



July 14, 2022

Environment, Climate and Parks
Environmental Stewardship Division
Environmental Compliance and Enforcement Branch
1007 Century Street
Winnipeg, MB R3H 0W4

Attention: Kristal Harman, Director

**RE: FILE NO. 1071.00 PORTAGE AVENUE INTERCEPTOR SIPHON REPLACEMENT
PROJECT AT OMAND'S CREEK – FINAL CLOSURE REPORT**

As requested in your letter dated June 14, 2022, please find attached the Portage Avenue Interceptor Siphon Replacement Project at Omand's Creek – Final Closure Report (File No. 1071.00) for the overflow event that occurred from March 16, 2022 to March 25, 2022 as recorded in the Dry Weather Overflow Notification Reports Nos. 4 to 11, 13, and 14.

This final closure report summarizes the issues that lead to discharge event, provides an overview of what occurred during the event, describes the circumstances that impacted the duration and severity of the event, and includes an assessment of what improvements can be made for future contracts of a similar nature.

If you require any further information or clarification, please contact me at 204-986-2304 or slambert@winnipeg.ca.

Sincerely,



Susan Lambert, P. Eng.
Branch Head, Wastewater Collection

- C. Michael A. Jack, CAO, City of Winnipeg
- C. D. Wiebe, Manager, Water and Waste Department, Engineering Services
- C. W. Carroll, Manager, Water and Waste Department, Wastewater Services
- T. W. Shanks, Director, Water and Waste Department
- James Capotosto/Siobhan Burland Ross/Bereket Assefa, Environmental Approvals Branch
- Yvonne Hawryliuk/Nada Suresh/Julie Froese, Environmental Compliance and Enforcement Branch
- Public Registry

PORTAGE AVENUE INTERCEPTOR SIPHON REPLACEMENT – DRY WEATHER OVERFLOW EVENT FINAL CLOSURE REPORT

This final closure report has been prepared in response to your letter dated June 14, 2022, to summarize the issues and activities related to the overflow event that occurred from March 16, 2022 to March 25, 2022 as recorded in the Dry Weather Overflow Notification Reports Nos. 4 to 11, 13, and 14.

1.0 BACKGROUND

The March 16, 2022 to March 25, 2022 overflow event occurred during the Portage Avenue Interceptor Siphon Replacement project. The scope of work of this project was to replace the portion of the Portage Avenue interceptor sewer that extends across and below Omand's Creek, approximately 80m east of the Empress Street East overpass. A map of the project area is included in Figure 1.

The Portage Avenue interceptor sewer, including the portion across Omand's Creek, was nearing the end of its service life and required rehabilitation. The interceptor sewer was installed in 1958 and conveys combined sewage (wastewater and stormwater) flows from three upstream sewer districts (Ferry Road, Riverbend, and Tylehurst Sewer Districts) by gravity to the Clifton Sewer District on the east side of Omand's Creek.

Trenchless sewer rehabilitation techniques can only be utilized on straight portions of pipe. The portion of the interceptor sewer crossing Omand's Creek required an open cut method due to the presence of several bends. Part of the project also included the removal and replacement of two water main crossings as they were in very close proximity to the interceptor sewer.

The project was tendered in late November 2021 with construction anticipated to begin in mid-January 2022. A Substantial Performance date of March 11, 2022 was specified in order to avoid work being undertaken during spring melt conditions.

The work was planned during the winter months to:

- minimize the impact to the riverbank
- comply with Department of Fisheries and Oceans (DFO) requirements
- minimize the temporary sewage by-pass pumping requirements

- temporary sewage by-pass pumping was required while the interceptor sewer was out of service. The interceptor sewer conveys combined wet weather flows in the spring, summer and fall months, but only conveys wastewater flows (dry weather flows) during the winter season. By conducting the work in the winter season, temporary sewage by-pass pumping requirements are significantly reduced



Figure 1: Project Area

2.0 ISSUES THAT LEAD TO THE DISCHARGE EVENT

The project was delayed beyond the March 11, 2022 date of Substantial Performance which led to the March 16, 2022 to March 25, 2022 overflow event. Key issues that lead to the schedule delay included:

- delay in awarding the construction contract
 - The project was not awarded until December 29, 2021 due to internal consultations regarding bid pricing. The delayed award date therefore did not allow the Contractor much time for pre-construction activities and planning in advance of mobilization
- water main pipe availability
 - The interceptor sewer could not be taken out of service until the water main pipe arrived. The availability of the water main pipe was confirmed ahead of posting the tender; however, by the time the contractor ordered the water main pipe, it was no longer available from a single supplier which resulted in a delay in procuring the pipe
- failure of City infrastructure
 - A failure of a flap gate and a water main break upstream of the construction area resulted in increased inflows to the system including to the construction site. This resulted in the contractor having to divert efforts away from construction activities to manage these increased inflows
- weather delays
 - The number of days where cold and blizzard-like conditions either slowed or stopped construction were beyond that of a typical construction year
- specialty bend failure
 - On March 13, 2022, the last piece of the new siphon crossing (a pre-fabricated 600mm PVC bend) broke during installation. As this was a specialty part, it couldn't be procured locally and a new specialty bend had to be fabricated. This shipped to site on March 19, 2022

3.0 OVERVIEW OF WHAT OCCURRED DURING THE EVENT

The project included provision for temporary sewage by-pass pumping that was designed to convey dry weather flows while the interceptor sewer was out of service. The temporary sewage by-pass pumping system could redirect 170 l/s of flow which is more than the expected dry weather flow. For redundancy, a second pump with equivalent capacity was also installed for use as an immediate backup should the primary pump fail.

On March 15, 2022, a rainfall event increased the combined sewer flows to the site to a point where both the primary and back-up temporary sewage by-pass pumps running at a combined capacity of 340 l/s could not keep up. Mobile vacuum trucks were dispatched to site to supplement the temporary sewage by-pass pumping. The temporary sewage by-pass pumping and vacuum trucks were able to keep up with the increased wet weather sewer flows.

On March 16, 2022, the warm weather continued, resulting in a rapid melt of the large snowpack from the winter season. Both the primary and back-up by-pass pumps were running at full capacity along with the mobile vacuum trucks however, the high wet weather flows exceeded this combined pumping capacity and flooded the construction site. To manage site flooding, a controlled discharge was initiated later that same day to the Assiniboine River from the upstream pump station as recorded in the Dry Weather Overflow Notification Reports.

4.0 CIRCUMSTANCES WHICH IMPACTED THE DURATION AND SEVERITY OF THE EVENT

4.1 Duration

The duration of the overflow event was prolonged by the following factors which are described in detail below:

- the temporary flooding of the construction site
- the procurement and delivery of a replacement specialty bend
- installation error

Temporary Flooding of the Construction Site

On March 16, 2022, the temporary by-pass pumping system onsite was overwhelmed and the construction site was flooded. The flooding of the construction site lead to delays in the re-establishment of the interceptor sewer and ultimately prolonged the overflow event.

The flows that entered the excavation on Portage Avenue transported aggregate that made its way into the bottom of the interceptor sewer and completely plugged the new pipe. Due to space constraints, the aggregate could not be removed until the replacement specialty bend was installed. Once the replacement specialty bend was installed, it took two full days to clean out the aggregate from the new interceptor sewer.

Procurement and Delivery of a Replacement Specialty Bend

The duration of the overflow event was prolonged due to the specialty bend that broke during installation. The new specialty bend took approximately one week to manufacture and be delivered to site. Once the new specialty bend was on site and installed, the Contractor had to complete the following before reinstating the interceptor sewer:

- removing the aggregate from the interceptor sewer (as described above)
- pressure testing of the interceptor sewer to ensure no leaks
- final pipe connection of the interceptor sewer to the upstream manhole

Installation Error

During pressure testing of the new interceptor sewer, a pipe joint became separated due to an installation error. This extended the overflow duration by one day as the Contractor had to repair the separated joint and re-pressure test.

4.2 Severity

The severity of the overflow event was affected by the following factors which are described in detail below:

- increased temporary sewage by-pass pumping system capacity
- 24/7 site and engineering-operations coordination plan

Increased temporary by-pass pumping system capacity

On March 13, 2022, the project team directed the Contractor to procure additional pumps to supplement the installed temporary sewage by-pass pumping system. The pumps arrived on March 17, 2022. The temporary sewage by-pass pumping capacity was increased to approximately 460 l/s (nearly 3 times the peak dry weather flows). No further pumps could be added to the system due to physical space constraints for suction pipes. By increasing the temporary sewage by-pass pumping capacity to its maximum potential, the amount of wet weather flow shed due to the construction project was limited as much as practical.

24/7 monitoring and coordination plan

To minimize the overall volume of wastewater discharged to the environment, the project team implemented a 24/7 monitoring and coordination plan from March 16, 2022 to March 25, 2022.

The pumps at the upstream lift stations were only shut down when needed during peak flow periods. This reduced the amount of discharge to the environment as load shedding was carefully monitored and only utilized when flows exceeded the capacity of the temporary sewage by-pass pumping system. The highly controlled discharge minimizes the impact to the environment as much as possible compared to an uncontrolled overflow or flooding the site which would have further delayed reinstating the interceptor.

During each day as temperatures rose and flows exceeded the by-pass pumping capacity, lift station pumps were sequentially turned off (one at a time) as required. Similarly, as temperatures dropped in the evenings and flows subsided, the lift station pumps were again brought back online as soon as possible.

5.0 ASSESSMENT OF IMPROVEMENTS FOR FUTURE CONTRACTS

To minimize the probability of such an event occurring in the future on similar projects that require temporary sewage by-pass pumping, the following measures and/or steps are recommended:

- Tender the projects earlier. This provides more time for: issues that may occur during the award phase; the Contractor to perform pre-construction activities; and more flexibility in the schedule to address unforeseen issues that may occur
- Consider augmenting how liquidated damages (LD) clauses are included in the tender. Inclusion of interim critical dates and associated LDs for commencement of construction and various phases of work throughout construction. Consider higher LDs for not meeting Substantial Performance dates to put more risk onto the Contractor and to encourage them to consider construction activities and processes to better address project risk
- Examine historical and recent weather data and trends to re-evaluate the construction window. Consider including an asset in-service date of March 1 as a critical date in the contract. While contingency plans are developed for all projects and go/no go meetings are held for high schedule risk projects, specific weather-related emergency response plans should be considered for projects as schedule risks increase
- Where there are custom or pre-fabricated fittings with long lead times, conduct a cost benefit assessment to determine if the contract should require that spare fittings be on site. Regardless of use, these fittings would be paid for by the City
- Consider qualification-based tenders for high risk projects versus low-bid award

Submitted to: Environment, Climate and Parks

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