



# **New Dundee Water Supply System – Iron and Manganese Upgrades Class Environmental Assessment**

Class Environmental Assessment  
Environmental Study Report  
Final REV 01

Prepared for:  
Region of Waterloo

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**RVA 194591**

September 18, 2023



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September 18, 2023

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**Attention: Kaoru Yajima**

Dear Mr. Yajima:

Re: New Dundee Water Supply Iron and Manganese Treatment Upgrades Class Environmental Assessment - Environmental Study Report – Final REV 01

Please see the enclosed revised final Class Environmental Assessment Environmental Study Report regarding the New Dundee Water Supply Iron and Manganese Treatment Upgrades, incorporating comments received by the Ministry of Citizenship and Multiculturalism (MCM) in response to the Notice of Completion. Changes to the document from the previously posted Environmental Study Report are referenced in the footnotes.

Yours very truly,

**R.V. ANDERSON ASSOCIATES LIMITED**

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Encls. Environmental Study Report (Final)



**New Dundee Water Supply – Iron and Manganese Treatment Upgrades  
Class Environmental Assessment Environmental Study Report**

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<sup>1</sup> Revised based on letter received from the MCM dated June 9, 2023 in response to the initial Notice of Completion.

## **Executive Summary**

### **Project Overview**

The Region of Waterloo has embarked upon a Class Environmental Assessment for the New Dundee Water Supply System in the Community of New Dundee, in the Township of Wilmot. Due to anticipated changes to the Ontario Drinking Water Standards (ODWS) in terms of the manganese aesthetic objective, the New Dundee Wells were identified for potential treatment upgrades to meet the anticipated new standard.

The New Dundee community is currently supplied by two groundwater wells, located at 156 Alderview Drive, Wilmot. Raw water is pumped from these two wells at a combined maximum flow of 983,520 L/day, or 11.38 L/s, per the Permit to Take Water (PTTW) dated January 28, 2019. The facility consists of two treatment trains and four reservoir cells, with sodium hypochlorite injection for primary and secondary disinfection, and two high lift pumps that discharge water to the distribution system.

This project is a Schedule 'C' Municipal Class Environmental Assessment (Class EA) as it involves major expansions to the existing facilities. As part of the Schedule C Class EA, a list of alternative treatment and residual management solutions were reviewed and evaluated. Once the preferred treatment and residual management solutions were selected, several alternative location design concepts were developed and evaluated for the purposes of future property acquisition by the Region.

### **Evaluation Methodology**

To evaluate the alternative solutions and alternative design concepts, four categories were proposed for the evaluation: Technical, Natural Environmental, Social, and Financial (25% weighting each). A sensitivity analysis was also applied to these weightings for evaluation purposes. The highest scoring solution or design in the natural environmental, social, and financial categories represents a lesser impact or cost. Under the technical category, the highest scoring solution represents better performance.

Each of the primary categories was further subdivided into specific criteria that were used to inform its overall score, with each individual criterion equally weighted.

### **Development and Evaluation of Alternative Solutions**

To reduce the manganese concentrations in the New Dundee Water Supply System to meet the anticipated ODWS objectives, a long list of iron and manganese treatment technologies were identified and reviewed. The long list was then refined into a short list of two alternatives for detailed evaluation: Oxidation and Filtration, and Membrane Filtration. The short list of alternatives was then evaluated using the evaluation methodology described above. The preferred treatment alternative was determined to be oxidation using chlorine and filtration using either manganese dioxide coated media or manganese dioxide media. This alternative is a proven and effective technology with relatively small footprint, no additional chemicals, and lower costs and impacts compared with other alternatives.

Similar to the evaluation of treatment alternatives, a long list of residual management alternatives was developed and refined into a short list of two alternatives: Backwash Equalization Tank (BET) + Supernatant Recycle + Solid Hauling and BET and a New Sewage Pumping Station. The preferred residual management system will consist of a backwash equalization tank, recycling of the supernatant, and hauling of the residuals.

Sensitivity analyses were conducted where different weightings of the categories were evaluated to determine if the outcome of the different weightings would impact the selection of preferred alternatives. The preferred alternatives were not impacted by the variation in weighting.

### **Development and Evaluation of Alternative Design Concepts**

Based on the preferred treatment and residual management approach, RVA worked with the Region to develop a conceptual building size. From public feedback through the consultation process, there were requests to reduce the footprint as much as possible. RVA and the Region conducted a water demand review and arrived at a 30% footprint reduction; the proposed building is estimated to be 15 m by 12 m. The total land area required for the building also included solids holding tank and driveway.

Five locations for the new iron and manganese facility were identified in the area surrounding the existing plant. These locations were identified based on considerations for land size available, vehicle access, distance to the existing New Dundee Water Supply System, environmental features, culture heritage features, areas of archeological potential, and current and potential future land uses.

A sensitivity analysis was performed on the evaluation of the location design concepts. The preferred location was not impacted by the variation in weighting.

### **Preferred Solution**

To reduce the manganese concentrations in the New Dundee Water Supply System to meet the aesthetic objective of 0.02 mg/L, the preferred treatment solution was 'Alternative 5 – Oxidation and Filtration'. This solution consisted of conventional oxidation using chlorine and filtration using either manganese dioxide coated media or manganese dioxide media.

Following the selection of the preferred alternative treatment solution, the preferred residual management solution was determined to be 'Alternative E – Backwash Equalization Tank + Supernatant Recycle + Solids Hauling.'

Based on the preferred treatment and residual management solutions, a preliminary facility size and property size was determined. The preferred location was Location Alternative 2, which is to the immediate northwest of the existing facility at 156 Alderview Drive.

### **Public Consultation**

Public consultation was completed as part of this Class EA process. There were multiple agencies, municipalities, stakeholder groups, and members of the public within 1 km of the existing well site that were invited to participate and comment on this study. Notice of Study Commencement was advertised in April 2020.

Subsequently, three public consultation centers (PCCs) were held virtually due to the Covid-19 pandemic:

- PCC #1 presented the information regarding the problem and opportunity statement.

- PCC #2 presented the information regarding the list of treatment and residual management alternative solutions and evaluation criteria. A short-list of possible location of a new facility to house the treatment equipment was also presented
- PCC #3 presented the information regarding the list of alternatives for locations and preferred design.

Notices for each PCC was informed through direct mail, email, local newspaper notices and Region website. For each PCC, PCC materials, including a narrated video, video transcript, slides, and comment sheet were available for review for 30 days. Indigenous communities were contacted and a record of consultation detailing all consultation efforts undertaken was prepared, in accordance with Ministry of the Environment, Conservation and Parks (MECP) requirements.

### **Mitigation Measures**

Measures were proposed to mitigate impacts to the community and the natural environment to be considered during design and implemented in construction:

- During design, consideration should be made for:
  - disruption to species at risk and their habitat
  - climate change
  - holding a public consultation meeting
  - retaining a landscape architect to design the new site landscaping
- Measures to be considered for construction including:
  - minimizing noise, dust, vibration, and traffic
  - minimizing ground and surface water contaminations.
- The new facility should be given an architectural façade that allows it to blend in with the surrounding farmscape and rural countryside, as recommended from the Cultural Heritage reporting done on the site.

### **Next Steps and Schedule**

Following the publishing of this Environmental Study Report (ESR) for the 30-day review period, if there are no comments, the next phase of this project will be to proceed with the property acquisition, detailed design, approvals, and construction of the preferred alternatives.

## 1.0 Introduction And Background

The Region of Waterloo has embarked upon a Class Environmental Assessment (Class EA) for the New Dundee Water Supply System in the Community of New Dundee, in the Township of Wilmot, in accordance with the requirements of the Municipal Class Environmental Assessment which is an approved process under the Ontario Environmental Assessment Act. The New Dundee Water Supply facility is located on 156 Alderview Dr., Township of Wilmot.

The Region is completing this Class EA to address water treatment upgrades that have been identified based on anticipated changes to the Ontario Drinking Water Standards (ODWS). In June 2019, Health Canada issued the Guidelines for Canadian Drinking Water Quality: Guideline Technical Document – Manganese, which established an aesthetic objective (AO) of 0.02 mg/L of manganese in treated drinking water. It should be noted that aesthetic objectives are intended to address non-health related items such as odour, taste, and colour. To be in line with the Health Canada recommendations, it is anticipated the provincial objective for manganese will be reduced from 0.05 mg/L to 0.02 mg/L, with a design operating objective of 0.015 mg/L. The New Dundee Well Supply System was identified by the Region as eligible for potential treatment upgrades to consistently meet the anticipated new standard. In September 2019, the Region retained R.V. Anderson Associates Limited (RVA) to complete the Class EA for the Iron and Manganese Treatment Upgrades.

### 1.1 Class EA Process

The process used to undertake the New Dundee Class EA followed the Schedule C process as prescribed by the Municipal Class Environmental Assessment process per Environmental Assessment Act, R.S.O. 1990.

The Municipal Class EA is an approved planning procedure that municipal proponents can follow to meet the requirements of the Ontario Environmental Assessment Act. The Class EA approach guides proponents to evaluate the environmental impacts of alternatives to a project and alternative methods of carrying out the project.

The Class EA approach includes requirements for public, Indigenous, and regulatory agency input. The Class EA planning process has five phases, including public consultation requirements, as follows:

- **Phase 1:** Definition of Problem or Opportunity, Optional Public Consultation
- **Phase 2:** Identification and Evaluation of Alternative Solutions, Mandatory Public Consultation
- **Phase 3:** Identification and Evaluation of Alternative Design Concepts for the Preferred Solution, Mandatory Public Consultation
- **Phase 4:** Completion of the Environmental Study Report, Mandatory Public Consultation
- **Phase 5:** Implementation of the Works (i.e., design and construction), Optional Public Consultation

As part of the Schedule C project, Phases 1 through 4 must be fulfilled, an Environmental Study Report (ESR) prepared, a notice of completion issued, and a 30-day public review period provided. During the 30-day public review period any comments or requests from stakeholders, agencies, or concerned parties will be addressed according to the procedures outlined in the Municipal Class EA Manual (2000, as amended in 2007, 2011, and 2015). If there are no concerns, then the proponent may proceed to implementation.

If concerns regarding the project's impact could not be resolved directly with the project proponent, a person may make a Section 16(6) Order request to MECP after the posting of a Notice of Completion and before the 30-day public comment period is complete, requiring a higher level of study (i.e., requiring an individual/comprehensive EA approval before being able to proceed), or that conditions be imposed (e.g., require further studies), only on the grounds that the requested order may prevent, mitigate or remedy adverse impacts on constitutionally protected Aboriginal and treaty rights. Requests on other grounds will not be considered. Additional information of Section 16 Order can be found at [Class environmental assessments: Section 16 Order | ontario.ca](https://www.ontario.ca/class-environmental-assessments/section-16-order)

The 2020 Provincial Policy Statement (PPS) under the Planning Act, sets policy directions on the rules for land use planning in Ontario. It covers policies about managing growth, using and managing natural resources, protecting the environment, along with public health and safety. The PPS supports the provincial goals related to land using planning, growth management, intensification, and infrastructure planning while minimizing the cost to develop. Municipal planning decisions are required to be consistent with the PPS.

This Class EA study follows the PPS under Policy 1.6.6, which states key planning objectives for water services shall:

- Ensure that systems provided can be sustained by the water resources, prepares for impacts by changing climate,
- Be feasible and financially viable over their lifecycle,
- Protect human health and safety, protect natural environment,
- Promote water conservation and water use efficiency, and
- Integrate servicing and land use considerations in all stages of the planning process.

## 1.2 Problem/Opportunity Statement

The Problem/Opportunity Statement for this project is as follows:

Anticipated future changes to the manganese concentrations in the Ontario Drinking Water Standards (ODWS) based on Health Canada's new guideline for manganese prompted the Region of Waterloo to assess potential impacts to its water treatment facilities. This assessment was completed in 2017 though the System Wide Water Supply Facility Assessment for the Proposed Health Canada Manganese Guidelines Study.

The study identified several facilities that would require water treatment upgrades to achieve a level below the Health Canada recommendation for an aesthetic objective of less than 0.02 mg/L of manganese. The New Dundee Water Supply System was identified as one of the facilities that would require upgrades.

The purpose of this study is to identify a preferred treatment strategy for the New Dundee Water Supply to meet the anticipated new ODWS manganese guidelines. As the existing site for the New Dundee Water supply has a constrained footprint, a new treatment approach may require land acquisition. If required, the study is to determine a preferred location, layout, and conceptual design of a new facility.

In addressing the objectives of the study, consideration shall be given to technical requirements of the Region, as well as impacts on the area's natural, cultural, and social environments, and overall cost.

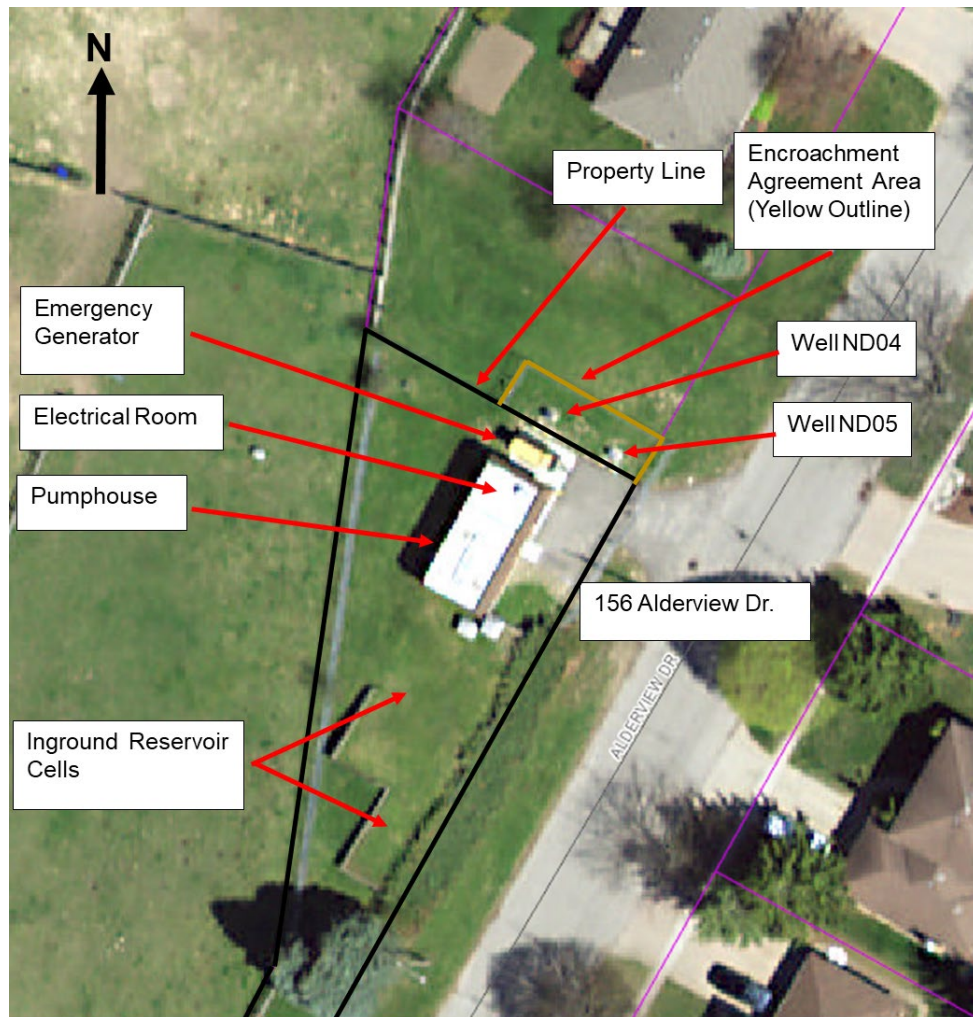
### 1.3 Project Background

The project background was reviewed as part of Technical Memorandum #1 (TM #1) located in **Appendix A** and has been summarized in the following section.

#### 1.3.1 Existing Water Supply System

As one of the Region's Rural Water Supply Systems, the New Dundee Well Supply System was built in 1977 to meet the increased water demands in the community of New Dundee. Currently, the community is supplied by two secure wells (i.e., not under the influence of surface water, ND04 and ND05, located at 156 Alderview Drive, Wilmot, in the community of New Dundee. The facility has undergone a few upgrades in the past and now comprises of one pumphouse, one electrical room, one portable generator, as well as four inground reservoir cells with a total storage capacity of 387.5 m<sup>3</sup>.

The existing property is approximately 970 m<sup>2</sup> in size, including a paved area to the southeast of the station for parking, but excluding the fenced portion located on the property to the north. The property to the north is the Township of Wilmot's property, but the Region of Waterloo has been given permission to use it per an encroachment agreement signed in 2003. An annotated orthographic photo of the existing facility is shown in **Figure 1.1**.



**Figure 1.1: New Dundee Existing Facility**

Raw water is pumped from two wells at a combined maximum flow of 983,520 L/day, or 11.38 L/s, per the Permit to Take Water (PTTW) dated January 28, 2019. Sodium hypochlorite solution is injected into the raw water prior to entering the reservoirs, which are sized to allow sufficient contact time for primary disinfection. After the required contact time is achieved in the reservoir cells, the water is pumped to the distribution system using two distribution pumps (Township of Wilmot owns and operates the distribution system). Flowrates are monitored for both raw and treated water flows. Free chlorine residual is measured downstream of chlorine injection point (upstream of the reservoirs), and both turbidity and free chlorine residual are measured at the discharge point to the distribution system.

Raw and treated water flow rate data from January 2016 to November 2019 were provided by the Region and reviewed. In general, the well and high distribution pumps were running continuously for the dates given. It was found that the average flow supplied by the facility to the distribution system was 2.28 L/s, with a maximum flow rate of 4.5 L/s and a minimum flow rate of 0.89 L/s.

Well ND04 was commissioned in 1990 as part of the pumping station expansion project. The well is located approximately 5 m to the northeast of the pumphouse. Based on the Biennial Groundwater Monitoring Report completed by R.J. Burnside & Associates in 2017 this well may be classified as groundwater not under the direct influent of surface water (non-GUDI). Well ND04 delivers an average day flow of 1.54 L/s, which accounts for 67% of the well system output to the distribution system. The minimum and maximum day flow this well has produced is 0.76 L/s and 3.22 L/s, respectively.

Well ND05 is also classified as non-GUDI, and it is located about 5 m off the east corner of the pumphouse. Well ND05 delivers an average day flowrate of 0.76 L/s which accounts for 33% of the well system output to the distribution system. The minimum and maximum day flow this well has produced is 0.16 L/s and 3.53 L/s, respectively.

### **1.3.2 Design Objective Based on New Regulations**

The Ontario Drinking Water Standards (ODWS) had previously set the aesthetic objective (AO) for manganese in water at 0.05 mg/L; however, Health Canada has modified their Guideline concentration to 0.02 mg/L, to ensure that discolouration of laundry and plumbing fixtures will not result due to manganese. Health Canada has also identified a target of 0.015 mg/L which will ensure that precipitated manganese does not accumulate in the distribution system.

In addition, Health Canada has established 0.12 mg/L as the maximum acceptable concentration (MAC) for manganese in drinking water.

The design objective for the New Dundee Well Supply System Manganese Treatment Upgrades is to meet the goal of less than 0.015 mg/L in the treated water.

### 1.3.3 Design Treatment Capacity

While the PTTW value is sometimes used as the standard for designing new water treatment capacities in well systems, it is evident based on historical flows in New Dundee that the maximum community water demand is well below the PTTW value. As such, RVA conducted a design flow analysis based on historical daily flows from the well pumps, high lift pumps, and using the Region’s 2020 Water and Wastewater Monitoring Report to develop the proposed treatment capacity of the iron and manganese removal system. A summary of the findings is provided in **Tables 1.1** and **1.2** below.

**Table 1.1: Water Demand Projection for 2021, 2026, and 2031**

Year	Projected Population	Average Day Flow (L/cap/day)	Average Daily Flow (L/s)	Max Day Flow (L/cap/day)	Max Day Flow (L/s)
2021	1079	208.3*	2.60	482.0*	5.89
2026	1135	208.3*	2.74	482.0*	6.02
2031	1190	208.3*	2.87	482.0*	<b>6.64</b>

\*Per capita Average and Peak day flows were derived from historical data

**Table 1.2: Treatment Capacity Calculation**

Parameter	Description	Calculation	Value (L/s)
A	Population	Population * per capita requirement	6.6
B	Process Water Use	10% of A	0.7
C	Safety Factor	10% of A+B	0.7
		<b>Total</b>	<b>8.0</b>

As a result of this analysis, RVA and the Region have elected to size the new treatment system to meet the 8.0 L/s (0.69 million litres per day; MLD) capacity.

### 1.3.4 Raw Water Quality

Historical water quality data was provided by the Region of Waterloo for the raw and treated water at New Dundee wells from January 2015 to January 2020. The data was evaluated for the minimum, maximum, and average concentrations for manganese and iron.

### Total Manganese

Manganese concentrations in the raw water from the active wells at New Dundee Water Supply (ND04, ND05) average 0.0315 mg/L for the years 2015 – 2019 while treated water has a lower concentration of manganese averaging 0.018 mg/L (2015 -2019) as seen in **Table 1.3**. The manganese concentrations meet the existing provincial AO for manganese; however, they mostly exceed the new AO guideline. The treated water currently falls between the new aesthetic objective and the design target, confirming the need for the manganese treatment system. Refer to Technical Memorandum #1 in **Appendix A** for more information regarding the total manganese concentrations for each of the two (2) wells over time.

**Table 1.3: Manganese Concentrations in New Dundee Well Supply System Raw Water and Treated Water (2015-2019) (Regional Municipality of Waterloo)**

Parameter	Unit	ND04 Manganese Concentration	ND05 Manganese Concentration	Treated Water Manganese Concentration
Average	(mg/L)	0.026	0.037	0.018
Maximum	(mg/L)	0.031	0.051	0.023
Minimum	(mg/L)	0.022	0.019	0.014

### Total Iron

The treatment equipment used for manganese removal will also reduce iron concentrations since iron is oxidized before manganese. Iron concentrations in raw and treated water are below the ODWS’s aesthetic objective of 0.3 mg/L for iron, as shown in **Table 1.4**. Refer to **Appendix A** for more information regarding the total iron concentrations in each of the two (2) wells over time.

**Table 1.4: Iron Concentration in New Dundee Well Supply System Raw Water and Treated Water (2015-2019) (Regional Municipality of Waterloo)**

Parameter	Unit	ND04 Iron Concentration	ND05 Iron Concentration	Treated Water Iron Concentration
Average	(mg/L)	0.061	0.015	0.021
Maximum	(mg/L)	0.1	0.037	0.044
Minimum	(mg/L)	0.032	0.01	0.01

### 1.3.5 Previous Reports and Documentation

A background review was completed of previous studies and available information related to the New Dundee Water Supply System. The following documents were reviewed and summarized in **Appendix A**:

- Township of Wilmot Engineers' report for Water Works of the New Dundee Water Supply System (Earth Tech Canada Inc., 2001)
- System Wide Water Supply Facility Assessment for the Proposed Health Canada Manganese Guidelines (Stantec Consulting Ltd., 2017)
- 2017 Biennial Groundwater Monitoring Report-New Dundee Well Field, Region of Waterloo (R.J. Burnside & Associates Limited, 2018)
- New Dundee Water Treatment Plant & System Supply Wells ND4, ND5 Asset Inventory & Condition Assessment (C3 Water Inc, 2018)

## 1.4 Existing Conditions of Study Area

Natural environment and archeological desktop studies were conducted for an area within a roughly 1 km radius surrounding the New Dundee Water Supply System site. A summary of the findings is included below. **Figure 1.2** is a map of the study area containing information from the natural environment and archeological desktop studies. **Appendix A** also includes information based on a walkthrough of the existing facility.

### 1.4.1 Natural Environment Existing Conditions Report (LGL Limited, May 2020)

The Background Natural Sciences Report was completed in April and May 2020 by LGL Limited, an environmental and ecological research consultant company retained by RVA. The report summarizes the various flora and fauna species as well as important physiographical features within the EA Study Area. The report is included in **Appendix A** as part of Technical Memorandum #1.

The Study Area consists largely of the Alder Lake, Alder Marsh, and the Alder downstream wetland complex. These areas are designated per the Township Official Plan, and these features have associated floodplains as mapped out by the Grand River Conservation Authority (GRCA). The wildlife habitat consists mainly of agricultural and manicured properties, with some deciduous and coniferous forest pockets. There are a number of bird species that are threatened or are of special concern that may reside in these wildlife habitats.

The findings of this report indicate that any alternate sites chosen as part of the EA process should be subject to bird breeding surveys and an Ecological Landscape Classification (ELC) survey of the chosen location. These bird breeding surveys were subsequently completed and are detailed in **Section 4.3.1**.

#### 1.4.2 Cultural Heritage Environment

Cultural heritage resources include archaeological resources, built heritage resources and cultural heritage landscapes.

##### 1.4.2.1 Archaeological Resources

The Stage 1 AA was completed in April and May 2020 by Archeoworks Inc., an archaeological and cultural heritage services consultant retained by RVA. The report analyzed the archaeological potential of the Class EA Study Area and maps the locations of areas of archaeological or cultural significance. The full report is available in **Appendix H**. The completed Stage 1 AA was submitted to the Ministry of Citizenship and Multiculturalism (MCM) and entered into the Ministry's registry on November 9, 2021.

The following recommendations are presented in the report:

1. Lands that were subjected to previous archaeological assessments (Archeologix Inc. (Golder Associates Ltd.), 2002a,b; ARA, 2010; Detritus Consulting Ltd., 2016) and deemed free of further archaeological concern are recommended to be exempt from further assessment.
2. Parts of the study area that were identified as having archaeological potential removed are exempt from requiring Stage 2 AA (extents of these areas to be confirmed during the Stage 2 AA).
3. Parts of the study area that were identified as having no or low archaeological potential are exempt from requiring Stage 2 AA (extents of these areas to be confirmed during the Stage 2 AA).
4. All areas identified as retaining archaeological potential must be subjected to a Stage 2 AA. These areas must be subjected to pedestrian or test pit survey at five-metre intervals in accordance with the standards set within Sections 2.1.1 and 2.1.2 of the 2011 S&G.

5. Should proposed construction impacts occur within 50 metres of the GPS coordinates recorded in the digital Ontario Archaeological Sites Database (OASD) site forms available on Past Portal for the approximate locations of the Goettling Site (AiHd-9) and Smith Site (AiHd-10), the following archaeological investigations are required:
  - a. As there is the potential to encounter both deeply buried archaeological resources and for archaeological resources to be present near the surface, per Section 2.1.7, Standard 2 of the 2011 S&G, intensified surface survey methods (Stage 2 test pit or pedestrian survey) must occur over a minimum 20-metre radius around the recorded site GPS coordinates in accordance with the standards set within Sections 2.1.1 and 2.1.2 of the 2011 S&G.
  - b. Following the completion of the Stage 2 AA, regardless of the results, the Registrar of Burial Sites at the Ministry of Government and Consumer Services and the Ministry of Citizenship and Multiculturalism (MCM) must be contacted regarding recommendations for subsequent stages of fieldwork. Also, the appropriate recommendations for further Stage 3 burial site investigations (e.g., hand excavation, mechanical topsoil removal, construction monitoring, etc.) will be made following the detailed design phase of the proposed development.
6. As per the Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, c.33 no intrusive activity may occur within the limits of the New Dundee Union Cemetery without consent from the cemetery operator and the Bereavement Authority of Ontario.
  - a. Should the area within the current cemetery limits be impacted, additional archaeological investigation consisting of Stage 2 test pit survey followed by Stage 3 mechanical topsoil removal is required. A Cemetery Investigation Authorization (CIA) issued by the Bereavement Authority of Ontario is also required and needs to be obtained prior to conducting any soil-intrusive work (e.g., Stage 2/3/4 investigations; construction monitoring).

7. Lands within the 20-metre cemetery investigation area surrounding the New Dundee Union Cemetery that were identified as having no potential for unmarked burials (see Map 12) do not require a Stage 3 cemetery investigation.
8. Should proposed construction impacts occur within the swaths of land adjacent to the New Dundee Union Cemetery identified as having potential for the recovery of unmarked burials, the following archaeological/cemetery investigations are required:
  - a. As there is the potential for the New Dundee Union Cemetery to extend into the study area, a Cemetery Investigation Authorization (CIA) issued by the Bereavement Authority of Ontario is required and needs to be obtained prior to conducting any soil-intrusive work (e.g., Stage 2/3/4 investigations; construction monitoring).
  - b. Per Section 2.2, Guideline 4 of the 2011 S&G, and in accordance with the Registrar’s Directive: Archaeological Assessments & Investigations on Cemetery Lands (dated April 11, 2018) and the Registrar’s Directive: Authorization of Archaeological Assessments & Investigations on Cemetery Lands (dated March 1, 2019), further Stage 3 cemetery investigations are required to determine the boundaries of the cemetery. Given the complexity of the field conditions surrounding the New Dundee Union Cemetery, the appropriate recommendations for further Stage 3 cemetery investigations (e.g., hand excavation, mechanical topsoil removal, construction monitoring, etc.) will be made following the detailed design phase of the proposed development. Recommendations for subsequent stages of fieldwork must be made in consultation with the Ministry of Citizenship and Multiculturalism (MCM).

No construction activities shall take place within the study area prior to the MCM (Heritage Planning Unit) confirming in writing that all archaeological licensing and technical review requirements have been satisfied.

A Stage 2 archaeological assessment and any further recommended assessment (e.g., Stage 3 and 4) will be completed as early as possible in the detailed design phase and prior to any ground disturbing activities.

#### 1.4.2.2 Built Heritage Resources and Cultural Heritage Landscapes

The Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes Screening Checklist<sup>2</sup> was prepared in April 2022 by Parslow Heritage Consultancy Inc., a cultural heritage consultant retained by RVA. The checklist was used to screen for known and potential cultural heritage resources, along with other considerations such as Indigenous Land use. The study area for the checklist included the New Dundee Water Supply Facility (current location and proposed building) and all properties immediately adjacent to the facility. The complete checklist is included in **Appendix I**. The checklist identified 328 Main St as a property with potential cultural heritage value or interest (CHVI) and recommended a Cultural Heritage Evaluation for this property during the Class EA phase, if there are any changes in this area.

A Cultural Heritage Evaluation Report (CHER) (dated November 2022 and prepared by Parslow Heritage Consultancy Inc.) (See appendix I) determined the property to be of CHVI. A Heritage Impact Assessment (HIA) will be undertaken by a qualified consultant during the detailed design phase of the project, as the EA will only conceptually establish the façade and the general footprint.

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<sup>2</sup> Revised based on letter received from the MCM dated June 9, 2023 in response to the initial Notice of Completion.



Figure 1.2: Map of Study Area

## 1.5 Pilot Testing Requirements

Pilot testing is typically used to confirm the suitability of a proposed treatment system and determine key design parameters such as the filter loading rate. In consideration of findings from previous pilot tests completed in the Region for iron and manganese treatment, RVA recommended the following:

1. Pilot testing is not required for the proposed treatment at New Dundee Water Treatment Plant. This is because the same treatment technology, using conventional oxidation using sodium hypochlorite and pressure filtration with catalytic media, has been demonstrated to achieve required removal of iron and manganese levels that are similar or higher than levels found in New Dundee well water.
2. Filtration rate should be selected as 14.4 m/hr, the maximum filter loading rate recommended by the American Water Works Association (AWWA) Iron and Manganese Removal Handbook, which would provide an additional factor of safety.
3. Since previous pilot studies discovered copper levels higher than Provincial Water Quality Objectives (PWQO) limit of 5 ppb in the backwash wastewater, the backwash wastewater supernatant should be recycled through the filters. This was further confirmed when the pilot testing raw water quality was compared to the New Dundee raw water quality, and the copper content was similar. As part of the Class EA, historic copper concentrations were reviewed, and the raw water quality were tested again in Q4 2019.

## 2.0 Evaluation Methodology

The following four categories were used for the evaluation of the alternatives identified during Phase 2 and 3 of the Class EA process:

- Technical
- Natural Environmental
- Social
- Financial

The highest scoring solution or design for the natural environmental, social, and financial categories represents a lesser impact or cost. Under the technical category, the highest scoring solution represents better performance.

To produce an overall score for each alternative solution/design, the scores from each category had an equal weighting (25%).

Each of the primary categories was further subdivided into specific criteria that were used to inform its overall score. Individual criterion within each category was equally weighted.

A description of the four categories and their criteria are listed below. Refer to Technical Memorandum #2 in **Appendix B** for more detail on the individual criteria.

### **Technical Criteria**

Technical criteria reflect those engineering considerations that relate to the design, functionality and feasibility of the proposed solutions or design concepts. These criteria are meant to evaluate how well the design solves the project goal originally outlined by the Region. Technical criteria used in the evaluation were as follows.

The solution:

- Provides reliable service
- Meets existing and future needs
- Aligns with existing and planned infrastructure
- Aligns with existing and future use
- Aligns with approval and permitting process
- Manages and minimizes construction risks
- Has the ability to adapt to climate change

### **Natural Environmental Criteria**

Natural environmental criteria evaluate the degree to which the solution/design impacts the natural environment, with emphasis on those sensitive areas that are most critical to human or ecological functions and are most likely to be disturbed. An ideal solution/design should have the least amount of ecological impact. The criteria used in the evaluation were as follows.

The solution:

- Protects environmental features
- Protects wildlife and species at risk
- Protects groundwater, streams, and rivers
- Minimizes climate change impacts

### **Social Criteria**

Social criteria represent the effect a solution or design will have on the local human environment. Overall, the solution/design should have a positive effect on the functioning of the community without imposing an economic burden or altering the community's sociocultural fabric. The social criteria used in the evaluation were as follows.

The solution:

- Minimizes impacts to residents related to noise, odour, traffic, and aesthetics.
- Minimizes impacts to businesses
- Manages and minimizes construction impact
- Avoids impacts to (known and/or potential) built heritage resources and cultural heritage landscapes.
- Avoids impacts to archaeological resources and areas of archaeological potential.
- Protects health and safety

### **Financial Criteria**






Financial factors quantify the cost of the solution to the Region over its service life. All costs should be minimized. In other words, the solution:

- Provides low lifecycle costs

## 2.1 Scoring Method

A graphical-numerical scoring method, as shown in **Table 2.1**, was used to evaluate the criteria within the four main categories. Preference for an alternative solution or design is indicated by the direction and colour of the arrow, as well as the magnitude of the numerical score. A double blue arrow represents an optimal alignment with the criteria objective, and a double orange arrow represents a poor alignment with the criteria objective. **Table 2.1** below gives an example of the five possible scorings and their meanings relative to each other.

**Table 2.1: Example Scoring Graphics**

				
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Low Alignment with Criteria</b>	<b>Not Well Aligned with Criteria</b>	<b>Somewhat Aligned with Criteria</b>	<b>Well Aligned with Criteria</b>	<b>Very Well Aligned with Criteria</b>

Each major category was assigned a single score based on the combined scores of the various criteria. The scores for the categories were then combined into an overall score to provide a final assessment of the alternative solutions/designs.

For the assessment of the alternatives, the majority of the scoring was based on a qualitative assessment with assumptions supporting the rationale described. For the 'Financial Criteria, scoring was completed via a quantitative assessment using preliminary lifecycle costs, which are included in **Appendices C** and **E**.

### 3.0 Development And Evaluation Of Alternative Solutions

#### 3.1 Discussion of Treatment Alternatives

The following long list of treatment alternatives was developed and pre-screened to obtain a short list that was subsequently developed reviewed in detail:

- **Alternative 1:** Do Nothing
- **Alternative 2:** Watermain Extension from Region Integrated Urban System in Kitchener
- **Alternative 3:** In Situ Removal
- **Alternative 4:** Iron and Manganese Sequestration
- **Alternative 5:** Oxidation and Filtration
- **Alternative 6:** Biological Filtration
- **Alternative 7:** Membrane Filtration
- **Alternative 8:** Lime and Soda Softening
- **Alternative 9:** Ion Exchange Softening

**Table 3.1** summarizes the preliminary assessment of the long list of treatment alternatives. Only the alternatives that passed the pre-screening were evaluated further with the evaluation criteria outlined in Section 1.5. For the alternatives that were not carried forward to detailed evaluation, refer to TM #3 in **Appendix C** for more detail.

**Table 3.1: Preliminary List of Treatment Alternatives**

<b>Preliminary List of Treatment Alternatives</b>	<b>Preliminary Assessment</b>
<b>Alternative 1: Do Nothing</b>	Alternative 1 does not meet the Class EA objective to reduce manganese concentrations, this alternative and therefore is not considered further.
<b>Alternative 2: Watermain Extension from Region Integrated Urban Water System in Kitchener</b>	The Region’s Integrated Urban Water System is currently around 10 km away from New Dundee. Watermain extension has not been considered in the Kitchener Growth Management Plan as of 2019. As such, this alternative was not considered further.

Preliminary List of Treatment Alternatives	Preliminary Assessment
<b>Alternative 3: In Situ Removal</b>	Alternative 3 involves injecting aerated water into the target aquifer for manganese precipitation. This alternative has only seen limited installations in the worldwide and raises concerns about possible clogging of the aquifer and altering the aquifer geochemistry. As a result, this alternative was not considered further.
<b>Alternative 4: Iron and Manganese Sequestration</b>	This alternative is employed as a temporary measure usually, and the manganese is not removed in this process, so the objective of lowering manganese concentrations is not met. As a result, this alternative was not considered further.
<b>Alternative 5: Oxidation and Filtration</b>	Alternative 5 is a feasible solution and will be reviewed and evaluated in detail to identify a preferred solution.
<b>Alternative 6: Biological Filtration</b>	The very low iron and manganese concentrations could require a very long time to develop the biological media. Due to the long pilot study time required and high cost associated such a pilot study, this alternative was not considered for further analysis.
<b>Alternative 7: Membrane Filtration</b>	Alternative 7 is a feasible solution and will be reviewed and evaluated in detail to identify a preferred solution.
<b>Alternative 8: Lime and Soda Softening</b>	Manganese reduction is only a by-product of lime and soda ash softening. Alternative 8 also requires a large footprint and produces a large amount of waste. As such, this alternative was not considered further.

Preliminary List of Treatment Alternatives	Preliminary Assessment
<p><b>Alternative 9 – Ion Exchange Softening</b></p>	<p>Manganese reduction is only a by-product of ion exchange softening. Alternative 9 also poses health risk due to raised sodium levels in treated water. As such, this alternative was not considered further.</p>

Based on the review, the following short list of technology alternatives were selected for detailed evaluation:

- **Alternative 5 – Chlorine Oxidation + Pressure Filtration**
- **Alternative 7 – Membrane Filtration**

The descriptions of the short-listed alternatives are listed below:

**Alternative 5 – Chlorine Oxidation + Pressure Filtration**

This alternative consists of oxidizing the raw water to precipitate the iron and manganese out of solution, and then removing the precipitated particles via filtration and adsorption. A list of possible oxidants for use is provided below:

1. Permanganate: Either potassium permanganate (KmnO4) or sodium permanganate (NaMnO4). An overdose of the chemical could result in turning the water a pink colour.
2. Chlorine Dioxide: Unstable and must be either produced on site or shipped in specialized containers at low temperatures. Solution is explosive if it is able to evaporate.
3. Ozone: Less effective than other oxidants for achieving levels below 0.02 mg/L, the proposed AO. Limited pilot studies have been completed on this subject, and onsite production of ozone requires significant capital and operating cost requirement.
4. Chlorine: Chlorine, in the form of sodium hypochlorite solution (NaOCl) is capable of oxidizing manganese in raw water. It takes time to oxide the manganese with chlorine alone. The use of a catalytic filtration media such as catalytic greensand or manganese dioxide allows the reaction to be complete on the surface of the media grains.

The second aspect of the treatment process is the filtration process. For groundwater that is non-GUDI, the AWWA Iron and Manganese Removal Handbook recommends that pressure filtration be employed, because the footprint is smaller, and the groundwater does not require the filter to remove pathogens that would be present in surface water. For filter media, manganese greensand and manganese dioxide have both been pilot tested in previous Region of Waterloo projects with similar raw water quality, and both were found to produce similar filter effluent quality results. Therefore, we recommend both media be allowed as options.

For this system, the oxidation and conventional filtration best suited is a chlorine oxidation using sodium hypochlorite followed by a pressure filtration system with manganese greensand or manganese dioxide filter media.

### **Alternative 7 – Membrane Filtration**

Membrane filtration is the process of using a semi-permeable membrane to remove the manganese and iron from the raw water stream while allowing the water to flow through uninhibited. Use of a membrane filtration system still requires oxidation prior to the filtration, and the most common form of oxidant used in for this application is permanganate, however chlorine may also be used. One other important factor with membrane filtration is the possibility of fouling, where if the manganese or iron is oxidized in the membrane it may clog the membrane pores, increasing head loss through the membrane and decreasing the efficiency of future removals. A pilot test study would be required, and the membrane technology would require a pre- selection process. The treatment process is also considered very energy intensive, resulting in higher energy consumption rates and increased greenhouse gas (GHG) emissions. However, membrane filtration is often considered to have the smallest of footprints compared to the other treatment processes. As public perception and minimizing additional land purchasing is one of the objectives of the Class EA, this option was considered further for a shortlisted review.











#### **3.1.1 Treatment Alternatives Evaluation**







The short-listed alternative solutions were evaluated following the evaluation criteria outlined in Section 1.5 in **Table 3.2** to **Table 3.5**.

One aspect of the evaluation was determining facility footprint sizing. To compare the facility footprint sizes, RVA has drawn upon past experience and projects in order to determine the approximate sizes for comparison purposes and has concluded that the membrane treatment alternative would have a smaller footprint compared to the conventional oxidation and filtration process.











For comparison of the lifecycle costs, a high-level cost estimate was conducted based on historical data from similar projects. These values are not to be used as a construction cost estimate and do not include the cost of land acquisition or other elements common to both alternatives; they are intended only for the relative comparison of the alternatives at this stage.

**Table 3.2: Evaluation of Alternative Solutions- Technical Category**









Evaluation Category	Criteria	Percentage	Alternative 5	Alternative 7
			Chlorine Oxidation + Pressure Filtration	Membrane Filtration
Technical	Provides Reliable Service	3.57%	<ul style="list-style-type: none"> <li>Technology will reliably provide drinking water that meets the future proposed standard.</li> </ul> 	<ul style="list-style-type: none"> <li>Technology will reliably provide drinking water that meets the future proposed standard.</li> <li>Complex to operate and monitor the treatment process with multiple chemicals require</li> </ul> 
Technical	Meets Existing and Future Needs	3.57%	<ul style="list-style-type: none"> <li>Technology meets existing and future needs for drinking water.</li> </ul> 	<ul style="list-style-type: none"> <li>Technology meets existing and futures needs for drinking water.</li> </ul> 
Technical	Aligns with Existing and Planned Infrastructure	3.57%	<ul style="list-style-type: none"> <li>Treatment technology is currently in use in the Region for iron and manganese removal.</li> <li>Chlorine currently in use in the existing facility</li> </ul> 	<ul style="list-style-type: none"> <li>Treatment technology is not currently in use in the Region for iron and manganese removal.</li> <li>Additional chemicals are required for backwash and maintenance purposes.</li> </ul> 
Technical	Aligns with Existing and Future Land Use	3.57%	<ul style="list-style-type: none"> <li>Treatment will require medium sized property acquisition partially or fully outside the Rural Settlement Area Boundary.</li> </ul> 	<ul style="list-style-type: none"> <li>Treatment will require a small sized property acquisition partially or fully outside the Rural Settlement Area Boundary</li> </ul> 
Technical	Aligns with Approval and Permitting Process	3.57%	<ul style="list-style-type: none"> <li>Standard permits and approvals are required to construct this treatment technology.</li> </ul> 	<ul style="list-style-type: none"> <li>Standard permits and approvals are required to construct this treatment technology.</li> </ul> 







Evaluation Category	Criteria	Percentage	Alternative 5		Alternative 7	
			Chlorine Oxidation + Pressure Filtration		Membrane Filtration	
Technical	Manages and Minimizes Construction Risks	3.57%	<ul style="list-style-type: none"> <li>Treatment technology will not adversely affect or increase construction risks.</li> </ul> 	<ul style="list-style-type: none"> <li>Treatment technology will not adversely affect or increase construction risks.</li> </ul> 		
Technical	Ability to Adapt to Climate Change	3.57%	<ul style="list-style-type: none"> <li>Treatment technology is fully indoors and will be resilient to extreme weather events.</li> </ul> 	<ul style="list-style-type: none"> <li>Treatment technology is fully indoors and will be resilient to extreme weather events.</li> <li>Increased energy consumption associated with this technology would lead to more GHG emissions.</li> </ul> 		
<b>Overall Technical Score</b>		<b>25%</b>				

**Table 3.3: Evaluation of Alternative Solutions- Natural Environment Category**







Evaluation Category	Criteria	Percentage	Alternative 5		Alternative 7	
			Chlorine Oxidation + Pressure Filtration		Membrane Filtration	
Natural Environment	Protects Environmental Features	6.25%	<ul style="list-style-type: none"> <li>No additional chemicals are required over what is currently being used at the site.</li> <li>Treatment requires a medium sized footprint facility.</li> </ul> 	<ul style="list-style-type: none"> <li>Additional chemicals are required over what is currently being used at the site, creating additional spill risks to the environment.</li> <li>Treatment requires a small sized footprint facility.</li> </ul> 		
Natural Environment	Protects Wildlife and Species at Risk	6.25%	<ul style="list-style-type: none"> <li>Medium treatment footprint site will impact wildlife habitats.</li> </ul> 	<ul style="list-style-type: none"> <li>Small treatment footprint site will impact wildlife habitats.</li> </ul> 		
Natural Environment	Protects Groundwater, Streams, and Rivers	6.25%	<ul style="list-style-type: none"> <li>Treatment process will have minimal impact to GRCA Regulated Floodplains and local streams and rivers.</li> </ul> 	<ul style="list-style-type: none"> <li>Additional chemical storage and deliveries present increased risks of spills to the environment.</li> </ul> 		
Natural Environment	Minimizes Climate Change Impacts	6.25%	<ul style="list-style-type: none"> <li>No relative difference between alternatives with respect to possible climate change impacts.</li> </ul> 	<ul style="list-style-type: none"> <li>No relative difference between alternatives with respect to possible climate change impacts.</li> </ul> 		
<b>Overall Natural Environment Score</b>		25%				

**Table 3.4: Evaluation of Alternative Solutions- Social Category**

			Alternative 5	Alternative 7
Evaluation Category	Criteria	Percentage		
Social	<b>Minimizes Impacts to Residents Related to Noise, Odour, Traffic, and Aesthetics</b>	4.17%	<ul style="list-style-type: none"> <li>Treatment facility will visually change the existing suburban landscape</li> <li>Minimal effects on noise, odour, and traffic in the area.</li> </ul> 	<ul style="list-style-type: none"> <li>Treatment facility will visually change the existing suburban landscape</li> <li>Negative effects on traffic in the area due to increased chemical deliveries and additional operator personnel for maintenance purposes.</li> </ul> 
Social	<b>Minimizes Impacts to Businesses</b>	4.17%	<ul style="list-style-type: none"> <li>Treatment technology will improve water quality for local businesses.</li> </ul> 	<ul style="list-style-type: none"> <li>Treatment technology will improve water quality for local businesses.</li> </ul> 
Social	<b>Manages and Minimizes Construction Impact</b>	4.17%	<ul style="list-style-type: none"> <li>Construction of facility with proper measures will have minimal impacts on the surrounding area.</li> </ul> 	<ul style="list-style-type: none"> <li>Construction of facility with proper measures will have minimal impacts on the surrounding area.</li> </ul> 
Social	<b>Avoids impacts to (known and/or potential) built heritage resources and cultural heritage landscapes</b>	4.17%	<ul style="list-style-type: none"> <li>Built Heritage Resources and Cultural Heritage Landscapes will not be impacted by the treatment technology.</li> </ul> 	<ul style="list-style-type: none"> <li>Built Heritage Resources and Cultural Heritage Landscapes will not be impacted by the treatment technology.</li> </ul> 
Social	<b>Avoids impacts to archaeological resources and areas of archaeological potential</b>	4.17%	<ul style="list-style-type: none"> <li>Treatment technology may impact archaeological resources.</li> <li>A Stage 2 archaeological assessment and any further recommended assessment (e.g., Stage 3 and 4) be completed as early as possible in the detailed design phase and prior to any ground disturbing activities.</li> </ul>	<ul style="list-style-type: none"> <li>Treatment technology may impact archaeological resources</li> <li>A Stage 2 archaeological assessment and any further recommended assessment (e.g., Stage 3 and 4) be completed as early as possible in the detailed design phase and prior to any ground disturbing activities.</li> </ul>

			Alternative 5	Alternative 7
Evaluation Category	Criteria	Percentage		
				
<b>Social</b>	<b>Protects Health and Safety</b>	4.17%	<ul style="list-style-type: none"> <li>Region operations will not be negatively affected by the treatment technology.</li> <li>Public health and safety will not be affected by treatment technology.</li> </ul> 	<ul style="list-style-type: none"> <li>Region operations working with additional chemicals will require additional health and safety precautions and increase risk to the staff.</li> <li>Public health and safety will not be affected by treatment technology.</li> </ul> 
<b>Overall Social Score</b>		25%		









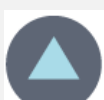

**Table 3.5: Evaluation of Alternative Solutions- Financial Category**

Evaluation Category	Criteria	Percentage	Alternative 5	Alternative 7
			Chlorine Oxidation + Pressure Filtration	Membrane Filtration
Financial	Provides Low Lifecycle Costs	25%	<ul style="list-style-type: none"> <li>The treatment technology has a lifecycle cost of \$5,000,000</li> </ul> 	<ul style="list-style-type: none"> <li>The treatment technology has a lifecycle cost of \$9,000,000</li> </ul> 
			 	
<b>Overall Financial Score</b>			 	

### 3.2 Preferred Treatment Solution

Based on the detailed evaluation of the three alternatives as summarized in **Table 3.6**, the preferred alternative is the use of conventional oxidation using chlorine and pressure filtration using manganese dioxide coated or pure manganese dioxide media.

**Table 3.6: Summary of Evaluation Criteria Technology Alternatives**

Evaluation Category	Percentage	Alternative 5	Alternative 7
		Chlorine Oxidation + Pressure Filtration	Membrane Filtration
Technical	25%		
Natural Environment	25%		
Social	25%		
Financial	25%		
Overall Score	100%		

During the first PCC completed in June and July of 2020; data collection was completed in the form of comments sheets. These comments sheets were analyzed to determine stakeholder preferences with respect to evaluation criteria weighting up to this point. In this case, the social evaluation criteria have some greater weight than the others as the facility is located in a small town and suburban neighbourhood. The weighting was therefore changed to the following:

- Technical 20%, Natural Environment 20%, Social 40%, Financial 20%

The results of this sensitivity analysis yielded Alternative 5 as still the preferred solution.

### 3.3 Discussion of Residual Management Alternatives

Based on the selection of the treatment technology, an estimate of residual production (i.e., waste from the treatment process) was prepared, and a list of potential residual management alternatives was developed. The residual management alternatives were evaluated using the criteria identified in Section 1.5.

#### 3.3.1 Residuals Produced

Residual management alternatives will be needed to manage the following residuals:

- Filter purge
- Filter backwash
- Filter to waste
- Chlorine analyzers
- Turbidity analyzers

**Table 3.7** summarizes the estimated process residuals wastewater volumes. Refer to Technical Memorandum #3 in **Appendix C** for more detail regarding the assumptions for estimating the total volume of waste streams.

**Table 3.7: Estimated Residual Management Streams**

Source	Rate per unit (m <sup>3</sup> /hr)	Number of Units	Time (hr/cycle)	Frequency (Days/backwash cycle)	Volume/cycle (m <sup>3</sup> /week)
<b>Filter Purge</b>	14.4	2	0.033	3.5	3.4
<b>Filter Backwash</b>	132.4	2	0.17	3.5	154.7
<b>Filter to Waste</b>	14.4	2	0.083	3.5	8.4
<b>Chlorine Analyzers</b>	0.05	2	48	3.5	16.8
<b>Turbidity Analyzers</b>	0.018	2	48	3.5	6.1
<b>Total</b>					189.4

Waste stream sources that are not process residuals include:

- Sample Sink
- Eyewash Station
- Safety Shower
- Floor Drains
- Washrooms (if required)

Management of these waste streams will be confirmed in later stages of this project and may include discharge to surface, storm sewers, or septic systems, depending on the characteristics of the waste stream.

### 3.3.2 Residual Management Alternatives

Following the pre-screening of treatment alternatives, the following residual management solutions were considered:

- **Alternative A** – Do Nothing
- **Alternative B** – Backwash Equalization Tank (BET) with pumping of all residuals and supernatants to an existing sanitary sewer.
- **Alternative C** – BET with supernatant discharged to the storm sewer system, and solids hauled off to septage receiving station.
- **Alternative D** – Lagoon for backwash equalization and solids storage (all residuals) with supernatant discharged to the storm sewer system,
- **Alternative E** – BET with supernatant recycled into the raw water supply, upstream of the filters, and solids hauled to a septic receiving station.

**Table 3.8** summarizes the preliminary assessment of the long list of residual management alternatives. Only the residual management alternatives that passed the pre-screening were evaluated further with the evaluation criteria outlined in Section 1.5. For the alternatives that were not carried forward to detailed evaluation, refer to Technical Memorandum #3 in **Appendix C** for more detail.

**Table 3.8: Preliminary List of Residual Management Alternatives**

Preliminary List of Residual Management Alternatives	Preliminary Assessment
<b>Alternative A – Do Nothing</b>	There will be residuals produced by the filters that must be addressed, this alternative was not considered further.
<b>Alternative B – Backwash Equalization Tank (BET) with pumping of all residuals and supernatant to an existing sanitary sewer</b>	Alternative B is a feasible solution and will be reviewed and evaluated in detail to identify a preferred solution.
<b>Alternative C – BET with supernatant released to the storm sewer system, and solids hauled off to a septage receiving station</b>	Alternative C involved discharge of the supernatant to the environment via storm sewer. Pilot testing results indicate that supernatant exceeds discharge limits for chlorine and copper in PWQO, this alternative is not considered feasible and will not be evaluated.
<b>Alternative D – Lagoon for backwash equalization and solids storage (all residuals) with supernatant released to the storm sewer system</b>	In addition to supernatant exceedance, as explained for Alternative C, Alternative D also involved additional land acquisition for lagoons, this alternative is not considered feasible and will not be evaluated.
<b>Alternative E – BET with supernatant recycled into raw water supply, upstream of the filters, and solids hauled to a septic receiving station</b>	Alternative E is a feasible solution and will be reviewed and evaluated in detail to identify a preferred solution.

Based on the review, the following short list of residual management alternatives were selected for detailed evaluation:

- **Alternative B –** BET with pumping of all residuals and supernatant to an existing sanitary sewer; and
- **Alternative E –** BET with supernatant recycled into the raw water supply, upstream of the filters, and solids hauled to a septic receiving station

Descriptions of short-listed residual management alternatives are listed below:

### **Alternative B – BET and New Sewage Pumping Stations**

The community of New Dundee does not have a local sanitary sewer system. The nearest sanitary sewer system is approximately 9 km away following major roadways, at the south-west corner of Kitchener. As this would effectively manage the residuals, this alternative will be further considered in the detailed evaluation. For the purposes of estimating the scope, it was assumed two pumping stations will be required to move the flows to the existing sanitary system in addition to the pumping from the facility. If this solution were selected as the preferred solution, additional analysis would need to be conducted on the existing Kitchener sewer capacity, and also on the new sewage pumping stations, including their design flow rates, configuration, and associated forcemain alignment.









### **Alternative E – BET + Supernatant Recycle + Solids Hauling**









This option would allow for the supernatant to be used effectively and not require any additional dechlorination, while only marginally increasing loading rates on the filters from 13.3 m/hr at PTTW Design rates to 14.5 m/hr at PTTW plus 3.6 m<sup>3</sup>/hr recycle rates. The settled solids would be pumped out into a septage truck, resulting in periodic truck traffic in the area. Due to the minimal construction works requirements compared to the other options, and effective reuse of backwash supernatant on site, this alternative was evaluated further.

### **3.3.3 Residual Management Evaluation**











The short-listed residual management alternative solutions were evaluated as per the evaluation criteria outlined in Section 2.0 in **Table 3.9 to Table 3.12**. For comparison of the lifecycle costs, a high-level cost projection was conducted based on historical data from similar projects. These values are not to be used as a construction cost estimate and are only for relative comparison of alternatives at this stage.

**Table 3.9: Evaluation of Alternative Solutions- Technical Category**









Evaluation Category	Criteria	Percentage	Alternative B		Alternative E	
			BET and New Sewage Pumping Stations	BET + Supernatant Recycle + Solids Hauling	BET + Supernatant Recycle + Solids Hauling	BET + Supernatant Recycle + Solids Hauling
Technical	Provides Reliable Service	3.57%	<ul style="list-style-type: none"> <li>Will reliably manage and handle residuals.</li> <li>New sewage pumping stations will increase operational complexity and odour control issues with low forcemain usages.</li> </ul> 	<ul style="list-style-type: none"> <li>Will reliably manage and handle residuals.</li> </ul> 		
Technical	Meets Existing and Future Needs	3.57%	<ul style="list-style-type: none"> <li>Will meet the current and future residual management needs of the facility.</li> </ul> 	<ul style="list-style-type: none"> <li>Will meet the current and future residual management needs of the facility.</li> </ul> 		
Technical	Aligns with Existing and Planned Infrastructure	3.57%	<ul style="list-style-type: none"> <li>No existing sanitary sewer system.</li> <li>Existing sanitary system not designed for these additional flows.</li> </ul> 	<ul style="list-style-type: none"> <li>Residual management currently in use by the Region and other municipalities.</li> </ul> 		
Technical	Aligns with Existing and Future Land Use	3.57%	<ul style="list-style-type: none"> <li>Sewage pumping stations will have impacts on existing land use, and future land uses.</li> </ul> 	<ul style="list-style-type: none"> <li>BET and solids tank will have a low impact on the existing and future land uses.</li> </ul> 		






			Alternative B	Alternative E
Evaluation Category	Criteria	Percentage	BET and new Sewage Pumping Stations	BET + Supernatant Recycle + Solids Hauling
Technical	<b>Aligns with Approval and Permitting Process</b>	3.57%	<ul style="list-style-type: none"> <li>Additional approvals and permits are required for linear construction, and for construction of new sewage pumping stations.</li> </ul> 	<ul style="list-style-type: none"> <li>Standard permits and approvals are required to construct this residual management.</li> </ul> 
Technical	<b>Manages and Minimizes Construction Risks</b>	3.57%	<ul style="list-style-type: none"> <li>Residual management will greatly increase construction risks, due to the large scope of construction required, along existing and operational roadways.</li> </ul> 	<ul style="list-style-type: none"> <li>Residual management will not adversely affect construction risks.</li> </ul> 
Technical	<b>Ability to Adapt to Climate Change</b>	3.57%	<ul style="list-style-type: none"> <li>Residual management strategy will require additional standby power or emergency storage requirements in the event of a power outage.</li> </ul> 	<ul style="list-style-type: none"> <li>Residual management strategy is fully indoors, and is resistant to extreme weather events, with usable existing standby power.</li> </ul> 
<b>Overall Technical Score</b>		<b>25%</b>		

**Table 3.10: Evaluation of Alternative Solutions- Natural Environment Category**





Evaluation Category	Criteria	Percentage	Alternative B		Alternative E	
			BET and New Sewage Pumping Stations		BET + Supernatant Recycle + Solids Hauling	
Natural Environment	Protects Environmental Features	6.25%	<ul style="list-style-type: none"> <li>Alternative will have a negative impact on sensitive environmental features due to creek crossings.</li> </ul> 	<ul style="list-style-type: none"> <li>Residual management strategy will have no impact on environmentally sensitive areas.</li> </ul> 		
Natural Environment	Protects Wildlife and Species at Risk	6.25%	<ul style="list-style-type: none"> <li>Alternative will have negative impacts to possible species at risk in environmentally sensitive areas, such as the aforementioned creek crossing.</li> </ul> 	<ul style="list-style-type: none"> <li>Alternative will have little impact on wildlife.</li> </ul> 		
Natural Environment	Protects Groundwater, Streams, and Rivers	6.25%	<ul style="list-style-type: none"> <li>Forcemain will cross under one creek, and through wetlands, increasing chance of breaks.</li> </ul> 	<ul style="list-style-type: none"> <li>Facility location will be outside of a GRCA regulated area, minimizing adverse effects against local watercourses and sources.</li> </ul> 		
Natural Environment	Minimizes Climate Change Impacts	6.25%	<ul style="list-style-type: none"> <li>Construction of forcemains and sewage pumping stations will result in the release of greenhouse gas (GHG) emissions.</li> </ul> 	<ul style="list-style-type: none"> <li>Hauling away of settled solids will result in the release of GHG emissions</li> </ul> 		
<b>Overall Natural Environment Score</b>		<b>25%</b>				

**Table 3.11: Evaluation of Alternative Solutions- Social Category**

Evaluation Category	Criteria	Percentage	Alternative B	Alternative E
			BET and New Sewage Pumping Stations	BET + Supernatant Recycle + Solids Hauling
Social	Minimizes Impacts to Residents Related to Noise, Odour, Traffic, and Aesthetics	4.17%	<ul style="list-style-type: none"> <li>Sewage pumping stations will impact the suburban landscape of the area.</li> <li>Sewage pumping stations will increase risk of odour impacts</li> </ul> 	<ul style="list-style-type: none"> <li>Residual management facility will visually change the existing suburban landscape</li> <li>Negative effects on traffic in the area due to increased solids hauling requirements</li> </ul> 
Social	Minimizes Impacts to Businesses	4.17%	<ul style="list-style-type: none"> <li>Roadway construction will have negative impacts on local businesses</li> </ul> 	<ul style="list-style-type: none"> <li>Truck hauling will have minimal impacts on residents</li> </ul> 
Social	Manages and Minimizes Construction Impact	4.17%	<ul style="list-style-type: none"> <li>Construction of forcemain will have large impact along its route on the surrounding area.</li> </ul> 	<ul style="list-style-type: none"> <li>Construction of facility with proper measures will have minimal impacts on the surrounding area.</li> </ul> 
Social	Protects Cultural Heritage Features	4.17%	<ul style="list-style-type: none"> <li>Built Heritage Resources and Cultural Heritage Landscapes have a greater risk of being impacted by this residual management strategy</li> </ul> 	<ul style="list-style-type: none"> <li>Built Heritage Resources and Cultural Heritage Landscapes will not be impacted by the residual management strategy.</li> </ul> 

			Alternative B	Alternative E
Evaluation Category	Criteria	Percentage	BET and New Sewage Pumping Stations	BET + Supernatant Recycle + Solids Hauling
Social	Protects Archaeological Features	4.17%	<ul style="list-style-type: none"> <li>Archaeological resources have a greater risk of being impacted by this residual management strategy.</li> <li>A Stage 2 archaeological assessment and any further recommended assessment (e.g., Stage 3 and 4) be completed as early as possible in the detailed design phase and prior to any ground disturbing activities. Due to length of forcemain, additional area will need to be captured. A Stage 1 AA is required for all previously unassessed lands.</li> </ul>	<ul style="list-style-type: none"> <li>Residual management strategy may impact existing archaeological resources.</li> <li>A Stage 2 archaeological assessment and any further recommended assessment (e.g., Stage 3 and 4) be completed as early as possible in the detailed design phase and prior to any ground disturbing activities.</li> </ul>
				
Social	Protects Health and Safety	4.17%	<ul style="list-style-type: none"> <li>Region operations will require additional personal protective equipment (PPE) and confined space entry equipment to service the sewage pumping stations.</li> <li>Public health and safety will not be affected by treatment technology.</li> </ul>	<ul style="list-style-type: none"> <li>Construction and operation will have minimal impacts on residents and Region staff.</li> <li>Public health and safety will not be affected by treatment technology.</li> </ul>
				
<b>Overall Social Score</b>		<b>25%</b>		











**Table 3.12: Evaluation of Alternative Solutions- Financial Category**

Evaluation Category	Criteria	Percentage	Alternative B	Alternative E
			BET and New Sewage Pumping Stations	BET + Supernatant Recycle + Solids Hauling
Financial	Provides Low Lifecycle Costs	25%	<ul style="list-style-type: none"> <li>The residual management alternative has a lifecycle cost of \$6,500,000.</li> </ul> 	<ul style="list-style-type: none"> <li>The residual management alternative has a lifecycle cost of \$1,200,000.</li> </ul> 
<b>Overall Financial Score</b>				

### 3.4 Preferred Residual Management Solution

Based on the detailed evaluation of the two alternatives as summarized in **Table 3.13**, the preferred alternative is

**Table 3.13: Summary of Evaluation Criteria Residual Management Alternatives**

Evaluation Category	Percentage	Alternative B	Alternative E
		BET and New Sewage Pumping Stations	BET + Supernatant Recycle + Solids Hauling
Technical	25%		
Natural Environment	25%		
Social	25%		
Financial	25%		
Overall Score			

As with the treatment technology evaluation, the short-listen residual management alternatives were subject to a sensitivity analysis. Due to the suburb surrounding the existing well supply facility, the social criteria have been increased per following:

- Technical 20%, Natural Environment 20%, Social 40%, Financial 20%

In this case, Alternative E was still shown as the preferred alternative.

## 4.0 Development And Evaluation Of Alternative Design Concepts

The basis of this design was on the preferred treatment alternative of chlorine oxidation using sodium hypochlorite followed by pressure filtration, and a residual management strategy of a BET for backwash and process water storage, with supernatant being recycled back into the raw water inlet upstream of oxidation, and settled solids being hauled off.

### 4.1 Facility Requirements for the Preferred Treatment Technology and Residual Management Solution

Based on the preferred approach of oxidation, filtration, with supernatant recycling and hauling settled solids, the new facility requires space for:

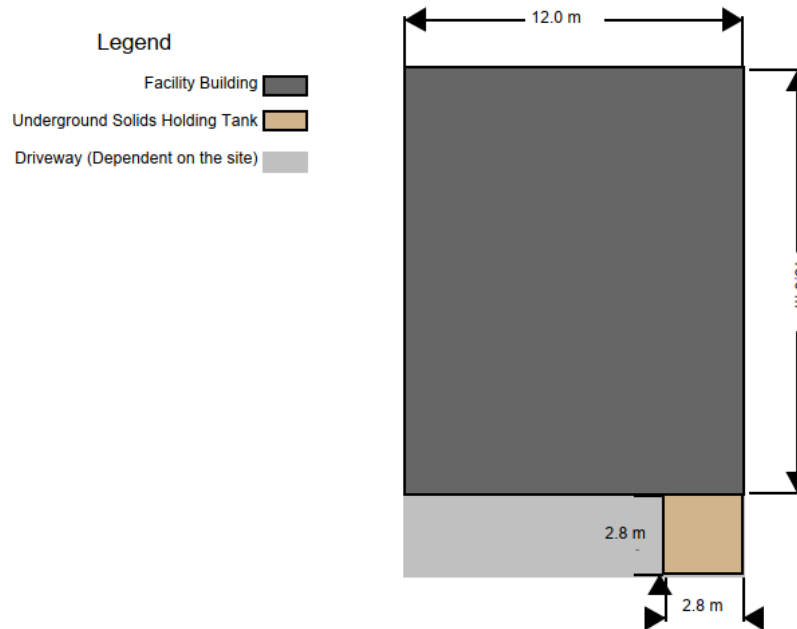
- An inground backwash equalization tank with two cells,
- An inground backwash supply tank with two cells,
- An inground sludge holding tank with one cell,
- An electrical room,
- A filter and process room, which would include:
  - Filters and associated piping,
  - Backwash supply pumps,
  - Blowers,
  - Supernatant supply pumps,
  - Sodium hypochlorite dosing and storage system,
- Alterations to the existing water supply facility and system, which could include well pump replacement, and electrical, process piping, and architectural changes.

For purposes of determining the area of property required, as part of TM#4, RVA worked with the Region to develop a conceptual building size for a proposed treatment design capacity of 8.0 L/s (0.69 MLD). Refer to Technical Memorandum #4 in **Appendix D** for more detail regarding the preliminary equipment and tankage assumptions

As part of TM #4, RVA worked with the Region to develop a conservative building size of 19 m by 14 m. During the PCC #2 comment period, numerous stakeholders expressed an interest in minimizing the size of the future facility. In response, the Region reviewed the initial design capacity of the manganese removal facility of 11.4 L/s, which equalled the existing PTTW. A summary of this

review is shown in Table 1.2. As a result of this review, the design treatment capacity was reduced to 8.0 L/s. The building was then resized and reduced to 15 m by 12 m, an approximate 30% reduction, with a 2.8 m by 2.8 m sludge holding tank located belowground adjacent to the building. Additional space on the site was included for sludge holding tank and driveway access.

The preliminary site layout is shown in **Figure 4.1**.



**Figure 4.1: Preliminary Site Layout**

## 4.2 Discussion of Location Design Concepts

Based on the preliminary site layout, five preliminary locations for the iron and manganese facility were identified as shown in **Figure 4.2**. The potential sites were identified based on considerations for:

- Available land size
- Proximity to the existing water supply facility
- Distance to the existing New Dundee Water Supply System
- Environmental, cultural heritage, and areas of archeological potential, based on an Existing Conditions Report and Stage 1 Archeological Assessment
- Existing and potential future land uses

A summary map is shown in **Figure 4.2**. Also shown on this drawing is an approximate location of the floodplain elevation, as provided by the GRCA during the virtual PCC #2 review period, in June 2021. The floodplain is approximated to be 319.9 m Above Sea Level (ASL).

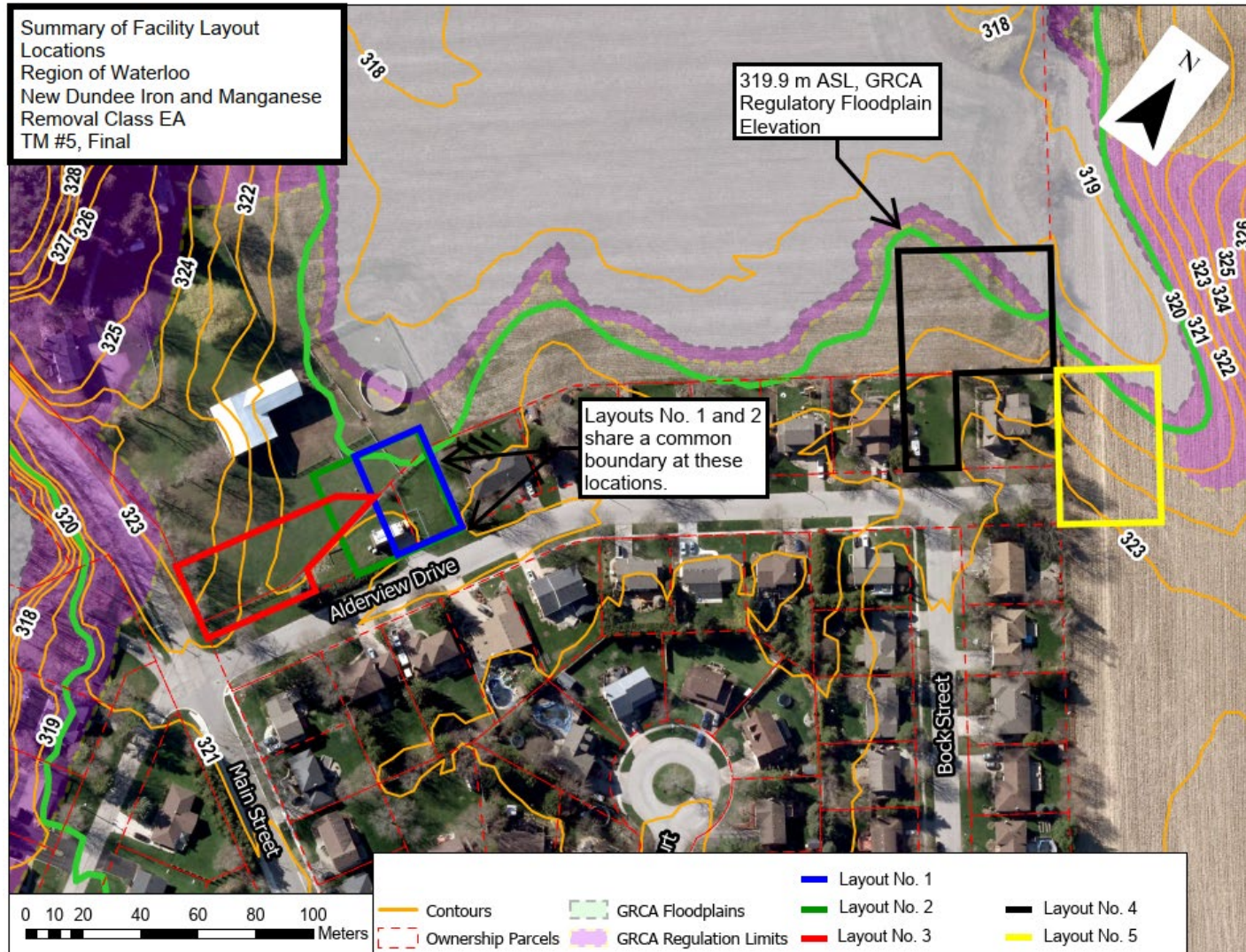


Figure 4.2: Preliminary Site Location Alternatives

### 4.3 Facility Location Alternatives Site Investigations and Considerations

As part of TM #1, natural environment and archeological desktop studies were conducted within 1 km radius surrounding the New Dundee Water Supply System site. Considerations were also made regarding stakeholder comments made during public consultation periods.

#### 4.3.1 Natural Environment Existing Conditions Report

To supplement the natural environment existing conditions study, a Natural Sciences Report was completed including field visits in May and June 2021, at the location alternatives for a visual assessment of the habitat, flora, and fauna. Measures were recommended to mitigate impact during construction. The 'New Dundee Water Supply System Iron and Manganese Upgrades Natural Sciences Report' is included in **Appendix G**.

The wildlife habitat where the five alternatives are located consist mainly of agriculture and manicured areas, with some deciduous and coniferous trees throughout. These trees and shrubs are mostly ornamental or hedgerows, and no plant species at risk were identified in or around the five alternative locations.

For fauna species at risk, one possible habitat for barn swallows was identified in the barn at 328 Main Street. Barn swallow habitat is defined through three categories. Category 1 is the nest location and has the highest level of habitat disturbance intolerance. Category 2 is a 5 m diameter around the nest and has the next highest disturbance intolerance. Category 3 is the 5 – 200 m diameter from the nest and has the most tolerance for disturbance. Alternative locations 1 – 3 are located within this category, while Alternatives 4 and 5 are not located in any of the defined barn swallow habitat categories.

To construct in a Category 3 location, an Information Gathering Form (IGF) is required for submittal to the MECP. An IGF is a document completed by the proponent which describes the site and its surroundings, provides information on the ecological communities, forest types, and surrounding activity, provides a schedule and summary of the proposed site activities, and a description of the site how the activities may positively or negatively affect the species at risk. Depending on consultation with the local Ministry of Natural Resources office, Species at Risk (SAR) surveys may be required as well. They are typically one day field investigations whose timing is season dependent. A sample Information

Gathering Form is available at this link on the Province of Ontario's website:  
[Ontario Central Forms Repository - Form Identification \(gov.on.ca\)](https://www.ontario.ca/gov/forms-repository)

#### 4.3.2 Stage 1 Archaeological Assessment

Based on Stage 1 archeological assessment (AA) completed and included in TM #1, all five locations were identified as retaining archeological potential and further archeological assessment is required through a Stage 2 AA. As part of the Stage 2 AA, any active or recently cultivated agricultural land must be ploughed before the site is visited by an archeologist. Any other land that has not been disturbed requires test pit surveys, at 5 m spacings. As part of the consultation process, First Nation and Indigenous groups should be notified about any future archaeological studies. For the evaluation, it was assumed that all five sites are equal in archeological potential. The Stage 1 AA report was submitted to the MCM and was entered into the registry in November 2021, with the Project Information Form Number P1059-0066-2020, MCM File Number 0012287.

#### 4.3.3 Cultural Heritage Checklist and Evaluation Report

Based on the Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes checklist summarized in Section 1.4.3 of this ESR, if a proposed location is adjacent to the existing facility, a Cultural Heritage Evaluation Report (CHER) should be completed for 328 Main Street. As such, Parslow Heritage Consultancy Inc. Prepared a CHER for the property in June 2022. The report reviewed legislative and policy framework, conducted historical research of relevant documents, evaluated the CHVI, and concluded that the property does meet the criteria for CHVI. The complete report is included in **Appendix I**. The report further assessed the potential impacts on the property's CHVI as a result of the water treatment facility expansion but found no significant impacts. The following recommendations were provided in the report:

- The CHER be sent for review and comment to the Region of Waterloo Heritage Planning and Advisory Committee and the Heritage Wilmot Advisory Committee.
- The Final CHER be deposited at a location to be determined by the Region of Waterloo Heritage Planning and Advisory Committee and the Heritage Wilmot Advisory Committee.

- Given the property at 328 Main Street was found to be of CHVI, a Heritage Impact Assessment (HIA) be undertaken by a qualified consultant during the detailed design phase of the project, as the EA will only conceptually establish the façade and the general footprint. The HIA is to be undertaken once the site plan and the building design have been defined during detailed design.

#### 4.4 Facility Location Alternatives Initial Evaluation

The initial location alternatives evaluation is used to remove any of the location alternatives that are unacceptable from an operational, natural heritage, cultural heritage, archaeological, or social standpoint. After an initial evaluation, Location 4 and Location 5 alternatives are removed because these two alternatives are considered as remote locations from the existing site with higher land acquisition costs as well as additional operation and maintenance efforts to keep infrastructure in a state of good repair. In addition, there will be disruption to the use of Alderview Road due to the installation of new piping connecting the existing facility and the new facility at Location 4 or 5. As a result, Location Alternatives 4 and 5 are eliminated and Location Alternatives 1, 2, and 3 are carried forward to the detailed evaluation.
















#### 4.5 Facility Location Alternatives Detailed Evaluation










The alternative facility locations were evaluated following the evaluation criteria outlined in TM #2. The evaluation scoring is provided in **Table 4.1** to **Table 4.4** for technical, natural environmental, social, and financial categories. An overall summary of the evaluation is provided and summarized in **Table 4.5**.

##### 4.5.1 Lifecycle Cost Analysis
















As part of the financial criteria evaluation, a lifecycle cost analysis over 50 years was completed for each location alternative. The lifecycle cost includes capital construction costs for each of the three new location alternatives, as well as property acquisition costs, and operation and maintenance costs over the facility's design life. This analysis is available as part of TM #5 in **Appendix E**, with a summary of the findings provided in **Table 4.4**.

**Table 4.1: Evaluation of Location Alternatives - Technical Category**













Criteria	Percentage	Location 1	Location 2	Location 3
<b>Provides Reliable Service</b>	3.57%	<ul style="list-style-type: none"> <li>This location is directly adjacent to the existing site, reducing the underground infrastructure requirements, and reduces the chance of service interruptions.</li> <li>This location would require construction directly adjacent to the wells, requiring more complex construction techniques</li> </ul> 	<ul style="list-style-type: none"> <li>This location is directly adjacent to the existing site, reducing the underground infrastructure requirements, and reduces the chance of service interruptions.</li> </ul> 	<ul style="list-style-type: none"> <li>This location is adjacent to the existing site, but further away than Location 1 and 2. This somewhat increases the underground infrastructure requirements, and increases the chance of service interruptions.</li> </ul> 
<b>Meets Existing and Future Needs</b>	3.57%	<p>Location meets current and future needs for drinking water supply.</p> 	<ul style="list-style-type: none"> <li>Location meets current and future needs for drinking water supply.</li> </ul> 	<ul style="list-style-type: none"> <li>Location meets current and future needs for drinking water supply.</li> </ul> 
<b>Aligns with Existing and Planned Infrastructure</b>	3.57%	<ul style="list-style-type: none"> <li>Location can connect with existing distribution system</li> <li>Location would be more difficult to interconnect with existing facility than Location 2.</li> </ul> 	<ul style="list-style-type: none"> <li>Location can connect with existing distribution system</li> </ul> 	<ul style="list-style-type: none"> <li>Location can connect with existing distribution system</li> <li>Facility location further away from existing facility than Locations 1 or 2.</li> </ul> 
<b>Aligns with Existing and Future Land Use</b>	3.57%	<ul style="list-style-type: none"> <li>Location is within 100 m of the existing municipal wells.</li> </ul> 	<ul style="list-style-type: none"> <li>Location is within 100 m of the existing municipal wells.</li> </ul> 	<ul style="list-style-type: none"> <li>Location is within 100 m of the existing municipal wells.</li> </ul> 
<b>Aligns with Approval and Permitting Process</b>	3.57%	<ul style="list-style-type: none"> <li>Standard permits and approvals are required.</li> </ul> 	<ul style="list-style-type: none"> <li>Standard permits and approvals are required.</li> </ul> 	<ul style="list-style-type: none"> <li>Standard permits and approvals are required.</li> </ul> 










Criteria	Percentage	Location 1	Location 2	Location 3
<b>Manages and Minimizes Construction Risks</b>	3.57%	<ul style="list-style-type: none"> <li>Location constructed close to existing structures and wells, would require additional shoring and dewatering considerations.</li> </ul> 	<ul style="list-style-type: none"> <li>Location constructed close to existing structures and wells, would require additional shoring and dewatering considerations.</li> </ul> 	<ul style="list-style-type: none"> <li>Location not constructed close to existing structures and wells, less construction risk than Locations 1 or 2.</li> <li>Additional underground works required for utility connections.</li> </ul> 
<b>Ability to Adapt to Climate Change</b>	3.57%	<ul style="list-style-type: none"> <li>Location will not be constructed in the GRCA floodplain.</li> </ul> 	<ul style="list-style-type: none"> <li>Location will not be constructed in the GRCA floodplain.</li> </ul> 	<ul style="list-style-type: none"> <li>Location will not be constructed in the GRCA floodplain.</li> </ul> 
<b>Overall Technical Score</b>	<b>25%</b>			

**Table 4.2: Evaluation of Location Alternatives - Natural Environment Category**







Criteria	Percentage	Location 1	Location 2	Location 3
<b>Protects Environmental Features</b>	6.3%	<ul style="list-style-type: none"> <li>Construction of facility at this location has minimal impacts to environmental features, such as Alder Creek, Alder Marsh, and Alder Lake.</li> </ul> 	<ul style="list-style-type: none"> <li>Construction of facility at this location has minimal impacts to environmental features, such as Alder Creek, Alder Marsh, and Alder Lake.</li> </ul> 	<ul style="list-style-type: none"> <li>Construction of facility at this location has minimal impacts to environmental features, such as Alder Creek, Alder Marsh, and Alder Lake.</li> </ul> 
<b>Protects Wildlife and Species at Risk</b>	6.3%	<ul style="list-style-type: none"> <li>Per Section 3.1.1, this alternative is in Category 3 of the barn swallow habitat. An Information Gathering Form should be submitted for this alternative, if it is preferred, during detailed design.</li> <li>No SAR tree species were found in this alternative location.</li> </ul> 	<ul style="list-style-type: none"> <li>Per Section 3.1.1, this alternative is in Category 3 of the barn swallow habitat. An Information Gathering Form should be submitted for this alternative, if it is preferred, during detailed design.</li> <li>No SAR tree species were found in this alternative location.</li> </ul> 	<ul style="list-style-type: none"> <li>Per Section 3.1.1, this alternative is in Category 3 of the barn swallow habitat. An Information Gathering Form should be submitted for this alternative, if it is preferred, during detailed design.</li> <li>No SAR tree species were found in this alternative location.</li> </ul> 
<b>Protects Groundwater, Streams, and Rivers</b>	6.3%	<ul style="list-style-type: none"> <li>New facility to be constructed within 100 m of an existing municipal well.</li> <li>Mitigation and risk management measures will be implemented to reduce risk of contamination during construction.</li> </ul> 	<ul style="list-style-type: none"> <li>New facility to be constructed within 100 m of an existing municipal well.</li> <li>Mitigation and risk management measures will be implemented to reduce risk of contamination during construction.</li> </ul> 	<ul style="list-style-type: none"> <li>New facility to be constructed within 100 m of an existing municipal well.</li> <li>Mitigation and risk management measures will be implemented to reduce risk of contamination during construction.</li> </ul> 
<b>Minimizes Climate Change Impacts</b>	6.3%	<ul style="list-style-type: none"> <li>No relative difference between locations with respect to possible climate change impacts.</li> </ul> 	<ul style="list-style-type: none"> <li>No relative difference between locations with respect to possible climate change impacts.</li> </ul> 	<ul style="list-style-type: none"> <li>No relative difference between locations with respect to possible climate change impacts.</li> </ul> 
<b>Overall Natural Heritage Score</b>	25%			

**Table 4.3: Evaluation of Location Alternatives - Social Category**

Criteria	Percentage	Location 1	Location 2	Location 3
<b>Minimizes Impacts to Residents Related to Noise, Odour, Traffic, and Aesthetics</b>	4.2%	<ul style="list-style-type: none"> <li>Location is closest to the existing residence at 182 Alderview Drive, which creates the largest potential for impacts due to noise and traffic.</li> <li>Location reduces line-of-sight from Alderview Dr. to the farm.</li> </ul> 	<ul style="list-style-type: none"> <li>Location is a medium distance away from the residence at 182 Alderview Drive, creates a medium potential for impacts due to noise and traffic.</li> <li>Location would not impair line-of-sight from Alderview Dr. to the farm.</li> </ul> 	<ul style="list-style-type: none"> <li>Location is a far distance away from the residence at 182 Alderview Drive, creates a low potential for impacts due to noise and traffic.</li> <li>Location would greatly impair line-of-sight from Alderview Dr. and Main Street to the farm</li> </ul> 
<b>Minimizes Impacts to Businesses</b>	4.2%	<ul style="list-style-type: none"> <li>Location is in a residential neighbourhood, no businesses would be affected.</li> </ul> 	<ul style="list-style-type: none"> <li>Location is in a residential neighbourhood, no businesses would be affected.</li> </ul> 	<ul style="list-style-type: none"> <li>Location is in adjacent to a main road, construction may impact main road access/cleanliness.</li> </ul> 
<b>Manages and Minimizes Construction Impact</b>	4.2%	<ul style="list-style-type: none"> <li>Construction laydown area able to be located partially within the site, and partially on the west boulevard of Alderview Drive.</li> </ul> 	<ul style="list-style-type: none"> <li>Construction laydown area able to be located partially within the site, and partially on the west boulevard of Alderview Drive</li> </ul> 	<ul style="list-style-type: none"> <li>Location requires the greatest amount of excavation works, causing the greatest construction impact.</li> </ul> 
<b>Avoids impacts to (known and/or potential) built heritage resources and cultural heritage landscapes</b>	4.2%	<ul style="list-style-type: none"> <li>Location encroaches upon a possible future Cultural Heritage Landscape (CHL), and blocks line-of-sight to the possible future CHL from Alderview Drive.</li> <li>Based on findings from the CHER, a Heritage Impact Assessment (HIA) will be completed for the preferred location, as it relates to 328 Main Street property.</li> </ul> 	<ul style="list-style-type: none"> <li>Location encroaches upon a possible future Cultural Heritage Landscape (CHL) but does not block line-of-sight to the possible future CHL from Alderview Drive.</li> <li>Based on findings from the CHER, a Heritage Impact Assessment (HIA) will be completed for the preferred location, as it relates to 328 Main Street property.</li> </ul> 	<ul style="list-style-type: none"> <li>Location encroaches upon a possible future Cultural Heritage Landscape (CHL), and greatly blocks line-of-sight to the possible future CHL from Alderview Drive and from Main Street.</li> <li>Based on findings from the CHER, a Heritage Impact Assessment (HIA) will be completed for the preferred location, as it relates to 328 Main Street property.</li> </ul> 

Criteria	Percentage	Location 1	Location 2	Location 3
<b>Avoids impacts to archaeological resources and areas of archaeological potential</b>	4.2%	<ul style="list-style-type: none"> <li>Location has archaeological potential.</li> </ul> 	<ul style="list-style-type: none"> <li>Location has archaeological potential.</li> </ul> 	<ul style="list-style-type: none"> <li>Location has the greatest area of archaeological potential, due to the amount of property acquisition.</li> </ul> 
<b>Protects Health and Safety</b>	4.2%	<ul style="list-style-type: none"> <li>Region staff health and safety will not be negatively impacted by the site location.</li> <li>Public health and safety will not be negatively impacted by this location.</li> </ul> 	<ul style="list-style-type: none"> <li>Region staff health and safety will not be negatively impacted by the site location.</li> <li>Public health and safety will not be negatively impacted by this location.</li> </ul> 	<ul style="list-style-type: none"> <li>Region staff health and safety will not be negatively impacted by the site location.</li> <li>Public health and safety will not be negatively impacted by this location.</li> </ul> 
<b>Overall Social Score</b>	25%			
















**Table 4.4: Evaluation of Location Alternatives - Financial Category**

Criteria	Percentage	Location 1	Location 2	Location 3
<b>Provides Low Lifecycle Costs</b>	25%	<ul style="list-style-type: none"> <li>• Lifecycle cost of \$8.2 million dollars</li> <li>• Requires the least land acquisition.</li> </ul> 	<ul style="list-style-type: none"> <li>• Lifecycle cost of \$8.2 million dollars</li> <li>• Requires the second most land acquisition.</li> </ul> 	<ul style="list-style-type: none"> <li>• Lifecycle cost of \$8.3 million dollars</li> <li>• Requires the most land acquisition.</li> </ul> 
<b>Overall Financial Score</b>	25%			

#### 4.6 Preferred Location Design Solution

Based on the detailed evaluation of the three locations as summarized in Table 4.5, Location 2 is the preferred location since it is well aligned with the criteria in all four categories.

**Table 4.5: Summary of Evaluation Criteria Location Alternatives**

Evaluation Category	Percentage	Location 1	Location 2	Location 3
Technical	25%			
Natural Heritage	25%			
Social	25%			
Financial	25%			
Overall				

#### 4.7 Sensitivity Analysis

Many comments were received through the public consultation events indicating local residents would like the pastoral aesthetic to be maintained, prioritizing the least intrusive option. As such, a number of sensitivity analyses were completed on the evaluation categories, to alter the weightings to better align with community concerns as follows:

- Technical 25%, Natural Heritage 25%, Social 40%, Financial 10%.
- Technical 33%, Natural Heritage 33%, Social 33%, Financial 0%.
- Technical 20%, Natural Heritage 40%, Social 40%, Financial 0%.

The findings for each analysis yield Location 2 as the preferred location.

## 5.0 Preferred Solutions And Design Concept

This section summarizes the preferred alternative solutions and the preferred alternative design concept presented in Section 3.0 and Section 4.0.

### 5.1 Preferred Alternative Solution

To reduce the manganese concentrations in the New Dundee Wells to meet the anticipated aesthetic objective of 0.02 mg/L, the preferred treatment solution was ‘Alternative 5 - Chlorine Oxidation + Pressure Filtration’. This solution consisted of chemical oxidation using chlorine as pre-treatment for filters with catalytic media. It was recommended for the following reasons:

- It is a reliable and effective technology.
- No additional chemicals are required.
- Minimal impact to regulated floodplains, local streams, and rivers.
- Minimal effects on noise, odour, and traffic in the area.
- It has the lowest lifecycle cost.

Following the selection of the preferred alternative treatment solution, the preferred residual management solution was determined to be ‘Alternative E- a Backwash Equalization Tank for wastewater storage, with supernatant being recycled back into the raw water inlet upstream of oxidation, and settled solids being hauled to a Regional septic receiving facility.’ It was recommended for the following reasons:

- It is a proven and reliable residual management solution.
- It aligns with existing and planned infrastructure
- It minimizes the construction complexity comparing to other alternative locations.
- It has lower social and natural environment impacts than the other residual management alternatives.
- It has lower costs and impacts than the other alternatives.

### 5.2 Preferred Alternative Location Design Concept

Based on the preferred treatment and residual management solutions, a preliminary facility size and property size was determined, and three locations were short listed for detailed review and evaluation.

The preferred location was determined to be Location 2. It was recommended for the following reasons:

- It is adjacent to the existing building, and it reduces service interruptions
- It is easier to connect with existing facility and distribution system
- It would minimize line-of-sight impacts from the intersection of Alderview Dr. and Main St. to the farm

A map showing the preferred location can be seen in Figure 5.1: Preferred Location (Location 2).

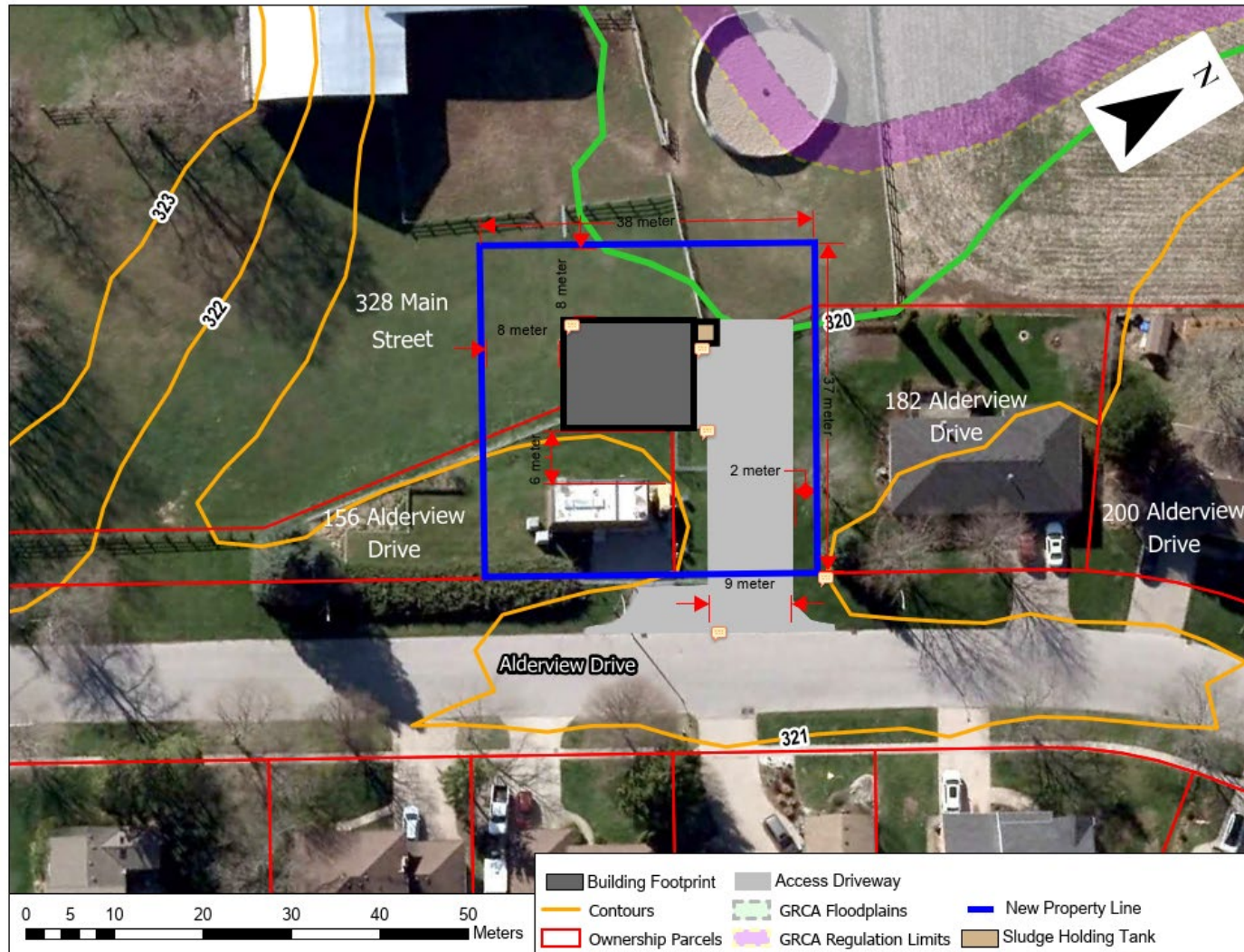


Figure 5.1: Preferred Location (Location 2)



**Figure 5.2 : Architectural Rendering of the Proposed New Facility**

## 6.0 Public Consultation

As part of this Class EA process, public consultation was completed by the project team. A summary of the public consultation is provided in the following sections, with all publicly available information on the Region of Waterloo’s website, under the New Dundee Water Supply – Iron and Manganese Water Treatment Upgrades accordion menu, and linked here: [New Dundee Class EA Region of Waterloo Project Webpage](#).

### 6.1 Stakeholders

Stakeholder correspondence and communication was a key component of this Schedule C Class EA Study. There were multiple agencies, municipalities, stakeholder groups, and members of the public within 1 km of the existing well site that were invited to participate and comment on this study. A full list of the stakeholders is presented in **Appendix F-1**. **Appendix F-2** contains a Comments Log for the entirety of the Class EA. For privacy reasons, personal information has been redacted from the comments received and from the stakeholder list.

### 6.2 Notice of Study Commencement

A “Notice of Study Commencement” was advertised in New Hamburg Independent and Ayr News in the week of April 22 and April 29, 2020, and in the New Hamburg Independent on April 15 and April 22, 2020. It was posted on the Region’s website and mailed to a list of potentially interested groups and agencies on April 13, 2020. The notice advised that the Class EA for this project was commencing and that any questions or comments on this project should be submitted to the Region or RVA. Copies of the notice and advertisements are provided in **Appendix F-3**. As mentioned previously, comments on the Notice of Commencement are summarized in **Appendix F-2**.

A summary of comments received in response to the Notice of Commencement were:

- Letters from the MECP and MCM requesting and confirming requirements from a reporting standpoint for this Class EA.
- Response from GRCA acknowledging receipt of the Notice, and stating they would offer support for any mapping, property ownership, and dam operation.

- One comment from a resident expressing concern over past pollution in Alder Lake and its effect on the groundwater system. The Region’s response was to put the resident in contact with the GRCA to discuss further, but stated the wells were non-GUDI.

### 6.3 Public and Agency Consultation

Three formal Public Consultation Centres (PCCs) were held virtually due to the Covid-19 pandemic, and PCC materials were available online for review for 30 days. Copies of the display boards and information regarding the PCCs, as well as summary of correspondence received, and project team responses are provided in **Appendices F-4 to F-9**.

#### 6.3.1 Comments and Inputs Received

**Appendix F-2** contains a summary of the comments received before, during, and after the PCCs and throughout the study. For privacy reasons, personal information has been redacted from the comments received.

Comments were accepted until May 9, 2022. All comments have since been addressed.

#### 6.3.2 PCC #1

On June 16, 2020, a Notice of Public Consultation Centre (PCC) was sent out to the stakeholders list advising that a PCC was planned to provide further information to the public on this Class EA, and to receive input and comments from interested parties. A Notice of PCC was published in local newspapers and on the Region website. Copies of the notices are provided in **Appendix F-4**.

A virtual PCC was held on June 18, 2020 through the Region of Waterloo website. As part of this virtual PCC, a narrated video, the transcript of the video and the slides were provided on the Region of Waterloo’s website. The virtual PCC presented the information regarding the problem and opportunity statement. A comment sheet was also provided for interested parties to fill out and submit. A copy of the display materials is provided in **Appendix F-5**.

The virtual PCC video received 178 views. In total thirteen (13) individuals submitted comments by email, voicemail, and mail between June 22 and August 12, 2020. **Appendix F-2** contains all the correspondence related to PCC #1. A link to the PCC #1 video is given here: [PCC #1 YouTube Link](#)

Comments received during this PCC were responded to and tracked, and a summary of the comments received can be found in **Table 6.1**.

### 6.3.3 PCC #2

On May 7, 2021, a Notice of Public Consultation Centre (PCC) was sent out to the stakeholders list advising that a PCC was planned to provide further information to the public on this Class EA, and to receive input and comments from interested parties. A Notice of PCC was posted in local newspapers and on the Region website. Copies of the notices are provided in **Appendix F-6**.

A virtual PCC was held on May 11, 2021 on the Region of Waterloo website. At part of this virtual PCC, a narrated video, the transcript of the video and the slides were provided on the Region of Waterloo's website. The virtual PCC presented the information regarding the list of treatment and residual management alternative solutions and evaluation criteria. A short-list of possible location of a new facility to house the treatment equipment was also presented. A comment sheet was also provided for interested parties to fill out and submit. A copy of the display materials is provided in **Appendix F-7**.

The virtual PCC video received 153 views. In total twenty-three (23) individuals submitted comments by email, voicemail, and mail including 7 comment sheets between May 11 and August 19, 2021. **Appendix F-2** contains all the correspondence related to PCC #2. A link to PCC #2 is provided here: [PCC #2 YouTube Link](#).

Comments received during this PCC were responded to and tracked, and a summary of the comments received can be found in **Table 6.1**.

### 6.3.4 PCC #3

On February 4, 2022, a Notice of Public Consultation Centre (PCC) was sent out to the stakeholders list advising that a PCC was planned to provide further information to the public on this Class EA, and to receive input and comments from interested parties. A Notice of PCC was published on local newspapers and on the Region website. Copies of the notices are provided in **Appendix F-8**.

A virtual PCC was held on February 8, 2022 on the Region of Waterloo website. As part of this virtual PCC, a narrated video, the transcript of the video and the slides were provided on the Region of Waterloo’s website. The virtual PCC presented the information regarding the list of alternatives for locations and preferred design. A comment sheet was also provided for interested parties to fill out and submit. A copy of the display materials is provided in **Appendix F-9**.

The virtual PCC video received 70 views. In total seventeen (17) individuals submitted comments by email, voicemail, and mail including 4 comment sheets between February 8 and April 6, 2022. **Appendix F-2** contains all the correspondence related to PCC #3. A link to PCC #3 is provided here: [PCC #3 YouTube Link](#)

### 6.3.5 Notice of Completion

A Notice of Completion will be mailed to the stakeholders in early 2023 advising that the project had been filed for the 30-day review period. The notice invited interested parties to submit comments to the Region of Waterloo within the allotted public review period. The Notice of Completion was also published in the New Hamburg Independent, the Waterloo Record, and on the Region’s website.

## 6.4 First Nations Consultation

Indigenous communities were contacted and a record of consultation detailing all consultation efforts undertaken was prepared, in accordance with MECP requirements. The project team recognized the role that consultation with these communities plays in successful completion of the EA process and incorporated additional due diligence to ensure Indigenous communities were appropriately consulted.

The Indigenous communities contacted include:

- Six Nations of the Grand River Territory
- Haudenosaunee Confederacy Council
- Mississaugas of the New Credit First Nation

Contacts were obtained from Region’s master contact list, MECP Notice of Commencement Letter, and stakeholder lists from past Class EAs within the Region. It should be noted that both email notices and letter notices were sent to multiple contacts for each Indigenous community since some email addresses in the contact list were found to be not in service.

The list of Indigenous community contacts can be found in **Appendix F-1**. Only one comment was received from Mississaugas of the New Credit First Nation requesting a change of email address, which is recorded in the comment log in **Appendix F-2**.

**Table 6.1: Summary of Comments Received during Class EA**

<b>Name / Agency</b>	<b>Comment Period</b>	<b>Comment / Request</b>	<b>Responses</b>
<b>MECP</b>	Notice of Commencement	<ul style="list-style-type: none"> <li>Letter from the MECP confirming receipt of Notice, providing additional background information, and stating reporting and reviewing requirements and recommendations for this Class EA.</li> </ul>	<ul style="list-style-type: none"> <li>Project team acknowledged receipt of the documentation, and included ESR sections for MECP requirements, and will provide sufficient review periods for the draft ESR.</li> </ul>
<b>MCM</b>	Notice of Commencement	<ul style="list-style-type: none"> <li>Letter from the MCM confirming receipt of Notice, and stating reporting and review requirements and recommendations for this Class EA.</li> </ul>	<ul style="list-style-type: none"> <li>Region responded that project team will meet reporting and review timelines.</li> </ul>
<b>GRCA</b>	Notice of Commencement	<ul style="list-style-type: none"> <li>Response from GRCA acknowledging receipt of the Notice, and stating they would offer support for any mapping, property ownership, and dam operation.</li> </ul>	<ul style="list-style-type: none"> <li>Acknowledged receipt of email</li> </ul>
<b>Multiple Stakeholders</b>	Notice of Commencement, PCC #1, PCC #2, and PCC #3	<ul style="list-style-type: none"> <li>Requested to be added or removed from the stakeholder list.</li> </ul>	<ul style="list-style-type: none"> <li>Region made necessary revisions as the project progressed to the stakeholder lists.</li> </ul>
<b>Zayo</b>	PCC #1	<ul style="list-style-type: none"> <li>Email correspondence from Zayo (telecommunications company) confirming the correct contact and stating they do not have any conflicts in the Study Area.</li> </ul>	<ul style="list-style-type: none"> <li>Acknowledged receipt of this information.</li> </ul>
<b>Hydro One</b>	PCC #1 and #2	<ul style="list-style-type: none"> <li>Email correspondence from Hydro One stating Class EA team should notify them when sites are selected, so Hydro One can confirm the potential sites will not be in proximity to Hydro One assets.</li> </ul>	<ul style="list-style-type: none"> <li>Acknowledged receipt, and per PCC #2, it was confirmed with Hydro One that there were no transmission assets in the subject areas.</li> </ul>
<b>Resident</b>	PCC #1	<ul style="list-style-type: none"> <li>Questions from a resident concerning the impacts of iron and manganese in the water supply system via voicemail.</li> </ul>	<ul style="list-style-type: none"> <li>The Region responded to the resident, provided a summary of iron and manganese in the water supply system, the new AO, and Region's approach in handling this in their water supply system.</li> </ul>
<b>Resident</b>	PCC #1	<ul style="list-style-type: none"> <li>A comment from a resident stating concern for the future building size, and a request to minimize the future building and construction.</li> </ul>	<ul style="list-style-type: none"> <li>Thanked resident for their comment, and stated that it was too early in the process to determine building sizing or site sizing at this point, but this would be considered going forward.</li> </ul>
<b>Residents</b>	PCC #2	<ul style="list-style-type: none"> <li>Numerous residents had comments expressing their preferences for the location of the new facility.</li> </ul>	<ul style="list-style-type: none"> <li>Region stated that selection of the preferred site will be completed and presented as part of PCC #3.</li> </ul>
<b>Residents</b>	PCC #2	<ul style="list-style-type: none"> <li>Multiple comments from residents asking for a better formatted Comment Sheet.</li> </ul>	<ul style="list-style-type: none"> <li>Region acknowledged their comments, and stated that comment sheet will be corrected going forward to address formatting issues and make it easier to provide feedback. The comment sheet was revamped as part of PCC #3.</li> </ul>

Name / Agency	Comment Period	Comment / Request	Responses
<b>Residents</b>	PCC #2	<ul style="list-style-type: none"> <li>Multiple requests from residents regarding the size of the proposed treatment facility.</li> </ul>	<ul style="list-style-type: none"> <li>The Region stated that the new facility would be 15 by 20 m and one storey tall. Further detailed would be provided in PCC #3.<sup>3</sup></li> </ul>
<b>Residents</b>	PCC #2	<ul style="list-style-type: none"> <li>Multiple residents requested more information regarding the preferred residual management strategy of hauling off settled solids, such as the frequency of the event, and noise and smell associated with the work.</li> </ul>	<ul style="list-style-type: none"> <li>Based on experience at Region's existing, similarly-sized water facilities for iron and manganese removal, a truck will be on site typically once a month to remove solids from the holding tank. To minimize the noise impacts, this work is planned to occur during weekday business hours. The operation takes roughly one to two hours. There should be no smell associated with the operation.</li> </ul>
<b>Residents</b>	PCC #2	<ul style="list-style-type: none"> <li>Request for a municipal sewer system be installed such that no hauling of solids is required.</li> </ul>	<ul style="list-style-type: none"> <li>Region responded that there is no municipal sanitary servicing in this area, so this is not a feasible option. The stakeholder was directed to contact the Township for any further questions regarding sanitary sewer systems.</li> </ul>
<b>Residents</b>	PCC #2 and PCC #3	<ul style="list-style-type: none"> <li>Multiple residents commented that the new facility will negatively affect the property values and aesthetic appeal of the neighbourhood.</li> </ul>	<ul style="list-style-type: none"> <li>The Region responded that the new treatment facility is being constructed to enable the Region of Waterloo to maintain high quality drinking water and treat water to aesthetic objective levels. The building design will consider the uniqueness of the community and incorporate a façade that effectively aligns with the architectural features in New Dundee and the local neighbourhood. Improvements to the façade of the existing building and relocating of the existing generator will also be included in the upgrades and will improve the overall aesthetics of the site. A conceptual architectural rendering was provided to residents.</li> </ul>
<b>Resident</b>	PCC #2	<ul style="list-style-type: none"> <li>A comment from a resident expressing concerns for site grading and insufficient space for truck turning.</li> </ul>	<ul style="list-style-type: none"> <li>The Region stated that the new site layout will confirm that grades are reflective of the surrounding area, and that post development stormwater flows will equal pre-development stormwater flows. Sufficient space will be provided such that truck turning radii do not infringe on curbs or boulevards.</li> </ul>
<b>Resident</b>	PCC #2	<ul style="list-style-type: none"> <li>Resident is concerned that the road is too narrow for solids hauling trucks to access the site.</li> </ul>	<ul style="list-style-type: none"> <li>The existing road is wide enough to accommodate the pump truck. The Region has a number of iron and manganese treatment plants in similar residential areas where trucks have no issues accessing the site.</li> </ul>
<b>Residents</b>	PCC #2	<ul style="list-style-type: none"> <li>Multiple residents asked about archaeological potential in the farm field adjacent to the existing facility.</li> </ul>	<ul style="list-style-type: none"> <li>Region responded that an initial archaeological assessment was completed in 2020, and archaeological potential was identified in the field adjacent to the 156 Alderview Drive Water Treatment Plant site. During the preliminary design phase, a Stage 2 Archaeological Assessment will be completed to determine if the area has any further archaeological potential.</li> </ul>

<sup>3</sup> As part of Section 1.3.3

Name / Agency	Comment Period	Comment / Request	Responses
<b>Residents</b>	PCC #2	<ul style="list-style-type: none"> <li>Requests for more information on building architectural design and site landscaping design.</li> </ul>	<ul style="list-style-type: none"> <li>Region responded that an architectural rendering will be included as part of PCC #3 to give an idea of what the building could look like and to receive public feedback. The architecture of the building will strive to match the existing pastoral aesthetic. A landscape architect will be retained during design to present a suitable landscaping plan is included in the upgrades. The public will have an opportunity to review the rendering and comment.</li> </ul>
<b>Residents</b>	PCC #2	<ul style="list-style-type: none"> <li>Residents had different preferences of the location of the treatment facility: on the existing site, or away from the existing site, and requested more information on how the alternatives were evaluated.</li> </ul>	<ul style="list-style-type: none"> <li>In the responses, Region explained that the selection of the preferred site alternative will be based on evaluation of the five alternatives against four evaluation criteria categories: technical, environmental, social/cultural, and financial. As a preliminary evaluation, the criteria categories will be weighted equally, however it is standard practice to conduct a sensitivity analysis by changing the weighting of the criteria which are more important to stakeholders interested in the project.</li> </ul>
<b>Residents</b>	PCC #2	<ul style="list-style-type: none"> <li>Residents asked what Aesthetic Objectives are, and what the existing water quality is at New Dundee.</li> </ul>	<ul style="list-style-type: none"> <li>Region responded that drinking water quality standards and aesthetic objectives are regulated by the Ministry of Environment, Conservation and Parks of the Ontario government. The water supplied from the New Dundee Water Treatment Plant satisfies all current drinking water quality standards and objectives and is safe to consume. Objectives, according to the Ministry, are targets that should be met. The Province is contemplating a reduction of the manganese aesthetic objective (AO) from the current 0.05mg/L to 0.02 mg/L based on Health Canada recommendations. The levels of manganese at New Dundee meet the current AO but would be above the proposed AO.</li> </ul>
<b>Residents</b>	PCC #2	<ul style="list-style-type: none"> <li>Multiple residents asked about the timeline for implementation.</li> </ul>	<ul style="list-style-type: none"> <li>Region responded that the timing of the adoption of AO level into the Provincial standards is dependent on the Province's processes. The Region is taking a proactive approach to identify needs for treatment at all of its water treatment plants in order to meet the anticipated changes to the Provincial standards. Currently construction for this facility is planned to start in 2028 or 2029.</li> </ul>

Name / Agency	Comment Period	Comment / Request	Responses
<b>Residents</b>	PCC #2	<ul style="list-style-type: none"> <li>Multiple Residents requested further information on why Do-Nothing solution was screened out.</li> </ul>	<ul style="list-style-type: none"> <li>Region stated that the existing New Dundee Water Supply System was identified as requiring treatment based on detailed analysis of water quality and performance of the existing system with consideration of the contemplated AO levels. As a result, alternative solutions were identified to meet this level. The screened-out alternatives were eliminated because they failed to meet critical criteria that are needed to meet the project goals. These goals were set by considering how to best solve the project objective with the minimal amount of disruption or cost to people and the environment. Specifically, the Do-Nothing alternative was eliminated from detailed evaluation because it does not address improving the existing water quality levels.</li> </ul>
<b>Resident</b>	PCC #2	<ul style="list-style-type: none"> <li>Resident would like to know the locations of other manganese removal facilities within the Region.</li> </ul>	<ul style="list-style-type: none"> <li>The Region has a number of iron and manganese removal facilities located in the communities of New Hamburg, Foxboro, Heidelberg, St. Clements, Roseville as well as a number located in Kitchener, Cambridge, and Waterloo. There are also ongoing planning studies to install new iron and manganese removal facilities, similar to New Dundee, at the Erb Street Water Supply System, the Shingletown Water Supply system, and the Middleton Water Supply System.</li> </ul>
<b>Resident</b>	PCC #2	<ul style="list-style-type: none"> <li>Resident asked if the alternative evaluation was based on facts or opinions.</li> </ul>	<ul style="list-style-type: none"> <li>Region responded that on PCC#2 slide 4, a breakdown of criteria used to score the alternatives was presented. They are grouped into technical, social, natural environment and financial criteria. Scoring is based on studies, background data collected, and the professional expertise of the project team. Region welcomes feedback on any criteria that has been missed. Feedback collected will be considered as part of the EA process.</li> </ul>
<b>Resident</b>	PCC #2	<ul style="list-style-type: none"> <li>Resident identified a discrepancy on hauling frequency in the slides provided in PCC #2.</li> </ul>	<ul style="list-style-type: none"> <li>Region thanked the resident, and clarified that the settled solids will be hauled off once per month at the most, but it will likely be roughly eight times a year. This is typical for the iron and manganese facilities located in other rural communities in the Region. Region will clarify this in the next round of consultations.</li> </ul>

Name / Agency	Comment Period	Comment / Request	Responses
<b>Residents</b>	PCC #2	<ul style="list-style-type: none"> <li>Residents hoped that other possibilities will be considered, not just the preferred.</li> <li>Resident felt that the two options provided are not the most viable options.</li> </ul>	<ul style="list-style-type: none"> <li>Region responded that the engineering consultant has developed alternatives which are in line with good water supply engineering practice and that meet the project objectives. The intent of the Municipal Class Environmental Assessment process is to collect all relevant information, including public feedback, to identify the preferred solution. The selection of the preferred site alternative will be based on evaluation of the five alternatives against four evaluation criteria categories: Technical, Environmental, Social/Cultural, and Financial. Details on the evaluation process will be included in PCC#3. Region encourages resident’s feedback if residents feel that there are alternatives that should have been considered or if there are any information that may has been missed as part of the project.</li> </ul>
<b>Resident</b>	PCC #2	<ul style="list-style-type: none"> <li>Request for clarification on different site sizes for each alternative location.</li> </ul>	<ul style="list-style-type: none"> <li>Region explained that the difference in sizes was due to access radius of maintenance vehicles, parking, and building orientation.</li> </ul>
<b>Residents</b>	PCC #2	<ul style="list-style-type: none"> <li>Residents commented that community interests should be incorporated, and weighting of the criteria should not be the same for every category.</li> </ul>	<ul style="list-style-type: none"> <li>Region responded that the selection of the preferred site alternative will be based on evaluation of the five alternatives against four evaluation criteria categories: Technical, Environmental, Social/Cultural, and Financial. As a preliminary evaluation, the criteria categories will be weighted equally, however it is standard practice to conduct sensitivity analysis by changing the weighting of the criteria which are more important to stakeholders interested in the project.</li> </ul>
<b>Residents</b>	PCC #2 and PCC #3	<ul style="list-style-type: none"> <li>Residents are concerned about noise, odour, smell of diesel, and increased operator presence from solids hauling.</li> </ul>	<ul style="list-style-type: none"> <li>Region responded that during construction of the facility, there will be increased truck and vehicle traffic. Once the facility is running, any additional noise will be minimal. No odor is anticipated from the future operation of the facility. Sludge hauling will occur once a month and will typically take 1 to 2 hours occurring during weekday hours. There is not anticipated to be any additional operator presence.</li> </ul>
<b>Resident</b>	PCC #2	<ul style="list-style-type: none"> <li>Resident requested evaluation criteria and scoring matrix.</li> </ul>	<ul style="list-style-type: none"> <li>Region explained that the scoring matrix for the preferred site will be provided and presented as part of PCC #3. Additional details will also be included in the Environmental Study Report that will be available for public review and feedback during the 30-day filing period.</li> </ul>
<b>Resident</b>	PCC #2	<ul style="list-style-type: none"> <li>Resident commented that pasturelands provide a higher environmental value than cropland.</li> </ul>	<ul style="list-style-type: none"> <li>As part of the project a professional ecologist completed a Natural Heritage study. The findings from this study were considered as part of the evaluation. Based on preliminary site investigations, our ecologists have not noted any features that exclude any of the site options at the moment. The findings will be shared at PCC#3.</li> </ul>

Name / Agency	Comment Period	Comment / Request	Responses
<b>Resident</b>	PCC #3	<ul style="list-style-type: none"> <li>Resident would like to know why scheduled construction is in 7 years instead of sooner.</li> </ul>	<ul style="list-style-type: none"> <li>The Region is currently planning to implement the New Dundee Water Supply upgrades as one of a number of water supply upgrade projects across the Region to meet the anticipated Provincial Aesthetic Objectives. The upgrades are currently scheduled for construction in approximately seven years based on anticipated timing of the new standards and allowing time for preliminary design, detailed design, tendering, and land purchase of these projects.</li> </ul>
<b>GRCA</b>	PCC #3	<ul style="list-style-type: none"> <li>GRCA asked the Region to ensure vertical datum matches Regulatory Floodplain Elevation (RFE). This helps confirm compliance and the need for a GRCA permit.</li> </ul>	<ul style="list-style-type: none"> <li>Region acknowledged the receipt of comment, and will pass this information on to detailed design.</li> </ul>
<b>Residents</b>	PCC #3	<ul style="list-style-type: none"> <li>Multiple residents asked for an in-person meeting.</li> </ul>	<ul style="list-style-type: none"> <li>Virtual meetings offer opportunities to reach a greater audience, but Region does recognize that some residents prefer a face-to-face experience. Region's project manager will reach out to area residents to offer one-on-one phone or online virtual meeting for those who would like to learn more about the project, ask their questions, and discuss their issues in more detail.</li> </ul>
<b>Resident</b>	PCC #3	<ul style="list-style-type: none"> <li>Resident asked if Region considered bringing in Kitchener's water lines.</li> </ul>	<ul style="list-style-type: none"> <li>Region explained that this option has been considered in the long list of alternatives, as presented in PCC #2. Based on the Region's Official Plan, further development of Kitchener will not occur further west based on the protected Countryside Line.</li> </ul>
<b>Residents</b>	PCC #3	<ul style="list-style-type: none"> <li>Multiple residents stated that the preferred location will impact the value of the surrounding properties, and requested compensation.</li> </ul>	<ul style="list-style-type: none"> <li>Region responded that the new treatment facility is being constructed to ensure that the Region of Waterloo maintains its goal of treating its drinking water to aesthetic objective levels. The construction is not expected to affect the surrounding property values. Improvements to the aesthetics to the existing facility, including a new façade and an attempt to relocate the existing generator, will also be included as part of the upgrades.</li> </ul>
<b>Residents</b>	PCC #3	<ul style="list-style-type: none"> <li>A Resident prefers the alternative site location at the end of the street.</li> </ul>	<ul style="list-style-type: none"> <li>Region explained that the alternative locations at the end of Alderview Drive were not considered preferred due to three major considerations. The first is the complexity involved with operating the new treatment equipment remotely from the existing treatment plant. The second is the consideration for extensive construction under Alderview Drive to install piping and utilities. The third is the need for maintenance and delivery vehicles to drive to the end of Alderview Drive.</li> </ul>
<b>Residents</b>	PCC #3	<ul style="list-style-type: none"> <li>Residents expressed concerns regarding water damage caused by water running off from asphalt driveway.</li> </ul>	<ul style="list-style-type: none"> <li>Region responded that neighbouring properties will not suffer from water running off from the driveway. The design of the upgrades will ensure that no additional runoff will occur off the existing site.</li> </ul>

Name / Agency	Comment Period	Comment / Request	Responses
<b>Residents</b>	PCC #3	<ul style="list-style-type: none"> <li>Resident requested to make the proposed building smaller and blend with surroundings.</li> <li>Resident concerned with unsightly, oversized addition in proximity to other houses.</li> </ul>	<ul style="list-style-type: none"> <li>Region recognized the feedback received in the previous PCC #2 and has reduced the size of the building. The result was a 33 per cent decrease in the building footprint which was presented in PCC #3. The design is still at a conceptual level and the Region is committed to look for further opportunities to reduce the building footprint and optimize the building orientation in future design phases.</li> <li>The Region appreciates the infrastructure is situated in a unique rural area and is committed to ensuring the architectural finish of the building reflects the existing pastoral aesthetic. A landscape architect will be retained during design to present a suitable landscaping plan as well.</li> </ul>
<b>Residents</b>	PCC #3	<ul style="list-style-type: none"> <li>Multiple residents provided suggestions on locations and design of driveways.</li> </ul>	<ul style="list-style-type: none"> <li>Region explained that the driveway was positioned as such to minimize property acquisition and to keep it within the confines of the Region’s existing property as much as possible. The configuration of the final treatment building, including the driveway and entrance, will be further refined during future design phases and will consider any opportunities to minimize impacts on adjacent properties while still ensuring full site functionality.</li> </ul>
<b>Residents</b>	PCC #3	<ul style="list-style-type: none"> <li>Residents suggested grass/gravel/crushed stone driveway instead of asphalt.</li> </ul>	<ul style="list-style-type: none"> <li>Region acknowledged receipt of comment and responded that further design of the driveway will be considered during detailed design.</li> </ul>
<b>Residents</b>	PCC #3	<ul style="list-style-type: none"> <li>Requests for fencing without blocking resident’s access to paddock.</li> <li>Resident requested clarification on the location of the fence</li> </ul>	<ul style="list-style-type: none"> <li>Region responded that although not pictured in the rendering provided in PCC #3, the site will be fenced in for security purposes in the preliminary and detailed design.</li> <li>Region clarified that fencing will be around the entire property. The type of fence will be determined upon the next phase of design.</li> </ul>
<b>Residents</b>	PCC #3	<ul style="list-style-type: none"> <li>Requests to be consulted for architecture and landscaping designs.</li> </ul>	<ul style="list-style-type: none"> <li>The Region will retain a landscape architect for the preliminary and detailed design of the new facility, and a consultation will be held to review the landscaping plan with the community during detailed design.</li> </ul>
<b>Residents</b>	PCC #3	<ul style="list-style-type: none"> <li>Several residents requested altering existing building to better fit the design of the new building.</li> </ul>	<ul style="list-style-type: none"> <li>Region thanked the residents for their suggestions. The Region will include improvements to the existing building façade as part of the upgrades. A conceptual rendering was provided to resident.</li> </ul>
<b>Residents</b>	PCC #3	<ul style="list-style-type: none"> <li>Residents suggested to limit truck visits to weekday working hours only and requested no idling of trucks in the driveway.</li> </ul>	<ul style="list-style-type: none"> <li>During construction of the facility, there will be increased truck and vehicle traffic. Mitigation measures and restrictions on when construction traffic will be enforced through the construction contract.</li> </ul>

Name / Agency	Comment Period	Comment / Request	Responses
Resident	PCC #3	<ul style="list-style-type: none"> <li>Resident asked if inflation was considered in cost estimate</li> </ul>	<ul style="list-style-type: none"> <li>Once the facility is operational, there will be truck haulage traffic. Based on our experience at existing, similarly sized facilities, this can be up to once a month however is likely closer to roughly eight times a year. There will be noise associated with the process and therefore it will be timed to occur during weekday business hours.</li> <li>Region responded that the comparative capital cost estimates were developed to reflect the present value of the construction, and have not considered future inflation.</li> </ul>
Residents	PCC #3	<ul style="list-style-type: none"> <li>Residents requested explanation of existing iron/manganese levels and government guidelines.</li> <li>Residents requested explanation of why Region think the change in regulation is on the way, and Region’s plan if it changes again in the future.</li> </ul>	<ul style="list-style-type: none"> <li>Region explained that drinking water quality standards and aesthetic objectives are regulated by the Ministry of Environment, Conservation and Parks of the Ontario government. Iron and manganese are considered aesthetic objectives that may impact the look or taste of water or cause staining of fixtures or laundry. As mentioned in slide 7 of PCC #1, the Province is contemplating a reduction of the manganese aesthetic objective (AO) from the current 0.05mg/l to 0.02 mg/l based on Health Canada recommendations. The levels of manganese at New Dundee meet the current AO but would be above the proposed AO.</li> <li>The Region is continually in communication with the Province to understand any future changes to guidelines and to plan for them accordingly.</li> </ul>
Resident	PCC #3	<ul style="list-style-type: none"> <li>Resident requested responses received from Phase 1.</li> </ul>	<ul style="list-style-type: none"> <li>Region attached Notice of Class EA Commencement and PCC #1 response summary sheet in the response to Resident. Region also provided the website for PCC materials.</li> </ul>
Resident	PCC #3	<ul style="list-style-type: none"> <li>Requested explanation for: Location #1 and 2 are in the same area but Location #1 need "more complex construction techniques required due to Proximity to existing wells" while Location #2 has "possible interconnection with the existing facility"</li> </ul>	<ul style="list-style-type: none"> <li>Region explained that there are two municipal wells that are the source of drinking water for New Dundee. Both are located to the right of the existing water treatment building, when looking from Alderview Drive. Location 1 would be constructed very close to these wells while Location 2 is further away, behind the existing building.</li> <li>Constructing in Location 1 near these wells and near the property line would require more expensive construction techniques, such as shoring for excavation stability, so they do not compromise the wells. Regarding interconnection, Location 2 would be easier to connect to the existing water treatment plant, with a possible connection to the existing building. This will be explored as a possibility in the Preliminary Design stage.</li> </ul>

Name / Agency	Comment Period	Comment / Request	Responses
<b>Resident</b>	PCC #3	<ul style="list-style-type: none"> <li>Resident requested to choose a location far from resident homes. Prefer not on Alderview/Main St, suggested Bridge St east of village</li> </ul>	<ul style="list-style-type: none"> <li>Region stated that the source of the water and the existing treatment are both located at 154 Alderview Drive. Based on the evaluation criteria used, the locations were evaluated and the alternative closest to the existing water treatment plant was identified as the preferred location.</li> </ul>
<b>Resident</b>	PCC #3	<ul style="list-style-type: none"> <li>Resident wanted to know the levels of manganese in the treated water at New Dundee, the current Health Canada levels, and the proposed Health Canada Aesthetic Objectives?</li> </ul>	<ul style="list-style-type: none"> <li>Region explained that the levels of manganese in New Dundee wells generally range between 0.02 to 0.05 mg/l. The current Provincial Ministry aesthetic objective (AO) for manganese is 0.05 mg/l. Health Canada has recommended lowering the manganese AO to 0.02 mg/l with a design target of 0.015mg/l. The Province is anticipated to adopt the Health Canada recommendation.</li> </ul>
<b>Resident</b>	PCC #3	<ul style="list-style-type: none"> <li>Resident commented that the expansion will have greater cost to climate change and the environment</li> </ul>	<ul style="list-style-type: none"> <li>Region responded that the new treatment facility is being constructed to ensure the Region of Waterloo maintains its goal of treating its drinking water to the Province’s aesthetic objective levels, but the Region recognizes any alternative will have some impact on the environment. Mitigation of future climate change impacts was considered as part of evaluation process and additional efforts will be made to find opportunities to reduce the environmental impact and reduce greenhouse gas emissions as part of the design process.</li> </ul>
<b>Resident</b>	PCC #3	<ul style="list-style-type: none"> <li>Resident was disappointed that impacts to neighboring properties, including residential homes and the farm, are not included in the evaluation/not discussed in PCC.</li> </ul>	<ul style="list-style-type: none"> <li>Region stated that impact to the neighbours was a very important consideration for the Region and this was reflected under the “Social/cultural” criteria presented on PCC #3 slide 17. Alternative #2 was given a higher social score as compared to Alternative #3 due to the visual impact to the overall community from the corner of Alderview Drive and Main Street in Alternative #3. Alternative #2 was also given a higher social score over Alternative #1 as it better fits behind the existing building, thereby reducing the visual impact from Alderview Drive.</li> </ul>
<b>Resident</b>	PCC #3	<ul style="list-style-type: none"> <li>Resident concerned about salty snow pushed to their lawn and kills the grass</li> </ul>	<ul style="list-style-type: none"> <li>Region responded that due to the proximity of the driveway to the Region’s existing municipal wells, salting of the driveway is minimized to protect the quality of our drinking water.</li> </ul>
<b>Resident</b>	PCC #3	<ul style="list-style-type: none"> <li>Resident commented that preferred site location will hinder the view of farms</li> </ul>	<ul style="list-style-type: none"> <li>Based on the evaluation presented on PCC #3 slide 17, under “Social/cultural” criteria, it was deemed alternative #2 would have the least visual impact on the farm. The new building footprint has been minimized to reduce the view of the farm and opportunities to further reduce the footprint of the facility and to optimize the building orientation will be key components of the next stage of design.</li> </ul>

Name / Agency	Comment Period	Comment / Request	Responses
<b>Residents</b>	PCC #3	<ul style="list-style-type: none"> <li>Residents commented that the building appears to be very close to the barn and would block passage from the paddock to the rest of the barn yard.</li> </ul>	<ul style="list-style-type: none"> <li>Region responded that the footprint of the building shown in the consultation material is considered conceptual and takes into account conservative assumptions including property setbacks. The Region will work with Township staff and identify if setback requirements can be lessened, which would reduce the amount of additional property required. The Region is also committed to work on optimizing the building footprint and orientation during the design phases to lessen these impacts.</li> </ul>
<b>Resident</b>	PCC #3	<ul style="list-style-type: none"> <li>Resident asked to be consulted for the final design of building exterior, site grading, landscape design, water runoff management, and fencing</li> </ul>	<ul style="list-style-type: none"> <li>The public will have the opportunity to review the Environmental Study Report for this Class Environmental Assessment study when the Notice of Completion is issued. Furthermore, the Region will commit to an additional public consultation center during detailed design to show the proposed site plan, architectural finishes, and landscaping plan.</li> </ul>
<b>Resident</b>	PCC #3	<ul style="list-style-type: none"> <li>Resident asked if it is possible for Region to choose a different site without further public consultation?</li> </ul>	<ul style="list-style-type: none"> <li>Scoring that is presented to the public and other stakeholders is considered preliminary as the Region is seeking feedback on the process and will consider any additional information gathered through consultation before finalizing the preferred solution. Once the Environmental Study Report has been filed for the 30-day public period and all feedback has been received and considered, the preferred location will be considered finalized. Once the Class EA process is completed, major considerations such as preferred location and treatment technology would need to remain as presented to the public. Should a change be required, a Class EA Addendum must be filed, and the Region must conduct additional public consultation as part of the process.</li> </ul>
<b>Residents</b>	PCC #3	<ul style="list-style-type: none"> <li>Residents asked the Region’s timeline to purchase the land for expansion, and Region’s plan if landowner refuse to sell</li> </ul>	<ul style="list-style-type: none"> <li>Region responded that where land acquisition is required, the Region would like to start these discussions early in order to have these details finalized before proceeding with detailed design, which typically starts 2-3 years ahead of construction. The Region’s preferred approach is to work with the landowner to negotiate an agreement that is agreeable to all parties involved. This could include the timing of the transfer of the property.</li> </ul>
<b>Resident</b>	PCC #3	<ul style="list-style-type: none"> <li>Resident believes “prohibitive cost” is an over exaggeration for alternative location at the end of Alderview drive, and there will be less noise impact for Alternative Location #5.</li> </ul>	<ul style="list-style-type: none"> <li>Region explained that additional costs associated with alternative #5 (and alternative #4) would be from the need to install the necessary buried infrastructure starting from the existing building at 154 Alderview Drive, to the new building at alternative #5 (or #4) and then back again. This entails road construction along most of Alderview Drive to bury two sets of piping and valves, along with electrical and communications cables. The noise would be attributed to the construction to install this infrastructure.</li> </ul>

Name / Agency	Comment Period	Comment / Request	Responses
<b>Resident</b>	PCC #3	<ul style="list-style-type: none"> <li>Several residents suggested relocating the generator to hide it.</li> </ul>	<ul style="list-style-type: none"> <li>Region thanked resident for the suggestion, and stated that relocation of the generator will be included as part of the upgrades.</li> </ul>
<b>Resident</b>	PCC #3	<ul style="list-style-type: none"> <li>Resident is concerned with existing wells at the preferred location</li> <li>The resident subsequently clarified their statement, saying that they have a drinking water well located right in the context of the proposed building location that will be buried.</li> </ul>	<ul style="list-style-type: none"> <li>The upgrades for the New Dundee Water Treatment building will address water quality (additional treatment) but the amount of water taken will remain the same. Therefore, it is not anticipated that the private wells will be impacted with the operation of the new building. However, during construction, some dewatering may be necessary. Prior to any construction the Region will retain a licensed professional hydrogeologist to conduct tests to ensure measures are taken so that private wells are not impacted during construction.</li> <li>Generally, when the Region impacts a drinking water source, the Region must provide for a new source, either through a new well or connection to the system, based on negotiations between the parties affected. Region will clearly document the impact to the well in question, the need to carry out some hydrogeological investigation, and requirement to provide drinking water to resident's property.</li> </ul>
<b>Resident</b>	PCC #3	<ul style="list-style-type: none"> <li>Resident asked if this building would affect the status of the farm agriculture use, and if there will be any restrictions for livestock in the future.</li> </ul>	<ul style="list-style-type: none"> <li>Region responded that upon conferring with Township of Wilmot Planning staff, the new building will not cause any change to land use zoning, nor create any restrictions to the surrounding property.</li> </ul>
<b>Resident</b>	PCC #3	<ul style="list-style-type: none"> <li>Resident requested Region to provide guideline for contractor to minimize disturbance to the neighborhood during construction (site to remain clean, shall not block resident's driveway)</li> </ul>	<ul style="list-style-type: none"> <li>Region thanked the resident for raising this comment. As part of the Construction contract, the Region will require and enforce proper parking during construction to minimize disruptions and blockages of any residential driveways.</li> </ul>
<b>Resident</b>	PCC #3	<ul style="list-style-type: none"> <li>Resident requested the removal of exterior light at the existing building.</li> </ul>	<ul style="list-style-type: none"> <li>Region responded that operations staff were notified, and a switch has been added so that it is turned on only when staff are present, and lights are needed.</li> </ul>
<b>Resident</b>	PCC #3	<ul style="list-style-type: none"> <li>Resident suggested an alternative driveway alignment along the opposite side of the building.</li> </ul>	<ul style="list-style-type: none"> <li>Region conducted additional evaluation of the suggested driveway alignment as a new alternative in terms of Technical, Natural Heritage, Social, and Financial impacts, and concluded that the suggested driveway alignment scored lower than the preferred Alternative 2.</li> </ul>

## 7.0 Mitigation Measures

The recommended mitigation measures to implement the preferred alternative solutions and preferred location design concept have been summarized in **Table 7.1** below. It discusses possible general, as well as specific, mitigation measures during design and construction to minimize the impacts to the public and environment. Refer to the Natural Sciences Report in **Appendix G** for further details on the natural environmental mitigation measures.

**Table 7.1: Mitigation Measures During Design and Construction**

Impacts	Mitigating Measures
Noise from Construction Equipment	<p>Work should take place within the local noise bylaw requirements.</p> <p>Construct hoarding around noise generating stationary equipment wherever possible.</p>
Dust and Mud from Construction Activities	<p>Specify the need for street sweeping mud mats during construction, minimizing traffic, and increasing moisture during dry weather. Non-chloride dust suppressants may also be applied during construction but only as needed. Use of dust suppressants should not leave the roadway to prevent contamination of groundwater. For a comprehensive list of fugitive dust prevention and control measures, refer to Cheminfo Services Inc. Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities report prepared for Environment Canada. March 2005.</p>
Impacts to Residents Related to Traffic	<p>On Alderview Drive, one lane of traffic should be maintained in both directions. If not possible, one lane of traffic for shared use in both directions with traffic control should be maintained (i.e., flag persons, timed streetlights)</p> <p>Access for emergency response vehicles and personnel always should be maintained along with public access to private residences and businesses.</p> <p>Proper parking should be enforced during construction to minimize disruptions and blockages of any residential driveways.</p>

Impacts	Mitigating Measures
Disruption to Species at Risk, and/or Their Habitats	<p>Minimize vegetation, tree removal and the construction area to the extent possible.</p> <p>Direct external facility lighting away from any significant natural heritage features where possible.</p> <p>Remove trees within the designated permitted period of September 30 to April 1 unless special permission and investigations are undertaken to confirm no impact to wildlife. Timing is weather dependent and should be confirmed by the MECP</p> <p>If required, removal of buildings/infrastructure will need to be screened for species at risk that may nest/roost there.</p> <p>One possible habitat for barn swallows (Category 3: the 5 – 200 m diameter from the nest and has the most tolerance for disturbance) was identified in the barn at 328 Main Street. To construct in a Category 3 location, an Information Gathering Form (IGF) is required for submittal to the MECP. The IGF for Barn Swallow should be submitted to <a href="mailto:SAROntario@ontario.ca">SAROntario@ontario.ca</a> after field assessments have been completed. Depending on consultation with the local Ministry of Natural Resources office, Species at Risk surveys may be required as well.</p>
Damage to Existing Trees	<p>Appropriate tree protection measures should be installed within the project area to help protect trees to be retained.</p>
Groundwater or Surface Water Contamination (Through Construction Activities)	<p>The preferred location is located within 100 m of the existing New Dundee wells, and subject to the source protection plan policies including restrictions for applying de-icing salt, discharge from a stormwater facility, and the storage and handling of fuel. None of the future operational activities are subject to or are classified as prohibited, and if any new activities arise during detailed design, these can be captured through a risk management plan, in consultation with the Region.</p>

Impacts	Mitigating Measures
	<p>Avoid refueling and cleaning of construction equipment within the wellhead protection area.</p> <p>During construction, proper precautions are to be taken to prevent spills, and ensure any spills are reported and promptly cleaned up.</p> <p>A geotechnical and hydrogeological investigation was completed in Q1 2023, which showed that construction of the future facility at the depths proposed in the Class EA would not disrupt the aquifer or create a preferential pathway for contaminants to travel to the well head, both during construction and during future station operation.</p>
<p>Noise from Diesel Generator Under Normal Operation</p>	<p>Silencing equipment has been installed to meet the MECP regulations. Air and Noise modeling will need to be undertaken during detailed design and Environmental Compliance Approval (ECA) submitted to MECP. The Region will consider moving the standby diesel generator inside the new facility as part of the conceptual design.</p>
<p>Noise from Solids Hauling Under Normal Operation</p>	<p>To minimize the noise impacts, solids hauling work is planned to occur during weekday business hours only.</p>
<p>Impacts to Residents Related to Aesthetics of Facility/Building On Surrounding Residential Neighbourhood</p>	<p>Design of the building to blend in with the surrounding residential community. An architectural rendering of the new facility is provided in Figure 5.2 and uses similar materials and finishes as other buildings in the area. Landscaping will be employed to help screen the facility. The location of the building is selected to minimize the line-of-sight impacts.</p> <p>Design for landscaping using native vegetation where possible to provide natural habitat to wildlife and aesthetics. A landscape architect is to be retained as part of Detailed Design.</p> <p>In addition, one public consultation centre is to be held prior to construction to present to local stakeholders the extents of construction, landscape design, proposed fencing, construction schedule, and temporary impacts.</p>

Impacts	Mitigating Measures
Climate Change	<p>The preferred location of the facility is not located within the local floodplain but consultation with the GRCA will be conducted to assess the flooding potential.</p> <p>Design of facility infrastructure should consider the impact of more severe winds and storms and extreme temperature ranges.</p> <p>The facility will be remotely monitored and operated, reducing GHG emissions due to operator visits. In addition, hauling of settled solids will only occur when the tank is near full, optimizing the number of hauling trips required per year.</p>
Archeological Resources	<p>A licensed archaeologist should undertake a Stage 2 archaeological assessment and any further recommended archaeological assessments (e.g., Stage 3,4) as early as possible during detailed design and prior to any ground disturbing activities.</p> <p>Where archaeological resources are impacted by EA project work, MCM will be notified by contacting <a href="mailto:archaeology@ontario.ca">archaeology@ontario.ca</a>. All activities impacting archaeological resources must cease immediately, and a licensed archaeologist is required to carry out an archaeological assessment in accordance with the Ontario Heritage Act and the Standards and Guidelines for Consultant Archaeologists.</p> <p>If human remains are encountered, all activities must cease immediately, and the local police and coroner must be contacted. In situations where human remains are associated with archaeological resources, MCM should also be notified (at <a href="mailto:archaeology@ontario.ca">archaeology@ontario.ca</a>) to ensure that the site is not subject to unlicensed alterations which would be a contravention of the Ontario Heritage Act.</p>
Built heritage Resources and Cultural Heritage Landscape Impacts	<p>Cultural Heritage resources were identified at the property adjacent to the existing site (more details included in Section 4.3.3<sup>4</sup>). Recommendations</p>

<sup>4</sup> Revised based on letter received from the MCM dated June 9, 2023 in response to the initial Notice of Completion.

Impacts	Mitigating Measures
	<p>have been provided in that Section which will be adhered to, and no further work is recommended for the area.</p>
<p>Geotechnical Concerns</p>	<p>A geotechnical investigation will be completed as part of a conceptual design of the preferred location after the ESR is filed, which will identify soil conditions and parameters for construction. This work will be completed in line with Region of Waterloo best practices and requirements, and reporting will be reviewed by the Region.</p>
<p>Hydrogeological Concerns</p>	<p>A hydrogeological investigation was completed in Q1 2023 as part of a conceptual design of the preferred location. Preliminary findings of the report show that construction of the future facility at the depths proposed in the Class EA would not disrupt the aquifer or create a preferential pathway for contaminants to travel to the well head, both during construction and during future station operation. The complete report will identify groundwater conditions and dewatering volumes for future construction. This work was completed in line with Region of Waterloo best practices and requirements, and reporting will be reviewed by the Region.</p> <p>When the Region impacts a drinking water source, they must provide for a new source, either through a new well or connection to the system, based on negotiations between parties affected. One well will need to be relocated on the 328 Main Street property, so the Region will negotiate with the property owner on a suitable new source.</p>
<p>Excess Soils and Groundwater Quality</p>	<p>Soil sampling will be completed during the conceptual design to determine the suitability and quality of the existing soils, for future reuse on this site or others when construction commences.</p>
<p>Sediment and Erosion</p>	<p>Follow all applicable regulations and by-laws concerning erosion and sedimentation control, noise, environmental controls, vibration, and public safety.</p> <p>Site plan should clearly identify stockpiling and staging areas.</p>

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Impacts	Mitigating Measures
See below for a more detailed discussion.	

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Erosion and sedimentation are a primary concern during construction. Mitigating measures for erosion and sedimentation control include:

- Erosion and sediment controls may be achieved with sediment control fencing around the perimeter of the work area(s). Sediment control and construction silt fences should be installed prior to the start of construction and removed following the restoration of vegetation during the construction period.
- All dewatering of the work area(s) by pumping will need to discharge flows through a filter bag and disperse the flow through a vegetated area at least 10 m from the watercourse, or as per regulations, or into a storm catch basin.
- Other sediment control measures such as temporary sedimentation basins or swales will be used on an “as required basis” to supplement the other mitigation measures.

The temporary erosion and sediment controls are to be maintained in good working condition throughout the construction period and until the erosion control measures have taken hold.

## 8.0 Approvals, Permits, And Other Requirements

### 8.1 Design and Construction Stage Approval/Permit Requirements

The following summarizes some of the anticipated approvals, permits, and other requirements that will be required for this project during design and/or construction. The specific list of approvals, permits, and other requirements will be confirmed during detailed design for the project. The timing of some of these approvals will depend on when the project is undertaken.

- Building Permit
- Township and GRCA Site Plan Approval
- Drinking Water Works Permit Amendment
- Endangered Species Act permit or authorization if required. To construct in a Category 3 location of barn swallow habitat, an Information Gathering Form (IGF) is required for submittal to the MECP. Depending on consultation with the local Ministry of Natural Resources office, Species at Risk surveys may be required as well.

- Municipal Drinking Water License update
- Permit to Take Water if required or Environmental Activity and Sector Registry (EASR) for construction dewatering, depending on the calculated dewatering requirements during construction
- Excess Soils Management Planning Documents, including Assessment of Past Use, Soil Sampling Analysis Plan, Soil Characterization Report, and Fill Management Plan
- Stage 2 Archaeological Assessment for the preferred location – Location 2 study area. Early consultation with the approval agencies during the design stage is recommended. Additional approvals may be required as the project progresses with further investigations, detailed design, and construction.

## 9.0 Next Steps And Schedule

Following the 30-day public review period, if there are no concerns, then the proponent may proceed to implementation. To implement the preferred treatment and residual management solutions and the preferred location, the next steps include property acquisition, detailed design, and construction.

Since the preferred location for the new facility is on lands that are privately owned, the Region will need to enter discussions with the landowners to acquire the necessary property. After the Region acquires the property, it is estimated that detailed design will take place between 2026 and 2028. Construction is estimated to take place between 2029 and 2031.

As part of detailed design, the next steps for the project include:

- Stage 2 AA is required to be completed.
- Complete Subsurface Utility Engineering (SUE) and topographic survey
- Meeting with the GRCA to discuss approval requirements for building within a GRCA regulated area.
- Meeting with MECP regarding the SAR habitat requirements. Information Gathering Form (IGF) is required for submittal to the MECP. If it is determined that there will be impacts to SAR, or if there is uncertainty with the impacts to SAR, a formal review under the Endangered Species Act (ESA) would be required by contacting [SARontario@ontario.ca](mailto:SARontario@ontario.ca). If impacts

on protected species and their habitats can not be avoided, an application for an authorization under the ESA would be required.

- Completion of the equipment preselection, pre-design, and detailed design

## 10.0 Appendices