

Municipality of Chatham-Kent
Infrastructure and Engineering Services
Engineering and Transportation Division

To: Mayor and Members of Council

From: Jason Cikatricis, C.E.T.,
Engineering Technologist

Date: June 13, 2020

Subject: Lord Selkirk Bridge over the Sydenham River – Bridge Rehabilitation,
Community of Wallaceburg.

Recommendations

It is recommended that:

1. The contract amendment in the amount of \$95,188.94 (including HST) for additional design, contract administration and inspection of the rehabilitation of the Lord Selkirk Bridge over the Sydenham River, be awarded to AECOM Canada Ltd.
2. The Mayor and Clerk be authorized to enter into the recommended agreements.

Background

The Lord Selkirk (McNaughton Avenue over Sydenham River) bridge was built in 1950. The structure has a south-north orientation and is located on McNaughton Avenue 0.1 km south of Dufferin Avenue in the community of Wallaceburg. This twin leaf bascule bridge carries 2 lanes of predominantly vehicular traffic across the Sydenham River in 9 non-continuous spans with a total crossing length of 109.51 m and a maximum clearance of 7.5 m. The deck has a travel width of 9.64 m and an overall width of 14.62 m.

With an Annual Average Daily Traffic volume (AADT) of 19,100, this crossing is heavily used with truck volumes accounting for 25 to 50 percent of the total traffic. This structure is part of the Ministry of Transportation (MTO) Connecting Link roadway network.

A single load posting of 15 tonnes was posted in November 2016 following a Detailed Condition Assessment. Structural steel repairs were completed in February 2017 to allow the load posting to be increased from a single load posting to a triple posting of 15/25/40.

In December of 2017, Chatham-Kent Council awarded a Request for Proposal (RFP) to AECOM Canada Ltd. (AECOM) for the rehabilitation design, construction administration, and inspection of the Lord Selkirk Bridge over the Sydenham River to remove the load posting and return it to full traffic loading according to the Canadian Highway Bridge Design Code (CHBDC). A traffic impact study formed part of the scope of work in order to manage traffic flows on surrounding roads once the bridge is closed to all traffic.

The rehabilitation involved structural, mechanical, and electrical repairs which will allow this structure to continue to operate as a moveable bridge, while achieving the overall goal of removal of the load posting.

The contractor, Landform Civil Infrastructures (LCI), commenced work on March 1, 2019 and continued to work approximately 6 days a week until the project was nearly complete at the end of November 2019. Small amounts of remaining work continued into December 2019, and continued from January 2020 until May 2020. In order to try to mitigate cost over-runs as much as possible, AECOM reduced the hours of inspections when they could, in order to maximize the contract administration and inspection budget.

Comments

During the 14 months of construction, AECOM and LCI Canada Ltd. worked together to complete the bridge rehabilitation as tendered. As with all rehabilitations, especially moveable bridge rehabilitations, once the work proceeded into different stages of construction, there were a number of unforeseen issues that had to be resolved. Some of the issues could not have been included as part of the original tendered design because it would not become evident until the bridge was disassembled. Therefore, due to the number of unforeseen issues, the contractor and consultant had to spend more time and costs to complete the rehabilitation.

The additional work that had to be completed is listed below:

- Temporary traffic signals had to be installed at the intersection of Reaume Avenue and Murray Street to help manage the traffic detour. Due to a very large number of buried and overhead utilities at this intersection, AECOM had to assist in the re-design of the pole and wiring locations in order to avoid conflicts with the existing Bell and Cogeco lines, natural gas mains, and overhead and buried hydro cables.
- According to the tender, the open steel deck grating was to be removed, repaired and re-installed. The contractor confirmed that the number of welds holding the grating onto the beams (in excess of 5500) would take a significantly longer time than estimated and extra fees would be required. Due to the very large number of welds, if the existing open steel grating was removed, it would not be structurally sound to be reinstalled. The most financially responsible action to take was to replace the open steel deck grating with new grating. The contractor was very fair at giving Chatham-Kent a credit for the removal costs of the grating, and applying that cost to the purchase of new deck grating. AECOM had to complete the inspection of the partial removal of the existing grating and the inspection of the installation of the new grating; plus design and specify the details for the new grating.
- According to the tender, the concrete and steel access panels on either side of the bridge, used to access the mechanical equipment (5-6 m below), were to be rehabilitated. Upon further investigation, the existing access panels had been welded and concreted into place therefore simple removal was not possible. The concrete and steel access panels, and their frames, had to be completely removed by cutting, chipping and grinding. The panels and their frames had to

be completely replaced with new panels. AECOM had to design and inspect the fabrication and installation of these hatches, as they are a structural component carrying vehicular traffic above.

- The existing pier sidewalk stringers were in poorer condition than originally thought which required a structural evaluation. New connections had to be designed and implemented by AECOM.
- The existing steel access walkway platform in the north bascule pit was failing and damaged while operating the north leaf of the bridge. AECOM needed to completely re-design the steel walkway to new safety design standards, as well as oversee the fabrication and installation.
- The existing south bascule girder had an existing twist in it that only appeared after additional structural elements (stringers and floor beams) were removed. The twist of this bascule girder had to be properly investigated and evaluated as this was a major structural element of the moveable component of the bridge. AECOM had to do additional analysis and calculations to ensure there was enough structural capacity in the existing girder considering the twist issue. AECOM confirmed that the twisted girder could be twisted back into proper alignment with the proper method and order of operations. LCI's methodology had to be reviewed by AECOM's structural engineer prior to any work commencing. The girder was twisted back into the proper orientation, and the new stringers and floor beams were installed as originally designed.
- Once the large steel bascule girders were sandblasted and prepared for the new painting system; a large number of structural rivets were in very poor shape and required replacement. AECOM staff had to inspect all the rivets on all four (4) large bascule girders and direct the contractor on which structural rivets needed replacement. The number of rivet replacements and methodology on how they needed to be replaced had to be specified by AECOM. These structural rivets hold the large bascule girders together, therefore it was critical that the rivets are replaced in a specific order to not compromise the integrity of the steel girders while they are repaired in place.
- High hazardous materials contained in the existing paint (throughout various rehabilitated bridge elements) resulted in additional precautions during paint removal. This resulted in an approximate six (6) week addition to the construction schedule. AECOM had to oversee the paint sampling and testing, as well as review and approve the required containment and removal system used by the contractor.

Comments cont'd

- Since this is a movable bridge, when the bridge is in the closed position to allow vehicular traffic, there is a locking jaw mechanism (referred to as the span lock), that connects the north span and south span; allowing the structure to carry vehicular traffic. Rehabilitation of the span lock was not required as part of the original tender. After most of the structural rehabilitation was completed, noise and vibration developed which resulted in the need for two (2) pins in the span lock to be replaced. Both pins were non-standard and had to be specially fabricated. This extended the work by approximately two (2) to three (3) months and required engineering assistance. AECOM had to identify and design which two (2) pins had to be replaced, and with what size. The fabrication of the pins and the methodology of the pin replacement had to be reviewed, approved, and inspected by AECOM.
- There were significant repairs required to the concrete piers / pits as the concrete was soft. The contractor needed to chip and remove all of the soft concrete (a larger quantity than shown in the tender documents) which took more time and inspection by LCI and AECOM.
- The concrete steps to the north control tower were in poorer shape than originally thought and had to be reconstructed. Because the work was tedious and over open water; the design and method of the rehabilitation of the concrete steps had to be completed by AECOM in order to avoid additional costs to install another work platform below.
- The existing brakes that are used to slow the bridge while raising and lowering the spans, were found to be faulty and had to be replaced. AECOM's mechanical and electrical engineers had to assist in the removal, replacement and set up of the brake replacements.
- There were multiple shop drawing reviews and delayed deliveries due to the ability to find aging replacement components. Some components such as the manual transfer switch, surge protection devices and industry approved navigational lighting took significantly longer to deliver and install.
- To ensure proper and reliable operation of the bridge, additional testing and commissioning has been required (in addition to the original scope). The operational issues are attributed to the age of the structure. In order to be financially responsible with this bridge rehabilitation, portions of the existing electrical and mechanical components were re-used that have caused some of the issues.

The recommended contract amendment costs are for additional design, contract administration and inspection of the rehabilitation of the Lord Selkirk Bridge over the Sydenham River.

Areas of Strategic Focus and Critical Success Factors

The recommendations in this report support the following areas of strategic focus:

- Economic Prosperity:
Chatham-Kent is an innovative and thriving community with a diversified economy
- A Healthy and Safe Community: Chatham-Kent is a healthy and safe community with sustainable population growth
- People and Culture:
Chatham-Kent is recognized as a culturally vibrant, dynamic, and creative community
- Environmental Sustainability:
Chatham-Kent is a community that is environmentally sustainable and promotes stewardship of our natural resources

The recommendations in this report support the following critical success factors:

- Financial Sustainability:
The Corporation of the Municipality of Chatham-Kent is financially sustainable
- Open, Transparent and Effective Governance:
The Corporation of the Municipality of Chatham-Kent is open, transparent and effectively governed with efficient and bold, visionary leadership
- Has the potential to support all areas of strategic focus & critical success factors
- Neutral issues (does not support negatively or positively)

Consultation

The tenders were received by the Purchasing Officer and reviewed by the Engineering and Transportation Division.

Financial Implications

Financial Implications
 Lord Selkirk Bridge over the Sydenham River – Bridge Rehabilitation
 Project Costs

Recommended Tender (Including HST)	\$ 95,188.94
Less HST Rebate 11.24%	-\$ 9,468.35
Total Current Project Costs	\$ 85,720.59
Total Current Project Funding	\$ 85,720.59

This amendment cost represents a 12.6% overage to the original consulting contract for the Lord Selkirk Bridge rehabilitation.

The total current project costs listed above will be funded from the Bridge Lifecycle Reserve, which includes funds under the Association of Municipalities of Ontario (AMO) Federal Transfers of Federal Gas Tax Funding Agreement.

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