

**Baden – New Hamburg Water
and Wastewater System
Servicing Review**

Project File Report



Prepared for:
Region of Waterloo

Prepared by:
Stantec Consulting Ltd.
300 Hagey Blvd., Suite 100
Waterloo, ON N2L 0A4

and

C3 Water Inc.
350 Woolwich Street South
Breslau, ON N0B 1M0

September 2023

Sign-off Sheet

This document entitled Baden – New Hamburg Water and Wastewater System Servicing Review was prepared by Stantec Consulting Ltd. (“Stantec”) for the account of Region of Waterloo (the “Client”). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec’s professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Prepared by _____

(signature)

Sarah Micks, BES

Reviewed by _____

(signature)

Paula Hohner, MScPI, MCIP, RPP

Approved by _____

(signature)

Jeff Paul, P.Eng.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

Table of Contents

Executive Summary	i
Abbreviations	viii
1.0 Introduction	1
1.1 Study Area.....	1
1.2 Municipal Class Environmental Assessment Process	2
1.2.1 Planning Process.....	3
1.2.2 Class EA Project Classification	4
1.2.3 Comments and Request for Higher Level of Study	6
1.3 Communications and Consultation Plan.....	7
1.4 First Nation and Indigenous Community Consultation.....	8
1.5 Public Consultation.....	9
1.6 Agency Consultation.....	10
2.0 Policy, Planning and Design Documents	11
2.1 Federal Legislation	11
2.1.1 Canadian Environmental Assessment Act.....	11
2.1.2 Fisheries Act.....	11
2.1.3 Migratory Birds Act	12
2.1.4 Species at Risk Act.....	12
2.2 Provincial Policies and Legislation.....	13
2.2.1 The Planning Act.....	13
2.2.2 Provincial Policy Statement	13
2.2.3 Endangered Species Act.....	14
2.2.4 Climate Change.....	14
2.2.5 Grand River Conservation Authority	15
2.2.6 Grand River Source Protection Plan.....	15
2.2.7 MOE Guideline D-2: Compatibility between Sewage Treatment and Sensitive Land Use.....	16
2.3 Municipal Planning Policies	16
2.3.1 Region of Waterloo Official Plan.....	16
2.3.2 Township of Wilmot Official Plan (2019).....	18
3.0 Relevant Municipal Studies/Projects	19
3.1 Water Infrastructure	19
3.2 Wastewater Infrastructure	19

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

4.0	Existing Conditions	20
4.1	Socio-Economic.....	20
4.2	Natural Environment.....	23
4.2.1	Designated Natural Heritage Features	24
4.2.2	Fish and Fish Habitat.....	26
4.2.3	Significant Species	26
4.3	Cultural Heritage Resources	27
4.3.1	Built Heritage Resources and Cultural Heritage Landscapes.....	27
4.3.1	Archaeological Resources.....	27
5.0	Water and Wastewater Servicing	30
5.1	Water Supply and Distribution System	30
5.1.1	Existing Water Supply Infrastructure	30
5.1.2	Existing Water Pressure	31
5.1.3	Future Projections	31
5.1.4	Water Supply and Demand	32
5.1.5	Existing Fire Flow	33
5.1.6	Future Fire Flow	33
5.1.7	Revised Future Fire Flow	33
5.1.8	Foxboro Green Water Treatment Plant	34
5.2	Wastewater Collection and Treatment System.....	35
5.2.1	Existing Wastewater Infrastructure.....	35
5.2.2	Projected Average Daily Flows (Wastewater)	36
5.2.3	Foxboro Green Wastewater Treatment Plant.....	37
6.0	Problem and Opportunity Statement	38
7.0	Alternative Solutions	39
7.1.1	Water Supply.....	39
7.1.2	Wastewater Servicing.....	40
7.1.3	Foxboro Green Community	43
8.0	Evaluation of Alternative Solutions	47
8.1	Evaluation Criteria	47
8.2	Evaluation Methodology	50
8.3	Evaluation of Alternative Solutions	51
8.3.1	Water Supply Alternative Solutions	51
8.3.2	Evaluation of Wastewater Alternative Solutions	51
8.3.3	Evaluation of Foxboro Green Community Alternative Solutions	53
8.4	Evaluation Summary and Preliminary Preferred Alternative.....	53
8.4.1	Baden-New Hamburg Wastewater Servicing	53
8.4.2	Foxboro Green Water and Wastewater Servicing	58

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

9.0	Preliminary Cost Estimate	66
9.1	Implementation Timeframe and Schedule	67
9.2	Baden Well Decommissioning	67
10.0	Potential Environmental Impacts	67
10.1	Natural Environment.....	68
10.1.1	Significant Wildlife Habitat	68
10.1.2	Fish and Fish Habitat.....	69
10.2	Archaeological Resources	71
10.3	Cultural Heritage Resources	72
11.0	Proposed Environmental Mitigation and Monitoring Requirements.....	74
11.1.1	Protection of Fish.....	74
11.1.2	Erosion and Sediment Control.....	74
11.1.3	Protection of Migratory Birds	74
11.1.4	Protection of Wildlife.....	75
11.1.5	Standard Mitigation Measures for Construction.....	76
11.2	GRCA Mitigation Requirements.....	76
11.3	Archaeological Resources	77
11.4	Built Heritage Resources and Cultural Heritage Landscapes.....	77
11.5	Climate Change.....	78
11.6	Source Protection	78
11.7	Groundwater.....	80
11.8	Excess Materials and Waste	80
12.0	Approvals and Permits	80
12.1.1	Ministry of Transportation Public Transportation and Highway Improvement Act	80
12.1.2	Fisheries and Oceans Canada / Fisheries Act	81
12.1.3	Species at Risk Act.....	81
12.1.4	Grand River Conservation Authority / Conservation Authorities Act82	
12.1.5	Endangered Species Act.....	82
12.1.6	Additional Requirements for Impact Assessment and Refinement of Mitigation Measures	84
13.0	Commitments to Carry Forward to Detailed Design and Construction	85
14.0	Closing	96

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

List of Tables

Table 1: Baden Growth Projections.....	22
Table 2: New Hamburg Growth Projections	23
Table 3: Two-Tiered System: Water / Wastewater Infrastructure.....	30
Table 4: Average Day and Maximum Day Water Demands.....	32
Table 5: Proposed BNH Fire Flow Targets (GMBP, 2022)	34
Table 6: Projected Average Daily Flows.....	37
Table 7: Projected Peak Wet Weather Flows	37
Table 8: Evaluation Criteria	47
Table 9: Evaluation Scoring Criteria.....	51
Table 10 : Summary of Evaluation of Wastewater Alternative Solutions.....	52
Table 11: Summary of Evaluation of Foxboro Green Community Alternative Solutions.....	55
Table 12: Potential Impacts to Cultural Heritage Resources.....	73
Table 13: SAR potentially occurring within projects study areas within the Servicing Review Study Area	83
Table 14: Baden-New Hamburg Wastewater Servicing (Alternative WW4) Design Commitments	86
Table 15: Foxboro Water and Wastewater Servicing (Alternative F3) Design Commitments	91

List of Figures

Figure 1: Wastewater Preferred Alternative.....	iv
Figure 2: Foxboro Green Community Preferred Alternative.....	v
Figure 3: Servicing Review Study Area	2
Figure 4: Municipal Class Environmental Assessment Process	5
Figure 5: Development Blocks within the Urban Boundary	21
Figure 6: Natural Heritage Existing Conditions	25
Figure 7: Existing Cultural Heritage Resources	29
Figure 8: Existing Water Supply System	31
Figure 9: Existing Wastewater System.....	36
Figure 10: Alternative WW2	41
Figure 11: Alternative WW3	42
Figure 12: Alternative WW4	43
Figure 13: Alternative F2.....	44
Figure 14: Alternative F3.....	45
Figure 15: Alternative F4.....	46
Figure 16: Baden-New Hamburg WW4 Preferred Alternative.....	58
Figure 17: Foxboro Green Water and Wastewater Servicing Sub-Option Alternatives	60
Figure 18: Foxboro Water and Wastewater Servicing Preferred Alternative	61
Figure 19: Revised Foxboro Water and Wastewater Servicing Preferred Alternative	64

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

List of Appendices

APPENDIX A	CONSULTATION
APPENDIX B	TECHNICAL MEMO #1 BACKGROUND REVIEW
APPENDIX C	TECHNICAL MEMO #2 EVALUATION CRITERIA
APPENDIX D	TECHNICAL MEMO #3 WATER INFRASTRUCTURE ALTERNATIVES & WATER ANALYSIS UPDATE
APPENDIX E	TECHNICAL MEMO #4 WASTEWATER INFRASTRUCTURE ALTERNATIVES
APPENDIX F	TECHNICAL MEMO #5 & #5A EVALUATION AND PREFERRED ALTERNATIVES
APPENDIX G	NATURAL HERITAGE MEMO
APPENDIX H	STAGE 1 ARCHAEOLOGICAL ASSESSMENT P390-0364-2022
APPENDIX I	CULTURAL HERITAGE REPORT

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

Executive Summary

The Region of Waterloo (Region) retained Stantec Consulting Ltd. (Stantec) and C3 Water Inc. (C3W) to complete a System Servicing Review for the New Hamburg Water and Wastewater Systems. The study area for this servicing review includes the water and wastewater systems that serve the communities of Baden, New Hamburg and Foxboro Green within the Township of Wilmot, Region of Waterloo (see map). Future planned growth and development has been identified within the current Urban Area Boundaries for Baden, New Hamburg, and Foxboro Green, as defined in the Township of Wilmot Official Plan (2019). Prior to any development of planned growth, the water and wastewater servicing requirements for these areas need to be addressed.

This System Servicing Study is being undertaken in accordance with Approach #2 of the Master Planning Process, as outlined in Appendix 4 of the Municipal Class Environmental Assessment document (October 2000, as amended in 2007, 2011 and 2015). As such, the Study will address Phases 1 and 2 of the EA process to fulfill the requirements for the recommended Schedule B projects identified.

Consultation

A contact list was developed at the outset of the study, which includes relevant government and regulatory agencies, utilities, community organizations, interested members of the public, Indigenous communities, and First Nations. Project notices issued to date include the Notice of Study Commencement (February 2020), Notice of Public Consultation Centre (PCC) #1 (May 2021), Notice of PCC #2 (December 2021), and Notice of PCC #3 (May 2022). The Notice of Completion is anticipated to be issued in March 2023. All notices have been emailed to the contact list, emailed to First Nations, and published in the New Hamburg Independent and Ayr News newspapers in two consecutive editions.

Three PCC's were held throughout the study to ensure stakeholders had an understanding of the project, and to provide opportunities to provide input into the alternative solutions, evaluation criteria, and design alternatives. While the project information would typically be presented at a PCC event, adjustments were made to ensure public safety and COVID-19 restrictions on public gatherings. As a result, the Region of Waterloo provided the presentation materials on the Engage Waterloo Region website for public review.

All input from the public, review agencies, committees, and other stakeholders has been documented. All consultation with First Nations has also been documented in a Consultation Log.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

Phase 1 – Problem and Opportunities

Phase 1 of the MCEA process identifies the problem or opportunity that has led to the undertaking of the Class EA. The Problem and Opportunity statement for the Baden-New Hamburg Water and Wastewater System Servicing Review is as follows:

The communities of Baden and New Hamburg are currently serviced by a two-tier water and wastewater system run by the Township and the Region. This Servicing Review will assess those assets that are owned and operated by the Region of Waterloo that serve the communities of Baden, New Hamburg and Foxboro Green and assess current and future servicing needs within the community based on the Region's 2011 Master Plan Update, the Township of Wilmot's 2019 Official Plan, Recommendations from the Region's 2018 Wastewater Treatment Plan, and current development applications.

The purpose of this Servicing Review is intended to provide recommendations on the following:

- Capacity, quality, and any necessary upgrades of the existing water supply system
- Capacity, condition, and any necessary upgrades of the wastewater treatment and collection system
- Current industry standards and new technologies and/or infrastructure for water and wastewater servicing

This phase of the project identified three areas where upgrades were required to service existing and future growth:

- Additional water storage was identified as being required under the future growth scenarios
- The Baden Pumping Station was identified as having insufficient capacity under the future growth scenarios under wet weather conditions
- The Foxboro Green water and wastewater systems were identified as requiring significant maintenance and upgrades and required further study to review alternative servicing scenarios.

Phase 2 – Alternative Solutions

Alternative solutions are identified and evaluated based on their ability to reduce impacts to the socio-economic, natural, technical, and financial environments.

Alternative solutions were identified and evaluated for Water Supply, Wastewater, and the Foxboro Green community.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

Water Supply Alternative Solutions considered for the study area include:

- WS1 - Do Nothing
- WS2 - Provide increased storage at the New Hamburg Water Treatment Plant (WTP)
- WS3 Provide new storage at the Baden Wells site
- WS4 – Provide new storage at the Shingletown/K50 Wells site

Wastewater Alternative Solutions considered for the study area include:

- WW1 - Do Nothing
- WW2 – Upgrade system and maintain existing configuration
- WW3 – Upgrade system and convey directly to Morningside Pump Station
- WW4 – Upgrade system and convey directly to New Hamburg Wastewater Treatment Plant

Foxboro Green Community Alternative Solutions include:

- F1 – Do Nothing
- F2 – Connect Foxboro to Baden via existing rights-of-way
- F3 – Connect Foxboro to future expanded Baden service area using a direct route
- F4 – Connect Foxboro to New Hamburg via rights-of-way

Following the evaluation, the preliminary preferred alternatives for the Water Supply, Wastewater and Foxboro Green Community improvements were identified.

Preliminary Preferred Alternatives

Water Supply Preferred Alternative

Alternative WS2 – Construction of new storage at New Hamburg WTP, was originally identified as the preliminary preferred alternative. Since the completion of the system servicing review for this MCEA, the Region completed a more detailed investigation of the storage requirements using the Fire Underwriters Survey (FUS) guidelines. This was done as the data for analysis was available and is also part of an undertaking the Region is completing to standardize its approach to fire flow. As a result of this investigation, the water storage requirements previously identified have changed and the recommendation for expansion of storage at New Hamburg WTP is not required.

Wastewater Preferred Alternative

Alternative WW4 – Upgrade system and convey directly to New Hamburg Wastewater Treatment Plant, has been identified as the preliminary preferred alternative. As shown on the attached figure, this alternative involves constructing a new Baden Sanitary Pumping Station and constructing new twin forcemains to direct flow through road

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

allowances and easements to the Baden – New Hamburg Wastewater Treatment Plant. The Wastewater Preferred Alternative is displayed in **Figure 1**.

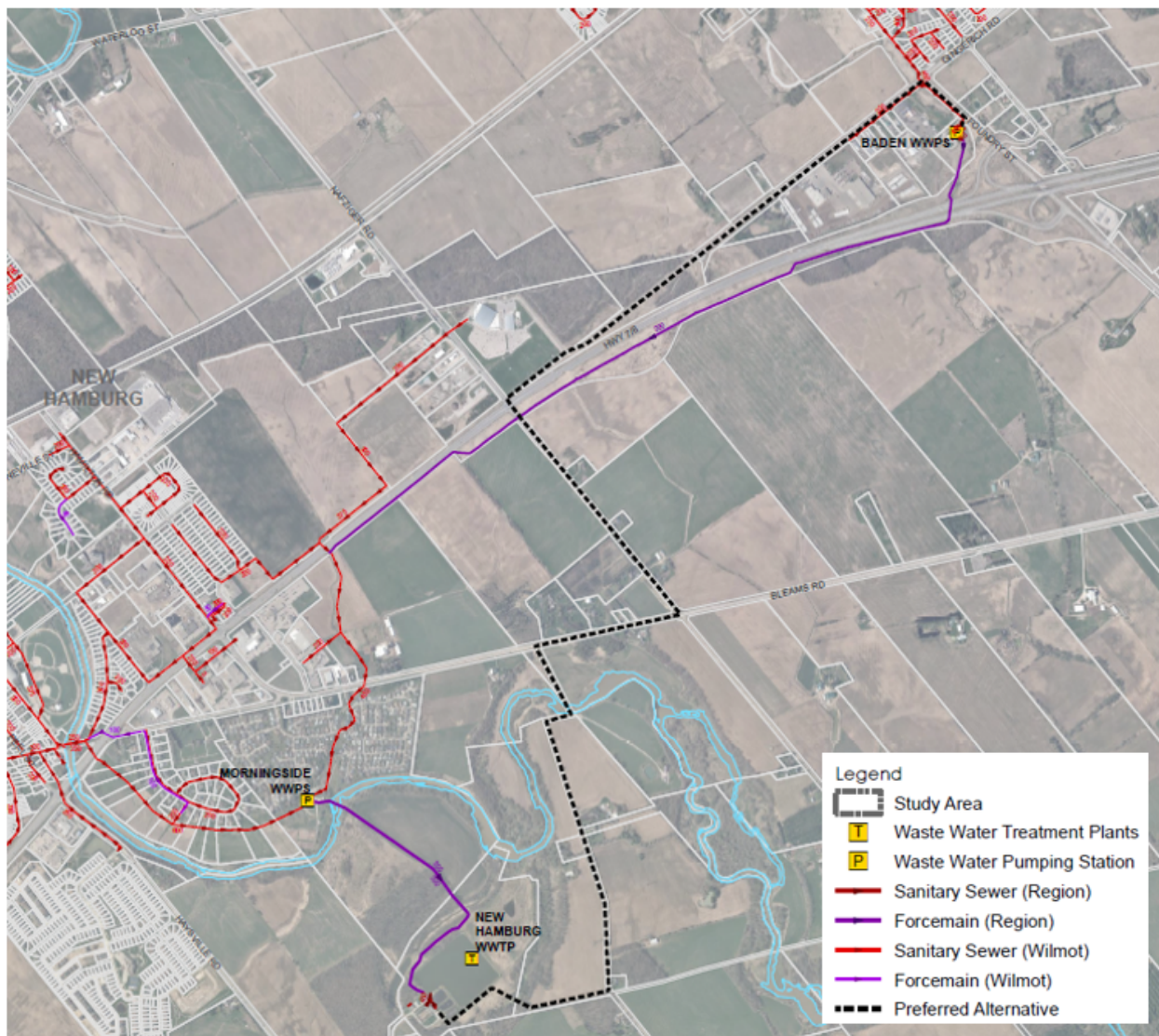


Figure 1: Wastewater Preferred Alternative

Foxboro Green Community Preferred Alternative

Alternative F3 – Connect Foxboro to future expanded Baden service area using a direct route, has been identified as the preliminary preferred alternative. As shown on the attached figure, this alternative involves converting the existing wastewater treatment facilities in Foxboro into sanitary pumping stations and then pumping flow from these facilities via forcemain to the proposed sanitary sewer system to be constructed in the new development area in the north-west corner of Baden. Similarly, the water supply system will also be connected to the proposed development and the existing water

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

supply system in Foxboro will be decommissioned. The Foxboro Green Community Preferred Alternative is displayed in **Figure 2**.

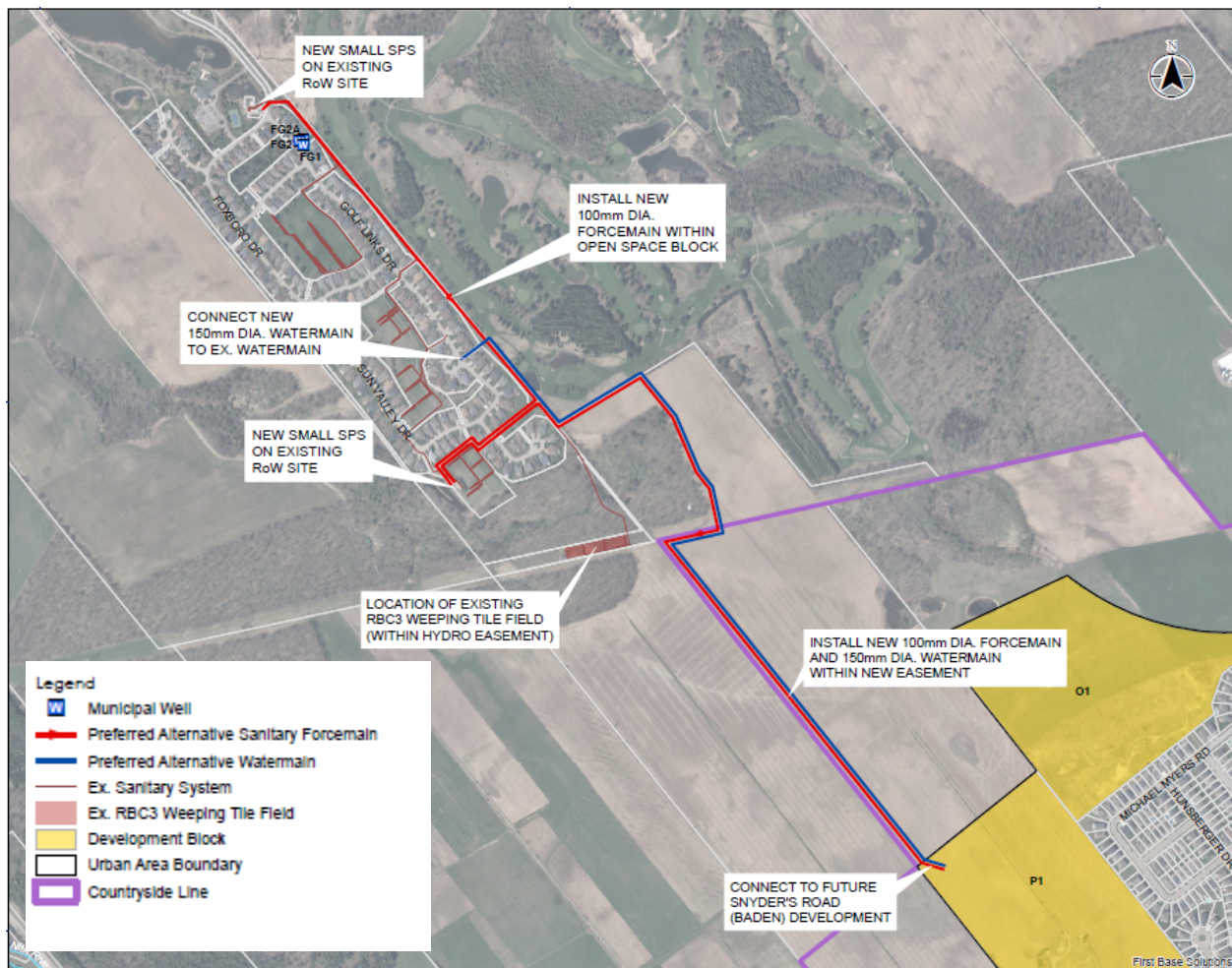


Figure 2: Foxboro Green Community Preferred Alternative

Implementation Timeframe and Schedule

The implementation of the preferred improvements is anticipated to commence in a staged manner with the initial project, the Baden Pumping Station upgrade, likely proceeding to construction in 2025, subject to available funding, and easement needs be met. Construction of the Foxboro Green connection requires the completion of servicing to the development limits of Baden and timing is thus predicated on completion of these works.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

Potential Impacts and Proposed Mitigation

Many of the environmental concerns related to this project have been mitigated through the process by which the preferred design was selected. The anticipated impacts and proposed mitigation measures have been described in Section 10 and 11 of this report. The Region of Waterloo will work with the Grand River Conservation Authority and the Ministry of Environment, Conservation and Parks during detailed design and prior to the start of construction to ensure that the proposed works are acceptable and to obtain required permits as discussed in Section 12 of the report.

Approvals and Permits

All permitting requirements should be identified during the detailed design. The following list is provided for guidance and may not include all of the required permits:

- Ministry of Transportation Public Transportation and Highway Improvement Act - any proposal crossing the designated highway limits (Highway 7/8) will require MTO review and approval (Encroachment Permit). Any portion of the proposal outside the highway designated limits but within MTO's Permit Control Area will require MTO review and approval (Building and Land Use Permit). This requirement will specifically apply to the construction of the twin forcemains from the Baden PS to the Baden – New Hamburg WWTP where these forcemains cross Highway 7/8.
- Fisheries and Oceans Canada - The Act prohibits activities that result in the death of fish or the harmful alteration, disruption or destruction (HADD) of fish habitat unless authorized by the Minister of Fisheries, Oceans and the Canadian Coast Guard. If it is determined that the death of fish or HADD of fish habitat is unavoidable as part of the Project, an authorization under the Fisheries Act may be required. Design plans are necessary to determine the potential for the death of fish or harmful alteration, disruption or destruction of fish habitat. This requirement will specifically apply to the construction of the twin forcemains from the Baden PS to the Baden – New Hamburg WWTP where these forcemains cross the Nith River. This river crossing is proposed to be accomplished by placing the forcemains on the side of the existing bridge to mitigate impacts, however, DFO approval will still be required due to the work being completed in proximity of the Nith River.
- Species at Risk Act (SARA) - Permits for prohibited activities may be issued under Section 73 of the SARA. Design plans are necessary to determine if a SAR Permit is needed for work at the Nith River due to the presence of SAR. This requirement will specifically apply to the construction of the twin forcemains from the Baden PS to the Baden – New Hamburg WWTP where these forcemains cross the Nith River. This river crossing is proposed to be accomplished by placing the forcemains on the side of the existing bridge to mitigate impacts, however, a SAR permit may still be required due to the work being completed in proximity of the Nith River.
- Grand River Conservation Authority - Regulated Areas Ontario Regulation 157/06 due to the potential to interfere with watercourses, valleys, wetlands and shorelines. If required, a permit application package may be required for submission to GRCA.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

Consultation with GRCA during detailed design is recommended to confirm permit application requirements. Regulated areas are associated with drainage features and/or wetlands in the Baden-New Hamburg Wastewater Servicing Areas, and the Foxboro Green Water and Wastewater Servicing Area.

- Endangered Species Act - A permit may be issued under Section 17(2) of the ESA or eligible activities can be registered under Ontario Regulation 242/08 to authorize work that is otherwise prohibited. A SAR Permit may be required for the Baden-New Hamburg Wastewater Servicing Area and the Foxboro Green Water and Wastewater Servicing Study Area associated within the alignment of the preferred alternatives.
- Township of Wilmot – The Region will work with the Township on aspects of the preferred alternatives including design of forcemain on their bridge crossing the Nith River and obtaining easements on their property.
- Foxboro Green Waterloo Standard Condominium Corporation 365 – The Region is required to consult with Foxboro Green on future stages of the design and construction stages as it pertains to their property and services.

Closing

The filing of this Project File Report represents the conclusion of Phase 1 and Phase 2 of the Municipal Class EA planning process as outlined in the MCEA document. Provided that no Section 16 Order requests are received and provided all appropriate environmental and engineering permitting and approvals are obtained, the Region may proceed with detailed design and implementation (Phase 5) 30 days following the completion of the public review period.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

Abbreviations

ADF	Average Daily Flow
ANSI	Area of Natural and Scientific Interest Earth Science
BNH	Baden New Hamburg
CHAR	Cultural Heritage Assessment Report
CWA	Clean Water Act 2006
DFO	Department of Fisheries and Oceans Canada
EA	Environmental Assessment
ECA	Environmental Compliance Approval
ESA	Endangered Species Act
I/I	Inflow and Infiltration
masl	Metres above sea level
MBR	Membrane Bioreactor
MCEA	Municipal Class Environmental Assessment
MCM	Ministry of Citizenship and Multiculturalism
MEA	Municipal Engineers Association
MECP	Ministry of the Environment, Conservation and Parks
MHSTCI	Ministry of Heritage, Sport, Tourism and Culture Industries
MTCS	Ministry of Tourism, Culture and Sport
MOECC	Ministry of the Environment and Climate Change

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

NDMNRF	Northern Development, Mines, Natural Resources and Forestry
MNRF	Ministry of Natural Resources and Forestry
PPS	Provincial Policy Statement
PRV	Pressure Reducing Valve
PSW	Provincially Significant Wetland
RBC	Rotating Biological Contactor
RMOW	Regional Municipality of Waterloo
SAR	Species at Risk
SARA	Species at Risk Act
SARO	Species at Risk in Ontario
SBR	Sequencing Batch Reactor
SCADA	Supervisory Control and Data Acquisition
SOCC	Species of Conservation Concern
SPP	Source Protection Plan
SPS	Sewage Pump Station
TM	Technical Memorandum
UNESCO	United Nations Educational, Scientific and Cultural Organization
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

1.0 Introduction

The Region of Waterloo (Region) retained Stantec Consulting Ltd. (Stantec) and C3 Water Inc. (C3W) to complete a System Servicing Review for the New Hamburg Water and Wastewater Systems. Future planned growth and development has been identified within the current Urban Area Boundaries for Baden, New Hamburg, and Foxboro Green, as defined in the Township of Wilmot Official Plan (2019). Prior to any development of planned growth, the water and wastewater servicing needs for these areas needs to be addressed.

The purpose of this Servicing Review is to evaluate the status of existing water and wastewater servicing systems in Baden – New Hamburg, provide recommendations to address existing servicing constraints, and to provide the framework to meet the water / wastewater servicing needs for the planned growth within the community. Planned growth will be compared and considered up to the rated capacity of existing Region infrastructure, particularly the current rated capacity of the New Hamburg WWTP and the existing water supply systems.

This System Servicing Study is being undertaken in accordance with Approach #2 of the Master Planning Process, as outlined in Appendix 4 of the Municipal Class Environmental Assessment document (October 2000, as amended in 2007, 2011 and 2015). As such, the Study will address Phases 1 and 2 of the EA process to fulfill the requirements for the recommended Schedule B projects identified.

1.1 Study Area

As shown in **Figure 3**, the study area for this servicing review includes the water and wastewater systems that serve the communities of Baden, New Hamburg and Foxboro Green within the Township of Wilmot, Region of Waterloo.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

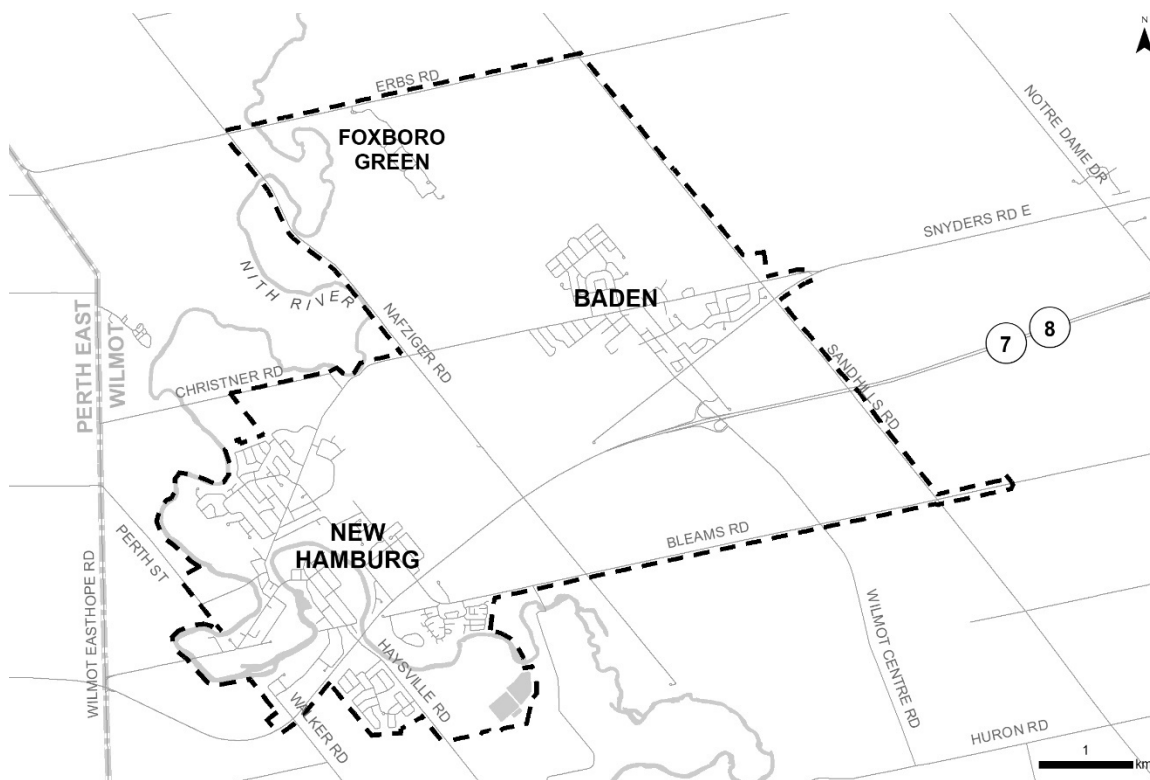


Figure 3: Servicing Review Study Area

1.2 Municipal Class Environmental Assessment Process

The *Environmental Assessment Act of Ontario, R.S.O 1990* (EA Act) provides for the protection, conservation, and management of the environment in Ontario. The Ministry of the Environment, Conservation and Parks (MECP) is responsible for administration of the EA Act.

The Municipal Class Environmental Assessment (MCEA) is an approved Class EA under the EA Act that applies to municipal infrastructure projects including roads, water, wastewater and transit. This process provides a comprehensive planning approach to consider alternative solutions and evaluate their impacts on a set of criteria (e.g., environmental, transportation, socio-economic, engineering considerations) and determine mitigating measures to arrive at a preferred alternative for addressing a problem (or opportunity) identified.

The MCEA process involves a rigorous public consultation component that includes various provincial and municipal agencies, First Nations and Indigenous communities, and the public.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

1.2.1 Planning Process

The MCEA process is undertaken prior to modifications or additions to municipal infrastructure, to ensure that potential impacts associated with all project aspects are considered.

The MCEA process, as illustrated in Figure 4, was developed by the Municipal Engineers Association (MEA) to fulfill the requirements of the EA Act for municipal infrastructure projects, and consists of the following five (5) phases:

- **Phase 1:** Identify the problem/opportunity
- **Phase 2:** Identify and evaluate alternative solutions
- **Phase 3:** Identify and examine alternative design concepts for the preferred solution
- **Phase 4:** Formally document the planning process
- **Phase 5:** Proceed to implementation of the project

Based on the nature and extent of the project, as well as its anticipated impacts to the surrounding environment, the MCEA document specifies four different schedules under which projects may be planned, and the assessment process required for each:

Schedule A projects are pre-approved under the MCEA and can proceed directly to Phase 5 (implementation). Schedule A projects are limited in scale and have minimal anticipated impacts to the environment, generally including normal or emergency operational and maintenance activities.

Schedule A+ projects are pre-approved under the MCEA, although the proponent is required to advise the public of the project prior to construction activities. These types of projects are limited in scale with minimal environmental impacts, and thus require no formal documentation.

Schedule B projects are required to proceed through the first two phases of the MCEA process to identify the problem or opportunity, as well as identify and assess any reasonable/feasible Alternative Solutions and select a Preferred Solution. Proponents must also contact all relevant agencies, Indigenous Communities and affected members of the public to ensure that they are aware of the project and that their concerns are considered and addressed. A record of the process followed is also documented within a Project File or a Project File Report and filed for a 30-day public review period. If there are no significant impacts identified, and no requests are received to undertake the project as an individual Environmental Assessment (through the Part II Order process), the project may then proceed to detail design (i.e., Phase 5).

Schedule C projects are required to proceed through all five stages of the MCEA process, as they have the potential for significant environmental effects. These projects generally include the construction of new facilities, or major expansions to existing

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

facilities. Schedule C projects require an Environmental Study Report be completed and filed for a 30-day public review period.

The selection of the appropriate project schedule to be followed is dependent on the anticipated level of environmental impact, and at times the estimated construction costs.

1.2.2 Class EA Project Classification

This System Servicing Study is being undertaken in accordance with Approach #2 of the Master Planning Process, as outlined in Appendix 4 of the Municipal Class Environmental Assessment document (October 2000, as amended in 2007, 2011 and 2015). Master plans are long range plans which integrate infrastructure requirements for existing and future land use with environmental assessment planning principles. These plans examine an infrastructure system(s) or group of related projects in order to outline a framework for planning for subsequent projects and/or developments.

According to Appendix 1 of the MCEA document, Schedule B level of assessment is recommended for works that include: establishing new or expanding/replacing existing water storage facilities; establishing a water distribution system outside of existing road allowance or an existing utility corridor (i.e., a proposed easement); and constructing a new pumping station or increase pumping station capacity by adding or replacing equipment and appurtenances, where new equipment is located in a new building or structure.

This report fulfills the requirements of Schedule B projects identified through the Master Planning process. Any Schedule C projects identified would continue to fulfill Phases 3 and 4 under separate study, including the preparation of an Environmental Study Report (ESR) and filing for a 30-day public review.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

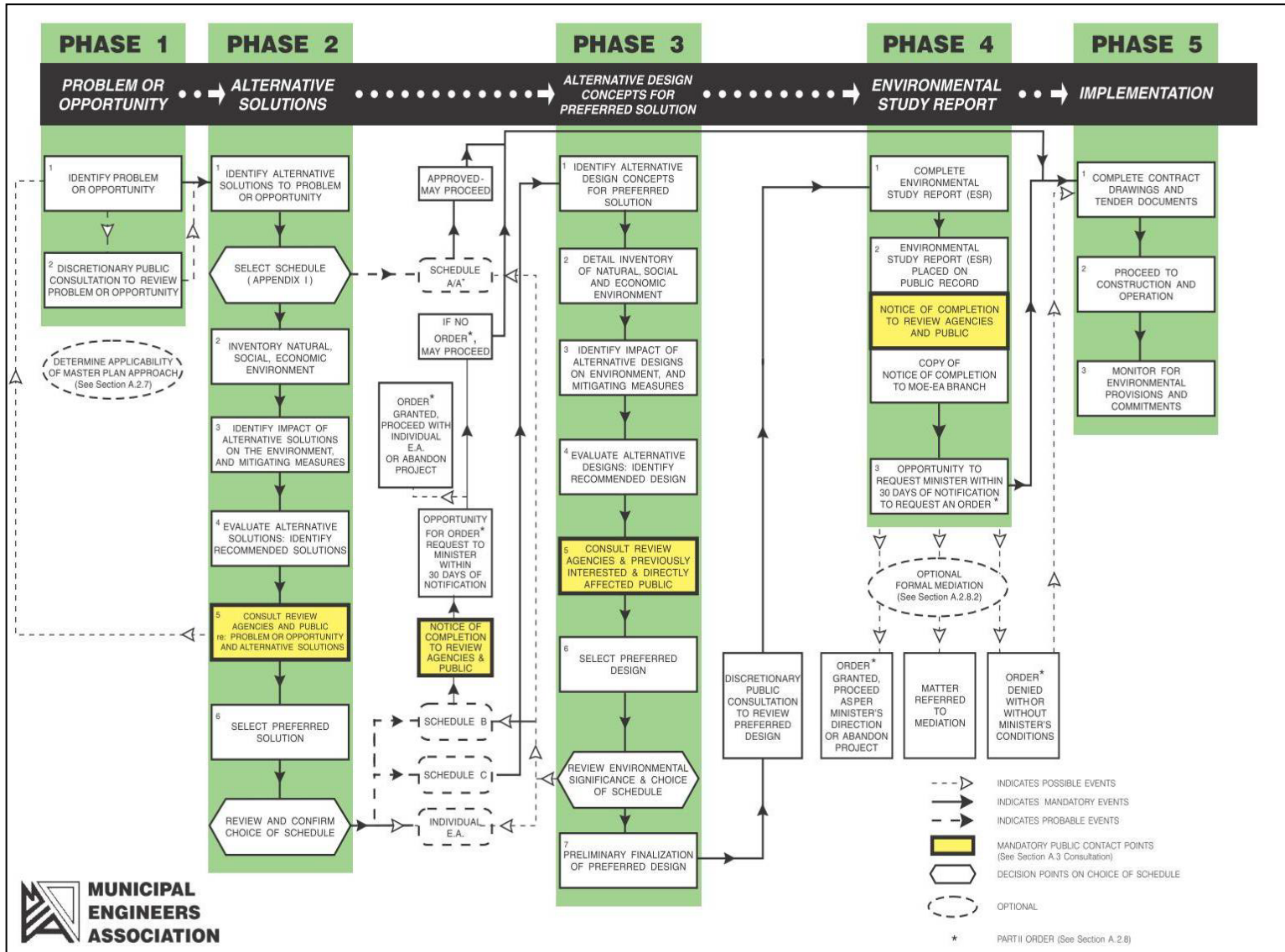


Figure 4: Municipal Class Environmental Assessment Process

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

1.2.3 Comments and Request for Higher Level of Study

Interested persons may provide written comments to the Region of Waterloo for a response using the following contact information:

Kaoru Yajima, P.Eng.
Sr. Engineer, Water Services, Region of Waterloo
150 Frederick Street, 7th Floor
Kitchener, ON N2G 4J3
Tel: 519-575-4757 ext. 3349
Email: kyajima@regionofwaterloo.ca

In addition, a request may be made to the Ministry of the Environment, Conservation and Parks for an order requiring a higher level of study (i.e., requiring an individual/comprehensive EA approval before being able to proceed), or that conditions be imposed (e.g., require further studies), only on the grounds that the requested order may prevent, mitigate or remedy adverse impacts on constitutionally protected Aboriginal and treaty rights. Requests on other grounds will not be considered. Requests should include the requester contact information and full name for the ministry.

Requests should specify what kind of order is being requested (request for additional conditions or a request for an individual/comprehensive environmental assessment), how an order may prevent, mitigate, or remedy those potential adverse impacts, and any information in support of the statements in the request. This will ensure that the ministry is able to efficiently begin reviewing the request. The request should be sent in writing by mail or by email to:

Minister of the Environment, Conservation and Parks
Ministry of Environment, Conservation and Parks
777 Bay Street, 5th Floor
Toronto ON M7A 2J3
minister.mecp@ontario.ca

and

Director, Environmental Assessment Branch
Ministry of Environment, Conservation and Parks
135 St. Clair Ave. W, 1st Floor
Toronto ON, M4V 1P5
EABDirector@ontario.ca

Requests should also be sent to Region of Waterloo by mail or by email.

1.3 Communications and Consultation Plan

Consultation is a vital part of the Class EA process. Active engagement with all potentially affected parties including government agencies, community members, special interest groups, and First Nations and Indigenous communities ensures a transparent and responsible planning process.

At the initiation of the project, a contact list was created which includes relevant Federal and Provincial government agencies, local government officials, First Nations and Indigenous communities, special interest groups, landowners, and developers. Those who expressed interest were also included on the project mailing list. All project notifications were mailed to the entire study contact list, delivered to residents within the study area, and posted on the Region of Waterloo’s website (<https://www.regionofwaterloo.ca/en/living-here/current-projects.aspx>).

Three online Public Consultation Centres (PCCs) were held throughout the study to serve as forums for two-way communication between the project team and members of the public. The objective of the PCCs were to convey project information in a clear, concise way. The PCC’s were all held online through the Region’s YouTube channel, with a pre-recorded presentation available for public review. All presentation materials and comments received have been included in Appendix A. The following table provides an overview of the key points of contact:

Point of Contact	Method of Communication
<i>Notice of Commencement to introduce the project</i>	<ul style="list-style-type: none"> • Mailed and emailed to contact list (March 2, 2021) • Published on the Region’s website (https://www.regionofwaterloo.ca/en/living-here/current-projects.aspx)
<i>Public Consultation Centre 1</i> June 1, 2021 to July 1, 2021	<ul style="list-style-type: none"> • Mailed and emailed to contact list (May 25, 2021) • Notice published in the New Hamburg Independent Newspaper (May 26, 2021) • PCC display material posted to the Region’s website (https://www.regionofwaterloo.ca/en/living-here/current-projects.aspx)
<i>Public Consultation Centre 2</i> December 7, 2021 to January 12, 2022	<ul style="list-style-type: none"> • Mailed and emailed to contact list (November 30, 2021) • Notice published in the New Hamburg Independent and Ayr News newspaper (May 26, 2021) PCC display material posted to the Region’s website (https://www.regionofwaterloo.ca/en/living-here/current-projects.aspx)
<i>Public Consultation Centre 3</i>	<ul style="list-style-type: none"> • Mailed and emailed to contact list (May 31, 2022) • Notice published in the New Hamburg Independent and Ayr News newspaper (June 1, 2022 and June 8, 2022)

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

<i>Point of Contact</i>	Method of Communication
June 7, 2022 to July 7, 2022	<ul style="list-style-type: none"> PCC display material posted to the Region’s website (https://www.regionofwaterloo.ca/en/living-here/current-projects.aspx)
<i>Notice of Completion to provide an overview of study recommendations, public review period, and Part II Order process.</i> 30-day review period – April 10, 2023 to May 9, 2023	<ul style="list-style-type: none"> Mailed and emailed to contact list (April 4, 2023) Notice published in the New Hamburg Independent and Ayr News newspaper (April 5, 2023 and April 12, 2023) Report made available on the Region’s website (https://www.regionofwaterloo.ca/en/living-here/current-projects.aspx)

1.4 First Nation and Indigenous Community Consultation

First Nations and Indigenous communities were contacted over the duration of the study based on correspondence with MECP and known interests. Project notices were mailed to communities. Mississaugas of the Credit First Nation responded at the onset of the study, noting their interest in the study, and interest in participating with Field Liaison Representatives during the environmental survey and archaeological assessment process. The First Nation and Indigenous Community Communication Log, notification materials provided to Indigenous Communities and correspondence from Indigenous Communities is provided in **Appendix A**.

Communities contacted include:

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

The first point of contact for this project was the Notice of Study Commencement, which was mailed on March 2, 2021.

All public material has been forwarded, and follow-up emails were completed to ensure that sufficient information was provided. All interested parties were notified and invited to all PCCs and given the opportunity to express concerns and provide feedback through an invitation to meet.

A response to the initial notice was received from the Mississaugas of the Credit First Nation on March 30, 2021, requesting engagement on some of the background studies. A response was sent to this initial request by the Region on April 23, 2021.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

Subsequently, and in accordance with the initial request, the Natural Heritage Assessment Report, Stage 1 Archaeological Assessment Report, and Cultural Heritage Report were distributed to Mississaugas of the Credit First Nation on July 14, 2022. Comments were requested by Monday, August 15, 2022. No comments were received.

The Stage 1 Archaeological Assessment Report recommended a stage 2 investigation for select areas of the project. This work is anticipated to be completed during the detailed design phase of the projects. Each of the First Nations consulted through this study should be notified of this work and invited to attend all field work that may be completed.

1.5 Public Consultation

A key component of the MCEA process is consultation with members of the public. For this study, the main points of public consultation are:

- To notify the public that the study was commencing
- To review and receive public input regarding the problem being addressed and discuss issues related to the project including alternative solutions, environmental considerations, conceptual corridors, and evaluation criteria
- To review and receive public input regarding the design alternatives, evaluation of design alternatives, and preliminary preferred alternative
- To review and receive feedback on the preliminary preferred alternative including proposed mitigation measures
- To review the final report (Servicing Study/Project File Report)

A significant component to the MCEA process is the documentation of how public input has influenced project planning, and how issues have been managed. The Project Team acknowledged all submitted comments and provided responses on how these stakeholder comments, questions and/or issues have been considered in the servicing study. All questions and comments from PCCs, electronic comments and those received directly via phone, mail or email have been documented.

Morningside Adult Lifestyle Community

Following the Notice of Commencement, correspondence was received from Morningside Adult Lifestyle Community, on February 4, 2021. The correspondence notes the proposed sewer main would travel through their community, and notes interest in understanding any impacts in the community. The Region followed up with the community over the telephone, and they were notified of all future milestones related to the study. Alternatives WW2 and WW3 would have created some construction impact to this community. In evaluating these alternatives, the socio-economic impact of this disruption was considered in the evaluation matrix.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

Foxboro Green (Waterloo Standard Condominium Corporation #365)

Following the third PCC, correspondence was received from Foxboro Green (Waterloo Standard Condominium Corporation #365), on June 23, 2022. The correspondence requested a meeting with the Region and Stantec to discuss the details of the study, as well as a number of questions and concerns related to the Foxboro Green Community. Staff from the Region of Waterloo and Stantec met with representatives of the Foxboro Green Community to answer their questions and review their concerns.

Correspondence and discussions were exchanged between Foxboro, the Region and Stantec during the latter part of 2022. As a result of these discussions, some modification to the forcemain and watermain alignments shown under preferred alternative F3 were undertaken for those proposed works within the Foxboro community. With these modifications, the Foxboro Community Condo Board confirmed their agreement with the preferred alternative as modified. Section 8.4.2.1 contains the written correspondence which describes these discussions in more detail.

A copy of all public consultation is included in **Appendix A**.

1.6 Agency Consultation

Agencies and developers invited to participate in the study are listed below.

Provincial

Ministry of Natural Resources and Forestry
Ministry of the Environment, Conservation and Parks
Ministry of Tourism, Culture and Sport
Infrastructure Ontario
Ministry of Agriculture, Food and Rural Affairs
Ministry of Municipal Affairs and Housing
Ministry of Transportation
Ontario Realty Corporation

Local

Township of Wilmot
Grand River Conservation Authority
Region of Waterloo Ecological and Environmental Advisory Committee
Region of Waterloo Heritage Planning Advisory Committee
Heritage Wilmot
Waterloo Region Home Builders Association
Wilmot Centre Monitoring Program Public Liaison Committee
Enbridge Pipeline
Kitchener-Wilmot Hydro
Canadian National Railway
Canadian Pacific Railway

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

GO Transit
Goderich-Exeter Railway Company Limited
Hydro One
Rogers Cable Systems Utilities Coordinating Committee
Bell Canada

Developers/Consultants

Foxboro Green Community
Dietrich Engineering
Morningside Condominium Corporation
Badenview Developments Inc.
Newdale Farm Inc.
Morningside Adult Lifestyle Community
Mattamy Homes
Voisin Developments
MTE Consultants Inc.
Walter Fedy

2.0 Policy, Planning and Design Documents

2.1 Federal Legislation

2.1.1 Canadian Environmental Assessment Act

The *Canadian Environmental Assessment Act* (2012) focuses federal environmental review on projects which have the potential to cause significant adverse environmental effects in areas of federal jurisdiction. For the *Act* to apply, the proposed project must be designated under the “Regulations Designating Physical Activities” and specifically be listed in the “Schedule for Physical Activities”. Review of the Schedule for Physical Activities shows there is no physical activity that matches the work proposed for the construction of pumping stations and sewers. Therefore, meeting the requirements of the *Canadian Environmental Assessment Act* will not be necessary for this project.

2.1.2 Fisheries Act

The federal *Fisheries Act* (1985) is the primary legislation governing fish and fish habitat in Canada. The *Fisheries Act* defines fish habitat as “...waters frequented by fish and any other areas on which fish depend directly or indirectly in order to carry out their life processes including spawning grounds and nursery, rearing, food supply and migration areas.” The fish and fish habitat protection provisions of the *Fisheries Act* apply to all fish and fish habitat in Canada. The Act prohibits activities that result in the death of fish or the harmful alteration, disruption, or destruction (HADD) of fish habitat unless

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

authorized by the Minister of Fisheries, Oceans, and the Canadian Coast Guard. If it is determined that the death of fish or HADD of fish habitat is unavoidable as part of the Project, an authorization under the *Fisheries Act* may be required.

2.1.3 Migratory Birds Act

The federal *Migratory Birds Convention Act*, 1995 (MBCA) protects migratory birds and their nests (S.4). Section 6 of the Migratory Bird Regulations (C.R.C., c. 1035) prohibits the disturbance, destruction or taking of a nest, egg, or nest shelter of a migratory bird. Nest disturbance during vegetation clearing may be considered as “incidental take” and is a contravention of the MBCA. To avoid damaging or disturbing bird nests and contravening the MBCA, the timing of any vegetation clearing should occur outside of the primary nesting period (i.e., the period when the percent of total nesting species is greater than 10% based on Environment Canada’s Nesting Calendars and the period for which due diligence mitigation measures are generally recommended).

2.1.4 Species at Risk Act

The *Species at Risk Act* (SARA) identifies wildlife species considered to be at risk in Canada and designates them as threatened, endangered, extirpated or of special concern. Species at Risk (SAR) are identified and assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), which is an independent committee of wildlife experts and scientists that makes recommendations to the federal government regarding the status of wildlife species in Canada.

The purpose of SARA is to prevent wildlife species from being extirpated or becoming extinct, to provide for the recovery of wildlife species that are extirpated, endangered, or threatened as a result of human activity and to manage species of special concern to prevent them from becoming endangered or threatened.

The protection and conservation measures afforded by SARA apply to those species identified on Schedule 1 of the *Act*. Other species identified by COSEWIC as SAR that required further assessment in accordance with current assessment criteria are identified on Schedule 2 (Endangered and Threatened) and Schedule 3 (Special Concern) of the *Act*. All listed (Schedule 1) aquatic species and migratory birds in Canada are protected by SARA. Remaining listed species (plants, mammals, reptiles, amphibians) are only protected where they occur on federal lands (i.e., National Parks, First Nations Reserves).

Any activity affecting a listed species, or its critical habitat requires the prior issuance of a permit from the applicable agency, either Environment and Climate Change Canada or Fisheries and Oceans Canada (DFO). Permits may only be issued for scientific research relating to the conservation of the species, where activities are required to benefit a species or to enhance its chances of survival or for incidental impacts. Efforts

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

to avoid, reduce, or minimize impacts must first be employed and activities will not be permitted if they would jeopardize the survival or recovery of the species.

2.2 Provincial Policies and Legislation

2.2.1 The Planning Act

The *Planning Act, R.S.O. 1990, c.P13* sets the framework for land use planning in Ontario. According to the provisions within the Act, the Province of Ontario is the primary authority for planning matters in Ontario, and the Act enables the Province to delegate some of its planning authority to the upper-tier municipalities (i.e., counties and regional/district municipalities, and planning boards) while retaining control through the approval process. Municipalities must conform to approved policies of the Provincial government and its agencies. Provincial ministries, municipal councils, planners, and other stakeholders implement the Act when they undertake certain actions, including:

- Preparing Official Plans and planning policies that guide future development considering provincial interests, such as protecting and managing natural resources
- Regulating and controlling land uses through zoning by-laws and minor variances
- Dividing land into separate lots for sale or development through Plans of Subdivision or a Land Severance

This study considers development applications approved under the *Planning Act* and associated conditions of approval along with lands designated for future development within the Region of Waterloo.

2.2.2 Provincial Policy Statement

The *Provincial Policy Statement (PPS) (2020)*, issued under Section 3 of the *Planning Act*, sets a policy foundation for regulating the development and use of land. It provides direction on matters of provincial interest and supports the enhancement of the quality of life for all citizens of Ontario, while still maintaining environmental integrity. In accordance with Section 3 of the *Planning Act*, decisions affecting planning matters shall have regard for the PPS. The PPS establishes a framework to build strong communities while ensuring development patterns are efficient and optimize the use of land, resources, and public investment in infrastructure.

Policies relevant to water and wastewater infrastructure include the requirement for infrastructure to be provided in a coordinated, efficient, and cost-effective manner that considers impacts from climate change while accommodating projected needs (Policy 1.6.1). These systems are meant to be sustainable, feasible, financially viable, in compliance with all regulatory requirements, and integrated with land use considerations across all stages of the planning process (Policy 1.6.6). The service shall promote the efficient use and optimization of existing services, ensure the systems are

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

reliable, promote efficiency, and integrate land use considerations throughout the process. The preferred alternatives and supporting recommendations will meet the objectives of the PPS by providing for infrastructure that is appropriate to address projected needs, protects the natural environment and protects public health and safety.

2.2.3 Endangered Species Act

The *Endangered Species Act* (ESA) (2007) identifies wildlife species considered to be at risk in Ontario and designates them as threatened, endangered, extirpated or of special concern. Provincial species at risk are identified and assessed by the Committee on the Status of Species at Risk in Ontario (COSSARO) which is a committee of wildlife experts and scientists, as well as those who provide Indigenous traditional knowledge, that classify species according to their degree of risk based on the best available scientific information, community knowledge and Indigenous traditional knowledge. When COSSARO classifies a species at risk, that classification applies throughout Ontario, unless otherwise noted.

The ESA protects species at risk and their habitats by prohibiting anyone from killing, harming, harassing, or possessing protected species, as well as prohibiting any damage or destruction to the habitat of species identified on the Species at Risk in Ontario (SARO) list. Species listed as threatened or endangered on the SARO list are provided with general habitat protections under the *ESA*, which protect areas that species depend on to carry out their life processes, such as reproduction, rearing, hibernation, migration, or feeding.

Activity that may impact a protected species or its habitat requires the prior issuance of a permit from the MECP. Such permits may only be issued under certain circumstances, which are limited to activities required to protect human health and safety, activities that will assist in the protection or recovery of the species, activities that will result in an overall benefit to the species or activities that may provide significant social or economic benefit without jeopardizing the survival or recovery of the species in Ontario.

A permit may be issued under Section 17(2) of the *ESA* or eligible activities can be registered under Ontario Regulation 242/08 to authorize work that is otherwise prohibited. Consultation with the ministry is recommended early in detailed design and prior to the works starting to ensure compliance with the *ESA*.

2.2.4 Climate Change

The MECP's guide, *Consideration of Climate Change in the Environmental Assessment Process*, outlines two approaches for considering and addressing climate change in project planning, including:

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

- Reducing a project's impact on climate change (climate change mitigation measures).
- Increasing the projects and local ecosystem's resilience to climate change (climate change adaptation).

As part of this study, the objectives of the climate change document have been considered and incorporated into the generation and evaluation of alternatives and mitigation measures.

2.2.5 Grand River Conservation Authority

The study area is located within the Grand River Conservation Authority (GRCA) jurisdiction and specific lands within the study area are subject to regulation policies. The study area includes GRCA regulated watercourses. To ensure that the regulatory policies associated with the GRCA regulated watercourses are complied with, the Region will consult GRCA throughout the timeline of this project.

2.2.6 Grand River Source Protection Plan

In accordance with Ontario's *Clean Water Act* (CWA), the Region of Waterloo has enacted policies through the Grand River Source Protection Plan (SPP) to protect groundwater sources within the Region. The SPP policies work to reduce risk by regulating proposed and existing activities which have been identified as posing significant threats to drinking water safety. Depending on the hydrology and geology of an area, as well as potential risks posed by activities onsite, different policies under the SP may apply to the study area.

An amendment to the MEA Class EA document (2015) requires the Class EA planning process have regard for the CWA and the policies set out in the approved SPPs. Impacts to the SPP policies will be identified through the evaluation of alternative solutions.

The Region's SPP policies may come into effect during the design and construction phases of the project, should the preferred alternative involve activities which are deemed significant threats under Ontario's CWA and the Grand River SPP. Such significant threats include, but are not limited to, the storage of salt over 1 tonne, storage, and handling of organic solvents and/or dense non-aqueous phase liquids. However, for these policies to apply, they must occur in relevant vulnerable areas within the study area, as identified by the 2015 Grand River Assessment Report and the SPP.

The Class EA planning process takes into consideration the CWA and SPP policies, with impacts identified through the evaluation of alternative solutions. Apart from the development of new groundwater sources, which would result in the creation of new vulnerable areas, it is not anticipated that alternatives developed as part of the Baden

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

New Hamburg Water and Wastewater System Servicing Review EA would have significant implications regarding the Region's SPP policies.

The Region has identified wellhead protection areas (WHPA), the area around a wellhead where land use activities have potential to affect the quality of water that flows into the well. Each identified WHPA is assigned a vulnerability score based on the characteristics of the ground overlying the aquifer. The higher the vulnerability score, the higher the concern for possible source water contamination, with a score of 10 being the highest. Portions of the Foxboro Green Community are located in a Highly Vulnerable Aquifer (HVA) scoring 6, a Significant Groundwater Recharge Area (SGRA), and a Wellhead Protection Area (WHPA)-A, -B, -C, and -D with vulnerability scores of 10, 6, 4, and 2, respectively. The northern area of Foxboro Green community, from approximately Highway 9 to Foxboro Drive and Golf Links Drive intersect, is identified as a WHPA-A, with a vulnerability score of 10. The WHPA identifies the potential for Chemical or Pathogen parameters to impact the drinking water supply in this area. Any works that are considered a drinking water threat should be completed under the Grand River SPP Policy RW-MC-12.

2.2.7 MOE Guideline D-2: Compatibility between Sewage Treatment and Sensitive Land Use

Guideline D-2 applies to all Certificate of Approval applications for new and expanding municipal and private sewage treatment facilities. The Guideline includes recommended separation distances and other control measures to minimize the impacts of noise and odours on “sensitive land uses” adjacent to municipal and private sewage treatment facilities.

Procedure D-1-3 defines “sensitive land uses” as a part of the natural or built environment which would experience one or more adverse effects from contaminant discharges generated by a nearby facility. This includes residences or facilities where people sleep, institutions, outdoor recreational uses, certain agricultural operations and bird/wildlife habitats or sanctuaries.

Guideline D-2 requires a separation distance of 100 meters from sensitive land uses for sewage treatment plants with a capacity of 500 m³/d to 25,000 m³/d. The recommended distance is 150 meters, measured from the periphery of the noise/odour-producing source/structure, to the property/lot line of the sensitive land use.

2.3 Municipal Planning Policies

2.3.1 Region of Waterloo Official Plan

The Region of Waterloo is an upper-tier municipality, which encompasses seven local municipalities. The Regional Official Plan is a guiding document for directing growth and

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

change throughout the Region of for the next 20 years. The plan also implements the main growth goals identified by the Regional Growth Management Strategy and sets out actions to achieve a sustainable and livable Waterloo Region.

Land within the urban portion of the study area, meaning lands falling within the Urban Area Boundary for Baden and New Hamburg, are designated Built-up area or Township Greenfield Area. The overall goal for areas is to promote balanced growth and contribute to the creation of complete communities within these designations. The Regional Official Plan also requires these areas to be developed and planned to achieve or exceed a minimum density of 45 residents and jobs combined per hectare. The Baden-New Hamburg water and wastewater system will need to be able to accommodate this target density to comply with Regional Official Plan policies.

There is a small portion of land located north of the Baden Urban Area Boundary and located within the Study Area that is designated Rural Areas. The Rural Areas designation identifies areas where Canada Land Inventory Class 4 to 7 soils predominate and which are typically characterized by one or more of steep slopes, environmental features and/or existing non-farm lots. The primary land uses permitted in Rural Areas designations will include agricultural uses, agriculture-related uses, and secondary uses. Once alternatives for this project are narrowed down, further assessment can be completed to ensure the alternatives are in areas compatible with Canada Land Inventory Class 4 to 7 soils.

Lands east of Foundry Street within the Study area, outside of the urban boundary, are also designated Protected Countryside. Protected Countryside identifies a broad band of permanently protected environmental features and agricultural lands. This designation contains a unique concentration of farmlands, woodlands, watercourses, river valleys and wetlands. It also includes several significant Regional Recharge Areas, which sustain some of the richest sources of groundwater in the Grand River watershed and account for a significant share of the region's water supply.

The remainder of the study area, outside of the urban boundaries, is designated Prime Agricultural Area. The Prime Agricultural Area designation identifies an area where prime agricultural lands predominate. This designation includes areas of prime agricultural lands and associated areas of Canada Land Inventory Class 4 to 7 soils, and additional areas where there is a local concentration of farms that exhibit characteristics of ongoing agriculture. Within the Prime Agricultural Area designations, all types, sizes and intensities of agricultural uses and normal farm practices will be promoted and protected in accordance with Provincial standards. The alternatives developed as part of this EA will need to be developed in a way which protects the rural character of the countryside while supporting the development of strong and prosperous rural communities.

The Regional Official Plan also sets out policies related to Land Use Compatibility. The Region will consider the adverse effects associated with the operation of municipal

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

wastewater systems on sensitive land uses during the Environmental Assessment and development application review processes and may require the use of separation distances or other mitigation measures.

The Official Plan provides recommendations on how the Region should manage infrastructure planning and water supply. It is an objective of the Region to plan and manage municipal drinking-water supply systems using a comprehensive, integrated approach that reduces water demand, achieves efficiency of water use, and protects, improves, or restores the water quality and quantity. To achieve such, the Region shall undertake infrastructure planning, development and asset management which optimizes the use of existing infrastructure, accommodates forecast growth, and promotes sustainability and a healthy population.

2.3.2 Township of Wilmot Official Plan (2019)

The Township of Wilmot is one of the seven local municipalities within the Region of Waterloo. The Township is predominantly rural in character, but also embraces a variety of urban communities, including the Baden and New Hamburg Urban Areas, and twelve Rural Settlement Areas located throughout the surrounding Countryside. The Plan establishes the direction for development initiated by both the public and private sectors. As a result, the plan ensures that adequate public services are available for the health, safety, and convenience of the residents of the Township and encourage development for a desirable community.

The 2019 Township of Wilmot Official Plan provided population projections up to 2031. The projections predict a population of 28,500 people by 2031, increasing from 17,700 in 2006, with employment of 10,000 people up from 6,730 in 2006.

The Official Plan states that new developments shall be serviced by municipal water services unless it is not feasible, and the Township will not recommend approval for development proposals in municipally serviced areas where there is insufficient capacity in the supply system. Non-residential development that requires significant quantities of water are discouraged. Water conservation will be encouraged and supported through reduction of consumption and demand management, avoidance of wasteful practices and water recycling.

Lands within the urban portion of the study area are designated a combination of Urban Residential, Urban Core Area, General Industrial, Light Industrial, Highway Commercial, Open Space, and Major Recreation. Lands located outside of the urban portion of the study area are designated a combination of Countryside, Rural Settlement Area, and Open Space.

The Township, in conjunction with the Region of Waterloo, will ensure that new development is serviced by adequate and effective water, wastewater and storm water facilities that aim to protect human health and the natural environment. Although the

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

lands within the study area are subject to specific land use policies of the Township Official Plan, public utilities such as local water supply, sewage, and drainage facilities have specialized policies and are permitted in all designations within the Township. Relating to any public utility use within the Township, said utility will be subject to any regulatory requirements, such as the provisions of the Environmental Assessment Act, through which the location of such use will be justified, and the utility will be determined to be compatible with the surrounding uses.

3.0 Relevant Municipal Studies/Projects

The following section provides summaries of previous reports that are of relevance to this study, specifically related to water and wastewater infrastructure. The findings and recommendations of the previous reports are summarized to assess which recommendations have been implemented since the time of the report development, for consideration in the current Servicing Study.

3.1 Water Infrastructure

Several studies related to water infrastructure are listed below. Details about how these studies influence the water infrastructure improvements for the Baden-New Hamburg Water and Wastewater System Servicing Review can be found in Technical Memorandum #1 provided in **Appendix B**.

- Region of Waterloo Water Supply and Distribution Operations Master Plan (2015)
- Baden-New Hamburg Water and Wastewater Master Plan (2011)
- Baden-New Hamburg Water Distribution System Operating Strategy (2017)
- Shingletown Wells Iron and Manganese Treatment Upgrades – Schedule C Class EA (Ongoing)
- Baden-Wilmot Nitrate Modelling Update (Ongoing)
- Inventory, Condition, and Capital Assessment (2019)
- Morningside Sanitary Trunk Sewer Environmental Assessment – Growth Methodology Memo – Draft (GM Blueplan, 2021)

3.2 Wastewater Infrastructure

Several studies related to wastewater infrastructure are listed below. Details about how these studies influence the wastewater infrastructure improvements for the Baden-New Hamburg Water and Wastewater System Servicing Review can be found in Technical Memorandum #1 provided in **Appendix B**.

- Flow Monitoring for the Sanitary Sewer Inflow/Infiltration Study (2008)
- Foundry Street Sanitary Sewer Study (2010)

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

- Baden-New Hamburg Water and Wastewater Master Plan Update (2011)
- Morningside Sewage Pump Station Capacity Assessment (2017)
- Morningside SPS Draw Down Testing and Reporting (2017)
- Morningside Sewage Pump Station Capacity Assessment – Draw Down Pump Test and Results (2018)
- Baden / New Hamburg Draw Down Testing and Reporting Technical Memorandum (2018)
- 2018 Wastewater Treatment Master Plan Update (2018)
- Morningside Sanitary Trunk Sewer Environmental Assessment – Growth Methodology Memo – Draft (GM Blueplan, Feb 8, 2021)

4.0 Existing Conditions

4.1 Socio-Economic

The Region of Waterloo Official Plan is a guiding document for directing growth and change throughout the Region for the next 20 years. Land within the urban portion of the study area, meaning lands falling within the Urban Boundary for Baden and New Hamburg, are designated built-up area or Township Greenfield Area. The overall goal for these areas is to promote balanced growth and contribute to the creation of complete communities. The Plan requires these areas to be developed and planned to achieve or exceed a minimum density of 45 residents and jobs combined per hectare. The future development blocks within the Baden-New Hamburg Urban Area Boundary are shown on Figure 5.

The Baden-New Hamburg water and wastewater system will need to be able to accommodate this target density. Lands located within the study area include designated Rural Areas, Urban Areas, Protected Countryside, and Prime Agricultural Area.

The 2019 Township of Wilmot Official Plan outlines the Council's long-term policy direction to guide future development within the Township. The Official Plan outlines the criteria to be considered in evaluating development applications including where new individual wastewater treatment systems will be permitted. Further, the Official Plan states that new developments shall be serviced by municipal water services unless this is not considered feasible, and the Township will not recommend approval for development proposals in the municipally serviced areas where there is insufficient capacity in the supply system. Lands within the urban portion of the study area include a combination of Urban, Residential, Urban Core Area, General Industrial, Light Industrial, Highway Commercial, Open Space, and Major Recreation. Lands located outside the urban portion of the study area are designated a combination of Countryside, Rural Settlement Area, and Open Space.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

The Township, in conjunction with the Region, will ensure that all new development is serviced by adequate and effective water, wastewater and storm water facilities. Growth projections under this study were generated using the growth as shown in Figure 5.

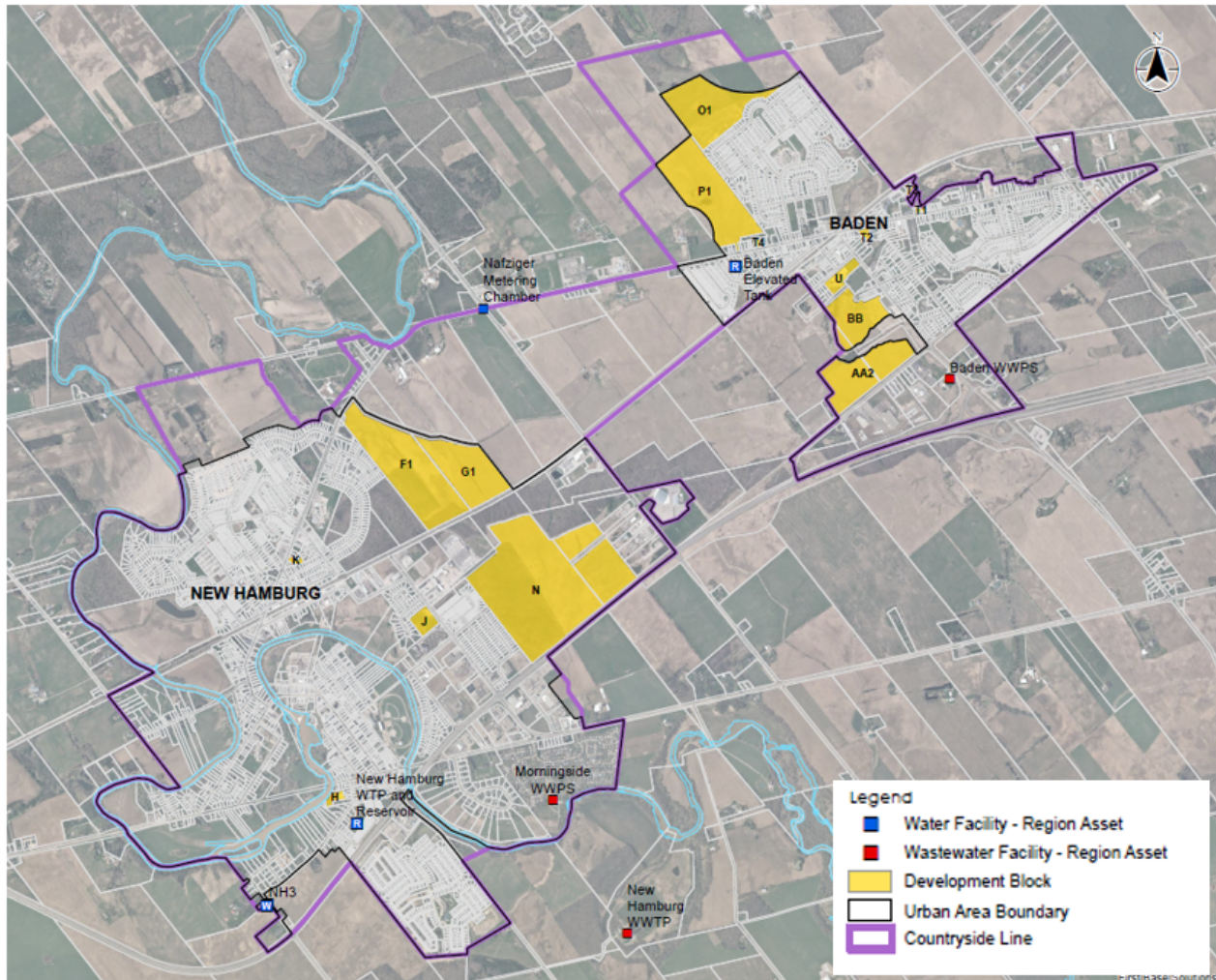


Figure 5: Development Blocks within the Urban Boundary

These growth projections were discussed with the Township and the agreed upon growth projections are summarized in Table 1 and Table 2. More detailed information is provided in Technical Memorandum #1 in **Appendix B**.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

Table 1: Baden Growth Projections

Development Area	Development Name (if applicable)	Development Status	Maximum # of Residential Units Planned	Projected Population ¹
T1	Snyder's/Brubacher (Ulmer)	Residential Intensification	n/a	15
T2	Baden Emporium	Residential Intensification	n/a	25
T3	Brubacher (LVM) (53-75 Brubacher Street)	Residential Intensification	n/a	17
T4	Miller and Keuhl (142 Snyder's Road East)	Residential Intensification	n/a	30
BB	Schmidt Estate	Designated Residential	263	729
U	n/a	Residential Intensification	n/a	129
P1	Snyder's Road	Designated Residential	392	1086
O1	Activa North	Designated Residential	430	1191
AA2	n/a	Future Employment	n/a	517
			Totals:	3738

1. Morningside Sanitary Trunk Sewer EA – Growth Methodology Memo (GM Blueplan, Feb 8, 2021). "Designated Residential" developments were modified from the original report to use a factor of 2.77 people/unit.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

Table 2: New Hamburg Growth Projections

Development Area	Development Name (if applicable)	Development Status	Maximum # of Residential Units Planned	Projected Population ¹
N	Badenview Dev. / New Hamburglrs Inc.	Designated Employment	n/a	2213
H	n/a	Residential Intensification	n/a	50
J	n/a	Residential Intensification	n/a	121
K	n/a	Residential Intensification	n/a	22
F1 & G1	NH Properties	Designated Residential	792	2194
			Totals:	4600

4.2 Natural Environment

Stantec completed a background review of natural environment features, including designated natural areas, fish communities and fish habitat and potential Species at Risk (SAR) and Species of Conservation Concern (SOCC). This is documented in Technical Memorandum #1, provided in **Appendix B**.

For this assessment, SAR are defined as species that are listed as Endangered or Threatened on the Species at Risk in Ontario List. SOCC are defined as species that are classified as Special Concern provincially or federally or ranked as S1-S3 in the Ministry of Natural Resources and Forestry’s (MNR) Natural Heritage Information Centre (NHIC) database. Sources reviewed included Land Information Ontario (LIO) database (MNR 2022a) and Township of Wilmot Official Plan (Township of Wilmot 2019). Data was compiled in a GIS database to support mapping and data query requirements of the natural heritage assessment.

For the potential occurrence SAR or SOCC the following sources were consulted for recent (1990-present) records in the vicinity of the Study Area:

- Natural Heritage Information Centre (NHIC) Biodiversity Explorer database (MNR 2022b)
- Atlas of the Mammals of Ontario (Dobbyn 1994)

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

- Ontario Reptile and Amphibian Atlas (Ontario Nature 2019)
- Ontario Breeding Bird Atlas (Cadman et al. 2007)
- eBird Online Database (eBird 2022)
- iNaturalist Database (iNaturalist 2022)
- Fisheries and Oceans Canada (DFO) – Aquatic Species at Risk Map (DFO 2022)
- Species at Risk Public Registry (Environment and Climate Change Canada 2022)
- Species at Risk in Ontario List (MECP 2022)

The Study Area is in Ecoregion 6E (Lake Simcoe-Rideau Ecoregion), and more specifically the Ecodistrict of 6E-1 (Stratford). This Ecodistrict consists of smooth clay areas and gently rolling till moraines, known as the Stratford Till Plain and the Oxford Till Plain. The land use in this Ecodistrict is predominately agriculture with cropland constituting a large portion of the land cover (44%). Other land uses include gravel pits, quarries, and settlement areas. Sixteen percent (16%) of the Ecodistrict remains as natural cover and includes forests and wetland pockets of swamp.

Forest communities are dominated by broadleaved trees that are common to both the Great Lakes-St. Lawrence and Deciduous Forest Regions. They consist of beech and sugar maple, together with basswood, red maple, red oak, white oak, and bur oak.

4.2.1 Designated Natural Heritage Features

As shown on Figure 6, the following natural heritage features or areas are in or adjacent to the Baden – New Hamburg Water Servicing Study Area:

- GRCA Regulation Limit (Ontario Regulation 150/06) and floodplain of the Nith River, Baden Creek and associated tributaries
- GRCA regulated features (Ontario Regulation 150/06), including the Nith River, Baden Creek and associated tributaries, floodplain, and wetlands
The New Hamburg Oxbow Wetland Provincially Significant Wetland (PSW) Complex
- St. Agatha Beech Maple Forest and Phillipsburg Forest Life Science Areas of Natural and Scientific Interest (ANSI)
- Deer wintering area identified in the Phillipsburg Forest ANSI/Phillipsburg Wetland Complex
- Environmentally constrained Lands associated with the Nith River Corridor (Map 4.2 of the Township of Wilmot Official Plan)
- Environmentally constrained Lands associated with Baden Creek and its tributaries, and the Baden Wetland Complex (Map 4.1 of the Township of Wilmot Official Plan)
- Non-provincially significant wetlands associated with the Baden East and Baden Southwest Wetland Complex and the Silver Spring Creek Hunsburger Creek Wetland Complex
- Non-provincially significant wetlands associated with the Phillipsburg Wetland Complex

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

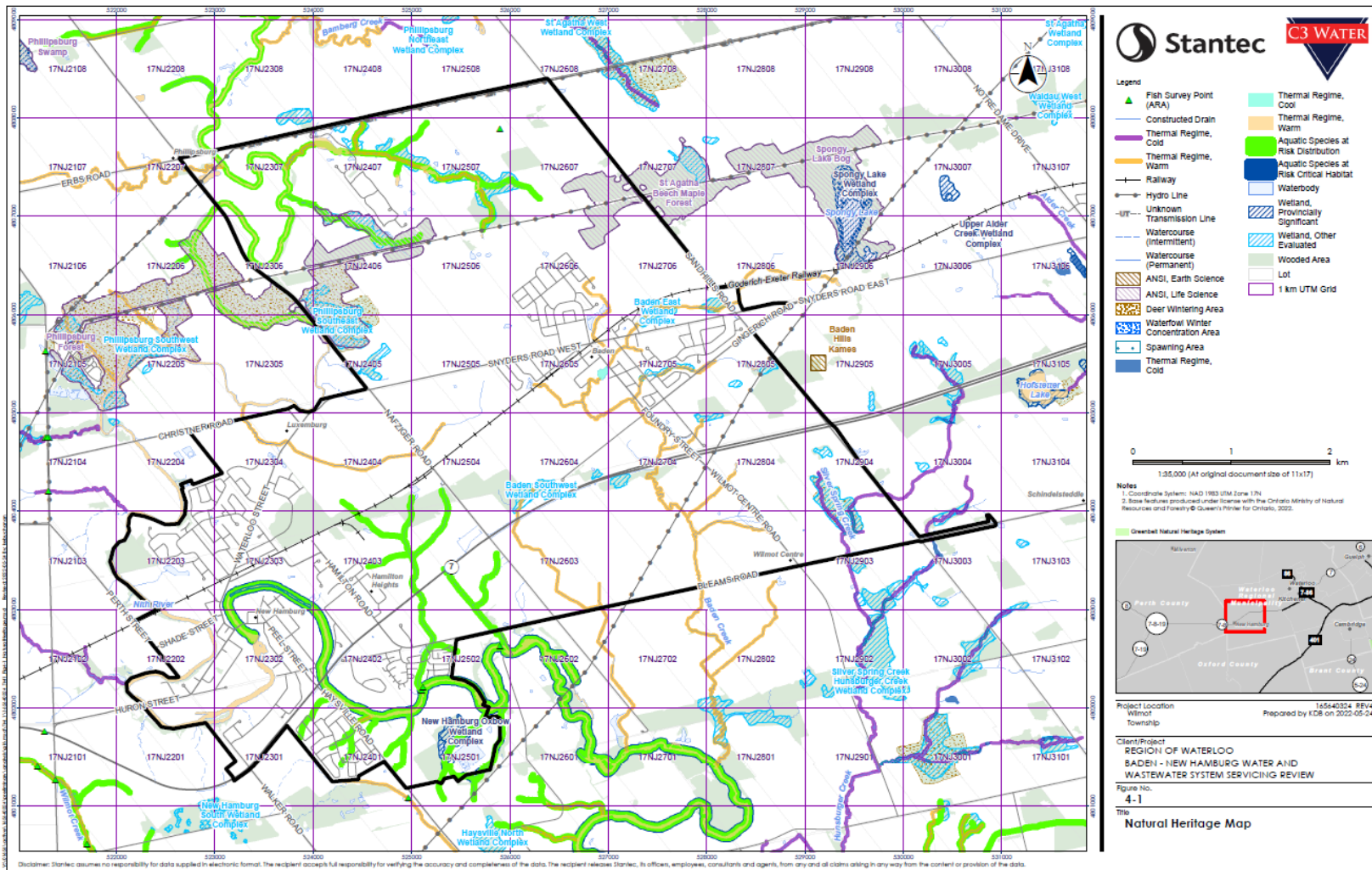


Figure 6: Natural Heritage Existing Conditions

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

4.2.2 Fish and Fish Habitat

The study area is located in the Grand River watershed and includes the following sub-watersheds that include tributaries with a range of flow regimes and thermal regimes, and constructed drains:

- Baden Creek
- Nith River
- Silver Springs Creek

Based on available background data (NDMNRF 2022a; GRCA 2022) most of the watercourses in the study area have a warmwater thermal regime. One exception is Silver Springs Creek in the southeast segment of the Servicing Review Study Area, which has a coldwater thermal regime (NDMNRF 2022a; GRCA 2022).

There are records of 22 fish species from the Nith River (NDMNRF 2022a). The species identified in the NDMNRF data are common and widespread in southern Ontario and classified as Not at Risk (NAR). There are records of aquatic species at risk in the Servicing Review Study Area (DFO 2022; NDMNRF 2022b), which are discussed below.

4.2.3 Significant Species

A review of the background databases identified eleven terrestrial species at risk (SAR) with records that overlap with the study area, including:

- Butternut
- Bank Swallow
- Barn Swallow
- Bobolink
- Chimney Swift
- Eastern Meadowlark
- Red-headed Woodpecker
- Eastern Small-footed Myotis
- Little Brown Myotis
- Tricolored Bat

A review of the background databases identified eleven species of conservation concern (SOCC) with records that overlap with the study area, including:

- Green Dragon
- Western Chorus Frog (Great Lakes – St. Lawrence pop.)
- Snapping Turtle
- Midland Painted Turtle

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

- Eastern Milksnake
- Caspian Tern
- Common Nighthawk
- Eastern Wood-pewee
- Peregrine Falcon
- Wood Thrush
- Monarch

A review of the background databases identified two aquatic SAR (Black Redhorse and Silver Shiner), and two SOCC (Northern Sunfish Great Lakes – Upper St. Lawrence pop. and Rainbow Mussel).

4.3 Cultural Heritage Resources

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

4.3.1 Built Heritage Resources and Cultural Heritage Landscapes

A desktop review was completed to identify known (listed and designated) cultural heritage resources in the study area, as shown on Figure 7. This information does not account for potential heritage resources typically considered in the EA process, such as properties/structures over 40 years of age, national historic sites, federal or United Nations Educational, Scientific and Cultural Organization (UNESCO) designations, interpretive or commemorative plaques or cultural heritage landscapes. A screening checklist and/or a Cultural Heritage Assessment Report (CHAR) will be undertaken following the selection of the recommended alternatives.

A Cultural Heritage Report- Existing Conditions and Preliminary Impact Assessment was undertaken on March 10, 2023 by Stantec Consulting Ltd. for study area. This report consisted of data collection, background historic research, review of secondary source material and field review. A total of 6 potential built heritage resources and 1 recognized cultural heritage landscape were identified within or adjacent to the project area. The Cultural Heritage Report is included in Appendix I.

4.3.1 Archaeological Resources

Archaeological potential is established by determining the likelihood that archaeological resources may be present within a study area. To aid in the evaluation of archaeological potential, the Ministry of Citizenship and Multiculturalism (MCM) considers variables, such as: proximity to registered archaeological sites, distance to various types of water sources, soil texture and drainage, glacial geomorphology, elevated topography and the

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

general topographic variability of the area, and proximity to areas of early Euro-Canadian settlement, including places of military or pioneer settlements, early transportation routes, and properties listed on the municipal register or designated under the *Ontario Heritage Act* or properties that local histories or informants have identified with possible historical events.

A Stage 1 archaeological assessment (AA) (Project Information Form number (PIF) P390-0364-2022) was undertaken on March 27, 2023 by Stantec Consulting Ltd. for the preliminary preferred alternatives. A Stage 1 AA consists of a review of geographic, land use and historical information for the property and the relevant surrounding area, and contacting MCM to find out whether, or not, there are any known archaeological sites on or near the property. Its purpose is to identify areas of archaeological potential and further archaeological assessment (e.g., Stage 2-4) as necessary. The Stage 1 AA is included in Appendix H.

Based on a preliminary review of the study area for the project, it is likely that portions of the study area will retain potential for the identification of archaeological resources. A Stage 1 archaeological assessment was undertaken following the selection of the recommended alternatives in accordance with the Ministry's 2011 Standards and Guidelines for Consultant Archaeologists which is discussed in Section 10.2.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

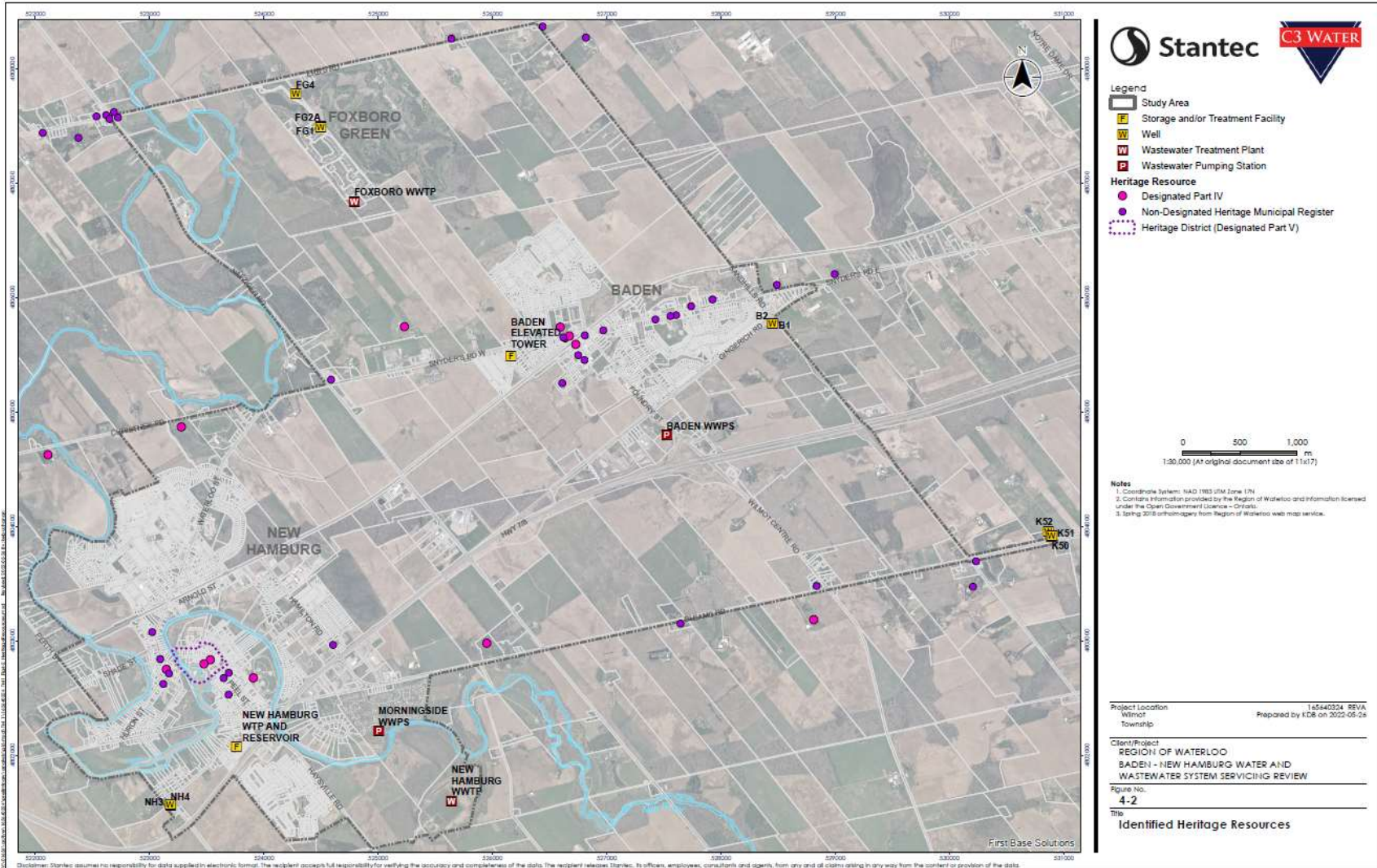


Figure 7: Existing Cultural Heritage Resources

5.0 Water and Wastewater Servicing

The communities of Baden and New Hamburg are situated within the Township of Wilmot in the Regional Municipality of Waterloo. The water and wastewater systems in these communities are operated as a two-tier system. Table 3 outlines the responsibilities of the Region and the Township in this system.

Table 3: Two-Tiered System: Water / Wastewater Infrastructure

Owner	Water Infrastructure	Wastewater Infrastructure
Region	<ul style="list-style-type: none"> • water supply • treatment storage • trunk distribution 	<ul style="list-style-type: none"> • two raw wastewater pumping stations (Baden and Morningside) • treatment • discharge • biosolids management
Township	<ul style="list-style-type: none"> • water distribution • water service connections 	<ul style="list-style-type: none"> • wastewater collection • three pumping stations

5.1 Water Supply and Distribution System

5.1.1 Existing Water Supply Infrastructure

There are a total of ten wells and two storage and/or treatment facilities within the study area. **Figure 8** provides an overview of the Existing Water System that serves the communities of Baden, New Hamburg, and Foxboro Green by illustrating the exact locations of the wells, storage and/or treatment facilities, as well as the local watermain system. The Region’s water infrastructure is show in blue and yellow. The major water supply infrastructure is listed below.

- K50 Wells or Wilmot Centre Well Field (Shingletown Water Supply System)
- New Hamburg Wells, Reservoir and Water Treatment Plant (NHWTP)
- Foxboro Wells
- Baden Wells
- Baden Elevated Tank

Additional details of the water supply infrastructure metrics can be found in Technical Memorandum #1 provided in **Appendix B**.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

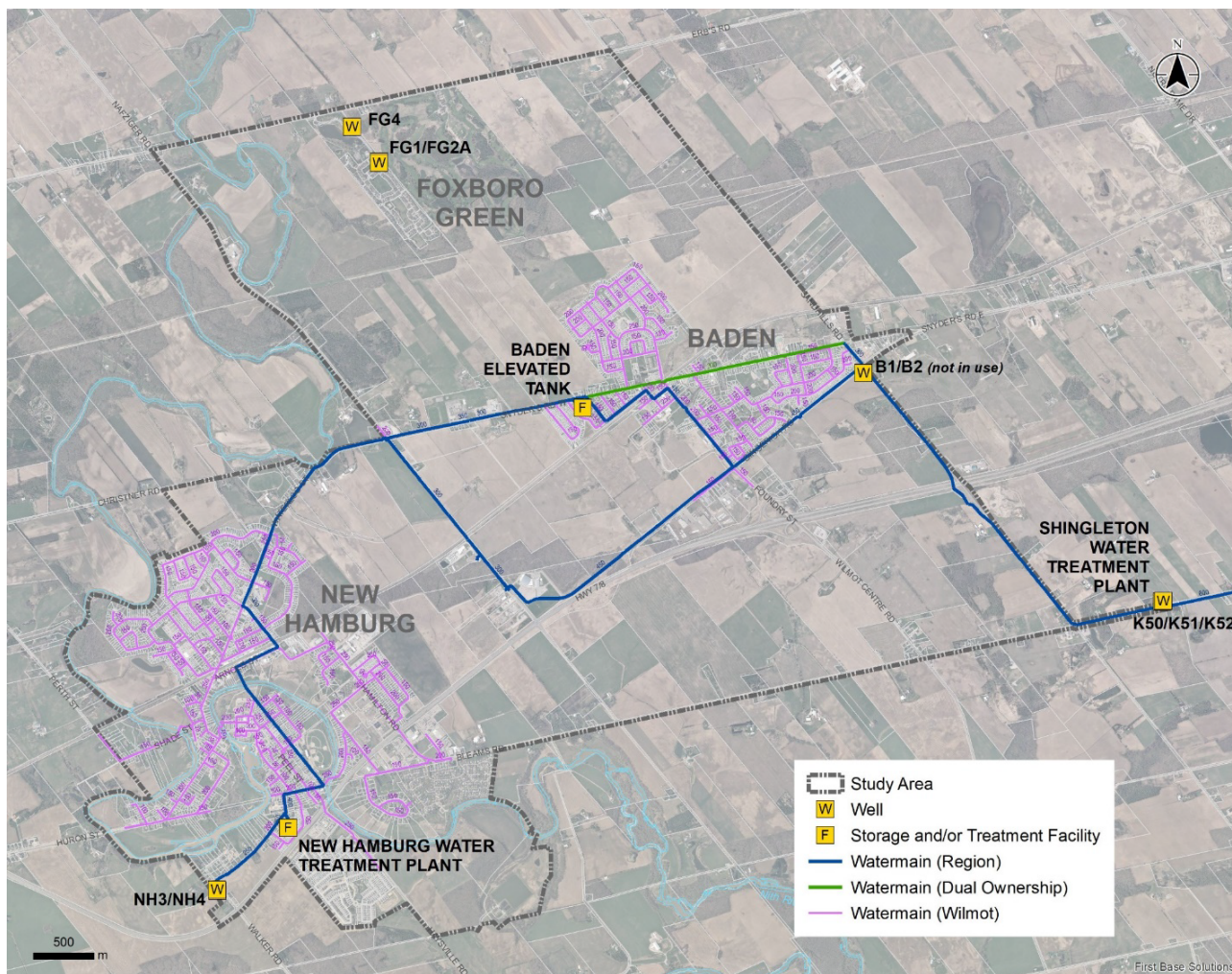


Figure 8: Existing Water Supply System

5.1.2 Existing Water Pressure

The water pressures within the existing Baden-New Hamburg system were found to be within the preferred operational limited of 345-550 kpa (50-80 psi), with some nodes slightly exceeding the upper preferred limit.

5.1.3 Future Projections

The watermain distribution network model was run under future demand conditions (i.e., using future growth projections). In addition to future demands, planned infrastructure changes were included in the future system analysis. This consisted of the new transmission main connecting the south ends of Baden–New Hamburg that will serve as a primary supply link between the towns. The new transmission line will supply water

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

from the NH WTP to the Baden ET with a new PRV chamber on Jacob Street to supply New Hamburg.

5.1.4 Water Supply and Demand

The Baden and New Hamburg system is currently supplied by the New Hamburg wells and the K50 wells with a combined total PTTW of 199 L/s. Existing and future demands are shown below in Table 4. The full PTTW is being carried forward as the system supply capacity due to the redundant wells that have been built at both locations. New Hamburg's existing MDD is 42.1 L/s which is greater than the capacity of the of the NH wells (41 L/s). Baden, with a smaller population, has a smaller MDD at 25.1L/s. The PTTW at the K50s is 158 L/s. Currently up to 87 L/s of the K50s water is sent to the Mannheim Water Treatment Plant but the full 158 L/s PTTW is available for Baden and New Hamburg if needed. Foxboro demands have been included in the future Baden ADD and MDD demands, with an ADD of 1.2 L/s and a MDD of 2.3 L/s.

The future MDD of the total Baden and New Hamburg system was less than the existing total PTTW by approximately 103 L/s, indicating that the existing available supply is sufficient to meet future demands.

As discussed, the Baden Wells are not currently used due to water quality concerns. The Region has advised that these wells are not being considered for the purposes of existing water supply redundancy. As water supply under future demand conditions is not expected to exceed the existing available supply from the K50s and the NH Wells, it is not expected that the Baden Wells will be required in the future to meet system demands. If it is found that the Baden Wells are not needed to supply system demands, the source water protection requirements for a potable water at this location could be released.

The summary of existing and future Average Day Demand (ADD) and Maximum Day Demand (MDD) are provided in Table 4.

Table 4: Average Day and Maximum Day Water Demands

	Average Day Demand – Existing (L/s)	Average Day Demand – Future (L/s)	Max Day Demand – Existing (L/s)	Max Day Demand – Future (L/s)
Baden	12.9	20.1	25.1	39.2
New Hamburg	21.6	29.0	42.1	56.5
Total	34.4	49.0	67.2	95.7

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

5.1.5 Existing Fire Flow

Based on the model results, the system was able to meet the MECP fire flow requirements of 274 L/s at a residual pressure of 138 kPa in downtown Baden. Downtown New Hamburg achieved a fire flow of 214 L/s, less than the MECP fire flow of 274 L/s. The New Hamburg pumps were limited to two pumps running at a maximum flow of 60 L/s each based on their curves, for a total of 120 L/s of available flow from the NH WTP. Flow from the NH Reservoir was also limited by a minimum water level of 40%. Flow is also provided to New Hamburg through the Nafziger PRV. As such, it was found that the available fire flow in New Hamburg was limited by the available storage and pumping capacity at the NH WTP and capacity constraints of the system. The target MECP fire flow guideline was met at all key Baden locations but was not met at any of the key New Hamburg locations.

5.1.6 Future Fire Flow

Fire flow constraints were seen in the model under future demand conditions. With the future Baden-New Hamburg connection, the booster pumping station at the NH WTP was controlled by the level of the Baden ET. Under future MDD conditions, the New Hamburg Reservoir maintained an adequate water level under normal operating conditions.

The future MECP fire flow requirement of 330 L/s for 5 hours was applied in the downtown New Hamburg commercial area. The New Hamburg reservoir drained down to the 40% full approximately 4 hours after the fire flow started. While the Baden ET continued to supply the remaining demand, the water level dropped to approximately 1 m, or 8% volume by the end of the fire flow period. Existing storage was found to be insufficient to supply the future fire flow demand.

Under future conditions, the MECP fire flow of 330 L/s was achieved only in Baden locations. Locations within New Hamburg saw an increase in available fire flow compared to existing conditions. This can be attributed to the new transmission main connection between New Hamburg and Baden providing additional capacity. Existing storage and pump capacity was found to be insufficient under existing and future conditions to supply the required fire flow in New Hamburg. More detail on these findings is provided in Technical Memorandum #1 in **Appendix B** and Technical Memorandum #3 in **Appendix D**.

5.1.7 Revised Future Fire Flow

Since the completion of the initial work in the servicing study, target fire flow guidelines have been revisited by the Region based on the Fire Underwriter's Survey (FUS) method and a sample of buildings in BNH. The proposed fire flow guidelines are summarized in Table 5 below. The Region has indicated that these fire flow guidelines

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

should be used for system analysis, rather than the MECP method referenced in the previous section. This information was provided after PCC #3 and the issuance of the Technical Memorandums contained in the Appendix. Accordingly, recommendations made in those documents are revised based on this information.

Table 5: Proposed BNH Fire Flow Targets (GMBP, 2022)

Land Use	Fire Flow (L/s)
Commercial	150
Industrial	250
Institutional	175
Residential - Single	75
Residential - Multi	175

The storage requirement calculations were updated based on the largest BNH fire flow target from Table 5 above of 250 L/s. The FUS provides guidelines for fire flow durations based on the required flow. The FUS duration for a 250 L/s fire flow is 3.25 hrs.

Storage requirements for treated water are determined from the MECP Design Guidelines for Drinking Water Systems. The total required water storage is equal to the sum of A + B + C. These are defined as:

- A is fire storage
- 250 L/s for 3.25 hours
- B is equalization storage (25% of the maximum day demand), and
- C is emergency storage (25% of A + B).

The total required storage is calculated as 6186 m³.

The existing available storage is 6,848 m³, based on a usable volume of 1,448 m³ at the New Hamburg Water Treatment Plant (NH WTP) and 5,400 m³ at the Baden Elevated Tank (ET). Based on this analysis, the existing available storage is sufficient to meet future requirements.

More detail on this analysis is contained in the Water Analysis Update Technical Memorandum contained in **Appendix D**.

5.1.8 Foxboro Green Water Treatment Plant

The Foxboro WTP is located at 87 Foxboro Drive in Foxboro Green, Wilmot Township and supplies the Foxboro Green system. The Foxboro WTP is owned and operated by the Region, while the distribution system is maintained by Foxboro Green Condominium Corporation under a servicing contract by the Ontario Clean Water Agency. The WTP

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

includes a single-cell reservoir with a volume of 90 m³ and has a rated capacity of 288 m³/day. The WTP is supplied by three wells, with an allowable 7,019 m³/day (13 L/s).

Raw water is treated at the WTP using sodium hypochlorite and filtration as needed for iron and manganese removal. The disinfection system is comprised of one bulk storage tank, two metering pumps which operate simultaneously. The filtration system consists of a reaction vessel for oxidation, two dual media filters containing sand and anthracite coal, and a 25 m³ backwash settling tank, flow control valves, flow meter, and back flow prevention. The facility is equipped with four pressure tanks to provide distribution system pressure. Emergency power is supplied by a 125-kW portable diesel generator, permanently assigned to the site.

The Foxboro Green WTP serves a single community which is not expected to see significant growth to 2051. It is therefore expected that no expansions will be necessary. The current WTP has been experiencing operational challenges and a retrofit of the Foxboro WTP is required to continue operation. The capacity of the Foxboro wells has also been in decline and additional supply options need to be explored. This servicing review encompassed a review of the Foxboro Green water supply system to determine if alternative solutions to the current servicing should be considered.

5.2 Wastewater Collection and Treatment System

5.2.1 Existing Wastewater Infrastructure

There are a total of six sanitary pumping stations and two wastewater treatment plants (WWTP) within the study area. **Figure 9** provides an overview of the Existing Wastewater System that serves the communities of Baden, New Hamburg, and Foxboro Green by illustrating the exact locations of sanitary pumping stations and wastewater treatment plants within the study area, as well as the local sanitary sewers and forcemain system. The Region's wastewater infrastructure is shown in purple and yellow. The Region-owned Baden and New Hamburg Wastewater System consists of the following infrastructure:

- New Hamburg WWTP
- Foxboro Green WWTP
- Morningside Sewage Pumping Station
- Baden SPS

Wastewater is collected from the Baden and New Hamburg service areas and conveyed to the New Hamburg WWTP for treatment and subsequently discharged into the Nith River. Foxboro Green wastewater is treated at the Foxboro Green WWTP with biological treatment and denitrification, followed by discharge to a leaching bed system. The Foxboro Green WWTP serves a single community and is separate from the Baden-New Hamburg system.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

Additional details of the wastewater system can be found in Technical Memorandum #1 provided in **Appendix B**.

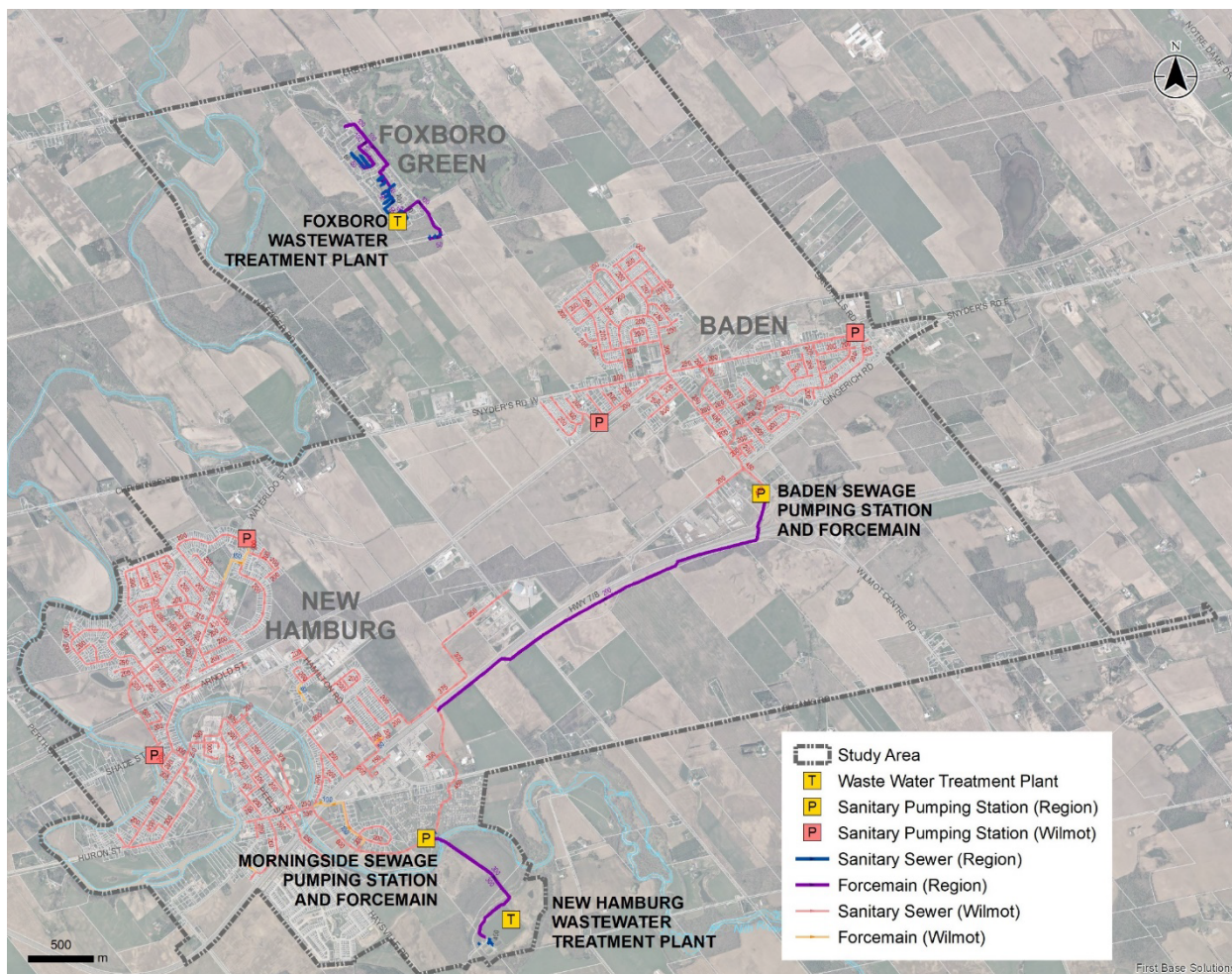


Figure 9: Existing Wastewater System

5.2.2 Projected Average Daily Flows (Wastewater)

Flow projections were completed, assuming the existing system configuration is maintained, that all Baden WWPS flows are conveyed through the Morningside WWPS, before discharging to the New Hamburg WWTP. These projections were based on development blocks within the Urban Area boundary, and more details can be found in Technical Memo #1, **Appendix B**. The average daily flows (ADFs) are presented in Table 6 and Projected Peak Wet Weather Flows are provided in Table 7.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

Table 6: Projected Average Daily Flows

	Current ADF (L/s)	Projected Additional ADF (L/s)	Total Daily Flow (L/s) (Current +Projected)	Rated Capacity (NH WWTP-ADF) (L/s)
Baden WWPS	17.07	13.50	30.33	-
Morningside WWPS	44	34.85	78.42	-
New Hamburg WWTP	42.82	34.85	77.25	79.86

As noted in Table 6, the recently expanded New Hamburg WWTP is expected to have sufficient ADF rated capacity to accommodate the future growth planned within the Baden and New Hamburg Urban Area Boundaries. As a result, the treatment capacity of the New Hamburg WWTP was not reviewed further as part of this study.

Table 7: Projected Peak Wet Weather Flows

	Peak Wet Weather Flow (L/s) (2016) ¹	Projected Additional Peak Wet Weather Flow (L/s)	Total Peak Wet Weather Flow (L/s) (Current + Projected)	Firm Capacity (L/s)¹
Baden	185	60.0	244.1	187
Morningside	205	147.1	360.8	248

1. Region of Waterloo 2018 Wastewater Treatment Master Plan (CIMA+, July 2018)

As noted in Table 7, the Baden and Morningside pumping stations are anticipated to be under capacity in the future conditions scenario and required further study under this review to determine alternative solutions to satisfy the growth needs of this community. The Region understands that the Township of Wilmot is currently undergoing an Inflow and Infiltration Study focused on reducing wet weather flows and it is expected that updates will be received on the study's progress and the Township's efforts to reduce the peak flows.

5.2.3 Foxboro Green Wastewater Treatment Plant

The Foxboro Green WWTP is a rotating biological contactor (RBC) plant, that was constructed in 1999 within the Foxboro Green Retirement Community. The WWTP consists of three packaged RBC plants, each with a rated ADF capacity of 50 m³/day. The total rated ADF capacity of the plant is 150m³/day.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

Treatment processes at the facility include:

- primary clarification
- rotating contactors
- intermediate clarification
- denitrification
- final clarification prior to discharge to seven subsurface disposal leaching beds (Leaching Beds A, B, C, D, E, F and G)

Disinfection is not required for the leaching bed system and no chemicals are used in the RBC process. Waste activated sludge (WAS) is returned to the primary settling tanks for co-thickening. Co-thickened primary sludge and WAS are hauled to the Waterloo WWTP for further treatment.

The Foxboro Green WWTP serves a single community which is not expected to see significant growth to 2051. It is therefore expected that no expansions will be necessary. The current WWTP has been experiencing operational challenges resulting in elevated nitrate levels in the surrounding groundwater. The facility also sees higher than average operating and maintenance costs. Given the issues noted at this facility, this servicing review encompassed a review of the Foxboro Green wastewater treatment system to determine if alternative solutions to the current servicing should be considered.

6.0 Problem and Opportunity Statement

The first step in the Class EA process is to identify the problem or opportunity that has led to the undertaking of the Class EA. The Problem and Opportunity statement for the Baden-New Hamburg Water and Wastewater System Servicing Review is as follows:

The communities of Baden and New Hamburg are currently serviced by a two-tier water and wastewater system run by the Township and the Region. This Servicing Review will assess the current water and wastewater systems that are owned and operated by the Region of Waterloo that serve the communities of Baden, New Hamburg and Foxboro Green and assess current and future servicing needs within the community based on the Region's 2011 Master Plan Update, the Township of Wilmot's 2019 Official Plan, Recommendations from the Region's 2018 Wastewater Treatment Plan, and current development applications.

The purpose of this Servicing Review is to evaluate the status of existing water and wastewater servicing systems in Baden – New Hamburg, provide recommendations to address existing servicing constraints, and to provide the framework to meet the water / wastewater servicing needs for the Region up to the treated capacity of the New

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

Hamburg Wastewater Treatment Plant. Specifically, the Class EA is intended to provide recommendations on the following:

- Capacity, quality, and any necessary upgrades of the supply from the existing water supply system
- Capacity, condition, and any necessary upgrades of the wastewater treatment and collection system
- Current industry standards and new technologies and/or infrastructure for water and wastewater servicing

7.0 Alternative Solutions

As part of Phase 2 of the Class EA process, reasonable and feasible alternative solutions to the Problem and Opportunity Statement are identified. The framework and criteria for assessing the alternatives are also identified to determine the advantages and disadvantages with respect to the natural, social, technical, and financial environments. Based on this evaluation, recommendations are identified and confirmed based on public, agency, and Indigenous community consultation. Mitigation measures are identified to offset any potential environmental impacts of the recommendations.

The following sections describe the potential alternative solutions that were considered and provides an overview of the evaluation process for each key issue.

7.1.1 Water Supply

The following alternatives were developed and evaluated for public review at PCC #2 and PCC #3:

- Alternative WS 1 – Do Nothing
- Alternative WS 2 – Expanded Storage at New Hamburg WTP
- Alternative WS 3 – Added Storage at Baden Wells
- Alternative WS 4 – Added Storage at K50 Wells

Alternative WS 2 was presented as the recommended solution at PCC #3. Since the completion of the system servicing review for this MCEA, target fire flow guidelines have been revisited by the Region (rather than the MECP fire flow requirements discussed in Section 5.1.5). As a result of the modified fire flow guidelines, the water storage recommendations presented have changed and expanded storage at New Hamburg WTP is no longer required.

Although no longer applicable to this study, additional details regarding the water infrastructure alternatives evaluated can be found in Technical Memorandum #3 provided in **Appendix D**. Additional details regarding the fire flow/storage requirements are provided in Technical Memorandum #5A in **Appendix F**.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

7.1.2 Wastewater Servicing

Alternative WW1 – Do Nothing

Figure 10 displays the location of this alternative. This alternative does not include any upgrades to the existing Region wastewater assets within the system. Under this scenario, both the firm capacity of the Baden WWPS and the Morningside WWPS would be exceeded. Accordingly, this is not a feasible alternative for consideration as it does not meet the overall intent of the study.

Alternative WW2 – Upgrade System and Maintain Existing Configuration

This alternative maintains the existing wastewater system configuration and provides the upgrades and new infrastructure required to meet the future needs of Baden – New Hamburg. This alternative includes the following projects:

- the construction of a new Baden Pumping Station*
- the addition of a new forcemain which would run alongside the existing 200 mm forcemain connecting the Baden Pumping Station to the Morningside Trunk Sewer.
- the construction of a new Morningside Trunk Sewer
- the construction/upgrade of the Morningside Pumping Station.
- the potential construction of a new forcemain parallel to the existing forcemain from the Morningside Pumping Station to the New Hamburg WWTP.

*Except for WW1, all options consider the need to construct a new Baden Pumping Station. Upgrading of the existing station is not considered feasible due to the extent of the upgrades and the need to bring the existing station up to current standards.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

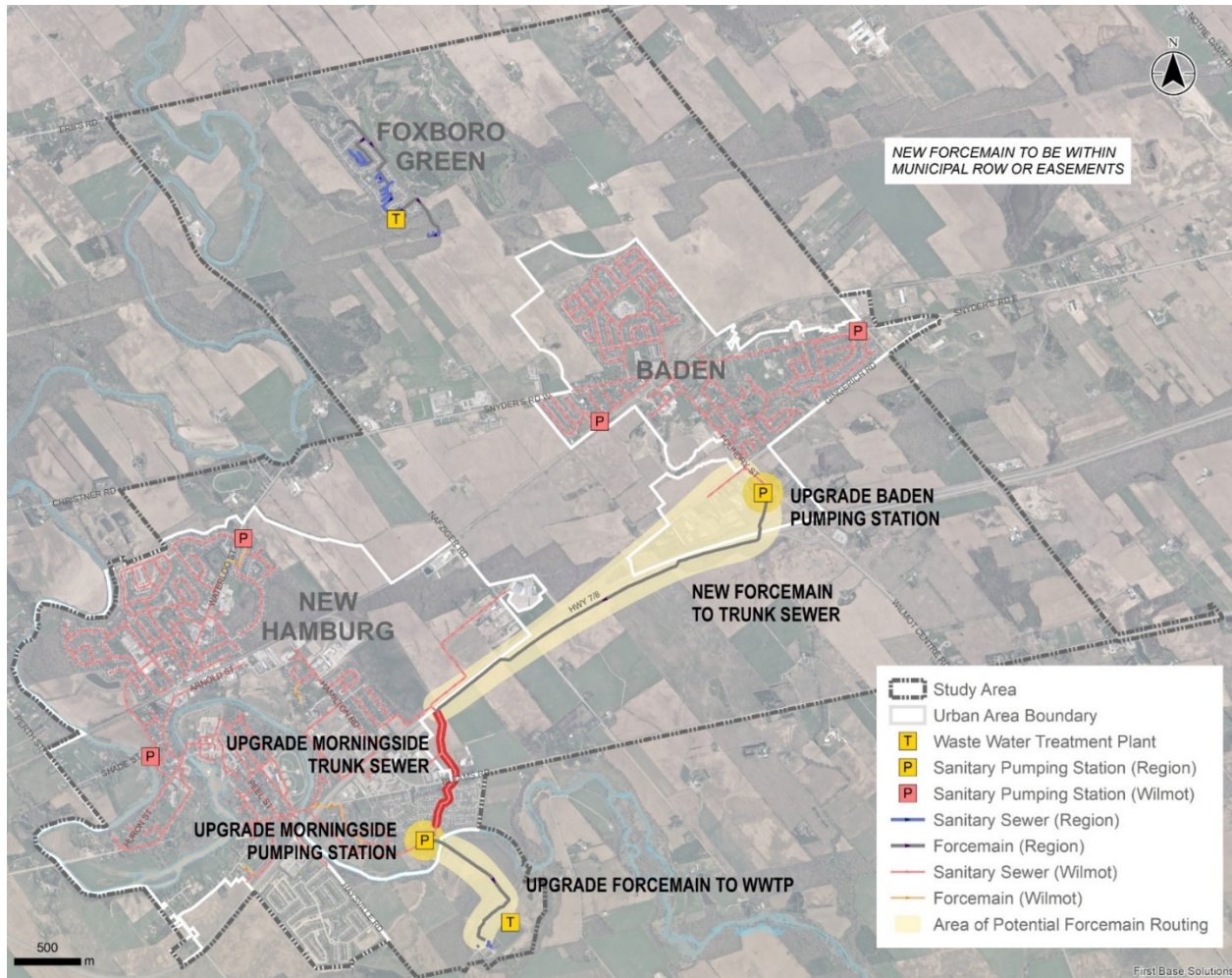


Figure 10: Alternative WW2

Alternative WW3 – Upgrade System and Convey Directly to Morningside WWPS

Figure 11 displays the location of this alternative. This alternative is similar to alternative WW2 but differs in that it extends the forcemain from the Baden WWPS directly to the Morningside WWPS and eliminates the need to upgrade the Morningside trunk sewer. This alternative includes the following projects:

- the construction/upgrade of the Baden Pumping Station
- the addition of a new forcemain which would run alongside the existing 200 mm forcemain and connect directly to the Morningside Pumping Station.
- the construction/upgrade of Morningside Pumping Station.
- the potential construction of a new forcemain parallel to the existing forcemain from the Morningside Pumping Station to the New Hamburg WWTP.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

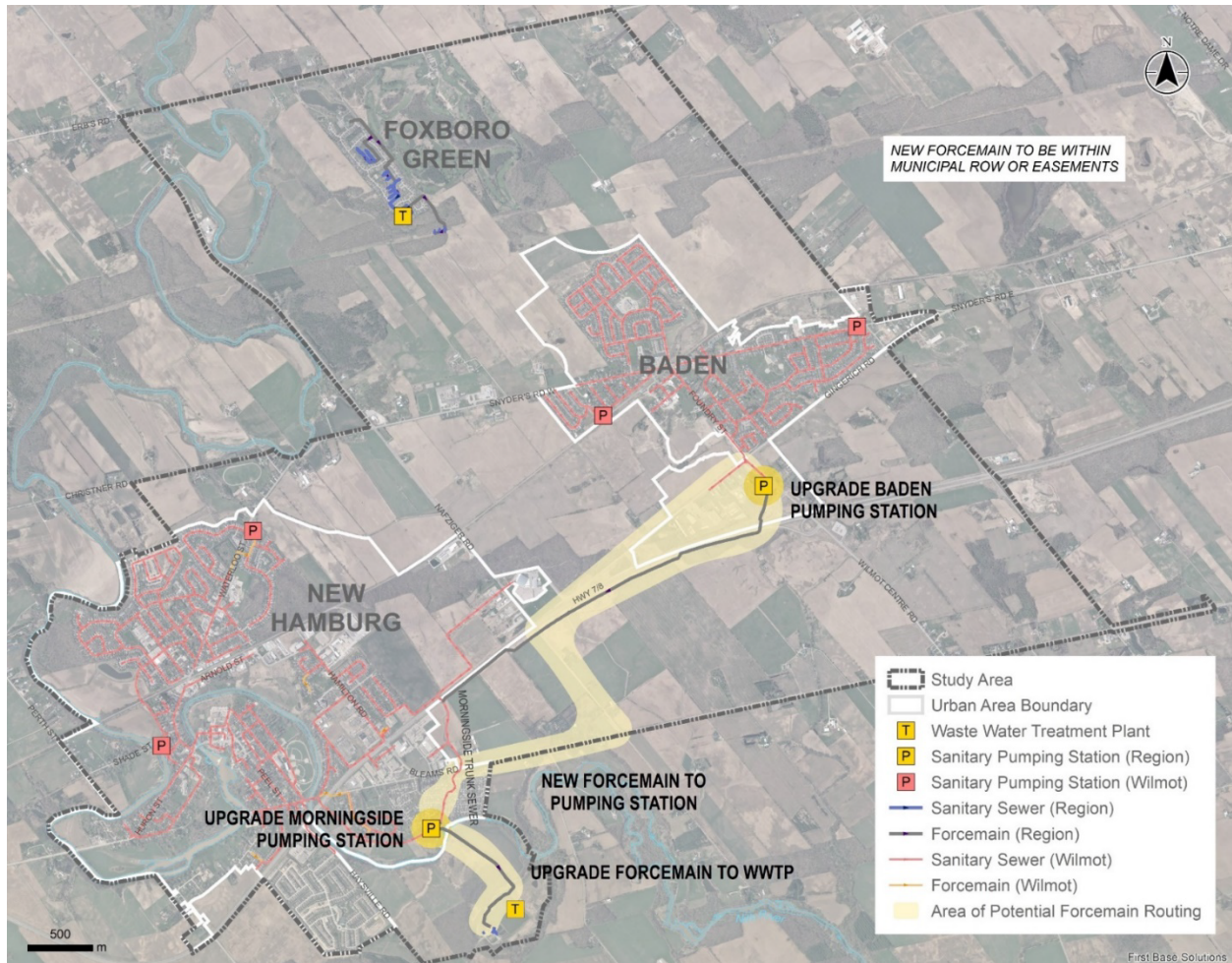


Figure 11: Alternative WW3

Alternative WW4 – Upgrade System and Convey Directly to New Hamburg WWTP

Figure 12 displays the location of this alternative. This alternative bypasses the Morningside WWPS and has flows from the Baden WWPS conveyed by forcemain directly to the Baden WWPS directly to the New Hamburg WWTP. Accordingly, flows currently pumped from the Baden WWPS to the Morningside WWPS will be removed from Morningside thus freeing up capacity in the station. Analysis undertaken under this alternative indicates that the capacity created by this redirection of flows is sufficient to allow for future growth in the New Hamburg area and eliminates the need to upgrade the Morningside WWPS. Thus, this alternative includes the following projects:

- the construction/upgrade of the Baden Pumping Station
- installation of new twin forcemains which would connect the Baden Pumping Station to the New Hamburg WWTP, bypassing the Morningside WWPS.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

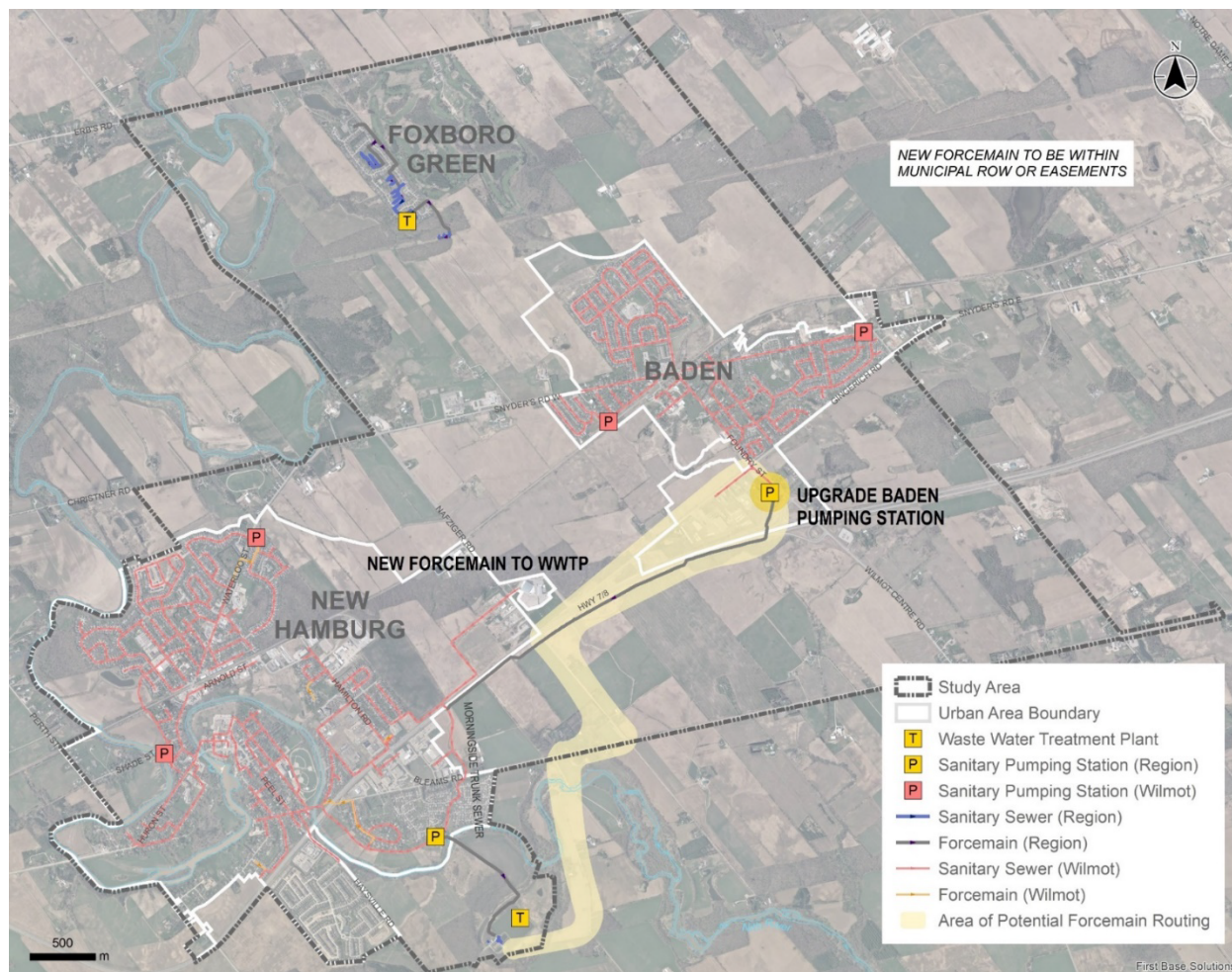


Figure 12: Alternative WW4

7.1.3 Foxboro Green Community

As noted in Section 5.1 and 5.2, the water and wastewater servicing of the Foxboro Green community was considered for further study due to operation and maintenance issues in the current facilities. In this situation, water and wastewater solutions would work in parallel and so the alternatives advanced in this study consider water and wastewater in tandem.

Alternative F1 – Do Nothing

Under this alternative, Foxboro Green would continue to utilize their existing water system. This option would include significant equipment upgrades or replacement at the Foxboro WTP which would be required in the immediate future. Foxboro Green would continue to utilize their existing wastewater treatment system. This alternative does not address concerns regarding elevated nitrate levels within the surrounding groundwater

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

system, inability of the WWTP to continually meeting effluent solids objectives, or the significant asset renewal requirements at the WWTP in the near future.

Alternative F2 – Provide Connection to Existing Baden Infrastructure Using Existing Road Allowances

Under this alternative, Foxboro Green would be connected to the Baden water supply system via existing road allowances. **Figure 13** displays the location of this alternative.

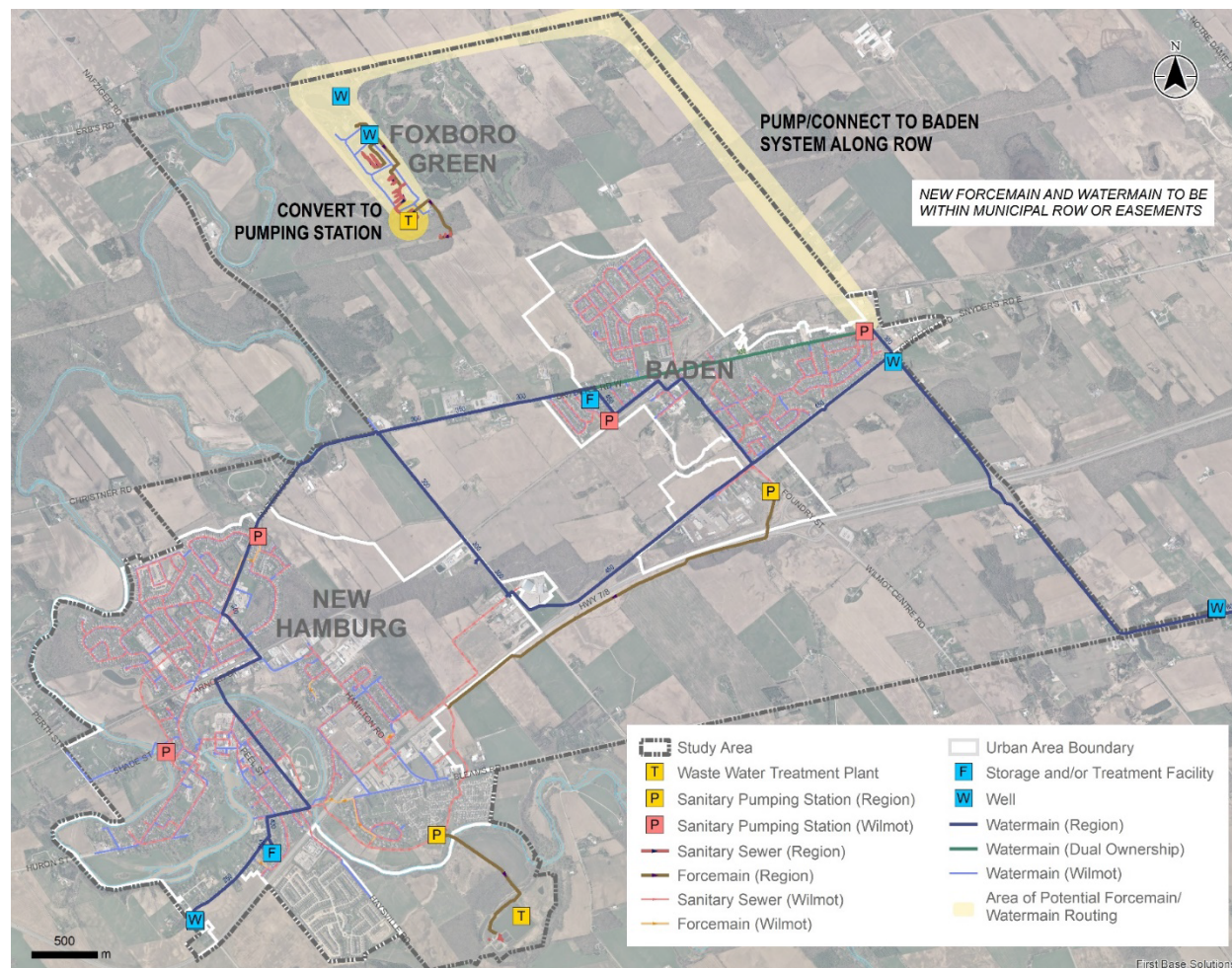


Figure 13: Alternative F2

Alternative F3 – Provide Connection to Baden Using a Direct Route

Under this alternative, Foxboro Green would be connected to the Baden water supply system within corridors across new development and agricultural lands. Foxboro Green would be connected to the Baden sanitary sewer system within corridors across new development and agricultural lands. **Figure 14** displays the location of this alternative.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

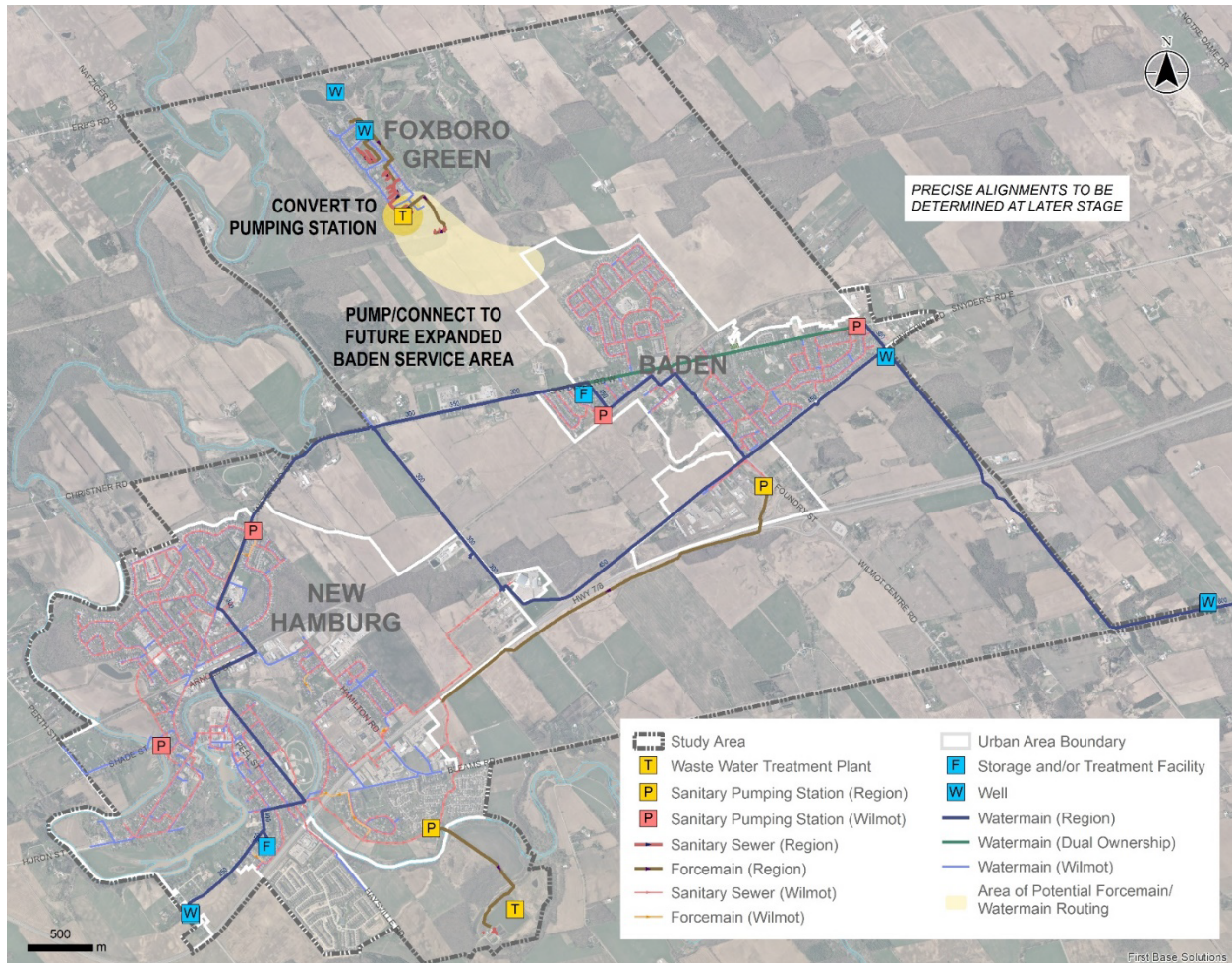


Figure 14: Alternative F3

Alternative F4 – Provide Connection to the Existing New Hamburg Infrastructure Using Existing Road Allowances

Under this alternative, Foxboro Green would be connected to the New Hamburg water supply system through existing road allowances. Foxboro Green would be connected to the New Hamburg sanitary sewer system through existing road allowances. **Figure 15** displays the location of this alternative.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

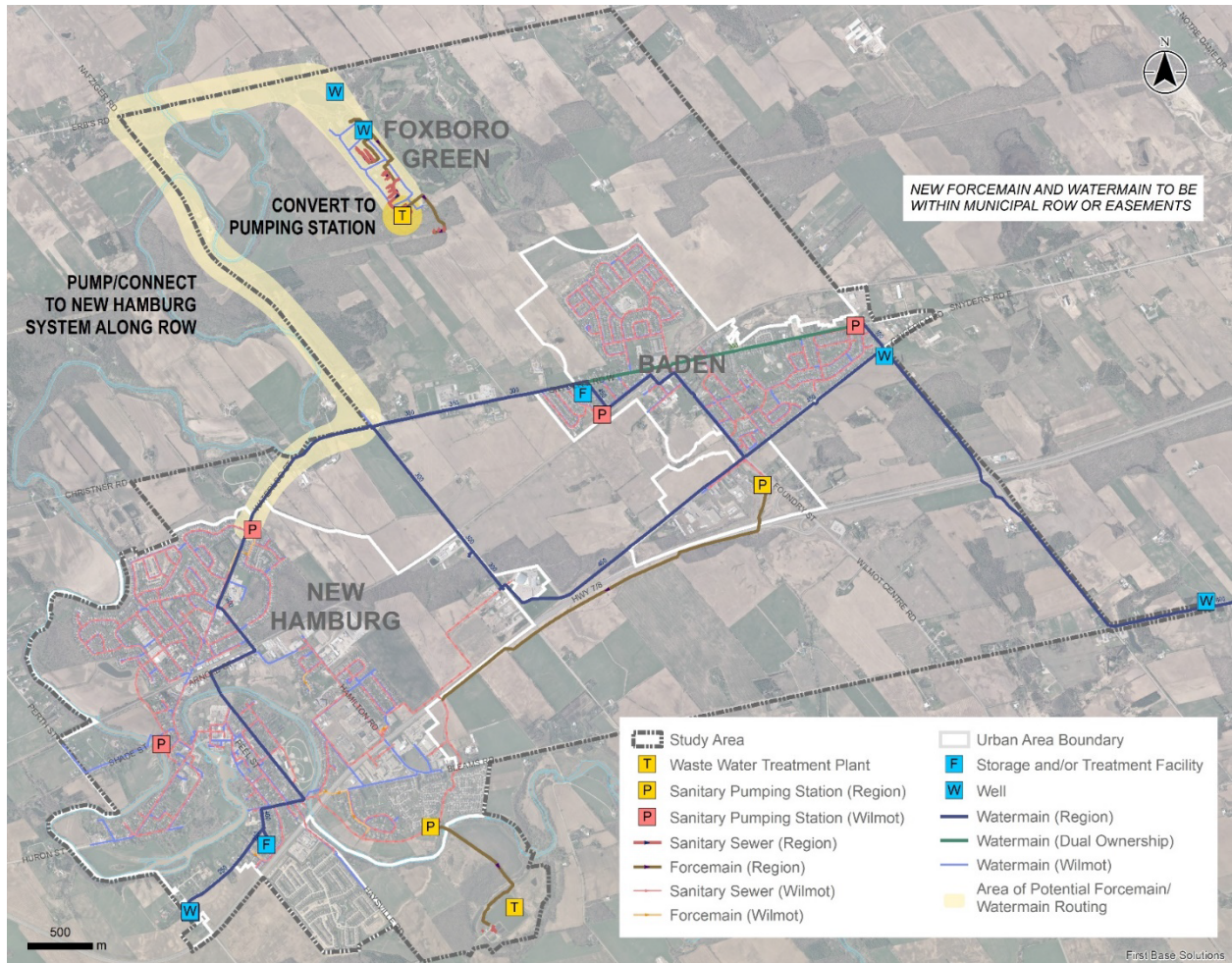


Figure 15: Alternative F4

8.0 Evaluation of Alternative Solutions

A qualitative evaluation process is used to determine the relative suitability of each alternative in accordance with a specific set of evaluation criteria. The criteria were developed to identify impacts to the natural, social, technical, and financial environments to satisfy requirements under the EA Act.

Technical Memorandum #2 (**Appendix C**) provides a summary of the problem and opportunity statement, evaluation criteria and methodology and is documented below.

8.1 Evaluation Criteria

Based on the review of background information and characterization of the study area, the criteria in Table 8. was identified for this study.

Table 8: Evaluation Criteria

Environmental Component	Evaluation Criteria	Description
Natural Environment	Protects environmental features	<ul style="list-style-type: none"> Protect sensitive natural features and regulated areas. Minimize the potential impact from construction and operation to existing terrestrial habitats/features, vegetation, wetlands, woodlots, and steep slopes. Allow for scheduling and roll-out of construction activities in a way and at a time of year that would limit the negative impacts on the vegetation of the site and surrounding area.
	Protects wildlife and species at risk	<ul style="list-style-type: none"> Minimize impacts to wildlife (including species at risk) or identified habitat locations for these species. Protect fisheries and aquatic health. Allow for scheduling and roll-out of construction activities in a way and at a time of year that would limit the negative impacts on wildlife and species at risk.
	Protects groundwater	<ul style="list-style-type: none"> Protect groundwater and meets Clean Water Act requirements. Minimize impacts on the GRCA regulated floodplain.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

Environmental Component	Evaluation Criteria	Description
	Minimizes climate change impacts	<ul style="list-style-type: none"> • Minimize GHG emissions and negative impacts on the landscape which may alter the ecosystems' ability to remove carbon dioxide from the atmosphere (e.g., changes to site and vicinity plant cover). • Prioritize energy and water conservation and efficiency measures and/or adaptive re-use of buildings or structures to reduce new energy or material demands. Evaluate contributions to or investments in natural spaces that offset or mitigate the alternative's climate change impacts
Social	Minimizes impacts to residents related to noise, odour, traffic, and aesthetics	<ul style="list-style-type: none"> • Minimize noise, odour, and truck traffic affecting the community during pumping station operation. Maintain access to and aesthetics of public spaces. Minimize negative impacts that may result due to changes to the neighbourhood characteristics (e.g., recreational features, green space, property values).
	Minimizes impacts to businesses	<ul style="list-style-type: none"> • Maintain access for businesses during construction and operation. Minimize potential negative effects on short-term and long-term business vitality, and community growth and development.
	Manages and minimizes construction impacts	<ul style="list-style-type: none"> • Minimize noise, odour, road closures, and truck traffic affecting the community during construction.
	Conserves built heritage resources and cultural heritage landscapes	<ul style="list-style-type: none"> • Minimize potential impact on known (e.g., previously recognized) and potential built heritage resources and cultural heritage landscapes. •
	Conserves archaeological resources	<ul style="list-style-type: none"> • Minimize potential impact to archaeological Sites and areas of archaeological potential.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

Environmental Component	Evaluation Criteria	Description
	Protects health and safety	<ul style="list-style-type: none"> Minimize the potential risk to public health and safety, particularly on downstream users (including for recreation and tourism). Minimize the potential risk to operator and maintenance staff's health and safety.
Technical	Provides reliable service	<ul style="list-style-type: none"> Prioritize security, reliability, and robustness. Lesser likelihood of process upset or mechanical breakdown.
	Meets existing and future needs	<ul style="list-style-type: none"> Meets the long-term capacity requirements to service the projected population growth in the sanitary catchment area. Provide appropriate site access and egress for operations and maintenance per current standards and best practices. Provide operational redundancy to allow for maintenance and cleaning of equipment and infrastructure. Minimize increases in operational and/or maintenance complexity of the station
	Aligns with existing and planned infrastructure	<ul style="list-style-type: none"> Optimize existing infrastructure investment including structures, tanks, and equipment. Align with planned infrastructure projects including recommendations of the Region's 2018 Wastewater Treatment Master Plan Update, the Foundry Street sanitary Sewer Study (2010), the Baden-New Hamburg Water and Wastewater Master Plan (2011), and the Morningside Sewage Pump Station Capacity Assessment (2017).
	Aligns with existing and future land use	<ul style="list-style-type: none"> Evaluate need to acquire land for new pumping station or expansion of pumping station and ownership requirements.
	Aligns with approval and permitting process	<ul style="list-style-type: none"> Minimize the complexity and time spent to obtain approvals from various regulatory agencies.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

Environmental Component	Evaluation Criteria	Description
	Manages and minimizes construction risks	<ul style="list-style-type: none"> Minimize complexity of construction and maximize ability to maintain adequate sewage pumping services during construction.
	Ability to adapt to climate change	<ul style="list-style-type: none"> Promote resiliency to extreme weather events. Prioritize climate change adaptation to minimize risk associated with variation in climate parameters (temperature, precipitation, wind gusts, or other) and natural hazards (flooding, high river levels, or other). Prioritize the surrounding area’s ability to be resilient and maintain its adaptive capacity to climate change.
Financial	Provides low lifecycle costs	<ul style="list-style-type: none"> Minimize capital, operation, and maintenance (life cycle) costs over a 50-year period.






8.2 Evaluation Methodology

The framework and criteria for assessing alternative solutions are identified to determine the advantages and disadvantages with respect to the environmental, social, technical, and financial components of the project. A detailed assessment of each alternative was completed based on the criteria outlined above. A comparative evaluation matrix was further prepared and used to present the evaluation of treatment options as well as siting options.

Each treatment option and siting option was evaluated based on the above criteria and given a score of 1 to 5 as well as a symbol indicating the scoring, as per Table 9. a rating of 1 indicates a low alignment with the criteria while a rating of 5 indicates that the alternative is very well alignment with the criteria. Table 9 outlines the scoring matrix.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

Table 9: Evaluation Scoring Criteria

Graphic	Rating/Description
	5 – Very well aligned with criteria
	4 – Well aligned with criteria
	3 – Somewhat aligned with criteria
	2 – Not well aligned with criteria
	1 – Low alignment with criteria

8.3 Evaluation of Alternative Solutions

8.3.1 Water Supply Alternative Solutions

Although presented at PCC #3 and evaluated in Technical Memorandum #5, the evaluation of Water Supply Alternative Solutions has been removed from this Project File Report because additional water supply is no longer required as outlined in Section 5.0.

8.3.2 Evaluation of Wastewater Alternative Solutions

A summary of the evaluation of Wastewater Alternative Solutions is provided in Table 10. Detailed evaluations and summaries of the evaluation were completed as part of the study, and are available in Technical Memorandum #5 and provided in **Appendix F**.

The evaluation determined that Alternative WW4 is recommended to best address the problems identified in the Servicing Study to meet future requirements of water and wastewater servicing in the Urban Area Boundary.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

Table 10 : Summary of Evaluation of Wastewater Alternative Solutions

Factors and Criteria	Alternative WW1 – Do Nothing	Alternative WW2 – Upgrade system and maintain existing configuration	WW3 – Upgrade system and convey directly to Morningside Pump Station	Alternative WW4 – Upgrade system and convey directly to New Hamburg Wastewater Treatment Plant
ENVIRONMENTAL				
SOCIAL				
TECHNICAL				
FINANCIAL Provides low lifecycle costs 1. Minimize capital, operation, and maintenance (life cycle) costs over a 50-year period.	2. Estimated Initial Capital Cost: \$1.8M 3. Estimated 50-Year Lifecycle Costs: \$23M 	4. Estimated Initial Capital Cost: \$20.5M 5. Estimated 50-Year Lifecycle Costs: \$42.8M 	6. Estimated Initial Capital Cost: \$117.1M 7. Estimated 50-Year Lifecycle Costs: \$38.7M 	8. Estimated Initial Capital Cost: \$14.2M 9. Estimated 50-Year Lifecycle Costs: \$35.2M
SUMMARY	Not Recommended	 Least Preferred	 Moderately Preferred	 Preferred

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

8.3.3 Evaluation of Foxboro Green Community Alternative Solutions

A summary of the evaluation of Foxboro Green Community Alternative Solutions is provided in Table 11. Detailed evaluations and summaries of the evaluation were completed as part of the study, and are available in Technical Memorandum #5 and 5A provided in **Appendix F**.

The evaluation determined that Alternative F3 is recommended to best address the problems identified in the Servicing Study to meet future requirements of water and wastewater servicing in the Urban Area Boundary.

8.4 Evaluation Summary and Preliminary Preferred Alternative

8.4.1 Baden-New Hamburg Wastewater Servicing

Alternative WW4 has been identified as the preliminary preferred alternative. The preferred alignment for WW4 is shown in **Figure 16**. This alternative bypasses the Morningside WWPS and has flows from the Baden WWPS conveyed by forcemain directly to the Baden WWPS directly to the New Hamburg WWTP. Accordingly, flows currently pumped from the Baden WWPS to the Morningside WWPS will be removed from Morningside thus freeing up capacity in the station. Analysis undertaken under this alternative indicates that the capacity created by this redirection of flows is sufficient to allow for future growth in the New Hamburg area and eliminates the need to upgrade the Morningside WWPS.

This alternative has the highest potential to minimize impacts such as noise, and road closures as the new forcemain route is not located near residential neighbourhoods. Impacts to business operations during construction are anticipated to be minimal as compared to other alternatives.

Alternative WW4 has a high potential to meet the long-term capacity requirements for Baden-New Hamburg, high potential to improve operational redundancy, potential to reduce operational and/or maintenance complexity of infrastructure and does not require multiple facility upgrades. As new infrastructure will be constructed, there is high potential to maintain adequate sewage pumping service during construction. This alternative provides the greatest increase in flow capacity, promoting the greatest amount of resiliency to extreme weather events and minimizes risk associated with variation in climate parameters. Finally, in comparison with WW2 and WW3, WW4 has the lowest financial estimated cost for both initial capital and 50-year lifecycle costs.

Several sub-options of Alternative WW4 were reviewed for the section of forcemain routing from the Baden WWPS to the crossing required at Highway 7/8. Several factors contributed to the sub-options including access to appurtenances along the route,

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW









Ministry of Transportation requirements for crossing a provincial highway, and easement requirements for the forcemain along smaller township roads. Details of the routing options are discussed in Technical Memorandum #5, provided in **Appendix F**.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

Table 11: Summary of Evaluation of Foxboro Green Community Alternative Solutions

Factors and Criteria	Alternative F1 – Do Nothing	Alternative F2 – Connect Foxboro to Baden via Existing Rights-of-Way	Alternative F3 – Connect Foxboro to Future Expand Baden Service Area using a Direct Route	Alternative F4 – Connect Foxboro to New Hamburg via Rights-of-Way
ENVIRONMENTAL				
SOCIAL				
TECHNICAL				
FINANCIAL Provides low lifecycle costs 10. Minimize capital, operation, and maintenance (life cycle) costs over a 50-year period.	<u>Foxboro Wastewater System</u> 11. Estimated Initial Capital Cost: \$1M 12. Estimated 50-Year Lifecycle Costs: \$30.3M <u>Foxboro Water System</u> 13. Estimated Initial Capital Cost: \$6.9M 14. Estimated 50-Year Lifecycle Costs: \$11.8M <u>Foxboro Combined</u> 15. Estimated Initial Capital Cost: \$7.9M	<u>Foxboro Wastewater System</u> 17. Estimated Initial Capital Cost: \$5.9M 18. Estimated 50-Year Lifecycle Costs: \$17.8M <u>Foxboro Water System</u> 19. Estimated Initial Capital Cost: \$3.4M 20. Estimated 50-Year Lifecycle Costs: \$4.1M <u>Foxboro Combined</u> 21. Estimated Initial Capital Cost: \$9.3M 22. Estimated 50-Year Lifecycle Costs: \$21.9M	<u>Foxboro Wastewater System</u> 23. Estimated Initial Capital Cost: \$2.9M 24. Estimated 50-Year Lifecycle Costs: \$10.9M <u>Foxboro Water System</u> 25. Estimated Initial Capital Cost: \$0.8M 26. Estimated 50-Year Lifecycle Costs: \$1.4M <u>Foxboro Combined</u> 27. Estimated Initial Capital Cost: \$3.7M 28. Estimated 50-Year Lifecycle Costs: \$12.3M	<u>Foxboro Wastewater System</u> 29. Estimated Initial Capital Cost: \$6.8M 30. Estimated 50-Year Lifecycle Costs: \$19.3M <u>Foxboro Water System</u> 31. Estimated Initial Capital Cost: \$3.3M 32. Estimated 50-Year Lifecycle Costs: \$4.2M <u>Foxboro Combined</u> 33. Estimated Initial Capital Cost: \$10.1M Estimated 50-Year Lifecycle Costs: \$23.5M

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

Factors and Criteria	Alternative F1 – Do Nothing	Alternative F2 – Connect Foxboro to Baden via Existing Rights-of-Way	Alternative F3 – Connect Foxboro to Future Expand Baden Service Area using a Direct Route	Alternative F4 – Connect Foxboro to New Hamburg via Rights-of-Way
	16. Estimated 50-Year Lifecycle Costs: \$42.1M 			
SUMMARY	 Not Recommended	 Moderately Preferred	 Preferred	 Least Preferred

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

Based on the preferred alignment as shown, the emergency laneway from Gingerich to the Wilmot Recreation Complex (WRC) will be utilized for the forcemain construction and will require easements to be arranged prior to start of construction, and the WRC private laneway and Township Road will be restored following forcemain construction. Timing of the work will be coordinated with WRC staff as the alignment may disturb the soccer fields, thus construction will should occur outside of the field use season.

Two alignment sub-options were considered to connect from Highway 7/8 south to the New Hamburg WWTP:

1. Sub-option 4C is approximately 700 m in length, requires the purchase of an easement, and requires an Oxbow creek crossing.
2. Sub-option 4D is approximately 2860 m in length and requires an Oxbow creek crossing.

Sub-option 4C, as shown on **Figure 16**, was selected as the preferred alternative due to the significantly shorter, and thus more economically feasible, forcemain length.

The forcemain alignment selected generally follows road allowances except where noted above. This does not preclude the Region from utilizing an alternative alignment where that alignment continues to follow existing road allowances or easements.

The forcemain alignment proposed is conceptually considered to be constructed by open cut methods for the majority of the length with the twin forcemains laid in a common trench. Minor water crossings such as the Baden Creek and the Nith River oxbow should be completed by trenchless methods in order to mitigate environmental impact. Additionally, the crossing of Highway 7/8 should also be completed by trenchless methods in order to reduce cost and disruption to this highway. Initial consultation was undertaken through this study with the Ministry of Transportation. Further consultation through the detailed design phase will be necessary to finalize the design of this crossing. Conceptually, the crossing of the Nith River is envisioned to be completed by hanging the forcemain on the side of the bridge crossing of Holland Mills Road. This may be accomplished by merging the twin forcemains into a single larger forcemain for this crossing so that only one pipe is placed on the bridge. Completing the crossing in this manner would mitigate impacts to the Nith River.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

heritage landscapes within the site. Alternative F3 provides a high potential to meet the long-term capacity requirements for both water and wastewater. The existing WTP and WWTP can remain operational during construction. As a result of increased flow capacity, alternative F3 promotes resiliency to extreme weather events and minimizes risk associated with variation in climate parameters. Finally, in comparison with F1, F2 and F4, alternative F3 has a significantly lower estimated cost for both initial capital and 50-year lifecycle costs.

Figure 17 shows the forcemain and watermain sub-option routing associated with F3. Sub-option 3A would involve installing the forcemain and watermain by directionally drilling under the woodlot. The required pipe length was estimated to be 390 m. Sub-option 3B involves purchasing an easement and installing the watermain and forcemain by open-cut method through the woodlot. The required pipe length was estimated to be 610 m. Sub-option 3C involves purchasing an easement to the east of the woodlot and installing the watermain and forcemain by open-cut method. The required length was estimated to be 950 m. Sub-option 3C has been selected as the preferred routing, as it does not disturb the natural heritage features in the woodlot and uses an open-cut method which is typically less risky and more cost effective than directional drill. The final preferred alignment for alternative F3 is shown in **Figure 18**.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

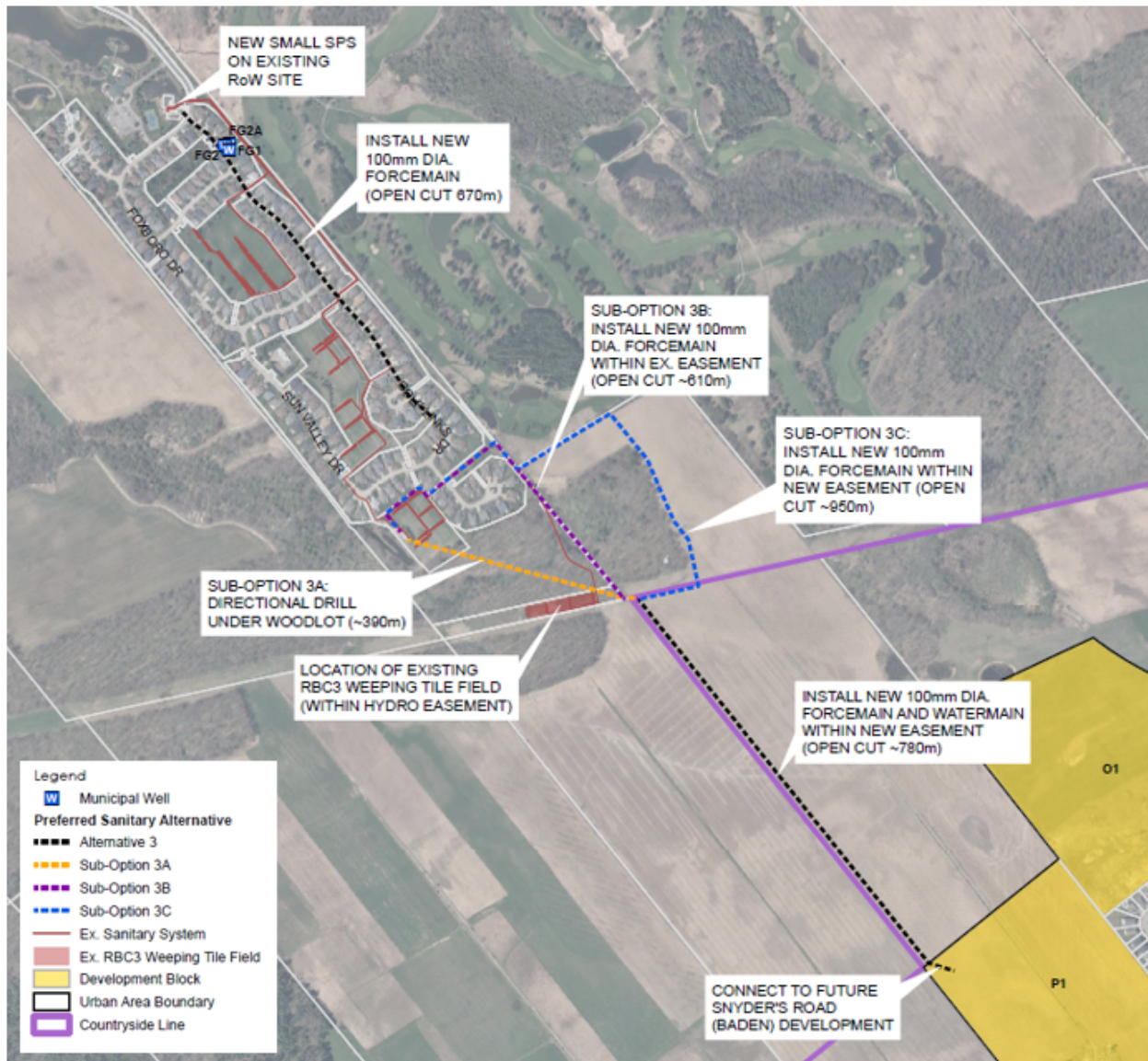


Figure 17: Foxboro Green Water and Wastewater Servicing Sub-Option Alternatives

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

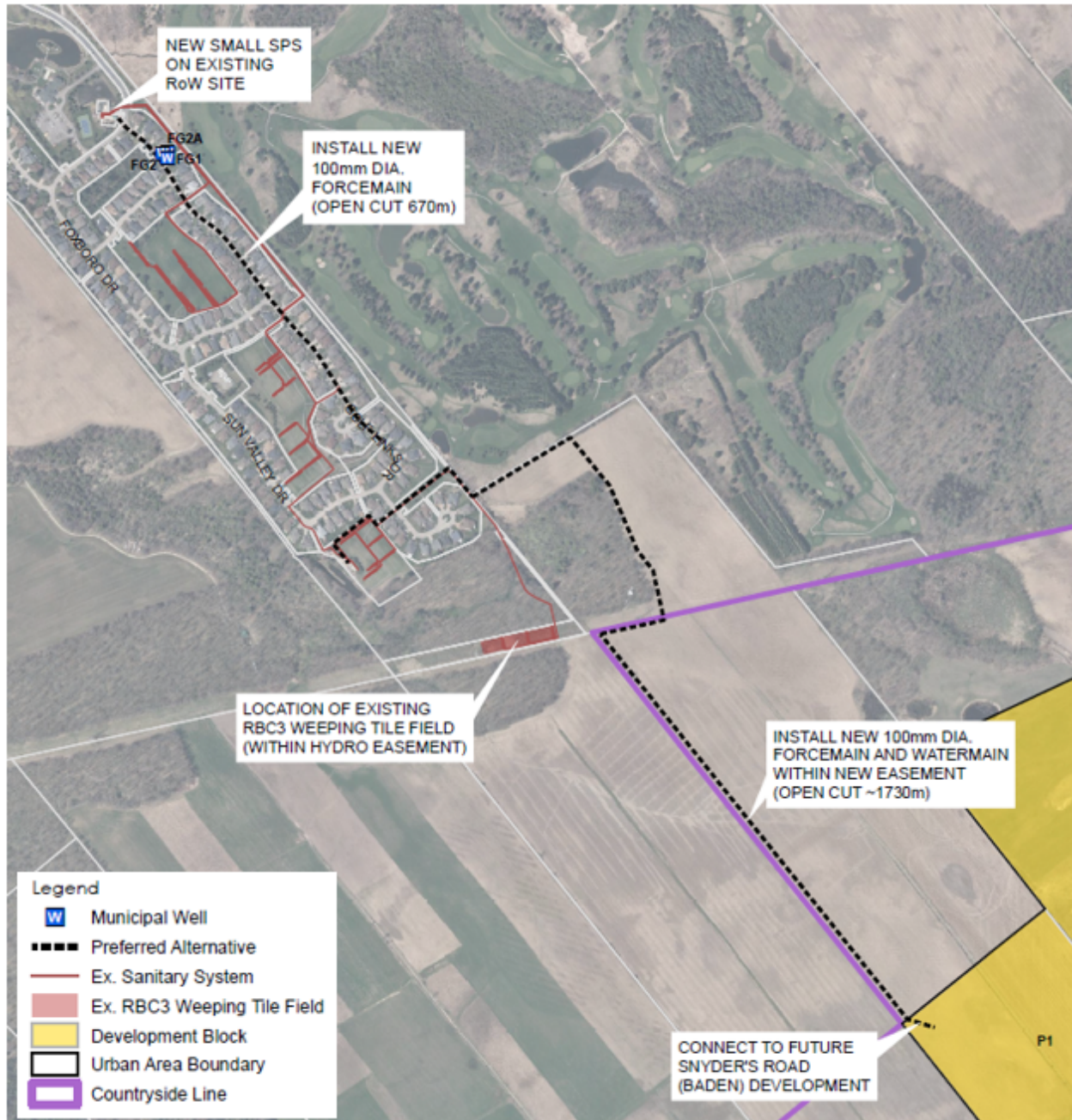


Figure 18: Foxboro Water and Wastewater Servicing Preferred Alternative

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

8.4.2.1 Design Changes Resulting from Consultation with Foxboro Green

Following PCC #3, correspondence with Foxboro Green (Waterloo Standard Condominium Corporation #365) was received requesting a meeting to discuss the details of the study, as well as a number of questions and concerns related to the Foxboro Green community. Following discussions one of the key issues that was identified as the alignment of the forcemain and watermains and their impact on the community during construction.

A copy of correspondence with Foxboro Green is provided in **Appendix A**. Technical Memorandum #5A detailing the sub-options reviewed, as summarized below, is provided in **Appendix F**.

Sanitary Forcemain Alignment

The Project Team reviewed sub-options to the preliminary preferred Alternative F3 - the alternative by which flows from the Foxboro Community are conveyed to the Baden water and wastewater system by a direct route. The sanitary forcemain alignment options considered are Sub-option 3i and Sub-option 3ii.

Sub-option 3i is the forcemain alignment option presented at PCC #3 and involves the construction of a new 100mm diameter sanitary forcemain along Golf Links Road. The northern end of the forcemain connects to a proposed sanitary pumping station in the location of the existing sanitary treatment system for Foxboro. The southern end of the forcemain connects to the existing sanitary sewer on Golf Links Drive in the vicinity of Mun. No. 174 Golf Links Drive. The forcemain would be contained within the roadway of the condominium corporation.

Sub-option 3ii is the forcemain alignment option suggested by the Foxboro Community and involves the construction of a new 100mm diameter sanitary forcemain along the Open Space block east of Golf Links Road, continuing along the open space block between Mun. No. 166 Golf Links Drive and Mun. No. 168 Golf Links Drive and then along Golf Links Drive to connect with the existing sanitary sewer in the vicinity of Mun. No. 174 Golf Links Drive.

In the evaluation of the two sub-options, Sub-option 3ii (placement of the forcemain along the Open Space block east of Golf Links Drive) is the preliminary preferred sub-alternative.

Sub-option 3i ranked poorly on the social criteria, largely from the input that was provided by the Foxboro Residents. The community clearly indicated that construction on Golf Links Drive proposed by Sub-option 3i would have a negative impact on the community. The impacts of construction would impact residents' ability to access sidewalks and walking trails during construction. While these impacts could be mitigated

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

through the employment of trenchless methods for construction, there would still be an impact on the community.

The option of placing the forcemain along the Open Space block was favoured by the Foxboro Residents because it represented a lesser disruption to the community. There may still be impacts due to noise and dust as construction will still occur adjacent to existing homes, however, that impact is limited only to the homes on the east side of Golf Links Drive and not to the community as a whole.

Under the financial criteria, there was no difference in lifecycle costs between the two sub-options, however there would be a small cost savings in the initial capital cost associated with a reduction in restoration costs. Sub-option 3i would involve more extensive restoration of Golf Links Drive while sub-option 3ii would involve only restoration of a pathway.

Conclusion

Further correspondence and discussions were conducted with the Foxboro Community as provided in Appendix A which resulted in some further minor modifications to the preferred alternative. A final response letter was received from Foxboro Green on December 29, 2022, indicating that the Board of Foxboro Green, WSCC No. 365 agrees in principle with the revised preferred alternative which is presented in **Figure 19**.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

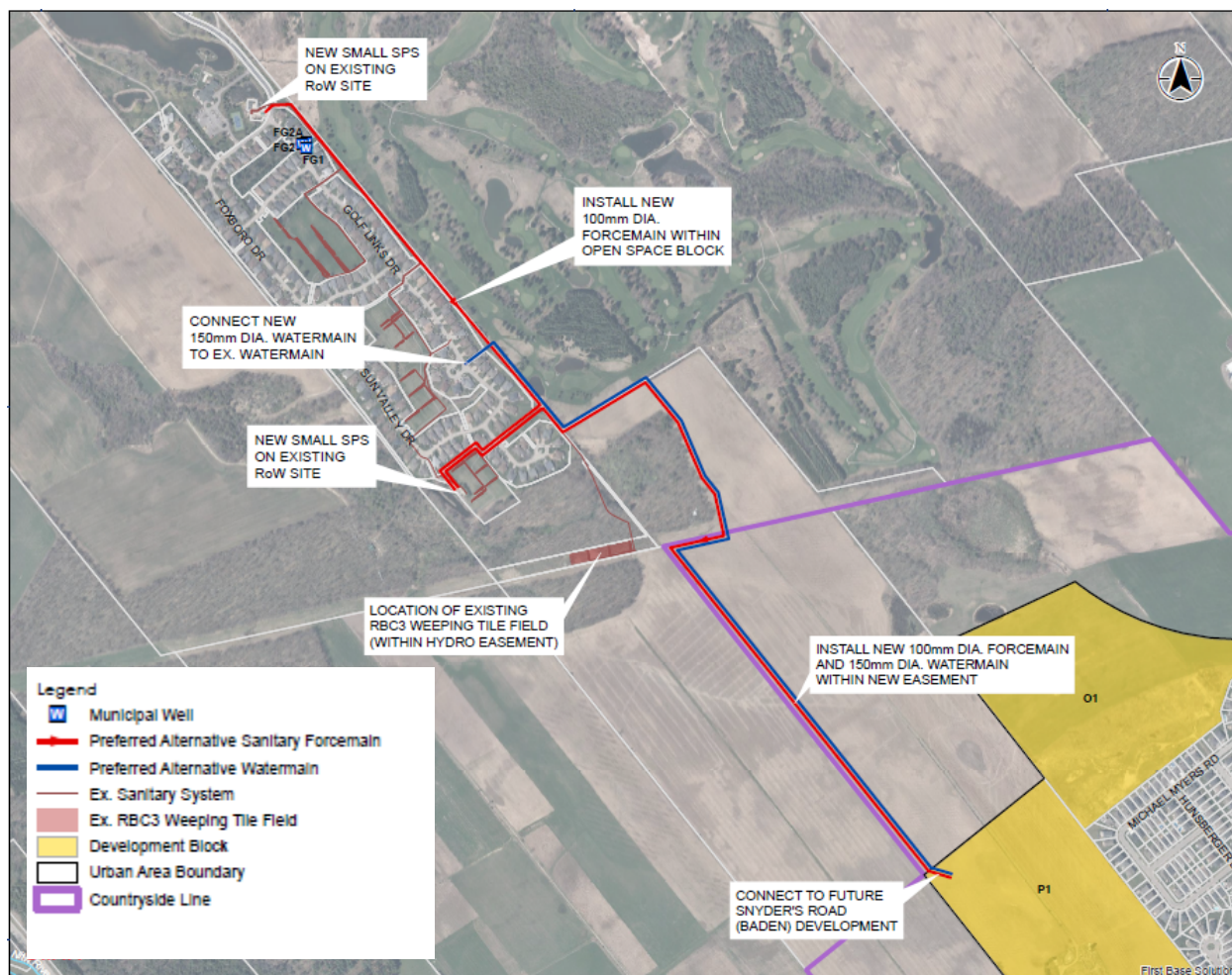


Figure 19: Revised Foxboro Water and Wastewater Servicing Preferred Alternative

8.4.2.2 Concept Design for the Foxboro North PS

This pumping station will convey flows from the northern half of the Foxboro Green community to the Foxboro South PS via a 100mm forcemain as noted above. The Foxboro North PS will require a rated firm capacity of approximately 5.0 L/s. A simple, duplex submersible pump station will be installed in the vicinity of the existing Foxboro WWTP (at RCB1 & RBC3) while the Foxboro WWTP remains active. As the property owned by the Region in this area is limited, additional property will be required in order to site this facility. A new forcemain connection from the duplex pump station will be connected to one of the existing 100mm diameter effluent lines, along with a minor extension of the same forcemain, in order to convey flows to the southern gravity collection system. The duplex pump station can utilize the existing MCC and control systems available from the Foxboro WWTP. It is anticipated that there will be adequate additional electrical capacity and space within the existing PLC control cabinet for the

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

new pump station. Once the station is fully commissioned and operational, it is recommended the Region decommission the existing RBC tanks. This can be accomplished by removing all internal components of the RBC tanks and backfilling with granular material, leaving the concrete structures abandoned below grade. Alternatively, the tanks can be fully removed which will increase demolition costs but will provide significant green space once completed that could be offered to the community for recreational uses. These works at the RBC1 and RBC2 site can be coordinated with the planned decommissioning of the Foxboro WTP, which is also located on the same property and may be subject to demolition once a new watermain connection is in place for the Foxboro Green community. Prior to finalizing the design basis for the new Foxboro North PS, it is recommended the Region carry out gravity flow metering upstream of the existing RBC1 and RBC2 tanks to confirm average and peak daily flow rates for the design of the new station, and for adequate sizing of the PS wet well and equalization storage.

8.4.2.3 Concept Design for the Foxboro South PS

This pumping station will convey flows from the entire Foxboro Green community south to the Baden sanitary collection system. Flows to this station will consist of both pumped flows from the Foxboro North PS and flows from the southern portion of the Foxboro Green community via gravity, which currently discharge to the RBC3 treatment unit of the Foxboro WWTP. Similar to the Foxboro North PS, it is anticipated that the existing electrical supply and PLC panel for the RBC3 treatment system will have adequate capacity to power and control the new Foxboro South PS, but this can be confirmed prior to the design stage. The estimated rated firm capacity for the Foxboro South PS is 10.4 L/s. It is also recommended that gravity sewer flows upstream of the RBC3 treatment unit be monitored for average and peak flows prior to finalizing the design basis for the new PS. A submersible, duplex pumping station is proposed for the Foxboro South PS, near the inlet pumping station to the RBC3 treatment unit. The Region owns some additional property in this area and should be able to accommodate the new pumping station without the need to acquire additional land. Adequate wet well and equalization storage for wet weather events (inflow / infiltration) should be considered during the design stage for the new station. Once the new Foxboro South PS is fully implemented and commissioned, the RBC3 treatment unit can either be decommissioned or demolished, similar to RBC1 and RBC2 as outlined above.

8.4.2.4 Implementation Timeframe and Schedule

The implementation of the preferred improvements is anticipated to commence in a staged manner with the initial project, the Baden Pumping Station upgrade, likely proceeding to construction in 2025, subject to available funding, and easement needs be met. Construction of the Foxboro Green connection requires the completion of servicing to the development limits of Baden and timing is thus predicated on completion of these works.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

In order to mitigate Source Water Protection issues as outlined in Section 11.6, the following sequencing should be followed for the implementation of the Foxboro Green connection:

1. Construction of the watermain be undertaken in advance of or concurrent with the forcemain construction;
2. The watermain be connected to the existing watermains within the Foxboro Community and the watermain be commissioned and charged;
3. The existing Foxboro wells be taken out of service.
4. The sanitary pumping station and forcemain be completed, commissioned and put into service;
5. The existing Foxboro wells be decommissioned in accordance with Ontario Regulation 903 Wells (R.R.O. 1990, Reg. 903: WELLS (ontario.ca)).

9.0 Preliminary Cost Estimate

Capital cost estimates and 50-year lifecycle cost estimates were prepared for the preliminary preferred alternatives. These cost estimates are considered Class IV or planning level estimates, and generally include:

- Building, mechanical equipment, etc.
- Approximate 'per metre' costs for forcemain and watermain installation

Baden – New Hamburg Wastewater Alternative WW4 and Foxboro Green Water and Wastewater Alternative F3 contain non-Region owned properties for which property acquisition costs may be incurred.

WW4: Upgrade System and Convey Directly to New Hamburg WWTP	<ul style="list-style-type: none">• Estimated initial capital cost: \$14.2M• Estimated 50-year lifecycle cost: \$35.2M
F3: Provide Connection to Baden Using a Direct Route	<ul style="list-style-type: none">• Estimated initial capital cost: \$3.7M• Estimated 50-year lifecycle cost: \$12.3M

9.1 Implementation Timeframe and Schedule

The implementation of the preferred improvements is anticipated to proceed in a phased manner as required by growth. Implementation of WW4 is anticipated to be the first project to proceed since the Baden Pumping Station is currently at capacity. It is anticipated that design will commence after completion of this study and construction will proceed in 2024/2025.

Alternative F3 is expected to be the next project as the Foxboro community requires imminent significant upgrades to the existing water treatment facility. Implementation of this alternative is predicated on the construction of water and sanitary services in the new development in the north-west corner of Baden. Accordingly, implementation timing of this project will depend on the construction timing of those works. Accordingly, the Region may be required to complete improvement works for the Foxboro facilities in order to meet operational constraints and criteria in the interim until the works contemplated by this study are completed.

9.2 Baden Well Decommissioning

In addition to the above improvements, it is recommended that the Baden B1 and B2 wells be decommissioned. The Baden wells have been out of service for a number of years. Due to a high level of nitrates in the groundwater the wells were taken out of service. Currently the Baden-New Hamburg system is supplied by the New Hamburg wells and the K50 wells and have significant supply capacity well beyond the projected water demands within the study horizon. The Baden wells are not currently operated and would require treatment to be brought back into service. Treatment for nitrates is difficult and costly. Due to the existing large supply capacity in Baden-New Hamburg and the limited supply from the Baden wells as well as the difficulty of treatment, it is recommended that the Baden wells be taken out of service and decommissioned.

10.0 Potential Environmental Impacts

Following an evaluation of alternatives, the two preliminary preferred alternatives include upgrades to the Baden Wastewater Pumping Station, and a new force main from the Baden Pumping Station to the New Hamburg Wastewater Treatment Plant. The Project will involve the construction of the preferred Baden wastewater servicing alternative WW4 to the New Hamburg Wastewater Treatment Plant, and the Foxboro Green preferred alternative F3.

The following provides a description of the potential environmental impacts anticipated for each project area.

10.1 Natural Environment

A natural heritage background review and one-day field investigation was conducted to identify sensitive terrestrial and aquatic natural heritage features within approximately 120 m of the preferred alternative for each of the three projects, which are referred to as the “project Study Areas”. A copy of the Natural Heritage Memo is provided in **Appendix G**.

10.1.1 Significant Wildlife Habitat

Wildlife habitat is defined as an area where plants, animals and other organisms live, including areas where species concentrate at a vulnerable point in their life cycle, and areas that are important to migratory and non-migratory species (MNR 2000). Significant wildlife habitats are grouped into four categories according to the *Significant Wildlife Technical Guide* (MNR 2000) and the Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E (MNR 2015) in the following categories:

1. Seasonal concentration areas
2. Animal movement corridors
3. Rare vegetation communities or specialized habitats
4. Habitats of species of conservation concern

Based on results from the field investigation, there is candidate Significant Wildlife Habitat (SWH) for the following wildlife within the project Study Areas:

- Bat maternity colonies in forest and swamp communities
- Amphibian breeding habitat in wetlands and vernal pools
- Special concern and provincially rare species

The following is of note for the three focused study areas.

10.1.1.1 Baden-New Hamburg Wastewater Servicing Study Area (Alternative WW4)

- Cliff Swallow nesting activity was confirmed on the bridge where Holland Mills Road intersects the Nith River (south of Bleams Road E). Approximately 20 active nests were observed on either side of the bridge (approximately 40 active nests in total). However, bridges are not included in this habitat type.
- A Barn Swallow Kiosk is present just west of the Holland Mills Road bridge over the Nith River; however, the kiosk was inactive at the time of Stantec’s June 9, 2022, field investigation. Barn Swallows were observed at multiple locations during field investigations, but no active nesting was confirmed.
- Suitable habitat for bat maternity colonies exists within the study area. Several large-diameter bat trees with suitable cavities/peeling bark were identified during field investigations.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

- Amphibian breeding habitat (woodland and wetland) is present.
- Suitable habitat for Eastern Wood-pewee, Wood Thrush, Common Nighthawk, Monarch, Midland Painted Turtle, Snapping Turtle, Rainbow Mussel, Northern Sunfish and Green Dragon was identified. Eastern Wood-Pewee and Snapping Turtle were observed on June 9, 2022.

10.1.1.2 Foxboro Water and Wastewater Servicing Study Area (Alternative F3)

- Significant habitat for deer wintering areas is present in the Phillipsburg Forest ANSI. Alternative F3 is in close proximity to this ANSI; however, the deer wintering area does not intersect with this project.
- Suitable habitat for bat maternity colonies exists. Several large-diameter bat trees with suitable cavities/peeling bark were identified during field investigations.
- Amphibian breeding habitat (woodland and wetland) is present.

10.1.2 Fish and Fish Habitat

Descriptions of watercourses in each of the three study areas for the preliminary preferred alternatives are provided below.

10.1.2.1 Baden-New Hamburg Wastewater Servicing Study Area (Alternative WW4)

The preferred alternative for the Baden-New Hamburg Wastewater Servicing project crosses three mapped watercourses and there are two additional mapped surface water features within the Study Area. Watercourses crossed by the preferred alternative are within the GRCA's regulation limits. Mitigation strategies for the watercrossings noted below are outlined in Section 11.0.

Baden Creek

Baden Creek has a permanent flow regime, a warmwater thermal regime, and supports a diverse baitfish community (NDMNRF 2022b). Baden Creek flows south and is a tributary to the Nith River. At the proposed crossing location, Baden Creek exhibited riffle-pool-run morphology, with a wetted width ranging from 2 m (riffle) to 5 m (pool) and depths ranging from 0.05 m (riffle) to 0.7 m (pool). Baden Creek has an average bankfull width of 4 m and a bankfull depth of 0.5 m. Substrates consisted of sand, cobble, clay, gravel, silt, and boulder.

The creek banks were primarily well vegetated, with some small areas vulnerable to erosion, actively eroding, and depositional. Fish cover was abundant and provided by in-stream vegetation (sage pondweed), cobble, undercut banks, woody debris, and overhanging vegetation. Riparian vegetation consisted of grasses, Manitoba maple, shrub willow, and asters.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

Creek Chub was observed within the watercourse during the June 9, 2022, field investigation. The drainage ditch on the south side of Gingerich Road drains into Baden Creek and exhibited some limited flow during the field visit, however it is unlikely to directly support fish habitat due to physical barriers including a steep gradient at the confluence with Baden Creek.

Nith River

The Nith River is a permanent, warm water feature that supports a diverse sport and bait fish community (NDMNRF 2022b). Within the Study Area, the Nith River is mapped critical habitat for the Threatened Silver Shiner (DFO 2022). Additionally, there are records of the Threatened Black Redhorse within the Study Area (DFO 2022).

Within the vicinity of the proposed crossing location, the Nith River exhibits riffle-pool-run morphology. At the time of the field investigation, the wetted width ranged from 20 m (riffle) to 30 m (pool) and water depths ranged from 0.2 m (riffle) to 1.1 m (pool). At the bridge crossing on Holland Mills Road (preferred alternative) the Nith River has a bankfull width of 28 m and a bankfull depth of 1.2 m. Substrates consisted of clay, cobble, boulder, and silt.

Banks at the bridge were primarily armored with boulder and cobble, with some areas of active erosion immediately upstream of the bridge and some areas vulnerable to erosion. Cover for fish was provided by boulder, cobble, woody debris, and overhanging vegetation. Riparian vegetation consisted of trees, shrubs, and grasses.

The Nith River supports Silver Shiner and Black Redhorse. Provincially regulated habitat and federally regulated Critical Habitat for Silver Shiner includes the entire floodplain or riparian area adjacent to the occupied reach.

Tributaries to the Nith River

There is a mapped tributary on the west side of Holland Mills Road, that flows into the Nith River from the north near the proposed location of the Nith River crossing. The unnamed tributary has an intermittent flow regime (NDMNRF 2022a). The tributary had run morphology with an average wetted width of 1 m and an average depth of 0.1 m. Bankfull width was 2.2 m and bankfull depth was 0.4 m. Substrates consisted of clay, silt, cobble, gravel, and sand.

Banks were primarily protected with vegetation, with some areas vulnerable to erosion and a small amount of active erosion near the confluence with the Nith River. Fish cover was abundant and was provided by woody debris, emergent vegetation (grasses), undercut banks, and overhanging vegetation. Riparian vegetation consisted of Manitoba maple and grasses. Although no fish were observed, there were no barriers to fish passage from the Nith River. This tributary is within the Silver Shiner Critical Habitat area of the Nith River.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

There is a mapped watercourse located approximately 200 m east of Highway 7 and Nafziger Road that is crossed by the preferred alternative. The mapped tributary is a tiled drainage feature (NDMNR 2022a) and there is no visible surface water feature. In the absence of a surface water feature, the watercourse does not directly support fish habitat.

The outlet from the New Hamburg Wastewater Treatment Plant flows into the New Hamburg Oxbow Wetland Complex. The oxbow is mapped as Northern Sunfish habitat (DFO 2022). Northern Sunfish is a Special Concern species.

During the June 9, 2022, field investigation, Common Carp (*Cyprinus carpio*), Fathead Minnow (*Pimephales promelas*), and Creek Chub (*Semotilus atromaculatus*) were observed in the vicinity of the outlet of the WWTP.

10.1.2.2 Foxboro Water and Wastewater Servicing Study Area (Alternative F3)

There is one mapped intermittent tributary to the Nith River within the Foxboro Green Study Area. The tributary is mapped by DFO as supporting Rainbow Mussel (*Villosa iris*), a Special Concern species. On June 9, 2022, there was no visible channel at the location of the mapped watercourse and the location was characterized by damp soils and semi-aquatic vegetation (cattail, *Phragmites*). The watercourse would not directly support fish or provide habitat for Rainbow Mussel within the Study Area.

Within the Study Area, the mapped tributary is within the GRCA's regulation limit; however, the preferred alternative does not cross the tributary.

10.2 Archaeological Resources

The Region retained Stantec to undertake a Stage 1 archaeological assessment for the Preliminary Preferred Alternatives. The study area for this archaeological assessment is in part of Lots 17-19, German Block North of Bleams Road; part of Lots 18-21 and 23, German Block South of Bleams Road; part of Lot 16, German Block North of Snyder's Road; part of Lot 15-17, German Block South of Snyder's Road; and, part of Lot 16, German Block South of Erbs Road, in the former Geographic Township of Wilmot, Waterloo County, now the Township of Wilmot, Regional Municipality of Waterloo.

A Stage 1 archaeological assessment was completed under Project Information Form #P390-0362-2022. Parts of the study area were extensively disturbed from previous road construction, utility installations, infrastructure development, and building footprints, which have removed any archaeological potential that may have been present. Also, parts of the study area were determined to have no or low archaeological potential based on identifying permanently wet areas and steeply sloping terrain. Other parts of the study area have been subject to previous archaeological assessments and were determined to have no further cultural value or interest. These areas have no to low archaeological potential.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

The remainder of the study area was determined to retain archaeological potential based on its proximity to water sources, registered archaeological sites, historical settlements and routes, and physiographic features.

A Stage 2 archaeological assessment will be completed during detailed design and prior to any impacts.

The Stage 1 report was submitted to MCM to review the presented results and accept into the *Ontario Public Register of Archaeological Reports*. A copy of the Stage 1 report is provided in **Appendix H**.

10.3 Cultural Heritage Resources

In order to identify the presence of built heritage resources and cultural heritage landscapes within the Study Area, understand the potential impacts of the project on these resources, and prepare mitigation strategies to minimize these impacts, it was determined that a *Cultural Heritage Report: Existing Conditions and Preliminary Impact Assessment* would be prepared. A copy of the Cultural Heritage Report is provided in **Appendix I**.

As part of the Cultural Heritage Report, potential built heritage resources and cultural heritage landscapes were identified, inventoried, and evaluated according to *Ontario Regulation (O. Reg.) 9/06*, the criteria for determining cultural heritage value or interest (CHVI) (Government of Ontario 2006a). A land use history was completed to provide a cultural context for the Study Area and historical background upon which to base evaluations. Where CHVI was identified, the resource was mapped, and recommendations were made for further study. The objectives of the Cultural Heritage Report are summarized below:

- Prepare a land use history of the Study Area for use in the identification and evaluation of built heritage resources and cultural heritage landscapes
- Identify potential built heritage resources and cultural heritage landscapes within the Study Area through a windshield survey from the public right of way
- Evaluate the CHVI of the potential built heritage resources and cultural heritage landscapes to determine the number of heritage resources present
- Prepare recommendations for future work where built heritage resources and cultural heritage landscapes were identified

Where a component of a previously identified or potential built heritage resource or cultural heritage landscape was situated within the Study Area, the impacts of the proposed undertaking were evaluated. direct impacts to any previously identified or potential built heritage resources or cultural heritage landscapes are anticipated at this stage of the Project.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

The proximity of Project components to built heritage resources and cultural heritage landscapes was considered in this assessment, particularly those within 50 metres, in order to encompass a wide enough buffer zone to account for built resources less than 40 metres from curbside or potential construction activities. The 50-metre buffer represents a conservative approach to effects identification. Table 12 identifies the indirect impacts for one property (3277 Bleams Road East).

Table 12: Potential Impacts to Cultural Heritage Resources

CHR Reference Number	Location	Previous Heritage Recognition	Type and Description of Potential/Anticipated Impact	Mitigation
BHR-2	3277 Bleams Road East	Identified during field review	Indirect: The barn is situated adjacent to the Project Location. Construction activities are proposed within 35 metres of the identified BHR. The position of the barn within 35 metres has the potential for indirect impacts resulting from vibration damage during construction activities.	<p>Preferred Option: Avoid the BHR by establishing a buffer zone around the barn to limit construction activity to more than 50 metres away. This should use appropriate preventative measures such as mapping of the BHR on construction maps and temporary fencing. Staging and laydown areas should also be selected so that they are non-invasive and avoid the BHR. Where avoidance is not feasible, the alternative option should be applied.</p> <p>Alternative Option: Where construction activities are anticipated within the 50-metre buffer zone a pre-construction vibration assessment by a qualified engineer is recommended in order to determine if vibration monitoring or site plan controls are required.</p>

11.0 Proposed Environmental Mitigation and Monitoring Requirements

11.1.1 Protection of Fish

Open drainage features are absent from the site alternatives, and in-water work is not anticipated as part of this assignment. Further discussion of the federal Fisheries Act and authorization of in-water work is provided in the Permitting Considerations section below. As noted above, standard measures for sediment and erosion control will be implemented to protect drainage features from sediment and other contaminants that may be transported in runoff from disturbed work areas. Where applicable, dewatering discharge will be managed and treated to reduce the risk of erosion and/or release of sediment-laden or contaminated water to drainage features.

As noted in Section 8.4.1, the twin forcemains will be installed along the existing bridge crossing to avoid impacts to the watercourses within the study area.

11.1.2 Erosion and Sediment Control

An erosion and sediment control (ESC) plan will be developed and employed during construction to reduce the risk of erosion and the entry of sediment into drainage features and wetlands. Mitigation included in the plan will include the following measures:

- Implement project-specific temporary ESC measures per prior to starting work (e.g., silt fence and/or sediment logs).
- Keep additional ESC materials available on site to provide a contingency supply in the event of an emergency.
- Monitor and maintain erosion and sediment controls, as required. Controls are to be removed only after the soils of the construction area have stabilized and vegetation cover has re-established.
- Stabilize materials requiring stockpiling (fill, topsoil, etc.) and keep a safe distance (> 30 m) from drainage features and wetlands.

11.1.3 Protection of Migratory Birds

The federal Migratory Birds Convention Act (MBCA) provides legal protection of migratory birds and their nests in Canada. Construction timing must consider restrictions imposed by the MBCA. To avoid damaging or disturbing bird nests and contravening the MBCA, the timing of any vegetation clearing will occur outside of the primary nesting period (i.e., the period when the percent of total nesting species is greater than 10% based on Environment Canada's Nesting Calendars and the period for which due diligence mitigation measures are generally recommended).

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

The primary nesting period (PNP) identified for southern Ontario is April 1 - August 31, although nesting also infrequently occurs outside of this period (Environment Canada 2014). Vegetation removal during this core nesting period is not recommended; however, if required, a nest survey may be carried out by a qualified person in simple habitats such as an urban park, a vacant lot with few possible nest sites, a previously cleared area, or a structure (ECCC 2019). If a migratory bird nest is located within the work area at any time, a no-disturbance buffer will be delineated. This buffer will be maintained for the entire duration of the nest activity, which will be determined using periodic checks by the avian biologist. The radius of the buffer generally varies from 5 m - 60 m depending on the sensitivity of the nesting species. Work will not resume within the nest buffer until the nest is confirmed to be no longer active.

11.1.4 Protection of Wildlife

The following mitigation measures are recommended to avoid impacts to wildlife during construction:

- A visual search of the work area will be conducted before work commences each day, particularly for the period when most wildlife is active (generally April 1 to October 31). Visual inspections will locate and avoid snakes, turtles, and other ground dwelling wildlife such as small mammals. Visual searches will include inspection of machinery and equipment left in the work area overnight prior to starting equipment.
- If wildlife is encountered, work at that location will stop, and the animal(s) will be permitted reasonable time to leave the work area on their own.
- Contractors will be made aware of the turtle nesting period (May 15 to September 15) and potential for turtle nesting during construction. Sediment fencing will be installed along the limits of the work zone to reduce the potential for turtles to enter the construction area. If possible, installation of sediment fencing will occur before May 15 or after September 15 (i.e., outside of turtle nesting season) to restrict the movement of nesting turtles into the work zone. If installation of fencing occurs during the turtle nesting season, it is recommended that the area be searched for evidence of turtles or nests prior to installation of fencing. Further specifications for reptile exclusion fencing will follow Best Practices Technical Note – Reptile and Amphibian Exclusion Fencing (MNR 2013) and Best Management Practices for Mitigating the Effects of Road Mortality on Amphibian and Reptile Species at Risk in Ontario (MNR 2016). The exclusion fencing is to be maintained around the work area for the duration of the turtle nesting activity period and checked daily to identify any repairs that may be needed. Fencing will be repaired immediately.
- If a nesting turtle is encountered during construction at any time, the turtle will not be disturbed. Work in the area must stop until the turtle has completed nesting and/or vacated the area. The nest site will be noted, and a biologist or other qualified professional will be contacted for direction. Turtle nests are protected under the *Fish and Wildlife Conservation Act* (FWCA); therefore, and nests will not be disturbed.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

- Sediment and erosion control measures, such as fencing or blanket, utilized on the site during construction will avoid products with plastic mesh due to risk of entanglement of snakes or other wildlife.
- Observations of species at risk or species of conservation concern (e.g., snapping turtle or midland painted turtle) will be reported to MECP and MNRF within 48 hours. Species at risk will not be handled, harassed, or moved in any way, unless they are in immediate danger.

11.1.5 Standard Mitigation Measures for Construction

Inadvertent encroachment of heavy equipment, siltation and/or spills of deleterious substances, noise, and dust migration into natural features were identified as potential indirect impacts from construction. These impacts may alter species composition by compacting and smothering vegetation and introducing substances that could be harmful to vegetation and wildlife, such as fuel used by construction vehicles and introduction and spread of invasive species. Additional disturbance may be required to facilitate spill clean-up activities. Where they occur, these impacts are expected to be localized to the construction area and adjacent areas.

Potential indirect effects to natural heritage features include construction phase activities such as inadvertent encroachment of heavy equipment, siltation and/or spills of deleterious substances, noise, and dust migration. These impacts may alter species composition by compacting and smothering vegetation and introducing substances that could be harmful to vegetation and wildlife, such as fuel used by construction vehicles.

Additional disturbance may be required to facilitate spill clean-up activities. Where they occur, these impacts are expected to be localized to the construction area and adjacent areas.

These potential indirect effects are common to various types of construction and can be controlled using standard mitigation measures for erosion and sediment control as discussed previously.

11.2 GRCA Mitigation Requirements

The GRCA provided mitigation requirements for the preferred alternatives, to ensure the reduced impact on natural environment features. GRCA noted the following:

- Alternative WS2 is not within a regulated GRCA area.
- Alternative WW4 traverses multiple features, including Baden Creek, the Nith River, and other unnamed tributaries and associated floodplains, riverine slopes, and wetlands. Construction methods will:
 - Avoid natural hazards, and intrusions on significant natural features or hydrologic/ecological functions. If unavoidable, impacts should be minimized with restoration and enhancement measures incorporated into the design.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

- Structures and grading across watercourse and in floodplains should be done to limit adverse hydraulic or fluvial impacts and ensure no loss of flood storage.
- Infrastructure in the proximity of erosion hazards or wetlands should be done using trenchless technology to avoid impacts. Any at-grade work within these areas may require a supporting geotechnical investigation and environmental impact study.
- Alternative F3 does not appear to be within a regulated GRCA area.

11.3 Archaeological Resources

A Stage 2 archaeological assessment will be completed during detailed design and prior to any impacts in accordance with the recommendations in the Stage 1 report. The Stage 1 report was submitted to MCM to review the presented results and accept into the *Ontario Public Register of Archaeological Reports*. A copy of the Stage 1 report is provided in **Appendix H**.

Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48(1) of the Ontario Heritage Act. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out an archaeological assessment, in compliance with Section 48(1) of the Ontario Heritage Act.

The Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, c.33 requires that any person discovering human remains must cease all activities immediately and notify the police or coroner. If the coroner does not suspect foul play in the disposition of the remains, in accordance with Ontario Regulation 30/11 the coroner shall notify the Registrar, Ontario Ministry of Public and Business Service Delivery, which administers provisions of that Act related to burial sites. In situations where human remains are associated with archaeological resources, the Ministry of Citizenship and Multiculturalism should also be notified (at archaeology@ontario.ca) to ensure that the archaeological site is not subject to unlicensed alterations which would be a contravention of the Ontario Heritage Act.

11.4 Built Heritage Resources and Cultural Heritage Landscapes

The property located at 3277 Bleams Road (BHR-2) was determined to be situated within 50 m of planned construction activities of the new forcemain (Alternative WW4), and at risk for potential indirect vibration related impacts.

The preferred option is avoidance of 3277 Bleams Road East (BHR-2) by establishing a buffer zone around the built heritage resource to avoid construction activity within 50 m. This should use appropriate preventative measures such as mapping on construction

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

maps and temporary fencing. Staging and laydown areas should also be selected so that they are non-invasive and avoid the previously identified or potential built heritage resource or cultural heritage landscape. Where avoidance is not feasible, the alternative option should be applied.

If 3277 Bleams Road East (BHR-2) cannot be avoided, the alternative option to mitigate this risk is for a qualified building condition specialist or engineer to develop a strategy to carry out condition surveys and vibration monitoring, where required. The pre-condition survey may consist of screening activities to identify critical properties and determine appropriate vibration levels based on building type, age, and condition. Vibration monitoring may consist of random confirmatory vibration monitoring during pipeline installation at the most critical properties. A post-condition survey should be carried out on an as-needed basis to be determined by the qualified building condition specialist or engineer.

11.5 Climate Change

The MECP's guide, *Consideration of Climate Change in the Environmental Assessment Process*, outlines two approaches for consideration and addressing climate change in project planning including:

- Reducing a projects impact on climate change (climate change mitigation).
- Increasing the projects and local ecosystems resilience to climate change (climate change adaptation).

The probability of a climate change event occurring is increasing, and infrastructure needs to be better adapted to build resilience to the impacts of climate change now, and into the future. There are many climate change related parameters with the potential to impact water and wastewater infrastructure, such as precipitation, which puts strain on the infrastructure system. Increased risk of flooding as a result of climate change can overwhelm the water treatment and sewage systems, a risk that can be mitigated through providing capacity and reliable infrastructure. It is crucial that the system be resilient to reduce vulnerability to climate change, while also reducing the overall impact on the environment. The recommended infrastructure considered natural heritage features, wildlife, emissions, and additional impacts.

11.6 Source Protection

The proposed route for the Baden – New Hamburg Forcemain and Pumping station is located in an Intake Protection Zone (IPZ)-3 with a vulnerability score of 5. The proposed route for the Foxboro Green forcemain and watermain is located in a Highly Vulnerable Aquifer (HVA) scoring 6, a Significant Groundwater Recharge Area (SGRA), and a Wellhead Protection Area (WHPA)-A, -B, -C, and -D with vulnerability scores of 10, 6, 4, and 2, respectively. Given that the proposed Foxboro Green forcemain will be

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

located within a WHPA-A scoring 10, it is a significant drinking water threat, and Grand River Source Protection Plan Policy RW-MC-12 will apply as noted below.

The Wellhead Protection Areas noted above are associated with the wells in Foxboro which currently provide drinking water to the residents of the Foxboro Community. With the implementation of the preferred servicing option F3 for the Foxboro Community, those wells will no longer be required. If the construction and commissioning sequencing of the project is completed in a manner which ensures that the wells are taken out of service prior to the operation of the sanitary pumping station and forcemain, the contamination risk can be mitigated. Therefore the following construction staging for the project is recommended:

1. Construction of the watermain be undertaken in advance of or concurrent with the forcemain construction;
2. The watermain be connected to the existing watermains within the Foxboro Community and the watermain be commissioned and charged;
3. The existing Foxboro wells be taken out of service.
4. The sanitary pumping station and forcemain be completed, commissioned and put into service;
5. The existing Foxboro wells be decommissioned in accordance with Ontario Regulation 903 Wells (R.R.O. 1990, Reg. 903: WELLS (ontario.ca)).

Following the above procedure will ensure that the Foxboro wells are no longer in use prior the operation of the sanitary focemain thus reducing the risks associated with this project. The remaining risks are associated with the construction phase of the watermain and forcemain. To address those risks, and as part of the Environmental Compliance Approval process, the Region shall ensure that the proposed sanitary infrastructure design includes appropriate measures to ensure that the construction activity is not a significant drinking water threat. These measures will include the following:

- Proper management of refueling and handling of fuel during construction;
- Ensuring that all personnel on site (contractor, consultant, owner, etc.) receive proper orientation prior to commencing work and are aware of the well head protection area and mitigating measures and contingency plans;
- No work to occur in advance of proper approvals;
- Use of oils or chemicals for dust suppression are strictly prohibited;
- A contingency plan be developed for spill response.

11.7 Groundwater

The decommissioning of the Baden former production wells B1 and B2 should be completed in accordance with Ontario Regulation 903 Wells (R.R.O. 1990, Reg. 903: WELLS (ontario.ca)).

11.8 Excess Materials and Waste

Activities involving the management of excess construction soil should be completed in accordance with O. Reg. 406/19 *On-Site and Excess Soil Management* and the ministry's current guidance document titled "Management of Excess Soil – A Guide for Best Management Practices" (2014), and all waste generated during construction must be disposed of in accordance with ministry requirements.

12.0 Approvals and Permits

Any permits required will be confirmed during detailed design. Prior to commencing design implementation, the following permits/approvals may be required:

12.1.1 Ministry of Transportation Public Transportation and Highway Improvement Act

In accordance with comments received from the Ministry of Transportation dated August 4, 2022, any proposal crossing the designated highway limits (Highway 7/8) will require MTO review and approval (Encroachment Permit). Any portion of the proposal outside the highway designated limits but within MTO's Permit Control Area will require MTO review and approval (Building and Land Use Permit).

To assist with selecting a preferred route and as conditions of permits, the following shall be considered:

- The crossing shall remain outside the functional area of an intersection and cross perpendicular to Highway 7/8.
- Any parallel running lines shall be outside the Highway property limits. Note highway widenings associated with municipal development applications such as Badenvue Subdivision should be considered.
- Highway 7/8 is Classified as Freeway, enhanced depths for crossings of 3m below bottom of ditch and 5m below C/L grade are required.
- Impacts to potential MTO Highway expansion.
- Limited to trenchless installation and method supported by a Geotechnical Investigation Report.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

- When crossing Highway 7/8, the force main will need to be installed inside of a casing filled with non-shrinkable grout from ditch line to ditch line.
- Detailed site drawings, including offset dimensions from MTO property limits and vertical profile information (cross section) at crossing location.
- Proposed construction access to the work area. Note, direct highway access will not be permitted, alternative access shall be secured.
- Duration of crossing work, Traffic staging and detour signage drawings
- Timing of work, and conflict with MTO Capital Construction project (2024-2025).
- In conjunction with a permit, a legal agreement will need to be executed between the Municipality and the MTO, outlining the legal requirements for cost responsibilities associated with future works of this sewer.

12.1.2 Fisheries and Oceans Canada / Fisheries Act

The federal Fisheries Act (1985) is the primary legislation governing fish and fish habitat in Canada. The Fisheries Act defines fish habitat as “waters frequented by fish and any other areas on which fish depend directly or indirectly in order to carry out their life processes including spawning grounds and nursery, rearing, food supply and migration areas.” The fish and fish habitat protection provisions of the Fisheries Act apply to all fish and fish habitat in Canada. The Act prohibits activities that result in the death of fish or the harmful alteration, disruption, or destruction (HADD) of fish habitat unless authorized by the Minister of Fisheries, Oceans and the Canadian Coast Guard. If it is determined that the death of fish or HADD of fish habitat is unavoidable as part of the Project, an authorization under the Fisheries Act may be required.

Design plans are necessary to determine the potential for the death of fish or HADD of fish habitat and if DFO review under the Fisheries Act is required.

12.1.3 Species at Risk Act

The federal *Species at Risk Act*, 2002 (SARA) protects wildlife species listed as extirpated, endangered, or threatened under Schedule 1 of the Act from harm, harassment, killing or capture or collection. SARA also prohibits the damage or destruction of the residence of listed species, and the destruction of their critical habitat. SARA protections also extend to migratory birds and some SAR on non-federal land and to aquatic SAR. Permits for prohibited activities may be issued under Section 73 of the SARA.

Design plans are necessary to determine if a SAR Permit may be needed for work at the Nith River due to the presence of Black Redhorse and Silver Shiner. In addition to species presence, the Nith River is identified as Critical Habitat for Silver Shiner, which includes the meander belt of the river and an additional 30 m of riparian habitat beyond the meander belt.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

12.1.4 Grand River Conservation Authority / Conservation Authorities Act

The GRCA administers a regulation made under Section 28 of the provincial *Conservation Authorities Act*, known as *Development, Interference with Wetlands and Alterations to Shorelines and Watercourses* (Ontario Regulation 157/06). The GRCA implements the regulation by issuing permits for works in or near watercourses, valleys, wetlands, or shorelines, when required. Regulated areas are associated with drainage features and/or wetlands in the following Study Areas:

- Baden – New Hamburg Wastewater Servicing
- Foxboro Green Water and Wastewater Servicing

Detailed construction plans for the preferred site will be assessed to identify permitting requirements associated with the preferred site in consultation with GRCA.

12.1.5 Endangered Species Act

The provincial *Endangered Species Act* (ESA) prohibits the killing, harming, harassing, capturing, or taking of a living member of a species listed as Threatened, Endangered or Extirpated by the Species at Risk in Ontario (SARO) list (Ontario Regulation 230/08) (Section 9), or the damage to habitat of similarly designated species (Section 10). A permit may be issued under Section 17(2) of the ESA or eligible activities can be registered under Ontario Regulation 242/08 to authorize work that is otherwise prohibited.

Table 13 provides a list of SAR that have the potential to occur within the Baden-New Hamburg Wastewater Servicing Study Area and the Foxboro Green Water and Wastewater Servicing Study Area associated within the alignment of the preferred alternatives.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

Table 13: SAR potentially occurring within projects study areas within the Servicing Review Study Area

Species	Baden-New Hamburg Wastewater Servicing Study Area (yes/no)	Foxboro Green Water and Wastewater Servicing Study Area (yes/no)
Bobolink	Yes	No
Eastern Meadowlark	Yes	No
Chimney Swift	Yes	No
Red-headed Woodpecker	Yes	Yes
Eastern Small-footed Myotis	Yes	Yes
Little Brown Myotis	Yes	Yes
Northern Myotis	Yes	Yes
Tricoloured Bat	Yes	Yes
Butternut	Yes	Yes
Black Redhorse	Yes	No
Silver Shiner	Yes	No
Spiny Softshell	Yes	Yes

Further, Barn Swallow was the only SAR previously identified in the desktop background review observed within the Baden-New Hamburg Water Servicing Study Area on June 9, 2022. Within the Baden-New Hamburg Wastewater Servicing Study Area, Silver Shiner and Black Redhorse are present in the Nith River (NDMNR 2022b; DFO 2022). Detailed construction plans will be assessed to identify potential impacts to protected SAR and their habitats.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

If suitable habitat for protected SAR cannot be avoided, field habitat assessments and/or species use surveys will be conducted to determine if SAR or their habitat are present. If SAR and their habitat are not present, no further mitigation or authorization is required. If SAR or their habitat is present, site specific authorization and mitigation requirements will be identified.

Authorization (e.g., permit vs. registration) and additional mitigation requirements is determined in consultation with the Ministry of the Environmental, Conservation and Parks.

12.1.6 Additional Requirements for Impact Assessment and Refinement of Mitigation Measures

Detailed construction plans for the preferred site will be required to assess and identify potential impacts, refine standard and site-specific mitigation recommendations, and determine requirements for authorization under the relevant federal (Fisheries Act, SARA) and provincial (Conservation Authorities Act, ESA) legislation. Upon the availability of detailed design plans, the following assessments may be required to conduct a complete impact assessment and refine mitigation measures:

- Surveys for birds, bats, and vegetation - in the Foxboro Green Water and Wastewater Servicing Study Area south of the condominiums (parallel to the woodlot and south of the woodlot through the agricultural fields). Access to the area was restricted on June 9.
- Grassland bird surveys - several fallow fields and pastures were identified in the Baden - New Hamburg Wastewater Servicing Study Area. These do not meet the criteria for SWH, but presence/absence surveys may be needed for Bobolink/Eastern Meadowlark.
- Invasive species survey – there is an abundance of Phragmites within the Baden - New Hamburg Wastewater Servicing Study Area. This is discussed briefly in the standard mitigation section, but further action may be needed to reduce spread.
- Turtle basking surveys - no turtle nesting or overwintering habitat was observed but snapping turtles and are present within the Foxboro Green Water and Wastewater Servicing Study Area and the Baden - New Hamburg Wastewater Servicing Study Area.
- Barn Swallow presence/ absence survey – there was an inactive kiosk on Holland Mills Road. The kiosk should be checked if work is scheduled to occur during the Barn Swallow nesting period.
- Amphibian surveys - appropriate habitat was identified; therefore, surveys may be required.
- Vegetation inventory – in the Baden – New Hamburg Wastewater Servicing Study Area within the Critical Habitat area for Silver Shiner at the proposed Nith River crossing location.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

- Bat maternity roost habitat survey - There are a number of large diameter trees (greater than 10 cm diameter at breast height) in the Baden-New Hamburg Wastewater Servicing and Foxboro Green Water and Wastewater Servicing Study Areas that could potentially function as bat maternity roost trees for bat SAR. Site-level assessments would be required to confirm suitability of the trees as bat maternity roost habitat if there are anticipated impacts.

13.0 Commitments to Carry Forward to Detailed Design and Construction

As part of the Class EA process, measures to offset potential impacts of the proposed undertaking are identified based on the scope of work for the study. The study recommendations were developed to minimize negative impacts within the study area; however, the potential exists for some environmental impacts during construction. The anticipated impacts and proposed mitigation measures have been described in Section 10.0 and Section 11.0.

The potential impacts and mitigation measures vary between each of the preferred solutions for wastewater infrastructure improvements, and the Foxboro Green community improvements.

Table 14 and Table 15 provide a list of specific commitments to be carried forward to Phase 5 of the Municipal Class EA process, Implementation (detailed design and construction) for each of the preferred solutions. The Region will work with GRCA, MECP, MNRF, MTO, and additional stakeholders during the detailed design and implementation phases to ensure that the proposed works are acceptable, and to obtain required permits.

These mitigation and enhancement measures should be consulted and updated during preliminary and detailed design based on updated site-specific information.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

Table 14: Baden-New Hamburg Wastewater Servicing (Alternative WW4) Design Commitments

ID#	Detailed Design Commitments - Baden-New Hamburg Wastewater Servicing (Alternative WW4)
1	Aquatic Environment
	<ul style="list-style-type: none"> • Mitigation strategies will be developed during detail design for the avoidance of wildlife within the aquatic environment. The Grand River supports several diverse species, including Species at Risk, and therefore requires a comprehensive mitigation plan. • The federal Species at Risk Act, 2002 (SARA) protects wildlife species listed as extirpated, endangered, or threatened under Schedule 1 of the Act from harm, harassment, killing or capture or collection. SARA also prohibits the damage or destruction of the residence of listed species, and the destruction of their critical habitat. SARA protections also extend to migratory birds and some SAR on non-federal land and to aquatic SAR. Permits for prohibited activities may be issued under Section 73 of the SARA. • Design plans are necessary to determine if a SAR Permit may be needed for work at the Nith River due to the presence of Black Redhorse and Silver Shiner. In addition to species presence, the Nith River is identified as Critical Habitat for Silver Shiner, which includes the entire floodplain or riparian area adjacent to an occupied reach.
2	Sediment and Erosion Control
	<ul style="list-style-type: none"> • A Sediment and Erosion Control Plan will be developed during detailed design to address site-specific requirements for protection and landscape considerations such as topography, slope, and drainage patterns. Specific sediment and erosion control measures will be identified and depicted on plans associated with grading and construction. • GRCA administers a regulation made under Section 28 of the provincial Conservation Authorities Act, known as Development, Interference with Wetlands and Alterations to Shorelines and Watercourses (Ontario Regulation 150/06). The GRCA implements the regulation by issuing permits for works in or near watercourses, valleys, wetlands, or shorelines, when required. Detailed construction plans for the projects must be assessed to identify specific GRCA permitting requirements.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

ID#	Detailed Design Commitments - Baden-New Hamburg Wastewater Servicing (Alternative WW4)
3	<p>Protection of Species at Risk</p>
	<ul style="list-style-type: none"> • Authorization from MECP is required for any work that may cause harm to identified SAR or SAR habitat. Formal consultation with MNRF will commence through the submission of an Information Gathering Form (IGF) and detail design plan/consultation footprint impacts for the preferred alternative. The Region of Waterloo will work with MECP and GRCA to determine additional study requirements and mitigation/compensation requirements during their review of the IGF and permit application. • Additional detailed studies will be completed during detail design, as required by MECP, MNRF and GRCA.
4	<p>Terrestrial Environment</p>
	<ul style="list-style-type: none"> • Endangered bat surveys – Removal of suitable bat maternity roost trees may require species use surveys to determine if SAR bats are present and to identify requirements under the Endangered Species Act • Grassland bird surveys - Several fallow fields and pastures were identified in the Baden - New Hamburg Wastewater Servicing Study Area. These do not meet the criteria for SWH, but presence/absence surveys may be needed for Bobolink/Eastern Meadowlark • Invasive species survey – There is an abundance of Phragmites in this protect Study Area, and further surveys may be needed to understand where Phragmites and other potentially problematic invasive species occur so that they can be managed during construction. • Turtle basking surveys - No turtle nesting or overwintering habitat was observed but snapping turtles and are present within this project Study Area. • Amphibian surveys – Suitable breeding habitat was identified; therefore, surveys may be required to determine habitat use. • Butternut surveys / health assessments – Butternut may occur in wooded or open areas. Presence / absence should be determined prior to tree removals; if present a butternut health assessment may be required to support authorizations under the Endangered Species Act. • Vegetation inventory – Inventory is recommended within the Critical Habitat area for Silver Shiner (i.e., floodplain or riparian area adjacent to an occupied reach) at the proposed Nith River crossing location, to support SAR permit applications.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

ID#	Detailed Design Commitments - Baden-New Hamburg Wastewater Servicing (Alternative WW4)
	<ul style="list-style-type: none"> Wildlife use of structures - If anthropogenic structures such as buildings or culverts will be disturbed, it may be necessary to screen them for presence / absence of bird nests, bats, or other wildlife.
5	Breeding Birds
	<ul style="list-style-type: none"> The primary nesting period (PNP) is April 1 – August 31. Vegetation removal during this core nesting period is to be avoided. If a migratory bird nest is located within the work area at any time, a ‘no-disturbance buffer’ will be delineated and maintained for the duration of the nest activity, which will be determined using periodic checks by the avian biologist. Work will not resume within the nest buffer until the nest is confirmed to be no longer active.
6	Vegetation Management
	<ul style="list-style-type: none"> Stabilize and re-vegetate areas of disturbed/exposed soil, as soon as practicably possible with native seed mixes and woody vegetation. Removal of suitable bat maternity roost trees (trees greater than 10 cm diameter at breast height) will not occur during the active roosting season (between April 1 and October 1).
7	Air Quality
	<ul style="list-style-type: none"> During construction, vehicles/machinery and equipment will be good in repair, equipped with emission controls, as applicable, properly maintained and operated within regulatory requirements. A minimal number of machines operating in one area shall be considered during construction activities. Water and non-chloride dust suppressants will be applied during construction to protect air quality associated with dust.
8	Archaeology
	<ul style="list-style-type: none"> A Stage 2 archaeological assessment will be completed during detailed design.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

ID#	Detailed Design Commitments - Baden-New Hamburg Wastewater Servicing (Alternative WW4)
	<ul style="list-style-type: none"> • Consultation and engagement will continue with interested First Nations and Indigenous Communities during detailed design as it relates to the project and further archaeological assessment. The Region will contact Indigenous communities to arrange on-site monitoring as part of the fieldwork, as required.
9	Cultural Heritage
	<ul style="list-style-type: none"> • 3277 Bleams Road (BHR-2) located in proximity of planned construction activities of the new forcemain (Alternative WW4), and at risk for potential indirect vibration related impacts. • Establish buffer zone around the built heritage resource to avoid construction activity within 50 metres. This should use appropriate preventative measures such as mapping on construction maps and temporary fencing, including staging and laydown areas. • If 3277 Bleams Road East (BHR-2) cannot be avoided, a qualified building condition specialist or engineer shall develop a strategy to carry out condition surveys and vibration monitoring, where required (e.g., pre-condition survey may consist of screening activities to identify critical properties and determine appropriate vibration levels based on building type, age, and condition). Vibration monitoring may consist of random confirmatory vibration monitoring during pipeline installation at the most critical properties. A post-condition survey should be carried out on an as-needed basis to be determined by the qualified building condition specialist or engineer.
10	Utilities
	<ul style="list-style-type: none"> • The Region will continue to engage with utilities during detail design. • The design will attempt to minimize disruption to existing services to residential and commercial users before and during construction.
11	Property
	<ul style="list-style-type: none"> • Permission-to-enter onto private properties will be required for some construction. The Region will engage with affected property owners. • An easement will be required on the Township owned property at the Wilmot Recreation Complex to permit the forcemain construction.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

ID#	Detailed Design Commitments - Baden-New Hamburg Wastewater Servicing (Alternative WW4)
	<ul style="list-style-type: none"> • An easement will be required on privately owned lands to permit the forcemain construction from Holland Mills Road to the New Hamburg WWTP.
12	Construction Timing / Implementation
	<ul style="list-style-type: none"> • Road closures may be required during construction and alternate routes/detours should be determined during detail design, as required. • The emergency laneway along Gingerich Road to the Wilmot Recreation Complex will be maintained during construction in the event that access from Nafziger Road is unavailable. • Construction will also be coordinated to allow for usage of soccer fields at the Wilmot Recreation Complex. Construction should be completed when there is no impact to the seasonal usage of the soccer fields. • The Region will continue to engage with MTO during detail design regarding the crossing of Highway 7. • Work with Wilmot Township engineering staff on design of pipe strapping on Holland Mills Road bridge • Work with Wilmot Township engineering staff on their Baden Trunk Sanitary Sewer connection including easements.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

Table 15: Foxboro Water and Wastewater Servicing (Alternative F3) Design Commitments

ID#	Detail Design Commitments - Foxboro Water and Wastewater Servicing (Alternative F3)
1	Aquatic Environment
	<ul style="list-style-type: none"> • Mitigation strategies will be developed during detail design for the avoidance of wildlife within the aquatic environment. The Grand River supports several diverse species, including Species at Risk, and therefore requires a comprehensive mitigation plan. • Mitigation will be determined in consultation with MECP and GRCA as part of the ESA permit application. • Design plans are necessary to determine the potential for the death of fish or HADD of fish habitat and if DFO review under the <i>Fisheries Act</i> is required.
2	Sediment and Erosion Control
	<ul style="list-style-type: none"> • A Sediment and Erosion Control Plan will be developed during detailed design to address site-specific requirements for protection and landscape considerations such as topography, slope, and drainage patterns. Specific sediment and erosion control measures will be identified and depicted on plans associated with grading and construction. • GRCA administers a regulation made under Section 28 of the provincial Conservation Authorities Act, known as Development, Interference with Wetlands and Alterations to Shorelines and Watercourses (Ontario Regulation 150/06). The GRCA implements the regulation by issuing permits for works in or near watercourses, valleys, wetlands, or shorelines, when required. Detailed construction plans for the projects must be assessed to identify specific GRCA permitting requirements.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

ID#	Detail Design Commitments - Foxboro Water and Wastewater Servicing (Alternative F3)
3	Protection of Species at Risk
	<ul style="list-style-type: none"> • Authorization from MECP is required for any work that may cause harm to identified SAR or SAR habitat. Formal consultation with MNRF will commence through the submission of an Information Gathering Form (IGF) and detail design plan/consultation footprint impacts for the preferred alternative. The Region of Waterloo will work with MECP and GRCA to determine additional study requirements and mitigation/compensation requirements during their review of the IGF and permit application. • Additional detailed studies will be completed during detail design, as required by MECP, MNRF and GRCA.
4	Terrestrial Environment
	<ul style="list-style-type: none"> • Mitigation strategies will be developed during detailed design for the protection of terrestrial species. • Endangered bat surveys – Removal of suitable bat maternity roost trees may require species use surveys to determine if SAR bats are present and to identify requirements under the Endangered Species Act. • Invasive species survey – Phragmites was observed in this project Study Area, and further surveys may be needed to understand where Phragmites and other potentially problematic invasive species occur so that they can be managed during construction. • Turtle basking surveys - no turtle nesting or overwintering habitat was observed but snapping turtles and are present within the Foxboro Green Water and Wastewater Servicing Study Area. • Barn Swallow presence/ absence survey – there was an inactive kiosk on Holland Mills Road. The kiosk should be checked if work is scheduled to occur during the BARS window (May 1 to August 31). • Amphibian surveys – suitable breeding habitat was identified; therefore, surveys may be required. • Butternut surveys / health assessments – Butternut may occur in wooded or open areas. Presence / absence should be determined prior to tree removals; if present a butternut health assessment may be required to support authorizations under the Endangered Species Act. • Wildlife use of structures - If anthropogenic structures such as buildings or culverts will be disturbed, it may be necessary to screen them for presence / absence of bird nests, bats, or other wildlife.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

ID#	Detail Design Commitments - Foxboro Water and Wastewater Servicing (Alternative F3)
5	Breeding Birds
	<ul style="list-style-type: none"> • The primary nesting period (PNP) is April 1 – August 31. Vegetation removal during this core nesting period is not recommended; however, if required, a nest survey may be carried out by a qualified person (i.e., ecologist) • If a migratory bird nest is located within the work area at any time, a ‘no-disturbance buffer’ will be delineated and maintained for the duration of the nest activity, which will be determined using periodic checks by the avian biologist. Work will not resume within the nest buffer until the nest is confirmed to be no longer active.
6	Vegetation Management
	<ul style="list-style-type: none"> • Stabilize and re-vegetate areas of disturbed/exposed soil, as soon as practicably possible with native seed mixes and woody vegetation. • Removal of suitable bat maternity roost trees (trees greater than 10 cm diameter at breast height) will not occur during the active roosting season (between April 1 and October 1).
7	Air Quality
	<ul style="list-style-type: none"> • During construction, vehicles/machinery and equipment will be good in repair, equipped with emission controls, as applicable, properly maintained and operated within regulatory requirements. • A minimal number of machines operating in one area shall be considered during construction activities. • Water and non-chloride dust suppressants will be applied during construction to protect air quality associated with dust.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

ID#	Detail Design Commitments - Foxboro Water and Wastewater Servicing (Alternative F3)
8	Archaeology
	<ul style="list-style-type: none"> • A Stage 2 archaeological assessment will be completed during detail design. • Consultation and engagement will continue with interested First Nations during detail design as it relates to the project and further archaeological assessment. The Region will contact Indigenous communities to arrange on-site monitoring as part of the fieldwork, as required.
9	Cultural Heritage
	<ul style="list-style-type: none"> • N/A
10	Utilities
	<ul style="list-style-type: none"> • The Region will continue to engage with utilities during detail design. • The design will attempt to minimize disruption to existing services to residential and commercial users before and during construction.
11	Property
	<ul style="list-style-type: none"> • Permission-to-enter onto private properties will be required for some construction. The Region will engage with affected property owners. • Ongoing communication during detailed design and construction of this project is recommended with the Foxboro Condominium Corporation in order to address issues and concerns on an ongoing basis. • Easements will be required from the Foxboro Condominium Corporation as well as private lands south of Foxboro for the construction of the watermain and sanitary forcemain.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

ID#	Detail Design Commitments - Foxboro Water and Wastewater Servicing (Alternative F3)
12	Construction Timing / Implementation
	<ul style="list-style-type: none">• Road closures may be required during construction and alternate routes/detours should be determined during detail design, as required.

BADEN – NEW HAMBURG WATER AND WASTEWATER SYSTEM SERVICING REVIEW

14.0 Closing

In summary, the projects proposed under this study are listed as follows:

Project Name	Project Description	Class EA Schedule
Baden Pumping Station	Construction of new pumping station within existing pump station property limits and decommissioning of existing pump station	B
Baden Forcemain	Construction of new twin forcemains from new Baden PS to New Hamburg WWTP – alignment within existing road allowances, existing Region-owned lands, and lands where new easements are required.	B
Foxboro North Pump Station	Construction of new pumping station on lands to be procured from Foxboro Condominium	B
Foxboro South Pump Station	Construction of new pumping station on existing Region-owned lands	B
Foxboro Water / Wastewater Servicing Connections	Construction of new sanitary forcemain and watermain on lands where new easements are required.	B
Foxboro Water and Sanitary Treatment Facility Decommissioning	Decommissioning of existing sanitary and water treatment facilities currently servicing the Foxboro Community	A/A+
Baden Wells Decommissioning	Decommissioning of existing wells which are currently not in service and not required to provide water supply in future	A/A+

It should be noted that, at the time of preparing this Master Plan, the MCEA process and associated project schedules were under review. The selection of Project Schedule should be reviewed and confirmed at the outset of project planning.

This Project File Report summarizes Phase 1 and Phase 2 of the Municipal Class EA planning process for the Schedule B projects discussed, as outlined in the MCEA document. The report was filed for public comment between Monday, April 10, 2023 to Tuesday, May 9, 2023. The draft report was updated to reflect comments received during the comment period, and no Section 16 Order requests were received. Provided that all appropriate environmental and engineering permitting, and approvals are obtained, the Region may proceed with detailed design and implementation (Phase 5).