REPORT FOR ACTION

Rouge Park Bridges Transportation Master Plan Environmental Assessment

Date: February 12, 2024
To: Infrastructure and Environment Committee
From: General Manager, Transportation Services
Wards: Ward 25 - Scarborough-Rouge Park

SUMMARY

The City of Toronto owns and manages transportation infrastructure within the boundaries of the Rouge National Urban Park (RNUP). Under agreement with Parks Canada, the City provides basic municipal services, such as police, fire and emergency services and winter maintenance, and the City owns bridge structures within the Park that function as part of the transportation network.

Transportation Services, in partnership with Engineering and Construction Services has completed a Transportation Master Plan (TMP) for five bridges that cross over the Rouge River and Little Rouge River, as well as two CP Rail corridor underpasses within the RNUP. All five bridges considered in the TMP require repairs and/or rehabilitation as they are at or nearing the end of their service life. Most of the bridges were built in the early 1900s and are historically significant, and as a result, planning for rehabilitation triggers the need to complete a Schedule B Environmental Assessment under the Municipal Class Environmental Assessment (EA) process.

The TMP EA process holistically reviewed the area transportation network against other environmental factors to determine where it was warranted to rehabilitate or replace bridges to meet current standards and growth requirements, versus where it was possible to maintain heritage assets through minor repairs while still meeting transportation needs. The Preferred Solutions recommended in this report include retaining the Sewells Bridge and Maxwell's Bridge and replacing the Hillside Bridge, Milne Bailey Bridge and Stott's Bridge.

Finally, it was determined that opportunities to improve clearances on the CP Rail corridor underpasses requires further study to confirm whether it is possible to lower the road without impact to existing bridge abutments.

RECOMMENDATIONS

The General Manager, Transportation Services recommends that:

1. City Council endorse the preferred solutions for the Rouge Park Bridges Transportation Master Plan, which includes the following:
    a. Retain Sewells Bridge and Maxwell's Bridge with minor rehabilitations; and
    b. Replace Milne Bailey Bridge, Hillside Bridge, and Stott's Bridge with sympathetically designed bridges; and explore opportunities for adaptive re-use of the bridges elsewhere in the Rouge National Urban Park, or alternatively adaptive re-use of bridge elements within the replaced bridges, where feasible.

2. City Council authorize the General Manager, Transportation Services to prepare the Rouge Park Bridges Transportation Master Plan Report, issue the Notice of Completion, and put the Transportation Master Plan in the public record in accordance with the requirements of the Municipal Class Environmental Assessment process.

FINANCIAL IMPACT

A preliminary capital cost estimate for design and construction of approximately $48,000,000 (in 2023 dollars and excluding any property acquisition costs) has been identified for the Preferred Solutions for the five bridges.

Subject to Council's approval of this report, staff will continue to advance the design of the Preferred Solutions identified in the Rouge Park Bridges TMP. The funding for preliminary design is estimated at $600,000 and has been included in the 2024-2033 capital budget (CTP515-01). As the costs of implementation are further refined, funding required for the implementation of the project will be reflected as part of future capital budget submission processes for consideration by Council.

The Chief Financial Officer and Treasurer has reviewed this report and agrees with the financial impact information.

DECISION HISTORY

At its meeting on July 19, 2022, City Council adopted a motion for the "Authorization to enter into Agreement with Parks Canada and to install a Pedestrian Crossover in Rouge National Urban Park" authorizing the installation of a pedestrian crossover on Twyn Rivers Drive. City Council also authorized the General Manager, Transportation Services, to negotiate, enter into, and execute an agreement with Parks Canada regarding the pedestrian crossover and associated improvements.
https://secure.toronto.ca/council/agenda-item.do?item=2022.SC33.65

At its meeting on November 15, 2016, Scarborough Community Council referred a motion to "Request for Report on Traffic Safety Issues on Twyn Rivers Drive" for the Director of Transportation Services to report back to Community Council. https://secure.toronto.ca/council/agenda-item.do?item=2016.SC18.30

COMMENTS

Transportation Master Plan Process

The City of Toronto initiated the Rouge Park Bridges Transportation Master Plan (TMP) in 2020 to study five bridges within the Rouge National Urban Park (RNUP). Most of the bridges were built in the 1900s. All five bridges now require repair. The bridges provide crossings over the Rouge River and Little Rouge River. Additionally, there are two CP Rail corridor underpasses in the RNUP that were considered as part of the TMP.

The TMP is being completed in accordance with the requirements for a Master Plan project (Approach #2) under the Municipal Class Environmental Assessment Act (MCEA). This includes the completion of Phase 1 (identification of the Problems and/or Opportunities) and Phase 2 (identification and evaluation of Alternative Solutions or Alternatives). The process also includes the level of investigation, consultation, and documentation to fulfil the requirements for Schedule B projects, as set out in the MCEA.

The overall approach undertaken for the Rouge Park Bridges TMP was to:

- Develop a long-term (20-year time horizon) strategy for the bridge sites within the Rouge National Urban Park (RNUP);
- Protect the ecological integrity of the RNUP;
- Honour the heritage of these bridge sites;
- Improve the function of the crossings for all travel modes, where appropriate, including for people driving and vulnerable road users, such as pedestrians/hikers and people cycling; and
- Maintain sustainable access for users within the park.

The Rouge Park Bridges TMP process followed the MCEA process and included establishing a problem and opportunity statement, followed by completing an inventory of the environment, and developing and evaluating Alternative Solutions for each bridge to arrive at unique, Preferred Solutions for each bridge.

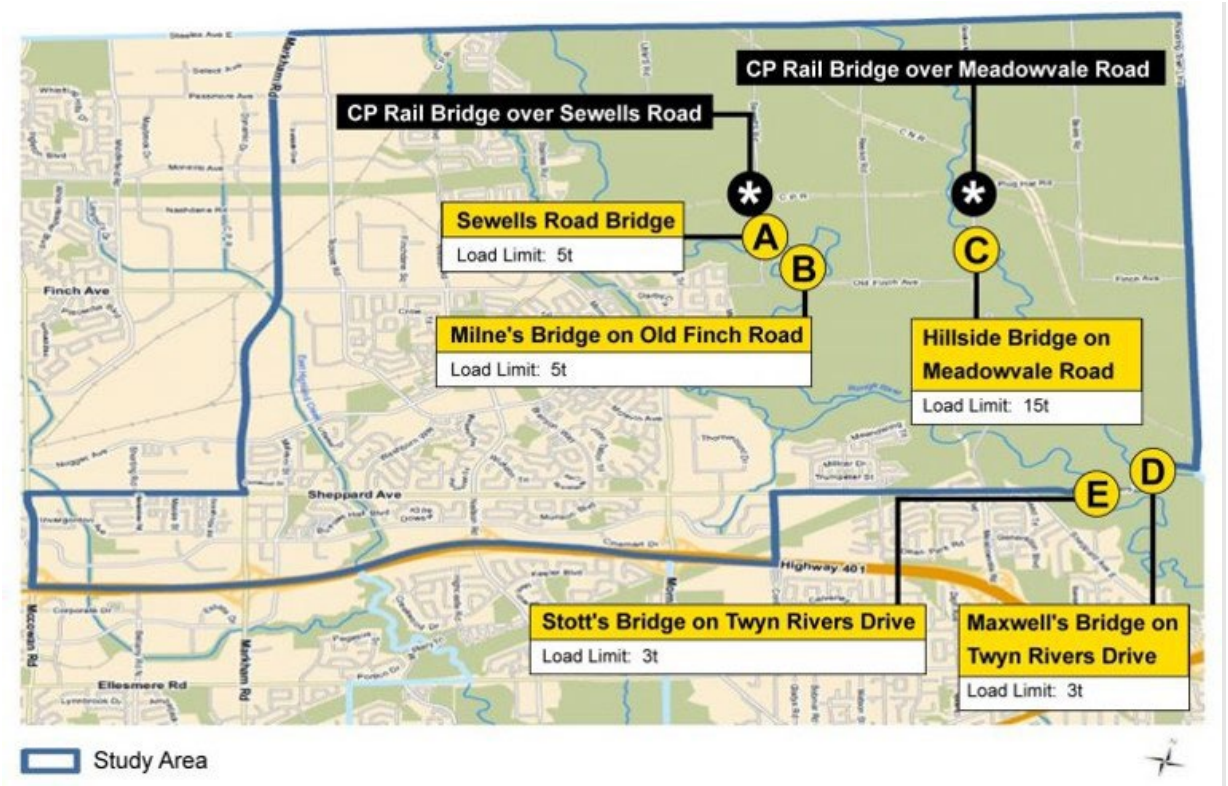
Study Area and Bridge Overview

The TMP study area is generally bounded by Steeles Avenue East to the north, Markham Road to the west, Highway 401 to the south, and Pickering Townline to the east. The study area is located within an Area of Natural Significance (ANSI) and overlaps with a large section of the RNUP, with all five bridges located within the RNUP. The establishment of RNUP under the federal jurisdiction of Parks Canada was finalized

in 2019, consolidating lands from the City of Toronto, York Region and Durham Region. The RNUP area contains the main Rouge River and Little Rouge River valleys, some of the largest forest blocks in the City, and provincially and locally significant natural areas, including the Rouge River Valley Provincial Area of Natural and Scientific Interest (ANSI) and the Rouge River Marshes Provincially Significant Wetland. The City maintains ownership, jurisdiction and management responsibility for public roads and bridges in its right-of-ways within the RNUP boundaries.

In the City's Official Plan, the RNUP lands are designated Natural Areas and Other Open Spaces, with Utility Corridors running north-south and east-west through the lands. The Official Plan requires Natural Areas to be maintained primarily in a natural state, while allowing for compatible recreational, cultural and educational uses, and conservation projects, public transit, public works and utilities for which no reasonable alternatives are available. Much of the Natural Areas designated lands are also identified as Environmentally Significant Areas on Map 12A of the Official Plan. The remainder of the TMP study area is primarily designated as Neighbourhoods, with some Employment and Mixed Use Areas located along Sheppard Avenue East, Highway 401 and Morningside Avenue.

The five bridges are included on the City's Heritage Register. Four of the bridges are individually designated under Part IV of the Ontario Heritage Act (OHA), and one of the bridges is listed on the Register. Each bridge is within an approximate 20 metre right-of-way, and has a load limit in place, which limits their use by heavy vehicles, such as trucks and emergency vehicles.



Map of Study Area with Five Bridge Locations

A. Sewells Road Suspension Bridge (No. 812)

Sewells Road Bridge is located on Sewells Road between Steeles Avenue to the north and Old Finch Avenue to the south, crossing over the Rouge River. Sewells Road has a two lane rural cross-section with no paved shoulder, bike lanes or sidewalks. The bridge width of just under 4 metres, only permits one lane of traffic at a time, with yield signs posted to accommodate alternating direction traffic.

Sewells Bridge is one of only a few suspension bridges on a public road in Ontario. It was designed by Frank Barber and built in 1912. The bridge is a 48.8 metre long three-span stiffened suspension bridge with an exposed concrete deck. Since the original bridge construction, the Sewells Bridge was rehabilitated in 1980, 1987 and 2013. A monument was installed in 1981, following the first bridge restoration. In 1997, Sewells Road Bridge was designated under Part IV of the OHA by the former City of Scarborough Council through Designation By-law 25155.

A 2021 Bridge Inspection listed the bridge in good condition, with abutments and piers in generally good condition, however these inspections are intended to identify repairs required in the next two years, and do not address long-term considerations.

View of Sewells Road Suspension Bridge

B. Milne Bailey Bridge on Old Finch Avenue (No. 813)

Milne Bailey Bridge is located on Old Finch Avenue between Sewells Road to the west and Reesor Road to the east, crossing over the Rouge River. Old Finch Avenue has a two lane rural cross-section with no paved shoulder, bike lanes or sidewalks. The bridge width of 3.6 metres restricts traffic to a single lane, alternating direction configuration. Pedestrians and people cycling must walk on the bridge deck to cross the bridge.

Milne Bailey Bridge was erected as a steel structure by Ellis Engineering with assistance from the Canadian Military Engineers in 1988, replacing a 1954 bridge erected by the Second Field Engineer Regiment of the Canadian Military Engineers. It has a 57.9 metre long two-span with an open grating deck. A monument was installed in 1985 at the southwest corner of the bridge, commemorating the bridge construction of 1954. The bridge is listed on the City's Heritage Register.

Repair work was completed in 2013. The deck grating has been damaged numerous times and repaired with flat plate. The deck panels are loose, causing significant noise, with abrasions observed and loose bolted connections. A 2021 Bridge Inspection listed the bridge in good condition. As previously noted, these inspections are intended to identify repairs required in the next two years, and do not address long-term considerations. The deck appears to be at or near the end of its useful service life.

View of Milne Bailey Bridge

C. Hillside Bridge on Meadowvale Road (No. 806)

Hillside Bridge is located on Meadowvale Road between Plug Hat Road to the north and Old Finch Avenue to the south, crossing over the Little Rouge River. Meadowvale Road has a two lane rural cross-section with no paved shoulder, bikeways or sidewalks. The bridge width of 4.6 metres restricts traffic to a single lane, alternating direction configuration.

Hillside Bridge is a Warren pony truss steel bridge constructed in 1917. The bridge has a 24.7 metre single-span with an open grating deck. In 1997, Hillside Bridge was designated under Part IV of the OHA by the former City of Scarborough Council through Designation By-law 25153.

The Hillside Bridge was rehabilitated in 1986 and was temporarily closed in 2020 for repairs. A 2021 Bridge Inspection listed the bridge in fair condition. As previously noted, these inspections do not address long-term considerations, and the bridge is nearing the end of its service life.

View of Hillside Bridge

D. Maxwell's Bridge on Twyn Rivers Drive (No. 802)

Maxwell's Bridge is located on Twyn Rivers Drive between Sheppard Avenue East and the boundary of the City of Toronto and the City of Pickering, crossing over the Little Rouge River. Twyn Rivers Drive has a two lane rural cross-section with no paved shoulder, bike lanes or sidewalks. The curb-to-curb width of 6.1 metres on the bridge accommodates two lanes of traffic.

Maxwell’s Bridge is a reinforced concrete, bowstring arch bridge constructed in 1927. The bridge has a 19 metre single-span with a concrete deck slab and an asphalt surface. In 1997, Maxwell's Bridge was designated under Part IV of the OHA by the former City of Scarborough Council through Designation By-law 25152.

A 2013 inspection report recommended concrete patching, and replacement of asphalt and waterproofing, which was implemented. At the time, the abutments were in generally good condition. A 2021 Bridge Inspection listed the bridge in good condition, with minor spalls on the curbs, barriers, and abutments and areas of delamination on the verticals. These inspections identify repairs required in the next two years, and do not address long-term considerations.

The RNUP Orchard Trail crosses the road north of the bridge and the RNUP Vista-Mast Trail to the southeast of the bridge. A new section of trail with a dedicated pedestrian bridge across the Little Rouge Creek was recently added and sections of the trails that formerly crossed Twyn Rivers Drive near the bridge have been officially closed. Additionally, just to the east of the bridge along Twyn Rivers Drive, there is a parking lot for hikers on property owned by RNUP.

Twyn Rivers Drive is identified as an evacuation route in the event of a Pickering Nuclear Generating Station evacuation event. Its effectiveness for use as an evacuation route is hampered by the low load limits at Maxwell's Bridge and Stott’s Bridge, the single lane width of Stott’s Bridge and the extremely steep roadway grade climbing to the west.

View of Maxwell's Bridge

E. Stotts' Bridge on Twyn Rivers Drive (No. 803)

Stott's Bridge is located on Twyn Rivers Drive between Sheppard Avenue East and the City limits, crossing over the Rouge River. Twyn Rivers Drive has a two lane rural cross-section with no paved shoulder, bike lanes or sidewalks. The bridge width of 4.1 metres restricts traffic to a single lane, alternating direction configuration.

Stott's Bridge is a Warren pony truss bridge constructed in 1915. The bridge has a 22.1 metre single-span with an open grating deck.

In 1997, Stott's Bridge was designated under Part IV of the OHA by the former City of Scarborough Council through Designation By-law 25155. Since the original bridge construction, the Stott's Bridge was rehabilitated or repaired in 1997, 2013 and 2020. In 2020, the bridge was temporarily closed to accommodate repairs to sway bracing, tie plates, stringers, and the open grate decking. A 2021 Bridge Inspection listed the bridge in fair condition. Similar to the other bridges, these inspections do not address long-term considerations. The bridge is nearing the end of its service life.

Twyn Rivers Drive is identified as an evacuation route in the event of a Pickering Nuclear Generating Station evacuation event. Its effectiveness for use as an evacuation route is hampered by the low load limits at Maxwell's Bridge and Stott's Bridge, the single lane width of Stott's Bridge and the extremely steep roadway grade climbing to the west.

View of Stott's Bridge

CP Rail Corridor Underpasses

There are two CP Rail bridges passing over roads in the study area:

- CP Rail Bridge over Sewells Road located approximately 400 metres north of the Sewells Road Bridge, and
- CP Rail Bridge over Meadowvale Road located approximately 550 metres north of the Hillside Bridge.

Both bridges have a 3.5 metre vertical clearance, which obstructs access for fire and other service trucks. This constraint, combined with load restrictions for the City bridges, creates a section of roadway without fire truck access.

Both bridges also have narrow horizontal clearances, allowing only a single lane of traffic to pass underneath at a time. This requires vehicles to stop with limited sight lines. However, the width is not a constraint on fire truck access.

View of CP Rail Bridge over Sewells Road

View of CP Rail Bridge over Meadowvale Road

At-Grade Rail Crossings

There are three at-grade railway crossings in the study area:

- CN Rail at Sewells Road
- CN Rail at Reesor Road
- CP Rail at Reesor Road

These at-grade crossings are a constraint on fire and emergency vehicle response times when the roadway is blocked by a passing train, requiring alternative routes, but otherwise are not a significant constraint to regular travel. The effect of these crossings was included in the traffic analysis work through the TMP and should be monitored in the future as traffic increases on affected roadways.

Public Engagement Summary

The Notice of Study Commencement for the Rouge Park Bridges TMP was posted on the City's website on December 14, 2020. The notice was also distributed to the project

contact list, and to approximately 21,000 addresses in the surrounding area. Below is a summary of public consultation events undertaken to inform the Rouge Park Bridges TMP:

- A Public Information Centre (PIC #1) was held on October 21, 2021 (online) and provided area residents and community groups with an opportunity to learn more about the project and to provide input to support the early phases of the study, development of problem and opportunity statement, and other background work for the TMP.
- The City posted an interactive Virtual Mapping Tool, providing the opportunity to learn more about the bridges and provide comments and ideas on each of the bridges in Fall 2021. Comments received through this tool related to heritage, environment, traffic, and walking/cycling routes.
- The City posted the Phase 1 Consultation Report in December 2021 on the City's website and through the project's contact list.
- Meeting with Curve Lake First Nation in April 2022.
- The City posted an online survey, available through Summer 2022 to provide additional feedback opportunity, and included background information on the project and asked respondents to identify their relationship to the project and indicate their level of agreement with the recommendation for each of the five bridges. The survey included an opportunity to provide additional comments related to each bridge and to the study overall.
- A second Public Information Centre (PIC #2) held July 20, 2022 (online) to get feedback and input on the evaluation of Alternative Solutions and Preferred Solutions.
- The City posted the Phase 2 Consultation Report in January 2024 on the City's website and through the project's contact list.

A Technical Advisory Committee (TAC) meeting was established for the project consisting of participants from various agencies and organizations with an interest in the area. The project team met with the TAC two times throughout the project. Additionally, the project team sought advice and input at key stages of the planning and decision-making process from Indigenous Communities and from specific interested organizations/agencies/divisions. These included:

- Parks Canada;
- Toronto and Region Conservation Authority (TRCA);
- Save the Rouge;
- Regional Municipalities of York and Durham;
- Scarborough Preservation Panel; and
- Other City Divisions (Engineering & Construction Services, City Planning, Parks Forestry and Recreation, and Fire Services).

Through these consultations, the team heard feedback that can be grouped under several thematic areas, including:

- **Natural Environment:** protect species/avoid disrupting flora and fauna; improve runoff quality and salt management; improve connectivity at crossings and improve

habitat; adhere to relevant policy documents; avoid disruptions; minimize the level and spread of noise; and consider lighting.
- **Vehicles/Traffic:** traffic management at bridges and traffic concerns (heavy traffic during rush hour); replace bridges to code; consider if widening or increasing capacity of bridges will increase traffic flow; and EMS vehicles need to cross bridges.
- **Pedestrians and Cycling:** improve pedestrian and cycling infrastructure on, or adjacent to structures; increase safety and access for pedestrians and people cycling; and connect to trails.
- **Design:** add a second, parallel bridge next to existing bridges, and modify the steep gradients or the road itself to enhance vehicle safety.
- **Heritage:** enhance historical signage (especially at Milne Bailey Bridge), and name bridges after significant people who contributed to the park.

Summary of the Outcomes of the TMP Study

Problems and/or Opportunities

The identification of problems and/or opportunities at the outset of an EA study is required by the MCEA. For the Rouge Park Bridges TMP, this statement was developed based on an understanding of the existing conditions and issues, and further refined through consultation with interested parties and partners, and is outlined as follows:

"The intent of the TMP is to determine Preferred Alternatives for the future of five bridges recognizing the need to:
- Address the deteriorating condition of the bridges,
- Maintain the rural character of the roadways and their rights-of-way,
- Support the local transportation network within the Park, including access for emergency services,
- Follow heritage conservation principles at each bridge,
- Improve the safety and function of these sites for all users, and
- Mitigate potential impacts to the natural environment of the RNUP."

Development of Alternatives

The development of Alternatives for each bridge followed a two-step approach. The initial step included a screening to confirm a bridge is required at each location to determine whether a “Remove” alternative should be considered. This screening was based on four factors: Fire and Emergency Medical Services, Evacuation Route, Traffic Access, and Heritage. If the screening results determined that a bridge was required, further development of alternatives would be undertaken.

Through this screening process, it was determined that none of the crossings should be closed or decommissioned permanently. All alternatives considered require bridge crossings to be in service for the next 20 plus years.

The second step involved developing and evaluating Alternative Solutions. For each bridge, three possible alternatives were considered, as outlined below.

Retain
Retention of the existing bridge means keeping the bridge in its existing configuration with minimal changes, if any. It may include modest repairs to extend its life, or improvements to roadway approaches, sight lines, signage or other ancillary features. However, functional improvements that change the cross-section of the bridge, or strengthening that substantially alters the form and appearance of the structure are not considered a retain alternative.

Rehabilitate:
Rehabilitation of the existing bridge means strengthening and altering the exiting bridge substantially to improve its function. This may include adding structural components to supplement the existing ones, replacing components of the structure or other similar improvements. Significant alterations in form and appearance may occur. For the bridges in this study, widening as part of rehabilitation was not considered feasible.

Replace:
Replacement of the existing bridge means complete removal of the existing bridge and replacing with a new structure (and determining the ability to relocate or adaptively re-use elements in a new bridge). This allows the greatest improvement in the functional characteristics of the bridge such as load-carrying capacity, width and service life. For replacement of heritage bridges, it must be demonstrated that the other alternatives are not suitable before replacement is identified as a Preferred Solution.

A summary of Alternatives for each bridge is included in Attachment 1.

Evaluation of Alternatives

Once the Alternatives were established, the next step of the process was to establish the criteria for the evaluation of Alternatives at each bridge. There was a total of 19 criteria/measures within six thematic areas, summarized below. The full evaluation criteria utilized for the evaluation are included in Attachment 2. The evaluation criteria was categorized under the following headings:

- Bridge Condition and Function,
- Transportation,
- Heritage and Archaeology,
- Natural Environment and Hydraulics,
- Public Uses in Rouge National Urban Park, and
- Implementation.

The evaluation of Alternatives considered the following:

- Immediate safety issues related to condition of bridge structures;
- RNUP's legislation to conserve nature, culture, and agriculture, including priority for ecological integrity;
- Provincial requirements for treatment of heritage bridges;
- Safe and efficient emergency vehicle and maintenance vehicle access;
- Access to existing and future land uses, including park-related trails and infrastructure;

- Improvements to pedestrian and cycling infrastructure;
- Traffic volumes, future demands, and available network capacity;
- Maintenance of the two lane rural character of the existing roadways;
- Low clearance constraints at CP Rail Bridge crossings over Sewells Road and Meadowvale Road;
- Constraints from the three at-grade CN crossings; and
- Provincial Greenbelt policies and City of Toronto policies regarding infrastructure improvements, as well as Parks Canada's RNUP Management Plan guidance in relation to ecological integrity and infrastructure.

Given the identified cultural heritage attributes of the bridges, additional criteria for heritage conservation options are based on the 'Conservation of Historic Places in Canada;' (Parks Canada, 2010) which provides principles for infrastructure conservation and references the Ontario Heritage Bridge Guidelines (MTO, 2008) for the specific case of bridges. This provides a rank-order approach to heritage bridge conservation options, ranging from least to most heritage impact. The rank-order approach requires each option to be evaluated and found to be non-viable before the subsequent option is considered. These options were considered in addition to the evaluation criteria above. The rank-order options are listed below with further detail included in Attachment 3:

1. Retain existing bridge with no major modifications
2. Retain and restore missing or deteriorated elements
3. Retain bridge with sympathetic modification
4. Retain with sympathetically designed new structure nearby
5. Retain and adapt for alternative use
6. Retain as heritage monument for viewing purposes
7. Relocate (applicable for smaller, lighter structures)
8. Remove and replace (consider sympathetic design and details)

Evaluation of Alternatives and Preferred Solutions

The evaluation of alternatives and Preferred Solutions are summarized in the tables and text below. Matrices of the evaluation for each of the bridges are included in Attachment 4.

A. Sewells Road Suspension Bridge (No. 812)

Table 1: Sewells Road Suspension Bridge Evaluation of Alternatives Summary

Criteria	Retain	Rehabilitate	Replace
Bridge Condition & Function	Bridge has remaining service life. Bridge would remain one lane with load posting.	Repairs to address deterioration. Bridge would remain one lane with load posting.	New two lane bridge would meet current standards.

Criteria	Retain	Rehabilitate	Replace
Transportation	Bridge would remain one lane wide, and low load restrictions require use of an alternative route for trucks and emergency vehicles. Maintains existing recreational access.	Bridge would remain one lane wide, and low load restrictions require use of an alternative route for trucks and emergency vehicles. Maintains existing recreational access.	New two lane bridge would allow for full access to the bridge and could improve active transportation access.
Heritage & Archaeology	Cultural heritage value would be maintained.	Rehabilitation has the potential to impact the cultural heritage.	Sympathetic design would be recommended.
Natural Environment & Hydraulics	No impacts to Species at Risk or Significant Wildlife Habitat. No improvement to river conveyance, continued risk of substandard clearances.	Potential temporary and permanent impacts to Species at Risk, potential loss of aquatic habitat. No improvement to river conveyance, continued risk of substandard clearances.	Potential temporary impacts to Species at Risk, potential loss of aquatic habitat. Replacement bridge would meet current standards and protection of adjacent riverbanks would be provided.
Public Uses in the RNUP	Maintains existing public and worker access.	Maintains existing public and worker access.	Improves public and worker access.
Implementation	High complexity due to unusual structure type.	Not feasible to strengthen to current standards.	Sympathetic design would be recommended.

Retaining the existing Sewells Bridge structure is recommended as the Preferred Solution at this site. Rehabilitation cannot address the safety concerns and functional limitations of the single lane crossing without replacing a large proportion of the superstructure, which would eliminate the bridge's heritage value. Further, replacement does not appear to be warranted at this time, based on the reported condition of the bridge structure and given that alternative routing for heavier vehicles can be accommodated on alternative routes. The evaluation of the Alternatives for this bridge demonstrated that the retain alternative resulted in most preferred factors related to heritage/archaeology, natural environment and hydraulics, and implementation.

Maintenance repairs sympathetic to the bridge's existing design, with allowances made for inclusion of modern materials to meet current design and safety codes, is preferred from a heritage perspective as it would retain the heritage attributes of the bridge and retain the historical and contextual value of the subject crossing.

B. *Milne Bailey Bridge on Old Finch Avenue (No. 813)*

Table 2: Milne Bailey Bridge Evaluation of Alternatives Summary

Criteria	Retain	Rehabilitate	Replace
Bridge Condition & Function	Capacity, durability, reliability, risk, and traffic signals remain.	Service life extended, but bridge would remain one lane with load posting and traffic signals remain.	New two lane bridge would meet current standards and eliminate traffic signals.
Transportation	Bridge would remain one lane wide, and low load restrictions require use of an alternative route for trucks and emergency vehicles. Maintains existing recreational access.	Bridge would remain one lane wide, and low load restrictions require use of an alternative route for trucks and emergency vehicles. Maintains existing recreational access.	New two lane bridge would allow for full access to the bridge and could improve active transportation access.
Heritage & Archaeology	Cultural heritage value would be maintained for study period.	Rehabilitation would deter from the cultural heritage at the site	New panel bridge would provide sympathetic design to the existing.
Natural Environment & Hydraulics	No impacts to Species at Risk or Significant Wildlife Habitat. No improvement to river conveyance, continued risk of substandard clearances.	Potential temporary and permanent impacts to Species at Risk, potential loss of aquatic habitat. No improvement to river conveyance, continued risk of substandard clearances.	Potential temporary impacts to Species at Risk, potential loss of aquatic habitat. Replacement bridge would meet current standards and protection of adjacent riverbanks would be provided.
Public Uses in the RNUP	Maintains existing public and worker access.	Maintains existing public and worker access.	Improves public and worker access.

Criteria	Retain	Rehabilitate	Replace
Implementation	Pier is in poor condition and needs to be replaced.	Condition makes it infeasible to reuse superstructure after dismantlement.	Panel bridge type is feasible.

Replacement of the existing Milne Bailey Bridge structure is recommended as the Preferred Solution at this site. Retaining the original structure is not feasible based on the condition of the existing pier bent. Risks associated with rehabilitating an obsolete proprietary system would be difficult to manage and could lead to significant delays and alterations during construction. The evaluation of the Alternatives for this bridge demonstrated that the replace alternative resulted in most preferred factors related to bridge condition and function, transportation, and implementation. Cost was not considered to be a primary driver of the evaluation.

A sympathetically designed bridge to the original heritage bridge is recommended as the preferred replacement structure.

C. Hillside Bridge on Meadowvale Road (No. 806)

Table 3: Hillside Bridge Evaluation of Alternatives Summary

Criteria	Retain	Rehabilitate	Replace
Bridge Condition & Function	Capacity, durability, reliability, risk, and high repair frequency remain.	Service life extended, but bridge would remain one lane with load posting.	New bridge would meet current bridge and geometric standards.
Transportation	Bridge would remain one lane wide, and low load restrictions require use of an alternative route for trucks and emergency vehicles. Maintains existing recreational access.	Bridge would remain one lane wide, and low load restrictions require use of an alternative route for trucks and emergency vehicles. Maintains existing recreational access.	New two lane bridge would allow for full access to the bridge and could improve active transportation access.
Heritage & Archaeology	Cultural heritage value would be maintained for study period.	Rehabilitation would deter from the heritage conservation.	Sympathetic design and adaptive reuse may mitigate impacts.

Criteria	Retain	Rehabilitate	Replace
Natural Environment & Hydraulics	No impacts to Species at Risk or Significant Wildlife Habitat. No improvement to river conveyance, continued risk of substandard clearances.	Potential temporary and permanent impacts to Species at Risk, potential loss of aquatic habitat. No improvement to river conveyance, continued risk of substandard clearances.	Potential temporary impacts to Species at Risk, potential loss of aquatic habitat. Replacement bridge would meet current standards and protection of adjacent riverbanks would be provided.
Public Uses in the RNUP	Maintains existing public and worker access.	Maintains existing public and worker access.	Improves public and worker access.
Implementation	Significant ongoing repairs and monitoring for study period.	Cannot strengthen to current standards or widen to two lanes.	Normal bridge and roadway design and construction.

Replacement of the existing Hillside Bridge structure is recommended as the Preferred Solution at this site. Retaining the original structure is not feasible based on its current condition. The existing design is functionally obsolete, and rehabilitation cannot address all the safety concerns and functional deficiencies of the single lane crossing and would require major modifications, essentially removing the bridge's heritage value. The evaluation of the Alternatives for this bridge demonstrated that the replace alternative resulted in most preferred factors related to bridge condition and function, transportation, and implementation. Cost was not considered to be a primary driver of the evaluation.

A sympathetically designed bridge to the original heritage bridge is recommended as the preferred replacement structure.

D. Maxwell's Bridge on Twyn Rivers Drive (No. 802)

Table 4: Maxwell's Bridge Evaluation of Alternatives Summary

Criteria	Retain	Rehabilitate	Replace
Bridge Condition & Function	Bridge has remaining service life. Bridge would remain with load posting and has negligible protection from vehicle collisions.	Repairs to address deterioration. Bridge would remain with load posting.	New two lane bridge would meet current standards.

Criteria	Retain	Rehabilitate	Replace
Transportation	Bridge would remain one lane wide, and low load restrictions require use of an alternative route for trucks and emergency vehicles. Maintains existing recreational access.	Bridge would remain one lane wide, and low load restrictions require use of an alternative route for trucks and emergency vehicles. Maintains existing recreational access.	New two lane bridge would allow for full access to the bridge and could improve pedestrian and cyclist access.
Heritage & Archaeology	Cultural heritage value would be maintained.	Rehabilitation would significantly alter the original form and impact the cultural heritage.	Sympathetic design would be recommended.
Natural Environment & Hydraulics	No impacts to Species at Risk or Significant Wildlife Habitat. No improvement to river conveyance, continued risk of substandard clearances.	Potential temporary and permanent impacts to Species at Risk, potential loss of aquatic habitat. No improvement to river conveyance, continued risk of substandard clearances.	Potential temporary impacts to Species at Risk, potential loss of aquatic habitat. Replacement bridge would meet current standards and protection of adjacent riverbanks would be provided.
Public Uses in the RNUP	Maintains existing public and worker access.	Maintains existing public and worker access.	Improves public and worker access.
Implementation	Low complexity due to limited scope. Continued risk associated with unknown existing reinforcing details and ability to be compliant with current codes and standards.	High complexity due to unknown existing reinforcing details. Not feasible to strengthen to current standards.	Sympathetic design would be recommended.

Retaining the existing Maxwell's Bridge structure is recommended as the Preferred Solution at this site. Rehabilitation to permit truck traffic is not expected to be feasible and even modest strengthening would significantly alter the original form and appearance of the structure and impact the cultural heritage value. Replacement does not appear to be warranted at this time, based on the reported condition. The evaluation of the Alternatives for this bridge demonstrated that the retain alternative resulted in most preferred factors related to heritage/archaeology, natural environment and

hydraulics, and implementation. Cost was not considered to be a primary driver of the evaluation.

Parks Canada recently installed a new pedestrian and cycling trail bridge in close proximity to this bridge. They have further plans to divert trails away from this bridge reducing the need to accommodate active transportation modes on Maxwell's Bridge.

Sympathetic maintenance repairs with allowances made for inclusion of modern materials to meet current design and safety codes is preferred from a heritage perspective as it would retain the heritage attributes of the bridge and retain the historical and contextual value of the crossing.

E. Stotts' Bridge on Twyn Rivers Drive (No. 803)

Table 5: Stott's Bridge Evaluation of Alternatives Summary

Criteria	Retain	Rehabilitate	Replace
Bridge Condition & Function	Capacity, durability, reliability, risk, and high repair frequency remain.	Service life extended, but bridge would remain one lane with load posting.	New bridge would meet current bridge and geometric standards.
Transportation	Bridge would remain one lane wide, and low load restrictions require use of an alternative route for trucks and emergency vehicles. Maintains existing recreational access.	Bridge would remain one lane wide, and low load restrictions require use of an alternative route for trucks and emergency vehicles. Maintains existing recreational access.	New two lane bridge would allow for full access to the bridge and could improve active transportation access.
Heritage & Archaeology	Cultural heritage value would be maintained for study period.	Rehabilitation would deter from the heritage conservation.	Sympathetic design and adaptive reuse may mitigate impacts.
Natural Environment & Hydraulics	No impacts to Species at Risk or Significant Wildlife Habitat. No improvement to river conveyance, continued risk of substandard clearances.	Potential temporary and permanent impacts to Species at Risk, potential loss of aquatic habitat. No improvement to river conveyance, continued risk of substandard clearances.	Potential temporary impacts to Species at Risk, potential loss of aquatic habitat. Replacement bridge would meet current standards and protection of adjacent riverbanks would be provided.
Public Uses in the RNUP	Maintains existing public and worker access.	Maintains existing public and worker access.	Maintains existing public and worker access.

Criteria	Retain	Rehabilitate	Replace
Implementation	Significant ongoing repairs and monitoring for study period.	Cannot strengthen to current standards or widen to two lanes.	Normal bridge and roadway design and construction

Replacement of the existing Stott's Bridge structure is recommended as the Preferred Solution at this site. Retaining the original structure is not feasible based on its current condition. The existing design is functionally obsolete, and rehabilitation cannot address all the safety concerns and functional deficiencies of the single lane crossing and would require major modifications, essentially removing the bridge's heritage value. The evaluation of the Alternatives for this bridge demonstrated that the replace alternative resulted in most preferred factors related to bridge condition and function, transportation, and implementation. Cost was not considered to be a primary driver of the evaluation.

A sympathetically designed bridge to the original heritage bridge is recommended as the preferred replacement structure.

Additional Recommendations

In addition to the evaluation of Alternative and Preferred Solutions for each of the bridges, there are several recommendations that should be explored and undertaken in preparation for, and through future detailed design, and in particular for bridges that are proposed to be replaced:

- Ensure the continued visual experiences of road users through designs that allow views of the Rouge River and Little Rouge River and of the associated river valley, through appropriate structure scale and height, while still meeting safety and design guidelines;
- Identify feasibility of, and opportunities for, the relocation and/or adaptive re-use of bridge structures that are to be replaced. If suitable locations are not identified, determine if storage facilities exist that could be used to house the structural elements until suitable locations for adaptive re-use are determined;
- Undertake full recording of the structure, prior to removal, through proper documentation for archival purposes;
- Consider a commemorative strategy, such as interpretive historical plaque/commemoration, this may include materials from the structure and/or re-use of existing heritage plaques;
- Include post-construction rehabilitation and landscaping at all bridge sites to ensure that their relationship to their context within the Rouge Park are maintained. Post-construction rehabilitation may include planting with sympathetic species where any tree or vegetation removal is required; and
- Prioritize environmental considerations through detailed design, including impacts on the natural environment, watercourses and riverbeds, and habitats, including consideration of flood conveyance, and winter maintenance to minimize impacts on the natural environment.

Consideration for operation and maintenance, particularly winter maintenance, will need to inform decision making during detailed design. Currently, in order to meet clearance and load restrictions on these bridges, the City has been using pick-up trucks for winter maintenance, using salt where appropriate (though not on bridges with open grate decks). As part of the TMP, the functional designs for the bridges that are being recommended to be replaced include either concrete decks with asphalt or epoxy aggregate on a steel deck. Consideration of decking materials during the detailed design stage will need to take into consideration operations and maintenance as well as other matters, such as environmental impacts to the watercourses and accessibility.

CP Rail Corridor Underpasses
The TMP has identified a recommendation to lower the road at the two CP Rail corridor underpasses on Sewells Road and Meadowvale Road by approximately 0.6 – 0.7 metres to improve vertical clearance at these crossings, which would allow access for fire and other trucks. Further engineering review is required to determine if the roadway could be lowered using retaining walls to increase the vertical clearance. The roadway would also require regrading for some distance approaching the bridge to provide a smooth transition that meets geometric guidelines. Opportunities to improve clearances on the CP Rail corridor underpasses requires further study to confirm whether it is possible to lower the road without impact to existing bridge abutments.

Next Steps

Completing the Transportation Master Plan
Subject to Council approval of this report, Transportation Services will prepare the Rouge Park Bridges Transportation Master Plan Report, issue the Notice of Completion, and put the Transportation Master Plan in the public record in accordance with the requirements of the Municipal Class Environmental Assessment process.

Detailed Design and Heritage Impact Assessment Work
The TMP recommends the Preferred Solution for each bridge, and functional (10%) design work has been completed to support this. Subject to Council endorsement of the TMP, further detailed design work will need to be undertaken for all bridges and to improve vertical clearances at the CP Rail corridor underpasses.

As each of the subject bridges are identified as built heritage resources by the City of Toronto, and there are direct impacts anticipated to each in the recommended alternatives, resource-specific Heritage Impact Assessments (HIAs) will be required to assess the specific impacts to each structure and provide specific mitigation measures and confirmation of the feasibility of the proposed strategies in the context of the development/alteration by a professional engineer. These HIAs should be prepared by a qualified heritage consultant as early as possible in future design stages.

For the four bridges that are individually designated under Part IV of the Ontario Heritage Act - Sewells Bridge (Structure ID 812), Maxwell's Bridge (Structure ID 802), Stott's Bridge (Structure ID 803), and Hillside Bridge (Structure ID 806) - permission under Sections 33 and 34 of the OHA will be required. The proposed demolition (including relocation) of a heritage bridge, and proposed alterations to and removal of

heritage attributes, will require City Council approval and a report to the Toronto Preservation Board.

The detailed design and implementation schedule will need to be coordinated with other infrastructure works and planned developments in the area.

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ATTACHMENTS

Attachment 1 - Summary of Alternatives by Bridge
Attachment 2 - Criteria Used for Evaluation of Alternatives
Attachment 3 - Heritage Option Review by Bridge
Attachment 4 – Evaluation of Alternatives by Bridge

Attachment 1 - Summary of Alternatives by Bridge

Bridge Name	Bridge Description	Alternatives		
		Retain	Rehabilitate	Replace
Sewells Bridge	Sewells Bridge is a three-span suspension structure over the Rouge River on Sewells Road. The bridge was constructed in 1912. It is one lane wide, which is narrower than the existing two lane roadway and located on a slight bend in the road. The bridge has a load posting of 5 tonnes, which is extremely low. The bridge has been designated as a heritage property under the Ontario Heritage Act.	Would involve keeping the bridge essentially in its current condition for the retention period, at which time a re-evaluation would be undertaken. Maintenance repairs would be conducted. Following repairs, a monitoring and maintenance program would be required to extend the service life until rehabilitation or replacement.	Would involve repairing the existing bridge similar to the retain alternative. Widening and adding a sidewalk are not feasible.	Would involve constructing a new bridge at the same location and removing the existing bridge. The new bridge may be longer and higher than existing, to meet hydraulic requirements.

Milne's Bailey Bridge	Milne's Bailey Bridge is a two-span steel panel bridge (with the trade name "Bailey bridge") structure over the Rouge River on Old Finch Avenue. The bridge was constructed in 1988 to replace a similar bridge constructed in 1954 following the loss of its predecessor from Hurricane Hazel. In both 1954 and 1988, the bridge was erected by the Canadian Army. The bridge is one lane wide, which is narrower than the existing two lane roadway and located on a sharp bend in the road, requiring traffic signals at each end to accommodate alternating direction of traffic on the bridge. The bridge has a load posting of 5 tonnes, which is extremely low. The bridge has not been designated as a heritage property under the Ontario Heritage Act but has been listed by the City as of heritage interest.	Would involve keeping the bridge essentially in its current condition for the retention period, at which time a re-evaluation would be undertaken. Following repairs, a monitoring and maintenance program would be required to extend the service life until rehabilitation or replacement.	Would involve repairing the existing bridge similar to the retain alternative. Widening and adding a sidewalk are not feasible.	Would involve constructing a new bridge with a sympathetic design at the same location and removing the existing bridge. The new bridge may be longer and higher than existing, to meet hydraulic requirements.

Bridge Name	Bridge Description	Alternatives		
		Retain	Rehabilitate	Replace
Hillside Bridge	The Hillside Bridge is a single-span steel pony-truss structure over the Little Rouge River on Meadowvale Road. The bridge was constructed in 1917. It is one lane wide, which is narrower than the existing two lane roadway, and requires drivers to yield to oncoming traffic. The bridge has a load posting of 15 tonnes, which is approximately one quarter of the capacity of a modern bridge. Critical repairs were required in 2020 involving temporary closure of the bridge during the work. The bridge has been designated as a heritage property under the Ontario Heritage Act.	Would involve keeping the bridge essentially in its current condition for the retention period, at which time a re-evaluation would be undertaken. Maintenance repairs would be conducted. Following repairs, a monitoring and maintenance program would be required to extend the service life until rehabilitation or replacement.	Would involve repairing the existing bridge similar to the retain alternative. Widening and adding a sidewalk are not feasible.	Would involve constructing a new bridge at the same location and removing the existing bridge. The new bridge would be longer and higher than existing, to meet hydraulic requirements.

Bridge Name	Bridge Description	Alternatives		
		Retain	Rehabilitate	Replace
Maxwell's Bridge	Maxwell's Bridge is a single-span concrete bowstring arch structure over the Little Rouge River on Twyn Rivers Drive. The bridge was constructed in 1927. It is two lanes wide which matches the existing roadway. The bridge has a load posting of 3 tonnes, which is the lowest posting that is typically used in practice. The bridge has been designated as a heritage property under the Ontario Heritage Act.	Would involve keeping the bridge in its current condition for the retention period, at which time a re-evaluation would be undertaken. Maintenance repairs would be conducted. Following repairs, above-average maintenance is anticipated until the next assessment is conducted.	Would involve repairing the existing bridge similar to the retain alternative. Widening and adding a sidewalk are not feasible.	Would involve constructing a new bridge at the same location and removing the existing bridge. The new bridge would be longer and higher than existing, to meet hydraulic requirements.

Bridge Name	Bridge Description	Alternatives		
		Retain	Rehabilitate	Replace
Stott's Bridge	Stott's Bridge is a single-span steel pony-truss structure over the Rouge River on Twyn Rivers Drive. The bridge was constructed in 1915. It is one lane wide, which is narrower than the existing two lane roadway, and requires drivers to yield to oncoming traffic. The bridge has a load posting of 3 tonnes, which is the lowest posting that is typically used in practice. Critical repairs were required in 2020 involving temporary closure of the bridge during the work. The bridge has been designated as a heritage property under the Ontario Heritage Act.	Would involve keeping the bridge essentially in its current condition for the retention period, at which time a re-evaluation would be undertaken. Maintenance repairs would be conducted. Following repairs, a monitoring and maintenance program would be required to extend the service life until rehabilitation or replacement.	Would involve repairing the existing bridge similar to the retain alternative. Widening and adding a sidewalk are not feasible.	Would involve constructing a new bridge at the same location and removing the existing bridge. The new bridge would be longer and higher than existing, to meet hydraulic requirements.

Attachment 2 - Criteria Used for Evaluation of Alternatives

Criteria	Measures
Bridge Condition & Function	
Bridge Condition	Assessment of the existing condition of the bridge and the extent of deterioration currently present. The greater deterioration on key structural components of the bridge will require more extensive repairs.
Bridge Life & Maintenance	Estimated remaining service life of the existing bridge. The need for frequent repairs is undesirable as repairs and maintenance disrupt the use.
Vehicle types crossing the bridge	Ability of the structure to support loads of the following vehicles. It is preferred the structure can support each of these vehicle types: Fire trucks (30 t), Ambulances (9 t), service vehicles; delivery trucks and snow removal vehicles.
Bridge Safety & Function	Assessment of the structure's safety and function, including the width, collision risk, active transportation separation and deck surface. The preferred alternative will maintain or improve the structure's safety and function.
Transportation	
Roadway Design	Assessment of the structure's transportation safety, including design criteria, geometry, speed reduction, cross-section, and approach sight lines. The preferred alternative will maintain or improve the safety of vehicles.
Traffic Operations	Assessment of the structure's traffic operations, including potential travel delays due to single lane bridge. The preferred alternative will have lower travel delays.

Network Connectivity & Access	Evaluation of the network connectivity of the structure, including potential alternative routes and redundant routes, and detour travel time. The preferred alternative will maintain or improve potential network connections to the structure. Assessment of the structure's Emergency Access capabilities, including Fire and emergency response, and the nuclear evacuation route. The preferred alternative will have a lower response time for Fire and EMS and a shorter evacuation route.
Active Transportation	Assessment of the structure's active transportation capabilities, including supporting on-road cycling and pedestrians. The preferred alternative will maintain or improve the structure's ability to support these activities.
Recreational Access	Assessment of the structure's access to recreation, including the maintenance or improvement of recreational access to RNUP and Toronto Zoo. The preferred alternative will maintain or improve recreational access.
Heritage & Archaeology	
Cultural Heritage	Assessment of the cultural heritage resources, including both cultural heritage landscapes and resources in the community. The preferred alternative will be respectful of the Cultural Heritage identified in the Study Area.
Built Heritage	Assessment of the Built Heritage of the structure, including the uniqueness of bridge. Alternative that provides more conservation will be preferred, if engineering safety criteria are met.
Archaeological Potential	Assessment of the Archaeological Potential of the structure, including the potential area(s) of disturbance. The preferred alternative will have limited impacts to area(s) of Archaeological Potential.
Natural Environment & Hydraulics	

Terrestrial Habitat	Assessment of effects to Species at Risk and Significant Wildlife Habitat, including any potential temporary and permanent effects, and any potential disturbance, removal and/or destruction of habitat, wildlife movement or habitat fragmentation. The preferred alternative will have limited impacts to Species at Risk and Significant Wildlife Habitat.
Aquatic Habitat	Assessment of effects to Species at Risk and Aquatic Habitat, including any potential temporary and permanent effects, and effects to bank vegetation, run habitat, in-stream habitat, cover habitat and water/surface flow. The preferred alternative will have limited impacts to Species at Risk and Aquatic Habitat.
River Conveyance	Assessment of effects to the river conveyance, including any potential effects to clearance, span, bank scour, and climate change resilience (i.e., potential damage to structure). The preferred alternative will have limited impacts to river conveyance.
Public Uses in Rouge National Urban Park	
Rouge National Urban Park (RNUP)	Assessment of effects to public and worker access to amenities at Rouge National Urban Park, (e.g., visitor centre and trailheads), and any potential effects on the RNUP. The preferred alternative will be supportive of the RNUP Management Plan, and ongoing operations.
Toronto Zoo	Assessment of effects to public and worker access to the Toronto Zoo. The preferred alternative will be supportive of the ongoing operations of the Toronto Zoo.
Implementation	
Complexity & Constructability	Assessment of the complexity of implementing the alternative, including construction access, duration, utilities and other factors. The preferred alternative is less complex to implement.

Cost Considerations	Assessment of the initial cost of the structure, including environmental mitigations, design, and construction. Consideration of the lifecycle of the structure, including maintenance and future replacement. The preferred alternative has a lower cost.

Attachment 3 - Heritage Option Review by Bridge

These evaluations of Ontario Heritage Bridge Guidelines (OHBG) Conservation Options were prepared based on engineering and technical review and support the selection of preliminary Preferred Solutions for each bridge site. Heritage conservation options are based on the 'Conservation of Historic Places in Canada;' (Parks Canada, 2010) which provides principles for infrastructure conservation and references the OHBG. This provides a rank-order approach to heritage bridge conservation options, ranging from least to most heritage impact. The rank order approach requires each option to be evaluated and found to be non-viable before the subsequent option is considered. The rank-order options that were considered for each bridge are listed in the tables below.

Table 3.1: Sewells Road Bridge

Conservation Options	Evaluation Summary	Recommendation
1. Retain existing bridge with no major modifications	Viable for study period based on condition, recognizing it is on a "no trucks" route, it has had proven performance to date, and recognizing that for fire and emergency access to both ends of the bridge is achievable on existing roadways. On-going maintenance and monitoring are recommended.	Recommended: Retain existing bridge (option #1)

Table 3.2: Milne Bailey Bridge

Conservation Options	Evaluation Summary	Recommendation
1. Retain existing bridge with no major modifications	Not viable due to the poor condition of the bridge pier.	Not Recommended
2. Retain & restore missing or deteriorated elements	Same evaluation as option #1. Not viable to restore because this type of bridge uses proprietary ("Bailey Bridge") panels that cannot be sourced in new condition, used panels are difficult to find, and there are known fatigue details that greatly increase the risk associated with the reuse of these panels.	Not Recommended
3. Retain bridge with sympathetic modification	Same evaluation as option #2.	Not Recommended

Conservation Options	Evaluation Summary	Recommendation
4. Retain with sympathetically designed new structure nearby	Same evaluation as option #1. Since existing bridge cannot be retained, bypass options are not considered further.	Not Recommended
5. Retain and adapt for alternative use	Not viable to retain the bridge in-place for alternative use because a vehicular crossing is required at this location.	Not Recommended
6. Retain as heritage monument for viewing purposes	Not viable to retain the bridge in-place as a monument because a vehicular crossing is required at this location.	Not Recommended
7. Relocate (applicable for smaller, lighter structures)	Relocation of the steel modular panel truss and floor is a viable option, requiring modifications for an alternative use (e.g., pedestrian crossing on a trail). This option may be considered if a suitable site can be determined, and it should be recognized the rehabilitation or replacement of the floor system and a shorter bridge span will likely be required to reduce the load demands, and to account for disposal of deteriorated components. The bridge could be reconstructed at a new location using fewer panels.	Recommended: Remove and replace bridge (option #8, perhaps with option #7).
8. Remove and replace (consider sympathetic details)	This option could be applied in conjunction with a replacement bridge (option 8), but is considered optional, since a suitable site may not be available, and sympathetic replacement is recommended for the vehicular bridge. For sympathetic details, the replacement bridge could be constructed using a modern type of panel bridge. The span lengths and pier placement would be modified to suit the site. Removal of the existing bridge could also include relocation for alternative use as outlined under option 7.	Recommended: Remove and replace bridge (option #8, perhaps with option #7).

Table 3.3: Hillside Bridge

Conservation Options	Evaluation Summary	Recommendation
1. Retain existing bridge with no major modifications	Not viable due to the poor condition of the bridge.	Not Recommended
2. Retain & restore missing or deteriorated elements	Not viable because localized repairs will not achieve the required structural capacity and durability.	Not Recommended
3. Retain bridge with sympathetic modification	Not viable because sympathetic modification would require strengthening of all members and connections to an impractical size and scale, obscuring the original bridge from sight and destroying any residual heritage appearance or value.	Not Recommended
4. Retain with sympathetically designed new structure nearby	Not viable to retain the bridge on its current alignment because it cannot be rehabilitated for the required loads and changing the roadway alignment to bypass the bridge would create road safety concerns. This option would also not be feasible within the roadway right-of-way allowance.	Not Recommended
5. Retain and adapt for alternative use	Not viable to retain the bridge in-place for alternative use because a vehicular crossing is required at this location.	Not Recommended
6. Retain as heritage monument for viewing purposes	Not viable to retain the bridge in-place as a monument because a vehicular crossing is required at this location.	Not Recommended
7. Relocate (applicable for smaller, lighter structures)	Relocation of the steel pony truss is a viable option, requiring strengthening for an alternative use (e.g., pedestrian crossing on a trail). This option may be considered if a suitable site can be determined, and it should be recognized the rehabilitation will be extensive for any use and may involve modifying the bridge to make it narrower and reduce the load demands. This option could be applied in conjunction with a replacement bridge (option 8) to address the need for a vehicular crossing.	Recommended: Remove and replace bridge (option #8, perhaps with option #7).

Conservation Options	Evaluation Summary	Recommendation
8. Remove and replace (consider sympathetic details)	For sympathetic details, the replacement bridge could be constructed using a modern type of pony truss bridge. The span lengths would be modified to suit the site. Removal of the existing bridge may also include relocation for alternative use as outlined under option 7.	Recommended: Remove and replace bridge (option #8, perhaps with option #7).

Table 3.4: Maxwell's Bridge

Conservation Options	Evaluation Summary	Recommendation
1. Retain existing bridge with no major modifications	Viable for look-ahead period based on condition, and two lane width, recognizing it is on a "no trucks" route, it has had proven performance to date, and recognizing that the nearby Stott's Bridge (Site E) has been identified for replacement which will allow fire and emergency access to the west of Maxwell's Bridge. On-going maintenance and monitoring are recommended.	Recommended: Retain existing bridge (option #1)

Table 3.5: Stott's Bridge

Conservation Options	Evaluation Summary	Recommendation
1. Retain existing bridge with no major modifications	Not viable due to the poor condition of the bridge.	Not Recommended
2. Retain & restore missing or deteriorated elements	Not viable because localized repairs will not achieve the required structural capacity and durability.	Not Recommended
3. Retain bridge with sympathetic modification	Not viable because sympathetic modification would require strengthening of all members and connections to an impractical size and scale, obscuring the original bridge from sight and destroying any residual heritage appearance or value.	Not Recommended

Conservation Options	Evaluation Summary	Recommendation
4. Retain with sympathetically designed new structure nearby	Not viable to retain the bridge on its current alignment because it cannot be rehabilitated for the required loads and changing the roadway alignment to bypass the bridge would create road safety concerns. This option would also not be feasible within the roadway right-of-way allowance.	Not Recommended
5. Retain and adapt for alternative use	Not viable to retain the bridge in-place for alternative use because a vehicular crossing is required at this location.	Not Recommended
6. Retain as heritage monument for viewing purposes	Not viable to retain the bridge in-place as a monument because a vehicular crossing is required at this location.	Not Recommended
7. Relocate (applicable for smaller, lighter structures)	Relocation of the steel pony truss is a viable option, requiring strengthening for an alternative use (e.g., pedestrian crossing on a trail). This option may be considered if a suitable site can be determined, and it should be recognized the rehabilitation will be extensive for any use and may involve modifying the bridge to make it narrower and reduce the load demands. This option could be applied in conjunction with a replacement bridge (option 8) to address the need for a vehicular crossing.	Recommended: Remove and replace bridge (option #8, perhaps with option #7).
8. Remove and replace (consider sympathetic details)	For sympathetic details, the replacement bridge could be constructed using a modern type of pony truss bridge. The span lengths would be modified to suit the site. Removal of the existing bridge may also include relocation for alternative use as outlined under option 7.	Recommended: Remove and replace bridge (option #8, perhaps with option #7).

Attachment 4 - Evaluation of Alternatives by Bridge

Evaluation of Alternatives – Sewells Bridge

Least Preferred	Neutral	Most Preferred
✗	–	✓

Factor Area	Retain (minor repairs)	Rehabilitate (strengthen)	Replace (remove old)
Bridge Condition & Function	–	✗	✓
Transportation	–	–	✓
Heritage & Archaeology	✓	✗	✗
Natural Environment & Hydraulics	✓	–	–
Public Uses in Rouge National Urban Park	–	–	–
Implementation (Cost and Complexity)	✓	✗	✓
Overall	✓	✗	–

Sewells Bridge Evaluation of Alternatives

Evaluation of Alternatives – Milne Bridge

Least Preferred	Neutral	Most Preferred
✗	–	✓

Factor Area	Retain (minor repairs)	Rehabilitate (strengthen)	Replace (remove old)
Bridge Condition & Function	✗	✗	✓
Transportation	–	–	✓
Heritage & Archaeology	✓	–	✗
Natural Environment & Hydraulics	✓	–	–
Public Uses in Rouge National Urban Park	–	–	–
Implementation (Cost and Complexity)	✗	✗	✓
Overall	✗	✗	✓

Milne Bridge Evaluation of Alternatives

Evaluation of Alternatives – Hillside Bridge

Least Preferred	Neutral	Most Preferred
✗	–	✓

Factor Area	Retain (minor repairs)	Rehabilitate (strengthen)	Replace (remove old)
Bridge Condition & Function	✗	✗	✓
Transportation	–	–	✓
Heritage & Archaeology	✓	✗	✗
Natural Environment & Hydraulics	✓	–	–
Public Uses in Rouge National Urban Park	–	–	–
Implementation (Cost and Complexity)	✗	✗	✓
Overall	✗	✗	✓

Hillside Bridge Evaluation of Alternatives

Evaluation of Alternatives – Maxwell's Bridge

Least Preferred	Neutral	Most Preferred
✗	–	✓

Factor Area	Retain (minor repairs)	Rehabilitate (strengthen)	Replace (remove old)
Bridge Condition & Function	–	✗	✓
Transportation	–	–	✓
Heritage & Archaeology	✓	✗	✗
Natural Environment & Hydraulics	✓	–	–
Public Uses in Rouge National Urban Park	–	–	–
Implementation (Cost and Complexity)	✓	✗	✓
Overall	✓	✗	–

Maxwell's Bridge Evaluation of Alternatives

Evaluation of Alternatives – Stott's Bridge

Least Preferred	Neutral	Most Preferred
✗	–	✓

Factor Area	Retain (minor repairs)	Rehabilitate (strengthen)	Replace (remove old)
Bridge Condition & Function	✗	✗	✓
Transportation	–	–	✓
Heritage & Archaeology	✓	✗	✗
Natural Environment & Hydraulics	✓	–	–
Public Uses in Rouge National Urban Park	–	–	–
Implementation (Cost and Complexity)	✗	✗	✓
Overall	✗	✗	✓

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Stott's Bridge Evaluation of Alternatives