

Prepared By:



in association with:



The Corporation Of The City Of Guelph

Project File Report: Clythe Well Treatment Upgrades Class Environmental Assessment

City File: S12-001

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GMBP File: 112041

March 2018

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Project File Report: Clythe Well Treatment Upgrades Class Environmental Assessment**The Corporation Of The City Of Guelph****March 2018****City of Guelph File: S12-001****GMBP File: 112041**

1. Introduction and Background

1.1 Introduction

The City of Guelph Water Services retained GM BluePlan Engineering Limited (GMBP) to complete a Municipal Class Environmental Assessment (Class EA) to improve water supply in the City of Guelph through treatment upgrades for the Clythe Well. Master Planning and Engineering studies have identified the need to develop additional local water sources to meet future demand, and included recommendations to provide treatment for Clythe Well to allow it to be returned to service.

The technical objective of this study is to evaluate options for the Clythe well treatment including primary disinfection for a groundwater source and improvement of aesthetic water quality to address naturally occurring iron, manganese, and hydrogen sulphide in the raw well water.

This Study is being conducted to satisfy the requirements of the Municipal Class Environmental Assessment process as set out in the Municipal Engineers Association (October 2000, as amended in 2007, 2011 and 2015). This assessment also includes conceptual design of the preferred alternative along with an implementation schedule and budgetary cost estimates. This Project File Report (PFR) was prepared to document and summarize the Class EA process leading to the selection of the preferred alternative for bringing the Clythe Well back into service.

For reference and orientation purposes when reading this report, Watson Road is considered to run north-south.

1.2 Study Team

The study team involved with completion of the Class EA process consists of the following organizations.

Proponent: City of Guelph

Prime Consultant: GM BluePlan Engineering Limited

Sub-consultants:

- Environmental Consultant: Natural Resource Solutions Inc.
- Archaeological Consultant: Archaeological Services Inc.
- Electrical Consultant: Eramosa Engineering Inc.

Natural Resource Solutions Inc. (NRSI) conducted a Natural Heritage Characterization desktop study for the shortlisted site alternatives, which reviewed natural heritage inventories to identify potential wildlife habitat, Species at Risk (SAR), and other significant natural features within the study area, and identify associated constraints and opportunities for development.

Archaeological Services Inc. (ASI) conducted a Stage 1 Archaeological Assessment including a field investigation for the shortlisted site alternatives to determine the potential for archaeological resources at each site, and determine the need for a Stage 2 Assessment.

Eramosa Engineering developed a conceptual electrical, instrumentation and controls plan for the preferred alternative site only.

1.3 Background

1.3.1 Existing Clythe Well and Booster Station Facility

The City's water supply consists of several wells located across the City at locations where the aquifers are known to be productive. The Clythe Well and Booster Pumping Station are located at the east boundary of the City at 24 Watson Road North. The well was drilled in 1976, although it was not permitted for use until 1983 at which time the Clythe facility was constructed to include a well house, in-ground reservoir and booster pumping station. The Clythe facility operated as a booster pumping station transferring water from the low pressure zone (Zone 1) to the high pressure zone (Zone 2) starting in 1983. A new pump room was constructed in 1998 and a third booster pump was added in 2004 to bring the station to its current firm capacity of 10,886 m³/d. The underground, baffled reservoir has a capacity of approximately 670 m³.

The Clythe Well was operated between 1990 and 1999 as a groundwater supply source having a rated capacity of 5,237 m³/d (Amended PTTW No. 1008-9J7S6G, expiring May 31, 2024).

The well was taken out of service due to an increasing number of customer complaints regarding poor taste and odour and associated water quality concerns (i.e. elevated iron, manganese, and sulphides). Efforts to mitigate these concerns through installation of a 200mm diameter steel liner in the well in 1999 to seal off the upper formations were unsuccessful. As a result, the facility has been operating since that time as a booster station only, transferring water from Zone 1 to Zone 2.

The Clythe site has very restricted available space and the existing facilities occupy most of the usable area on the property. In order to bring Clythe well back into service, a review of alternative locations is required to accommodate a treatment facility.

1.3.2 Related Studies

An assessment of the well (Stantec/Lotowater 2008) and treatability assessment (GMBP, 2010) confirmed the continued presence of these contaminants. During the 2010 treatability testing, average values for iron, manganese, and hydrogen sulphide in raw water from Clythe well were 0.18 mg/L, 0.03 mg/L, and 0.43 mg/L, respectively. The corresponding aesthetic objectives for iron, manganese, and hydrogen sulphide are 0.30 mg/L, 0.05 mg/L, and 0.05 mg/L, respectively. During the treatability assessment, oxidation using sodium hypochlorite prior to filtration with catalytic media and final polishing with activated carbon were found to provide highly effective and satisfactory results. The intent of this Class EA is to evaluate options for the location of a new treatment facility to bring the well back into service.

The hydrogeological well assessment (Stantec/Lotowater 2008) also verified the well as a secure groundwater source (i.e. non-GUDI), and recommended a sustainable pumping rate of 39 L/s (3,370 m³/d), which is below the permitted capacity of 61 L/s (5,237 m³/d) as stated in the Permit To Take Water.

The 2008 Water and Wastewater Servicing Master Plan (WWSMP) identified the need to relocate and expand the Clythe Booster Pumping Station (BPS) in order to address pressure challenges and to increase storage in Zone 2 brought on by increased development. The 2014 Water Supply Master Plan Upgrade **identified the Clythe Well as one of the City's drinking water sources targeted to be returned to service with treatment by 2020.**

In 2011, a water modeling study of the City's pressure Zone 2 (Stantec, 2011) recommended relocation of Clythe BPS along with changes to the pressure zone boundary. A key recommendation was to create a new Zone 2 East that would operate at a hydraulic grade line of approximately 397.5+/- m while Zone 2 West would remain at 393.5+/- m with the new boundary being located generally along the Speed River. A number of watermain improvements, zone boundary changes, and additional storage requirements for Zone 2 were also identified. **Storage upgrade requirements were further defined in the "Zone 2 Study – Proposed Infrastructure Plan (C3 Water, Oct 2015).** Although this Class EA will address only

Clythe well treatment, it will consider impacts to the **City's overall** water system, and compatibility with planned storage and booster pumping upgrades.

In 2017, the Guelph Tier Three Water Budget and Local Area Risk Assessment were completed **to determine the sustainability of the City's water supply** on a quantity basis, and identify threats. A Risk Management Measures Evaluation Process (RMMEP) for Significant Drinking Water Threats (SDWT) identified in the Tier Three Water Budget report is currently being developed. The Clythe well was included in the Tier Three Water Budget model, in part, to assess the impact of pumping the well on groundwater discharge to cold-water streams, and was found to have a moderate, not significant impact.

2. Class Environmental Assessment Process

This Class EA study was completed as a Schedule 'B' undertaking in accordance with the requirements of the Municipal Class Environmental Assessment process (latest edition at time of preparation of this Report). The Class EA process includes public and review agency consultation, evaluation of alternatives, an impact assessment of the recommended alternative, and identification of measures to mitigate potential adverse effects. The Notice of Study Commencement for this project is contained in Appendix B.

2.1 Environmental Assessment Act

Ontario's Environmental Assessment Act (EAA) was passed in 1975 and was proclaimed in 1976. The EAA requires proponents to examine and document the environmental effects that could result from major projects or activities and their alternatives. Municipal undertakings became subject to the EAA in 1981.

The EAA's comprehensive definition of the environment is:

- Air, land or water;
- Plant and animal life, including human life;
- The social, economic and cultural conditions that influence the life of humans or a community;
- Any building, structure, machine or other device or thing made by humans;
- Any solid, liquid, gas, odour, heat, sound, vibration, or radiation resulting directly or indirectly from human activities; and,
- Any part or combination of the foregoing and the interrelationships between any two or more of them, in or of Ontario.

The purpose of the EAA is the betterment of the people of the whole or any part of Ontario by providing for the protection, conservation and wise management of the environment in Ontario (RSO1990, c.18, s.2).

2.2 Principles of Environmental Planning

The EAA sets a framework for a rational, objective, transparent, replicable and impartial planning process based on the following five key principles:

- **Consultation with affected parties.** Consultation with the public and government review agencies is an integral part of the planning process. Consultation allows the proponent to identify and address any concerns cooperatively before final decisions are made. Consultation should begin as early as possible in the planning process.
- **Consideration of a reasonable range of alternatives.** Alternatives include functionally different solutions, “alternatives to” the proposed undertaking and “alternative methods” of implementing the preferred solution. The “do nothing” alternative must also be considered.
- Identification and consideration of the effects of each alternative on all aspects of the environment. These aspects include the natural, social, cultural, technical and economic environments.
- Systematic evaluation of alternatives in terms of their advantages and disadvantages to determine their net environmental effects. The evaluation shall increase in the level of detail as the study moves from the evaluation of “alternatives to” to the evaluation of “alternative methods”.
- Provision of clean and complete documentation of the planning process followed to allow “traceability” of decision-making with respect to the project. The planning process must be documented in such a way that it may be repeated with similar results.

2.3 Class Environmental Assessment

“Class” Environmental Assessments (Class EAs) were approved by the Minister of the Environment in 1987 for municipal projects having predictable and mitigatable impacts. The Municipal Class EA process was revised and updated in 1993, 2000, 2007, 2011 and 2015.

The Class EA approach streamlines the planning and approvals process for municipal projects that are:

- Recurring;
- Similar in nature;
- Usually limited in scale;
- Predictable in the range of environmental impacts; and,
- Responsive to mitigation.

The Municipal Class Environmental Assessment, prepared by the Municipal Engineers Association (October 2000, as amended in 2007, 2011 and 2015) outlines procedures to be followed to satisfy Class EA requirements for water, wastewater, stormwater management and

road projects. The process includes five phases as noted below. A detailed Municipal Class EA process flowchart is provided in **Figure 1** of **Appendix A**.

- **Phase 1: Problem or Opportunity Definition;**
- **Phase 2: Identification and Evaluation of Alternative Solutions** to determine a preferred solution while taking input from the public and other stakeholders into consideration;
- **Phase 3: Examination of Alternative Methods** of implementation of the preferred solution while taking input from the public and other stakeholders into consideration;
- **Phase 4: Documentation of the Class EA process** in the form of an Environmental Study Report (ESR) for public review; and
- **Phase 5: Implementation and Monitoring.**

The Class EA:
A Framework for
Environmental Planning

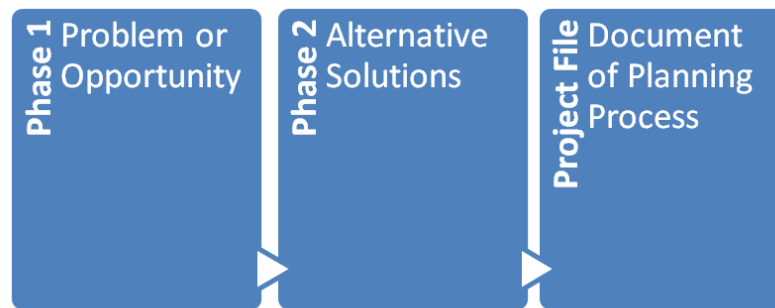
The Class EA provides the framework
for environmental assessment planning
of municipal infrastructure projects to
fulfill the requirement of the EA Act.

Projects subject to the Class EA process are classified into the **following four “schedules”** depending on the degree of the expected impacts.

Schedule A projects are minor or emergency operational and maintenance activities and are approved without the need for further assessment. These projects are typically smaller in scale and do not have a significant environmental effect.

Schedule A+ projects are also pre-approved; however, the public is to be advised prior to the project implementation. Although projects of this class do not usually have the potential for adverse environmental impacts, they tend to be broader in scale in comparison to Schedule A projects.

Schedule B projects require a screening of alternatives for their environmental impacts and Phases 1 and 2 of the planning process must be completed as illustrated above. The proponent is required to consult with the affected public and relevant review agencies. If outstanding issues remain after the public review period, any party may request that the Minister of the Environment consider a Part II Order, also known as bumping-up the project to a Schedule C Class EA or an Individual EA. Provided that no significant impacts are identified and no requests for a Part II Order to a Schedule C or Individual Environmental Assessment are received, Schedule B projects are approved and may proceed directly to implementation.



Schedule 'B' Class EA Process

Schedule C projects must satisfy all five phases of the Class EA process. These projects have the potential for greater environmental impacts. Phase 3 involves the assessment of alternative methods of carrying out the project, as well as public consultation on the preferred conceptual design. Phase 4 normally includes the preparation of an Environmental Study Report (ESR) that is filed for public review. Provided no significant impacts are identified and **no requests for Part II Order or "bump-up" to an Individual** Environmental Assessment are received, Schedule C projects are then approved and may proceed directly to implementation.

Given the nature of this project, the Municipal Class EA for Clythe Well Treatment Upgrades is **classified as a Schedule 'B' undertaking** and includes Phases 1 and 2 of the Class EA process.

2.4 Objectives of Class EA

The primary objective of the Municipal Class EA is to complete a comprehensive, inclusive, and environmentally sound planning process for treatment upgrades to the Clythe Well and to select a preferred site for locating a treatment facility. Study objectives include:

- Protection of the environment as defined in the Ontario EAA
- Extensive consultation with a broad range of stakeholders including interested agencies and the public to encourage participation and input in developing alternatives
- Facilitating communication between parties with a range of interests
- Documentation of the Municipal Class EA planning process

- Mitigation and monitoring to ensure minimal environmental impact throughout the life cycle of the project

Completion of the Municipal Class EA process will ensure that the preferred solution to the identified problem will be acceptable to stakeholders and satisfy technical, environmental, cultural and economic criteria for the project.

3. Existing Conditions

3.1 General

This section presents the characteristics of the study area to provide a baseline description as well as context for site identification and evaluation, identification of relevant agencies and interested parties (such as local community groups), and assessment of potential social and environmental impacts associated with the proposed undertaking.

The Study Area established by the Steering Committee was based primarily on limits of the area for identification of an appropriate site for the proposed treatment facility and is bounded approximately by York Road to the south, the municipal boundary between the City of Guelph and Guelph-Eramosa Township to the east, Eastview Road to the north, and Summit Ridge Drive to the west.

Figure 2 in **Appendix A** presents the Study Area. The study area boundaries were included in the Notice of Commencement that was distributed to all parties and agencies on the contact list.

3.2 Planning Context

There are several municipal and provincial planning policies, regulations and initiatives relating to municipal water services and the protection of groundwater and surface water resources. This section identifies the policies, regulations and initiatives relevant to this study.

3.2.1 Provincial

Provincial Policy Statement

The Planning Act requires that municipal decisions affecting a planning matter “shall be consistent with” the Provincial Policy Statement (PPS) issued by the Ministry of Municipal Affairs and Housing in 2014.

As required by the PPS, municipalities shall ensure that water services are provided in a manner that:

- Directs and accommodates expected growth in a manner that promotes efficient use of existing services.
- Can be sustained by the water resources upon which such services rely.
- Is feasible, financially viable and complies with regulatory requirements.
- Protects human health and the environment.
- Promotes water conservation and water use efficiency.
- Integrates servicing and land use considerations in all stages of the planning process.

Safe Drinking Water Act

Ontario's Safe Drinking Water Act recognizes that the people of Ontario are entitled to safe drinking water. The Act provides for the protection of human health and prevention of drinking water health hazards through the control and regulation of drinking water systems and drinking water testing.

Clean Water Act and Source Water Protection Initiatives

The Drinking Water Source Protection Program, as prescribed by the Ontario Clean Water Act (2006), has the responsibility to develop science-based drinking water source protection plans and policies for each source protection area across Ontario. The program, facilitated by local conservation authorities, includes effort from municipalities and local Source Protection Committees. The goal is to ensure the protection of municipal water supplies from a list of prescribed drinking water threats.

3.2.2 Municipal – City of Guelph

City of Guelph Official Plan

The City of Guelph's Official Plan Amendment Number 48 Five Year Review was approved by the Ontario Municipal Board in October 2017. The Official Plan "establishes a vision, guiding principles, strategic goals, objectives and policies to manage future land use patterns that have a positive effect on the social, economic, cultural and natural environment of the City and guides decision making and community building to the year 2031."

In relation to water system development, item 3.19 in the above referenced Official Plan amendment states that:

"Construction of new, or expansion or existing, municipal or private communal water...systems should only be considered where the following conditions are met:

- i) Strategies for water conservation and other water demand management initiatives are being implemented in the existing service area; and
- ii) Plans for expansion or for new services are to serve growth in a manner that supports achievement of the intensification and density targets of this Plan.”

3.2.3 Grand River Conservation Authority

The Grand River Conservation Authority (GRCA) issues Watershed Report Cards summarizing the state of the water quality and forest conditions for the 16 watersheds managed by the GRCA that drain to the Grand River and ultimately Lake Erie. The Watershed Report Cards provide recommendations on how residents and municipalities can improve watershed and forest health.

3.3 Physical Description

The Study Area is located in northeast Guelph near the eastern boundary of the City and is predominantly a residential area with a serviced population of approximately 5,000 people. The study area is rectangular in shape and covers an area of approximately 3 square kilometres, comprising a footprint that is approximately 2 km north-to-south and 1.5 km west-to-east. The study area was selected to include potentially developable sites for the proposed treatment facility within a reasonable proximity to Clythe Well.

3.4 Land Uses

The area is characterized predominantly by residential land uses along with public parks, walking trails, two elementary schools and the East Side Branch of the Guelph Public Library system. There is active residential land development currently underway within the study area on lands located between Watson Parkway N. and the eastern boundary of the City, as well as on Watson Parkway, north of Joe Veroni Park. The Laura Bailey Memorial Trail as well as the Watson Creek Trails run through part of the study area.

The City of Guelph Official Plan (2001, Amendment #28 Five-year Review 2017) identifies the following land use designations within the study area:

- **Residential (low density, low density greenfield, medium density, high density)** located throughout the study area and including two elementary schools located adjacent to one another on Grange Road; John Danby Public School and Holy Trinity Catholic Elementary School;
- **Community Mixed-Use Centre** at the intersection of Starwood Drive and Watson Parkway where the East Branch of the Guelph library is located, and future commercial and mixed uses are planned;

- **Service Commercial** along the north side of York Road at the western limits of the study area including an upholstery business, an auto-mechanic shop, and a site at the southeast corner of Eastview Road and Watson Parkway North that is under development;
- **Open Space and Park** including Eastview Open Space and adjacent Grange Road Park located on Grange Road just west of Watson Road, Joe Veroni Park located at the northeast corner of Fleming Road and Watson Road, Severn Drive Park located at the northeast corner of Severn Drive and Grange Road, Lee Street Park located on Lee Street south of Silurian Drive, and O'Connor Lane Park located at O'Connor Lane and Lee Street;
- **Industrial** designated greenfield site at 25 Watson Road North across the road from the Clythe Well and Booster Station;
- **Significant Natural Areas and Natural Areas** along Clythe Creek and Hadati Creek and associated Provincially Significant Wetland.

The former Eastview Landfill, which ceased operations in 2003, is located just outside the northern boundary of the study area. For reference, **Appendix A** includes copies of City of Guelph Defined Area Zoning Maps 61 and 62 which cover the project study area.

3.5 Natural Environment

Clythe Creek and Provincially Significant Wetland (PSW) complex, Hadati Creek and PSW complex, forests and meadows are located within the study area. The study area is located within the Grand River watershed and within the jurisdiction of the Grand River Conservation Authority (GRCA). The study area does not contain and is not adjacent to any Areas of Natural and Scientific Interest (ANSI) or Environmentally Sensitive Areas (ESA). The study area contains potential habitat for Species at Risk (SAR) based on a desktop review, but does not contain any previously designated Significant Wildlife Habitat as defined by the Ministry of Natural Resources and Forestry (MNRF).

The topography of the study area is moderately sloping with elevations of approximately 325 masl (metres above sea level) in the southern portion of the study area and rising towards the east, west, and northern portions to elevations of approximately 350 masl.

Natural features within the study area are further detailed in NRSI's "Natural Feature Characterization of Alternatives Sites" report found in **Appendix J**.

3.6 Social Environment and Cultural Heritage

The study area is located almost entirely within the area of the Grange Hill East community group area with a very small portion located at the eastern extremity of the Two Rivers Neighbourhood Group area. The German Canadian Cultural Club has a group facility located on Fleming Road, although it is noted that the property owner has a Draft Plan of Subdivision before the City Planning Committee for approval to remove the facility and build residential units on the property.

Although the majority of the built structures within the study area are new constructions, there are some detached homes that are greater than 40 years, requiring further review of potential for heritage value. From an archaeological perspective, much of the study area has been previously disturbed, though some isolated areas have the potential for archaeological value. Further details on archaeological potential can be found in ASI's Stage 1 Archaeological Assessment found in **Appendix K**.

4. Phase 1: Opportunity Statement

Master Planning and Engineering Studies completed by the City of Guelph have identified the need to develop additional local water sources, and to implement upgrades to existing wells to meet future supply requirements in the City.

Returning Clythe Well to service with added treatment was identified in the 2014 Water Supply Master Plan (AECOM, May 2014) as a high priority project. The Treatability Assessment of the Clythe and Helmar Wells (Gamsby and Mannerow, now GM BluePlan, Feb 2010) concluded that raw water from the Clythe Well can be successfully treated for aesthetic quality parameters with well-established technologies.

The purpose of this Schedule 'B' Municipal Class EA process is to select a preferred solution through a comprehensive, environmentally sound planning process open to public participation to address the following objective:

Provide treatment for Clythe Well (an approved water source) to return it to service, **contributing to the City's ability to meet long-term water demands and integrating with the City's broader Official Plan (Amendment 48 Five Year Review, Sept 2017) to ensure "a safe and reliable local water supply".**

5. Phase 2: Alternative Solutions

5.1 General Considerations

Alternative solutions to the problem included:

- Do nothing
- Limit community growth
- Implement water conservation measures
- Upgrade water supply for north-east Guelph

The existing Clythe Well and Booster Pumping Station is located at 24 Watson Road North. The site property is owned by the Corporation of the City of Guelph. The size of the well-house property is approximately 0.1 hectares (ha) and is roughly triangular in shape with overall dimensions of approximately 40m by 50m by 60m as shown in **Appendix G**.

Strategy A: Do Nothing

For the purposes of comparison, the 'Do Nothing' scenario will be evaluated. This would involve maintaining the existing Clythe station as a booster pumping station only, and keeping the Clythe well offline. The "Do Nothing" alternative requires very little or no capital cost to implement. However, it does not address the project objective to develop additional water sources to meet future demand in the City of Guelph as stated in the opportunity statement.

Strategy B: Limit Community Growth

An alternative strategy would be to maintain existing water demand by limiting community growth, including residential, commercial and industrial development. In effect, this alternative would be similar Strategy A 'Do Nothing,' because community growth would be more limited if the Clythe well is not brought back online.

Strategy C: Implement Water Conservation Measures

In order to maintain existing water demand in the City and still allow for some development without increasing the system capacity, the option to conserve water was reviewed. Conservation measures could include educating residents on the impacts of water conservation, implementing water use restrictions and incentives to reduce water consumption. No changes would be made to the existing water supply, treatment, storage, pumping or distribution systems. Water conservation is an alternative that could be combined with other alternatives. City of Guelph water conservation measures are included in future growth projections identified in the Water Supply Master Plan.

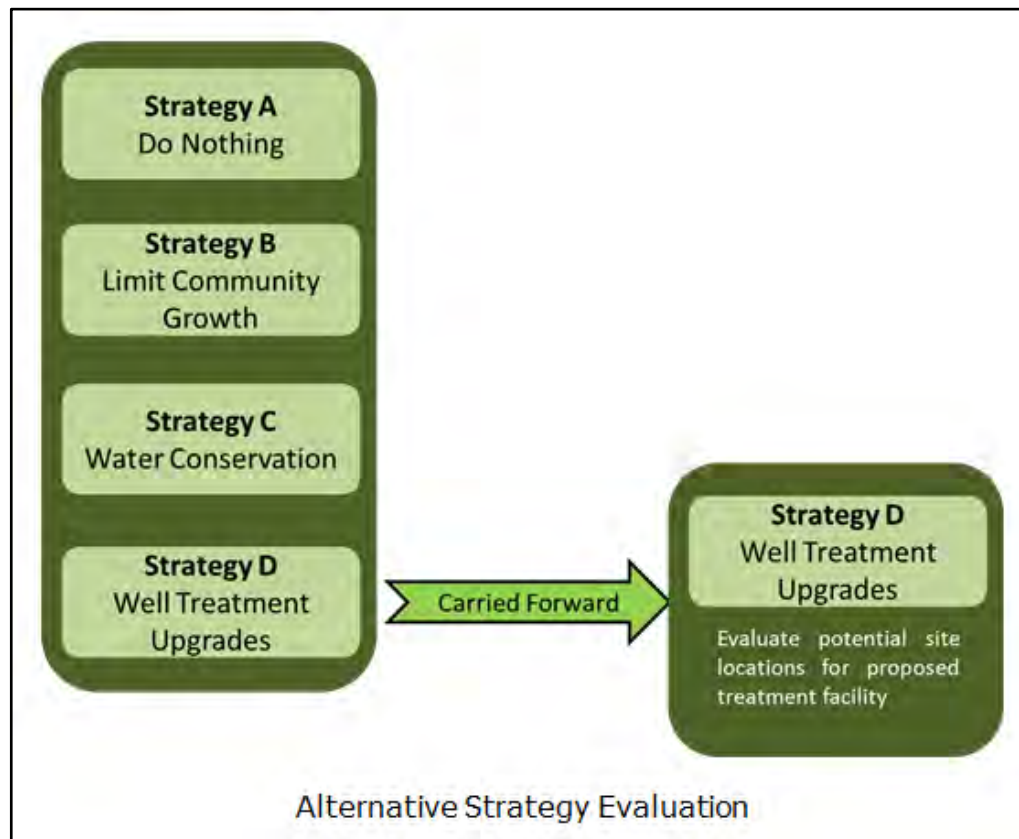
Strategy D: Implement Clythe Well Treatment

Additional water supply would be made available in northeast Guelph by bringing the Clythe well back online and implementing treatment to improve water quality, including taste and

odour. This alternative would involve construction of a water treatment facility at either the existing Clythe Station property, or at an alternative offsite location. Depending on location, the treatment facility may discharge treated water back into the existing Clythe Booster Station for pumping into Zone 2 pressure zone. Alternatively, the facility may include a contact tank and booster pumps to convey treated water directly into the Zone 2 pressure zone.

5.2 Evaluation of General Strategies

The general strategies listed in 5.1 were evaluated based on their ability to reasonably satisfy the project objectives listed in the Opportunity Statement. Strategies that do not meet project objectives were screened from further consideration. The flow chart below describes the strategies that were carried forward to detailed evaluation.



Strategy A to 'Do Nothing' does not address the key project objective of developing additional water sources in the City of Guelph to meet future demand, and will not be considered further.

Strategy B to limit community growth was screened out, because it is not consistent with Official Plan policies. Therefore, limiting community growth does not meet the project objectives and will not be carried forward for further evaluation.

Strategy C to implement water conservation measures will not be considered further, because the City of Guelph currently practices water conservation. The City has well-established and comprehensive water conservation programs in place across several sectors of development. These have had a positive impact as demonstrated by total water consumptions trends in recent years. However, water conservation measures alone are not considered sufficient to make up for long-term increasing water demand in the City as noted in the 2014 Water Supply Master Plan. If development proceeds as per the existing Official Plan, water conservation on its own would not be sufficient to meet future water demands within existing capacity.

Strategy D to implement Clythe well treatment is the only strategy that satisfies the project objectives. Siting of the treatment facility will be evaluated in further detail.

5.3 Identification and Evaluation of Candidate Sites

5.3.1 Location of Treatment Facility

This study will evaluate multiple site locations for the Clythe Well Treatment Facility (approx. 0.2 to 0.3 hectares in size), including the option to expand the existing Clythe Station to accommodate a new treatment facility within the defined Study Area. The nature of the project will also require route selection for associated pipelines:

- a. Raw water pipeline from the existing Clythe Well to the treatment facility site.
- b. Zone 2 watermain from the proposed treatment facility site to either 1) the nearest large diameter (min. 300mm diameter) watermain in Zone 2, or 2) the Clythe Booster Pumping Station.

The location of the proposed treatment facility will dictate the route selection for the above pipelines.

5.3.2 Site Identification and Description

There are several potential properties within the study area that may be suitable for construction of a water treatment facility. Several of these sites are owned by the City, and some are privately owned.

A comprehensive process was undertaken to identify and evaluate candidate sites for the Clythe Water Treatment Facility. Properties were selected through brain storming sessions with key City staff, as well as, field surveys by the consultant team. Required criteria for site selection included undeveloped land that has sufficient available space to construct a new treatment facility. Only sites located within City limits were considered. Alternatives being

considered for screening-level evaluation are described below, with key features summarized in **Table 1**.

Alternative 1 – Existing Clythe Well

This alternative would involve expansion of the existing Clythe station within the existing property limits to include a treatment facility. Under this alternative, treated water from the new treatment system would be conveyed to the existing reservoir to be pumped to Pressure Zone 2. As such, no additional watermains are required, and all new piping would be inside the existing station.

It is evident that there is limited available space on the existing property to construct a treatment facility, as most of the site is occupied with the existing reservoir and pumping station. Furthermore, the station continues to operate as a booster pumping station and construction would have to work around a critical facility that must remain in service. Consequently, while it may be possible to construct a treatment facility at the existing Clythe site, constructability would be challenging and problematic.

Alternative 2 – 25 Watson Road North (Industrial)

Under this alternative, a new treatment facility would be constructed at the undeveloped privately-owned property directly across the road from the existing Clythe station. A watermain would be constructed to bring raw water from the Clythe well across the road to the new treatment facility, and a second new watermain would convey treated water back to the existing Clythe station reservoir for pumping into Zone 2. It is possible under this alternative to pump water from the new treatment facility directly to Zone 2 distribution. However, evaluation and cost comparisons between alternatives were based on treated water being conveyed back to the existing Clythe Station reservoir for pumping into Zone 2.

Alternative 3 – 18 Watson Road North (Residential)

Under this alternative, a new treatment facility would be constructed at 18 Watson Road North, a privately-owned residential property directly adjacent and to the south of the existing Clythe station. Similar to Alternative 2, a watermain would be constructed to bring raw water from the Clythe well to the new treatment facility, and a second new watermain would convey treated water back to the existing Clythe station reservoir for pumping into Zone 2. It is possible under this alternative to pump water from the new treatment facility directly to Zone 2 distribution. However, evaluation and cost comparisons between alternatives were based on treated water being conveyed back to the existing Clythe Station reservoir for pumping into Zone 2.

Alternative 4 – Eastview Open Space

This alternative would involve construction of a new treatment facility within the city-owned Eastview Open Space property located near the northern extent of the study area. A watermain approximately 1,900 metres in length would be constructed to convey raw water from Clythe well to the new treatment facility, and a second local watermain would convey treated water directly to the Zone 2 distribution main located on Grange Road.

Alternative 5 – Joe Veroni Park

This alternative would involve construction of a new treatment facility within the city-owned Joe Veroni Park property located at the northeast corner of Watson Parkway N and Fleming Road. As with Alternative 4, an 850 metre watermain would be constructed to convey raw water from Clythe well to the new treatment facility, and a second local watermain would convey treated water directly to the closest Zone 2 distribution main located on Watson Parkway North.

Alternative 6 – Severn Drive Park

This alternative would involve construction of a new treatment facility within the city-owned Severn Drive Park property located to the northeast extent of the study area. As with Alternatives 4 and 5, a 1,700 metre watermain would be constructed to convey raw water from Clythe well to the new treatment facility, and a second watermain would convey treated water directly to the closest Zone 2 distribution main located on Grange Road.

Alternative 7 – Grange Road Park

This alternative would involve construction of a new treatment facility within the city-owned Grange Road Park property located to the south of Eastview Open Space in the northern portion of the study area. As with Alternatives 4, 5 and 6, a 1,600 metre watermain would be constructed to convey raw water from Clythe well to the new treatment facility, and a second watermain would convey treated water directly to the closest Zone 2 distribution main located on Grange Road.

Alternative 8 – 115 Watson Parkway

Under this alternative, a new treatment facility would be constructed at 115 Watson Road North, a privately-owned undeveloped property located to the north of the existing Clythe station along Watson Road N. Similar to Alternatives 2 and 3, because of the close proximity of this site to the Clythe well, a watermain would be constructed to bring raw water from Clythe well to the new treatment facility, and a second new watermain would convey treated water back to the existing Clythe station reservoir for pumping into Zone 2. It is possible to include a reservoir and booster pumps at the treatment facility and pump directly into Zone 2,

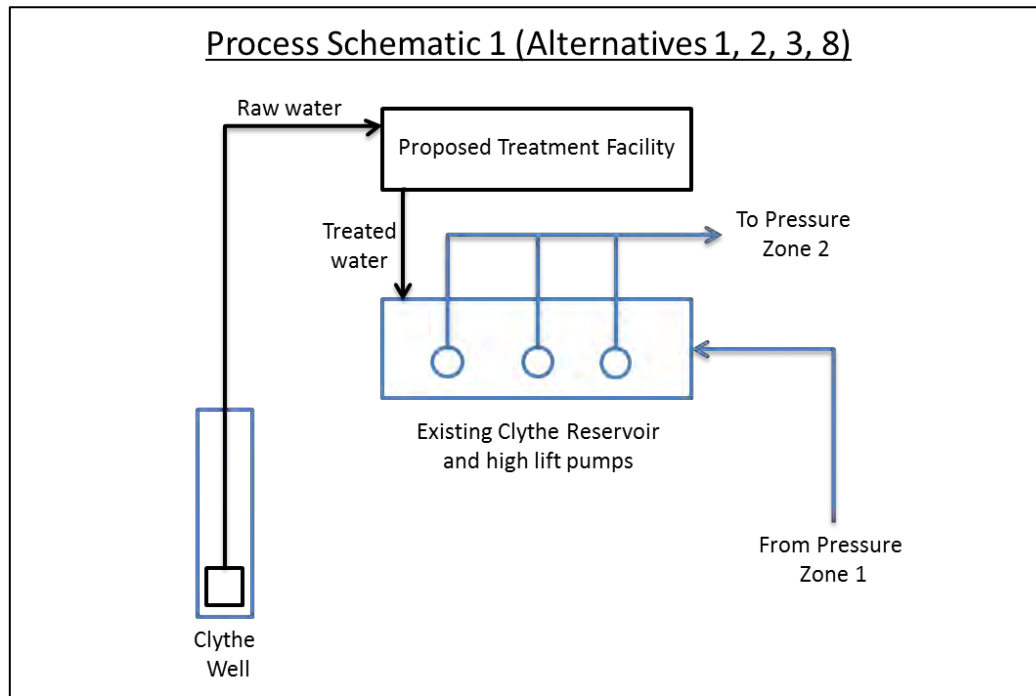
although due to the proximity to the existing Clythe booster station, this option was not evaluated in detail.

5.3.3 Overall Process Strategy Alternatives

Overall, Alternatives 1, 2, 3 and 8, which include a treatment facility location close to the existing well, follow the same general process strategy as illustrated in Process Schematic 1 on the following page. Alternatives 4, 5, 6, and 7 each incorporate a treatment facility site that is located farther from the existing well, and follow a different general process strategy that includes a new contact tank and booster pumps, as illustrated in Process Schematic 2 on the following page. We note that Process Schematic 2 could also apply to Alternatives 2, 3 and 8, as described in the previous paragraphs for those respective Alternatives.

The location of each site is shown in **Figure 2** in **Appendix A**

Process Schematic 1 (Alternatives 1, 2, 3, 8)



Process Schematic 2 (Alternatives 4, 5, 6, 7)

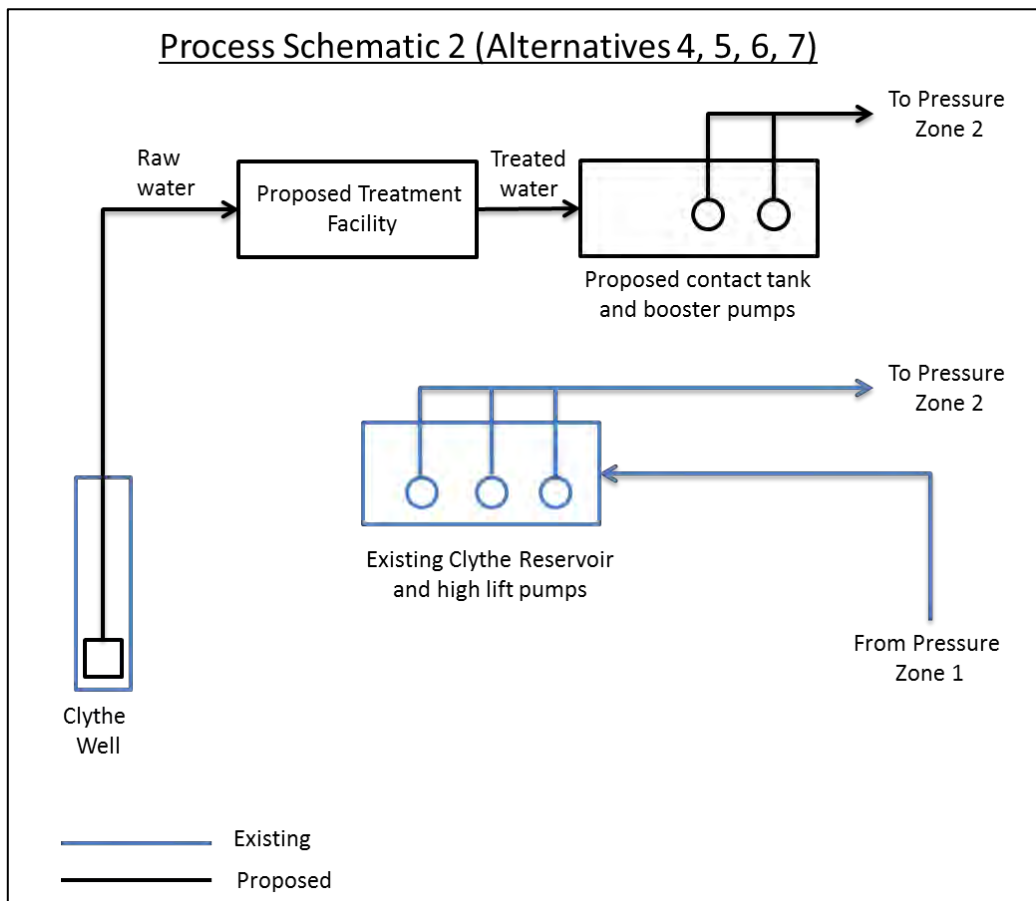


Table 1. Long List of Site Alternatives for Water Treatment Facility

ITEM	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7	Alternative 8
Site ID	Existing Clythe Station (expansion)	25 Watson Road Industrial	18 Watson Road Residential	Eastview Open Space	Joe Veroni Park	Severn Drive Park	Grange Road Park	115 Watson Parkway
Civic Address	24 Watson Rd. N	25 Watson Rd. N	18 Watson Rd. N	305 Eastview Rd.	245 Watson Pkwy. N	125 Severn Dr.	598 Grange Rd.	same, (formerly 72) Watson Rd. N.)
Ownership	City of Guelph	Private Developer	Private Resident	City of Guelph	City of Guelph	City of Guelph	City of Guelph	Private Developer
OP Designation (per OPA 48, approved Oct 2017)	Industrial	Industrial with partial Natural Area Overlay	Industrial	Open space and park, Significant Natural Area	Low density greenfield residential	Open space and park	Open space and park	Community mixed-use centre ¹
Zoning	Urban Reserve (UR)	Industrial (B.3-7)	Urban Reserve (UR)	Urban Reserve (UR)	Neighbourhood Park (P.2)	Specialized Neighbourhood Park (P.3)	Neighbourhood Park (P.2)	Special community shopping centre CC-15 (H)
Approximate Size and Shape	0.08 ha, triangular	3.1 ha, rectangular	0.5 ha, triangular	4.3 ha, rectangular	1.2 ha, rectangular	2.5 ha, rectangular	1.4 ha, triangular	8.3 ha, irregular
Approximate Site Dimensions (m)	30 x 38 x 40	360 x 85	90 x 80 x 120	240 x 180	150 x 80	250 x 100	250 x 190 x 150	250 x 330 (avg)
Approximate Area Available for Development ²	0.01 ha	2.1 ha	0.3 ha	2.0 ha	0.6 ha	1.0 ha	0.3 ha	6.0 ha
Elevation (masl)	327	332	330	346	345	353	347	327
Raw Watermain Length	nil	400 m	70 m	1,900 m (~1,400m along ROW)	850 m	1,700 m (~1,500m along ROW)	1,600 m (~1,400m along ROW)	300 m
Treated Watermain Length to Nearest Distribution Main	nil	400 m	70 m	500 m	50 m	200 m	200 m	300 m
Estimated Total Watermain Length	nil	800 m	140 m	2,500 m	900 m	1,900 m	1,800 m	600 m
Current Status	Active BPS for Zone 2	Undeveloped	Private residential property, occupied	Undeveloped	Existing public park	Existing public park	Existing public park	Undeveloped
Development Plans	None	Draft plan for serviced industrial lots dormant	None	Portion of area may be needed for compensation tree plantings	No current plans for further development	No current plans for further development	No current plans for further development	Preliminary development plans

1. Official Plan designation for 115 Watson Road property is currently under appeal with Ontario Municipal Board

2. Area available for development excludes portions of site containing environmentally sensitive areas and associated buffers, as well as existing infrastructure

5.4 Screening Level Evaluation

After reviewing each long-listed site, five of the eight alternative sites were screened out due to substantial constraints that would prevent practical development of that site, as described in **Table 2** below.

Table 2. Screening Level Evaluation of Long List of Sites

Site Identification	Screening-Level Evaluation	Result
1. Existing Clythe Station	City-owned property, inadequate available space, very poor constructability, booster station must remain in service	Not carried forward
2. 25 Watson Road Industrial	Privately owned and currently for sale, not developed, adequate size, located close to existing Clythe Well site	Carried Forward as Option A
3. 18 Watson Road Residential	Privately owned residential property, not currently for sale, currently occupied by owner, located adjacent to existing Clythe Well site.	Not carried forward
4. Eastview Open Space	City property, adequate size, undeveloped, designated for other use during course of Class EA Study and no longer available	Not carried forward
5. Joe Veroni Park	City-owned property, marginally adequate size, currently developed as a public park, treatment facility would reduce park open space and negatively impact aesthetics and public use	Not carried forward
6. Severn Drive Park	City-owned property, adequate size, currently developed as a public park, treatment facility would reduce park open space and negatively impact aesthetics and public use	Not carried forward
7. Grange Road Park	City-owned property, adequate size, currently developed as a public park, area available that would have minimal impact on park open space	Carried Forward as Option B
8. 115 Watson Parkway	Privately owned, not developed, adequate size, located in close proximity to existing Clythe Well site	Carried Forward as Option C

Three alternative sites show potential for the development of a water treatment facility, and will be considered under detailed evaluation as follows.

- **Option A** – 25 Watson Road Industrial
- **Option B** – Grange Road Park
- **Option C** – 115 Watson Parkway

5.5 Detailed Site Evaluation Criteria

The following sections define each criterion used to evaluate the three short-listed candidate sites. The criteria are grouped into 6 categories as follows:

- Site Requirements
- Land-Use Planning Objectives
- Natural Environment
- Social and Cultural Environment
- Economic Environment
- Technical Feasibility

Potential sites were evaluated using a matrix with scores from 1 to 10 assigned to each criterion, with 1 being poor and 10 being excellent. The six major criteria categories were given equal weighting. The overall score for each site was calculated and sites were then ranked from most to least preferred (i.e. highest to lowest score).

5.5.1 Site Requirements

Adequate Developable Size

Conceptual sizing of the treatment facility established a footprint on the order of approximately 0.2 hectares or 2,000 m² (0.5 acres), which could be accommodated on a parcel of land with a footprint of 40m by 50m or a parcel covering a similar area. This is based on construction of a treatment building incorporating treatment filters, chemical storage, washroom, stand-by power and electrical room, and site features including access road, parking/turnaround space for service vehicles, security fencing, and a buffer around the perimeter for aesthetic treatment to mitigate the visual and noise impact with neighbours where required. For site alternatives that require booster pumping capacity and a contact tank, the estimated site footprint increases to approximately 0.3 hectares or 3,000 m² (0.75 acres).

Sites with available space of at least 0.3 ha are ranked more favourably. Sites that are smaller than 0.2 ha in size would receive a zero score for this criterion since it would not be possible to construct the proposed facilities at such a site.

Proximity to Large Distribution Mains

Clythe well and the existing booster station are located at the existing pressure zone boundary between Zone 1 (low pressure) and Zone 2 (high pressure). Treated water from Clythe well is to be conveyed into Zone 2. Whether the existing booster station is used to convey treated water from Clythe well or a new booster station is constructed for that purpose at a different location, it is advantageous that the treatment facility and booster station be located close to large diameter watermains in both Zones 1 and 2. Large diameter watermains are considered to be at least 300mm (12 inches) in diameter and preferably a minimum of 400mm (16 inches). It is noted that there is an existing 400mm diameter Zone 2 watermain along Watson Road and Watson Parkway from York Road to Speedvale Avenue, which is a main transmission line in the northeast section of the City water distribution system. Consequently, sites located near Watson Road rank highly under this criterion. There is also a relatively large 300mm Zone 2 watermain along Grange Road from City limits in the east to Starwood Drive in the west.

Elevation Appropriate for Intended Use

Ground elevation at the existing Clythe Booster Station is 327 metres above sea level (masl). Typical available head in Zone 1 water arriving at the existing station is in the range of 40 to 45 metres. There is sufficient residual pressure in Zone 1 to deliver water further into Zone 2 to areas with a moderately higher elevation. For Options A (25 Watson Road Industrial) and C (115 Watson Parkway), where treated water would be pumped back to the existing Clythe booster pumping station, a site elevation that is similar to the Clythe Station elevation is preferable to reduce energy costs for pumping to the treatment facility and back to Clythe station. For Option B (Grange Road Park), where booster pumping directly to local Zone 2 distribution on Grange Road would be implemented due to the distance from Clythe Well, it is preferable for the facility elevation to be high enough to reduce the size of the new booster pumps. As such, Option B, a facility elevation in the range of 345 to 350 masl ranked well under this criterion. **It is noted that the City's Water Supply Master Plan identifies the need for future elevated storage in the northeast quadrant; consequently Option B would have an advantage over Options A and C in terms of making accommodating future storage.**

Adequate Site Access

The site must have adequate access for vehicles, equipment, and materials during construction and for service vehicles during its entire service life. A paved access road is required. Sites that score high for this criterion either already have a site access road, or require minimal social or environmental disturbance to construct one.

Availability of Site Services (access road, sanitary, power, communications, natural gas)

Availability of site services including access road, sanitary sewer, Hydro, communication, and natural gas is required. The availability of 3-phase power supply is also required for the large capacity booster pump motors to be installed. Although most sites are either serviced or within close proximity to these services since all sites are located within the City, a site that requires installation of relatively long linear infrastructure or that does not have a sanitary sewer outlet that allows gravity servicing of the site would score low under this criteria.

5.5.2 Land-Use Planning Objectives

Availability of Property for Purchase by City

One of the sites identified for detailed evaluation is a City-owned property. However, two are not owned by the City and consequently property acquisition would be required. Properties that are already owned by the City would receive a full score under this criterion. Privately owned lands that have active development plans would score low while privately owned lands that do not have active development plans would score moderately higher.

Compatibility with Municipal Zoning and Planning Policies

Construction of a public water supply facility should be compatible with zoning, as well as, maintain the intent of the Official Plan, community plan, and other planning policies and good urban planning principles. The zoning of most sites may have to be amended to be compatible with site development as a public water supply. The applicable zoning designation for a public water facility is institutional (I.1) or specialized urban reserve (UR). City owned lands or privately owned sites that would not require rezoning rank well under this criterion. The City Planning Department has indicated that critical public works facilities such as City water treatment facilities are permitted uses that would not require a change in zoning or the Official Plan.

5.5.3 Natural Environment

Impact on Natural Environment

The potential impact on the natural environment such as woodlands, wildlife, terrestrial vegetation, groundwater, aquatic, air, etc. was assessed for each site. Sites that have already been extensively disturbed or do not include sensitive environmental features score well under this criterion.

Impact on Designated Areas

The headwaters of Watson Creek and Hadati Creek are located within the study area. There are Provincially Significant Wetlands (PSW) and Environmentally Sensitive Habitats (ESH)

within the study area. Input from the Grand River Conservation Authority (GRCA) and the Ministry of Natural Resources and Forestry (MNRF) was obtained during the site evaluation process to identify sensitive areas and stipulate measures to mitigate environmental impacts. Sites that do not have these features within or adjacent to them are expected to have minimal impact and therefore would score relatively well.

Energy Consumption/Carbon Footprint

One of the largest energy consumers at the proposed facility will be pumping costs. Consequently, sites located closer to the existing Clythe station at a similar elevation will score higher under this criterion.

5.5.4 Social and Cultural Environment

Public Acceptance

As part of the Municipal Class EA process, at least one Public Information Centre (PIC) is required to directly solicit input and comments from the public on the preferred solution. The preferred alternative must have a reasonable degree of acceptance from the public to be implemented. Sites that are located with some buffering distance from the nearest residential properties or that do not impact existing uses of public parks tend to score well against this criterion.

Aesthetic Appearance/Landscaping

The aesthetic quality of the proposed facility must receive careful consideration. A visually appealing facility can be achieved through landscape and architectural design that is not only compatible to the surrounding neighbourhood, but well-received by the public and enhances the aesthetic quality of the property. Architectural treatments have been used successfully at several City pumping stations to reduce the industrial appearance of the building and make it blend in well with the surroundings. Landscaping features such as trees screens, grassed areas, and berms serve to give the property a park like setting. Locations that have space to facilitate landscaping or are far enough from public view as to not require additional architectural and landscaping considerations will score high under this criterion.

Noise

It is anticipated that there will be minimal noise emanating from the facility. Most noise will occur during construction. During operation of the facility, very little noise will be produced even though at least one pump will be running continuously for the life of the facility. Extensive experience at other City pumping station demonstrates that the facilities operate with all doors closed and no windows, resulting in very little opportunity for noise from the station. In addition, visual buffers such as trees also serve to dampen noise levels. Facility locations that are farthest from sensitive noise receptors will score higher under this criterion.

Archaeological/Heritage Sites

A specialist archaeological sub-consultant was retained as part of the study team to research and assess the potential for archaeological or heritage impacts on the selected preferred site. Undisturbed sites, and sites located near rivers and creeks tend to have a higher potential for historical significance. A Stage 1 Archaeological Assessment was conducted for each site by ASI Archaeological Services Inc., which included field investigations. The Heritage Checklist is included in Stakeholder Correspondence Appendix E with correspondence from Joe Muller at the Ministry of Tourism Culture and Sport (MTCS).

Compatibility with Adjacent Land Uses

There is a variety of land uses in the study area, although residential development predominates. Sites for the proposed treatment facility where a buffer or physical separation can be achieved from the nearest private residences scored relatively well for this criterion.

Property Impacts

Sites that require extensive tree clearing or earthworks are examples of impacts from construction of a water treatment facility. Conversely, for sites that are relatively large and could readily accommodate a public water treatment facility without compromising the overall value of the property score well. This criteria also considers displacement of existing land use.

First Nations/Aboriginal Peoples

Several First Nations agencies and Aboriginal groups were contacted a part of the public consultation process. Sites located near rivers and creeks tend to have a higher potential for significance to First Nations and Aboriginal peoples.

Compatibility with Parks and Recreation Plans

There are several City of Guelph public parks in the study area, including Joe Veroni Park, Severn Drive Park, and Grange Road Park. The City has expressed a preference to avoid impacts on parks with existing facilities (playgrounds, sports fields, walking trails, etc.). Overall, constructing a treatment facility in a park setting may adversely impact park use, potentially through noise and dust during construction and reduced aesthetics and space for recreational use during operation of the facility.

5.5.5 Economic Environment

Lifecycle Cost

The standard definition of lifecycle cost is the total accounting of all costs for a project from inception through construction, operation, and decommissioning encompassing the entire life of a project (including design, construction, land acquisition, provision of utilities/services,

operating cost, maintenance cost, replacement cost). It is noted that life cycle costs tend to be a larger financial commitment than construction costs, which can be substantial but are one-time costs.

Capital Cost

Capital costs are considered to be a one-time cost related to engineering and construction of the water treatment facility.

5.5.6 Technical Feasibility

Operational and Maintenance Complexity

The new treatment, pumping and storage facility will be designed to ensure that ongoing operation of the facility is as convenient and safe as possible for operations staff. At a minimum, the system will be designed to meet applicable industry standards, regulations, and best practices without excessive complexity. Sites with more convenient access for operators would score higher.

Proximity to Proposed Pressure Zone Boundary

It is proposed that the location of the new pressure zone boundary be shifted north to be along Fleming Road in the Watson Road area. Therefore, sites that are located near this area or near existing infrastructure servicing that could accommodate a future booster pumping station will score well under this criterion. Sites that require long lengths of transmission mains to be installed, or have a restricted site area for expansion, will score lower under this criterion.

Ease of Implementation

This criterion is based mainly on overall constructability. The new water treatment facility should be designed to facilitate a reasonably smooth approvals and construction process. Issues such as environmentally sensitive areas (PSW, ANSI), and geotechnical considerations for shallow groundwater or bedrock should be investigated prior to detailed design to address potential challenges with approvals and construction.

Watercourse Crossings

This criterion looks at the feasibility and constructability of watermain watercourse crossings from a geotechnical perspective. Clythe Creek and Watson Creek are the only natural water courses in the study area that could potentially have to be crossed with a pipeline. Sites that require fewer crossings score higher for this criterion.

5.6 Detailed Evaluation

A detailed evaluation was completed for each of the three shortlisted site options, with results and overall ranking of sites provided in **Table 3**. A detailed evaluation matrix is available in **Appendix F** that provides a further breakdown of scoring for each evaluation criteria noted above in Section 5.5.

Table 3. Detailed Evaluation of Alternative Sites

CRITERIA	Option A 25 Watson Road Industrial	Option B Grange Road Park	Option C 115 Watson Parkway
Site Requirements	<ul style="list-style-type: none"> Large area for development One viable site access location Moderate distance from site services and large distribution main 	<ul style="list-style-type: none"> Limited space available that will not impact current park use No existing site access to area where facility could be located; new access would need to be constructed Moderate distance from site services and large watermain 	<ul style="list-style-type: none"> Large area for development, although only a portion of site would likely be acquired Multiple site access locations Close to site services and large distribution main
Land Use Planning Objectives	<ul style="list-style-type: none"> Privately owned Currently for sale Compatible with Official Plan Designation 	<ul style="list-style-type: none"> City owned Compatible with Official Plan Designation, but portion of parkland area would be removed, potentially leaving parkland deficit 	<ul style="list-style-type: none"> Privately owned Not currently for sale Application for development is pending; future of development is uncertain
Natural Environment	<ul style="list-style-type: none"> Only site access passes through Provincial Significant Wetland buffer Potential for Species at Risk and Significant Wildlife Habitat to be confirmed with field investigation No watercourse crossing required Majority of site is within GRCA regulation limit 	<ul style="list-style-type: none"> No potential for Species at Risk habitat Requires one watercourse crossing through a wetland Site falls entirely within GRCA regulation limit 	<ul style="list-style-type: none"> Potential for Species at Risk and Significant Wildlife Habitat to be confirmed with field investigation May require two watercourse crossings through a wetland Portion of site is within GRCA regulation limit
Social and Cultural Environment	<ul style="list-style-type: none"> Minimal public impact during construction and operation Potential for provision of other City services at this site No potential for archaeological resources identified 	<ul style="list-style-type: none"> Use of park temporarily disrupted, and permanent reduction of parkland Construction impacts (noise/dust) No potential for archaeological resources identified Potential visual impact to near-by residents and users of park 	<ul style="list-style-type: none"> Reduction in land available for development, may affect value of property Minor construction impacts (noise/dust) No potential for archaeological resources identified Compatibility of treatment facility aesthetics with other potential development at this site (i.e. residential/commercial) to be considered
Economic Environment	<ul style="list-style-type: none"> Lower capital cost for treatment facility, no booster pumps or chlorine contact tank required, relatively short length of watermain Capital cost increased by cost of property acquisition Operational cost lower, as elevation of facility would be close to that of Clythe Station 	<ul style="list-style-type: none"> Higher capital cost to install new chlorine contact tank and booster pumps, and greater lengths of new watermain City-owned property, so no acquisition cost Higher operation cost to operate additional booster pumps 	<ul style="list-style-type: none"> Lower capital cost for treatment facility, no booster pumps or chlorine contact tank required, relatively short watermain Cost of property acquisition is unknown and could significantly impact cost of this alternative. Negotiations for property acquisition may be challenging considering current stage of development plans. Operational cost lower, as elevation of facility would be close to that of Clythe Station
Technical Feasibility	<ul style="list-style-type: none"> Good constructability for greenfield site, with additional consideration given to installation of paved access driveway to mitigate environmental impacts Higher elevation may lead to reduced dewatering requirements No watercourse crossings, simplifying geotechnical work 	<ul style="list-style-type: none"> Watercourse crossing may pose challenge from geotechnical perspective Mitigation of impacts to park during construction must be considered, may limit timing window for work. New watermain along road allowance may require partial road closure. Location in park may limit timing of operations staff to complete various maintenance procedures 	<ul style="list-style-type: none"> Potential challenges coordinating work with other development projects on-site Watercourse crossings may pose challenge from geotechnical perspective Greater potential for groundwater impacts / dewatering due to proximity to wetland and lower elevation
OVERALL RANKING	1 (PREFERRED)	3 (ALTERNATE)	2 (ALTERNATE)

6. Phase 2: Public and Agency Consultation

In accordance with the Schedule B Municipal Class EA process, regular consultation with the public, government agencies, First Nations and Métis groups, and other identified stakeholders was undertaken. The following actions were taken to notify and communicate with stakeholders.

6.1 Notice of Study Commencement

A Notice of Study Commencement was sent via email or postal service to identified agencies, and First Nations stakeholders between August 30 and September 15, 2017. The Notice was also posted on the City of Guelph website.

6.2 Public Open House

A Public Open House was held at Victoria Road Recreation Centre at 151 Victoria Road North on October 19, 2017 where the public was invited to review the Class EA procedure, background information preceding this study, the need and opportunity supporting the project and to provide input for consideration in the alternative solution selection process.

A Notice of Public Open House was published in the Guelph Mercury Tribune local newspaper on October 5 and October 12, 2017 in advance of the Open House, and was also posted on the City of Guelph website. The Notice was distributed by email or mail to agencies and First Nations stakeholders, as well as affected property owners on October 11, 2017.

The format of the Open House was kept informal with no official public presentation or mass audience question and answer session. A more detailed account of the proceedings at the Public Open House is detailed below in Section 6.3 and copies of the notice and display boards presented are attached in **Appendix C**.

6.3 Public Comments

Contained in **Appendix E** is a summarized list of verbal and written comments received from interested public and private stakeholders. Some comments were received during the Public Open House described above, and others were submitted separately via email to the project team. Replies have been provided by GM BluePlan to all those that commented.

Of the inquiries and comments received, the majority were concerned with impacts to the aquifer if Clythe well is returned to service. **Table 4** summarizes the key concerns

brought up by community members and the study team's responses to address those concerns.

Table 4. Summary of Public Comments and Study Team Responses

Public Concern	Summarized Response
<p>1. Returning Clythe Well to service could negatively impact Clythe Creek PSW (Provincially Significant Wetland)</p>	<p>Clythe Well is an existing municipal well as defined in the Municipal Class EA document, and has received necessary approvals, including an existing Permit to Take Water. The well was previously in operation and no changes are proposed for the well. As such, this Class EA study considers only the additional environmental impacts that may occur as a result of proposed treatment upgrades to return Clythe Well to service.</p> <p>Well confirmed as a secure groundwater source (i.e. not Groundwater Under the Direct Influence of surface water) in the City Engineers' Report (Acres and Associated, 2001).</p> <p>In the Source Water Determination (Stantec, 2008), water quality analyses including Laser Particle Counting and Microscopic Particulate Analysis, Stantec stated: "Based on these findings, together with the water level monitoring data, it was concluded that the water quality of the Clythe Well is not influenced by surface water and this assessment should be considered in any proposed changes to the treatment for this well"</p>
<p>2. Returning Clythe Well to service could potentially allow leachate from the closed Eastview Landfill site to enter the aquifer that supplies Clythe Well</p>	<p>The groundwater capture zone for Clythe well does not extend to the Eastview Landfill, consequently the well will not be impacted by leachate.</p>

Public Concern	Summarized Response
3. Returning Clythe Well to service could impact quantities available from nearby private wells	<p>For private wells that were in service before the Clythe Well original Permit to Take Water was issued, the City is responsible for taking necessary steps if there is any negative impact to those water supplies. This may include providing a supply of water equivalent in quantity and quality to normal well taking, or reduce the City's water taking, or provide reasonable compensation to the well owner.</p> <p>Based on available information from groundwater monitoring wells located within the capture zone of Clythe Well, impacts are not expected to be significant.</p>
4. Returning Clythe Well to service could change requirements of near- by farmers' Nutrient Management Practices	<p>No changes to nutrient management practices are anticipated as a result of returning Clythe well to service. City of Guelph Source Water Protection Project (2010) included consideration for withdrawal from Clythe Well. Therefore, no required changes to nutrient management practices are anticipated.</p>
5. Constructing a water treatment facility in Grange Park is not desirable for neighbouring residents	<p>Option B for Grange Road Park was ranked less favorably under 'Social and Cultural Environment' criteria, and was not selected as the preferred site.</p>

6.4 Additional Stakeholder Consultation

6.4.1 City of Guelph

An internal City Department workshop was held on July 10, 2017 that included representation from City of Guelph Planning, Parks and Engineering to solicit feedback on the long list of site locations for the water treatment facility. Workshop minutes from this consultation can be found in **Appendix E**.

6.4.2 Grand River Conservation Authority (GRCA)

A consultation meeting was held at GRCA headquarters at 400 Clyde Road in Cambridge on September 27, 2017 to review implications of development for the three short-listed sites, specifically with respect to mitigation measures required for development within the GRCA regulated area and close to Provincially Significant Wetlands. Meeting minutes can be found **Appendix E**. Key considerations noted by GRCA included that land development plans should not impact the ecological or hydrological function of natural features such as existing water courses and wetlands. Also, development could occur within a wetland buffer subject to conditions and mitigation measures that would be defined on a site-specific basis. GRCA recommended a targeted investigation to identify the wetland boundary of Clythe Creek more precisely in the field to verify the extent of encroachment into the wetland buffer for our preferred sites. This work was completed subsequent to the meeting and results are taken into consideration in this EA process and shown on Report Figures in **Appendix A**.

6.4.3 First Nations

Notice of Commencement, Notice of Open House and Notice of Completion were sent to First Nations groups as identified by the MOECC. Following issuance of this Project File Report, additional consultation will be requested with First Nations groups to ensure any comments they may have are taken into account, and they have been given sufficient time to comment. A record of First Nations consultation to date can be found in **Appendix E**.

6.4.4 Private Property Owners

The City of Guelph has initiated discussions with the owners of 25 Watson Road North which is the preferred site for a new treatment facility. Owners are amenable to selling property, and the City's offer is subject to completion of this Class EA.

6.5 Notice of Study Completion

A Notice of Study Completion was sent to all the stakeholders identified in **Appendix E** on March 29, 2018, and also published on the City of Guelph website and in the Guelph Mercury Tribune local newspaper on March 29, 2018 and April 12, 2018. A copy of the notice is also provided in **Appendix D**. The Project File Report was placed on public record for a 30 day review period beginning March 29, 2018 and ending April 28, 2018.

All correspondence from the public, agencies and other stakeholders related to this study can be found in **Appendix E**.

7. Conceptual Design for the Recommended Solution

7.1 Overview

A conceptual design of the preferred alternative is included as part of this Class EA to determine property requirements based on a preliminary site layout and to develop a budgetary cost for the work. During the 2010 treatability testing (GM BluePlan, formerly Gamsby and Mannerow Limited), average values for iron, manganese, and hydrogen sulphide in raw water from Clythe well were 0.18 mg/L, 0.03 mg/L, and 0.43 mg/L, respectively. Maximum values recorded during treatability testing for iron, manganese, and hydrogen sulphide in raw water from Clythe well were 0.21 mg/L, 0.04 mg/L, and 0.45 mg/L, respectively. Comparison with previous test results for raw water quality conducted in 2008 by Lotowater/Stantec during well rehabilitation indicates stable levels of iron, a possible declining trend for manganese, and a possible increasing trend for hydrogen sulphide. The corresponding aesthetic objectives for iron, manganese, and hydrogen sulphide are 0.30 mg/L, 0.05 mg/L, and 0.05 mg/L, respectively. The basis of design for sizing pressure filters with catalytic oxidation media and for pressure activated carbon contactors was based on results of the 2010 treatability testing. It is noted that MOECC is proposing to establish manganese as a health-related parameter which may include adopting a maximum acceptable concentration of 0.10 mg/L and an aesthetic objective of 0.02 mg/L which would be consistent with Health Canada Guidelines for drinking water quality. The proposed treatment system should be designed on the basis of the Province of Ontario adopting the Federal drinking water guidelines for these parameters. The proposed water system upgrades to bring Clythe well back into service include the following major components:

- a. Construction of water treatment facility at 25 Watson Road North, including treatment building, access road, and parking area.
- b. Construction of raw watermain from Clythe well to treatment facility
- c. Construction of treated water transmission watermain from treatment facility to existing Clythe station reservoir for pumping to zone 2 using existing high lift pumps. It is noted that the option exists to pump water from the new treatment facility directly to Zone 2 distribution. However, evaluation and cost comparisons between alternatives were based on treated water being conveyed back to the existing Clythe Station reservoir for pumping into Zone 2.
- d. Equip Clythe well with a submersible well pump to allow pumping to new treatment facility
- e. Construction of a treatment facility for reduction of aesthetic water parameters including elevated iron, manganese, and hydrogen sulphide. The treatment plant

will generally include chemical dosing systems, catalytic greensand media filters, activated carbon contactors, electrical room with motor control centre (MCC), instrumentation for flow, pressure, chlorine, residual, and turbidity, process pumps, valves and piping, and standby power.

- f. Allowance for expansion of the water treatment facility to accommodate future relocation of the pressure zone boundary.
- g. Upgrades to the existing Clythe Station to maintain a state of good repair and functionality. **Appendix I** has the Clythe Station Facility Assessment Report

Conceptual design drawings for the proposed works are included in **Appendix G**.

7.2 Water Treatment Facility

7.2.1 Site Works

Site works will include installation of an access road and parking area to allow vehicle access to the treatment building. Building access would be required for both City Operations and fuel delivery vehicles for a proposed stand-by diesel generator. There are no sanitary sewers along the Watson Road N. frontage. Process residuals may be decanted and de-chlorinated for proper disposal. Sanitary sewage from the on-site washroom and various floor drains could be directed to a holding tank for periodic removal by tanker truck for off-site disposal. Alternatively, a sanitary sewer or forcemain could be constructed from the facility to the closest existing City sanitary sewer.

Minor grading will be required to accommodate the access road and allow for drainage. Site runoff will be directed to an existing road side ditch along Watson Road N.

7.2.2 Process Design

Clythe well will be equipped to pump at a rate of approximately 40 L/s. This has been established in previous hydrogeological assessments of Clythe well as a sustainable pumping rate. It is noted that the station is permitted to draw up to 60.6 L/s continuously or 5,237 cu.m./day under the existing Permit to Take Water (PTTW).

For the purposes of determining site needs and a capital budget estimate, the preliminary process configuration is based on recommendations from the Treatability Assessment completed in 2010, where raw water will be treated with multi-stage filtration in the proposed water treatment building. The first treatment stage would use manganese dioxide filters for removal of iron, manganese and sulphide. The second treatment stage would use activated carbon filtration as a polishing stage to improve odour and taste. The proposed treatment facility will use back-washable media filtration in upright cylindrical pressure vessels, each equipped with a valve nest for filtration, backwashing, and filter to

waste functions. The filtration system will be configured with the total flow split across 2 parallel filtration trains each for catalytic greensand media filters and for activated carbon contactors. This arrangement offers improved operational flexibility to handle process upsets and reduced backwash flow rates. The parallel treatment train arrangement is recommended for the Clythe site due to the capacity of the well (up to 40 L/s) and high H₂S concentration in raw water. It is suggested that main line process piping in the plant be Schedule 10 stainless steel.

Dedicated backwash pumps operating on variable speed drives would be installed along with backwash waste settling and holding tanks for residuals management. A two compartment backwash waste tank is recommended, with the first compartment being a surge tank and the second compartment being a sludge tank. Typical operation involves backwash water entering the surge tank only to avoid re-suspending settled solids in the sludge tank from previous backwashes. Backwash from both filtration stages will be clarified using gravity settling. Supernatant from the sludge tank could be recovered and recycled back to the raw water supply line if desired by the City and approved by the MOECC, or dechlorinated and decanted to waste. Due to the presence of high sulphide concentrations in the raw well water, recycle of backwash supernatant may not be desirable. This will be confirmed during detailed design. Settled sludge will be periodically hauled offsite by licensed waste haulers.

Raw water may be pre-chlorinated at the existing Clythe station immediately after it is pumped out of the well, and filtered water from the proposed treatment facility may be re-chlorinated if required after it returns to the Clythe station, before it enters the existing reservoir.

The final process treatment strategy will be reviewed and confirmed during preliminary and detailed design.

7.2.3 Building and Structural

The water treatment building will generally be a rectangular one-storey slab-on-grade industrial structure with modest architectural treatments on the exterior for aesthetics. The interior of the facility will consist of dedicated spaces for filtration and process, an electrical room, and standby power generator room with adjacent fuel storage, chemical room, and a washroom. Insulated roll-up overhead doors will be provided at strategic locations in the building envelope to facilitate installation and removal of large filter vessels. The building may be designed as a “post disaster” building under the Ontario Building Code, although that will be verified during detailed design.

7.2.4 Electrical and Controls

Mainline electrical power servicing to the site of the proposed water treatment plant will be from a transformer (location and capacity to be confirmed during detailed design). The hydro service will be 600 V/3-phase/4 w/60 Hz.

Dedicated on-site standby power will be provided for the plant via a diesel or natural gas powered generator. An automatic transfer switch (ATS) will be provided to automatically switch the station to the standby power system in the event of a main line power outage. The generator will be sized to allow operation of emergency loads during a power outage. The standby generator will be an indoor unit with a fuel tank including secondary containment and at least 24 hours of storage at 75% load.

The new station electrical distribution system includes a free standing Motor Control Centre (MCC), which houses the following major components:

- Customer Metering
- Surge Protection Devices
- Pump Starters – variable frequency drives (VFD) and full voltage non-reversing ratchet (FVNR) (600V)
- Feeder Breakers for ventilation and heating equipment.
- Station Service Transformer
- Power Distribution Panels

Power for general (120/208V) station lighting, receptacles and equipment is supplied from the 120/208V distribution panel, which is fed from the 30KVA 600-208/120V station service transformer.

SCADA network connection will be with new fiber cable run between the new station and the existing Clythe well station, and connected to the existing Rogers SCADA network.

7.3 Pipelines

Two new watermains are required to bring raw water from the existing well to the proposed treatment facility, and to return treated water to the Clythe station reservoir. As noted above, the option exists to pump treated water directly into Zone 2 distribution if a contact tank and booster pumping is incorporated into the proposed facility.

The alignment of watermains within the water treatment facility property will follow the proposed access road, and open cut installation should be feasible for the entire watermain route to Clythe station. Trenchless installation under Watson Road N. may be

considered to reduce impacts to the adjacent wetland, and methods must be in line with requirements of GRCA. Pipelines will likely be PVC AWWA C900 pipe material.

7.4 Capital Budget Estimate

The following table provides a summary breakdown of the capital budget estimate for the preferred alternative, with a detailed line item breakdown presented in **Appendix H**.

Table 5. Summary Breakdown of Capital Budget Estimate

Item No. and Description	Budget Estimate (\$ 2018)
1. General (mobilization, demobilization, insurance, bonding, temporary facilities,)	210,000
2. Property Acquisition	1,200,000
3. Site Works	410,000
4. Pipelines	320,000
5. Structural and Buildings	960,000
6. Mechanical and Process Equipment	1,260,000
7. Electrical, Controls, and Instrumentation	1,190,000
Sub-total for Construction	5,547,000
8. Engineering (15%) and SCADA Programming	752,000
Sub-Total for Engineering and Construction	6,299,000
9. Contingency Allowance (25%)	1,575,000
TOTAL CAPITAL BUDGET ESTIMATE	\$ 7,874,000

The following considerations and assumptions were made in developing the budgetary capital cost estimate:

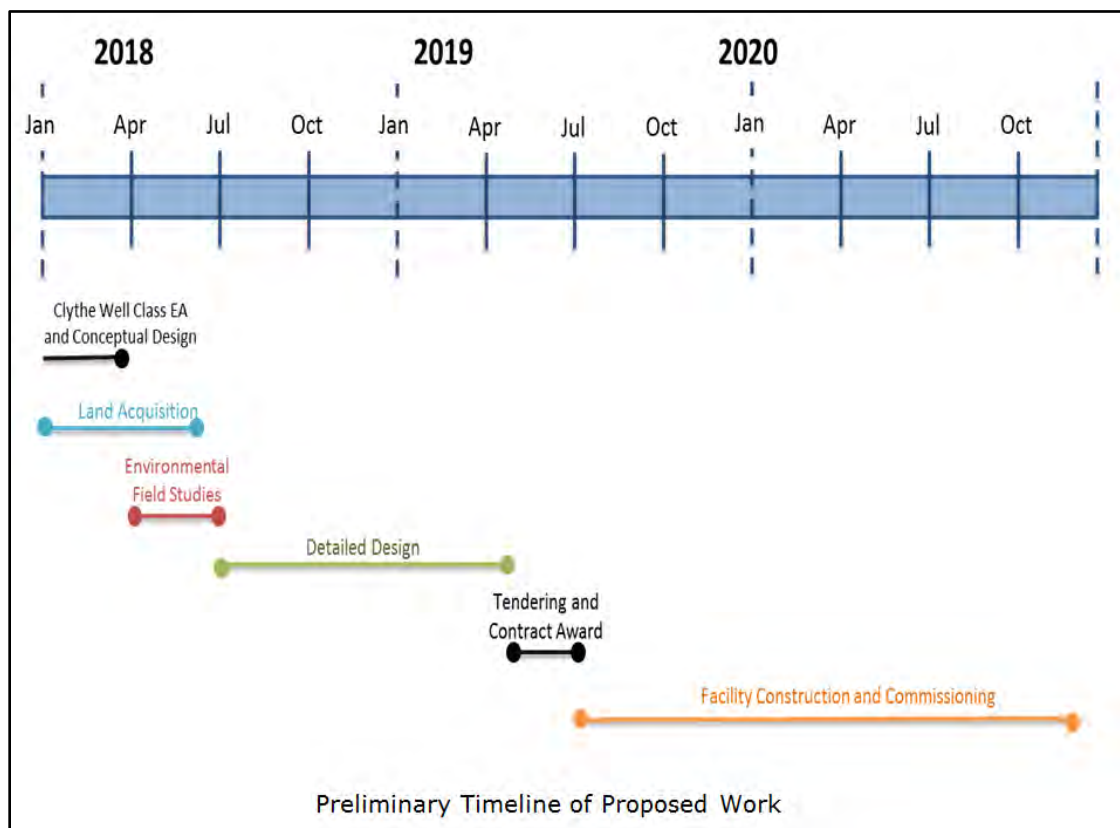
1. The above costs do not include HST.
2. A contingency allowance was included since the budget estimate is based on conceptual design only.
3. An estimate of property acquisition costs are included.
4. Costs are based on recent tender prices for similar work and budget estimates from suppliers for materials and equipment.
5. Above costs are based on providing primary disinfection for a secure groundwater source.

6. Above costs are based on not recycling the backwash supernatant due to elevated hydrogen sulphide. Supernatant to be dechlorinated and discharged to storm sewer.
7. The above costs are based on continued use of existing reservoir and high lift pumps at 24 Watson Road N. (existing Clythe Well and Booster Pumping Station) for their current purpose.
8. The above costs are based on using the existing Clythe Reservoir and Booster Pumping Station to deliver treated water from the new treatment facility into Zone 2.
9. Underground reinforced concrete tank at new site will serve as backwash holding and settling tankage.

8. Project Implementation

8.1 General Timeline

It is anticipated that detailed design will begin after the completion of this Class EA, and after property acquisition of 25 Watson Road North is complete. A preliminary timeline of proposed works is illustrated below.



8.2 Approvals

Several approvals or permits must be obtained prior to beginning construction of the water treatment facility and associated watermain. Anticipated approval requirements are listed in **Table 6** below.

Table 6. Required Approvals for New Water Treatment Facility for Clythe Well

Permit / Approval	Agency	Requirements	Timeline
Site Plan Approval	City of Guelph	<ul style="list-style-type: none"> Pre-consultation meeting to confirm requirements. Submission would generally include design drawings (site plan, landscape, grading/drainage, site servicing, building elevations/floor plans) 	4 – 6 months after completion of 90% design
Building Permit	City of Guelph	<ul style="list-style-type: none"> Site plan and building layout and structural drawings 	2 months after completion of 90% design
Road Occupancy Permit	City of Guelph	<ul style="list-style-type: none"> Pending construction method for watermain crossings of Watson Road N Utility stakeouts to be completed prior to commencing work 	2 – 4 weeks
Permit to Take Water (PTTW)	MOECC	<ul style="list-style-type: none"> Temporary Permit may be required for construction dewatering operations pending completion of geotechnical and hydrogeological investigation 	3 – 6 months
Drinking Water Works Permit Amendment	MOECC	<ul style="list-style-type: none"> Submission would generally include the following: <ul style="list-style-type: none"> - Design brief - Detailed design drawings and specifications - Existing PTTW - Plan for disposal of process waste streams 	4 – 6 months after completion of 90% design

Permit / Approval	Agency	Requirements	Timeline
GRCA Development Permit	GRCA	<ul style="list-style-type: none"> Permit required for work within GRCA regulation limit, which covers most of the 25 Watson Rd N property. Permit application would include: <ul style="list-style-type: none"> - Site plan with existing site conditions, property boundaries and proposed works - Sedimentation and Erosion control plans - Wildlife impact assessment / mitigation report - Geotechnical / Hydrogeological Report - Post-construction and restoration/landscape plans 	3 – 6 months after completion of 90% design
N/A	MNRF	<ul style="list-style-type: none"> An MNRF permit is not anticipated, but consultation with MNRF following completion of wildlife field investigations to confirm mitigation requirements for any identified SAR or SWH is required. 	N/A

8.3 Potential Impacts and Mitigation Measures

The potential impacts of the preferred design alternative are summarized in **Table 7**. Overall, each of the potential environmental impacts identified can be mitigated.

Table 7. Potential Impacts and Proposed Mitigation Measures

Potential Impact	Mitigation Measures	Application
Social and Community Impacts		
Construction would generate some short-term and temporary noise, dust and truck traffic disturbance	<ul style="list-style-type: none"> • Restrict any required road closures to off-peak traffic times, outside of 'rush hour' • Limit construction activities to daytime hours • Implement dust reduction practices, such as water spraying, as needed • Clearly communicate planned construction works and schedule to nearby residents, particularly regarding activities that may generate noise, vibrations or dust. • Shut off idling equipment • Motors equipped with mufflers where possible 	<ul style="list-style-type: none"> • Prior to and throughout construction period
Groundwater and Surface Water Impacts		
Potential impact on Clythe Creek Wetland Complex, as a result of constructing access driveway through wetland buffer area	<ul style="list-style-type: none"> • Conduct study to demonstrate that construction works and permanent structures will not impact the ecological or hydrological function of natural features such as existing watercourses and wetlands. • Pursue further consultation with GRCA to implement site specific mitigation measures in order to obtain a GRCA permit to construct, which may include implementing sediment and erosion control measures (i.e. silt fence, swales, check dams, etc.) to prevent slope erosion and sediment migration into watercourse 	<ul style="list-style-type: none"> • Planning and Design Phase • During Construction
Potential impacts on new private wells in the area if existing well	<ul style="list-style-type: none"> • For private wells that were in place before the initial Clythe Well Permit to Take Water was issued, the City may monitor water levels before and during production well tests to 	<ul style="list-style-type: none"> • Post-construction

Potential Impact	Mitigation Measures	Application
returned to service	determine any impact. If negative impacts occur to private wells during testing, the City will be responsible to take such action necessary to supply water equivalent in quantity and quality to normal well taking or provide reasonable compensation to the well owner. This could include lowering the pump, drilling a deeper well, or connecting the property to the municipal drinking water service. In addition, Guelph Water Services has a Standard Operating Procedure to address well interference complaints and a Well Interference Committee to address unresolved complaints.	
Reduced groundwater quantity from dewatering	<ul style="list-style-type: none"> Hydrogeological investigations Appropriate dewatering methods Environmental monitoring for dewatering activities 	<ul style="list-style-type: none"> Design phase During construction
Contamination of groundwater or surface water through run-off, spills and leaks	<ul style="list-style-type: none"> Spill response plan including spill control and containment measures 	<ul style="list-style-type: none"> Throughout construction , especially in proximity to surface water systems
Wildlife and Vegetation Impacts		
Cold Water Fisheries in Clythe Creek and Clythe Creek wetland complex	<ul style="list-style-type: none"> Although Clythe Creek is a 'cool' watercourse, it is managed as a 'cold' watercourse as it is primarily fed by groundwater, and construction timing windows to protect fisheries must be observed. Confirm required timing windows with MNRF. 	<ul style="list-style-type: none"> Design phase and during construction

Potential Impact	Mitigation Measures	Application
Species at Risk (SAR) and Significant Wildlife Habitat (SWH)	<ul style="list-style-type: none"> The site contains suitable habitat for several species of bird, bat, and plant SAR, and several types of SWH. Additional field studies are required to confirm presence of SAR and SWH. Pending completion of field studies, required mitigation measures will be confirmed in consultation with the MNRF, and may include restricted construction timing windows, designating a portion of the site as permanent habitat, supplementary habitat provisions (i.e. barn swallow nest box) 	<ul style="list-style-type: none"> Planning and design
Significant Cultural Woodland	<ul style="list-style-type: none"> Ensure all proposed infrastructure and construction operations are located outside of woodland buffers. Ensure a clear delineation is established onsite (i.e. boundary of silt fence is outside of woodland buffer) Restoration and planting as required Tree protection hoarding as required 	<ul style="list-style-type: none"> Planning, design and construction

9. Next Steps

9.1 Submission of Project File Report

The Project File Report will be available for public review for a 30-day review period. During this time, public and agency stakeholders are encouraged to review outstanding issues with the study team.

9.2 Part II Order Requests

If concerns arise regarding this project which cannot be resolved in discussion with the proponent, a person or party may request that the MOECC make an order for the project to comply with Part II of the Environmental Assessment Act (referred to as a Part II Order), which addresses individual environmental assessments. Requests must be received in writing by the Minister at the address below within 30-calendar days of the Notice of Study Completion.

The Honourable Chris Ballard
Minister of the Environment and Climate Change
77 Wellesley Street W.
Toronto, Ontario M7A 2T5
Fax: 416-314-8452

Copies of the request must also be sent to the Director of the Environmental Approvals Branch at the MOECC and the City of Guelph at the addresses below:

Attn: Ms. Kathleen O'Neill
Director, Environmental Approvals Branch
Ministry of the Environment and Climate Change
1st Floor
135 St. Clair Ave W
Toronto, Ontario M4V 1P5
EAASIBgen@ontario.ca


Robin Puskas, P. Eng.
Project Manager
City of Guelph Water Services
1 Carden Street
Guelph, ON N1H 3A1
robin.puskas@guelph.ca

If there is no Part II Order Request received by **April 28, 2018**, the City of Guelph intends on implementing the recommended alternative described in the Project File Report.

Yours truly,

GM BluePlan Engineering Limited

Per:

A handwritten signature in blue ink, appearing to read 'Grant Parkinson'.

Grant Parkinson, P. Eng.

Per:

A handwritten signature in blue ink, appearing to read 'Laura Verhaeghe'.

Laura Verhaeghe, P. Eng.