

Staff Report



To	Committee of the Whole
Service Area	Infrastructure, Development and Enterprise Services
Date	Tuesday, June 7, 2022
Subject	2022 Wastewater Treatment and Biosolids Management Master Plan Update

Recommendation

1. That the 2022 Wastewater Treatment and Biosolids Management Master Plan Update be approved according to the requirements of the Class EA process, and the associated projects be implemented subject to future budget approvals.
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Executive Summary

Purpose of Report

The purpose of this report is to inform Council of the final recommendation resulting from the completed tasks to update the Wastewater Treatment and Biosolids Management Master Plan and to receive Council's approval of the recommendation.

Key Findings

The Wastewater Treatment and Biosolids Management Master Plan (WWTBMMP) combined two previously separate master plans to provide an update to how the City will manage and treat wastewater and biosolids at the Water Resource Recovery Centre (WRRC). Projects identified in the short term (0-5 years) for flow capacity up to 72.5 MLD and in projects identified in the longer term (6-15 years) for a flow capacity up to 79.2 MLD need to be completed to meet 2051 capacity needs. The WRRC is currently rated to treat 64 MLD.

Following a rigorous and consultative process, final recommendations of projects to ensure reliability, sustainability, and resiliency for wastewater treatment and biosolids management have been developed. Through the evaluation of alternatives process, preliminary preferred solutions were recommended for the short-term (0-5 years), medium-term (year 6 -15) and long-term (year 16 - 2051).

The Water Resource Recovery Centre can support growth to 2051 by utilizing new technology, optimizing existing infrastructure and expanding unit processes.

Financial Implications

Under the Development Charges Act, the development and capital construction of new water servicing capacity to support community growth is funded by Development Charges (DCs), with exact project funding eligibility to be confirmed

through future updates to the City's Development Charge Review Background Study.

The estimated financial impacts of the master plan are still in development and at a high-level as shown in Attachment 1. Early class D estimates (+50%/-30%) that are based on current construction costs and so subject to change show capital investments of \$105 million over the short term (0 - Year 5), \$43.5 million in the midterm (Year 6-15) and up \$34.2 million over the long term (Year 16 - 2051).

The City's WWTBMMP is a key step in the overall implementation of the City's Official Plan. As we move from the master plan stage to the implementation stage, more robust analysis of project timing and cost estimates will be performed. This master plan will be considered with the other master plans nearing completion and will be viewed with a corporate lens to incorporate the City's strategic goals. Once the overall financial impact is understood the plan will be compared to our existing capital plan, incorporate fiscal constraints and our capacity to deliver. The timing, pace and overall cost of this plan is subject to change. The financial information outlined is intended to be a high-level estimate that will be refined as it is incorporated into the overall corporate plan and multi-year budget process. No additional operating expenses or FTEs are projected as an outcome of the WWTBMMP.

Report

In January 2020, the City of Guelph initiated the Wastewater Treatment and Biosolids Management Master Plan (WWTBMMP) through the Municipal Engineers Association (MEA) Schedule B Class Environmental Assessment (EA) process.

The approach for the WWTBMMP Update follows [the Municipal Class Environmental Assessment](#) (MCEA) process for Master Plans (Municipal Engineers Association, 2015) and is intended to fulfill the following MCEA process phases:

- Phase 1 - Identify and describe problem(s) and opportunities
- Phase 2 - Identify and evaluate alternative solutions and establish the preferred solution

The WWTBMMP Update identifies the need for individual projects and their conceptual feasibility, including anticipated project triggers and impacts. As necessary, projects will proceed in accordance with remaining Class Environmental Assessment (Class EA).

The City previously completed a Wastewater Treatment Master Plan in 2009 and a Biosolids Master Plan in 2006; this WWTBMMP has combined and updated both the wastewater treatment and biosolids management master plans as one. To be future ready and meet the 2051 planning horizon, this Master Plan update provides recommendations and a roadmap for future capital investment at the Guelph Water Resource Recovery Centre (WRRC). The master plan project considers:

- Advances in treatment technologies
- Changes in infrastructure needs and legislation
- Sustainable and cost-efficient wastewater treatment concepts that mitigate climate change and contribute to reaching the City's goal of using 100 per cent renewable energy sources by 2050
- Guelph's growing population and its impact on the wastewater treatment process and Speed River's capacity

- How the WWTBMMP will contribute to achieving the strategic priorities set out through the City's Strategic Plan

The master plan used the 2051 planning horizon population of 203,000 (as the addition of the 5,000 population was not approved until after the master plan was substantially completed) resulting in a projected average daily wastewater flow of 79.2 ML/d. The current discharge limits to the Speed River are expected to become more stringent throughout this planning horizon. As a result, additional wastewater treatment requirements and the associated costs will accompany growth to meet future discharge requirements and maintain the health of the environment.

The health of the Speed River and the surrounding environment is important. To characterize the existing status of the Speed River as the receiver of the City's wastewater discharge, the City completed an [Assimilative Capacity Study](#). The study obtained a thorough understanding of the effects of the existing WRRC effluent on downstream water quality and generated modelling to predict effects at the future projected flows. The Assimilative Capacity project team shared available data with the Master Plan project team to be considered as the Master Plan final recommendations were developed.

A detailed infrastructure capacity assessment has been completed for the wastewater treatment process, biosolids management and biogas utilization for the WRRC. This assessment has determined which processes will require infrastructure upgrades to meet increased capacity based on the projected flows within the planning period to 2051. This review has also confirmed that the current WRRC site has adequate space for future expansion needs for wastewater treatment and biosolids management.

Evaluation Criteria

This Master Plan update also generated a list of wastewater treatment and biosolids management alternatives to meet the future needs. A detailed evaluation process resulted in a list of the preferred wastewater treatment and biosolids management strategies and technologies.

The Evaluation Framework that was used to measure alternate technologies was completed in two stages.

Initially all proposed technologies were given a pass/fail based on:

- Performance
- Proven technology
- Resiliency and reliability

Those technologies that made it through were then measured using the following evaluation criteria. (All criteria had equal weighting of 25% each.)

- Natural Environment
- Social/Cultural Environment
- Technical Environment
- Economics

Projects identified:

Alternative solutions were chosen and evaluated for wastewater treatment, biosolids management and energy recovery.

Themes identified through the master plan process include:

- Utilization of existing infrastructure through maximizing existing buildings or tanks. Examples include:
 - Preliminary treatment upgrades
 - Plant #2 secondary clarifier expansion
 - Primary sludge and thickening upgrades
- Sustainability due to climate change through use of new technologies and concepts. Examples include:
 - Further the combined heat and power process to save energy costs and reduce the carbon footprint
 - Use disk filters as a new technology to increase capacity to the existing tertiary filtration system
- Environmental Stewardship
 - The [Assimilative Capacity Study \(ACS\) of the Speed River](#) has thoroughly examined the environment upstream and downstream of the wastewater treatment plant single discharge location into the Speed River. The characteristics of the river will help inform future regulatory discharge limits. Data from this study will also directly inform the detailed design of applicable future capital projects.

Renaming the Wastewater Treatment Plant to the Water Resource Recovery Centre:

It became apparent through the focus on existing processes, as well as what the future holds, that the WWTP does far more than treat wastewater. There is a significant focus on the resource aspect of the wastewater treatment process, for example:

- The facility is already producing a high-quality effluent and has water re-use on the radar, such as for flushing the sanitary collection system.
- Through the CFIA approved fertilizer product, important nutrients such as nitrogen and phosphorus are beneficially re-used.
- Renewable energy occurs using cogeneration engines that utilize 80% of the digester gas for on-site power and heat.
- Future possibilities include investigating the feasibility of the facility to carry out “phosphorous farming.”

With there already being a significant focus on the products and benefits of treatment, rather than the waste coming into the facility, changing the name from the Wastewater Treatment Plant (WWTP) to the Water Resource Recovery Centre (WRRRC) clearly identifies what the facility is already doing and, more importantly, where the facility is heading.

The unveiling of the new name was held on April 23, 2022, at the Wastewater Open House. This very successful event (with over 400 attendees) educated and demonstrated to members of the public about the services provided by Wastewater Services and also by all the divisions within Environmental Services.

This Master Plan update process has been rigorous and consultative. The final recommendations of projects to be implemented will ensure reliability and resiliency for wastewater treatment and biosolids management. The result of this Master Plan update will inform smart planning to ensure that the City’s wastewater is managed

in a way that is sustainable, protects water ways and the environment, while providing the capacity to meet and support the City's Growth Plan.

Financial Implications

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The City's WWTBMMP is a key step in the overall implementation of the City's official plan. As we move from the master plan stage to the implementation stage, more robust analysis of project timing and cost estimates will be performed. This master plan will be considered with the other master plans nearing completion and will be viewed with a corporate lens to incorporate the City's strategic goals. Once the overall financial impact is understood, the plan will be compared to our existing capital plan, incorporate fiscal constraints and our capacity to deliver. The timing, pace and overall cost of this plan is subject to change. The financial information outlined is intended to be a high-level estimate that will be refined as it is incorporated into the overall corporate plan and multi-year budget process. No additional operating expenses or FTEs are projected as an outcome of the WWTBMMP.

Consultations

Community Engagement and Consultation

The WWTBMMP Update was guided by the City's [Community Engagement Framework](#) (CEF). In alignment with this framework, a WWTBMMP Community Engagement Plan (CEP) was developed by the Project Team.

The alternatives and the evaluation process were shared with the Community Liaison Group, communicated to the community and the public through continued updates to the City's website and through the second Virtual Public Open House.

The Community Liaison Group (CLG) was made up of technically knowledgeable individuals from the Grand River Conservation Authority, Ministry of the Environment Conservation and Parks (MECP), Guelph-Eramosa Township, City staff and the community. There have been three meetings of this team throughout the project.

Three Virtual Open Houses (VOH) informed the community on the master plan progress. Each VOH provided the opportunity to participate in surveys as well as ask questions or leave comments through the Have Your Say platform. Each open house remained open and active for approximately 40 days and was well received.

- There have been two Indigenous consultations through the support of the Intergovernmental Relations Office; both meetings were meaningful and well received.

- In July, City Staff presented a WWTBMMP update to the Six Nations of the Grand River and in October to the Mississaugas of the Credit First Nation.

Several of the recommended projects have been identified as requiring a Schedule C Environmental Study Report prior to commencement. To address this requirement in the most cost effective and timely manner, there was a scope change to this master plan project to complete an Environmental Study Report. With this report, projects can move to the detailed design stage much sooner than if this Schedule C Class EA was treated as a separate project after the Schedule B Class EA master Plan project was closed.

The facility location of planned future projects can be found in Attachment-2.

Following Council's approval, the master plan team will begin to implement the recommendations in accordance with budget approvals. The final recommendations report will be shared with the MECP, where a non-technical review will take place. Following this process, a Notice of Completion will be posted providing the public with 30 days to comment on the final report.

Internal Consultation

- Effective ongoing touchpoints with all the other master plan leads throughout this project have provided the opportunity to share updates, coordinate messaging or activities as well as share lessons learned and resources as applicable.
- Collaborative discussions have also taken place within the Environmental Services Master Plan teams:
 - Solid Waste Resources: to discuss the feasibility of utilizing Separated Source Organics (SSO's) as a possible future fuel source through co-digestion at the WRRC to be revisited in the next MP update.
 - Water Services: to share and discuss anticipated water use trends and sharing the river data that has been collected through the assimilative capacity study.

Strategic Plan Alignment

Working Together for Our Future: This project has been successful largely due to involving a wide range of stakeholders internally with corporate colleagues and externally through the community and industry experts. This collaborative approach supports the strategic plan.

Sustaining Our Future: A review of not only how to meet growth but also climate change and investigating methods to manage both in the most sustainable way has been a key theme of the WWTBMMP. New technologies and concepts are key components of how to mitigate these demands on treatment.

Attachments

Attachment-1 Early High Level Class D Estimates and Potential Capital Investments

Attachment-2 Facility Location of Planned Future Projects

Departmental Approval

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