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Coldwater Wastewater Treatment Plant and Main Pumping Station Expansion Class EA

ENVIRONMENTAL STUDY REPORT- FINAL

Township of Severn

File 321867 | February 12, 2026

Document Control

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Issue	Date	Description
0	September 30, 2025	Draft Report for Client Review
1	November 6, 2025	Final Draft Report
2	February 12, 2026	Final Report

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1 Study Purpose and Organization

1.1 STUDY PURPOSE

This Class Environmental Assessment (Class EA) was undertaken to address the need for additional wastewater treatment and pumping capacity to service the anticipated growth in the community of Coldwater, Township of Severn. The Class EA's purpose was to identify the preferred solution for increasing the capacity of the Coldwater Wastewater Treatment Plant (WWTP) and Main Sewage Pumping Station (SPS).

1.2 PROBLEM STATEMENT

The community of Coldwater is expected to grow significantly over the next 20 years. The Coldwater WWTP does not have capacity to treat the wastewater associated with the anticipated population growth in Coldwater, nor does the Main SPS have capacity to convey the projected flows to the WWTP.

1.3 CLASS ENVIRONMENTAL ASSESSMENT PROCESS

This project followed the Municipal Class Environmental Assessment process as described in the Municipal Engineers Association Municipal Class Environmental Assessment (October 2000, as amended in 2023). The Municipal Class EA is a planning and design process to identify, compare and evaluate alternative solutions to a problem. It applies to all municipal road, water and wastewater projects, and significant private projects. It considers all aspects of the environment: natural, social, cultural and economic, and involves consultation with the public, affected parties and review agencies throughout the process.

This project was considered a Schedule C undertaking, in accordance with Appendix 1 of the Municipal Class EA document, as it may involve the construction or expansion of a WWTP. A Schedule C undertaking has the potential for significant environmental effects and must proceed through the full planning and documentation procedures specified in the Municipal Class EA document.

The Class EA described in this Environmental Study Report proceeded through the following phases:

- Phase 1: Identify the problem or opportunity.
- Phase 2: Identify and evaluate alternative solutions, then select the preferred solutions.
- Phase 3: Identify and evaluate alternative design concepts for the preferred solutions, then select the preferred designs.

- Phase 4: Prepare an Environmental Study Report, and review period.

Following the satisfactory completion of the Class EA, detailed design can proceed, and a submission can be made to the Ministry of the Environment, Conservation and Parks (MECP) for approval to construct and operate the wastewater works under the *Ontario Water Resources Act*.

1.4 REFERENCES

This Environmental Study Report was prepared with significant contributions from the Township of Severn. In addition, the following documents were referred to:

- Coldwater Wastewater Treatment and Collection System Annual Reports, Township of Severn.
- Coldwater Water Pollution Control Plan & Collection System Operations Manual, Township of Severn, 2018.
- Coldwater WWTP Amended Certificate of Approval.
- Environmental Compliance Approval for the Municipal Sewage Collection System for Coldwater, Washago and West Shore.
- Coldwater Wastewater Plant data.
- Various Staff Reports and planning documents showing connected properties and wastewater capacity allocation.
- Township of Severn Engineering Standards, Sanitary System.
- Drawings of the Coldwater WWTP expansion, TSH, 2008.
- Drawings of Pumping Station No. 1, J.D. Reid, 1974.
- Township of Severn Servicing Master Plan Water, Wastewater and Stormwater - Draft, Civica, 2025.
- Coldwater Inflow and Infiltration Investigation, Stantec, August 2016.
- Provincial (Stream) Water Quality Monitoring Network Dataset – Ontario Data Catalogue
- Water Survey Canada gauge in Coldwater.
- Water Quality Coldwater Creek, 1989-1990, Status Report, Michael Michalski Associates, 1992.
- Severn Sound Source Protection Area Approved Assessment Report, 2015.

2 Existing Wastewater Infrastructure

2.1 WASTEWATER TREATMENT PLANT

2.1.1 Description

The Coldwater WWTP is located at 1030 Upper Big Chute Road on a 2.3 ha Township property, as shown on Figure 1 overleaf.

The Coldwater WWTP consists of two package treatment plants: the original extended aeration plant (EA plant) and a sequencing batch reactor plant (SBR plant) added in 2006. Alum is added for phosphorus removal in each plant. The combined secondary effluent is disinfected by ultraviolet light (UV) in a common facility and discharged to a 430 m long outfall pipe to the Coldwater River. Biosolids are aerobically digested in each plant and stored in a common sludge storage tank before disposal by land application.

The existing WWTP's process flow diagram is presented on Figure PR-1 in Appendix A.

2.1.2 Approved Capacity

The WWTP operates under Certificate of Approval (CoA) No. 3832-6S2QCH dated August 2006 (attached in Appendix A).

The WWTP has a rated average day capacity of 921 m^3/day and a maximum daily flow capacity of 3,240 m^3/day. The EA plant has an average rated capacity of 546 m^3/day (59% of total). The SBR plant has an average rated capacity of 375 m^3/day (41% of total). The CoA does not specify the peak or maximum daily flow capacity of each plant.

2.1.3 Wastewater Flows

The WWTP influent flows for the past five years (2020 to 2024 inclusively) are summarized in Table 1.

In 2024, the WWTP was operating at 58% of its average rated capacity of 921 m^3/day, based on the influent flow data. The maximum daily influent flow in the past five years was 1,893 m^3/day, which corresponds to 67% of the WWTP's maximum daily flow capacity. The highest maximum day factor (ratio of maximum daily flow to average daily flow) in the past five years was 3.8.

The EA plant has been used on average at 80% of its capacity, while the SBR plant has been used at approximately 55% of its capacity. Overall, more wastewater is directed to the EA plant (68%) than to the SBR plant (32%).

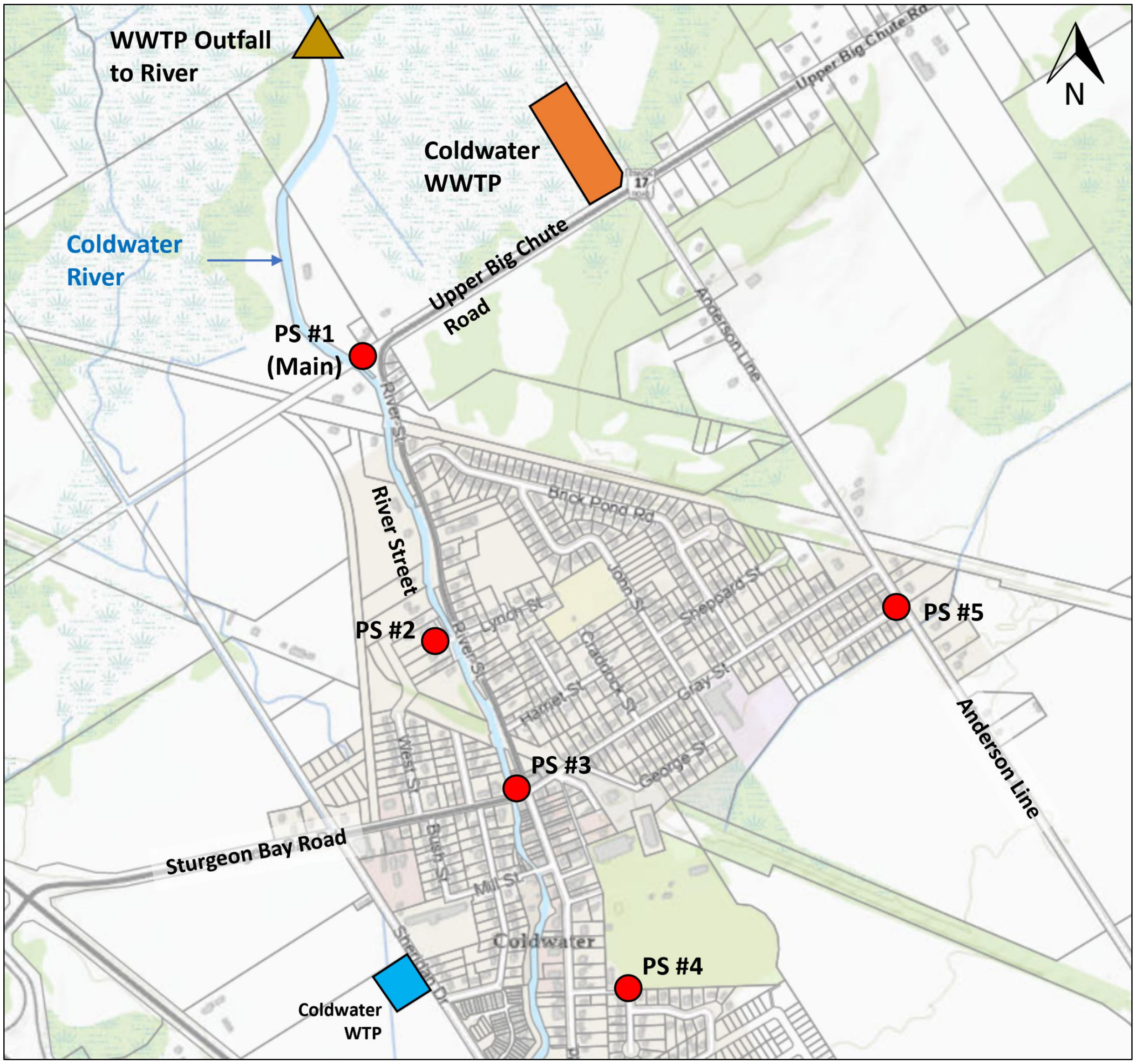

Figure 1: Coldwater WWTP and Main SPS Location Plan

Table 1: WWTP Historical Influent Flows (2020-2024)

	AVERAGE DAILY INFLUENT FLOW (m^3/d)	MAX DAILY FLOW (m^3/d)	MAX DAY FACTOR
2020	611	1,751	2.9
2021	528	1,893	3.6
2022	470	1,796	3.8
2023	626	1,745	2.8
2024	537	1,790	3.3
5-year average	**554**		3.3
5-year max		**1,893**	3.8
Rated Capacity	921	3,240	3.5

2.1.4 Treatment and Hydraulic Capacity of Process Units

The treatment and hydraulic capacities of each of the WWTP's process units were assessed to identify capacity constraints and determine if residual capacity (beyond their rated capacity) is available to support a WWTP expansion. This assessment is summarized in Table 2.

Overall, the existing EA plant and the SBR plant do not have residual capacity that would allow their rerating to a higher design flow, although some of their components, such as the EA plant's grit channels, could be operated at a higher flow.

The common UV disinfection system has no spare capacity, although a second UV channel is available for expansion.

The alum storage and metering system and the sludge storage tank can support an expansion.

Table 2: WWTP Process Unit Capacity Assessment

PROCESS UNIT	ACTUAL CAPACITY VS PLANT RATED CAPACITY	ESTIMATED RESIDUAL CAPACITY (m^3/day)
EA Plant		
Grit Channel	Has excess capacity	2,430 (PF)
Aeration Tank	No excess capacity	0
Clarifier	No excess capacity	0
SBR Plant		
Aeration tank	No excess capacity	0
Pumps	No excess capacity	0
Alum System		
Storage Tanks	Has excess capacity	1,842 (ADF)
Chemical Feed Pumps	Has excess capacity	460 (ADF)
UV System	No excess capacity	0
Sludge Storage	Has excess capacity	1,110 (ADF)

2.1.5 WWTP Treatment Performance

The performance of the WWTP from 2020 to 2024, for the parameters that have a compliance criterion or objective in the CoA, is summarized in Table 3. The WWTP performs well and consistently meets its objectives and compliance criteria.

Table 3: WWTP Performance (2020-2024)

PARAMETER	INFLUENT QUALITY (AVERAGE)	EFFLUENT QUALITY (AVERAGE)	OBJECTIVE	LIMIT
Total Suspended Solids (mg/L)	125	7	10	15
CBOD (mg/L)	119	2.9	10	15
Total Phosphorus (mg/L)	3.4	0.1	0.3	0.5
Ammonia - Summer (mg/L)		0.2	1	
Ammonia - Winter (mg/L)		0.8	3	
E. Coli (cfu)		9	200	

2.2 MAIN SEWAGE PUMPING STATION

Wastewater is pumped to the WWTP from the Main SPS, which is located at the intersection of River Street and Upper Big Chute Road, as shown on Figure 1.

In accordance with the CoA, the Main SPS is equipped with three pumps, two duty/one stand-by, with a firm pumping capacity of 18.8 L/s (1,624 m^3/day) with two pumps in operation.

The firm capacity of the SPS is lower than the maximum daily flow capacity of the WWTP (3,240 m^3/day).

The maximum daily influent flows recorded in the past five years (2020-2024), which reached 1,893 m^3/day, exceeded the SPS' firm capacity. More recently, on March 31, 2025, during an extreme wet weather event, the Township recorded an influent flow of 3,155 m^3/day, which significantly exceeded the capacity of the SPS.

Because of the SPS's insufficient pumping capacity, the Township frequently hauls sewage from the Main SPS to the WWTP during high flow periods to prevent overflows.

The Township indicated that historically, there have been isolated occurrences of overflows to the Coldwater River, although none in the 2020-2024 period. The March 2025 severe wet weather event caused an overflow.

3 WWTP Capacity Needs

This section presents the Coldwater population projections and the associated short term and longer term WWTP capacity needs.

3.1 EXISTING AND PROJECTED SERVICED POPULATION

3.1.1 Existing Population

The Coldwater population in 2025 is estimated at 1,900 persons, based on 707 water connections and an occupancy of 2.7 persons per unit.

3.1.2 Long-Term Population Projections

The current and future wastewater capacity allocation to development and infill properties within the Coldwater settlement boundaries as of February 2023, were provided by the Township to assist with the long-term population projections.

The projected numbers of Equivalent Residential Units (ERU) and associated populations at build-out are summarized in Table 4. The population projections are based on an occupancy of 2.7 persons per unit (ppu). As per Township requirements, an allowance for accessory units was added, corresponding to a 2.5% increase to the total number of new units. This calculation indicates Coldwater's total equivalent population could reach approximately 8,300 at build-out.

Table 4: Projected Serviced Equivalent Population at Build-out

	EQUIVALENT RESIDENTIAL UNITS	POPULATION
Existing (2019)	566	1,500
Allocated (as of 2023)	187	506
Future	2,261	6,103
Allowance for accessory units	61	165
Total	**3,075**	**8,274**

Note: Based on February 2023 projections from Township of Severn

Projections of future growth of the Coldwater community to the year 2051 were also developed for the Township's Servicing Master Plan (SMP). As per the Draft SMP, which was consulted for this EA, Coldwater's projected 2051 population is 3,113 and the ultimate serviced population is

3,750. This serviced population of 3,750 was selected to align the WWTP capacity with the Water Treatment Plant's capacity.

3.2 WASTEWATER GENERATION

3.2.1 Historical Wastewater Generation Rates

Considering the WWTP influent flow data from 2019 to 2024, and using estimated serviced populations, the calculated per capita average wastewater flows ranged from 276 L/capita/day to 394 L/capita/day, as shown in Table 5. The variation in the annual average flows is most likely caused by wet weather induced inflow and infiltration (I/I) in the sanitary system that has been observed by the Township and confirmed in the Coldwater Inflow and Infiltration Investigation report (Stantec, 2016).

Table 5: Estimated Per Capita Wastewater Flows

YEAR	ANNUAL INFLUENT ADF (m^3/day)	ESTIMATED SERVICED POPULATION	ESTIMATED PER CAPITA FLOW (L/cap/day)
2019	591	1,500[1]	394
2020	611	1,567	390
2021	528	1,633	323
2022	470	1,700	276
2023	626	1,767	354
2024	537	1,833	293
2025		1,900[1]	

1. Populations provided by Township from numbers of connections

3.2.2 Proposed Average per Capita Flow

Based on the above, it is recommended that planning of the WWTP expansion be based on an average per capita wastewater generation rate of 400 L/capita/day, which includes average I/I. This recommended value is higher than the Township's Engineering Standards for the sanitary system of 350 L/capita/day because the Coldwater historical data shows there have been years when the per capita wastewater flows have been high.

The proposed average per capita flow assumes realistically that the Township controls the I/I and achieves minor I/I reductions through repairs of the sanitary system. In the future, if wastewater flow data shows that the average generation rate is trending down because of lower

I/I contribution in new areas and of lower water consumption due to water conservation and low water use fixtures, the available capacity will allow a postponing of the next WWTP expansion phase.

3.2.3 Maximum Day Factor

In the past five years, the annual maximum day factor (ratio of maximum daily flow to average daily flow) ranged from 2.8 to 3.8, with an average of 3.3. Based on the CoA, the WWTP is rated for a maximum daily flow that corresponds to 3.5 times the average daily flow.

Upon review of the Coldwater Inflow and Infiltration Investigation report (Stantec, 2016), which found that the sewer system is affected by groundwater infiltration and inflow in the spring due to the higher groundwater table and snowmelt, and in consideration of the seasonal high flows at the WWTP, it is recommended that the maximum day factor used for the design of the WWTP expansion be higher than 3.5, which was used for the previous WWTP design. Although the domestic peak flows are expected to attenuate as the serviced population increases, I/I is not expected to be reduced significantly without major measures. Therefore, a maximum day factor of 4 is recommended to be used for the design of the WWTP expansion.

3.2.4 Peak I/I

For sizing the SPS expansion and the WWTP influent works, the Township Standards peak I/I rate of 0.23 L/ha/s should be used to estimate the peak instantaneous flow.

3.2.5 Summary

The recommended design criteria for the WWTP and SPS expansion are summarized in Table 6.

Table 6: Recommended WWTP and SPS Design Criteria

	CRITERIA
Domestic wastewater generation rate, incl. average I/I	400 L/cap/day
Maximum Day Factor	4
Peak I/I	0.23 L/s/ha

3.3 FUTURE WASTEWATER TREATMENT NEEDS

Considering the extent of proposed developments in Coldwater, it was agreed in discussion with the Township that in a first phase, the required Coldwater WWTP average day capacity should be 1,500 m^3/day, and the maximum daily flow capacity should be 6,000 m^3/day (using a maximum day factor of 4).

A Phase 1 expanded WWTP capacity of 1,500 m^3/day can service a total equivalent population of 3,750. This serviced population slightly exceeds the projected 2051 population of 3,113 but will match the servicing capacity of the Coldwater Water Treatment Plant, which can supply 3,750 customers at the historical water consumption rates (Civica, 2025).

As shown in Table 7, assuming Coldwater grows at an annual rate of 30 units/year, the existing WWTP can accommodate growth for the next 5 years, and a Phase 1 expanded capacity of 1,500 m^3/day could accommodate the next 28 years of growth.

Ultimately, a WWTP capacity of 3,000 m^3/day could be needed to service the build-out of the Coldwater community. Expansion in three phases is anticipated however will depend on the rate of development in Coldwater.

Table 7: Required WWTP Capacity and Phasing

EXPANSION PHASES	AVERAGE	MAX DAILY			
Existing WWTP	921	3,240	2,300	852	5
Phase 1	1,500	6,000	3,750	1,389	28
Phase 2	2,000	8,000	5,000	1,852	43
Phase 3	3,000	12,000	7,500	2,778	74

1. At a per capita flow rate of 400 L/cap/day
2. At 2.7 ppu
3. From 2025 estimated population of 1,900, and assuming a growth rate of 30 units/year

3.4 FUTURE MAIN SPS CAPACITY NEEDS

The capacity of the Main SPS needs to be increased to closely match the capacity of the Coldwater WWTP and ensure it can convey the peak instantaneous flow from its catchment area.

In the future, not all wastewater flows treated at the Coldwater WWTP will be pumped from the Main SPS. The Township is planning developments in a second catchment area to the southeast (Anderson Line). Wastewater flows from this development area will be pumped from a future SPS to the expanded WWTP. The WWTP expansion will therefore need to accommodate two influent forcemains.

4 Environmental Conditions

The environmental conditions near the Coldwater WWTP and Main SPS, and the Coldwater River in which the WWTP discharges its effluent, are presented in this section.

4.1 NATURAL ENVIRONMENT

4.1.1 Coldwater WWTP Site

The Coldwater WWTP is on a 2.3 ha Township property on the north side of Upper Big Chute Road, within a fenced area. The WWTP property is surrounded by wetlands, including portions of the Matchedash Bay Provincially Significant Wetland (PSW), as shown on Figure 2.

The property has manicured lawn, cultural meadow, and some forest and wetland on the eastern portion. A small portion of the on-site wetland is within the Matchedash Bay PSW. Further description of the vegetation is presented in the report by Michalski Nielsen (March 2023) in Appendix B.

Many Species at Risk (SAR) are known in this area, close to Georgian Bay. However, as indicated in the attached Michalski Nielsen report, "the substantially anthropogenic nature of the subject property, in combination with the entire site being fenced, largely eliminates habitat potential for most of these species within the property limits". There is potential for significant wildlife habitat, however the woodland and wetland areas on the property are a very small portion of the vegetation communities beyond the property boundaries.

The wetland within the property and a 15 m buffer is to be protected. Tree removal should be minimized and conducted between October and April to avoid impacts on breeding birds and potential bat roosting/maternity activities.

The WWTP site is outside of the Coldwater Water Treatment Plant wellhead protection areas (WHPAs).

4.1.2 Main SPS Site

The Main SPS is in a small grassed area adjacent to the road and approximately 30 m from the edge of the Coldwater River, where there is a boat launch. There are no natural environmental features near the site.

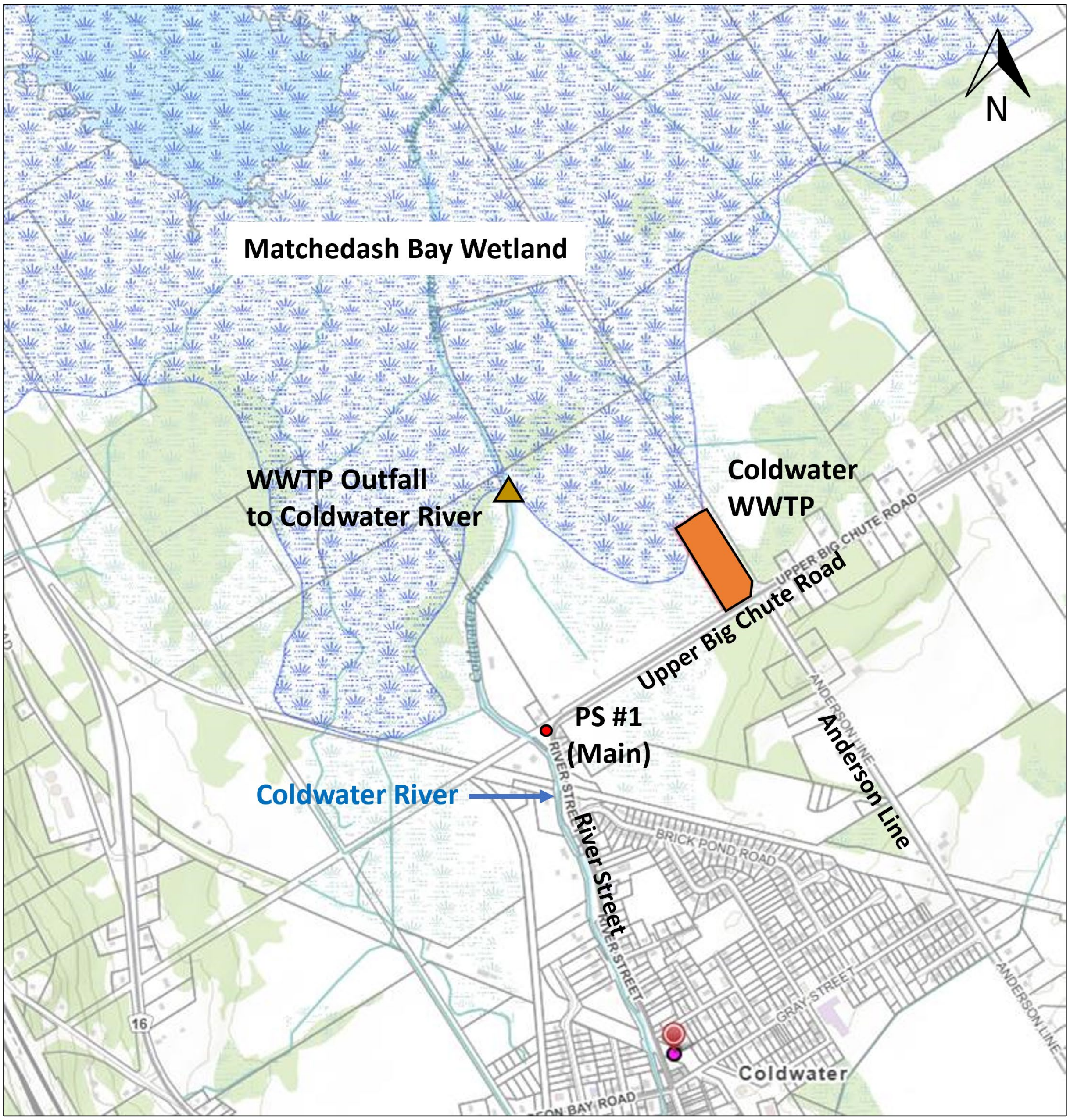

Figure 2: Natural Environment Features near Coldwater WWTP and Main SPS

4.1.3 Coldwater River

The Coldwater River is in the Severn Sound watershed. It flows from south to north through the village of Coldwater and discharges to Matchedash Bay of Georgian Bay.

Based on the Severn Sound Source Protection Area Approved Assessment Report, the Coldwater River has a total drainage area of approximately 191 km^2. Near its discharge to Matchedash Bay, the Coldwater River connects with the larger North River, which has a drainage area of 319 km^2.

The Coldwater River subwatershed is approximately 50% woodland. Most streams in the Severn Sound watershed, including Coldwater River, are considered cool to cold water. The Coldwater River has a relatively healthy benthic community structure.

The Coldwater WWTP's outfall to the Coldwater River is within a wetland area, north of the Village of Coldwater and approximately 500 m northwest of the Coldwater WWTP. Within this wetland area and 1.5 km downstream of the outfall, the North River joins with the Coldwater River.

Monitoring of the water quality in the Coldwater River was completed for this Class EA. Monitoring results are presented in Section 7.

4.2 ADJACENT LAND USES

4.2.1 Coldwater WWTP Site

The Coldwater WWTP property is surrounded by Environmental Protection designated lands to the west and north, and by agricultural land to the east. Immediately south on Upper Big Chute Road, the land is designated Rural. However, there are existing residential properties, and planned residential developments, to the southeast of the WWTP site.

4.2.2 Main SPS Site

The Main SPS is in a small open space between River Street and the Coldwater River, surrounded by access driveways to a municipal boat launch and residential properties to the north. Residential properties are also located southeast of the SPS site. Figure 3 shows the SPS location.

Figure 3: Main SPS Site

4.3 CULTURAL HERITAGE RESOURCES

4.3.1 Archaeological Resources

A Stage 1-2 archaeological property assessment was completed for the Coldwater WWTP site. The archaeological assessment report by Amick Consultants Limited is attached in Appendix C. The assessment determined that although the site has potential for sites relating to early post-contact settlements because it is in an area that is close to historic transportation routes and was well populated during the 19th century, and has potential for significant archaeological resources of native origins based on proximity to a source of water, no archaeological resources were encountered. The Stage 1-2 archaeological report's preliminary conclusions are that no further archaeological assessment is warranted. No ground-disturbing activities will be conducted until the report is entered into the Ontario Public Register of Archaeological Reports.

4.3.2 Built Heritage Resources and Cultural Heritage Landscapes

There is low potential for built heritage resources and cultural heritage landscapes at the WWTP and Main SPS sites based on the screening checklist "Criteria for Evaluation Potential for Built Heritage Resources and Cultural Heritage Landscapes" from the Ministry of Tourism, Culture and Sport attached in Appendix C. The oldest structure (sewage treatment EA tank) at the existing WWTP is about 50 years old, based on the 1975 date on the original CoA. The tank was refurbished in 2011. Therefore, no further technical cultural heritage study was completed.

5 Regulatory Context

5.1 ONTARIO WATER RESOURCES ACT

The construction and operation of wastewater treatment facilities in Ontario are regulated under the *Ontario Water Resources Act*, 1990. An Environmental Compliance Approval (ECA) must be obtained for the construction and operation of a new wastewater treatment facility or modifications and upgrades to existing facilities. The ECA sets site-specific environmental controls to protect human health and the natural environment.

5.2 SEVERN SOUND

The Township of Severn is not regulated by a Conservation Authority, but it is a partner municipality of the Severn Sound Environmental Association, which provides support to sustain environmental quality and protection of Severn Sound and its tributaries.

5.3 SOURCE WATER PROTECTION

Under the *Clean Water Act*, 2006, source water protection plans were developed to protect municipal water supplies from various threats including sewage works. The South Georgian Bay Lake Simcoe Source Protection Plan provides the source water protection plan for the Severn Sound Source Protection Area. It defined the WHPAs for the Coldwater municipal wells.

The groundwater vulnerability for the Coldwater drinking water supply was delineated, and the areas determined to contribute groundwater to the wells within the 25-year capture zone were defined as WHPA. The Coldwater WWTP and the Main SPS are outside the defined WHPAs and were not identified as potential Significant Drinking Water Threats.

6 Alternative Planning Solutions

To address the need for increased wastewater treatment and pumping capacity, alternative planning solutions were developed and assessed.

6.1 LIST AND DESCRIPTIONS

The following alternative planning solutions were considered:

1. **Do Nothing**

   This alternative is considered for comparison purposes. There would be no changes to the capacity of the existing SPS and WWTP. Residential and employment growth in Coldwater would be limited to the capacity of the existing WWTP that is estimated to be capable of servicing an equivalent population of 2,300. Therefore, the existing (2025) population of 1,900 could increase by approximately 400 persons. The Township could approve some growth in Coldwater but could not service all the development applications under review nor the build-out of the community within the settlement area limits. Alternatively, new growth beyond the capacity of the WWTP would need to be serviced by individual septic systems on-site.

   Do Nothing would not address the insufficient pumping capacity at the Main SPS. Haulage of wastewater by tanker truck from the Main SPS to the WWTP would continue to occur, and the risk of raw wastewater overflows from the Main SPS to the Coldwater River would increase.

2. **Reduce Wastewater Flows**

   With this alternative, the Township would take measures to reduce the wastewater flows, such as finding and controlling the extraneous flows that reach the sanitary sewers (inflow from sump pumps and direct connections, infiltration of groundwater through joints and cracks in sewers and maintenance holes) or encouraging water conservation through low water use fixtures.

   Some areas in Coldwater are known to have sanitary sewers that convey higher flows seasonally. To identify and mitigate the sources of extraneous flows, the Township would need to conduct a sanitary sewer inspection program and implement a repair and rehabilitation plan, as well as finding and disconnecting sump pump and other direct drainage connections. These measures would need to be recurring efforts to control I/I.

   The amount of extraneous flow reduction that can be achieved is difficult to estimate and is typically not permanent. As sewers age, the likelihood of I/I increases. Any reduction in influent flows to the Main SPS and WWTP achieved through I/I reduction measures will not offset the increase in wastewater flows from planned developments and growth. As a result, this alternative cannot be considered a solution on its own, but rather an approach that is included with the preferred solution.

3. **Expand Coldwater WWTP and Main SPS at their Current Sites**

This alternative consists of expanding the Coldwater WWTP on its current site on Upper Big Chute Road. The existing facilities on the site would continue to be utilized, and additional treatment units would be constructed as needed for the required additional capacity. The existing treated effluent outfall to Coldwater River would be maintained. The level of wastewater treatment would be increased to ensure that the increase in effluent flow discharged to the Coldwater River does not result in a deterioration of the river water quality. Design concepts for the WWTP expansion would be developed in the next phase of the Class EA. This alternative would involve multiple expansion phases to match the expected population and employment growth.

This alternative includes expanding the Main SPS, at its current location at the intersection of River Road and Upper Big Chute Road. The below-ground wet well would be expanded, and the pumps would be replaced with larger capacity pumps.

4. **Build a New WWTP and Expand the Main SPS**

4A. Build a New WWTP on the Existing Site

This alternative consists of replacing the existing Coldwater WWTP with a new facility on the existing site and expanding the Main SPS at its existing location. At the WWTP site, it would involve building new buildings and treatment facilities adjacent to the existing WWTP, which would be kept in operation until the new WWTP is commissioned. Then the redundant components of the existing WWTP would be demolished. The existing outfall would be maintained.

4B. Build a New WWTP on a New Site

This alternative consists of replacing the existing Coldwater WWTP with a new facility that would be built on a new site and expanding the Main SPS at its existing location. A potential WWTP site has not been investigated but would need to be near the existing WWTP to make use of the existing sanitary sewers and pumping system and to facilitate effluent discharge to the Coldwater River. The existing WWTP buildings and treatment tanks at the current site would be demolished.

6.2 ASSESSMENT

6.2.1 Evaluation Criteria

The following evaluation criteria were used to compare the alternative planning solutions.

Meet the objectives? Can the alternative solution address the need for additional wastewater pumping and treatment capacity? Can it do so reliably?

Coldwater River water quality. Does the alternative solution impact the Coldwater River's water quality, fisheries and aquatic habitat?

Vegetation and wildlife habitat. Does the alternative solution have the potential to impact any significant vegetation, woodland and wildlife and SAR habitat, or require removal of trees?

Archaeological and cultural heritage resources. Is there potential for archaeological findings in the areas where new facilities would be constructed? Are there built heritage resources and landscapes in the areas where new facilities would be located, that could be impacted by construction activities?

Technical feasibility/ease of implementation. Are there major technical constraints to implementation, and relative difficulty in construction? Compare the extent of infrastructure that needs to be constructed to implement.

Operation and maintenance requirements. Will the alternative solution change the extent of facility operation and maintenance effort?

Use of existing infrastructure. Will the alternative solution make use of existing facilities and infrastructure? Compare the extent to which existing wastewater infrastructure can be used.

Potential for phasing or future expansion. Can the alternative solution be implemented in phases? Does it provide opportunities for capacity increases in the future? Compare the opportunities for project phasing and future expansion.

Recreational or community facilities. Could the alternative solution, or its construction, impact the use of existing recreational amenities such as walking trails, snowmobile trails, boat launches, or other lands used for recreational activities?

Aesthetics. Does the alternative solution have potential visual impacts and/or potential for noise and odour to adjacent properties?

Road impacts. Does the alternative solution have the potential to increase truck traffic on Coldwater roads?

Property values. Does the alternative solution have potential impact on the value of existing and future properties near the new facilities?

Construction impacts. Will construction of the alternative solution have temporary impacts such as traffic disruption, noise, inconvenience?

Property requirements/land acquisition. Does the alternative solution require the purchase of additional land for its implementation?

Project costs. What are the expected relative capital and operating costs to implement the alternative solution?

Financial impacts on residents. Could the alternative solution have a financial impact on existing residents? What is the likely source of funding for the implementation of the solution?

Energy requirements and GHG reduction. Does the alternative solution offer an opportunity to reduce the Township's energy requirements and GHG emissions?

Climate change resiliency. Can the alternative solution improve the wastewater infrastructure's resiliency to effects from climate change?

6.2.2 Comparative Assessment and Preliminary Preferred Solution

Table 8 presents a comparative assessment of the alternative solutions. In summary:

- As the problem to be addressed is the need for wastewater capacity to service a significant amount of future growth in Coldwater, the Do Nothing alternative (Alt. 1), which would require growth to be limited, cannot be considered the appropriate solution.
- The extent of additional wastewater capacity needed is more than can be obtained by reducing I/I in the sanitary collection system. Therefore, reducing wastewater flows (Alt. 2) on its own is not a viable solution.
- The Coldwater WWTP site is sufficiently large to accommodate the required WWTP expansion for the anticipated population growth. Expanding the existing WWTP (Alt. 3) on the current site would not impact any significant natural, cultural or archaeological features as the site is already disturbed by past construction activity. It would not have significant impacts on residents due to the location of the WWTP away from the road. Expansion on the existing site would have the lowest capital costs, which would be paid through development charges from new homes, as the project is required to service growth.
- Building a new WWTP (Alt. 4) would have advantages over expanding the existing WWTP including providing more flexibility for construction and future expansion if needed, and more opportunity for designing a facility that produces less greenhouse gases, is more energy efficient, and more resilient to climate change.

- For Alt. 3 and Alt. 4, an increase in the wastewater effluent volume from a larger WWTP is not expected to negatively impact the quality of the Coldwater River if the level of wastewater treatment is increased to maintain river water quality.

Considering all factors, overall, the preliminary preferred solution is to expand the WWTP and Main SPS on their current sites. An I/I control program should also be implemented.

6.3 CONFIRMATION OF CLASS EA SCHEDULE

The preliminary preferred solution of expanding the Coldwater WWTP and Main SPS is considered a Schedule C undertaking in accordance with the MEA Class EA document. The Class EA needs to proceed through Phases 1 and 4 of the Class EA process.

Table 8: Comparative Assessment of Alternative Solutions

EVALUATION CRITERIA	ALT 1: DO NOTHING	ALT 2: REDUCE WASTEWATER FLOWS	ALT 3: EXPAND WWTP AND SPS AT EXISTING SITES	ALT 4: BUILD NEW WWTP AND EXPAND SPS	
				A. EXISTING WWTP SITE	B. NEW WWTP SITE
General					
Meet the objectives?	Does not address servicing needs for all anticipated growth.	Does not address servicing needs for all anticipated growth.	Can provide required pumping and treatment capacity.	Can provide required pumping and treatment capacity.	Can provide required pumping and treatment capacity
	Negative	Negative	Very positive	Very positive	Very positive
Environmental					
Coldwater River Water Quality	No changes to water quality of Coldwater River.	No changes to water quality of Coldwater River.	Wastewater treatment would be increased to improve effluent quality, ensuring minimal impact to Coldwater River water quality.	Wastewater treatment would be increased to improve effluent quality, ensuring minimal impact to Coldwater River water quality.	Wastewater treatment would be increased to improve effluent quality, ensuring minimal impact to Coldwater River water quality.
	No impact	No impact	Minor negative	Minor negative	Minor negative
Aquatic Resources and Habitat in Coldwater River	No changes to aquatic habitat in Coldwater River.	No changes to aquatic habitat in Coldwater River.	Low potential impact from increased effluent flow at outfall: effluent quality would be improved and meet or be better than PWQOs.	Low potential impact from increased effluent flow at outfall: effluent quality would be improved and meet or be better than PWQOs.	Low potential impact from increased effluent flow at outfall: effluent quality would be improved and meet or be better than PWQOs.
	No impact	No impact	Minor negative	Minor negative	Minor negative
Vegetation and Wildlife Habitat	No potential impacts to significant vegetation, woodland and wildlife habitats.	Sewer repairs or replacements in ROWs do not impact vegetation, woodland and wildlife habitats.	WWTP expansion could encroach on marsh, meadow and woodlands on site and may require tree removal. Main SPS is in fully developed area: no potential	New WWTP could encroach on marsh, meadow and woodlands on site. Potential for tree removal is high. Main SPS is in fully developed area: no potential impact on	New WWTP near existing WWTP could affect local wetlands or woodlands and require tree clearing. Main SPS is in fully developed area: no potential impact on

EVALUATION CRITERIA	ALT 1: DO NOTHING	ALT 2: REDUCE WASTEWATER FLOWS	ALT 3: EXPAND WWTP AND SPS AT EXISTING SITES	ALT 4: BUILD NEW WWTP AND EXPAND SPS	
				A. EXISTING WWTP SITE	B. NEW WWTP SITE
			impact on vegetation and wildlife habitat.	vegetation and wildlife habitat.	vegetation and wildlife habitat.
	No impact	No impact	Minor negative	Negative	Negative
Archaeological and Cultural Heritage Resources	No potential impacts to archaeological and cultural heritage resources.	No potential impacts to archaeological and cultural heritage resources.	Existing WWTP and Main SPS sites have no cultural heritage and archaeological resources.	Existing WWTP and Main SPS sites have no cultural heritage and archaeological resources.	Potential impacts to archaeological and cultural heritage resources on an undeveloped site.
	No impact	No impact	No impact	No impact	Negative
Technical					
Technical Feasibility/Ease of Implementation	Not applicable.	Sewer repairs and replacement are technically feasible and relatively easy to implement.	WWTP expansion can be built on existing site. Would involve WWTP modifications and staging to maintain WWTP in operation. Main SPS can be expanded with larger below-ground wet well and pumps.	New WWTP could be constructed while maintaining existing WWTP in operation. Space constraints may negatively affect construction. Main SPS can be expanded with larger below-ground wet well and pumps.	New WWTP could be constructed while maintaining existing WWTP in operation. Additional infrastructure would be required to connect to existing sewer system. Main SPS can be expanded with larger below-ground wet well and pumps.
	No impact	No impact	Minor negative	Minor negative	Negative
Use of Existing Infrastructure	Existing infrastructure continues to be utilized.	Existing sewers, SPS and WWTP would be used, except for replaced sewers.	Would use existing WWTP, Main SPS and forcemain.	Would not use most of existing WWTP. Would use existing Main SPS and forcemain.	Would not use existing WWTP. May not use ex. Main SPS, depending on new WWTP location.
	No impact	Very positive	Very positive	Minor negative	Negative

EVALUATION CRITERIA	ALT 1: DO NOTHING	ALT 2: REDUCE WASTEWATER FLOWS	ALT 3: EXPAND WWTP AND SPS AT EXISTING SITES	ALT 4: BUILD NEW WWTP AND EXPAND SPS	
				A. EXISTING WWTP SITE	B. NEW WWTP SITE
Operation and Maintenance Requirements	No changes.	No changes.	O & M efforts would increase with larger WWTP and new equipment.	O & M efforts would increase with larger WWTP and new equipment.	O & M efforts would increase with larger WWTP and new equipment.
	No impact	No impact	Minor negative	Minor negative	Minor negative
Potential for Phasing or Future Expansion	No potential for expansion.	No potential for expansion.	WWTP expansion would be phased to match growth. Space available on site for multiple expansions. Main SPS expansion could be phased with pump replacements.	New WWTP would be built in phases to match growth. Limited space for further expansions. Main SPS expansion could be phased with pump replacements.	New WWTP would be built in phases to match growth. New WWTP site would provide sufficient space for expansions. Main SPS expansion could be phased with pump replacements.
	Negative	Negative	Positive	Minor negative	Very positive
Socio-Economic					
Recreation or Community Facilities	No potential impacts.	No potential impacts.	No potential impact as WWTP would be expanded on existing site. Main SPS expansion could temporarily impact boat launch access.	No potential impact as WWTP would be expanded on existing site. Main SPS expansion could temporarily impact boat launch access.	Potential impact depending on selected WWTP site. Main SPS expansion could temporarily impact boat launch access.
	No impact	No impact	No impact	No impact	Minor negative
Aesthetics	No potential impacts.	No potential impacts.	Low potential impacts from new WWTP as existing site is not near residences, and Main SPS expansion would be below-ground.	More potential impacts because new WWTP structures would be closer to the road. Main SPS expansion would be below-ground.	Potential impacts depend on selected WWTP site.
	No impact	No impact	Minor negative	Negative	Minor negative

EVALUATION CRITERIA	ALT 1: DO NOTHING	ALT 2: REDUCE WASTEWATER FLOWS	ALT 3: EXPAND WWTP AND SPS AT EXISTING SITES	ALT 4: BUILD NEW WWTP AND EXPAND SPS	
				A. EXISTING WWTP SITE	B. NEW WWTP SITE
Traffic/Road Impacts	No potential impacts.	No potential impacts.	Minor increase in traffic due to increase in sludge haulage from expanded WWTP.	Minor increase in traffic due to increase in sludge haulage from expanded WWTP.	Potential traffic impacts to different roads depending on selected WWTP site.
	No impact	No impact	Minor negative	Minor negative	Minor negative
Property Values	No potential impacts.	No potential impacts.	No potential impact on property values as WWTP expansion site is not near residences and Main SPS expansion would be below-ground.	No potential impact on property values as WWTP expansion site is not near residences and Main SPS expansion would be below-ground.	Potential impact depending on selected WWTP site.
	No impact	No impact	No impact	No impact	Minor negative
Construction Impacts	No potential impacts.	Sewer repairs or replacement may cause temporary traffic disruptions and inconvenience.	Expansion of WWTP and Main SPS may cause temporary traffic disruptions and inconvenience.	Construction of WWTP and expansion of Main SPS may cause temporary traffic disruptions and inconvenience.	Construction of WWTP and expansion of Main SPS may cause temporary traffic disruptions and inconvenience.
	No impact	Minor negative	Minor negative	Minor negative	Minor negative
Property Requirements/Land Acquisition	No land acquisition required.	No land acquisition required.	No land acquisition required.	No land acquisition required.	Land acquisition would be required.
	No impact	No impact	No impact	No impact	Negative
Relative Project Costs	No costs.	Replacement of sewers has relatively low cost.	Expansion of existing WWTP has medium-high cost.	Replacement of WWTP and decommissioning of existing WWTP has high costs.	Replacement of WWTP has highest cost because of land acquisition, site preparation, additional sewers and forcemain.
	No impact	Very positive	Positive	Minor negative	Negative

EVALUATION CRITERIA	ALT 1: DO NOTHING	ALT 2: REDUCE WASTEWATER FLOWS	ALT 3: EXPAND WWTP AND SPS AT EXISTING SITES	ALT 4: BUILD NEW WWTP AND EXPAND SPS	
				A. EXISTING WWTP SITE	B. NEW WWTP SITE
Financial Impacts on Residents	No potential impacts.	Replacement of sewers has relatively low cost to existing residents.	WWTP and SPS expansions for growth are paid through DCs. No costs to existing residents.	Replacing existing WWTP would have costs to existing residents and to developers through DCs.	Replacing existing WWTP would have costs to existing residents and to developers through DCs.
	No impact	Positive	Very positive	Negative	Negative
Energy Requirements and GHG Reduction	No potential improvements.	No potential improvements.	Expanded WWTP and SPS would use more energy for operation. Design would provide opportunity to reduce GHG emissions.	Larger WWTP and SPS would use more energy for operation. Design would provide opportunity to improve energy efficiency and reduce GHG emissions.	Larger WWTP and SPS would use more energy for operation. Design would provide opportunity to improve energy efficiency and reduce GHG emissions.
	No impact	No impact	Positive	Positive	Positive
Climate Change Resiliency	No potential impacts.	Sewer repairs and replacement would reduce impacts of more severe wet weather events on flows.	WWTP and SPS expansions would provide opportunity to build in climate change resiliency.	WWTP replacement and SPS expansion would provide more opportunities to build in climate change resiliency.	WWTP replacement and SPS expansion would provide more opportunities to build in climate change resiliency.
	No impact	Positive	Positive	Very positive	Very positive

7 Effluent Quality Requirements

A receiving water assessment for the discharge of effluent to the Coldwater River was completed and submitted to MECP to assist in developing the effluent quality requirements for the expanded WWTP. The Receiving Water Assessment Report (Tatham, 2024) is attached in Appendix D. The parameters of the assessment, consultation with MECP, and selected effluent quality criteria for the proposed Phase 1 WWTP expansion to a capacity of 1,500 m^3/day, are summarized below.

7.1 COLDWATER RIVER FLOWS

The flows in the Coldwater River were obtained from the Water Survey Canada gauge located in Coldwater that is approximately 1.5 km upstream of the WWTP outfall.

Based on the 1992 to 2022 data at this WSC gauge, the 20-year low flow (annual minimum 7-day streamflow that is exceeded in 19 out of 20 years on average, or 7Q20) at the Coldwater River WSC gauge is 0.75 m^3/s. Considering the potential impacts of climate change, the Coldwater River 7Q20 flow was reduced by 10% to 0.675 m^3/s for the receiving water assessment.

A WWTP Phase 1 expansion effluent flow of 1,500 m^3/d (0.0174 m^3/s) will correspond to 2.5% of the 7Q20 low flow of 0.675 m^3/s. In the future, when the WWTP is expanded to 3,000 m^3/day, the effluent flow will correspond to 5% of the 7Q20 low flow.

7.2 COLDWATER RIVER WATER QUALITY

7.2.1 Provincial Water Quality Data

Data from the Provincial (Stream) Water Quality Monitoring Network station at County Road 17 in Coldwater was analyzed to characterize the background water quality upstream of the Coldwater WWTP outfall and compare it with the Provincial Water Quality Objectives (PWQO) and the Canadian Water Quality Guidelines for the Protection of Aquatic Life (CWQG). This monitoring station is approximately 2 km upstream of the WWTP outfall. The data indicates the following:

- The river's Total Phosphorus (TP) 75^{th} percentile concentration of 0.0235 mg/L is below the PWQO of 0.03 mg/L; therefore, the river is considered a Policy 1 receiver for phosphorus.
- The Dissolved Oxygen (DO) 25^{th} percentile level is 10.52 mg/L, which is above the PWQO of 5 to 8 mg/L for coldwater streams. The Coldwater River is considered a Policy 1 receiver for dissolved oxygen.

- In the May to October period, the calculated unionized ammonia concentration ranged from 0.0005 mg/L to 0.0007 mg/L, which is below the PWQO of 0.02 mg/L (0.0164 mg/L as N). Therefore, the Coldwater River is considered a Policy 1 receiver for unionized ammonia.
- The river's 75th percentile concentration of suspended solids is 6.51 mg/L.
- The nitrate levels are well below the CWQG of 3 mg/L.

As the Coldwater River is a Policy 1 receiver, water quality must be maintained at or above the PWQOs.

7.2.2 Water Quality Monitoring for Study

The water quality of the Coldwater River was also measured for this Class EA at six monitoring stations on four dates over a one-year period: June 30, 2021, August 24, 2021, October 29, 2021, and March 10, 2022. Three of the monitoring stations were upstream of the WWTP outfall, and three stations were downstream of the WWTP outfall. The 2021-2022 water quality data for all sampling locations is presented in the receiving water assessment report in Appendix D.

The 2021-2022 monitoring data was compared with the data previously collected in 1989-1990 at the same monitoring locations. This indicates the WWTP effluent discharge has had minor impacts on the river's water quality. In summary, the 2021-2022 river water quality data shows that:

- The mean TP concentration downstream of the outfall was 0.024 mg/L. TP levels increased downstream of the outfall in both the 2021-2022 and the 1989-1990 data sets, however they were at or below the PWQO, except in March 2022.
- The DO downstream of the outfall was slightly lower than upstream of the outfall, but still above 10 mg/L and the PWQO for cold water streams, except in August 2021 when the river had significantly lower DO levels both upstream and downstream of the WWTP outfall.
- The mean ammonia level was higher downstream of the outfall, potentially because of the WWTP effluent discharge. The calculated un-ionized ammonia concentrations were well below the PWQO of 0.0164 mg-N/L. Mean ammonia levels in the river were lower in 2021-2022 than they were in 1989-1990.
- The WWTP effluent discharge does not appear to be a significant contributor to suspended solids in the river. Suspended solids downstream of the WWTP outfall were in some cases lower than upstream, and when they were higher (summer and fall), the increment was less than 2.7 mg/L, which meets the CWQG criterion of a maximum increase in Total Particulate Matter of 5 mg/L above background levels.

7.3 MASS BALANCE MODELLING

Mass balance calculations were completed to determine the effluent quality that is required to ensure the downstream receiving water quality is maintained below the PWQOs and the increase in suspended solids meets the CWQG. These calculations were completed for three potential expansion phases, to 1,500 m^3/day, 2,250 m^3/day and 3,000 m^3/day.

In summary, the results of the mass balance modelling indicated that:

- WWTP effluent TP concentration must be reduced from the current limit to maintain river water quality at or below the PWQO.
- Effluent suspended solids must also be reduced to maintain the current levels downstream of the outfall and meet the CWQG suggested maximum increase above background levels.
- Effluent Biological Oxygen Demand (BOD_5) should also be lower to ensure the river's high DO level of 10 mg/L is maintained after the WWTP is expanded, thus keeping current conditions for aquatic biota.
- In the critical May to October period, the WWTP effluent ammonia concentration should not exceed 5 mg/L at a flow of 1,500 m^3/day to ensure the PWQO is met. Lower ammonia levels must be met as the WWTP is further expanded.

7.4 EFFLUENT QUALITY CRITERIA

The Receiving Water Assessment Report was submitted in January 2025 to MECP EA Coordinator and to the Water Resources Unit, Central Region, for input on the proposed effluent quality criteria presented in the report.

Following meetings and correspondence with the MECP and the Township regarding the proposed effluent quality criteria and the impacts on the Coldwater River, on March 6, 2025, MECP agreed with the proposed effluent quality objectives and limits summarized in Table 9 for a WWTP expansion to 1,500 m^3.day.

Effluent quality criteria for the next expansion phases were not discussed in any detail with MECP because of the long timeline to the next expansion. Further consultation with MECP will be required. The effluent quality criteria will be more stringent as the WWTP capacity increases to minimize the impacts of higher effluent flows on the Coldwater River's water quality.

Table 9: Proposed Effluent Quality Criteria for Phase 1 WWTP Expansion

PARAMETER	EFFLUENT OBJECTIVE (mg/L)	EFFLUENT LIMIT (mg/L)	EFFLUENT ANNUAL LOADING (kg/year)
$CBOD_5$	5	10	
Total Suspended Solids	5	10	
Total Phosphorus	0.12	0.18	66
Ammonia Nitrogen (Summer)	1.0	2.0	
Ammonia Nitrogen (Winter)	3.0	6.0	

8 Alternative Design Concepts

8.1 WWTP EXPANSION CONFIGURATION

To meet the effluent quality criteria and provide process reliability and resiliency, the expanded WWTP is proposed to have the following main components:

- Common headworks facility for influent flow equalization, screening, and flow splitting. A septage receiving facility is proposed to be added.
- New secondary treatment units, and use of existing package plants on an interim basis.
- Common existing chemical feed facility.
- New common tertiary filtration facility.
- Expanded common UV disinfection facility.
- Common existing sludge management facility.

Alternative technologies for pre-treatment, secondary treatment, and tertiary filtration were assessed for suitability for implementation at the Coldwater WWTP. The following sections discuss appropriate technologies, present their comparative assessments, and recommend the preliminary preferred approaches for the three treatment stages.

8.2 PRE-TREATMENT ALTERNATIVES

Currently, pre-treatment at both the EA plant and the SBR plant consists of manual bar screens only. The existing SBR plant is equipped with a screen conveyor that is not in use. The existing EA plant's comminutor has been removed and cannot be replaced; the grit channel is not utilized.

Discussions with the WWTP operators revealed that the influent's grit content has been minimal; most of the grit settles in the upstream pumping stations, from where it is regularly removed. Therefore, options for screening were considered for the Class EA, as described below. Grit removal channels will be considered at the detailed design phase.

8.2.1 Screening Options

Screening is required to remove large solids, such as plastics, rags, and other debris, that could interfere with the downstream treatment processes and pumps. Screening improves overall operational efficiency by reducing the risk of equipment damage, clogging, and maintenance issues, while enhancing the quality of the treated effluent.

The following three screening options, suitable for small WWTPs, were considered.

Option 1- In-Channel Conveyor Screen

An in-channel conveyor screen is a fully automated device that is widely used and well established for pre-treatment in municipal wastewater facilities. It integrates screening, conveying solids, and dewatering in one system. Wastewater flows through a perforated screening surface. The captured solids are conveyed and dewatered typically through compression in a dewatering zone. Dewatered solids are captured in a bin for disposal. It is typically designed with a bypass manual bar screen to ensure uninterrupted screening if the conveyor screen is offline.

For the Coldwater WWTP, this option would consist of the following components:

- One channel with an in-channel conveyor screen, which provides fine screening though a perforated tube or plate.
- A screening basket for disposal of the dewatered solids.
- A second parallel channel with a manually cleaned and operated bypass screen.

The in-channel conveyor screen installed upstream of the SBR tank is not in use due to maintenance issues. Cold weather, along with the expansion and contraction of metal parts, has led to multiple repairs of the mechanical components. To mitigate this, the conveyor screen has been covered, however, difficulty remains in accessing parts. Accordingly, for the WWTP expansion, a conveyor screen would be installed indoors in a heated and well-ventilated area.

The estimated cost to supply and install an in-channel conveyor screen with a parallel manual bar screen, with a peak flow capacity of 6,000 m^3/day, including the concrete channels, is $450,000. This estimated cost excludes the building in which the screen would be housed, and all associated electrical and mechanical costs. The estimated operating cost for electricity and labour is $23,000/year.

Option 2- Manual Bar Screen

With manual bar screens, operators are responsible for physically cleaning the screens, removing accumulated debris, and disposing of the screenings, to maintain an uninterrupted flow of wastewater.

For the Coldwater WWTP expansion, two manual bar screens (duty/standby) would be installed in two parallel bar screen channels each sized to handle the design peak flow. The bar screens would have 12 mm spacing, as per the existing WWTP's bar screen spacing. Although manual bar screens can be installed outdoors, for the Coldwater WWTP expansion, manual bar screens would be installed indoors in a heated and well-ventilated area.

The estimated cost to supply and install two bar screens, including the concrete channels, is $150,000. This estimated cost excludes the building in which the screen would be housed, and all associated electrical and mechanical costs. The estimated operating labour cost is $36,000/year.

Option 3- Rotary Drum Screen

A rotary drum screen is an automated rotating perforated cylindrical drum that rotates on an axis to provide continuous fine screening. As wastewater flows through the perforated drum, solids are retained on the interior surface of the drum and are subsequently removed through mechanical scraping or using a washing mechanism. Similarly to a conveyor screen, continuous operation reduces maintenance and cleaning requirements.

A rotary drum screen requires more space than a manual or conveyor screen. It is a high capacity and higher energy system that is more suitable for larger treatment plants. Since the other options can provide adequate screening with a smaller footprint and lower cost, rotary drum screens were not evaluated further.

8.2.2 Assessment and Preliminary Preferred Screening Design Concept

Table 10 overleaf compares the two screening options described above. In summary, the main advantages and disadvantages of each option are:

- **Option 1 - In-channel conveyor screen**. An in-channel conveyor screen is automated and combines screening, conveying, and dewatering. It minimizes manual intervention and can improve operational efficiency. It provides fine and coarse screening. As it is susceptible to freezing, it needs to be housed in a building. It has a higher capital cost than a manual bar screen.
- **Option 2 - Manual bar screen**. A manual bar screen offers a cost-effective and straightforward method for debris removal and can handle large flow volumes at a low capital cost. However, it is labor-intensive, requiring operator diligence to clean and maintain. Their operational efficiency depends on the frequency of cleaning, and there are some concerns with worker safety.

The preliminary preferred option is to use an in-channel conveyer screen with a parallel bypass bar screen, for the following reasons:

- As the WWTP is expanded, an automated screening system will reduce labour for manual cleaning and handling of debris.
- Providing parallel manual bar screen and conveyor screen provides flexibility.
- A conveyor screen provides a fine screen for the removal of smaller solids.

- The WWTP operators are familiar with the equipment, operation and maintenance.
- Issues experienced at the WWTP with the outdoor SBR conveyor screen will be addressed by housing the screening equipment in a heated and ventilated building and by selecting equipment with the input of the operators.

8.3 SECONDARY TREATMENT ALTERNATIVES

The secondary treatment process selected for the Coldwater WWTP expansion must be capable of achieving the required effluent quality criteria for ammonia and BOD_5. Total phosphorus and TSS removal must also be achieved at the secondary treatment stage through chemical precipitation and settling in the secondary clarifier.

8.3.1 Secondary Treatment Options

Secondary biological treatment processes that are applicable to small WWTPs and that can achieve the effluent quality criteria were considered as described below. Package plants were considered.

Option 1 – Extended Aeration

The extended aeration (EA) activated sludge process is a variant of the conventional activated sludge process. Following screening, wastewater is discharged into a completely mixed aeration tank that contains suspended biomass for the biological digestion of organic matter. The aeration tank's mixed liquor is settled in a clarifier. Part of the settled sludge is returned to the aeration tank; the remainder is wasted to a sludge tank for further treatment and disposal.

The EA activated sludge process is very common for small WWTPs because they require a smaller footprint than conventional activated sludge plants as they do not have primary clarifiers, and because the process produces less biosolids for disposal. The original Coldwater WWTP built in the 1970s is a package EA plant that is still in operation.

For this option, a package EA plant for the Phase 1 WWTP expansion would consist of two 750 m^3/day biological treatment trains, each consisting of one rectangular aeration tank with a fine bubble aeration system; one rectangular clarifier with a sludge collection system; two submersible waste sludge transfer pumps for sludge recirculation, and actuated plug valves. The tanks would be reinforced concrete structures for durability. The overall footprint for two 750 m^3/day trains is approximately 590 m^2. The aeration and clarification tanks would not be covered, similarly to the existing EA plant.

Table 10: Assessment of Alternative Screening Options

EVALUATION CRITERIA	IN-CHANNEL CONVEYOR SCREEN	MANUAL BAR SCREEN
Process Description	Shaftless spiral mechanism that screens, conveys, and dewaters in one compact system.	Debris collected on the bar screen and manually removed and disposed of.
Perforation Size	3 mm to 6 mm. .	6 mm to 25 mm..
	Fine screening	Coarse screening
Power Requirements	1 kWh	No power requirements
	Low	None
Required Footprint	Approx. 14 m^2	Approx. 11 m^2
	More space	Less space
O & M Requirements	Fully automated. Routine maintenance. Operators are familiar with O&M requirements.	Manual removal of solids. Routine maintenance. Operators are familiar with O&M requirements.
	Automated	Manual
Similar Applications	Common	Used at most sewage treatment plants
	Common	Common
Potential Odour and Aesthetic Impacts	Conveyor screen is in stainless-steel tube, which would be inside ventilated building with odour control unit, minimizing odours. Minimal noise. Building's visual impacts can be minimized with architectural design and landscaping.	Screen would be in ventilated area inside building with odour control unit, minimizing odours. No noise. Building's visual impacts can be minimized with architectural design and landscaping.
	Low potential impact	Higher potential impact
Potential Environmental Impacts	Debris disposed in landfill.	Debris disposed in landfill.
	Low potential impact	Low potential impact
Estimated Equipment Cost/Screen	$450,000, for one conveyor screen and one manual screen	$ 150,000 for two manual screens
	Higher cost	Lower cost
Estimated Labour and Electricity Costs	$23,000/year	$ 36,000/year
	Lower O&M cost	Higher O&M cost

Each EA train would require two 10 hp aeration blowers (duty/standby). The existing Disinfection/Blower Building has an area for a future blower; however, this area is insufficient. A new building will be required to house blowers for Phase 1 and subsequent WWTP expansions. Waste sludge will be pumped to the existing sludge storage tank. A package EA plant lends itself to a modular design for further expansion of the Coldwater WWTP.

The estimated cost for the supply and installation of two 750 m^3/day EA trains, including the blowers, controls, concrete tankage and associated site works, is $5.8 M. This estimated cost excludes the building in which the blowers would be housed and the associated electrical and mechanical costs. The estimated annual operating cost, for electricity labour and maintenance, is $67,000 per year.

Option 2 - Sequencing Batch Reactor

A sequencing batch reactor (SBR) system utilizes the extended aeration activated sludge treatment process but treats wastewater in batches using a fully automated fill-and-draw sequence. It provides aeration and settling within the same tank.

The SBR process has become more common in the past 20 years. The Coldwater WWTP was expanded in 2006 using a package SBR plant, which remains in operation.

The SBR option for the WWTP Phase 1 expansion would consist of two 750 m^3/day trains, each with one rectangular SBR tank with a fine bubble aeration system, a decanter assembly and two submersible sludge transfer pumps for sludge recirculation. The tanks would be concrete structures. The approximate overall footprint for two 750 m^3/day SBR trains is 480 m^2. The SBRs would not be covered, like the existing SBR on site.

Each SBR train would require two 30 hp aeration blowers (duty/standby). Like Option 1, the existing dedicated area for a future blower in the Disinfection/Blower Building is insufficient. A new building will be required to house blowers for Phase 1 and subsequent WWTP expansions. Waste sludge would be pumped to the existing sludge storage tank. A package SBR plant lends itself to a modular design for further expansion of the WWTP.

The estimated capital cost for two 750 m^3/day SBR trains, including the blowers, controls, concrete tankage and associated site works, is $4.5 M. This estimated cost excludes the building in which the blowers would be housed and the associated electrical and mechanical costs. The estimated annual operating cost, including electricity, labour and maintenance, is approximately $83,000 per year.

Option 3 - Moving Bed Biofilm Reactor

The moving bed biofilm reactor (MBBR) process is like the extended aeration activated sludge process in that it consists of an aeration tank and a clarifier. However, a MBBR utilizes plastic media carriers that are kept in suspension in the aeration tank to provide a surface on which biomass can attach and grow. The plastic media carriers maximize the biomass within the tank, thus allowing for more organic material digestion and ammonia reduction than in an EA system. A MBBR does not need to return activated sludge from the clarifier to maintain an active biomass as the bacteria populations are regenerated directly on the media surface. Attached biomass is considered more resilient to fluctuations in wastewater flow and quality.

MBBR systems are mainly used where available space is limited as the aeration tank can be smaller than for an EA plant for the same effluent quality due to higher performance. MBBRs are used more frequently for industrial wastewater applications due to their ability to treat high strength wastewater in a small footprint.

The MBBR option for the WWTP Phase 1 expansion would consist of two 750 m^3/day trains, each with a three-stage MBBR rectangular tank with a coarse bubble aeration system and a media retention screen to prevent plastic media from moving downstream; a mixing chamber for coagulant dosing; and a rectangular secondary clarifier with a sludge collection mechanism. The tanks would be concrete structures. The overall footprint required for a 750 m^3/day MBBR train is approximately 390 m^2. The tanks would typically be open to the atmosphere.

Each MBBR train would require two 50 hp aeration blowers. Like Option 1, a new building would be required to house blowers for Phase 1 and subsequent WWTP expansions. Waste sludge would be pumped to the existing sludge storage tank. The operation and maintenance requirements for an MBBR facility are like the requirements for an EA plant.

The estimated capital cost for two 750 m^3/day MBBR trains, including blowers, controls, concrete tankage and associated site works, is $8.2 M. This estimated cost excludes the building in which the blowers would be housed and the associated electrical and mechanical costs. The estimated annual operating cost, including electricity, labour and maintenance, is $182,000 per year.

Option 4 - Membrane Bioreactor

A membrane bioreactor (MBR) is a fully automated activated sludge process that uses ultrafiltration membranes instead of a clarifier for suspended solids removal. The MBR is a completely mixed aeration tank with suspended biomass growth for biological treatment. The membranes perform solid-liquid separation to keep the biomass and solids inside the bioreactor and allow the treated effluent to pass through. An MBR can produce a very high effluent quality within a small footprint.

The MBR option was not carried further as a viable option in this assessment due to its high cost, high complexity, and high energy requirement, all of which are typically considered when very stringent effluent quality limits must be met and where there is limited available space. The Coldwater WWTP effluent quality that needs to be achieved to protect the Coldwater River does not require a very high level of treatment and its associated high capital and operating costs, nor does the WWTP site have significant space constraints.

8.3.2 Assessment and Preliminary Preferred Secondary Treatment Design Concept

The options of expanding the WWTP with EA, SBR, and MBBR plants were assessed based on technical, environmental, socio-economical, and financial aspects, as presented in Table 11. In summary, the main advantages and disadvantages of each process are:

- **Option 1 - Extended Aeration.** The EA option can provide the level of organic and ammonia treatment to achieve the required effluent quality. It requires a small overall footprint. The Coldwater WWTP operators are familiar with the operation and maintenance of EA plants and are satisfied with their performance and ease of operation.
- **Option 2 - Sequencing Batch Reactor.**_ The SBR option can provide the required level of treatment and effluent quality. It requires a smaller footprint than an EA plant. It has the lowest capital cost and operating costs. Coldwater WWTP operators find the SBR plant more difficult to operate and maintain than the EA plant.
- **Option 3 - Moving Bed Biofilm Reactor.** An MBBR can provide the required level of treatment and effluent quality and is resilient to influent flow and quality fluctuations. It has the highest capital cost and the highest operating cost due to the energy required to keep the plastic carriers in suspension. Operation and maintenance requirements are otherwise like an EA plant.

Each option will require a building to house the blowers and the controls. Each option can be implemented on the WWTP site.

The preliminary preferred option is the EA option, for the following reasons:

- The EA offers more flexibility and resilience to flow fluctuations.
- Operators are familiar with the EA process and equipment and prefer it over the SBR due to its simplicity.
- It has similar operating costs to the SBR option.
- Although it is not the most compact system, the WWTP site has sufficient space for future expansions using EA plants.
- It can be maintained with locally sourced system components and service.

Table 11: Assessment of Alternative Secondary Treatment Options

EVALUATION CRITERIA	EXTENDED AERATION (EA)	SEQUENCING BATCH REACTOR (SBR)	MOVING BED BIOFILM REACTOR (MBBR)
Process Description	Fully automated activated sludge process with aeration and clarification tanks.	Fully automated activated sludge process operating in batches (fill & draw) in one tank.	Fully automated activated sludge process, with suspended plastic media in aeration tank.
Achievable Effluent Quality	BOD & TSS: 5 to 10 mg/L TP: 0.15 mg/L; TN: 1 to 5 mg/L	BOD & TSS: 5 to 10 mg/L TP: 0.15 mg/L; TN: 1 to 5 mg/L	BOD & TSS: 5 to 10 mg/L TP: 0.15 mg/L; TN: 1 to 5 mg/L
	Good	Good	Good
Treatment Reliability	Reliable process with competent operation and maintenance.	Reliable process with competent O&M. Parameters can be adjusted to optimize performance.	Reliable process with competent operation and maintenance.
	Reliable	Reliable	Reliable
Ability to Handle Influent Peak Flows	Large aeration tank attenuates influent flows.	Limited capacity for variation by adjusting timers for fill and draw.	Large aeration tank attenuates flows. High flows will not wash out biomass.
	Good	Limited	Good
Ability to Handle Influent Low Flows	Process and tank can accommodate longer retention time associated with low flows.	SBR requires minimum flow/volume for good process performance.	Process can operate at low flows. Attached biomass can adapt to lower influent loading.
	Good	Limited	Good
Treatment Complexity	Simple process, well known to operators. Includes sludge recirculation and wasting.	Moderate complexity due to batch operation and automated control of fill & draw system.	Simple process, similar to EA. Sludge recirculation not required.
	Simple	More complex	Simple
Blower Size	7.5 kW (10 hp)	22 kW (30 hp)	37.3 kW (50 hp)
	Small	Medium	Large
Level of Automation	No automation needed. Flow through system.	Fully automated batch process.	No automation needed. Flow through system.
	Minimal	Full	Minimal
Biosolids Production	Provides some aerobic digestion. Estimated sludge production: 11.7 m^3/d at 0.85%.	Provides some aerobic digestion. Estimated sludge production: 12 m^3/d at 0.85% solids.	Provides some aerobic digestion. Estimated sludge production: 45 m^3/d at 0.80% solids.
	Low	Low	More
Required Footprint	590 m^2	480 m^2	390 m^2
	Largest	Smaller	Smallest

EVALUATION CRITERIA	EXTENDED AERATION (EA)	SEQUENCING BATCH REACTOR (SBR)	MOVING BED BIOFILM REACTOR (MBBR)
Power Requirements	800 kWh	600 kWh	2400 kWh
	Low	Lowest	Highest
Operation and Maintenance Requirements	O&M for blowers, sludge pumps, actuated valves, sludge removal mechanism. Can be sourced locally. Operators are familiar with O&M.	O&M for blowers, sludge and transfer pumps, decanter drive. Most can be sourced locally. Operators are familiar with O&M.	O&M for blowers, sludge removal mechanism, sludge pumps. Plastic media needs replenishment. Operators are unfamiliar with O&M.
	Less	Less	More
Similar Applications in Ontario	Very common in Ontario	Common in Ontario	Common in industrial applications.
	Most Common	Common	Not common
Potential Environmental Impacts	Can meet effluent quality to protect Coldwater River. Biosolids disposed at approved land application site.	Can meet effluent quality to protect Coldwater River. Biosolids disposed at approved land application site.	Can meet effluent quality to protect Coldwater River. Biosolids disposed at approved land application site.
	Low Potential Impact	Low Potential Impact	Low Potential Impact
Potential Noise, Odour & Aesthetic Impacts	Built near other structures away from road. Blowers will be in building. Outdoor tanks could cause minor odour.	Built near other structures away from road. Blowers will be in building. Outdoor tanks could cause minor odour.	Built near other structures away from road. Blowers will be in building. Outdoor tanks could cause minor odour.
	Low Potential Impact	Low Potential Impact	Low Potential Impact
Potential Impacts on Adjacent Land Uses	Adjacent land uses will not be impacted.	Adjacent land uses will not be impacted.	Adjacent land uses will not be impacted.
	Low Potential Impact	Low Potential Impact	Low Potential Impact
Estimated Capital Costs	$5.8 M	$4.5 M	$8.2M
	Lower Cost	Lowest Cost	Highest Cost
Estimated Operating Costs	$67,000 per year	$83,000 per year	$182,000 per year
	Lowest Cost	Lower Cost	Highest Cost

8.4 TERTIARY FILTRATION ALTERNATIVES

Tertiary filtration is proposed as a secondary effluent polishing step for suspended solids and phosphorus removal.

8.4.1 Filtration Options

Option 1 – Disk Filter

A disk filter consists of multiple rotating disks each equipped with a series of filtering surfaces made from cloth or stainless steel that are housed in a tank. The flow direction may be inside-out or outside-in. Outside-in cloth disk filters are the more common configuration and are assumed for this assessment of options. As the influent passes through the disks, solids are captured on their surface, and the filtered water (filtrate) is collected within the disk structure. During backwashing, the layer of captured solids is removed either by a vacuum system or by spray nozzles. The dislodged solids settle at the bottom of the tank and are pumped to the WWTP's sludge handling system. Disk filters provide a continuous treatment process. While one disk is backwashed, the other disks continue to filter the influent for uninterrupted operation and consistent filtration efficiency.

Disk filtration technology is well established and is currently used at WWTPs across Ontario. Cloth disk filters can achieve suspended solids levels below 10 mg/L, and total phosphorus concentrations below 0.15 mg/L. In the future, when more stringent phosphorus limit will apply, a chemical feed and dosing system can be added to improve performance.

A tertiary disk filter package for the Coldwater WWTP Phase 1 expansion would consist of two concrete filter tanks, each with a disk filter unit with an average day capacity of 1,500 m^3/day, and two filter feed pumps, one backwash pump and one sludge pump. The approximate footprint for two disk filters is 40 m^2.

The estimated equipment supply and installation cost for two disk filters (duty/standby) including the concrete tankage is $1.5 M. This cost excludes the building in which the filters would be housed and associated electrical and mechanical costs. The estimated annual operating cost for electricity, labour and maintenance is $34,000/year.

Option 2 – Granular Media Filter

Granular media filters for tertiary effluent treatment are available in various configurations, including deep-bed gravity downflow with automatic backwash, and continuous upflow filtration systems.

Assuming a maximum filtration rate of 3.3 L/m^2/s (MECP, 2008), two gravity media filters (duty/standby) each with a surface area of 21 m^2 and a media depth of 1.2 m to 1.8 m would be needed at the Coldwater WWTP to filter 1,500 m^3/day. A filtered effluent backwash tank with a volume of approximately 130 m^3 would be required assuming a backwash rate of 10 L/m^2/s for 10 minutes, as well as air diffusers to effectively clean the media and prevent biofouling. Backwash wastewater would be returned to the headworks. Similarly to disk filters, in the future when more stringent phosphorus limits will apply, a chemical feed and dosing system can be added.

Continuous upflow sand filters (such as DynaSand) are used in many WWTPs in Ontario, including in Huntsville, Springwater Township and Severn Township. The secondary effluent moves upward through a deep sand bed. Sand is removed from the bottom and cleaned using filtered water, then returned to the top. The filter runs continuously and does not need to shut down for backwashing. It does not require a backwashing tank and pump.

Continuous upflow sand filters were not considered further because operators at both the Huntsville and the West Shore WWTP in Severn have expressed concerns with their operation, including loss of the sand media, and difficulty in process control. As a result, this type of filter is not proposed for their WWTP expansions.

Option 3 – Membrane Filtration

Membrane filtration is a complex, pressure-driven process in which particles are separated by being repelled through a semi-permeable membrane. Using a high-pressure pump or vacuum pump, membrane filtration provides a very high quality effluent and high removal efficiency. An important design factor is the fouling of the membranes that depend on the quality of the secondary effluent and is difficult to characterize without a pilot test. To address membrane fouling, regular physical and chemical cleaning is required. Membranes typically have a relatively short lifespan. Their replacement significantly contributes to high operating and maintenance costs. Membrane filtration is employed when very high effluent quality is required, where high performance can justify the capital and operating costs.

Considering that the required effluent quality for the Coldwater WWTP expansion is not very stringent, the high capital, operating and energy costs, and maintenance concerns with membrane fouling, the membrane filtration option was not evaluated further.

8.4.2 Assessment and Preliminary Preferred Filtration Design Concept

Table 12 overleaf summarizes the comparison of the tertiary filtration options.

Table 12: Assessment of Alternative Tertiary Filtration Options

EVALUATION CRITERIA	DISK FILTER	GRAVITY MEDIA FILTER
Process Description	Fully automated rotating disks with fine mesh or cloth media that captures suspended solids as effluent flows over the surface. Typically installed above-ground.	Fully automated gravity granular media filter to capture suspended solids. Various configurations. Can be built above or below-ground
Achievable Effluent Quality	Suspended Solids: < 5 mg/L Total Phosphorus: < 0.15 mg/L	Suspended Solids: < 10 mg/L Total Phosphorus: < 0.15 mg/L
	Better	Good
Treatment Reliability	Reliable process with competent operation and equipment maintenance.	Reliable process with competent operation and equipment maintenance.
	Reliable	Reliable
Backwash and Cleaning Requirements	Cleaning one disk at a time by vacuum or water jets. Continuous operation during backwashing, using filtered water within tank. Chemical cleaning is recommended.	Backwashing temporarily disrupts filtration, reducing filter's overall efficiency. Requires backwash water tank.
	More efficient	Less efficient
System Complexity	Moderate complexity due to mechanical components and backwash process. Adjustments may require specialized knowledge initially.	Moderate complexity for backwash process.
	More complex	Moderate
Level of Automation	Fully-automated filtration and backwash	Fully-automated filtration and backwash.
	Full	Full
Required Footprint	40 m^2	130 m^2
	Smaller	Larger
Power Consumption	64 KWhr	More energy due to high head requirement.
	Less	More
Operation and Maintenance Requirements	Routine maintenance. Frequency can be reduced with design adjustments. System has cover access and quickly removable filtering sectors.	Routine maintenance. Difficult access to replace below filter components.
	Easier	More difficult
Headlosses	0.05 m - 0.4 m at ADF. Crossflow filtration and continuous backwash minimize headlosses.	0.6 m to 2.7 m at ADF. More potential for fouling.
	Less	More

EVALUATION CRITERIA	DISK FILTER	GRAVITY MEDIA FILTER
Similar Applications in Ontario	More common in new installations. Used in Orillia, Wasaga Beach, Hamilton and Kitchener.	Less common in new installations.
	Common	Less common
Potential Environmental Impacts	Process can meet required effluent quality to protect river quality. Backwash wastewater is processed at WWTP.	Process can meet required effluent quality to protect river quality. Backwash wastewater is processed at WWTP.
	Low potential impact	Low potential impact
Potential Noise, Odour & Aesthetic Impacts	No noise and odour. Low visual impacts as filters will be inside building. Impact can be minimized with architectural design and landscaping.	No noise and odour. Low visual impacts as filters will be inside building. Impact can be minimized with architectural design and landscaping.
	Low potential impact	Low potential impact
Estimated Equipment Cost	$1.5 M	Higher costs because of backwash tank, piping and pumps.
	Lower	Higher
Estimated Operating Costs	$34,000 per year	Higher because of backwash pumps.
	Lower	Higher

In summary, the main advantages and disadvantages of each technology are:

- **Option 1 - Disk filters**. Disk filtration can achieve the required effluent quality with a small footprint. The disk cleaning process allows for continuous filtration and does not require a backwash water tank. There is no significant downtime and operating and maintenance requirements are relatively low.
- **Option 2 - Media filters**. Media filtration can achieve the required effluent quality. However, it requires a significant footprint for the filters and backwash tank and has higher maintenance requirements. Media filters are mechanically complex and have high headlosses.

The preliminary preferred approach is to use cloth disk filters for tertiary filtration. This option is preferred for the following reasons:

- It has been demonstrated to be capable of achieving the required level of treatment using equipment that is now well-established and currently in use at other plants in Ontario.
- It offers continuous backwashing for an uninterrupted treatment process.
- It is a compact technology.
- Capital, operating and maintenance costs are lower. Due to the accessible parts and straightforward technology, maintenance issues can be resolved quickly.

8.5 MAIN SPS EXPANSION ALTERNATIVES

8.5.1 Main SPS Options

Two options were considered for the expansion of the Main SPS at its current location.

Option 1: Expand and Upgrade the Main SPS

The existing SPS consists of a below-ground 2.4 m diameter and 5 m deep circular concrete structure equipped with three submersible pumps and associated valves. Increasing the SPS capacity requires a larger below-grade wet well and replacement of the pumps, piping and valves. Emergency storage also needs to be provided.

This option would involve building a wet well adjacent to and hydraulically connected to the existing wet well. The upgraded SPS would operate with two submersible pumps (duty/standby). Together, the two wet wells would provide the required emergency storage above the normal pump operating level.

During construction of the expanded SPS, a temporary bypass pumping system would keep the wastewater flowing to the WWTP.

Option 2: Replace the Main SPS

As there is limited space on the site for a SPS building, this option would involve installing a new below-grade wet well with two submersible pumps (duty/stand-by). This new below-ground SPS would be adjacent to the existing SPS, which would be decommissioned but its concrete tank would be used for emergency storage of flows more than the pumps' capacity. Wastewater temporarily stored in this existing structure would be pumped out into the new SPS when capacity becomes available.

While the new SPS is constructed, the existing SPS would be available to pump wastewater to the WWTP.

8.5.2 Assessment and Preliminary Preferred SPS Design Concept

Table 13 overleaf summarizes the comparison of the two Main SPS options.

Building a new SPS is the preliminary preferred solution because it would provide opportunities to improve on the design of the pumping station. Existing infrastructure would be used as the existing SPS structure will be maintained for emergency storage in wet weather events. Construction will have a lower cost because the existing SPS would continue to operate while the new SPS is built, therefore eliminating the high cost of bypass pumping. Potential impacts of constructing a new SPS on access to the boat ramp can be minimized by siting the new SPS close to the existing SPS.

Table 13: Assessment of Main SPS Alternatives

EVALUATION CRITERIA	MAIN SPS UPGRADE AND EXPANSION	MAIN SPS REPLACEMENT
Description	Keep SPS. Replace piping, valves and pumps. Add connected wet well.	Build new below-grade pumping SPS. Use existing structure for emergency storage
Capacity and Emergency Storage	Designed to pump Phase 2 peak flow (93 L/s). Expanded wet well has 0.5 hour storage @ ADF	Designed to pump Phase 2 peak flow (93 L/s). New wet well has 0.5 hour storage @ ADF
	Same	Same
Power Requirements	Pumps would use approx. 50 kW	Pumps would use approx. 50 kW
	Same	Same
Facility Footprint	Existing SPS + additional wet well: 25m^2	New SPS + existing wet well: 21 m^2
	More	Less
Station Design Improvements	Only minor equipment upgrades can be implemented in the existing SPS.	New SPS offers opportunity to improve design to facilitate O&M
	Few	More
Required Site Modifications	Hydro pole relocation; rerouting of the discharge forcemain to valve chamber.	Hydro pole relocation; rerouting of the influent sewer and discharge forcemain to valve chamber.
	Some	More
Use of Existing Infrastructure	Uses existing SPS structure. Replaces aged equipment with new.	Uses existing SPS structure for emergency storage. Replaces aged equipment with new.
	Yes	Yes
O & M Requirements	Requires maintenance of two wet wells and two pumps.	Requires maintenance of one wet well and two pumps.
	More	Less
Bypass Pumping during Construction	Requires bypass pumping during construction of connected wet well	Can be built while maintaining ex SPS in operation. Minimal bypass pumping will be required.
	Yes	Limited
Construction Impact on Boat Access	May impact boat access. Can be mitigated by minimizing construction in boating season.	May impact boat access. Can be mitigated by minimizing construction in boating season.
	Potential Impact	Potential Impact
Potential Odour, Noise & Aesthetic Impacts	Potential odours. Additional wet well would be like existing: below-ground with access hatches.	Potential odours. New SPS would be like existing: below-ground with above ground panels.
	Potential Minor Impact	Potential Minor Impact

EVALUATION CRITERIA	MAIN SPS UPGRADE AND EXPANSION	MAIN SPS REPLACEMENT
Potential Environmental Impacts	Capacity increase will significantly reduce potential overflows to river.	Capacity increase will significantly reduce potential overflows to river.
	Positive Impact	Positive Impact
Estimated Capital Cost	$4 M	$3.5 M
	More	Less

9 Public and Agency Consultation

9.1 NOTICE OF STUDY COMMENCEMENT

The Notice of Study Commencement was mailed and emailed on March 22, 2023, to all stakeholders on the initial mailing list, including First Nations and indigenous organizations. The Notice of Study Commencement and the initial mailing list are attached in Appendix E.

The Township created a project specific webpage Coldwater Wastewater Treatment Plant Expansion | Township of Severn on which it posted the Notice and can receive comments.

Comments received in response to the Notice of Study Commencement are summarized in Table 14.

Table 14: Summary of Comments Received during Phase 1

DATE	FROM	COMMENT	RESPONSE
April 4, 2023	Kevin Bechard, Innovative Planning Solutions	Requested the full property of 20 Sheridan Drive be considered within the servicing area of the expanded WWTP.	E-mail on April 14, 2023 that only units that are within the Settlement Area boundary are included in the study.
April 14, 2023	Moxa Shah, Telecon/Rogers	Rogers Communication plant is within marked area of the site drawing. Requires 1 m clearances.	No response required.
April 21, 2023	Chunmei Liu, MECP	Acknowledgement letter. Provides guidance re MECP interests in Class EAs.	No response required.
June 9, 2023	Dan Minkin, Ministry of Citizenship and Multiculturalism	Requested screening and evaluation to ensure conservation of archaeological and heritage resources. An archaeological assessment must be completed if the project area exhibits archaeological potential. If built heritage resources and/or cultural heritage landscapes are in the study area, a cultural heritage evaluation report and a heritage impact assessment must be completed.	No response submitted. An archaeological assessment will be completed by the end of June 2023.

9.2 PUBLIC INFORMATION CENTRE NO. 1

The public and stakeholders, agencies, and interested parties on the updated mailing list were invited to a Phase 1 Public Information Centre (PIC) in which the study team described the existing WWTP and SPS infrastructure, the needs for wastewater capacity to accommodate growth, the Coldwater River water quality, the assessment of alternative planning solutions, and the preliminary preferred solution.

The Notice of Public Information Centre No. 1 was mailed and emailed on May 12, 2023. It was also posted on the Township's webpage and on Orillia Matters online newspaper for two weeks starting on May 17, 2023. The Notice of PIC No. 1 and the updated mailing list are attached in Appendix F.

The PIC was held in the Coldwater Community Centre on June 1, 2023. The PIC consisted of a presentation by Tatham, followed by a question-and-answer period. A Zoom link was also created to allow attendees to join virtually. Eight people attended in person, including three staff, and several more attended online. Display boards were available for review and discussion with the project team before and after the presentation.

Following the PIC, the presentation and the recording were posted on the Township's website. The attendance sheet and a copy of the presentation slides are included in Appendix F.

Comments received at and following PIC No. 1 and their responses are attached in Appendix F and summarized in Table 15.

9.3 PUBLIC INFORMATION NO. 2

A second PIC was held on May 29, 2025, to present for public input the wastewater treatment and pumping design options developed during Phase 3 of the Class EA and the preliminary recommendations.

The Notice of Public Information Centre No. 2 was mailed and emailed on May 15, 2025. It was posted on the Township's webpage and on Orillia Matters on-line newspaper from May 16 to May 24, 2025. The Notice of PIC No. 2 and the updated mailing list are attached in Appendix G.

The PIC was held in the Coldwater Community Centre on May 29, 2025. The PIC consisted of a presentation by Tatham, followed by a question-and-answer period. Seven people attended in person, including two staff. Following the PIC, the presentation was posted on the Township's website. The attendance sheet and a copy of the presentation slides are attached in Appendix G.

Comments received at and following PIC No. 2 and their responses are attached in Appendix G and summarized in Table 16.

Table 15: Summary of Comments Received during Phase 2

DATE	FROM	COMMENT	RESPONSE
June 1, 2023	Aisha Chiandet, Severn Sound Environmental Association	Requested clarifications on septage and biosolids treatment and handling, and Township interest in partnership for shared septage treatment facility.	E-mail on June 13, 2023. Septage is not accepted at the WWTP. Biosolids are aerobically digested at the WWTP, then hauled for farm land application.
June 1, 2023	Rayanne Gale	Requested more information about effluent effects on the river including temperature, quality and contamination.	E-mail on June 2, 2023. The WWTP expansion will produce higher effluent quality, to meet MECP requirements, therefore will not affect the river water quality.
June 13, 2023	Chris Hachey, Historic Saugeen Métis	Advised the Coldwater WWTP is not within the Traditional Territory of the Historic Saugeen Métis.	Contact removed from the mailing list.

Table 16: Summary of Comments Received during Phase 3

DATE	FROM	COMMENT	RESPONSE
May 29, 2025	Ken Cadeau	Asking Township the plans for SPS No.2 on Original Reinbird St. Concerns with electrical panel and odours and possibility of sewage backup in basement.	SPS 2 is not part of Class EA. Township responded directly.
May 29, 2025	Stefan Szczerbak, Planscape Inc.	Request to consider his client's property on Anderson Line in the WWTP capacity allocation.	Township responded directly

9.4 CONSULTATION WITH INDIGENOUS COMMUNITIES

Indigenous First Nations and other groups were invited to participate in the Class EA with each notice. The list of 17 Indigenous groups that were contacted is included in the attached mailing lists. There were no responses except from the Historic Saugeen Metis who indicated Coldwater was not in their traditional territory.

9.5 NOTICE OF COMPLETION

The Notice of Completion and the Draft Environmental Stuy Report, dated November 6, 2025, were posted on November 10, 2025 on the Township's website, for a 30-day review period.

The Notice was advertised in the online newspaper Orillia Matters from November 11 to 17, 2025, and mailed and e-mailed to the updated mailing list on November 11, 2025. The Notice and the mailing list are attached in Appendix H.

Table 17 summarizes the correspondence received during the 30-day review period. Copies of the correspondence are attached in Appendix H.

Table 17: Summary of Comments Received after the Notice of Completion

DATE	FROM	COMMENT	RESPONSE
Dec. 4, 2025	Chunmei Liu, MECP	No additional concerns or questions from surface water perspective and no compliance concerns. Comments from air quality analyst forthcoming.	No response required
Dec. 12, 2025	Dan Minkin, Ministry of Citizenship and Multiculturalism	ESR should include commitment for possibility of unexpectedly encountering archaeological artefacts during construction. Noting that assessment results are preliminary.	Report edited accordingly.
Dec. 12, 2025	Stephen McGovarin	Concerns regarding impacts on fish and ecosystem health. Questions re: consultation with Williams Treaty First Nations and Metis; consideration for cumulative effects on Coldwater River; established baselines for fish habitat; alternatives to expanding the WWTP.	E-mail response on Dec. 17, 2025
Dec. 12, 2025	Valerie Schell	Concerns with increased residential housing, including impacts on Coldwater River water quality and algal mats.	E-mail response on Dec. 17, 2025
Dec. 19, 2025	Chunmei Liu, MECP	Air quality assessment should consider all emission sources and potential odour impacts. Clarifications were requested.	E-mail response on Feb. 3, 2026, and report edited accordingly.

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10 Preferred WWTP Expansion Concept

The conceptual design of the Coldwater WWTP Phase 1 expansion is presented below. It is based on the preliminary preferred design concepts, which were discussed with the Township, and for which there were no comments received during the consultation phase.

10.1 WWTP EXPANSION STAGING

The WWTP expansion is proposed to be implemented in multiple phases to accommodate the community's rate of growth. Initially, the expansion must provide flexibility to use the two existing package plants, which are in operating condition, and can continue to be used while the WWTP expansion is constructed and commissioned, and until the Township determines they are no longer cost-effective to maintain and operate and should then be decommissioned.

For the comparison of alternative design concepts presented in Section 8, it was anticipated that the staging would involve construction of components in increments of 750 m^3/day. However, following the assessment of alternative design concepts, it was determined in consultation with the Township that the preferred initial expansion phase should involve increasing the secondary treatment capacity with a 1,000 m^3/day EA unit rather than a 750 m^3/day unit, to reduce reliance on the existing EA and SBR plants.

The WWTP expansions are proposed to be phased as follows:

- Phase 1 (average daily flow capacity of 1,500 m^3/day):
    - Construct and commission one new 1,000 m^3/day EA package unit.
    - Complete a detailed inspection of the existing EA plant, refurbish components as needed, and operate at a flow of 500 m^3/day.
    - Maintain the existing SBR plant as a stand-by unit.
    - Construct the required headworks, effluent pumping, and tertiary filtration facilities, and install additional UV equipment.
- Phase 2 (average daily flow capacity of 2,000 m^3/day):
    - Construct and commission a second 1,000 m^3/day EA package unit.
    - Abandon the existing EA and SBR plants.
    - Expand the other WWTP facilities as required.

- Phase 3 (average daily flow capacity of 3,000 m^3/day):
  - Construct and commission a third 1,000 m^3/day EA package unit
  - Expand the other WWTP facilities as required.

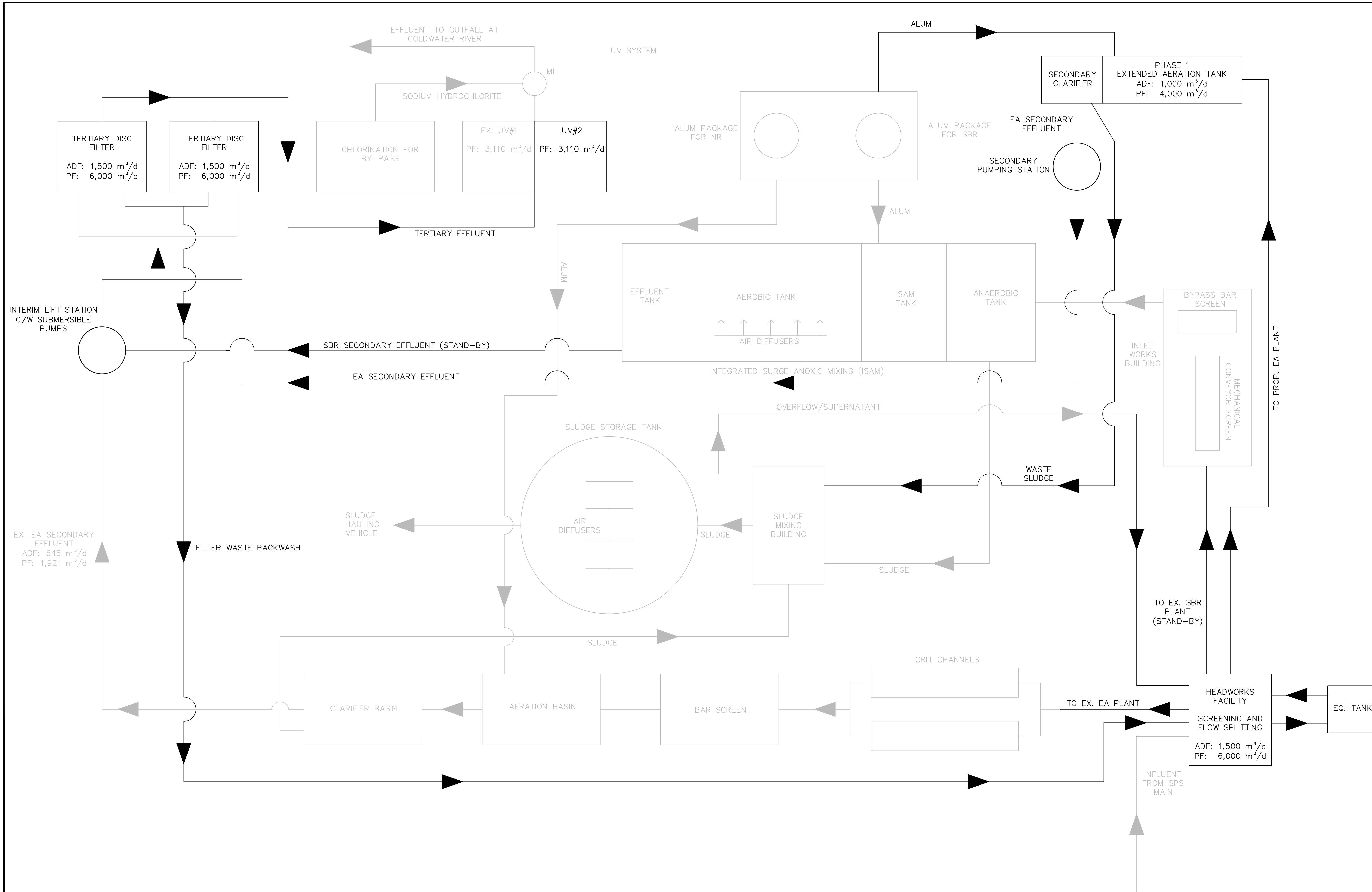
10.2 WWTP EXPANSION LAYOUT

The proposed flow diagram for the Phase 1 WWTP expansion is shown as Figure 4, and the proposed Phase 1 site layout is shown as Figure 5. Figure 6 illustrates the suggested layout of all recommended and required facilities for the subsequent expansion.

Overall, the Phase 1 expansion is proposed to consist of:

- New headworks facility housing a conveyor screen with a parallel manual screen, overflow to an influent flow equalization tank, flow splitting tankage, and a septage receiving and screening facility.
- One new EA train, with use of the existing EA unit, and the existing SBR unit as stand-by.
- New secondary effluent pumping station, housing blowers and controls for the new EA unit.
- New tertiary filtration building housing two disk filters and controls.
- Additional UV bank in the existing UV channel in the Disinfection/Blower Building.
- Existing chemical feed facility.
- Existing sludge management facility.
- Expansion of the electrical main and standby power facilities.

The existing 400 mm diameter outfall does not need to be upsized for the proposed expansion flows.



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No.	REVISION DESCRIPTION	DATE
1.	ISSUED FOR EXPANSION CLASS EA	JAN/25

ENGINEER STAMP

COLDWATER WWTP EXPANSION
TOWNSHIP OF SEVERN

TATHAM ENGINEERING

PHASE 1 EXPANSION PROCESS FLOW DIAGRAM

DESIGN: ST	FILE: 321867	DWG:
DRAWN: JR	DATE: JUN 2023	**FIG.4**
CHECK: ST	SCALE: N.T.S.	

Drawing Name: 321867-FIG01.dwg, Plotted: Sep 29, 2025

LEGEND

FENCE
PROPERTY LINE
OUTFALL PIPE

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CONTRACTOR MUST VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER BEFORE COMMENCING WORK. DRAWINGS ARE NOT TO BE SCALED.

BENCHMARKS

NOTES

No.	REVISION DESCRIPTION	DATE
1.	ISSUED FOR EXPANSION CLASS EA	JAN/25

ENGINEER STAMP

COLDWATER WWTP EXPANSION
TOWNSHIP OF SEVERN

TATHAM ENGINEERING

PHASE 1 EXPANSION
PROPOSED SITE LAYOUT

DESIGN: ST	FILE: 321867	DWG:
DRAWN: JR	DATE: JUN 2023	**FIG.5**
CHECK: ST	SCALE: 1:250	

Drawing Name: 321867-FIG01.dwg, Plotted: Sep 29, 2025

LEGEND

FENCE
PROPERTY LINE
OUTFALL PIPE

DISCLAIMER AND COPYRIGHT

CONTRACTOR MUST VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER BEFORE COMMENCING WORK. DRAWINGS ARE NOT TO BE SCALED.

Drawing Name: 321867-FIG01.dwg, Plotted: Sep 29, 2025

BENCHMARKS

NOTES

No.	REVISION DESCRIPTION	DATE
1.	ISSUED FOR EXPANSION CLASS EA	JAN/25

ENGINEER STAMP

COLDWATER WWTP EXPANSION
TOWNSHIP OF SEVERN

TATHAM ENGINEERING

PHASE 2 EXPANSION
PROPOSED SITE LAYOUT

DESIGN: ST	FILE: 321867	DWG:
DRAWN: JR	DATE: JUN 2023	FIG.6
CHECK: ST	SCALE: 1:250	

10.3 ADDITIONAL FACILITIES

The following additional facilities and buildings will be required for the Phase 1 expansion.

10.3.1 Headworks Building

The headworks building will house screening equipment, flow splitting tankage and piping to control and distribute the influent screened flow to the multiple secondary treatment units, and a septage receiving facility. An adjacent below-ground equalization tank will receive peak wet weather flows above the WWTP's maximum capacity. A below-ground septage receiving and holding tank is proposed on the other side of the headworks building.

The headworks building is proposed to be a two-storey building, where the forcemains from the Main SPS and from a future pumping station serving developments in the north east of Coldwater, will discharge into a flow splitter chamber on the second floor, at the same elevation as the existing SBR discharge, thus providing gravity flow to the secondary treatment units. The ground floor is proposed to be used to house a septage receiving/handling facility, screening bins, and provide space for storage, operation and maintenance activities.

The process equipment, channels and tanks, should be designed to accommodate the next expansion phase to 2,000 m^3/day.

Screening

From the influent flow splitter chamber, pumped raw wastewater will flow to a conveyor screen channel or be bypassed to a parallel manual screen channel.

The two screening channels and equipment should be sized to convey and treat the instantaneous peak flows. Downstream of the screens, flows exceeding the WWTP's maximum daily capacity will overflow to the equalization tank

The screening equipment will consist of:

- Single in-channel mechanical conveyor screen with perforated screening surface, dewatering, and a waste screening basket. The screen will have 6 mm screen openings.
- Single bypass manually-cleaned screen with 12 mm bar spacing.

Flow Equalization

Peak influent flows exceeding the WWTP's maximum capacity that may occur during wet weather events will overflow by gravity through a weir from the screens' downstream chamber to the below-ground concrete equalization tank. When peak flows have receded, submersible pumps (duty/standby) will be used to pump the tank's content to the flow metering channel.

The proposed volume of the equalization tank for Phase 1 is 740 m^3, sized to store an instantaneous peak flow of 102 L/s over a 2-hour period. The peak flow corresponds to the Phase 1 design maximum daily wastewater flow of 6,000 m^3/day (69 L/s) plus a peak inflow and infiltration allowance of 33 L/s (based on 0.23 L/ha/s over 140 ha). Approximate dimensions of the equalization tank are 12 m by 12.5 m and 5 m deep.

Flow Measurement and Splitting

Screened wastewater flow is proposed to be measured by an in-channel Parshall flume sized to accurately measure the range of flows up to the Phase 2 expansion flows.

The flow metering channel will convey influent flows to a chamber from which the flow will be split using actuated valves between the new EA plant, the existing EA plant, the existing SBR plant, and future expansions.

Septage Receiving Facility

The septage receiving facility is proposed to consist of a septage receiving/holding tank, and a septage handling station.

The maximum recommended septage volume accepted at the WWTP is 5% of the WWTP's capacity, or 75 m^3/day, to protect the biological treatment process. The suggested volume of the septage holding tank is 200 m^3, which could store the Phase 1 maximum daily septage volume over 2.5 days, and the Phase 2 maximum volume over two days.

A package septage handling station should be considered to screen the septage and remove large solids and rags, before discharge into the influent channel. This station should be housed in the headworks building (first floor) so that odours can be controlled and treated. The septage handling station will draw from the septage holding tank and once the heavy solids have been removed, the septage will be pumped to the inlet channel.

Odour Control

The headworks building's ventilation system will be connected to an odour control unit capable of handling the raw wastewater and septage odours. An advanced oxidation system is recommended to effectively neutralize the odours. This system's components would be outside the headworks building.

Best management practices will need to be implemented to mitigate fugitive odour emissions from the headworks building.

10.3.2 Secondary Treatment Unit

The proposed secondary treatment unit is a package EA plant with a capacity of 1,000 m^3/day, consisting of:

- Two rectangular reinforced concrete aeration basins, each approximately 24 m by 5 m, equipped with fine bubble diffusers.
- Two rectangular reinforced concrete clarifiers, each approximately 13 m by 5 m, equipped with weirs and settled solids removal mechanisms.
- Two submersible pumps with VFDs for return sludge handling and waste sludge transfer to the existing Sludge Mixing Building.

The secondary treatment tanks will be set at approximately the same elevation as the existing EA plant.

Alum will be added upstream of the clarifiers for phosphorus reduction. Two additional chemical metering pumps will be installed in the existing Disinfection and Blower Building for this purpose.

10.3.3 Secondary Effluent Pumping Station and Control Building

The effluent from the new secondary treatment unit needs to be pumped to the new tertiary filters. The Phase 1 expansion will therefore include a secondary effluent pumping station.

The secondary effluent pumping station will have:

- Below-ground secondary effluent wet well, with two effluent submersible pumps (duty/stand-by), and valve chamber.
- Two positive displacement blowers (duty/stand-by), each with an approximately 16 HP electrical motor, for the aeration of the new EA unit.
- Magnetic flowmeter.
- MCCs, electrical panels, instrumentation and controls for the pumping station and the new secondary treatment unit(s), and ATS for the new emergency generator.
- Laboratory
- Office
- Washroom

The pumping station and wet well should be designed to accommodate additional pumps and blowers for future expansions. A 10 m by 16 m building is envisioned.

10.3.4 Interim Lift Station

The effluent from the existing SBR and EA plants is currently directed to the existing Disinfection and Blower Building. For the Phase 1 expansion, the effluent from these existing facilities will need to be redirected to a new below-ground lift station that will pump it to the new tertiary filters.

As this lift station will be decommissioned for the Phase 2 expansion, when the existing EA and SBR plants are decommissioned, and thus may not be used for an extended duration, it could consist of a below grade pre-fabricated FRP station or concrete maintenance hole 2.4 m in diameter and approximately 4 m deep, equipped with two 38 L/s submersible pumps (duty/stand-by), meeting the capacities of the SBR and existing EA plant.

10.3.5 Tertiary Filter Building

To achieve the expected effluent phosphorus compliance limit (0.18 mg/L), two tertiary disc filters are proposed in a new tertiary filter building. The filters will treat secondary effluent pumped from the new secondary effluent pumping station and the interim lift station.

Two cloth media disc filters (duty/stand-by) in stainless steel tanks, each capable of handling the maximum daily flow of 6,000 m^3/day, are proposed. The filters' discs would be made of a 10 micron mesh typically.

The filters will be backwashed using filtered water within the filter tanks. Maintenance of the disc filters will include chemical cleaning and high pressure washing. Dirty backwash and cleaning wastewater will discharge to a below-grade tank and be pumped to the inlet chamber of the headworks building.

When the WWTP is further expanded, the effluent compliance criteria for phosphorus will be more stringent and tertiary coagulation and flocculation may be needed to consistently achieve the lower phosphorus limit. Accordingly, the tertiary filter building should be designed to accommodate a future expansion that includes a flocculation tank upstream of the disc filters and alum feed lines from the existing Disinfection and Blower Building.

10.4 EXISTING FACILITIES

10.4.1 Disinfection and Blower Building

The existing Disinfection and Blower Building, which consists of the following, will not need to be expanded.

- an electrical and blower room with the emergency backup diesel generator, two SBR blowers (duty/standby), one sludge storage blower, and the MCCs; and

- a UV/chemical feed room with two UV channels (one is currently equipped with UV equipment), two alum storage tanks and the alum dosing system.

However, some modifications to the equipment will be required for the Phase 1 expansion as described below.

Electrical and Blower Room

The electrical and blower room has space allocated for a future blower and an air compressor. This space is sufficient to accommodate one additional set of duty/standby blowers. However, the new blowers for the new EA unit are proposed to be installed in the new secondary effluent pumping station adjacent to the new EA units for better efficiency.

The existing 275 kW emergency generator is insufficient for the WWTP Phase 1 expansion. It is proposed to replace it with a larger external unit at a location to be established during detailed electrical design.

All other existing equipment in this room is proposed to be maintained for the operation of the existing WWTP systems.

UV/Chemical Feed Room

Within the UV/chemical feed room, one UV channel is equipped with a single-bank Trojan UV 3600PTP unit, while the other channel is empty. This second channel can accommodate the required additional UV lamps for the Phase 1 expansion. The existing UV lamp has a peak flow capacity of 3,110 m^3/day. A bank of UV lamps and associated control equipment and weir will be added in the existing second channel to increase the UV capacity to 6,220 m^3/day, which provides for the Phase 1 expansion peak capacity.

The two existing 5,680 L alum storage tanks are adequate: at the Phase 1 expansion flow: assuming an alum dosage of 200 mg/L, they will provide 60 days of alum storage. Two additional alum metering pumps and associated feed lines will be needed for alum addition at the new EA unit.

10.4.2 Control Building

The existing Control Building that serves the existing EA plant, will remain in place for the Phase 1 expansion. No modifications are required for the Phase 1 expansion. It will become redundant and could be decommissioned when the existing EA plant is decommissioned in Phase 2.

10.4.3 Sludge Storage and Sludge Mixing Building

The existing aerated sludge storage tank has a working volume of 2,011 m^3 as per the O&M Manual and is in good condition. Assuming a typical liquid sludge volume in the sludge storage tank of 5.5 L per m^3 of wastewater treated by extended aeration activated sludge with phosphorus removal (MECP Design Guidelines for Sewage Works), the sludge storage tank can provide 240 days of storage at the Phase 1 expansion flow.

The existing mixing pump and decant pump in the Sludge Mixing Building are also in good condition and are expected to meet the needs of the Phase 1 expansion.

10.4.4 Effluent Outfall

The existing 400 mm diameter effluent outfall will not need to be upsized for the proposed expansions. Velocity in the pipe at the Phase 1 WWTP maximum daily flow of 6,000 m^3/day will be 0.55 m/s. At the ultimate WWTP expansion maximum daily flow capacity of 12,000 m^3/day, the calculated velocity is 1.1 m/s. These flow velocities are within the MECP Design Guidelines.

10.5 POWER SUPPLY

The WWTP expansion and additional buildings will increase the electrical load and require an upgrade to the existing main and emergency power supply.

The existing 300 kVA transformer for the Coldwater WWTP site is in the northwest corner of the site behind the Disinfection and Blower Building. The secondary supply cables have a capacity of 400A at 600V. The WWTP expansion will require a replacement transformer with a capacity of 750 kVA and upsizing the secondary cabling. This transformer will be adequate for the electrical loads of the Phase 2 expansion.

The existing 275 kW emergency generator will need to be replaced with a 750 kW 600 V generator to supply all components of the expanded WWTP (Phase 2). An exterior generator in a sound-proof enclosure is recommended.

10.6 AIR QUALITY ASSESSMENT

A preliminary air quality assessment was completed for the expanded WWTP, including existing facilities that will remain and proposed WWTP expansion buildings and tanks, as per the preliminary site layout (Figure 5). Air emissions were estimated by prorating data from similar existing WWTPs. Conservative assumptions were applied to establish the worst-case emission rates.

The proposed headworks building, including the septage receiving tank and screening facility, and the proposed equalization tank where raw wastewater will discharge at the WWTP site, are the main potential air emissions and odour sources. Based on data from USEPA, and from operators' experience, emissions from EA plants are not significant.

The below-ground sewage equalization tank and the septage receiving tank will not be vented to the atmosphere but rather entirely mechanically vented to an odour control unit that will also serve the headworks building.

For the emergency diesel generator, it was assumed that regular maintenance testing occurs 1 hour per 24-hour period, and that a full load bank test takes 4 hours per 24-hour period.

Modelling using AERMOD Version 22112 indicated that point of impingement (POI) concentrations of key contaminants (hydrogen sulphide, methyl mercaptan, dimethyl sulphide, carbon disulphide, total reduced sulfur) are within MECP limits at the WWTP site property line and at all sensitive receptors for all averaging periods. The proposed emergency generator's NOx emissions can be maintained within MECP limits at the property line if the exhaust height is 2 m above the generator housing and the exhaust is free of any impediments that prevent the free flow of the emissions, such as a rain cap.

Further details of the air emissions assessment, including the source identification table, source summary table, dispersion modelling inputs, and modelled emissions summary table, are presented in Appendix I.

A more detailed air quality and odour assessment will need to be completed in support of the application for MECP approval of the WWTP expansion to identify the required mitigating measures for all potential sources of odour and air emissions.

10.7 REQUIRED PERMITS AND APPROVALS

During design and construction, the following approvals and permits are anticipated to be required. Requirements will be confirmed during detailed design.

- Amendment to the Coldwater WWTP ECAs: 3832-6S2QCH (Sewage) and 3993-7E2L56 (Air).
- Any Excess Soil Management documents
- Building Permit
- Electrical Safety Authority approval

10.8 MITIGATING MEASURES

10.8.1 Heritage Resources

Although the Stages 1 & 2 archaeological assessment did not find archaeological resources on the Coldwater WWTP site, the Township is committed to taking the appropriate measures should archaeological artefacts be encountered during construction. If this happens, work impacting the archeological resources must cease, the Ministry of Citizenship and Multiculturalism (MCM) must be contacted, and an additional assessment be conducted by a licensed archaeologist.

10.8.2 Natural Resources

The WWTP site is mostly covered with grassed lawn and thus has limited habitat potential for most SAR. To minimize potential impacts from construction on the wildlife species that could be present and on potential habitat use, such as bat maternity roosting in the woodlands, and amphibian breeding and turtle overwintering in the wetlands, the wetland areas within the property must be avoided and woodland removal minimized and timed appropriately.

Although the proposed WWTP expansion layout avoids the wetland areas, it will require some tree removal from the Dry-to Fresh White Ash Deciduous Forest community (FOD4-2) and relocation of the fence on the east side of the site.

To protect the natural environment, the following mitigating measures are required:

- Avoid and protect the entire area of wetland (Organic Cattail Shallow Marsh (MAS3-1) community) plus a 15 m buffer from that community wherever a natural buffer of that dimension presently occurs.
- Minimize tree removal in the woodland areas.
- Tree removal should only occur between October 31 and April 1 to avoid impacts on breeding birds and potential bat roosting/maternity activities.
- Incorporate tree and vegetation planting in the site plan design to replace removed trees and provide carbon sinks for any GHG emissions.

10.8.3 Community Impacts

To minimize impacts of construction on the community, the following mitigation measures are recommended:

- Include specifications in the tender documents that state:
  - Construction hours must be limited to normal daytime hours and follow the Township's Noise Bylaw.
  - Environmental controls must be in place to minimize off-site runoff and to the adjacent wetland areas. Erosion and sedimentation control measures must be in place for the duration of construction.

    - A plan must be prepared to prevent or minimize the entry of deleterious substances into the wetland areas.
    - Spills must be reported to MECP, contained and cleaned up.
- Enclose the replacement emergency generator in an acoustic enclosure and select a diesel generator with an appropriate stack height to meet MECP air emissions requirements and noise limits at the closest existing and future sensitive receptors.
- In the proposed headworks building:
    - Install a mechanical ventilation system connected to an odour control unit designed to handle the entire building, including the septage receiving area and the equalization tank, to meet the MECP odour limits at nearby sensitive receptors (existing and proposed residential areas).
    - Install acoustic louvres as required to maintain noise levels below limits.
    - Recommend best management practices to minimize fugitive odours.
- Incorporate energy efficient equipment in the design of the WWTP.
- Inform Coldwater residents of the proposed construction activities and provide a communication contact.

10.9 OPINION OF PROBABLE COSTS

The preliminary construction cost estimate for the Phase 1 WWTP expansion is $28.7 M (2025$). This estimate is considered a Class C cost estimate, accurate to ± 30%. It is based on the concept design presented in this report, preliminary quotations for major process equipment, and typical tender prices from Tatham's projects database. It does not include engineering costs for design and construction and site-specific investigations, all of which could add 20% to the construction costs. The breakdown of the conceptual construction cost estimate is attached In Appendix J.

11 Preferred Main SPS Expansion Concept

The preferred option for the Main SPS is to build a new below-ground SPS and repurpose the existing SPS as an overflow tank. Further details are presented below.

11.1 DESIGN CONCEPT

The proposed new SPS will have capacity to convey the peak instantaneous wastewater flow from its tributary area, which for the Phase 1 expansion is expected to include most of Coldwater, but exclude development areas in the northeast of the community that would be served by a local pumping station. The Phase 1 peak instantaneous flow is estimated at 102 L/s, consisting of the projected maximum daily wastewater flow of 69 L/s and a peak wet weather induced inflow and infiltration allowance of 33 L/s.

The expanded Main SPS will be a below-grade structure consisting of a rectangular concrete wet well, sized as per MECP Design Guidelines, with a surface area of approximately 16 m^2 and a depth of 5 m. For Phase 1, it will be equipped with three 15 HP sewage submersible pumps (2 duty/1 standby) with VFDs. Preliminary pump sizing is 51 L/s at a TDH of 14 m. For the future Phase 2 expansion, the pumps will need to be replaced with larger pumps. Pump discharge piping will be 200 mm in diameter and include a magnetic flowmeter. The SPS will rely on ultrasonic level monitors for pump control, with float backup. Instruments and control will be connected to the Township SCADA at the WWTP.

If the proposed 51 L/s pumps are installed before the WWTP is expanded, two pumps only can be operated in duty/stand-by, controlled using the VFDs to a lesser flow to match the existing WWTP's maximum capacity.

If incoming peak instantaneous flows exceed the new SPS's pumping capacity and emergency storage in its wet well, liquid will overflow into the existing pumping station structure, which can provide an additional 17 m^3 of storage (below the overflow pipe elevation).

The existing emergency generator will be replaced with a larger 150 kVA unit with sub-base fuel tank in a sound-proof enclosure. This unit will meet emergency power needs for upsized pumps in Phase 2.

Main power supply and cables to the expanded facility will be upgraded to a 600V, 200A service. Existing hydro poles adjacent to the existing SPS will likely need to be relocated to facilitate the realignment of the influent 350 mm gravity sewer.

The existing 200 mm diameter HDPE discharge forcemain to the WWTP will be maintained for the Phase 1 WWTP expansion. The discharge forcemain however will need to be twinned for Phase 2, with the flow split between the twin forcemains.

11.2 REQUIRED PERMITS AND APPROVALS

The anticipated approvals and permits that will be required during design and construction are listed below. They will be confirmed during detailed design.

- Amendment to CLI-ECA 148-W601 for the Municipal Sewage Collection System.
- Any Excess Soil Management documents
- Building Permit
- Electrical Safety Authority approval

11.3 MITIGATING MEASURES

Construction of the replacement Main SPS has the potential to negatively affect the nearby residents and access to the municipal boat launch. Potential impacts on the adjacent Coldwater River also need to be addressed.

The following mitigating measures are recommended to be implemented to minimize negative impacts:

- Siting and dimensioning of the replacement SPS so that it has minimal encroachment on the access driveways to the boat launch.
- Design the wet well to minimize odour formation.
- Most of the construction period is conducted outside of the June to September boating season.
- Specify in the tender that:
  - The construction staging area must not interfere with operational access to the boat launch and access to residential driveways.
  - Construction hours must be limited to normal daytime hours and follow the Township's Noise Bylaw.
  - Environmental controls must be in place to minimize off-site runoff and to the Coldwater River and to minimize noise and vibration impacts. Erosion and sedimentation control measures must be in place for the duration of construction.

  - A plan must be prepared to prevent or minimize the entry of deleterious substances into the Coldwater River, and a response plan be developed and implemented if deleterious substances migrate to the River. Spills must be reported to MECP, contained and cleaned up.

- Enclose the replacement emergency generator in an acoustic enclosure and select a diesel generator that meets MECP air emissions requirements at the closest sensitive receptor.
- Inform Coldwater residents of the proposed construction activities and provide communication contact.

11.4 OPINION OF PROBABLE COSTS

The preliminary construction cost estimate for replacing the Main SPS for the Phase 1 WWTP expansion is $4.1 M (2025$). This estimate is considered a Class C cost estimate, accurate to ±30%. It is based on the concept design presented in this report, preliminary quotations for the major equipment, and typical tender prices from Tatham's projects database. It does not include engineering costs for design and construction and site-specific investigations, all of which could add 20% to the construction costs. The breakdown of the conceptual construction cost estimate is attached In Appendix J.

12 Conclusions and Next Steps

12.1 SUMMARY OF PREFERRED SOLUTIONS

The Class EA concluded that the preferred planning solutions are to expand the Coldwater WWTP and the Main SPS on their current sites in a phased manner to match the anticipated growth of the community, and to implement an I/I control program.

The first expansion phase should be to an average daily capacity of 1,500 m^3/day and a maximum daily capacity of 6,000 m^3/day, which will service an increase in population from 1,900 persons in 2025 to 3,750 persons. The second expansion phase is recommended to be to an average daily capacity of 2,000 m^3/day, to service a population of 5,000 people.

The preferred design concepts for the Phase 1 WWTP expansion involve:

- adding a 1,000 m^3/day EA package unit;
- maintaining the existing EA unit in operation and the existing SBR unit as a stand-by unit;
- adding a headworks facility to house screening equipment and flow splitting to the proposed and existing secondary treatment units;
- adding a wastewater equalization tank for the handling of wet weather induced peak flows;
- adding a septage receiving tank and handling facility;
- adding a secondary effluent pumping station and control building;
- adding a tertiary filtration facility to house disc filters;
- expanding the UV disinfection system;
- upgrading the main and stand-by electrical supply systems, including replacing the diesel generator; and
- maintaining the existing chemical feed system, sludge management system, and outfall to the Coldwater River.

The preferred design concept for the Main SPS expansion is to build a below-ground SPS and repurpose the existing SPS as an overflow tank. The existing forcemain can be maintained until the Phase 2 expansion when it will need to be twinned.

12.2 REQUIRED STUDIES

The following studies should be completed:

- I/I control plan, including updating the 2016 Inflow and Infiltration study, identifying the sources of I/I through sanitary sewer system inspections and smoke testing, and determining the sources that can be effectively reduced. The plan should include a repair plan of main sewers, maintenance holes and laterals, a sump pump monitoring and disconnection plan, and an ongoing sewer video inspection schedule, combined with a repair or rehabilitation budget.

  Success in implementing I/I control measures can delay the next expansion of the WWTP and allow further developments to be serviced with the existing facilities.

- Detailed air emissions and odour assessment study during detailed design of the WWTP expansion to determine if MECP odour and air contaminant limits will be met at the nearby sensitive receptors, and the requirement for mitigating measures.
- Detailed inspection of the existing EA plant, once the Phase 1 WWTP expansion is in operation, and refurbishing the facility if and as needed.

12.3 PRELIMINARY SCHEDULE

Upon completion of the Class EA, following the 30-day review period after the Notice of Study Completion is issued, design and implementation of the Phase 1 expansion projects can advance.

It is recommended that the Main SPS expansion project be prioritized as the need to increase the pumping capacity is immediate.

The anticipated timelines for implementation of the SPS and WWTP expansions are two years and four years respectively, as presented in Table 18.

Table 18: Preliminary Implementation Timeline

NEXT STEPS	APPROXIMATE DURATION
Request for proposals	2 months
Main SPS Expansion	
Preliminary design and application for MECP approval	4 months
MECP review and receipt of amended CLI-ECA	6 months
Detailed design (concurrent with MECP review)	6 months
Tendering	2 months
Construction and Commissioning	8-12 months
Estimated Total Duration to Main SPS Implementation	**2 years**
WWTP Expansion	
Preliminary design and application for MECP approval	6 months
MECP review and receipt of amended WWTP ECA	12 months
Detailed design (concurrent with MECP review)	12 months
Tendering	2 months
Construction and Commissioning	2 years
Estimated Total Duration to WWTP Phase 1 Expansion Implementation	**4 years**