



City of
Peterborough

To: **Members of the General Committee**

From: **Cynthia Fletcher,
Commissioner of Infrastructure and Planning Services**

Meeting Date: **March 4, 2019**

Subject: **Report IPSIM19-006
Capital and Operating Costs for Stormwater Management**

Purpose

A report to provide information on the Capital and Operating costs associated with the rehabilitation and maintenance of the City's Stormwater Management Ponds.

Recommendation

That Council approve the recommendation outlined in Report IPSIM19-006 dated March 4, 2019 of the Commissioner of Infrastructure and Planning Services as follows:

That Report IPSIM19-006 be received for information.

Budget and Financial Implications

There is no budget or financial implications as a result of the recommendations in this report.

Background

Finance Committee, at its meeting of January 16, 2019, in consideration of Report CLSFS18-045, the 2019 Draft Budget, and more specifically in relation to the Budget and Financial Implications, Item ii, being “a budget provision of 0.38% (\$620,000) for Stormwater Protection”, requested;

“That staff report to General Committee with the costs to maintain the stormwater management ponds”.

Stormwater is the name given to rain and melted snow when it hits and flows along the ground. Stormwater that leaves your property is captured and carried by a massive system of catch basins (road grates), storm sewers (drainage pipes), ditches, culverts, stormwater ponds and outfalls (point where stormwater discharges to a water body). This system carries stormwater to the nearest creek, river or lake. The stormwater that enters the storm sewer system is not treated at the wastewater treatment plant on Kennedy Road. In newer parts of the City, stormwater may enter a stormwater retention pond where some pollutants are removed and water is held back to reduce flooding.

The 2019 budget provision of \$620,000 is the second year of a ten-year phase in to gradually increase the annual budget and address the City’s significant funding gap to effectively manage the entire stormwater infrastructure (ie of which one asset category is stormwater management ponds). Stormwater management pond (SWMP) cleanouts are one of the many required activities, identified in the Stormwater Quality Management Master Plan (SWQMP) to maintain and improve the City’s stormwater infrastructure. The adoption of the SWQMP was supported by Council on February 13, 2017 via Report USEC17-001.

Discussion

Stormwater Management System

The City owns and operates an extensive stormwater drainage system that serves local residents and businesses. It is comprised of several thousand catchbasins, hundreds of kilometers of pipes, curbs, and ditches, numerous oil/grit treatment units and ponds. The stormwater system is a vital component of the City’s infrastructure. The system ensures efficient drainage of rain and snowmelt, and helps to protect public safety, health, property and source drinking water.

SWMP’s are important components of the City’s stormwater infrastructure. A SWMP is an engineered structure intended to collect rainfall and surface runoff (stormwater). They are typically located in newer parts of the City, constructed in the last 20 to 30

years. A SWMP temporarily stores and slowly releases water to prevent downstream flooding. The SWMP also allows sediment (sand and gravel) and other pollution to settle out thereby improving the quality of water that is discharged to the natural environment.

The City currently owns and operates 29 SWMP's. In addition, there are six ponds constructed in active subdivisions not yet assumed by the City. Approximately 25% of the City has some form of stormwater treatment, which is provided primarily with SWMP's.

Stormwater Asset Value

The replacement value of the City's stormwater infrastructure was estimated in the Water Resource Funding Study (WRFS) to be \$534.8 million (2016 cost projections). Based on useful life, this translates to approximately \$10 million per year in expected rehabilitation. The current funding level approved by Council through the 2018 and 2019 budget process is \$1.2M annually. This funding level currently leaves a gap of approximately \$8.8M annually; however, the annual funding approved is helping to close the gap.

The majority of the City's stormwater asset value is in storm pipes, representing 77.4% of the total. A breakdown of asset values for the stormwater system is provided in Table 1.. Of this total replacement value, \$10.5 million or 2.0% of the total replacement cost is attributed to SWMP's.

Table 1 – Asset Value

Storm Water Assets	Total Replacement Costs (2016\$)
Storm Pipe	\$414.1 M
Storm Manholes	\$89.0 M
Catch Basins	\$21.1 M
Storm Ponds	\$10.5 M
Total	\$534.7 M

The City continues to work on the overall condition evaluation of the stormwater system. Early results suggest that condition ratings of poor to very poor represent an approximate value of \$40 million. This value is absent of approximately \$250 million of stormwater infrastructure yet to be inspected and/or rated.

Costs for SWMP Operations and Maintenance

The City is actively working to maintain and/or repair SWMP's that fall below the minimum standard. This ensures the City complies with the Ministry of Environment

Conservation and Parks(MECP) Environmental Compliance Approval (ECA) issued for each pond. An ECA is not an order by the Ministr, it is conditions imposed on the City by the Ministry through the approval to construct a pond. If the City fails to meet the conditions within the ECA, the Ministry may issue an order to meet the conditions. In addition to the regular maintenance and ECA works, the City continues to look for opportunities to create new stormwater management infrastructure where it does not currently exist or rehabilitate existing facilities to deliver an improved level of service.

City staff inspects, surveys, monitors and assesses the condition of each SWMP annually (as required by our ECA). Based on this assessment and previous information provided in the SWQMP, the following ponds shown in Table 2 require immediate attention to maintain compliance with their ECA. A brief description of the deficiency is also provided and an estimated cost to complete the works.

Table 2 – Immediate Capital Maintenance Needs

Pond	Deficiency	Volume of Sediment (m3)	Estimated Capital Cost
Cunningham	Remove accumulated Sediment	500	\$160,000
Fairview Estates	Remove Accumulated sediment	2000	\$560,000
Glenforest	Pond redesign (outlet repair and flood reduction) and remove sediment	300	\$1,140,000 ¹
Towerhill South	Remove accumulated sediment and Phragmites	200	\$100,000
Meadows	Remove accumulated sediment and Phragmites	200	\$100,000
		Total	\$2.1M

¹The full scope of work required at the Glenforest pond will be determined through a pond redesign. The pond can function more efficiently with a redesigned outlet and additional storage for water quality control and is a recommended project for the Byersville/Harper Flood Reduction Study.

Based on the above Table 2, the immediate need for SWMP capital works is estimated at \$2.1 million. The average cost for a pond cleanout can vary significantly based on the volume of sediment to be removed. Other factors such as site access, dewatering requirements, quality of sediment (disposal), pond repairs, drainage treatment area and scale of a project can have significant impact on the overall project cost.

The City of Markham conducted a comprehensive study of pond clean-outs and assessed the cost per cubic metre of sediment removed. The study showed a large variability in costs, particularly for small SWMP's. There was a clear declining trend in the per cubic metre costs for larger ponds where more sediment was removed.

In 2018 the City cleaned out three ponds at a total cost of approximately \$280,000. The 2019 work program will include two ponds cleanouts and two detailed designs for retrofit/cleanout works. The City's average cost per cubic metre of sediment removed was \$442 and the average volume of sediment removed at each pond was 210 cubic metres. This price is in line with the benchmark costs reported in the Markham study for small pond clean-outs.

Table 3 summarizes the costs for SWMP infrastructure renewal and improvement. The following information originated from the SWQMP and is updated where new information is available.

Table 3 – SWMP Renewal and Improvement

Existing system restoration to satisfy ECA's (from Table 2)	\$2.1 M
¹ Measures to improve existing system performance (one time cost)	\$2.0 M ⁴
² Annual capital maintenance costs	
• Wet pond maintenance	\$390,000 ³
• Dry pond maintenance	\$51,000 ⁴
Total	\$4.54 M

¹Includes capital works to improve pond function (water quality and flood control), ease of maintenance, etc.

²Annual maintenance costs are projected to increase marginally as the City assumes responsibility of additional ponds.

³ Based on an estimated annual volume of sediment removed of 1300m³ at an average cost of \$300/m³.

⁴ Based on **2014 estimate** in SWQMP

Other annual or recurring operational costs associated with SWMP's, storm sewers, and the overall health of our creeks and wetlands are provided in Table 4. The following works are funded through the City's operating budget.

Table 4 – System Operation and Maintenance

SWMP monitoring and routine maintenance: Structured inspection program, water quality monitoring, landscape maintenance, routine debris removal, minor repairs, and record keeping and reporting	\$84,000
Storm sewer and catch basin cleaning: annual sediment removal of catchbasins and oil and grit separators and flushing of storm sewers	\$350,000
Street sweeping program	\$700,000
Total (annual)	\$1.13M

Summary

The most recent pond inspections have estimated an annual lifecycle operating cost for SWMP's to be \$525,000. This cost is comprised of wet/dry pond maintenance (as outlined in table 3: \$390,000 + \$51,000) and monitoring activities (outlined in table 4: \$84,000. This does not include any major reconstructions or new construction. The lifecycle operating cost includes sediment removal, monitoring programs, inspections and routine maintenance activities (grass cutting, litter removal, etc). In the immediate future, there is a need to include additional capital funds in the budget to accelerate maintenance at ponds that do not comply with their ECA's.

The total estimated capital cost to address ponds that do not comply with their ECA's is approximately \$2.1M, as detailed in Table 3. The total estimated capital cost to improve pond function is \$2.0M also detailed in Table 3. These improvements are strongly recommended measures to improve water quality, flood control, and ease of maintenance.

The most recent budget approved an additional \$620,000 annually to maintain and rehabilitate all stormwater infrastructure, beyond simply stormwater ponds. There exists a funding need of approximately \$10M to maintain, operate and rehabilitate all of our stormwater infrastructure based on useful life. Although the combined 2018 and 2019 budget approvals allocated \$1.2M annually for all stormwater related work, there continues to be a funding gap of approximately \$8.8M.

Submitted by,

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