

TO:	CHAIR AND MEMBERS CIVIC WORKS COMMITTEE MEETING ON JUNE 7, 2017
FROM:	KELLY SCHERR, P. ENG, MBA, FEC MANAGING DIRECTOR, ENVIRONMENTAL & ENGINEERING SERVICES AND CITY ENGINEER
SUBJECT:	BLACKFRIARS BRIDGE PROJECT STATUS UPDATE

RECOMMENDATION

That on the recommendation of the Managing Director, Environmental & Engineering Services and City Engineer the following actions **BE TAKEN** with respect to the Blackfriars Bridge Rehabilitation:

- (a) This report providing a project status update **BE RECEIVED** for information in coordination with the public meeting identified herein; and,
- (b) The Managing Director, Environmental & Engineering Services and City Engineer **BE DIRECTED** to authorize the exemption from the Canadian Highway Bridge Design Code (under Clause 15.3.1) to enable the retention and continued use of the existing lattice in the pedestrian railing, it being noted that the lattice railing is a significant heritage feature of the bridge.

PREVIOUS REPORTS PERTINENT TO THIS MATTER

- London Advisory Committee on Heritage (LACH) – May 10, 2017 – Heritage Alteration Permit Application at Blackfriars Bridge (2 Blackfriars Street)
- Civic Works Committee – April 25, 2016 – Blackfriars Bridge – Detailed Design & Tendering Appointment of Consulting Engineer
- Civic Works Committee – February 2, 2016 – Blackfriars Bridge - Environmental Study Report
- Civic Works Committee – May 26, 2014 – Appointment of Consulting Engineers, Blackfriars Bridge Environmental Assessment
- Civic Works Committee - September 9, 2013 – Blackfriars Bridge – Structural Repairs and Temporary Closure
- Civic Works Committee - March 18, 2013 – Blackfriars Bridge Detailed Structural Inspection
- Environment and Transportation Committee – April 26, 2010 – Appointment of Consulting Engineers - Traffic Study - Blackfriars Bridge Risk Assessment
- Environment and Transportation Committee – February 8, 2010 – Appointment of Consulting Engineers – Bridge Rehabilitation Program and Traffic Studies, Meadowlily Bridge Evaluation and Blackfriars Bridge Risk Assessment
- Environment and Transportation Committee – July 9, 2007 – Blackfriars Street Community Concerns

2015-19 STRATEGIC PLAN

The following report supports the Strategic Plan through the strategic focus area of Building a Sustainable City. Heritage conservation is an integral part of this focus area and includes managing and upgrading transportation heritage bridges through the Heritage Bridge Preservation Strategy and protecting and celebrating London's heritage for current and future generations.

BACKGROUND

Purpose

This report provides an update on the current status of the detailed design for the rehabilitation of Blackfriars Bridge and requests Council's direction to retain the existing lattice detailing in the pedestrian railing on Blackfriars Bridge.

Context

Blackfriars Bridge is located over the North Branch of the Thames River connecting Blackfriars Street to Ridout Street North. Blackfriars Bridge was erected in 1875.

Blackfriars Bridge is an individually heritage-designated property under Part IV of the *Ontario Heritage Act* in 1992 by By-law No. L.S.P.-3140-106. The bridge is also included in the Blackfriars/Petersville Heritage Conservation District which was designated under Part V the *Ontario Heritage Act* in 2015 and adjacent to the Downtown Heritage Conservation District which was designated under Part V of the *Ontario Heritage Act* in 2013.

Blackfriars Bridge is included on the Ontario Heritage Bridge List, a list of provincially-significant bridge structures. In 2016, Blackfriars Bridge was recognized as a National Historic Civil Engineering Site by the Canadian Society for Civil Engineering.

DISCUSSION

Background

Blackfriars Bridge is recognized as a nationally-significant cultural heritage resource. It is a rare example of a wrought iron bowstring arch truss bridge. It was fabricated by the Wrought Iron Bridge Company of Canton, Ohio and assembled under the supervision of Isaac Crouse, a noted London bridge builder in 1875. Blackfriars Bridge is the only known wrought iron bowstring truss bridge in Canada and the longest wrought iron bowstring span known in North America.

Blackfriars Bridge has been modified over its lifetime. Municipal records dating back to the 1940s document the maintenance and repairs to Blackfriars Bridge. Alterations in the 1950s introduced steel components into the wrought iron structure. These alterations have resulted in a “heavier” appearance. Replacement of the timber deck boards have been the most common recent alteration to Blackfriars Bridge.

Project Status

Over the past number of years the City of London has completed a risk assessment, a detailed structural inspection and an environmental assessment (EA) to chart the course for the future of this long-lived asset to our community. The EA recommended that the bridge be rehabilitated and re-opened to two-way pedestrian and cyclist traffic and one-way eastbound motor vehicle traffic.

Two requests for a Part 2 Order were submitted to the Minister of the Environment and Climate Change (MOECC) in response to the EA. The Minister, in a letter dated April 19th 2017, decided that an individual environmental assessment for this project was not required. This enables the project to proceed to construction. Conditions in the letter oblige the City to:

1. Within 5 years of the project completion, submit a report with additional traffic studies to the Director of the Environmental Approvals Branch at MOECC. This report shall study the traffic patterns of the bridge, and shall demonstrate the need for the continued use of the bridge for vehicle traffic. If it is determined that the bridge is no longer required for vehicle traffic within the City’s transportation network, the City shall document this determination in the report and consider converting the project to a pedestrian and cycling only bridge and acquire any necessary approvals for implementation.
2. The City shall develop a traffic safety plan for the project during the detailed design phase.
 - a) The traffic safety plan shall include a rationale for the use of a turn-around feature on Ridout Street
 - b) The traffic safety plan shall include traffic, pedestrian and cyclist safety mitigation measures that consider, but are not limited to:
 - i. Signage
 - ii. Line painting (sightlines)
 - iii. Calming measures (streetscaping)
 - c) The City shall consult with interested persons, including the Part 2 Order requesters, on the traffic safety plan prior to finalization of the Plan
 - d) The City shall submit the final traffic safety plan and documentation on the consultation to the Director of the Environmental Approvals Branch prior to operation of the project.
3. Once conditions 1 and 2 have been satisfied, the City shall notify the Director of the Environmental Approvals Branch.

Arrangements including an upcoming public meeting are underway to undertake these consultations with respect to the traffic safety plan.

The detailed design for the rehabilitation of this structure has resulted in a heritage alteration permit application that is currently in progress via the London Advisory Committee on Heritage (LACH) and the Planning & Environment Committee (PEC).

A pre-qualification of four contractors with a demonstrated ability and the expertise to compete the complex repairs required on Blackfriars Bridge has occurred due to the unique nature of the project. The project is progressing to tender and the commencement of the rehabilitation work is anticipated to begin by this fall.

A pre-construction Public Information Session to share the construction plans, schedule and traffic safety plan with interested attendees is being held as follows:

Date: June 7, 2017
Time: 5:00 pm to 8:00 pm
Location: St. George's Anglican Church
227 Wharncliffe Rd North

Rehabilitation Design

Rehabilitation of structures falls under the "Public Transportation and Highway Improvement Act" (R.S.O. 1990, CHAPTER P.50) which includes O. Reg. 104/97, "Standards for Bridges" and subsequent amendments, the latest being O. Reg. 472/10. This legislation invokes the Canadian Highway Bridge Design Code (CHBDC, CSA-S6.) and exceptions as governing the parameters for the design, evaluation and structural rehabilitation design for fixed and moveable highway bridges in Canada. The term "highway" is defined as "a common and public thoroughfare, e.g., a road, street, avenue, parkway, driveway, square, place, bridge, culvert, viaduct, or trestle, designed and intended for, or used by the general public for, the passage of pedestrians, cyclists, animals, or vehicles."

The CHBDC mandates that when rehabilitating an existing structure the proposed works bring the existing structure up to current bridge design codes, recognizing the advancements for safety requirements. This requirement becomes a challenge when dealing with a heritage structure and alterations or "sympathetic designs" may be required to meet this criteria.

The design team has taken a responsible and thoughtful approach to achieve this requirement while recognizing and retaining as much of the heritage attributes of Blackfriars Bridge as possible in the rehabilitation. On the bridge itself, the planned works will complete the following:

- Replacement of cover plates on top chord arches;
- Strengthening of top chord riveted connections;
- Modification to top chord hangers and diagonal connection details;
- Strengthening of vertical and diagonal truss members (approximately 15% of original members require replacement);
- Replacement of longitudinal stringers (from 1986 rehabilitation);
- Replacement of transverse floor beams (original 1875 construction);
- Modification to lower panel point connections (below the deck);
- Replacement of bottom lateral bracing (from 1986 rehabilitation);

- Repairs to top lateral bracing system;
- Repairs to pedestrian railing at sidewalk;
- Rehabilitation of bridge bearings and top portion of the abutments;
- Repainting of the bridge to match the existing green colour;
- Replacement of the timber deck with a more durable material in the vehicle lanes and wood on the pedestrian walkway;
- Repair of all primary members of the bridge by bolt or riveting rather than welding (due to impurities in the material, welding of wrought iron could result in the failure of the welds by brittle fractures after a number of stress cycles);
- Replication and installation of “Wrought Iron Bridge Company of Canton, Ohio” signs reusing salvaged wrought iron material; and,
- Illumination of the bridge structure and its approaches.

The rehabilitation is planned to occur off-site. This involves lifting the bridge off its abutments, disassembling, making repairs and modifications in a controlled shop environment, reassembling and lifting the bridge back into place on the rehabilitated abutments. Off-site rehabilitation will create a safer worksite, ensure better quality control, allow for hot riveting, reduce the need for environmental protection measures and take advantage of the winter months to complete much of the work.

With proper future maintenance, these planned works are expected to extend the life of Blackfriars Bridge for an additional 75 years.

Pedestrian Railing

Of particular focus through the design is the existing pedestrian railing pictured below in Figure 1. The lower portion of the railing (including the lattice) is original from the 1875 construction, with the top rail believed to have been added in the 1950s. The railing is a heritage attribute of Blackfriars Bridge. The existing openings in this railing are 180 mm wide. The current Canadian Highway Bridge Design Code (CHBDC) specifies a current maximum acceptable opening of 150 mm.

Figure 1 – Blackfriars Bridge – Existing Pedestrian Railing



The City's design consultant (Dillon Consulting Ltd) approached the Ministry of Transportation Ontario (MTO) as the Authority under the statute and the Canadian Standards Association (CSA) for code interpretation clarification on the question of accepting the existing 180mm opening size in the existing pedestrian railing. The response received was an interpretation of Clause 15.3.1 from the CHBDC, under the rehabilitation section, as meaning the 'owner can make this determination'. This means that the City of London can decide to accept the existing opening as is, even though it does not meet the current bridge design code.

The existing lattice/railing of Blackfriars Bridge has successfully performed its function for as long as available records can substantiate and current staff are not aware of safety concerns arising from railing lattice design. Retention of the existing railing would introduce no change in physical risk to users as compared to the previous condition that has existed since the 1950s rehabilitation.

City staff recommend that Council enable the retention and continued use of the existing heritage lattice in the pedestrian railing by directing the City Engineer to authorize the exemption from the Canadian Highway Bridge Design Code (under Clause 15.3.1). This recommendation is supported by Risk Management and Legal.

This issue was recently discussed during the presentation to LACH to support the heritage alteration permit application. LACH also recommends that the existing 1875 lattice in the pedestrian hand railing be accepted in its original configuration, despite not meeting the current design codes.

A similar condition exists in the City of Ottawa. The Minto East Bridge, another heritage structure shown in Figure 2, has recently been rehabilitated including the retention of its original pedestrian railings. Openings in the railings on the Minto East Bridge are wider than the lattice opening on the Blackfriars Bridge.

Figure 2 –Minto East Bridge, City of Ottawa –2016



If the opening in the lattice of the existing railing was required to be revised to comply with the 150 mm dimension to meet the current design codes, there would be a significant change in appearance, an adverse impact to this heritage attribute and an appreciable additional cost incurred to create a sympathetic new bridge component.

Sympathetic alterations must be made to the posts of the pedestrian railing to meet current safety criteria. Transportation staff are working with the City's Heritage Planner to finalize a design for that detail that conserves this significant heritage attribute while meeting the safety criteria of the CHBDC.

CONCLUSION

Blackfriars Bridge is unique structure that is a significant heritage asset for the City of London, the Province of Ontario and Canada. The rehabilitation of this iconic structure will extend its life, so that future generations of Londoners can enjoy this glimpse of London's past. The project is proceeding to construction this year and a public meeting is scheduled for June 7, 2017 to provide information.

The statute governing this type of work requires all major bridge rehabilitations to bring the existing structure up to the current bridge design codes of the day. The planned rehabilitation works for Blackfriars Bridge have taken a thoughtful and responsible approach to achieve this requirement while maintaining the heritage attributes of this bridge.

The original 1875 lattice in the pedestrian railing is a significant heritage attribute that contributes to the cultural heritage value of the Blackfriars Bridge. The opening size in the lattice is marginally greater than currently specified in the CHBDC. Clause 15.3.1. of the CHBDC allows the owner (the City) to choose to retain the original railing. City staff recommend directing the City Engineer to authorize an exemption to the CHBDC to retain the current design based on an evaluation of risk, heritage and cost.

Acknowledgements

This report was prepared with the assistance of Jane Fullick, Senior Technologist, Transportation Planning & Design Division and Kyle Gonyou, Heritage Planner.

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