

Emergency Non-competitive Contract with OJCR Construction Ltd., to Secure a 2100mm Transmission Watermain

Date: March 12, 2021

To: General Government & Licensing Committee

From: General Manager, Toronto Water and Chief Procurement Officer, Purchasing and Materials Management Division

Wards: Scarborough-Guildwood (Ward 24)

SUMMARY

The purpose of this report is to advise Toronto City Council, pursuant to Chapter 195 of the Toronto Municipal Code (Purchasing By-law, Section 195-7.4), of a non-competitive contract with OJCR Construction Ltd. (OJCR) to procure emergency general contracting and construction services to structurally secure a 2100 millimetre (more than seven feet in diameter) transmission watermain for a total value of \$6,529,231.81 (\$6,644,146.29 net of HST recoveries).

The issuance of this non-competitive construction contract was a matter of extreme urgency due to the high risk of the watermain failing and causing catastrophic damage to the surrounding properties, the potential washout of Ellesmere Road and to protect health and safety. The 2100 millimetre watermain has now been permanently secured, the culvert structurally rehabilitated and the surrounding area restored.

In consultation with the Purchasing and Materials Management Division, this emergency procurement could not be reported to the General Government and Licensing Committee and Council in the required timeframe. This was as a result of the requirements for Toronto Water to investigate and undertake the critical emergency construction work and to properly reconcile and approve all payments to the contractor/subcontractors – a process that was finalized in December 2020. Reporting back to City Council is required in accordance with Municipal Code Chapter 195, Purchasing, where the potential value of the non-competitive contract exceeds \$500,000 as per Article 7, Section 195-7.4(B) of the Purchasing By-law.

RECOMMENDATIONS

The General Manager, Toronto Water and the Chief Procurement Officer, Purchasing and Materials Management Division recommend that:

1. City Council receive this report for information.

FINANCIAL IMPACT

The total emergency non-competitive contract (PO # 6049786) was issued for \$6,529,231.81 (\$6,644,146.29 net of HST recoveries) under the emergency provision of the Purchasing By-law.

This emergency non-competitive contract was funded from the 2019 Approved Operating Budget and 2020 Approved Operating Budget for Toronto Water through unused contingencies and various contract savings.

Table 1: 2019 & 2020 Operating Budget Financial Impact Summary

Contract Period	Total Amount (net of HST recoveries)
2019 Expenditures (TW2040)	\$4,443,829.92
2020 Expenditures (TW2040)	\$2,200,316.37
Total Amended Contract Value	\$6,644,146.29

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

DECISION HISTORY

There is no decision history.

COMMENTS

On April 25, 2019, during routine inspection, Toronto Water (TW) discovered an exposed section of a 2100 millimetre transmission watermain (located under Ellesmere Road east of Neilson Road – see Figure 1) as a result of the collapse of a 3,000 millimetre (nearly 10 feet in diameter) culvert (a tunnel that carries a stream or open drain under a road or railroad). The culvert conveys water from the Highland Creek under Ellesmere Road; the transmission watermain conveys 380,000,000 litres of potable drinking water daily.

Figure 1: Location of undermined 2100mm transmission watermain



Transmission watermains are very large pipes that move enormous quantities of potable water at high pressure and this particular transmission watermain is directly connected to the F.J. Horgan Water Treatment Plant.

The transmission watermain became exposed and lost its structural support provided by the soil that had been washed out during the slope and culvert collapse. The exposure of the watermain was deemed an emergency by the General Manager of Toronto Water, under Chapter 195-7.1(G) of the Municipal Code,

TW engaged the City's emergency response contractor OJCR to mobilize and continuously work until the 2100 millimetre watermain was secured against the failed slope (see Figures 2 and 3). For safety of the personnel onsite, the surrounding properties and the public, the F.J. Horgan Water Treatment Plant was required to temporarily halt potable water production in the event that the transmission watermain failed.

Once the site was stabilized and it was safe to conduct further investigation, it was determined that the failed culvert (see Figure 2) had significantly deteriorated beyond the collapsed section and continued to pose a high risk of imminent slope failure. This required rehabilitating the remaining section of the culvert using a method called slip lining (a process used to stop infiltration and restore structural integrity to an existing pipe).

In order to complete the emergency work, OJCR engaged specialized sub-contractors to provide the following construction services: heavy equipment and earthworks (dump trucks, bulldozers, backhoe, excavators, vacuum excavators, etc.), engineers (civil, geotechnical, structural), riprap, armour stone, concrete, pipe, pipe lining, grout, etc.

Figure 2: Failed culvert and site safety preparation



Figure 3: Mobilization of equipment to complete emergency repairs



On April 26, 2019, TW submitted an emergency declaration to the Toronto and Region Conservation Authority (TRCA) as the worksite was located in their jurisdiction. The TRCA required TW to additionally design and reconstruct the slope and outfall for the culvert as well reinstate and restore a section of Highland Creek.

Below is a summary of some of the key components of the work completed through the emergency non-competitive contract (PO # 6049786) from April 2019 to July 2020.

Making the worksite safe for construction (\$869,860)

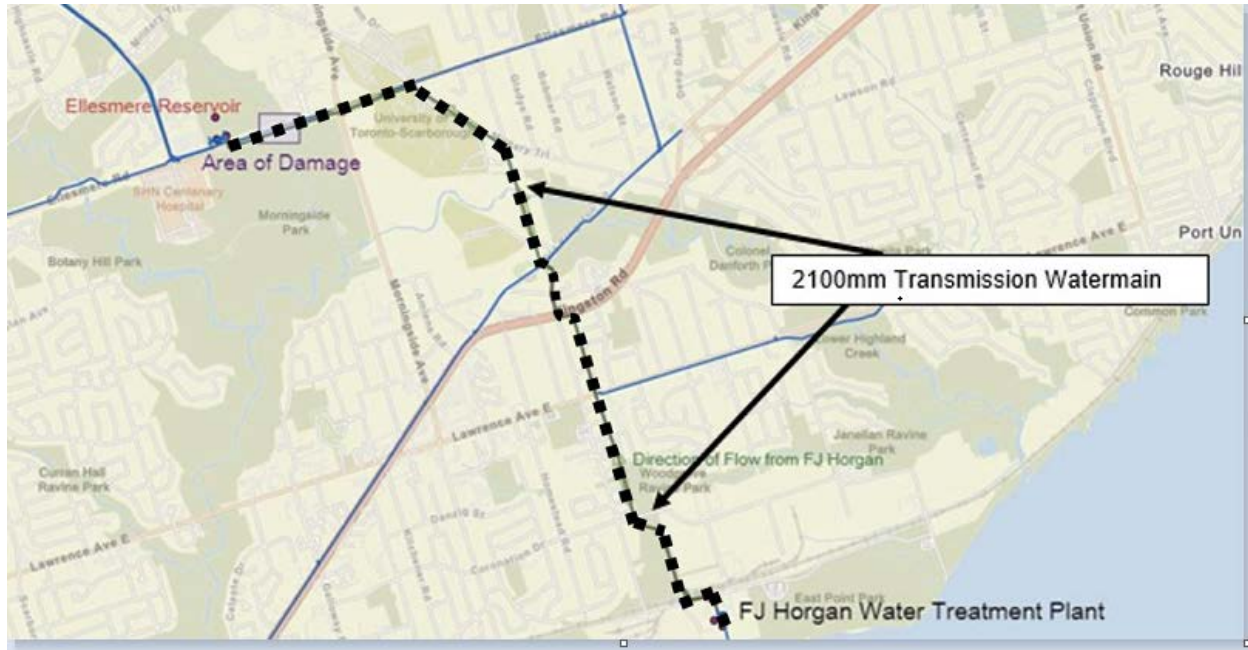
The failed slope and location posed many obstacles for safety and access. In order to access the location of the failure in a safe manner, the contractor constructed an 80 metre (262 feet) long temporary access road from Ellesmere Road down to the creek bed which was approximately 10 metres (32 feet) lower than Ellesmere Road (see Figure 3).

Once the temporary access road was completed the contractor and sub-contractors built a staging area where they positioned the necessary equipment to further assess the failure and determined a method to construct a permanent support structure for the transmission watermain. As a temporary measure, the contractors supported the watermain with steel plates and steel I-beams while the construction continued.

As the culvert is below the transmission watermain (see Figure 2), the contractors used timber supports to build a form structure around the culvert up to the base of the watermain. Once the timber form was completed the contractors installed a floor structure between the watermain and the culvert, and filled the form with concrete. This created a monolithic support structure from the bottom of the culvert to the bottom of the transmission watermain to fill the void that was created during the slope failure.

An additional complexity to the emergency work is the direct connection of the transmission watermain to the F.J. Horgan Water Treatment Plant that also supplies potable water to the underground Ellesmere water reservoir (see Figure 4). Water reservoirs provide additional storage to ensure an uninterrupted supply of drinking water. The F.J. Horgan Water Treatment Plant was temporarily taken out of service as a precaution which resulted in the reservoir being drained and replenished. Once the permanent support structure for the transmission watermain was put in place, the F.J. Horgan Water Treatment Plant began production of potable water again and staff were able to put the transmission watermain back into service while the work was underway.

Figure 4: Location of area of damage, Ellesmere Reservoir, F.J. Horgan Water Treatment Plant and the 2100 millimetre transmission watermain



Culvert repair and securing the transmission watermain (\$2,276,184)

Once the transmission watermain was secured, TW was able to conduct a detailed internal investigation of the damaged culvert. The investigation found the remaining culvert section required immediate rehabilitation as it had also lost its structural integrity causing further failure to be imminent. Further failure of the culvert posed a significant risk to the collapse of Ellesmere Road and additional slope failure which would cause the watermain to lose its structural integrity once again.

The two options to rehabilitate the culvert were to either fully replace the culvert with an open excavation, or to slip-line the internal structure of the existing culvert. Full replacement would require a much more extended construction schedule and would close Ellesmere Road for the duration of the construction. Another significant drawback of full replacement of the culvert was the location of the road closure restricting a main access route to Scarborough Health Network Centenary Hospital. The time critical nature of the repair was a priority to reduce risk of failure and it was determined the slip-lining method would be most expedient and effective.

To prepare the existing culvert for slip-lining the contractor performed multiple spot repairs on the existing culvert structure. In addition to the repairs, the contractor installed a grout pipe system to fill the annular void between the existing culvert and the slip-line pipe, a skid system to enable the slip-line pipe to be pushed through the existing culvert and a loading platform to stage and align the sections of the slip-line as they were being installed. Once all the sections of the slip-line pipe were installed within the existing culvert structure the contractor installed the section of the culvert that had broken off and washed away during the slope failure. With the new slip-lined structure completely installed the contractor fused each section of the slip-line pipe to its adjacent section and grouted the annular void around the newly installed slip-line pipe. With this

new structure in place the transmission watermain was now permanently secured and no longer at risk of further failure.

TRCA requirements - slope stability (\$3,383,188)

During the repair of the culvert, a site meeting was held on May 6, 2019 between TW and the TRCA to discuss the City's submission of the emergency declaration to the TRCA. As a result of the site meeting, TRCA provided requirements that TW retain a geotechnical engineer to assess the slope stability and design stabilization measures including a headwall (a wall of masonry or concrete built at the outlet of a drainpipe or culvert) as part of reinstating the slope. The geotechnical engineer commenced a site survey to collect data using bore holes and submitted a series of designs that required revisions with a final design sent to TRCA on August 14, 2019. On September 3, 2019, TW received design approval from TRCA and began construction immediately after the culvert rehabilitation was completed.

The contractor began with the installation of the support structure for the headwall. This included excavation and construction of forms for the steel reinforced concrete foundation. Once the foundation was complete, the contractor installed and secured the precast headwall to the foundation and backfilled the remaining excavated area. With the headwall installed, the contractor began reconstruction of the outfall from the headwall down to and including the creek banks. This included installation of armour stone to rebuild the creek bank, as well as to create a stepped slope which was used to diffuse the flow and mitigate future erosion of the newly installed creek banks. Finally, the contractor reinstated the slope that had washed away and installed all surface restorations (see Figure 5) including terraseed and sod and any hard surfaces that had been damaged by construction such as concrete sidewalks and asphalt walkways.

Figure 5: Full Site Restoration



The Fair Wage Office has reported that OJCR Construction Ltd. has reviewed and understands the Fair Wage Policy and Labour Trades requirements. They have also agreed to fully comply.

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