

# **Emergency Non-Competitive Contract with Clearway Construction Limited to Rescue a Micro-Tunneling Boring Machine on Old Mill Drive for Assignment 5-01 Under the Basement Flooding Protection Program Phase 4**

**Date:** February 16, 2023

**To:** General Government Committee

**From:** Chief Engineer and Executive Director, Engineering and Construction Services and Chief Procurement Officer, Purchasing and Materials Management Division

**Wards:** 4 (Parkdale-High Park)

## **SUMMARY**

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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 Clearway Construction Limited, to procure construction services to rescue a micro-tunnelling boring machine on Old Mill Drive (north of Bloor Street), for Assignment 5-01 under the Basement Flooding Protection Program Phase 4, for a total value of \$8,997,161 excluding HST (\$9,155,511 net of HST recoveries).

The issuance of this non-competitive contract was a matter of extreme urgency, as there was a significant health and safety hazard to the public. The micro-tunnelling boring machine which was being used to construct a new 900 millimetre diameter storm sewer along Old Mill Drive, was ensnared by unforeseen steel tiebacks which had been used to previously brace shoring from two mid-rise development excavations. The integrity of the roadway, nearby subway tunnel and surrounding infrastructure was undermined as a result of ground movement around the micro-tunnelling boring machine due to excessive ground water and poor soil conditions. This ground instability further led to the creation of a sinkhole in the work zone.

The non-competitive contract was required to allow the contractor, Clearway Construction Limited, to review the impacted area and safely proceed with the micro-tunnelling boring machine rescue operations, including de-stressing and removing steel tiebacks; and jet and compaction grouting to stabilize the ground.

This repair was deemed an emergency during Council Recess under Chapter 195-7.1 (G) of the Municipal Code. Reporting back to City Council is required in accordance with Municipal Code Chapter 195, Purchasing, Article 7, Section 195-7.4(B) where an emergency non-competitive contract exceeds \$500,000.

## RECOMMENDATIONS

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The Chief Engineer and Executive Director, Engineering and Construction Services and the Chief Procurement Officer, Purchasing and Materials Management recommend that:

1. City Council receive this report for information.

## FINANCIAL IMPACT

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The total emergency non-competitive contract, Purchase Order Number 6054015, was issued for a total value of \$8,997,161 (\$9,155,511 net of HST recoveries) under the emergency provision of the Purchasing By-law.

Forecasted expenditures are shown in Table 1 below. The emergency work performed in 2022 will be funded from the 2022 Approved Capital Budget and 2023-2031 Approved Capital Plan. Expenditures forecasted for completion of this emergency project in 2023 will be funded from the 2023 Approved Capital Budget and 2024-2032 Approved Capital Plan. The approved cashflow for 2022 to 2023 is shown in Table 1 below.

**Table 1: Financial Impact Summary**

<b>WBS Element/ Description</b>	<b>2022</b>	<b>2023</b>	<b>Total (Net of HST Recoveries)</b>
CWW421-17-19 Basement Flooding Relief - Group 4 (Construction) Re: Hand Mining Micro-tunnelling boring machine recovery and additional scope for tieback removal	\$4,784,447	\$0	\$4,784,447
CWW421-17-19 Basement Flooding Relief - Group 4 (Construction) Re: Improve ground conditions utilizing two phase compaction grouting	\$1,642,045	\$182,449	\$1,824,494
CWW421-17-19 Basement Flooding Relief - Group 4 (Construction) Re: Contingency	\$2,000,000	\$546,569	\$2,546,569
<b>Total (Net of HST Recoveries)</b>	<b>\$8,426,492</b>	<b>\$729,019</b>	<b>\$9,155,511</b>

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

## **DECISION HISTORY**

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At its meetings of September 24, 2008 and September 21, 2011, Council adopted criteria to prioritize, and sequence recommended Basement Flooding Protection Program projects that are identified through completed studies to protect the greatest number of properties as soon as possible, within approved budgets, as appropriate funding opportunities are available and in coordination with other capital project and population growth needs in the area. The Council adopted criteria and the corresponding staff reports can be found at:

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2008.EX23.16>

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2011.PW7.6>

At its meeting of July 19, 2017, Bid Award Panel adopted the award of Request for Proposal No. 9117-17-7067 in accordance with the Contract Details set out in the report (July 11, 2017) from the Director, Purchasing and Materials Management for the provision of Detailed Design and Construction Administration Engineering Services for Assignments under the Basement Flooding Protection Program Phase 4, for the years 2017 to 2024, to WSP Canada Group Limited for a Contract Award Value of \$8,045,004 net of HST recoveries. The Council adopted item and the corresponding staff reports can be found at: <https://secure.toronto.ca/council/agenda-item.do?item=2017.BA32.8>.

At its meeting of June 18, 2019, Council granted the authority to apply for federal funding under the Disaster Mitigation and Adaptation Fund and to enter into and execute agreements, including any amendments, with the Government of Canada under the Disaster Mitigation and Adaptation Fund on terms and conditions satisfactory to the City Manager and the Chief Financial Officer and Treasurer and in a form satisfactory to the City Solicitor. The Council adopted item and the corresponding staff reports can be found at:

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2019.EX6.4>

At its meeting of November 25 and 26, 2020, Council adopted the amended threshold for the cost per benefitting property at the preliminary design phase, and direct that projects identified through completed Basement Flooding studies proceed to detailed design and construction, if the cost per benefitting property, as determined during the preliminary design phase, is less than the amended threshold. The Council adopted item and the corresponding staff reports can be found at:

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2020.IE17.5>

At its meeting of July 21, 2021, Bid Award Panel adopted the award of Contract Number 20ECS-LU-01FP, Request for Tender Ariba Doc Number 2834835422, in accordance with the Contract Details set out in the report (July 15, 2021) from the Chief Procurement Officer for the construction of sewer upgrades and related improvements for Basement Flooding Protection Program Phase 4, Assignment 5-01 on Catherine

Street and Old Mill Drive to Clearway Construction Inc. for a Contract Award Value of \$7,197,303 net of HST recoveries. The Council adopted item and the corresponding staff reports can be found at: <https://secure.toronto.ca/council/agenda-item.do?item=2021.BA145.2>.

At its meeting of December 15, 16 and 17, 2021, Council adopted the 2022 Rate Supported Budgets - 2022 Water and Wastewater Consumption Rates and Service Fees. In support, a briefing note titled "2022 Capital Budget Briefing Note - Basement Flooding Protection Program - Program Status Update and Project List: 2022 to 2026", contains the updated planned schedule for engineering design and construction of infrastructure upgrades supporting Toronto Water's Basement Flooding Protection Program. The Council adopted item and supporting Briefing Note can be found at: <http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2021.EX28.6>  
<https://www.toronto.ca/legdocs/mmis/2021/ex/bgrd/backgroundfile-173775.pdf>

## COMMENTS

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### Background

As a part of the City of Toronto's Basement Flooding Protection Program Phase 4 Contract 20ECS-LU-01FP, Clearway Construction Limited (the Contractor), was required to install a 900 millimetre diameter storm sewer on Old Mill Drive. The 282 metre long section between maintenance holes OD5 and OD8 (see Figure 1) was to be constructed by micro-tunnelling, a trenchless construction methodology. The proposed scope of work included crossing the Toronto Transit Commission's Line 2 subway tunnel just north of maintenance hole OD8. The Contractor retained a micro-tunnelling subcontractor, Earth Boring CO Limited, to complete the micro-tunnelling work, including tunnel entrance and exit shafts, which would subsequently form maintenance holes OD5 and OD8.

Figure 1: Location of proposed 900mm diameter storm sewer on Old Mill Drive between maintenance holes OD5 and OD8



On March 9, 2022, the Contractor commenced the micro-tunnelling from maintenance hole OD5 utilizing a specialized micro-tunnel boring machine consisting of a cutting wheel head and a tail can section supplied. The micro-tunnelling boring machine encountered a vertical alignment issue, which caused it to deviate off its alignment, requiring the machine to be rescued. In May 2022, Earth Boring CO Limited commenced the rescue of the micro-tunnelling boring machine using maintenance hole OD8 as a rescue shaft.

On June 9, 2022, during installation of the concrete shoring for the OD8 shaft, the contractor encountered an existing steel tieback within the alignment of the horizontal recovery shaft. Upon further investigation, it was determined that the steel tieback was part of a deep foundation shoring system for the construction of mid-rise buildings at 1 and 2 Old Mill Drive which flank the 20ECS-LU-01FP contract limits near the intersection of Old Mill Drive and Bloor Street.

The Contractor prepared a plan to safely de-stress, cut and remove the steel tie back, ensuring the safety of both the adjacent permanent building structures and their foundations. The Contractor retained a specialist tieback subcontractor, HC Matcon Incorporated, who assessed the conditions on site and prepared a site-specific plan.

The structural engineer of record for the development works and building shoring systems of 1 and 2 Old Mill Drive, Isherwood Geotechnical Engineers, was also consulted to provide background information on the developer's shoring system. The alignment of the micro-tunnelling boring machine recovery was reviewed against the background data and it was determined that there were up to 14 existing tiebacks that could conflict with the micro-tunnelling boring machine recovery alignment.

Upon discovery of the extent of the potential tiebacks, alternative construction methodologies to facilitate the micro-tunnelling boring machine recovery operation were investigated to optimize the rescue while minimizing the cost, as follows:

**Table 2. Proposed Options for Micro-tunnelling boring machine Recovery**

Option	Description of Additional Scope	Total Cost (excluding HST)
Option 1. Additional Scope for Tieback Removal	Hand mining the micro-tunnelling boring machine recovery works, including the removal of a maximum of 14 tiebacks in conflict with the recovery operations.	\$4,701,697.48
Option 2. Additional Scope for Rescue Shaft	Construction of an 8.0metre diameter vertical recovery shaft for extrication of the micro-tunnelling boring machine with repositioning of the proposed OD8 maintenance hole to the recovery shaft location.	\$6,631,154.48
Option 3. Additional Scope for New Shaft & Abandon Machine	Full abandonment of the micro-tunnelling boring machine with construction of a 4.0metre diameter shaft with repositioning of the proposed OD8 maintenance hole to the new shaft location.	\$10,460,131.01

City staff in consultation with the City's engineering design consultant, WSP Canada Group Limited, reviewed the three options, and opted to proceed with Option 1 to continue with the hand mining micro-tunnelling boring machine recovery works including destressing and removal of up to 14 tiebacks, as this approach carried the least risk and lowest cost at \$4,701,697 excluding HST (\$4,784,447 net of HST recoveries).

The contractor proceeded with the hand mining operation and has mined and hydraulically jacked 7.5 metres of the total 12.5 metre micro-tunnelling boring machine recovery tunnel (1.8 metre diameter steel casing), effectively reaching the face of the micro-tunnelling boring machine, where it was found that the machine was entangled in a steel tieback (see Figure 2).

Figure 2: Face of the micro-tunnelling boring machine entangled in a steel tieback



As the work progressed, the Contractor encountered a significant increase in groundwater infiltration into the recovery tunnel at the face of the micro-tunnelling boring machine, which caused increased ground movement around the machine, resulting in a sinkhole in the work zone (see Figure 3).

Figure 3: Sinkhole in the work zone between 1 and 2 Old Mill Drive



The Contractor retained a subcontractor (Keller Group) as an expert in ground improvements and stabilization to assist with implementing an approach to stabilize the soil around the micro-tunnelling boring machine. Keller Group reviewed the current site conditions and proposed a two phased approach utilizing compaction grouting to stabilize the surrounding area and the upper soil strata followed by jet grouting to fully encapsulate the tunnel alignment to allow for the contractor to safely proceed with the hand mining recovery operations. This approach was reviewed and approved by staff, as it provided the best approach to facilitate the completion of the micro-tunnelling boring machine rescue operations and the installation of the remaining scope of sewer work.

The Contractor provided a quotation for this additional scope of work in the amount of \$1,559,076 (excluding HST). City staff in consultation with the City's engineering design consultant, WSP Canada Group Limited, reviewed the quotation and found it to be fair and reasonable. An additional 15 percent contingency of \$233,862, to allow for any additional unforeseen conditions, for a total funding of \$1,792,938 excluding HST (\$1,824,494 net of HST recoveries) was included.

In October 2022, prior to finalization of the Non-Competitive Procurement, the City's Consultant, WSP Canada Group Limited, reviewed the status of the work and noted that their estimate for works completed up to September 30, 2022 was higher than anticipated for this stage due to these unforeseen groundwater conditions and overruns to the daily values due to the extended duration of the work. Based on this and the newly estimated completion of the rescue operation, WSP Canada Group Limited recommended the inclusion of additional contingency funds to this Non-Competitive Procurement, in the amount \$2,502,525 excluding HST (\$2,546,569 net of HST recoveries), to allow for the expected overruns to address and further manage and control additional excessive groundwater that may be encountered during the remaining work.

### **Work Completed in 2022**

- Advancement of 7.5 metres of the 1.8 metre diameter steel casing by means of hand mining and hydraulic jacking, along with soil improvement stabilization utilizing an injectable multi-urethane grout. The face of the micro-tunnel boring machine has been exposed at the face of the recovery tunnel.
- The de-stressing and removal of four (4) existing tiebacks encountered within the alignment of the tunnel along with the removal of the tiebacks found entangled within the face of the micro tunnel boring machine.
- Emergency surface remediation for sinkholes located within the recovery tunnel alignment along with the repair and shoring up of the existing service utilities within the immediate construction zone of influence.
- Ground stabilization, including a two-staged approach of compaction grouting of the surface strata and jet grouting for stabilizing and encapsulation of the recovery tunnel alignment.
- Preparation works to facilitate the first stage of compaction grouting conducted by the ground improvement subcontractor Keller Group, including utility daylighting, installation of grout sleeves and working pad area.



- Cleanout operations for material infiltration in the downstream section of the new 900mm diameter storm sewer pipe.

### **Work Completed in January 2023**

- Keller Group mobilized to site and completed the injection grouting for fifty-one (51) holes.
- Clearway Construction Limited conducted preparation works to facilitate the second stage of the ground improvement works by means of jet grouting including surveyor layout, vacuum excavation and installation of PVC sleeves and u-filled in place.

### **Anticipated Schedule of Remaining Work in 2023**

- Jet grouting the second stage works has commenced and is expected to take three to four weeks to complete, with a target completion by end of February 2023.
- Completion of the remaining section of the recovery tunnel along with removal of the micro-tunnelling boring machine is anticipated to require two to four weeks with completion targeted by the end of March 2023.

## **CONTACT**

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## **SIGNATURE**

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