

City of Belleville

Report No: ENG-2022-06

Meeting Date: July 11, 2022



To: Mayor and Members of Council
Department: Engineering & Development Services
Staff Contact: Ray Ford, Manager of Engineering

Subject: Front Street (Upper) Bridge Rehabilitation

Recommendation:

“That Report No. ENG-2022-06, Front Street (Upper) Bridge Rehabilitation be received, and;

That the future function of the Front Street (Upper) Bridge be studied within the update of the Transportation Master Plan.”

Strategic Plan Alignment:

Infrastructure: Develop asset management strategies and programs to resolve delivery shortfalls and protect our investment in existing infrastructure

Transportation and Mobility: Plan and develop a safe and efficient road and transportation system that addresses the needs of our residents and businesses

Background:

At the City Council meeting on June 13, information was requested regarding the Front Street (Upper) Bridge. This report has been prepared to address the inquiries at this previous Council meeting.

Enhanced OSIM Inspections in 2014 and regular OSIM Inspections in 2016 identified the Front Street (Upper) Bridge as a priority for major rehabilitation. The Upper Bridge has sustained significant deterioration of key structural elements including the arches, abutments, pier, deck joints and sidewalk.

The concrete bowstring arch bridge was originally constructed circa 1930 and no (known) major rehabilitation was carried out on the structure until 1992. In 1992, a major rehabilitation was carried out which generally consisted of the full depth replacement of the concrete deck, the

reinforcement (encasement) of the existing floor beams and the completion of partial depth concrete repairs on the arch elements (arch ribs, arch tie beam and arch hangers). Since the major rehabilitation in 1992, the bridge has undergone another minor rehabilitation in 2003 generally consisting of localized partial depth concrete repairs on the arch ribs, arch hangers, pedestrian barrier and top of concrete sidewalk.

Following a Request for Prequalification (RFPQ), a Request for Proposals RFP-ENG2018-20 for Consulting Services for the Design of the Front Street (Upper) Bridge Rehabilitation (Capital Budget Issue 2018-1.013) was issued in 2018. HP Engineering Inc. was retained through RFP-ENG2018-20 to complete a detailed review and design for the rehabilitation of this structure. The review and design have been completed and it is anticipated that this bridge rehabilitation project will be recommended in the 2023 or 2024 Capital Budget in alignment with the City's Asset Management Plan.

Financial/Analysis:

Painting the Bridge

Several inquiries regarding painting the bridge, or specific bridge components, have been received over the past several years. In considering these inquiries it is important to recognize the age of the structure and its material construction.

This bridge was built over 90 years ago. From engineering investigations and recommendations the City has received for both the Upper and Lower Bridges, it has become apparent that any coating applied to the 1930's concrete must be "breathable" to avoid trapping moisture within the structure. If moisture (from rain, dew, fog, high humidity, etc.) remains trapped in the concrete, the moisture could freeze and cause the concrete to fracture (spall). To prevent moisture from becoming entrapped in the concrete, it is vitally important that any product applied to the concrete be breathable to allow moisture to escape.

The Professional Engineer who has completed the rehabilitation design has specified the following to be used as part of the planned rehabilitation:

- Specific procedures for surface preparation (i.e. removal of previous pargings and coatings) to ensure appropriate bonding between the original concrete and new rehabilitation applications.
- Application of a waterproofing concentrate and thin parge coat resurfacing product (Xypex) for restoration and remedying of imperfections in the deteriorated concrete surface.
- Application of a specific sealer that is recommended for the materials of the bridge Sikagard Color A50 Lo-VOC (acrylic copolymer methacrylate resin based sealer).

Within the recommended rehabilitation design, applying a breathable, tintable concrete sealer (as noted above) is recommended to ensure the best results for the concrete used on the bridge.

In regard to the bridge's existing condition and whether it could be painted, it must be noted that the bridge could not be painted or sealed in its current condition without first abrasive blast cleaning of the surfaces as there is potential for mildew or other accretions to be present on the existing pargings / coatings. Painting will not remedy any surface imperfections nor provide any

restorative properties and painting in its existing condition without blast cleaning of the surfaces would likely result in the paint delaminating (peeling) which must be avoided given that this bridge spans the Moira River and this material should not be allowed to enter the river.

It is important that all applications on the original concrete are compatible and work as a system to properly protect the original concrete and also to ensure no delaminations or peeling occurs. Failure to apply proper coatings will decrease the longevity of the structure and increase the frequency of the repairs required. In consideration of all the issues noted herein, painting of this structure at this time cannot be recommended. Prior to issuing the contract for the rehabilitation of this bridge, staff and the design consultant will investigate whether there are any suitable “breathable” paint products which could be applied during or following the rehabilitation work and provide an update during Capital Budget discussions.

Closure of the Bridge

Upper Bridge is a key transportation connection within the City and it is important to understand the impacts before closing a significant bridge within the City. Some of the studies that should occur include a traffic study to ensure that the two remaining bridges (Lower and Sagonaska) are able to accommodate the increased traffic and to understand where the traffic using the bridge would be diverted to. Currently this bridge is the joining connection for those traveling from the east end of town to the west end along Station/Moira Street; as well as for northbound traffic on Pinnacle St trying to access Moira St W. Due to the “No Left Turn” at the Pinnacle-Moira Street intersection when travelling north across the Sagonaska Bridge, the permanent closure of the Upper Bridge would force vehicles to continue north to Grove Street, which would then have to come back south to Moira Street; or to travel south to Bridge Street and then back northerly to Moira Street West. Changes in traffic patterns, such as those mentioned above, can have large impacts on neighbouring streets and the City needs to determine those impacts and whether the neighbouring streets can handle the additional traffic.

In addition to the change in traffic patterns, the traffic signals within the local area are synchronized and would have to be analyzed prior to closing the Upper Bridge to maintain optimum traffic flow. The approaching roadways, intersections and signage would also have to be reconfigured due to turning lanes, restricted turns etc.

To address this inquiry the function and purpose of the structure and the traffic impacts associated with its closure will be considered through the update of the Transportation Master Plan which has been approved as a 2022 project.

Use as an Event Space

There has been discussions and interest in the closure of the bridge to create an event space of placemaking space. One definition of **placemaking** is “**creating places and focus on transforming public spaces to strengthen the connections between people and places.**” It is important to note that the City has undertaken a Downtown Commons Study to provide for this type of placemaking which has proposed extensive public spaces focused around the area by City Hall including the arena, Market Square, and Riverfront Commons. In addition, programmable spaces were considered during the reconstruction of Front Street whereby

sections of Front Street can be closed for events to become pedestrian promenades such as between Victoria Avenue and Campbell Street.

In considering potential uses for the Upper Bridge, should it be decided to close the bridge there are many opportunities that could be considered including winter ice skating for the Downtown core, evening concerts and there are endless opportunities that could be presented to Council. As well, shifting Downtown events to the Upper Bridge could potentially reduce staffing costs associated with road closures.

A Plan for the Downtown can provide a framework and a longer-term vision that identifies key opportunities and strategies to leverage public works and private sector development to enhance cultural resources and create artful, livable communities. This Plan would review all potential cultural spaces in the Downtown and surrounding areas to avoid the creation of underutilized spaces. Therefore it is recommended that a Plan for Downtown event spaces be considered before proceeding with a full-time bridge closure and conversion to an event or placemaking space.

Interim Considerations as an Event Space

Short term closures of the bridge for an occasional event would not have any long term traffic impacts or concerns and can be supported. However before the bridge is used as event space, it may be necessary to complete other assessments or reviews. For example it may be necessary to verify that the bridge is adequate and safe as an event space (i.e: the dead load of an ice rink in the winter could place unnecessary strain on the Bridge and may overload the bridge) and these assessments could be conducted as part of the event planning process.

Conclusion:

City Staff recommend that the projected repairs occur within the next two years and that the function of the Upper Bridge remains as it is within the City until it can be studied within the update of the Transportation Master Plan.

Approved by:

Stephen Ashton, Director of Engineering
Joseph Reid, General Manager
Cheryl Pallo, Administrative Coordinator
Christine Stewart, Deputy City Clerk
Rod Bovay, Chief Administrative Officer

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