
TO: GENERAL COMMITTEE

SUBJECT: APPROVAL OF WATER ASSET MANAGEMENT PLAN

WARDS: ALL

PREPARED BY AND KEY CONTACTS: S. DREWETTE, CET, SENIOR ASSET MANAGEMENT PROGRAM COORDINATOR

SUBMITTED BY: K. OAKLEY, P. ENG., MANAGER OF CORPORATE ASSET MANAGEMENT

GENERAL MANAGER APPROVAL: A. MILLER, RPP, GENERAL MANAGER OF INFRASTRUCTURE AND GROWTH MANAGEMENT

CHIEF ADMINISTRATIVE OFFICER APPROVAL: M. PROWSE, CHIEF ADMINISTRATIVE OFFICER

RECOMMENDED MOTION

1. That the 2021 Water Asset Management Plan prepared by SLBC Inc., dated September 29, 2021 attached to Staff Report CAM004-21, be approved.

PURPOSE & BACKGROUND

2. The primary purpose of this Staff Report is to receive Council approval of the Water Asset Management Plan (AMP) in accordance with Provincial Regulations.
3. Additionally, the Staff Report and AMP serve to provide valuable information to Council about:
 - a) The City's water infrastructure needs in order to provide a safe and reliable water supply that will continue to support our existing community and economy as well as accommodating growth in a sustainable way;
 - b) The levels of service for water that the City proposes to provide over the next 10 years;
 - c) The investment needs to look after what we currently own, and to expand/upgrade the system, (including non-growth share of growth projects, and Development Charge funded growth); and
 - d) The risks to levels of service that result from underinvestment.
4. The goal of asset management is to ensure the City's financial sustainability by making informed investment decisions that deliver City services at the desired level while minimizing costs and maintaining an acceptable level of risk.
5. The Province of Ontario's *Infrastructure for Jobs and Prosperity Act, 2015 (IJPA)* was enacted with the purpose of "establish[ing] mechanisms to encourage principled, evidence-based and strategic long-term infrastructure planning that supports job creation and training opportunities, economic growth and protection of the environment, and incorporate design excellence into infrastructure planning". The IJPA applies to the province but also to the broader public sector, including municipalities.

6. The first regulation made under the IJPA was *Ontario Regulation 588/17: Asset Management Planning for Municipal Infrastructure*. O. Reg 588/17 came into effect in January 2018 and prescribed timelines for Ontario municipalities to develop asset management plans. In 2021, those timelines were revised, giving municipalities an additional year to achieve the previously prescribed milestones. The current timelines and requirements are summarized in the table below:

Provincial Prescribed Milestone	City of Barrie status
Phase 1 (by July 1, 2019): Strategic Asset Management Policy	Adopted June 2019
Phase 2 (by July 1, 2022): Asset management plans for core infrastructure assets which include water, wastewater and stormwater assets, roads, bridges and culverts; within this, the plans for core assets must include current levels of service and costs to maintain these levels.	Stormwater – Approved by Council in Q1, 2021 Transportation – Approved by Council in Q2, 2021 Wastewater – Planned for Council in November, 2021 Water – Subject of this report
Phase 3 (by July 1, 2024): Asset management plans for all other municipal assets, including current levels of service and costs to maintain these levels.	Future update included in budget forecast
Phase 4 (by July 1, 2025): Builds on phases 2 and 3 where plans shift from current levels of service to focus on proposed levels of service and related lifecycle management and financial strategies for all assets.	Preliminary efforts have been included in the 2021 Water and Wastewater AMPs and will be revisited in advance of the 2025 deadline.

7. The 2021 Water Asset Management Plan is an update of the City's previous asset management plan prepared in 2015.

ANALYSIS

State of the City's Water Assets

8. The AMP includes water assets owned and operated by the City, including the surface water treatment plant, wells, storage towers and reservoirs, pumping stations, water mains, valves, hydrants, and meters, which together total over \$1.305 billion in replacement value.
9. The majority of the City's water assets are in the distribution system, with a replacement value of approximately \$960 million. The remainder of the water assets include supply (this includes the treatment plant) at approximately \$295 million, and storage, at approximately \$50 million.
10. The water network is anticipated to grow by approximately \$251 million through developer contributions and City contracted construction to \$1.56 billion (2021\$) by the end of the 10-year planning period ending in 2031. This growth includes expansion and upgrade projects.
11. Most of the City's water distribution infrastructure has more than half of its service life remaining, this is expected as much of it was constructed during the rapid growth that occurred from the 1980s through the 2000s. Notable exceptions include water meters and pressure reducing valve (PRV) chambers, which both have relatively short service lives of 20 years and are 70% consumed on average.

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12. The Surface Water Treatment Plant (SWTP) began operation in phases between 2010 and 2011, so the average age of its systems and components is 11 years. The maximum potential life of the various components ranges from 15 to 75 years, with the average service life of those systems and components being 52 years. As such, on average the SWTP is about 20% through its lifecycle. The plant is a critical piece of the water system and has a high replacement cost. While the City must appropriately plan for the associated financial needs it should be noted that the plant is unlikely to be completely replaced at any point in time, and instead the various components will be rehabilitated or replaced as needed over time.
13. Due to gaps in historical records, reliable age data is lacking for some components of vertical assets in the groundwater system, specifically booster pump stations, towers, reservoirs and wells. In these cases, to determine replacement needs and remaining life, a visual condition assessment was conducted by component, and analysed by building and process system. Actual condition assessment usually provides a better representation of investment needs than theoretical condition derived from age.
14. The physical condition of Barrie's water infrastructure is generally good with 91% considered to be in fair or better condition. This makes sense given the young age of the City's water assets. Assets in Very Poor condition are due or overdue for replacement and are often called the "renewal backlog". This backlog exists due to historical underinvestment. Investment gaps are discussed further below and will be addressed based on priority and risk through the City's Capital Plan. The renewal backlog for water assets is currently 2.0% of the total replacement value, or \$25.6 million, consisting of the following asset types:
- Water mains (\$7.7 million)
 - PRV Chambers (\$6.1 million)
 - Water meters (\$6.9 million)
 - Components of booster pump stations (\$4.2 million), towers & reservoirs (\$0.6 million) and wells (\$0.1 million)

Levels of Service

15. Defining and documenting the level of service is a key part of asset management. It allows the City to determine the investment needs with a specific level of service in mind, and it provides Council and the public with clear expectations for the services they receive. Ontario Regulation 588/17 defines mandatory level of service measurements for water systems and requires that current and proposed levels of service are documented for the 10-year planning period.

Levels of Service for Water Assets (Table 4 - O. Reg 588/17)

Community levels of service (qualitative descriptions)	Technical level of service metrics (technical metrics)	2021 Technical performance	2021 performance grade	2031 proposed performance (grade)
1. Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal water system.	1. Percentage of properties connected to the municipal water system.	94.5%	Good	95% (Good)
2. Description, which may include maps, of the user groups or areas of the municipality that have fire flow.	2. Percentage of properties where fire flow is available.	94.5%	Good	95% (Good)
Description of boil water advisories and service interruptions.	1. The number of connection-days per year where a boil water advisory notice is in place compared to the total number of properties connected to the municipal water system.	0	Very Good	0 (Very Good)
	2. The number of connection-days per year due to water main breaks compared to the total number of properties connected to the municipal water system.	1.8	Very Good	1.5 (Very Good)

16. In addition to levels of service, O.Reg. 588/17 also requires that additional performance measures established by the municipality be included in the AMP. The City tracks and manages the performance of water services through a number of metrics such as asset condition, energy efficiency, and timely completion of maintenance activities. These metrics along with the 2021 performance and the projected 2031 performance are included in the AMP on page 27.
17. On average, the City's water assets are in good condition, of adequate capacity, and performing well at delivering expected service levels. These levels of service and performance are projected to be sustainable over the 10-year planning period from 2022-2031 despite the investment gaps discussed below.

Management and Investment in the City's Water Assets

18. The Asset Management Plan considers the life cycle activities needed to ensure that the City's water infrastructure can sustainably meet defined levels of service. The Water AMP builds on best practices already underway in the City and also considers additional life cycle activities to address gaps in the City's current programs. Improving asset life cycle strategies is an ongoing focus of City staff in all departments.
19. Based on an understanding of the City's current assets, condition, lifespan and rehabilitation/replacement costs, the Asset Management Plan identified the sustainable long-term operations, maintenance, and renewal needs to provide the proposed levels of service. One of the key conclusions in the AMP is that the City is underspending on water assets, and that this trend continues through the current 10-year Capital Plan and Outlook.
20. The Asset Management Plan also considers the growth and upgrade needs identified in the 2019 Master Plans for water supply, distribution, and storage, and compares these forecasted needs to the planned expenditures in the Capital Plan and Outlook.
21. The table below summarizes the costs of the forecasted needs and compares them to the planned expenditures in the 2021 Business Plan and Budget. The gap represents a shortfall in planned investment relative to the identified needs.

Asset Lifecycle Activity	10-year (2022 – 2031) Ave Annual Amounts (2021\$M/yr)			
	Forecast Needs	Planned Spending	Gap	Funding Ratio
Renewal	\$9.4	\$7.19	\$2.23	76%
Expansion* & Upgrade	\$9.7	\$8.45	\$1.25	87%
Operations & Maintenance	\$25.5	\$22.81**	\$2.72	89%
All	\$44.6	\$38.45	\$6.20	86%

* Includes only assets to be constructed by the City, such as transmission water mains; excludes local watermains built as part of development.

** Includes 3-yr Operating forecast and assumes a 2% annual increase for the remaining 7 years.

22. Based on this analysis, the City is underinvesting in its water assets by an average of approximately \$6 million per year.
23. The AMP presents two different renewal gaps for water infrastructure, the 10-year gap noted above, and a longer term gap shown below. The \$9.4 million in forecast asset renewal needs presented above, is based an average of the specific needs for the 10-year period 2022 to 2031. This is a reasonable number to use for short and medium-term asset and financial planning. However, this number is considerably lower than the average renewal needs over the longer term. As the cohort of water infrastructure built during periods of high growth start to deteriorate and require repair and replacement the City's investment needs will increase. The average annual renewal investment needs over the full lifecycle of the City's assets is \$25.2 million per year, meaning that outside of the 10 years, the renewal gap will grow significantly if the actual investment levels don't catch up and keep pace.

Asset Lifecycle Activity	Full Asset Lifecycle Ave Annual Amounts (2021\$M/yr)			
	Forecast Needs	Planned Spending	Gap	Funding Ratio
Renewal	\$25.2	\$7.2	\$18.0	30%

24. Although the City has a relatively small renewal gap in the shorter (10-year) term it will require significantly more investment over the longer term to sustain the water network in a state of good repair as the assets continue to age and deteriorate. While service levels and performance are projected to be acceptable over the next 10 years, there are still investment gaps. To maintain the long-term sustainability of the water system, reserves will need to be adequately funded so that the City can afford to renew the large quantity of relatively new water assets as they begin to age. Continued under-investment will increase this gap and the associated burden placed on future ratepayers. Underfunding the lifecycle needs for these assets will result in reduced levels of service and increased risks over the long term.
25. A long-term strategy needs to be considered when exploring ways of closing this gap. The City will need to consider either phasing capital projects in later years, increasing the amount of debt borrowed or increasing rates to allow larger draws from reserves. A combination of these options may also be considered, along with revising service levels and accepting higher risk.
26. The slower than anticipated pace of growth in the City has resulted in the deferral of some expansion and upgrade projects in the capital plan. In some cases, this may be acceptable as the demand associated with new development has also been delayed, however for some projects which also have a benefit to the existing community, these delays will result in reduced levels of service and increased risks.
27. As the City plans for increased expansion, upgrade, renewal, operations, and maintenance needs, it will be important to also consider the resourcing needs for the City's departments to deliver the required projects and programs.

Advancing Asset Management

28. Development of AM Plans is an iterative process that includes improving data, processes, systems, staff skills, and organizational culture over time.
29. Asset management decisions are made by staff in all areas of the City and by Council. The value of asset management planning is in providing data to inform these decisions, identifying areas for improvement, documenting risks, and outlining the requirements for long term sustainability.
30. Existing data gaps resulted in the inability to estimate the condition of approximately 4.5% of water assets in this asset management plan. One critical area for improvement will be to close such data gaps to ensure that the City can make informed decisions about the current needs, risks, and service level implications of these assets.
31. The City must continue to improve its asset management capabilities, including data tracking and analysis, in order to be able to model and understand the risks associated with different asset management strategies and funding scenarios. This is a required level of analysis under O.Reg. 588/17 and also a critical capability to enable the City to effectively manage its assets to provide the desired levels of service at acceptable levels of risk and the lowest sustainable cost.
32. This Staff Report and the attached AMP have summarized the status and funding needs of the City's current and future water assets. It represents an important step in the ever-evolving process of asset management at the City of Barrie. Over the coming months and years, Council will be hearing more about asset management as the City completes AMPs for all of our assets. This information will be used to plan long term in a way that is sustainable and fair to current and future generations.

ENVIRONMENTAL AND CLIMATE CHANGE IMPACT MATTERS

33. The following environmental and climate change impact matters have been considered in the development of the recommendation:
- a) The approval of the Water Asset Management Plan does not directly link to environmental and climate change impacts; however the AMP does include consideration of performance measurements related to the energy efficiency of the water system as well as planned upgrades, including solar PV installation at the SWTP, to improve energy efficiency. Furthermore, asset management planning will be important when considering further actions to address environmental and climate change impacts and their relationship to levels of service, costs, and risk.

ALTERNATIVE

34. The following alternative is available for consideration by General Committee:

Alternative #1 General Committee could choose not to approve this Staff Report and the attached Water Asset Management Plan.

This alternative is not recommended as it would jeopardize the City's compliance with Ontario Regulations. Being out of compliance could impact the City's ability to compete for grants and external funding from the province.

FINANCIAL

35. There are no direct financial implications for the Corporation resulting from the proposed approval of this report. The AMP includes a Financial Analysis section, and the details and conclusions are presented in the analysis section of this Staff Report.
36. The information in the Water Asset Management Plan aligns with the Water Financial Plan approved in May of 2021 (INF-005-21), and both documents will be used to help inform capital and operating budgets and serve as inputs into other studies.

LINKAGE TO 2018–2022 STRATEGIC PLAN

37. The recommendation(s) included in this Staff Report support the following goals identified in the 2018-2022 Strategic Plan:
- Fostering a Safe and Healthy City
 - Building Strong Neighbourhoods
 - Offering Innovative & Citizen Driven Services
38. Efficient, well maintained, and sustainable assets are critical for building a greener Barrie while mitigating and adapting to climate change, growing responsibly, and making tax dollars go further.
39. Asset management planning is an ongoing and long-term process that allows the City of Barrie to use technology to make the best possible investment decisions for its assets, which in turn improves the services offered to citizens.