New Dundee Water Supply – Iron and Manganese Treatment Upgrades

Schedule “C” Class Environmental Assessment

Virtual Public Consultation Centre #2

File Uploaded on Tuesday May 11, 2021, to the Region of Waterloo’s website and YouTube Page
Welcome!

The Goals of this Virtual Public Consultation Centre:

- Provide background information on the New Dundee Water Supply System
- Evaluate alternatives for iron and manganese treatment and residuals management
- Provide the evaluation criteria for the treatment and residual management alternatives
- Present treatment facility location requirements and potential locations
- Answer any questions you may have and provide an opportunity to get involved in the project

Comments received during this study will be used to identify a recommended approach for the New Dundee Water Supply iron and manganese treatment
New Dundee water supply system iron and manganese treatment upgrades project overview

What are we doing?
Planning upgrades to the New Dundee Water Supply System to provide treatment for iron and manganese. This study will look at the best way to complete these upgrades.

Why are we doing it?
More stringent aesthetic drinking water objectives for manganese are expected in the near future. The New Dundee Water Supply System has been identified as requiring upgrades to meet these future aesthetic objectives. We are taking steps now to ensure we are ready to meet these objectives.

What does it mean to you?
These upgrades will require a new building for the treatment equipment. It is expected additional property at the Region’s existing water supply site or a new site will be required. There is no change in the amount of water being taken from the New Dundee Water Supply wells.

Aesthetic objectives are targets we meet when treating water for taste, odour, and colour.
Evaluation criteria

Criteria scoring
The iron and manganese treatment processes will be evaluated according to the criteria shown below, with each of the four categories being considered equally. The highest score will identify the preferred alternative.

Technical Criteria
• Provides reliable service
• Meets current and future needs
• Aligns with existing and planned infrastructure
• Aligns with existing and future land uses
• Aligns with approval and permitting process
• Manages and minimizes construction risks
• Ability to adapt to climate change

Social Criteria
• Protects health and safety
• Minimizes impacts to residents and businesses related to noise, odour, traffic, and aesthetics
• Minimizes impacts to businesses
• Manages and minimizes construction impacts
• Protects cultural heritage features
• Protects archaeological features

Financial Criteria
• Provides low lifecycle costs

Natural Environment Criteria
• Protects environmental features
• Protects wildlife and species at risk
• Protects groundwater, streams, and rivers
• Minimizes climate change impacts
Potential treatment alternatives

Potential alternatives were screened to develop a short-list of options for detailed evaluation. Alternatives that were screened out did not meet the project objectives.

<table>
<thead>
<tr>
<th>Screened out alternatives</th>
<th>Short-listed alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>✗ Do nothing</td>
<td>Oxidation and conventional filtration</td>
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<tr>
<td>✗ New watermain</td>
<td>Oxidation and membrane filtration</td>
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<tr>
<td>✗ Iron and manganese sequestration</td>
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<td>✗ In situ removal</td>
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<td>✗ Ion exchange softening</td>
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<td>✗ Biological filtration</td>
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<td>✗ Lime and Soda Softening</td>
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Short listed alternative 1: Oxidation and conventional filtration

**Description:** Adding a chlorine solution to the water to oxidize the iron and manganese before being removed through filtration

**Advantages:**
- This is a reliable process in removing iron and manganese.
- This technology is currently being used at other facilities in the Region.
- No additional chemicals required since chlorine solution is already used at the existing facility. Operation of technology will not negatively impact operator health and safety.
- Treatment facility will be resilient to extreme weather events.

**Disadvantages:**
- A medium sized footprint is required for this alternative, to account for the new filters, backwash systems and residual management.

**Estimated Comparative Lifecycle Cost:** $4 Million
Short listed alternative 2: Oxidation and membrane filtration

<table>
<thead>
<tr>
<th>Description:</th>
<th>Adding an oxidant to oxidize the iron and manganese, before being pumped under pressure through a membrane filtration system</th>
</tr>
</thead>
</table>
| Advantages:  | • This is a reliable process in removing iron and manganese.  
• This alternative has the smaller footprint of the two alternatives.  
• Treatment facility will be resilient to extreme weather events. |
| Disadvantages: | • Additional chemicals are required for maintenance, which increases cost, operational complexity, risk of spills and operator health and safety hazards.  
• Disposal of large volumes of residuals is difficult with no sanitary sewer connection in the study area. |
| Estimated Comparative Lifecycle Cost: | $9 Million |
# Evaluation of treatment alternatives

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Alternative 1: Oxidation and conventional filtration</th>
<th>Alternative 2: Oxidation and membrane filtration</th>
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<td>Overall Score</td>
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Preferred treatment approach

Alternative 1: Oxidation and conventional filtration had the best score in each of the four evaluation categories and is the preliminary preferred treatment approach. This option has the lowest lifecycle cost and this treatment approach is successfully used for iron and manganese treatment at other facilities in the Region.
Residual waste produced by the preferred alternative

The next step in the process is to develop residual management systems for the backwash* water produced.

The backwash water volumes produced are expected to contain small concentrations of iron and manganese. After adequate settling time, most of the remaining water could separate as “supernatant**”. The solids would gradually thicken to a liquid “settled solids” suspension.

*Backwash Water: Water used to clean a filter by flowing the water in reverse of the typical direction of flow.

**Supernatant: Clear liquid that lies above the settled solids after settling. Backwash water separates into supernatant and settled solids.
**How to manage residuals under the preferred alternative**

Potential residuals management alternatives were considered for the preferred treatment alternative. Residual management alternatives that were screened out did not meet the project objectives.

<table>
<thead>
<tr>
<th>Screened out alternatives</th>
<th>Short-listed alternatives</th>
</tr>
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<tr>
<td>✗ Lagoons with supernatant to the storm sewer</td>
<td>Backwash equalization tank with recycling of supernatant back to the treatment plant and settled solids haulage</td>
</tr>
<tr>
<td>✗ Storage tanks with supernatant to the storm sewer</td>
<td>Backwash equalization tank with pumping to a sanitary collection system 9 km away</td>
</tr>
</tbody>
</table>
Short-listed residual management alternative 1: Backwash equalization tank with recycling of supernatant and settled solids haulage

**Description:** A backwash equalization tank (BET) to hold the backwash water while it settles to supernatant and solids. The supernatant would be recycled back to the start of the treatment and settled solids would be hauled by truck to a septage receiving station.

**Advantages:**
- This alternative has been used for other plants within the Region and aligns with infrastructure.
- Treatment facility will be resilient to extreme weather events.

**Disadvantages:**
- This process would require a truck to haul the settled solids once every month.

**Estimated Comparative Lifecycle Cost:** $1.3 Million
Short-listed residual management alternative 2: Backwash equalization tank with pumping to a sanitary collection system

Description: A BET to hold the backwash water before pumping the residuals to a sanitary collection system.

Advantages:
• There’s no truck haulage required for this alternative.

Disadvantages:
• The closest sanitary collection system with potential capacity is in Kitchener, located approximately 9 km away from the New Dundee Water Supply Facility.
• Construction of the piping is expensive and would have a greater impact on the community.
• Length of piping and potential pumping station requirements increases operation and maintenance complexity

Estimated Comparative Lifecycle Cost: $15.5 Million
# Evaluation of residual management alternatives

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Alternative 1: BET + Recycling Supernatant + Hauling Settled Solids</th>
<th>Alternative 2: BET + Pump to Existing Sanitary System</th>
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<td>Technical</td>
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- **Very well aligned with criteria**
Preferred residual management approach

**Alternative 1**: Backwash equalization tank with supernatant recycling and haulage of settled solids had the best score in each of the four evaluation categories and is the preliminary preferred residual management approach. This option has the lowest lifecycle cost, is currently in use by the Region at other facilities and is water efficient.

The settled solids would be hauled off site on a monthly or bi-monthly basis, depending on how much is produced.
Requirements for potential treatment site location

There is not enough space on the existing site for a new treatment facility. Potential options for a new site were identified based on:

- **Land size for new building and driveway**
- **Vehicle access to the new site**
- **Distance to the existing New Dundee Water Supply facility and watermains**
- **Environmental features, cultural heritage features, and areas of archaeological potential**
- **Current and potential future land uses**
Short-list of potential locations

These short-listed facility locations will be evaluated in detail. The evaluation results will be presented at the next Public Consultation Centre #3 where there will be an opportunity review and provide comments.
Overview of the Municipal Class Environmental Assessment planning process

This study is being completed as a Schedule C Class Environmental Assessment. A Class Environmental Assessment is a decision making process that all municipalities in Ontario follow for building new infrastructure. The process will allow you to follow what is planned and provide opportunities for you to ask questions and provide input.
Next steps

- **Collect data, review existing conditions and identify project constraints and opportunities**
- **Introduce the project**
- **Develop and evaluate alternatives to meet the New Dundee Water Supply System’s needs including treatment approach and key site requirements**
- **Identify the preferred alternative based on the evaluation process (the preferred alternative is the option that is considered the best overall solution)**
- **Obtain input on the preferred treatment approach**
- **Develop and evaluate the design of the preferred alternative including the facility location and site considerations**
- **Obtain input on the facility location and size**
- **Prepare the Environmental Study Report to document project information and the decision-making process**

Region of Waterloo Council

Region of Waterloo Council will provide approval to file the Environmental Study Report for a **30-day review period for public comment**.

An opportunity for the public to provide input
Thank you for your participation!

Get engaged!

We are in the middle of the New Dundee Water Supply System Iron and Manganese Treatment Upgrades Environmental Assessment. Do you have questions, comments, or want to stay up to date?

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More information, including copies of project notices and Public Consultation Centre materials like a transcript of this virtual presentation can be found at:

https://www.regionofwaterloo.ca/waterprojects