis Lake Road				
Structure Location	0.3 km West of Paddy's Court				
Latitude	45.224000	Longitude	-78.644800		
Owner(s)	Municipality of Dysart et al	Heritage Designation:	Not Cons. ☒ Cons./not App. Design./Not List List/not Desig. Desig. & List		
MTO Region *		Road Class:	Freeway Arterial Collector Local ☒		
MTO District *		Posted Speed	50	No. of Lanes 2	
Old County *		AADT		% Trucks	
Geographic Twp. *		Special Routes:	Transit Truck School Bicycle		
Structure Type *	Bridge	Detour Length Around Bridge		(km)	
Total Deck Length	7.0	Fill on Structure	0	(m)	
Overall Str. Width	6.7	Skew Angle	0	(degrees)	
Total Deck Area	46.9	Direction of Structure	N to S		
Roadway Width	6.2	No. of Spans	1		
Span Lengths	6.1			(m)	

Historical Data:

Year Built	1966	Last Biennial Inspection	2014
Current Load Limit	N/A/ / (tonnes)	Last BridgeMaster Inspection	N/A
Load Limit Bylaw #	N/A	Last Evaluation	N/A
Bylaw Expiry Date	N/A	Last Underwater Inspection	N/A
Min. Vertical Clearance	- (m)	Last Condition Survey	N/A

Rehab. History: (Date/description)

Field Inspection Information:	
Date of Inspection:	August 11, 2016
Inspector:	Robert Brooks – Tulloch Engineering
Others in Party:	Elizabeth Perry – Tulloch Engineering
Equipment Used:	Camera, Hammer, Tape Measure
Weather:	Sun
Temperature:	+29°C

Additional Investigations Required:	Priority			Estimated Cost
	None	Normal	Urgent	
Detailed Deck Condition Survey:	X			
DART Survey:	X			
Detailed Coating Condition Survey:	X			
Underwater Investigation:	X			
Fatigue Investigation:	X			
Seismic Investigation:	X			
Structure Evaluation:			X	10,000.00
Load Posting – Estimated Load	No Limit	Total Cost		\$10,000
Special Notes: Laminated wood deck to be included as part of structure evaluation.				
Next Detailed Inspection:			2018	

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 to 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	

Municipal Structure Inspection Form

MTO Site Number:

DY - 1

Element Data

Element Group:	Abutments		Length:		(m)
Element Name:	Ballast Walls		Width:	7.2	(m)
Location:			Height:	2.8	(m)
Material:	Wood		Count:	2	(items)
Element Type:			Total Quantity:	40.3	(m ²)
Environment:	Benign <u>Moderate</u> / Severe		Limited Insp'n:	☐	
Protection System:	Creosote		Performance Deficiencies		
Condition Data:	Units <u>m²</u> / m / each / % / all	Exc.			
			25.3	15.0	
Comments:					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		
Comments:					

Element Group:	Abutments		Length:	3.0	(m)
Element Name:	Wingwalls		Width:		(m)
Location:	NE/SW/NW/SE		Height:	2.8	(m)
Material:	Wood		Count:	4	(items)
Element Type:	Wood Piles and Lagging		Total Quantity:	33.6	(m ²)
Environment:	Benign <u>Moderate</u> / Severe		Limited Insp'n:	☐	
Protection System:	Creosote		Performance Deficiencies		
Condition Data:	Units <u>m²</u> / m / each / % / all	Exc.			
			10.2	15	8.4
Comments: Wingwall at Northwest quadrant has failed due to severe rot and decay. Pile support for wing wall has also rotted and offers no structural load carrying capacity for wing wall at this area.					
Performance Deficiencies: Load carrying capacity.					
Recommended Work:	☐ Minor Rehab ☒ Replace		☒ Major Rehab ☐ None		Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		
Comments: Replace and/or major rehab. ballast wing walls.					

Element Group:	Barriers		Length:	8.0	(m)
Element Name:	Railing Systems		Width:		(m)
Location:			Height:	0.5	(m)
Material:	Steel		Count:	2	(items)
Element Type:	Flex Beam on Wood Post		Total Quantity:	16.0	(m)
Environment:	Benign / Moderate <u>Severe</u>		Limited Insp'n:	☐	
Protection System:	Galvanizing / Creosote (or Pressure Treat)		Performance Deficiencies		
Condition Data:	Units <u>m / m</u> each / % / all	Exc.			
			16.0		
Comments: Guiderail in good condition with minor rust in localized areas. Guiderail system does not comply with bridge code; guiderail should be extended on all four quadrants with proper end treatments. Wood posts have light to medium splits and checks throughout.					
Performance Deficiencies: Pedestrian / vehicle hazard					
Recommended Work:	☐ Minor Rehab ☒ Replace		☐ Major Rehab ☐ None		Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		
Comments: Provide new guiderail system as part of bridge rehab.					

Municipal Structure Inspection Form

MTO Site Number:

DY - 1

Element Data

Element Group:	Beam/ MLE	Length:	8.8	(m)
Element Name:	Girders	Width:	0.31	(m)
Location:	N/S	Height:	0.31	(m)
Material:	Wood	Count:	8	(items)
Element Type:	Rectangular-solid	Total Quantity:	65.5	(m ²)
Environment:	Benign <u>Moderate</u> Severe	Limited Insp'n:	☐	
Protection System:	Creosote			
Condition	Units	Exc.	Good	Fair
Data:	m ² / m / each / % / all		17.5	32
		Poor	16	
		Performance Deficiencies		
		01		
Comments: Minor checking and moderate longitudinal cracking throughout all members. The 4th and 5th beam girders, from the North elevation, have severe long. cracking migrating to bearing support location on East abutment. Visible deflection in 4th and 5th beam girders was observed under loading of tandem axle dump truck. Severe delamination and lateral cracking observed in 4th beam from North elevation.				
Performance Deficiencies: Load carrying capacity				
Recommended Work:		☐ Minor Rehab		☐ Major Rehab
☒ Replace		☐ None		Maintenance Needs:
Timeframe:		☒ 1 - 5 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
☐ 6 - 10 Years				
Comments: Structural evaluation recommended. Load rate bridge. Replace failed girder(s) and deck.				

Element Group:	Deck	Length:	7.0	(m)
Element Name:	Wearing Surface	Width:	6.2	(m)
Location:	Deck Top	Height:	0.04	(m)
Material:	Asphalt	Count:	1	(items)
Element Type:		Total Quantity:	43.4	(m ²)
Environment:	Benign / Moderate <u>Severe</u>	Limited Insp'n:	☐	
Protection System:				
Condition	Units	Exc.	Good	Fair
Data:	m ² / m / each / % / all			18.0
		Poor	25.4	
		Performance Deficiencies		
		09		
Comments: Surface treated wearing surface has moderate to severe alligator cracking throughout. Some recent patching has been done. Severe cracking and potholes throughout the surface is creating a rough riding surface and allowing water through.				
Performance Deficiencies: Rough riding surface				
Recommended Work:		☐ Minor Rehab		☐ Major Rehab
☒ Replace		☐ None		Maintenance Needs:
Timeframe:		☒ 1 - 5 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
☐ 6 - 10 Years				
Comments: Provide new asphalt wearing surface as part of bridge rehab.				

Element Group:	Pier	Length (avg):	0.30	(m)
Element Name:	Pier Bearings	Width:	0.30	(m)
Location:	NE/SW	Height:	0.21	(m)
Material:	Wood	Count:	16	(items)
Element Type:	Creosote	Total Quantity:	16.0	(ea)
Environment:	Benign <u>Moderate</u> Severe	Limited Insp'n:	☐	
Protection System:				
Condition	Units	Exc.	Good	Fair
Data:	m ² / m / <u>each</u> / % / all		16.0	
		Poor		
		Performance Deficiencies		
		00		
Comments:				
Performance Deficiencies: None				
Recommended Work:		☐ Minor Rehab		☐ Major Rehab
☐ Replace		☒ None		Maintenance Needs:
Timeframe:		☐ 1 - 5 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
☐ 6 - 10 Years				
Comments:				

Municipal Structure Inspection Form

MTO Site Number:

DY - 1

Element Data

Element Group:	Pier	Length:	7.0	(m)
Element Name:	Caps	Width:	0.30	(m)
Location:	N/S	Height:	0.30	(m)
Material:	Wood	Count:	3	(items)
Element Type:		Total Quantity:	18.9	(m ²)
Environment:	Benign / <u>Moderate</u> / Severe	Limited Insp'n:	☒	
Protection System:	Creosote			
Condition	Units	Exc.	Good	Fair
Data:	<u>m</u> / m / each / % / all		18.9	
Performance Deficiencies				
00				
Comments: Pile caps in good condition; light to medium splitting and checking at ends.				
Performance Deficiencies: None				
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None	
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years	
Comments:				
Maintenance Needs: -				
☐ Urgent ☐ 1 Year ☐ 2 Year				

Element Group:	Pier	Length:		(m)
Element Name:	Pile Bents	Width:	0.30	(m)
Location:	N/S	Height:	2.0	(m)
Material:	Wood	Count:	12	(items)
Element Type:	Timber Piles with Capping Beam	Total Quantity:	22.6	(m ²)
Environment:	Benign / <u>Moderate</u> / Severe	Limited Insp'n:	☐	
Protection System:	Creosote			
Condition	Units	Exc.	Good	Fair
Data:	<u>m</u> / m / each / % / all		13.6	9.0
Performance Deficiencies				
00				
Comments: Light checking above waterline. No displacement noted.				
Performance Deficiencies: None				
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None	
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years	
Comments:				
Maintenance Needs: -				
☐ Urgent ☐ 1 Year ☐ 2 Year				

Element Group:	Retaining Wall	Length:	8	(m)
Element Name:	Walls	Width:	2	(m)
Location:	East Quadrant	Height:	0.5	(m)
Material:	Gabion Basket	Count:	4	(items)
Element Type:		Total Quantity:	4	(each)
Environment:	Benign / Moderate / <u>Severe</u>	Limited Insp'n:	☐	
Protection System:	Galvanized			
Condition	Units	Exc.	Good	Fair
Data:	m ² / m / <u>each</u> / % / all			1.0
Performance Deficiencies				
03,04				
Comments: Toppling over due to settlement and ground movement.				
Performance Deficiencies: Continuing settlement and movement				
Recommended Work:	☐ Minor Rehab ☒ Replace		☐ Major Rehab ☐ None	
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years	
Comments:	Stabalization required for toppling gabion basket retaining wall			
Maintenance Needs: -				
☐ Urgent ☐ 1 Year ☐ 2 Year				

Municipal Structure Inspection Form

MTO Site Number:

DY - 1

Element Data

Element Group:	Sidewalks/Curbs		Length:	8.0	(m)
Element Name:	Curbs		Width:	0.20	(m)
Location:	NW/SE		Height:	0.20	(m)
Material:	Wood		Count:	2	(items)
Element Type:	Creosote		Total Quantity:	9.6	(m ²)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	m / m / each / % / all			9.6	
Comments: Minor splits and checks, curbs should be replaced as part of bridge rehab.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace ☐ 1 - 5 Years		☐ Major Rehab ☒ None ☐ 6 - 10 Years		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:					
Comments:					

Element Group:	Approaches		Length:	6	(m)
Element Name:	Approach Wearing Surface		Width:	6.2	(m)
Location:	N/S		Height:	0.04	(m)
Material:	Asphalt		Count:	2	(items)
Element Type:			Total Quantity:	74.4	(m ²)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	m / m / each / % / all		32	28.0	14.0
Comments: Light to medium wheel rutting and uneven surface. Continuing settlement causing uneven riding surface in West quadrant.					
Performance Deficiencies: Settlement and rough riding surface					
Recommended Work:	☐ Minor Rehab ☐ Replace ☒ 1 - 5 Years		☒ Major Rehab ☐ None ☐ 6 - 10 Years		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:					
Comments:	Remove overgrown vegetation. Provide proper drainage at all four quadrants as part of rehab work.				

Element Group:	Deck		Length:	7.0	(m)
Element Name:	Soffit - Thin Slab		Width:	6.7	(m)
Location:			Height:		(m)
Material:	Laminated Wood Deck		Count:	1	(items)
Element Type:			Total Quantity:	48.0	(m ²)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:	Creosote, Surface Treatment		Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	m / m / each / % / all		48.0		
Comments: Medium to severe water staining throughout.					
Performance Deficiencies: Load carrying capacity					
Recommended Work:	☐ Minor Rehab ☒ Replace ☒ 1 - 5 Years		☐ Major Rehab ☐ None ☐ 6 - 10 Years		Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:					
Comments:	Deck has failed where beam / girder has failed				

Municipal Structure Inspection Form

MTO Site Number:

DY - 1

Element Data

Element Group:	Embankments & Streams		Length:		(m)
Element Name:	Embankments		Width:		(m)
Location:	NE/NW/SE/SW		Height:		(m)
Material:		Count:	4	(items)	
Element Type:		Total Quantity:	4	(ea)	
Environment:	Benign / <u>Moderate</u> / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	m ² / m / <u>each</u> / % / all			2.0	2.0
15					
Comments:					
Performance Deficiencies: Unstable embankments					
Recommended Work:		☐ Minor Rehab ☒ Replace		☐ Major Rehab ☐ None	
Timeframe:		☒ 1 - 5 Years ☐ 6 - 10 Years		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year	
Comments: Repair unstable embankments					

Element Group:	Embankments & Streams		Length:		(m)
Element Name:	Slope Protection		Width:		(m)
Location:	NE/NW/SE/SW		Height:		(m)
Material:	Rip Rap		Count:	4	(items)
Element Type:		Total Quantity:	4.0	(ea)	
Environment:	Benign / <u>Moderate</u> / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	m ² / m / <u>each</u> / % / all			1.0	3.0
15					
Comments:					
Performance Deficiencies: Unstable embankment					
Recommended Work:		☐ Minor Rehab ☒ Replace		☐ Major Rehab ☐ None	
Timeframe:		☒ 1 - 5 Years ☐ 6 - 10 Years		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year	
Comments: Provide slope protection to all quadrants after embankment rehab.					

Element Group:	Embankments & Streams		Length:		(m)
Element Name:	Streams & Waterways		Width:		(m)
Location:			Height:		(m)
Material:		Count:	1	(items)	
Element Type:		Total Quantity:	1.0	(ea)	
Environment:	<u>Benign</u> / Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	m ² / m / <u>each</u> / % / all		1.0		
00					
Comments:					
Performance Deficiencies: None					
Recommended Work:		☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None	
Timeframe:		☐ 1 - 5 Years ☐ 6 - 10 Years		Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year	
Comments:					

Municipal Structure Inspection Form

MTO Site Number:

DY - 1

Repair and Rehabilitation Required:		Priority				Estimated Construction Cost
Element	Repair and Rehabilitation Required	6 to 10 years	1 to 5 years	Within 1 year	Urgent	
Bridge	Replace MLE (Wood Beams)				X	\$26,500
Wingwalls	Replace Wingwall / Retaining Walls				X	\$55,000
Wearing Surface (Decks)	Replace deck wearing surface.				X	\$7,250
Wearing Surface (Approaches)	Replace approach wearing surfaces.				X	\$2,250
Sidewalk/Curbs	Replace curbs as part of bridge rehab				X	\$2,000
Total Cost						\$93,000

Associated Work:	Comments	Estimated Cost
Approaches:	Install guiderail and end treatment	\$25,000
Detours:		
Traffic Control:		
Utilities:		
Right of Way:		
Environmental Study:		
Other:	Engineering	\$7,500
Contingencies:		\$9,500
Total Cost		\$42,000

Justification:

Structure No: DY-2

Kennisis Lake Narrows Bridge

Structure Description

Kennisis Lake Narrows Bridge is located on North Kennisis Lake Road, at Kennisis Lake Narrows, approximately 400 m west of Watts Road. The bridge was constructed in 1966 and is a 7 m single span, two lane structure with a timber deck, timber beams and timber abutments. The bridge has an overall 6.8 m deck width with 6.2 m wide surface treated wearing surface with timber curbs. There is steel beam guiderail with hazard markers across the structure but no guiderail on the approaches.

Structure Condition

The structure is in fair overall condition with a BCI of 66 and a BSI of 62. The abutments are in good condition with no deficiencies noted above the waterline. The timber beams and deck appear to be in good condition with minor cracking and checking observed. It should be noted that moderate deflection was observed under loading by a tandem axle dump truck. The surface treated wearing surface is in fair condition exhibiting slippage cracking and sections of the wooden deck are visible through the surface treatment. The approaches are in good condition; however, there is evidence of erosion on the approach embankments. There was a large amount of sand and debris on the bridge deck and blocking the deck drains at the time of inspection.

The guiderail over the structure is in good condition with localized corrosion and minor collision damage. The guiderail should be extended on all approaches with proper end treatments.

Recommendation

It is recommended that the main longitudinal beam and soffit areas undergo an enhanced visual inspection with boat or barge due to limited access and detailed structural analysis be performed for potential load posting. The wearing surface should be replaced within 1-5 years and maintenance should be undertaken to repair the loose guiderail. Bridge cleaning of the deck and deck drains under the curb should be conducted immediately to alleviate surface ponding issues. It is recommended that the guiderail extensions with end treatments be addressed in the future when the structure undergoes a major rehabilitation.



Photo 1: General View – Looking West



Photo 2: General View – Looking East

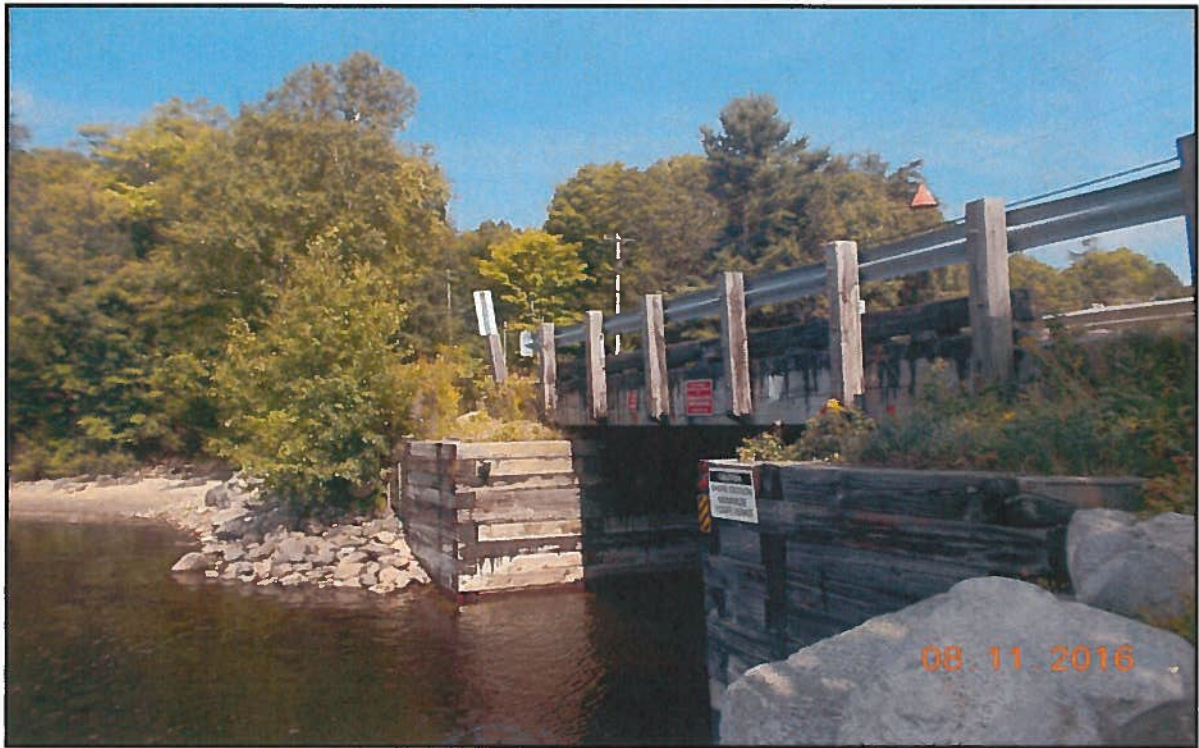


Photo 3: General View – Southeast Elevation



Photo 4: Deck Wearing Surface – Looking West



Photo 5: Loss of Bond & Map Cracking in Deck– Northwest Quadrant



Photo 6: General View – West Abutment

Inventory Data:

Structure Name	Kennisis Lake Narrows Bridge				
Main Hwy/Road #		On ☒ Under	Crossing Type:	Navig. Water ☒ Non-Navig. Water Rail Road Ped. Other	
Road Name	Kennisis Lake Road				
Structure Location	0.4 km West of Watts Road				
Latitude	45.241800	Longitude	-78.598200		
Owner(s)	Municipality of Dysart et al	Heritage Designation:	Not Cons. ☒ Cons./not App. List/not Desig. Desig./Not List Desig. & List		
MTO Region *		Road Class:	Freeway Arterial Collector Local ☒		
MTO District *		Posted Speed	50	No. of Lanes	2
Old County *		AADT		% Trucks	
Geographic Twp. *		Special Routes:	Transit Truck School Bicycle		
Structure Type *	Bridge	Detour Length Around Bridge		(km)	
Total Deck Length	13.8	(m)	Fill on Structure	0	(m)
Overall Str. Width	6.8	(m)	Skew Angle	0	(degrees)
Total Deck Area	94.0	(sq.m)	Direction of Structure	E to W	
Roadway Width	6.2	(m)	No. of Spans	1	
Span Lengths	7.0 (m)				

Historical Data:

Year Built		Last Biennial Inspection	2014
Current Load Limit	N/A / (tonnes)	Last BridgeMaster Inspection	N/A
Load Limit Bylaw #	N/A	Last Evaluation	N/A
Bylaw Expiry Date	N/A	Last Underwater Inspection	N/A
Min. Vertical Clearance	- (m)	Last Condition Survey	N/A

Rehab. History: (Date/description)

Field Inspection Information:	
Date of Inspection:	August 11, 2016
Inspector:	Robert Brooks – Tulloch Engineering
Others in Party:	Elizabeth Perry – Tulloch Engineering
Equipment Used:	Camera, Hammer, Tape Measure
Weather:	Sun
Temperature:	+28°C

Additional Investigations Required:	Priority			Estimated Cost
	None	Normal	Urgent	
Detailed Deck Condition Survey:	X			
DART Survey:	X			
Detailed Coating Condition Survey:	X			
Underwater Investigation:	X			
Fatigue Investigation:	X			
Seismic Investigation:	X			
Structure Evaluation:		X		\$10,000
Load Posting – Estimated Load			Total Cost	\$10,000
Special Notes: Enhanced visual inspection of main longitudinal elements with boat or barge is recommended and Structural Evaluation for Possible Load Posting given evidence of deflection during loading by tandem truck.				
Next Detailed Inspection:	2018			

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 to 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 | |

Municipal Structure Inspection Form

MTO Site Number:

DY - 2

Element Data

Element Group:	Abutments		Length:		(m)
Element Name:	Abutment Walls		Width:	9.8	(m)
Location:	East / West		Height:	2.5	(m)
Material:	Wood		Count:	2	(items)
Element Type:			Total Quantity:	49.0	(m ²)
Environment:	Benign / <u>Moderate</u> / Severe		Limited Insp'n:	☐	
Protection System:	Creosote		Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	m ² / m / each / % / all		49.0		
00					
Comments:					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		
Comments:					

Element Group:	Abutments		Length:		(m)
Element Name:	Wingwalls		Width:	2.5	(m)
Location:	NE/NW/SE/SW		Height:	2.50	(m)
Material:	Wood		Count:	4	(items)
Element Type:	Wood Crib		Total Quantity:	25.0	(m ²)
Environment:	Benign / <u>Moderate</u> / Severe		Limited Insp'n:	☐	
Protection System:	Creosote		Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	m ² / m / each / % / all		19	4	2
00					
Comments: Minor checking in wood beams. Cracking, splintering end post at S/W quadrant.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		
Comments:					

Element Group:	Barriers		Length:	16.0	(m)
Element Name:	Railing Systems		Width:		(m)
Location:	Across structure only		Height:		(m)
Material:	Steel		Count:	2	(items)
Element Type:	Steel Flex Beam on Wood Post		Total Quantity:	32	(m)
Environment:	Benign / Moderate / <u>Severe</u>		Limited Insp'n:	☐	
Protection System:	Galvanized / Creosote (or Pressure Treat)		Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	m / m / each / % / all			32	
00					
Comments: Existing guiderail in fair condition with missing bolts at end post locations in the NE and SE quadrants. Guiderail should be extended with proper end treatments in accordance with Ontario Provincial Standards.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: 03 ☐ Urgent ☒ 1 Year ☐ 2 Year
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		
Comments: Bridge and Handrail Maintenance.					

Municipal Structure Inspection Form

MTO Site Number:

DY - 2

Element Data

Element Group:	Beam / MLE		Length:	8.8	(m)
Element Name:	Girders		Width:	0.250	(m)
Location:	E/W		Height:	0.60	(m)
Material:	Wood		Count:	9	(items)
Element Type:	Rectangular-solid		Total Quantity:	114.8	(m ²)
Environment:	Benign <u>Moderate</u> / Severe		Limited Insp'n:	☒	
Protection System:	Creosote		Performance Deficiencies		
Condition Data:	Units	Exc.	Good	Fair	Poor
	m ² / m / each / % / all		92.8	20	2
02					
Comments: Moderate to severe checking along North girder. Deflection of beam girders, at center span, was observed under loading of passing tandem axel dump truck. Limited inspection access only.					
Performance Deficiencies: Excessive deformations (deflection)					
Recommended Work:		☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None	
Timeframe:		☐ 1 - 5 Years ☐ 6 - 10 Years		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year	
Comments: Enhanced visual and structural inspection is recommended.					

Element Group:	Deck		Length:	13.8	(m)
Element Name:	Deck Top		Width:	6.8	(m)
Location:			Height:		(m)
Material:	Wood		Count:	1	(items)
Element Type:	Laminated Wood Decking - transverse		Total Quantity:	94.0	(m ²)
Environment:	Benign <u>Moderate</u> / Severe		Limited Insp'n:	☒	
Protection System:	Creosote / Surface Treatment		Performance Deficiencies		
Condition Data:	Units	Exc.	Good	Fair	Poor
	m ² / m / each / % / all		94.0		
00					
Comments: Good overall condition; no loose or rotten deck boards observed.					
Performance Deficiencies: None					
Recommended Work:		☐ Minor Rehab ☒ Replace		☐ Major Rehab ☒ None	
Timeframe:		☐ 1 - 5 Years ☐ 6 - 10 Years		Maintenance Needs: 02 ☐ Urgent ☒ 1 Year ☐ 2 Year	
Comments: Remove sand build-up.					

Element Group:	Deck		Length:	13.8	(m)
Element Name:	Wearing Surface (Decks)		Width:	6.20	(m)
Location:			Height:		(m)
Material:	Surface Treatment		Count:		(items)
Element Type:			Total Quantity:	85.6	(m ²)
Environment:	Benign / Moderate <u>Severe</u>		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units	Exc.	Good	Fair	Poor
	m ² / m / each <u>%</u> all		10.4	37.6	37.6
10					
Comments: Alligator map cracking with localized potholes observed. Deck requires cleaning/sweeping to promote drainage and preserve wood deck and curbs. Asphalt deterioration and loss of bond in SE quadrant.					
Performance Deficiencies: Surface ponding					
Recommended Work:		☐ Minor Rehab ☒ Replace		☐ Major Rehab ☐ None	
Timeframe:		☒ 1 - 5 Years ☐ 6 - 10 Years		Maintenance Needs: 02, 12 ☐ Urgent ☒ 1 Year ☐ 2 Year	
Comments: Bridge Cleaning & surface repair in NE quadrant.					

Municipal Structure Inspection Form

MTO Site Number:

DY - 2

Element Data

Element Group:	Retaining Walls		Length:	3.0	(m)	
Element Name:	Walls		Width:	2.0	(m)	
Location:	NW Quadrant		Height:	0.5	(m)	
Material:	Other		Count:	2	(items)	
Element Type:	Gabions		Total Quantity:	3	(m ²)	
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐		
Protection System:	Galvanized		Performance Deficiencies			
Condition	Units	Exc.				Good
Data:	m ² / m / each / % / all			3.0		00
Comments: Retaining walls show signs of previous settlement, no signs of continued settlement observed.						
Performance Deficiencies: None						
Recommended Work:	☐ Minor Rehab		☐ Major Rehab		Maintenance Needs: -	
	☐ Replace		☒ None			
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year	
Comments:						

Element Group:	Sidewalks / Curbs		Length:	13.0	(m)	
Element Name:	Curbs		Width:	0.30	(m)	
Location:	N / S		Height:	0.30	(m)	
Material:	Wood		Count:	2	(items)	
Element Type:			Total Quantity:	15.6	(m ²)	
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐		
Protection System:	Creosote		Performance Deficiencies			
Condition	Units	Exc.				Good
Data:	m ² / m / each / % / all		1.6	10.0	5.0	00
Comments: Minor plow/vehicle damage to curbs; some rot/section loss at ends. Accumulated sand/sediment against curb significant - needs cleaning to promote drainage and prevent rot. Longitudinal splits throughout members.						
Performance Deficiencies: None						
Recommended Work:	☐ Minor Rehab		☐ Major Rehab		Maintenance Needs: 02	
	☐ Replace		☒ None			
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☒ 1 Year ☐ 2 Year	
Comments: Bridge cleaning						

Element Group:	Approaches		Length:	6	(m)	
Element Name:	Wearing Surface		Width:	6.2	(m)	
Location:	East and West		Height:		(m)	
Material:	Asphalt		Count:	2	(items)	
Element Type:			Total Quantity:	74.4	(m ²)	
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐		
Protection System:			Performance Deficiencies			
Condition	Units	Exc.				Good
Data:	m ² / m / each / % / all		68	4	2	00
Comments: Provide adequate means for drainage at all four quadrants.						
Performance Deficiencies: None						
Recommended Work:	☒ Minor Rehab		☐ Major Rehab		Maintenance Needs: 02	
	☐ Replace		☐ None			
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☒ 1 Year ☐ 2 Year	
Comments: Provide proper drainage all Quadrants.						

Municipal Structure Inspection Form

MTO Site Number:

DY - 2

Repair and Rehabilitation Required:		Priority				Estimated Construction Cost
Element	Repair and Rehabilitation Required	6 to 10 years	1 to 5 years	Within 1 year	Urgent	
Wearing Surface (Decks)	Resurface with double surface treatment to protect wooden deck		X			\$7,500
Total Cost						\$7,500

Associated Work:	Comments	Estimated Cost
Approaches:	Extend guiderail on approaches andadd end treatments.	\$25,000
Detours:		
Traffic Control:		
Utilities:		
Right of Way:		
Environmental Study:		
Other:		
Contingencies:		
Total Cost		\$25,000

Justification:

Structure No: DY-3

Barry's Bridge

Structure Description

Barry's Bridge is located on Barry Line Road, 1 km west of Kennisis Lake Road. The bridge was constructed in 1960 and is an 18.7 m three-span, two-lane structure with a timber deck, timber piers and timber abutments. The bridge crosses a non-navigable watercourse on an east/west tangential alignment. The bridge has a 7.4 m overall deck width with a 6.8 m wide surface treated wearing surface with timber curbs. There is steel beam guiderail across the structure but no guiderail on the approaches.

Structure Condition

The structure is in fair overall condition with a BCI of 64 and a BSI of 61. The wooden ballast walls are in fair condition with some loose and cracked boards; there is evidence of material loss from behind the abutments. There is evidence of backfill material washing out from behind the ballast walls and scour at the base. The timber piles and caps are in good condition with minor checking observed. The timber deck is in good condition with minor cracking and no evidence of water penetration. The wearing surface is in poor to fair condition exhibiting severe potholing, alligator cracking with sections of the deck visible. There was a large amount of sand and debris on the bridge deck and blocking the deck drains at the time in inspection and of previous inspections.

The guiderail over the structure is in good condition with localized corrosion and minor collision damage. The post in the north east corner has been damaged and is loose. The guiderail should be extended on all approaches with proper end treatments.

Recommendations

It is recommended the structure undergo a minor rehabilitation in 1-5 years to repair the ballast walls, damaged beam, rebuild the approaches, install guiderail with end treatments and replace the deck wearing surface. Maintenance should be undertaken to repair/replace the damaged guiderail post and clean the bridge deck and deck drains under the curb. Guiderail extension on the approaches should be undertaken in the future when the structure undergoes a major rehabilitation. Debris should be cleaned from stream in northwest quadrant at time of bridge cleaning.



Photo 1: General Arrangement – Looking North



Photo 2: General Arrangement – West Elevation



Photo 3: General Arrangement – South Ballast Wall



Photo 4: General Arrangement – North Ballast Wall

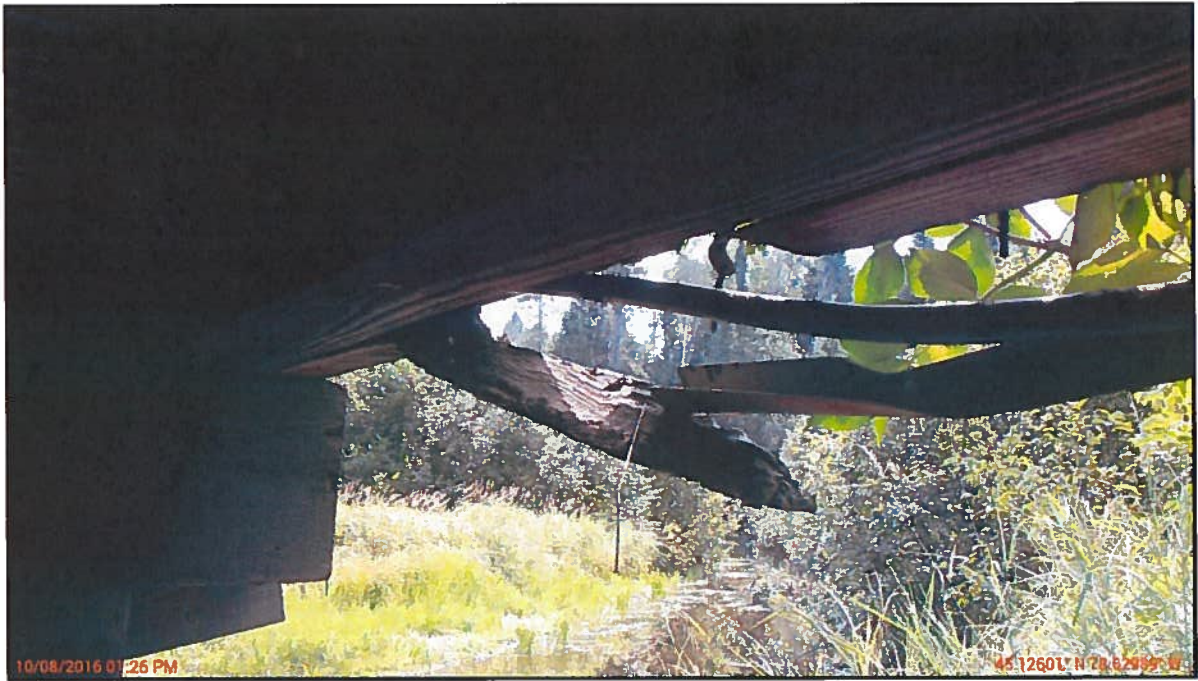


Photo 5: Damaged Exterior Wood Beam – Northwest Quadrant

Inventory Data:

Structure Name	Barry's Bridge				
Main Hwy/Road #		On ☒ Under	Crossing Type:	Navig. Water Rail Road	Non-Navig. Water ☒ Ped. Other
Road Name	Barry Line Road				
Structure Location	0.05 km East of Binscrath Trail				
Latitude	45.126200	Longitude	-78.630000		
Owner(s)	Municipality of Dysart et al	Heritage Designation:	Not Cons. Design./Not List	Cons./not App. Design. & List	List/not Desig. & List
MTO Region *		Road Class:	Freeway	Arterial	Collector Local ☒
MTO District *		Posted Speed	50	No. of Lanes	2
Old County *		AADT		% Trucks	
Geographic Twp. *		Special Routes:	Transit	Truck	School Bicycle
Structure Type *	Bridge	Detour Length Around Bridge		(km)	
Total Deck Length	18.7	(m)	Fill on Structure	0	(m)
Overall Str. Width	7.3	(m)	Skew Angle	0	(degrees)
Total Deck Area	137.0	(sq.m)	Direction of Structure	N to S	
Roadway Width	6.8	(m)	No. of Spans	3	
Span Lengths	6.2				(m)

Historical Data:

Year Built	1960	Last Biennial Inspection	2014
Current Load Limit	N/A / (tonnes)	Last BridgeMaster Inspection	N/A
Load Limit Bylaw #	N/A	Last Evaluation	N/A
Bylaw Expiry Date	N/A	Last Underwater Inspection	N/A
Min. Vertical Clearance	- (m)	Last Condition Survey	N/A

 Rehab. History: (Date/description)

Field Inspection Information:	
Date of Inspection:	August 10, 2016
Inspector:	Robert Brooks – Tulloch Engineering
Others in Party:	Elizabeth Perry – Tulloch Engineering
Equipment Used:	Camera, Hammer, Tape Measure
Weather:	Sun
Temperature:	+29°C

Additional Investigations Required:		Priority			Estimated Cost			
		None	Normal	Urgent				
Detailed Deck Condition Survey:		X						
DART Survey:		X						
Detailed Coating Condition Survey:		X						
Underwater Investigation:		X						
Fatigue Investigation:		X						
Seismic Investigation:		X						
Structure Evaluation:		X						
Load Posting – Estimated Load		Total Cost			\$0			
Special Notes:								
Next Detailed Inspection:		2018						

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 to 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 | |

Municipal Structure Inspection Form

MTO Site Number:

DY - 3

Element Data

Element Group:	Abutments		Length:		(m)
Element Name:	Ballast Walls		Width:	7.0	(m)
Location:	N / S		Height:	2.0	(m)
Material:	Timber		Count:	2	(items)
Element Type:			Total Quantity:	28.0	(m ²)
Environment:	Benign <u>Moderate</u> / Severe		Limited Insp'n:	☐	
Protection System:	Creosote		Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	m ² / m / each / % / all		22	4	2
Comments: Ballast walls in good to fair condition with localized deformations of several segments of timber causing material washout.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: 09 ☐ Urgent ☒ 1 Year ☐ 2 Year
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		repair ballast wall timbers
Comments:					

Element Group:	Approaches		Length:	6.0	(m)
Element Name:	Wearing Surface		Width:	7.5	(m)
Location:	N / S		Height:		(m)
Material:	Asphalt		Count:	2	(items)
Element Type:			Total Quantity:	90.0	(m ²)
Environment:	Benign / Moderate <u>Severe</u>		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	m ² / m / each / % / all			22.5	67.5
Comments: Significant patching observed at approaches, as well as potholes and cracking, rutting and rippling.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☒ Replace		☐ Major Rehab ☐ None		Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		
Comments: Replace asphalt wearing surface.					

Element Group:	Barriers		Length:	19.0	(m)
Element Name:	Railing Systems		Width:		(m)
Location:	E / W		Height:		(m)
Material:	Steel Flex Beam on Wood Post		Count:	2	(items)
Element Type:			Total Quantity:	38.0	(m)
Environment:	Benign / Moderate <u>Severe</u>		Limited Insp'n:	☐	
Protection System:	Galvanized / Creosote (Pressure Treat)		Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	m / m each / % / all		15.0	18.0	5.0
Comments: Damage to guiderail and end post in N/E corner; minor collision damage mid-span. No guiderail on approaches.					
Performance Deficiencies: None					
Recommended Work:	☒ Minor Rehab ☐ Replace		☐ Major Rehab ☐ None		Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		
Comments:					

Municipal Structure Inspection Form

MTO Site Number:

DY - 3

Element Data

Element Group:	Beam /MLE	Length:	18.7	(m)		
Element Name:	Girders	Width:	0.250	(m)		
Location:	N/ S	Height:	0.60	(m)		
Material:	Wood	Count:	9	(items)		
Element Type:	Rectangular-solid	Total Quantity:	328.0	(m ²)		
Environment:	Benign <u>Moderate</u> / Severe	Limited Insp'n:	☐			
Protection System:	Creosote	Performance Deficiencies				
Condition Data:	Units: m ² / m / each / % / all				Exc.	Good
			200.0	127	1	01
Comments: Beams in general good condition with minor checking and splits. A severe longitudinal split was observed at the Northwest quadrant; this area should be monitored.						
Performance Deficiencies: Load carrying capacity						
Recommended Work: ☐ Minor Rehab ☒ Replace ☐ Major Rehab ☐ None		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year				
Timeframe: ☒ 1 - 5 Years ☐ 6 - 10 Years						
Comments: Replace damaged girder at Northwest quadrant as part of bridge rehabilitation.						

Element Group:	Deck	Length:	18.7	(m)		
Element Name:	Deck Top	Width:	7.3	(m)		
Location:	Under Asphalt	Height:		(m)		
Material:	Wood	Count:	1	(items)		
Element Type:	Laminated Wood Decking - transverse	Total Quantity:	137.0	(m ²)		
Environment:	Benign <u>Moderate</u> / Severe	Limited Insp'n:	☒			
Protection System:	Creosote	Performance Deficiencies				
Condition Data:	Units: m / m / each / % / all				Exc.	Good
			137.0			00
Comments: Deck appears to be in good condition with light to moderate signs of water penetration on underside.						
Performance Deficiencies: None						
Recommended Work: ☐ Minor Rehab ☐ Replace ☐ Major Rehab ☐ None		Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year				
Timeframe: ☐ 1 - 5 Years ☐ 6 - 10 Years						
Comments:						

Element Group:	Deck	Length (avg):	18.7	(m)		
Element Name:	Wearing Surface	Width:	6.80	(m)		
Location:	Deck Top	Height:		(m)		
Material:	Asphalt	Count:	1	(items)		
Element Type:		Total Quantity:	127.2	(m ²)		
Environment:	Benign / Moderate <u>Severe</u>	Limited Insp'n:	☐			
Protection System:		Performance Deficiencies				
Condition Data:	Units: m ² / m / each / % / all				Exc.	Good
				31.3	95.9	09
Comments: Deck in poor condition. Extensive patching and alligator map cracking. Ravelling along edges with severe transverse crack throughout. Deck has no drains; therefore, water is penetrating into the wood deck below.						
Performance Deficiencies: Rough riding surface						
Recommended Work: ☐ Minor Rehab ☒ Replace ☐ Major Rehab ☐ None		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year				
Timeframe: ☒ 1 - 5 Years ☐ 6 - 10 Years						
Comments: Replace asphalt wearing surface						

Municipal Structure Inspection Form

MTO Site Number:

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Element Data

Element Group:	Pier	Length:	2.0	(m)
Element Name:	Shaft / Columns / Pile Bents	Width:	0.30	(m)
Location:	4 Bents	Height:	2.00	(m)
Material:	Wood	Count:	24	(items)
Element Type:	Timber Piles with Capping Beam	Total Quantity:	45.2	(m ²)
Environment:	Benign <u>Moderate</u> / Severe	Limited Insp'n:	☐	
Protection System:	Creosote			
Condition	Units	Exc.	Good	Fair
Data:	<u>m²</u> / m / each / % / all			45.2
		Poor	Performance Deficiencies	
			00	
Comments:				
Performance Deficiencies: None				
Recommended Work:	☐ Minor Rehab	☐ Major Rehab		Maintenance Needs: -
	☐ Replace	☒ None		☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☐ 1 - 5 Years	☐ 6 - 10 Years		
Comments:				

Element Group:	Sidewalk / Curbs	Length:	18.7	(m)
Element Name:	Curbs	Width:	0.30	(m)
Location:	East / West	Height:	0.30	(m)
Material:	Wood	Count:	2	(items)
Element Type:		Total Quantity:	22.4	(m ²)
Environment:	Benign / Moderate / <u>Severe</u>	Limited Insp'n:	☐	
Protection System:	Creosote			
Condition	Units	Exc.	Good	Fair
Data:	<u>m²</u> / m / each / % / all		8.4	10.0
		Poor	Performance Deficiencies	
			00	
Comments: Minor damage to curbs. Significant accumulation of sand and debris at and under curbs, obstructing drainage. Splits throughout with rot and signs of light insect infestation in rotted areas.				
Performance Deficiencies: None				
Recommended Work:	☐ Minor Rehab	☐ Major Rehab		Maintenance Needs: -02
	☒ Replace	☐ None		☒ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☒ 1 - 5 Years	☐ 6 - 10 Years		Bridge cleaning
Comments: Replace timber curbs				

Element Group:	Stream & Embankments	Length:		(m)
Element Name:	Embankments	Width:		(m)
Location:	NE/NW/SE/SW	Height:		(m)
Material:		Count:		(items)
Element Type:		Total Quantity:	4.0	(ea)
Environment:	<u>Benign</u> / Moderate / Severe	Limited Insp'n:	☐	
Protection System:				
Condition	Units	Exc.	Good	Fair
Data:	m ² / m <u>each</u> / % / all		4.0	
		Poor	Performance Deficiencies	
			00	
Comments:				
Performance Deficiencies: None				
Recommended Work:	☐ Minor Rehab	☐ Major Rehab		Maintenance Needs: 02
	☐ Replace	☐ None		☐ Urgent ☒ 1 Year ☐ 2 Year
Timeframe:	☐ 1 - 5 Years	☐ 6 - 10 Years		Remove granular material from stream
Comments:				

Municipal Structure Inspection Form

MTO Site Number:

DY - 3

Element Data

Element Group:	Streams & Embankments		Length:		(m)
Element Name:	Slope Protection		Width:		(m)
Location:	NE/SW/SE/SW		Height:		(m)
Material:			Count:	4	(items)
Element Type:			Total Quantity:	4	(ea)
Environment:	<u>Benign</u> Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	m ² / m <u>each</u> / % / all			4.0	
Comments: No slope protection					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		
Comments:					

Element Group:	Streams & Embankments		Length:		(m)
Element Name:	Streams & Waterways		Width:		(m)
Location:	Upstream /Downstream		Height:		(m)
Material:			Count:	2	(items)
Element Type:			Total Quantity:	2.0	(ea)
Environment:	<u>Benign</u> Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	m ² / m <u>each</u> / % / all		1.0	1.0	
Comments: Vegetation partially obstructing waterway at Northwest quadrant.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: 17 ☐ Urgent ☒ 1 Year ☐ 2 Year
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		Clear debris.
Comments:					

Element Group:	Pier		Length:	7.3	(m)
Element Name:	Caps		Width:	0.3	(m)
Location:	Capping Beams		Height:	0.3	(m)
Material:	Wood		Count:	4	(items)
Element Type:			Total Quantity:	26.3	(m ²)
Environment:	<u>Benign</u> Moderate / Severe		Limited Insp'n:	☒	
Protection System:	Creosote		Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	<u>m²</u> / m / each / % / all		26.3		
Comments:					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		
Comments:					

Municipal Structure Inspection Form

MTO Site Number:

DY - 3

Repair and Rehabilitation Required:		Priority				Estimated Construction Cost
Element	Repair and Rehabilitation Required	6 to 10 years	1 to 5 years	Within 1 year	Urgent	
MLE	Replace damaged girder			X		\$10,000
Curbs	Replace		X			\$5,000
Ballast Walls	Rebuild abutment walls to prevent washout of backfill.		X			\$60,000
Wearing Surface (Approaches)	Rebuild and resurface approaches		X			\$5,000
Railing System	Repair guiderail and end post				X	\$2,000
Wearing Surface (Decks)	Resurface deck with double surface treatment		X			\$5,000
Total Cost						\$87,000

Associated Work:	Comments	Estimated Cost
Approaches:	Extend guiderail on approaches and add end treatments.	\$25,000
Detours:		
Traffic Control:		\$5,000
Utilities:		
Right of Way:		
Environmental Study:		
Other:		
Contingencies:		
Total Cost		\$30,000

Justification:

Structure No: DY-4

Redstone Brook Bridge

Structure Description

The Redstone Brook Bridge is located on Green Lake Road, 2 km west of Kennisis Lake Road. The bridge was constructed in 1960 and is a 16.3 m three-span, two-lane structure with a timber and concrete composite deck, timber piers and timber abutments. The bridge crosses a non-navigable watercourse on an east/west tangential alignment. The bridge has an 8.5 m overall deck width with a 7.4 m wide surface treated wearing surface with concrete curbs. There is steel beam guiderail across the structure but no guiderail on the approaches.

Structure Condition

The structure is in fair overall condition with a BCI of 61 and a BSI of 58. The wooden ballast walls are in fair to poor condition with severe erosion / scour at the southwest ballast wingwall causing continued settlement and movement causing the embankment to become unstable. There is significant evidence of backfill material washing out from behind the southeast ballast wall, which has undermined the approach. There is a sinkhole in the east approach and there is evidence of undermining of the east approach. The approaches show evidence of settlement with significant asphalt padding. The timber piles and caps are in good condition with minor checking observed. The timber deck is in good condition with minor cracking and evidence of water penetration at localized areas. The wearing surface is in fair condition exhibiting moderate potholing, and edge breaks. The concrete curbs are in good condition with minor spalls and snowplow / vehicle damage.

The guiderail over the structure is in fair condition with localized corrosion and minor collision damage. The spacing between support posts for the guiderail is excessive and may not provide adequate protect in the event of a collision. Several supports posts were observed to be deteriorated and/or loose. The guiderail should be extended on all approaches with proper end treatments.

Recommendations

It is recommended that the structure undergo a minor rehabilitation in 1-5 years to repair the ballast walls, embankments, pad and resurface the approaches, deck wearing surface and replace the guiderail over the structure. It is highly recommended that the root cause of the hole at the east approach be investigated. The undermined east approach wearing surface should be investigated further and repaired immediately as a matter of safety. Maintenance should be undertaken to repair the loose guiderail posts and clean the bridge deck and deck drains. The tree and other debris should be removed from under the structure to prevent damage to the structure and to allow for proper flow under the structure. Guiderail extension on the approaches should be undertaken in the future when the structure undergoes a major rehabilitation.



Photo 1 : General Arrangement – Looking East



Photo 2 : General Arrangement – Looking West



Photo 3: General Arrangement – North Elevation



Photo 4: Deck Wearing Surface – Looking West



Photo 5: East Approach Wearing Surface – Undermined Asphalt Zone (Sinkhole)



Photo 6: Undermined Ballast Wing Wall – Southwest Quadrant

Inventory Data:

Structure Name	Redstone Brook Bridge				
Main Hwy/Road #		On ☒ Under	Crossing Type:	Navig. Water Rail Road	Non-Navig. Water ☒ Ped. Other
Road Name	Green Lake Road				
Structure Location	1.0 km East of Stanhope Airport Road				
Latitude	45.109500	Longitude	-78.634000		
Owner(s)	Municipality of Dysart et al	Heritage Designation:	Not Cons. Design./Not List	Cons./not App. Design. & List	List/not Desig. & List
MTO Region *		Road Class:	Freeway	Arterial	Collector Local ☒
MTO District *		Posted Speed	50	No. of Lanes	2
Old County *		AADT		% Trucks	
Geographic Twp. *		Special Routes:	Transit	Truck	School Bicycle
Structure Type *	Bridge	Detour Length Around Bridge		(km)	
Total Deck Length	16.3	Fill on Structure		(m)	
Overall Str. Width	8.5	Skew Angle	0	(degrees)	
Total Deck Area	139.0	Direction of Structure	E to W		
Roadway Width	7.4	No. of Spans	3		
Span Lengths	5.4				(m)

Historical Data:

Year Built	1960	Last Biennial Inspection	2014
Current Load Limit	N/A / / (tonnes)	Last BridgeMaster Inspection	N/A
Load Limit Bylaw #	N/A	Last Evaluation	N/A
Bylaw Expiry Date	N/A	Last Underwater Inspection	N/A
Min. Vertical Clearance	- (m)	Last Condition Survey	N/A

Rehab. History: (Date/description)

Field Inspection Information:	
Date of Inspection:	August 10, 2016
Inspector:	Robert Brooks – Tulloch Engineering
Others in Party:	Elizabeth Perry – Tulloch Engineering
Equipment Used:	Camera, Hammer, Tape Measure
Weather:	Sun
Temperature:	+29°C

Additional Investigations Required:	Priority			Estimated Cost
	None	Normal	Urgent	
Detailed Deck Condition Survey:	X			
DART Survey:	X			
Detailed Coating Condition Survey:	X			
Underwater Investigation:	X			
Fatigue Investigation:	X			
Seismic Investigation:	X			
Structure Evaluation:	X			
Load Posting – Estimated Load			Total Cost	\$0
Special Notes:				
Next Detailed Inspection:			2018	

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 to 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 | |

Municipal Structure Inspection Form

MTO Site Number:

DY - 4

Element Data

Element Group:	Abutments		Length:	7	(m)
Element Name:	Ballast Walls		Width:		(m)
Location:	East / West		Height:	1.5	(m)
Material:	Wood Timber		Count:	2	(items)
Element Type:			Total Quantity:	21	(m ²)
Environment:	Benign / <u>Moderate</u> / Severe		Limited Insp'n:	☐	
Protection System:	Creosote / Pressure Treat		Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc.			
			11	10	
Comments: Evidence of material loss from behind east abutment ballast wall resulting in large cavity below asphalt wearing surface - repair required to prevent subsidence and further erosion.					
Performance Deficiencies: Undermining of foundation					
Recommended Work:	☐ Minor Rehab		☒ Major Rehab		Maintenance Needs: 13
	☐ Replace		☐ None		
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		Repair eroded cavity behind East abutment wall.
Comments: Repair undermining of east ballast wall.					

Element Group:	Abutments		Length:	2.0	(m)
Element Name:	Wing Wall		Width:		(m)
Location:	NE/NW/SE/SW		Height:	1.50	(m)
Material:	Wood Timber		Count:	4	(items)
Element Type:			Total Quantity:	12.0	(m ²)
Environment:	Benign / <u>Moderate</u> / Severe		Limited Insp'n:	☐	
Protection System:	Creosote / pressure treat		Performance Deficiencies		
Condition Data:	Units m / m / each / % / all	Exc.			
			4.5	5	2.5
Comments: Southwest wing wall has severe erosion with continuing settlement and movement.					
Performance Deficiencies: Continuing settlement, movement is causing the embankment to become unstable.					
Recommended Work:	☐ Minor Rehab		☐ Major Rehab		Maintenance Needs:
	☒ Replace		☐ None		
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments: Replace Southwest wing wall.					

Element Group:	Barriers		Length:	15.0	(m)
Element Name:	Railing Systems		Width:		(m)
Location:			Height:		(m)
Material:	Steel		Count:	2	(items)
Element Type:	Steel Flex Beam over Other Railing		Total Quantity:	30.0	(m)
Environment:	Benign / Moderate / <u>Severe</u>		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m / m / each / % / all	Exc.			
				20.0	10.0
Comments: Guiderail in fair condition with slight corrosion. Post spacing is insufficient. Post anchors loose in places. No guiderail on approaches.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab		☐ Major Rehab		Maintenance Needs:
	☒ Replace		☐ None		
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments: Provide new guardrail system at time of rehabilitation					

Municipal Structure Inspection Form

MTO Site Number:

DY - 4

Element Data

Element Group:	Deck		Length:		(m)
Element Name:	Drainage (Decks)		Width:		(m)
Location:	North / South		Height:		(m)
Material:	Steel		Count:	6	(items)
Element Type:	Metal Drain Pipes		Total Quantity:	6	(each)
Environment:	Benign / Moderate Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m each / % / all	Exc.	Good	Fair	Poor
			6		
Comments:					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		
Comments:					

Element Group:	Deck		Length:	16.3	(m)
Element Name:	Deck Top		Width:	8.5	(m)
Location:			Height:		(m)
Material:	Wood		Count:	1	(items)
Element Type:	Laminated Wood Decking - Longitudinal		Total Quantity:	139.0	(m ²)
Environment:	Benign Moderate / Severe		Limited Insp'n:	☒	
Protection System:			Performance Deficiencies		
Condition Data:	Units m / m / each / % / all	Exc.	Good	Fair	Poor
			139.0		
Comments: Some deflection noted with evidence of water leakage through deck.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		
Comments:					

Element Group:	Deck		Length:	16.3	(m)
Element Name:	Wearing Surface (Decks)		Width:	7.4	(m)
Location:			Height:		(m)
Material:	Asphalt		Count:	1	(items)
Element Type:			Total Quantity:	121.0	(m ²)
Environment:	Benign Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m² / m / each / % / all	Exc.	Good	Fair	Poor
			73.7	31.0	16.3
Comments: Wearing surface in fair condition; some potholes and cracking. Missing asphalt on edges with poor bondage and raveling of concrete at Southwest quadrant.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☒ Replace		☐ Major Rehab ☐ None		Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		
Comments:					

Municipal Structure Inspection Form

MTO Site Number:

DY - 4

Element Data

Element Group:	Approaches		Length:	10.0	(m)
Element Name:	Wearing Surface (Approaches)		Width:	7.5	(m)
Location:			Height:		(m)
Material:	Surface Treatment		Count:	2	(items)
Element Type:			Total Quantity:	150.0	(m ²)
Environment:	Benign / Moderate Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc.	Good	Fair	Poor
			116.0	30.0	4
Comments: East approach has a small pothole/washout under asphalt surface (approximately 600mm deep) undermining surface treatment. Severe raveling with loose surface bonading along South approach.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☒ Replace		☐ Major Rehab ☐ None		Maintenance Needs: 12
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		☒ Urgent ☐ 1 Year ☐ 2 Year
Comments: Resurface wearing surface at time of rehabilitation.					Repair pot hole in East approach and replace erroded material.

Element Group:	Pier		Length:		(m)
Element Name:	Shaft / Columns / Pile Bents		Width:	0.30	(m)
Location:			Height:	1.75	(m)
Material:	Wood		Count:	28	(items)
Element Type:	Timber Piles with Capping Beam		Total Quantity:	46.2	(m ²)
Environment:	Benign Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc.	Good	Fair	Poor
			26	20	
Comments:					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: -
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments:					

Element Group:	Sidewalk / Curbs		Length:	16.0	(m)
Element Name:	Curbs		Width:		(m)
Location:			Height:		(m)
Material:	Cast-in-place Concrete		Count:	2	(items)
Element Type:			Total Quantity:	32	(m)
Environment:	Benign / Moderate Severe		Limited Insp'n:	☐	
Protection System:	Creosote		Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc.	Good	Fair	Poor
			22	10	
Comments: Some scaling and isolated minor spalling and abrasion.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: -
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments:					

Municipal Structure Inspection Form

MTO Site Number:

DY - 4

Element Data

Element Group:	Embankments & Streams		Length:		(m)
Element Name:	Embankments		Width:		(m)
Location:	NE/NW/SE/SW		Height:		(m)
Material:			Count:	4	(items)
Element Type:			Total Quantity:	4.0	(ea)
Environment:	Benign Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m each / % / all	Exc.	Good	Fair	Poor
			3.0	0	1
15					
Comments: Southwest embankment is severely eroded.					
Performance Deficiencies: Unstable embankment					
Recommended Work:	☐ Minor Rehab ☒ Replace		☐ Major Rehab ☐ None		Maintenance Needs:
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments: Provide stable embankment with new retaining / wingwall system as part of rehabilitation of Southwest embankment.					

Element Group:	Embankments & Streams		Length:		(m)
Element Name:	Slope Protection		Width:		(m)
Location:	NE/NW/SE/SW		Height:		(m)
Material:			Count:		(items)
Element Type:			Total Quantity:		(ea)
Environment:	Benign Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m each / % / all	Exc.	Good	Fair	Poor
00					
Comments: No slope protection present.					
Performance Deficiencies: None					
Recommended Work:	☒ Minor Rehab ☐ Replace		☐ Major Rehab ☐ None		Maintenance Needs:
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments: Provide slope protection to Southwest and Northwest quadrants as part of rehabilitation work.					

Element Group:	Embankments & Streams		Length:		(m)
Element Name:	Streams & Waterways		Width:		(m)
Location:	Upstream / Downstream		Height:		(m)
Material:			Count:	2	(items)
Element Type:			Total Quantity:	2	(ea)
Environment:	Benign Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m each / % / all	Exc.	Good	Fair	Poor
			2		
00					
Comments:					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs:
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☒ 1 Year ☐ 2 Year
Comments: Remove debris					

Municipal Structure Inspection Form

MTO Site Number:

DY - 4

Repair and Rehabilitation Required:		Priority				Estimated Construction Cost
Element	Repair and Rehabilitation Required	6 to 10 years	1 to 5 years	Within 1 year	Urgent	
Ballast Wingwall	Repair/rebuild abutment wing wall			X		\$5,000
Ballast Walls	Rebuild ballast walls to prevent washout of material			X		\$80,000
Railing System	Replace guiderail on structure		X			\$15,000
Wearing Surface (Decks)	Resurface deck with double surface treatment		X			\$5,000
Total Cost						\$105,000

Associated Work:	Comments	Estimated Cost
Approaches:	Resurface approaches and extend guiderail with end treatments	\$35,000
Detours:		\$5,000
Traffic Control:		
Utilities:		
Right of Way:		
Environmental Study:		
Other:		
Contingencies:		
	Total Cost	\$40,000

Justification:	
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Structure No: DY-5

Guilford Pine Lake

Structure Description

Guilford Pine Lake Bridge is located on Pine Lake Road, 0.5 km north of Eagle Lake Road. The bridge was constructed in 2008 and is an 18 m single span, two-lane structure with a concrete deck supported by steel girders on concrete abutments. The structure has a combination of sheet pile and armour stone wing walls. The bridge crosses a navigable waterway on a north/south alignment. The bridge has an overall 9.0 m wide concrete deck and 7.0 m wide driving surface with concrete parapet walls and steel railing. There is steel beam guiderail on the approaches with proper end treatments.

Structure Condition

The structure is in good condition with a BCI of 90 and BSI of 87. The concrete abutments and soffit are in excellent condition with no signs of distress. The exposed concrete deck is in good condition with minor spalling and loss of aggregate. The concrete parapet walls are in good condition with minor localized damage and vertical shrinkage cracking. The wing walls and erosion protection at the waterline are in excellent condition. The approaches appear to be in good condition.

The barrier over the structure and the guiderail on the approaches is in good condition with minor collision damage to the guiderail in the northwest corner.

Recommendations

The structure does not require any improvements at this time. Maintenance is required to repair the damaged guiderail and minor concrete repairs to the parapet walls could be undertaken at the same time. The deck should be swept to remove debris and sand to promote positive drainage.



Photo 1 : General Arrangement – Looking South



Photo 2 : General Arrangement – Looking North



Photo 3 : General Arrangement – Upstream View



Photo 4 : General Arrangement – Downstream View

Inventory Data:

Structure Name	Guilford Pine Lake Bridge				
Main Hwy/Road #		On ☒ Under	Crossing Type:	Navig. Water ☒ Non-Navig. Water Rail Road Ped. Other	
Road Name	Pine Lake Road				
Structure Location	0.45 km North of Eagle Lake Road				
Latitude	45.117300	Longitude	-78.582000		
Owner(s)	Municipality of Dysart et al	Heritage Designation:	Not Cons. Desig./Not List	Cons./not App. Desig. & List	List/not Desig. & List
MTO Region *		Road Class:	Freeway	Arterial	Collector Local ☒
MTO District *		Posted Speed	50	No. of Lanes	2
Old County *		AADT		% Trucks	
Geographic Twp. *		Special Routes:	Transit	Truck	School Bicycle
Structure Type *	Concrete Deck on Steel Girder	Detour Length Around Bridge		(km)	
Total Deck Length	20.0	(m)	Fill on Structure	0	(m)
Overall Str. Width	9.0	(m)	Skew Angle	0	(degrees)
Total Deck Area	180.0	(sq.m)	Direction of Structure	N to S	
Roadway Width	7.0	(m)	No. of Spans	1	
Span Lengths	18.0 (m)				

Historical Data:

Year Built	2008	Last Biennial Inspection	2014
Current Load Limit	N/A / (tonnes)	Last BridgeMaster Inspection	N/A
Load Limit Bylaw #	N/A	Last Evaluation	N/A
Bylaw Expiry Date	N/A	Last Underwater Inspection	N/A
Min. Vertical Clearance	- (m)	Last Condition Survey	N/A

Rehab. History: (Date/description)

Field Inspection Information:	
Date of Inspection:	August 10, 2016
Inspector:	Robert Brooks – Tulloch Engineering
Others in Party:	Elizabeth Perry – Tulloch Engineering
Equipment Used:	Camera, Hammer, Tape Measure
Weather:	Sun
Temperature:	+28°C

Additional Investigations Required:	Priority			Estimated Cost
	None	Normal	Urgent	
Detailed Deck Condition Survey:	X			
DART Survey:	X			
Detailed Coating Condition Survey:	X			
Underwater Investigation:	X			
Fatigue Investigation:	X			
Seismic Investigation:	X			
Structure Evaluation:	X			
Load Posting – Estimated Load			Total Cost	\$0
Special Notes:				
Next Detailed Inspection:			2018	

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 to 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 | |

Municipal Structure Inspection Form
MTO Site Number:

DY - 5

Element Data

Element Group:	Abutments		Length:		(m)
Element Name:	Ballast Walls		Width:	9.0	(m)
Location:			Height:	1.5	(m)
Material:	Corrugated Steel		Count:	2	(items)
Element Type:	Steel Sheet Pile		Total Quantity:	27.0	(m ²)
Environment:	Benign <u>Moderate</u> / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	m ² / m / each / % / all	27			
00					
Comments:					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab		☐ Major Rehab		Maintenance Needs:
	☐ Replace		☒ None		
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments:					

Element Group:	Abutments		Length:	6.0	(m)
Element Name:	Wingwalls		Width:		(m)
Location:			Height:	1.5	(m)
Material:	Corrugated Steel		Count:	4	(items)
Element Type:	Steel Sheet Piles		Total Quantity:	36.0	(m ²)
Environment:	Benign <u>Moderate</u> / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	m ² / m / each / % / all	36			
00					
Comments: Light corrosion and surface staining, light weathering.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab		☐ Major Rehab		Maintenance Needs:
	☐ Replace		☒ None		
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments:					

Element Group:	Barriers		Length:	18.0	(m)
Element Name:	Barrier / Parapet Wall		Width:	0.20	(m)
Location:			Height:	1.2	(m)
Material:	Cast-in-place Concrete		Count:	2	(items)
Element Type:	Parapet Wall with Two Rails		Total Quantity:	43.0	(m ²)
Environment:	Benign / Moderate <u>Severe</u>		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	m ² / m / each / % / all		43		
00					
Comments: Minor shrinkage cracking; isolated spalls, collision damage to parapet wall.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab		☐ Major Rehab		Maintenance Needs:
	☐ Replace		☒ None		
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments:					

Municipal Structure Inspection Form

MTO Site Number:

DY - 5

Element Data

Element Group:	Approaches		Length:	75	(m)	
Element Name:	Guiderail		Width:		(m)	
Location:			Height:		(m)	
Material:	Steel		Count:	2	(items)	
Element Type:	Steel Flex Beam on Steel Post		Total Quantity:	150.0	(m)	
Environment:	Benign / Moderate Severe		Limited Insp'n:	☐		
Protection System:	Galvanized		Performance Deficiencies			
Condition Data:	Units m ² / m each / % / all	Exc.				Good
			145.0	5		00
Comments: Collision damage to guiderail on NW corner.						
Performance Deficiencies: None						
Recommended Work:	☒ Minor Rehab ☐ Replace		☐ Major Rehab ☐ None		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year	
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years			
Comments:						

Element Group:	Beam / MLE		Length:	19.0	(m)	
Element Name:	Girders		Width:	0.20	(m)	
Location:	N / S		Height:	0.50	(m)	
Material:	Steel		Count:	4	(items)	
Element Type:	I-type		Total Quantity:	91.2	(m ²)	
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☒		
Protection System:			Performance Deficiencies			
Condition Data:	Units m ² / m / each / % / all	Exc.				Good
		91.2				00
Comments:						
Performance Deficiencies: None						
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year	
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years			
Comments:						

Element Group:	Deck		Length:	20	(m)	
Element Name:	Deck Top		Width:	9.0	(m)	
Location:			Height:		(m)	
Material:	Cast-in-place Concrete		Count:	1	(items)	
Element Type:	Cast-in-place Concrete on Supports		Total Quantity:	180.0	(m ²)	
Environment:	Benign / Moderate Severe		Limited Insp'n:	☐		
Protection System:			Performance Deficiencies			
Condition Data:	Units m ² / m / each / % / all	Exc.				Good
			180.0			00
Comments: Minor spalling of concrete deck.						
Performance Deficiencies: None						
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year	
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years			
Comments:						

Municipal Structure Inspection Form

MTO Site Number:

DY - 5

Element Data

Element Group:	Embankments & Streams		Length:		(m)
Element Name:	Slope Protection		Width:		(m)
Location:			Height:		(m)
Material:	Other		Count:	4	(items)
Element Type:	Rip Rap		Total Quantity:	4	(each)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc. 4	Good	Fair	Poor
					00
Comments: Rip rap protection in good condition.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: -
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments:					

Element Group:	Approaches		Length:	6.0	(m)
Element Name:	Wearing Surface		Width:	7.00	(m)
Location:			Height:		(m)
Material:	Asphalt		Count:	2	(items)
Element Type:			Total Quantity:	84	(m ²)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc.	Good 72	Fair 12.0	Poor
					00
Comments: Raveling of concrete along edges with loss of bond.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: -
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments:					

Element Group:	Accessories		Length:		(m)
Element Name:	Signs		Width:		(m)
Location:	NE/NW/SE/SW		Height:		(m)
Material:	Steel		Count:	2	(items)
Element Type:			Total Quantity:	2	(each)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc.	Good 2	Fair	Poor
					00
Comments: Missing hazard signs at end of guardrails on NE/NW quadrants (2 missing).					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: 17
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☒ 1 Year ☐ 2 Year
Comments: Install hazard signs					

Municipal Structure Inspection Form

MTO Site Number:

DY - 5

Element Data

Element Group:	Beam / MLE		Length:		(m)	
Element Name:	Stringers		Width:		(m)	
Location:	E/W		Height:		(m)	
Material:	Steel		Count:	4	(items)	
Element Type:			Total Quantity:	4	(each)	
Environment:	Benign <u>Moderate</u> / Severe		Limited Insp'n:	☐		
Protection System:			Performance Deficiencies			
Condition	Units	Exc.				Good
Data:	m ² / m / <u>each</u> / % / all	4				00
Comments:						
Performance Deficiencies: None						
Recommended Work:	☐ Minor Rehab		☐ Major Rehab		Maintenance Needs: -	
	☐ Replace		☒ None			
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year	
Comments:						

Municipal Structure Inspection Form

MTO Site Number:

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Repair and Rehabilitation Required:		Priority				Estimated Construction Cost
Element	Repair and Rehabilitation Required	6 to 10 years	1 to 5 years	Within 1 year	Urgent	
Railing System	Minor repair to guidrail		X			\$2,000
					Total Cost	\$2,000

Associated Work:	Comments	Estimated Cost
Approaches:		
Detours:		
Traffic Control:		
Utilities:		
Right of Way:		
Environmental Study:		
Other:		
Contingencies:		
Total Cost		\$0

Justification:

Structure No: DY-6

Guilford Cranberry Lake Bridge

Structure Description

Guilford Cranberry Lake Bridge is located on Cranberry Lake Drive, 0.5 km north of Eagle Lake Road. The bridge was constructed in 2013 and is a 26 m single span, two-lane structure with a steel deck supported by steel girders on concrete bearing slabs with corrugated steel ballast walls. The structure crosses a navigable waterway on an east/west alignment. The structure has a deck width of 5.3 m with an asphalt wearing surface and no curbs; drainage is by sheet flow over the deck edge. There is steel beam guiderail across the structure and on the approaches.

Structure Condition

The structure and all individual elements are in good condition with a BCI of 99 and BSI of 97. The bridge wearing surface and approaches have recently been upgraded with hot mix asphalt wearing surfaces. The only deficiency noted was erosion and wash-out of the shoulders and wearing surface near the deck ends.

Recommendations

The structure does not require any improvements at this time. Maintenance should be undertaken to address erosion of shoulders near deck ends.



Photo 1 : General Arrangement - Looking North



Photo 2 : General Arrangement – West Elevation



Photo 3 : South Approach Wearing Surface



Photo 4 : Asphalt Wearing Surface Edge of Pavement – Southwest Quadrant



Photo 5 : Guiderrail Impact Damage - Southeast Quadrant



Photo 6 : General Arrangement – North Abutment Wall

Inventory Data:

Structure Name	Guilford Cranberry Lake Bridge				
Main Hwy/Road #		On ☒ Under	Crossing Type:	Navig. Water ☒ Non-Navig. Water Rail Road Ped. Other	
Road Name	Cranberry Lake Road				
Structure Location	0.08 km North of Eagle Lake Road				
Latitude	45.119800	Longitude	-78.568700		
Owner(s)	Municipality of Dysart et al	Heritage Designation:	Not Cons. ☒ Cons./not App. List/not Desig.	Desig./Not List Desig. & List	
MTO Region *		Road Class:	Freeway Arterial Collector Local ☒		
MTO District *		Posted Speed	50	No. of Lanes 1	
Old County *		AADT		% Trucks	
Geographic Twp. *		Special Routes:	Transit Truck School Bicycle		
Structure Type *	Bridge	Detour Length Around Bridge		(km)	
Total Deck Length	26.0	(m)	Fill on Structure	0 (m)	
Overall Str. Width	5.3	(m)	Skew Angle	0 (degrees)	
Total Deck Area	138.0	(sq.m)	Direction of Structure	N to S	
Roadway Width	5.2	(m)	No. of Spans	1	
Span Lengths	26.0			(m)	

Historical Data:

Year Built	2013	Last Biennial Inspection	2014
Current Load Limit	N/A / (tonnes)	Last BridgeMaster Inspection	N/A
Load Limit Bylaw #	N/A	Last Evaluation	N/A
Bylaw Expiry Date	N/A	Last Underwater Inspection	N/A
Min. Vertical Clearance	- (m)	Last Condition Survey	N/A

Rehab. History: (Date/description)

Field Inspection Information:	
Date of Inspection:	August 10, 2016
Inspector:	Robert Brooks – Tulloch Engineering
Others in Party:	Elizabeth Perry – Tulloch Engineering
Equipment Used:	Camera, Hammer, Tape Measure
Weather:	Sun
Temperature:	+27°C

Additional Investigations Required:	Priority			Estimated Cost
	None	Normal	Urgent	
Detailed Deck Condition Survey:	X			
DART Survey:	X			
Detailed Coating Condition Survey:	X			
Underwater Investigation:	X			
Fatigue Investigation:	X			
Seismic Investigation:	X			
Structure Evaluation:	X			
Load Posting – Estimated Load			Total Cost	\$0
Special Notes:				
Next Detailed Inspection:			2018	

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 to 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 | |

Municipal Structure Inspection Form

MTO Site Number:

DY - 6

Element Data

Element Group:	Abutments		Length:		(m)
Element Name:	Abutment Walls		Width:	9.0	(m)
Location:	N/S		Height:	2.0	(m)
Material:	Corrugated Steel		Count:	2	(items)
Element Type:	Retained Soil Systems		Total Quantity:	36.0	(m ²)
Environment:	Benign / <u>Moderate</u> / Severe		Limited Insp'n:	☐	
Protection System:	Galvanized		Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	m ² / m / each / % / all	36			
Comments:					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs:
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments:					

Element Group:	Approaches		Length:	6.0	(m)
Element Name:	Wearing Surface (Approaches)		Width:	7.0	(m)
Location:	N/S		Height:		(m)
Material:	Asphalt		Count:	2	(items)
Element Type:			Total Quantity:	84.0	(m ²)
Environment:	Benign / Moderate / <u>Severe</u>		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	m ² / m / each / % / all		80	4	
Comments: SW quadrant has minor surface erosion.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: 17
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☒ 1 Year ☐ 2 Year
Comments: Provide drain locations on SW quadrant to properly channel water and offer embankment protection from erosion.					

Element Group:	Barriers		Length:	58.0	(m)
Element Name:	Railing Systems		Width:		(m)
Location:	E/W		Height:		(m)
Material:	Steel		Count:	2	(items)
Element Type:	Steel Flex Beam on Steel Post		Total Quantity:	116	(m)
Environment:	Benign / Moderate / <u>Severe</u>		Limited Insp'n:	☐	
Protection System:	Galvanized		Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	m / m each / % / all	113	3		
Comments: Appears to have longitudinal scrape damage from passing vehicle.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs:
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments:					

Municipal Structure Inspection Form

MTO Site Number:

DY - 6

Element Data

Element Group:	Beam / MLE	Length:	26.0	(m)
Element Name:	Girders	Width:	0.30	(m)
Location:	N/S	Height:	1.0	(m)
Material:	Steel	Count:	4	(items)
Element Type:	I-type	Total Quantity:	166.4	(m ²)
Environment:	Benign <u>Moderate</u> / Severe	Limited Insp'n:	☐	
Protection System:				
Condition	Units	Exc.	Good	Fair
Data:	<u>m²</u> / m / each / % / all	166.4		
Performance Deficiencies				
00				
Comments: New in 2013. Light to moderate corrosion, petina flaking, no section loss.				
Performance Deficiencies: None				
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None	
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years	
Comments:			Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year	

Element Group:	Deck	Length:	26.0	(m)
Element Name:	Deck Top	Width:	5.3	(m)
Location:		Height:		(m)
Material:	Corrugated Steel	Count:	1	(items)
Element Type:		Total Quantity:	138.0	(m ²)
Environment:	Benign <u>Moderate</u> / Severe	Limited Insp'n:	☐	
Protection System:				
Condition	Units	Exc.	Good	Fair
Data:	<u>m</u> / m / each / % / all	131.1		6.9
Performance Deficiencies				
00				
Comments:				
Performance Deficiencies: None				
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None	
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years	
Comments:			Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year	

Element Group:	Deck	Length (avg):	26.0	(m)
Element Name:	Wearing Surface (Decks)	Width:	5.30	(m)
Location:		Height:		(m)
Material:	Asphalt	Count:	1	(items)
Element Type:		Total Quantity:	138.0	(m ²)
Environment:	Benign / Moderate <u>Severe</u>	Limited Insp'n:	☐	
Protection System:				
Condition	Units	Exc.	Good	Fair
Data:	<u>m</u> / m / each / % / all	131.1		6.9
Performance Deficiencies				
00				
Comments: Minor rutting, transverse cracks throughout width of roadway at North and South abutments.				
Performance Deficiencies: None				
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None	
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years	
Comments:			Maintenance Needs: 15 ☐ Urgent ☒ 1 Year ☐ 2 Year Rout and seal transverse cracks.	

Municipal Structure Inspection Form

MTO Site Number:

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Element Data

Element Group:	Embankments & Streams		Length:		(m)
Element Name:	Embankments		Width:		(m)
Location:	NE/NW/SE/SW		Height:		(m)
Material:	Rock/Boulder		Count:	4	(items)
Element Type:	Rip Rap		Total Quantity:	4	(each)
Environment:	Benign / <u>Moderate</u> / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m <u>each</u> / % / all	Exc. 4	Good	Fair	Poor
00					
Comments:					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace ☐ 1 - 5 Years		☐ Major Rehab ☒ None ☐ 6 - 10 Years		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:					
Comments:					

Element Group:	Accessories		Length:		(m)
Element Name:	Signs		Width:		(m)
Location:	NE/NW/SE/SW		Height:		(m)
Material:	Steel		Count:	2	(items)
Element Type:			Total Quantity:	2.0	(ea)
Environment:	Benign / Moderate / <u>Severe</u>		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m <u>each</u> / % / all	Exc.	Good	Fair 2.0	Poor
00					
Comments: Raise hazard signs. Install narrow structure signage and one lane only when used by narrow trucks signage.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace ☐ 1 - 5 Years		☐ Major Rehab ☒ None ☐ 6 - 10 Years		Maintenance Needs: - ☒ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:					
Comments:	Install formentioned signage				

Element Group:	MLE's		Length:	0.975	(m)
Element Name:	Diaphragms		Width:	0.165	(m)
Location:	E/W		Height:	0.425	(m)
Material:	Steel		Count:	18	(items)
Element Type:			Total Quantity:	17.8	(m ²)
Environment:	Benign / <u>Moderate</u> / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units <u>m</u> / m / each / % / all	Exc. 17.8	Good	Fair	Poor
00					
Comments: Light to moderate corrosion and patina flaking, no section loss.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace ☐ 1 - 5 Years		☐ Major Rehab ☒ None ☐ 6 - 10 Years		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:					
Comments:					

Municipal Structure Inspection Form
MTO Site Number:

DY - 6

Element Data

Element Group:	Piers		Length:		(m)
Element Name:	Bearings		Width:		(m)
Location:	Abutments		Height:		(m)
Material:	Elastomeric Rubber		Count:	8	(items)
Element Type:			Total Quantity:	8	(each)
Environment:	Benign <u>Moderate</u> / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
	m ² / m <u>each</u> / % / all	8			
Performance Deficiencies					
00					
Comments:					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year
	☐ 1 - 5 Years ☐ 6 - 10 Years				
Timeframe:					
Comments:					

Municipal Structure Inspection Form

MTO Site Number:

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Repair and Rehabilitation Required:		Priority				Estimated Construction Cost
Element	Repair and Rehabilitation Required	6 to 10 years	1 to 5 years	Within 1 year	Urgent	
Total Cost						

Associated Work:	Comments	Estimated Cost
Approaches:		
Detours:		
Traffic Control:		
Utilities:		
Right of Way:		
Environmental Study:		
Other:		
Contingencies:		
Total Cost		\$0

Justification:

Structure No: DY-7

Oblong Lake Narrows Bridge

Structure Description

The Oblong Lake Narrows Bridge is located on Haliburton Lake Road, immediately North of the intersection of Haliburton Lake Road and Harburn Road, in the hamlet of Fort Irwin. The bridge was constructed in 1964 and is an 18.6 m triple span, two lane structure with a composite wood/concrete deck, supported by timber piles and pile caps with timber ballast wall abutments. The structure crosses a navigable watercourse (Oblong Lake) on a North/South tangential alignment. The bridge has an 8.5 m wide concrete deck with an asphaltic wearing surface and concrete curbs. There is a steel barrier over the structure with concrete end posts and one steel beam guiderail on the Southeast approach. The bridge is currently load posted / limited to 20 / 32 / 40 tonnes.

Structure Condition

The overall structure is in poor condition with a BCI of 42 and BSI of 33. The substructure is in good to fair condition given its age; however, the superstructure including deck, curbs, sidewalk and railings are in poor condition and require replacement. The timber piles and pile caps are in good condition with minor checking and cracking noted at end bent locations. It should be noted the two center bents have limited inspection due to accessibility. The timber abutments are in fair condition; however, the gabion wing walls have been displaced and require replacement and stabilization with proper slope protection in all four quadrants. The concrete deck, curbs and sidewalk are in poor condition with extensive spalling of the soffit and curb areas revealing localized exposed rebar. The longitudinal wooden deck shows signs of water penetration. The wearing surface is in good to poor condition with extensive potholes and patching evident. The steel barrier over the structure is in fair to poor condition with severe corrosion, isolated collision damage and severe deterioration of the concrete end posts. The barrier does not comply with the bridge code and likely would not provide sufficient protection in the event of a collision. The steel beam guiderail on the Southeast approach is in poor condition with visible impact damage and is not connected to the structure. The other three approach quadrants have no steel beam guiderail system.

Recommendations

The substructure; excluding piles and capping beams, and superstructure; excluding possible wood soffit, require major rehabilitation. The structure requires major rehabilitation including repair/replacement of abutments, deck, soffit, wearing surface and guiderails. A detailed deck condition survey should be conducted prior to major rehabilitation work to establish actual deck conditions between composite materials. It is also recommended that an enhanced visual inspection of center bents be conducted at that time to ensure the integrity of major structural pier components. This work should be undertaken in 1-5 years.



Photo 1 : General Arrangement - Looking North

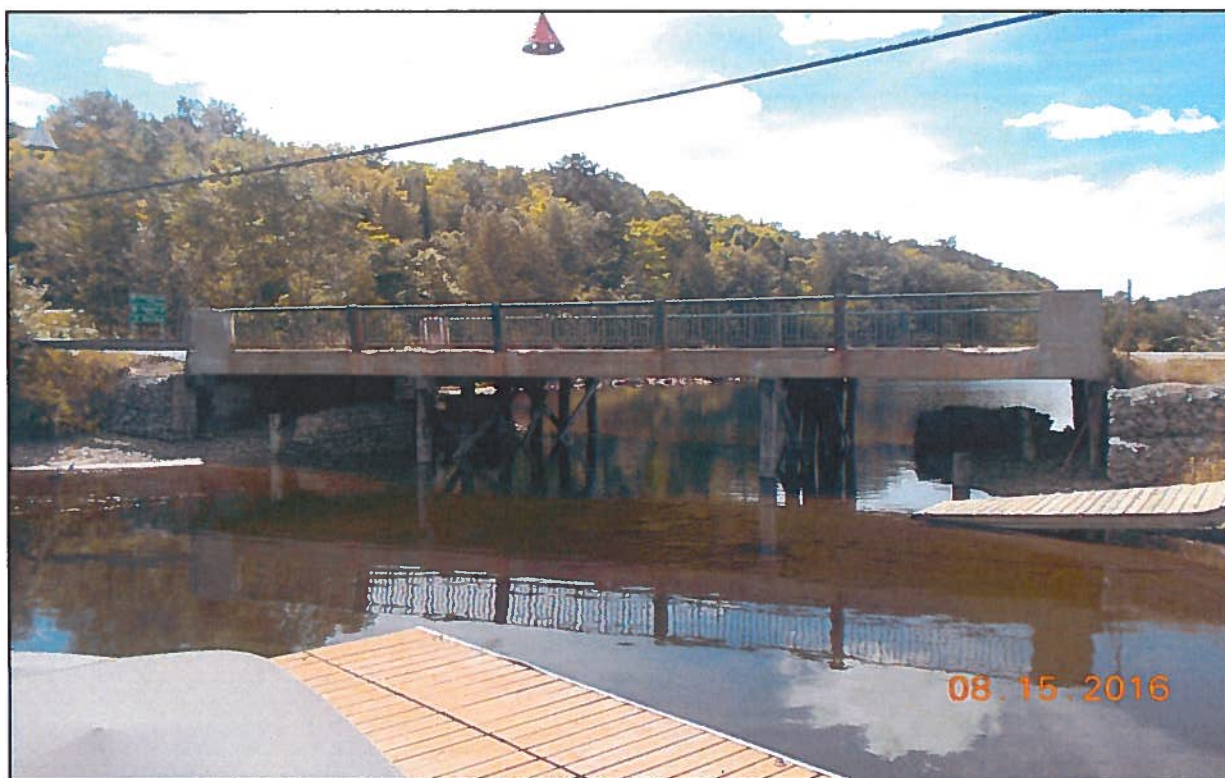


Photo 2 : General Arrangement - Looking West



Photo 3 : Asphalt Wearing Surface and Curb Deterioration - East Lane Looking North



Photo 4 : Deformed Guiderail System Missing Supports - Southeast Quadrant



Photo 5 : Detached Guiderail System - Southeast Quadrant



Photo 6 : Typical Concrete End Post of Handrail System - Southeast Quadrant



Photo 7 : Inadequate Load Carrying Capacity at Handrail Posts - Typical View



Photo 8 : Erosion at Gabion Basket Retaining Wall - Southwest Quadrant

Inventory Data:

Structure Name	Oblong Lake Narrows Bridge				
Main Hwy/Road #		On ☒ Under	Crossing Type:	Navig. Water ☒ Non-Navig. Water Rail Road ☒ Ped. Other	
Road Name	Haliburton Lake Road				
Structure Location	0.07 km North of CR 14 & CR 19 Intersection in Fort Irwin				
Latitude	45.178200	Longitude	-78.423800		
Owner(s)	Municipality of Dysart et al	Heritage Designation:	Not Cons. ☒ Cons./not App. List/not Desig. Desig./Not List Desig. & List		
MTO Region *		Road Class:	Freeway Arterial Collector Local ☒		
MTO District *		Posted Speed	50	No. of Lanes	2
Old County *		AADT		% Trucks	
Geographic Twp. *		Special Routes:	Transit Truck School Bicycle		
Structure Type *	Bridge	Detour Length Around Bridge	None	(km)	
Total Deck Length	18.6	(m)	Fill on Structure	0	(m)
Overall Str. Width	9.4	(m)	Skew Angle		(degrees)
Total Deck Area	175.0	(sq.m)	Direction of Structure	N to S	
Roadway Width	7.4	(m)	No. of Spans	3	
Span Lengths	6.2 (m)				

Historical Data:

Year Built	1964	Last Biennial Inspection	2014
Current Load Limit	20/32/40 (tonnes)	Last BridgeMaster Inspection	N/A
Load Limit Bylaw #	2011-96	Last Evaluation	N/A
Bylaw Expiry Date	N/A	Last Underwater Inspection	N/A
Min. Vertical Clearance	- (m)	Last Condition Survey	N/A

Rehab. History: (Date/description)

Field Inspection Information:	
Date of Inspection:	August 15, 2016
Inspector:	Robert Brooks – Tulloch Engineering
Others in Party:	Elizabeth Perry – Tulloch Engineering
Equipment Used:	Camera, Hammer, Tape Measure
Weather:	Sun
Temperature:	+18°C

Additional Investigations Required:	Priority			Estimated Cost
	None	Normal	Urgent	
Detailed Deck Condition Survey:	X			
DART Survey:	X			
Detailed Coating Condition Survey:	X			
Underwater Investigation:	X			
Fatigue Investigation:	X			
Seismic Investigation:	X			
Structure Evaluation:		X		\$10,000.00
Load Posting – Estimated Load			Total Cost	\$10,000.00
Special Notes: 1. Recommend structure evaluation to determine condition of existing wood pile and capping beam system including any other structural elements prior to major rehabilitation work.				
Next Detailed Inspection:	2018			

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 to 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 | |

Municipal Structure Inspection Form

MTO Site Number:

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Element Data

Element Group:	Abutments	Length:		(m)
Element Name:	Ballast Walls	Width:	10.0	(m)
Location:	Under deck	Height:	2.0	(m)
Material:	Wood	Count:	2	(items)
Element Type:		Total Quantity:	40.0	(m ²)
Environment:	<u>Benign</u> Moderate / Severe	Limited Insp'n:	☐	
Protection System:				
Condition	Units	Exc.	Good	Fair
Data:	<u>m²</u> / m / each / % / all			40
				Poor
				Performance Deficiencies
				00
Comments: Light to medium water stains.				
Performance Deficiencies: None				
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None	
Timeframe:	☐ 1 - 5 Years ☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year	
Comments: Replace when major overall bridge rehabilitation work to be completed.				

Element Group:	Barriers	Length:	17.00	(m)
Element Name:	Hand Railings	Width:		(m)
Location:	Both sides of bridge	Height:	1.20	(m)
Material:	Steel	Count:	2	(items)
Element Type:	Double Railing	Total Quantity:	34.0	(m)
Environment:	Benign / Moderate <u>Severe</u>	Limited Insp'n:	☐	
Protection System:				
Condition	Units	Exc.	Good	Fair
Data:	<u>m / m</u> each / % / all			19
				Poor
				Performance Deficiencies
				08
Comments: Significant corrosion; railing not compliant with Bridge Code. Railing should be replaced as part of structure rehabilitation. Posts bases have severely deteriorated with exposed rebar. Connection to cast in place end posts has severely deteriorated at top connection.				
Performance Deficiencies: None				
Recommended Work:	☐ Minor Rehab ☒ Replace		☐ Major Rehab ☐ None	
Timeframe:	☒ 1 - 5 Years ☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year	
Comments: Replace when major overall bridge rehabilitation work to be completed. Should rehabilitation work be postponed, complete major rehab. in 1-5 years.				

Element Group:	Barriers	Length:	0.75	(m)
Element Name:	Posts	Width:	0.20	(m)
Location:	All 4 corners of bridge	Height:	1.3	(m)
Material:	Cast-in-place Concrete	Count:	4	(items)
Element Type:		Total Quantity:	4	(each)
Environment:	Benign / Moderate <u>Severe</u>	Limited Insp'n:	☐	
Protection System:				
Condition	Units	Exc.	Good	Fair
Data:	m ² / m <u>each</u> / % / all			2
				Poor
				Performance Deficiencies
				00
Comments: Two of four posts are badly spalled and deteriorated with exposed rebar. Handrail anchor is exposed.				
Performance Deficiencies: None				
Recommended Work:	☐ Minor Rehab ☒ Replace		☐ Major Rehab ☐ None	
Timeframe:	☒ 1 - 5 Years ☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year	
Comments: Replace when major overall bridge rehabilitation work to be completed. Should overall bridge rehabilitation work be postponed, complete major rehab. in 1-5 years.				

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MTO Site Number:

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Element Data

Element Group:	Approach		Length:	8.0	(m)
Element Name:	Barriers (Guiderail)		Width:		(m)
Location:	Southeast quadrant only		Height:		(m)
Material:	Steel		Count:	1	(items)
Element Type:	Steel Flex Beam on Wood Post		Total Quantity:	8.0	(m)
Environment:	Benign / Moderate Severe		Limited Insp'n:	☐	
Protection System:					
Condition	Units	Exc.	Good	Fair	Poor
Data:	m / m / each / % / all				8
					Performance Deficiencies
					08
Comments: Guiderail on southeast approach only and it is damaged, not at proper elevation and not connected to bridge. Impact damage in SE quadrant. There are no guiderails on any of the other 3 approaches.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☒ Replace		☐ Major Rehab ☐ None		Maintenance Needs: -
Timeframe:	☒ 1 - 5 Years ☐ 6 - 10 Years				☒ Urgent ☒ 1 Year ☐ 2 Year
Comments: Replace one existing guiderail and install 3 new guiderail systems.					Reconnect guiderail at SE quadrant.

Element Group:	Deck		Length:	18.6	(m)
Element Name:	Soffit - Thick Slab		Width:		(m)
Location:	Exterior Face and 1 m Underside		Height:	1.5	(m)
Material:	Cast-In-Place Concrete and Wood		Count:	2	(items)
Element Type:			Total Quantity:	55.8	(m ²)
Environment:	Benign Moderate / Severe		Limited Insp'n:	☒	
Protection System:					
Condition	Units	Exc.	Good	Fair	Poor
Data:	m / m / each / % / all			27.9	27.9
					Performance Deficiencies
					00
Comments: Exterior soffit has light stained map cracking with localized delaminations.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☒ Replace		☐ Major Rehab ☐ None		Maintenance Needs:
Timeframe:	☒ 1 - 5 Years ☐ 6 - 10 Years				☐ Urgent ☐ 1 Year ☐ 2 Year
Comments: Replace when major overall bridge rehabilitation work to be completed. Should overall bridge rehabilitation work be postponed complete major rehab. in 1-5 years.					

Element Group:	Deck		Length:	18.6	(m)
Element Name:	Deck Top		Width:	8.50	(m)
Location:			Height:		(m)
Material:	Concrete and Wood Composite		Count:	1	(items)
Element Type:	Laminated Wood Decking - Longitudinal		Total Quantity:	158.0	(m ²)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☒	
Protection System:					
Condition	Units	Exc.	Good	Fair	Poor
Data:	m / m / each / % / all		57.6	63.2	37.2
					Performance Deficiencies
					00
Comments: Wooden deck showing signs of water penetration and damage.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☒ Replace		☐ Major Rehab ☒ None		Maintenance Needs: -
Timeframe:	☒ 1 - 5 Years ☐ 6 - 10 Years				☐ Urgent ☐ 1 Year ☐ 2 Year
Comments: Replace when major overall bridge rehabilitation work to be completed.					

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Element Data

Element Group:	Deck	Length:	18.6	(m)
Element Name:	Wearing Surface	Width:	8.50	(m)
Location:		Height:		(m)
Material:	Asphalt	Count:	1	(items)
Element Type:		Total Quantity:	158.0	(m ²)
Environment:	Benign / Moderate Severe	Limited Insp'n:	☐	
Protection System:				
Condition Data:	Units m² / m / each / % / all	Exc.	Good	Fair
			24.16	60.4
				Poor
				37.2
Performance Deficiencies 10, 11				
Comments: Wearing surface in poor condition with extensive potholes and patching and raveling along East and West crossfall. Lack of deck drainage and/or ponding may be resulting in potholes.				
Performance Deficiencies: None				
Recommended Work:	☐ Minor Rehab ☒ Replace	☐ Major Rehab ☐ None	Maintenance Needs: -	
Timeframe:	☒ 1 - 5 Years	☐ 6 - 10 Years	☐ Urgent ☐ 1 Year ☐ 2 Year	
Comments: Replace when major overall bridge rehabilitation work to be completed. Should overall bridge rehabilitation work be postponed complete major rehab. in 1-5 years.				

Element Group:	Abutment	Length:	2.0	(m)
Element Name:	Wingwalls	Width:	1.0	(m)
Location:		Height:	1.5	(m)
Material:	Metal Gabion Basket and Rock	Count:	4	(items)
Element Type:		Total Quantity:	12.0	(m ²)
Environment:	Benign / Moderate / Severe	Limited Insp'n:	☐	
Protection System:				
Condition Data:	Units m² / m / each / % / all	Exc.	Good	Fair
			3.0	6.0
				Poor
				3.0
Performance Deficiencies 15				
Comments: Gabions in fair to poor condition; some displacement and erosion.				
Performance Deficiencies: None				
Recommended Work:	☐ Minor Rehab ☒ Replace	☐ Major Rehab ☐ None	Maintenance Needs: -	
Timeframe:	☐ 1 - 5 Years	☐ 6 - 10 Years	☐ Urgent ☐ 1 Year ☐ 2 Year	
Comments: Replace when major overall bridge rehabilitation work to be completed. Should overall bridge rehabilitation work be postponed complete minor rehab. in 1-5 years including slope protection to support gabions.				

Element Group:	Sidewalk / Curbs	Length:	18.0	(m)
Element Name:	Sidewalk and Curb	Width:	1.00	(m)
Location:	East (S/W) West (Curb)	Height:	0.20	(m)
Material:	Cast-In-Place Concrete	Count:	2	(items)
Element Type:		Total Quantity:	43.2	(m ²)
Environment:	Benign / Moderate Severe	Limited Insp'n:	☐	
Protection System:				
Condition Data:	Units m² / m / each / % / all	Exc.	Good	Fair
			7.2	21.6
				Poor
				14.4
Performance Deficiencies 00				
Comments: Significant spalling and deterioration of sidewalk and curb with exposed rebar, abrasion and impact damage throughout.				
Performance Deficiencies: None				
Recommended Work:	☐ Minor Rehab ☒ Replace	☐ Major Rehab ☐ None	Maintenance Needs: -	
Timeframe:	☒ 1 - 5 Years	☐ 6 - 10 Years	☐ Urgent ☐ 1 Year ☐ 2 Year	
Comments: Replace when major overall bridge rehabilitation work to be completed.				

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Element Data

Element Group:	Approaches		Length:	6	(m)
Element Name:	Wearing Surface		Width:	7.4	(m)
Location:	North and South		Height:		(m)
Material:	Asphalt		Count:	2	(items)
Element Type:			Total Quantity:	88.8	(m ²)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units	Exc.	Good	Fair	Poor
	m ² / m / each / % / all		73.8	10	5
Comments: Severe erosion at south approach. Medium to Severe longitudinal transverse cracks and wheel rutting. Erosion					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☒ Replace		☐ Major Rehab ☐ None		Maintenance Needs: -
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☒ 1 Year ☐ 2 Year
Comments: Provide proper drainage. Clear over grown vegetation. Provide proper signage. Replace when major overall bridge rehabilitation work to be completed. Should overall bridge rehabilitation work be postponed complete major rehab. in 1-5 years.					13 - Erosion control

Element Group:	Piers / Piles		Length:		(m)
Element Name:	Pile Bents		Width:		(m)
Location:	4 Locations equally spaced		Height:		(m)
Material:	Wood		Count:	24	(items)
Element Type:	Pile		Total Quantity:	24.0	(each)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units	Exc.	Good	Fair	Poor
	m ² / m / each / % / all		24.0		
Comments: Light to Medium splits throughout piles.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☐ None		Maintenance Needs: -
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments: Perform detailed structural condition survey prior to undertaking major overall bridge rehab.					

Element Group:	Embankments & Streams		Length:		(m)
Element Name:	Embankments		Width:		(m)
Location:	4 Quadrants		Height:		(m)
Material:			Count:	4	(items)
Element Type:			Total Quantity:		(m ²)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units	Exc.	Good	Fair	Poor
	m ² / m / each / % / all				4.0
Comments: Slope protection required to stabilize embankments and gabion baskets.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☐ None		Maintenance Needs: -
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☒ 1 Year ☐ 2 Year
Comments: Provide slope protection.					Slope protection required.

Municipal Structure Inspection Form

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Element Data

Element Group:	Accessories		Length:		(m)
Element Name:	Signs		Width:		(m)
Location:			Height:		(m)
Material:			Count:	4	(items)
Element Type:			Total Quantity:	4.0	(each)
Environment:	Benign / <u>Moderate</u> / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m / <u>each</u> / % / all	Exc.	Good	Fair	Poor
				1	3
08					
Comments:					
Performance Deficiencies: Replace signs					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☐ None		Maintenance Needs: - ☒ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		
Comments: Missing and bent signs					

Element Group:	Piers / Piles		Length:		(m)
Element Name:	Pile Cap Beam		Width:		(m)
Location:	4 Locations equally spaced		Height:		(m)
Material:	Wood		Count:	4	(items)
Element Type:	Pile		Total Quantity:	4.0	(each)
Environment:	<u>Benign</u> / Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m / <u>each</u> / % / all	Exc.	Good	Fair	Poor
			4.0		
00					
Comments: 4 capping beams 0.300 x 0.300 mm in good condition.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☐ None		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		
Comments: Perform detailed structural condition survey prior to undertaking major overall bridge rehab.					

Element Group:			Length:		(m)
Element Name:			Width:		(m)
Location:			Height:		(m)
Material:			Count:		(items)
Element Type:			Total Quantity:		(m ²)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc.	Good	Fair	Poor
Comments:					
Performance Deficiencies:					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☐ None		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		
Comments: Slope protection required.					

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MTO Site Number:

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Repair and Rehabilitation Required:		Priority				Estimated Construction Cost
Element	Repair and Rehabilitation Required	6 to 10 years	1 to 5 years	Within 1 year	Urgent	
Wearing Surface	Replace with asphalt wearing surface		X			\$10,000
Approaches	Replace with concrete and asphalt approach slab					\$100,000
Deck	Replace with composite concrete and asphalt deck		X			\$230,000
Barriers	Replace barriers (railings) with current OPS barrier		X			\$35,000
Abutment Ballast Walls	Replace with wood ballast walls		X			\$28,000
Retaining Walls	Replace with steel sheet piles		X			\$60,000
Total Cost						\$463,000

Associated Work:	Comments	Estimated Cost
Approaches:	Guiderail	\$13,000
Detours:		
Traffic Control:	Traffic Control, Temporary Signals, Signage	\$80,000
Utilities:		
Eng. Design & Supervision:	Design and Contract Administration / Construction Inspection	\$65,000
Environmental Study:		
Other:	Environmental Controls	\$5,000
Other:		
Contingencies:		\$100,000
Total Cost		\$263,000

Justification:

Major bridge rehabilitation design with cost estimate completed by DM Wills in January 2013. Cost estimate from Wills increased here at inflationary levels.

Structure No: DY-8

South Bay Bridge

Structure Description

The South Bay Bridge is located on Hodgson Road, 1.1 km east of Harburn Road. The bridge was constructed in 1960 and is a 20.1 m single span, two-lane structure with a concrete deck supported by timber piles and timber abutments. The structure crosses a navigable waterway on an east/west tangential alignment. The structure has an overall width of 7.8 m and 7.3 m wide surface treatment driving surface with concrete curbs. There is a steel barrier over the structure with concrete end posts. There is no guiderail on the approaches.

Structure Condition

The structure is in fair overall condition with a BCI of 68 and a BSI of 65. The substructure including timber piles, pile caps and abutments are in good condition with localized checking and cracking. There is some evidence of backfill material washing out near the abutment face. Erosion of backfill embankments, along the approaches, is causing progressive deterioration of edge of asphalt and undermining of deck components. There are no wing walls or erosion protection on the approaches which is allowing erosion of the embankments and may cause loss of backfill behind abutments. The concrete deck is in fair condition with frequent spalling, loss of aggregate and asphalt patching. The barrier over the structure is in good condition with minor corrosion and splitting of the posts.

Recommendations

The structure requires a minor rehabilitation including installation of erosion protection on the approach embankments, rebuilding and resurfacing of the approaches and repairs to the deck. This work should be completed in the 6-10 year period. Guiderail extension on the approaches should be undertaken in the future when the structure undergoes a major rehabilitation.



Photo 1 : General Arrangement - Looking West



Photo 2 : General Arrangement - Looking East

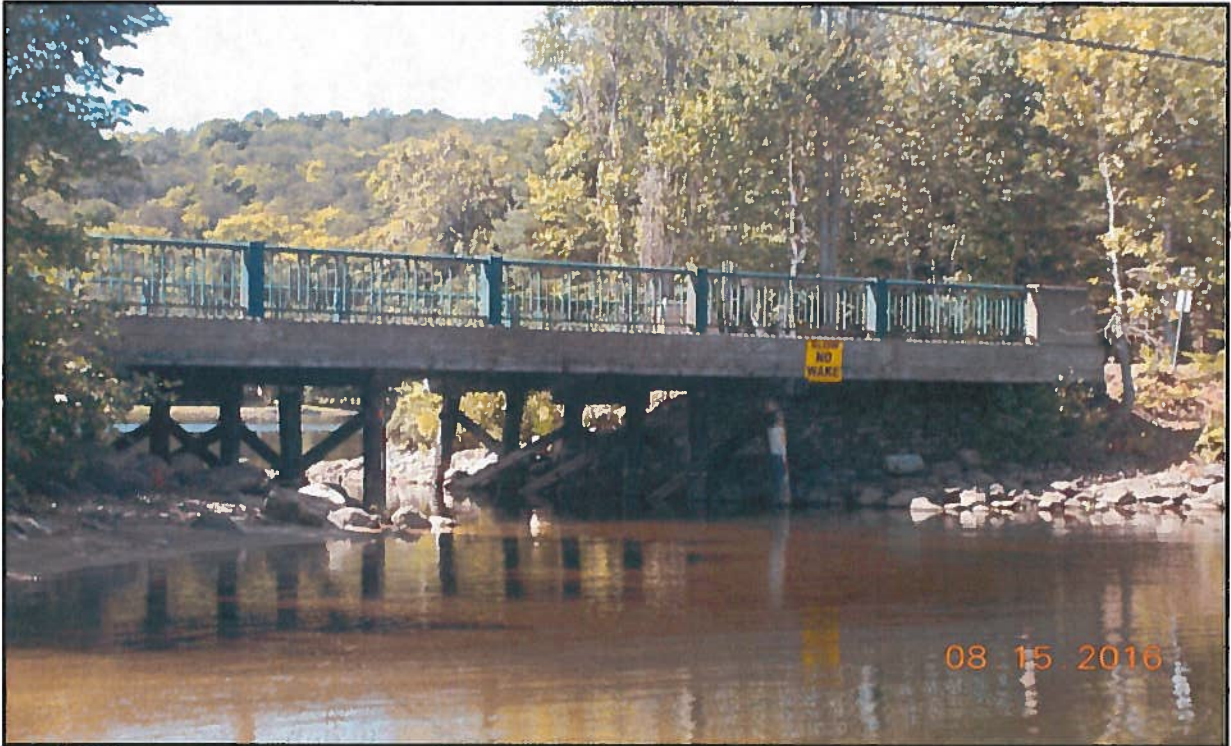


Photo 3 : General View – North Elevation

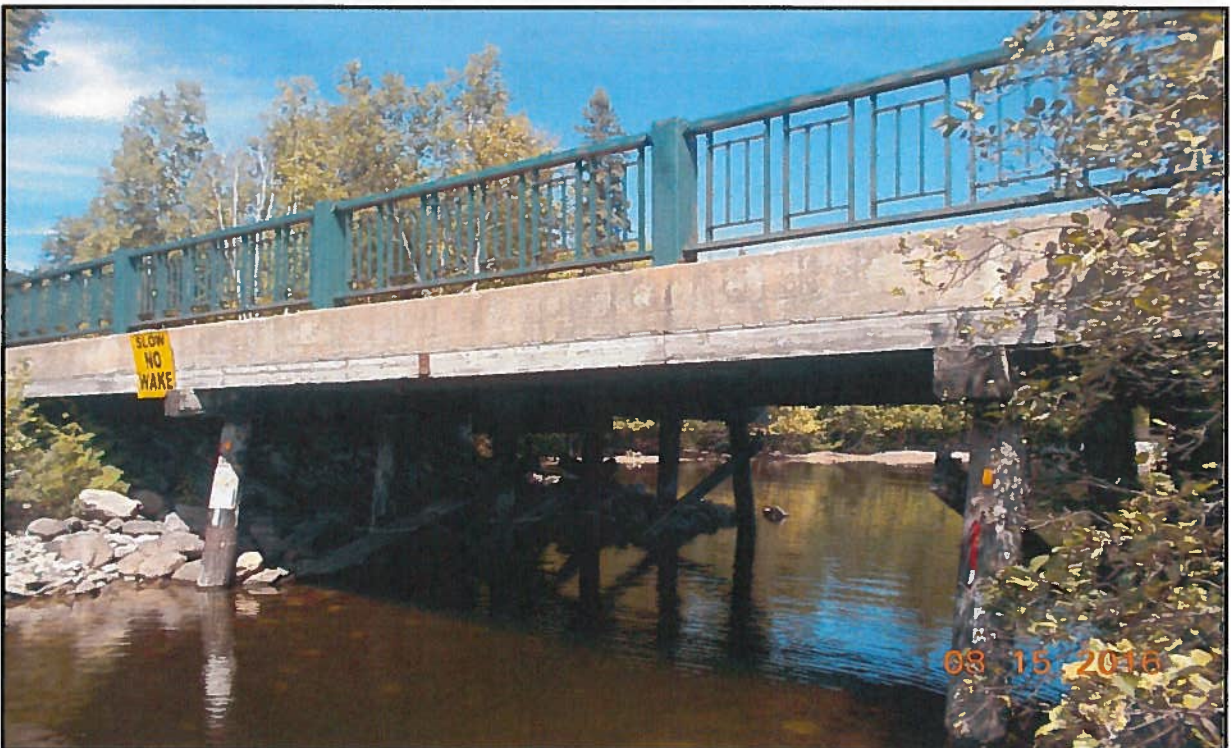


Photo 4 : General View – South Elevation



Photo 5 : Deck Wearing Surface – Looking West



Photo 6 : Deck Wearing Surface - Localized Potholes



Photo 7 : Erosion of Embankment - Northwest Quadrant

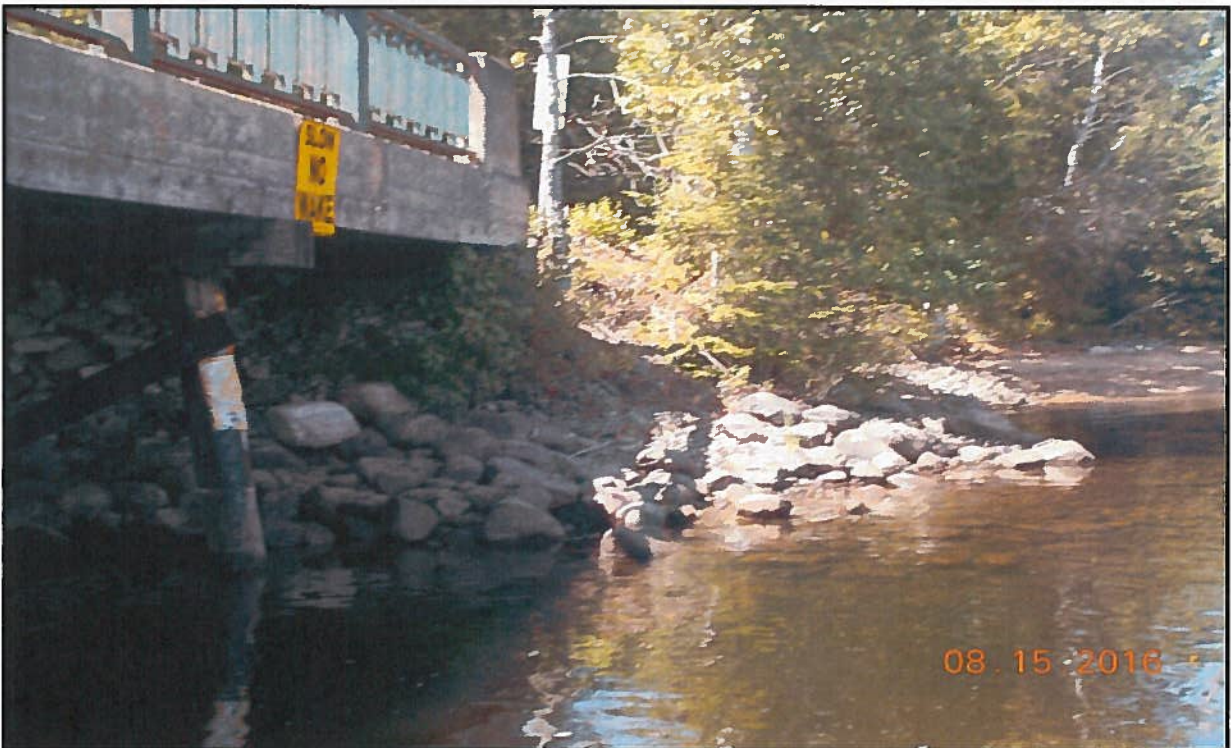


Photo 8 : Erosion of Embankment - Northwest Quadrant Looking West



Photo 9 : Erosion of Embankment - Northeast Quadrant

Inventory Data:

Structure Name	South Bay Bridge				
Main Hwy/Road #	County Rd 19	On ☒ Under	Crossing Type:	Navig. Water ☒ Non-Navig. Water Rail Road Ped. Other	
Road Name	Hodgson Road				
Structure Location	0.35 km East of Dunn Road				
Latitude	45.170500	Longitude	-78.408000		
Owner(s)	Municipality of Dysart et al	Heritage Designation:	Not Cons. Desig./Not List	Cons./not App. Desig. & List	
MTO Region *		Road Class:	Freeway Arterial Collector	Local ☒	
MTO District *		Posted Speed	60	No. of Lanes 2	
Old County *		AADT		% Trucks	
Geographic Twp. *		Special Routes:	Transit Truck School Bicycle		
Structure Type *	Bridge	Detour Length Around Bridge		(km)	
Total Deck Length	20.7	Fill on Structure	0	(m)	
Overall Str. Width	7.8	Skew Angle	0	(degrees)	
Total Deck Area	186.0	Direction of Structure	E to W		
Roadway Width	7.5	No. of Spans	3		
Span Lengths	20.1 (m)				

Historical Data:

Year Built	1960	Last Biennial Inspection	2014
Current Load Limit	N/A (tonnes)	Last BridgeMaster Inspection	N/A
Load Limit Bylaw #	N/A	Last Evaluation	N/A
Bylaw Expiry Date	N/A	Last Underwater Inspection	N/A
Min. Vertical Clearance	- (m)	Last Condition Survey	N/A

Rehab. History: (Date/description)

Field Inspection Information:	
Date of Inspection:	August 15, 2016
Inspector:	Robert Brooks – Tulloch Engineering
Others in Party:	Elizabeth Perry – Tulloch Engineering
Equipment Used:	Camera, Hammer, Tape Measure
Weather:	Sun
Temperature:	+19°C

Additional Investigations Required:	Priority			Estimated Cost
	None	Normal	Urgent	
Detailed Deck Condition Survey:	X			
DART Survey:	X			
Detailed Coating Condition Survey:	X			
Underwater Investigation:	X			
Fatigue Investigation:	X			
Seismic Investigation:	X			
Structure Evaluation:	X			
Load Posting – Estimated Load			Total Cost	\$0
Special Notes:				
Next Detailed Inspection:			2018	

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 to 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	

Municipal Structure Inspection Form

MTO Site Number:

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Element Data

Element Group:	Abutments		Length:		(m)
Element Name:	Abutment Walls		Width:	9.0	(m)
Location:	E/W		Height:	1.0	(m)
Material:	Wood		Count:	2	(items)
Element Type:			Total Quantity:	18.0	(m ²)
Environment:	Benign <u>Moderate</u> / Severe		Limited Insp'n:	☒	
Protection System:	Creosote		Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	m ² / m / each / % / all		15.0	3.0	
Comments: Abutments in good condition; minor cracking and warping of boards. Some evidence of material washout from behind abutments.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: 09
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☒ 1 Year ☐ 2 Year
Comments:	Fix / patch boards				

Element Group:	Approaches		Length:		(m)
Element Name:	Drainage (Approaches)		Width:		(m)
Location:	NE/NW/SE/SW		Height:		(m)
Material:	Gravel		Count:	4	(items)
Element Type:			Total Quantity:	4.0	(each)
Environment:	Benign <u>Moderate</u> / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	m ² / m <u>each</u> / % / all			2	2
Comments: Erosion present on all approaches; provide means for water channeling.					
Performance Deficiencies: None					
Recommended Work:	☒ Minor Rehab ☐ Replace		☐ Major Rehab ☐ None		Maintenance Needs:
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments:					

Element Group:	Approaches		Length:	6	(m)
Element Name:	Wearing Surface (Approaches)		Width:	7.5	(m)
Location:	E/W		Height:		(m)
Material:	Surface Treatment		Count:	2	(items)
Element Type:			Total Quantity:	90.0	(m ²)
Environment:	Benign <u>Moderate</u> / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	m ² / m / each / % / all		45	45.0	
Comments: Surface treatment on approaches in fair to poor condition with extensive potholing and patching. Light to medium raveling was also observed.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☒ Replace		☐ Major Rehab ☐ None		Maintenance Needs:
Timeframe:	☐ 1 - 5 Years		☒ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments:					

Municipal Structure Inspection Form

MTO Site Number:

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Element Data

Element Group:	Barriers		Length:	20.0	(m)
Element Name:	Hand Railings		Width:		(m)
Location:	N/S		Height:	1.2	(m)
Material:	Steel		Count:	2	(items)
Element Type:	Double Railing		Total Quantity:	40.0	(m)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:	Galvanized (Paint)		Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc.	Good	Fair	Poor
			35.0	5.0	
Comments: Overall good condition; light corrosion and cracking on posts.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace ☐ 1 - 5 Years		☐ Major Rehab ☒ None ☐ 6 - 10 Years		Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:					
Comments:					

Element Group:	Barriers		Length:	1.5	(m)
Element Name:	Railing Systems - End Post		Width:	0.4	(m)
Location:	NE/NW/SE/SW		Height:	1.0	(m)
Material:	Concrete		Count:	4	(items)
Element Type:			Total Quantity:	17.6	(m ²)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m / m / each / % / all	Exc.	Good	Fair	Poor
			15.4	2.2	
Comments: No guiderail on approaches; recommend installation of guiderail and end treatments.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace ☐ 1 - 5 Years		☐ Major Rehab ☒ None ☐ 6 - 10 Years		Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:					
Comments:					

Element Group:	Deck		Length:	20.7	(m)
Element Name:	Deck Top		Width:	7.80	(m)
Location:			Height:		(m)
Material:	Cast-In-Place Concrete / Laminated Wood		Count:	1	(items)
Element Type:			Total Quantity:	161.5	(m ²)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☒	
Protection System:	Surface treatment		Performance Deficiencies		
Condition Data:	Units m² / m / each / % / all	Exc.	Good	Fair	Poor
			81.0	64.0	16.5
Comments:					
Performance Deficiencies: None					
Recommended Work:	☒ Minor Rehab ☐ Replace ☐ 1 - 5 Years		☐ Major Rehab ☐ None ☒ 6 - 10 Years		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:					
Comments:					

Municipal Structure Inspection Form

MTO Site Number:

DY - 8

Element Data

Element Group:	Pier	Length:		(m)
Element Name:	Shaft / Columns / Pile Bents	Width:	0.30	(m)
Location:		Height:	3.0	(m)
Material:	Wood	Count:	24	(items)
Element Type:	Timber Piles with Capping Beam	Total Quantity:	67.8	(m ²)
Environment:	Benign / <u>Moderate</u> / Severe	Limited Insp'n:	☐	
Protection System:	Creosote	Performance Deficiencies		
Condition	Units	Exc.	Good	Fair
Data:	<u>m²</u> / m / each / % / all		67.8	
Performance Deficiencies: 00				
Comments: Capping beam nuts loose.				
Performance Deficiencies: None				
Recommended Work:	☐ Minor Rehab	☐ Major Rehab	Maintenance Needs: 09 (17)	
	☐ Replace	☒ None	☐ Urgent ☒ 1 Year ☐ 2 Year	
Timeframe:	☐ 1 - 5 Years	☐ 6 - 10 Years	Tighten capping beam nuts	
Comments:				

Element Group:	Sidewalk / Curbs	Length:	20.7	(m)
Element Name:	Curbs	Width:	0.9	(m)
Location:	N/S	Height:	0.3	(m)
Material:	Cast-in-place Concrete	Count:	2	(items)
Element Type:		Total Quantity:	24.8	(m ²)
Environment:	Benign / Moderate / <u>Severe</u>	Limited Insp'n:	☐	
Protection System:		Performance Deficiencies		
Condition	Units	Exc.	Good	Fair
Data:	<u>m²</u> / m / each / % / all		17.8	7.0
Performance Deficiencies: 00				
Comments: Minor spalling of curbs, with some evidence of staining. Minor cracking.				
Performance Deficiencies: None				
Recommended Work:	☐ Minor Rehab	☐ Major Rehab	Maintenance Needs: -	
	☐ Replace	☒ None	☐ Urgent ☐ 1 Year ☐ 2 Year	
Timeframe:	☐ 1 - 5 Years	☐ 6 - 10 Years		
Comments:				

Element Group:	Deck	Length:	20.7	(m)
Element Name:	Soffit	Width:	7.80	(m)
Location:	Interior	Height:	0.25	(m)
Material:	Wood	Count:	1	(items)
Element Type:		Total Quantity:	161.5	(m ²)
Environment:	<u>Benign</u> / Moderate / Severe	Limited Insp'n:	☒	
Protection System:	Creosote (Concrete / Surface Treatment)	Performance Deficiencies		
Condition	Units	Exc.	Good	Fair
Data:	<u>m²</u> / m / each / % / all		106.5	50
Performance Deficiencies: 00				
Comments: Medium splits and checks throughout.				
Performance Deficiencies: None				
Recommended Work:	☐ Minor Rehab	☐ Major Rehab	Maintenance Needs: -	
	☐ Replace	☒ None	☐ Urgent ☐ 1 Year ☐ 2 Year	
Timeframe:	☐ 1 - 5 Years	☐ 6 - 10 Years		
Comments:				

Municipal Structure Inspection Form

MTO Site Number:

DY - 8

Element Data

Element Group:	Deck		Length:	20.7	(m)
Element Name:	Soffit - Thin Slab		Width:	0.55	(m)
Location:	Exterior		Height:		(m)
Material:	Cast-In-Place Concrete		Count:	2	(items)
Element Type:			Total Quantity:	22.7	(m ²)
Environment:	Benign <u>Moderate</u> / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc.	Good	Fair	Poor
			19.3	2.27	1.1
Comments: Light stained cracking of concrete, light to medium cracking of wood. Light to medium splits on South face.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: -
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments:					

Element Group:	Embankments & Streams		Length:		(m)
Element Name:	Embankments		Width:		(m)
Location:	NE/NW/SE/SW		Height:		(m)
Material:			Count:	4	(items)
Element Type:			Total Quantity:	4.0	(ea)
Environment:	Benign <u>Moderate</u> / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m / <u>each</u> / % / all	Exc.	Good	Fair	Poor
			2.0	2.0	
Comments: Erosion from wearing surface has deteriorated the embankment at NE and NW quadrants.					
Performance Deficiencies: None					
Recommended Work:	☒ Minor Rehab ☐ Replace		☐ Major Rehab ☐ None		Maintenance Needs: -
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments: Provide erosion control at NE and NW quadrants.					

Element Group:	Embankments & Streams		Length:		(m)
Element Name:	Slope Protection		Width:		(m)
Location:	NE/NW/SE/SW		Height:		(m)
Material:			Count:	4	(items)
Element Type:			Total Quantity:	4.0	(ea)
Environment:	Benign <u>Moderate</u> / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m / <u>each</u> / % / all	Exc.	Good	Fair	Poor
			2.0	2.0	
Comments: No slope protection at NE and NW quadrants.					
Performance Deficiencies: None					
Recommended Work:	☒ Minor Rehab ☐ Replace		☐ Major Rehab ☐ None		Maintenance Needs: -
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments: Provide slope protection to NE and NW quadrants.					

Municipal Structure Inspection Form

MTO Site Number:

DY-8

Element Data

Element Group:	Decks	Length:	20.70	(m)
Element Name:	Wearing Surface	Width:	7.50	(m)
Location:	Top	Height:		(m)
Material:	Surface Treatment	Count:		(items)
Element Type:		Total Quantity:	155	(m ²)
Environment:	Benign / Moderate Severe	Limited Insp'n:	☐	
Protection System:				
Condition	Units	Exc.	Good	Fair
Data:	m ² / m / each / % / all		149	4
				Poor
				2
				00
Comments: Longitudinal cracks and light to medium rutting throughout with localized pothole.				
Performance Deficiencies: None				
Recommended Work:	☐ Minor Rehab	☐ Major Rehab		Maintenance Needs: 12 / 15
	☒ Replace	☐ None		☐ Urgent ☒ 1 Year ☐ 2 Year
Timeframe:	☐ 1 - 5 Years	☒ 6 - 10 Years		Patch pothole and rout and seal longitudinal crack
Comments:				

Municipal Structure Inspection Form

MTO Site Number:

DY - 8

Repair and Rehabilitation Required:		Priority				Estimated Construction Cost
Element	Repair and Rehabilitation Required	6 to 10 years	1 to 5 years	Within 1 year	Urgent	
Drainage (Approaches)	Place rip rap erosion protection at all approaches		X			\$25,000
Wearing Surface (Approaches)	Repair and Resurface approaches and install adequate means for drainage	X				\$20,000
Deck Top	Repair and overlay deck with double surface treatment	X				\$25,000
Total Cost						\$70,000

Associated Work:	Comments	Estimated Cost
Approaches:	Install guiderail and end treatments	\$25,000
Detours:		
Traffic Control:		
Utilities:		
Eng Design & Supervision:		
Environmental Study:		
Other:		
Contingencies:		
Total Cost		\$25,000

Justification:	
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Structure No: DY-9

Koshlong Lake Bridge

Structure Description

Koshlong Lake Bridge is located on Koshlong Lake Road, 1.5 km east of County Road 1. The bridge was constructed in 1960 and is a 15.6 m three span, two-lane structure with a transverse timber deck on timber beams, piles and abutments. The bridge crosses a non-navigable watercourse on a north/south tangential alignment. The bridge has an overall width of 6.6 m and 6.1 m wide driving surface with timber curbs and a surface treated wearing surface. There is steel beam guiderail across the structure however it is not at the correct elevation; there is no guiderail on the approaches.

Structure Condition

The structure is in fair overall condition with a BCI of 68 and BSI of 66. The timber abutments are in good condition, however there is evidence of material loss from the sides of the abutments and they require stabilization. The timber piles and pile caps are in good condition with moderate checking and cracking. The wooden deck is in good condition with minor cracking; there is no evidence of water penetration. The wearing surface is in poor condition with extensive potholes, patching and cracking. The approaches are in fair condition with minor potholes. The approach side slopes require erosion protection to prevent further erosion near the deck ends. The wooden curbs are in fair condition with severe cracking and minor vehicle damage. There is excessive material build-up against the curbs which should be cleaned to promote deck drainage.

The steel beam guiderail over the structure is in fair condition but is not installed at the correct elevation and one post is missing. The guiderail should be replaced over the structure and extended on the approaches when the next major rehabilitation takes place.

Recommendations

The structure requires a minor rehabilitation within a 1-5 year period including: rebuilding of eroded embankments and installation of proper erosion protection on approach side slopes, stabilization of embankments at deck ends with gabion baskets, replacement of the surface treated wearing surface and address guiderail height. Maintenance should be undertaken to replace the missing guiderail post and clean the bridge deck to promote proper drainage.



Photo 1 : General Arrangement – Looking North

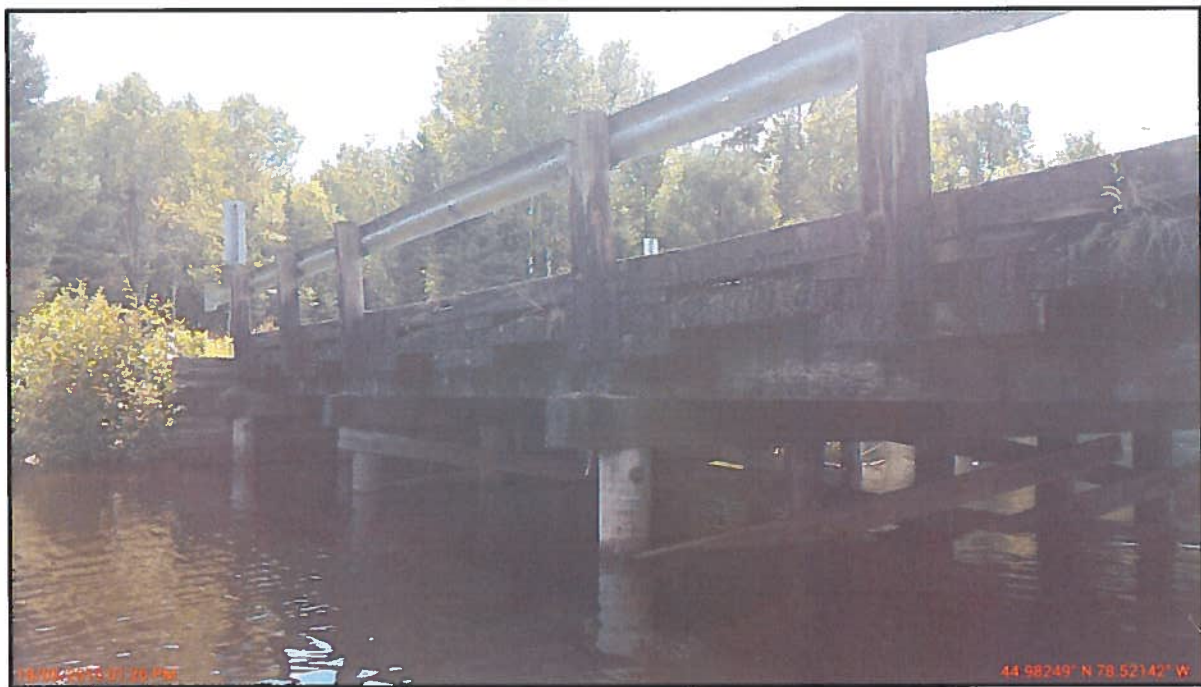


Photo 2 : General Arrangement – Northeast Elevation



Photo 3 : General Arrangement – Southwest Elevation



Photo 4 : General Arrangement – Deck Wearing Surface Looking South

Inventory Data:

Structure Name	Koshlong Lake Bridge				
Main Hwy/Road #		On ☒ Under	Crossing Type:	Navig. Water ☒ Non-Navig. Water Rail Road Ped. Other	
Road Name	Koshlong Lake Road				
Structure Location	0.15 km North of Tippys Trail				
Latitude	44.982500	Longitude	-78.521200		
Owner(s)	Municipality of Dysart et al	Heritage Designation:	Not Cons. ☒ Cons./not App. List/not Desig. Desig./Not List Desig. & List		
MTO Region *		Road Class:	Freeway Arterial Collector Local ☒		
MTO District *		Posted Speed	60	No. of Lanes 2	
Old County *		AADT		% Trucks	
Geographic Twp. *		Special Routes:	Transit Truck School Bicycle		
Structure Type *	Bridge	Detour Length Around Bridge		(km)	
Total Deck Length	15.9	(m)	Fill on Structure	0 (m)	
Overall Str. Width	6.6	(m)	Skew Angle	0 (degrees)	
Total Deck Area	105.0	(sq.m)	Direction of Structure	E to W	
Roadway Width	6.1	(m)	No. of Spans	3	
Span Lengths	5.2			(m)	

Historical Data:

Year Built	1960	Last Biennial Inspection	2014
Current Load Limit	N/A / (tonnes)	Last BridgeMaster Inspection	N/A
Load Limit Bylaw #	N/A	Last Evaluation	N/A
Bylaw Expiry Date	N/A	Last Underwater Inspection	N/A
Min. Vertical Clearance	- (m)	Last Condition Survey	N/A

Rehab. History: (Date/description)

Field Inspection Information:	
Date of Inspection:	August 18, 2016
Inspector:	Robert Brooks – Tulloch Engineering
Others in Party:	Elizabeth Perry – Tulloch Engineering
Equipment Used:	Camera, Hammer, Tape Measure
Weather:	Sun
Temperature:	+25°C

Additional Investigations Required:	Priority			Estimated Cost
	None	Normal	Urgent	
Detailed Deck Condition Survey:	X			
DART Survey:	X			
Detailed Coating Condition Survey:	X			
Underwater Investigation:	X			
Fatigue Investigation:	X			
Seismic Investigation:	X			
Structure Evaluation:	X			
Load Posting – Estimated Load			Total Cost	
Special Notes:				
Next Detailed Inspection:			2018	

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 to 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	

Municipal Structure Inspection Form

MTO Site Number:

DY - 9

Element Data

Element Group:	Approaches		Length:	6.0	(m)
Element Name:	Wearing Surface (Approaches)		Width:	7.5	(m)
Location:	E / W		Height:		(m)
Material:	Asphalt		Count:	2	(items)
Element Type:			Total Quantity:	90.0	(m ²)
Environment:	Benign / Moderate Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	m ² / m / each / % / all		60.0	20.0	10.0
Comments: Light cracking, edge of pavement is deteriorating with localized pothole. Erosion of sideslopes contributing to deterioration of edge of asphalt.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☒ Replace		☐ Major Rehab ☐ None		Maintenance Needs:
Timeframe:	☐ 1 - 5 Years		☒ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments:					

Element Group:	Barriers		Length:	16.00	(m)
Element Name:	Railing Systems		Width:		(m)
Location:	N / S		Height:		(m)
Material:	Steel & Wood		Count:	2	(items)
Element Type:	Steel Flex Beam on Wood Post		Total Quantity:	32.0	(m)
Environment:	Benign / Moderate Severe		Limited Insp'n:	☐	
Protection System:	Creosote / Galvanized		Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	m / m each / % / all			32	
Comments: Guiderail elevation too high; post missing along East side. Light to medium corrosion throughout the steel flex beam. Guiderail system has loose bolts, moderate splits and checks of wooden posts. Extend guidrails to end of approaches.					
Performance Deficiencies: Load carrying capacity of guiderail					
Recommended Work:	☒ Minor Rehab ☐ Replace		☒ Major Rehab ☐ None		Maintenance Needs: 03
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☒ 1 Year ☐ 2 Year
Comments: Install at standard height					
Replace missing wooden post on East side, tighten loose connections.					

Element Group:	Sidewalks/Curb		Length:	15.6	(m)
Element Name:	Curb		Width:	0.25	(m)
Location:	N / S		Height:	0.3	(m)
Material:	Wood		Count:	2	(items)
Element Type:			Total Quantity:	17.2	(m ²)
Environment:	Benign / Moderate Severe		Limited Insp'n:	☐	
Protection System:	Creosote		Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	m ² / m / each / % / all		17.2		
Comments: Medium weathering, light splits and checks throughout.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: 02
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☒ 1 Year ☐ 2 Year
Comments: Remove debris from drainage spaces.					

Municipal Structure Inspection Form

MTO Site Number:

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Element Data

Element Group:	Deck		Length:	15.9	(m)	
Element Name:	Deck Top		Width:	6.6	(m)	
Location:			Height:		(m)	
Material:	Wood		Count:	1	(items)	
Element Type:	Laminated Wood Decking - Transverse		Total Quantity:	105.0	(m ²)	
Environment:	Benign <u>Moderate</u> / Severe		Limited Insp'n:	☒		
Protection System:	Creosote / Surface Treatment		Performance Deficiencies			
Condition Data:	Units <u>m²</u> / m / each / % / all	Exc.				Good
			95.0	10		00
Comments: Minor displacement of deck boards with light to medium staining on underside of deck.						
Performance Deficiencies: None						
Recommended Work:	☐ Minor Rehab		☐ Major Rehab		Maintenance Needs:	
	☐ Replace		☒ None			
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year	
Comments:						

Element Group:	Deck		Length:	15.9	(m)	
Element Name:	Wearing Surface (Decks)		Width:	6.1	(m)	
Location:	Deck Top		Height:		(m)	
Material:	Asphalt Surface Treatment		Count:	1	(items)	
Element Type:			Total Quantity:	97.0	(m ²)	
Environment:	Benign / Moderate <u>Severe</u>		Limited Insp'n:	☐		
Protection System:			Performance Deficiencies			
Condition Data:	Units <u>m²</u> / m / each / % / all	Exc.				Good
			16	54	27	09, 10
Comments: Moderate potholes observed with transverse cracking throughout wearing surface. Surface ponding is causing progressive deterioration of existing asphalt wearing surface.						
Performance Deficiencies: Rough riding surface and surface ponding evident.						
Recommended Work:	☐ Minor Rehab		☐ Major Rehab		Maintenance Needs: 12	
	☒ Replace		☒ None			
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☒ 1 Year ☐ 2 Year	
Comments: Replace asphalt wearing surface.						
Provide bridge surface repairs as a minimum.						

Element Group:	Pier		Length:	8	(m)	
Element Name:	Caps		Width:	0.30	(m)	
Location:	4 Bents		Height:	0.30	(m)	
Material:	Wood		Count:	4	(items)	
Element Type:			Total Quantity:	28.8	(m ²)	
Environment:	<u>Benign</u> / Moderate / Severe		Limited Insp'n:	☒		
Protection System:	Creosote		Performance Deficiencies			
Condition Data:	Units <u>m²</u> / m / each / % / all	Exc.				Good
			27.8		1	00
Comments: Pier cap at South abutment has moderate to severe longitudinal cracks.						
Performance Deficiencies: None						
Recommended Work:	☐ Minor Rehab		☐ Major Rehab		Maintenance Needs: -	
	☐ Replace		☒ None			
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year	
Comments:						

Municipal Structure Inspection Form

MTO Site Number:

Element Data

Element Group:	Abutments		Length:	8.5	(m)
Element Name:	Ballast Wall		Width:		(m)
Location:	E / W		Height:	1.60	(m)
Material:	Wood		Count:	2	(items)
Element Type:			Total Quantity:	13.6	(m²)
Environment:	Benign <u>Moderate</u> Severe		Limited Insp'n:	☐	
Protection System:	Creosote				
Condition	Units	Exc.	Good	Fair	Poor
Data:	m² / m / each / % / all		13.6		
Performance Deficiencies: 00					
Comments: Light scour along the base of ballast wall. Scour behind ballast walls due to continued erosion of embankments.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: 13 ☐ Urgent ☒ 1 Year ☐ 2 Year
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		Erosion control
Comments:					

Element Group:	Beams/MLE's		Length:	5.5	(m)
Element Name:	Girders		Width:		(m)
Location:	East / West		Height:		(m)
Material:	Wood		Count:	27	(items)
Element Type:			Total Quantity:	27.0	(each)
Environment:	<u>Benign</u> / Moderate / Severe		Limited Insp'n:	☒	
Protection System:	Creosote				
Condition	Units	Exc.	Good	Fair	Poor
Data:	m² / m <u>each</u> / % / all		26.0	1.0	
Performance Deficiencies: 00					
Comments: Light to medium splits and cracks throughout. Medium cracks along the South East quadrant.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		
Comments:					

Element Group:	Embankments & Streams		Length:		(m)
Element Name:	Embankments		Width:		(m)
Location:	NE/NW/SE/SW		Height:		(m)
Material:			Count:	4	(items)
Element Type:			Total Quantity:	4.0	(ea)
Environment:	<u>Benign</u> / Moderate / Severe		Limited Insp'n:	☒	
Protection System:					
Condition	Units	Exc.	Good	Fair	Poor
Data:	m² / m <u>each</u> / % / all			4	
Performance Deficiencies: 15					
Comments: Continued erosion of embankments at ballast wall locations.					
Performance Deficiencies: Unstable embankments					
Recommended Work:	☒ Minor Rehab ☐ Replace		☐ Major Rehab ☐ None		Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☐ 1 - 5 Years		☒ 6 - 10 Years		
Comments: Repair eroded sections of embankments & provide slope protection at time of rehabilitation.					

Municipal Structure Inspection Form

MTO Site Number:

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Repair and Rehabilitation Required:		Priority				Estimated Construction Cost
Element	Repair and Rehabilitation Required	6 to 10 years	1 to 5 years	Within 1 year	Urgent	
Abutments	Stabilize sideslopes and provide lateral support for embankments at deck ends with gabion baskets & erosion protection.	X				\$65,000
Approach (Wearing Surface)	Replace asphalt wearing surfaces	X				\$25,000
Railing System	Replace guiderail over structure.	X				\$25,000
Deck (Wearing Surface)	Repair and resurface deck.		X			\$25,000
Total Cost						\$140,000

Associated Work:	Comments	Estimated Cost
Approaches:	Guiderail and end treatment on approaches	\$25,000
Detours:		
Traffic Control:		
Utilities:		
Right of Way:		
Environmental Study:		
Other:		
Contingencies:		
	Total Cost	\$25,000

Justification:

Structure No: DY-10

Kelly Lake Bridge

Structure Description

Kelly Lake Bridge is located on Kennisis Lake Road, 1.0 km west of Watts Road. The bridge was constructed in 1970 and is a 5.4 m single-span, two-lane structure with a transverse timber deck supported by timber beams on timber cribs. The structure crosses a navigable watercourse on an east/west tangential alignment. The bridge has an overall width of 6.7 m and 6.1 m wide driving surface with a surface treated wearing surface and timber curbs. There is steel beam guiderail across the structure but no guiderail on the approaches.

Structure Condition

The structure is in good overall condition with a BCI of 71 and BSI of 68. The wooden abutment cribs are in good condition. The concrete foundations under the cribbing exhibit minor spalling and scour at the waterline. Erosion protection should be placed along the abutments at the waterline to prevent further scour. The wooden deck is in good condition with no signs of water penetration or displacement of the boards. The surface treated wearing surface is in good condition with minor transverse cracking. The timber curbs are in fair condition with cracking and minor vehicle damage. There is excessive material build-up along the curbs which should be cleaned to improve deck drainage. The guiderail over the structure is in good condition with minor corrosion and cracking/checking of timber support posts.

Recommendations

The structure requires rip-rap erosion protection around both abutments to prevent further scour of the foundations and to provide embankment protection. Guiderail extension on the approaches should be undertaken in the future when the structure undergoes a major rehabilitation. The build-up of debris on the deck should be removed as part of maintenance.



Photo 1 : General Arrangement – Looking North

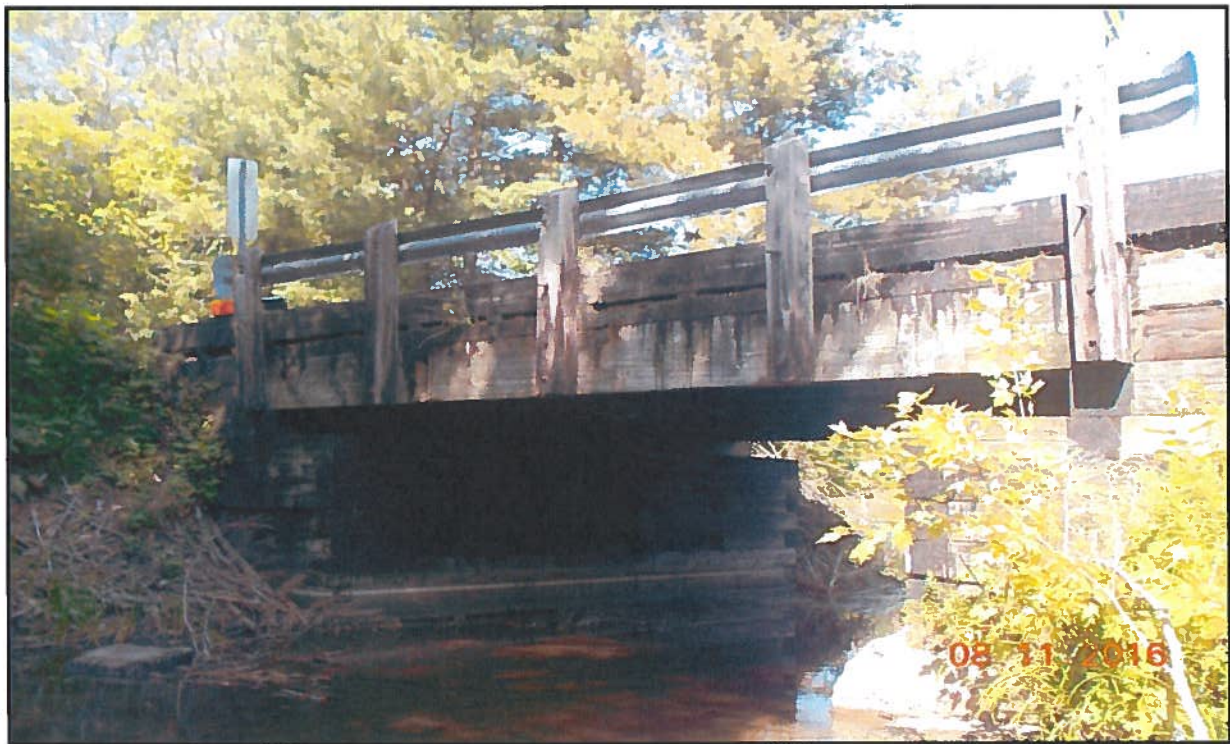


Photo 2 : General Arrangement – East Elevation



Photo 3 : Northeast Embankment – Looking North



Photo 4 : Northwest Embankment – Looking North



Photo 5 : Southwest Embankment – Looking South



Photo 6 : North Abutment – Looking North

Inventory Data:

Structure Name	Kelly Lake Bridge				
Main Hwy/Road #	County Road 7	On ☒	Under	Crossing Type:	Navig. Water ☒ Non-Navig. Water Rail Road Ped. Other
Road Name	Kennisis Lake Road				
Structure Location	North of North Kennisis Lake Road				
Latitude	45.241500	Longitude	-78.616500		
Owner(s)	Municipality of Dysart et al	Heritage Designation:	Not Cons. Desig./Not List	Cons./not App. Desig. & List	List/not Desig. & List
MTO Region *		Road Class:	Freeway	Arterial	Collector Local ☒
MTO District *		Posted Speed	50	No. of Lanes	2
Old County *		AADT		% Trucks	
Geographic Twp. *		Special Routes:	Transit	Truck	School Bicycle
Structure Type *	Bridge	Detour Length Around Bridge		(km)	
Total Deck Length	7.7	(m)	Fill on Structure	0	(m)
Overall Str. Width	6.7	(m)	Skew Angle	0	(degrees)
Total Deck Area	79.0	(sq.m)	Direction of Structure	N to S	
Roadway Width	6.1	(m)	No. of Spans	1	
Span Lengths	5.4				(m)

Historical Data:

Year Built	1970	Last Biennial Inspection	2014
Current Load Limit	N/A / / (tonnes)	Last BridgeMaster Inspection	N/A
Load Limit Bylaw #	N/A	Last Evaluation	N/A
Bylaw Expiry Date	N/A	Last Underwater Inspection	N/A
Min. Vertical Clearance	- (m)	Last Condition Survey	N/A

Rehab. History: (Date/description)

Field Inspection Information:	
Date of Inspection:	August 11, 2016
Inspector:	Robert Brooks – Tulloch Engineering
Others in Party:	Elizabeth Perry – Tulloch Engineering
Equipment Used:	Camera, Hammer, Tape Measure
Weather:	Sun
Temperature:	+26 ⁰ C

Additional Investigations Required:	Priority			Estimated Cost
	None	Normal	Urgent	
Detailed Deck Condition Survey:	X			
DART Survey:	X			
Detailed Coating Condition Survey:	X			
Underwater Investigation:	X			
Fatigue Investigation:	X			
Seismic Investigation:	X			
Structure Evaluation:	X			
Load Posting – Estimated Load			Total Cost	\$0
Special Notes:				
Next Detailed Inspection:				
2018				

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 to 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 | |

Municipal Structure Inspection Form

MTO Site Number:

DY - 10

Element Data

Element Group:	Abutments		Length:		(m)
Element Name:	Abutment Walls		Width:	7.0	(m)
Location:			Height:	2.0	(m)
Material:	Wood Timber		Count:	2	(items)
Element Type:	Crib or Gabion		Total Quantity:	28.0	(m ²)
Environment:	Benign <u>Moderate</u> / Severe		Limited Insp'n:	☐	
Protection System:	Creosote		Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	m ² / m / each / % / all		28		
00					
Comments: Crib in good condition, minor splits and checks.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		
Comments:					

Element Group:	Barriers		Length:	8.00	(m)
Element Name:	Railing Systems		Width:		(m)
Location:	E/W		Height:		(m)
Material:	Steel		Count:	2	(items)
Element Type:			Total Quantity:	16.0	(m)
Environment:	Benign / Moderate <u>Severe</u>		Limited Insp'n:	☐	
Protection System:	Galvanized Creosote		Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	m ² / m / each / % / all		16		
00					
Comments: Guiderail in good condition with minor corrosion and minor deflection. Posts have minor cracking, splits and checks. N/E quadrant end connection bolt requires refastening.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		
Comments:					

Element Group:	Beam/ MLE		Length:	11.7	(m)
Element Name:	Girders		Width:	0.20	(m)
Location:	N/S		Height:	0.55	(m)
Material:	Wood		Count:	10	(items)
Element Type:	Rectangular-solid		Total Quantity:	152.1	(m ²)
Environment:	<u>Benign</u> / Moderate / Severe		Limited Insp'n:	☐	
Protection System:	Creosote		Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	m ² / m / each / % / all		152.1		
00					
Comments: Minor cracking and checking. Moderate beam deflection observed while loading of tandem axle dump truck was observed.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		
Comments:					

Municipal Structure Inspection Form

MTO Site Number:

DY - 10

Element Data

Element Group:	Deck		Length:	7.7	(m)
Element Name:	Deck Top		Width:	6.7	(m)
Location:			Height:		(m)
Material:	Wood		Count:	1	(items)
Element Type:	Laminated Wood Decking - Transverse		Total Quantity:	51.6	(m ²)
Environment:	Benign <u>Moderate</u> / Severe		Limited Insp'n:	☐	
Protection System:	Creosote / Surface Treatment		Performance Deficiencies		
Condition Data:	Units <u>m²</u> / m / each / % / all	Exc.			
			39	13	
Comments:					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		
Comments:					

Element Group:	Deck		Length:	7.7	(m)
Element Name:	Wearing Surface (Decks)		Width:	6.7	(m)
Location:			Height:		(m)
Material:	Surface Treatment		Count:	1	(items)
Element Type:			Total Quantity:	51.6	(m ²)
Environment:	Benign / Moderate <u>Severe</u>		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units <u>m²</u> / m / each / % / all	Exc.			
			40.6	10	1.0
Comments: Minor transverse cracking.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☐ None		Maintenance Needs: 02 ☒ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		
Comments: Bridge cleaning along curbs to alleviate surface ponding.					

Element Group:	Foundations		Length (avg):	7	(m)
Element Name:	Foundation (Below Ground Level)		Width:	2.50	(m)
Location:			Height:	0.5	(m)
Material:	Cast-in-place Concrete		Count:	2	(items)
Element Type:			Total Quantity:	7.0	(m ²)
Environment:	<u>Benign</u> / Moderate / Severe		Limited Insp'n:	☒	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m / <u>each</u> / % / all	Exc.			
				7	
Comments: Scour on exposed concrete foundation; requires erosion protection. Significant deterioration of E abutment foundation bearing surface.					
Performance Deficiencies: None					
Recommended Work:	☒ Minor Rehab ☐ Replace		☐ Major Rehab ☐ None		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		
Comments: Clean and provide stable bearing surface.					

Municipal Structure Inspection Form

MTO Site Number:

DY- 10

Element Data

Element Group:	Approaches		Length:	6.0	(m)
Element Name:	Wearing Surface		Width:	6.10	(m)
Location:	N / S		Height:		(m)
Material:	Asphalt		Count:	2	(items)
Element Type:			Total Quantity:	73.2	(m ²)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc.	Good	Fair	Poor
			73.2		
Comments: Light wear and rutting.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: - ☐ Urgent ☒ 1 Year ☐ 2 Year
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		Remove overgrown vegetation along approach shoulders.
Comments:					

Element Group:	Sidewalks/Curbs		Length:	24	(m)
Element Name:	Curbs		Width:	0.27	(m)
Location:	N/S		Height:	0.35	(m)
Material:	Wood		Count:	2	(items)
Element Type:			Total Quantity:	29.8	(m ²)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc.	Good	Fair	Poor
			14.9	14.9	
Comments: Longitudnal cracks and splits.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		
Comments:					

Element Group:	Streams and Embankments		Length:		(m)
Element Name:	Embankments		Width:		(m)
Location:	NE/NW/SE/SW		Height:		(m)
Material:			Count:	4	(items)
Element Type:			Total Quantity:	4	(ea)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc.	Good	Fair	Poor
				4	
Comments: Build up of wood debris along embankments, inadequate slope protection.					
Performance Deficiencies: None					
Recommended Work:	☒ Minor Rehab ☐ Replace		☐ Major Rehab ☐ None		Maintenance Needs: 13,17 ☐ Urgent ☒ 1 Year ☐ 2 Year
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		Clean build up of wood debris
Comments: Provide rip rap slope protection.					

Municipal Structure Inspection Form

MTO Site Number:

DY - 10

Repair and Rehabilitation Required:		Priority				Estimated Construction Cost
Element	Repair and Rehabilitation Required	6 to 10 years	1 to 5 years	Within 1 year	Urgent	
Foundation (Below Ground Level)	Rip rap protectipn required on foundation to prevent scour		X			\$10,000
Total Cost						\$10,000

Associated Work:	Comments	Estimated Cost
Approaches:	Guiderrail on approaches with end treatment	\$25,000
Detours:		
Traffic Control:		
Utilities:		
Right of Way:		
Environmental Study:		
Other:		
Contingencies:		
	Total Cost	\$25,000

Justification:	
----------------	--

Structure No: DY-11

Burnt River Bridge

Structure Description

The Burnt River Bridge is located on Unicorn Road, 1.7 km south of Hutchings Road. The bridge was constructed in 2008 and is a 15.4 m single span, two lane structure with corrugated steel deck supported by steel girders on concrete bearing slabs with steel ballast walls. The bridge crosses a non-navigable watercourse on a north/south tangential alignment. The bridge has a 6.0 m wide deck with an asphalt covered wearing surface and gravel approaches. There is steel beam guiderail over the structure and on the approaches.

Structure Condition

The structure is in good overall condition with a BCI of 76 and BSI of 74. The concrete abutments and bearing slabs are in good condition. The bearing pads are in good condition. The steel deck and girders are in good condition; the girder ends have minor corrosion and loss of coating. The asphalt wearing surface is in good condition. The expansion joint seal has failed at the south end of the deck and requires replacement to prevent water infiltration.

Recommendations

The structure requires no major improvements at this time. Maintenance is required to replace the damaged expansion joint seal.



Photo 1 : General Arrangement – Looking North



Photo 2 : General Arrangement – Looking South



Photo 3 : General Arrangement – Southwest Elevation

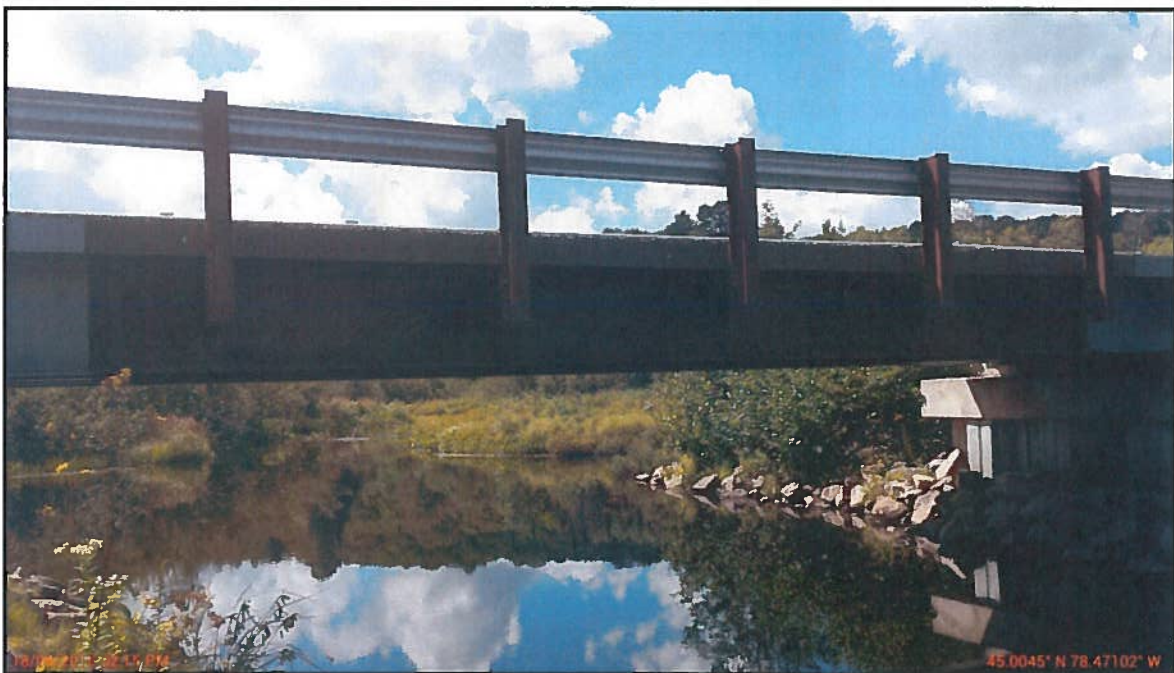


Photo 4 : General Arrangement – Southeast Elevation

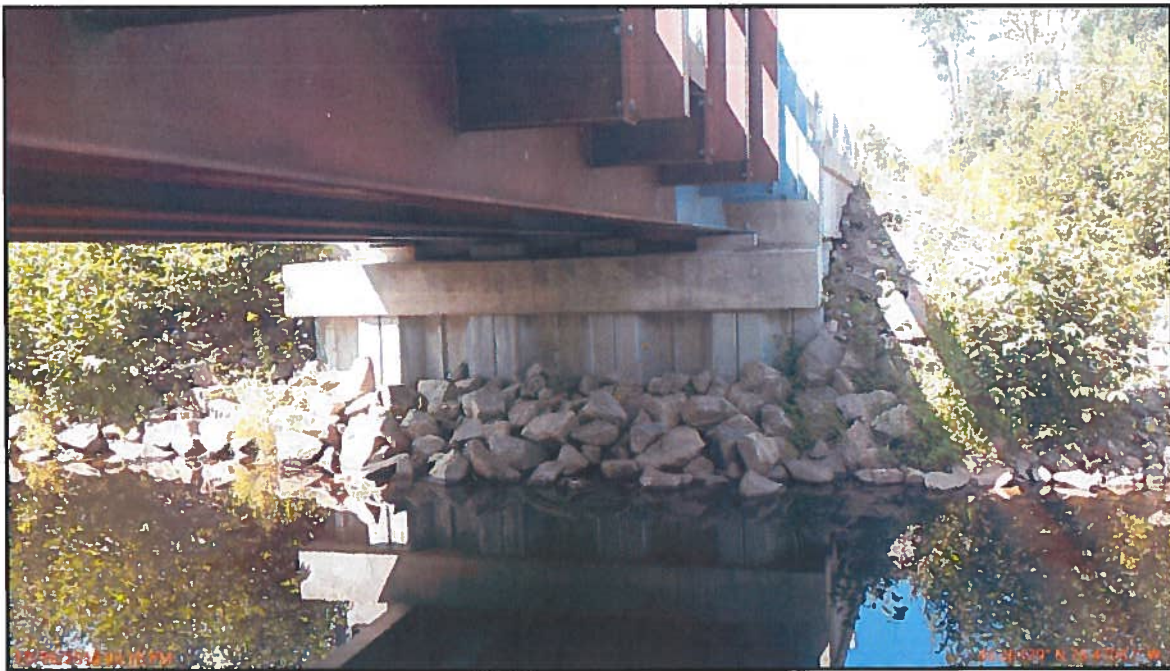


Photo 5 : General Arrangement – North Abutment



Photo 6 : South Expansion Joint at Deck / Approach Intersection

Inventory Data:

Structure Name	Burnt River Bridge				
Main Hwy/Road #		On ☒ Under	Crossing Type:	Navig. Water ☒ Non-Navig. Water Rail Road Ped. Other	
Road Name	Unicorn Road				
Structure Location	1.7 km South of Hutchings Road				
Latitude	45.004000	Longitude	-78.470200		
Owner(s)	County of Haliburton	Heritage Designation:	Not Cons. Design./Not List	Cons./not App. Design. & List	
MTO Region *		Road Class:	Freeway Arterial Collector Local ☒		
MTO District *		Posted Speed	50	No. of Lanes 2	
Old County *		AADT		% Trucks	
Geographic Twp. *		Special Routes:	Transit Truck School Bicycle		
Structure Type *	Bridge	Detour Length Around Bridge		(km)	
Total Deck Length	23.2	(m)	Fill on Structure	0 (m)	
Overall Str. Width	6.0	(m)	Skew Angle	0 (degrees)	
Total Deck Area	139.0	(sq.m)	Direction of Structure	N to S	
Roadway Width	6.0	(m)	No. of Spans	1	
Span Lengths	15.4			(m)	

Historical Data:

Year Built	2008	Last Biennial Inspection	2014
Current Load Limit	N/A / (tonnes)	Last BridgeMaster Inspection	N/A
Load Limit Bylaw #	N/A	Last Evaluation	N/A
Bylaw Expiry Date	N/A	Last Underwater Inspection	N/A
Min. Vertical Clearance	- (m)	Last Condition Survey	N/A

Rehab. History: (Date/description)

Field Inspection Information:	
Date of Inspection:	August 18, 2016
Inspector:	Robert Brooks – Tulloch Engineering
Others in Party:	Elizabeth Perry – Tulloch Engineering
Equipment Used:	Camera, Hammer, Tape Measure
Weather:	Sun
Temperature:	+27°C

Additional Investigations Required:	Priority			Estimated Cost
	None	Normal	Urgent	
Detailed Deck Condition Survey:	X			
DART Survey:	X			
Detailed Coating Condition Survey:	X			
Underwater Investigation:	X			
Fatigue Investigation:	X			
Seismic Investigation:	X			
Structure Evaluation:	X			
Load Posting – Estimated Load			Total Cost	\$0
Special Notes:				
Next Detailed Inspection:			2018	

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 to 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 | |

Municipal Structure Inspection Form

MTO Site Number:

DY - 11

Element Data

Element Group:	Abutments		Length:	7	(m)
Element Name:	Abutment Wall		Width:	1	(m)
Location:	Bearing Surface		Height:	0.5	(m)
Material:	Cast-In-Place Concrete		Count:	2	(items)
Element Type:			Total Quantity:	2	(each)
Environment:	Benign <u>Moderate</u> / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m <u>each</u> / % / all	Exc.	Good	Fair	Poor
			2		
Performance Deficiencies: 00					
Comments:					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs:
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments:					

Element Group:	Approaches		Length:	3.0	(m)
Element Name:	Wearing Surface (Approaches)		Width:	7.0	(m)
Location:			Height:		(m)
Material:	Gravel		Count:	2	(items)
Element Type:			Total Quantity:	42.0	(m ²)
Environment:	Benign / Moderate <u>Severe</u>		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units <u>m²</u> / m / each / % / all	Exc.	Good	Fair	Poor
			42.0		
Performance Deficiencies: 00					
Comments:					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs:
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments:					

Element Group:	Barriers		Length:	100	(m)
Element Name:	Railing Systems		Width:		(m)
Location:	E / W		Height:		(m)
Material:	Steel		Count:	2	(items)
Element Type:	Steel Flex Beam on Steel Post		Total Quantity:	200	(m)
Environment:	Benign / Moderate <u>Severe</u>		Limited Insp'n:	☐	
Protection System:	Galvanized		Performance Deficiencies		
Condition Data:	Units m <u>/ m</u> each / % / all	Exc.	Good	Fair	Poor
			200		
Performance Deficiencies: 00					
Comments: Missing 4 bolts on approach base plates.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs:
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☒ 1 Year ☐ 2 Year
Comments: Re-install missing bolts on baseplates.					

Municipal Structure Inspection Form

MTO Site Number:

DY - 11

Element Data

Element Group:	Beam/ MLE		Length:	23	(m)	
Element Name:	Girders		Width:	0.25	(m)	
Location:	N/S		Height:	0.75	(m)	
Material:	Steel		Count:	4	(items)	
Element Type:			Total Quantity:	161.0	(m ²)	
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐		
Protection System:	Paint		Performance Deficiencies			
Condition Data:	Units	Exc.				Good
	m ² / m / each / % / all		161.0			00
Comments: Minor corrosion at mid sections, protective coating applied at ends.						
Performance Deficiencies: None						
Recommended Work:	☐ Minor Rehab		☐ Major Rehab		Maintenance Needs: -	
	☐ Replace		☒ None			
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year	
Comments:						

Element Group:	Deck		Length:	23.0	(m)	
Element Name:	Wearing Surface (Decks)		Width:	6.0	(m)	
Location:	Deck Top		Height:		(m)	
Material:	Asphalt		Count:	1	(items)	
Element Type:			Total Quantity:	139.2	(m ²)	
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐		
Protection System:			Performance Deficiencies			
Condition Data:	Units	Exc.				Good
	m ² / m / each / % / all		139.2			00
Comments:						
Performance Deficiencies: None						
Recommended Work:	☐ Minor Rehab		☐ Major Rehab		Maintenance Needs:	
	☐ Replace		☒ None			
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year	
Comments:						

Element Group:	Abutments		Length (avg):	7	(m)	
Element Name:	Ballast Wall		Width:	0.50	(m)	
Location:	N / S		Height:	1	(m)	
Material:	Cast in Place Concrete / Sheet Pile		Count:	2	(items)	
Element Type:			Total Quantity:	14.0	(m ²)	
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐		
Protection System:			Performance Deficiencies			
Condition Data:	Units	Exc.				Good
	m ² / m / each / % / all	14				00
Comments:						
Performance Deficiencies: None						
Recommended Work:	☐ Minor Rehab		☐ Major Rehab		Maintenance Needs: -	
	☐ Replace		☒ None			
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year	
Comments:						

Municipal Structure Inspection Form

MTO Site Number:

DY-11

Element Data

Element Group:	Joints		Length:	6.0	(m)	
Element Name:	Seals		Width:		(m)	
Location:	N/S		Height:		(m)	
Material:	Pre Fabricated Rubber		Count:	2	(items)	
Element Type:			Total Quantity:	2	(ea)	
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐		
Protection System:	None		Performance Deficiencies			
Condition Data:	Units m ² / m / each / % / all	Exc.				Good
			1.0		1.0	00
Comments:						
Performance Deficiencies: None						
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: 05 ☐ Urgent ☒ 1 Year ☐ 2 Year	
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years			
Comments: Replace broken expansion joint seal (South expansion joint)						

Element Group:	Abutments		Length:	7	(m)	
Element Name:	Abutment Walls		Width:		(m)	
Location:	N / S		Height:	1.5	(m)	
Material:	Corrugated Galvanized		Count:	2	(items)	
Element Type:	Sheet Pile		Total Quantity:	21.0	(m ²)	
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐		
Protection System:			Performance Deficiencies			
Condition Data:	Units m ² / m / each / % / all	Exc.				Good
			21.0			00
Comments:						
Performance Deficiencies: None						
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year	
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years			
Comments:						

Element Group:	Embankments & Streams		Length:		(m)	
Element Name:	Embankments		Width:		(m)	
Location:	NE/NW/SE/SW		Height:		(m)	
Material:			Count:	4	(items)	
Element Type:			Total Quantity:	4.0	(ea)	
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐		
Protection System:			Performance Deficiencies			
Condition Data:	Units m ² / m / each / % / all	Exc.				Good
			4.0			00
Comments:						
Performance Deficiencies: None						
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☐ None		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year	
Timeframe:	☐ 1 - 5 Years		☒ 6 - 10 Years			
Comments:						

Municipal Structure Inspection Form

MTO Site Number:

DY-11

Element Data

Element Group:	Abutments		Length:		(m)
Element Name:	Bearings		Width:		(m)
Location:	N/S		Height:		(m)
Material:	Elastomeric Rubber		Count:	8	(items)
Element Type:			Total Quantity:	8.0	(ea)
Environment:	Benign / <u>Moderate</u> / Severe		Limited Insp'n:	☐	
Protection System:	Creosote		Performance Deficiencies		
Condition Data:	Units m ² / m <u>each</u> / % / all	Exc. 8			
00					
Comments:					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab		☐ Major Rehab		Maintenance Needs: -
	☐ Replace		☒ None		
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments:					

Municipal Structure Inspection Form

MTO Site Number:

DY - 11

Repair and Rehabilitation Required:		Priority				Estimated Construction Cost
Element	Repair and Rehabilitation Required	6 to 10 years	1 to 5 years	Within 1 year	Urgent	
Wearing Surface (Decks)	Replace joint seal at deck end			X		\$2,500
Total Cost						\$2,500

Associated Work:	Comments	Estimated Cost
Approaches:		
Detours:		
Traffic Control:		
Utilities:		
Right of Way:		
Environmental Study:		
Other:		
Contingencies:		
Total Cost		\$0

Justification:

Structure No: DY-12

Coleman Lake Bridge

Structure Description

The Coleman Lake Bridge is located on Coleman Lake Road, 0.5 km east of Kennisis Lake Road. The bridge was constructed in 2006 and is a 7.0 m single span, two lane structure with a transverse timber deck on steel girders and concrete abutments. The structure crosses a non-navigable watercourse on a north/south alignment. The bridge has a 7.0 m wide deck with a surface treated wearing surface. There is steel beam guiderail across the structure and on the approaches.

Structure Condition

The structure is in good overall condition with a SCI of 73 and BSI of 70. The concrete abutments are in fair condition with spalling and scouring on the abutment faces and embankments at waterline. Additional erosion protection is required at the abutment faces. The abutment has severe deterioration/spalling at the foundation. The steel girders are in good condition with minor corrosion. The wooden deck is in good condition however the surface treated wearing surface is badly deteriorated with moderate potholes and recent patching. The guiderail is in good condition with minor corrosion and collision damage to railing and posts.

Recommendations

The structure requires a minor rehabilitation to repair undermined abutments and wing walls, especially at the northeast quadrant. Also including installation of erosion protection at the abutment faces, repair of concrete abutments and replacement of surface treated wearing surface. This work should be completed in 1-5 years. Maintenance is required to repair the damage guiderail and posts.



Photo 1 : General Arrangement – Looking North

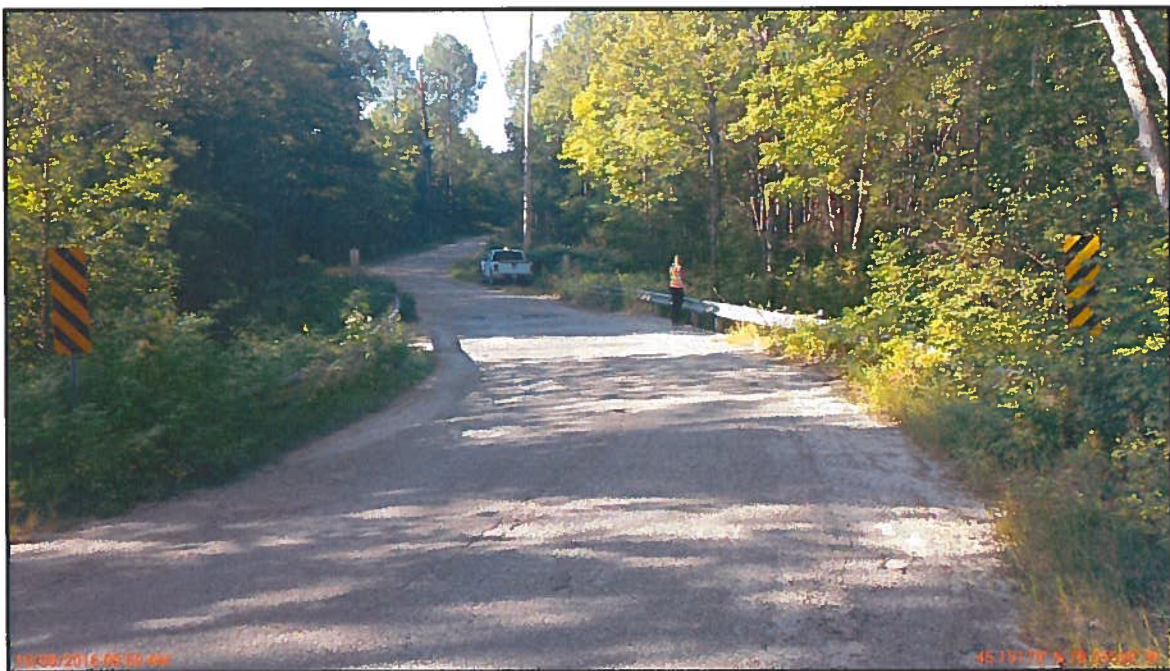


Photo 2 : General Arrangement – Looking South

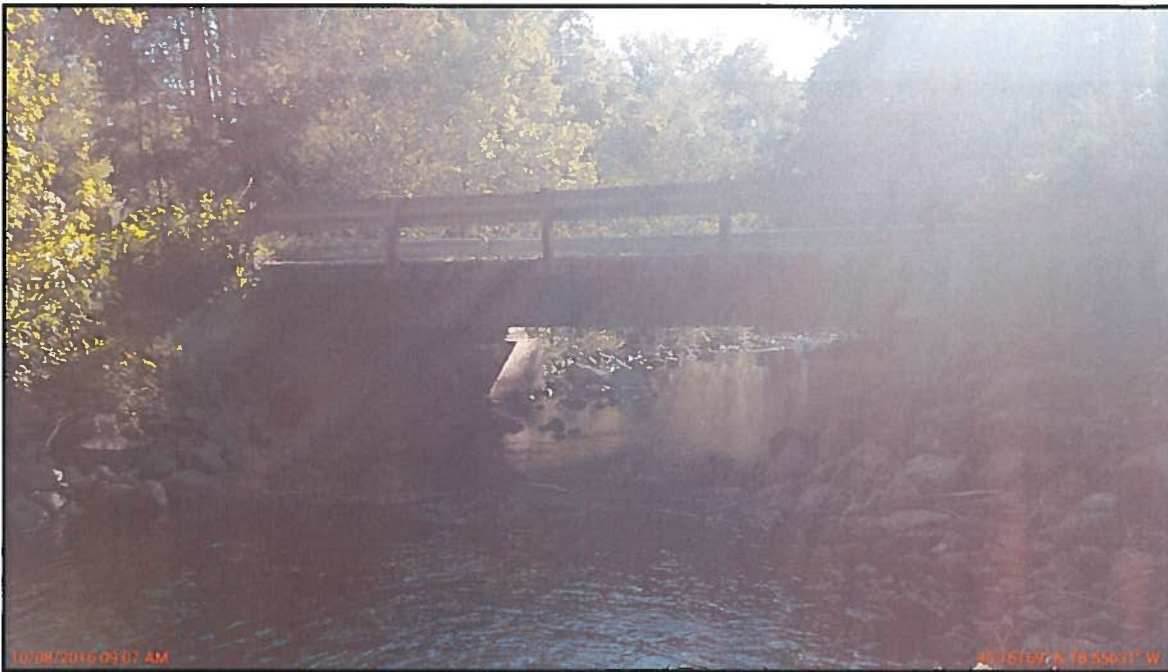


Photo 3 : General Arrangement – West Elevation



Photo 4 : General Arrangement – East Elevation



Photo 5 : General Arrangement – Southeast Embankment



Photo 6 : General Arrangement – Southeast Embankment at Abutment



Photo 7 : General Arrangement – Northeast Embankment at Abutment



Photo 8 : General Arrangement – Southwest Embankment Looking East

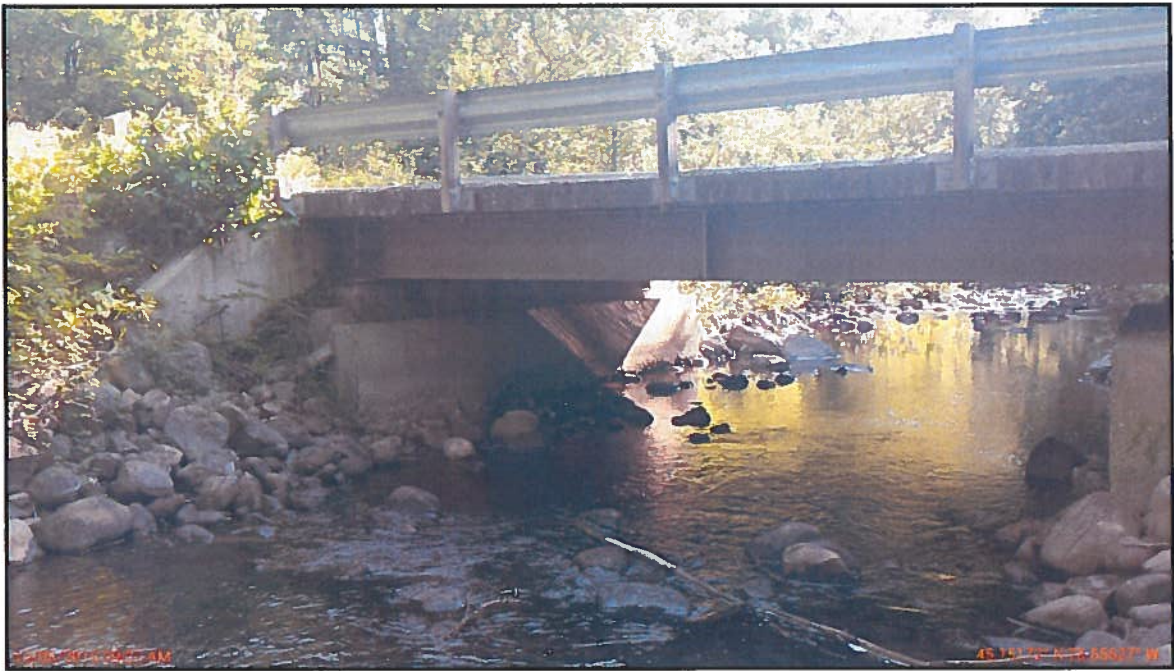


Photo 9 : General Arrangement – Northwest Embankment Looking Northeast



Photo 10 : General Arrangement – North Abutment



Photo 11 : South Approach Wearing Surface – Looking South



Photo 12 : South Approach Wearing Surface – Looking South



Photo 13 : North Approach Wearing Surface – Looking North



Photo 14 : Approach Guiderail – Northeast Quadrant

Inventory Data:

Structure Name	Coleman Lake Bridge				
Main Hwy/Road #		On ☒ Under	Crossing Type:	Navig. Water Rail ☐ Road ☐	Non-Navig. Water ☒ Ped. ☐ Other ☐
Road Name	Coleman Lake Road				
Structure Location	0.5 km East of Kennisis Lake Road (County Road 7)				
Latitude	45.151700	Longitude	-78.556200		
Owner(s)	Municipality of Dysart et al	Heritage Designation:	Not Cons. Design./Not List	Cons./not App. Design. & List	List/not Desig. Design. & List
MTO Region *		Road Class:	Freeway	Arterial	Collector Local ☒
MTO District *		Posted Speed	50	No. of Lanes	2
Old County *		AADT		% Trucks	
Geographic Twp. *		Special Routes:	Transit	Truck	School Bicycle
Structure Type *	I-Beam or Girder	Detour Length Around Bridge		(km)	
Total Deck Length	7.7	Fill on Structure	0	(m)	
Overall Str. Width	7.0	Skew Angle	0	(degrees)	
Total Deck Area	54.0	Direction of Structure	N to S		
Roadway Width	7.0	No. of Spans	1		
Span Lengths	7.0 (m)				

Historical Data:

Year Built	2006	Last Biennial Inspection	2014
Current Load Limit	N/A / (tonnes)	Last BridgeMaster Inspection	N/A
Load Limit Bylaw #	N/A	Last Evaluation	N/A
Bylaw Expiry Date	N/A	Last Underwater Inspection	N/A
Min. Vertical Clearance	- (m)	Last Condition Survey	N/A

Rehab. History: (Date/description)

Field Inspection Information:		
Date of Inspection:	August 10, 2016	
Inspector:	Robert Brooks – Tulloch Engineering	
Others in Party:	Elizabeth Perry – Tulloch Engineering	
Equipment Used:	Camera, Hammer, Tape Measure	
Weather:	Sun	
Temperature:	+19°C	

Additional Investigations Required:	Priority			Estimated Cost
	None	Normal	Urgent	
Detailed Deck Condition Survey:	X			
DART Survey:	X			
Detailed Coating Condition Survey:	X			
Underwater Investigation:	X			
Fatigue Investigation:	X			
Seismic Investigation:	X			
Structure Evaluation:	X			
Load Posting – Estimated Load			Total Cost	\$0
Special Notes:				
Next Detailed Inspection:			2018	

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 to 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 | |

Municipal Structure Inspection Form

MTO Site Number:

DY - 12

Element Data

Element Group:	Abutments		Length:	7	(m)
Element Name:	Abutment Walls		Width:		(m)
Location:	N/S		Height:	1.5	(m)
Material:	Cast-in-place Concrete		Count:	2	(items)
Element Type:	Integral		Total Quantity:	21.0	(m ²)
Environment:	Benign <u>Moderate</u> Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc.	Good	Fair	Poor
			16.0	5.0	
Comments: Severe scouring and undermining of North and South abutment faces.					
Performance Deficiencies: None					
Recommended Work:	☒ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs:
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments: Rebuild undermired section of abutment walls.					

Element Group:	Barriers		Length:	70.0	(m)
Element Name:	Railing Systems		Width:		(m)
Location:	E/W		Height:		(m)
Material:	Steel		Count:	2	(items)
Element Type:			Total Quantity:	140.0	(m)
Environment:	Benign / Moderate <u>Severe</u>		Limited Insp'n:	☐	
Protection System:	Galvanized		Performance Deficiencies		
Condition Data:	Units m / m each / % / all	Exc.	Good	Fair	Poor
			128.0	10.0	2
Comments: Collision damage to railing and posts at Northeast quadrant.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs:
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments:					

Element Group:	Beam / MLE		Length:	7.7	(m)
Element Name:	Girders		Width:	0.20	(m)
Location:	North/South Direction		Height:	0.50	(m)
Material:	Steel		Count:	6	(items)
Element Type:	I - Type		Total Quantity:	55.4	(m ²)
Environment:	Benign <u>Moderate</u> Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc.	Good	Fair	Poor
			55.4		
Comments:					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs:
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments:					

Municipal Structure Inspection Form

MTO Site Number:

DY - 12

Element Data

Element Group:	Deck		Length:	7.7	(m)
Element Name:	Deck Top		Width:	7.0	(m)
Location:			Height:		(m)
Material:	Wood		Count:	1	(items)
Element Type:	Laminated Wood Decking - Transverse		Total Quantity:	54.0	(m ²)
Environment:	Benign Moderate Severe		Limited Insp'n:	☒	
Protection System:	Asphalt		Performance Deficiencies		
Condition Data:	Units m² / m / each / % / all	Exc. 54.0			
00					
Comments:					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		
Comments:					

Element Group:	Deck		Length:	7.7	(m)
Element Name:	Wearing Surface (Decks)		Width:	7.0	(m)
Location:			Height:		(m)
Material:	Asphalt		Count:	1	(items)
Element Type:			Total Quantity:	54.0	(m ²)
Environment:	Benign / Moderate Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m / m / each / % / all	Exc.			
42.0 8.0 4.0 00					
Comments: Pothole patching has been conducted; light med raveling along wheel paths.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☒ Replace		☐ Major Rehab ☐ None		Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☐ 1 - 5 Years		☒ 6 - 10 Years		
Comments:					

Element Group:	Approaches		Length (avg):	6	(m)
Element Name:	Wearing Surface		Width:	7.00	(m)
Location:			Height:		(m)
Material:	Asphalt		Count:	2	(items)
Element Type:			Total Quantity:	84.0	(m ²)
Environment:	Benign / Moderate Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m² / m / each / % / all	Exc.			
21.0 42.0 21 09, 10					
Comments: Medium to severe pitting, rutting and potholes in both approaches.					
Performance Deficiencies: None					
Recommended Work:	☒ Minor Rehab ☐ Replace		☐ Major Rehab ☐ None		Maintenance Needs: -02 ☐ Urgent ☒ 1 Year ☐ 2 Year
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		
Comments: Repair potholes. Clean vegetation and sediment along shoulders to reduce surface ponding.					

Municipal Structure Inspection Form

MTO Site Number:

DY-12

Element Data

Element Group:	Abutments		Length:	7.7	(m)
Element Name:	Bearing		Width:		(m)
Location:	Under Steel Girders		Height:		(m)
Material:	Elastomeric Pads		Count:	12	(items)
Element Type:			Total Quantity:	12	(ea)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m each / % / all	Exc. 12	Good	Fair	Poor
					00
Comments:					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: -
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments:					

Element Group:	Abutment		Length:		(m)
Element Name:	Wing Walls		Width:		(m)
Location:	NE/NW/SE/SW		Height:		(m)
Material:	Cast-In-Place Concrete		Count:	4	(items)
Element Type:			Total Quantity:	4.0	(ea)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m each / % / all	Exc.	Good 2.0	Fair 1.0	Poor 1.0
					14,15
Comments: Severe undermining of wing wall foundation at NE quadrant causing unstable embankment.					
Performance Deficiencies: Undermining of foundation, unstable embankment.					
Recommended Work:	☒ Minor Rehab ☐ Replace		☐ Major Rehab ☐ None		Maintenance Needs: -
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments: Repair undermined section of wing wall at NE quadrant. Provide erosion control measures.					

Element Group:	Embankments & Streams		Length:		(m)
Element Name:	Embankments		Width:		(m)
Location:	NE/NW/SE/SW		Height:		(m)
Material:			Count:	4	(items)
Element Type:			Total Quantity:	4.0	(ea)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m each / % / all	Exc.	Good	Fair 2	Poor 2
					15
Comments: NE and SE embankments have severe scour. SE embankment has undermined log retaining wall causing the embankment to become loose and unstable. NE embankment is unstable do to undermined wing wall.					
Performance Deficiencies: None					
Recommended Work:	☒ Minor Rehab ☐ Replace		☐ Major Rehab ☐ None		Maintenance Needs: -
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments: Repair scoured and undermined embankments.					

Municipal Structure Inspection Form

MTO Site Number:

DY-12

Element Data

Element Group:	Embankments & Streams		Length:		(m)
Element Name:	Slope Protection		Width:		(m)
Location:	NE/NW/SE/SW		Height:		(m)
Material:			Count:	4	(items)
Element Type:			Total Quantity:	4.0	(ea)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m <u>each</u> / % / all	Exc.	Good	Fair	Poor
				2	2
Comments: Adequate slope protection required.					
Performance Deficiencies: None					
Recommended Work:	☒ Minor Rehab ☐ Replace		☐ Major Rehab ☐ None		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		
Comments: Provide rip rap slope protection in all four quadrants.					

Element Group:	Embankments & Streams		Length:		(m)
Element Name:	Streams and Waterways		Width:		(m)
Location:	Center		Height:		(m)
Material:			Count:	1	(items)
Element Type:			Total Quantity:	1.0	(each)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m <u>each</u> / % / all	Exc.	Good	Fair	Poor
			1.0		
Comments:					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		
Comments:					

Element Group:	Accessories		Length:		(m)
Element Name:	Signs		Width:		(m)
Location:	End of Approach Guidrails		Height:		(m)
Material:	Steel		Count:	4	(items)
Element Type:			Total Quantity:	4.0	(ea)
Environment:	Benign / Moderate / <u>Severe</u>		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m <u>each</u> / % / all	Exc.	Good	Fair	Poor
			4.0		
Comments:					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: 02 ☐ Urgent ☒ 1 Year ☐ 2 Year
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		
Comments: Clean vegetation around signs					

Municipal Structure Inspection Form

MTO Site Number:

DY - 12

Repair and Rehabilitation Required:		Priority				Estimated Construction Cost
Element	Repair and Rehabilitation Required	6 to 10 years	1 to 5 years	Within 1 year	Urgent	
Abutment Walls	Erosion protection required around abutment walls			X		\$10,000
Abutment Walls	Concrete repairs to undermined sections of abutments faces		X			\$20,000
Abutment Wing Walls	Repair undermined abutment wing wall at NE quadrant			X		\$5,000
Deck (Wearing Surface)	Replace wearing surface	X				\$15,000
Total Cost						\$50,000

Associated Work:	Comments	Estimated Cost
Approaches:	Wearing surface replacement	\$5,000
Detours:		
Traffic Control:		
Utilities:		
Right of Way:		
Environmental Study:		
Other:		
Contingencies:		
Total Cost		\$5,000

Justification:

Structure No: DY-13

Eagle Lake Bridge

Structure Description

Eagle Lake Bridge is located on Eagle Lake Road, 100 m east of Haliburton Lake Road. The bridge is a 6.1 m single span, single lane structure with concrete deck, concrete girders and concrete abutments and wingwalls. The age of the structure is unknown. The bridge has a 4.5 m wide driving surface with a surface treated wearing surface and concrete curbs. There is steel beam guiderail across the structure and on some of the approaches. The structure is situated immediately upstream of a dam owned by Trent Severn Waterway and for all intents and purposes is directly connected to the dam.

Structure Condition

The structure is in poor overall condition with a BCI of 53 and BSI of 49. The concrete abutments and wing walls exhibit significant scour on the upstream side of the structure. There is moderate to severe spalling and transverse cracking on both the wing walls and the abutments. The concrete girders are in poor condition with extensive delamination. The concrete deck soffit was observed to have severe delaminations with exposed and hanging rebar throughout. Previous concrete repairs to the girders have delaminated. The concrete curbs are in fair condition with extensive cracking and vehicle damage. The surface treated wearing surface is in fair condition with moderate potholes, cracking and minor settlement at the approaches. The guiderail over the structure is in poor condition; it is not adequately secured to the support posts and further the concrete support posts are in poor condition. The guiderail exhibits minor corrosion and vehicle damage.

Recommendations

The structure requires a detailed structural evaluation. The structural investigation should include a load rating. A cost-benefit analysis should be undertaken after structural investigation to evaluate which alternative will provide the lowest life-cycle cost to the Municipality at the time of detailed structural evaluation. Any major rehabilitation or replacement will have to be coordinated with the Trent Severn waterway as the bridge and dam are connected. Consideration should be given to closing the structure to vehicular traffic when it reaches the end of its service life, as opposed to replacing the structure. If the structure were closed, the detour is approximately 400 m, which would have a negligible impact on the travelling public.



Photo 1 : General Arrangement – Looking East



Photo 2 : General Arrangement – Looking West

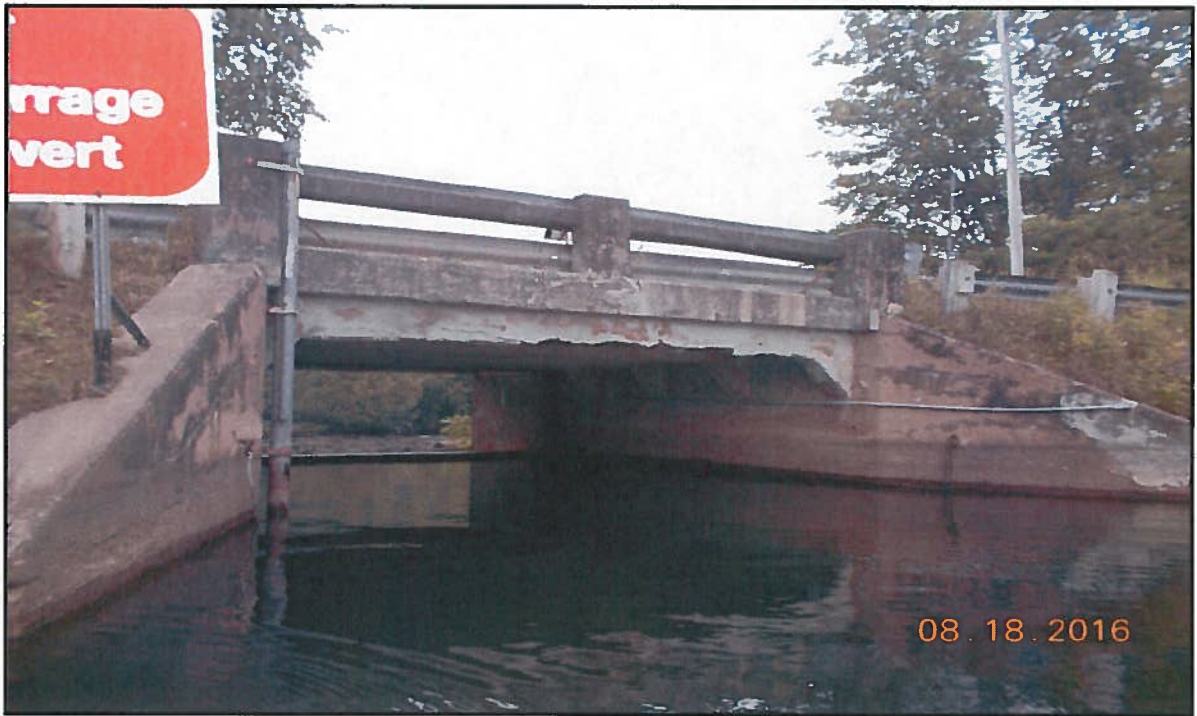


Photo 3 : General View – North Elevation



Photo 4 : General View – North Elevation Exterior Girder



Photo 5 : General View – N. Elevation Exterior Girder at East Abutment

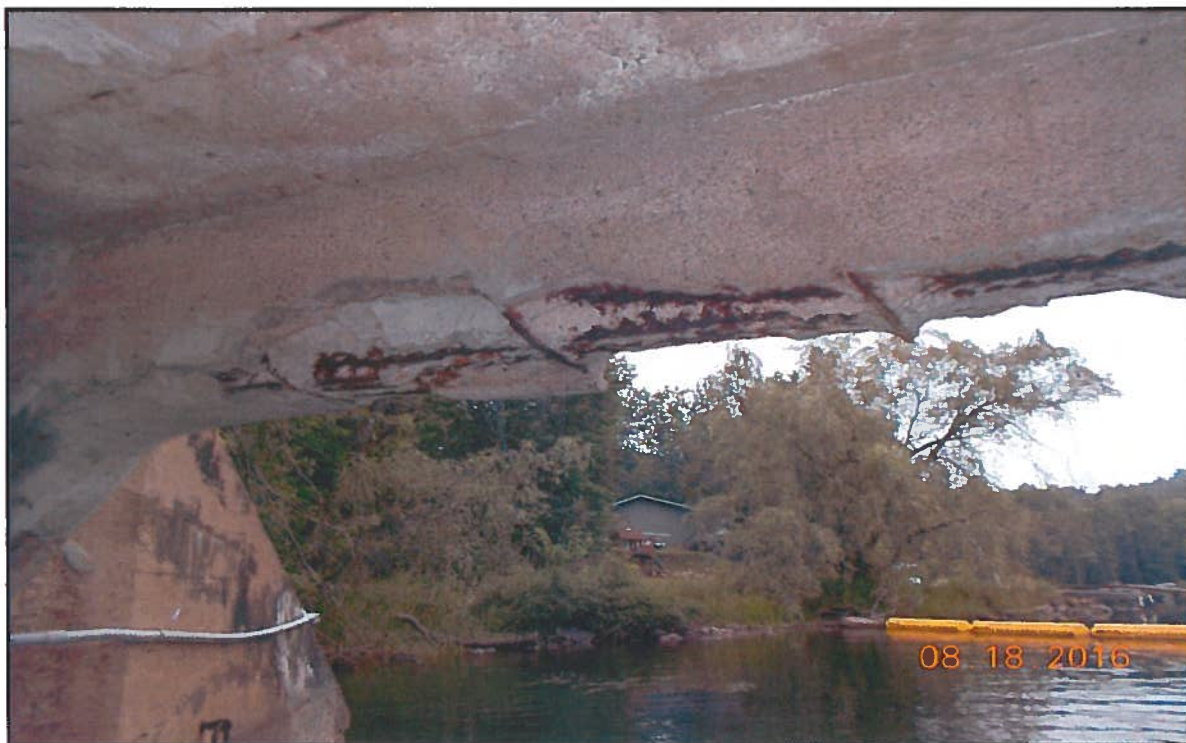


Photo 6 : North Exterior Girder at West Abutment – Looking North



Photo 7 : North Exterior Girder at Mid Span – Looking North



Photo 8 : General Girder Arrangement – Looking Northwest



Photo 9 : South Exterior Girder at East Abutment – Looking Northwest



Photo 10 : South Exterior Girder at East Abutment – Looking Southeast



Photo 11 : South Interior Girder (2nd from End) Mid-Span – Looking South



Photo 12 : South Interior Girder (2nd from End) Mid-Span – Looking Southeast



Photo 13 : Interior Soffit (2nd Bay From North Face) – Looking East



Photo 14 : Interior Soffit (2nd Bay From North Face) – Looking West



Photo 15 : Int. Soffit at W. Abutment (2nd Bay From North Face) – Looking North



Photo 16 : Damaged Guiderail System – Southwest Quadrant



Photo 17 : Typ. Rotted Post – Southwest Quadrant

Inventory Data:

Structure Name	Eagle Lake Road Bridge				
Main Hwy/Road #		On ☒ Under	Crossing Type:	Navig. Water Rail Non-Navig. Water Ped. Other	
Road Name	Eagle Lake Road				
Structure Location	1.0 km East of Haliburton Lake Road (County Road 14)				
Latitude	45.129000	Longitude	-78.508500		
Owner(s)	Municipality of Dysart et al	Heritage Designation:	Not Cons. Design./Not List	Cons./not App. Design. & List	
MTO Region *		Road Class:	Freeway Arterial Collector	Local ☒	
MTO District *		Posted Speed	50	No. of Lanes 1	
Old County *		AADT		% Trucks	
Geographic Twp. *		Special Routes:	Transit Truck School Bicycle		
Structure Type *	Rigid Frame	Detour Length Around Bridge		(km)	
Total Deck Length	6.9	(m)	Fill on Structure	0 (m)	
Overall Str. Width	5.1	(m)	Skew Angle	0 (degrees)	
Total Deck Area	35.2	(sq.m)	Direction of Structure	E to W	
Roadway Width	4.5	(m)	No. of Spans	1	
Span Lengths	6.1			(m)	

Historical Data:

Year Built		Last Biennial Inspection	2014
Current Load Limit	N/A / (tonnes)	Last BridgeMaster Inspection	N/A
Load Limit Bylaw #	N/A	Last Evaluation	N/A
Bylaw Expiry Date	N/A	Last Underwater Inspection	N/A
Min. Vertical Clearance	- (m)	Last Condition Survey	N/A

Rehab. History: (Date/description)

Field Inspection Information:	
Date of Inspection:	August 10, 2016
Inspector:	Robert Brooks – Tulloch Engineering
Others in Party:	Elizabeth Perry – Tulloch Engineering
Equipment Used:	Camera, Hammer, Tape Measure, Boat
Weather:	Sun
Temperature:	+26 ⁰ C

Additional Investigations Required:	Priority			Estimated Cost
	None	Normal	Urgent	
Detailed Deck Condition Survey:		X		\$5,000.00
DART Survey:	X			
Detailed Coating Condition Survey:	X			
Underwater Investigation:		X		\$5,000.00
Fatigue Investigation:	X			
Seismic Investigation:	X			
Structure Evaluation:			X	\$5,000.00
Load Posting – Estimated Load			Total Cost	\$15,000.00
Special Notes: Structural evaluation required to load rate structure for temporary use. Detailed deck condition survey required to assess integrity of deck concrete. Underwater investigation required to assess existing abutment wall conditions prior to rehabilitation work.				
Next Detailed Inspection:	2018			

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 to 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	

Municipal Structure Inspection Form

MTO Site Number:

DY - 13

Element Data

Element Group:	Abutments		Length:		(m)
Element Name:	Abutment Walls		Width:	6.0	(m)
Location:			Height:	2.0	(m)
Material:	Cast-In-Place Concrete		Count:	2	(items)
Element Type:	Integral		Total Quantity:	24.0	(m ²)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc.	Good	Fair	Poor
			18.0	4.0	2
00					
Comments: Moderate scour at upstream end; spalling along waterline; moderate transverse cracking.					
Performance Deficiencies: None					
Recommended Work:	☒ Minor Rehab ☐ Replace		☐ Major Rehab ☐ None		Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		
Comments:					

Element Group:	Abutments		Length:	3.0	(m)
Element Name:	Wingwalls		Width:		(m)
Location:	SE/SW		Height:	1.5	(m)
Material:	Cast-In-Place Concrete		Count:	2	(items)
Element Type:			Total Quantity:	9.0	(m ²)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc.	Good	Fair	Poor
			5.0	3.0	1
00					
Comments: Moderate to severe scour; moderate spalling and transverse cracking.					
Performance Deficiencies: None					
Recommended Work:	☒ Minor Rehab ☐ Replace		☐ Major Rehab ☐ None		Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		
Comments:					

Element Group:	Barriers		Length:	7.0	(m)
Element Name:	Barrier / Parapet Wall		Width:		(m)
Location:			Height:	1.0	(m)
Material:	Cast-In-Place Concrete		Count:	2	(items)
Element Type:	Concrete Balustrade		Total Quantity:	14.0	(m ²)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc.	Good	Fair	Poor
				14	
00					
Comments: Concrete posts in fair condition with moderate to severe spalling in localized areas.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☒ Major Rehab ☐ None		Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		
Comments:					

Municipal Structure Inspection Form

MTO Site Number:

DY - 13

Element Data

Element Group:	Barriers		Length:	55.0	(m)
Element Name:	Railing Systems		Width:		(m)
Location:	Double guiderail across structure		Height:		(m)
Material:	Steel		Count:	2	(items)
Element Type:	Steel Flex Beam		Total Quantity:	110.0	(m)
Environment:	Benign / Moderate Severe		Limited Insp'n:	☐	
Protection System:	Galvanized		Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc.	Good	Fair	Poor
			60.0	40.0	10.0
02					
Comments: Guiderail over structure has minor corrosion with collision damage at SW quadrant. Guiderails are loose and not adequately connected to posts. SE guiderail has significant tilting on approach. Moderate to severe splits and checks in wood posts with decay along approaches.					
Performance Deficiencies: None					
Recommended Work:	☒ Minor Rehab		☐ Major Rehab		Maintenance Needs: 02
	☐ Replace		☐ None		
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		Remove vegetation and granular material
Comments: Repair damaged sections of guiderail and replace rotten posts on approaches.					

Element Group:	Beam / MLE		Length:	6.9	(m)
Element Name:	Girders		Width:	0.50	(m)
Location:	E/W Direction		Height:	0.50	(m)
Material:	Cast-In-Place Concrete		Count:	5	(items)
Element Type:	Rectangular-Solid		Total Quantity:	52.0	(m ²)
Environment:	Benign Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc.	Good	Fair	Poor
				22.0	30.0
01					
Comments: Severe cracking, spalling, delaminations with exposed rebar and general disintegration of girder on South face. Severe spalling with exposed rebar, 2nd girder from North face, also observed. Previous parged areas are delaminating. Light to medium transverse cracking at bearing locations.					
Performance Deficiencies: Load carrying capacity					
Recommended Work:	☐ Minor Rehab		☒ Major Rehab		Maintenance Needs:
	☐ Replace		☐ None		
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		
Comments: Major rehabilitation or complete replacement required.					

Element Group:	Deck		Length:	6.1	(m)
Element Name:	Deck Top		Width:	5.1	(m)
Location:			Height:		(m)
Material:	Cast-in-place Concrete		Count:	1	(items)
Element Type:	Cast-in-place Concrete on Supports		Total Quantity:	31.1	(m ²)
Environment:	Benign Moderate / Severe		Limited Insp'n:	☐	
Protection System:	Asphalt		Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc.	Good	Fair	Poor
			21.1	10.0	
00					
Comments: Minor cracking and spalling.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab		☒ Major Rehab		Maintenance Needs: -
	☐ Replace		☐ None		
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		
Comments:					

Municipal Structure Inspection Form

MTO Site Number:

DY - 13

Element Data

Element Group:	Deck		Length:	6.1	(m)
Element Name:	Wearing Surface (Decks)		Width:	4.50	(m)
Location:			Height:		(m)
Material:	Asphalt		Count:	1	(items)
Element Type:			Total Quantity:	27.45	(m ²)
Environment:	Benign / Moderate Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc.	Good	Fair	Poor
			13.45	12.0	2.0
Comments: Potholes previously patched. Light to medium longitudinal and transverse cracking throughout. Light wheel rutting.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☒ Replace		☐ Major Rehab ☐ None		Maintenance Needs: -
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments: Replace at time of next major rehabilitation.					

Element Group:	Approaches		Length:	6	(m)
Element Name:	Wearing Surface		Width:	4.5	(m)
Location:			Height:		(m)
Material:	Asphalt		Count:	2	(items)
Element Type:			Total Quantity:	54.0	(m ²)
Environment:	Benign / Moderate Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc.	Good	Fair	Poor
			44.0	5.0	2.5
Comments: Potholes previously patched. Light to medium longitudinal and transverse cracking throughout. Light wheel rutting.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☒ Replace		☐ Major Rehab ☐ None		Maintenance Needs: -
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments: Replace at time of next major rehabilitation.					

Element Group:	Decks		Length:	6.1	(m)
Element Name:	Soffit - Thick Slab		Width:	5.1	(m)
Location:	Interior and Exterior		Height:	0.3	(m)
Material:	Cast-In Place Concrete		Count:	2	(items)
Element Type:			Total Quantity:	30.5	(m ²)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m / m / each / % / all	Exc.	Good	Fair	Poor
			7.6	15.25	7.6
Comments: Exposed rebar with insufficient clear cover and delaminated sections throughout. Localized areas have exposed rebar which has separated from the soffit structure and are currently hanging loosely.					
Performance Deficiencies: Load carrying capacity					
Recommended Work:	☐ Minor Rehab ☐ Replace		☒ Major Rehab ☐ None		Maintenance Needs: -
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments: Replace at time of next major rehabilitation					

Municipal Structure Inspection Form

MTO Site Number:

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Element Data

Element Group:	Embankments & Streams		Length:		(m)
Element Name:	Embankments		Width:		(m)
Location:	NE/NW/SE/SW		Height:		(m)
Material:			Count:	4	(items)
Element Type:			Total Quantity:	4.0	(ea)
Environment:	Benign / <u>Moderate</u> / Severe		Limited Insp'n:	☐	
Protection System:			ce		
Data:	Units	Exc.	Good	Fair	Poor
	m ² / m / <u>each</u> / % / all		4.0		00
Comments:					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace ☐ 1 - 5 Years		☐ Major Rehab ☒ None ☐ 6 - 10 Years		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:					
Comments:					

Element Group:	Embankments & Streams		Length:		(m)
Element Name:	Streams & Waterways		Width:		(m)
Location:	Center		Height:		(m)
Material:			Count:	1	(items)
Element Type:			Total Quantity:	1.0	(ea)
Environment:	<u>Benign</u> / Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	m ² / m / <u>each</u> / % / all		1.0		00
Comments:					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace ☐ 1 - 5 Years		☐ Major Rehab ☒ None ☐ 6 - 10 Years		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:					
Comments:					

Element Group:			Length:		(m)
Element Name:			Width:		(m)
Location:			Height:		(m)
Material:			Count:		(items)
Element Type:			Total Quantity:		(ea)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	m ² / m / each / % / all				
Comments:					
Performance Deficiencies:					
Recommended Work:	☐ Minor Rehab ☐ Replace ☐ 1 - 5 Years		☐ Major Rehab ☐ None ☐ 6 - 10 Years		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:					
Comments:					

Municipal Structure Inspection Form

MTO Site Number:

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Repair and Rehabilitation Required:		Priority				Estimated Construction Cost
Element	Repair and Rehabilitation Required	6 to 10 years	1 to 5 years	Within 1 year	Urgent	
MLE's/Girders	Replace or repair concrete girders		X			\$160,000
Deck - Thick Slab	Replace or repair concrete deck		X			\$100,000
Deck - Wearing Surface	Replace or repair wearing surface		X			\$15,000
Railing System	Replace guidrail system on structure		X			\$45,000
Abutment Walls	Replace or repair		X			\$125,000
Wingwalls	Replace or repair		X			\$75,000
Total Cost						\$520,000

Associated Work:	Comments	Estimated Cost
Approaches:	Rebuild and resurface approaches during rehabilitation. Replace guiderail.	\$45,000
Detours:		
Traffic Control:	Traffic control during construction staging	\$60,000
Utilities:		
Eng Design & Supervision:	Rehabilitation Design and inspection	\$75,000
Environmental Study:		
Other:		
Contingencies:		
Total Cost		\$180,000

Justification:

Structure No: DY-14

Pelaw River Bridge

Structure Description

The Pelaw River Bridge is located on Redkenn Drive, 5.6 km south of Kennisis Lake Road. The bridge was constructed in 1979 and is an 18.4 m three span, two lane structure with a composite concrete/timber deck, supported by timber piles and pile caps. The bridge crosses a navigable watercourse on a north/south tangential alignment. The bridge has an overall deck width of 8.5 m and 7.3 m wide exposed concrete driving surface (it appears to have previously had a surface treated wearing course in the southeast quadrant). There is steel beam guiderail across the structure and on the approaches. The bridge is currently load limited / posted at 20 / 32 / 40 tonnes.

Structure Condition

The structure is in fair overall condition with a BCI of 67 and a BSI of 53. The wooden abutments and wing walls are in fair condition, with some cracking and displacement of abutment boards. There is localized failure of one wingwall; the pile at this location appears to have shifted, causing the wingwall to fail. The piles, bracing and pile caps are in good condition with minor cracking and checking. Several piles on the north approach have sunk, creating a gap between the pile and pile cap. The exposed concrete deck is in good condition with minor spalling and loss of aggregate. The guiderail over the structure and on the approaches is in good condition with several damaged/loose posts and blocks.

Recommendations

The structure requires a minor rehabilitation to repair the abutment faces and wingwalls, stabilize the piles with wood blocking. This should be undertaken in 1-5 years. Maintenance is required to repair the loose/damaged guiderail posts and to clear vegetation along shoulder of approaches and guiderails.



Photo 1 : General Arrangement – Looking North

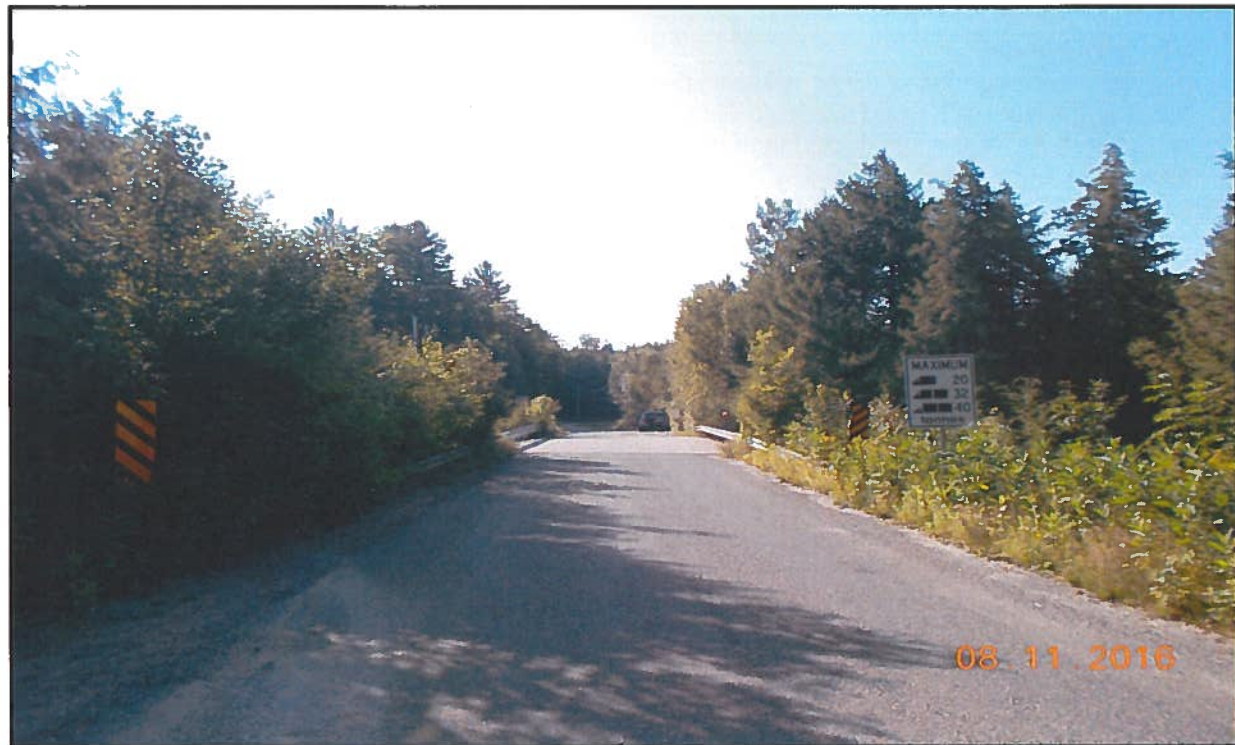


Photo 2 : General Arrangement – Looking South

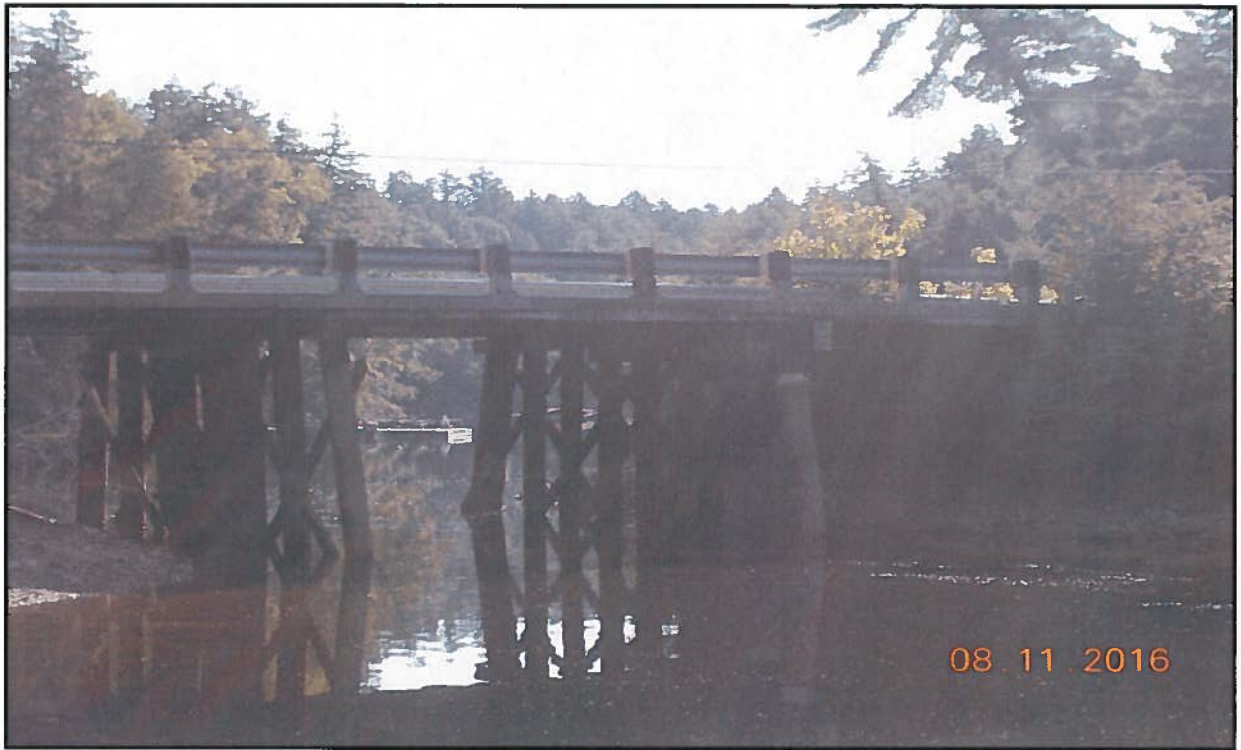


Photo 3 : General Arrangement – East Elevation



Photo 4 : Deck Wearing Surface – Asphalt Patching



Photo 5 : Gaps Between Piles and Capping Beam – Northeast Quadrant



Photo 6 : Typ. Approach Barrier Post with Severe Splits – Southeast Quadrant

Inventory Data:

Structure Name	Pelaw River Bridge				
Main Hwy/Road #		On ☒ Under	Crossing Type:	Navig. Water ☒ Non-Navig. Water Rail Road Ped. Other	
Road Name	Redkenn Drive				
Structure Location	0.05 km South of Pelaw Trail				
Latitude	45.047500	Longitude	-78.508700		
Owner(s)	Municipality of Dysart et al	Heritage Designation:	Not Cons. Design./Not List	Cons./not App. Design. & List	List/not Desig. & List
MTO Region *		Road Class:	Freeway	Arterial	Collector Local ☒
MTO District *		Posted Speed	50	No. of Lanes	2
Old County *		AADT		% Trucks	
Geographic Twp. *		Special Routes:	Transit	Truck	School Bicycle
Structure Type *	Bridge	Detour Length Around Bridge	N/A	(km)	
Total Deck Length	18.8	(m)	Fill on Structure	0	(m)
Overall Str. Width	8.5	(m)	Skew Angle	0	(degrees)
Total Deck Area	160.0	(sq.m)	Direction of Structure	N to S	
Roadway Width	7.3	(m)	No. of Spans	3	
Span Lengths	6.1				(m)

Historical Data:

Year Built	1979	Last Biennial Inspection	2014
Current Load Limit	20 32 / 40 (tonnes)	Last BridgeMaster Inspection	N/A
Load Limit Bylaw #	2011-96	Last Evaluation	N/A
Bylaw Expiry Date	N/A	Last Underwater Inspection	N/A
Min. Vertical Clearance	- (m)	Last Condition Survey	N/A

Rehab. History: (Date/description)

Field Inspection Information:	
Date of Inspection:	August 11, 2016
Inspector:	Robert Brooks – Tulloch Engineering
Others in Party:	Elizabeth Perry – Tulloch Engineering
Equipment Used:	Camera, Hammer, Tape Measure
Weather:	Sun
Temperature:	+22 ⁰ C

Additional Investigations Required:	Priority			Estimated Cost
	None	Normal	Urgent	
Detailed Deck Condition Survey:	X			
DART Survey:	X			
Detailed Coating Condition Survey:	X			
Underwater Investigation:	X			
Fatigue Investigation:	X			
Seismic Investigation:	X			
Structure Evaluation:	X			
Load Posting – Estimated Load			Total Cost	\$0
Special Notes:				
Next Detailed Inspection:			2018	

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 to 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 | |

Municipal Structure Inspection Form

MTO Site Number:

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Element Data

Element Group:	Abutments		Length:		(m)
Element Name:	Ballast Walls		Width:	9.0	(m)
Location:	N/S		Height:	1.0	(m)
Material:	Wood		Count:	2	(items)
Element Type:			Total Quantity:	18.0	(m ²)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:	Creosote		Performance Deficiencies		
Condition Data:	Units	Exc.	Good	Fair	Poor
	m / m / each / % / all		15	3	
00					
Comments: Minor cracking and displacement of boards.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs:
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments:					

Element Group:	Abutments		Length:		(m)
Element Name:	Wingwalls		Width:	3.0	(m)
Location:	NE/NW/SE/SW		Height:	2.00	(m)
Material:	Wood		Count:	4	(items)
Element Type:	Wood Piles and Lagging		Total Quantity:	24.0	(m ²)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:	Creosote		Performance Deficiencies		
Condition Data:	Units	Exc.	Good	Fair	Poor
	m / m / each / % / all		12.0	8.0	4.0
00					
Comments: Some settlement, displacement of wingwall.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: 02
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☒ 1 Year ☐ 2 Year
Clean vegetation around wing walls					
Comments:					

Element Group:	Barriers		Length:	100.0	(m)
Element Name:	Railing Systems		Width:		(m)
Location:	E/W		Height:		(m)
Material:	Wood		Count:	2	(items)
Element Type:	Steel Flex Beam on Wood Post		Total Quantity:	200	(m)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:	Galvanized / Creosote		Performance Deficiencies		
Condition Data:	Units	Exc.	Good	Fair	Poor
	m / m / each / % / all		150.0	49.0	1
00					
Comments: Guiderail in general good condition. Wooden posts have become loose due to deterioration. Moderate to severe splits and checks throughout posts with severe deterioration of wood posts on approaches. Approach guiderails are not compliant with bridge code.					
Performance Deficiencies: None					
Recommended Work:	☒ Minor Rehab ☐ Replace		☐ Major Rehab ☐ None		Maintenance Needs: 02
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☒ 1 Year ☐ 2 Year
Clean vegetation around railing system and hazard signs.					
Comments: Replace rotten and deteriorated wooden posts at time of next rehabilitation of guiderail system.					

Municipal Structure Inspection Form

MTO Site Number:

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Element Data

Element Group:	Deck		Length:	18.4	(m)
Element Name:	Deck Top		Width:	8.5	(m)
Location:			Height:		(m)
Material:	Other		Count:	1	(items)
Element Type:	Cast-In-Place Concrete on Laminated Wood		Total Quantity:	156.4	(m ²)
Environment:	Benign / Moderate Severe		Limited Insp'n:	☒	
Protection System:					
Condition Data:	Units	Exc.	Good	Fair	Poor
	m ² / m / each / % / all		156.4		
Performance Deficiencies: 00					
Comments:					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace ☐ 1 - 5 Years		☐ Major Rehab ☐ None ☐ 6 - 10 Years		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:					
Comments:					

Element Group:	Deck		Length:	18.4	(m)
Element Name:	Wearing Surface (Decks)		Width:	8.5	(m)
Location:			Height:		(m)
Material:	Concrete		Count:	1	(items)
Element Type:			Total Quantity:	156.4	(m ²)
Environment:	Benign / Moderate Severe		Limited Insp'n:	☐	
Protection System:	Asphalt				
Condition Data:	Units	Exc.	Good	Fair	Poor
	m / m / each / % / all		116.4	40.0	
Performance Deficiencies: 00					
Comments: Light to medium transverse cracking and general wearing of surface. Asphalt patch remains in the Southeast quadrant with light to medium raveling around edge.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace ☐ 1 - 5 Years		☐ Major Rehab ☒ None ☐ 6 - 10 Years		Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:					
Comments:					

Element Group:	Pier		Length:		(m)
Element Name:	Shaft / Columns / Pile Bents		Width:	0.30	(m)
Location:	4 Bents		Height:	5.0	(m)
Material:	Wood		Count:	52	(items)
Element Type:	Timber Piles with Capping Beam		Total Quantity:	245.0	(m ²)
Environment:	Benign Moderate / Severe		Limited Insp'n:	☐	
Protection System:					
Condition Data:	Units	Exc.	Good	Fair	Poor
	m ² / m / each / % / all		196	24.5	24.5
Performance Deficiencies: 01					
Comments: Piles in NE quadrant have sunk 50-100 mm and separated from pile cap. Capping beam bolts are loose and require tightening.					
Performance Deficiencies: Load carrying capacity compromised due to sinking piles at NE quadrant.					
Recommended Work:	☒ Minor Rehab ☐ Replace ☒ 1 - 5 Years		☐ Major Rehab ☐ None ☐ 6 - 10 Years		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:					
Comments:	Capping beam bolts require tightening. Gaps between wooden piles and capping beam at the Northeast quadrant require repairing.				

Municipal Structure Inspection Form
MTO Site Number:

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Element Data

Element Group:	Embankments & Streams				Length:		(m)
Element Name:	Embankments				Width:		(m)
Location:	NE/NW/SE/SW				Height:		(m)
Material:					Count:	4	(items)
Element Type:					Total Quantity:	4	(each)
Environment:	Benign / Moderate / Severe				Limited Insp'n:	☐	
Protection System:					Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc.	Good	Fair	Poor	00	
Comments: Minor wood debris on NE and SW quadrants.							
Performance Deficiencies: None							
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year		
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years				
Comments:							

Element Group:	Approaches				Length:	6	(m)
Element Name:	Wearing Surface				Width:	5.4	(m)
Location:	Top				Height:		(m)
Material:	Asphalt				Count:	2	(items)
Element Type:					Total Quantity:	64.8	(m ²)
Environment:	Benign / Moderate / Severe				Limited Insp'n:	☐	
Protection System:					Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc.	Good	Fair	Poor	00	
Comments: Asphalt debonded with medium to severe raveling along edge of pavement.							
Performance Deficiencies: None							
Recommended Work:	☐ Minor Rehab ☒ Replace		☐ Major Rehab ☐ None		Maintenance Needs: - ☐ Urgent ☒ 1 Year ☐ 2 Year		
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years				
Comments: Remove vegetation and debris along edge of pavement.							

Element Group:	Embankments				Length:		(m)
Element Name:	Streams				Width:		(m)
Location:	Center				Height:		(m)
Material:					Count:	1	(items)
Element Type:					Total Quantity:	1.0	(ea)
Environment:	Benign / Moderate / Severe				Limited Insp'n:	☐	
Protection System:					Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc.	Good	Fair	Poor	00	
Comments:							
Performance Deficiencies: None							
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year		
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years				
Comments:							

Municipal Structure Inspection Form
MTO Site Number:

DY-14

Element Data

Element Group:	Decks			Length:	18.40	(m)
Element Name:	Soffit - Thin Slab			Width:	8.50	(m)
Location:	Soffit			Height:		(m)
Material:	Wood			Count:	1	(items)
Element Type:	Laminated Wood Decking			Total Quantity:	156.4	(m²)
Environment:	Benign / Moderate / Severe			Limited Insp'n:	☐	
Protection System:	Creosote			Performance Deficiencies		
Condition Data:	Units	Exc.	Good			
	m² / m / each / % / all		156.4			00
Comments:						
Performance Deficiencies: None						
Recommended Work:	☐ Minor Rehab		☐ Major Rehab		Maintenance Needs:	
	☐ Replace		☒ None		☐ Urgent ☐ 1 Year ☐ 2 Year	
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years			
Comments:						

Municipal Structure Inspection Form

MTO Site Number:

DY - 14

Repair and Rehabilitation Required:		Priority				Estimated Construction Cost
Element	Repair and Rehabilitation Required	6 to 10 years	1 to 5 years	Within 1 year	Urgent	
Ballast Walls	Minor repairs to abutment boards		X			\$10,000
Wingwalls	Repairs to wingwall		X			\$45,000
Railing System	Replace blocking and posts		X			\$10,000
Shaft / Columns / Pile Bents	Jack and add blocking to sunken piles		X			\$30,000
Total Cost						\$95,000

Associated Work:	Comments	Estimated Cost
Approaches:	Guiderail and end treatment on approaches	\$15,000
Detours:		
Traffic Control:		
Utilities:		
Right of Way:		
Environmental Study:		
Other:		
Contingencies:		
Total Cost		\$15,000

Justification:

Structure No: DY-15

Drag River Bridge

Structure Description

The Drag River Bridge is located on Maple Avenue in the Community of Haliburton, 0.2 km north of Highland Street. The bridge was constructed in 1969 and is a 15.4 m single span, two lane concrete rigid frame structure. The bridge crosses the Drag River on a north/south tangential alignment. The bridge has a 12.0 m wide deck with a 9.4 m wide asphalt wearing surface and sidewalks on both sides. There is a galvanized steel railing over the structure with concrete end posts; there is no guiderail on the approaches.

Structure Condition

The structure is in good to fair overall condition with a BCI of 70 and BSI of 66. The concrete abutments are in good condition with minor vertical cracking. There is a small concrete retaining wall in the NE quadrant exhibiting minor erosion and washout; erosion protection should be placed to prevent further loss of material. The soffits exhibit localized severe spalling and scaling at the mid-span center zone; also, localized areas of staining indicating water penetration. The concrete curb and sidewalks are in fair condition, with spalling, vehicle damage and exposed rebar. The steel railing over the structure is in good condition with minor corrosion; the concrete end posts have moderate spalling and scaling and require repair. The asphalt wearing surface is in good condition, with some recent patching. There are no hazard signs at the terminations of the guiderails.

Recommendations

The structure requires minor rehabilitation to repair concrete soffit, sidewalk, curb and end posts. Full depth crack repair should be completed at the deck ends to prevent water penetration. Maintenance is required to place erosion protection at the retaining wall in the NE quadrant to prevent erosion. Hazard signage to Provincial Standards should be installed at the terminations of the guiderail. For aesthetics reasons, the steel railing system could be re-coated.



Photo 1 : General Arrangement - Looking South



Photo 2 : General Arrangement - Looking North



Photo 3 : General View - Looking Upstream



Photo 4 : General View - Looking Downstream



Photo 5 : General View of Handrail System- Looking East



Photo 6 : Curb / Sidewalk and Railing System / End Post – Northeast Quadrant



Photo 7 : Curb Deterioration – Southwest Quadrant



Photo 8 : Spalling Concrete – Mid Span of Soffit Looking East

Inventory Data:

Structure Name	Drag River Bridge				
Main Hwy/Road #		On	Under ☒	Crossing Type:	Navig. Water Rail Non-Navig. Water ☒ Ped. Other
Road Name	Maple Avenue				
Structure Location	0.08 km South of Victoria Street				
Latitude	45.047500	Longitude	-78.508700		
Owner(s)	Municipality of Dysart et al	Heritage Designation:	Not Cons. ☒	Cons./not App. Design./Not List	List/not Desig. Design. & List
MTO Region *		Road Class:	Freeway	Arterial X Collector	Local
MTO District *		Posted Speed	50	No. of Lanes	2
Old County *		AADT		% Trucks	
Geographic Twp. *		Special Routes:	Transit	Truck ☒ School ☒	Bicycle
Structure Type *	Rigid Frame	Detour Length Around Bridge		(km)	
Total Deck Length	17.0	Fill on Structure	0	(m)	
Overall Str. Width	12.0	Skew Angle	0	(degrees)	
Total Deck Area	204.0	Direction of Structure	N to S		
Roadway Width	9.4	No. of Spans	1		
Span Lengths	15.4				(m)

Historical Data:

Year Built	1969	Last Biennial Inspection	2014
Current Load Limit	N/A / (tonnes)	Last BridgeMaster Inspection	N/A
Load Limit Bylaw #	N/A	Last Evaluation	N/A
Bylaw Expiry Date	N/A	Last Underwater Inspection	N/A
Min. Vertical Clearance	- (m)	Last Condition Survey	N/A

Rehab. History: (Date/description)

Field Inspection Information:	
Date of Inspection:	August 18, 2016
Inspector:	Robert Brooks – Tulloch Engineering
Others in Party:	Elizabeth Perry – Tulloch Engineering
Equipment Used:	Camera, Hammer, Tape Measure
Weather:	Cloudy
Temperature:	+19°C

Additional Investigations Required:	Priority			Estimated Cost
	None	Normal	Urgent	
Detailed Deck Condition Survey:	X			
DART Survey:	X			
Detailed Coating Condition Survey:	X			
Underwater Investigation:	X			
Fatigue Investigation:	X			
Seismic Investigation:	X			
Structure Evaluation:	X			
Load Posting – Estimated Load			Total Cost	
Special Notes:				
Next Detailed Inspection:		2018		

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 to 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 | |

Municipal Structure Inspection Form

MTO Site Number:

DY - 15

Element Data

Element Group:	Abutments		Length:		(m)
Element Name:	Abutment Walls		Width:	12.0	(m)
Location:	Ends Under Bridge		Height:	1.5	(m)
Material:	Cast-In-Place Concrete		Count:	2	(items)
Element Type:	Conventional Closed		Total Quantity:	36.0	(m ²)
Environment:	Benign <u>Moderate</u> / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units	Exc.	Good	Fair	Poor
	m ² / m / each / % / all		36		
Comments: Minor vertical cracking at abutments. Light erosion of retaining wall in NE quadrant. Light abrasion at waterline on North abutment.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: 13 ☐ Urgent ☒ 1 Year ☐ 2 Year
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		Erosion control along abutment walls
Comments:					

Element Group:	Abutments		Length:	6.0	(m)
Element Name:	Wing Wall		Width:		(m)
Location:	Northwest Quadrant		Height:	0.5	(m)
Material:	Cast-In-Place Concrete		Count:	1	(items)
Element Type:			Total Quantity:	3.0	(m ²)
Environment:	Benign <u>Moderate</u> / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units	Exc.	Good	Fair	Poor
	m ² / m / each / % / all		1.0	1	1
Comments: Undermined wing wall at Northeast quadrant.					
Performance Deficiencies: None					
Recommended Work:	☒ Minor Rehab ☐ Replace		☐ Major Rehab ☐ None		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		
Comments: Stabilize wing wall and provide erosion protection.					

Element Group:	Approaches		Length:	6.0	(m)
Element Name:	Wearing Surface		Width:	9.40	(m)
Location:			Height:		(m)
Material:	Asphalt		Count:	2	(items)
Element Type:			Total Quantity:	112.8	(m ²)
Environment:	Benign / Moderate <u>Severe</u>		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units	Exc.	Good	Fair	Poor
	m / m / each / % / all		108.8	4	
Comments: Light to medium wheel rutting observed. Patching to transverse cracks has recently been done.					
Performance Deficiencies: None					
Recommended Work:	☒ Minor Rehab ☐ Replace		☐ Major Rehab ☐ None		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		
Comments: Repair rutting when road resurfaced.					

Municipal Structure Inspection Form

MTO Site Number:

DY - 15

Element Data

Element Group:	Barriers		Length:		(m)
Element Name:	Posts		Width:		(m)
Location:	End posts of railing		Height:	1.20	(m)
Material:	Cast-In-Place Concrete		Count:	4	(items)
Element Type:			Total Quantity:	4.0	(ea)
Environment:	Benign / Moderate Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc.	Good	Fair	Poor
				2	2
Performance Deficiencies: 00					
Comments: Severe spalling and exposed reinforcement at Southeast and Northeast quadrants.					
Performance Deficiencies: None					
Recommended Work:	☒ Minor Rehab ☐ Replace		☐ Major Rehab ☐ None		Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		
Comments: Repair damaged sections of concrete.					

Element Group:	Barriers		Length:	18.0	(m)
Element Name:	Railing System		Width:		(m)
Location:	E/W		Height:	1.2	(m)
Material:	Galvanized Steel		Count:	2	(items)
Element Type:	Double Railing		Total Quantity:	36.0	(m)
Environment:	Benign / Moderate Severe		Limited Insp'n:	☐	
Protection System:	Galvanizing		Performance Deficiencies		
Condition Data:	Units m / m / each / % / all	Exc.	Good	Fair	Poor
			32.0	4.0	
Performance Deficiencies: 00					
Comments: Minor corrosion on railings and posts.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: 03 ☐ Urgent ☐ 1 Year ☒ 2 Year
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		
Comments: Re-coat for aesthetics					

Element Group:	Deck		Length:	17	(m)
Element Name:	Wearing Surface		Width:	9.4	(m)
Location:			Height:		(m)
Material:	Asphalt		Count:	1	(items)
Element Type:			Total Quantity:	159.8	(m ²)
Environment:	Benign / Moderate Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m² / m / each / % / all	Exc.	Good	Fair	Poor
			132.2	27.6	
Performance Deficiencies: 00					
Comments: Asphalt generally in good condition with two large sealed cracks at deck ends.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		
Comments:					

Municipal Structure Inspection Form

MTO Site Number:

DY - 15

Element Data

Element Group:	Deck		Length:	17.0	(m)
Element Name:	Deck Top		Width:	12.0	(m)
Location:			Height:	0.5	(m)
Material:	Cast-In-Place Concrete		Count:	1	(items)
Element Type:			Total Quantity:	204.0	(m ²)
Environment:	Benign Moderate Severe		Limited Insp'n:	☒	
Protection System:	Asphalt		Performance Deficiencies		
Condition Data:	Units m² / m / each / % / all	Exc.	Good	Fair	Poor
			167.0	33.0	4
Comments:					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☒ Replace		☐ Major Rehab ☐ None		Maintenance Needs:
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments:					

Element Group:	Deck		Length:	15.4	(m)
Element Name:	Soffit - Thick Slab		Width:		(m)
Location:	Exterior		Height:	1.50	(m)
Material:	Cast-In-Place Concrete		Count:	2	(items)
Element Type:			Total Quantity:	46.2	(m ²)
Environment:	Benign Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m² / m / each / % / all	Exc.	Good	Fair	Poor
			46.2		
Comments: Minor cracks and staining.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs:
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments:					

Element Group:	Deck		Length:	15.4	(m)
Element Name:	Soffit - Thick Slab		Width:	10	(m)
Location:	Interior		Height:		(m)
Material:	Cast-In-Place Concrete		Count:	1	(items)
Element Type:			Total Quantity:	154.0	(m ²)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m / m / each / % / all	Exc.	Good	Fair	Poor
			136.5	16.5	1.0
Comments: Medium section of delaminated concrete is spalling away from soffit at the midspan zone.					
Performance Deficiencies: None					
Recommended Work:	☒ Minor Rehab ☐ Replace		☐ Major Rehab ☐ None		Maintenance Needs:
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments: Repair spalled sections of concrete.					

Municipal Structure Inspection Form

MTO Site Number:

DY-15

Element Data

Element Group:	Embankments & Streams		Length:		(m)
Element Name:	Embankments		Width:		(m)
Location:	NE/NW/SE/SW		Height:		(m)
Material:			Count:	4	(items)
Element Type:			Total Quantity:	4	(ea)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m each % / all	Exc.	Good	Fair	Poor
			2	1	1
Comments: Northeast quadrant is showing signs of erosion.					
Performance Deficiencies:					
Recommended Work:		☒ Minor Rehab ☐ Replace		☐ Major Rehab ☐ None	
Timeframe:		☒ 1 - 5 Years ☐ 6 - 10 Years		Maintenance Needs: 13 ☐ Urgent ☐ 1 Year ☒ 2 Year	
Comments: Address erosion when wingwall rehab. completed.				Provide erosion protection before or as part of rehab of wing wall.	

Element Group:	Embankments & Streams		Length:		(m)
Element Name:	Streams & Waterways		Width:		(m)
Location:	Center		Height:		(m)
Material:			Count:	1	(items)
Element Type:			Total Quantity:	1.0	(ea)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m each % / all	Exc.	Good	Fair	Poor
			1.0		
Comments:					
Performance Deficiencies: None					
Recommended Work:		☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None	
Timeframe:		☐ 1 - 5 Years ☐ 6 - 10 Years		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year	
Comments:					

Element Group:	Sidewalk / Curbs		Length:	18.0	(m)
Element Name:	Sidewalk		Width:	1.75	(m)
Location:	West		Height:	0.15	(m)
Material:	Cast-In-Place Concrete		Count:	1	(items)
Element Type:			Total Quantity:	34.2	(m ²)
Environment:	Benign / Moderate Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m / each % / all	Exc.	Good	Fair	Poor
			28.2	4.0	2.0
Comments: Plow damage and spalling concrete with exposed reinforcement, particularly in SW quadrant.					
Performance Deficiencies: None					
Recommended Work:		☒ Minor Rehab ☐ Replace		☐ Major Rehab ☐ None	
Timeframe:		☒ 1 - 5 Years ☐ 6 - 10 Years		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year	
Comments: Repair damaged concrete curbs.					

Municipal Structure Inspection Form
MTO Site Number:

DY - 15

Element Data

Element Group:	Sidewalk / Curbs		Length:	18.0	(m)
Element Name:	Curbs		Width:	0.85	(m)
Location:	East		Height:	0.15	(m)
Material:	Cast-In-Place Concrete		Count:	1	(items)
Element Type:			Total Quantity:	18	(m²)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units	Exc.	Good	Fair	Poor
	m / m / each / % / all		12	4	2
00					
Comments: Plo damage and spalling concrete with exposed reinforcement, particularly in NE corner.					
Performance Deficiencies: None					
Recommended Work:	☒ Minor Rehab ☐ Replace		☐ Major Rehab ☐ None		Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		
Comments: Repair damaged concrete curbs.					

Municipal Structure Inspection Form

MTO Site Number:

DY - 15

Repair and Rehabilitation Required:		Priority				Estimated Construction Cost
Element	Repair and Rehabilitation Required	6 to 10 years	1 to 5 years	Within 1 year	Urgent	
Railing System End Posts	Concrete repairs to end posts		X			\$10,000
Soffit - Thick Slab - Interior	Repair spalled concrete at midspan of soffit		X			\$20,000
Curbs	Repair spalled / damaged curbs		X			\$20,000
Abutment Wing Wall	Stabilize wing wall at Northeast quadrant			X		\$5,000
Total Cost						\$55,000

Associated Work:	Comments	Estimated Cost
Approaches:		
Detours:		
Traffic Control:		
Utilities:		
Right of Way:		
Environmental Study:		
Other:		
Contingencies:	Contingency including engineering	\$8,000
	Total Cost	\$8,000

Justification:

Structure No: DY-16

Highland Street Culvert

Structure Description

The Highland Street Culvert is located in the Community of Haliburton on Highland Street, 50 m west of Pine Avenue. The culvert is a 5.5 m span corrugated steel multi-plate pipe arch (open bottom) under a two-lane road. The culvert is approximately 25m long and extends under Highland Street which has a 9.0 m width with 1.2 m wide sidewalks and 3:1 embankments. The culvert crosses a non-navigable waterway at an approximate 30 degree skew. There is a steel railing system / barrier with concrete end posts on the south side of the structure and a steel beam guiderail on the north side, extending over the structure and the approaches.

Structure Condition

The structure is in good condition with a BCI of 72 and BSI of 69. There is moderate corrosion and pitting of the barrel of the culvert below the high water mark and around the waterline. The wearing surface is in fair to good condition with medium transverse cracks in the southbound lane. The roadway embankments are heavily vegetated and stable with no signs of erosion. Sections of concrete curb exhibit severe spalling, scaling and vehicle damage and will require replacement. The east curb is in severe condition with severe deterioration to curb and gutter system migrating towards the sidewalk. The guiderail on the North side over the structure and on the approaches is in good condition with minor corrosion and some loose/damaged and rotted posts. The guiderail posts should be replaced to maintain the integrity of the guiderail. The railing on the South side is in good condition with minor cosmetic damage and minor corrosion. Several of the south handrail system posts have lost their caps and should be replaced to prevent water damage.

Recommendations

The structure requires minor rehabilitation to the roadway curbs to address the deterioration of the concrete. This should be undertaken within a year to prevent further deterioration of sidewalk and to promote water flow to catch basins. Deck surface area requires routing and sealing of transverse cracks. Maintenance is required to repair/replace damaged guiderail posts and blocks. Investigation of the condition of the culvert invert is required to confirm condition. Due to high water levels and flows (downstream dam) this area could not be inspected during the OSIM inspection and will require an enhanced investigation with small boat.



Photo 1 : Deck Wearing Surface - Looking South



Photo 2 : Edge of Concrete Deck & Curb System - Looking South

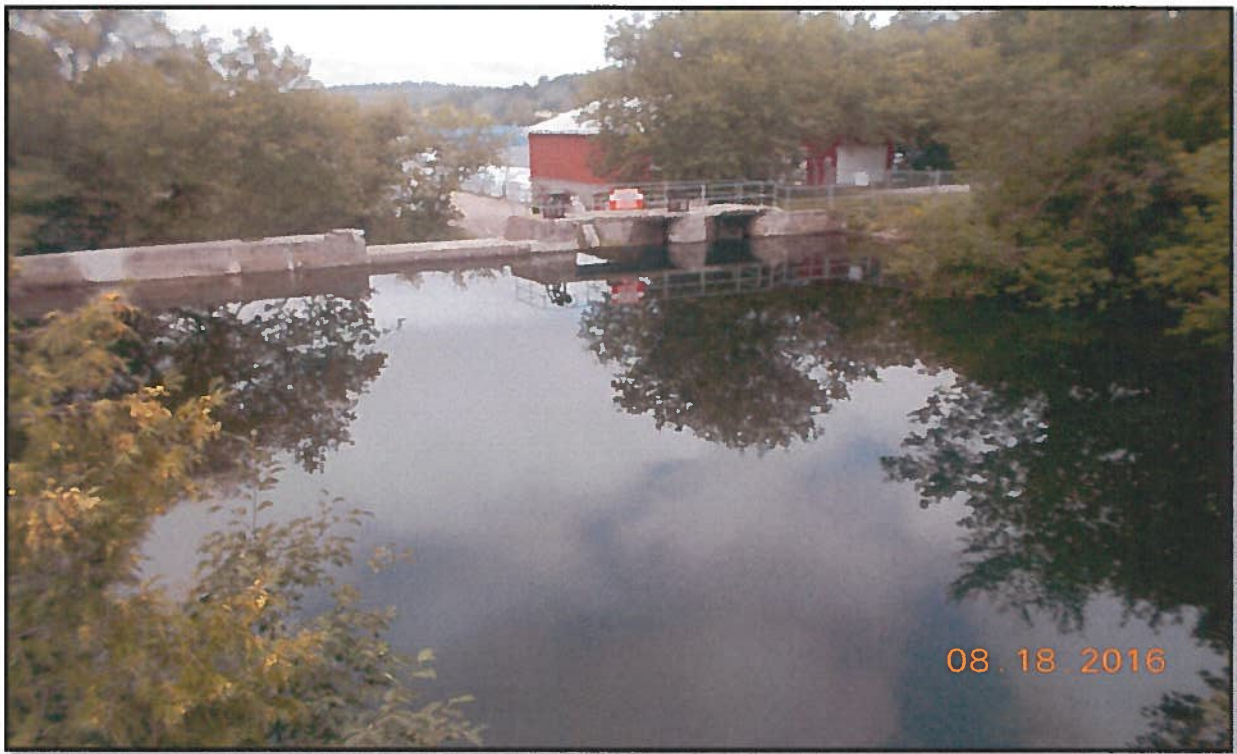


Photo 3 : General Upstream View– Looking East



Photo 4 : General Downstream View – Looking West

Inventory Data:

Structure Name	Highland Street Culvert				
Main Hwy/Road #		On	Under ☒	Crossing Type:	Navig. Water ☒ Non-Navig. Water Rail Road Ped. Other
Road Name	Highland Street				
Structure Location	0.05 km West of Pine Avenue				
Latitude	45.047200	Longitude	-78.506300		
Owner(s)	Municipality of Dysart et al	Heritage Designation:	Not Cons. Design./Not List	Cons./not App. Design. & List	List/not Desig. Design. & List
MTO Region *		Road Class:	Freeway	Arterial	Collector Local ☒
MTO District *		Posted Speed	50	No. of Lanes	2
Old County *		AADT		% Trucks	
Geographic Twp. *		Special Routes:	Transit	Truck	School Bicycle
Structure Type *		Detour Length Around Bridge		(km)	
Total Deck Length	5.5	Fill on Structure	1.5	(m)	
Overall Str. Width	25.8	Skew Angle		(degrees)	
Total Deck Area		Direction of Structure	E to W		
Roadway Width	9.0	No. of Spans	1		
Span Lengths	5.5 (m)				

Historical Data:

Year Built		Last Biennial Inspection	2014
Current Load Limit	N/A / (tonnes)	Last BridgeMaster Inspection	N/A
Load Limit Bylaw #	N/A	Last Evaluation	N/A
Bylaw Expiry Date	N/A	Last Underwater Inspection	N/A
Min. Vertical Clearance	- (m)	Last Condition Survey	N/A

Rehab. History: (Date/description)

Field Inspection Information:	
Date of Inspection:	August 18, 2016
Inspector:	Robert Brooks – Tulloch Engineering
Others in Party:	Elizabeth Perry – Tulloch Engineering
Equipment Used:	Camera, Hammer, Tape Measure
Weather:	Cloudy
Temperature:	+20°C

Additional Investigations Required:	Priority			Estimated Cost
	None	Normal	Urgent	
Detailed Deck Condition Survey:	X			
DART Survey:	X			
Detailed Coating Condition Survey:	X			
Underwater Investigation:	X			
Fatigue Investigation:	X			
Seismic Investigation:	X			
Structure Evaluation:		X		\$2,000.00
Load Posting – Estimated Load			Total Cost	\$2,000.00
Special Notes: Inspect inside of culvert from a boat				
Next Detailed Inspection:			2018	

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 to 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 | |

Municipal Structure Inspection Form

MTO Site Number:

DY - 16

Element Data

Element Group:	Approaches		Length:	6.0	(m)
Element Name:	Wearing Surface		Width:	7.0	(m)
Location:	E/W		Height:		(m)
Material:	Asphalt		Count:	2	(items)
Element Type:			Total Quantity:	84.0	(m ²)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc.	Good	Fair	Poor
			78	4	2
Comments: Light to medium transverse cracks with light raveling along edge of asphalt. Medium to severe longitudinal crack on South approach with small potholes.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: 15 ☐ Urgent ☒ 1 Year ☐ 2 Year
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		Rout and seal transverse cracks and patch potholes
Comments:					

Element Group:	Barriers		Length:	16.0	(m)
Element Name:	Hand Railings		Width:		(m)
Location:	South		Height:		(m)
Material:	Aluminum		Count:	1	(items)
Element Type:			Total Quantity:	16.0	(m)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m / m / each / % / all	Exc.	Good	Fair	Poor
			12.0	4.0	
Comments: Minor damage to hand railing. Missing top caps on posts (7 each; south side)					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: 02, 03 ☐ Urgent ☒ 1 Year ☐ 2 Year
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		Clean debris and vegetation around handrail to promote proper surface water drainage. Install top caps.
Comments:					

Element Group:	Barriers		Length:		(m)
Element Name:	Posts		Width:		(m)
Location:	North		Height:		(m)
Material:	Wood		Count:	30	(items)
Element Type:			Total Quantity:	30	(ea)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc.	Good	Fair	Poor
			16	7	7
Comments: Several guiderail posts and blocks loose and deteriorated with rotten section at center of post. Light to medium splits and checks throughout.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☒ Replace		☐ Major Rehab ☐ None		Maintenance Needs: ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:	☒ 1 - 5 Years		☐ 6 - 10 Years		
Comments:	Replace rotten wood posts				

Municipal Structure Inspection Form
MTO Site Number:

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Element Data

Element Group:	Decks		Length:	5.5	(m)
Element Name:	Wearing Surface		Width:	7.0	(m)
Location:	Top		Height:		(m)
Material:	Asphalt		Count:	1	(items)
Element Type:			Total Quantity:	38.5	(m ²)
Environment:	Benign / Moderate Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	m ² / m / each / % / all		38.0		0.5
Comments: Medium to severe transverse cracks in South lane.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace ☐ 1 - 5 Years		☐ Major Rehab ☒ None ☐ 6 - 10 Years		Maintenance Needs: 15 ☐ Urgent ☒ 1 Year ☐ 2 Year Rout and seal transverse cracks
Timeframe:					
Comments:					

Element Group:	Sidewalk / Curbs		Length:	100.0	(m)
Element Name:	Curbs		Width:	0.15	(m)
Location:	E /W		Height:	0.15	(m)
Material:	Cast-in-place Concrete		Count:	2	(items)
Element Type:			Total Quantity:	60.0	(m ²)
Environment:	Benign / Moderate Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	m ² / m / each / % / all			30	30
Comments: Severe deterioration of East curbs and gutter system is propagating towards sidewalk.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☒ Replace ☒ 1 - 5 Years		☐ Major Rehab ☐ None ☐ 6 - 10 Years		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:					
Comments:	Provide new curb and gutter system to East sidewalk.				

Element Group:	Barriers		Length:	80.0	(m)
Element Name:	Railing Systems		Width:		(m)
Location:	North		Height:	1.1	(m)
Material:	Steel		Count:	1	(items)
Element Type:	Steel Flex Beam on Wood Post		Total Quantity:	80.0	(m)
Environment:	Benign / Moderate Severe		Limited Insp'n:	☐	
Protection System:	Galvanized		Performance Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor
Data:	m ² m / each / % / all		75.0	5.0	
Comments: Minor collision damage to guiderail; minor surface corrosion.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace ☐ 1 - 5 Years		☐ Major Rehab ☒ None ☐ 6 - 10 Years		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:					
Comments:					

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MTO Site Number:

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Element Data

Element Group:	Culverts		Length:	25.8	(m)
Element Name:	Barrels		Width:	5.50	(m)
Location:	East / West		Height:	5.50	(m)
Material:	Corrugated Steel		Count:	1	(items)
Element Type:	Pipe Arch		Total Quantity:	225	(m ²)
Environment:	Benign Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc.	Good	Fair	Poor
			225		
Comments: Culvert barrel in good condition; minor surficial corrosion and pitting at waterline.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: -
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments:					

Element Group:	Embankments & Streams		Length:		(m)
Element Name:	Embankments		Width:		(m)
Location:	NE/NW/SE/SW		Height:		(m)
Material:			Count:	4	(items)
Element Type:			Total Quantity:	4.0	(ea)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc.	Good	Fair	Poor
			4		
Comments:					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: -
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☒ 1 Year ☐ 2 Year
Comments: Remove vegetation growth as part of regular maintenance					

Element Group:	Embankments & Streams		Length:		(m)
Element Name:	Streams & Waterways		Width:		(m)
Location:	Upstream / Downstream		Height:		(m)
Material:			Count:	2	(items)
Element Type:			Total Quantity:	2.0	(ea)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m ² / m / each / % / all	Exc.	Good	Fair	Poor
			2.0		
Comments:					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs: -
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments:					

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MTO Site Number:

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Repair and Rehabilitation Required:		Priority				Estimated Construction Cost
Element	Repair and Rehabilitation Required	6 to 10 years	1 to 5 years	Within 1 year	Urgent	
Posts	Replace damaged/deteriorated guiderail posts		X			\$10,000
Curbs	Replace concrete curb and gutter on East sidewalk		X			\$10,000
Total Cost						\$20,000

Associated Work:	Comments	Estimated Cost
Approaches:		
Detours:		
Traffic Control:		
Utilities:		
Right of Way:		
Environmental Study:		
Other:		
Contingencies:		
Total Cost		

Justification:

Structure No: DY-17
West Shore Kennisis Lake Culvert

Structure Description

The West Shore Kennisis Lake Culvert is located on West Shore Lake Road, 200 m West of Lipsy Lake Drive. The culvert is a 4.27 m span modular concrete box culvert under a two-lane road. The culvert is approximately 29.8m long and extends under West Shore Road on an East / West alignment with approximately 4m of fill on top of the structure. The culvert crosses a non-navigable waterway. There is no barrier system on the structure or on the approaches.

Structure Condition

The structure is in good condition with a BCI of 96 and BSI of 93. The structure appears to be newly constructed; however, the exact installation date is unknown. Both the deck and approach wearing surfaces are in good condition. The roadway embankments are lightly vegetated and stable with no signs of erosion. There is no guiderail over the structure or on the approaches with some loose/damaged posts remaining from a previous installation.

Recommendations

The structure requires no rehabilitation work itself. A guiderail system should be installed on either side of the structure and to extend past the approaches in accordance with provincial highway standards.



Photo 1: Culvert Inlet - Looking West



Photo 2: Culvert Outlet - Looking East

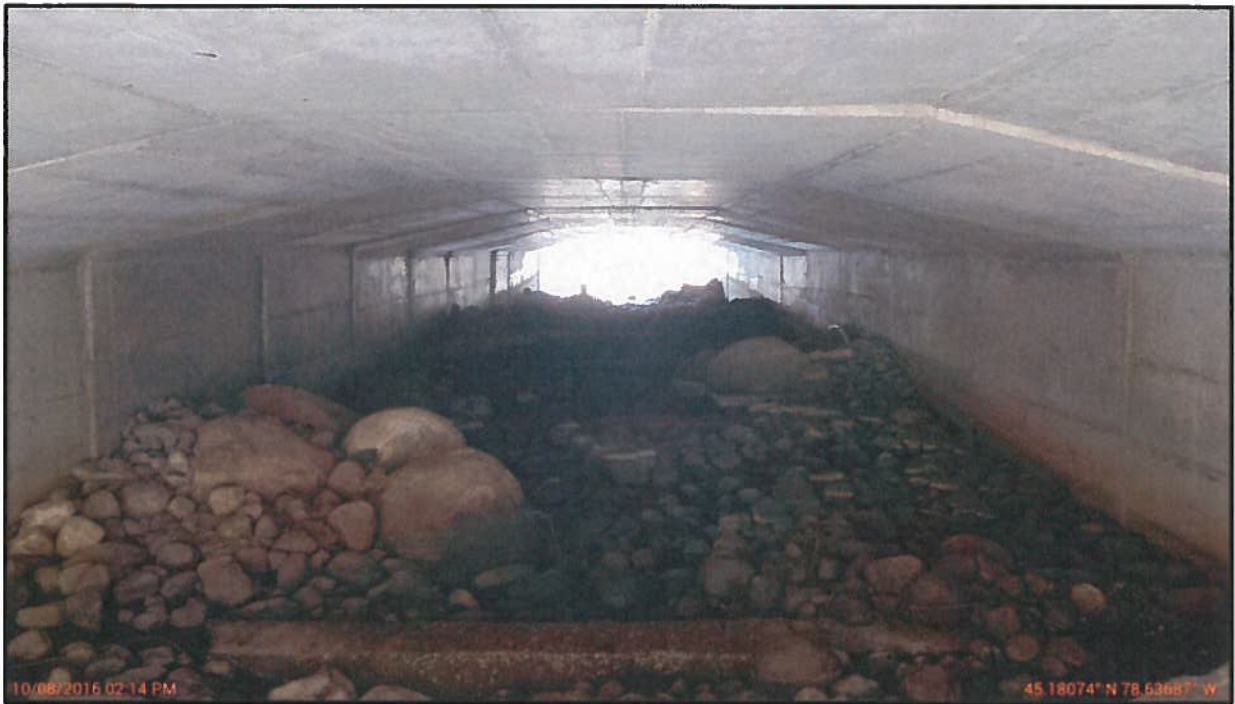


Photo 3: General View Culvert Barrel – Looking West



Photo 4: General View Culvert Inlet – Looking East



Photo 5: General View Culvert Outlet – Looking West



Photo 6: Typical Guide Rail System & Wearing Surface – Looking Southwest

Inventory Data:

Structure Name	West Shore Kennisis Lake Culvert									
Main Hwy/Road #		On	Under	Crossing Type:	Navig. Water Rail	Water Road	Non-Navig. Water Ped.	Other		
Road Name	West Shore Road									
Structure Location	0.2 km West of Lipsy Lake Drive									
Latitude	45.18074			Longitude	-78.63687					
Owner(s)	Municipality of Dysart et al			Heritage Designation:	Not Cons. Desig./Not List	Cons./not App. Desig. & List	List/not Desig. Desig. & List			
MTO Region *				Road Class:	Freeway	Arterial	Collector	Local		
MTO District *				Posted Speed		No. of Lanes				
Old County *				AADT		% Trucks				
Geographic Twp. *				Special Routes:	Transit	Truck	School	Bicycle		
Structure Type *	Box Culvert			Detour Length Around Bridge		(km)				
Total Deck Length	4.87		(m)	Fill on Structure	4	(m)				
Overall Str. Width	29.8 (length)		(m)	Skew Angle		(degrees)				
Total Deck Area			(sq.m)	Direction of Structure	E to W					
Roadway Width	6.8		(m)	No. of Spans	1					
Span Lengths	4.27		(m)							

Historical Data:

Year Built	N/A	Last Biennial Inspection	
Current Load Limit	N/A / (tonnes)	Last BridgeMaster Inspection	N/A
Load Limit Bylaw #	N/A	Last Evaluation	N/A
Bylaw Expiry Date	N/A	Last Underwater Inspection	N/A
Min. Vertical Clearance	- (m)	Last Condition Survey	N/A

Rehab. History: (Date/description)

Field Inspection Information:	
Date of Inspection:	August 10, 2016
Inspector:	Robert Brooks – Tulloch Engineering
Others in Party:	Elizabeth Perry – Tulloch Engineering
Equipment Used:	Camera, Hammer, Tape Measure
Weather:	Sun
Temperature:	+30 ⁰ C

Additional Investigations Required:	Priority			Estimated Cost
	None	Normal	Urgent	
Detailed Deck Condition Survey:	X			
DART Survey:	X			
Detailed Coating Condition Survey:	X			
Underwater Investigation:	X			
Fatigue Investigation:	X			
Seismic Investigation:	X			
Structure Evaluation:	X			
Load Posting – Estimated Load			Total Cost	\$0
Special Notes:				
Next Detailed Inspection:			2018	

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 to 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 | |

Municipal Structure Inspection Form

MTO Site Number:

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Element Data

Element Group:	Decks		Length:	4.87	(m)
Element Name:	Wearing Surface		Width:	6.8	(m)
Location:	Top		Height:		(m)
Material:	Asphalt		Count:	1	(items)
Element Type:			Total Quantity:	33.1	(m ²)
Environment:	Benign / Moderate Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m² / m / each / % / all	Exc.	Good	Fair	Poor
			33.1	0	0
Comments: Light to medium wheel rutting and raveling along edges.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs:
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments:					

Element Group:	Approach		Length:	6.00	(m)
Element Name:	Wearing Surface		Width:	6.8	(m)
Location:	N/S		Height:		(m)
Material:	Asphalt		Count:	2	(items)
Element Type:			Total Quantity:	81.6	(m ²)
Environment:	Benign / Moderate Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m² / m / each / % / all	Exc.	Good	Fair	Poor
			81.6		
Comments: Light to medium wheel rutting and raveling along edges.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs:
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments:					

Element Group:	Culverts		Length (avg):	29.84	(m)
Element Name:	Barrels		Width:	4.87	(m)
Location:			Height:	1.8	(m)
Material:	Pre-Cast Concrete		Count:		(items)
Element Type:			Total Quantity:	220.0	(m ²)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:			Performance Deficiencies		
Condition Data:	Units m² / m / each / % / all	Exc.	Good	Fair	Poor
		220			
Comments: Few minor spaces between segments.					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace		☐ Major Rehab ☒ None		Maintenance Needs:
Timeframe:	☐ 1 - 5 Years		☐ 6 - 10 Years		☐ Urgent ☐ 1 Year ☐ 2 Year
Comments:					

Municipal Structure Inspection Form

MTO Site Number:

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Element Data

Element Group:	Emankments & Streams		Length:		(m)
Element Name:	Embankments		Width:		(m)
Location:	NE/NW/SE/SW		Height:		(m)
Material:			Count:	4	(items)
Element Type:			Total Quantity:	4.0	(ea)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:					
Condition Data:	Units m ² / m each % / all	Exc.	Good	Fair	Poor
			4.0		
Performance Deficiencies: 00					
Comments:					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace ☐ 1 - 5 Years		☐ Major Rehab ☒ None ☐ 6 - 10 Years		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:					
Comments:					

Element Group:	Emankments & Streams		Length:		(m)
Element Name:	Streams & Waterways		Width:		(m)
Location:	Upstream / Downstream		Height:		(m)
Material:			Count:	2	(items)
Element Type:			Total Quantity:	2.0	(ea)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:					
Condition Data:	Units m ² / m each % / all	Exc.	Good	Fair	Poor
			2.0		
Performance Deficiencies: 00					
Comments:					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace ☐ 1 - 5 Years		☐ Major Rehab ☒ None ☐ 6 - 10 Years		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:					
Comments:					

Element Group:	Embankments		Length (avg):		(m)
Element Name:	Slope Protection		Width:		(m)
Location:	NE/NW/SE/SW		Height:		(m)
Material:			Count:	4	(items)
Element Type:			Total Quantity:	4.0	(ea)
Environment:	Benign / Moderate / Severe		Limited Insp'n:	☐	
Protection System:					
Condition Data:	Units m ² / m each % / all	Exc.	Good	Fair	Poor
			4.0		
Performance Deficiencies: 00					
Comments:					
Performance Deficiencies: None					
Recommended Work:	☐ Minor Rehab ☐ Replace ☐ 1 - 5 Years		☐ Major Rehab ☒ None ☐ 6 - 10 Years		Maintenance Needs: - ☐ Urgent ☐ 1 Year ☐ 2 Year
Timeframe:					
Comments:					

Municipal Structure Inspection Form

MTO Site Number:

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Repair and Rehabilitation Required:		Priority				Estimated Construction Cost
Element	Repair and Rehabilitation Required	6 to 10 years	1 to 5 years	Within 1 year	Urgent	
Total Cost						

Associated Work:	Comments	Estimated Cost
Approaches:	Provide guiderail system (± 80m) as per provincial highway standards	\$10,000
Detours:		
Traffic Control:		
Utilities:		
Right of Way:		
Environmental Study:		
Other:		
Contingencies:		
Total Cost		\$10,000

Justification: