What is driving the Master Plan Strategy Update?

Optimization of Existing and Future Infrastructure

Wet Weather Issues

MOE F-5-5 & Regulations

Meeting servicing needs for Niagara 2041

Comprehensive & Sustainable Capital Program

Seasonal Demands

Level of Service and Design Basis Review

Why are we Doing a Water and Wastewater Master Plan?

- The Region of Niagara has initiated a Region-Wide Water and Wastewater Master Servicing Plan (MSP) to provide safe, sustainable and optimized Water and Wastewater services that support growth.
- The MSP will provide the business case for the need, timing and cost of servicing and infrastructure while doing so through a fully integrated process with Niagara 2041.
- The MSP will provide a detailed Regional water and wastewater capital program vetted through the comprehensive Municipal Engineers Association (MEA) Class Environmental Assessment process for Master Plans - Approach #2.

Water and Wastewater Master Servicing Plan Vision Statement

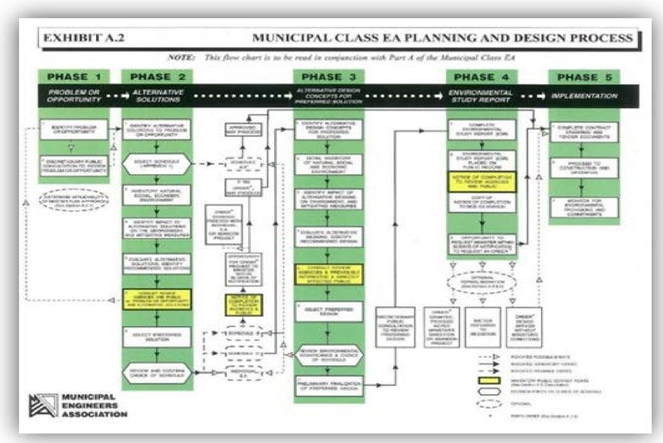
Providing for Today, Vision for Tomorrow

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.

- In 2011, the Region completed a Water and Wastewater Master Servicing Plan (MSP) update which looked at planned growth to 2031.
- With an updated planning horizon to 2041, the MSP 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 MSP will develop a long-termservicing 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.

Environmental Assessment Process & Consultation

- The study follows the Master Plan process as outlined in Section A.2.7 of the Municipal Engineers Association (MEA) Municipal Class Environmental Assessment (Oct 2000, as amended in 2007 and 2011).
- The Master Plan will be filed under Approach #2 of the MEA Class EA Approach for Master Planning.
- The Master Servicing Plan will meet the planning requirements for Schedule A, A+ and select Schedule B projects and provide the basis for future investigations of identified Schedule B and C projects.



PHASE 1
Identify & describe the Problem/Opportunity Statement

Notice of Commencement and PIC #1
Public Consultation/Review agency contact point
November 2015

PHASE 2
Complete Study Area Inventory identify Alternative Solutions and Growth Strategies

PIC #2
Public Consultation/Review agency contact point
June 2016

PHASE 3
Evaluate Alternative Solutions
Establish Preferred Solutions

PIC #3
Public Consultation/Review agency contact point
Summer/Early Fall 2016

We Are Here

BluePlan ENGINEERING

Niagara Region Water and Wastewater Master Servicing Plan

Notice of Completion
(Mandatory Contact Point)
November 2016

WATER AND WASTEWATER MASTER SERVICING PLAN KEY 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.

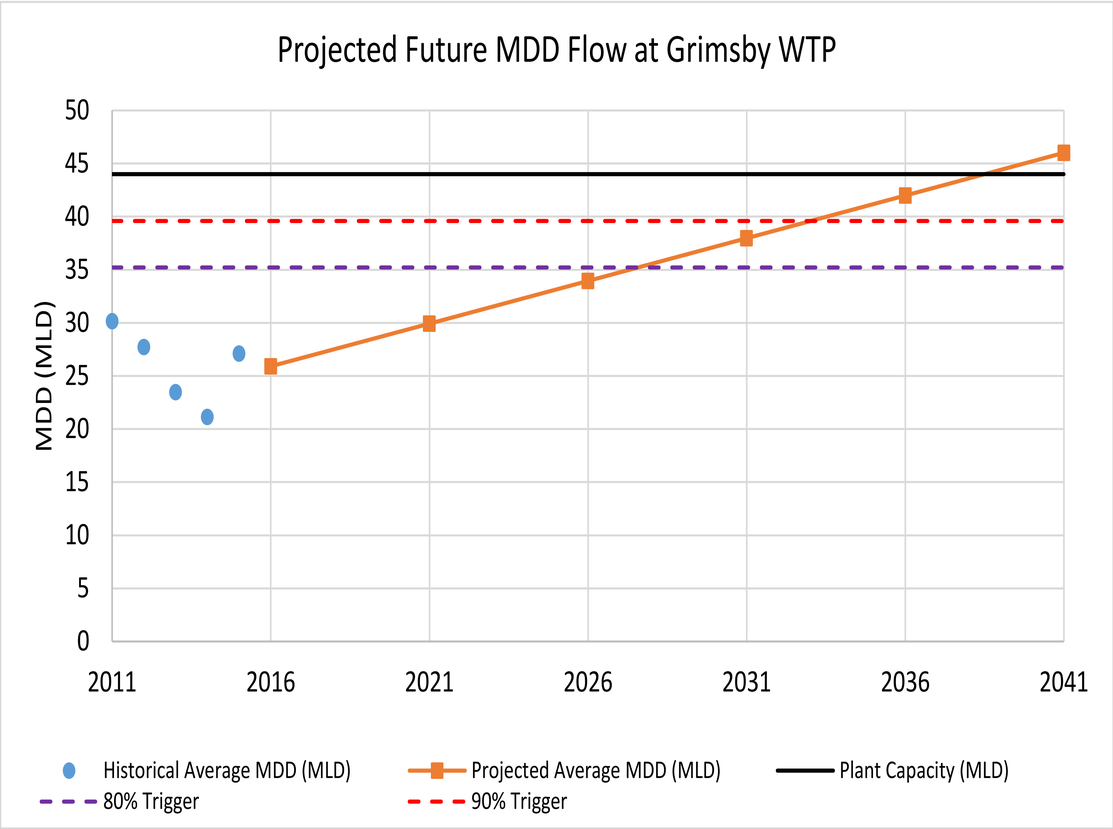
- Niagara Region will endeavor to maintain sufficient reserve capacity in its water and wastewater infrastructure and facilities to provide operational flexibility and meet potential changes in servicing conditions
- Niagara region shall endeavor to provide reliability, redundancy and security in its 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

WATER SERVICING

GRIMSBY WATER TREATMENT PLANT SYSTEM

Grimsby | Lincoln | West Lincoln

- Treatment: Deficit
- Pumping: Deficit
- Storage: Surplus
- Pressures:
  - » Majority 50-90 psi
  - » High (> 90 psi) minimum pressures in Grimsby and Lincoln
  - » < 40 psi in Smithville with growth
- Fire Flow:
  - » Issues in Smithville
- Security of Supply:
  - » Single branch trunk system



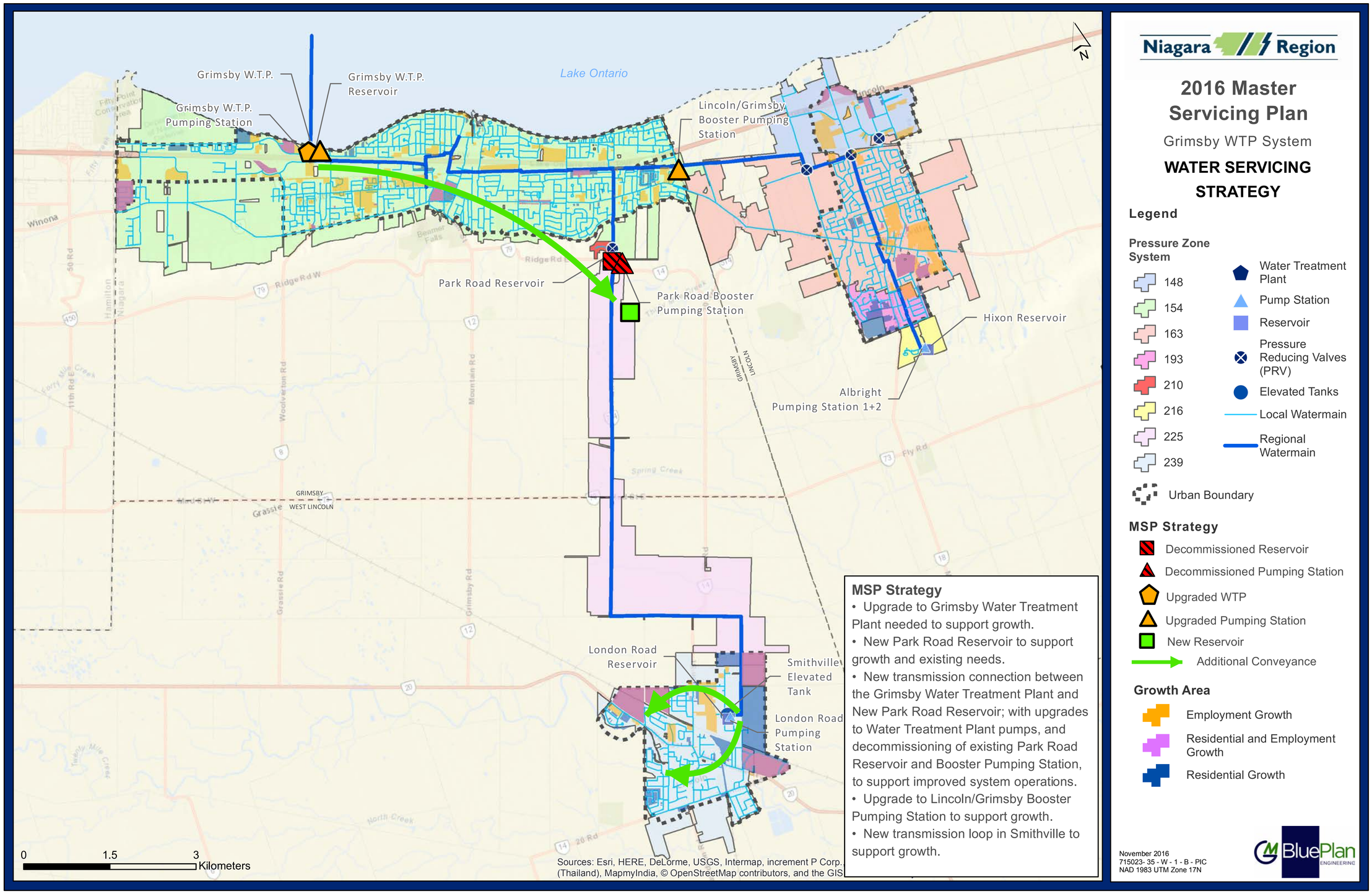
Challenges

- Significant growth
- Pumping capacity and treatment plant capacity limitation
- High pressures in Grimsby and Lincoln
- Conveyance capacity in Smithville
- Single branch trunk system

	2014	2041	Growth
Equivalent Population	62,468	101,442	38,974

HOW WE **FLOW**

Grimsby Water Treatment Plant System

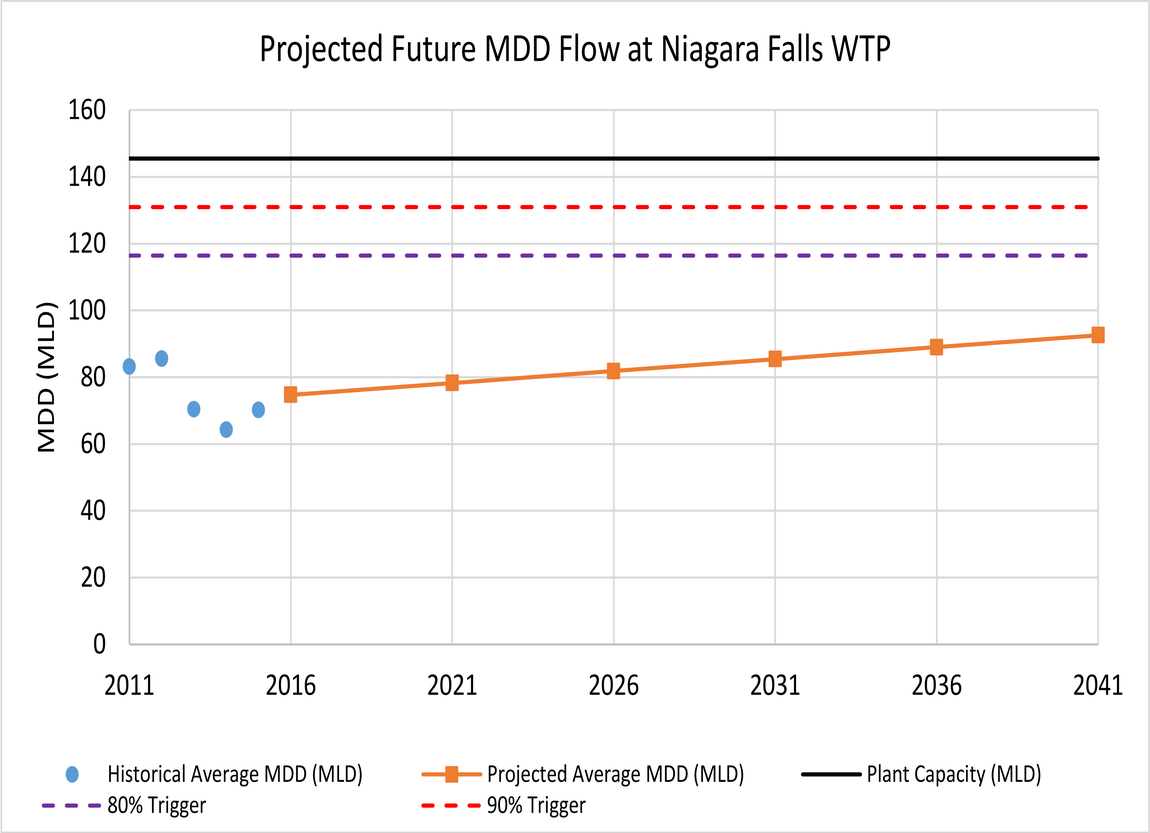


WATER SERVICING

NIAGARA FALLS WATER TREATMENT PLANT SYSTEM

Niagara Falls | Niagara-on-the-Lake | Thorold

- Treatment: Surplus
- Pumping:
  - » Existing surplus
  - » Future peak pumping deficit
- Storage:
  - » Existing surplus; balancing storage deficit
  - » Future deficit
- Pressures: 50-90 psi
- Fire Flow:
  - » Adequate capacity within the local system
- Security of Supply:
  - » Connections to growth in South
  - » Additional trunk lines to Decew
  - » High friction losses in distribution system



Challenges

- Significant growth in South
- Future storage deficit and existing balancing storage deficit = stress on existing pump capacity at treatment plant

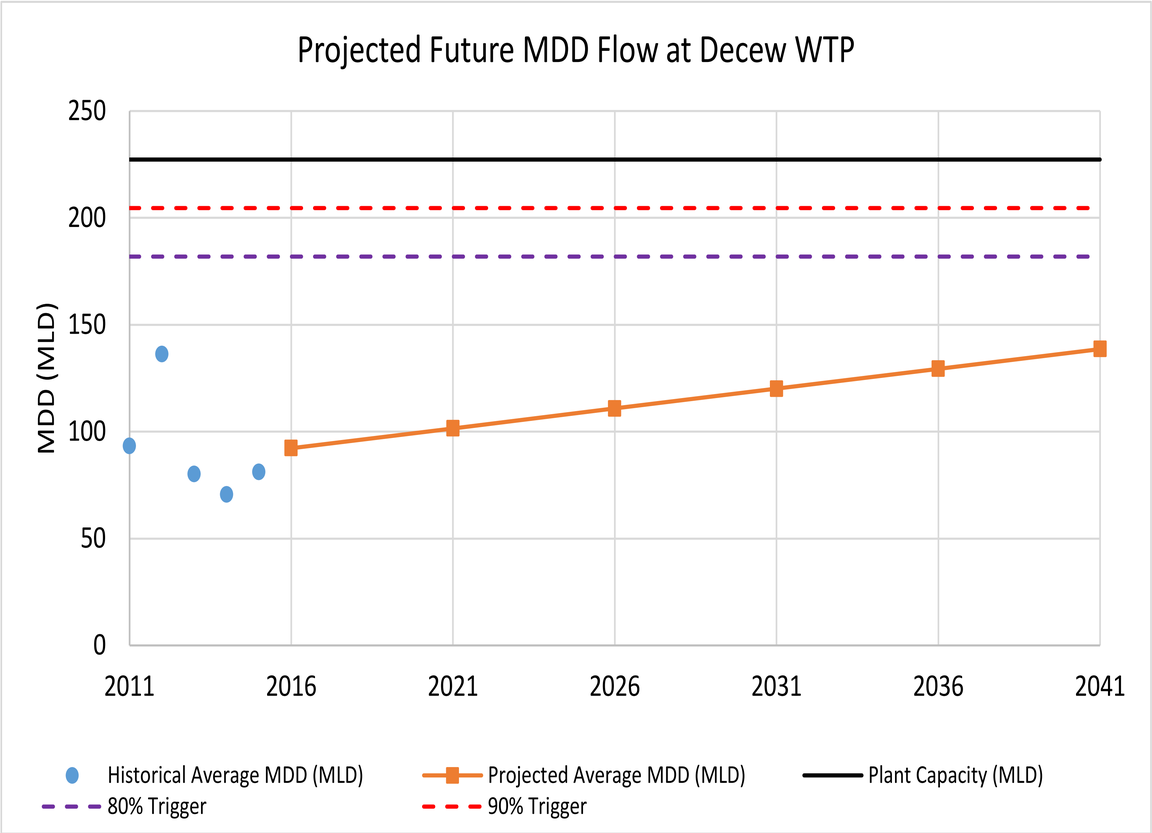
	2014	2041	Growth
Equivalent Population	131,081	185,070	53,989

WATER SERVICING

DECEW WATER TREATMENT PLANT SYSTEM

Niagara-on-the-Lake | St. Catharines | Lincoln | Thorold

- Treatment: Surplus
- Pumping: Surplus
- Storage:
  - » Surplus in 154 and 164
  - » Deficit in all other zones
- Pressures: 50-90 psi
- Fire Flow:
  - » Adequate capacity within the local system
- Security of Supply:
  - » Single trunk to Niagara-on-the-Lake
  - » Single trunk to Lincoln



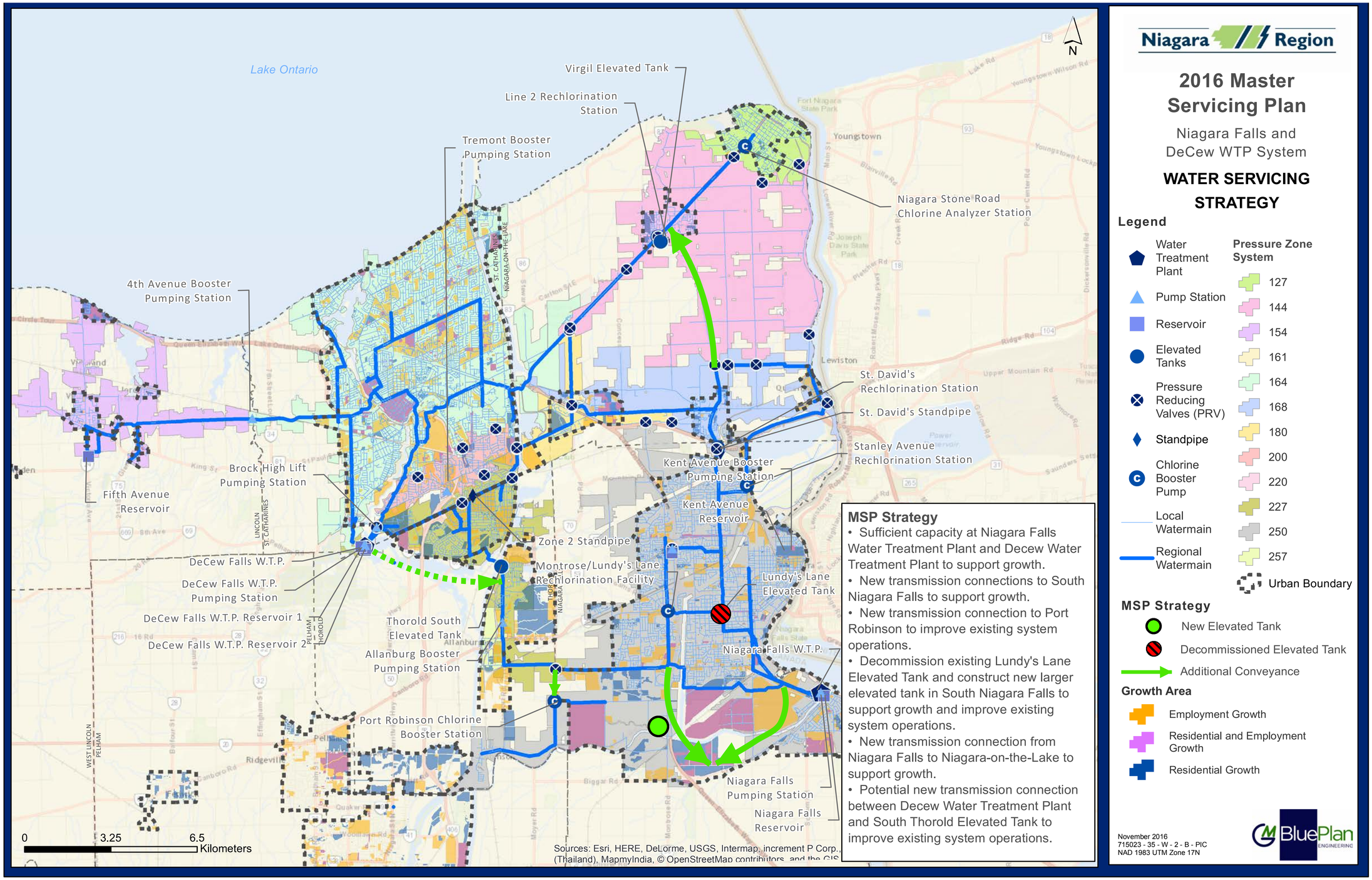
Challenges

- Significant built boundary growth
- Managing storage deficits via pumping and conveyance
- Conveyance and storage to Niagara-on-the-Lake
- Growth related conveyance limitations

	2014	2041	Growth
Equivalent Population	264,332	342,669	78,337

HOW WE **FLOW**

Niagara Falls and Decew Water Treatment Plant System



MSP Strategy

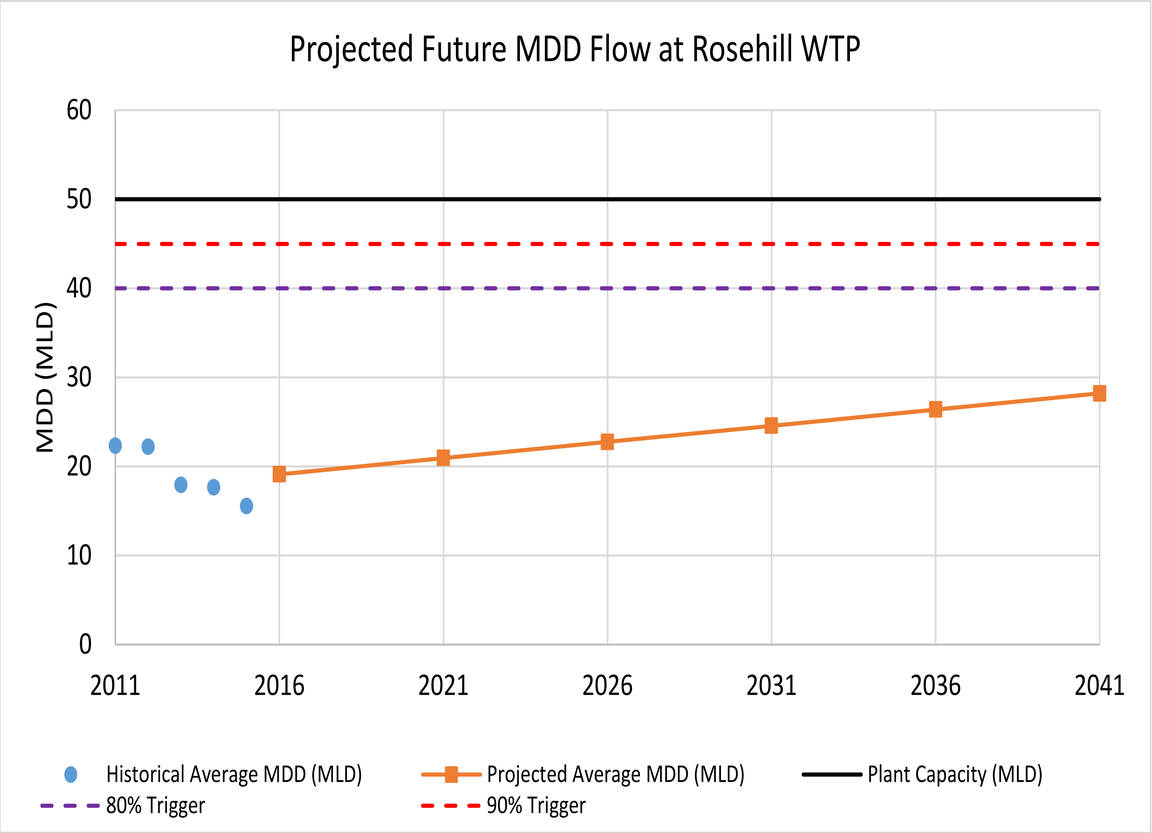
- Sufficient capacity at Niagara Falls Water Treatment Plant and Decew Water Treatment Plant to support growth.
- New transmission connections to South Niagara Falls to support growth.
- New transmission connection to Port Robinson to improve existing system operations.
- Decommission existing Lundy's Lane Elevated Tank and construct new larger elevated tank in South Niagara Falls to support growth and improve existing system operations.
- New transmission connection from Niagara Falls to Niagara-on-the-Lake to support growth.
- Potential new transmission connection between Decew Water Treatment Plant and South Thorold Elevated Tank to improve existing system operations.

WATER SERVICING

ROSEHILL WATER TREATMENT PLANT SYSTEM

Fort Erie

- Treatment: Surplus
- Pumping: Surplus
- Storage: Deficit
- Pressures: 50-90 psi
- Fire Flow:
  - » < 40 psi along trunk
  - » Adequate capacity within the local system
- Security of Supply:
  - » Single trunk feed to Downtown
  - » Single trunk feed to Crystal Beach



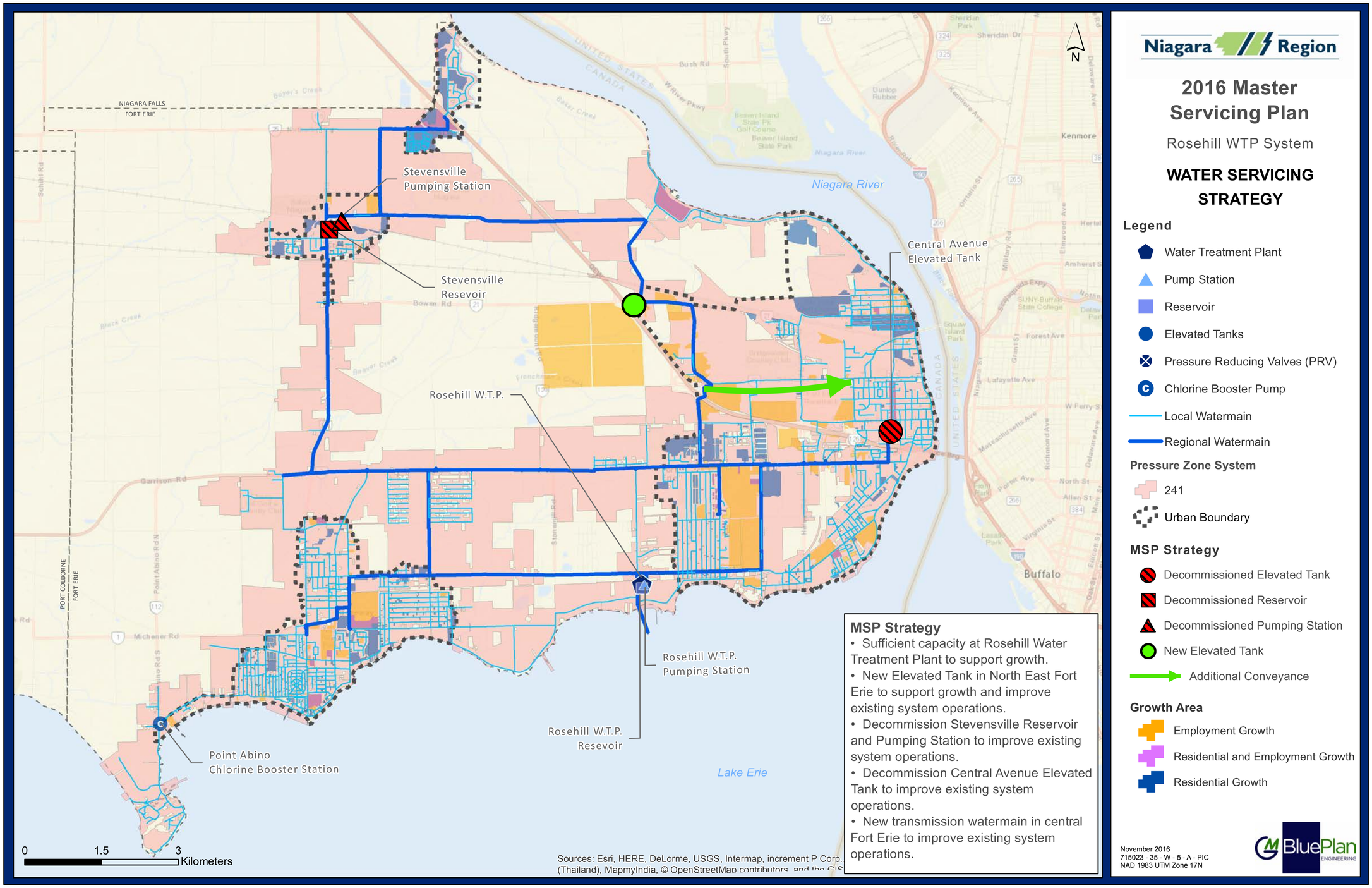
Challenges

- Significant growth
- Large employment growth in central Fort Erie
- Limited floating storage = sub-optimal pumping strategy and energy management
- Existing and increasing storage deficit

	2014	2041	Growth
Equivalent Population	43,008	61,792	18,784

HOW WE **FLOW**

ROSEHILL WATER TREATMENT PLANT SYSTEM

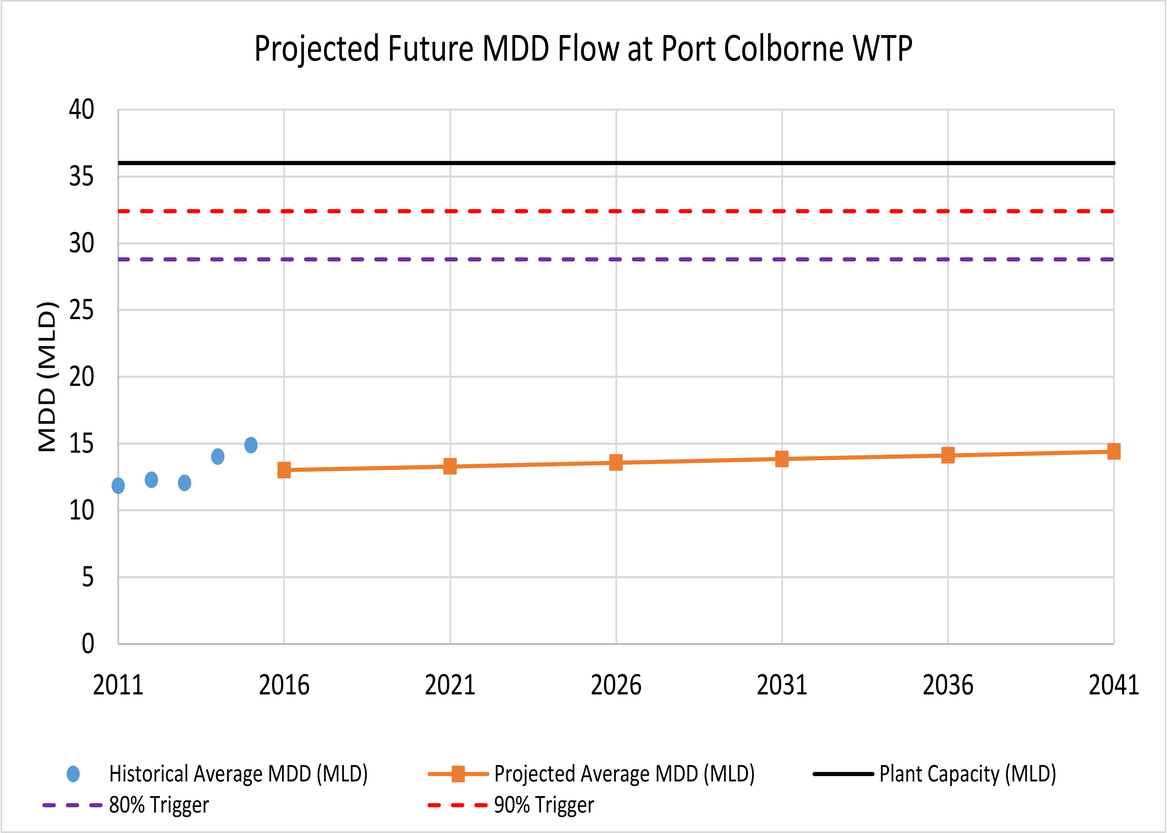


WATER SERVICING

PORT COLBORNE WATER TREATMENT PLANT SYSTEM

Port Colborne

- Treatment: Surplus
- Pumping: Surplus
- Storage:
  - » Existing deficit*
  - » Future surplus
- Pressures:
  - » Majority 50-90 psi
  - » Localized 40-50 psi
- Fire Flow:
  - » < 40 psi in NE
  - » Limitations in NE growth area
- Security of Supply:
  - » Single trunk feed to East side of canal
  - » No storage on East side of canal



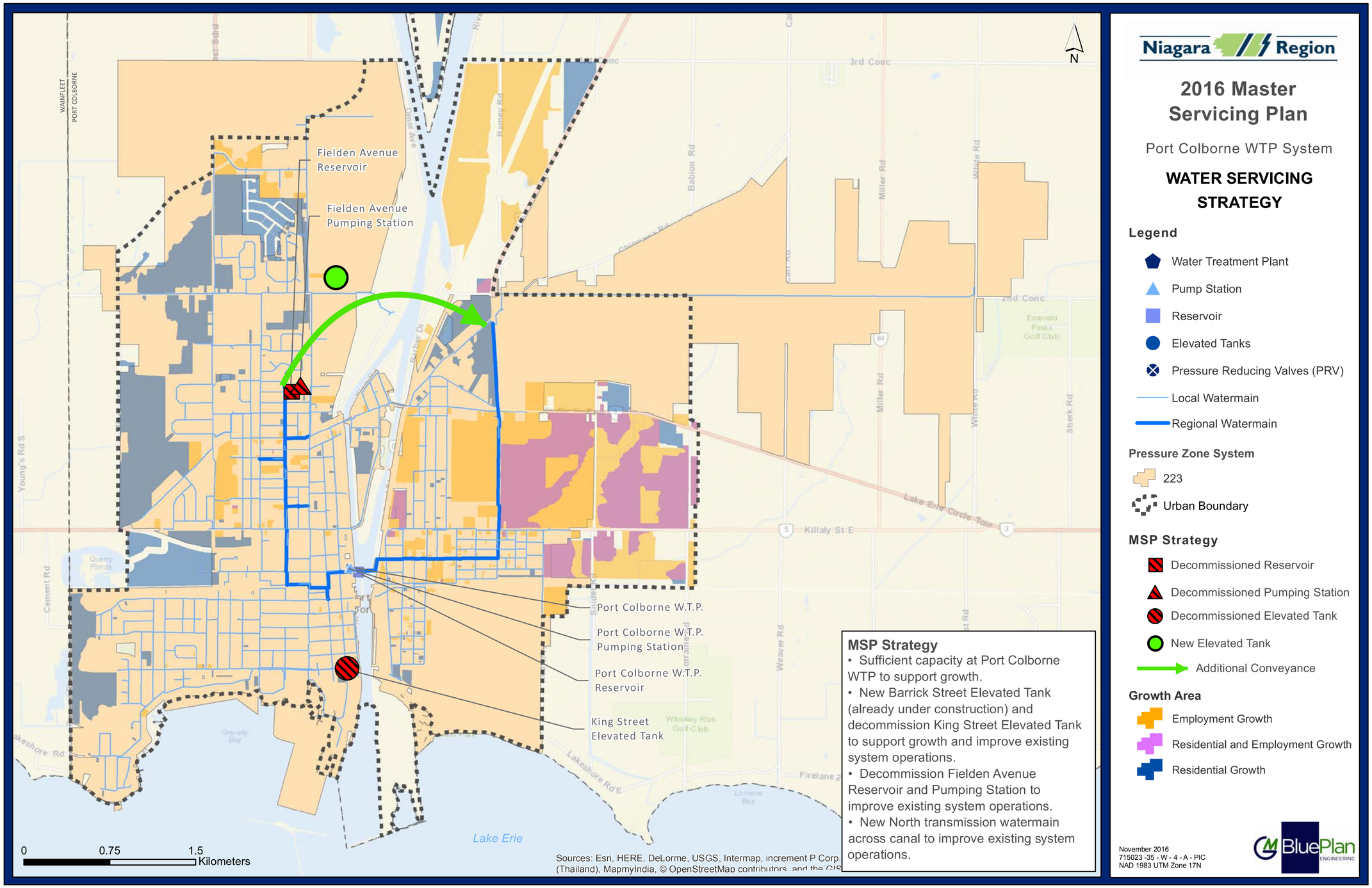
Challenges

- Limited floating storage = sub-optimal pumping strategy and energy management
- Low pressure areas
- Limited security of supply to East of canal

	2014	2041	Growth
Equivalent Population	24,891	29,527	4,635

HOW WE **FLOW**

PORT COLBORNE WATER TREATMENT PLANT SYSTEM

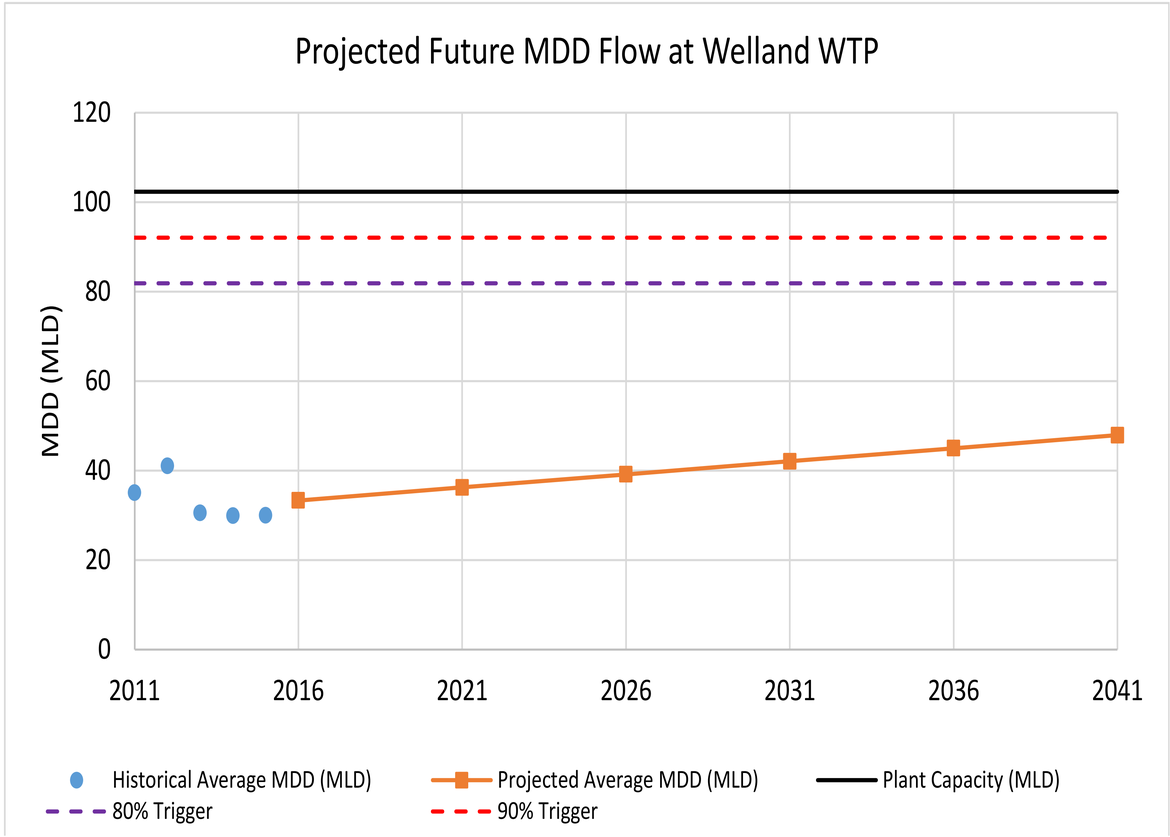


WATER SERVICING

WELLAND WATER TREATMENT PLANT SYSTEM

Welland | Pelham

- Treatment: Surplus
- Pumping:
  - »Upper zones (Pelham) deficit
  - »Lower zone (Welland) surplus
- Storage:
  - »Upper zones (Pelham) deficit
  - »Lower zone (Welland) surplus
- Pressures:
  - »Majority 50-90 psi
  - »Growth pressure issue in Fonthill
  - »Pressures outside optimal along zone boundaries
- Fire Flow:
  - »< 40 psi in North
  - »FF limitations in Pelham
- Security of Supply:
  - »Single trunk feed to Fenwick



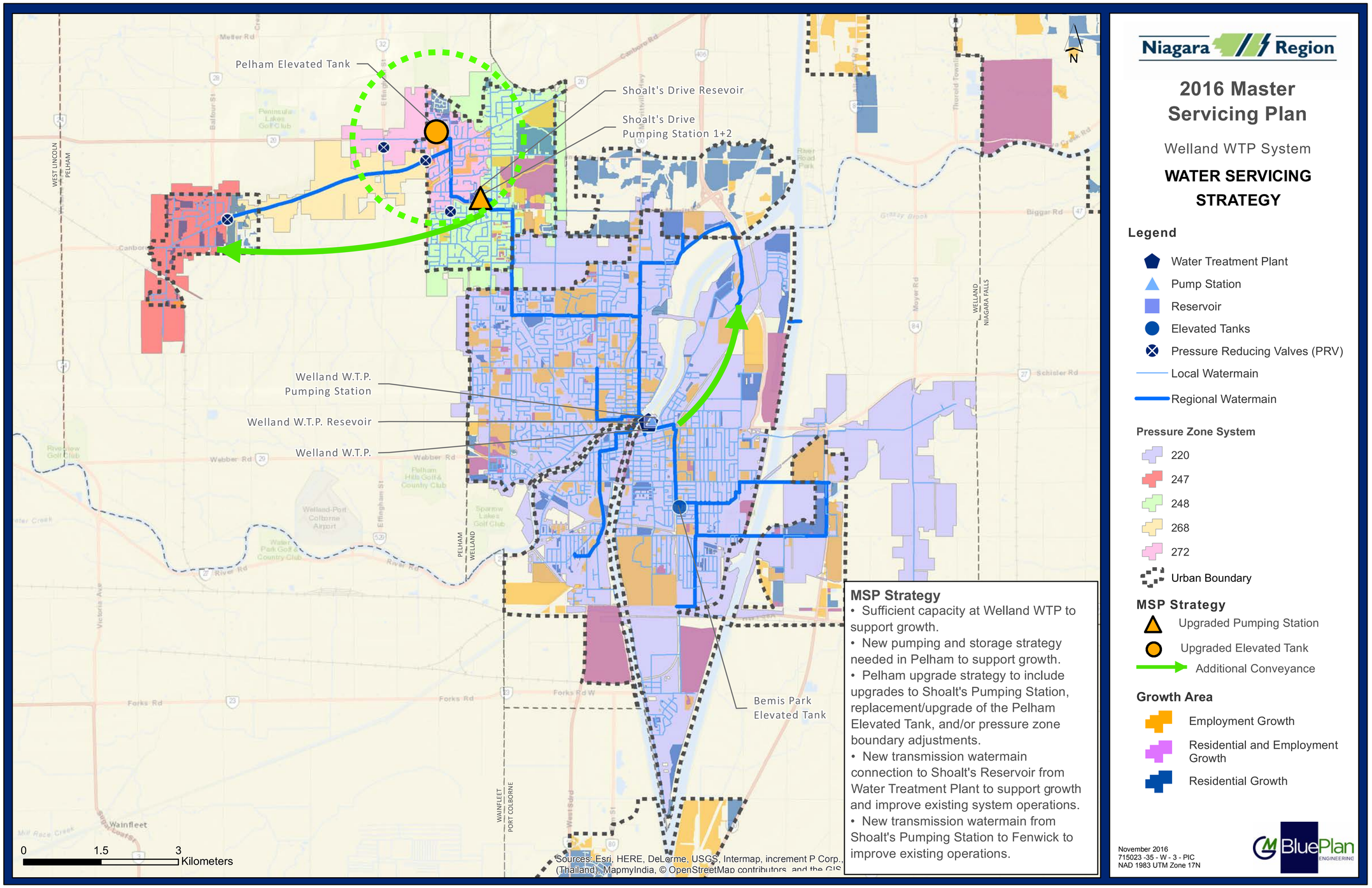
Challenges

- Pumping and storage deficits in upper zones (Pelham)
- Shoalt's Pumping Station operational limitations
- Bemis Elevated Tank operational issues
- Limited distribution capacity in Fonthill
- Pressures outside optimal along zone boundaries

	2014	2041	Growth
Equivalent Population	97,321	129,532	32,211

HOW WE **FLOW**

WELLAND WATER TREATMENT PLANT SYSTEM

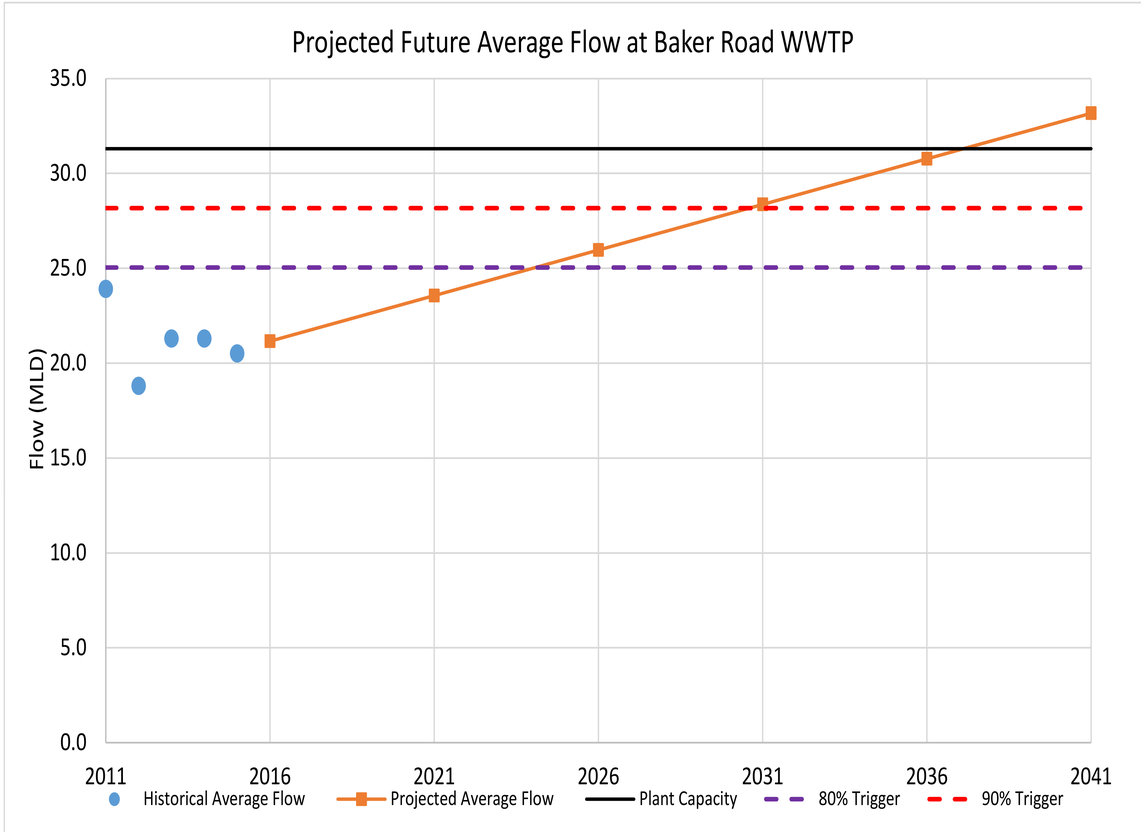


WASTEWATER SERVICING

BAKER ROAD WASTEWATER TREATMENT PLANT SYSTEM

Grimsby | Lincoln | West Lincoln

- Treatment: Deficit
- Pumping Stations:
  - » Several PS impacted under criteria
  - » Numerous pumping stations
- Conveyance: Greatest impact downstream of Smithville
- Wet Weather Commentary:
  - » West Grimsby: Pockets of High Inflow and Infiltration
  - » Smithville: Demonstrated Inflow and Infiltration impacts
  - » Lincoln: High Inflow and Infiltration



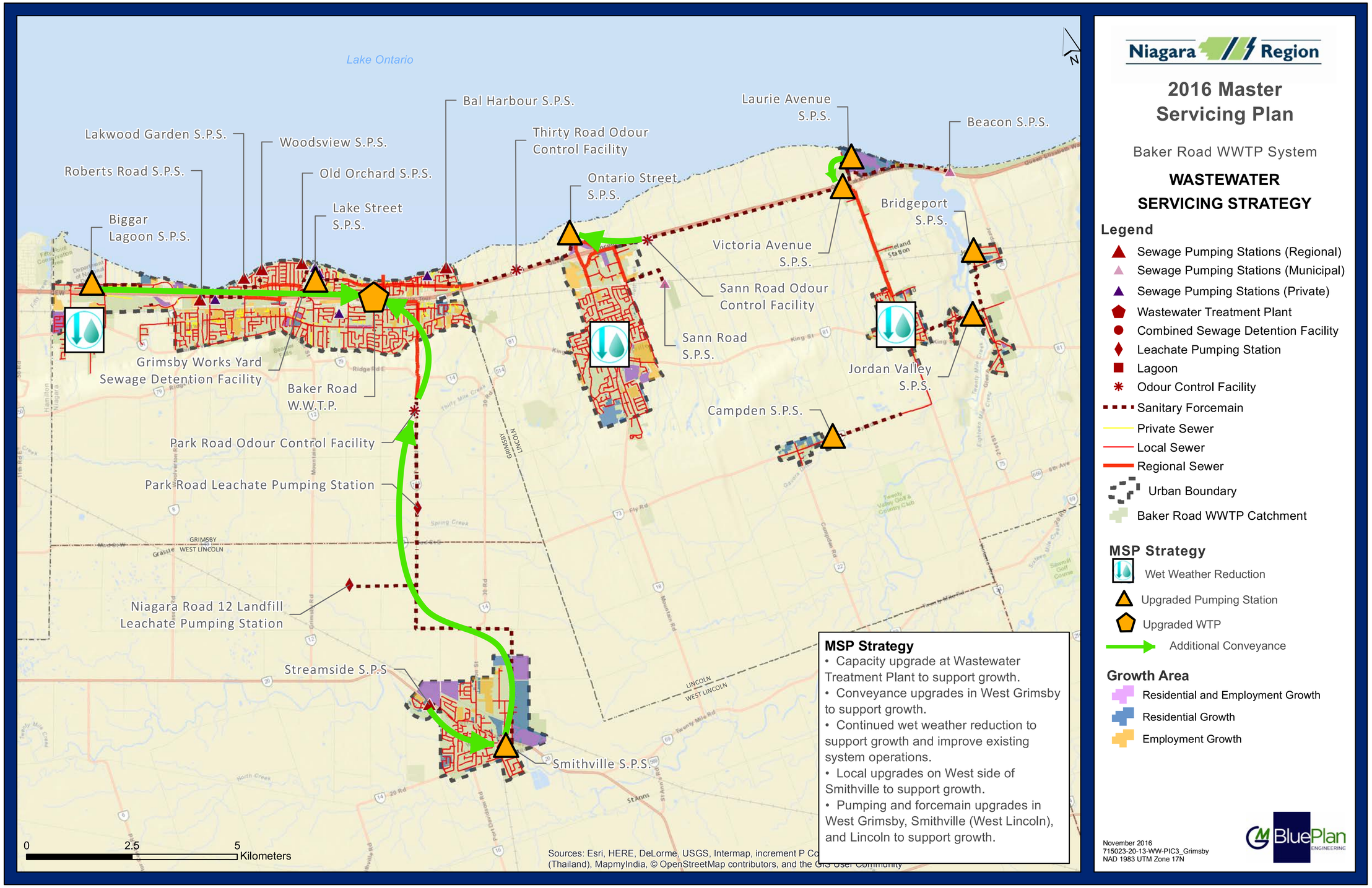
	2014	2041	Growth
Equivalent Population	75,773	119,441	43,667

Challenges

- Residential and employment growth spread out along highway and service road corridors
- Large number of pumping stations and cascading impact
- Significant growth in Smithville impacting pumping station and forcemain
- Areas of high Inflow and Infiltration

HOW WE **FLOW**

GRIMSBY WASTEWATER TREATMENT PLANT SYSTEM



MSP Strategy

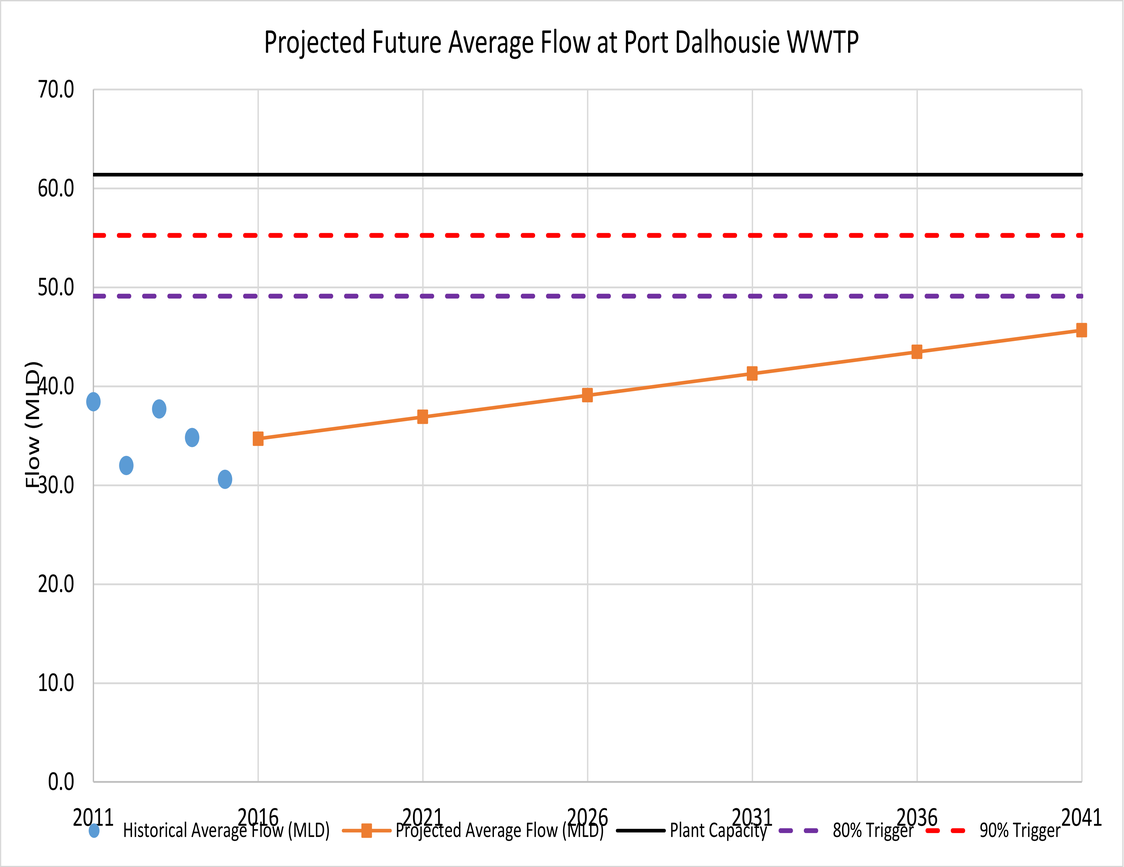
- Capacity upgrade at Wastewater Treatment Plant to support growth.
- Conveyance upgrades in West Grimsby to support growth.
- Continued wet weather reduction to support growth and improve existing system operations.
- Local upgrades on West side of Smithville to support growth.
- Pumping and forcemain upgrades in West Grimsby, Smithville (West Lincoln), and Lincoln to support growth.

WASTEWATER SERVICING

PORT DALHOUSIE WASTEWATER TREATMENT PLANT SYSTEM

St. Catharines | Thorold

- Treatment: Okay
- Pumping Stations:
  - » Generally okay under criteria
  - » Impacted under wet weather
- Conveyance:
  - » Generally okay under criteria
  - » Impacted under wet weather
- Wet Weather Commentary:
  - » Significant combined areas
  - » Very high wet weather impacts
  - » Greater need for inter-municipal solutions



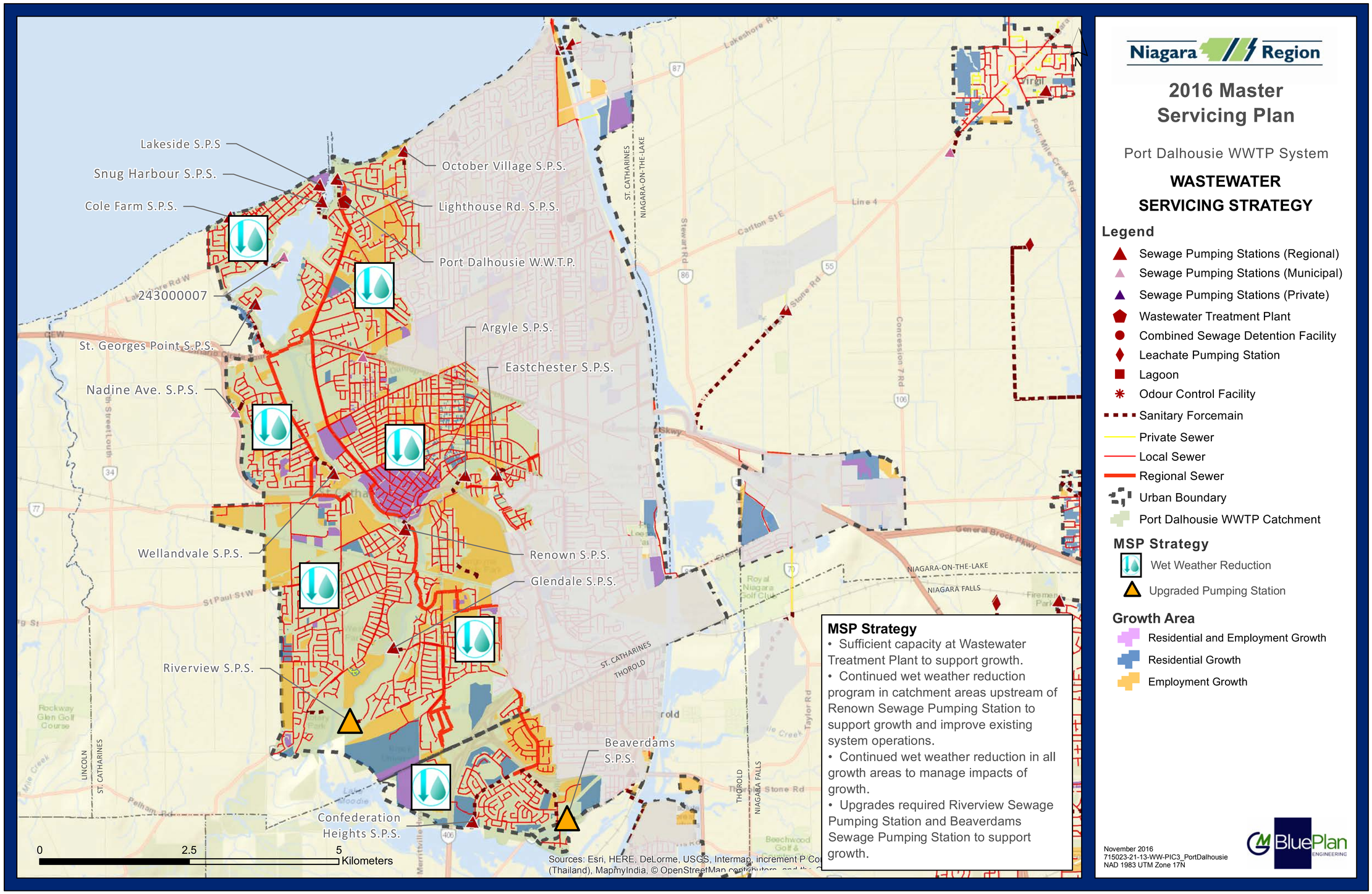
Challenges

- Primarily built boundary growth
- Significant combined areas
- Trunk follows river system and in escarpment area

	2014	2041	Growth
Equivalent Population	116,309	156,164	39,852

HOW WE **FLOW**

PORT DALHOUSIE WASTEWATER TREATMENT PLANT SYSTEM



NIAGARA 2041

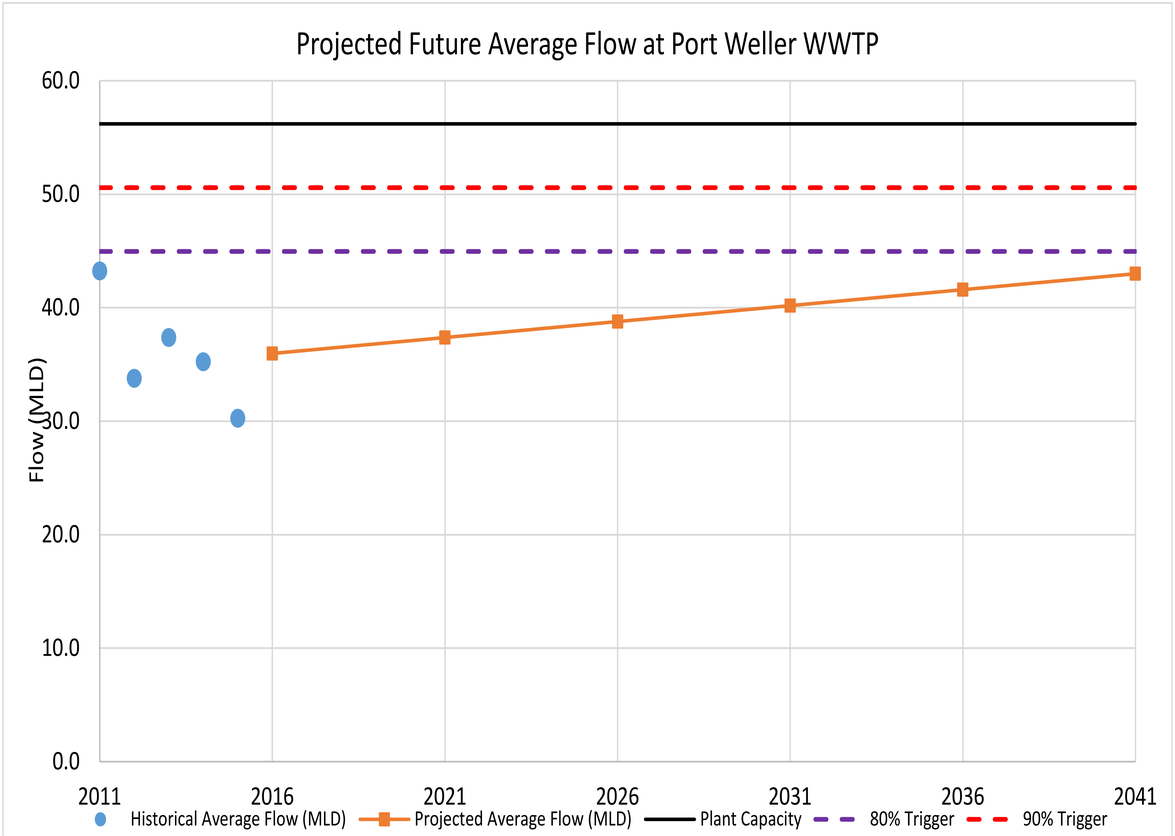
Fostering an Environment for Economic Prosperity

WASTEWATER SERVICING

PORT WELLER WASTEWATER TREATMENT PLANT SYSTEM

St. Catharines | Thorold

- Treatment: Okay
- Pumping Stations:
  - » Generally okay under criteria
  - » Impacted under wet weather
- Conveyance:
  - » Generally okay under criteria
  - » Impacted under wet weather
- Wet Weather Commentary:
  - » Significant combined areas
  - » Very high wet weather impacts
  - » Greater need for inter-municipal solutions



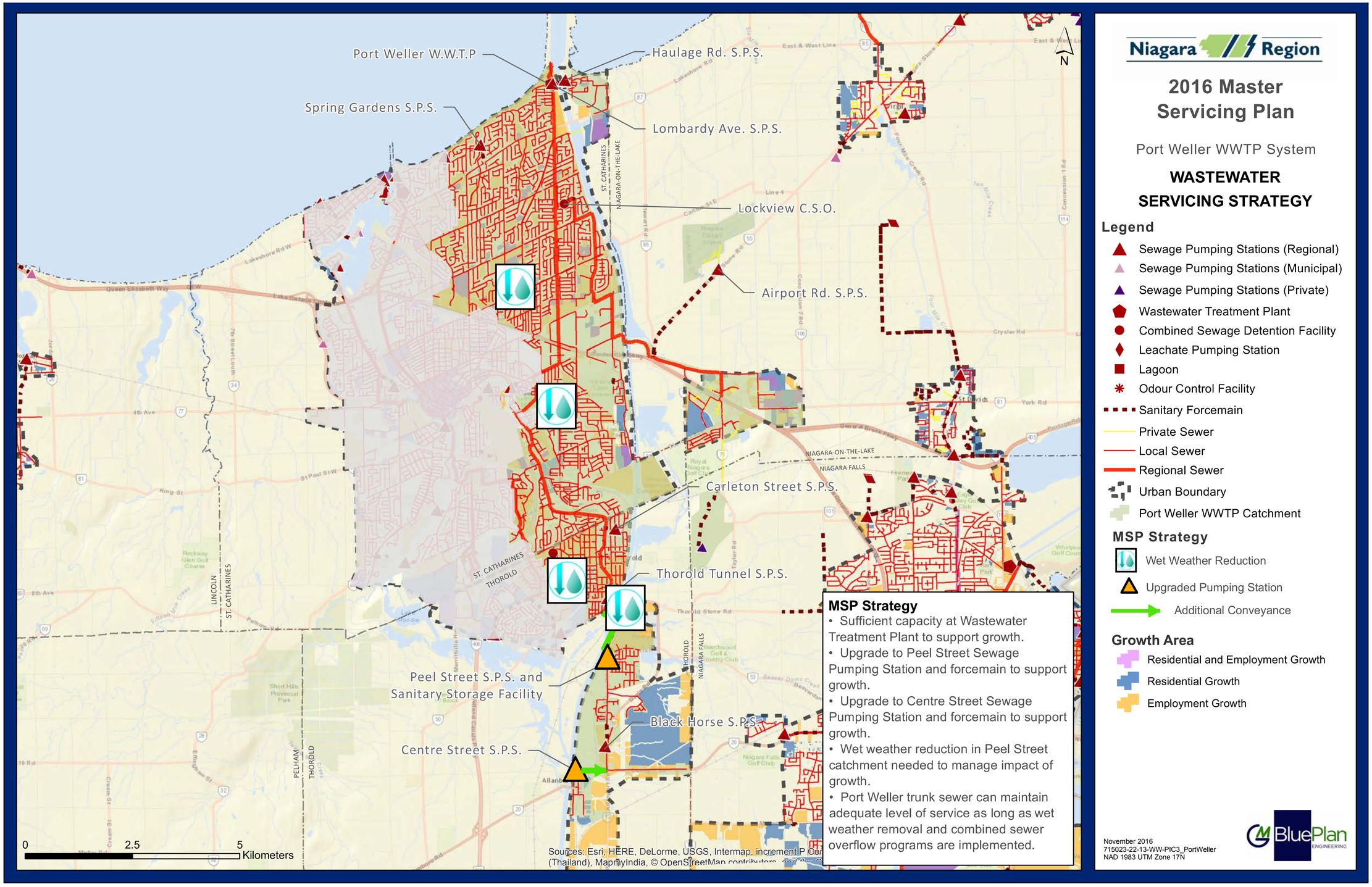
	2014	2041	Growth
Equivalent Population	116,309	156,164	39,852

Challenges

- Primarily built boundary growth
- Significant combined areas
- Trunk within built up areas with known CSO issues
- Thorold growth impacts Port Weller system
- Growth in South Thorold

HOW WE **FLOW**

PORT WELLER WASTEWATER TREATMENT PLANT SYSTEM



MSP Strategy

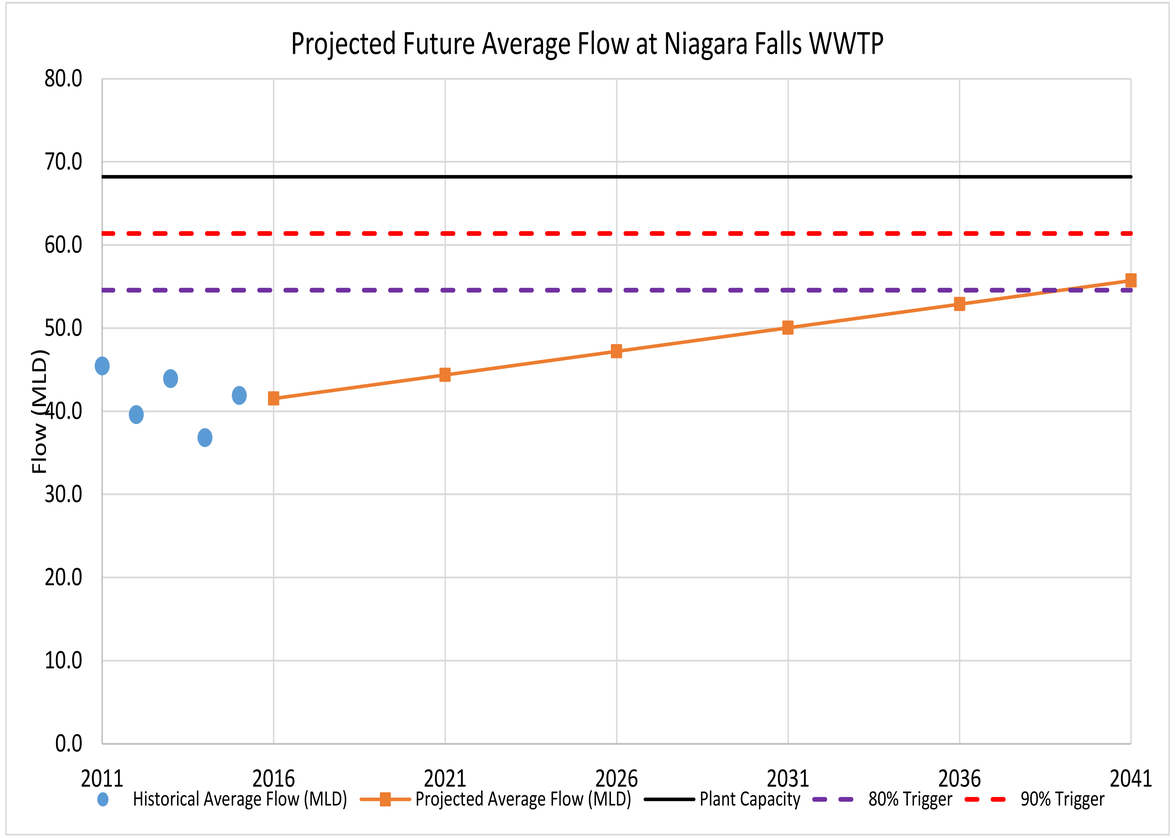
- Sufficient capacity at Wastewater Treatment Plant to support growth.
- Upgrade to Peel Street Sewage Pumping Station and forcemain to support growth.
- Upgrade to Centre Street Sewage Pumping Station and forcemain to support growth.
- Wet weather reduction in Peel Street catchment needed to manage impact of growth.
- Port Weller trunk sewer can maintain adequate level of service as long as wet weather removal and combined sewer overflow programs are implemented.

WASTEWATER SERVICING

NIAGARA FALLS WWTP SYSTEM

Niagara Falls

- Treatment: Approaching capacity
- Pumping Stations:
  - » Capacity impacts under design criteria
  - » Significant wet weather impacts
- Conveyance:
  - » Generally okay under criteria
  - » Impacted under wet weather
- Wet Weather Commentary:
  - » Existing combined areas
  - » Very high wet weather impacts
  - » Greater need for inter-municipal solutions



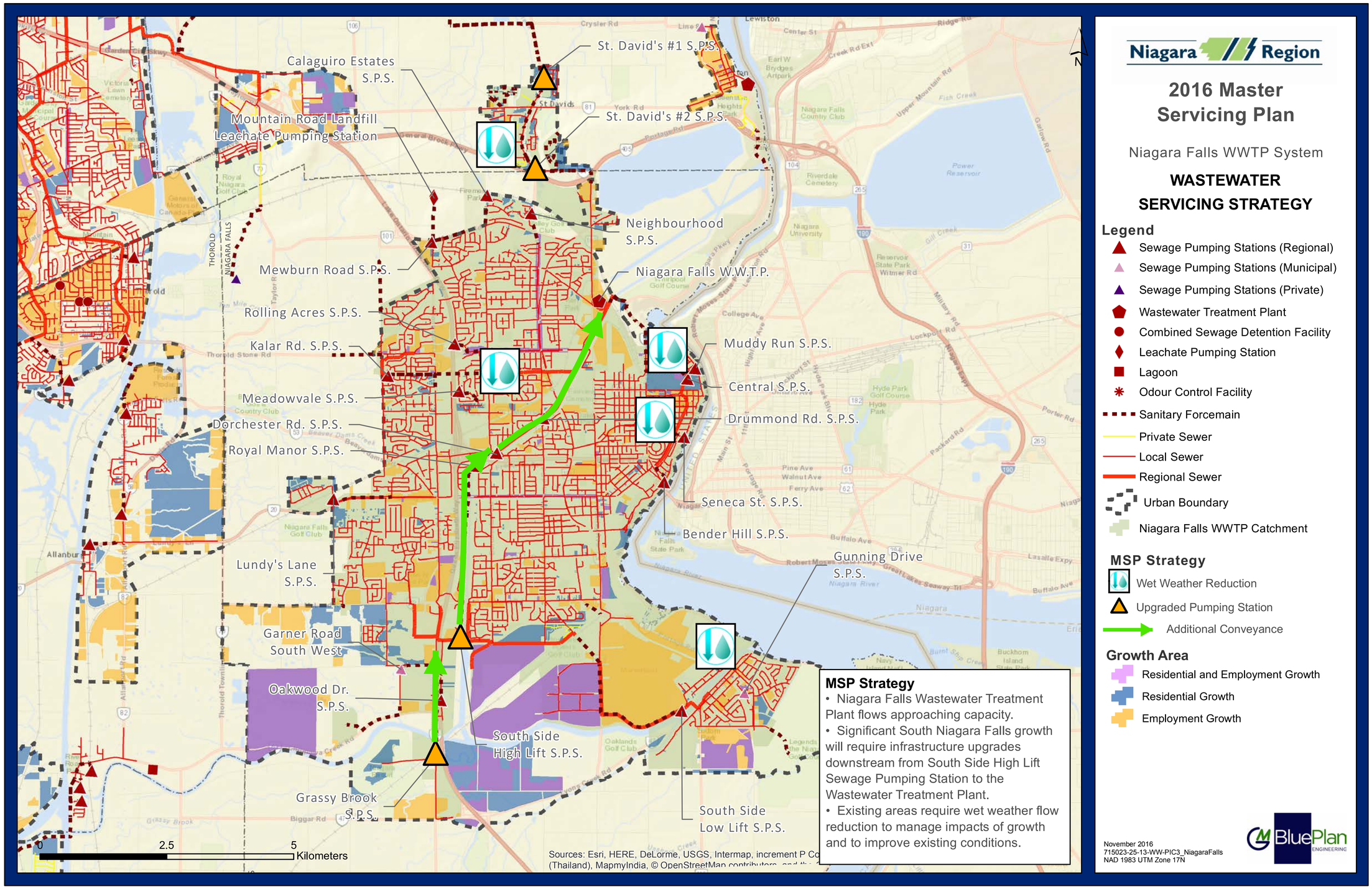
Challenges

- Significant greenfield growth areas in South – at upstream limit of existing system
- Significant cascading impacts due to size of system
- Constraints in neighbouring systems – could require integrated solutions with Niagara Falls

	2014	2041	Growth
Equivalent Population	128,263	179,848	51,585

HOW WE **FLOW**

NIAGARA FALLS WASTEWATER TREATMENT PLANT SYSTEM

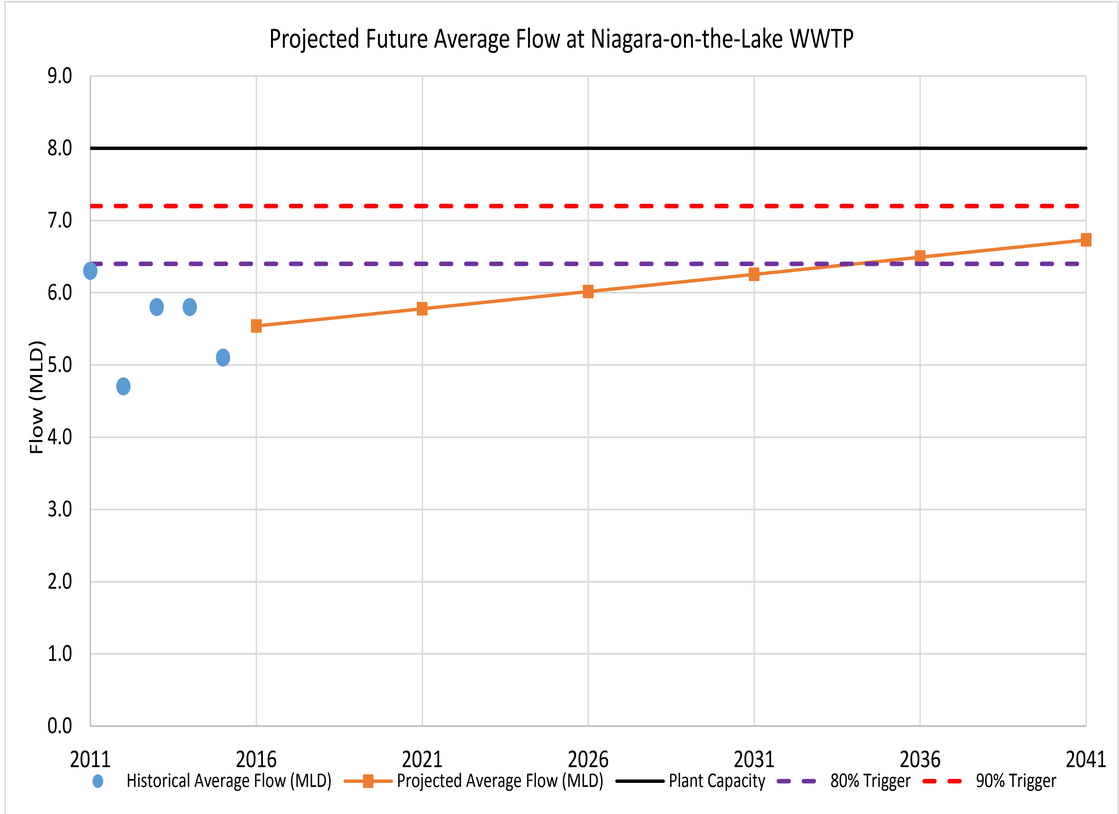


WASTEWATER SERVICING

NIAGARA-ON-THE-LAKE WASTEWATER TREATMENT PLANT SYSTEM

Niagara-on-the-Lake

- Treatment: Approaching capacity
- Pumping Stations:
  - » Virgil: Impacted by growth
  - » Old Town: Good under criteria
- Conveyance:
  - » Generally okay under criteria
  - » Impacted under wet weather
- Wet Weather Commentary:
  - » Virgil: Impacted under wet weather
  - » Old Town: Wet weather in line with criteria



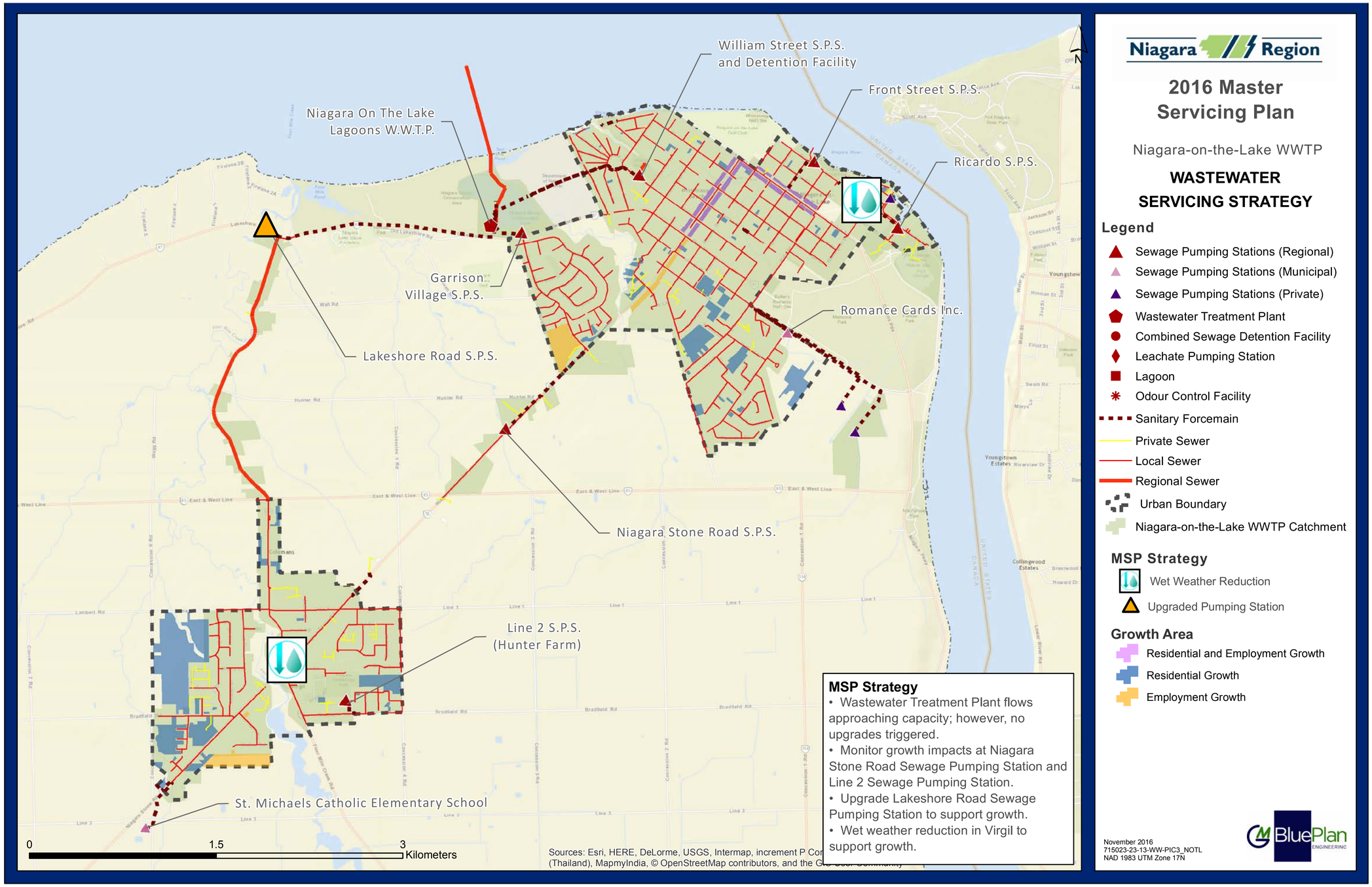
Challenges

- Development outside of urban boundary
- Pump discharges to WWTP
- Joint ownership pump stations

	2014	2041	Growth
Equivalent Population	17,204	21,532	4,328

HOW WE **FLOW**

NIAGARA-ON-THE-LAKE WASTEWATER TREATMENT PLANT SYSTEM

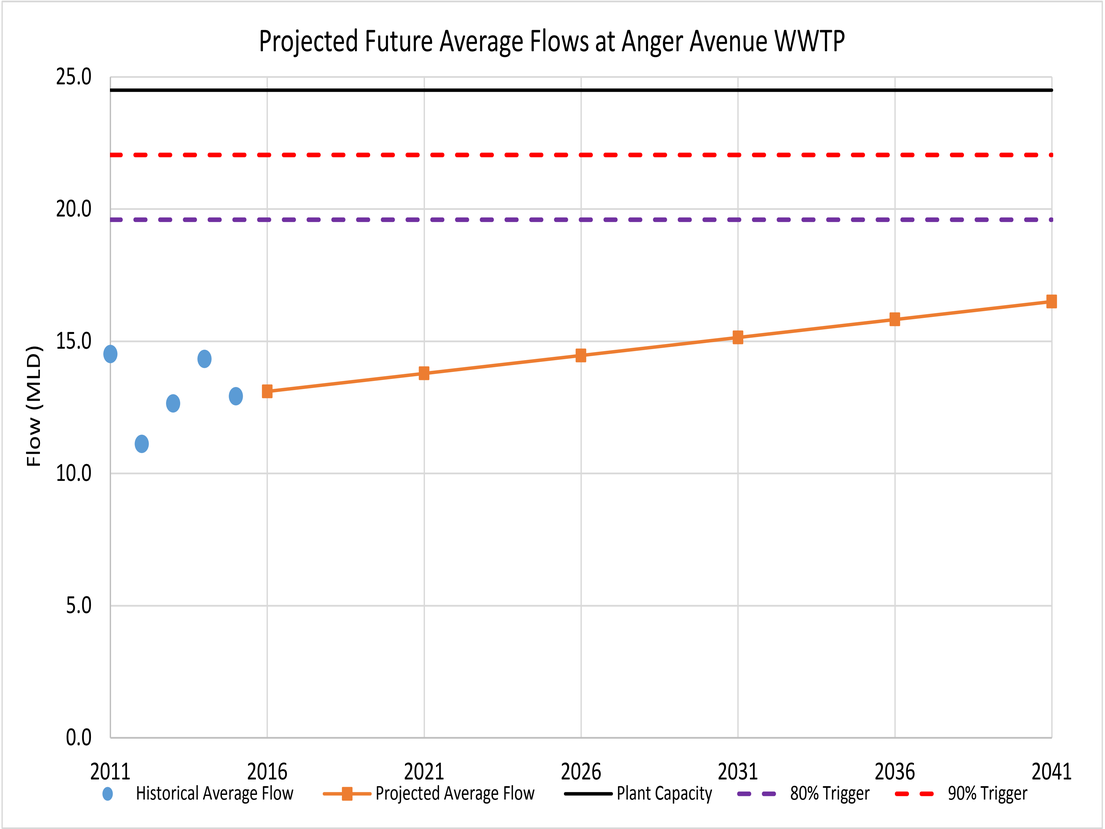


WASTEWATER SERVICING

ANGER AVENUE WASTEWATER TREATMENT PLANT SYSTEM

Fort Erie

- Treatment: Okay
- Pumping Stations:
  - » Alliston: Impacted by growth
  - » East Fort Erie: Wet weather impacts
- Conveyance:
  - » Generally okay under criteria
  - » Impacted under wet weather
- Wet Weather Commentary:
  - » High Inflow and Infiltration to Eastern pumping stations



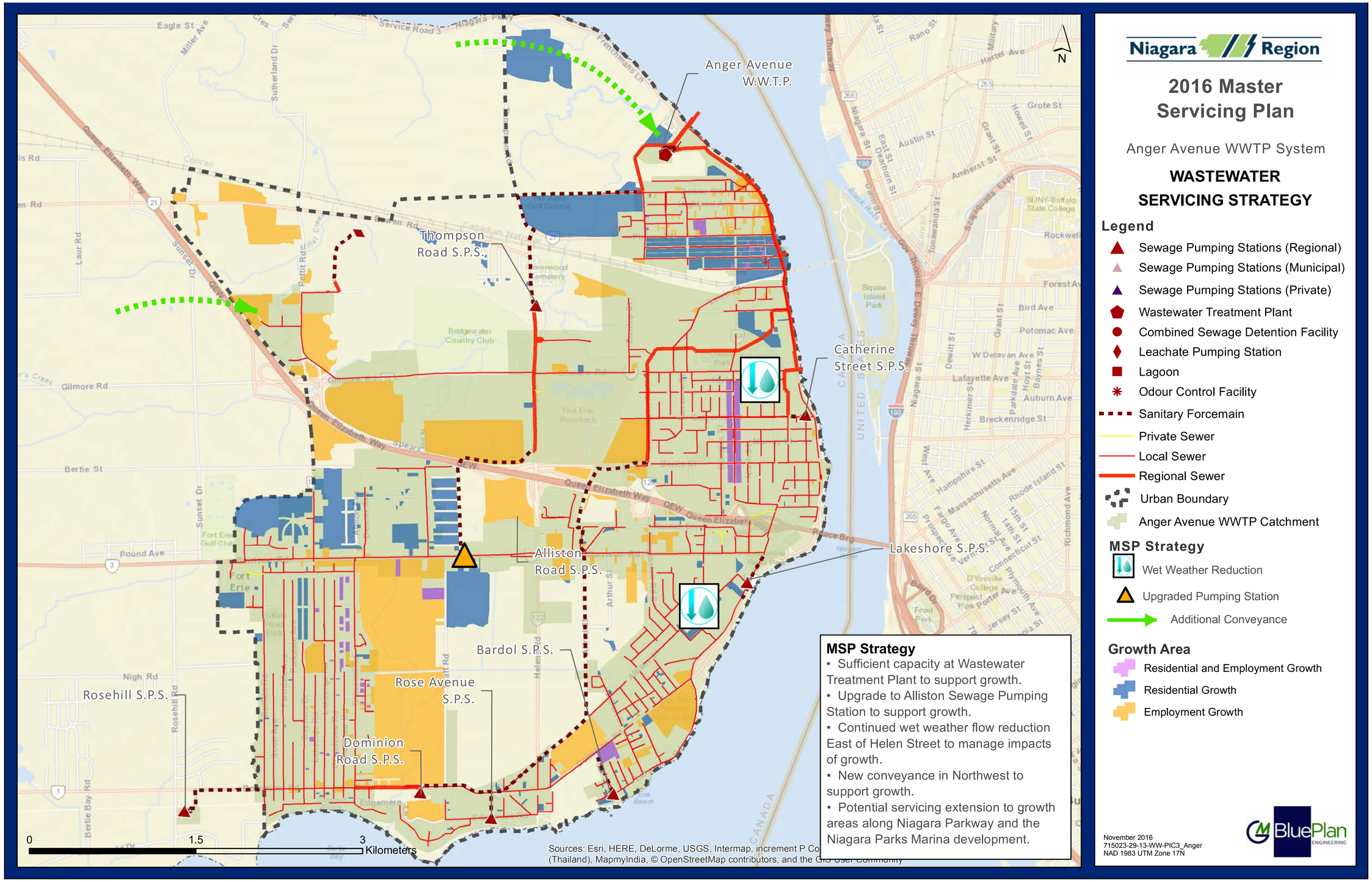
Challenges

- Servicing of Northwest growth areas
- Trunks through existing built areas

	2014	2041	Growth
Equivalent Population	25,148	37,507	12,359

HOW WE **FLOW**

ANGER AVENUE WASTEWATER TREATMENT PLANT SYSTEM



WASTEWATER SERVICING

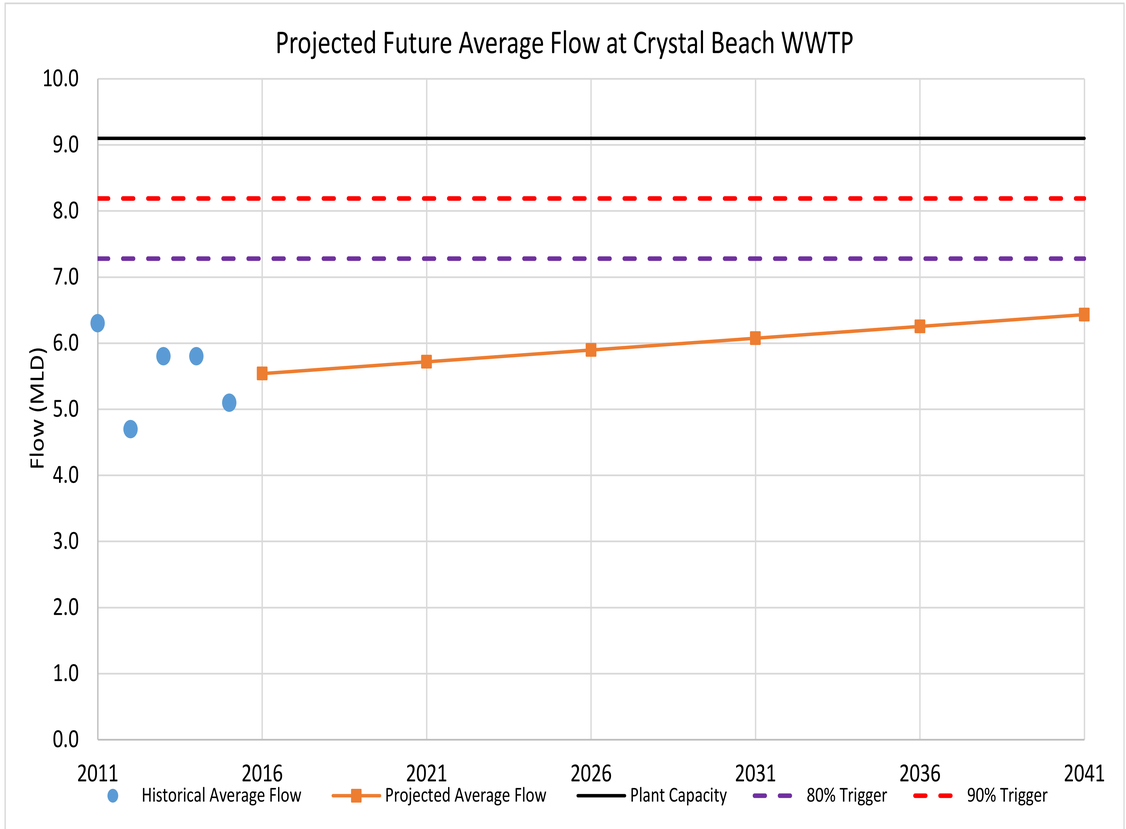
CRYSTAL BEACH WASTEWATER TREATMENT PLANT SYSTEM

Fort Erie

- Treatment: Okay
- Pumping Stations:
  - » Generally okay under criteria
  - » Shirley Rd: Not meeting criteria
- Conveyance:
  - » Generally okay under criteria
  - » Impacted under wet weather
- Wet Weather Commentary:
  - » Erie Road and Nigh Road impacted under wet weather

Challenges

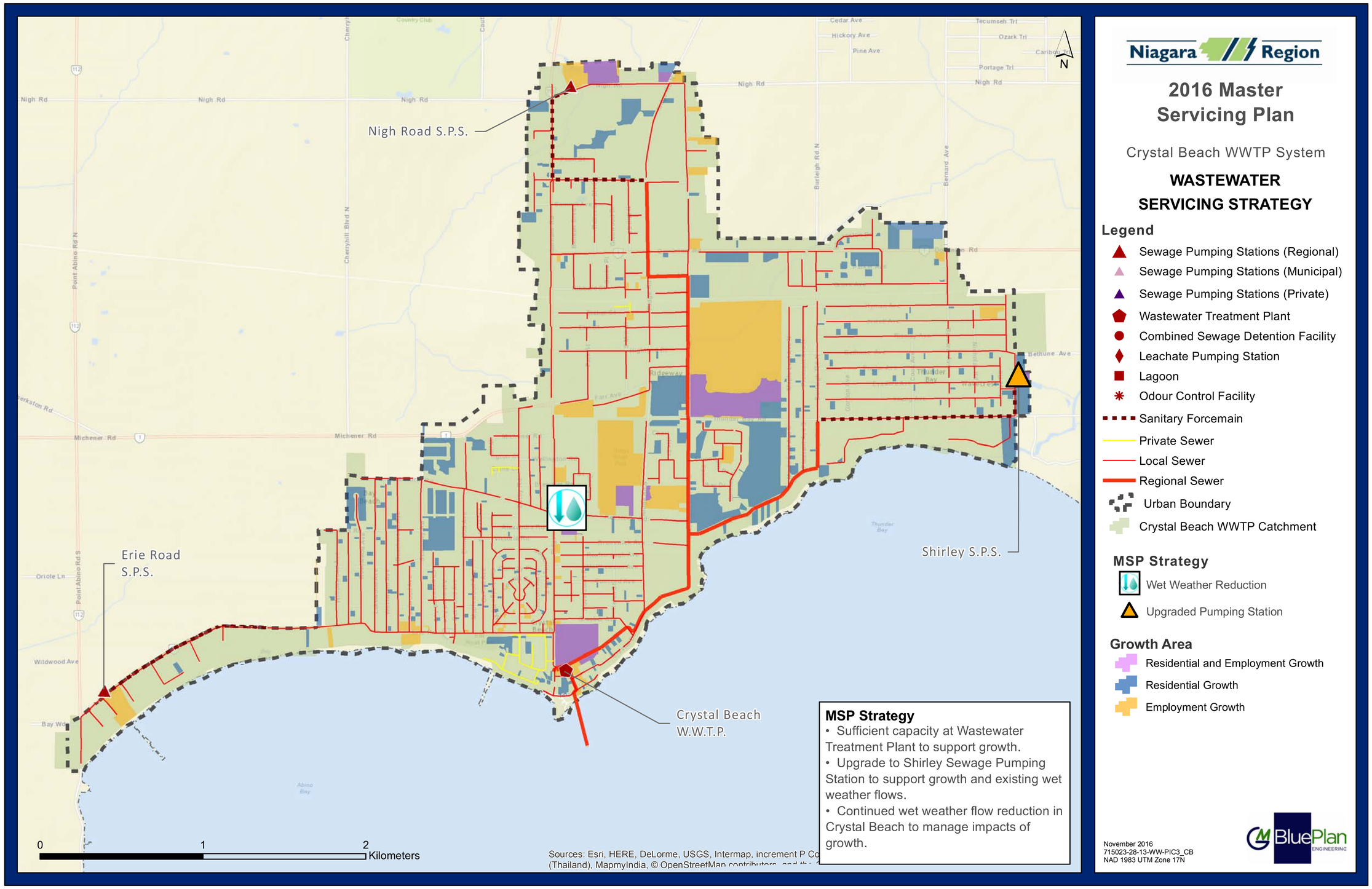
- Primarily built boundary growth



	2014	2041	Growth
Equivalent Population	10,918	14,163	3,246

HOW WE **FLOW**

CRYSTAL BEACH WASTEWATER TREATMENT PLANT SYSTEM

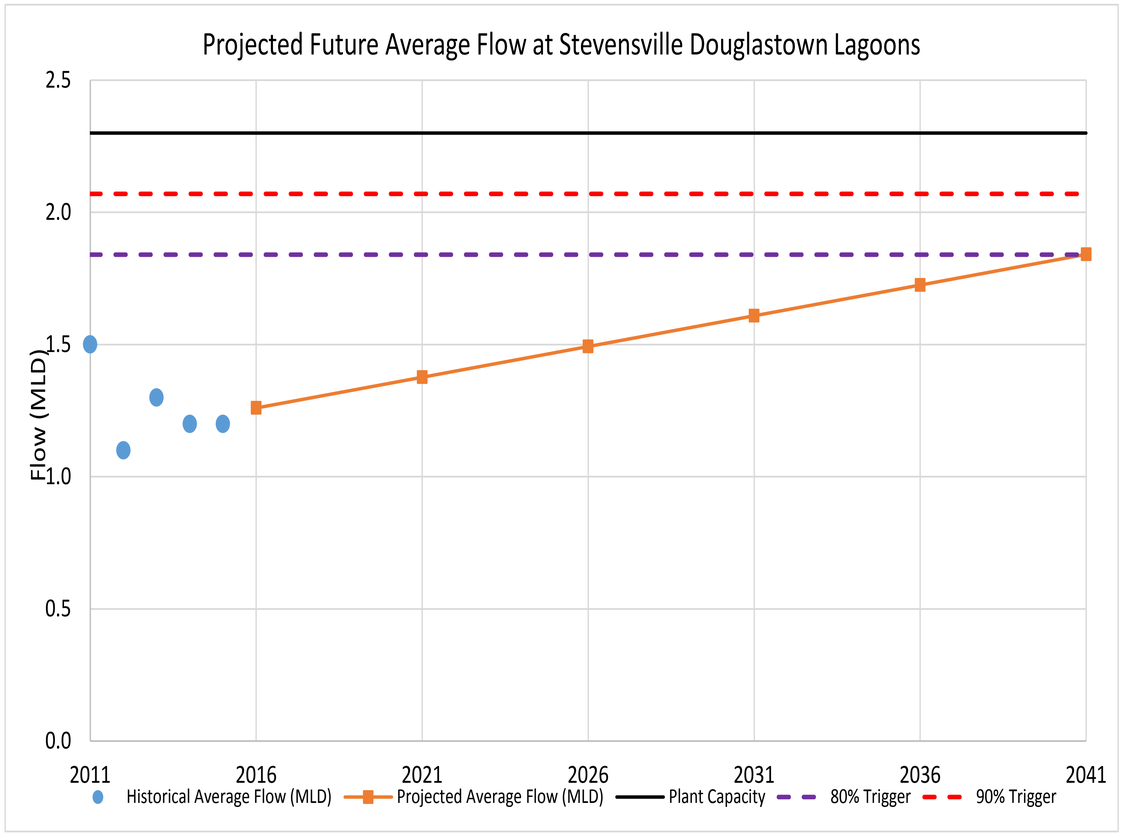


WASTEWATER SERVICING

STEVENSVILLE AND DOUGLASTOWN WASTEWATER TREATMENT SYSTEM

Fort Erie

- Treatment: Okay
- Pumping Stations:
  - » Douglastown: Generally okay under criteria
  - » Stevensville: Impacted under criteria
- Conveyance:
  - » Generally okay under criteria
  - » Impacted under wet weather
- Wet Weather Commentary:
  - » Inflow and infiltration reduction opportunity



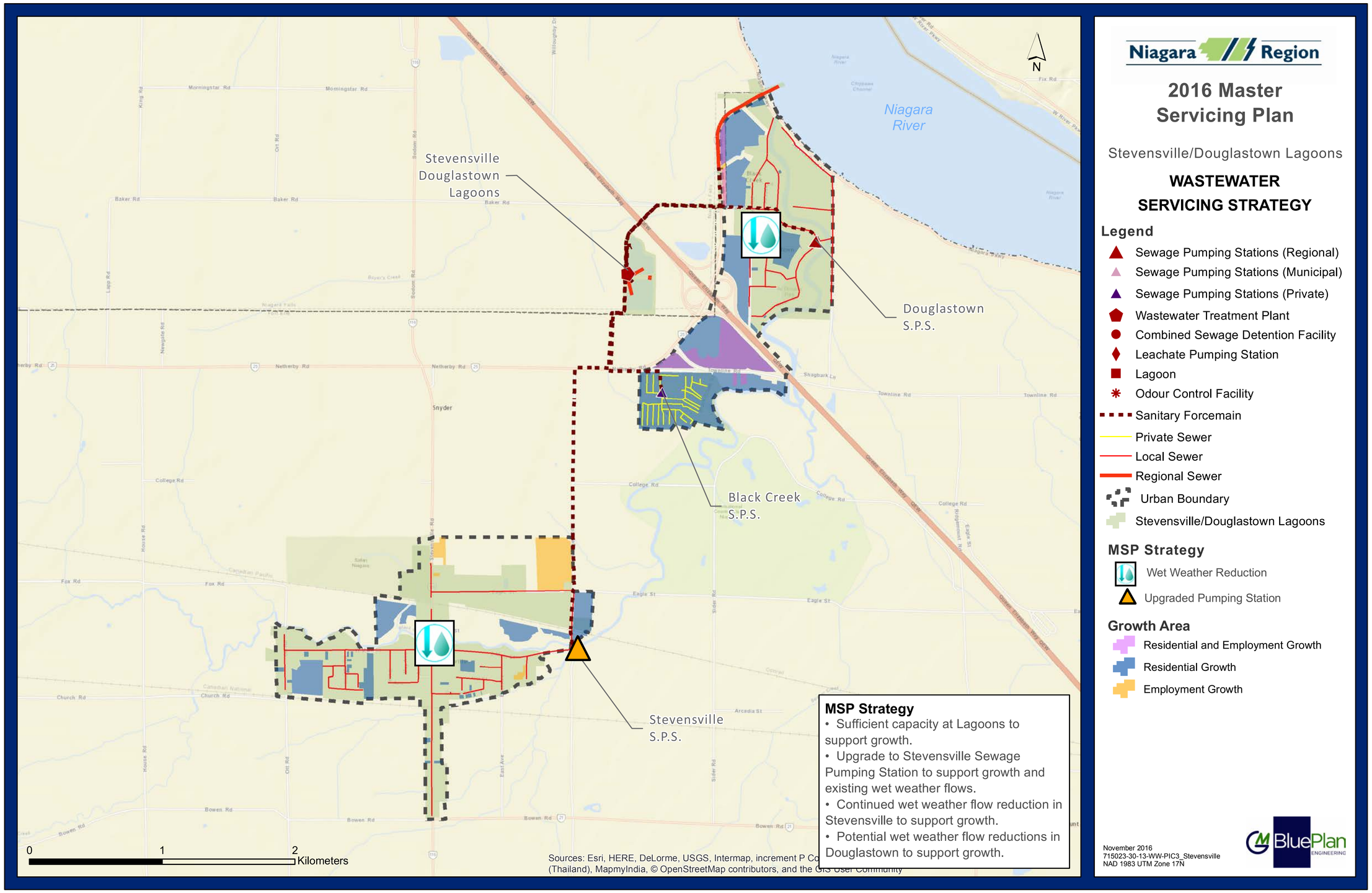
Challenges

- Limited growth capacity

	2014	2041	Growth
Equivalent Population	5,294	7,408	2,114

HOW WE **FLOW**

STEVENSVILLE | DOUGLASTOWN LAGOONS

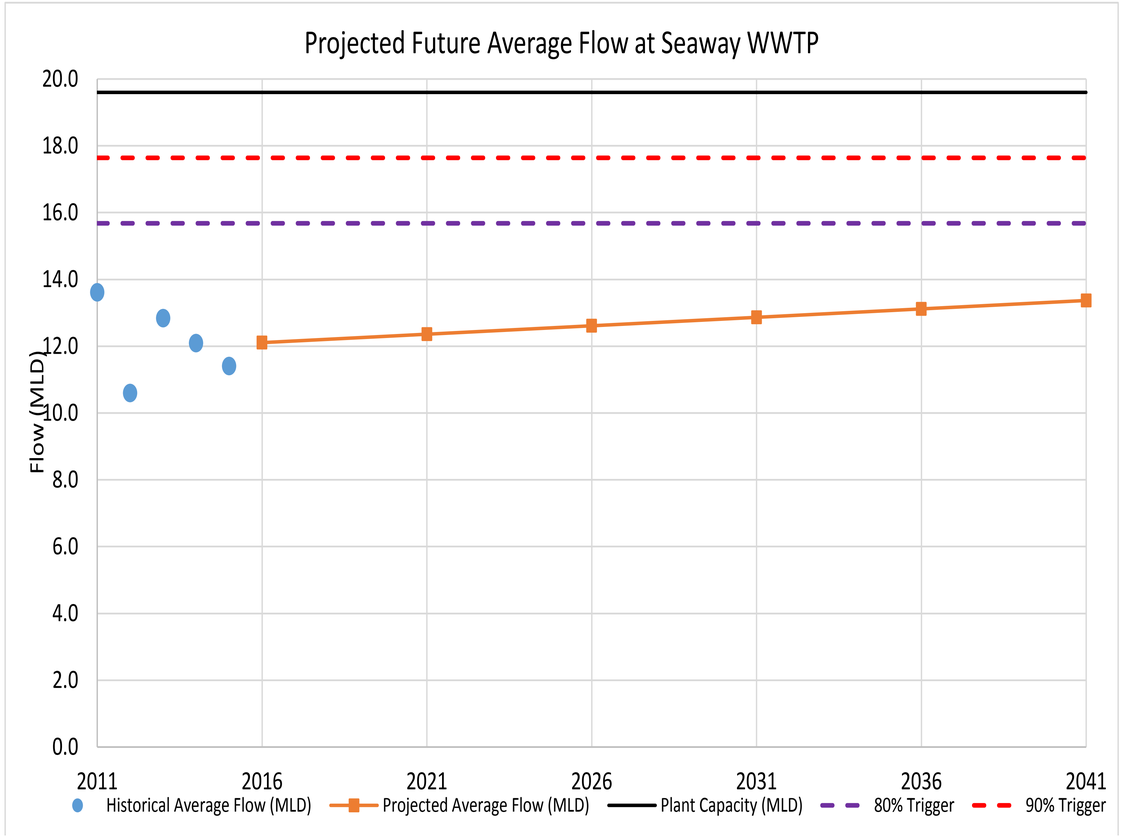


WASTEWATER SERVICING

SEAWAY WASTEWATER TREATMENT PLANT SYSTEM

Port Colborne

- Treatment: Okay
- Pumping Stations:
  - » Impacted by growth
  - » Existing capacity limitation at Steele and Rosemount South
- Conveyance:
  - » Generally okay under criteria
  - » Impacted under wet weather
- Wet Weather Commentary:
  - » Large growth land area relative to growth population



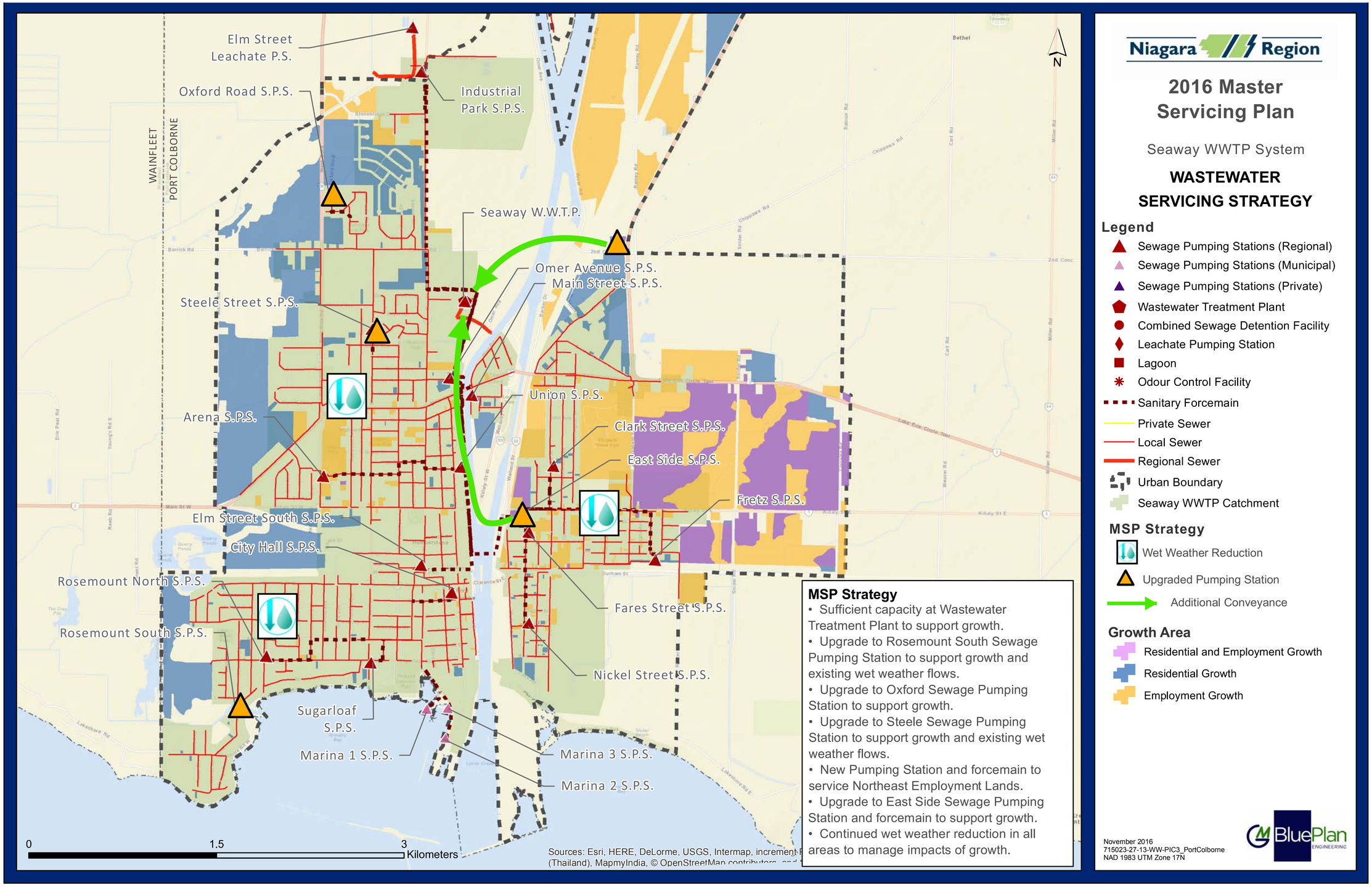
Challenges

- Small growth attribute to large areas
- Large greenfield areas potential to trigger Inflow and Infiltration related upgrades
- Canal crossing capacity to service East side growth

	2014	2041	Growth
Equivalent Population	24,087	28,678	4,591

HOW WE **FLOW**

PORT COLBORNE WASTEWATER TREATMENT PLANT SYSTEM



MSP Strategy

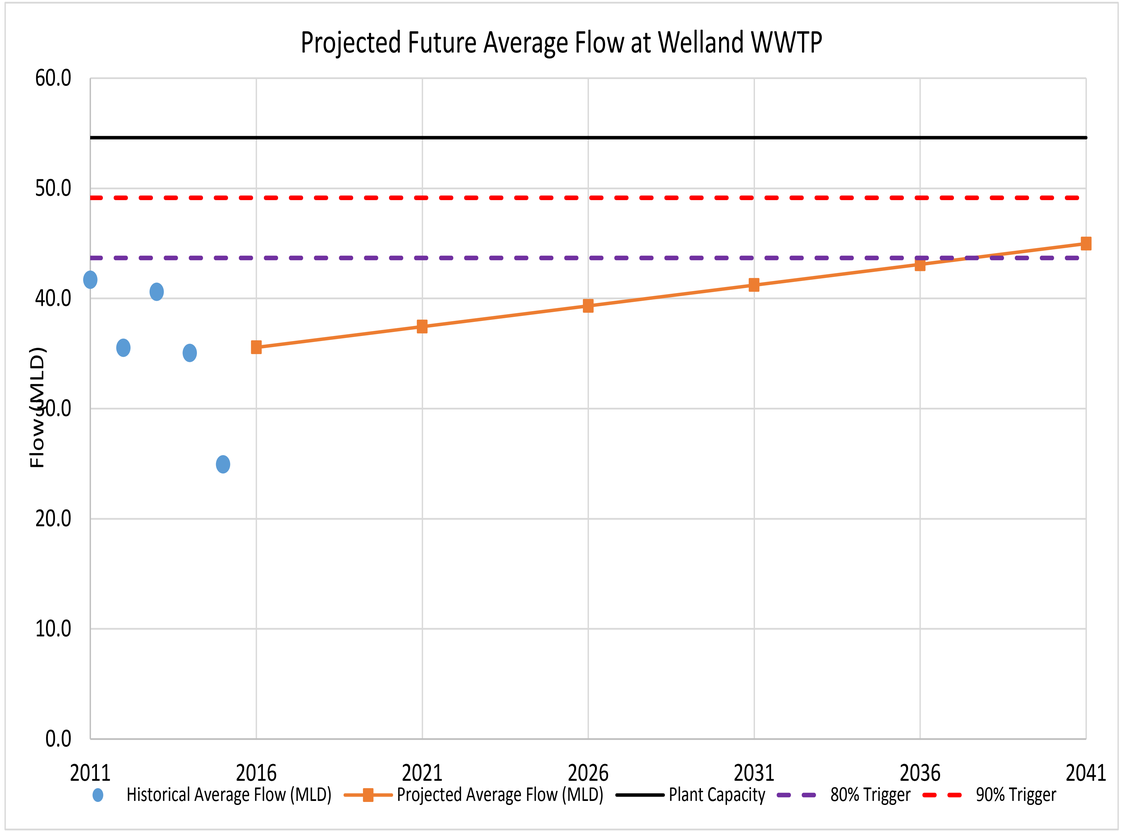
- Sufficient capacity at Wastewater Treatment Plant to support growth.
- Upgrade to Rosemount South Sewage Pumping Station to support growth and existing wet weather flows.
- Upgrade to Oxford Sewage Pumping Station to support growth.
- Upgrade to Steele Sewage Pumping Station to support growth and existing wet weather flows.
- New Pumping Station and forcemain to service Northeast Employment Lands.
- Upgrade to East Side Sewage Pumping Station and forcemain to support growth.
- Continued wet weather reduction in all areas to manage impacts of growth.

WASTEWATER SERVICING

WELLAND WWTP SYSTEM

Welland | Pelham

- Treatment: Approaching capacity
- Pumping Stations:
  - » Impacted by growth
  - » Existing capacity limitations at Park Lane and Foss under design
- Conveyance:
  - » Generally okay under criteria
  - » Impacted under wet weather
- Wet Weather Commentary:
  - » High wet weather impacts
  - » Significant combined areas



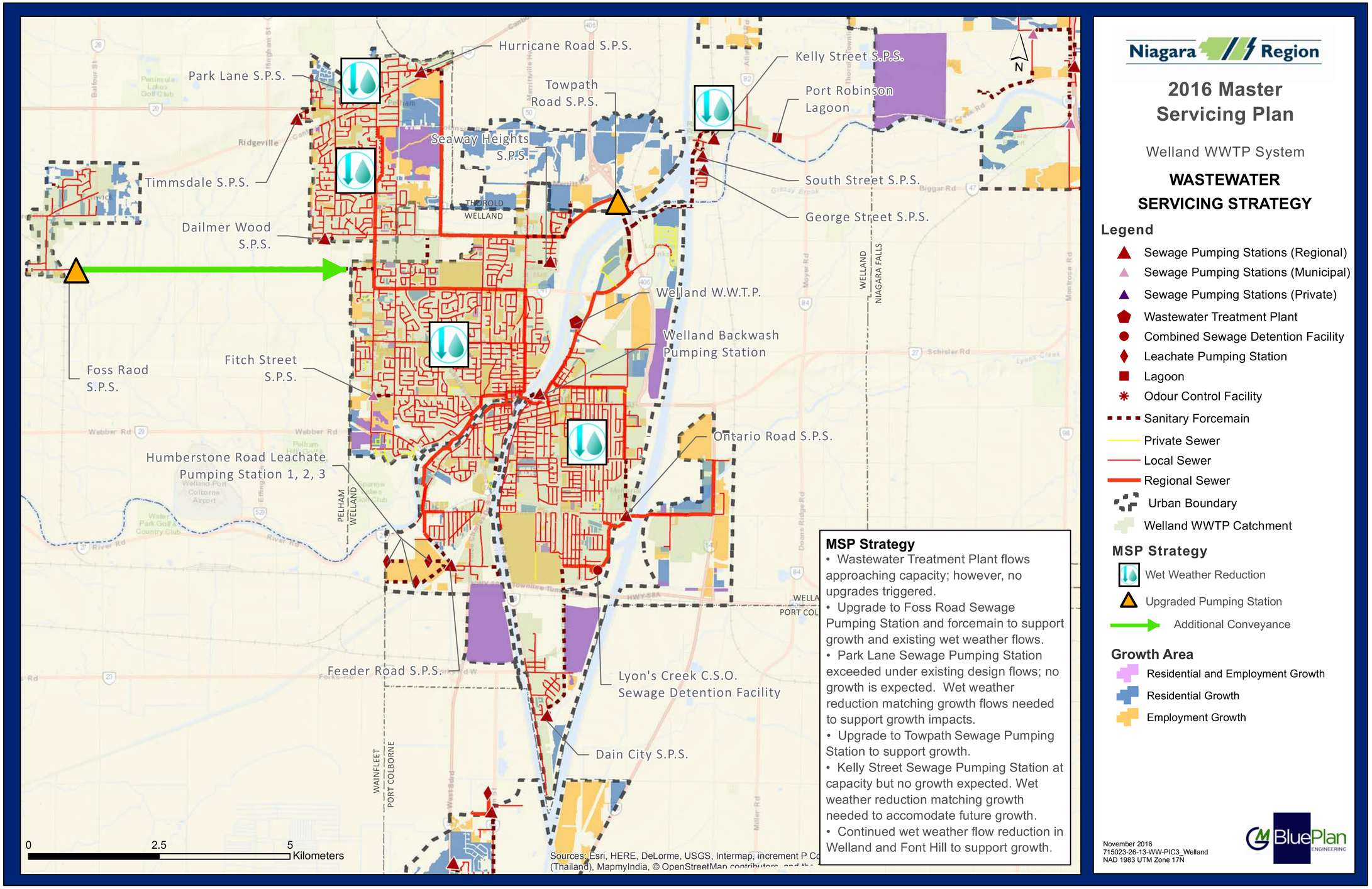
Challenges

- Combined areas
- Areas of high Inflow and Infiltration
- Canal crossing

	2014	2041	Growth
Equivalent Population	98,686	132,953	34,267

HOW WE **FLOW**

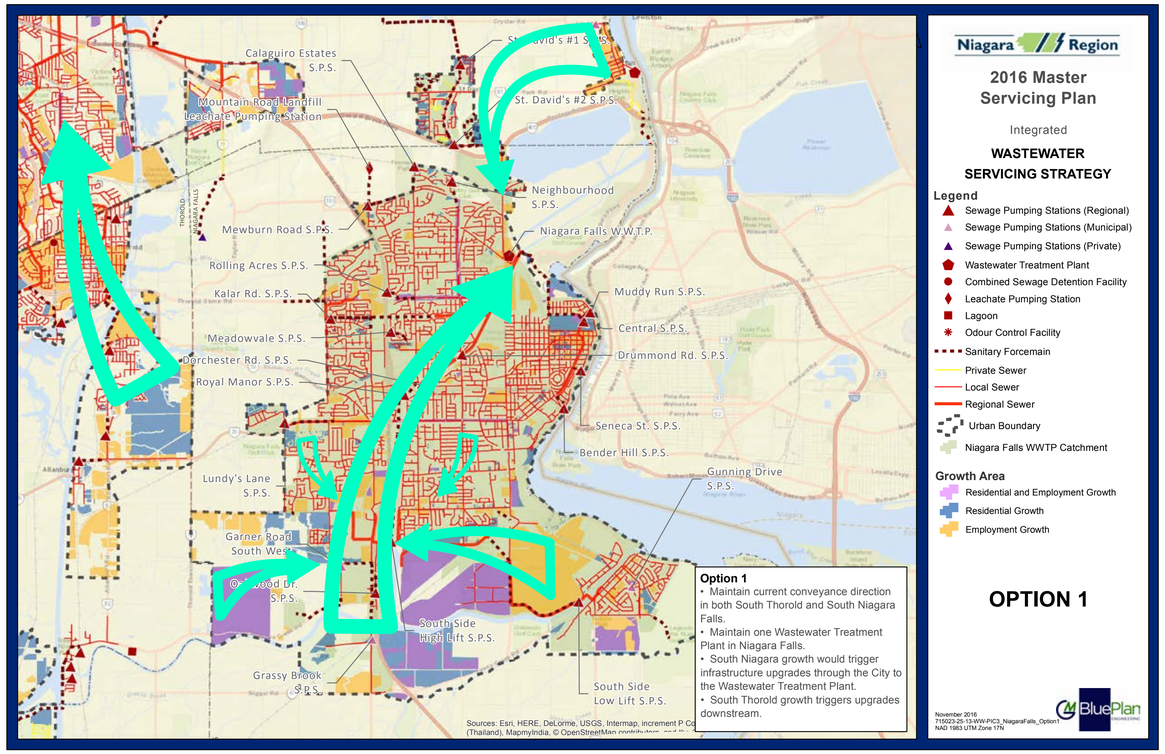
WELLAND WASTEWATER TREATMENT PLANT SYSTEM

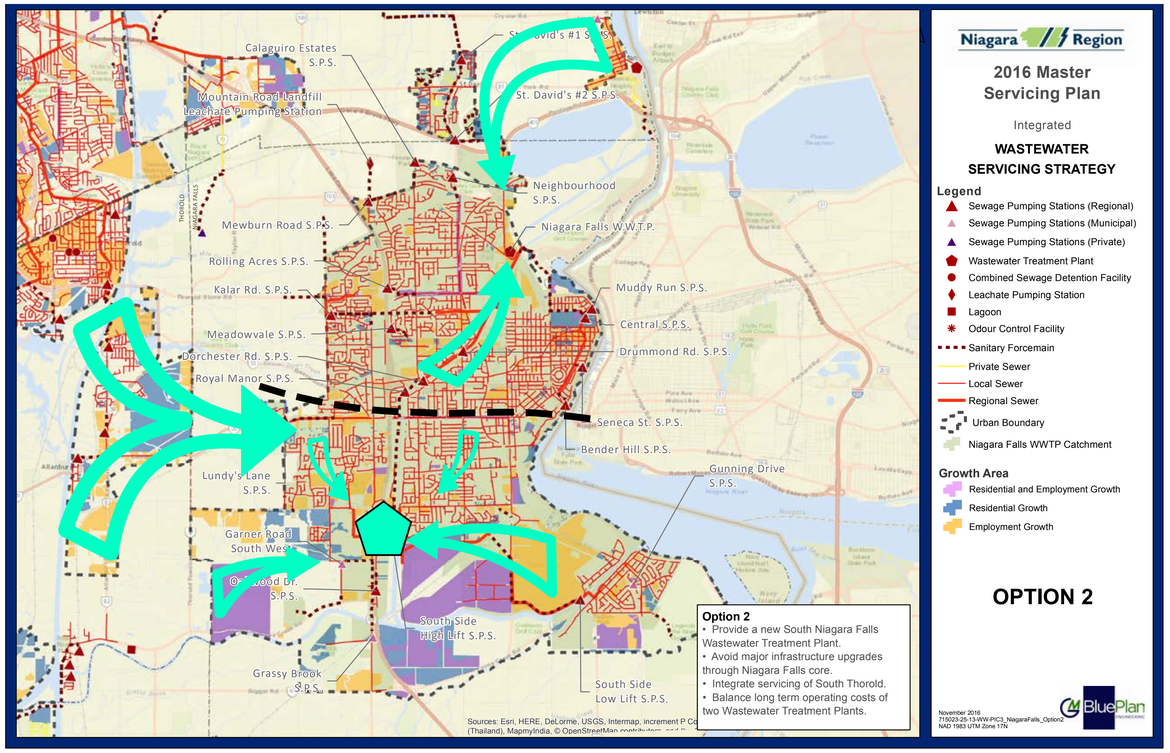


MSP Strategy

- Wastewater Treatment Plant flows approaching capacity; however, no upgrades triggered.
- Upgrade to Foss Road Sewage Pumping Station and forcemain to support growth and existing wet weather flows.
- Park Lane Sewage Pumping Station exceeded under existing design flows; no growth is expected. Wet weather reduction matching growth flows needed to support growth impacts.
- Upgrade to Towpath Sewage Pumping Station to support growth.
- Kelly Street Sewage Pumping Station at capacity but no growth expected. Wet weather reduction matching growth needed to accomodate future growth.
- Continued wet weather flow reduction in Welland and Font Hill to support growth.

HOW WE **FLOW**





Integrated South Niagara Falls Servicing Concepts