NOTICE OF COMMENTS RECEIVED
Following Completion of the Public Review Period

The Regional Municipality of Niagara filed the 2016 Water and Wastewater Master Servicing Plan Update report for the 45-day public review period from **Thursday June 15, 2017** to **Monday July 31, 2017**.

All comments received were tracked in the attached summary table and responses were issued where required. A copy of all comments and responses are attached in Volume 5. Revisions to the 2016 Water and Wastewater Master Servicing Plan Update include the following:

Volume 1

- **Figure 1.15** to reflect decommissioning/ownership of the Grassy Brook Sewage Pumping Station

Volume 3

- Capital Project **W-P-001** and **W-P-002** Municipality ownership revised from Welland to Pelham
- Capital Project **W-P-003** Municipality ownership revised from Lincoln to Grimsby
- Modifications to *2041 Collection Schematics* including **Figure 3.A.19**, **Figure 3.B.20**, **Figure 3.C.17**, **Figure 3.D.18**, **Figure 3.E.18**, and **Figure 3.F.19** to reflect the updated water system schematics

Volume 4

- Table of Contents – Spelling correction
- Tables: 1,7,8,9,10,11,12,13 in all parts
- Existing serviced population and employment numbers in introductions for all parts
- Example calculations for peak dry weather flow and peak wet weather flow for all parts
- Capital Project **WW-FM-003** Municipality ownership revised from Welland to Pelham
- Capital Project **WW-SPS-037** Municipality ownership revised from Pelham to Thorold
- Capital Project **WW-SS-003** and **WW-SS-004** Municipality ownership revised from West Lincoln to Grimsby
- Capital Project **WW-II-006**, **WW-II-007** Municipality ownership revised from West Lincoln to Lincoln
- Modifications to **Figure 4.F.1**, **Figure 4.F.2**, **Figure 4.F.4**, **Figure 4.F.5**, **Figure 4.F.6**, **Figure 4.F.7** to reflect decommissioning/ownership of the Grassy Brook Sewage Pumping Station
- Modifications to *2041 Collection Schematics* including **Figure 4.A.13**, **Figure 4.C.8**, **Figure 4.E.6**, **Figure 4.F.8**, **Figure 4.K.8** to reflect the updated wastewater system schematics
- Part F – *Niagara Falls Wastewater System*, **F.6.2 Pumping Stations** text change to reflect decommissioning of Grassy Brook Pumping Sewage Pumping Station.

Niagara Region

2016 Water and Wastewater Master Servicing Plan Update
Summary of 45-Day Review Comments

BluePlan ENGINEERING

#	From	To	Date Received	Type	Comment	Action	Status
1	Nancy Bozzato (Town of Pelham)	Natasha Devos (Regional Municipality of Niagara)	6/6/2017	E-mail	• Attached letter from Town of Pelham relating to the Fenwick Supply - Regional Water/Wastewater Master Plan • Includes a report considered by Pelham Council (June 5, 2017). Pelham Council reviewed this together with the 2016 Water and Wastewater Regional Master Servicing Plan Update information	• Request that steps be taken to ensure Regional Council is aware of this correspondence • No further action required	Complete
2	Andrea Clemencio (Town of Pelham)	Phill Lambert (Regional Municipality of Niagara)	6/6/2017	E-mail	• Council requested to see if other capital solutions for security concerns can be considered • To verify if an additional main or twinned main can serve as a return, rather than a feed to integrate and loop Fenwick into the system as a whole, rather than at the end of the Feeder main had been considered	• Phill Lambert provided response and forwarded email to GM BluePlan, Mayor of Pelham, Ron Tripp, & Regional contacts • Following 45-day review period, GM BluePlan will instigate and provide an additional response	Follow-up will be provided to Council
3	Dave Augustyn (Mayor - Town of Pelham)	Phill Lambert (Regional Municipality of Niagara)	6/6/2017	E-mail	• Highlighted that the "Security of Supply" project is currently in the Region's 2012 bylaw • Expressed interest to continue with Security of Supply project and will be informing Council	• Mayor to inform Council • No further action required	Complete
4	Tikvah Mindorff (Niagara Sustainability Initiative)	Natasha Devos (Regional Municipality of Niagara)	6/9/2017	E-mail	• Shared formal letter from Board of Directors - Niagara Sustainability Initiative "Comments on Niagara 2041" • Includes summary of How We Grow - Municipal Comprehensive Review, How We Go - Transportation Master Plan, and How We Flow - Water and Wastewater Master Servicing Plan (MSP)	• Region forwarded presentation to Ron Tripp (Niagara Region) to confirm in Council Agenda • Recommended action: Refer to consideration of PWC - Formal letter response provided to Niagara Sustainability Initative from Niagara 2041 team and signed by Ron Tripp	Complete
5	Phill Lambert (Regional Municipality of Niagara)	Julien Bell, Chris Hamel (GM BluePlan)	6/12/2017	E-mail	• Recap of Regional Council meeting held June 8, 2017 • Mayor of Pelham spoke about Town's concerns for security of supply to Fenwick • Mayor Dave and Pelham Council believes this should be in the new DC bylaw	• To be discussed and evaluated following the 45-day review period	Follow-up will be provided to Council
6	[redacted] (Resident)	Phill Lambert (Regional Municipality of Niagara)	6/22/2017	E-mail	• Would like to know when the Region plans to decommission the Sewage Lagoon servicing Stevensville and Douglastown/Black Creek	• Phill responded with a brief summary of the Water and Wastewater MSP Stevensville/Douglastown Lagoons • Provided link with direction to Volume 4- Part G Stevensville-Douglastown Wastewater System for additional information	Complete
7	Carmela Dipardo (City of Thorold)	Phill Lambert (Regional Municipality of Niagara)	6/23/2017	E-mail	• Confirmed receipt of 2016 Water and Wastewater MSP Update on June 20, 2017 at Thorold City Council meeting	• No further action required	Complete
8	[redacted] (Resident)	Phill Lambert (Regional Municipality of Niagara)	6/26/2017	E-mail	• Attached correspondence regarding the decommissioning of the Stevensville/Douglastown Sewage Waste Lagoon • To clarify why criteria for closure was different than closure of Port Robinson and Niagara-on-the-Lake	• Phill responded with a brief summary of the Water and Wastewater MSP Stevensville/Douglastown Lagoons • Provided link with direction to the Volume 4- Part G Stevensville-Douglastown Wastewater System for additional information	Complete
9	Phill Lambert (Regional Municipality of Niagara)	Lindsay Bowman (GM BluePlan)	6/29/2017	E-mail	• Provided recap of meeting with Richard Epp held at Regional Headquarters • Discussed analysis of Volume 4 in great detail to provide a good system understanding	• Resident may provide formal written comments to MOECC regarding the 1982 OMB decision in that the Lagoon should be decommissioned	Complete
10	Kelly M. Walsh (Town of Fort Erie)	Phill Lambert (Regional Municipality of Niagara)	7/6/2017	E-mail	• Would like clarification on two items: - The need for Region to provide a new main on Gilmore from Petit to Concession - The security of supply to Ridgeway/Crystal Beach • Provided attachment which includes a suggested alternative for the new main	• Detailed review was completed based on Fort Erie submission by GM BluePlan and Regional Staff • Response memo provided to Town of Fort Erie • No further action required	Complete
11	Suzanne McInnes (Niagara Peninsula Conservation Authority)	Phill Lambert (Regional Municipality of Niagara)	7/7/2017	E-mail	• NPCA comments are focused on the proposed inlet channel upgrades at the Decew Water Treatment Plant scheduled for 2017-2021 • Would like more information about channel upgrades because it may require some work for NPCA to update modelling for the intake protection zone within the work plan • Provided link to a workshop held in June regarding the Source Protection Plan work plan	• Regional W&WW staff met with NPCA staff to review	Complete
12	Nicole Coffer (Regional Municipality of Niagara)	Tikvah Mindorff (Niagara Sustainability Initiative)	7/6/2017	E-mail	• Attached letter from Ron Tripp that includes commentary and response to Niagara 2041- How We Grow, How We Flow, and How We Go • Copy was shared with Regional Council through email distribution	• Phill forwarded email to GM BluePlan • No further action required	Complete
13	[redacted] (Resident)	Phill Lambert (Regional Municipality of Niagara)	7/10/2017	E-mail	• Expressed concerns for the omission of the Sewage Lagoon closure • Requested response promptly to clarify omission	• Phill forwarded email to GM BluePlan • Phill responded to concerned resident with further context of the Study on June 26, 2017	Complete
14	[redacted] (Resident)	Phill Lambert (Regional Municipality of Niagara)	7/17/2017	E-mail	• Provided context on the area of Provincially Significant Wetlands (PSWs) noted within the Niagara MSP • Request that revisions be made to reflect PSW's in Figure 2.16 of the MSP	• Phill responded to email - Figure 2.16 was intended to provide an approximate location of potential future development in the Urban Area Boundary • Natural existing conditions are listed within Section 9 of the report • Provided opportunity to continue conversation	Complete
15	Tammy Cheyne (Regional Municipality of Niagara)	Phill Lambert (Regional Municipality of Niagara)	7/17/2017	E-mail	• [redacted](Resident) provided written letter expressing concerns for the omission of the Sewage Lagoon closure • [redacted](Resident) attached a Health and Safety letter with newspaper articles and additional information for Stevensville/Douglastown Lagoons	• Phill responded to concerned resident with further context of the W&WW MSP Study which focused on accomodating growth to 2041 on June 26, 2017 • Lagoon is operating in accordance with MOECC ECA	Complete
16	Phill Lambert (Regional Municipality of Niagara)	Lindsay Bowman (GM BluePlan)	7/26/2017	E-mail	• Would like clarification for Stevensville Lagoon's rated capacity values (Regional vs. ECA data)	• Rated capacity will be revised based on MOECC ECA values • No further action required	Complete
17	Garry Hunter (Hunter and Associates)	Phill Lambert (Regional Municipality of Niagara)	7/31/2017	E-mail	• Would like information on determination of the capacity of the Kalar Pumping Station in the City of Niagara Falls • Enclosed previous hydrographs of Wet Well Water Levels and Dry Weather Flows prepared from pumping station data supplied by the Region	• Phill responded following consultation with GM BluePlan • Provided additional context and references to areas of the report in which the capacity was calculated	Complete
18	[redacted] (Resident)	Phill Lambert (Regional Municipality of Niagara)	8/1/2017	E-mail	• To consider green infrastructure and reductions before overloaded stormwater systems • Advocate for conservation and restoration of Niagara's natural lands	• Phill forwarded email to GM BluePlan	Complete
19	Garry Hunter (Hunter and Associates)	Phill Lambert (Regional Municipality of Niagara)	8/3/2017	E-mail/Phone	• Provided summary and follow-up to previous phone conversation • Enclosed prior explanatory letter to Region for the Hydrographs • Believes the Kalar Road SPS Projected Peak Weather Flows by Catchment are significantly underestimated based on existing conditions and monitoring history	• Phone conversation with Mr. Hunter took place • Phill discussed content with GM BluePlan	Complete
20	Phill Lambert (Regional Municipality of Niagara)	Lindsay Bowman (GM BluePlan)	8/15/2017	E-mail	• Reviewed Secondary Plan in Niagara Falls for Grassy Brook SPS and Volume 4 MSP • Area was flagged for SPS capacity and FM upgrades, but projects were not carried forward • To revise for final version of MSP	• Would like verification on Grassy Brook Sewage Pumping Station ownership • Information forwarded to Greg Epp (Regional Municipality of Niagara)	Complete
21	Greg Epp (Regional Municipality of Niagara)	Phill Lambert (Regional Municipality of Niagara)	8/15/2017	E-mail	• Confirmed that Niagara Region has ownership of Grassy Brook Sewage Pumping Station • To include new information within the final Master Servicing Plan document	• Region provided information to GM BluePlan • GM BluePlan suggested decommissioning the station and convey flows via gravity to the new South Niagara Falls Wastewater Treatment Plant • GM BluePlan updated MSP Volume 4 respective text, figures, and project sheet for further clarification	Complete

Niagara Region

2016 Water and Wastewater Master Servicing Plan Update

HOW WE **FLOW**

Volume I - Executive Summary

Final Report

June, 2017

BluePlan ENGINEERING

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1. INTRODUCTION

1.1 Background

Niagara Region currently services the urban area of the municipalities of Grimsby, West Lincoln, Lincoln, St. Catharines, Thorold, Welland, Pelham, Port Colborne, Niagara-on-the-Lake, Niagara Falls, and Fort Erie. Water and wastewater servicing is operated under a two-tier system. Niagara Region is responsible for water treatment, transmission mains, storage facilities and major booster pumping stations; as well as wastewater treatment, trunk sewers and sewage pumping stations. The area municipalities are responsible for local water distribution networks and local sewer collection systems.

Niagara Region is part of the Greater Golden Horseshoe (GGH) area situated around the western and southern end of Lake Ontario that continues to be one of the fastest growing regions in North America. The Government of Ontario's legislative growth plan, *Places to Grow Act 2005* and recent amendments, identifies substantial population and employment growth for the GGH to year 2041.

Readily available and accessible public infrastructure is essential to the viability of existing and growing communities. Infrastructure planning, land use planning and infrastructure investment require close integration to ensure efficient, safe and economically achievable solutions to provide the required water and wastewater infrastructure. To balance the needs of growth with the protection and preservation of natural, environmental and heritage resources, Niagara Region initiated an integrated process under the umbrella Niagara 2041 to complete a Municipal Comprehensive Review, a new Transportation Master Plan, and a Water and Wastewater Master Servicing Plan Update.

The 2016 Master Servicing Plan Update provides a review, evaluation and development of water and wastewater servicing strategies for all servicing within the urban areas of the Region. The 2016 Master Servicing Plan Update uses updated population and employment growth forecasts based on a 2041 planning horizon.

The Study Area for the Master Servicing Plan Update covers primarily the urban areas of the local municipalities in Niagara Region serviced by the lake-based systems. The Township of Wainfleet is not included in the scope of this Master Servicing Plan Update.

Figure 1.1 Study Area

The 2016 Master Servicing Plan Update builds on previous work undertaken as part of the 2011 Master Servicing Plan and previous long term infrastructure planning studies. The 2016 Master Servicing Plan Update is a critical component in the Region's planning for growth and will provide the framework and vision for the water and wastewater servicing needs for the lake-based service areas of the Region to year 2041.

1.2 Integrated Planning Process

Niagara, as a whole, must proactively plan for and facilitate growth in order to conform with Provincial land use plans (*Places to Grow*). The Region is currently planning the best way to accommodate anticipated and targeted population and employment growth over the next 25

years. Under the umbrella “Niagara 2041” the Region will be establishing a growth strategy that will be urban in nature.

The establishment of the growth strategy involves completing (3) three projects:

1) Municipal Comprehensive Review (MCR) – ***How We Grow***

   Look at the land available across Niagara, ensure there is enough land to sustain the expected growth to year 2041 and examine how the land is distributed throughout Niagara

2) Transportation Master Plan (TMP) – ***How We Go***

   Look at current travel methods across Niagara and look to improve transportation systems including options for walking, cycling and public transit to better serve Niagara’s future needs

3) Water and Wastewater Master Servicing Plan (MSP) – ***How We Flow***

   Ensure Niagara has the infrastructure to provide critical water and wastewater services to the growing Region in a sustainable and financially responsible way

These three projects are inter-connected and collectively form the foundation to support and foster Niagara’s growth and input into the Niagara Region Development Charge Study. The Master Plans will identify the preferred servicing solution and associated infrastructure needs to support projected growth as set out in the Municipal Comprehensive Review.

1.3 Master Servicing Plan Update Objectives

The Master Servicing Plan Update comprehensively documents the development, evaluation and selection of the preferred water and wastewater servicing strategies to meet the servicing needs of existing users and future development to 2041.

The Master Servicing Plan Update evaluates the ability of existing and planned water and wastewater infrastructure in Niagara Region to efficiently and effectively service the Region’s existing users, service anticipated growth, and to evaluate and develop recommended servicing strategies.

The key objectives of the 2016 Master Servicing Plan Update are as follows:

- Review planning forecasts to 2041 and determine the impacts on servicing needs for the Region’s lake-based water and wastewater infrastructure;
- Evaluate the ability of existing and planned water and wastewater infrastructure to efficiently and effectively service the Region’s existing users and anticipated growth;

- Undertake a comprehensive review and analysis for both water and wastewater servicing requirements;
- Address key servicing considerations as part of the development and evaluation of water and wastewater servicing strategies including:
    - Level of service to existing users and approved growth
    - Operational flexibility and system security and reliability
    - Mitigation of impacts to natural, social and economic environments
    - Opportunity to meet policy, policy statements, regulations and technical criteria
    - Opportunity to optimize existing infrastructure and servicing strategies
    - Ensuring the strategies are cost effective
- Consider and develop sustainable servicing solutions with lifecycle considerations;
- Update the capital program cost estimating methodology and utilize updated industry trends and more detailed information from relevant Region studies and projects to provide appropriate capital cost estimates;
- Utilize the updated water and wastewater hydraulic models for the analysis of servicing alternatives;
- Establish a complete and implementable water and wastewater capital program;
- Provide extensive consultation with the public and stakeholders; and
- Complete the Master Servicing Plan Update in accordance with the MEA Class EA process for Master Plans.

1.4 Master Servicing Plan Update Report Outline

The 2016 Water and Wastewater Master Servicing Plan Update Report, including all supporting volumes, is the documentation placed on public record for the prescribed review period. The documentation, in its entirety, describes all required phases of the planning process and incorporates the procedure considered essential for compliance with the *Environmental Assessment Act*.

The 2016 Master Servicing Plan Update documentation is organized into five volumes as illustrated in the following Figure and as described below:

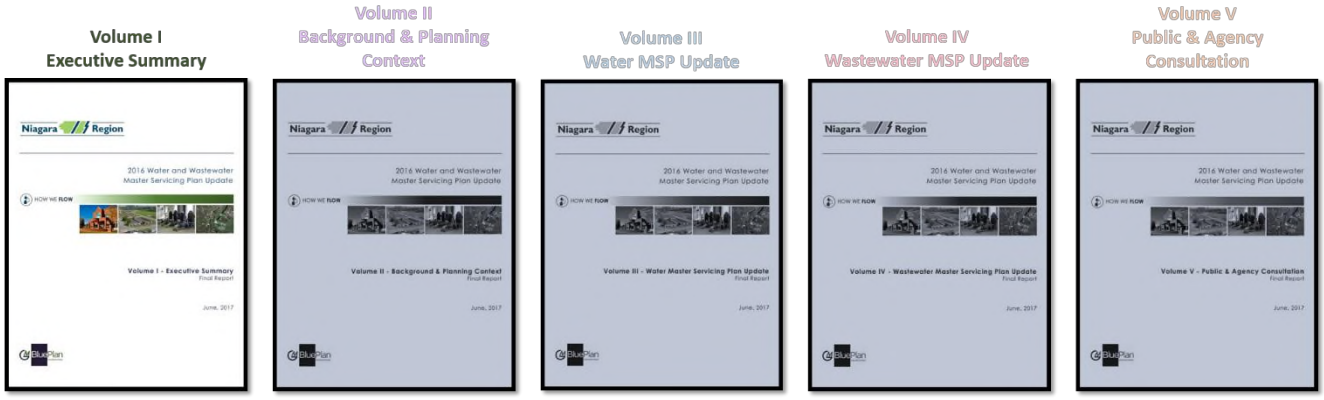


Figure 1.2 Master Servicing Plan Update Documentation

Volume I – Executive Summary

Volume I provides a brief overview of the 2016 Master Servicing Plan Update. It summarizes the information contained in Volumes II, III, IV and V, including problem statement, purpose of the study, significant planning, policy and technical considerations, and description of the preferred water and wastewater servicing strategies including depiction of the projects and documentation of the capital programs.

Volume II – Background and Planning Context

Volume II details the master planning process including the Master Plan Class EA process, related studies, legislative and policy planning context, water and wastewater servicing principles and policies, population and employment growth forecasts, existing environmental and servicing conditions and future considerations.

Volume III – Water Master Servicing Plan Update and Project File

Volume III is the principle document summarizing the study objectives, approach, methodologies, technical analyses, evaluation and selection of the preferred water servicing strategy for each of the water systems. This volume contains baseline water system data and performance information. This volume documents the water servicing strategy development with detailed information on the projects and capital program associated with the preferred water servicing strategy.

Volume IV – Wastewater Master Servicing Plan Update and Project File

Volume IV is the principle document summarizing the study objectives, approach, methodologies, technical analyses, evaluation and selection of the preferred wastewater servicing strategy for each of the wastewater systems. This volume contains baseline wastewater system data and performance information. This volume documents the wastewater servicing strategy development with detailed information on the projects and capital program associated with the preferred wastewater servicing strategy.

Volume V – Public and Agency Consultation

Volume V contains all relevant documentation of the public consultation process including notices, comments and responses, and distribution information. Presentation material from all Public Information Centres (PICs) held during the process is included. Other presentation material and discussion information from workshops held with relevant agencies, approval bodies and other stakeholders are also included.

2. BACKGROUND AND PLANNING CONTEXT

2.1 Master Servicing Plan Update Vision Statement

To set the stage for completing the Master Servicing Plan Update and to develop a foundation principle for the study, a vision statement was established:

Providing for Today, Vision for Tomorrow

"To establish a cost effective infrastructure program that meets the service needs of existing users, meets regulatory and legislative requirements, supports growth, and addresses the priority areas of climate change, energy management, infrastructure optimization, system security, and resiliency."

2.2 Problem and Opportunity Statement

The problem and opportunity statement defines the principal starting point in the undertaking of the Master Servicing Plan Update Class EA and assists in defining the scope of the project. The problem and opportunity statement for the 2016 Water and Wastewater Master Servicing Plan Update is defined as follows:

- In 2011, the Region completed a Water and Wastewater Master Servicing Plan update which looked at planned growth to 2031.
- With an updated planning horizon to 2041, the Master Servicing Plan needs to be updated to determine how the Region's Water and Wastewater Infrastructure will support growth in a sustainable and financially responsible manner.
- The Master Servicing Plan Update will develop a long-term servicing strategy and capital forecast to ensure the maintenance of services for existing residents and businesses as well as to support future growth in the community through 2041.
- The Master Servicing Plan Update will support growth in a sustainable and financially responsible manner.

2.3 Study Area

The Study Area for the 2016 Master Servicing Plan Update covers the municipalities of Grimsby, West Lincoln, Lincoln, St. Catharines, Thorold, Welland, Pelham, Port Colborne, Niagara-on-the-Lake, Niagara Falls, and Fort Erie. The Township of Wainfleet was not included in the study scope as it is not currently municipally serviced. The water and wastewater study areas including limits of existing infrastructure are depicted in the following Figures.

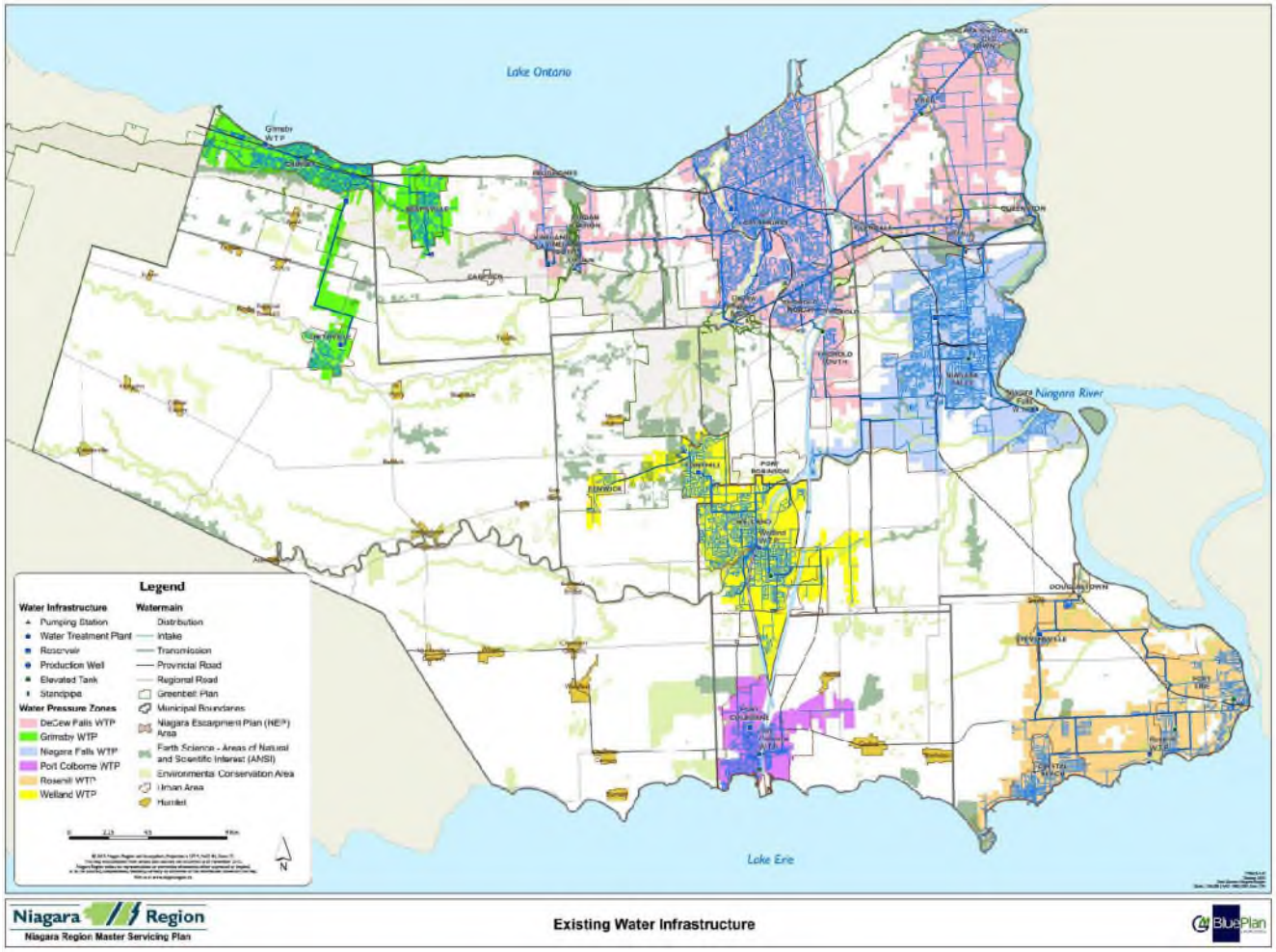


Figure 1.3 Existing Water Infrastructure

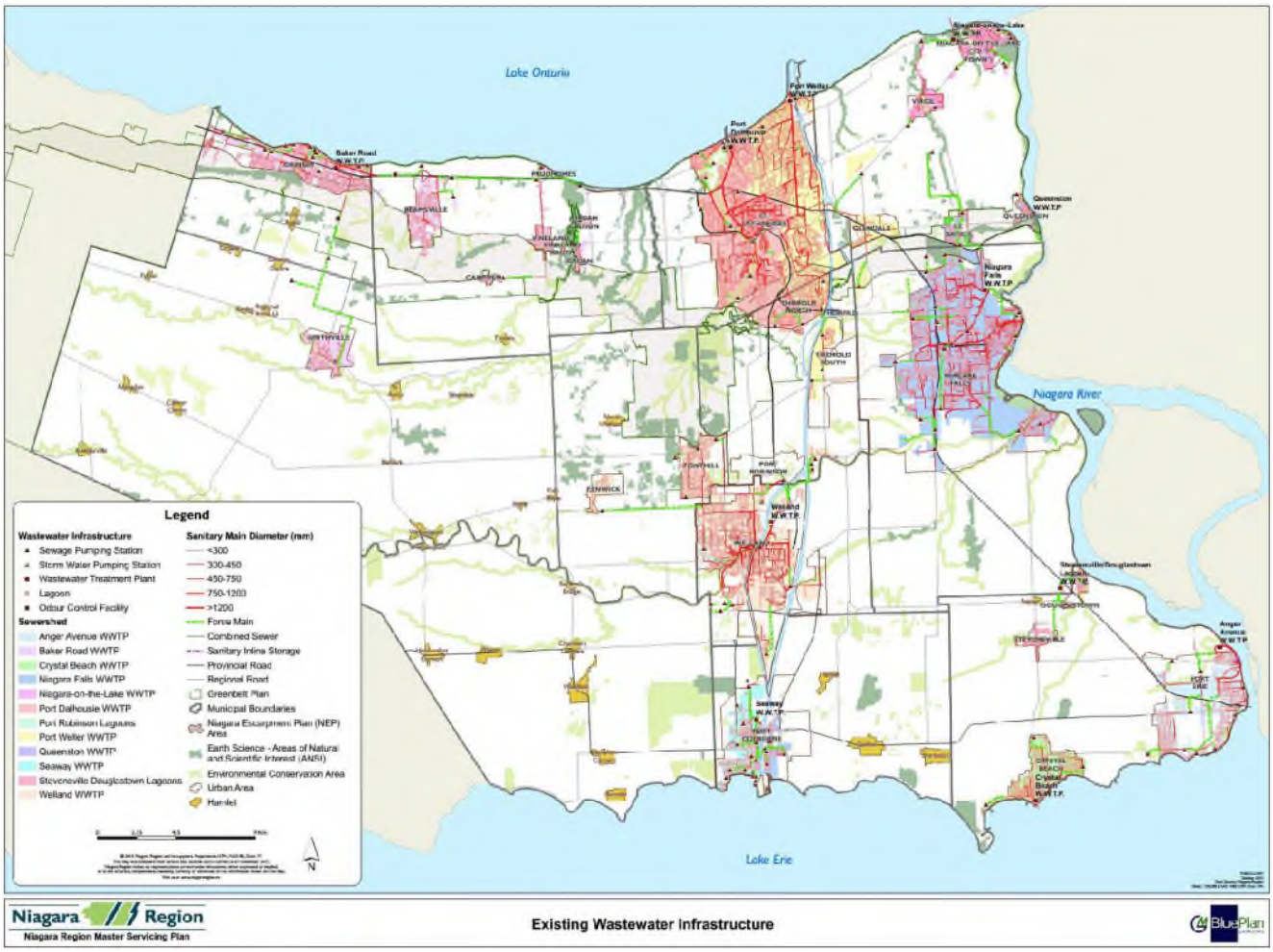


Figure 1.4 Existing Wastewater Infrastructure

2.4 Planning Context

The Province of Ontario's Places to Grow and Amendments is the official growth plan for the Greater Golden Horseshoe (GGH). It is a long term plan that provides a framework for implementing the Province's vision for building stronger, more prosperous communities by better managing growth in the Region to year 2041.

Niagara Region, through Niagara 2041 and the Municipal Comprehensive Review, established Regional and Local Municipal planning projections that were used as the planning basis for the 2016 Master Servicing Plan Update.

Table 1.1 Population Projections

Municipal Comprehensive Review Strategic Growth Option Forecast Total Population by Local Municipality								
Municipality	**Total Population Including Net Undercoverage**							
	2011	**2014 ***	**2016**	**2021**	**2026**	**2031**	**2036**	**2041**
Fort Erie	30,760	31,216	31,520	32,310	34,720	37,780	41,220	43,940
Grimsby	26,000	27,224	28,040	29,430	31,400	33,200	35,140	37,150
Lincoln	23,080	23,884	24,420	24,990	26,230	28,060	30,030	31,590
Niagara Falls	85,200	88,326	90,410	92,830	99,990	108,770	117,670	124,580
Niagara-on-the-Lake	15,810	17,112	17,980	19,750	21,420	22,850	24,700	26,580
Pelham	17,040	17,352	17,560	17,900	19,410	21,560	23,720	25,260
Port Colborne	18,910	18,838	18,790	18,600	19,210	20,080	21,050	21,820
St. Catharines	134,890	135,940	136,640	136,930	142,560	150,590	160,040	167,480
Thorold	18,410	18,944	19,300	19,680	21,500	23,850	26,470	28,470
Wainfleet	6,520	6,532	6,540	6,590	6,760	6,990	7,260	7,480
Welland	51,980	53,000	53,680	54,130	56,540	59,600	63,160	66,180
West Lincoln	14,200	14,608	14,880	16,170	18,930	22,630	26,530	29,460
Niagara Region	**442,800**	**452,976**	**459,760**	**469,310**	**498,670**	**535,960**	**576,990**	**609,990**

* Note: The Master Servicing Plan Update has an established baseline condition of year 2014. 2014 represents the best available system information and system calibration data for the water and wastewater models at the time of study initiation. The Master Servicing Plan Update has projected growth from year 2014 to establish the 2041 infrastructure needs.

Table 1.2 Employment Projections

Municipal Comprehensive Review Strategic Growth Option Forecast Employment by Local Municipality								
Municipality	**Total Place of Work Employment**							
	2011	**2014 ***	**2016**	**2021**	**2026**	**2031**	**2036**	**2041**
Fort Erie	11,290	11,992	12,460	13,270	13,960	14,920	15,940	17,240
Grimsby	7,720	9,010	9,870	10,780	11,440	12,380	13,310	14,630
Lincoln	9,740	10,664	11,280	11,870	12,300	13,040	13,710	14,600
Niagara Falls	41,030	43,628	45,360	47,790	49,630	52,060	54,570	57,720
Niagara-on-the-Lake	10,650	12,066	13,010	13,720	14,150	14,660	15,230	16,030
Pelham	4,090	4,360	4,540	4,880	5,220	5,750	6,280	6,930
Port Colborne	5,860	5,806	5,770	5,900	6,080	6,350	6,640	7,000
St. Catharines	60,180	61,668	62,660	65,530	67,820	71,480	75,240	80,240
Thorold	7,360	7,786	8,070	8,480	8,870	9,390	9,960	10,660
Wainfleet	1,160	1,244	1,300	1,350	1,400	1,470	1,550	1,650
Welland	22,090	22,990	23,590	24,490	25,170	26,220	27,300	28,760
West Lincoln	4,280	4,802	5,150	5,770	6,370	7,270	8,280	9,560
Niagara Region	**185,450**	**196,016**	**203,060**	**213,830**	**222,410**	**234,990**	**248,010**	**265,020**

* Note: The Master Servicing Plan Update has an established baseline condition of year 2014. 2014 represents the best available system information and system calibration data for the water and wastewater models at the time of study initiation. The Master Servicing Plan Update has projected growth from year 2014 to establish the 2041 infrastructure needs.

2.5 Water Demand Projections

The Master Servicing Plan Update has used the following design criteria to project water demands, determine capacity requirements and establish the water infrastructure program:

- Residential Average Day Demand: 300 Lpcd
- Employment Average Day Demand: 300 Lped
- Maximum Day Factors: based on rolling average for each system from last 5 years
- Residential Peak Hour Factor: 4
- Employment Peak Hour Factor: 2

Table 1.3 Water Demand Projections

Water System	2014 – 2041 Growth *			2014 Demands		2041 Demands	
	Growth Population	Growth Employment	Total Equivalent Growth	Average Day Demand (MLD)	Max Day Demand (MLD)	Average Day Demand (MLD)	Max Day Demand (MLD)
Grimsby Water Treatment Plant (WTP)	27,245	11,159	38,404	14.9	25.9	26.4	45.9
Decew WTP	53,246	25,790	79,036	60.4	93.6	84.1	130.4
Niagara Falls WTP	35,350	13,587	48,937	41.7	64.2	56.4	86.9
Fort Erie WTP	12,715	3,859	16,574	12.4	19.1	17.4	26.8
Port Colborne WTP	3,011	1,024	4,035	8.3	12.9	9.5	14.8
Welland WTP	23,485	8,473	31,958	21.7	33.2	31.3	47.9

* Note: The Master Servicing Plan Update has an established baseline condition of year 2014. 2014 represents the best available system information and system calibration data for the water and wastewater models at the time of study initiation. The Master Servicing Plan Update has projected water demands from year 2014 to establish the 2041 infrastructure needs.

2.6 Wastewater Flow Projections

The Master Servicing Plan Update has used the following design criteria to project wastewater flows, determine capacity requirements and establish the wastewater infrastructure program:

- Residential Average Day Demand: 275 Lpcd
- Employment Average Day Demand: 275 Lped
- Peak Factor based on Harmon formula with values between 2 and 4 with consideration to the catchment area performance
- Utilize an extraneous flow rate of 0.286 L/ha/s as the wet weather level of service for triggering and sizing Regional wastewater infrastructure

Table 1.4 Wastewater Flow Projections

Wastewater System	2014 – 2041 Growth *			2014 Average Day Demand (MLD)	2041 Average Day Demand (MLD)
	Growth Population	Growth Employment	Total Equivalent Growth		
Baker Road Wastewater Treatment Plant (WWTP)	31,425	12,231	43,656	20.5	32.5
Port Dalhousie WWTP	24,252	14,760	39,012	34.7	45.4
Port Weller WWTP	18,460	8,535	26,995	36.0	43.4
Niagara-on-the-Lake WWTP	5,138	1,736	6,874	4.4	6.3
Niagara Falls WWTP	38,323	13,626	51,949	41.5	55.8
Stevensville and Douglastown WWTP	1,544	524	2,068	1.3	1.9
Anger Avenue WWTP	7,663	3,456	11,119	13.1	16.2
Crystal Beach WWTP	3,496	256	3,752	5.5	6.5
Seaway WWTP	3,014	1,202	4,216	12.1	13.3
Welland WWTP	25,064	8,507	33,571	35.6	44.8

* Note: The Master Servicing Plan Update has an established baseline condition of year 2014. 2014 represents the best available system information and system calibration data for the water and wastewater models at the time of study initiation. The Master Servicing Plan Update has projected wastewater flows from year 2014 to establish the 2041 infrastructure needs.

3. SERVICING PRINCIPLES AND POLICY

Development of water and wastewater principles and policies are integral to provide guidelines and direction to the Master Servicing Plan Update process, as well as to the identification and evaluation of servicing strategies.

Through the course of the Master Servicing Plan Update, priority policy areas were brought forward including:

- Health and safety;
- System reliability and security;
- Reserve capacity for operational flexibility and level of service;
- Impacts of climate change;
- Considerations to energy use and efficiency;
- Recognition of impacts from water efficiency and conservation;
- Addressing issues related to the full lifecycle of water and wastewater services;

A comprehensive list of general, water and wastewater policies were established. As a result from the priority policy areas, key principle and policy statements were developed as highlighted below:

- Niagara Region will endeavor to maintain sufficient reserve capacity in its water and wastewater infrastructure and facilities to provide operational flexibility and meet potential changes in servicing conditions
- Niagara Region shall endeavor to provide reliability, redundancy and security in its water and wastewater systems with attention to high risk and critical areas
- Niagara Region shall be aware of and consider the potential impact of climate change on the planning and sizing of infrastructure
- Niagara region shall design water and wastewater facilities with consideration to energy use
- Niagara Region will consider levels of storage beyond MOE Guidelines where appropriate in order to provide operational flexibility, energy management and system security

- Niagara Region will review a combination of servicing strategies including infrastructure and non-infrastructure (e.g. i/i reduction) solutions to meet wet weather level of service and provide sufficient wastewater capacity
- Niagara Region will approach Guidelines F-5-5 and F-5-1 such that new development will not put the Region out of compliance with regulations and the Region will consider opportunities to not increase wet weather overflows beyond current conditions

4. WATER SERVICING STRATEGY

The process for developing, evaluating and selecting the preferred water servicing strategy followed these key steps:

- Review of baseline conditions across each water system;
- Identify opportunities and constraints for each system;
- Develop high level servicing concepts;
- Review each concept with respect to environmental, social, legal, technical and financial factors. Develop advantages and disadvantages for each;
- Provide additional detail for the preferred concept ensuring alignment, siting, capacity, timing and other technical factors are identified; and
- Develop a conceptual cost estimate for each project.

4.1 Water System Recommendations Overview

4.1.1 Grimsby Water Treatment Plant Service Area

The Grimsby Water System services the areas of Grimsby, and the urban areas of Lincoln and West Lincoln. There is a large amount of growth on this system to the year 2041.

Key aspects of the water servicing strategy include:

- Based on the level of growth on the system, the Grimsby Water Treatment Plant will require additional water treatment capacity.
- The location of water storage to optimize pumping costs and provide equalization and emergency storage to the system has been addressed. A new storage facility to support the Grimsby and Smithville service areas has been established. The new location results in decommissioning the existing reservoir and pumping station.
- To support the new storage location and to provide additional water transmission capacity through the Grimsby system, a new feedermain across Grimsby and a new feedermain from the Grimsby Water Treatment Plant are required.
- The level of growth in the Smithville area requires additional trunk watermain capacity through the network.
- Additional pumping capacity is required to support the Lincoln service area growth.

4.1.2 DeCew and Niagara Falls Water Treatment Plant Service Area

A significant portion of the Niagara Region including areas in St. Catharines, Niagara-On-The-Lake, Niagara Falls and Thorold is provided water through an integrated water system. The integrated water system is supplied by the DeCew Water Treatment Plant and the Niagara Falls Water Treatment Plant. This water system is projected to see significant intensification and greenfield growth.

Key aspects of the water servicing strategy include:

- Both the DeCew Water Treatment Plant and the Niagara Falls Water Treatment Plant have sufficient capacity to support growth to year 2041.
- The inlet channel for the DeCew Water Treatment Plant will have upgrades. This project is a shared project with OPG.
- Additional feedermain capacity is required in Niagara-On-The-Lake to support water supply to the growth areas.
- The storage location in Niagara Falls will be optimized with additional storage capacity provided in a new tank located in closer proximity to the growth areas in South Niagara Falls. The existing Lundy's Lane tank will be decommissioned.
- Due to the amount of growth in South Niagara Falls, a new trunk water feedermain will be required to support the growth demands.
- Additional feedermain capacity is required in the Port Robinson area due to growth and for trunk system connectivity.

4.1.3 Fort Erie Water Treatment Plant Service Area

The Fort Erie water system will experience additional demands from intensification and greenfield growth as well as a large amount of employment growth in central Fort Erie. The growth to 2041 will impact the existing system with limited floating water storage.

Key aspects of the water servicing strategy include:

- The Rosehill Water Treatment Plant has sufficient capacity to support growth to year 2041.

- The components of the Fort Erie water strategy are focused on providing additional storage for the growth in the area while optimizing the storage/pumping relationship to reduce long term lifecycle costs.
- A new water tank will be provided in central Fort Erie to support the system growth and directly support the employment centre.
- The new tank will allow for decommissioning of the existing Stevensville reservoir and pumping station.as well as Central Ave tank.
- Additional trunk feedermain capacity is required to support the new tank and for distribution in central Fort Erie.

4.1.4 Port Colborne Water Treatment Plant Service Area

The Port Colborne water system is not projected to have significant growth to year 2041. However, the location of growth in the northern portion of the system and the security of supply related to crossings of the Welland Canal requires infrastructure upgrades.

Key aspects of the water servicing strategy include:

- The Port Colborne Water Treatment Plant has sufficient capacity to support growth to year 2041.
- The components of the Port Colborne water strategy are focused on providing additional storage for the growth in the area while optimizing the storage/pumping relationship to reduce long term lifecycle costs.
- A new water tank will be provided in northern Port Colborne to support the system growth and optimize water levels for the system.
- The new tank will allow for decommissioning of the Fielden reservoir and pumping station as well as the King Street tank.
- Additional trunk water feedermain will be provided crossing the Canal to support growth on the East and West side of Port Colborne.

4.1.5 Welland Water Treatment Plant Service Area

The Welland water system services the areas of Welland as well as Fonthill and Fenwick in the Town of Pelham. The system is supplied by the Welland Water Treatment Plant. There is some growth projected for the system to year 2041. There are storage and pumping optimization opportunities for this system.

Key aspects of the water servicing strategy include:

- The Welland Water Treatment Plant has sufficient capacity to support growth to year 2041.
- The components of the Welland water strategy are focused on providing additional storage for the growth in the area while optimizing the storage/pumping relationship to reduce long term lifecycle costs.
- Both sets of pumps in the Shoalt's Drive pumping station for the higher and lower pressure zones will be upgraded to support growth.
- A new water tank, replacing the existing water tank, will be provided to support growth and optimize system pressures and performance in the area.
- Based on growth in the north and east limits of the system, additional water feedermain capacity is required.

4.2 Water Servicing Strategy Capital Program

A summary of the water servicing strategy capital program with details for each project is provided in the following table.

Each water project is depicted on the subsequent water servicing strategy Figures.

Table 1.5 Water Capital Program

Master Plan ID	Description	Year in Service	System	Total Component Estimated Cost
W-D-001	Decommissioning of Central Ave (Fort Erie South) ET	2022 - 2031	Rosehill	$ 1,979,000
W-D-002	Decommissioning of Stevensville Res + PS	2022 - 2031	Rosehill	$ 2,913,000
W-D-003	Decommissioning of Park Road Res + PS	2022 - 2031	Grimsby	$ 523,000
W-D-004	Decommissioning of Lundy's Lane ET	2032 - 2041	Niagara Falls	$ 1,979,000
W-D-005	Decommissioning of Pelham ET	2022 - 2031	Welland	$ 1,028,000
W-D-006	Decommissioning of King Street ET	2017 - 2021	Port Colborne	$ 1,979,000
W-D-007	Decommissioning of Fielden Ave Res + PS	2032 - 2041	Port Colborne	$ 2,913,000
W-F-001	Grimsby WTP Expansion	2022 - 2031	Grimsby	$ 51,496,000
W-F-002	Decew inlet channel	2017 - 2021	Decew	$ 22,969,000
W-M-001	New trunk main in Central Fort Erie	2022 - 2031	Rosehill	$ 9,479,000
W-M-002	New Conveyance to Port Colborne East side	2017 - 2021	Port Colborne	$ 11,548,000
W-M-003	New trunk main from Welland WTP to North	2032 - 2041	Welland	$ 7,556,000
W-M-004	Upgrade trunk main from Elizabeth Street to Park Road	2017 - 2021	Grimsby	$ 13,139,000
W-M-005	New trunk main from Grimsby WTP to New Grimsby Reservoir	2022 - 2031	Grimsby	$ 42,044,000
W-M-006	New trunk main in Smithville	2022 - 2031	Grimsby	$ 14,357,000
W-M-007	New trunk main from PRV to Port Robinson Chlorine BPS	2017 - 2021	Niagara Falls	$ 2,543,000
W-M-008	Trunk main from South NOTL to Virgil ET	2032 - 2041	Decew	$ 13,535,000
W-M-009	New Niagara Falls South trunk main to New Elevated Tank	2032 - 2041	Niagara Falls	$ 4,858,000
W-M-010	New Niagara Falls South trunk main	2032 - 2041	Niagara Falls	$ 18,316,000
W-M-011	New trunk main to Fort Erie Elevated Tank	2017 - 2021	Rosehill	$ 4,107,000
W-M-012	Upgrade watermain in Port Colborne to new Barrick Road ET	2017 - 2021	Port Colborne	$ 2,185,000
W-P-001	Upgrade Shoalt's Drive LLPS	2017 - 2021	Welland	$ 3,062,000
W-P-002	Upgrade Shoalt's Drive HLPS	2017 - 2021	Welland	$ 7,882,000
W-P-003	Upgrade Lincoln/Grimsby BPS	2032 - 2041	Grimsby	$ 989,000
W-S-001	New Fort Erie ET	2017 - 2021	Rosehill	$ 12,838,000
W-S-002	New Barrick Road ET in Port Colborne	2017 - 2021	Port Colborne	$ 8,022,000
W-S-003	New Pelham ET	2022 - 2031	Welland	$ 9,307,000
W-S-004	New South Niagara Falls ET	2032 - 2041	Niagara Falls	$ 9,629,000
W-S-005	New Grimsby Reservoir	2017 - 2021	Grimsby	$ 23,474,000
	Total			**$ 306,649,000**

Niagara Region

2016 MASTER SERVICING PLAN

MSP Water Projects

- Treatment Plant
- Reservoir
- Pumping Station
- Elevated Tank
- Watermain Projects

Water Facilities

- Water Treatment Plant
- Reservoir
- Elevated Tank
- Standpipe
- Chlorine Facility
- Pressure Reducing Valve

Pumping Station
- Regional
- Municipal

Water Network
- Regional
- Local
- Private

Pressure Zone System*

*Pressure zone limits are shown based on property boundaries.

148 163 210 225
154 193 216 239

Grimsby W.T.P. Reservoir
Grimsby W.T.P. Pumping Station
Grimsby W.T.P.
Lincoln/Grimsby Booster Pumping Station
W-P-003
W-M-004
W-F-001
W-M-005
W-D-003
Park Road Reservoir
Park Booster Pumping Station
W-S-005
Hixon Street Reservoir
Albright Booster Pumping Station 1 + 2
Smithville Elevated Tank
London Road Reservoir
London Road Pumping Station
W-M-006

Lake Ontario
City of Hamilton
Town of Grimsby
Township of West Lincoln
Town of Lincoln
Lincoln
Beamsville
Ridge Rd
Ridge Rd W
Mud St W
Mud St E
Fly Rd
Twenty Mile Rd
Mountain Rd
Grassie Rd
Grimsby Rd
Woolverton Rd
Park Rd S
Spring Creek
North Creek
Twenty Mile Creek

0 1 2 Kilometers

Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community

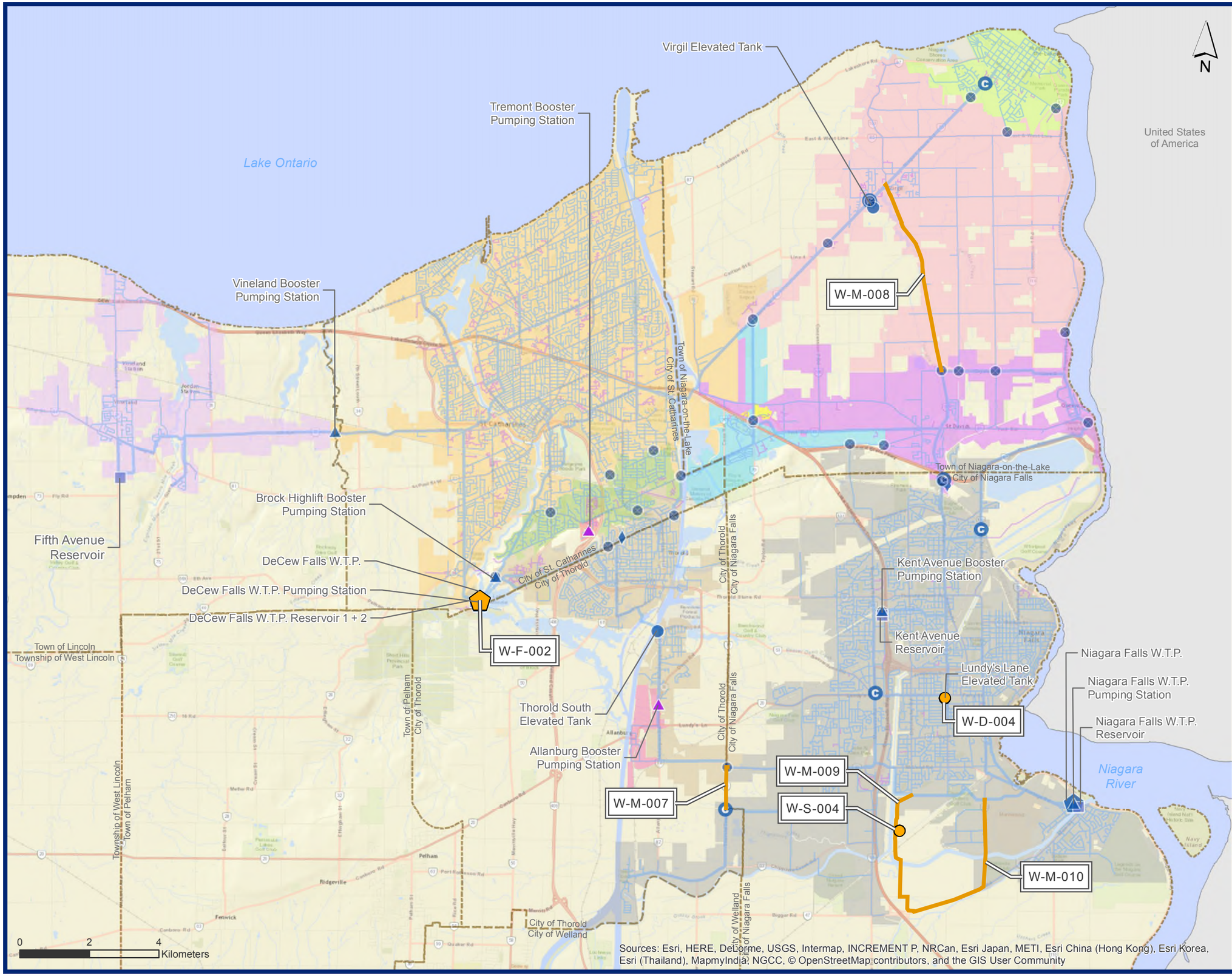
Figure 1.5
Preferred Water Strategy
Grimsby WTP

BluePlan

June 2017
715023-WW-6-Capital Projects (Grimsby)
NAD 1983 UTM Zone 17N

Niagara Region

2016 MASTER SERVICING PLAN



Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community

MSP Water Projects

- Treatment Plant
- Reservoir
- Pumping Station
- Elevated Tank
- Watermain Projects

Water Facilities

- Water Treatment Plant
- Reservoir
- Elevated Tank
- Standpipe
- Chlorine Facility
- Pressure Reducing Valve

Pumping Station
- Regional
- Municipal

Water Network
- Regional
- Local
- Private

Pressure Zone System*

*Pressure zone limits are shown based on property boundaries.

127	161	180	227
144	164	200	250
154	168	220	257

Figure 1.6

Preferred Water Strategy

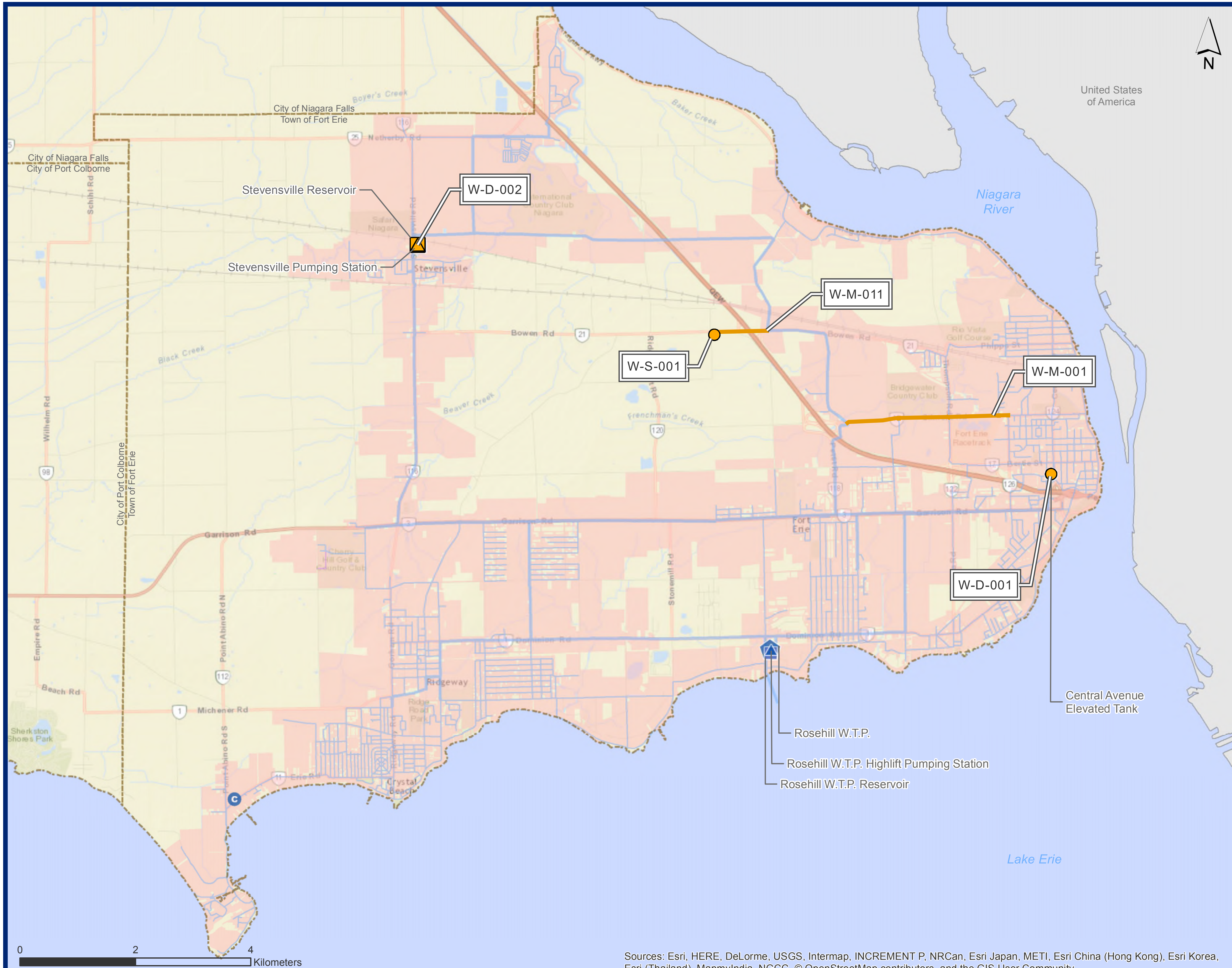
DeCew and Niagara Falls WTP

BluePlan

June 2017
715023-W-Capital Projects (DCNF)
NAD 1983 UTM Zone 17N

Niagara Region

2016 MASTER SERVICING PLAN



N
City of Niagara Falls
Town of Fort Erie
City of Niagara Falls
City of Port Colborne
City of Port Colborne
Town of Fort Erie
Stevensville Reservoir
W-D-002
Stevensville Pumping Station
Stevensville
W-M-011
W-S-001
W-M-001
W-D-001
Central Avenue
Elevated Tank
Rosehill W.T.P.
Rosehill W.T.P. Highlift Pumping Station
Rosehill W.T.P. Reservoir
United States
of America
Niagara
River
Lake Erie
Bowen Rd
Garrison Rd
Dominion Rd
Michener Rd
Beach Rd
Ridgeway
Crystal Beach
Fort Erie
Sherkston Shores Park
0
2
4
Kilometers
Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community

MSP Water Projects

- Treatment Plant
- Reservoir
- Pumping Station
- Elevated Tank
- Watermain Projects

Water Facilities

- Water Treatment Plant
- Reservoir
- Elevated Tank
- Standpipe
- Chlorine Facility
- Pressure Reducing Valve

Pumping Station

- Regional
- Municipal

Water Network

- Regional
- Local
- Private

Pressure Zone System*

*Pressure zone limits are shown based on property boundaries.

- 241

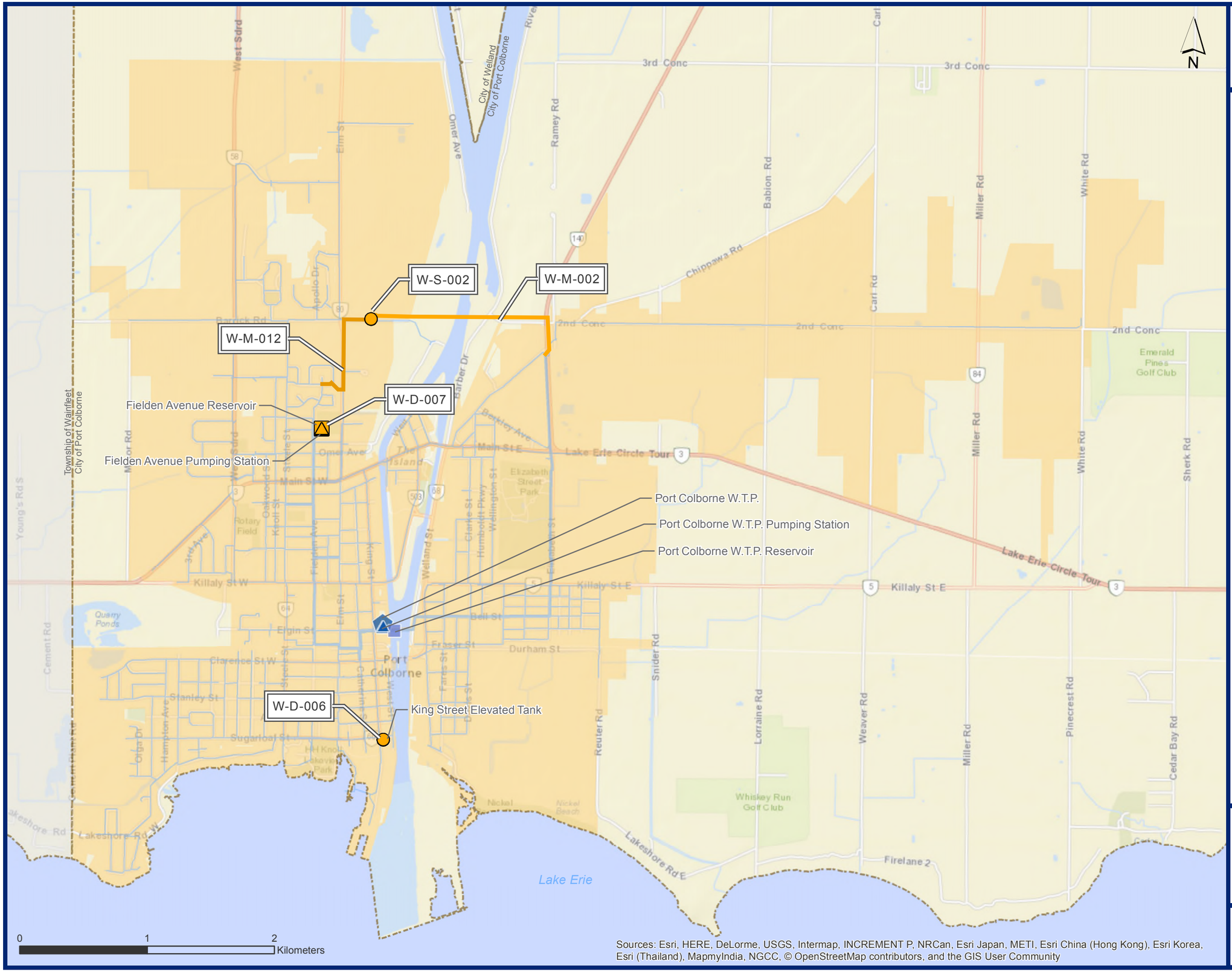
Figure 1.7

Preferred Water Strategy

Rosehill WTP

GM BluePlan

June 2017
715023-W-6-Capital Projects (FE)
NAD 1983 UTM Zone 17N



Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community

Niagara Region

2016 MASTER SERVICING PLAN

MSP Water Projects

- Treatment Plant
- Reservoir
- Pumping Station
- Elevated Tank
- Watermain Projects

Water Facilities

- Water Treatment Plant
- Reservoir
- Elevated Tank
- Standpipe
- Chlorine Facility
- Pressure Reducing Valve

Pumping Station
- Regional
- Municipal

Water Network
- Regional
- Local
- Private

Pressure Zone System*

*Pressure zone limits are shown based on property boundaries.

223

Figure 1.8

Preferred Water Strategy

Port Colborne WTP

BluePlan

June 2017
715023-W-Capital Projects (PC)
NAD 1983 UTM Zone 17N

2016 MASTER SERVICING PLAN

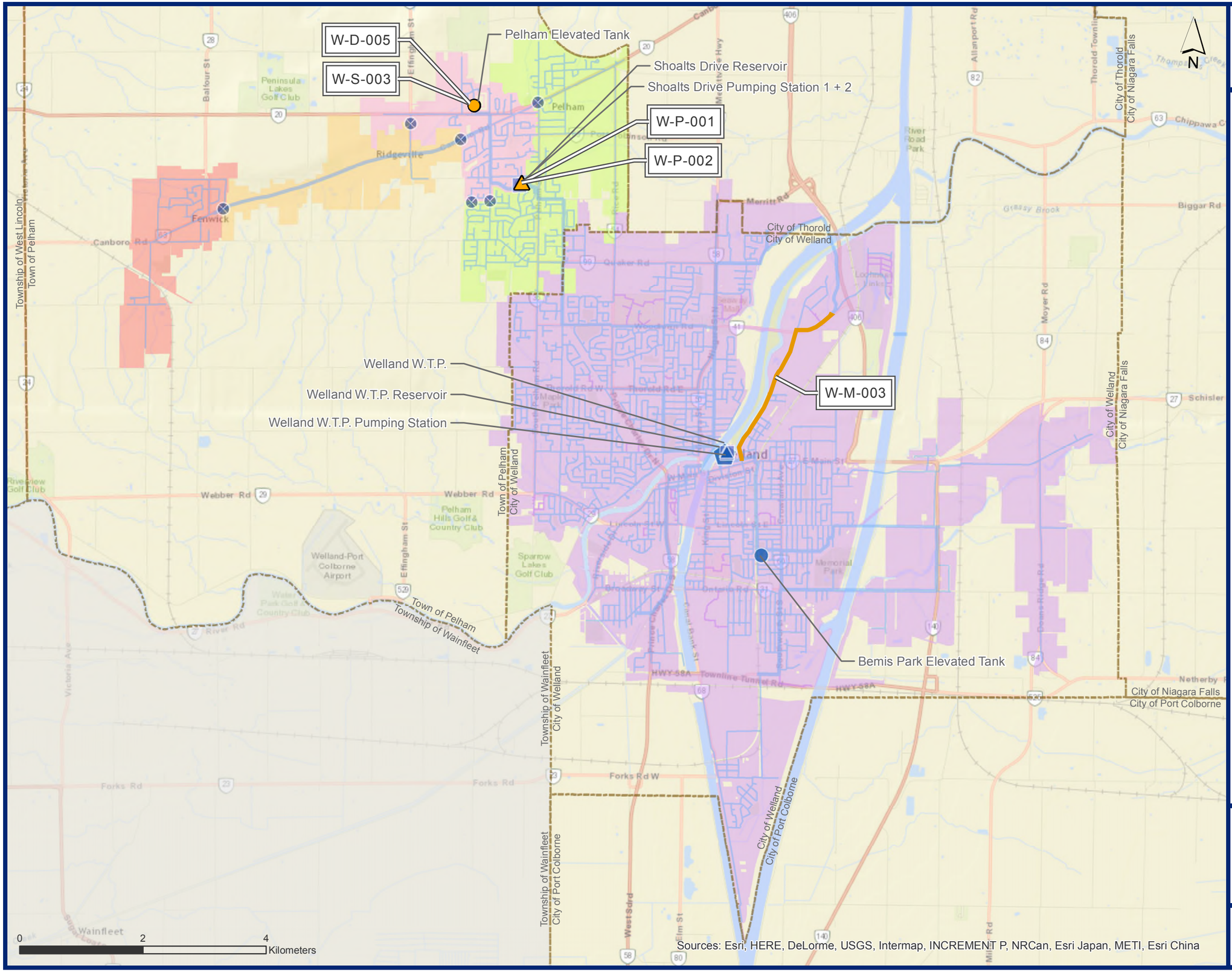


Figure 1.9

Preferred Water Strategy

Welland WTP

June 2017
715023-W-6-Capital Projects (Welland)
NAD 1983 UTM Zone 17N

5. WASTEWATER SERVICING STRATEGY

Similar to water, the process for developing, evaluating and selecting the preferred wastewater servicing strategy followed these key steps:

- Review of baseline conditions across each wastewater system;
- Identify opportunities and constraints for each system;
- Develop high level servicing concepts;
- Review each concept with respect to environmental, social, legal, technical and financial factors. Develop advantages and disadvantages for each;
- Provide additional detail for the preferred concept ensuring alignment, siting, capacity, timing and other technical factors are identified; and
- Develop a conceptual cost estimate for each project.

5.1 Wastewater System Recommendations Overview

The wastewater systems across the Region are impacted not only by growth but through wet weather responses in the systems compromising infrastructure capacity.

When reviewing wastewater system servicing alternatives, 3 typical strategies were considered for all systems:

- Capacity Upgrades: Wastewater Treatment Plant (WWTP), Sewage Pumping Station (SPS), Trunk Sewer
- Upstream Management: Storage, Peak Shaving, Diversion
- Peak Flow Management: Flow Reduction, RDII Removal

5.1.1 Baker Road Wastewater Treatment Plant Service Area

The Baker Road WWTP Wastewater System services the areas of Grimsby, and the urban areas of Lincoln and West Lincoln. There is a large amount of growth on this system to the year 2041.

The residential and employment growth is spread out along highway and service road corridors. The Baker Road system has a large number of pumping stations with cascading impact. There are areas of high inflow and infiltration across the system. The Smithville area in the system has projected significant growth which impacts the existing pumping station and forcemain.

Key aspects of the wastewater servicing strategy to address growth and challenges include:

- Based on the level of growth on the system, the Baker Road WWTP will require additional wastewater treatment capacity.
- The projected growth and wet weather flow needs across much of the service area has triggered sewage pumping station (SPS) upgrades across many of the facilities.
- The SPS upgrades and potential trunk sewer capacity constraints will be mitigated by implementing wet weather management programs in west Grimsby, Beamsville and Vineland
- There is significant growth projected in Smithville in relation to existing infrastructure capacity. A new trunk sewer in the community plus and expansion of the SPS will be required for the growth flows. The additional SPS capacity will require forcemain twinning and trunk sewer capacity upgrades downstream of the new forcemain.

5.1.2 Port Dalhousie Wastewater Treatment Plant Service Area

- The Port Dalhousie WWTP Wastewater System services the west portion of St. Catharines plus areas in Thorold North. There is a large amount of growth on this system to the year 2041 primarily attributed to intensification.
- St. Catharines has significant combined sewer areas. These areas are designed and see significant wet weather peak flows. Management of combined service areas requires local system management as well as trunk system management.
- While infrastructure capacity upgrades were considered, the recommended solution for the Port Dalhousie WWTP wastewater system is to provide wet weather management across the system. This will require Regional solutions as well as local municipal solutions.
- An upgrade to the Beaverdams SPS has been identified to support growth in the area.
- With implementation of the wet weather program, the Port Dalhousie WWTP will have sufficient capacity to meet growth to year 2041.

5.1.3 Port Weller Wastewater Treatment Plant Service Area

- The Port Weller WWTP Wastewater System services the east portion of St. Catharines plus areas in Thorold South. There is a large amount of growth on this system to the year 2041 attributed to intensification and greenfield growth in the south.

- St. Catharines has significant combined sewer areas. These areas are designed and see significant wet weather peak flows. Management of combined service areas requires local system management as well as trunk system management.
- Similar to the Port Dalhousie WWTP wastewater system, while infrastructure capacity upgrades were considered, the recommended solution for the Port Weller WWTP wastewater system is to provide wet weather management across the system. This will require Regional solutions as well as local municipal solutions.
- In addition to the wet weather program, there is opportunity to re-direct the Thorold South wastewater flows to the new South Niagara Falls system. The preferred strategy includes upgrades to the Peel Street SPS and forcemain to pump south and upgrades to the Black Horse SPS and forcemain to pump to the new South Niagara Falls wastewater system. This strategy will remove flows from Thorold South on the Port Weller system alleviating some existing capacity impacts.
- With implementation of the wet weather program and redirecting the Thorold South flows, the Port Weller WWTP will have sufficient capacity to meet growth to year 2041.

5.1.4 Niagara-On-The-Lake Wastewater Treatment Plant Service Area

- The pockets of urban areas in Niagara-On-The-Lake ultimately convey flows to the Niagara-On-The-Lake WWTP. There is some growth projected for these areas.
- The Niagara-On-The-Lake WWTP is a newly constructed facility. The WWTP has sufficient capacity to support growth to year 2041.
- The wastewater strategy is comprised of only a few sewage pumping station capacity upgrades to address additional flows from growth.
- Wet weather management is recommended for the system.

5.1.5 Queenston Wastewater Treatment Plant Service Area

- The Queenston WWTP wastewater system is a small system in Niagara-On-The-Lake. There is not much growth projected and the system has capacity to support its needs. However, from a lifecycle perspective, it can be inefficient to operate small independent systems.
- The South Niagara Falls wastewater strategy presents opportunities for adjacent systems. On this basis, it is recommended to redirect the Queenston flows with a new sewage pumping station to Niagara Falls and decommission the Queenston WWTP.

5.1.6 Niagara Falls Wastewater Treatment Plant Service Area

The Niagara Falls WWTP Wastewater System services the areas of Niagara Falls, and the urban area of St. David's in Niagara-On-The-Lake. There is a large amount of growth on this system to the year 2041.

There is significant greenfield growth projected in the south limits of the system as well as intensification growth throughout the system. With growth at the limits of the system, this has cascading impacts on infrastructure as the flows are conveyed through pumping stations, forcemains and trunk sewers to the existing Niagara Falls WWTP. There are areas of high inflow and infiltration across the system.

Key aspects of the wastewater servicing strategy to address growth and challenges include:

- Based on the level of growth on the system, the Niagara Falls WWTP is approaching capacity within the 2041 planning horizon. The plant is aging and requires sustainability upgrades to maintain level of service.
- Conveying growth flows to the Niagara Falls WWTP will require significant infrastructure upgrades across the system and within the built boundary of the City.
- Given the level of impact on the existing system based on current system conveyance, a broader evaluation process was undertaken to develop Niagara Falls servicing alternatives. A South Niagara Falls wastewater strategy was developed and evaluated. This process is documented in subsequent sections.
- The South Niagara Falls wastewater strategy resulted in the recommendation for a new South Niagara Falls WWTP.
- The Niagara Falls service area south of Lundy's Lane will convey flows to the new plant. The remaining service areas will continue to convey flows to the existing plant.
- Capacity upgrades in the St. David's area are required to support growth. This area as well as the Queenston service area will direct flows to the existing plant.
- The Thorold South service area will be directed to the new South Niagara Falls WWTP.
- The South Side High Lift pumping station will be directed south to the new plant.
- Isolated pumping stations will require capacity upgrades to support the project growth.
- In order to minimize infrastructure upgrades, wet weather management will be required across the Niagara Falls system.

5.1.7 Stevensville and Douglastown Lagoons Service Area

The Stevensville and Douglastown system is currently serviced by a lagoon treatment plant. Based on the projected growth in the area, the treatment plant will have sufficient capacity to support growth to 2041. The Stevensville sewage pumping station will require additional capacity and wet weather management is recommended for the system.

5.1.8 Anger Avenue Wastewater Treatment Plant Service Area

Anger Avenue WWTP services the Fort Erie wastewater system. The Fort Erie wastewater system will experience additional flows from intensification and greenfield growth as well as a large amount of employment growth in central Fort Erie.

Key aspects of the wastewater servicing strategy to address growth and challenges include:

- The Anger Avenue WWTP has sufficient capacity to support growth to year 2041.
- The projected growth will require pumping station expansions at Alliston SPS, Lakeshore Road SPS and Catherine Street SPS and forcemain.
- Additional wet weather management is recommended to minimize impact to existing infrastructure and support the growth to year 2041.

5.1.9 Crystal Beach Wastewater Treatment Plant Service Area

The Crystal Beach WWTP services an urban area on the Lake Erie shoreline in Fort Erie. There is some projected growth to year 2041 in the service area. The Crystal Beach WWTP has sufficient capacity to support growth to year 2041. The growth flows will require additional capacity at the Nigh Road SPS and Shirley Road SPS. Additional wet weather management in the core of the service area is recommended to minimize impact to existing infrastructure and support the growth to year 2041.

5.1.10 Seaway Wastewater Treatment Plant Service Area

The Seaway WWTP services the urban area of Port Colborne. The wastewater system requires many sewage pumping stations to service the existing and future growth areas as well as convey flows under the Canal to the plant.

Key aspects of the wastewater servicing strategy to address growth and challenges include:

- The Seaway WWTP has sufficient capacity to support growth to year 2041.

- The projected growth will require pumping station expansions at Oxford Road SPS, Steele Street SPS and Rosemount South SPS.
- Additional wet weather management, particularly on the east side of the Canal is recommended to minimize impact to existing infrastructure and support the growth to year 2041.

5.1.11 Welland Wastewater Treatment Plant Service Area

The Welland wastewater system services the areas of Welland as well as Fonthill and Fenwick in the Town of Pelham and the Port Robinson West area in the City of Thorold. The Welland WWTP services the full service area.

There is some growth projected for the system to year 2041. There are areas of combined sewers with high inflow and infiltration. This system also needs to manage wastewater conveyance under the Canal to the treatment plant.

Key aspects of the water servicing strategy include:

- The Welland WWTP has sufficient capacity to support growth to year 2041.
- Due to the projected in the Fenwick area, additional pumping station and forcemain capacity is required.
- Additional capacity is required at the Hurricane Road and Towpath SPS.
- Additional conveyance capacity across Highway 406 at the Towpath SPS is required to support growth.
- The wet weather management program within the core areas of Welland and within the combined sewer systems is required to support growth and minimize infrastructure costs within the built boundary.

5.2 Wet Weather Management Strategy

A significant element of the Niagara Region wastewater servicing strategy is the wet weather management program.

The Niagara wastewater systems are a mix of separated and combined sewer systems. Each system is experiencing varying levels of impact during wet weather conditions. Climate change continues to create changing weather conditions and the wastewater systems are experiencing in most cases high peak flows under rainfall events. Providing infrastructure capacity for the

peak flow events would require upgrades not only for local sewers, but also trunk sewers, pumping stations and ultimately the treatment plants. The infrastructure capacity approach can prove costly.

The wet weather management program in the Master Servicing Plan Update has been developed to identify targeted amounts of inflow and infiltration reduction intended to deal with existing capacity constraints as well as provide for growth related capacity without or minimizing expanding/upgrading existing trunk infrastructure.

The wet weather program in the Master Servicing Plan Update currently identifies overall preliminary priority, staging of location and target amount of inflow and infiltration reduction across all systems. This program provides for a proactive and targeted approach to addressing wet weather impacts.

5.3 South Niagara Falls Servicing Strategy

The South Niagara Falls servicing strategy has been highlighted based on the significant change in servicing strategy from previous Master Plans.

The Niagara 2041 planning exercise resulted in significant growth in South Niagara Falls partly based on the extension of the planning horizon from 2031 to 2041. It is noted that 64% of the growth in Niagara Falls is projected south of Lundy's Lane and 22.5% of the growth is projected south of the Welland River. This growth in combination with wet weather issues in South Niagara Falls as well as servicing constraints in adjacent wastewater systems including Thorold South and St. Catharines, prompted a broader review of wastewater servicing strategies for the area.

The analysis for the South Niagara Falls servicing strategy followed these principal steps:

- Review of system integration opportunities
- Hydraulic analysis of the systems
- Preliminary identification of infrastructure needs and alignments/sites
- Detailed cost benefit analysis considering capital, lifecycle and offsetting cost components
- Multiple bottom line evaluation process

The analysis developed and evaluated two options for the servicing of future growth:

1. Accommodate only the south Niagara Falls growth through the existing Niagara Falls Wastewater Treatment Plant (Go North) including all necessary upgrades / upsizing of existing infrastructure.
2. Construct a new South Niagara Falls Wastewater Treatment Plant (New Plant), divide the Niagara Falls service area into two, provide additional capacity suitable for the servicing of Thorold South, introduce additional capacity in the Port Weller sewer shed area of St. Catharines, create the opportunity to service future growth in the St. David's area of Niagara-on-the-Lake, and introduce significant capacity in the north sewer shed area of Niagara Falls for intensification and growth.

Option 2 – New Plant was selected as the preferred South Niagara Falls servicing strategy. Overall comments related to the selection of the New Plant option are:

- Providing a new South Niagara Falls WWTP provides the greatest flexibility and support for long term servicing and benefit to the Niagara Falls and surrounding systems.
- A new plant provides the greatest opportunity to mitigate risks including cost risks, implementation risks, and capacity risks.
- The New Plant option does have higher capital costs for 2041 program and higher annual lifecycle costs than the Go North option. However, the New Plant can provide more flexible and less expensive post 2041 costs.
- Based on the opportunity to implement green technologies and address wet weather issues, the New Plant provides opportunity for other funding sources similar to the NOTL plant.
- Under either option, continued sustainability upgrades will be required for existing infrastructure including the existing Niagara Falls WWTP.

5.4 Wastewater Servicing Strategy Capital Program

A summary of the wastewater servicing strategy capital program with details for each project is provided in the following table.

Each wastewater project is depicted on the subsequent wastewater servicing strategy Figures.

Table 1.6 Wastewater Capital Program

Master Plan ID	Description	Year in Service	System	Total Component Estimated Cost
WW-D-001	Decommissioning of Queenston WWTP	2022-2031	Queenston	$ 1,979,000
WW-FM-001	Upgrade Catherine St. SPS Forcemain	2032-2041	Anger Ave	$ 467,000
WW-FM-003	Upgrade Foss Road SPS Forcemain	2022-2031	Welland	$ 4,500,000
WW-FM-004	Laurie Avenue SPS Forcemain Upgrade	2017-2021	Baker Road	$ 2,981,000
WW-FM-005	New Peel Street SPS Forcemain	2022-2031	South Niagara Falls	$ 4,889,000
WW-FM-006	New Black Horse Forcemain to Niagara Falls	2022-2031	South Niagara Falls	$ 9,820,000
WW-FM-008	South Side High Lift conveyance	2022-2031	South Niagara Falls	$ 38,039,000
WW-FM-009	Dorchester Forcemain twinning	2022-2031	Niagara Falls	$ 303,000
WW-FM-010	St. Davids #1 Forcemain twinning	2022-2031	Niagara Falls	$ 3,923,000
WW-FM-011	Smithville Forcemain twinning	2022-2031	Baker Road	$ 18,132,000
WW-FM-012	New Queenston Forcemain	2022-2031	Niagara Falls	$ 11,136,000
WW-II-001	Wet weather reduction in East Fort Erie	2022-2031	Anger Ave	$ 4,500,000
WW-II-002	Wet weather reduction in Crystal Beach	2022-2031	Crystal Beach	$ 4,500,000
WW-II-003	Wet weather reduction in Stevensville/Douglastown	2022-2031	Stev / Doug	$ 4,500,000
WW-II-004	Wet weather reduction in Central Welland	2022-2031	Welland	$ 30,000,000
WW-II-005	Wet weather reduction in West Grimsby	2022-2031	Baker Road	$ 7,500,000
WW-II-006	Wet weather reduction in Beamsville	2022-2031	Baker Road	$ 3,000,000
WW-II-007	Wet weather reduction in Vineland	2022-2031	Baker Road	$ 1,500,000
WW-II-008	Wet weather reduction in St. Catharines - Port Dalhousie	2022-2031	Port Dalhousie	$ 30,000,000
WW-II-009	Wet weather reduction in Thorold North	2022-2031	Port Dalhousie	$ 13,500,000
WW-II-010	Wet weather reduction in St. Catharines and Thorold South - Port Weller	2017-2021	Port Weller	$ 20,100,000
WW-II-011	Wet weather reduction in Central Port Colborne	2022-2031	Seaway	$ 3,000,000
WW-II-012	Wet weather reduction in Central Niagara Falls	2022-2031	Niagara Falls	$ 15,000,000
WW-II-013	Wet weather reduction in South Side Niagara Falls	2017-2021	South Niagara Falls	$ 15,000,000
WW-II-014	Wet weather reduction in Northeast Niagara-on-the-Lake	2022-2031	NOTL	$ 750,000
WW-II-015	Wet weather reduction in Virgil	2022-2031	NOTL	$ 750,000
WW-SPS-001	Alliston SPS Pump Replacement - Anger Avenue	2022-2031	Anger Ave	$ 989,000
WW-SPS-002	Catherine St. SPS Expansion - Anger Avenue	2032-2041	Anger Ave	$ 2,945,000
WW-SPS-003	Lakeshore SPS Upgrade - Anger Avenue	2022-2031	Anger Ave	$ 2,618,000
WW-SPS-004	Shirley SPS Upgrade - Crystal Beach	2032-2041	Crystal Beach	$ 2,889,000
WW-SPS-005	Nigh Rd. SPS Pump Replacement - Crystal Beach	2022-2031	Crystal Beach	$ 989,000

Master Plan ID	Description	Year in Service	System	Total Component Estimated Cost
WW-SPS-006	Stevensville SPS Upgrade - Stevensville Douglastow n	2022-2031	Stev / Doug	$ 1,022,000
WW-SPS-007	Rosemount South SPS Pump Replacement - Seaw ay	2017-2021	Seaw ay	$ 665,000
WW-SPS-008	Oxford SPS Pump Replacement - Seaw ay	2032-2041	Seaw ay	$ 665,000
WW-SPS-009	Steele SPS Pump Replacement - Seaw ay	2032-2041	Seaw ay	$ 989,000
WW-SPS-011	Foss Road SPS Upgrade - Welland	2022-2031	Welland	$ 1,866,000
WW-SPS-012	Smithville SPS Expansion - Baker Road	2022-2031	Baker Road	$ 8,241,000
WW-SPS-013	Campden SPS Pump Replacement - Baker Road	2022-2031	Baker Road	$ 1,299,000
WW-SPS-014	Laurie Avenue SPS Expansion - Baker Road	2017-2021	Baker Road	$ 1,814,000
WW-SPS-015	Victoria Avenue SPS Upgrade - Baker Road	2017-2021	Baker Road	$ 4,051,000
WW-SPS-016	Bridgeport SPS Pump Replacement - Baker Road	2022-2031	Baker Road	$ 834,000
WW-SPS-017	Jordan Valley SPS Pump Replacement - Baker Road	2022-2031	Baker Road	$ 1,145,000
WW-SPS-018	Ontario Street SPS Upgrade - Baker Road	2032-2041	Baker Road	$ 3,755,000
WW-SPS-019	Biggar Lagoon Pump Replacement - Baker Road	2017-2021	Baker Road	$ 3,902,000
WW-SPS-020	Lake St SPS Upgrade - Baker Road	2017-2021	Baker Road	$ 4,410,000
WW-SPS-021	Beaverdams SPS Pump Replacement - Port Dalhousie	2017-2021	Port Dalhousie	$ 665,000
WW-SPS-025	Garner Road SPS Pump Replacement - Niagara Falls	2032-2041	Niagara Falls	$ 824,000
WW-SPS-026	Dorchester SPS Pump Replacement - Niagara Falls	2022-2031	Niagara Falls	$ 2,414,000
WW-SPS-028	Black Horse SPS Upgrade - South Niagara Falls	2022-2031	South Niagara Falls	$ 4,620,000
WW-SPS-031	St. Davids #2 SPS Expansion - Niagara Falls	2022-2031	Niagara Falls	$ 3,836,000
WW-SPS-032	St. Davids #1 SPS Upgrade - Niagara Falls	2022-2031	Niagara Falls	$ 1,794,000
WW-SPS-033	Lakeshore Road SPS Pump Replacement - NOTL	2032-2041	NOTL	$ 1,512,000
WW-SPS-034	Niagara Stone Road SPS Pump Replacement - NOTL	2032-2041	NOTL	$ 834,000
WW-SPS-035	Line 2 SPS Pump Replacement - NOTL	2017-2021	NOTL	$ 665,000
WW-SPS-036	Garrison Village SPS Pump Replacement - NOTL	2032-2041	NOTL	$ 1,250,000
WW-SPS-037	Tow path SPS Pump Replacement - Welland	2022-2031	Welland	$ 834,000
WW-SPS-038	Huricane Road SPS Pump Replacement - Welland	2022-2031	Welland	$ 1,250,000
WW-SPS-039	Queenston SPS	2022-2031	Niagara Falls	$ 2,996,000
WW-SS-001	Highw ay 406 Trunk Sew er Crossing	2017-2021	Welland	$ 1,450,000
WW-SS-002	Quaker Road Trunk Sew er	2022-2031	Welland	$ 1,725,000
WW-SS-003	Gravity Sew er upgrade in Grimsby	2022-2031	Baker Road	$ 5,667,000
WW-SS-004	Gravity Sew er upgrade in Grimsby	2022-2031	Baker Road	$ 923,000
WW-SS-005	Gravity Sew er upgrade in Smithville	2022-2031	Baker Road	$ 2,286,000
WW-TP-001	Baker Road WWTP Upgrade	2022-2031	Baker Road	$ 41,730,000
WW-TP-002	South Niagara Falls WWTP	2022-2031	Niagara Falls	$ 128,186,000
	Total			**$500,318,000**

Niagara Region

2016 MASTER SERVICING PLAN

MSP Wastewater Projects

- Treatment Plant
- Pumping Station
- Wet Weather Reduction
- Sanitary Sewer Projects
- Forcemain Projects

Wastewater Facilities

- Wastewater Treatment Plant
- Combined Sewage Detention Facility
- Lagoon
- Odour Control Facility
- Leachate Pumping Station

Pumping Stations
- Regional
- Municipal
- Private

Wastewater Network
- Regional
- Private
- Local
- Forcemain

Wastewater Catchments*

*Catchment limits are shown based on property boundaries and are within 100 m of sewers.

- Baker Road W.W.T.P.
- Bal Harbour
- Biggar Lagoon
- Bridgeport
- Campden
- Jordan Valley
- Lake Street
- Lakewood Garden
- Laurie Avenue
- Old Orchard
- Ontario Street
- Roberts Road
- Smithville
- Streamside
- Victoria Avenue
- Woodsview

Lake Ontario

Roberts Road Pumping Station
Biggar Lagoon Pumping Station
WW-SPS-019
WW-II-005
Lake Street Pumping Station
Old Orchard Pumping Station
WW-SPS-020
WW-TP-001
WW-SS-004
Bal Harbour Pumping Station
Ontario Street Pumping Station
WW-SPS-018
Laurie Avenue Pumping Station
WW-SPS-014
WW-FM-004
Victoria Avenue Pumping Station
WW-SPS-015
WW-SPS-016
Bridgeport Pumping Station
WW-II-007
WW-II-006
WW-SS-003
Baker Road W.W.T.P.
Lakewood Garden Pumping Station
Woodsview Pumping Station
WW-II-007
WW-II-007
Jordan Valley Pumping Station
WW-SPS-017
WW-SPS-013
Campden Pumping Station
WW-FM-011
Streamside Pumping Station
WW-SS-005
WW-SPS-012
Smithville Pumping Station

City of Hamilton
Town of Grimsby
Township of West Lincoln
Town of Lincoln
Town of Pelham

0 2 4 Kilometers

Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community

Figure 1.10
Preferred Wastewater Strategy
Baker Road WWTP

BluePlan

June 2017
715023-WW-6-Capital Projects (Baker Road)
NAD 1983 UTM Zone 17N

Niagara Region

2016 MASTER SERVICING PLAN

MSP Wastewater Projects

- Treatment Plant
- Pumping Station
- Wet Weather Reduction
- Sanitary Sewer Projects
- Forcemain Projects

Wastewater Facilities

- Wastewater Treatment Plant
- Combined Sewage Detention Facility
- Lagoon
- Odour Control Facility
- Leachate Pumping Station

Pumping Stations
- Regional
- Municipal
- Private

Wastewater Network
- Regional
- Private
- Local
- Forcemain

Wastewater Catchments*

*Catchment limits are shown based on property boundaries and are within 100 m of sewers.

- Port Dalhousie W.W.T.P.
- 243000007 (Private)
- Argyle
- Beaverdams
- Cole Farm
- Confederation Heights
- Eastchester
- Glendale
- Lakeside
- Lighthouse Road
- Nadine Avenue
- October Village
- Renown
- Riverview
- Snug Harbour
- St. Georges Point
- Wellandvale

Figure 1.11

Preferred Wastewater Strategy

Port Dalhousie WWTP

June 2017
715023-WW-6-Capital Projects (Port Dalhousie)
NAD 1983 UTM Zone 17N

Lake Ontario

Lakeside Pumping Station
Snug Harbour Pumping Station
Cole Farm Pumping Station
October Village Pumping Station
Lighthouse Road Pumping Station
Port Dalhousie W.W.T.P.
St. Georges Point Pumping Station
Argyle Pumping Station
Eastchester Pumping Station
Wellandvale Pumping Station
Renown Pumping Station
Glendale Pumping Station
Riverview Pumping Station
Confederation Heights Pumping Station
Beaverdams Pumping Station

WW-II-008
WW-II-009
WW-SPS-021

Town of Niagara-on-the-Lake
City of St. Catharines
Town of Niagara-on-the-Lake
City of Niagara Falls
City of St. Catharines
City of Thorold
Town of Lincoln
City of St. Catharines
Town of Lincoln
Town of Pelham
City of St. Catharines
Town of Pelham
Town of Pelham
City of Thorold
City of Thorold
City of Niagara Falls

0 1 2 Kilometers

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Niagara Region

2016 MASTER SERVICING PLAN

MSP Wastewater Projects

- Treatment Plant
- Pumping Station
- Wet Weather Reduction
- Sanitary Sewer Projects
- Forcemain Projects

Wastewater Facilities

- Wastewater Treatment Plant
- Combined Sewage Detention Facility
- Lagoon
- Odour Control Facility
- Leachate Pumping Station

Pumping Stations
- Regional
- Municipal
- Private

Wastewater Network
- Regional
- Private
- Local
- Forcemain

Wastewater Catchments*

*Catchment limits are shown based on property boundaries and are within 100 m of sewers.

- Port Weller W.W.T.P
- Airport Road
- Black Horse
- Carleton Street
- Centre Street
- Haulage Road
- Lombardy Avenue
- Peel Street
- Spring Gardens

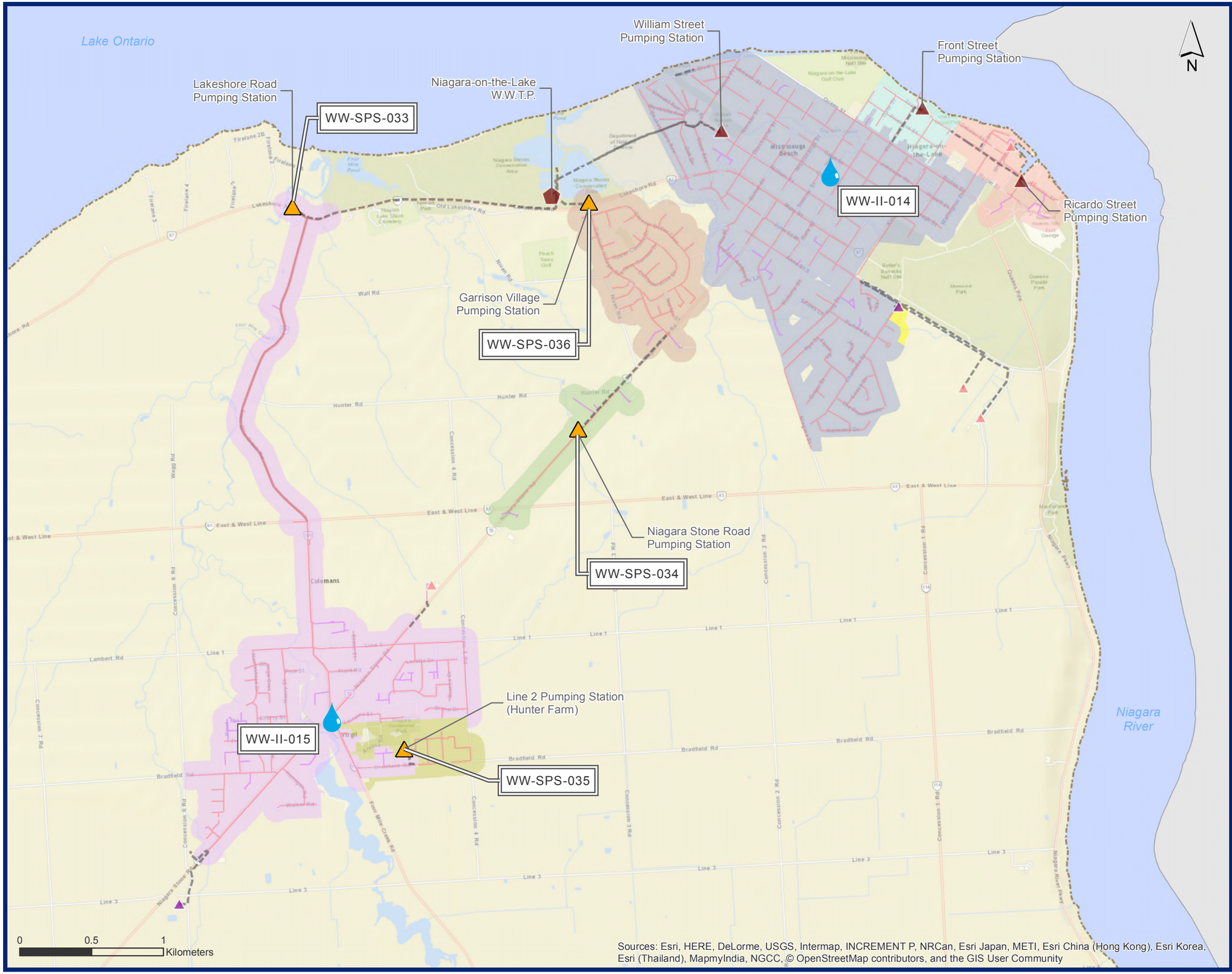
Figure 1.12

Preferred Wastewater Strategy

Port Weller WWTP

BluePlan

June 2017
715023-WW-6-Capital Projects (Port Weller)
NAD 1983 UTM Zone 17N



Niagara Region

2016 MASTER SERVICING PLAN

MSP Wastewater Projects

- Treatment Plant
- Pumping Station
- Wet Weather Reduction
- Sanitary Sewer Projects
- Forcemain Projects

Wastewater Facilities

- Wastewater Treatment Plant
- Combined Sewage Detention Facility
- Lagoon
- Odour Control Facility
- Leachate Pumping Station

Pumping Stations
- Regional
- Municipal
- Private

Wastewater Network
- Regional
- Private
- Local
- Forcemain

Wastewater Catchments*

*Catchment limits are shown based on property boundaries and are within 100 m of sewers.

- Front Street
- Garrison Village
- Lakeshore Road
- Line 2 (Hunter Farm)
- Niagara Stone Road
- Ricardo Street
- Romance Cards Inc.
- St. Michaels Catholic Elementary School
- William Street

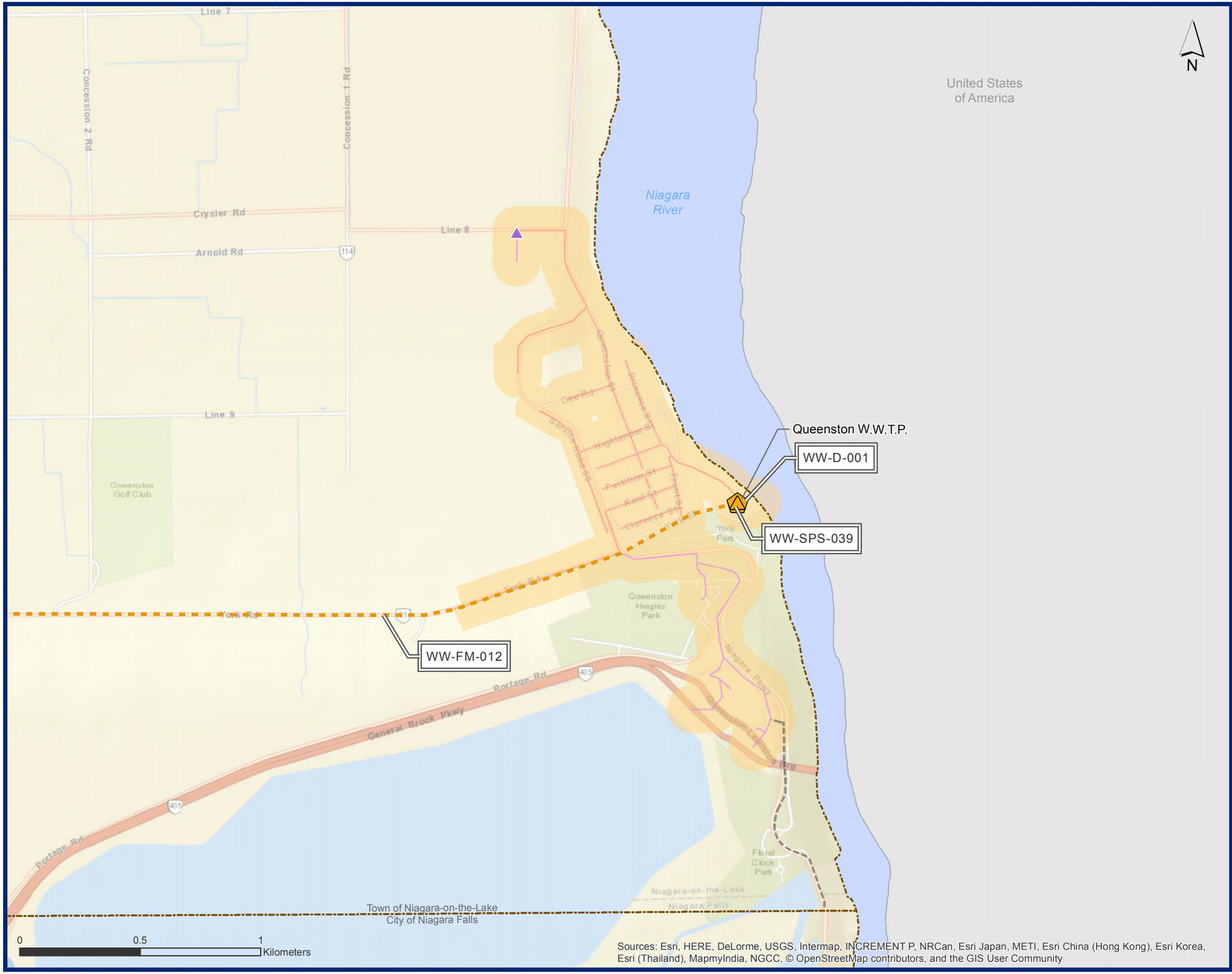
Figure 1.13

Preferred Wastewater Strategy

Niagara-on-the-Lake WWTP

BluePlan

June 2017
715023-WW-6-Capital Projects (NOTL)
NAD 1983 UTM Zone 17N



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Niagara Region

2016 MASTER SERVICING PLAN

MSP Wastewater Projects

- Treatment Plant
- Pumping Station
- Wet Weather Reduction
- Sanitary Sewer Projects
- Forcemain Projects

Wastewater Facilities

- Wastewater Treatment Plant
- Combined Sewage Detention Facility
- Lagoon
- Odour Control Facility
- Leachate Pumping Station

Pumping Stations
- Regional
- Municipal
- Private

Wastewater Network
- Regional
- Local
- Private
- Forcemain

Wastewater Catchments*

*Catchment limits are shown based on property boundaries and are within 100 m of sewers.

- Queenston W.W.T.P.

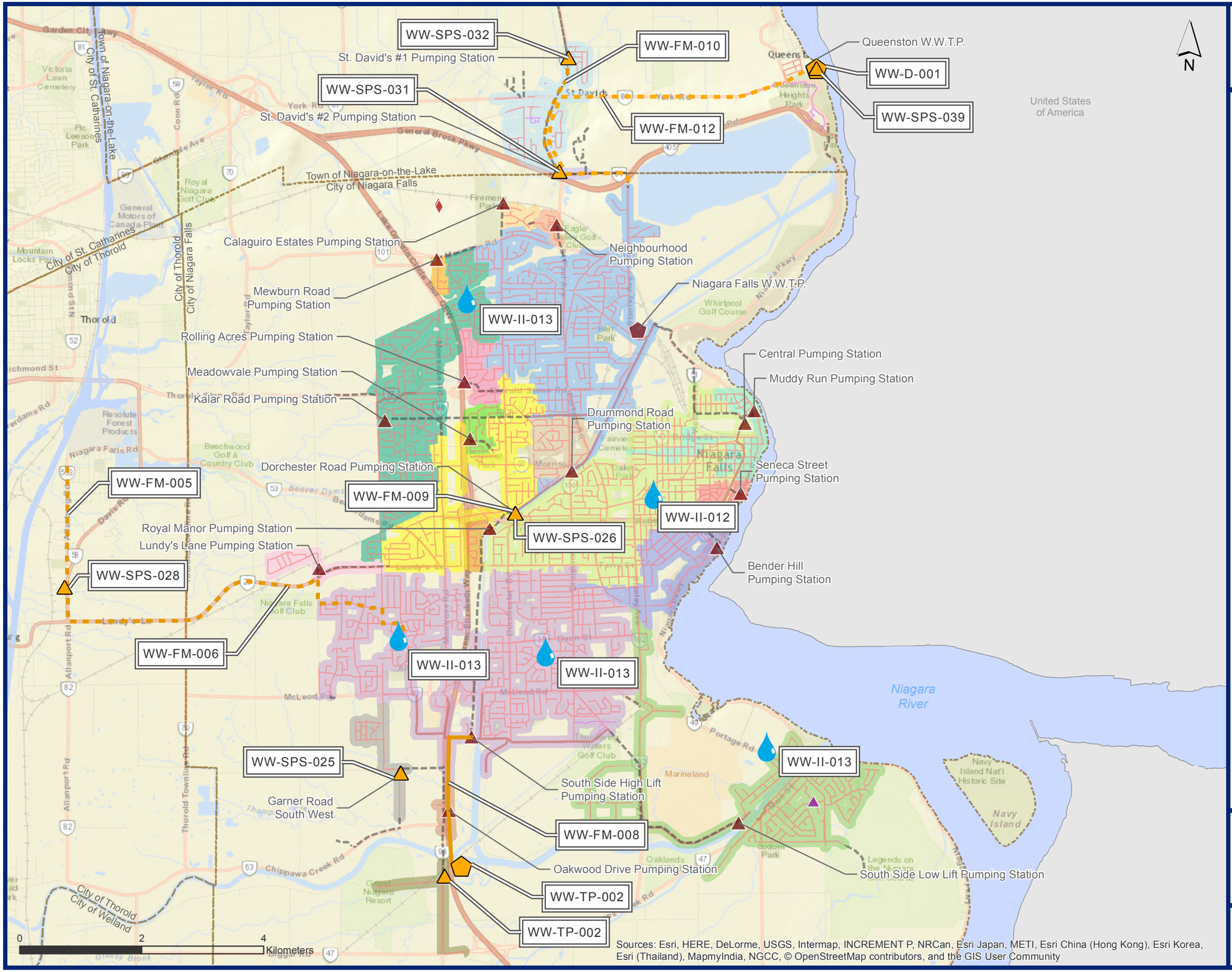
Figure 1.14

Preferred Wastewater Strategy

Queenston WWTP

BluePlan

June 2017
715023-WW-6-Capital Projects (Queenston)
NAD 1983 UTM Zone 17N



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Niagara Region

2016 MASTER SERVICING PLAN

MSP Wastewater Projects

- Treatment Plant
- Pumping Station
- Wet Weather Reduction
- Sanitary Sewer Projects
- Forcemain Projects

Wastewater Facilities

- Wastewater Treatment Plant
- Combined Sewage Detention Facility
- Lagoon
- Odour Control Facility
- Leachate Pumping Station

Pumping Stations
- Regional
- Municipal
- Private

Wastewater Network
- Regional
- Private
- Local
- Forcemain

Wastewater Catchments*

*Catchment limits are shown based on property boundaries and are within 100 m of sewers.

- Niagara Falls W.W.T.P.
- Bender Hill
- Calaguiro Estates
- Central
- Dorchester Road
- Drummond Road
- Garner Road South West
- Grassy Brook
- Kalar Road
- Lundy's Lane
- Meadowvale
- Mewburn Road
- Muddy Run
- Neighbourhood
- Oakwood Drive
- Rolling Acres
- Royal Manor
- Seneca Street
- South Side High Lift
- South Side Low Lift
- St. David's #1
- St. David's #2

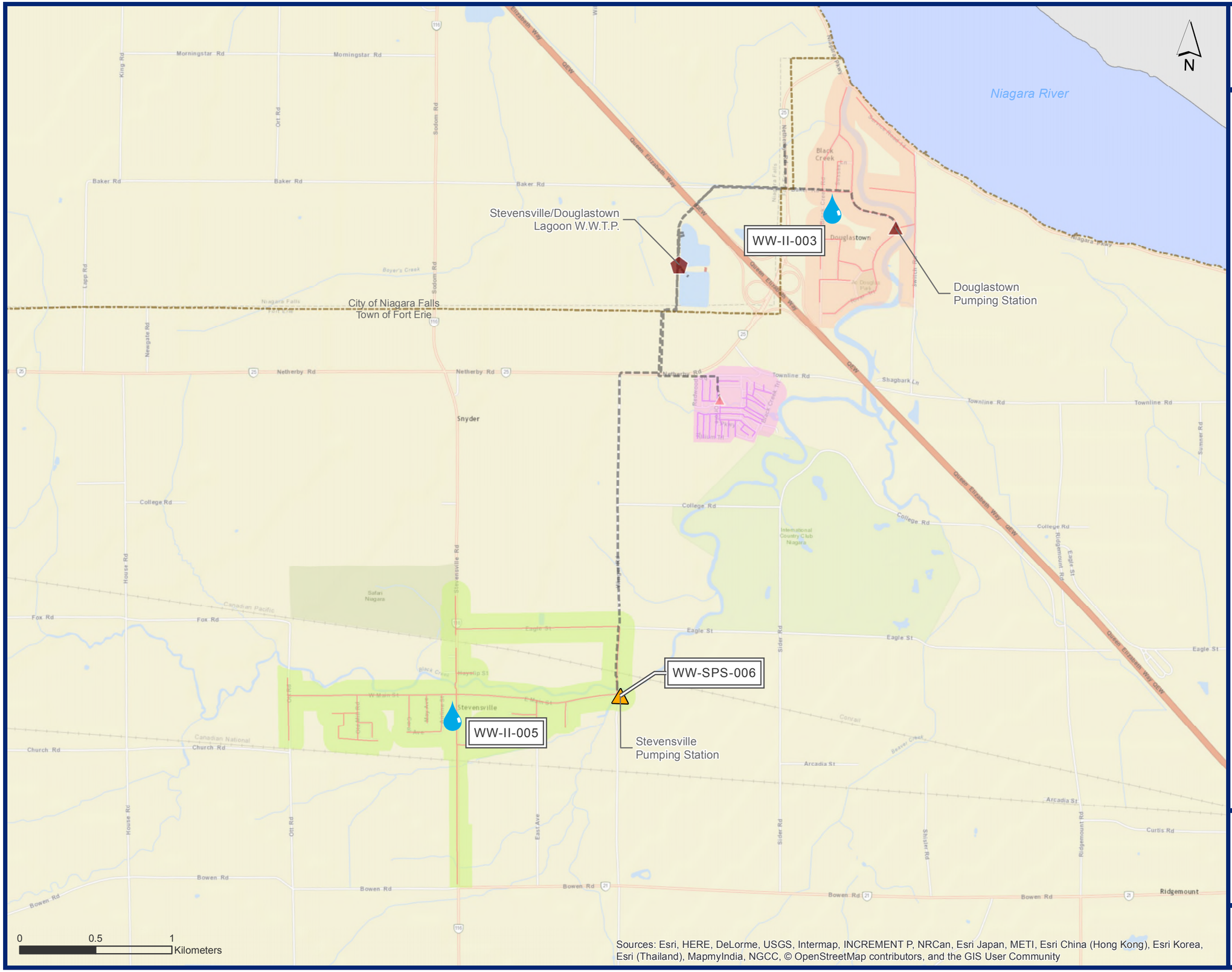
Figure 1.15

Preferred Wastewater Strategy

Niagara Falls WWTP

BluePlan Engineering

September 2017
715023-WW-6-Capital Projects (Niagara Falls)
NAD 1983 UTM Zone 17N



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Niagara Region

2016 MASTER SERVICING PLAN

MSP Wastewater Projects

- Treatment Plant
- Pumping Station
- Wet Weather Reduction
- Sanitary Sewer Projects
- Forcemain Projects

Wastewater Facilities

- Wastewater Treatment Plant
- Combined Sewage Detention Facility
- Lagoon
- Odour Control Facility
- Leachate Pumping Station

Pumping Stations
- Regional
- Municipal
- Private

Wastewater Network
- Regional
- Private
- Local
- Forcemain

Wastewater Catchments*

*Catchment limits are shown based on property boundaries and are within 100 m of sewers.

- Stevensville
- Douglastown
- Black Creek

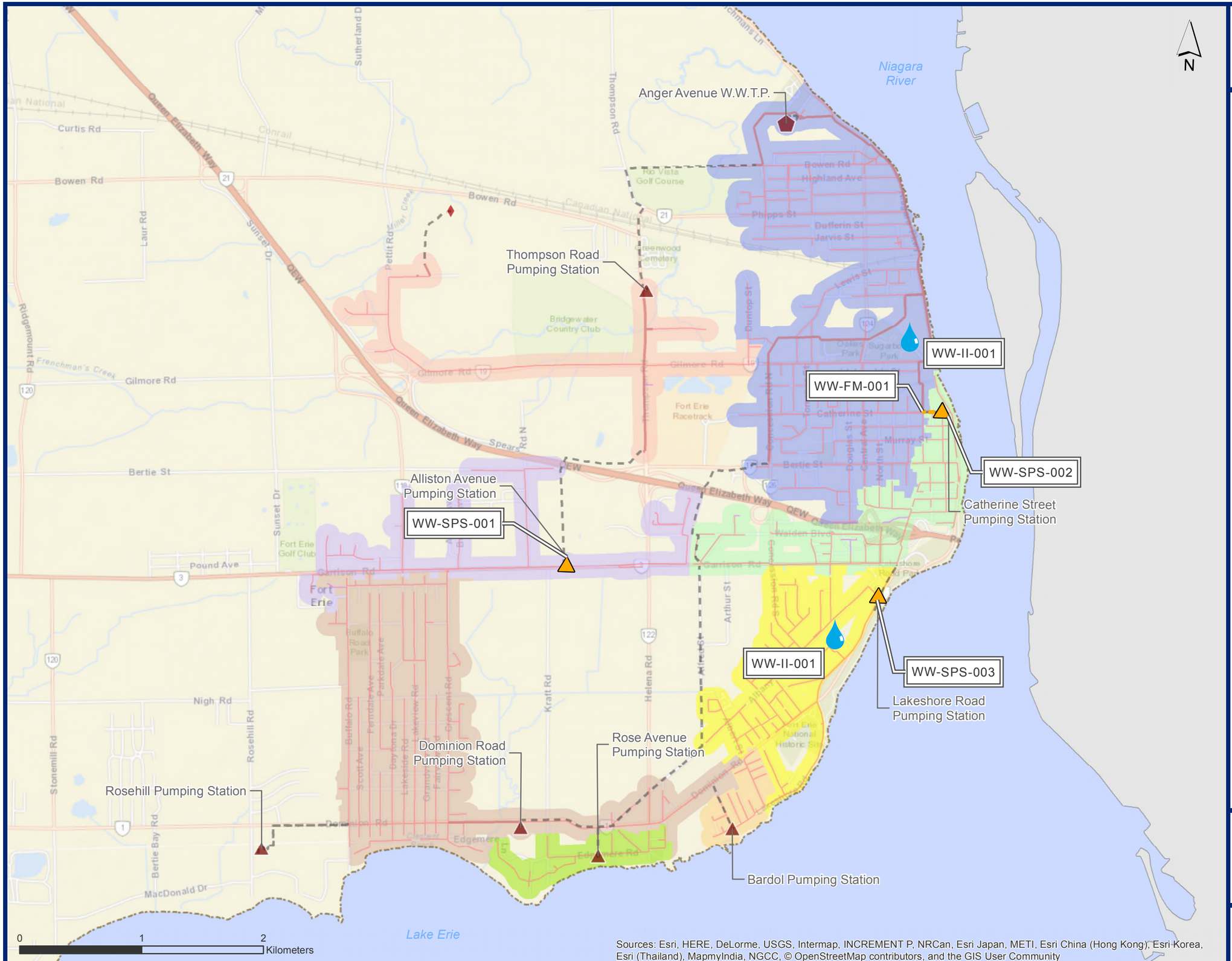
Figure 1.16

Preferred Wastewater Strategy

Stevensville Douglastown Lagoons

BluePlan

June 2017
715023-WW-6-Capital Projects (SD)
NAD 1983 UTM Zone 17N



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Niagara Region

2016 MASTER SERVICING PLAN

MSP Wastewater Projects

- Treatment Plant
- Pumping Station
- Wet Weather Reduction
- Sanitary Sewer Projects
- Forcemain Projects

Wastewater Facilities

- Wastewater Treatment Plant
- Combined Sewage Detention Facility
- Lagoon
- Odour Control Facility
- Leachate Pumping Station

Pumping Stations
- Regional
- Municipal
- Private

Wastewater Network
- Regional
- Private
- Local
- Forcemain

Wastewater Catchments*

*Catchment limits are shown based on property boundaries and are within 100 m of sewers.

- Anger Avenue W.W.T.P.
- Alliston Avenue
- Bardol
- Catherine Street
- Dominion Road
- Lakeshore Road
- Rose Avenue
- Thompson Road

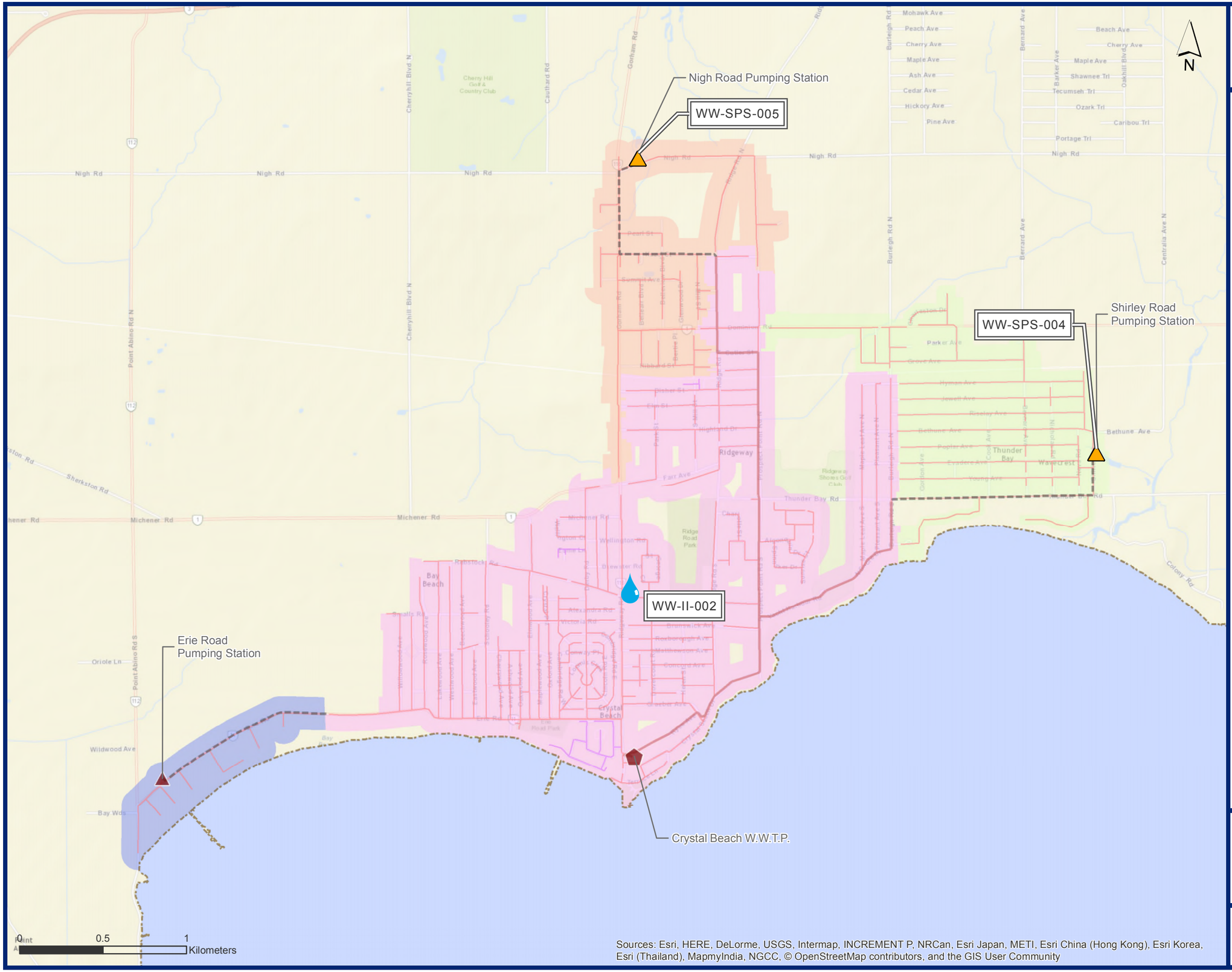
Figure 1.17

Preferred Wastewater Strategy

Anger Avenue WWTP

BluePlan

June 2017
715023-WW-6-Capital Projects (Anger Ave)
NAD 1983 UTM Zone 17N



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Niagara Region

2016 MASTER SERVICING PLAN

MSP Wastewater Projects

- Treatment Plant
- Pumping Station
- Wet Weather Reduction
- Sanitary Sewer Projects
- Forcemain Projects

Wastewater Facilities

- Wastewater Treatment Plant
- Combined Sewage Detention Facility
- Lagoon
- Odour Control Facility
- Leachate Pumping Station

Pumping Stations
- Regional
- Municipal
- Private

Wastewater Network
- Regional
- Private
- Local
- Forcemain

Wastewater Catchments*

*Catchment limits are shown based on property boundaries and are within 100 m of sewers.

- Crystal Beach W.W.T.P.
- Erie Road
- Nigh Road
- Shirley Road

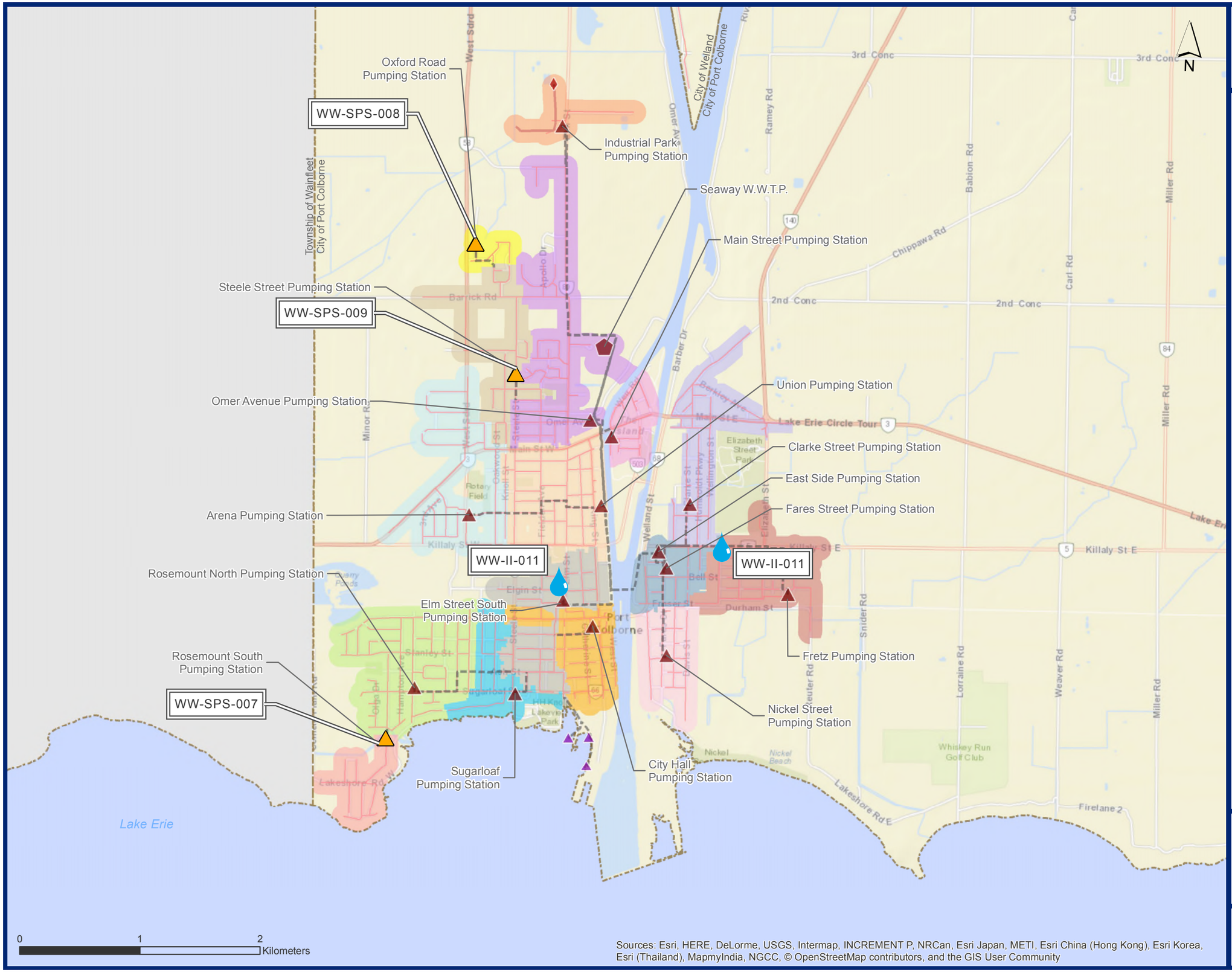
Figure 1.18

Preferred Wastewater Strategy

Crystal Beach WWTP

BluePlan

June 2017
715023-WW-6-Capital Projects (Crystal Beach)
NAD 1983 UTM Zone 17N



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Niagara Region

2016 MASTER SERVICING PLAN

MSP Wastewater Projects

- Treatment Plant
- Pumping Station
- Wet Weather Reduction
- Sanitary Sewer Projects
- Forcemain Projects

Wastewater Facilities

- Wastewater Treatment Plant
- Combined Sewage Detention Facility
- Lagoon
- Odour Control Facility
- Leachate Pumping Station

Pumping Stations
- Regional
- Municipal
- Private

Wastewater Network
- Regional
- Private
- Local
- Forcemain

Wastewater Catchments*

*Catchment limits are shown based on property boundaries and are within 100 m of sewers.

- Arena
- City Hall
- Clarke Street
- East Side
- Elm Street
- Fares Street
- Fretz
- Industrial Park
- Main Street
- Nickel Street
- Omer Avenue
- Oxford Road
- Rosemount North
- Rosemount South
- Steele Street
- Sugarloaf
- Union

Figure 1.19

Preferred Wastewater Strategy

Seaway WWTP

BluePlan

June 2017
715023-WW-6-Capital Projects (PC)
NAD 1983 UTM Zone 17N

Niagara Region

2016 MASTER SERVICING PLAN

MSP Wastewater Projects

- Treatment Plant
- Pumping Station
- Wet Weather Reduction
- Sanitary Sewer Projects
- Forcemain Projects

Wastewater Facilities

- Wastewater Treatment Plant
- Combined Sewage Detention Facility
- Lagoon
- Odour Control Facility
- Leachate Pumping Station

Pumping Stations
- Regional
- Municipal
- Private

Wastewater Network
- Regional
- Private
- Local
- Forcemain

Wastewater Catchments*

*Catchment limits are shown based on property boundaries and are within 100 m of sewers.

- Welland W.W.T.P.
- Dailmer Woods
- Dain City
- Feeder Road
- Foss Road
- George Street
- Hurricane Road
- Kelly Street
- Ontario Road
- Park Lane
- Seaway Heights
- Timmsdale
- Towpath Road
- 283000012 (Private)

Park Lane Pumping Station
Hurricane Road Pumping Station
WW-SPS-038
Kelly Street Pumping Station
South Street Pumping Station
WW-SS-001
Seaway Heights Pumping Station
Timmsdale Pumping Station
WW-SS-002
George Street Pumping Station
Dailmer Woods Pumping Station
WW-SPS-037
Towpath Road Pumping Station
WW-FM-003
Welland W.W.T.P.
WW-SPS-011
Foss Road Pumping Station
WW-II-004
Welland Backwash Pumping Station
Ontario Road Pumping Station
Feeder Road Pumping Station
Dain City Pumping Station
Town of Pelham
City of Thorold
City of Niagara Falls
Township of Wainfleet
City of Welland
City of Port Colborne

0 2 4 Kilometers

Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community

Figure 1.20
Preferred Wastewater Strategy
Welland WWTP

BluePlan

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715023-WW-6-Capital Projects (Welland)
NAD 1983 UTM Zone 17N