

<b>TO:</b>	<b>CHAIR AND MEMBERS CIVIC WORKS COMMITTEE MEETING ON AUGUST 29, 2017</b>
<b>FROM:</b>	<b>KELLY SCHERR, P.ENG., MBA, FEC MANAGING DIRECTOR, ENVIRONMENTAL &amp; ENGINEERING SERVICES AND CITY ENGINEER</b>
<b>SUBJECT:</b>	<b>WENIGE EXPRESSWAY BRIDGE DRAINAGE Highbury Avenue South over Thames River South Branch</b>

<b>RECOMMENDATION</b>
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That, on the recommendation of the Managing Director, Environmental and Engineering Services and City Engineer, the following report with respect to drainage on the Wenige Expressway Bridge (4-BR-14) **BE RECEIVED** for information.

<b>COUNCIL'S 2015-2019 STRATEGIC PLAN</b>
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The following report supports the Strategic Plan through the strategic focus area of Building a Sustainable City by addressing and managing the infrastructure gap. The report provides a information related to the management of the transportation network.

<b>BACKGROUND</b>
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**Background**

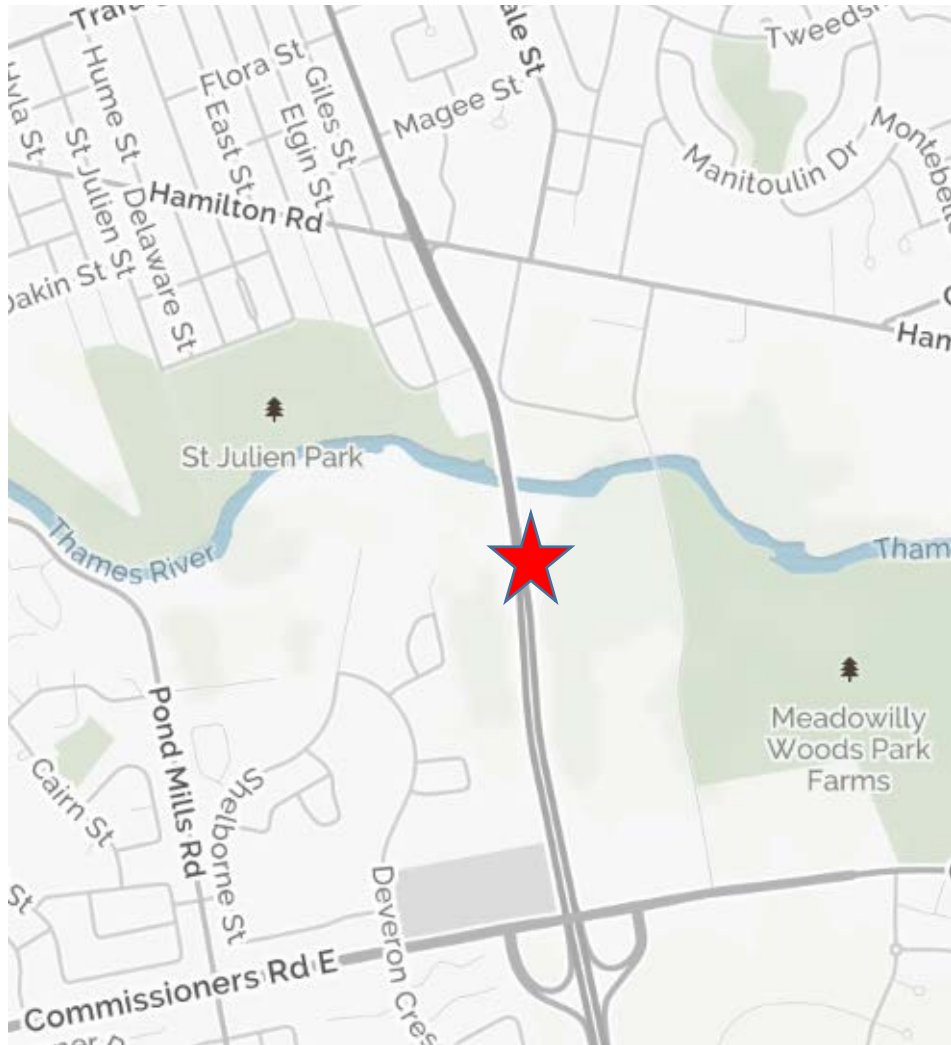
On May 16<sup>th</sup> 2017, Council resolved that the Civic Administration BE REQUESTED to review and report back with respect to current drainage issues and long term solutions for the bridge located at the Highbury Avenue extension.

Highbury Avenue South, south of Power Street is classed as a freeway carrying approximately 45,000 vehicles per day, with a posted speed limit of 100 km/h from south of Power Street to Highway 401. The existing Wenige Expressway Bridge (4-BR-14) carries Highbury Avenue South over the South Branch of the Thames River as illustrated in Figure 1. This report responds to the Council resolution related to reported poor drainage on the bridge deck affecting driver vision and comfort.

**Context**

The Wenige Expressway Bridge was constructed in 1965. The bridge has had one major rehabilitation completed in about 1989. Temporary concrete barriers were installed adjacent to the existing metal railings on the east side in 2009 and west side in 2011, after the metal railings were damaged by vehicle strikes. Recent temporary maintenance works have been done to maintain the expansion joints. Staff received reports that poor drainage of the deck became problematic during heavy rains this past spring.

Figure 1 – Location Map for Wenige Expressway Bridge



With only minor work being done on this structure since 1990, the current Structure Inventory Network Analysis places this bridge on the 6-10 year Major Repair program listing within the City's Bridge Management System (BMS).

In the past ten years records show that there have been 418 collisions on Highbury Avenue South between Power Street (south of Hamilton Road) to Hwy 401. Of these, only two collisions have been in the vicinity of the bridge.

## DISCUSSION

### **Bridge Condition**

From the 2015 BMS Inspection, this structure has an overall condition rating of 5.4 which suggests the bridge is in fair to poor condition and rehabilitation should be considered soon.

The bridge is currently on the recommended program for major repairs (based on available budget) under the 6-10 year timeline. The BMS report also recommends repairs and/or replacements of the expansion joints on this structure within the next five years, as there have been ongoing problems with them over the past few seasons. In the fall of 2016 the top plates of the expansion joints were welded down to stop their movement prior to the 2016-2017 winter season in order to prevent further damage by snow plows.

The general scope of future repair work is anticipated to include concrete repairs to the abutment walls, fascia, curb, wingwalls, soffit, deck and pier, bearing replacement, replacement of the railings with new concrete parapet walls, elimination/replacement of the expansion joints, coating of the structural steel, replacement of the guiderail, and installation of erosion/scour protection around the central pier and south abutment. Upgrades to existing lighting will also need to be considered.

## **Drainage**

This past spring, ponding on the bridge was identified as a concern. There are potentially two contributing factors to this situation.

The bridge has twelve 150 mm diameter deck drains spaced evenly along each side of the deck for a total 24 deck drains providing surface drainage. There are also catchbasins on the roadway, located just north and south of all four corners of the bridge.

Cleaning of these facilities is challenging due to the volume and speed of the traffic within this corridor, and requires a crash truck for worker safety. Cleaning of the deck drains is managed through the Roadside Operations Division and is completed annually. Maintenance/clearing of the catchbasins has been managed on an as needed basis by Sewer Operations Division.

With the accumulation of the sand and debris from winter maintenance activities, litter and debris, bridge deck drains and catchbasins are prone to becoming blocked. The cleaning programs managed by Roadside Operations and Sewer Operations Divisions are usually adequate to clear these blockages prior to any issues developing. However, this year, significant rainfall events occurred before annual cleaning operations were completed resulting in the ponding issues witnessed.

While the situation is currently resolved, it remains an ongoing maintenance requirement. To improve the drainage condition around the bridge, the four existing catchbasins will be added to the Sewer Operations Division's annual catchbasin cleaning program. To maximize on efficiency, the four catchbasins will be cleaned in coordination with the annual bridge maintenance program that includes the utilization of a crash truck in order to comply with legislative safety requirements.

## **Future Capital Plans**

Due to ongoing and escalating repairs, this structure has been identified to have a Preliminary Structural Design Inspection Report completed this year to assess the full scope of rehabilitation required and the estimated costs of these works. This will allow Transportation Planning and Design Division to develop the capital strategy and timing for these repairs to be completed. The functionality of the deck drains will be considered the upcoming structural assessment.

Pavement rehabilitation, including the concrete pavement that exists on much of the Highbury Avenue freeway south of this structure, is also a near-term asset management need that is under consideration. This will likely require replacement of the concrete pavement which is a costly undertaking for which a financial plan will be required. The pavement deterioration is slow and the need is not urgent. However, when necessary, costs will be significant in the order of \$15 to \$20 M.

The traffic management for the bridge and pavement rehabilitation would be most cost-effective if completed in one coordinated contract. The Wenige Expressway Bridge will likely be scheduled for rehabilitation in the mid to late 2020's. The bridge need will take precedence and proceed independent of the pavement rehabilitation if necessary.

<b>CONCLUSION</b>
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Staff have become aware of drainage concerns on the Wenige Expressway bridge deck. Maintenance cleaning of deck drains and catch basins will be managed on an enhanced basis to reduce the risk related to the substandard drainage arrangement on the bridge.

Future capital work on the structure will provide an opportunity for a better longer term solution to this issue. This issue will be considered in the upcoming preliminary structural design inspection report being commenced in the near future.

**Acknowledgements**

This report was prepared with assistance from Rob Burnard, C.E.T. Transportation and Roadside Operations Division and Jane Fullick, C.E.T., Senior Technologist of the Transportation Planning and Design Division.

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