



# Wastewater Treatment and Biosolids Management Master Plan



# City of Guelph Wastewater Treatment and Biosolids Management Master Plan

**Virtual Open House #2**





# Wastewater Treatment and Biosolids Management Master Plan



## Welcome to Virtual Community Open House #2

**Please sign in.**

The City is updating its Wastewater Treatment and Biosolids Management Master Plan, a long-term plan that will ensure Guelph's wastewater is managed in a way that is sustainable, protects our waterways and environment, and has the capacity to handle the City's growing population.

The Master Plan will look at how the City is currently managing and treating wastewater at the Guelph Wastewater Treatment Plant (WWTP) and guide how we will continue to meet the demands of our growing community now until 2051.

This is the second of two open houses that you will have the chance to have your say and help shape the Master Plan.





# Wastewater Treatment and Biosolids Management Master Plan

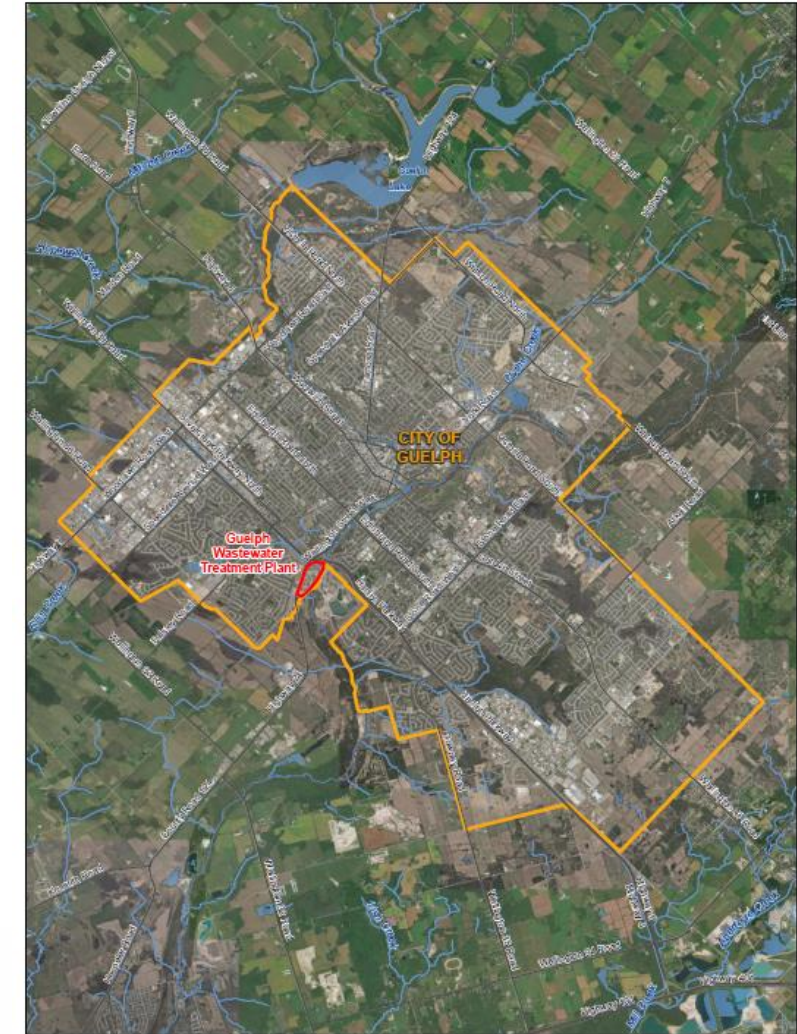


## Master Plan Purpose Statement

The Wastewater Treatment and Biosolids Master Plan will review and revise the City's 2009 Wastewater Treatment and 2006 Biosolids Management Master Plans to reflect updates in development and growth, expansion and re-rating, local initiatives and studies, climate change initiatives and official plan amendments and legislation and guidelines.

## Study Area

The Guelph WWTP collects and treats wastewater from within the urban boundaries of Guelph, as displayed in the figure. The Guelph WWTP also treats wastewater from the Gazer Mooney subdivision and the Village of Rockwood through a Memorandum of Understanding with the City of Guelph.





# Wastewater Treatment and Biosolids Management Master Plan

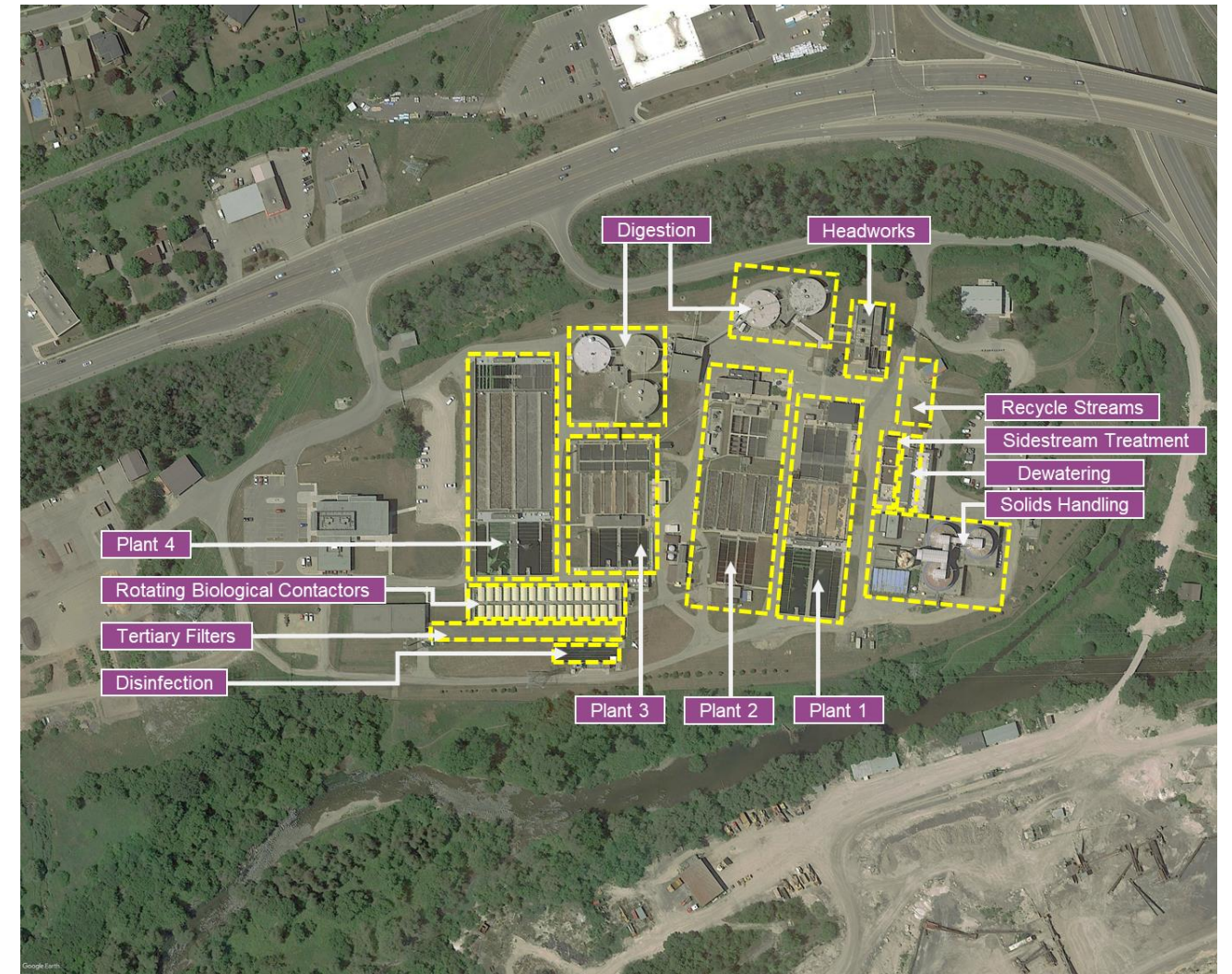


## Guelph Wastewater Treatment Plant

The Guelph Wastewater Treatment Plant has a current rated capacity to treat 64 million litres per day. This is equal to 26 Olympic-sized swimming pools per day.

Wastewater arriving at the Guelph Wastewater Treatment Plant undergoes multiple stages of treatment: preliminary, primary, secondary, tertiary, disinfection and dechlorination. The final treated and disinfected effluent is discharged into the Speed River.

Nutrient rich solids that are primarily organic are removed from the wastewater treatment processes undergo thickening, digestion, dewatering and are further stabilized through the Lystek process. The final product is a Canadian Food Inspection Agency approved fertilizer that is beneficially reused via land application.

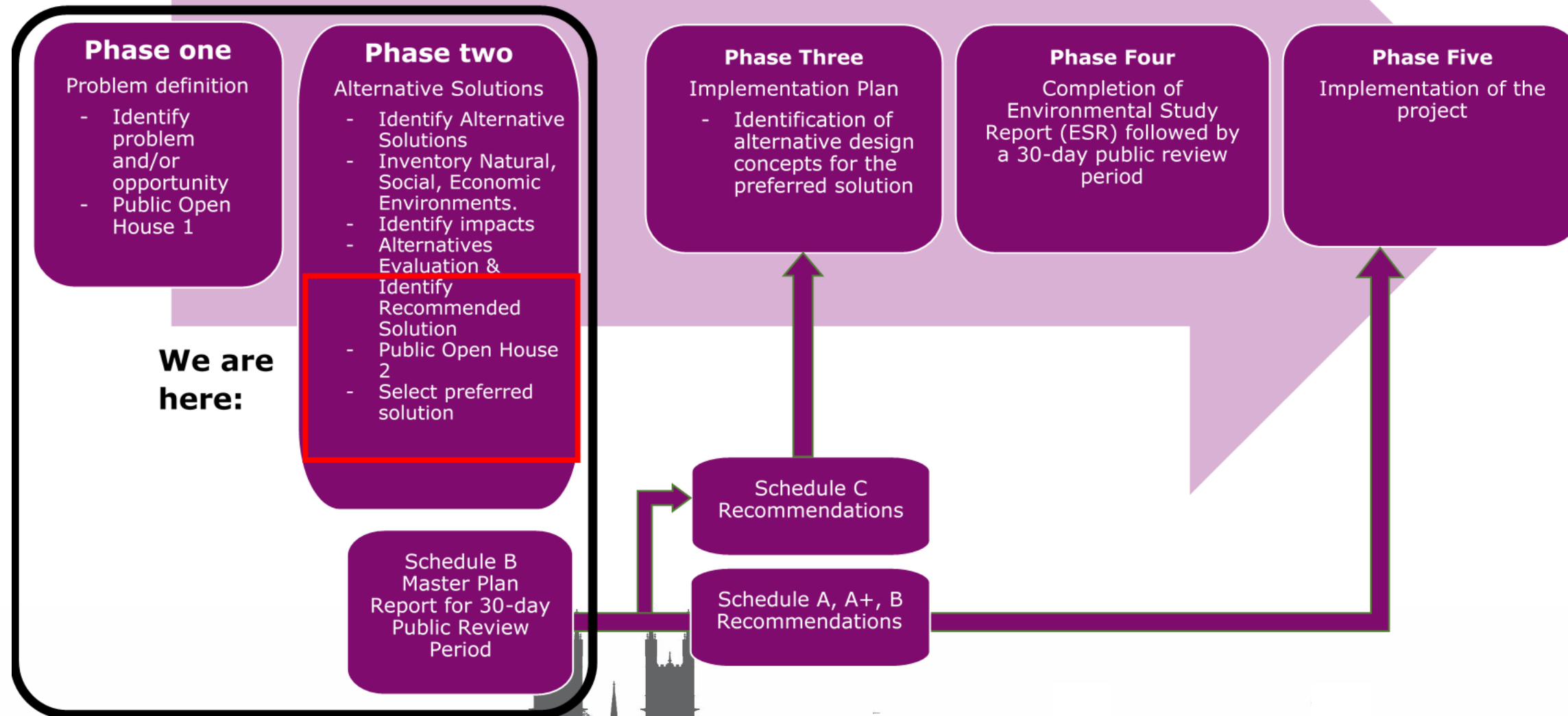




# Wastewater Treatment and Biosolids Management Master Plan



## Class Environmental Assessment Process



**We are here:**





# Wastewater Treatment and Biosolids Management Master Plan



## Community Engagement Plan

The City of Guelph is seeking suggestions, comments and ideas for the Master Planning Process. The City is interested in feedback from the Community Liaison Group, City of Guelph staff, Guelph community members and neighbours, Indigenous communities and Provincial Agencies.

The Community Liaison Group involves local stakeholders who will meet three (3) times during the Master Plan process.

We will have two (2) virtual open houses during the Master Plan process. The first one was held during Fall 2020 and presented the existing conditions at the Guelph WWTP.

Virtual open houses meet the Class EA consultation requirements provided that they meet your needs as a stakeholder.

The City's "Have Your Say" website shares specific information about the Master Plan as well as invites comments, questions and advice from the community. The Have Your Say website can be accessed at: <https://www.haveyoursay.guelph.ca/>

Following the completion of the Master Plan Report, it will be posted to the project website for a 30-day public review.





# Wastewater Treatment and Biosolids Management Master Plan



## Future Needs

Ontario's Growth Plan projects Guelph to have a population of 203,000 by the year 2051. Based on the per capita flow rate of 390 litres per capita per day, it is expected that the treatment plant will receive an average flow rate of 79.2 million litres per day.

The following processes are projected to require upgrades in the planning period, either due to capacity limitations or condition:

### Future Needs

#### Capacity-Based

- Screening
- Grit Removal
- Secondary Treatment
- Tertiary Treatment
- Waste Activated Sludge Thickening
- Digestion
- Cogeneration
- Biosolids Management

#### Condition-Based

- Grit Removal
- Tertiary Treatment
- Disinfection
- Cogeneration
- Dewatering

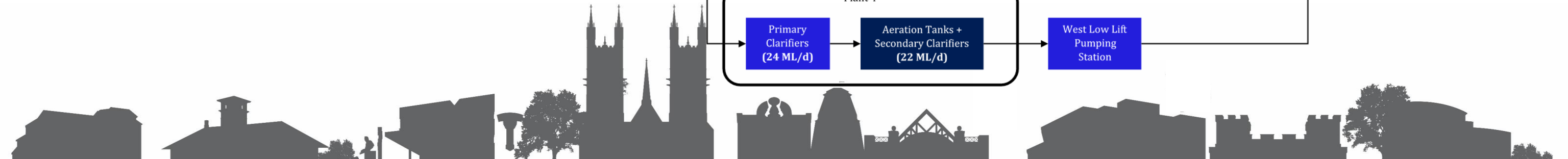
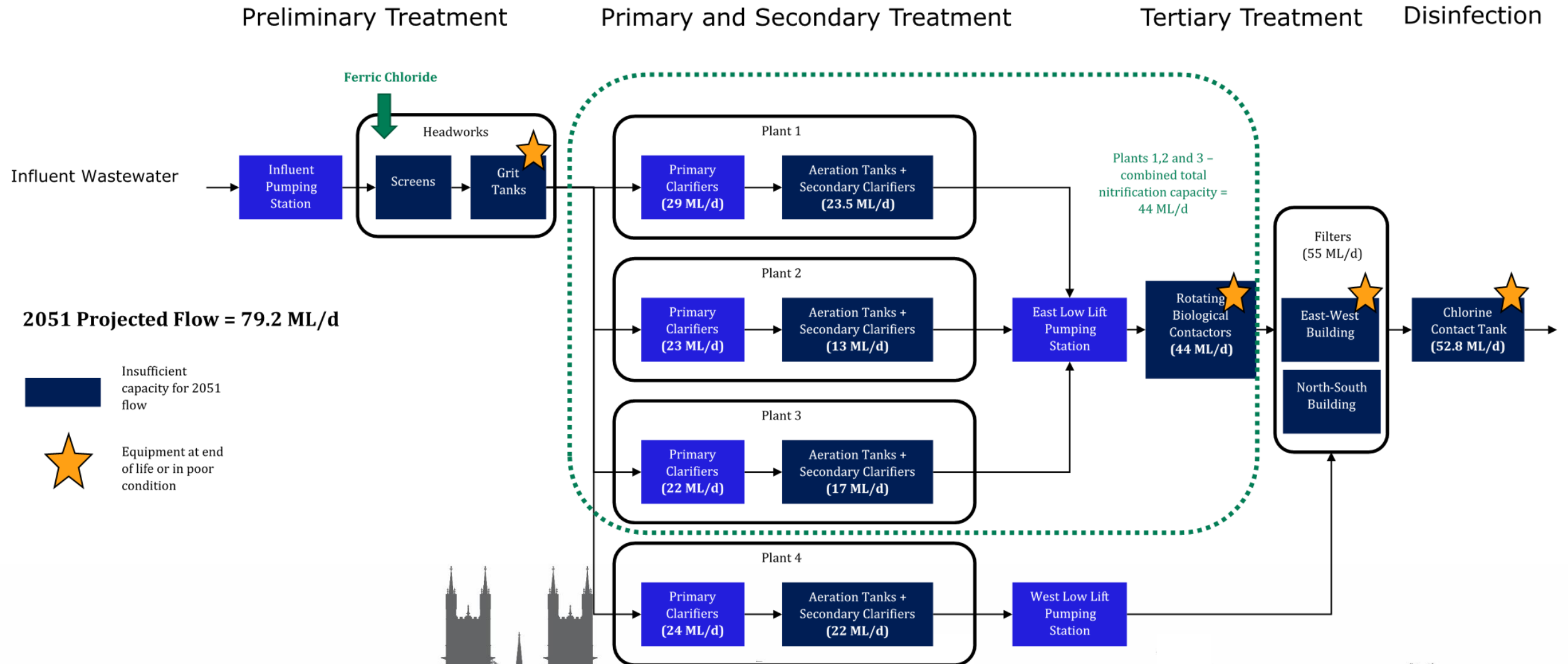




# Wastewater Treatment and Biosolids Management Master Plan



## Future Needs – Wastewater Treatment





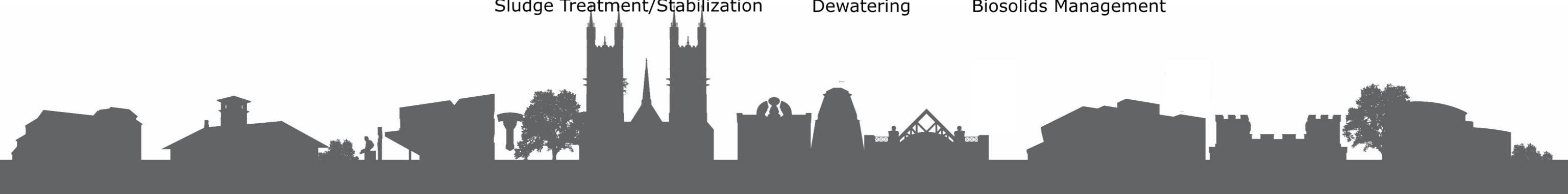
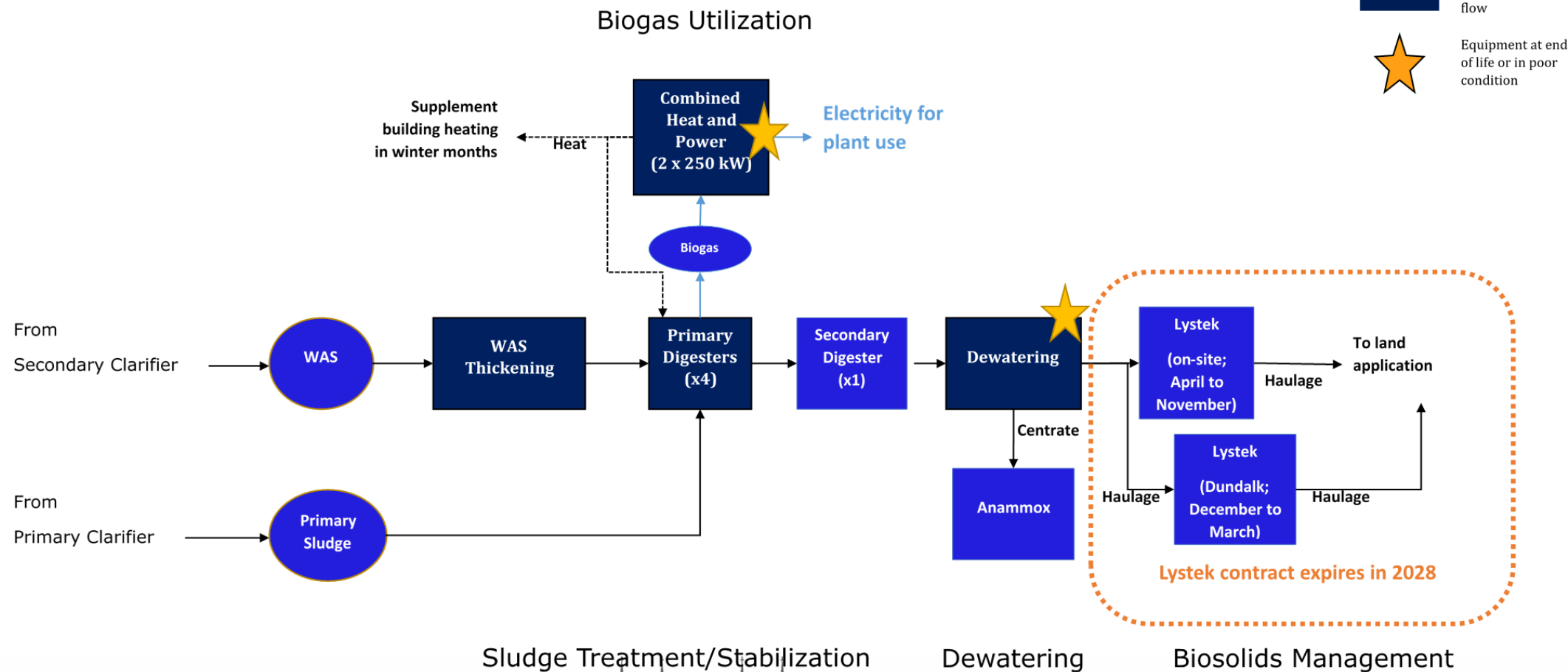


# Wastewater Treatment and Biosolids Management Master Plan



## Future Needs – Biosolids Management

2051 Projected Flow = 79.2 ML/d

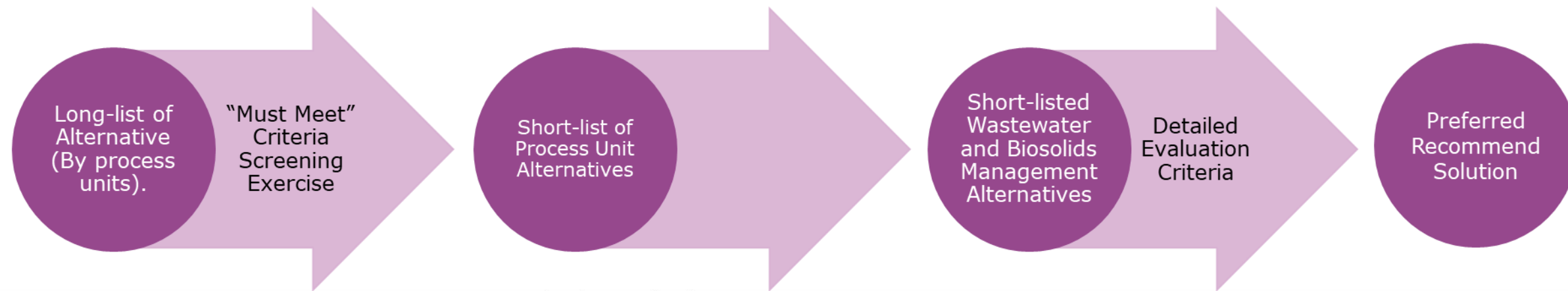




## Alternative Solutions and Evaluation Framework

The Municipal Engineers Association defines alternative solutions as feasible ways of solving an identified problem (deficiency) or addressing an opportunity (Municipal Class Environmental Assessment, 2015).

A long-list of alternative solutions was developed for each deficiency and opportunity. The long-list of alternative solutions was then evaluated against a set of “must meet” criteria that are aligned with the City’s goals and values. The intention of must meet criteria evaluation was to eliminate the potential alternatives that are not feasible for the Guelph WWTP. The alternatives that met all must-meet criteria were shortlisted for a further, detailed evaluation.





## Shortlisted Alternative Solutions

Shortlisted alternative solutions were subjected to a 2-stage detailed evaluation. In the first stage, alternatives were evaluated against the non-economic (natural, social/cultural and technical) criteria, presenting the “benefit score” for each alternative. Those alternatives that received significantly lower benefit scores than others were eliminated from consideration, as they clearly did not provide any advantage over other alternatives.



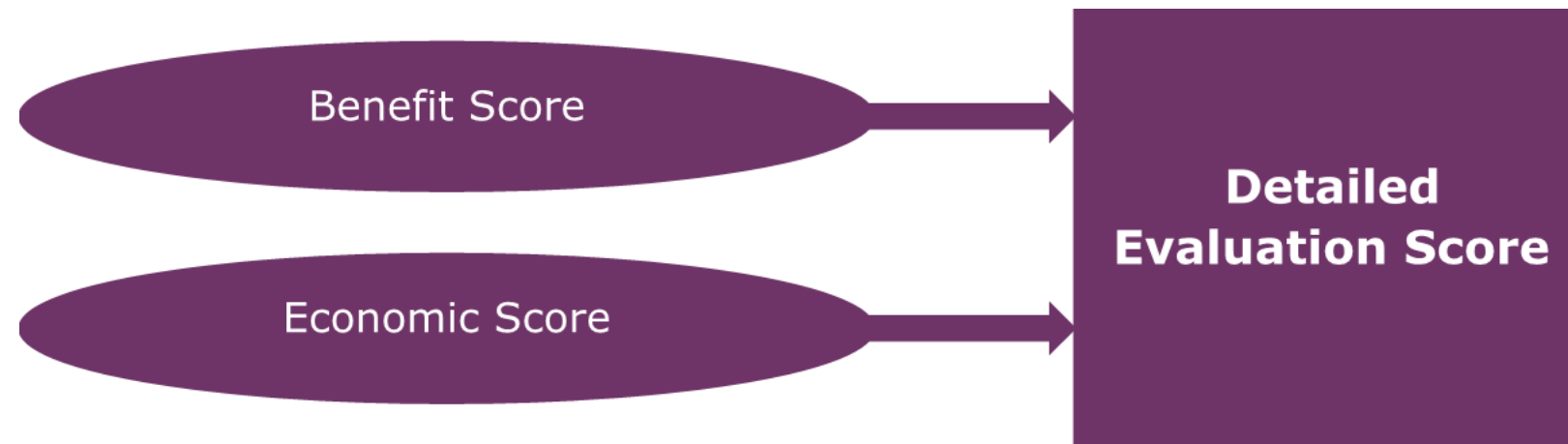


# Wastewater Treatment and Biosolids Management Master Plan



## Detailed Alternatives Evaluation

Alternative solutions that passed the first detailed evaluation stage were then subjected to detailed concept development and costing. For each alternative solution, alternative technologies were evaluated. Economic criteria scoring was completed and combined with the natural, social/cultural and technical criteria scores to provide an overall score for each alternative solution. Sensitivity analyses were completed by adjusting the criteria weighting. The wastewater treatment and biosolids management alternative solution that received the highest scores were selected as the preferred solutions.





# Wastewater Treatment and Biosolids Management Master Plan



## Detailed Alternatives Evaluation – Wastewater Treatment

The tables below present the ranking of shortlisted alternatives for each process unit. The number one ranked alternatives are the preferred solution for this Master Plan.

### Headworks

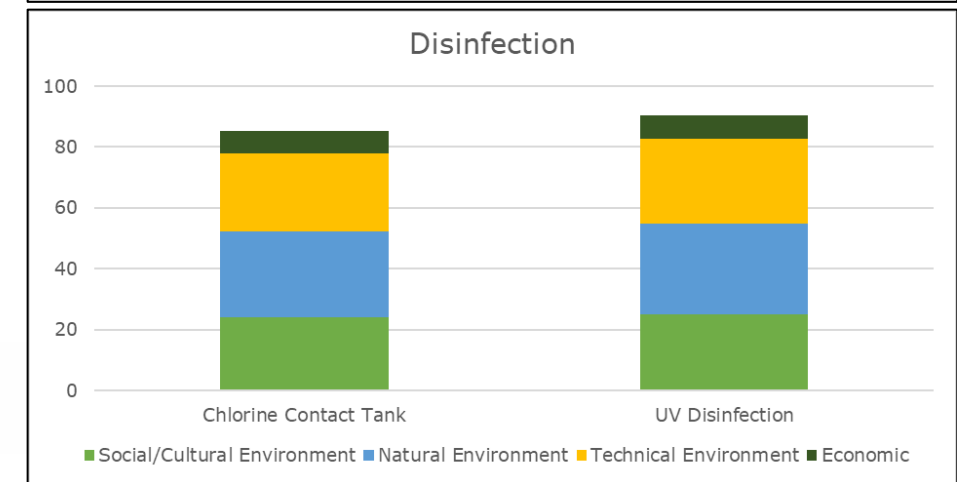
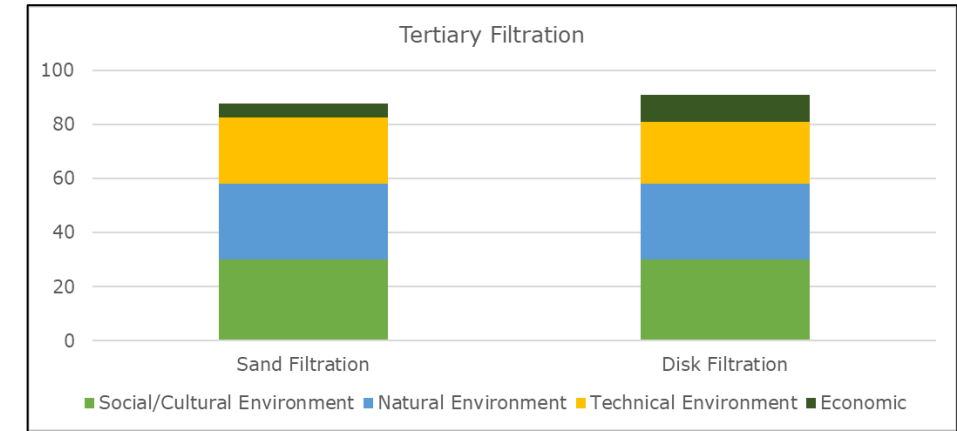
Rank	Shortlisted Alternative	Rationale for Preferred Solution
1	New Headworks Facility	<ul style="list-style-type: none"> <li>Only feasible alternative solution. Technology will be selected at a later stage.</li> </ul>

### Tertiary Filtration

Rank	Shortlisted Alternative	Rationale for Preferred Solution
1	Expansion with Disk Filters	<ul style="list-style-type: none"> <li>Lower lifecycle cost</li> <li>Significantly smaller footprint</li> </ul>
2	Expansion with Sand Filters	

### Disinfection

Rank	Shortlisted Alternative	Rationale for Preferred Solution
1	Expansion with UV Disinfection	<ul style="list-style-type: none"> <li>Better protection for the Speed River</li> <li>Less chemical usage</li> </ul>
2	Expansion with Chlorine Contact Tanks	





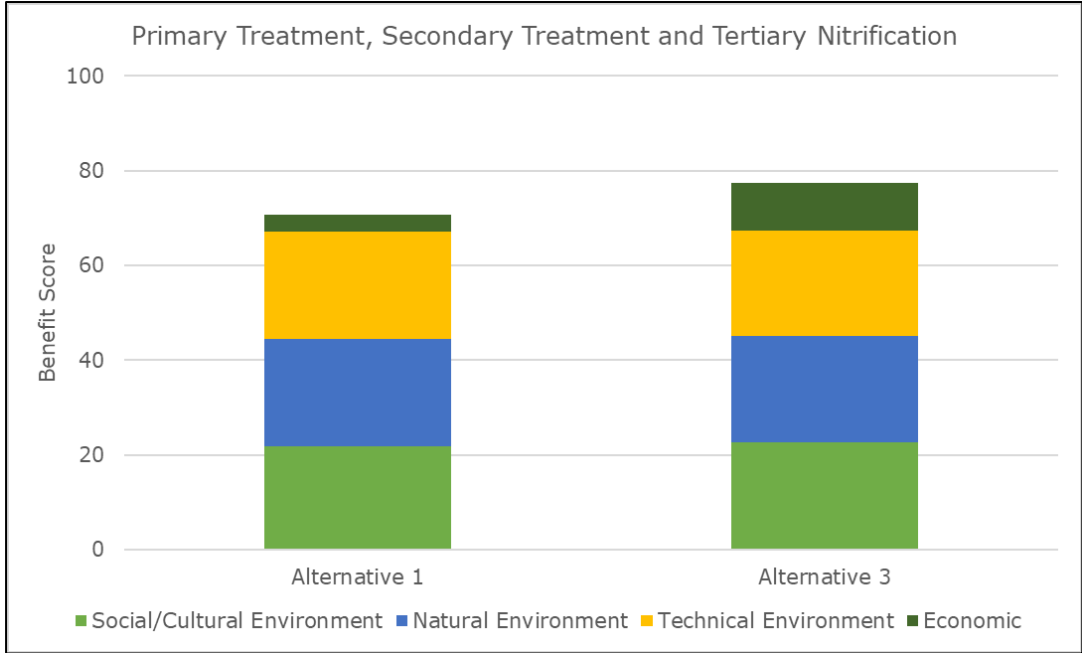
# Wastewater Treatment and Biosolids Management Master Plan



## Detailed Alternatives Evaluation – Wastewater Treatment Continued

The tables below present the ranking of shortlisted alternatives for each process unit. The number one ranked alternatives are the preferred solution for this Master Plan.

Primary Treatment, Secondary Treatment and Tertiary Nitrification		
Rank	Shortlisted Alternative	Rationale for Preferred Solution
1	Alternative 3 <ul style="list-style-type: none"> <li>Decommission and remove the Rotating Biological Contactors</li> <li>Construct 2 New Secondary Clarifiers in Plant 2</li> <li>Retrofit Plant 1 with WAS Hydrocyclones and Membrane Aerated Biofilm Reactors</li> </ul>	<ul style="list-style-type: none"> <li>Maximizes the potential of existing infrastructure</li> <li>Significantly lower lifecycle cost</li> <li>Does not require additional footprint</li> </ul>
2	Alternative 1 <ul style="list-style-type: none"> <li>Decommission and remove the Rotating Biological Contactors</li> <li>Construct 2 New Secondary Clarifiers in Plant 2</li> <li>Construct a New Plant 5</li> </ul>	





# Wastewater Treatment and Biosolids Management Master Plan



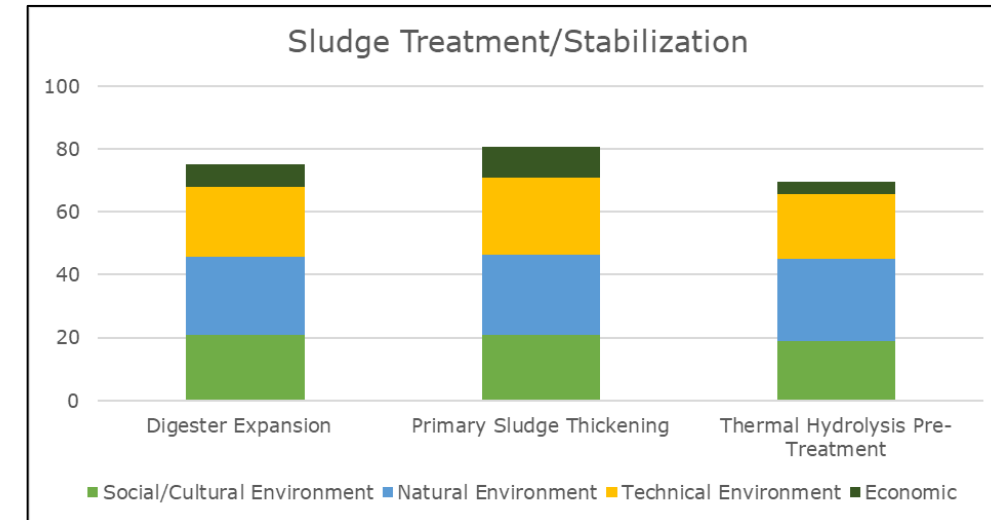
## Detailed Alternatives Evaluation – Biosolids Management

The tables below present the ranking of shortlisted alternatives for each process unit. The number one ranked alternatives are the preferred solution for this Master Plan.

Sludge Treatment/Stabilization		
Rank	Shortlisted Alternative	Rationale for Preferred Solution
1	<ul style="list-style-type: none"> <li>New Primary Sludge Thickening and WAS Thickening Facility</li> </ul>	<ul style="list-style-type: none"> <li>Significantly lower lifecycle cost</li> <li>Less complex operations and maintenance</li> <li>Less complex implementation</li> </ul>
2	<ul style="list-style-type: none"> <li>Digester Expansion, WAS Thickening Expansion</li> </ul>	
3	<ul style="list-style-type: none"> <li>New Thermal Hydrolysis Pretreatment Facility</li> </ul>	

Dewatering		
Rank	Shortlisted Alternative	Rationale for Preferred Solution
1	<ul style="list-style-type: none"> <li>New Dewatering Facility</li> </ul>	<ul style="list-style-type: none"> <li>Only feasible alternative solution. Technology will be selected at a later stage.</li> </ul>

Biogas Utilization		
Rank	Shortlisted Alternative	Rationale for Preferred Solution
1	<ul style="list-style-type: none"> <li>Expansion of Cogeneration System</li> </ul>	<ul style="list-style-type: none"> <li>Design is underway for this expansion.</li> </ul>





# Wastewater Treatment and Biosolids Management Master Plan



## Detailed Alternatives Evaluation – Biosolids Management Continued

The tables below present the ranking of shortlisted alternatives for each process unit. The number one ranked alternatives are the preferred solution for this Master Plan.

It is noted that scoring did not provide a clear preferred solution. However, when considering the advantages and associated risk, expansion of the Lystek process was determined to be the preferred solution.

Biosolids Management		
Rank	Shortlisted Alternative	Rationale for Preferred Solution
1	<ul style="list-style-type: none"><li>Expansion of Lystek Process</li></ul>	<ul style="list-style-type: none"><li>Lowest cost risk</li><li>The City has familiarity with the process</li><li>The City has a well-established relationship with Lystek</li><li>There is an established market for the product in Ontario</li></ul>
2	<ul style="list-style-type: none"><li>Contracted Haulage</li></ul>	
3	<ul style="list-style-type: none"><li>New Composting Facility</li></ul>	
4	<ul style="list-style-type: none"><li>New Thermal Drying Facility</li></ul>	



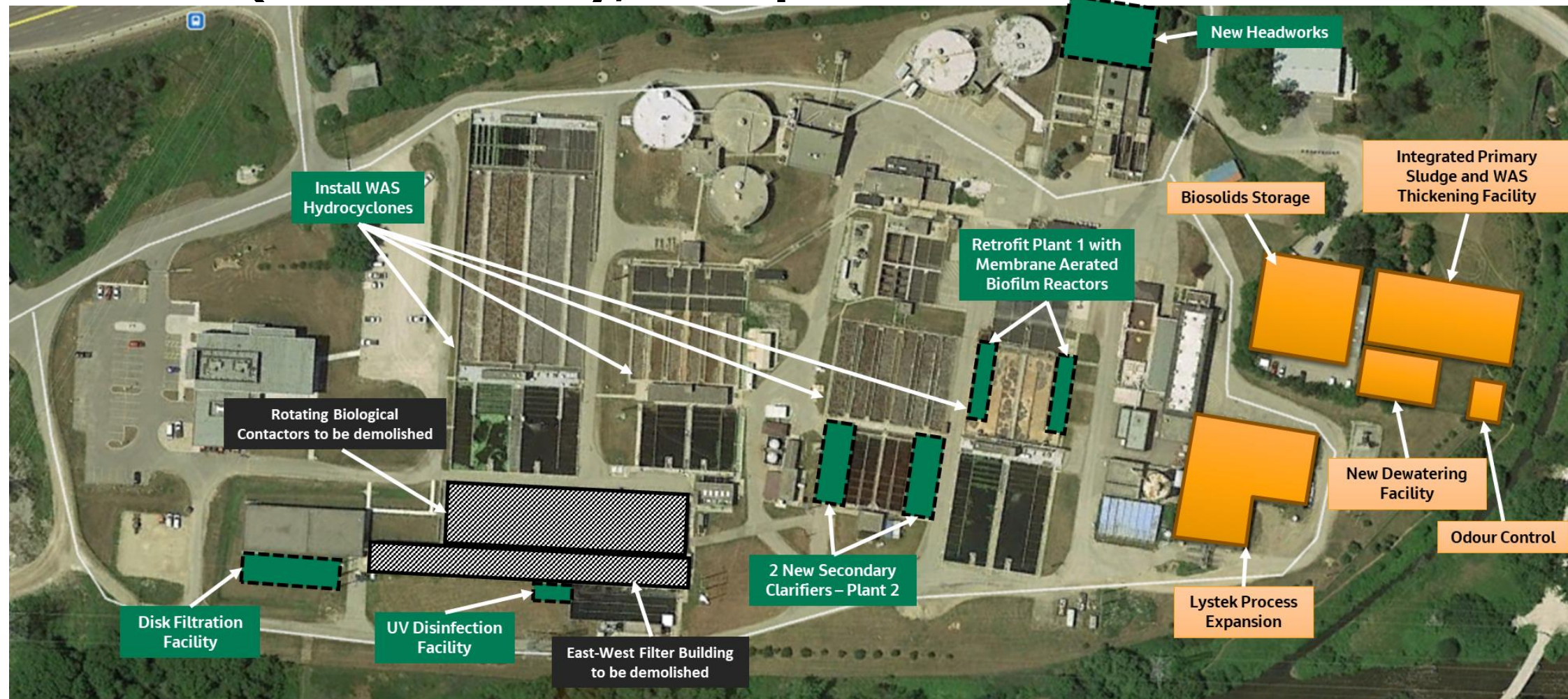




# Wastewater Treatment and Biosolids Management Master Plan



## Preferred Solution (For scale only, final process locations to be determined)





# Wastewater Treatment and Biosolids Management Master Plan



## Preferred Solution – Initial Implementation Plan

The table below presents the initial timeline from the completion of this Master Plan for implementation of the preferred solution. This plan will be further refined in the next phase of this Master Plan.

Short Term (0-10 years)	Medium Term (10-20 years)	Long Term (20-30 years)
<ul style="list-style-type: none"><li>▪ New Headworks Facility</li><li>▪ Construct 2 New Secondary Clarifiers in Plant 2</li><li>▪ Tertiary Filter Expansion</li><li>▪ Disinfection Expansion</li><li>▪ New Primary Sludge Thickening and WAS Thickening Facility</li><li>▪ New Dewatering Facility</li></ul>	<ul style="list-style-type: none"><li>▪ Decommission and Remove the Rotating Biological Contactors</li><li>▪ Expansion of the Lystek Process</li><li>▪ Expansion of the Cogeneration Process</li></ul>	<ul style="list-style-type: none"><li>▪ Retrofit Plant 1 with WAS Hydrocyclones and Membrane Aerated Biofilm Reactors</li></ul>

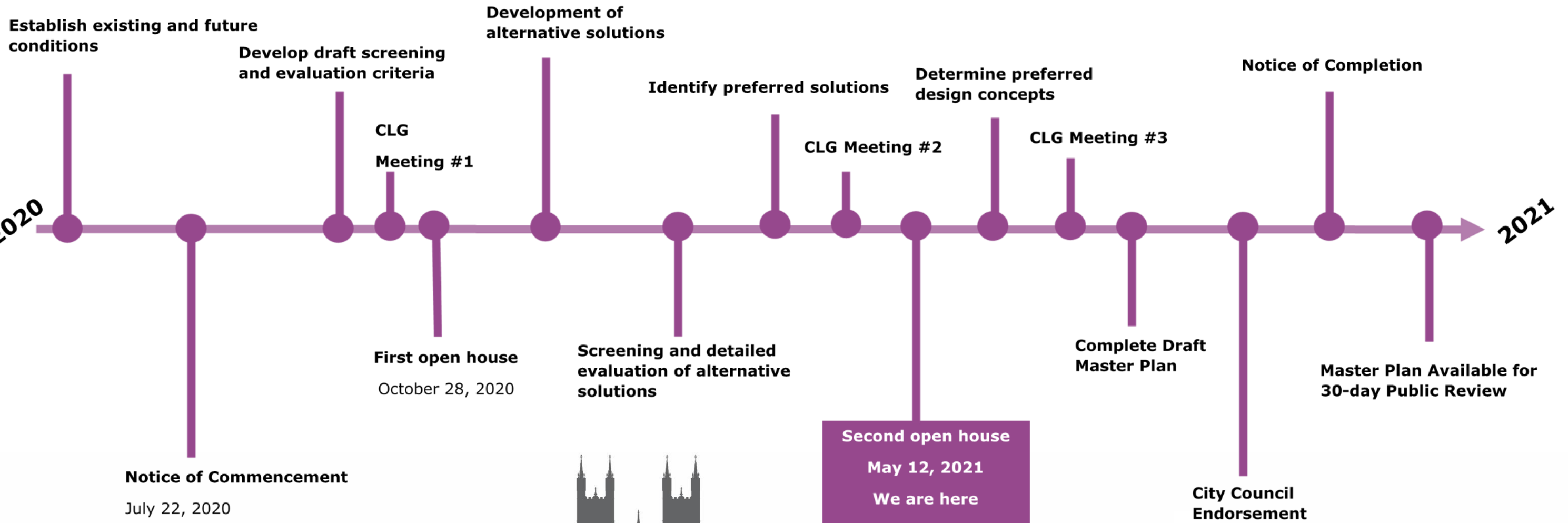




# Wastewater Treatment and Biosolids Management Master Plan



## Project Timeline





# Wastewater Treatment and Biosolids Management Master Plan



## Next Steps

Thank you for your interest in the City's Wastewater Treatment and Biosolids Management Master Plan. The next steps of this Master Plan are as follows:

- Phase 4: Implementation Plan
- Completion of the draft Master Plan in Fall 2021. Following City Council endorsement, the Master Plan will be available for 30-day public review. **This is the next point of public contact.**

**Your feedback is an important part of the Master Plan process.**

- Register, join the conversation and share your thoughts on the Have Your Say website at [www.haveyoursay.guelph.ca](http://www.haveyoursay.guelph.ca)
- Project information will continue to be updated on the Project website at [www.guelph.ca/wastewater](http://www.guelph.ca/wastewater)
- Join the project mailing list to receive project updates. Please provide your contact information (name and email) to the contacts below.
- Follow the conversation on Twitter at [www.twitter.com/cityofguelph](https://www.twitter.com/cityofguelph) and Facebook at [www.facebook.com/cityofguelph](https://www.facebook.com/cityofguelph)

**Please contact the project team with any additional comments or questions that you may have:**

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