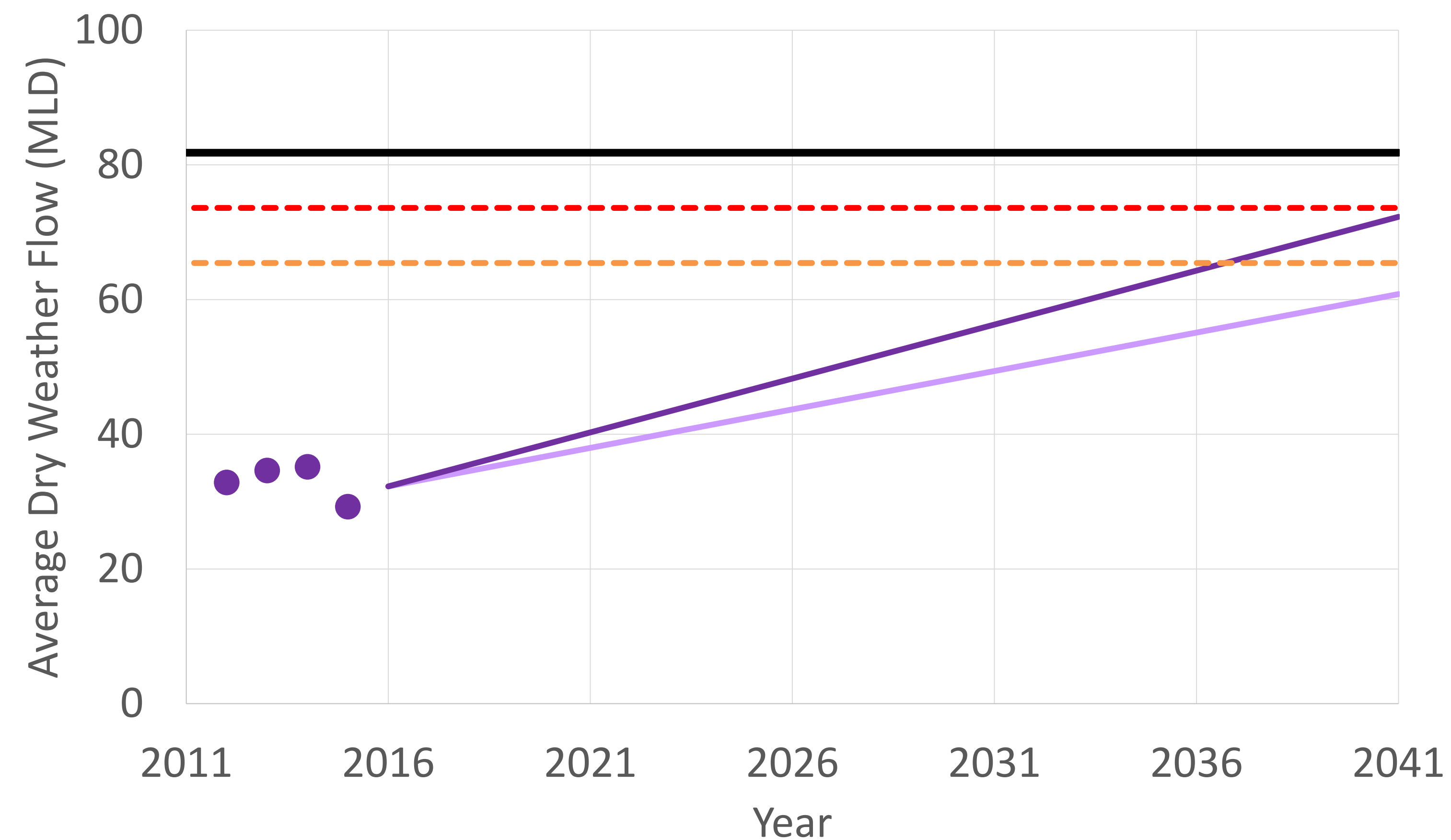


# Water and Wastewater Treatment Plants

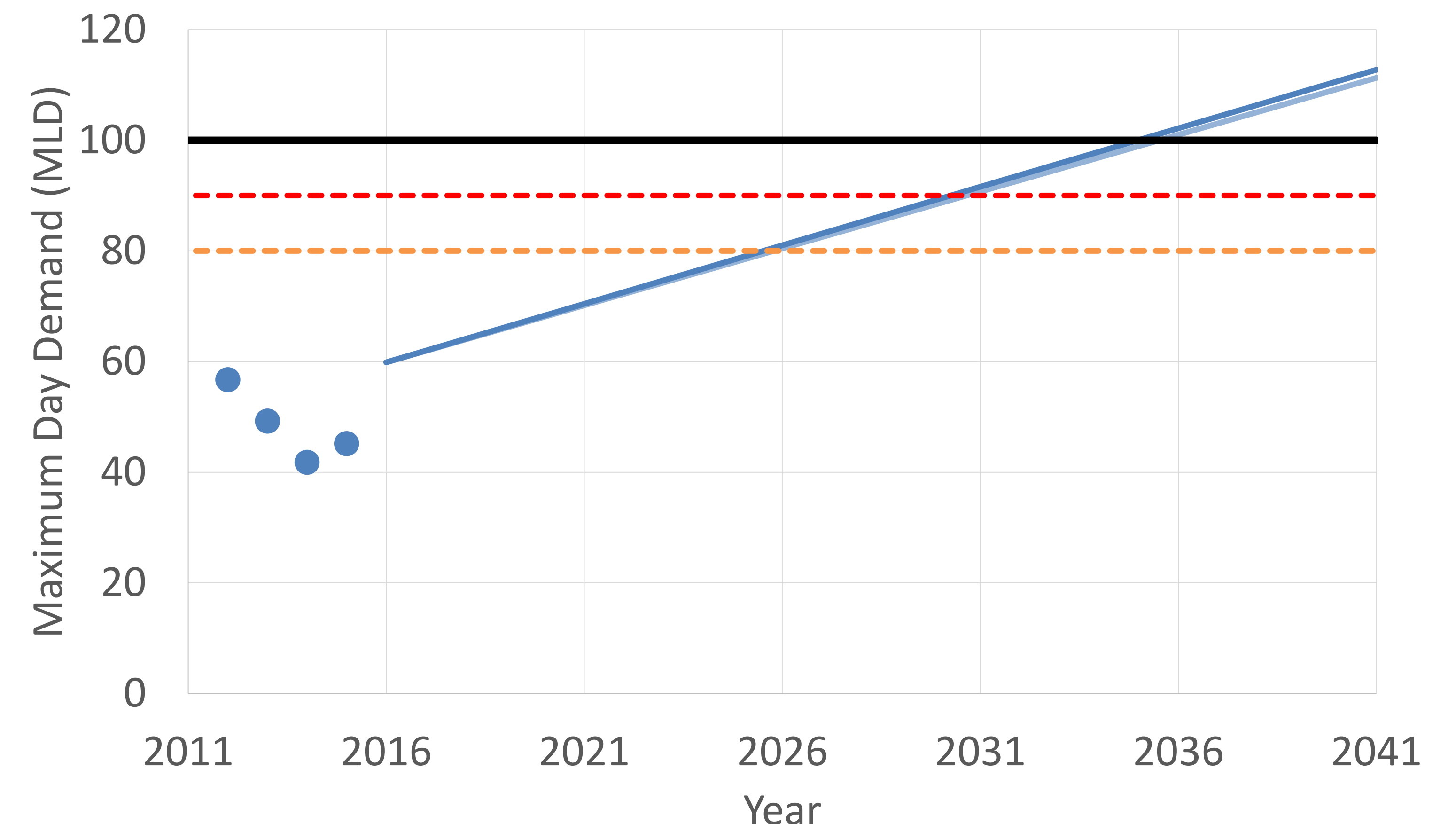
Wastewater Treatment Plant (WWTP) Capacity



— Wastewater Flow Projection (Flow from Brantford Only)  
— WWTP Capacity  
- - - 80% WWTP Capacity  
— Wastewater Flow Projection (Flow from Brantford, Cainsville, and Airport)  
- - - 90% WWTP Capacity  
● Historic

- Capacity upgrades to meet 2041 growth needs may be required; dependent on the negotiations of servicing agreements with the County of Brant
- WWTP process optimization and upgrades are needed to re-establish current rated capacity
- Opportunity to optimize processes with inadequate capacity in the short-term with further capacity upgrades in the long-term

Water Treatment Plant (WTP) Capacity

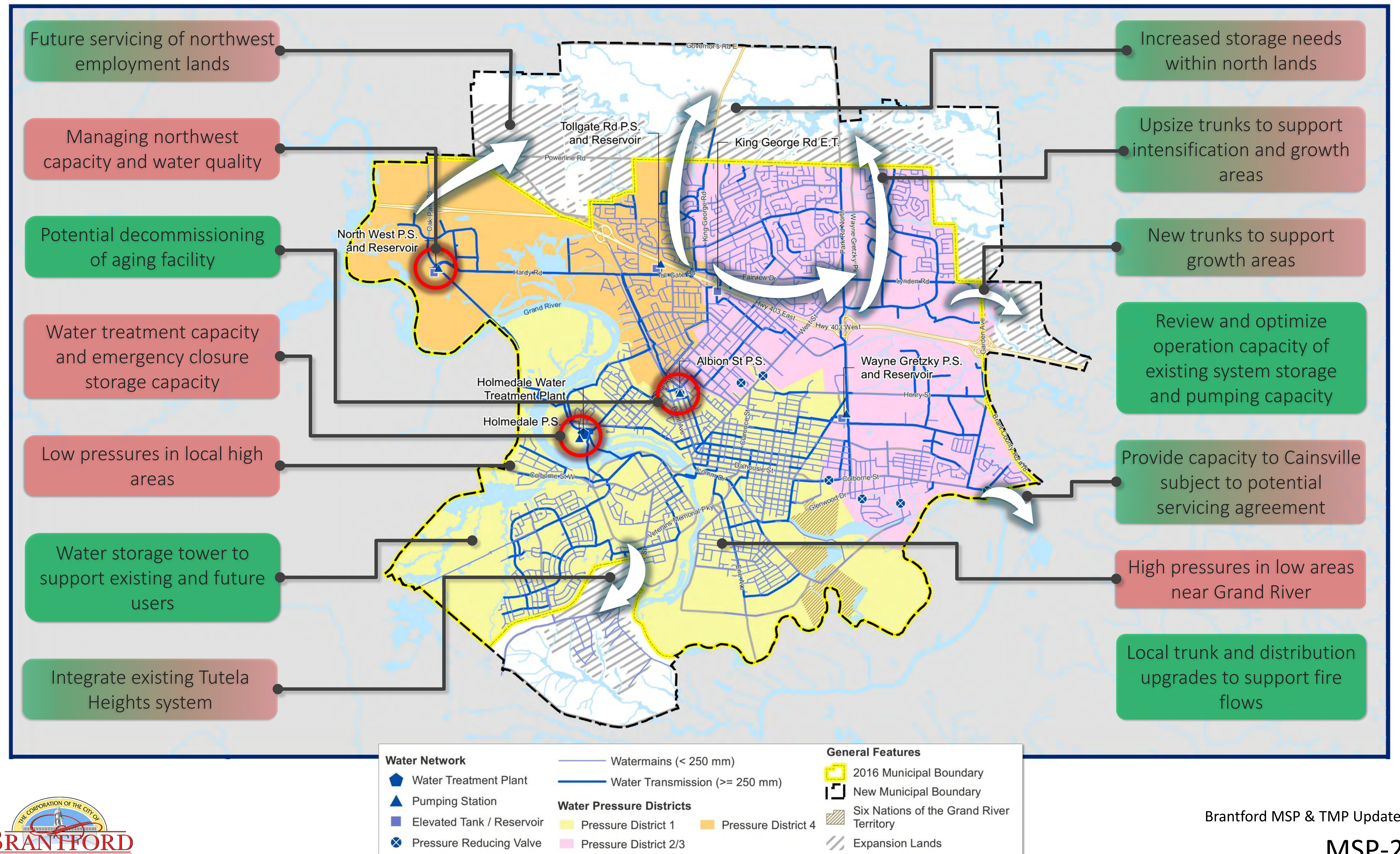


— Water Demand Projection (Supply to Brantford Only)  
— WTP Capacity  
- - - 80% WTP Capacity  
— Water Demand Projection (Supply to Brantford and Cainsville)  
- - - 90% WTP Capacity  
● Historic

- Capacity upgrades needed to meet 2041 growth
- Opportunity to implement process optimization and mechanical upgrades to increase rated capacity

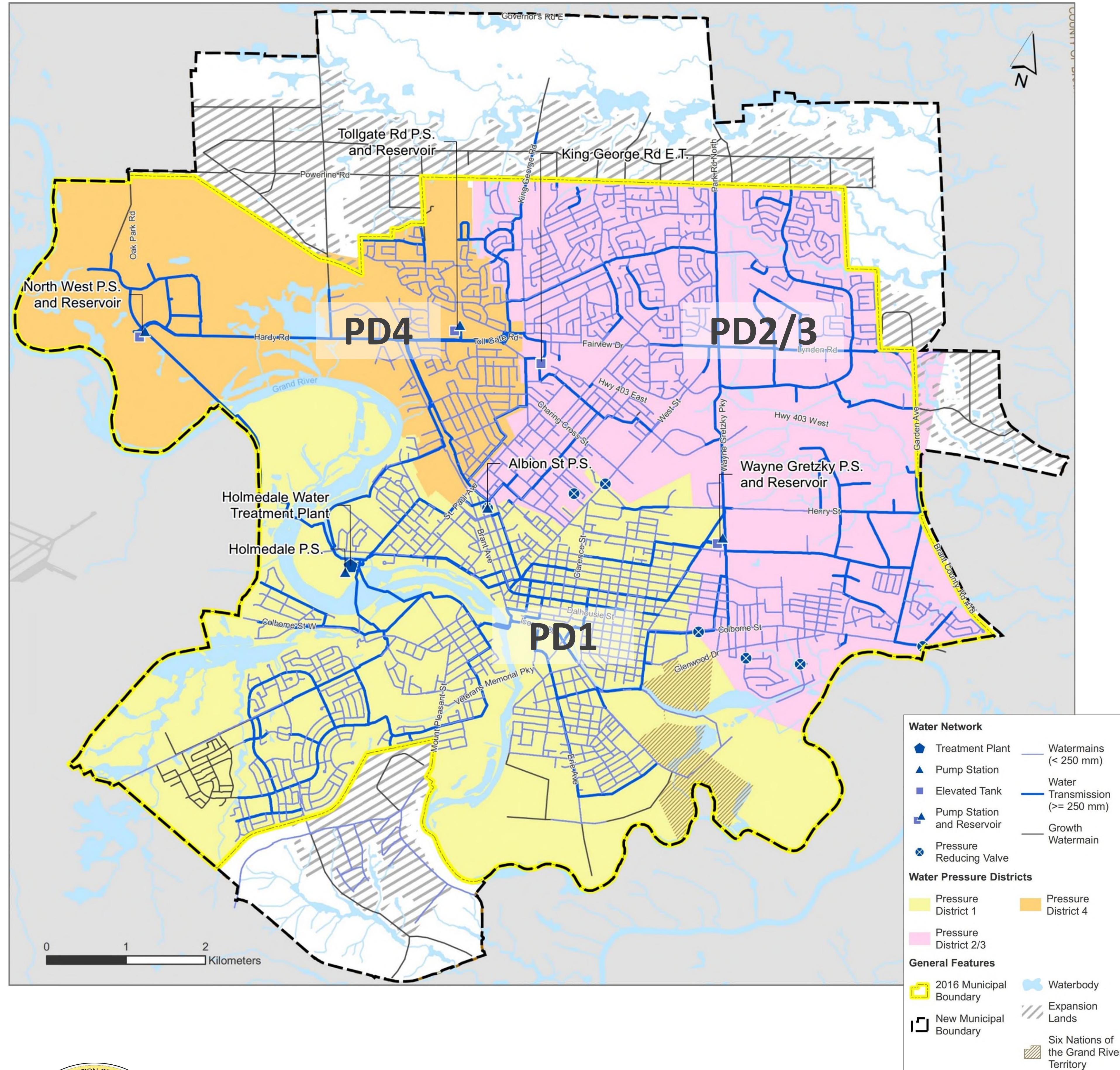


# Water Opportunities and Constraints





# Water Opportunities and Constraints



## Storage

- More water storage, either elevated or pumped, is needed in all pressure districts to accommodate 2041 growth
- Opportunity to increase elevated storage to decrease pumping needs
- Opportunity to replace aging King George Elevated Tank with new larger elevated tank

## Pumping

- Limited pumping upgrades needed in PD1 or PD2/3 to accommodate 2041 growth
- PD4 may need pumping upgrades; dependent on storage strategy
- Opportunity to decommission aging Albion PS

## Transmission (Watermains)

- Aging watermains will need to be replaced to improve local conveyance
- Trunk watermain upgrades needed to support intensification areas and to service expansion lands

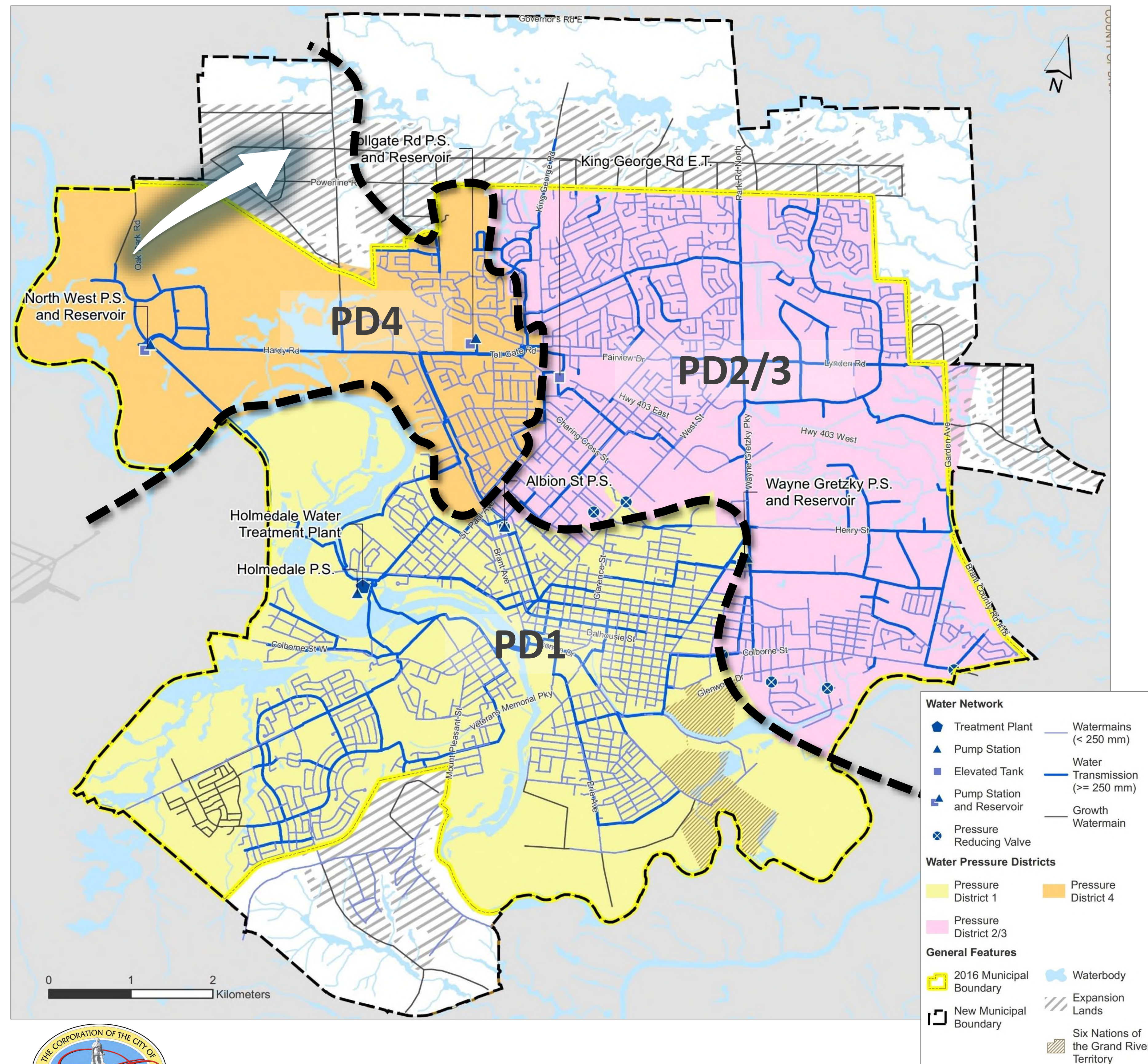
## Pressure

- High and low pressures exist due to variation in elevations



# Water Servicing Concept 1 – Status Quo

- Maintains current servicing strategy, including current pressure district boundaries
- Pressure district boundary for PD4 within expansion lands to be optimized based on local elevations and demands



## Storage

- More water storage, as either elevated or pumped water storage, is needed in all pressure districts

## Pumping

- No pumping upgrades needed in PD1 or PD2/3
- PD4 may need pumping upgrades; dependent on storage strategy

## Transmission (Watermains)

- Trunk watermain upgrades needed to support intensification areas and to service expansion lands

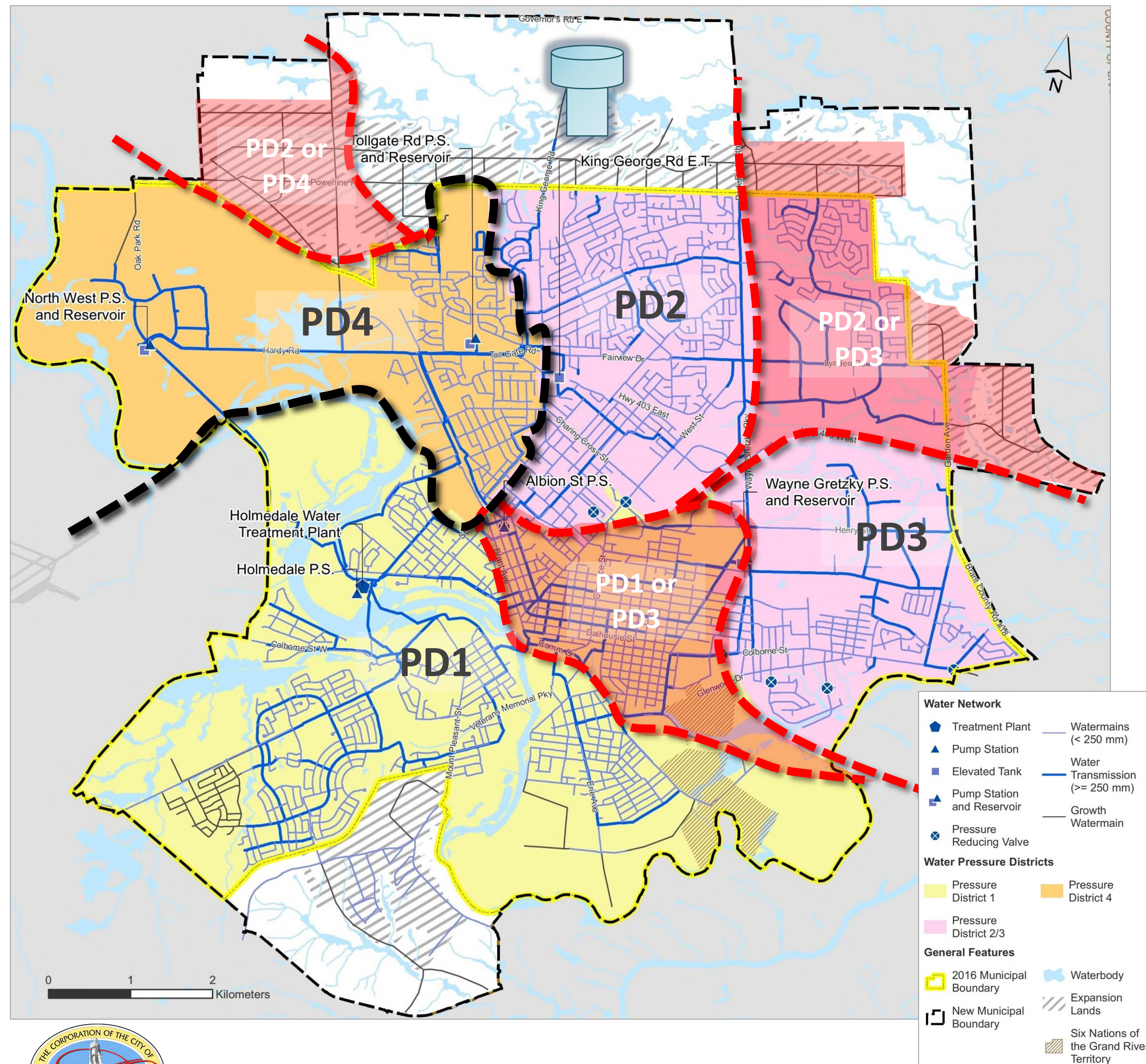
## Pressure

- Current pressures are maintained



# Water Servicing Concept 2 – Split Pressure District 2/3 into PD2 and PD3

- Split PD2/3 into two pressure districts to optimize pressures and facility needs
- Pressure district boundary realignment is flexible due to ground elevations



## Storage

- New water storage, as either elevated or pumped storage, is needed in PD1 and PD4
- New PD2 elevated tank to replace existing King George Elevated Tank and to support growth
- Water storage needs in PD3 are dependent on the boundary realignment

## Pumping

- No pumping upgrades needed in PD1
- Minor upgrades to PD2 and PD3 may be needed to support new pressure districts
- Potential PD4 upgrades needed; dependent on storage strategy and boundary realignment

## Transmission (Watermains)

- Trunk watermain upgrades needed to support intensification areas and to service expansion lands

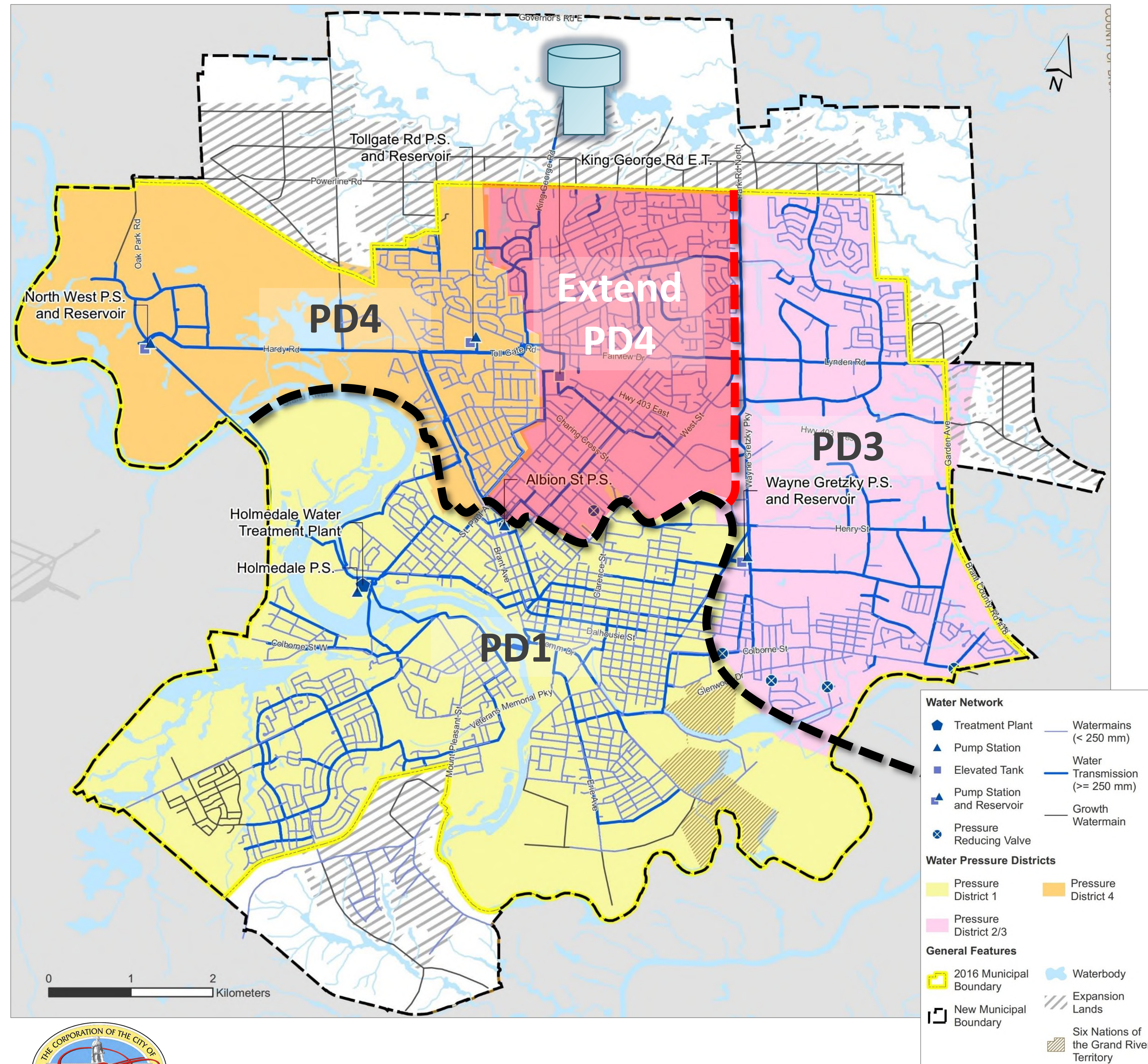
## Pressure

- Improved pressures in PD2 and PD3



# Water Servicing Concept 3 – Maximize Pressure District 4

- Expansion of PD4 eastwards to eliminate PD2 with the PD3 boundary realigned to Wayne Gretzky Parkway
- Pressure district boundary realignment to optimize pressures and facility needs



## Storage

- New PD4 elevated tank to replace King George Elevated Tank to support new pressure district operations and growth
- Potential PD3 storage upgrades needed

## Pumping

- No pumping upgrades are needed in PD1
- Pumping upgrades needed in PD3 and PD4 to accommodate new pressure districts

## Transmission (Watermains)

- Trunk watermain upgrades needed to support intensification areas and to service expansion lands

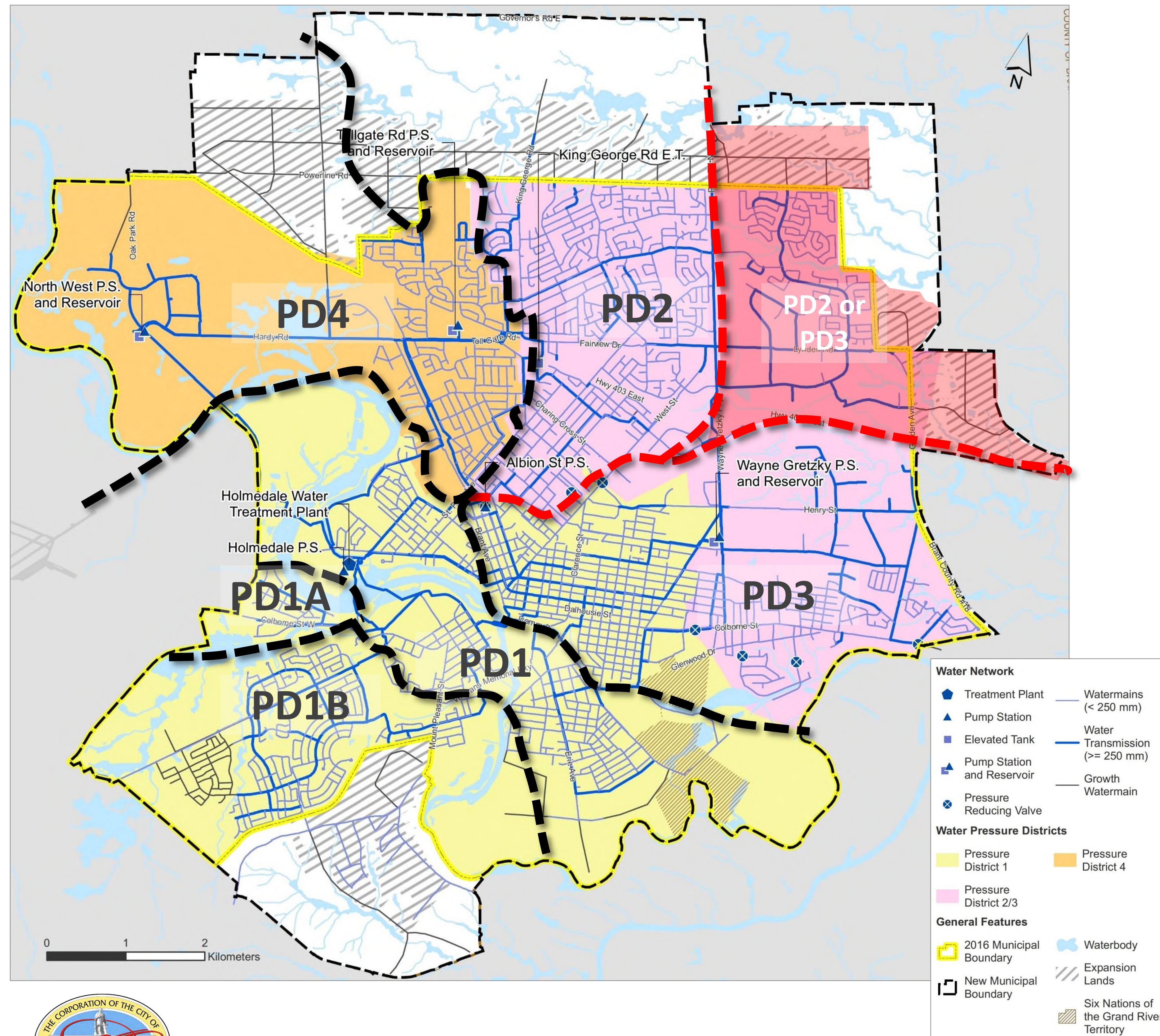
## Pressure

- Improved pressures in PD3 and PD4



# Water Servicing Concept 4 – Split Pressure District 1

- Split PD1 into three pressure districts to optimize PD1 pressures
- Split PD2/3 into two pressure districts to optimize pressures and facility needs
- Pressure district boundary realignment is flexible due to ground elevations



## Storage

- More water storage, as either elevated or pumped water storage, is needed in all pressure districts

## Pumping

- New pumping facilities are needed to accommodate PD1A and PD1B
- Minor upgrades to PD2 and PD3 may be needed to support new pressure districts
- Potential PD4 upgrades needed; dependent on storage strategy and boundary realignment

## Transmission (Watermains)

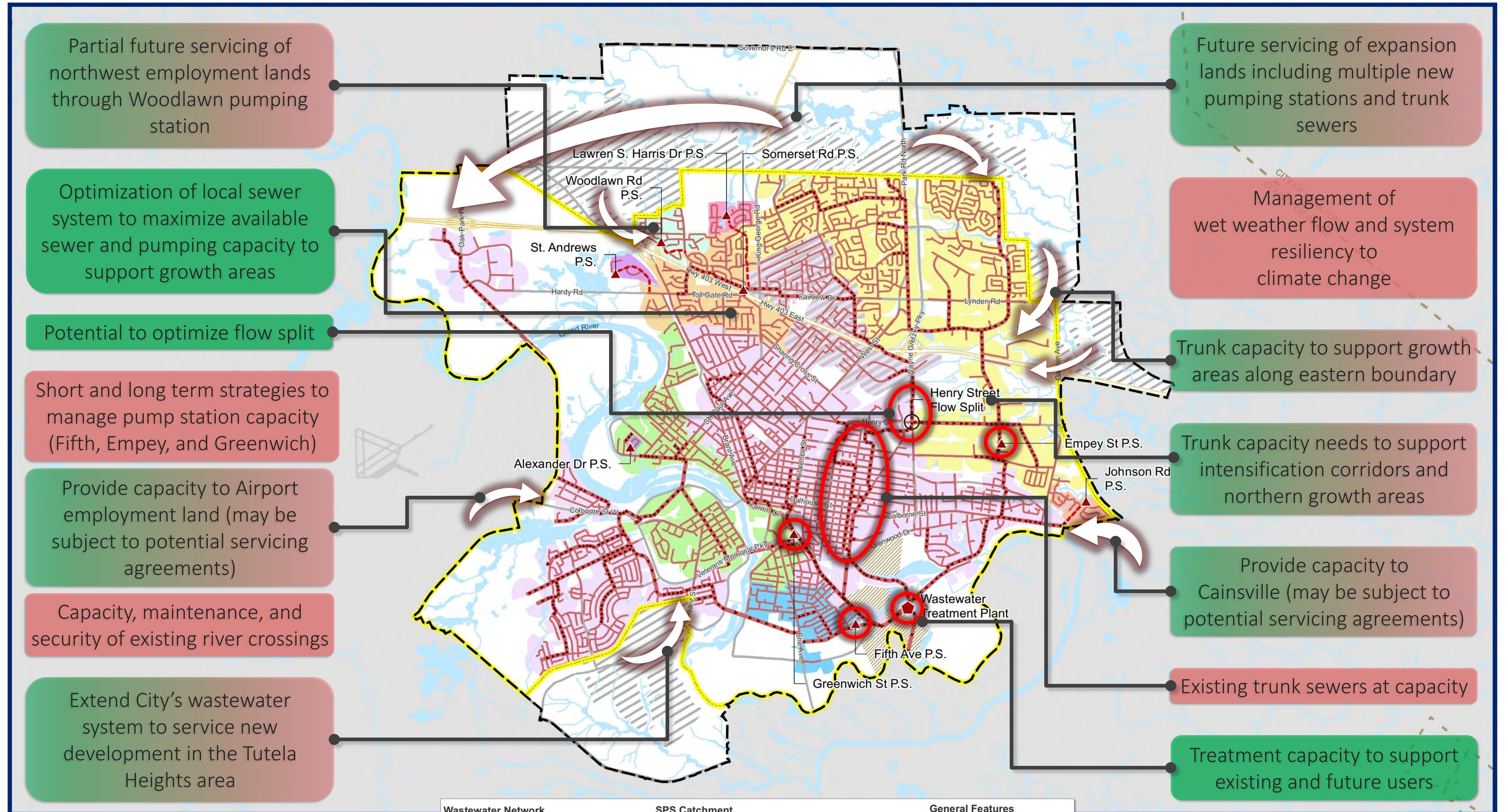
- Trunk watermain upgrades needed to support intensification areas and to service expansion lands

## Pressure

- Improved pressures in PD1, PD2, and PD3



# Wastewater Opportunities and Constraints

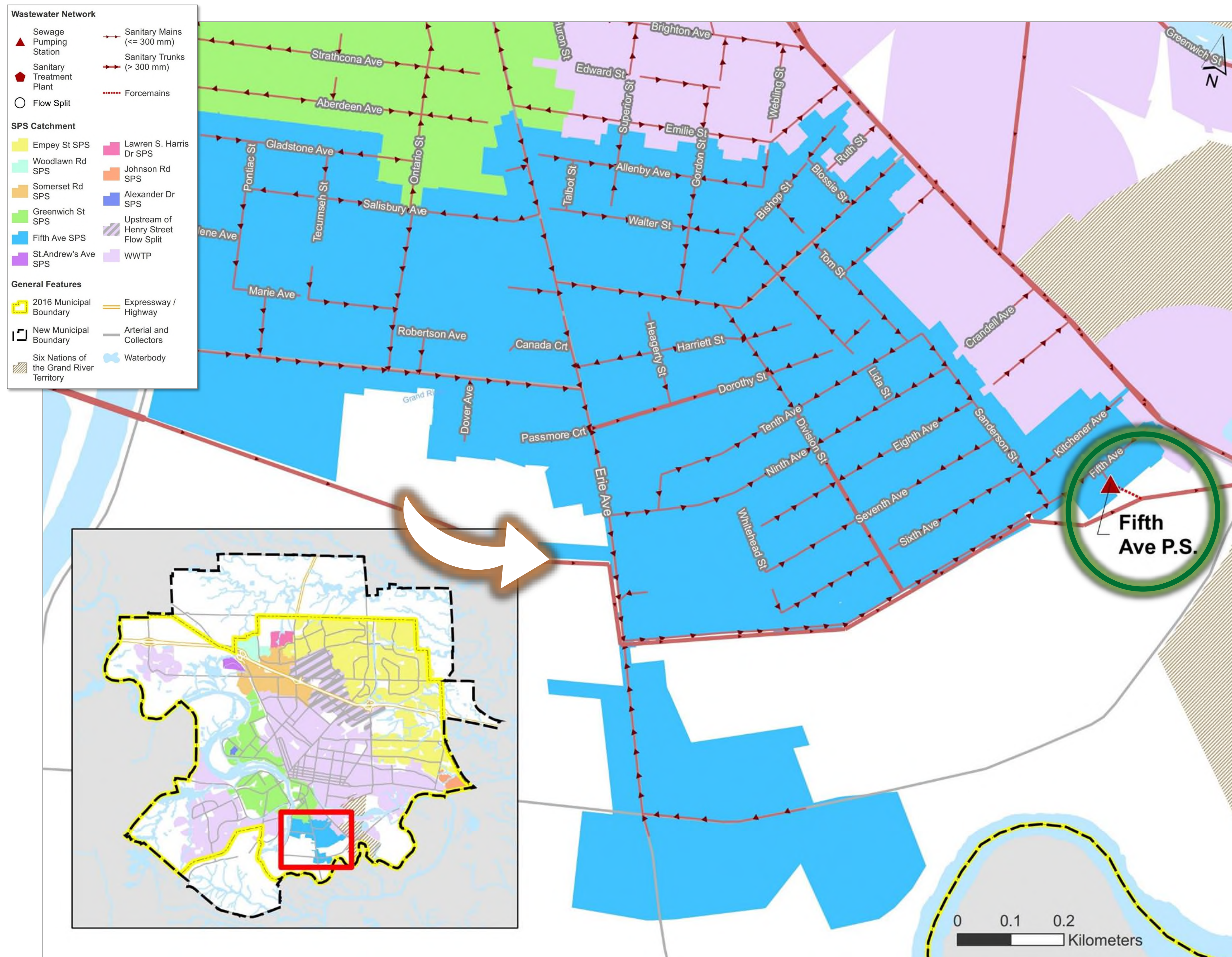


Wastewater Network		SPS Catchment		General Features	
	Sewage Treatment Plant		Alexander Dr		2016 Municipal Boundary
	Sewage Pumping Station		Empey St		New Municipal Boundary
	Flow Split		Fifth Ave		Six Nations of the Grand River Territory
	Force mains		Greenwich St		Expansion Lands
	Sanitary Mains (<= 300 mm)		Johnson Rd		
	Sanitary Trunks (> 300 mm)		Lawren S. Harris Dr		
			Somerset Rd		
			St. Andrew's Ave		
			Woodlawn Rd		
			Upstream of Henry St Flow Split		
			Wastewater Treatment Plant		



# Fifth Avenue Pumping Station Catchment Concepts

- Fifth Avenue Pumping Station catchment has high rates of inflow and infiltration limiting existing pumping station and sewer capacity
- Intensification occurring along Erie Avenue will contribute additional flows to the pumping station and sewers



## Diversion

- Opportunity to reconfigure upstream areas to divert flow away from Fifth Avenue Pumping Station
- Diversion opportunities are limited and unlikely to eliminate the need for pumping station upgrades

## Pumping

- City is currently undertaking pumping station upgrades, sized to meet 2041 flow targets

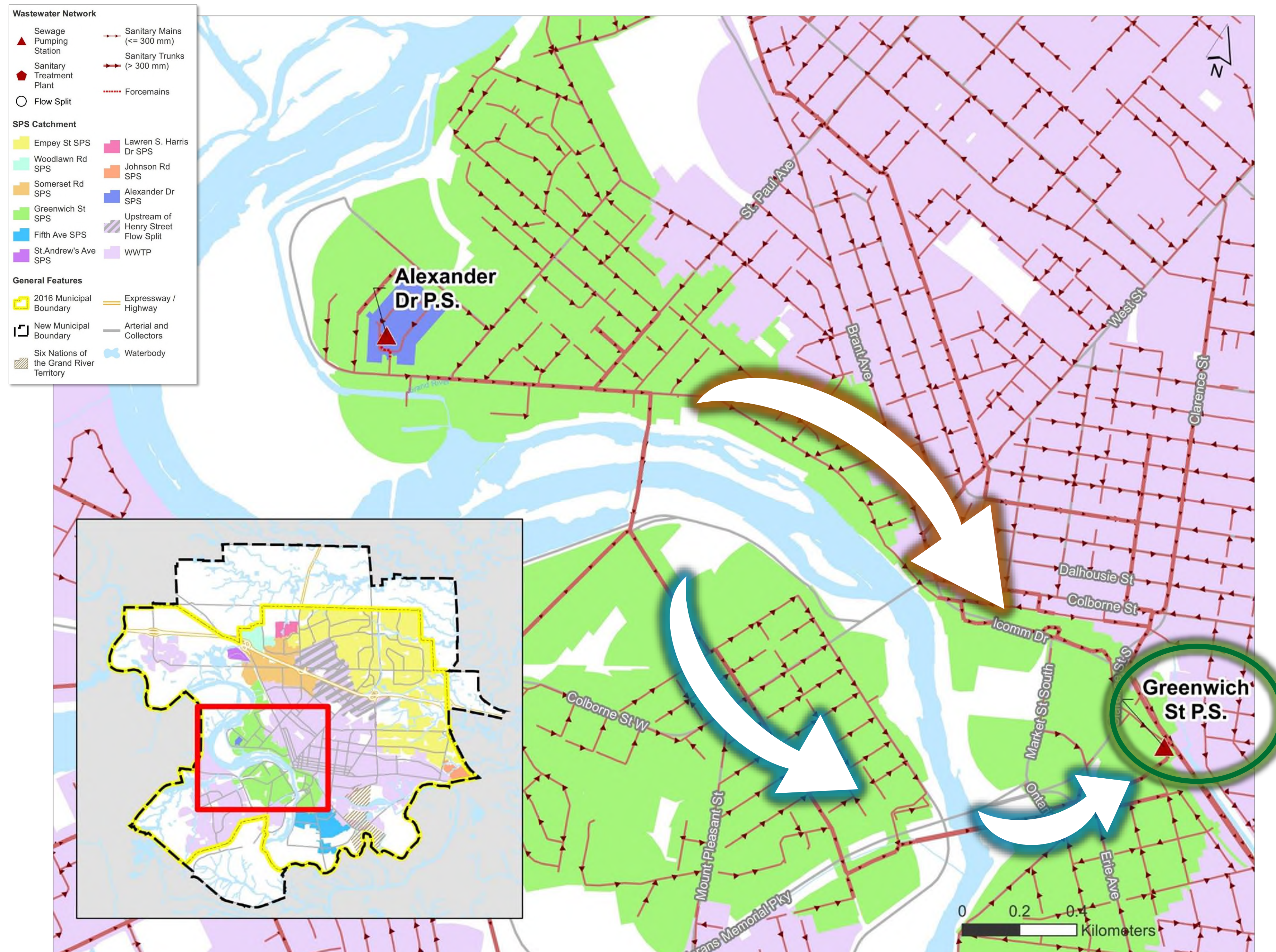
## Inflow and Infiltration Reduction

- Opportunity to implement inflow and infiltration reduction strategies to optimize existing pumping station and sewer capacity



# Greenwich Pumping Station Catchment Concepts

- Greenwich Pumping Station Catchment has high rates of inflow and infiltration, limiting existing pumping station and sewer capacity
- Intensification occurring in downtown, along Icomm Drive



## Diversion

- Opportunity to reconfigure upstream areas to divert flow away from Greenwich Avenue Pumping Station
- Diversion opportunities are limited and unlikely to eliminate the need for pumping station upgrades

## Trunk Sewer Upgrades

- Sewer upgrades needed to address existing issues and to support growth
- Potential to optimize flow splits to minimize sewer upgrades

## Pumping

- Pumping station upgrades are needed to support growth

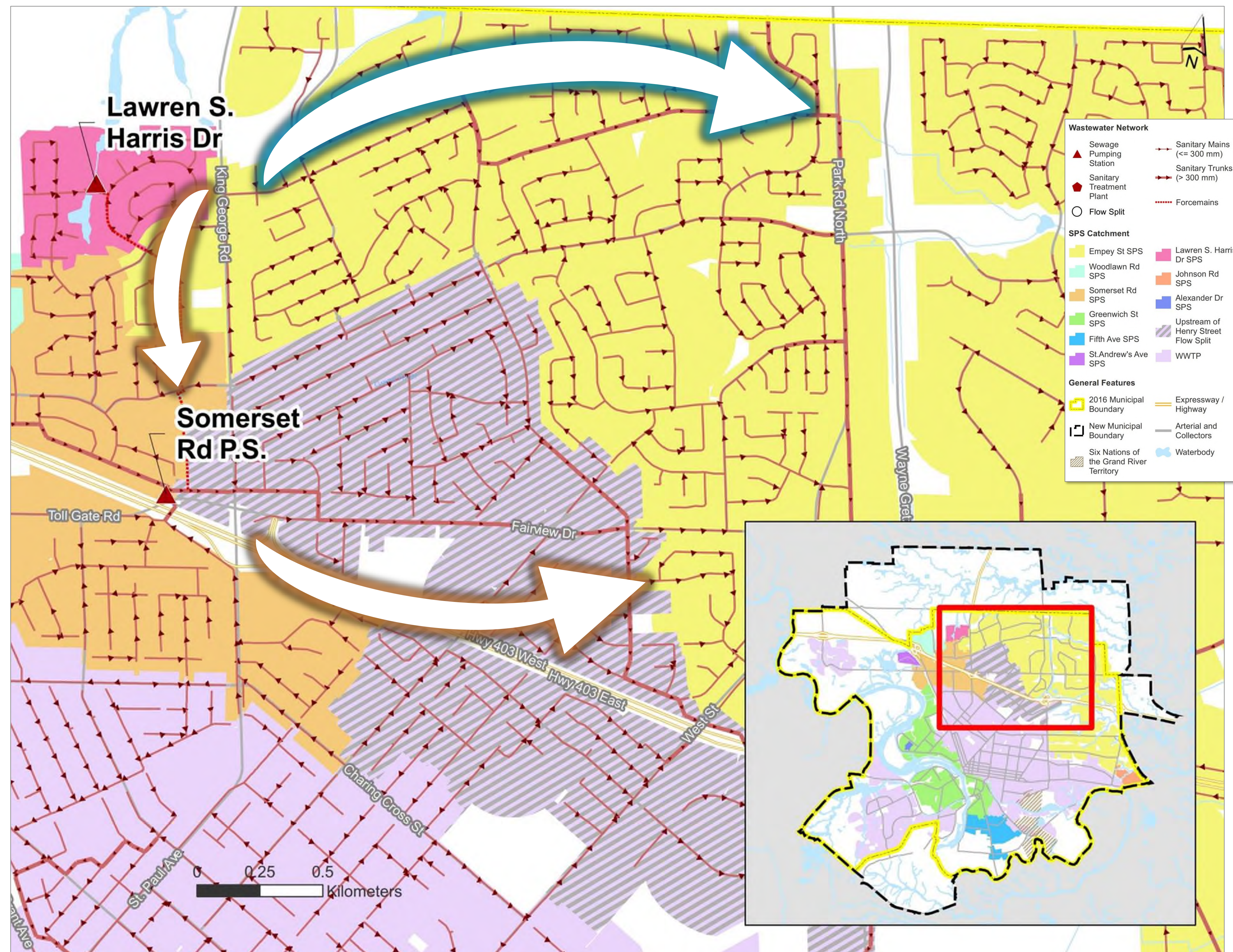
## Inflow and Infiltration Reduction

- Opportunity to implement inflow and infiltration reduction strategies to optimize existing pumping station and sewer capacity



# North Brantford Catchment Concepts

- Limited sewer capacity along King George Road and Powerline Road
- Limited capacity restricts sewer servicing options for North Expansion Lands
- Sewer upgrades are needed to support intensification corridors



## Diversion

- Opportunity to construct a new interceptor sewer to service intensification corridors and provide alternate servicing to the North expansion lands

## Trunk Sewer Upgrades

- Trunk sewer upgrades needed to support intensification corridors
- North and east expansion lands will trigger trunk sewer upgrades

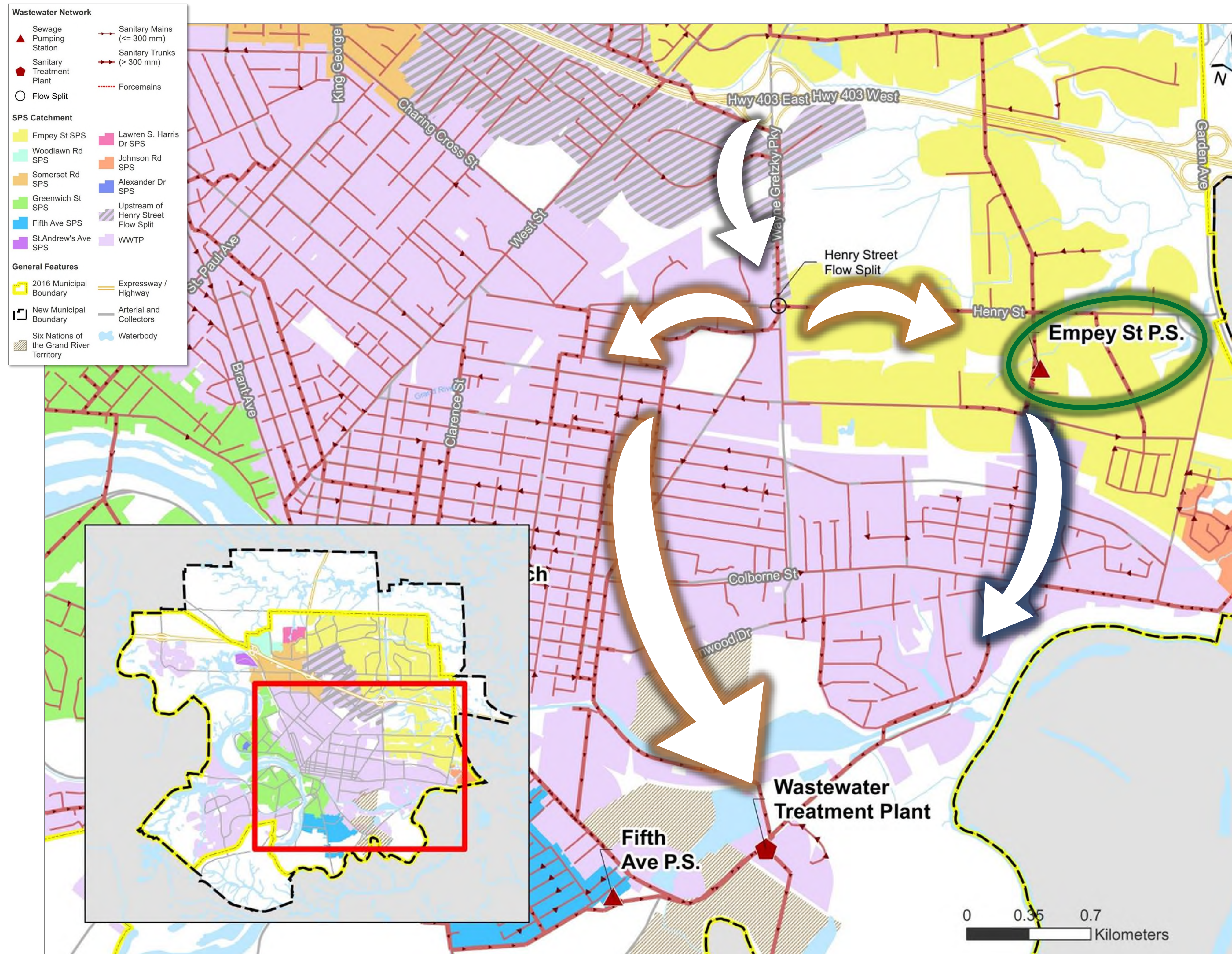
## Inflow and Infiltration Reduction

- Opportunity to implement inflow and infiltration reduction strategies to optimize existing pumping stations and sewer capacity



# Empey Street Pumping Station Concepts

- Significant growth and intensification expected upstream of the Empey Pumping Station, which has existing capacity restrictions
- Existing trunk sewer downstream of the Henry Street flow split is constrained



## Diversion

- Opportunity to adjust Henry Street flow split to concentrate upgrades to either the downstream sewer or at Empey Street Pumping Station

## Tunneling

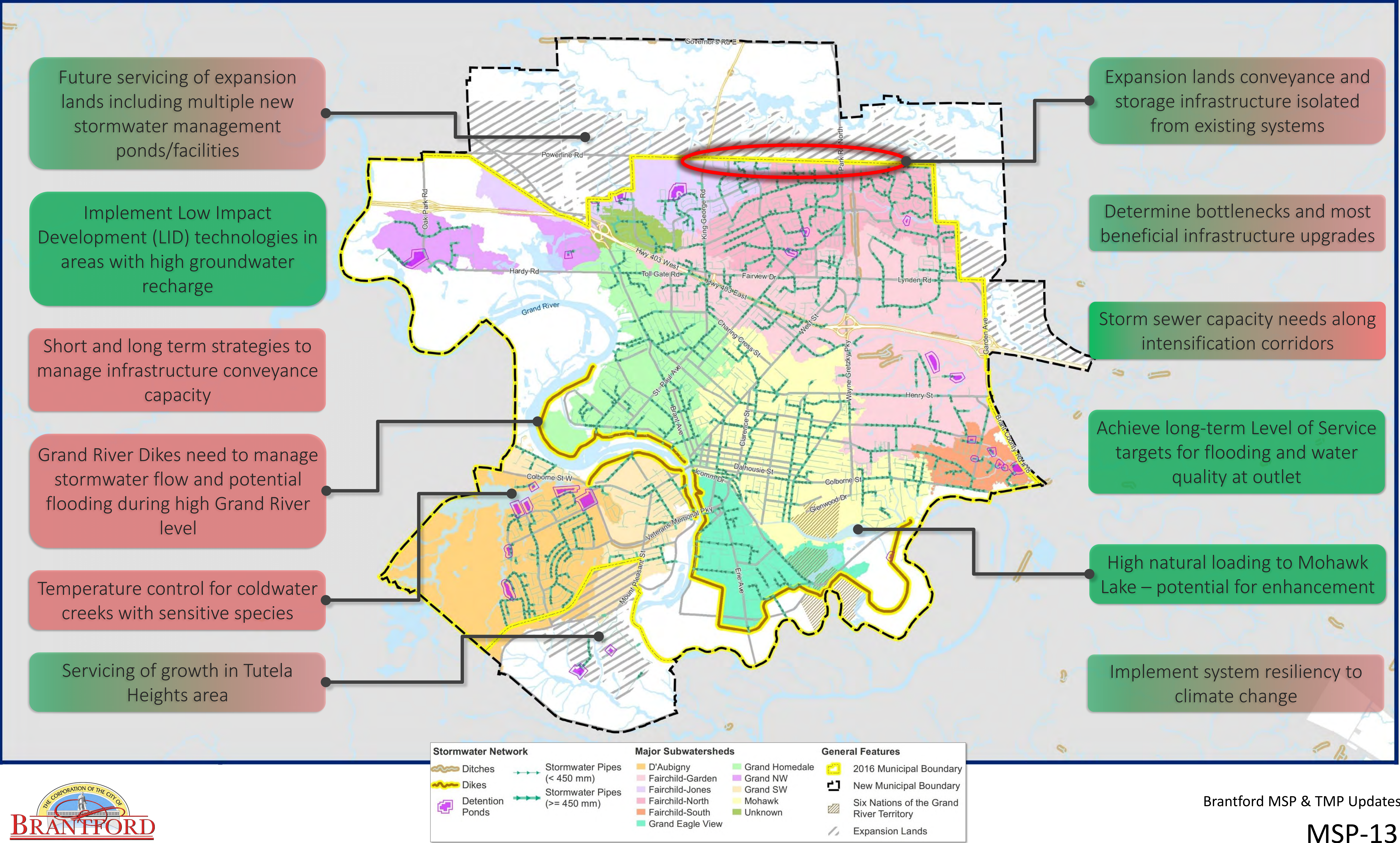
- Potential to bypass the Empey Street Pumping Station by constructing a deep tunneled sewer

## Pumping

- Pumping station upgrades are dependent on diversion and tunneling strategy
- Opportunity to accommodate pumping station upgrades at the existing Empey site

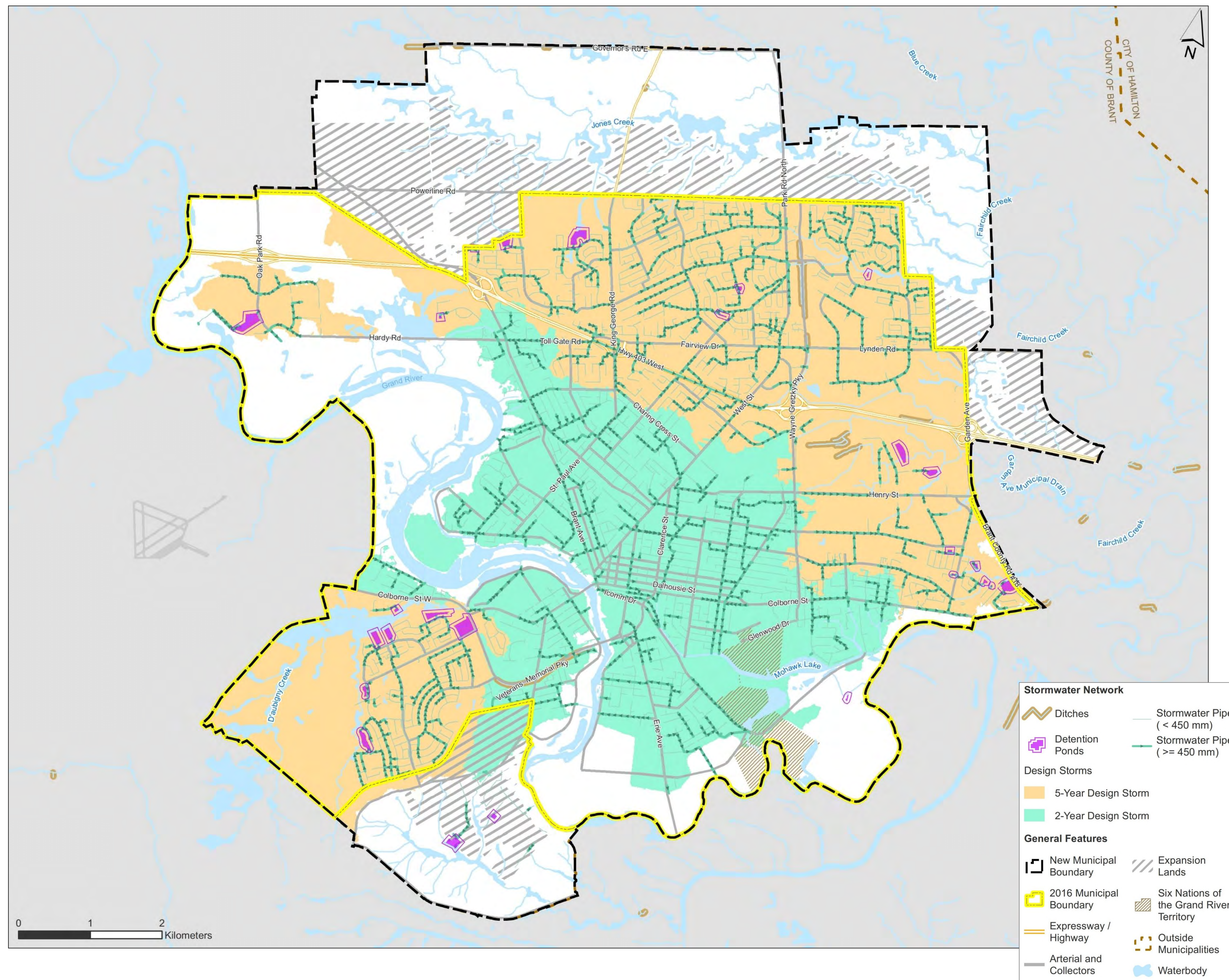


# Stormwater Opportunities and Constraints





# Stormwater Performance Targets

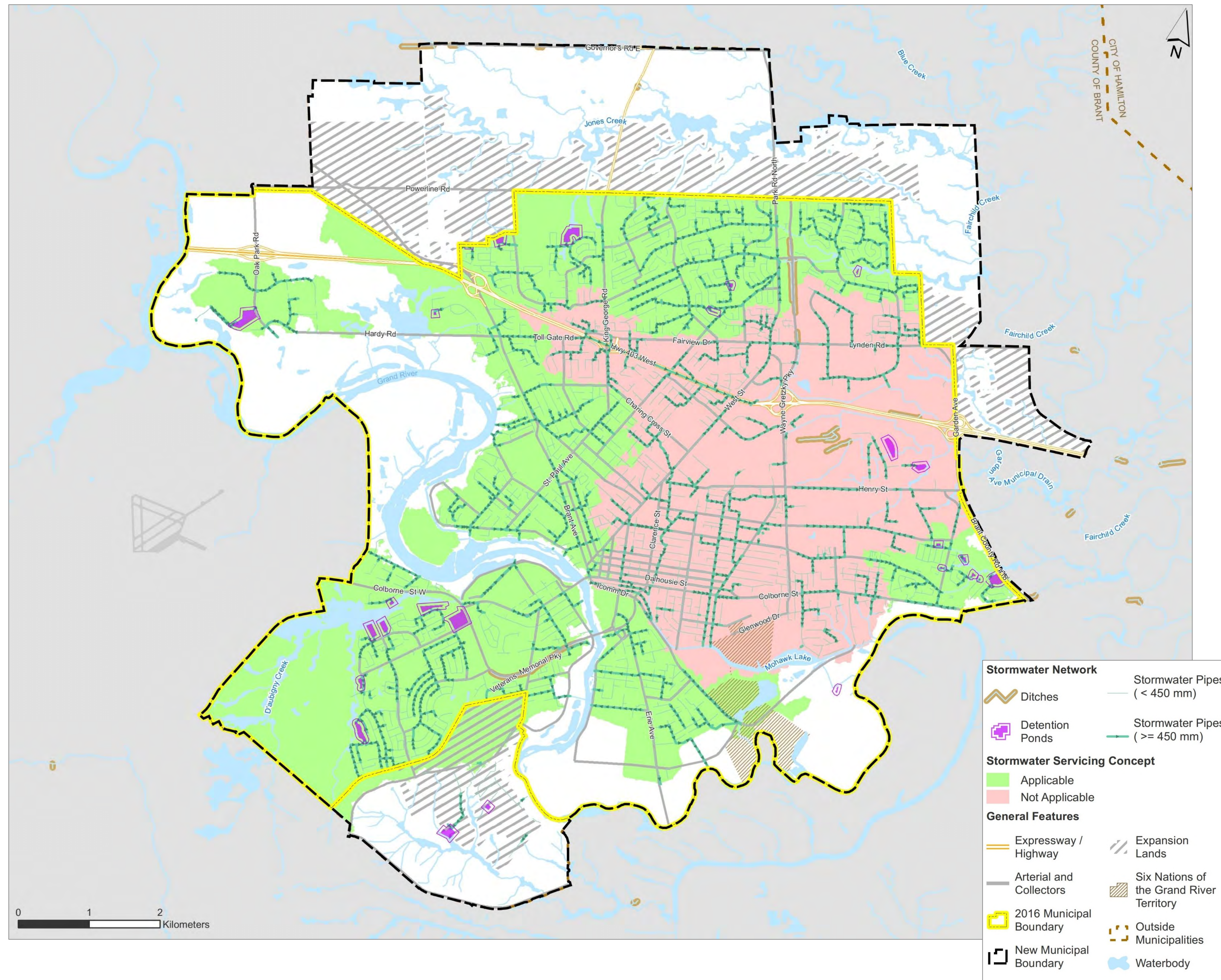


## Storm Sewer Capacity

- Storm sewer network built over time using different standards
- Older portions of the city have less capacity as compared to the newer portions
- Significant undertaking to elevate performance in older areas
- Target for minor storm network:
  - 2-year design storm in older areas
  - 5-year design storm in newer areas
- Major storm network to support 100-year design storm



# Stormwater Servicing Concept – Status Quo



## Strategy Summary

- Leave existing system as-is
- Ideal in locations that do not have existing or growth related issues or where benefit does not justify costs
- Certain areas do not have any applicable solution without changing entire system
- Can be combined with major system upgrades to minimize risk and/or on site management controls to limit impacts of growth

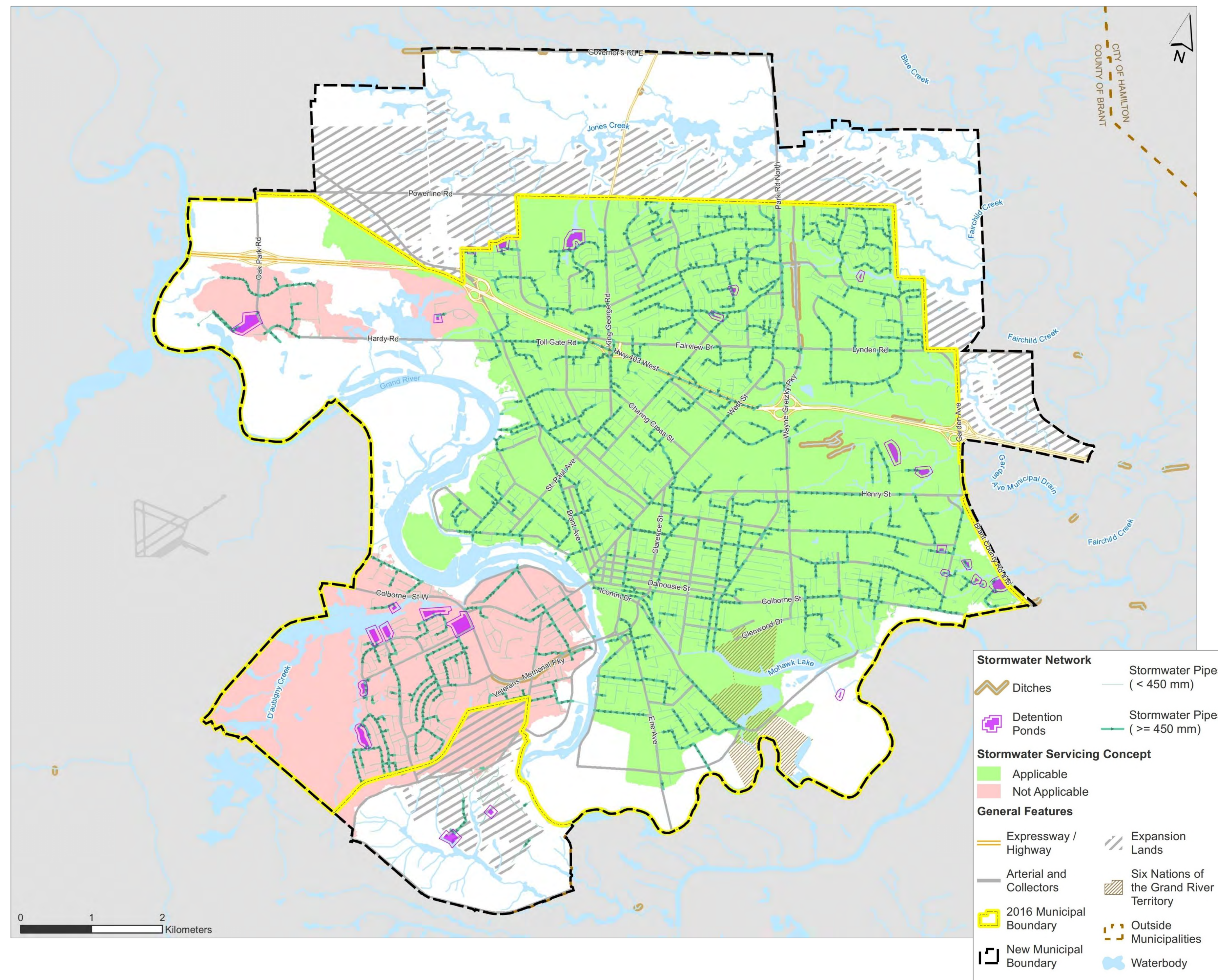
## Applicable Locations

- Grand River (Northwest, Eagle Place, Southwest, and Holmedale)
- Fairchild Creek (North, South, and Jones)
- D'Aubigny Creek



# Stormwater Servicing Concept – Minor System Upgrades

The objective of the **minor system** is to prevent nuisance flooding under 1 in 5 year storms (frequently occurring). Elements of the minor system include: roadside ditches, downspouts, foundation drains, small channels and swales, road and roof gutters, catch basins, storm sewers, and service connections.



## Strategy Summary

- Upgrade the sewers to increase capacity
- Dependent on location as some places have bottlenecks, while others need entire system upgraded/replaced
- Addresses localized flooding issues but can create downstream issues

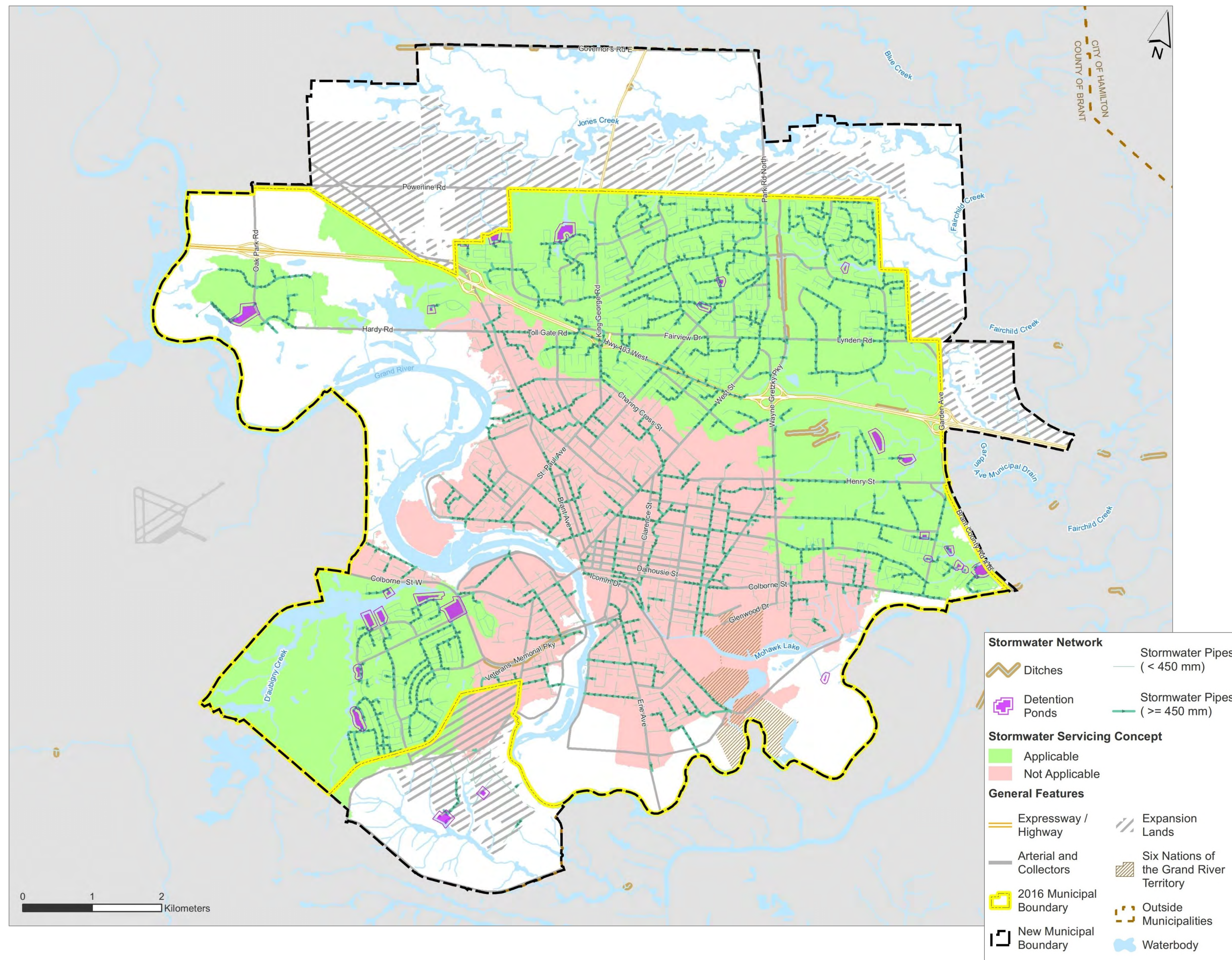
## Applicable Locations

- Grand River (Eagle Place and Holmedale)
- Mohawk Lake
- Fairchild Creek (Garden, North, South, and Jones)
- North Expansion Lands and Tutela Heights



# Stormwater Servicing Concept – Quantity Control

The potential impacts of increased peak flows include flooding and increased risks to life and property. In order to minimize these risks, the stormwater **quantity control** requirements for development should ensure that the post-development peak flow rates are not to exceed the corresponding pre-development peak flow rates.



## Strategy Summary

- Stormwater management ponds or on-site underground storage
- Storage is used to hold back water; reducing peak flows
- Addresses localized flooding issues by reducing sewer capacity needs and/or safely managing local floodwaters

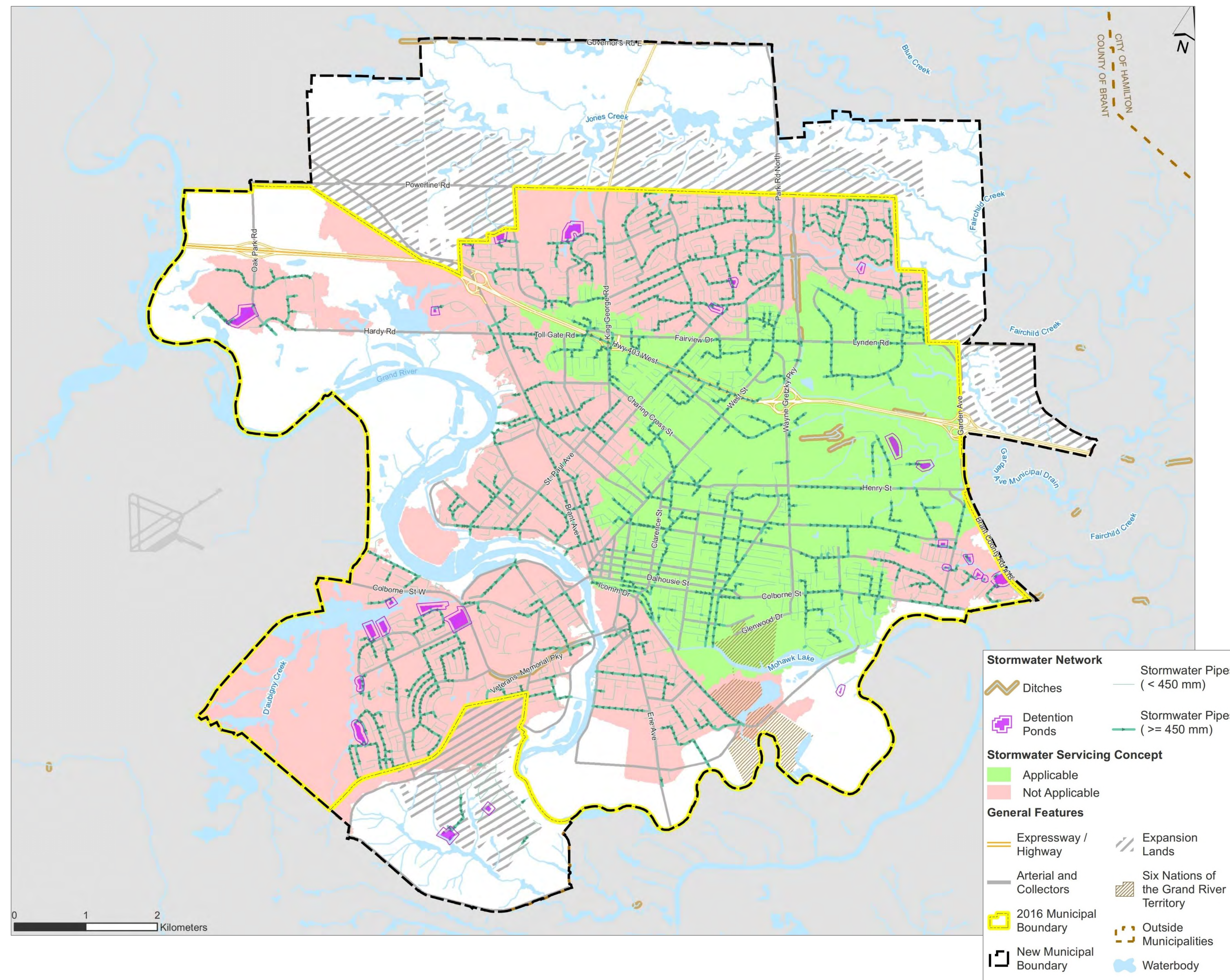
## Applicable Locations

- Grand River (Northwest)
- Fairchild Creek (Garden, North, South, and Jones)
- D'Aubigny Creek
- North Expansion Lands and Tutela Heights



# Stormwater Servicing Concept – Low Impact Development

**Low impact development** is a stormwater management strategy that seeks to mitigate the impacts of increased runoff and stormwater quality, managing runoff as close to its source as possible. These practices include but are not limited to: bioretention, perforated pipe system, permeable pavements, green roofs, enhanced grass swales, and rainwater harvesting.



## Strategy Summary

- Low impact developments rely on decentralized stormwater management facilities
- Low impact developments mimic nature's process of managing stormwater through natural systems
- Can reduce peak flows to the storm network by either reducing total runoff or providing storage function

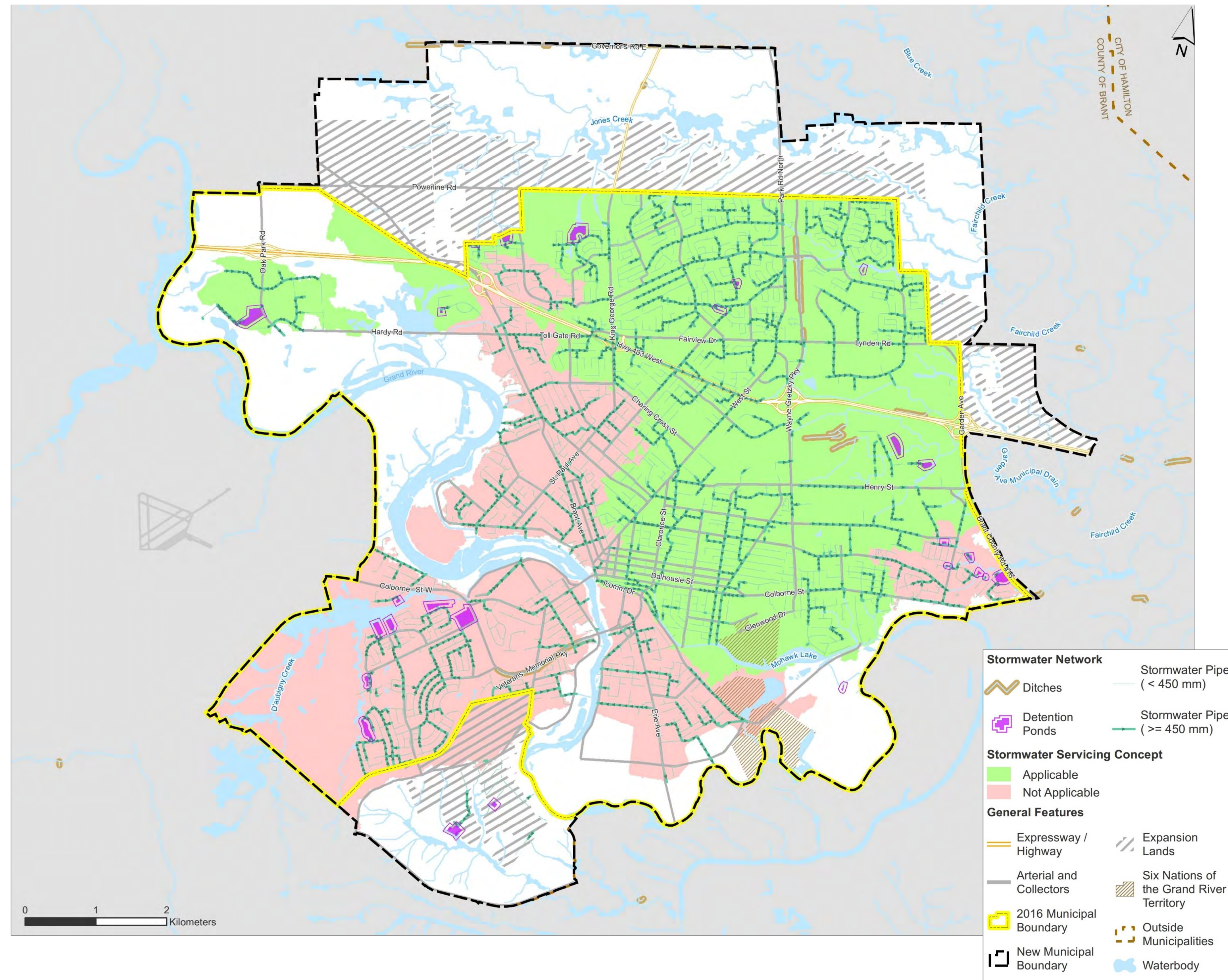
## Applicable Locations

- Mohawk Lake (Downtown)
- Fairchild Creek (Garden District)
- North Expansion Lands and Tutela Heights



# Stormwater Servicing Concept – Major System Upgrades

The objective of the **major system** is to reduce risk to life and property damage under 1 in 100 year storms (infrequent). Elements of the major system include: overland flow routes, natural streams, valleys, roads, channels, and stormwater management ponds.



## Strategy Summary

- Improve surface drainage routes (streets and channels) to safely manage stormwater
- Conveys all flow exceeding the capacity of the minor system
- Limited by existing topography and by features such as available outlets and river dykes

## Applicable Locations

- Mohawk Lake
- Grand River (Northwest)
- Fairchild Creek (Garden District, North, and Jones)