




**CITY OF HAMILTON**  
**PUBLIC WORKS DEPARTMENT**  
**Hamilton Water Division**

<b>TO:</b>	Chair and Members Public Works Committee
<b>COMMITTEE DATE:</b>	May 16, 2022
<b>SUBJECT/REPORT NO:</b>	Funding for the Woodward Wastewater Treatment Plant Primary Digester 3 Emergency Repairs (PW22034) (City Wide)
<b>WARD(S) AFFECTED:</b>	City Wide
<b>PREPARED BY:</b>	Stephanie Lapointe (905) 546-2424 Ext. 1929
<b>SUBMITTED BY:</b>	Shane McCauley Acting Director, Water and Wastewater Operations Public Works Department
<b>SIGNATURE:</b>	

## RECOMMENDATION

- (a) That up to \$5,000,000 from the Wastewater Capital Reserve (108005) be used to fund the emergency works approved under Procurement Policy By-Law No. 21-215, Policy 10 - Emergency Procurements, for the Woodward Wastewater Treatment Plant Primary Digester 3 failure.

## EXECUTIVE SUMMARY

Staff is seeking approval to access Wastewater Capital Reserve (Reserve) funds to pay for the emergency works described in Report PW22034.

On February 5, 2022, one (1) of the three (3) primary digesters at the Woodward Ave. Wastewater Treatment Plant (WWTP) suffered a catastrophic failure. The failure occurred when the discharge piping clogged, allowing pressure to build up in the digester to the point where the roof lifted breaking the seal, fracturing several roof brackets and causing an environmental spill of digested sludge. The spill was immediately reported to the Ministry of Environment, Conservation and Parks' Spills Action Centre (SAC) and contained on site with no impact to the public or the natural environment.

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OUR Vision: To be the best place to raise a child and age successfully.

OUR Mission: To provide high quality cost conscious public services that contribute to a healthy, safe and prosperous community, in a sustainable manner.

OUR Culture: Collective Ownership, Steadfast Integrity, Courageous Change, Sensational Service, Engaged Empowered Employees.

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An emergency declaration under Procurement Policy By-Law No. 21-215, Policy 10 - Emergency Procurements (Policy 10 Emergency) was requested and subsequently approved by the Acting General Manager of Public Works. This allowed staff to respond immediately to clean up the spill and engage consultants to begin the repair process which is expected to take between six (6) and eight (8) months, with costs estimated to be between \$1.5M and \$5M.

The Woodward WWTP has three (3) primary digesters, and the process requires a minimum of two (2) primary digesters to be in operation at all times. One (1) primary digester has recently been refurbished (digester 4); however, the two (2) remaining primary digesters (digesters 3 and 5) both had significant known deficiencies and are programmed for capital repairs beginning in 2023. Digester 3 has now failed, leaving only digesters 4 and 5 operational, and digester 5 remains at high risk for failure.

Hamilton Water staff is currently in the design stage of the project to refurbish both digester 5 and digester 3 in sequence; however, that project will not be tendered until the end of 2022 with construction beginning in 2023. The repairs to digester 3 cannot wait, and as a result they are being completed as an emergency. Work completed under this emergency will be limited to the work needed to return the failed digester to service. Once digester 3 is back in service, staff will be able to complete the refurbishment of both digesters in sequence without disrupting operations at the WWTP. Also included in the emergency work is the development of an operational contingency plan in case digester 5 fails before digester 3 is returned to service.

**Alternatives for Consideration – See Page 5**

**FINANCIAL – STAFFING – LEGAL IMPLICATIONS**

Financial: Total cost of the emergency works to be completed are estimated between \$1.5M and \$5.0M. The extent of the damage cannot be determined until the digester can be emptied, cleaned, and assessed. Staff have recommended funding this project from the Wastewater Capital Reserve (108005). Any surplus project funds will be returned to the Reserve at the end of the project. This Reserve has an uncommitted balance of \$45M.

Staffing: N/A

Legal: N/A

**HISTORICAL BACKGROUND**

Digesters are closed circular tanks where sludge from the wastewater treatment process is mixed and treated anaerobically (without oxygen). Digestion is a biological

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process which breaks down a significant amount of the organic solids in the sludge and at the same time produces methane gas. This is a critical part of the wastewater treatment process.

The Woodward Wastewater Treatment Plant (WWTP) North Digester Complex was constructed in 1967 and underwent significant upgrades in 1981 and 2000. The complex consists of three (3) primary digesters (digesters 3, 4, and 5) and one (1) secondary digester (digester 2). The system requires a minimum of two (2) primary digesters to be in operation at all times.

Primary digester 4 was cleaned out and refurbished in 2020/21 and is in good working condition. Primary digesters 3 and 5 are scheduled to be refurbished in sequence as a Capital Project (Project ID 5161966511), with construction beginning in 2023.

In the fall of 2021, staff replaced all five (5) mechanical mixers in digester 3 with new mixers to mitigate risk of failure while digester 5 was being refurbished. As a result of the improved mixing, solids that had accumulated in the digester began to be resuspended. Staff increased monitoring and inspection of the process, regularly clearing blockages in the discharge piping. However, on Saturday, February 5, 2022, the concentration of solids overwhelmed the discharge pipelines. Pressure increased within the digester because of the blocked pipelines and the digester roof failed. The roof lifted, fracturing welds, and breaking the roof seal.

The incident resulted in an environmental spill of digested sludge which was immediately reported to the Ministry of Environment, Conservation and Parks' Spills Action Centre (SAC). Staff had the spill under control within 25 minutes. The spilled material did not impact the public or enter the natural environment. It was contained locally on the Woodward WWTP site, cleaned up and discharged back into the WWTP for further treatment.

An emergency declaration under Procurement Policy By-Law No. 21-215, Policy 10 - Emergency Procurements (Policy 10 Emergency) was requested and subsequently approved by the Acting General Manager of Public Works. This allowed staff to respond immediately to clean up the spill and engage consultants to begin the repair process which is expected to take between six (6) and eight (8) months, with costs estimated to be between \$1.5 million and \$5 million. The spill clean-up of approximately 50,000 litres of sludge was completed February 10, 2022.

There are two (2) other primary digesters (digesters 4 and 5) providing treatment; however, digester 5 only has one (1) of five (5) mixers functioning. Should the last mixer in digester 5 fail before digester 3 is returned to service, the WWTP will be down to only one (1) primary digester (digester 4) which is insufficient to manage the sludge volumes that are separated by the WWTP's liquid processes.

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Digester 3 remains isolated and is in the process of being cleaned out to make the necessary repairs. This process involves pumping the accumulated solids out of the digester, dewatering them on site using specialized equipment and trucking the solids to an approved land application site. Based on staff's recent experience in cleaning out digester 4, the estimated cost for cleaning out digester 3 is approximately \$1.5M. Once the digester has been cleaned, a structural assessment of the digester including the roof needs to be completed and the necessary repairs made before the digester can be returned to service. The cost of the assessment, the extent of the damage and necessary repairs are all currently unknown. Operations has also engaged a consultant under roster to help develop a contingency plan should digester 5 also fail leaving operations with only one (1) functioning digester.

Project ID 5161966511 does exist for the clean out and repair of digesters 3 and 5, but the overall capital project costs are expected to be greater than what was originally budgeted. This is due to unknown project scope (since the digesters can't be drained and inspected prior to tendering), and also due to capital project cost increases being experienced in supplies and services due to the COVID 19 pandemic. Therefore, staff are recommending funding the emergency works from the Wastewater Capital Reserve (108005) and not to draw on Project ID 5161966511.

### **POLICY IMPLICATIONS AND LEGISLATED REQUIREMENTS**

Policy No. RATE-01 – Rate Reserves requires that all transfers from Reserves be approved by either a budget submission, by a separate Council report, or by a Council motion. The use of Reserve funds for these emergency works is in line with the policy. The policy sets a target balance for the Wastewater Capital Reserve (108005) of \$21 million - \$87 million. This Reserve has an uncommitted balance of \$45M.

### **RELEVANT CONSULTATION**

The Supervisor of Budgets and Financial Planning, Corporate Services Division was consulted to ensure sufficient funds are available in Wastewater Capital Reserve (108005); and is in support of the above recommendation.

The Manager of Procurement, Corporate Services Division was consulted to ensure the correct use of the Procurement Policy By-Law No. 21-215, Policy 10 - Emergency Procurements.

The Supervisor of the Hamilton Water Project Management Office and the Director of the Woodward Upgrades team were consulted to review the scope and funding options related to this emergency and the Digester 3 and 5 capital project (Project ID 5161966511); and are in support of the above analysis and recommendation.

## **ANALYSIS AND RATIONALE FOR RECOMMENDATION**

The Digester 3 and 5 capital project (Project ID 5161966511) contains just over \$13M for the cleanout and refurbishment of these two (2) digesters. The cleanout portion of this project, based on experience with digester 4, is expected to be approximately \$1.5M for each digester for a total of \$3M. The remaining \$10M is budgeted for assessments and repairs (approximately \$5M for each digester).

Utilizing funding from this project to manage this emergency was evaluated, and staff felt that funding the emergency works from the Wastewater Capital Reserve (108005) was the best option. There are several reasons for this. First, like other organizations the City is experiencing increased costs in supplies and services due to the COVID 19 pandemic, which were not anticipated when the original Digester 3 and 5 capital project was budgeted. Second, even though digester 3 is being cleaned as part of this emergency, to complete its ultimate refurbishment there will be a requirement to clean it out again after the digester 5 refurbishment has been completed. Third, the Digester 3 and 5 capital project is being tendered as a single project to obtain better pricing. As such, sufficient funds need to be available to award the project. The project is currently in design and is expected to be tendered and awarded at the end of 2022 or beginning of 2023. Funding the emergency from the Reserve will leave room in the current capital project to account for increases in costs due to the COVID 19 pandemic.

The extent of the damage and what repairs are necessary to return digester 3 to service are largely unknown at this time. Therefore, staff are recommending that \$5M from the Reserve be made available to fund this emergency. Any funds left over after the emergency works have been completed would be returned to the Reserve and reported to Council along with the total costs for the emergency as part of the Policy 10 - Emergency Procurements reporting process.

## **ALTERNATIVES FOR CONSIDERATION**

Alternative 1 - To fund the emergency using only the existing Digesters 3 and 5 capital project (Project ID 5161966511).

This alternative was discussed in the Analysis and Rationale for Recommendation section of Report PW22034.

**Financial:** Total cost of the emergency works to be completed are estimated between \$1.5M and \$5.0M. The extent of the damage cannot be determined until the digester can be emptied, cleaned, and assessed. This alternative will not impact the cost of the emergency works, and only provides a different option for funding. If this alternative was approved the budget for Project ID

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5161966511 would need to be adjusted during the 2023 Water, Wastewater and Storm Rate Budget process.

In addition, if the tender and award of the digester 3 and 5 capital project occurred in advance of approval of the 2023 Water, Wastewater and Storm Rate Budget there would not be enough budget in Project ID 5161966511 to award the tender, resulting in a failed procurement.

Staffing: N/A

Legal: N/A

Alternative 2 – To adjust the digesters 3 and 5 capital project and proceed with the complete refurbishment of digester 3, leaving digester 5 in operation until digester 3 has been completely refurbished.

With digester 3 currently out of service it is possible to switch the refurbishment order, and have it completed before digester 5. This option was reviewed by staff and it is not being recommended.

Completing the tendering and construction process for one digester will require approximately 18 months, during which digester 3 would not be available. With digester 3 offline there is extra stress on digester 5 which has only one (1) of five (5) mixers functioning and is considered a high risk for complete failure. Staff believe the risk of digester 5 failing within 18 months (and leaving the WWTP with only one operational primary digester), is too great.

In addition, the digesters 3 and 5 capital project did not contemplate the damage to the roof caused by the digester 3 failure which would likely require additional funds to be added to the project. By making only the necessary emergency repairs to digester 3 as recommended, this will allow the WWTP to have two reliable digesters back in service in approximately six (6) to eight (8) months, considerably reducing risk to the WWTP processes.

Financial: Total cost of the emergency works to be completed are estimated between \$1.5M and \$5.0M. The extent of the damage cannot be determined until the digester can be emptied, cleaned, and assessed. This alternative will not impact the cost of the emergency works, and only provides a different option for funding. If this alternative was approved the budget for Project ID 5161966511 would need to be adjusted during the 2023 Water, Wastewater and Storm Rate Budget process.

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In addition, if the tender and award of the digester 3 and 5 capital project occurred in advance of approval of the 2023 Water, Wastewater and Storm Rate Budget there would not be enough budget in Project ID 5161966511 to award the tender, resulting in a failed procurement.

Staffing: N/A

Legal: N/A

**ALIGNMENT TO THE 2016 – 2025 STRATEGIC PLAN**

**Community Engagement and Participation**

Hamilton has an open, transparent and accessible approach to City government that engages with and empowers all citizens to be involved in their community

**Healthy and Safe Communities**

Hamilton is a safe and supportive City where people are active, healthy, and have a high quality of life.

**Built Environment and Infrastructure**

Hamilton is supported by state-of-the-art infrastructure, transportation options, buildings and public spaces that create a dynamic City.

**Our People and Performance**

Hamiltonians have a high level of trust and confidence in their City government.

**APPENDICES AND SCHEDULES ATTACHED**

N/A