Municipality of Meaford Wastewater Treatment Plant (WWTP) Class EA

Environmental Study Report
FINAL

Prepared For:

The Municipality of Meaford

November 2024

CREATING QUALITY SOLUTIONS TOGETHER

Ainley GROUP

MUNICIPALITY OF MEAFORD WASTEWATER TREATMENT PLANT CLASS EA
ENVIRONMENTAL STUDY REPORT

PROJECT NO. 121027

Prepared For:

THE MUNICIPALITY OF MEAFORD

By:

Lanting Xie, E.I.T.

Checked By:

Simon Glass, P.Eng.

Ainley & Associates Ltd.
6299 Airport Road, Suite 205
Mississauga, ON L4V 1N3
Tel: (905) 452-5172
E-mail: ainleymississauga@ainleygroup.com

WWW.AINLEYGROUP.COM

Executive Summary

ES-1 Introduction and Background

This Municipal Class Environmental Assessment (Class EA) is being undertaken to complete Phase 3 and Phase 4 for the expansion of Meaford Wastewater Treatment Plant (WWTP) following the 2015 Meaford Water and Wastewater Master Plan (the Master Plan).

In 2007, the Municipality of Meaford retained EarthTech to complete a Class EA for the Meaford Wastewater Treatment Plant (WWTP), which recommended increasing the capacity of the plant through expanding the current plant at the existing site. The Master Plan completed by Ainley Group in 2015 reinforced the historical general alternative that recommended increasing the capacity of the plant by expanding within the existing property upon where the plant is situated.

Since completing the Master Plan and commencing this project in 2021, the County of Grey updated growth projections and related management strategies. Beyond the historical stance found in the 2007 Class EA and the Master Plan proposing the existing WWTP be expanded, the anticipated growth of the urban area in Meaford is motivation to now proceed with expanding the facility.

The Municipality of Meaford retained Ainley Group to conduct the WWTP EA, review the previous design recommendations indicated in the Master Plan and investigate new technologies, in accordance with the Municipal Class Environmental Assessment Document, October 2000, as amended in 2015.

ES-2 Class Environmental Assessment Process

Ontario's Environmental Assessment Act (henceforth referred to as "the EAA") was proclaimed in 1976. The EAA requires proponents to examine and document the environmental effects that might result from major projects or activities. Municipal undertakings became subject to the EAA in 1981.

The Municipal Class Environmental Assessment document, prepared by the Municipal Engineers Association (MEA) (October 2000, as amended in 2007, 2011, and 2015), outlines the procedures to be followed to satisfy Class EA requirements for water, wastewater and road projects. The process includes five phases:

- Phase 1: Problem Definition
- Phase 2: Identification and Evaluation of Alternative Solutions to Determine a Preferred Solution
- Phase 3: Examination of Alternative Methods of Implementation of the Preferred Solution
- Phase 4: Documentation of the Planning, Design and Consultation Process
- Phase 5: Implementation and Monitoring

Public and agency consultation are integral to the Class EA planning process. Projects subject to the Class EA process are classified into four possible "Schedules" depending on the degree of expected impacts. It is important to note that the Schedule assigned to a particular project is proponent-driven. For example, if a project has been designated as Schedule "A", the proponent can decide to comply with the requirements of a Schedule "B" or "C" of the MEA process based

on the magnitude of anticipated impacts or the special public and agency consultation requirements specific to that particular project.

Major expansions or the construction of new wastewater treatment facilities follow a Schedule 'C' process.

ES-3 Planning Policy

Various land use planning policies and principles were followed to illustrate the consistency of this project in relation to provincial, regional and municipal planning goals. The following is a list of the land use planning policies and principles reviewed and followed in this project:

- Provincial Policy Statement (2020)
- Clean Water Resources Act (1990)
- Ontario Water Resources Act (1990)
- Municipality of Meaford Official Plan (2014)
- Considering Climate Change in the Environmental Assessment Process (MECP, 2017)

ES-4 Problem and Opportunity Statement

Based on updated evaluation of the existing WWTP performance, condition and capacity, as well as existing and future wastewater flows from the service area, the Problem/Opportunity Statement is updated as follows:

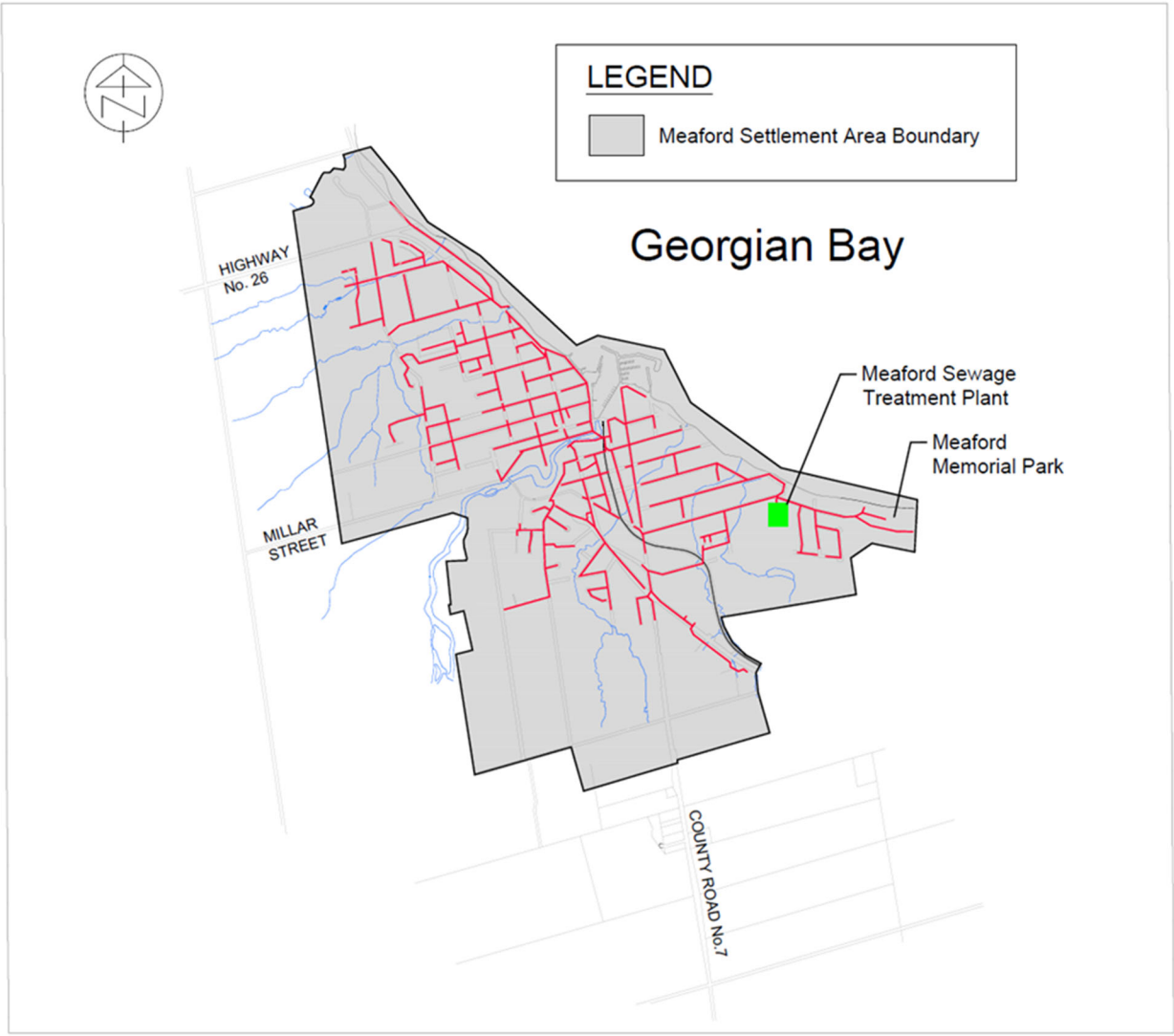
- The actual capacity of the WWTP is not the same as stated in the Environmental Compliance Approval (ECA) (rated capacity of the plant).
- With consideration of modern design criteria, the existing plant capacity is limited. The assessed capacity of the WWTP is 2,700 m^3/d based on paper analysis against MECP design criteria.
- The historical ADF in the recent 5 years has reached nearly 70% of plant's current rated capacity, but has reached 100% of the assessed capacity. The historical peak daily flow (PDF) has exceeded the peak rated capacity mentioned in the ECA.
- The plant headworks is integrated into the secondary treatment tanks and requires relocation in order to provide upgraded capacity and grit removal capabilities.
- The rate of development in Meaford has accelerated and wastewater treatment capacity is essential to facilitating growth of the community.

In order to manage population growth within the urban area, the Municipality of Meaford needs to expand the Meaford WWTP. Due to funding limitation the expansion plan must proceed under a phased approach.

ES-5 Study Area Overview

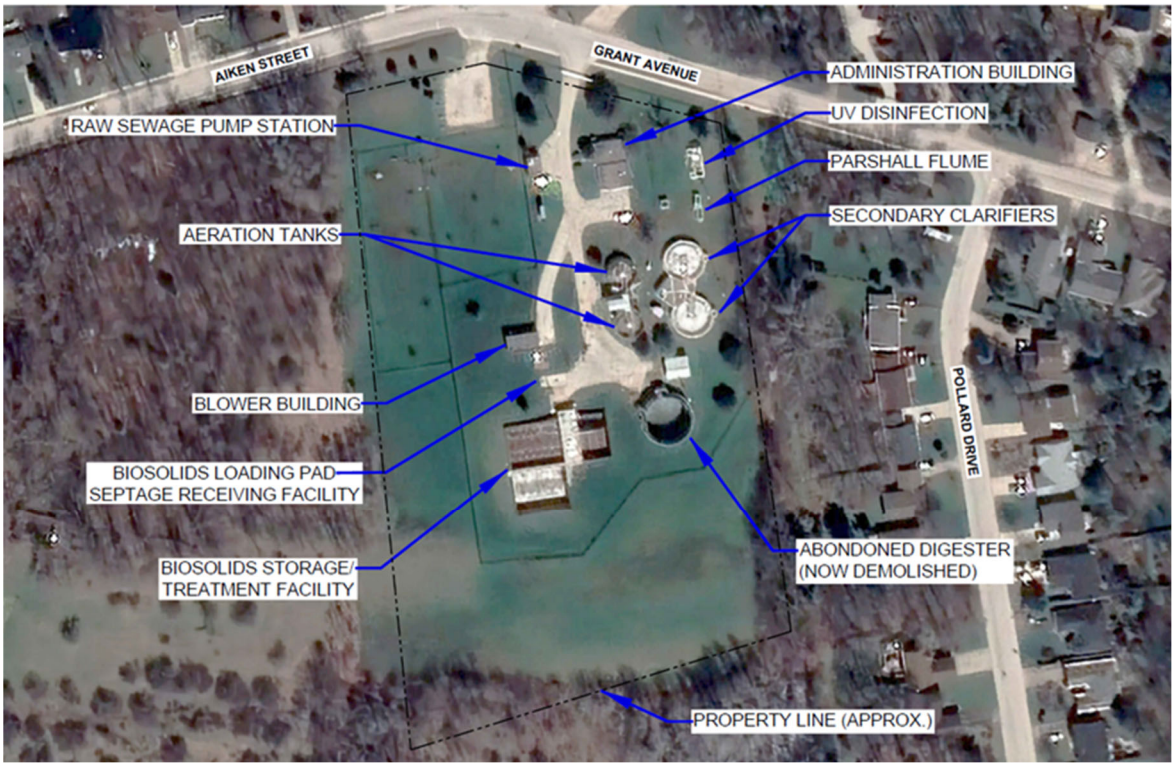
The study area is the Meaford Settlement Area Boundary which is currently being serviced by the existing WWTP as well as areas projected for growth adjacent to Highway 26. The Meaford WWTP, located on a 3.9 Ha parcel of land at 35 Grant Avenue, is the subject site. The study area and subject property are shown in **Figure ES-1**.

Figure ES-1 - Study Area



The Meaford WWTP is located at 35 Grant Avenue. The WWTP was originally constructed in 1969 and has undergone a variety of modifications and upgrades. The existing WWTP major treatment systems and layout are shown in **Figure ES-2**.

Figure ES-2 - Existing WWTP Site Layout



ES-6 Phase 2 Reconfirmation Studies

A series of investigations and technical studies were carried out in this Class EA to confirm the Master Plan findings to refine the problem/opportunity statement before proceeding with Phase 3 investigation of alternative solutions. These studies included:

- Condition Assessment to identify the condition of existing WWTP assets.
- Capacity Assessment to review the capacity of the existing WWTP.
- Current and Projected Wastewater Flows Assessment to provide an overview of the past and current wastewater flows and a projection of future flows based on current development information.
- Consultation with MECP to discuss the effluent limits for the Meaford WWTP and to confirm that limits proposed in the 2007 Class EA remain acceptable to the MECP.
- Socio-cultural Studies to assist in defining the potential impacts to archaeological resources, built heritage resources and cultural heritage landscapes.
- Climate Change Assessment to assist in defining the project's potential impacts to climate change and how climate change may impact the project.
- Natural Environment Study to identify the natural environment features of the study area.
- Socio-economic Environment Study to identify the socio-economic environment features of the study area.

ES-7 Evaluation Methodology

The evaluation methodology used to select the preferred design alternatives was established in a manner consistent with the principles of environmental assessment planning and decision-making as outlined in the Municipal Class Environment Assessment.

Evaluation of each of the treatment processes involved two main steps:

- Identification of a long list of all potential alternatives and the screening of this list down to a shortlist of viable alternatives.
- A detailed evaluation of the short-listed alternatives to identify a recommended preferred alternative solution.

The short-list evaluation process involved identification of potentially viable alternatives followed by conceptual design, sizing, and costing of each alternative and a detailed evaluation using screening criteria. The screening criteria were chosen to reflect key aspects of the component being evaluated. Four primary screening categories were used for the evaluation:

- Social/Cultural Impacts;
- Environmental Impacts;
- Technical Performance;
- Economic Impacts.

Each category was given a weighting to capture its importance relative to the other categories used to evaluate each component. The Harvey Ball scoring system was used and implemented using the scoring system defined in **Table ES-1**.

Table ES-1 - Harvey Ball Scoring System

Rating	Socio-Cultural	Technical	Environmental	Economic
● Most Preferred	Low Impact	High Technical Merit	Low Impact	Low Cost
◕ Moderately to Highly Preferred	Low to Moderate Impact	Moderate to High Technical Merit	Low to Moderate Impact	Low to Moderate Cost
◑ Moderately Preferred	Moderate Impact	Moderate Technical Merit	Moderate Impact	Moderate Cost
◔ Less Preferred	Moderate to High Impact	Low to Moderate Technical Merit	Moderate to High Impact	Moderate to High Cost
○ Least Preferred	High Impact	Low Technical Merit	High Impact	High Cost

ES-8 Phase 3 Design Alternatives and Evaluation

Phase 3 of the Class EA develops Design Alternatives and further details of their socio-cultural, technical, economic, and environmental impacts. The Design Alternatives evaluated in Phase 3 were alternatives related to meeting 2054 average daily flows and full build-out projections, managing current and projected peak flows, and technology alternatives for the plant expansion.

The design alternatives evaluated in Phase 3 were:

- Managing Current and Projected Peak Flows:
  - Alternative 1: Construct the Phase 2 Aeration and Sedimentation tanks in Phase 1 and use the tanks for peak flow management in the near term.
  - Alternative 2: Use a high-rate clarification system to treat flows exceeding the peak capacity of the WWTP.
- Secondary Treatment:
  - Alternative 1: Extended Aeration
  - Alternative 2: Sequencing Batch Reactor (SBR)
  - Alternative 3: Membrane Aerated Biofilm Reactor (MABR)
  - Alternative 4: Aerobic Granular Sludge (AGS)
- Tertiary Treatment:
  - Alternative 1: Up-flow Sand Filter
  - Alternative 2: Cloth Disc Filter
  - Alternative 3: High-rate Clarifier
- Disinfection Treatment:
  - Alternative 1: Chlorination/De-chlorination
  - Alternative 2: Ultra-Violet Radiation
- Solids Treatment:
  - Alternative 1: Aerobic Digestion
  - Alternative 2: Auto-Thermal Thermophilic Aerobic Digestion (ATAD)

ES-9 Recommended Design Alternative

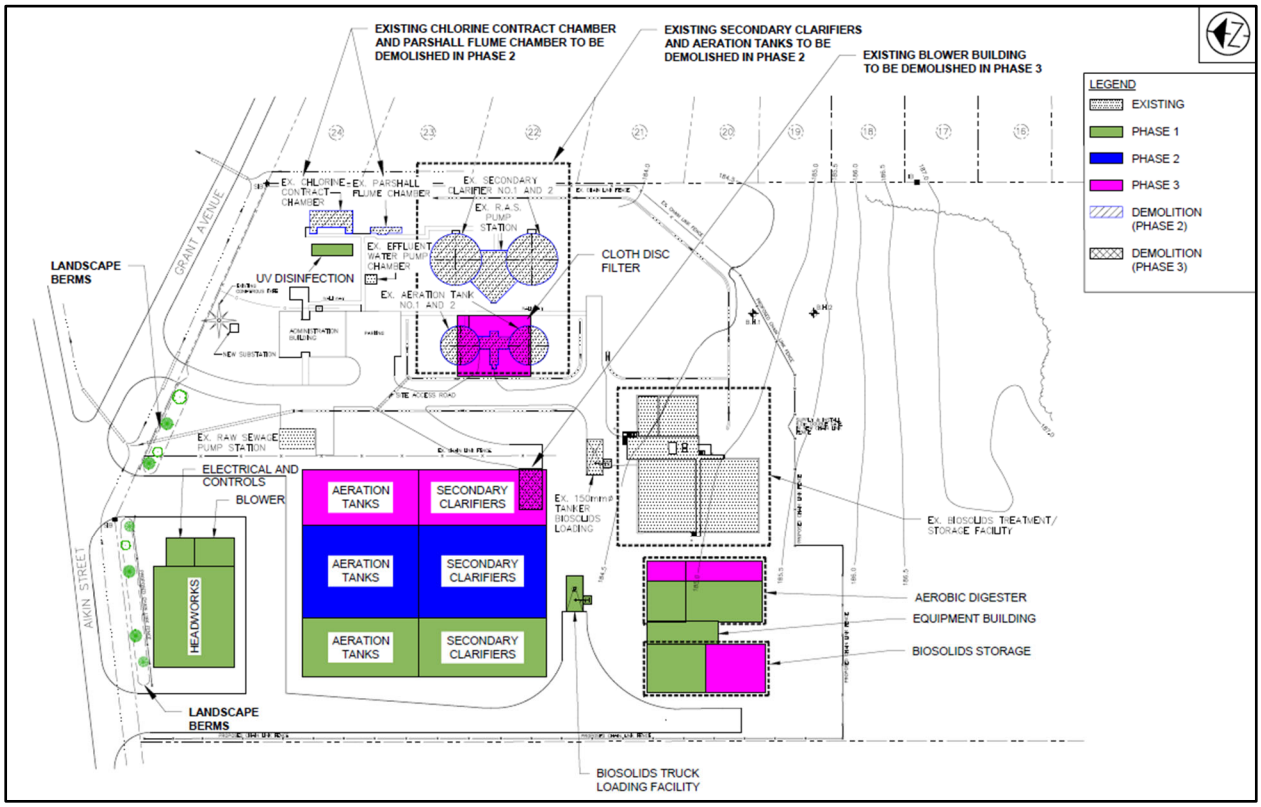
The recommended design alternatives based on the Phase 3 evaluations are summarized in **Table ES-2** below.

Table ES-2 - Recommended Design Alternatives

Process	Recommended Design Alternatives
Preliminary Treatment	Mechanical Screening and Grit Removal with Odour Control
Secondary Treatment	Extended Aeration
Tertiary Treatment	Cloth Disc Filter
Disinfection	UV Disinfection
Biosolids Management	Aerobic Digestion
Peak Flow Management	Equalization Storage

The conceptual layout of the preferred design alternative is shown in **Figure ES-3**.

Figure ES-3 - Meaford WWTP Preliminary Site Plan



ES-10 Opinion of Cost

Ainley Group has prepared a rough order of magnitude capital construction cost estimate (Class 5) for the Meaford WWTP.

A breakdown of the cost estimate is presented in **Table ES-3**. The estimated total capital construction cost for Phase 1, Phase 2, and Phase 3 are $56,245,000, $24,210,000, and $32,121,000 respectively (2023 dollars). The estimated total cost for the wastewater treatment plant to Full Buildout is $112,576,000 (2023 dollars).

Table ES-3 - Estimated Capital Construction Cost of Meaford WWTP

	PHASE 1 CAPITAL COST ESTIMATE (2023 Dollars)	PHASE 2 CAPITAL COST ESTIMATE (2023 Dollars)	PHASE 3 CAPITAL COST ESTIMATE (2023 Dollars)
Preliminary Treatment / Headworks	$12,836,000		
Secondary Treatment (Extended Aeration)	$11,944,000*	$13,228,000	$8,414,000
Tertiary Treatment (Cloth Filter Media)			$5,579,000
Disinfection (UV Radiation)	$760,000		$ 134,000
Biosolids Treatment (Aerobic Digestion)	$5,194,000		$ 3,424,000

	PHASE 1 CAPITAL COST ESTIMATE (2023 Dollars)	PHASE 2 CAPITAL COST ESTIMATE (2023 Dollars)	PHASE 3 CAPITAL COST ESTIMATE (2023 Dollars)
SUBTOTAL	**$ 30,734,000**	**$ 13,228,000**	**$17,551,000**
General Requirements including Mobilization and Demobilization, Insurance and Bonding, etc. (20%)	$6,147,000	$2,646,000	$3,511,000
Contractors Profit (8%)	$2,459,000	$1,059,000	$1,405,000
Contingency (40%)	$12,294,000	$5,292,000	$7,021,000
Engineering Fees (15%)	$4,611,000	$1,985,000	$2,633,000
TOTAL CAPITAL COST	**$56,245,000**	**$24,210,000**	**$32,121,000**

* Including cost for construction of the blower/RAS/WAS building

ES-11 Summary of Preferred Alternative

The key elements of the preferred Design Alternative are summarized in **Table ES-4**.

Table ES-4 - Summary of Phasing Strategy

Phasing	Proposed Expansion	Year to Begin Construction
Phase 1 - Expansion of the existing plant to achieve plant service until 2054	▪ New headworks facility for full-build out capacity (6,000 m^3/d)	2025
	▪ New extended aeration tanks and secondary clarifiers (1,700 m^3/d)	2026
	▪ New UV disinfection channel for full-build out capacity (6,000 m^3/d)	2026
	▪ New aerobic digesters (2,900 m^3/d)	2026
	▪ New biosolids storage units (1,200 m^3/d)	2026
Phase 2 - Replacement of the aging tanks to maintain plant service until 2054	▪ New extended aeration tanks and secondary clarifiers (2,700 m^3/d)	2041
	▪ Demolition of existing aeration tanks and secondary clarifiers	2041
Phase 3 - Expansion of the plant to full build-out capacity	▪ New extended aeration tanks and secondary clarifiers (1,600 m^3/d)	2053
	▪ New cloth disc filter for full-build out capacity (6,000 m^3/d)	2053
	▪ New aerobic digesters (1,600 m^3/d)	2053
	▪ New biosolids storage units (1,200 m^3/d)	2053

ES-12 Impacts, Mitigation Measures and Monitoring Program

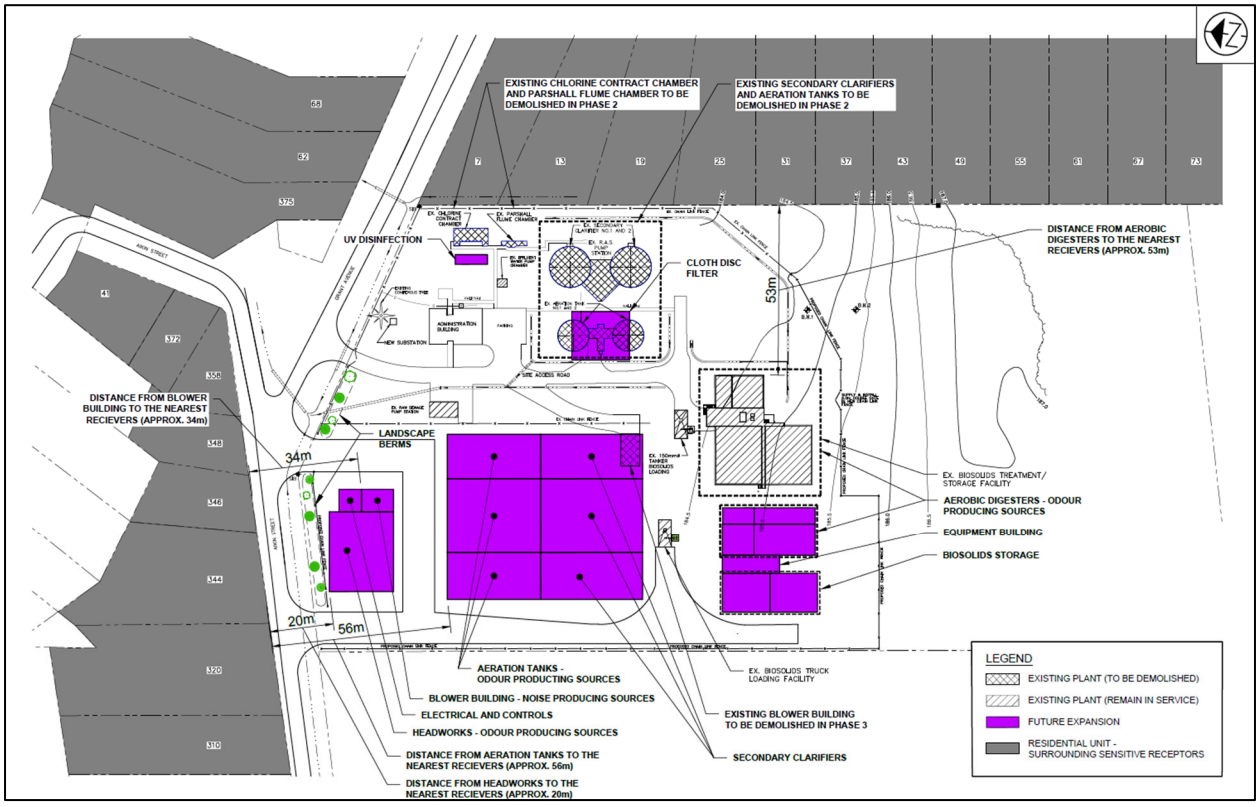
Through the evaluation of alternatives, potential impacts of expanding the Meaford WWTP evaluated on the social/cultural, technical, natural, and economic aspects of the environment

were identified. The potential impacts were evaluated and against the baseline conditions of continuing to maintain the Meaford WWTP (Do Nothing).

The site has been reviewed for archaeological and cultural heritage features and none were identified through the study. As such, no impacts to archaeological resources, built heritage resources and cultural heritage landscapes will occur during implementation of the solution.

Upon completion of the upgraded works, the new treatment processes have the potential to increase odour and air emissions and noise impacts at nearby sensitive receptors. The new layout proposed places odour and noise generating processes at a new location of the site with new sensitive receivers. **Figure ES-4** below presents the surrounding odour sensitive receptors, points of odour producing sources and the distance between each odour producing source and the nearest receptors.

Figure ES-4 - Odour and Noise Sensitive Receptors and Points of Producing Sources



The expansion of the Meaford WWTP will not adversely affect terrestrial habitat or wildlife within the proposed site footprint. The site is cleared and is currently used as a public dog park; the site does not contain any significant wildlife habitat, species at risk habitat, woodlands, wetlands, fish habitat or floodplain to be disturbed by construction activities. In addition, the existing outfall has sufficient capacity for the proposed suture capacity and no upgrades have been recommended; as such, no shoreline work is anticipated as part of the proposed upgrades.

Capital cost impacts of the proposed solution are significant; the proposed works have a total estimated capital cost of approximately $113 million over the full three-phases of expansion proposed. The yearly operation costs associated with the expanded works are anticipated to

rise resulting from costs to operate a chemical phosphorus removal system, increased sludge hauling resulting from additional flows and chemical use, and increased energy costs to operate blowers for the expanded capacity.

Monitoring of potential environmental impacts and mitigation measures, during and after the implementation of the preferred design alternative, is an important and necessary step. The mitigation measures and monitoring program during the construction and operation of the facilities were identified from social/cultural, technical, natural, and economic aspects.

Table ES-5 summarized the monitoring activities, frequency and timing of survey, and parameters for documentation.

Table ES-5 - Monitoring Program

Category	Monitoring Activities	Frequency	Documentation
Social/ Cultural	Community Feedback	Bi-annual community surveys to gather feedback on construction impacts and community satisfaction	Assess noise levels, dust complaints, and overall community sentiment regarding the construction process and during operation
	Traffic Monitoring	Monthly assessments during construction	Monitor traffic flow, congestion, and incidents near the construction site to ensure effective implementation of the traffic management plan
Technical	Water Quality Monitoring	Monthly sampling of effluent and downstream water quality during operational phases	Keep records of total phosphorus, nitrogen levels, suspended solids, and biochemical oxygen demand (BOD) parameters
	Surface Water Monitoring	Monthly sampling of final outfall mixing zone during construction	Assessment of potential cladophora management if warranted
	Stormwater Monitoring	Constant monitoring during wet weather conditions	Keep records of on-site spill events and mitigation measures taken
Natural	Terrestrial Habitat Assessment	Pre-construction, mid-construction, and post-construction assessments	Document any unexpected impacts on the site and surrounding areas, including monitoring for any unanticipated wildlife activity

Economic	Cost Analysis	Quarterly financial reviews to evaluate capital and operational expenditures	Track operational costs related to energy, chemical usage, and sludge management to assess budget compliance and identify potential savings

ES-13 Permits and Approvals

Prior to any construction of the works, all necessary approvals by concerned agencies must be in place. At the commencement of the implementation phase, an approvals register should be prepared and reviewed with concerned agencies to verify their specific requirements. The following represent the main approvals that will be required on the project:

- Ministry of Environment, Conservation and Parks (MECP): MECP will issue Environmental Compliance Approvals (ECA) for sewage, air and noise, which will delineate the physical extent of the works being approved and the compliance requirements for effluent quality, odour, and noise as well as outlining monitoring and reporting requirements. ECA applications will require completion of the designs and design reports.
- Grey Sauble Conservation Authority (GSCA): GSCA will require application for a work permit where the works affect a watercourse, floodplain, valley slope, wetland or hazardous lands. Applications will require submission of an Environmental Management Plan as well as relevant drawings.
- Ministry of Natural Resources and Forestry (MNRF): MNRF will require application for a permit for any works that affect species at risk, fish or bird habitat, as well as work in or near rivers. Applications will require submission of an Environmental Management Plan that delineates all potential impacts as well as planned mitigations.
- Municipality of Meaford (Municipality): The Municipality will require application for building permits for any building works including the WWTP.
- Hydro One: A range of permits and inspection will be required from Hydro One involving incoming power, protective systems, and installation compliance.
- Technical Standards and Safety Authority (TSSA): TSSA approval will be required for installation of the diesel generator and any fuel systems.

ES-14 Class EA Consultation

Public engagement and input are integral components of the Class EA process and assist in ensuring that anyone with an interest has the opportunity to provide input as the study proceeds.

Phase 1 & 2 consultation was completed as part of the 2015 Master Plan where the public and agency consultation, particularly with respect to the development and evaluation of all servicing alternatives and preferred solutions, were presented to the public at a Public Information Centre (PIC) held on February 26th, 2015. No comments regarding these solutions as presented were received following the Master Plan PIC.

A database containing the contact information of stakeholders, review agencies, indigenous groups, and other interested parties was developed at the outset of the study and it was further

updated regularly to invite participation in the study. Three Notices were issued throughout the study, including a Notice of Commencement (September 9th, 2021), Notice of PIC (September 28th, 2023) and Notice of Completion (July 11th, 2024), through distribution directly to contacts on the database, publication in local newspapers and posting on the Municipality's website.

An informal drop-in format PIC was held on October 12th, 2023 at the Meaford Hall. Display Boards containing pertinent information was available for public review. Representatives of the project team were presented to answer individual questions in a one-on-one format. A total of 31 visitors attended the PIC.

Engagement with specific First Nation communities, Saugeen Ojibway Nation (SON) and Huron-Wendat Nation, occurred throughout the study. Notices of Study Commencement, PIC and Study Completion were provided as well as follow-up phone calls made as each notice was issued. Representative were invited to participate in the archaeological assessment fieldwork and to provide comments on reports.

All input received from stakeholders was incorporated into the recommended design alternative.

Table of Contents

Table of Figures

Table of Tables

Appendices

Glossary of Terms

ADF	Average Daily Flow, typically expressed throughout the report in units of cubic metres per day (m^3/d)
AGS	Aerobic Granular Sludge
Ainley	Primary engineering consultant for the Class EA process.
Alternative Solution	A possible approach to fulfilling the goal and objective of the study or a component of the study.
ATAD	Autothermal Thermophilic Aerobic Digester
BOD	Biological Oxygen Demand.
Build-out	Refers to a future date where all vacant and underdeveloped lots have been fully developed in accordance with the Town's Official Plan.
Catchment	The collection of water over a drainage area due to the ground's natural topography.
CAS	Conventional Activated Sludge.
Class EA	Municipal Class Environmental Assessment, a planning process approved under the EA Act in Ontario for a class or group of municipal undertakings. The process must meet the requirements outlined in the "Municipal Class Environmental Assessment" document (Municipal Engineers Association, March 2023, as amended). The Class EA process involves evaluating the environmental effects of alternative solutions and design concepts to achieve a project objective and goal and includes mandatory requirements for public consultation.
Design Concept	A method of implementing an alternative solution(s).
EAA	Environmental Assessment Act, R.S.O. 1990, c.E.18 (Ontario)
Environmental Compliance Approval (ECA)	This approval covers emissions and discharges related to air, noise, waste or sewage.
Effluent	Liquid after treatment. Effluent refers to the liquid discharged from the WWTP to the receiving water.
ESR	Environmental Study Report, a report prepared at the culmination of Phase 4 of the Class EA process under a Schedule C planning process.
Evaluation Criteria	Criteria applied to assist in identifying the preferred solution(s).
Flood Plain	A flood plain is an area of land adjacent to a stream or river which stretches from the banks of its channel to the base of the enclosing valley walls and which experiences flooding during periods of high discharge.
Forcemain	A pressurized pipe used to convey pumped wastewater from a sewage pumping station.
Geotechnical Investigation	Study of the engineering behavior of earth materials such as soil properties, rock characteristics, natural slopes, earthworks and foundations, etc.
Inflow and Infiltration (I&I)	Rainwater and groundwater that enters a sanitary sewer during wet weather events or due to leakages, etc.
Lifecycle Cost	The total cost of facility ownership. It takes into account all costs of acquiring, owning, operating, and disposing of an asset.
Local Conservation Authority	A conservation authority is a local, community-based natural resource management agency based in Ontario, Canada. Conservation authorities are mandated to develop programs to further the conservation, restoration, development and management of Ontario's natural resources.

MABR	Membrane Aerated Biofilm Reactor
Master Plan	A comprehensive plan to guide long-term development in a particular area that is broad in scope. It focuses on the analysis of a system for the purpose of outlining a framework for use in future individual projects.
MEA	The Ontario Municipal Engineers Association (MEA) is an association of public sector Professional Engineers in the full-time employment of municipalities performing the various functions that comprise the field of municipal engineering.
MNRF	Ministry of Natural Resources and Forestry, the provincial agency responsible for the promotion of healthy, sustainable ecosystems and the conservation of biodiversity in Ontario.
MECP	Ministry of the Environment, Conservation and Parks, the provincial agency responsible for water, wastewater and waste regulation and approvals, and environmental assessments in Ontario.
NPV	Net Present Value is the value in the present of a sum of money, in contrast to some future value it will have when it has been invested at compound interest.
O&M	Operation and maintenance
Official Plan (OP)	An official plan describes your upper, lower or single–tier municipal council's policies on how land in a community should be used. It is prepared with input from members in a community and helps to ensure that future planning and development will meet the specific needs of the community.
PDF	Peak Daily Flow, typically expressed throughout the report in units of cubic metres per day (m^3/d)
Peaking Factor	The Harmon Peaking Factor is applied to the average daily flow in order to account for the possibility of uncertainty or underestimation. This factor reduces as contributing population increases and vice versa.
Peak Flow	An estimation of the maximum volume of wastewater generated over a single day. The peak day flow is calculated by multiplying the ADF by the Harmon Peaking Factor.
PHF	Peak Hourly Flow
Preferred Alternative	The alternative solution which is the recommended course of action to meet the objective statement based on its performance under the selection criteria.
RAS	Return Activated Sludge
SBR	Sequencing Batch Reactor
Screening Criteria	Criteria applied to identify the short-list of alternative solutions from the long-list of alternative solutions.
Service Area	The area that will receive sewage servicing as a result of this study.
Service Life	The length of time that an infrastructure component is anticipated to remain in use assuming proper preventative maintenance.
Sewage	The liquid waste products of domestic, industrial, agricultural and manufacturing activities directed to the wastewater collection system.
Study Area	The area under investigation in which construction may take place in order to provide servicing to the Service Area.
Storm Water Management Facility	A Facility that gathers rainfall and surface water runoff to help reduce the possibility of flooding and property damage. They are specifically designed to collect runoff from streets, the ground surface and storm sewers.
TAN	Total Ammonia Nitrate.

Threatened Species	A species likely to become endangered in Canada if the factors affecting its vulnerability are not reversed.
TM	Technical Memorandum
TP	Total Phosphorous
TSS	Total Suspended Solids
UV	Ultra-Violet
WAS	Waste Activated Sludge
Wastewater	See Sewage
Wastewater Treatment Plant (WWTP)	A plant that treats urban wastewater to remove solids, contaminants and other undesirable materials before discharging the treated effluent back to the environment. Referred to in this Class EA as a Wastewater Treatment Plant.

1 Introduction & Background

This Municipal Class Environmental Assessment (Class EA) is being undertaken to complete Phase 3 and Phase 4 for the expansion of Meaford Wastewater Treatment Plant (WWTP) following the 2015 Meaford Water and Wastewater Master Plan (the Master Plan).

The Class EA process will be documented in an Environmental Study Report (ESR). This ESR presents an overview of the study, provides a problem and opportunity statement and include a discussion of both the methodology used and the technical analysis conducted in accordance with the requirements for a Schedule 'C' Class EA.

The public consultation process carried out as a part of the study has been documented herein. Feedback arising from public consultation is integrated into the study findings. The specific feedback received on the study and the influence imparted on the course of the study is summarized in the report.

The first section of the report provides background information leading up to the Municipal of Meaford proceeding to complete outstanding components of a Schedule 'C' Class EA on the expansion of the Meaford WWTP. This section provides historical context provided through reviewing previous studies, study purposes, and project specific details.

1.1 Issue History

In 2007, the Municipality of Meaford retained EarthTech to complete a Class EA for the Meaford Wastewater Treatment Plant (WWTP). In their report, EarthTech recommended increasing the capacity of the plant through expanding the current plant at the existing site.

The 2015 Meaford Water and Wastewater Servicing Master Plan (the Master Plan), completed by Ainley Group, followed up on the completion of the 2007 Class EA. The Master Plan addressed the state of the existing infrastructure and identified existing and future wastewater needs required for servicing the full-built out requirements of the urbanized area of Meaford. In the Master Plan the preferred solution proposed for the WWTP was a combination of short-term, medium-term, and long-term initiatives involving the replacement of equipment and structures that had reached the end of their useful lifespan, as well as the phased expansion of the facility. A copy of the Master Plan is provided in **Appendix A**.

The completion of the Master Plan allowed for the Municipality to identify a group of related water and wastewater projects to be reviewed together before having to further engage in completing the Class EA process for individual projects when and if these proceeded. During the Master Plan, the Municipality had identified the problem or opportunity, as well as identified and evaluated the alternative solutions. By completing Phases 1 and 2 of the Class EA process during the Master Plan it therefore allowed subsequent phases of the EA process and requirements to be expedited and completed in advance of the construction of new infrastructure. The Municipality is now proceeding with completing the final phases of the Class EA following the Schedule 'C' Class EA process to expand the Meaford WWTP.

The current WWTP does not have any provisions to allow further expansion within the existing facility (i.e., there is no way to increase production of current treatment processes). A WWTP expansion is required to support growth and provide wastewater treatment to existing and future customers within urban Meaford. The Master Plan reinforced the historical general alternative that recommended increasing the capacity of the plant by expanding within the existing property upon where the plant is situated.

1.2 Earlier Studies

Several related studies were completed prior to the commencement of this Class EA Study. The following is a list of the documents and studies reviewed:

- Wastewater Treatment Plant Annual Performance Reports (2016-2022)
- Municipality of Meaford Official Plan (2014)
- Meaford Wastewater Treatment Plant ESR (2007)
- Assimilative Capacity Study Update (2012)
- Wastewater Treatment Plant Alternatives for Upgrading Report (2010)
- Meaford Water and Wastewater Servicing Master Plan (2015)
- Inflow and Infiltration Strategy Report (2021)
- Update to the County of Grey Growth Management Strategy (2021)

1.3 Phase 1 & 2 Consultation

The Master Plan included public and agency consultation, particularly with respect to the development and evaluation of all servicing alternatives. The comments and input received were taken into consideration during the preparation of the Master Plan process. The preferred solutions contained in the Master Plan were presented to the public at a Public Information Centre (PIC) held on February 26th, 2015. No comments regarding these solutions as presented were received following the Master Plan PIC.

1.4 Study Purposes

As previously stated, the Municipality of Meaford recognized the need to expand the Meaford WWTP. The 2007 Class EA and subsequent 2015 Master Plan both indicated the need to expand the facility. Further, expanding wastewater treatment on the current site where the WWTP operates was proposed.

Since completing the Master Plan and commencing this project in 2021, the County of Grey updated growth projections and related management strategies. The County commissioned Hemson Consulting Ltd., to complete the update and in that 2021 report (2021 Update to the County of Grey Growth Management Strategy (GMS) it shows the Municipality of Meaford is expected to grow by approximately 1,680 people, with 1,120 additional households and 650 new jobs created through to the year 2046. On an annual basis, according to the GMS, approximately 45 new households will be built in Meaford. While the growth allocations in the Hemson report have not been divided further between rural and urban areas of the Municipality, applicable provincial and local policies largely direct new development to the urban area where full municipal services are available. It is assumed the majority (90%) of the growth within the Municipality will therefore occur in the urban area where full municipal water and sewer services are provided. In addition, approximately 26 new jobs will be created each year and it is assumed these will be based in the urban area of Meaford.

Beyond the historical stance found in the 2007 Class EA and the Master Plan proposing the existing WWTP be expanded, the anticipated growth of the urban area in Meaford is motivation to now proceed with expanding the facility.

The Environmental Study Report (ESR) documents the planning process followed to complete this Class EA. As Phases 1 and 2 of the Class EA have essentially been completed through the Master Plan, the focus of this ESR reconfirms the preferred solution from the Master Plan to expand the Meaford WWTP, documents Phase 3 of the Class EA process and completes Phase 4.

1.5 Project Team

The project team members involved in the completion of this Schedule 'C' Class EA were as follows:

Proponent:	The Municipality of Meaford
Primary Consultant:	Ainley Group
Sub-consultants:	Archaeological Services Inc.

1.5.1 Authorization

The Municipality of Meaford retained Ainley Group to conduct the WWTP EA, review the previous design recommendations indicated in the Master Plan and investigate new technologies, in accordance with the Municipal Class Environmental Assessment Document, October 2000, as amended in 2015.

2 Class Environmental Assessment Process

Ontario's Environmental Assessment Act (henceforth referred to as "EAA") was proclaimed in 1976. The EAA requires proponents to examine and document the environmental effects that might result from major projects or activities. Municipal undertakings became subject to the EAA in 1981.

The EAA defines the environment broadly as:

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

The purpose of the EAA is the betterment of the people in the whole or any part of Ontario by providing for the protection, conservation and wise management of the environment in the province.

As set out in Section 5(3) of the EAA, an EA document must include the following:

- A description of the purpose of the undertaking including:
  - The undertaking.
  - The alternative methods of carrying out the undertaking.

  - Alternatives to the undertaking.
- A description of:
  - The environment that will be affected or that might reasonably be expected to be affected, directly or indirectly, by the undertaking or alternatives to the undertaking.
  - The effects that will be caused or that might reasonably be expected to be caused to the environment by the undertaking or alternatives to the undertaking.
  - The actions necessary or that may reasonably be expected to be necessary to prevent, change, mitigate or remedy the effects upon or the effects that might reasonably be expected upon the environment by the undertaking or alternatives to the undertaking.
- An evaluation of the advantages and disadvantages to the environment of the undertaking, the alternative methods of carrying out the undertaking and the alternatives to the undertaking.

2.1 Principles of Environmental Planning

EAA sets a framework for a systematic, rational and replicable environmental planning process that is based on five key principles, as follows:

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

2.2 Municipal Class Environmental Assessment

Class Environmental Assessments (EAs) were approved by the Minister of the Environment in 1987 for municipal projects having predictable impacts that can be mitigated. The Class EA approach streamlines the planning and approvals process for municipal projects which have the following characteristics:

- Recurring
- Similar in nature
- Usually limited in scale
- Predictable range of environmental impacts

- Environmental impacts are responsive to mitigation

The Municipal Class Environmental Assessment document, prepared by the Municipal Engineers Association (MEA) (October 2000, as amended in 2007, 2011, and 2015), outlines the procedures to be followed to satisfy Class EA requirements for water, wastewater and road projects. The process includes five phases:

- Phase 1: Problem Definition
- Phase 2: Identification and Evaluation of Alternative Solutions to Determine a Preferred Solution
- Phase 3: Examination of Alternative Methods of Implementation of the Preferred Solution
- Phase 4: Documentation of the Planning, Design and Consultation Process
- Phase 5: Implementation and Monitoring

Public and agency consultation are integral to the Class EA planning process. Projects subject to the Class EA process are classified into four possible "Schedules" depending on the degree of expected impacts. It is important to note that the Schedule assigned to a particular project is proponent-driven. For example, if a project has been designated as Schedule "A", the proponent can decide to comply with the requirements of a Schedule "B" or "C" of the MEA process based on the magnitude of anticipated impacts or the special public and agency consultation requirements specific to that particular project.

The Class EA process flowchart is provided in **Figure 2-1**.

Schedule "A" Projects

Schedule "A" projects are minor, operation and maintenance activities and are pre-approved without the need for further assessment. Projects with this designation are typically limited in scale and have minimal adverse environmental impacts. An example of a Schedule "A" wastewater project is the establishment of a sewage collection system and all necessary works to connect the system to an existing sewage outlet, where it is required as a condition of approval on a site plan, consent plan of subdivision or plan of condominium approved under the Planning Act prior to construction. This type of project is pre-approved and the proponent may proceed without following the procedures set out in any other part of the Class EA process.

Schedule "A+" Projects

Schedule "A+" projects were introduced by MEA in 2007. Similar to Schedule "A", these projects are also pre-approved. However, the difference is that for Schedule "A+" projects, the public must be advised prior to project implementation. An example of a Schedule "A+" wastewater project would be the establishment, extension or enlargement of a sewage collection system and all necessary works to connect the system to an existing sewage or natural drainage outlet, provided all such facilities are in either an existing road allowance or an existing utility corridor, including the use of Trenchless Technology for water crossings.

Schedule "B" Projects

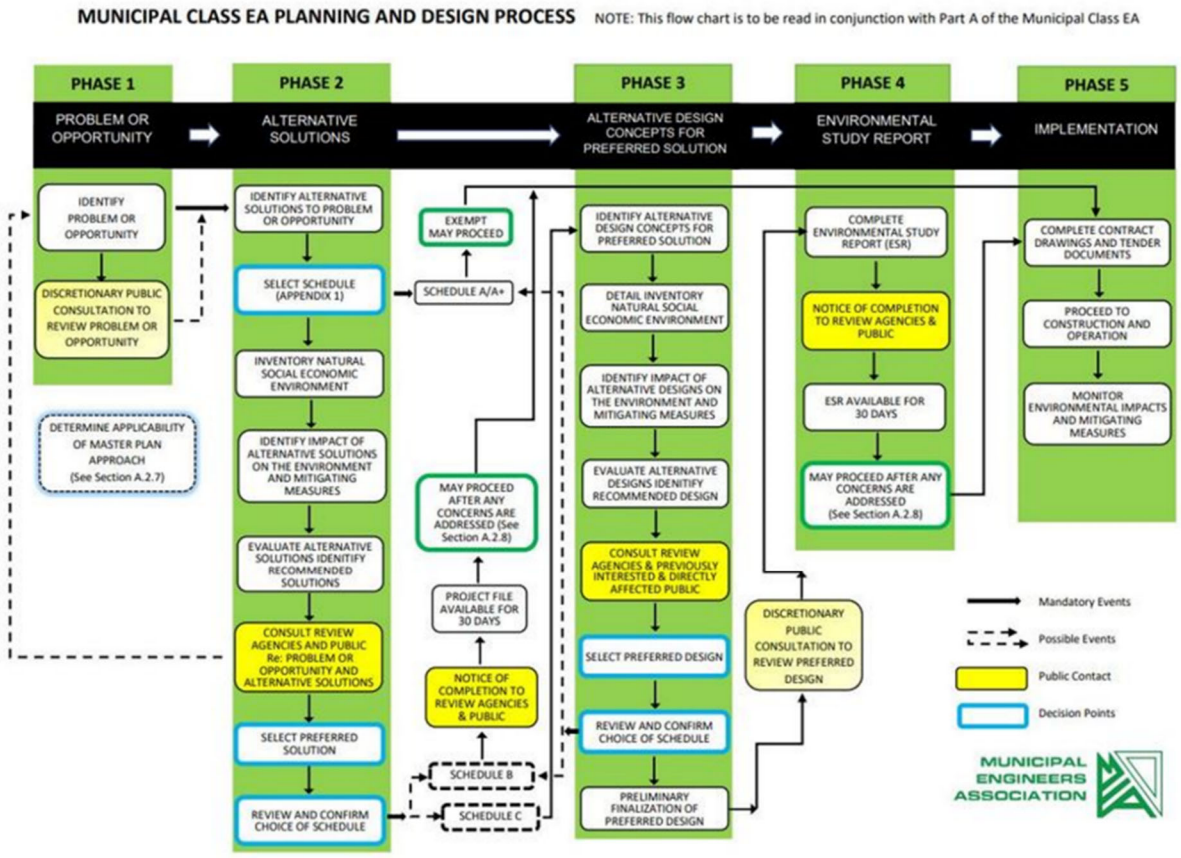
Schedule "B" projects generally include improvements and minor expansions to existing facilities where there is potential for some adverse environmental impacts. These projects require screening of alternatives for their environmental impacts and completion of Phases 1 and 2 of the Class EA planning process and public filing of the project file. If outstanding issues

remain after the public review period, any party may request that the Minister of the Environment and Climate Change consider a Part II Order (also known as bumping-up the project) to elevate the project to a more stringent process (Schedule “C” or an Individual Environmental Assessment). Provided no significant impacts are identified and no requests for a Part II order are received, Schedule “B” projects are approved and may proceed directly to Phase 5: Implementation. An example of a Schedule “B” wastewater project would be the establishment, extension or enlargement of a sewage collection system and all works necessary to connect the system to an existing sewage outlet where such facilities are not in an existing road allowance or an existing utility corridor.

Schedule “C” Projects

Schedule “C” projects generally include the construction of new facilities and major expansions to existing facilities. These projects are typically more complex and have the potential for significant environmental effects. As a result, they proceed under full planning and documentation procedures and satisfy all five phases of the Class EA planning process. Phase 3 involves the assessment of alternative methods of carrying out the project, as well as public consultation on the preferred conceptual design. Phase 4 is the preparation of an Environmental Study Report which is filed for public review. Provided no significant impacts are identified and no requests for Part II Order or “bump-up” to an Individual Environmental Assessment are received, Schedule “C” projects are then approved and may proceed to Phase 5: Implementation. An example of a Schedule “C” wastewater project would be construction of a new sewage system, including the construction of treatment and an outfall to a receiving water body and/or a constructed wetland for treatment.

Figure 2-1 - 2015 Municipal Class EA Process



Major expansions or the construction of new wastewater treatment facilities follow a Schedule 'C' process.

3 Planning Policy

This section provides a brief discussion of various land use planning policies and principles to illustrate the consistency of this project in relation to provincial, regional and municipal planning goals.

3.1 Provincial Policy Statement (2020)

The *Provincial Policy Statement (2020)* provides policy direction relating to land use planning and development in Ontario. Section 3 of the *Planning Act* stipulates that all decisions affecting planning matters are to be consistent with the *Provincial Policy Statement (PPS)*. Policies applicable to this project include the following:

- Section 1.1.1e) "Healthy, livable and safe communities are sustained by promoting the integration of land use planning, growth management, transit-supportive development, intensification and infrastructure planning to achieve cost-effective development patterns, optimization of transit investments, and standards to minimize land consumption and servicing costs."

- Section 1.6.1 “Infrastructure and public service facilities shall be provided in an efficient manner that prepares for the impacts of a changing climate while accommodating projected needs.”
- Section 1.6.6.2 “Municipal sewage services and municipal water services are the preferred form of servicing for settlement areas to support protection of the environment and minimize potential risks to human health and safety. Within settlement areas with existing municipal sewage services and municipal water services, intensification and redevelopment shall be promoted wherever feasible to optimize the use of the services.”
- Section 2.1.1 “Natural features and areas shall be protected for the long term.”
- Section 2.6.1 “Significant built heritage resources and significant cultural heritage landscapes shall be conserved.”

As the current project is following a Municipal Class Environmental Assessment process consideration is being given to the potential to impact the physical, natural, social, and economic environment prior to selection of the preferred solution. Various studies have been completed to obtain a better understanding of the existing conditions of the study area so that impacts can be properly assessed and appropriate mitigation developed.

3.2 Clean Water Act (2006)

The purpose of the *Clean Water Act ,2006 (CWA)* is to provide protection of municipal drinking water at the source and to safeguard human health and the environment. It aims to protect existing drinking and future drinking water sources. The CWA and its regulations ensure that municipal drinking water supplies is protected through prevention by the development of watershed-based source protection plans. The source protection plans identify vulnerable areas within each municipality and provide policies to address existing and future risks to municipal drinking water sources. This project is subjected to the *Grey Sauble Source Protection Plan (October 16, 2015)* and is within the Grey Sauble Source Protection Area.

3.3 Ontario Water Resources Act (1990)

Under the *Ontario Water Resources Act, 1990 (OWCA)*, the construction and operation of wastewater treatment facilities in the Georgian Bay are regulated. Requirements for the planning, design, construction and operations of sewage works are specified, along with the requirements that the Municipality must satisfy in order for the province to grant approval for establishing, altering, extending, or replacing wastewater system components.

3.4 Municipality of Meaford Official Plan (2014)

At the municipal level, provincial policy is implemented through the Municipality of Meaford Official Plan. Population and employment projections for the planning period have been prepared for the Municipality of Meaford to establish a basis for assessing the need to designate additional lands to accommodate growth, to determine housing needs and identify priorities for municipal infrastructure.

As a result of growth to the west and east of Meaford, it is estimated that the population of the Municipality will increase by between 2,000 and 4,000 people by 2026.

3.5 Climate Change

The MECP document entitled *"Considering Climate Change in the Environmental Assessment Process" (2017)* provides guidance relating to the Ministry's expectations for considering climate change during the environmental assessment process. The Guide is now a part of the Environmental Assessment Program's Guides and Codes of Practice. The environmental assessment of proposed undertakings is to consider how a project might impact climate change and how climate change may impact a project.

4 Problem Statement

As stated in Section 1.4, this Schedule "C" Class EA builds upon the recommendation found in the 2007 Class EA and 2015 Master Plan where re-assessing of the current WWTP is carried out and a phased expansion of the WWTP is proposed to meet current and future wastewater treatment requirements of the urban area of Meaford by expanding the process capacity of the existing plant from 2,700 m^3/d to 6,000 m^3/d.

The Master Plan addressed the state of the wastewater infrastructure and identified existing and future needs. Identified in the Master Plan were two key problems with the wastewater assets and these were:

- Lifecycle improvements due to the age of the facility; and
- Phased expansion required for full build-out.

Based on updated evaluation of the existing WWTP performance, condition and capacity, as well as existing and future wastewater flows from the service area, the problem/opportunity statement is updated and refined for this Class EA as follows:

- The actual capacity of the WWTP is not the same as the rated capacity of the WWTP as stated in the Environmental Compliance Approval (ECA).
- With consideration of modern design criteria, the existing plant capacity is limited. The assessed capacity of the WWTP is 2,700 m^3/d.
- The historical Average Daily Flows (ADF) in the recent 5 years has reached nearly 70% of plant's current rated capacity, but has reached 100% of the assessed capacity. The historical peak daily flow (PDF) has exceeded the peak rated capacity mentioned in the ECA.
- The plant headworks is integrated into the secondary treatment tanks and requires relocation in order to provide upgraded capacity and grit removal capabilities.
- The rate of development in Meaford has accelerated and wastewater treatment capacity is essential to facilitating growth of the community.

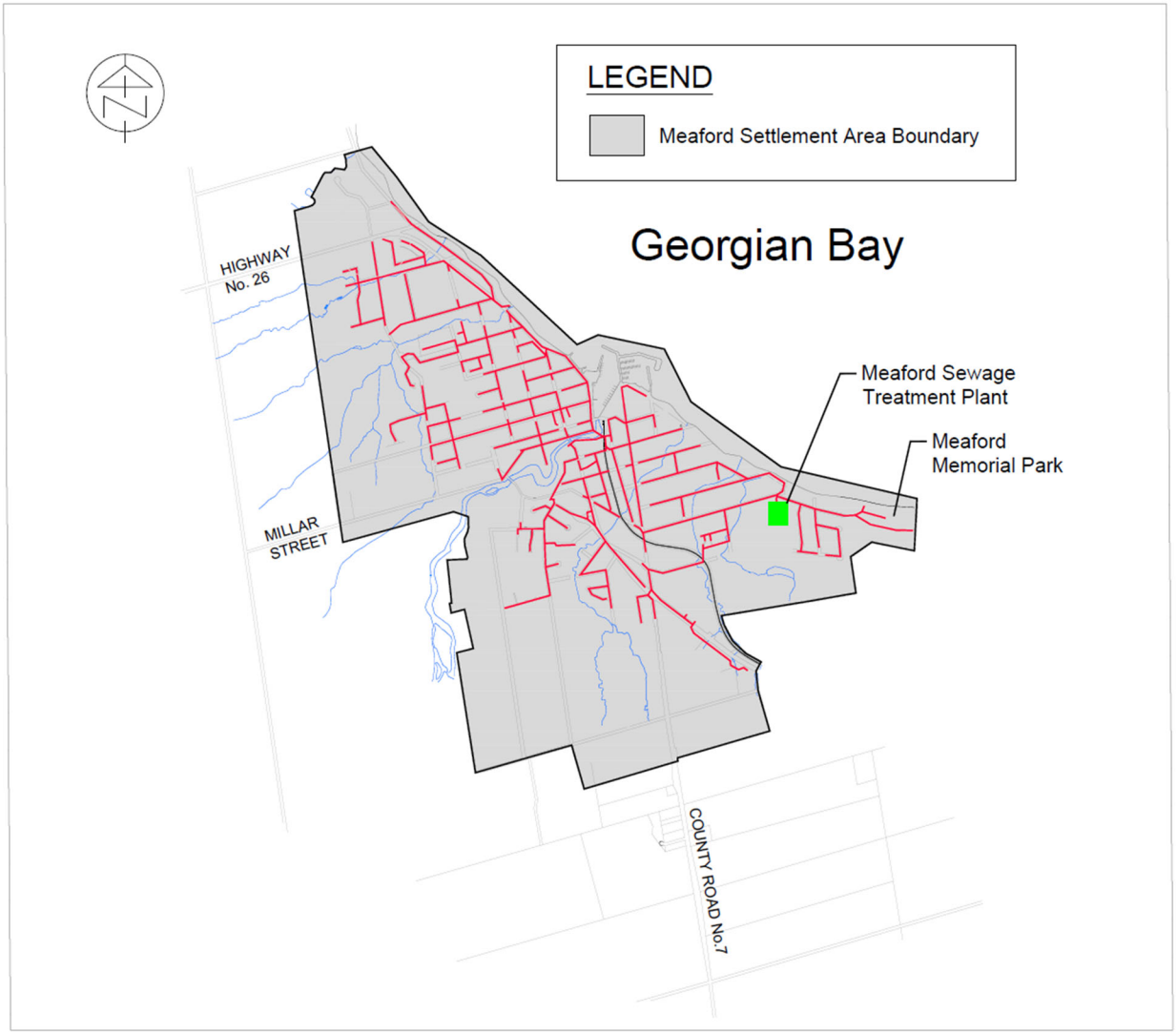
In order to manage population growth within the urban area, the Municipality of Meaford needs to expand the Meaford WWTP. Due to funding limitation the expansion plan must proceed under a phased approach.

5 Study Area Overview

The study area of the project was defined in the Master Plan and remains the same. The study area is the Meaford Settlement Area Boundary which is currently being serviced by the existing WWTP as well as areas projected for growth adjacent to Highway 26. The Meaford WWTP,

located on a 3.9 Ha parcel of land at 35 Grant Avenue, is the subject site. The study area and subject site are both shown in **Figure 5-1**.

Figure 5-1 - Study Area



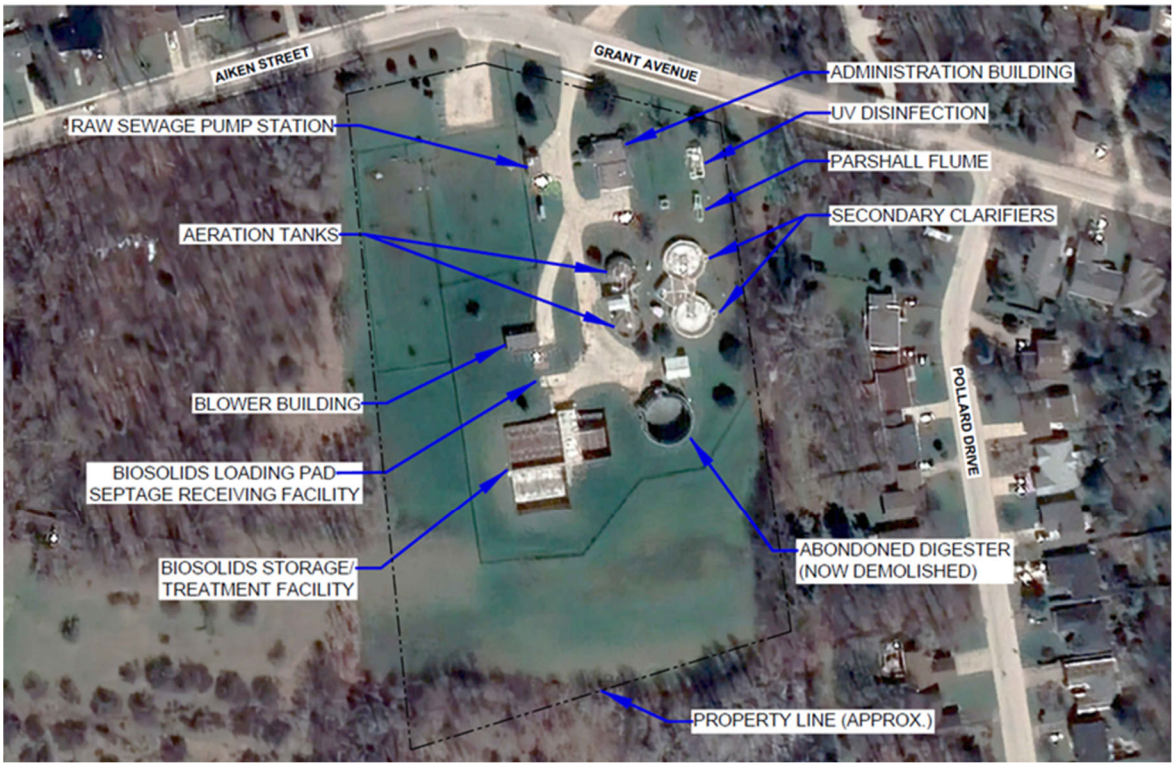
5.1 Meaford Wastewater Treatment Plant

The Meaford WWTP was originally constructed in 1969 and has undergone a variety of modifications and upgrades. The plant does not include grit removal or primary clarification and is considered as an Extended Aeration Activated Sludge (EAAS) process facility.

The collected sewage within the Municipality of Meaford is transferred to the Meaford WWTP from the onsite raw sewage pumping station and through a forcemain from the Big Head River Pump Station. Treated effluent is discharged to Georgian Bay through an outfall after going through an UV Disinfection process.

The existing WWTP major treatment systems and layout are shown in **Figure 5-2.**

Figure 5-2 - Existing WWTP Site Layout



6 Phase 2 Reconfirmation Studies

The following section provides summaries and details of updated investigations and technical studies carried out as due diligence to confirm the Master Plan findings to refine the problem/opportunity statement before proceeding with Phase 3 investigation of alternative solutions.

6.1 Condition Assessment

A full plant condition assessment was conducted for the existing Meaford WWTP. Details of analysis of the condition of the existing plant can be found in **Appendix B**.

The condition assessment is based on non-invasive observation of assets at the WWTP and a review of historical reporting. Where no apparent degradation of equipment is visible or where assets cannot be observed, the assessment relies on a comparison of asset age to assumed values for useful life for different asset categories.

It is estimated that a total capital cost of $3.2 million will be required to maintain the existing Meaford WWTP over the next 30 years based on 2021 estimation. It is understood however that plant upgrades required for the expansion of the facility may involve replacement of equipment. Coordination will be required between maintenance of the existing facilities and expansion upgrades.

6.2 Capacity Assessment

A full plant capacity assessment was conducted for the existing Meaford WWTP and a copy can be found in **Appendix C**.

The treatment capacity of each unit process at the Meaford WWTP was assessed using historical plant performance data, operational data, Certificate of Approval requirements, discussions with operations staff, and typical design parameters for the province of Ontario as recommended by the MECP.

Based on ECA #9036-AZFPV6 issued on October 10, 2018, the rated capacity of the WWTP is 3,910 m^3/d, with a secondary rated capacity of 489 m^3/h (11,736 m^3/d). The plant is unique in the way that it operates as a blend of CAS and EAAS processes and meet ECA discharge limits consistently in the last 7 years with the operation ADF significantly higher than calculated secondary capacity based on EAAS process.

Based on the paper analysis against MECP design criteria and the historical performance of the plant, the plant has enough capacity to treat a flow of 2,700 m^3/d with no performance issues. Therefore, any decisions for the future upgrades of the plant should be based on utilizing the plant as an EAAS plant with a capacity of 2,700 m^3/d.

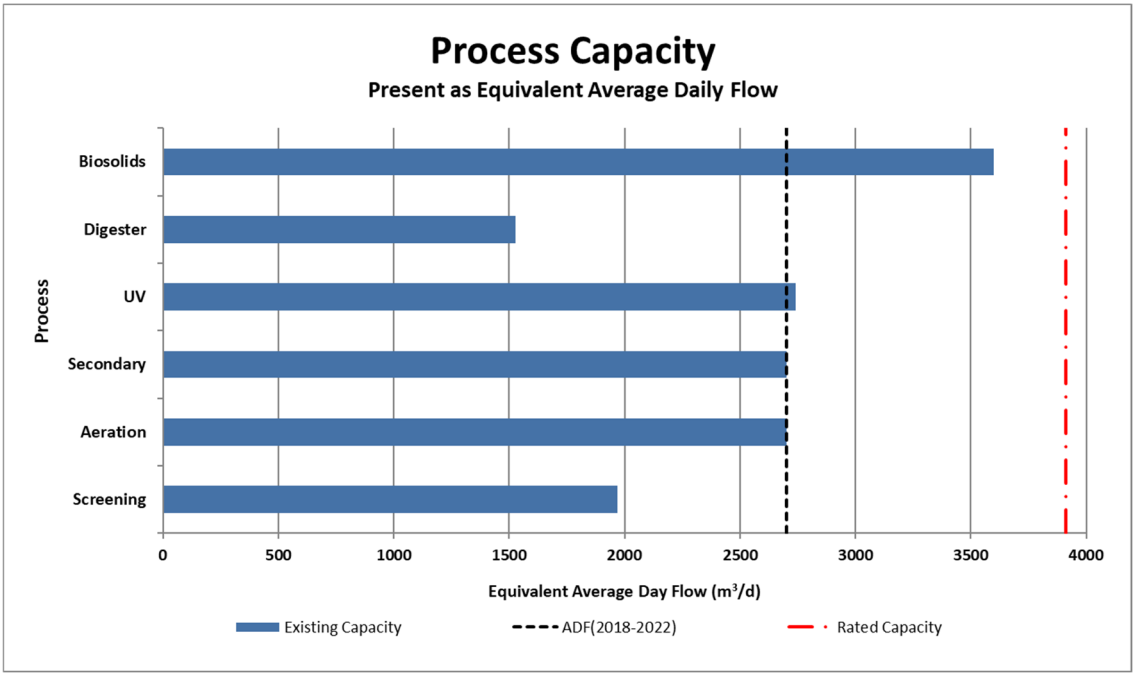
During the period of 2017-2020 the plant received an average daily flow of 2,950 m^3/d while continuing to meet the existing effluent criteria. Until the plant capacity has been expanded allocation should be allocated to an upper limit of 2,950 m^3/d.

The process capacity of the existing plant is summarized in **Table 6-1** and **Figure 6-1**.

Table 6-1 - Treatment Capacity Summary

Treatment Process		Basis of Design	Capacity (m^3/d)
Preliminary Treatment	Screening	Peak Instantaneous Flow	9,840
Secondary Treatment	Extended Aeration	Average Daily Flow	2,700
	Secondary Clarifiers	Peak Hourly Flow	9,350
Disinfection	UV Disinfection	Peak Hourly Flow	10,600
Sludge Management	Aerobic Digesters	Maximum Monthly Flow	2,900
	Biosolids Storage	Average Daily Flow	3,600

Figure 6-1 - Process Capacity



6.3 Current and Projected Wastewater Flows

A historical wastewater flow assessment and future flow projection was conducted for the Meaford WWTP, which outlines the past and current wastewater flows and anticipated future flows in the Meaford service area. Details of analysis of historical wastewater flows and future flows projections can be found in **Appendix D**.

A summary of the flow data from 2018 to 2022 is summarized in **Table 6-2**. The ADF in the recent 5 years has reached nearly 70% of the plant's ECA rated capacity, with a historical peak daily flow (PDF) exceeding the secondary treatment capacity. Average monthly flow is relatively consistent across the years, showing increased flow during the spring months, and very consistent low averages during the summer months. Higher observed peaks generally occur between February and April.

Table 6-2 - Historical Wastewater Flows

Year	Average Daily Flow (m^3/d)	Peak Daily Flow (m^3/d)	Peak Instantaneous Flow (m^3/d)
2018	2,811	11,864	16,974
2019	2,951	11,952	14,268
2020	2,891	9,731	14,005
2021	2,681	12,623	13,997
2022	2,335	8,648	13,997
5-year Summary	2,734	10,964	14,648

New development is estimated to proceed at a rate of 44.8 units/year, with 10% of all new units being constructed outside of the urban boundary and the catchment for the WWTP. New

residential growth in the urban area is estimated at a rate of 40.3 units/year with an average occupancy of 2.21 person per unit. In addition, 26 new jobs per year are assumed with flow estimated using the Ontario Building Code assumption for an 8-hour work day in a factory with showers. On this basis, projected flow rate in the year 2054 is in the range of 3,694 - 4,309 m^3/d. For the purpose of maintaining a conservative planning approach, the upper bound flow projection is carried forward. On this basis, ADF will exceed the plant rated capacity in the year 2044.

The population and flow projections anticipated for 2054 are summarized in **Table 6-3**. The peak daily flow is projected on the basis of historical plant data. While plant data does not provide a basis for the projection of peak hourly flows, a peak hourly peak factor of 4 is assumed. A peak instantaneous flow factor of 5 is assumed for the study period.

Table 6-3 - Wastewater Flow Projections for 2054

2054 Population	2054 Average Daily Flow	2054 Peak Daily Flow	2054 Peak Hourly Flow	2054 Peak Instantaneous Flow
8,019	4,400 m^3/d	17,000 m^3/d	17,600 m^3/d	22,000 m^3/d

6.4 Future Effluent Criteria

In 2022, Ainley Group contacted the MECP to discuss the effluent limits for the Meaford WWTP, and to confirm that limits proposed in the 2007 Class EA remain acceptable to the MECP. According to the Assimilative Capacity Study completed in 2007 by EarthTech, the proposed effluent objectives and limits, as listed in **Table 6-4** and **Table 6-5,** were projected for a future capacity of 6,000 m^3/d.

Table 6-4 - Effluent Objectives for Future Capacity of 6,000 m^3/d

Effluent Parameter	Monthly Average Concentration (mg/L)	Annual Average Loading (kg/d)
$CBOD_5$	10.0	60
Total Suspended Solids	10.0	60
Total Phosphorus	0.5	3.0
Total Ammonia Nitrogen Non-Freezing Period* Freezing Period*	 3.0 5.0	 18.0 30.0
pH of the effluent maintained between 6.0-9.5, inclusive, at all times		
* Note: Freezing Period: October 1 to May 14, Non-Freezing Period: May 15 to September 30		

Table 6-5 - Effluent Limits for Future Capacity of 6,000 m^3/d

Effluent Parameter	Monthly Average Concentration (mg/L)	Annual Average Loading (kg/d)
$CBOD_5$	15.0	90
Total Suspended Solids	15.0	90
Total Phosphorus	0.8	4.8
Total Ammonia Nitrogen Non-Freezing Period* Freezing Period*	 3.0 5.0	 18.0 30.0

Effluent Parameter	Monthly Average Concentration (mg/L)	Annual Average Loading (kg/d)
pH of the effluent maintained between 6.0-9.5, inclusive, at all times		

* Note: Freezing Period: October 1 to May 14, Non-Freezing Period: May 15 to September 30

Upon revisiting the population projection to the year 2054, and subsequently the 30-year projected wastewater flow for the Municipality of Meaford, it was determined that the projected ADF at the end of the study period is 4,400 m^3/d, approximately 26% lower than the previously proposed future capacity of 6,000 m^3/d. Accordingly, a new effluent limit of 1.0 mg/L total phosphorus (TP) was proposed to the MECP and was agreed to in principle for the capacity of 4,400 m^3/d. The record of consultation with the MECP and their response can be found in **Appendix E**.

It should be noted that achieving a TP limit of 0.8 mg/L and resulting objective of 0.5 mg/L may require adding a tertiary treatment unit to the Meaford WWTP. The need to add a tertiary treatment unit is dependent on the performance of the WWTP as flows approach 4,400 m^3/d.

The full listing of effluent objectives and limits determined for the 4,400 m^3/d expansion are summarized in **Table 6-6** and **Table 6-7**.

Table 6-6 - Effluent Objectives for Future Capacity of 4,400 m^3/d

Effluent Parameter	Monthly Average Concentration (mg/L)	Annual Average Loading (kg/d)
$CBOD_5$	10.0	44
Total Suspended Solids	10.0	44
Total Phosphorus	0.8	3.52
Total Ammonia Nitrogen Non-Freezing Period* Freezing Period*	 2.0 4.0	 8.8 17.6
pH of the effluent maintained between 6.0-9.5, inclusive, at all times		

* Note: Freezing Period: October 1 to May 14, Non-Freezing Period: May 15 to September 30

Table 6-7 - Effluent Limits for Future Capacity of 4,400 m^3/d

Effluent Parameter	Monthly Average Concentration (mg/L)	Annual Average Loading (kg/d)
$CBOD_5$	15.0	66
Total Suspended Solids	15.0	66
Total Phosphorus	1.0	4.4
Total Ammonia Nitrogen Non-Freezing Period* Freezing Period*	 3.0 5.0	 13.2 22
pH of the effluent maintained between 6.0-9.5, inclusive, at all times		

* Note: Freezing Period: October 1 to May 14, Non-Freezing Period: May 15 to September 30

6.5 Socio-cultural Studies

Archaeological Services Inc. (ASI) conducted three studies related to the socio-cultural environment of the subject site to support evaluations of the design alternatives. The three studies included:

- Stage 1 Archaeological Assessment
- Stage 2 Archaeological Assessment
- Cultural Heritage Evaluation Report

Copies of the final reports by ASI can be found in **Appendix F**.

6.5.1 Stage 1 Archaeological Assessment

The Stage 1 Archaeological Assessment (Background Research and Property Inspection) background study determined that there were no previously registered archaeological sites located within the study area. The property inspection determined that the off-leash dog park and southern half of the study area requires Stage 2 test pit survey. The remainder of the study area has been subject to deep soil disturbances due to construction of the WWTP components and therefore, did not retain archaeological potential.

The following recommendations were made:

- Parts of the study area exhibit archaeological potential. These lands require Stage 2 archaeological assessment by test pit at five metre intervals, where appropriate. Stage 2 is required prior to any proposed construction activities on these lands;
- The remainder of the study area does not retain archaeological potential on account of deep and extensive land disturbance. These lands do not require further archaeological assessment;
- Should the proposed work extend beyond the current study area, further archaeological assessment should be conducted to determine the archaeological potential of the surrounding lands.

6.5.2 Stage 2 Archaeological Assessment

ASI conducted a Stage 2 Archaeological Assessment to satisfy the recommendations of the Stage 1 assessment.

The Stage 2 property survey was conducted on July 11 and 12, 2022, in accordance with the Ontario Heritage Act and the Standards and Guidelines for Consultant Archaeologists by test pit survey. Approximately 1.6 percent of the study area (0.01 hectares) was previously assessed without further recommendations and not subject to Stage 2 assessment. Approximately 11 percent of the study area (0.08 hectares) was found to contain natural topsoil and was subject to test pit survey at five metre intervals, and 87.4 percent of the study area (0.68 hectares) did not contain natural topsoil and was subject to judgmental test pit survey at 10 metre intervals.

No archaeological resources were encountered during the course of the Stage 2 Archaeological Assessment for the Meaford WWTP Expansion. The study area did not require further archaeological assessment.

6.5.3 Cultural Heritage Evaluation Report

ASI conducted a Cultural Heritage Evaluation Report (CHER). As structures on the subject site are greater than 40 years old, the property requires a CHER. (Ministry of Tourism, Culture and Sport, 2016) to determine cultural heritage value or interest.

The evaluation was prepared in consideration of data regarding the design, historical/associative, and contextual values within the Municipality of Meaford. The evaluation determined that the property at 35 Grant Avenue did not meet the criteria outlined in Ontario Regulation 9/06 and therefore did not have cultural heritage value or interest.

6.6 Climate Change

As per the MECP guidance document referenced in Section 3.5, the project's potential impacts to climate change and how climate change may impact the project were considered. Climate change concerns generally relate to the increased concentration of greenhouse gases in the atmosphere, which can result in a rise in the global mean surface temperature. Increase temperatures worldwide are creating changes in climate that is resulting in extreme weather events.

The current project is proposing the construction of a new wastewater treatment plant. The infrastructure construction, operations and maintenance activities may increase Greenhouse Gas (GHG) emissions and impacting air quality and climate. Likewise, the implications of climate change on infrastructure can be wide-ranging and can encompass numerous aspects of a project.

6.7 Natural Environment

The natural features of Meaford include the Georgian Bay shorelines, the Bighead River and the Niagara Escarpment. The Bighead River is an extensive 30km system with associated tributaries discharging into Georgian Bay. The Bighead River is known to have following fish species inhabit it; rainbow trout, brown trout, bass, whitefish and Chinook salmon. With this variety of fish, the Bighead River is a popular location for recreational and sport fishing. The Niagara Escarpment is located outside of the boundaries of the Meaford urban area so does not fall within the study area of this Class EA.

Additional natural features of Meaford include forests, rolling valleys and wetlands. Several environmentally protected area corridors surrounding the watercourse system are located west of Meaford WWTP. South of Meaford WWTP is the Georgian Bay shoreline.

6.8 Socio-economic Environment

Meaford is situated on the southern shore of Georgian Bay and is at the heart of Ontario's apple country. Based on its waterfront location, the Municipality has strong recreational tourist-based economy followed by the aggregate and agricultural industry.

Meaford is an affordable place to live in comparison to many communities in southern Ontario. Meaford has quickly become a destination of choice amongst those looking to retire from the urban centres of southern Ontario and is an attractive place for young families because of the unmatched amenities offered locally and within the region.

Meaford is the cultural destination within Grey County with the Meaford Hall Arts and Cultural Centre operating as the main attraction. Home to outstanding live performances, rotating art

displays, and enriching lifelong learning classes. The Meaford region is rich with cultural history including being the resting place of Canadian icon, artist Tom Thomson. Meaford is also home to the canine hero Beautiful Joe, who inspired the bestselling novel “Beautiful Joe”, which contributed to worldwide awareness of animal cruelty, written by Margaret Saunders in 1893.

Meaford has a vibrant tourism economy with numerous outdoor activities and award-winning festivals and events. Meaford is well known for outstanding agri-tourism due to its unique growing opportunities and the beautiful trail systems attract visitors from all over the world.

Other significant socio economic and cultural features within the study area include the Bruce and Georgian trail systems, the Department of National Defence Military Manoeuvre and Training Facility and the potential for discovery of archaeological resources including built heritage, cemeteries, churches, and schools.

7 Evaluation Methodology

The evaluation methodology used to select the preferred design alternatives was established in a manner consistent with the principles of environmental assessment planning and decision-making as outlined in the Municipal Class Environment Assessment. This evaluation was performed for both the Liquid Treatment and Sludge/Biosolids Treatment processes of the plant.

Evaluation of each of the treatment processes involved two main steps:

- Identification of a long list of all potential alternatives and the screening of this list down to a shortlist of viable alternatives.
- A detailed evaluation of the short-listed alternatives to identify a recommended preferred alternative solution.

To achieve this goal, the following steps were undertaken:

- Develop a set of long-list screening criteria to screen the long list of technology alternatives to a short list. This set of criteria is meant to capture features that are considered essential to the success of the WWTP and to establish viability of the alternative.
- Develop a set of short-list evaluation criteria to evaluate the short-listed alternatives. This set of criteria consists of primary and secondary criteria and weightings. These criteria provide a more in-depth analysis of the technologies, sufficient to identify the recommended technology.
- Generate a long list of technologies that could be used for the process being evaluated.
- Use the long-list screening criteria to screen the long list to a short list.
- Develop design concepts (treatment trains) using the short-listed technologies.
- Perform detailed evaluations of each design concept, including a life-cycle cost analysis, using the short-list evaluation criteria.
- Identify the recommended treatment technology alternative, based on the results of the detailed evaluation.

7.1 Long-list Screening Criteria

The criteria selected and descriptions of each criterion for the long-list screening of the liquid train alternatives and sludge stabilization technologies are presented in **Table 7-1** and **Table 7-2**.

Table 7-1 - Liquid Train Long-List Screening Criteria

Criteria	Description
Proven Reliability	Demonstrated track record of consistently meeting and/or exceeding the treatment objectives set forth for the Municipal Class Environmental Assessment.
Ease of Expansion	The ability of the system to be easily expanded.
Operation and Maintenance (O&M)	The simplicity of operation and maintenance and level of staffing required.
Cost	Have benefits/value in-line with the anticipated capital costs and operation and maintenance costs.

Table 7-2 - Sludge Stabilization Long-List Screening Criteria

Criteria	Description
Regulatory Compliance	Ability to meet current and anticipated future regulations for processing and end-use / disposal.
Proven Reliability and Sustainability	Demonstrated successful projects of similar size and high level of flexibility to variations in sludge/biosolids quality and adverse weather conditions.
Staging / Phasing	Ability to easily expand to meet Meaford WWTP's Full Buildout capacity.
Cost	Have value in terms of performance and/or operation and maintenance that are reflective of the capital costs.
Resource Recovery / Revenue Generation	Ability for end product to be used beneficially (e.g., land application) or to generate revenue (e.g., sold commercially as compost or fertilizer)

7.2 Short-list Screening Criteria

In general, the short-list evaluation process involved identification of potentially viable alternatives followed by conceptual design, sizing, and costing of each alternative and a detailed evaluation using screening criteria. The screening criteria were chosen to reflect key aspects of the component being evaluated. Four primary screening categories were used for the evaluation:

- Social/Cultural Impacts;
- Environmental Impacts;
- Technical Performance;
- Economic Impacts.

Each category was given a weighting to capture its importance relative to the other categories used to evaluate each component. The Harvey Ball scoring system was used and implemented using the scoring system defined in **Table 7-3**.

Table 7-3 - Harvey Ball Scoring System

Rating	Socio-Cultural	Technical	Environmental	Economic
● Most Preferred	Low Impact	High Technical Merit	Low Impact	Low Cost

◕ Moderately to Highly Preferred	Low to Moderate Impact	Moderate to High Technical Merit	Low to Moderate Impact	Low to Moderate Cost
◑ Moderately Preferred	Moderate Impact	Moderate Technical Merit	Moderate Impact	Moderate Cost
◔ Less Preferred	Moderate to High Impact	Low to Moderate Technical Merit	Moderate to High Impact	Moderate to High Cost
○ Least Preferred	High Impact	Low Technical Merit	High Impact	High Cost

8 Phase 3 Design Alternatives and Evaluation

This section presents an overview of the work undertaken for Phase 3 of the Class EA process. Phase 3 develops design alternatives and further details of their technical, economic, and environmental impacts. The design alternatives evaluated in Phase 3 were alternatives related to meeting 2054 average daily flows and full build-out projections, managing current and projected peak flows, and technology alternatives for the plant expansion.

Section 8.2 builds upon the need to address peak flows at the WWTP identified in the Master Plan. Sections 8.3 and 8.4 discuss the evaluation of the liquid treatment alternative solutions and the solids treatment alternative solutions and more details of Technologies Design Alternatives and Evaluation can be found in **Appendix G**.

8.1 Do Nothing

The “Do nothing” alternative has been considered throughout the Phase 3 evaluation and reviewed as a benchmark to gauge the potential impacts of the other alternatives being considered.

Do nothing refers to no changes from the existing plant conditions. However, this option does not provide solution to facilitate the new development and residential growth. Thus, the alternative will be screened out and not carried forward for further evaluation.

8.2 Meaford WWTP Expansion Phasing

Based on review of the previous studies and upon revisiting the projection population of year 2054, the projected ADF at the end of the study period will be 4,400 m^3/d. The previous planning efforts have identified an ultimate expansion to an ADF capacity of 6,000 m^3/d, which was also taken into consideration in terms of the site planning and capital cost.

Per the results of the capacity assessment stated in Section 6.2, the actual capacity of the plant is less than the rated capacity and is limited by the secondary treatment capacity of 2,700 m^3/d. It was also determined that the total capacity of the digesters is 2,900 m^3/d for the maximum month loading. The biosolids storage has a capacity for 3,600 m^3/d average daily flow.

It is envisaged that the expansion of the Meaford WWTP would be take place in the following three phases:

- Phase 1: Expand the existing secondary treatment capacity of the WWTP by an additional 1,700 m^3/d to achieve full capacity of 4,400 m^3/d; expand sludge digestion and sludge storage by 2,900 m^3/d, and 1,200 m^3/d respectively; construct a new headworks to achieve capacity of

6,000 m^3/d; and construct a new blower/RAS/WAS building to achieve full capacity of 4,400 m^3/d.

- Phase 2 (Existing Plant Replacement): Demolish the plant's existing secondary treatment train and replace with new secondary treatment train for the capacity of 2,700 m^3/d.
- Phase 3: Expand the plant's secondary treatment capacity by an additional 1,600 m^3/d to achieve projected capacity of 6,000 m^3/d. Expand the plant's sludge digestion and sludge storage by 1,600 m^3/d, and 1,200 m^3/d, respectively, to achieve projected capacity of 6,000 m^3/d. Potentially, add 6,000 m^3/d capacity tertiary treatment.

While the Phases are presented in sequence based on the timelines anticipated by this study the Municipality may choose to proceed with Phase 3 ahead of Phase 2 should the condition of the existing plant allow continued use.

8.3 Managing Current and Projected Peak Flows

The Master Plan identified that peak flows to the WWTP needed to be addressed and recommended a two-part solution involving a continued inflow and infiltration (I&I) reduction program and the establishment of an equalization tank at the WWTP.

Following recommendations in the Master Plan, the Municipality has engaged in I&I reduction efforts though 2015-2023 and had success in maintaining a stable ADF, however; peak flows remain high and must be addressed as part of plant upgrades.

The study considered two design alternatives for addressing peak flow management at the plant:

- Alternative 1: Construct the Phase 2 (or Phase 3) Aeration and Sedimentation tanks in Phase 1 and use the tanks for peak flow management in the near term.
- Alternative 2: Use a high-rate clarification system to treat flows exceeding the peak capacity of the WWTP.

The evaluations of the two alternatives are summarized in **Table 8-1** - Peak Flow Management Evaluation. It is recommended that the Municipality retains the 2015 Master Plan general solution and proceeds with Alternative 1.

Table 8-1 - Peak Flow Management Evaluation

	Advantages	Disadvantages
Alternative 1	▪ Tanks can be designed for re-purposing in the future for the replacement of the existing WWTP; ▪ No additional chemical systems or operator training required.	▪ Phase 2 tanks can only provide sufficient storage for 16 hours of peak instantaneous flows (2054) or 37.5 hours at peak daily flows; ▪ Peak flows extending past 37.5 hours in duration cannot be handled.
Alternative 2	▪ High-rate clarifier can be sized to effectively manage all peak flows exceeding peak plant capacity; ▪ Process is not limited by available volume and can run continuously;	▪ The approach was not typically used in Municipal sewage treatment. Approval is required at the discretion of the MECP and may require pilot testing;

	▪ Process tanks for high-rate clarification may not be used at the plant if I&I efforts successfully reduce peak flows; ▪ Complex process which can be challenging to operate.

8.4 Liquid Treatment Alternative Evaluation

Treatment of the liquid component of wastewater involves several stages, typically starting with the removal of grit and larger particles and ending with disinfection of the treated effluent just prior to release into the environment.

A new preliminary treatment facility is necessary to be added to the Meaford WWTP. The new preliminary treatment will include a new mechanical screening system, a new grit removal system, a new headworks building and a new odour control unit.

The technologies that were short-listed for detailed evaluation for the liquid train treatment are listed below:

- Secondary Treatment
  - Extended Aeration
  - Sequencing Batch Reactor (SBR)
  - Membrane Aerated Biofilm Reactor (MABR)
  - Aerobic Granular Sludge (AGS)
- Tertiary Treatment
  - Up-flow Sand Filter
  - Cloth Disc Filter
  - High-rate Clarifier
- Disinfection Treatment
  - Chlorination/Dechlorination
  - Ultra-Violet Radiation

8.4.1 Secondary Treatment

In extended aeration process (Alternative 1), wastewater flows directly from the preliminary treatment system into the aeration tank, where BOD levels are reduced and ammonia and ammonium are converted to nitrate. Extended aeration process would not require primary treatment. If chemical phosphorous removal is included in this system, the coagulant can be added at multiple points in the process. The removal of solids is typically done by a secondary clarifier.

The SBR system (Alternative 2) uses a single tank/reactor as the anoxic tank, the aerobic tank, and the settling tank required for biological removal of nutrients from the wastewater. Primary clarification is not required in an SBR system. Wastewater flows directly from the preliminary treatment system to the SBR reactor.

The MABR process (Alternative 3) combines activated sludge treatment with biological treatment with gas transfer through specially designed membranes. In this process, air is introduced into hollow-fiber, composite membranes submerged in the wastewater to be treated.

Microorganisms grow on the surface of the membrane and create a biofilm. Oxygen from the introduced air diffuses through the membrane to support the microbial activity, allowing efficient removal of organic contaminants and nutrients from the wastewater.

The AGS process (Alternative 4) represents an aerobic biological treatment method that produces specially cultivated microbial aggregates called “granules”. The process operates under aerobic conditions in a process very similar to SBR. Oxygen is supplied to the bioreactor through aerators/diffusers that introduce air into the system. The granulation of the sludge provides in effect both aerobic and anoxic treatment.

The evaluation criteria and weightings used to evaluate the short-listed secondary treatment technology alternatives and the results of the detailed evaluation of the alternatives were summarized in **Table 8-2**.

The results of the evaluation show that the preferred secondary treatment technology is extended aeration process (Alternative 1).

Table 8-2 - Detailed Evaluation of Secondary Treatment Alternative

PRIMARY CRTERIA	SECONDARY CRITERIA	SHORT LISTED ALTERNATIVES			
		Alternative 1 Extended Aeration	Alternative 2 SBR	Alternative 3 MABR	Alternative 4 AGS
Social/Culture	Aesthetic Impacts (plant appearance)	◑	◑	●	◕
	Traffic (during construction and operation)	◑	◑	◑	◕
	Noise Impacts (during operation)	◔	◔	◕	◑
	Odour Impacts (during operation)	◑	◕	●	◑
	Archaeological Resources, Built Heritage Resources and Cultural Heritage Landscapes Impacts	●	●	●	●
Technical	Ability to Meet Regulatory Objectives	●	●	●	●
	Technology / Process Robustness/Capacity to handle high peak flow	●	◔	◑	○
	Ease of Expansion and Phasing to Buildout	●	●	●	●
	Energy Requirements	◑	◔	●	◕
	Operation & Maintenance Requirements (simplicity, operator skill level/quantity)	●	◔	◕	◑
	Site Requirements (plant footprint)	◔	◑	●	◕
Environmental	Public Health	◕	○	◔	○
	Sustainability	◑	◔	●	◕
	Greenhouse Gas Generation / Climate Change Impacts	◔	◔	●	◕
	Natural Environment Impact	◔	◑	●	◕
	Waste Generation	◑	◑	◕	●
Economic	Capital Cost	◕	●	○	◔
	Operation and Maintenance Costs	●	◔	○	◔
	Net Present Value	◕	●	○	◔
	TOTAL SCORE	●	◑	◑	◔

8.4.2 Tertiary Treatment

The up-flow sand filter (Alternative 1) is an up flow, deep bed, granular media filter with continuous backwash. Wastewater from the secondary treatment system would enter at the top of the filter and flows downward through the filter bed. The solids are captured by the media while the treated water rises and exits at the top of the filter.

The cloth disc filter treatment process (Alternative 2) uses cloth media to reduce phosphorus and capable of producing reuse quality effluent. Backwash and solids wasting are accomplished in filter tank with continuous filtration operation.

High-rate clarifier (Alternative 3) is a proven, compact and robust wastewater clarification system. The technology can be implemented at all stages of the treatment of municipal effluents and real-time treatment of wet weather flows. The coagulant and polymer are dosing into the clarifier influent to create hydroxide flocs and to ballast the flocs with Microsand. The sludge and Microsand slurry is pumped to a hydro cyclone where the sludge is separated from the Microsand. The clean Microsand is recycled back to the tank while the sludge is continuously discharged.

The evaluation criteria and weightings used to evaluate the short-listed tertiary treatment technology alternatives and the results of the detailed evaluation of the alternatives were summarized in **Table 8-3**.

The results of the evaluation show that the preferred tertiary treatment technology is cloth disc filter (Alternative 2).

Table 8-3 - Detailed Evaluation of Tertiary Treatment Alternatives

PRIMARY CRITERIA	SECONDARY CRITERIA	SHORT LISTED ALTERNATIVES		
		Alternative 1 Up-flow Sand Filter	Alternative 2 Cloth Disc Filter	Alternative 3 High-rate Clarifier
Social/ Culture	Aesthetic Impacts (plant appearance)	◕	●	◕
	Traffic (during construction and operation)	◕	◕	◕
	Noise Impacts (during operation)	◕	◕	◕
	Odour Impacts (during operation)	◕	◕	◕
	Archaeological Resources, Built Heritage Resources and Cultural Heritage Landscapes Impacts	●	●	●
Technical	Ability to Meet Regulatory Objectives	●	●	●
	Technology / Process Robustness/Capacity to handle high peak flow	◕	◕	◕
	Ease of Expansion and Phasing to Buildout	◕	◕	◕
	Energy Requirements	●	●	◕
	Operation & Maintenance Requirements (simplicity, operator skill level/quantity)	◕	◕	◕
	Site Requirements (plant footprint)	◕	●	◕
Environmental	Public Health	●	●	●
	Sustainability	◕	◕	◕
	Greenhouse Gas Generation / Climate Change Impacts	◑	●	◕
	Natural Environment Impact	◕	●	◕
	Waste Generation	◕	◕	●
Economic	Capital Cost	◕	◕	●
	Operation and Maintenance Costs	●	●	●
	TOTAL SCORE	◔	◕	◑

8.4.3 Disinfection

A chlorination/de-chlorination disinfection system (Alternative 1) achieves disinfection by dosing the treated wastewater with a chlorine solution. Typically, a solution of chlorine gas or sodium hypochlorite is used as the chlorinating agent. Chlorine released into the receiving water stream negatively impacts all forms of life in the stream. For this reason, a de-chlorination process is needed to remove residual chlorine prior to discharge to the river.

Disinfection via UV radiation (Alternative 2) involves exposing micro-organisms in wastewater to UV light within the 200 to 300 nanometer wavelength range. This range is called the germicidal range because micro-organisms, such as bacteria, viruses, and protozoa, are deactivated and lose the ability to reproduce after exposure. A UV disinfection system consists of a bank of UV radiation emitting tubes, which are submerged in the wastewater, usually a concrete channel. As the wastewater flows across the UV tubes, micro-organisms are exposed to the radiation and become deactivated.

The evaluation criteria and weightings used to evaluate the short-listed disinfection technology alternatives and the results of the detailed evaluation of the alternatives were summarized in **Table 8-4**.

The results of the evaluation show that the preferred disinfection technology is UV radiation (Alternative 2).

Table 8-4 - Detailed Evaluation of Disinfection Alternatives

PRIMARY CRITERIA	SECONDARY CRITERIA	SHORT LISTED ALTERNATIVES	
		Alternative 1 Chlorination/De-chlorination	Alternative 2 UV Disinfection
Social/ Culture	Aesthetic Impacts (plant appearance)	◑	●
	Traffic (during construction and operation)	◑	◕
	Noise Impacts (during operation)	◑	◑
	Odour Impacts (during operation)	◑	◕
	Archaeological Resources, Built Heritage Resources and Cultural Heritage Landscapes Impacts	●	●
Technical	Ability to Meet Regulatory Objectives	◕	◕
	Technology / Process Robustness/Capacity to handle high peak flow	◕	◑
	Ease of Expansion and Phasing to Buildout	◑	◕
	Energy Requirements	●	◑
	Operation & Maintenance Requirements (simplicity, operator skill level/quantity)	◑	◕
	Site Requirements (plant footprint)	◑	◕
Environmental	Public Health	◑	◕
	Sustainability	◑	◕
	Greenhouse Gas Generation / Climate Change Impacts	◑	◑
	Natural Environment Impact	◑	◕
	Waste Generation	◑	◕
Economic	Capital Cost	◑	●
	Operation and Maintenance Costs	◑	◕
	Net Present Value	◑	●
	TOTAL SCORE	◑	◕

8.5 Solids Treatment Alternatives Evaluation

Sludge/biosolids refers to the solid component in the wastewater. For the purposes of this assessment, sludge refers to wastewater solids that have not been stabilized and biosolids refers to wastewater solids that have been stabilized and are suitable for removal from the WWTP. Sludge does not include grit or solids that have been removed during preliminary treatment, as these solids are typically hauled off site for disposal at a landfill.

The on-site sludge stabilization technologies that were short-listed for detailed evaluation were:

- Aerobic Digestion
- Auto-Thermal Thermophilic Aerobic Digestion (ATAD)

8.5.1 Biosolids Management

In aerobic digestion process (Alternative 1), sludge and scum from the liquid train are directed to the aerobic digester. Stabilized sludge is pumped from the digester to the biosolids thickening tank at approximately 1.5% solids. Polymer is added to the thickening tank, which is equipped with a mixing system to allow the polymer to react with the biosolids. From the thickening tank, the biosolids is pumped to the biosolids settling tanks. The biosolids settling tank provide quiescence for settling and will be equipped with decanting systems to facilitate gravity thickening. Decanted liquid from the biosolids settling tank will be pumped to the head of the plant and thickened biosolids will be pumped to the biosolids storage tanks.

In ATAD process (Alternative 2), sludge and scum cannot be pumped directly to the ATAD. It needs to be thickened to approximately 5% solids. From the liquid train, sludge and scum are pumped to an equalization tank then to a mechanical thickener. Polymer is added to the mechanical thickening process to improve thickening. Since sludge fed to the ATAD must be at a prescribed solids concentration, mechanical thickening is incorporated in this alternative to ensure that the required solids concentration can be achieved in a reasonable length of time. Thickened sludge is then pumped to the ATAD for stabilization.

The evaluation criteria and weightings used to evaluate the short-listed biosolids management technology alternatives and the results of the detailed evaluation of the alternatives were summarized in **Table 8-5**.

The results of the evaluation show that the preferred biosolids management technology is aerobic digestion (Alternative 1).

Table 8-5 - Detailed Evaluation of Biosolids Management Alternatives

PRIMARY CRITERIA	SECONDARY CRITERIA	SHORT LISTED ALTERNATIVES	
		Alternative 1 Aerobic Digestion	Alternative 2 ATAD
Social/ Culture	Aesthetic Impacts (plant appearance)	●	◑
	Traffic (during construction and operation)	◕	●
	Noise Impacts (during operation)	●	◑
	Odour Impacts (during operation)	●	◔
	Archaeological Resources, Built Heritage Resources and Cultural Heritage Landscapes Impacts	●	●
Technical	Ability to Meet Regulatory Objectives	◕	●
	Technology / Process Robustness/Capacity to handle high peak flow	◕	●
	Ease of Expansion and Phasing to Buildout	●	◑
	Energy Requirements	◕	●
	Operation & Maintenance Requirements (simplicity, operator skill level/quantity)	●	○
	Site Requirements (plant footprint)	●	◑
Environmental	Public Health	◕	◕
	Sustainability	◕	●
	Greenhouse Gas Generation / Climate Change Impacts	◕	●
	Natural Environment Impact	●	◕
	Waste Generation	◑	◑
Economic	Capital Cost	●	◑
	Operation and Maintenance Costs	◕	●
	Net Present Value	●	◕
	TOTAL SCORE	◕	◑

9 Recommended Design Alternative

Based on the evaluation process, the recommended design alternatives are summarized in **Table 9-1**.

Table 9-1 - Recommended Design Alternatives

Process	Recommended Design Alternatives
Preliminary Treatment	Mechanical Screening and Grit Removal with Odour Control
Secondary Treatment	Extended Aeration
Tertiary Treatment	Cloth Disc Filter
Disinfection	UV Disinfection
Biosolids Management	Aerobic Digestion
Peak Flow Management	Equalization Storage

The flow schematic and site plan for the recommended design alternative are presented in **Figure 9-1** and **Figure 9-2.**

Figure 9-1 - Meaford WWTP Preliminary Preferred Process Flow Schematic

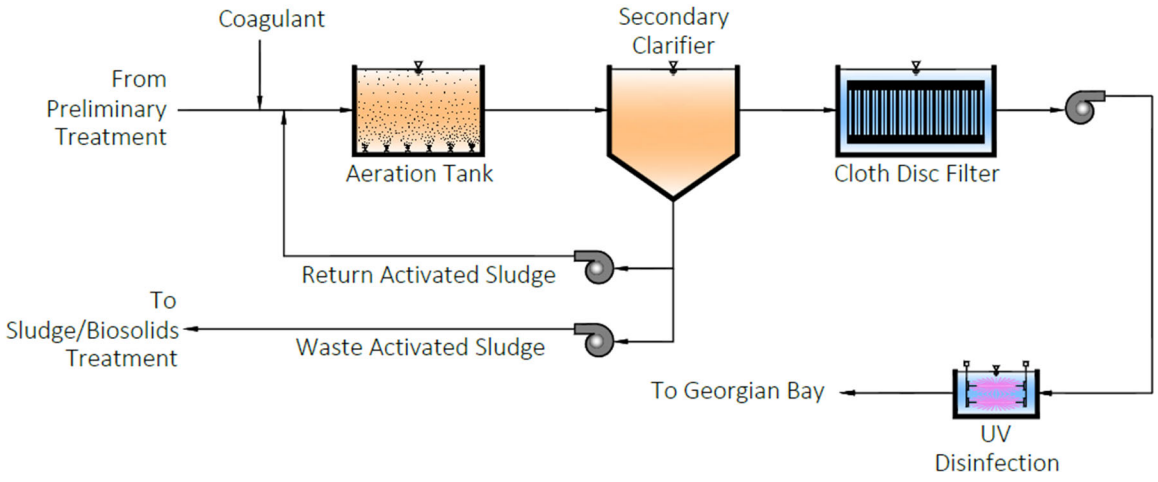
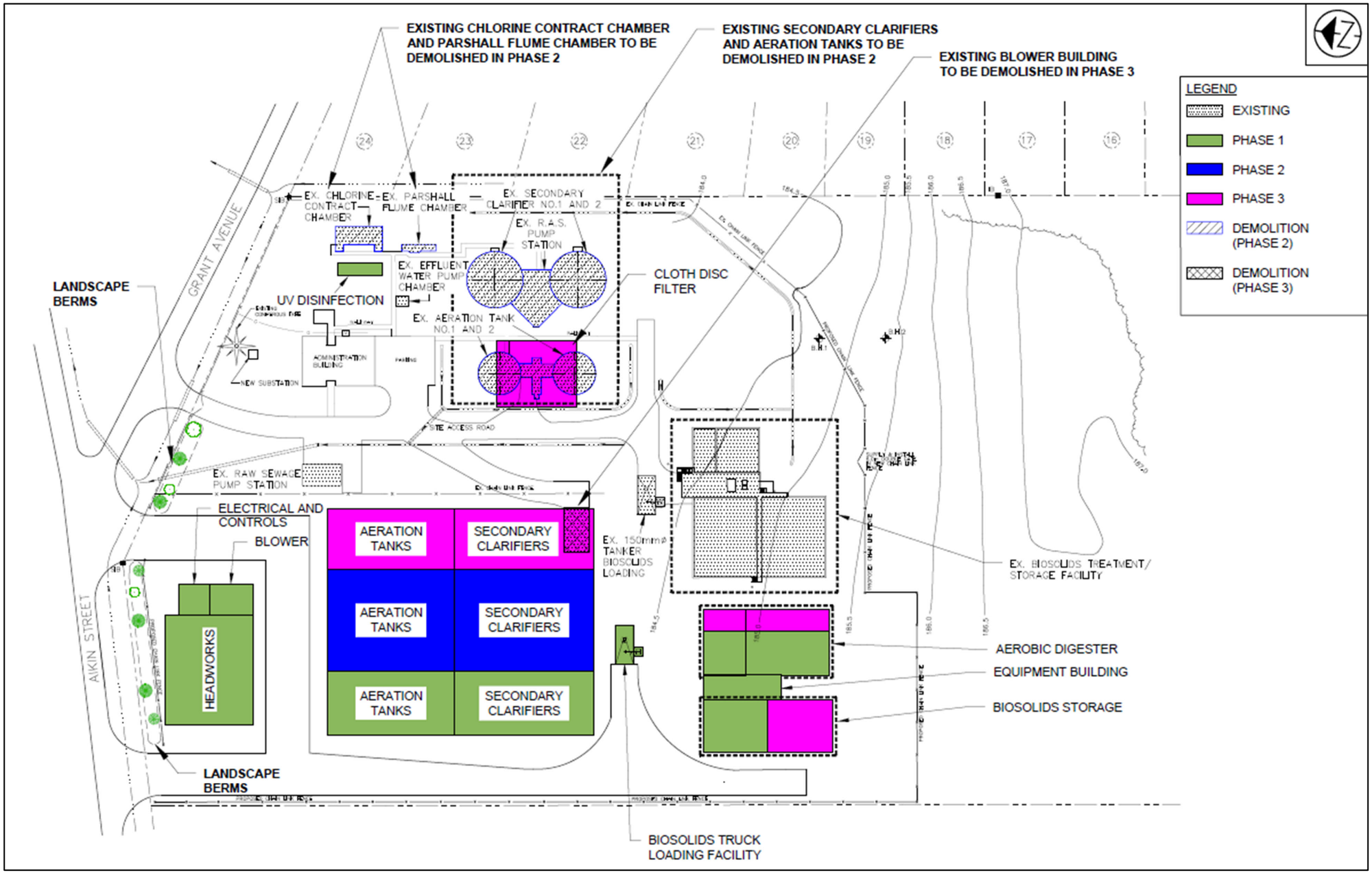


Figure 9-2 - Meaford WWTP Preliminary Site Plan



10 Opinion of Cost

Ainley Group has prepared a rough order of magnitude capital construction cost estimate (Class 5) for the Meaford WWTP based on the following assumptions:

- Costing of common equipment and construction materials has been based on Ainley's past project experience.
- Supplier quotations for major equipment.
- Structural and Architectural cost estimate is based on Ainley's past experience with similar scope projects as Geotechnical investigation is not available at this time.
- No contaminated soils have been assumed onsite.
- Cost for any required site investigations is not included in the estimate.
- This estimate does not include costs associated with any required upgrades at the on-site sewage pumping station and off-site sewage pumping stations.
- Any direct costs from utilities and required permits will be paid by the Municipality directly.

A breakdown of the cost estimate is presented in **Table 10-1**. The estimated total capital construction cost for Phase 1, Phase 2, and Phase 3 are $56,245,000, $24,210,000, and $32,121,000 respectively (2023 dollars). The estimated total cost for the wastewater treatment plant to Full Buildout is $112,576,000 (2023 dollars).

Table 10-1 - Estimated Capital Construction Cost of Meaford WWTP

	PHASE 1 CAPITAL COST ESTIMATE (2023 Dollars)	PHASE 2 CAPITAL COST ESTIMATE (2023 Dollars)	PHASE 3 CAPITAL COST ESTIMATE (2023 Dollars)
Preliminary Treatment / Headworks	$12,836,000		
Secondary Treatment (Extended Aeration)	$11,944,000*	$13,228,000	$8,414,000
Tertiary Treatment (Cloth Filter Media)			$ 5,579,000
Disinfection (UV Radiation)	$760,000		$ 134,000
Biosolids Treatment (Aerobic Digestion)	$5,194,000		$3,424,000
SUBTOTAL	**$30,734,000**	**$13,228,000**	**$17,551,000**
General Requirements including Mobilization and Demobilization, Insurance and Bonding, etc. (20%)	$6,147,000	$2,646,000	$3,511,000

	PHASE 1 CAPITAL COST ESTIMATE (2023 Dollars)	PHASE 2 CAPITAL COST ESTIMATE (2023 Dollars)	PHASE 3 CAPITAL COST ESTIMATE (2023 Dollars)
Contractors Profit (8%)	$2,459,000	$1,059,000	$1,405,000
Contingency (40%)	$12,294,000	$5,292,000	$7,021,000
Engineering Fees (15%)	$4,611,000	$1,985,000	$2,633,000
TOTAL CAPITAL COST	**$56,245,000**	**$24,210,000**	**$32,121,000**

* Including cost for construction of the blower/RAS/WAS building

11 Summary of Preferred Alternative

The preferred Design Alternative consists of the following key elements:

- Construction of a new headworks facility with an equivalent ADF capacity of 6,000 m^3/d in Phase 1, sufficient to treat the full-build out capacity;
- Construction of new extended aeration tanks and secondary clarifiers with an equivalent ADF capacity of 1,700 m^3/d in Phase 1 to increase the current plant capacity to 2054 ADF projection;
- Demolition of the existing aeration tanks and secondary clarifiers and construction of new extended aeration tanks and secondary clarifiers with an equivalent ADF capacity of 2,700 m^3/d in Phase 2 to maintain the 2054 ADF projection;
- Construction of new extended aeration tanks and secondary clarifiers with an equivalent ADF capacity of 1,600 m^3/d in Phase 3 to increase the current plant to full-build out capacity;
- Construction of a new UV disinfection channel with an equivalent ADF capacity of 6,000 m^3/d in Phase 1, sufficient to treat the full-build out capacity (the UV lamps will be added to the system according to the plant capacity);
- Construction of new tertiary treatment (cloth disc filter) with an equivalent ADF capacity of 6,000 m^3/d in Phase 3 to treat the full-build out capacity according to the plant performance;
- Construction of new aerobic digesters with an equivalent ADF capacity of 2,900 m^3/d in Phase 1 sufficient to treat the 2054 ADF projection, and another 1,600 m^3/d sufficient to treat the full-build out capacity;
- Construction of new biosolids storage units with an ADF capacity of 1,200 m^3/d in Phase 1 sufficient to treat the 2054 ADF projection, and another 1,200 m^3/d sufficient to treat the full-build out capacity.

12 Impacts, Mitigation Measures and Monitoring Program

12.1 Impacts of the Preferred Solution

Through the evaluation of alternatives, potential impacts of expanding the Meaford WWTP evaluated on the social/cultural, technical, natural, and economic aspects of the environment were identified. The potential impacts were evaluated and against the baseline conditions of continuing to maintain the Meaford WWTP (Do Nothing). A summary of the impacts of the preferred solution are presented in the following section.

12.1.1 Social/ Cultural Environment

The site has been reviewed for archaeological and cultural heritage features and none were identified through the study. As such, no impacts to archaeological resources, built heritage resources and cultural heritage landscapes will occur during implementation of the solution.

Construction of the proposed works will take place over a 3-year period during which time typical construction related impacts will be experienced by the surrounding area including noise and dust generation, potential for vibration and increased local traffic.

The expansion of the Meaford WWTP is within lands currently used for a public dog park. The Municipality of Meaford is a dog-friendly community and the loss of the gathering location for dog owners will be an impact on the social environment of the community.

The expanded WWTP will place new structures closer to Grant Street and closer to a different set of residents. The new works will impact the scenery for existing residents and for seasonal residents at Memorial Park that live along or travel along Grant Street.

12.1.2 Technical Environment

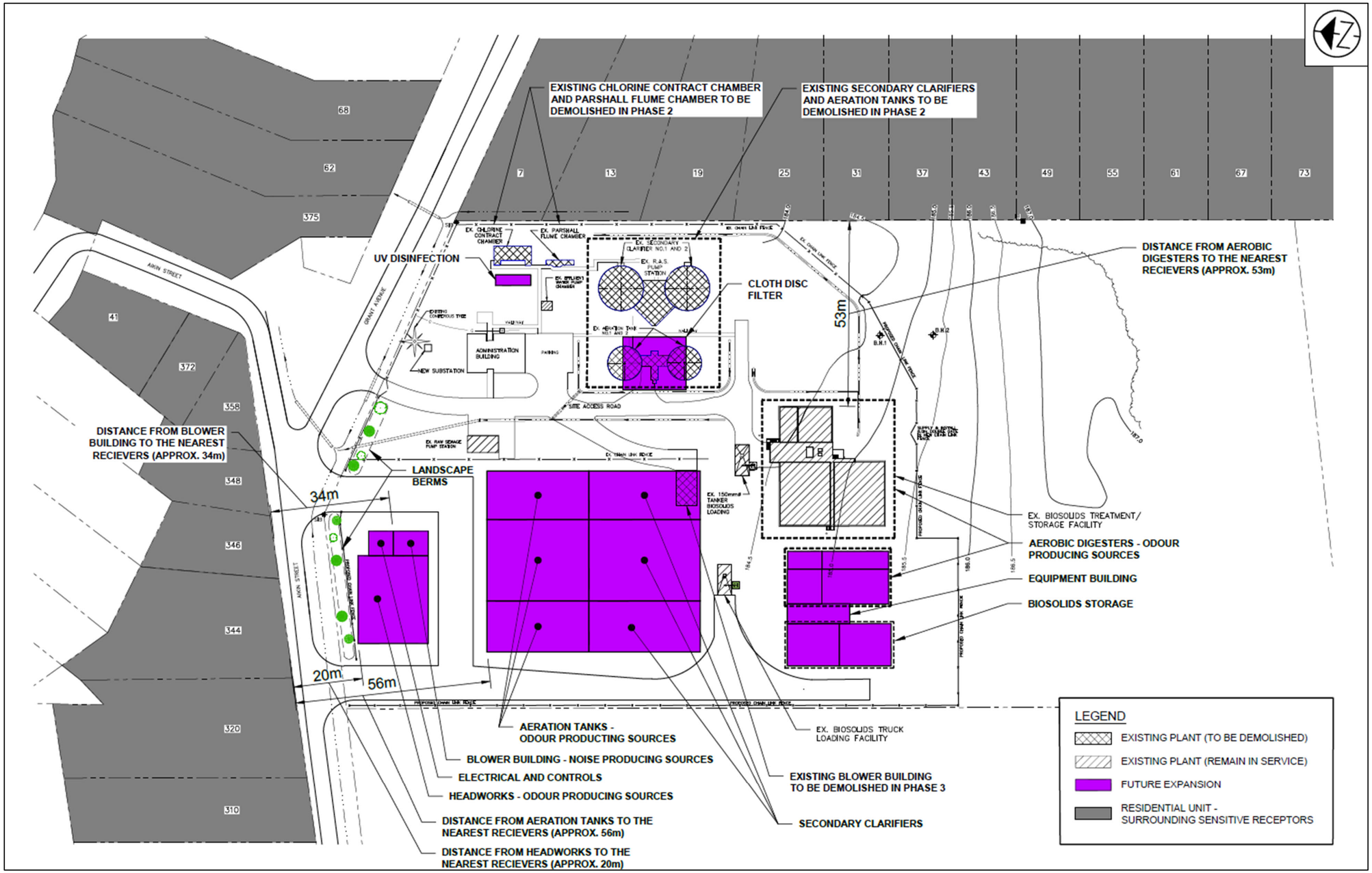
Through expansion of the Meaford WWTP the preferred solution will improve upon the both average and peak capacity of the facility. Expanded treatment capacity will enable development within the urban area of the Municipality to the projected 2054 population. In addition, improved hydraulic capacity and the establishment of flow equalization will address the high peak flows experienced at the WWTP and reduce the potential for overflows to the receiving water without treatment.

The upgraded plant will continue to operate within the current effluent loading objectives as the phased upgrade plan proceeds up to the future capacity of 6,000 m^3/d ADF. Effluent water quality will continue to be maintained as specified in the WWTP's ECA proscribed concentration limits. Conditions of the lakefront for tourism and recreation uses should remain at the baseline condition.

Upon completion of the upgraded works, the new treatment processes have the potential to increase odour and air emissions and noise impacts at nearby sensitive receptors. The new layout proposed places odour and noise generating processes at a new location of the site with new sensitive receivers. **Figure 12-1** below presents the surrounding odour sensitive receptors, points of odour producing sources and the distance between each odour producing source and the nearest receptors.

Geotechnical and hydrogeological conditions have not been established for the site; geotechnical and hydrogeological investigations will need to be conducted to determine structural requirements and dewatering needs during construction.

Figure 12-1 - Odour and Noise Sensitive Receptors and Points of Producing Sources



12.1.3 Natural Environment

The expansion of the Meaford WWTP will not adversely affect terrestrial habitat or wildlife within the proposed site footprint. The site is cleared and is currently used as a public dog park; the site does not contain any significant wildlife habitat, species at risk habitat, woodlands, wetlands, fish habitat or floodplain to be disturbed by construction activities. In addition, the existing outfall has sufficient capacity for the proposed suture capacity and no upgrades have been recommended; as such, no shoreline work is anticipated as part of the proposed upgrades.

The expanded WWTP will result in higher greenhouse gas (GHG) emissions with increased annual power and chemical consumption requirements for treating additional flows. However, the expansion of Meaford WWTP will improve the community safety level during the increased storm events caused by climate change. In general, wastewater facilities are classed as Post-Disaster Buildings (one that is essential to the provision of services in the event of disaster) in Ontario under the Ontario Building Code. As such, the proposed work is anticipated to have adverse effect on climate change, yet advantageous effect on mitigating potential impacts caused by climate change.

The loading limits for the key effluent parameters will be maintained as the plant capacity increases, as such, adverse impacts on the receiving water are not anticipated; however, the additional wastewater flow through the WWTP does have a potential to change existing conditions.

The development of the property will result in an increase to impermeable surface area which will increase potential for surface water run-off, impact water quality and decrease infiltration.

The proposed work includes demolition of the existing treatment facilities, where contaminants are potentially present.

12.1.4 Economic Environment

Capital cost impacts of the proposed solution are significant; the proposed works have a total estimated capital cost of approximately $113 million over the full three-phases of expansion proposed. The yearly operation costs associated with the expanded works are anticipated to rise resulting from costs to operate a chemical phosphorus removal system, increased sludge hauling resulting from additional flows and chemical use, and increased energy costs to operate blowers for the expanded capacity.

12.2 Mitigation Measures and Monitoring Program

Monitoring of potential environmental impacts and mitigation measures, during and after the implementation of the preferred design alternative, is an important and necessary step. This section outlines the mitigation measures and monitoring program during the construction and operation of the facilities. The mitigation measures and monitoring program identified from social/cultural, technical, natural, and economic aspects are summarized in the following sections.

12.2.1 Mitigation Measures

Social/cultural Environment

Community Engagement: Conduct regular community meetings to inform residents about construction schedules, potential impacts, and mitigation strategies.

Traffic Management Plan: Develop and implement a traffic management plan to minimize disruption caused by construction vehicles, including clear signage and alternate routes.

Alternative Dog Park Locations: Identify and develop alternative public spaces for dog owners to minimize the social impact of losing the current dog park.

Aesthetic Impacts: Establish a visual barrier between Grant Street and the proposed works through the use of a berm and/or tree stand.

Technical Environment

Flow Equalization: Implement a flow equalization system to manage peak flows and reduce the potential for untreated overflows.

Effluent Quality Assurance: Maintain effluent water quality within the established Environmental Compliance Approval (ECA) limits through application of well-established treatment technologies. Ensure compliance with phosphorus limits through establishment of a chemical phosphorus removal system.

Odour and Air Emission Control: Prepare an emissions summary and dispersion modeling (ESDM) report during detailed design to evaluate odour sources and treatment requirements. Utilize odour control systems to mitigate odour emissions from newly relocated processes as prescribed in the ESDM report, ensuring compliance with odour guidelines. Complete an air dispersion modelling as part of the detailed design and implement best management practices for the mitigation of odour and air emissions. Confirm mitigation measures and obtain Amended ECA (Air and Noise).

Noise Control: Prepare an Acoustic Assessment Report (AAR) during detailed design to evaluate noise sources and mitigation measures. House the noise sources in noise-attenuating structure to shield the environment and residents from the noise. Confirm mitigation measures and obtain Amended ECA (Air and Noise).

Geotechnical Investigation: Conduct a geotechnical investigation to determine the structural requirements for foundation design and underground tank construction.

Hydrogeological Investigation: Conduct a hydrogeological investigation to determine the extent of dewatering necessary to facilitate construction of underground structures.

Natural Environment

Environmental Management Plan: Complete an Environmental Management Plan during detailed deign to identify the impact to existing trees, stormwater management, impact to existing buildings, and restoration plans.

Site Management: Clearly demarcate construction zones to avoid disturbance to surrounding areas, ensuring that no significant habitat or wildlife is impacted outside of the existing site.

Monitoring Water Quality: Regular monitoring of the effluent and receiving water quality for key parameters to confirm that loading limits are met as capacity increases.

Environmental Protection: Implement erosion and sediment control measures during construction to prevent any runoff affecting nearby water bodies.

Stormwater management: Develop a stormwater management plan during detailed design the ensure pre-development run-off levels are maintained after construction. Develop and implement a site-specific spill management plan.

Climate Change Adaptation: Utilize rating systems targeting at reducing energy usage and meeting climate change targets to improve the energy efficiency during design, construction, and operation and maintenance to reduce GHG emissions. Investigate risk reduction measures at the detailed design stage to manage the additional challenge presented by climate change.

Areas of Potential Environmental Concern (APEC): Confirm designated substances such as asbestos for the existing structure that will be demolished. Conduct investigations for expansion works to identify potential hazards in areas to be excavated in support of developing excess soils management plan and construction dewatering plan.

Economic Environment

Cost Management Plan: Establish a financial management plan that includes regular assessments of operational costs, including energy and chemical use, to ensure budget adherence.

Grants and Funding: Explore potential grants or funding opportunities to offset capital and operational costs, including energy efficiency programs.

12.2.2 Monitoring Program

Table 12-1 summarized the monitoring activities, frequency and timing of survey, and parameters for documentation.

Table 12-1 - Monitoring Program

Category	Monitoring Activities	Frequency	Documentation
Social/ Cultural	Community Feedback	Bi-annual community surveys to gather feedback on construction impacts and community satisfaction	Assess noise levels, dust complaints, and overall community sentiment regarding the construction process and during operation
	Traffic Monitoring	Monthly assessments during construction	Monitor traffic flow, congestion, and incidents near the construction site to ensure effective implementation of the traffic management plan
Technical	Water Quality Monitoring	Monthly sampling of effluent and downstream water quality during operational phases	Keep records of total phosphorus, nitrogen levels, suspended solids, and biochemical oxygen demand (BOD) parameters

	Surface Water Monitoring	Monthly sampling of final outfall mixing zone during construction	Assessment of potential cladophora management if warranted
	Stormwater Monitoring	Constant monitoring during wet weather conditions	Keep records of on-site spill events and mitigation measures taken
Natural	Terrestrial Habitat Assessment	Pre-construction, mid-construction, and post-construction assessments	Document any unexpected impacts on the site and surrounding areas, including monitoring for any unanticipated wildlife activity
Economic	Cost Analysis	Quarterly financial reviews to evaluate capital and operational expenditures	Track operational costs related to energy, chemical usage, and sludge management to assess budget compliance and identify potential savings

13 Permits and Approvals

Prior to any construction of the works, all necessary approvals by concerned agencies must be in place. At the commencement of the implementation phase, an approvals register should be prepared and reviewed with concerned agencies to verify their specific requirements. The following represent the main approvals that will be required on the project:

- Ministry of Environment, Conservation and Parks (MECP): MECP will issue Environmental Compliance Approvals (ECA) for sewage, air and noise, which will delineate the physical extent of the works being approved and the compliance requirements for effluent quality, odour, and noise as well as outlining monitoring and reporting requirements. ECA applications will require completion of the designs and design reports.
- Grey Sauble Conservation Authority (GSCA): GSCA will require application for a work permit where the works affect a watercourse, floodplain, valley slope, wetland or hazardous lands. Applications will require submission of an Environmental Management Plan as well as relevant drawings.
- Ministry of Natural Resources and Forestry (MNRF): MNRF will require application for a permit for any works that affect species at risk, fish or bird habitat, as well as work in or near rivers. Applications will require submission of an Environmental Management Plan that delineates all potential impacts as well as planned mitigations.
- Municipality of Meaford (Municipality): The Municipality will require application for building permits for any building works including the WWTP.
- Hydro One: A range of permits and inspection will be required from Hydro One involving incoming power, protective systems, and installation compliance.
- Technical Standards and Safety Authority (TSSA): TSSA approval will be required for installation of the diesel generator and any fuel systems.

14 Phase 3 Consultation

Public engagement and input are integral components of the Class EA process and assist in ensuring that anyone with an interest in the study has the opportunity to provide input as the study proceeds.

A database containing the contact information of stakeholders, review agencies, indigenous groups, and other interested parties was developed at the outset of the study to invite participation in the study. The contact list was regularly updated throughout the study as more individuals became aware of the study or provided feedback. Interested parties could request to be added to the contact list at any point during the study in order to receive public notices and newly available public information as well as the opportunity to attend upcoming public events.

To facilitate communication with all stakeholders and other interested parties, the Municipality posted information relating to the Class EA on its website. The website contained project description, project timeline, project budget, contact information, copies of all issued notices, and the PIC materials.

Notices were distributed directly to key contacts and through local newspaper (Meaford Independent and Sun Times). All notices were sent directly to each person who requested inclusion in the Notice List. The notices that were provided as part of this Class EA and the date of issue are summarized in **Table 14-1**.

A study contact list and a complete consultation record can be found in **Appendix H**.

Table 14-1 - List of Public Notices Issued Throughout Study

Notice	Date of Issue	Purpose of Notice
Notice of Commencement	September 9th, 2021 September 16th, 2021	Informs that the study was underway and to provide information on the study process
Notice of PIC	September 28th, 2023 October 5th, 2023	Notifies of the details, date, and location of PIC, which presented the results of Phase 3 work of the Study.
Notice of Completion	July 18th, 2024	Notifies that the study has been completed and provides a date for when the ESR will be available for review.

14.1 Notice of Commencement

The Notice of Commencement was posted to two different local newspapers for public review.

The Notice of Commencement was published on Meaford Independent on September 9th, 2021 and September 16th, 2021 and in the Sun Times on September 24th, 2021.

14.2 Public Information Centre (PIC)

The PIC was held on October 12th, 2023 at the Terrace Room of Meaford Hall from 4:00pm to 6:00pm.

The PIC was for the community to learn about and give comments on a number of technical studies that have been completed. The focus of the studies include: archeological and cultural heritage assessment, population and wastewater flow projection, existing plant condition and

capacity evaluation, treatment technology alternative evaluation, and a preliminary cost analysis.

The PIC was held as an informal drop-in format, during which time Display Boards containing pertinent information was available for public review. Representatives of the project team were presented to answer individual questions in a one-on-one format.

A total of 31 visitors attended PIC.

14.3 Consultation with Saugeen Ojibway Nation

Engagement with Saugeen Ojibway Nation (SON) has occurred throughout this Class EA. Notices of Study Commencement, Public Information Centre and Study Completion were provided to SON.

Additional information was sent to SON on May 17, 2022, regarding the project team proposing changes to the effluent limits, a copy of this letter is attached in **Appendix H.**

Prior to conducting the archaeological assessment fieldwork carried out in July, 2022 SON was informed and invited to participate. ASI received a positive response from SON and fieldwork dates were coordinated with SON. On July 11, 2022, during the execution of the test pit survey, a field liaison representative from SON was on-site monitoring and provided input on the assessment. The SON field liaison representative was called away to another site on July 12 and no other SON representative was available that day.

As outlined in the Stage 2 Archaeological Assessment Report (**Appendix F**), no concerns were expressed during the execution of the test pit survey. The results of the assessment and the final Stage 2 report were shared with SON. On October 3, 2022, Robert Martin, the field liaison representative from SON, noted in an email the report was acceptable and asked to be engaged if additional fieldwork was required.

Prior to the start of the Notice of Completion period an electronic version of the draft ESR was emailed to SON on June 25, 2024 for their review and comment. On July 18, 2024, the Notice of Completion was sent to SON. Follow-up phone calls were later made on July 29 and August 21 to SON office to ensure they received the draft ESR. No response was received.

14.4 Consultation with Huron-Wendat Nation

Throughout this Class EA, engagement with Huron-Wendat Nation has occurred. Notices of Study Commencement and Public Information Centre were both provided to Huron-Wendat Nation.

An introductory telephone call was made following up on circulation of the Notice of Study Commencement in October 2021.

On May 17, 2022, as was done for SON, additional information was sent to Huron-Wendat Nation regarding the project team proposing changes to the effluent limits.

Prior to conducting the archaeological assessment fieldwork carried out in July, 2022 Huron-Wendat Nation was informed and invited to participate. Huron-Wendat confirming their involvement and indicated a field representative would be confirmed closer to the fieldwork date.

Huron-Wendat Nation was kept informed of the date scheduled to carry out Stage 2 fieldwork; however, a representative was not available on the actual day the fieldwork was carried out. In early October, 2022, the Stage 2 AA Report was provided to Huron-Wendat Nation for review. On October 18, 2022, Thiéfaine Terrier replied by email stating: “Our team reviewed the report. Everything is fine for us.”

Prior to the start of the Notice of Completion period an electronic version of the draft ESR was emailed to members of Huron-Wendat Nation on June 25, 2024 for their review and comment. Huron-Wendat Nation provided comments on the draft ESR to the project team in a letter dated June 27, 2024, stating: “We don’t have any comments at this point. Please keep us updated about any new project or archaeological studies and fieldwork.”

On July 18, 2024, the Notice of Completion was sent to Huron-Wendat Nation. Huron-Wendat Nation replied by email stating: “We don’t have any comments at this point. Please keep us updated about the project and if any archaeological work arises from new findings during construction.”

14.5 Notice of Completion

The Notice of Completion was posted on the Municipality’s website, published in local newspapers, and distributed to stakeholders on July 18, 2024.

The Notice of Completion was published on Meaford Independent on July 18th, 2024.

15 Conclusion

Through completion of the ESR and supporting studies, a phased strategy was developed for the expansion of Meaford WWTP and is summarized in **Table 15-1**.

Table 15-1 - Summary of the Phased Strategy

Phasing	Proposed Expansion	Year to Begin Construction
Phase 1 - Expansion of the existing plant to achieve plant service until 2054	▪ New headworks facility for full-build out capacity (6,000 m^3/d)	2025
	▪ New extended aeration tanks and secondary clarifiers (1,700 m^3/d)	2026
	▪ New UV disinfection channel for full-build out capacity (6,000 m^3/d)	2026
	▪ New aerobic digesters (2,900 m^3/d)	2026
	▪ New biosolids storage units (1,200 m^3/d)	2026
Phase 2 - Replacement of the aging tanks to maintain plant service until 2054	▪ New extended aeration tanks and secondary clarifiers (2,700 m^3/d)	2041
	▪ Demolition of existing aeration tanks and secondary clarifiers	2041
Phase 3 - Expansion of the plant to full build-out capacity	▪ New extended aeration tanks and secondary clarifiers (1,600 m^3/d)	2053
	▪ New cloth disc filter for full-build out capacity (6,000 m^3/d)	2053

▪ New aerobic digesters (1,600 m^3/d)	2053
▪ New biosolids storage units (1,200 m^3/d)	2053

The estimated total cost for WWTP expansion to full build-out is $112,576,000. Due to funding limitations, the expansion plan will proceed under a phased approach. The estimated total capital construction cost for Phase 1, Phase 2, and Phase 3 are $56,245,000, $ 24,210,000, and $32,121,000 respectively.

Phase 1 expansion should proceed immediately after the completion of the Class EA. While Phase 2 and 3 are presented in sequence based on the timelines anticipated by this study, the Municipality may choose to proceed with Phase 3 ahead of Phase 2 should the condition of the existing plant allow continued use.

Considering the peak flows of the plant remain high, Phase 2 and 3 aerations and sediment tanks can be constructed in Phase 1 for peak flow management in the near term.