

Virtual PIC – June 9, 2020 and June 30, 2020

City of Brantford Water, Wastewater, and

Stormwater

Update



Welcome

Why Are We Here?

- growth of the community
- recommendations for:
 - Public Transit Strategy

 - Roadway Network Infrastructure
 - Water Servicing
 - Wastewater Servicing
 - Stormwater Servicing

We Need Your Help!

- Review the content
- Ask questions
 - Provide comments

• The City is updating the 2014 Water, Wastewater and Stormwater Master Servicing Plan (MSP) and the 2014 Transportation Master Plan (TMP) • These updates will develop long term servicing and transportation strategies to ensure the maintenance of services for existing residents and business as well as support future

• This Virtual Public Information Centre is presenting the preferred future network

Active Transportation System (cycling and walking)

Virtual PIC – June 9, 2020 & June 30, 2020

Virtual Public Information Centre (PIC)

In response to the advice of public health officials to limit in-person gatherings due to COVID-19, this Virtual Public Information Centre (PIC) has been developed. Through this Virtual PIC, you will be able to learn more about the Master Servicing Plan and Transportation Master Plan projects and provide comments on the study findings.

Virtual PIC Process

- \bullet

In accordance with the Municipal Freedom of Information and Privacy Protection Act, no personal information will be included with the responses presented on the project website and all comments will become part of the public record.



June 9 at 3:00 p.m. PIC Boards and a video walkthrough of their content will be posted June 9 – June 23 First question and comment submission period June 30 at 3:00 p.m. A question and answers video will be posted June 30 – July 21 Second question and comments submission period July 28 at 3:00 p.m. A Frequently Asked Questions (FAQ) document will be posted

Growth Management Assumptions





Growth management assumptions influence how the City can accommodate forecasted growth and provide a basis for the Urban Structure as well as the development of land use designations and policies.

The Growth Plan for the Greater Golden Horseshoe projects that Brantford's population will reach 163,000 residents, with 79,000 jobs in the City, by the year 2041. As indicated in the table below, it is anticipated that new growth of 61,300 residents and 34,110 jobs will be distributed throughout the City, in a combination of intensification within the Built-up Area and growth in the City's new and existing Designated Greenfield and Employment Areas.

- Area (yellow on the map) as it continues to develop,.
- Downtown and other parts of the City.

Population and Employment	Population			Employment		
Growth, 2016-2041	2016	2041	Growth	2016	2041	Growth
Built-Up Community Area	94,720	110,305	15,585	18,530	28 <i>,</i> 055	9,525
Existing Designated Greenfield Area	6,485	29,845	23,360	355	1,495	1,140
New Designated Greenfield Area	*	22,620	22,620	*	4,955	4,955
Existing Employment Area			25,575	36,025	10,450	
New Employment Area				*	8,400	8,400
Rural Area	495	230	-265	430	70	-360
Total	101,700	163,000	61,300	44,890	79,000	34,110

pulation and employment will be absorbed into the New Designated Greenheid Area of New Employment Area. Source: Envisioning Brantford – MCR Part 1 Report, SGL Planning & Design et. Al., Chapters 6&10 Brantford MSP & TMP Updates

Virtual PIC – June 9, 2020 & June 30, 2020

The City's Built-up Area (shown in the light peach tone on the map) will accommodate over 15,000 new residents through intensification.

• Over 23,000 new residents will be added to the existing Designated Greenfield

Over 22,000 new residents will be accommodated in the boundary expansion lands in the new Designated Greenfield Area (orange on the map).

• 10,450 new jobs will be located in the existing Employment Areas (purple on the map), with 8,400 new jobs in new Employment Areas in the boundary expansion lands (blue on the map). The rest of the employment growth will be located in business, office, and commercial developments located in the

Municipal Class Environmental Assessment Process

The Water, Wastewater, and Stormwater Master Servicing Plan Update and Transportation Master Plan Update involve the completion of Phases 1 and 2 of the MEA Municipal Class Environmental Assessment (EA) process

Environmental Assessment Process

Problem and Opportunity

- What makes up the water, wastewater, stormwater, and transportation systems?
- How does it work?
- How well is it working?
- What do we need?
- Project problem and opportunity statement

Solutions

- needs?
- options?
- look like?

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, 2011, and 2015).







• What is the best option and why?

How do we move forward with the best option?

Evaluation Methodology

- Evaluation of alternatives is done in two steps detailed in the following flow chart







Selection will be guided by the **Reasoned Argument Approach** which provides clear and thorough rationale of tradeoffs among various criteria and highlights the reasons why one alternatives is the best alternative

> "High" alternatives generate beneficial impacts and/or has no substantial technical challenges "Medium" alternatives present a mix of positive and negative elements with some impacts "Low" alternatives present negative impacts and/or present significant technical challenges

Evaluation Criteria

Environmental Factors

- Protects environmental features
- Protects wildlife and species-at-risk
- Minimizes climate change impacts

Technical Factors

- Meets existing and future needs
- Provides reliable service
- Minimizes and manages construction risk
- Supports phased expansion of the system
- Operational complexity
- Resiliency to climate change





Financial Factors

Capital and life-cycle costs
Operation and maintenance costs
Aligns with approval and permitting process

Social and Cultural Factors

Protects resident quality of life
Manages and minimizes construction impacts
Protects cultural and archaeological heritage features

Water Servicing - Map Legend

• These water legends are applicable to increased legibility





These water legends are applicable to all upcoming maps in the Water Servicing Section, and is included here for

Water System Upg Supply Upgrade Watermains (< 250 mm) Pump Upgrade Water Storage Upgra Transmission (>= 250 mm) \bigotimes **Facility Decom** Growth New Water To Watermain New Valve Trunk Waterma Pressure District 4 Waterbody Expansion Lands Six Nations of 1/// the Grand River Territory

rades	
le	
2	
de	
mission	
wer	
ain Upgrade	



Water Servicing – Existing Conditions in the Water System





Supply

Plant to accommodate 2041 growth

Pressure

Storage

- needs
- larger water tower

Pumping

- storage strategy

Transmission (Watermains)

- conveyance
- areas and to service expansion lands

• Treatment capacity is needed at the Holmedale Water Treatment

• High and low pressures exist due to variation in elevations

• 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

• Opportunity to replace aging King George water tower with new

• Limited pumping upgrades needed in pressure district 1 or pressure district 2/3 to accommodate 2041 growth

• Pressure district 4 may need pumping upgrades; dependent on

Opportunity to decommission aging Albion Pumping Station

• Aging watermains will need to be replaced to improve local

Trunk watermain upgrades needed to support intensification

Brantford MSP & TMP Updates

Water Servicing – Supply



Water Treatment Plant (WTP) Capacity

- —Water Demand Projection (Supply to Brantford Only) **—**WTP Current Capacity ---WTP at 80% of Current Capacity
- -- WTP at 90% of Current Capacity
- -----Future WTP Capacity with Upgrades
- * Supply to Cainsville dependent on the negotiation of servicing agreements with the County of Brant



Process upgrades at the Holmedale Water Treatment Plant are needed to meet 2041 growth demands All proposed upgrades will be at the existing water treatment plant with minimal disruption to operations

—Water Demand Projection (Supply to Brantford and Cainsville)

Proposed Water Treatment Plant Upgrades

Upgrades at the Holmedale Water Treatment Plant will increase the rated capacity of the water treatment plant with completion over the next 10-15 years.

Proposed Works include the following upgrades: Low Lift Pumping Station & Header: Second low lift pump station which includes new intake and twin

- header
- \bullet chamber
- facility
- treatment process

Polymer Pumps: Increase pumping capacity **Ozonation:** Additional generator and new contact

Filtration: Upsize filtration well and backwash pumps **Residual Management:** Expand capacity at existing

Hydrogen Peroxide: Future addition to the preliminary



Water Servicing – Screening of Water Pressure Concepts

overall advantages and disadvantages

Concept 1: Status Quo



Maintains current servicing strategy, including current pressure district boundaries

Concept 2: Split PD2/3 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

Carried Forward

- Easiest to implement
- Minimizes facility upgrade needs

- Difficult to implement Complex long term operation



Four water servicing concepts were presented at the previous public information centres which been screened in or out based on feasibility and

Screened Out

Concept 3: Maximize PD 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

Carried Forward

Best optimizes system pressures



- 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

Screened Out

- Hardest to implement
- Requires the most new facilities and watermains



Water Servicing – Pressure District Boundary Alternatives

Alternative 1: Existing Pressure District Boundary

Existing pressure district boundaries will be maintained



Pressure

existing

Storage

- separate EA)

Pumping

- Albion Pumping Station decommissioned
- Upgrades may be needed to Northwest Pumping Station

Transmission (Watermains)



Alternative 3: Maximize Pressure District 4

• Pressures will be similar to

• Storage deficit in pressure districts 1, 2/3, and 4

• New water tower is needed in pressure district 2/3 as King George water tower will be decommissioned (location of a new water tower subject to a

• Pumping deficit in pressure district 2/3 and potentially 4

• Pumping upgrade needs at both Wayne Gretzky and Tollgate Pumping Stations will be at existing facilities

• Watermains will be needed to accommodate growth demands



Pressure district 4 is expanded east to Wayne Gretzky Parkway and incorporate pressure district 2

Pressure

• Pressures will be increased within existing pressure district 2/3 and decreased within new pressure district 3

Storage

- Storage deficit in pressure districts 1, 2/4, and 3
- New water tower is needed in pressure district 2/4 as King George water tower will be

decommissioned (location of a new water tower subject to a separate EA)

Pumping

- Pumping deficit in pressure district 2/4 and 3
- Pumping upgrade needs at Wayne Gretzky, Tollgate, and Northwest Pumping Station will be at existing facilities;
- Albion Pumping Station decommissioned

Transmission (Watermains)

• New trunk watermains needed to accommodate growth demands and pressure district change Brantford MSP & TMP Updates



Water Servicing – Pressure District Boundary Alternatives

Alternative 1: Existing Pressure District Boundary



Advantages:

- Minimal changes in existing operation of pressure districts
- Easy implementation of upgrades

Disadvantages:

- Land acquisition needs and potential delays for the
- new water tower

Alternative	Technical Ranking	Environmental Ranking	Social and Cultural Ranking	Financial Ranking
Alternative 1: Existing Pressure District Boundary	High	High	Med	Med
Alternative 3: Maximize Pressure District 4	Med	High	Low	Med



Alternative 3: Maximize Pressure District 4



Advantages:

- New water tower can be sited in employment lands
- Pressures can be optimized **Disadvantages:**
- Land acquisition needs and potential delays for the new water tower
- Complex implementation of upgrades which have quick timing and funding needs
- Major watermain construction within existing water system

Recommended Alternative

Recommended: The implementation and construction process is simpler

Not recommended: Complex implementation with quick timing and funding needs

Brantford MSP & TMP Updates

Water Servicing – Pressure District 1 Storage Alternatives

Alternative 1: Pressure District 1 Storage provided by Pumps at the Holmedale Water Treatment Plant Reservoir



Alternative	Technical Ranking	Environmental Ranking	Social and Cultural Ranking	Financial Ranking
Alternative 1: Storage at Holmedale Water Treatment Plant	Med	High	High	Med
Alternative 2: Storage via Valves at Large Water Tower from Pressure District 2/3	Med	High	High	High



Advantages:

- No changes in current
- operations of pressure
- district 1
- No significant construction challenges

Disadvantages:

Dependence on pumps has higher energy usage and reduced system resiliency



Alternative 2: Pressure District 1 Storage is provided from Large Water Tower by Valves from Pressure District 2/3

Advantages:

- Optimized location for valves provides better conveyance to more vulnerable areas
- Allows for sizing to accommodate future north trigger lands
- Provides greater hydraulic benefit and system resiliency

Disadvantages:

- May be an oversized water tower until full buildout
- May be more complex to operate the water system

Recommended Alternative

Not recommended: Less energy efficient and does not improve system resiliency

Recommended: Hydraulically, more beneficial and alternative allows for future accommodation of growth trigger lands

Brantford MSP & TMP Updates

Water Servicing – Pressure District 4 Storage Alternatives

Alternative 1: Upgrade Storage at Northwest Reservoir



Advantages:

- \bullet

Alternative	Technical Ranking	Environmental Ranking	Social and Cultural Ranking	Financial Ranking
Alternative 1: Upgrade Storage at Northwest Reservoir	Med	High	Med	Med
Alternative 2: New Pressure District 4 Water Tower	High	High	Med	Med



Alternative 2: New Pressure District 4 Water Tower

Maximizes use of existing facilities with no changes to current operations

Disadvantages:

Dependence on pumps has higher energy usage and reduced system resiliency Pump upgrades at the Northwest Pumping Station may be necessary to accommodate peak demands



Advantages:

- Location of the water tower can be optimized in employment lands
- Provides greater hydraulic benefit and system resiliency
- Pump upgrades at the Northwest Pumping Station are not necessary **Disadvantages:**
- City will have two water towers in the north lands

Recommended Alternative

Not recommended: Less energy efficient and does not improve system resiliency

Recommended: Hydraulically, more beneficial and alternative allows for future phasing for growth trigger lands

Brantford MSP & TMP Updates

Water Servicing – Planned or Proposed Upgrades

Colborne Street West Pumping Station

- Area along Colborne Street West, at the Municipal boundary has low pressures due to high ground level elevations
- Development proposed further west will need to be serviced by a pumping station



Planned Upgrades:

- New sub-pressure district to include existing • properties on Colborne Street West and development extending west to the municipal boundary
- Developer led pumping station to be sized to \bullet provide peak demands and fire flows to the development and existing properties



East Sub-Pressure District 2/3

- East expansion lands, east of Garden Avenue, will have high pressures due to low ground level elevations
- Growth occurring in the expansion lands will need to be serviced by pressure reducing valves



Planned Upgrades:

- New sub-pressure district to include east expansion lands, generally east of Garden Avenue to the municipal boundary
- Two pressure reducing valves will be sized to provide peak demands and fire flows
- New watermain along Garden Avenue will be needed to complete watermain loop

Proposed Upgrades:

- lacksquare
- lacksquare

Strawberry Hill Pumping Station

Strawberry Hill area, a local high point, has low pressures due to high ground level elevations Development potential within this area and its servicing would require a new pumping station



New sub-pressure district to include proposed development and existing properties Pumping station to be triggered by development and sized to provide peak demands to the development and/or existing properties

Brantford MSP & TMP Updates

Water Servicing – Trunk and Local Watermain Network





- fight fires
- - and 4

 - district 1

- \bullet watermain network
- \bullet at dead ends
- - (installed before 1990)

Trunk Watermain Needs

Trunk watermains are necessary to convey water from pumping or storage facilities to the distribution network Strengthening the trunk watermain network accommodates increased demands as well as provides adequate flows to

• Trunk watermain upgrades are needed: • Going to the North lands within pressure districts 2/3

> East-west within pressure district 2/3 Going south and into Tutela Heights within pressure

Downtown Brantford within pressure district 1

Local Watermain Needs

Local watermains connect to the strengthened trunk

Adjustments to the City's local watermain network, to

improve local fire flows, are typically needed along

older/smaller watermains, areas of high intensification, and

The replacement process to improve these fire flows is:

Replace watermain ≤ 100 mm in diameter

Replace Cast Iron watermain

Replace Asbestos Cement/Ductile Iron watermains

Upsize and loop to strengthen local trunk network

Brantford MSP & TMP Updates

Water Servicing – Preliminary Preferred Recommendation





Supply

Treatment Plant

Pressure

Storage

Pumping

Transmission (Watermains)

- Pressure district 1
- loop
- Pressure district 2/3
 - George Road
- Pressure district 4
 - and Paris Road

Increased treatment capacity at Holmedale Water

• Pressures will remain similar to existing

• New Water Tower in pressure district 2/3

• New Water Tower in pressure district 4

• Upgrade pumps at Wayne Gretzky and Tollgate Pumping Stations within pressure district 2/3

• Upgrade watermain downtown loop and Tutela Heights

• Upgrade watermain north to expansion lands along King

• Upgrade watermain east-west along Lynden Road

• New watermain north to expansion lands along Oak Park

Brantford MSP & TMP Updates

Water Servicing – Servicing Expansion Lands





Supply

• Increased treatment capacity at Holmedale Water Treatment Plant to accommodate growth within existing City Lands as well as the expansion lands

Pressure

- North residential lands will be serviced by pressure district 2/3
- North employment lands will be serviced by pressure district 4
- East residential lands will be serviced by two pressure reducing valves
- Tutela Heights will be serviced by pressure district 1

Storage

- New Water Tower in pressure district 2/3; location to be determined in future EA
- New Water Tower in pressure district 4; location to be determined in future EA

Pumping

• Upgrade pumps at Wayne Gretzky and Tollgate Pumping Stations within pressure district 2/3

Transmission (Watermains)

- Pressure district 1
- Upgrade watermain in Tutela Heights
- Pressure district 2/3
- Upgrade watermain north to expansion lands along King George Road
- Upgrade watermain east-west along Lynden Road
- Pressure district 4
- New watermain north to expansion lands along Oak Park and Paris Road



Wastewater Servicing - Map Legend

lacksquareincreased legibility





These wastewater legends are applicable to all upcoming maps in the Wastewater Servicing Section, and is included here for

les	
Expressway / Highway	
Arterial and Collectors	
Waterbody	
	Brant

Brantford MSP & TMP Updates





Wastewater Servicing – Existing Conditions in the Wastewater System

Treatment

- upgrades

Pumping

Greenwich)

Sanitary Sewers

- Trunk capacity needs to support intensification corridors and northern/eastern growth areas
- A number of existing sewers are at capacity or will be at capacity with 2041 growth flows and upgrades are necessary
- Optimization of local wastewater system and flow splits is required to maximize available sewer and pumping capacities to support 2041 growth

Inflow and Infiltration

• Wet weather management is needed throughout the entire wastewater system

• Existing Wastewater Treatment Plant upgrades are needed to support existing and future users Opportunity for short term optimization and

 Short and long term strategies are needed to manage pump station capacity (Fifth, Empey, and



Wastewater Servicing – Wastewater Treatment Plant

- \bullet establish current rated capacity
- lacksquare



Wastewater Treatment Plant (WWTP) Capacity

* Conveyance from Cainsville and Airport dependent on the negotiation of servicing agreement(s) with the County of Brant

Historic



– – WWTP at 80% of Reestablished Capacity

Process maintenance and optimization at the Wastewater Treatment Plant is needed to accommodate 2041 growth flows and re-

All proposed upgrades will be at the existing wastewater treatment plant with minimal disruption to operations

Upgrades at the Wastewater Treatment Plant allow for a rated capacity to be reestablished and maintained when completed within the next 5-15 years.

Proposed Works include the following upgrades: • Chlorine Contact Chamber: New chlorine contact

- chamber
- and PM2

Proposed Wastewater Treatment Plant Upgrades

Oxygenation: Upsize existing blowers **Aeration Tanks:** Optimize process flow rates to PM1

Waste Activated Sludge (WAS): New WAS facility to support primary clarifiers and anaerobic digester **Biosolids Storage Tank:** New decant system

Brantford MSP & TMP Updates





Wastewater Servicing – Existing Conditions in the Wastewater System

Fifth Ave Pumping Station Catchment

- Fifth Ave Pumping Station at current capacity to accommodate peak flows
- High rates of inflow and infiltration which limits existing pumping station and sewer capacity
- Opportunity to divert some flows to limit pumping station upgrade costs

Greenwich Pumping Station Catchment

- Local sewer and trunk sewer capacity constraints as a result of current and growth flows
- Greenwich Pumping Station at current capacity to accommodate peak flows
- Pumping Station are needed

North Brantford

• Trunk sewer constraints from King George Road to Park Road North due to existing and growth flows

Empey Street Pumping Station Catchment

- Current capacity at the Empey Pumping Station is sufficient to accommodate existing flows but may need to be upgraded to accommodate growth flows
- Constraints within the downtown trunk sewer due to existing and growth flows
- Opportunity to optimize Henry Street flow split

• Upgrades to both trunk sewers and the Greenwich



Wastewater Servicing – Screening of Wastewater Servicing Concepts

- lacksquareas the Fifth Avenue Pumping Station Catchment works are currently underway

Fifth Avenue Pumping Station Catchment Concepts



Concept 1: Diversion

Divert upstream flows away from Fifth Avenue Pumping Station

Concept 2: Pumping

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





Concept 1: Diversion

Concept 2: Trunk Sewer Upgrades

Upgrade trunk sewers with option to optimize flow split

Concept 3: Pumping

Pump upgrades at Greenwich Pumping Station

Pumping Concept Carried Forward

All Concepts Carried Forward



Four wastewater areas and their servicing concepts were presented at the previous public information centre All servicing concepts, for each wastewater area except Fifth Avenue, were carried forward and further developed into alternatives

Greenwich Pumping Station

Divert flows away from Greenwich Pumping Station

North Brantford Catchment Concepts



Concept 1: Diversion

Divert flows by a new interceptor sewer

Concept 2: Trunk Sewer Upgrades

Upgrade trunk sewers to Park Road North

All Concepts Carried Forward



Concept 1: Diversion

Divert flows at Henry Street to either Empey Street Pumping Station or downtown trunk sewer

Concept 2: Tunneling

Bypass Empey Street Pumping Station with deep tunneled sewer

Concept 3: Pumping

Upgrades at Empey Street Pumping Station dependent on diversion strategy

All Concepts Carried Forward



Wastewater Servicing – Greenwich Pumping Station Alternatives

Alternative 1: Divert More Flows to Grand River Avenue and Upgrade Greenwich Pumping Station



Alternative	Technical Ranking	Environmental Ranking	Social and Cultural Ranking	Financial Ranking
Alternative 1: Divert More Flows to Grand River Avenue and Upgrade Greenwich Pumping Station	High	High	Med	High
Alternative 2: Maintain Existing Flow Split by Upsizing Trunk Sewer and Upgrade Greenwich Pumping Station	Med	High	Med	Med



Alternative 2: Maintain Existing Flow Split by Upsizing Trunk Sewer and Upgrade Greenwich **Pumping Station**

Advantages:

Flows are not diverted across the Grand River Reduces existing local and trunk sewer constraints **Disadvantages:**

Sewer upgrades along Grand River Avenue (minor collector road)



Advantages:

Optimizes current flow \bullet split along Grand River Avenue and Catherine Avenue trunk sewers

Disadvantages:

- Increases flow across Grand River
- Some sewer constraints \bullet will remain
- Deep sewer upgrades

Recommended Alternative

Recommended: Sewer upgrades resolve constraints while minimizing flows crossing the Grand River

Not recommended: Sewer constraints remain and has complex construction

Brantford MSP & TMP Updates

Wastewater Servicing – North Brantford Alternatives

Alternative 1: New Sewer along King George Road and Fairview Drive to Baxter Road



Alternative	Technical Ranking	Environmental Ranking	Social and Cultural Ranking	Financial Ranking
Alternative 1: New Sewer to Baxter Road	Med	High	Low	Low
Alternative 2: Upgrade Existing Sewers to Park Road	Med	High	Med	High



Alternative 2: Upgrade Existing Trunk Sewer to Park Road

Advantages:

Optimizes downstream trunk sewer capacities Capacity to accommodate north lands King George Road septic sewers **Disadvantages:** Major construction

- disruptions
- Complex implementation Does not address existing



Advantages:

- Minimizes sewer upgrades and construction
- Lower capital cost **Disadvantages:**
- Minimal opportunity to service north lands or King George Road septic sewers

Recommended Alternative

Not Recommended: High construction disruptions and high costs

Recommended: Lower construction complexity, construction disruptions, and costs

Brantford MSP & TMP Updates

Wastewater Servicing – Empey Street Pumping Station Alternatives

Alternative 1A: Existing Flow Split with Sewer Upgrades Downtown and at Empey Pumping Station



Advantages:

- Minimizes upgrades and pump needs at **Empey Pumping Station**
- Short term capacity is available at **Empey Pumping Station**

Disadvantages:

High costs and construction to upgrade downtown sewers



Advantages:

- Minimizes upgrades and pump needs at **Empey Pumping Station**
- Short term capacity is available at **Empey Pumping Station**
- Provides additional system capacity

Disadvantages:

Alternative	Technical Ranking	Environmental Ranking	Social and Cultural Ranking	Financial Ranking	
Alternative 1A: Existing Flow Split with Sewer Upgrades Downtown and at Empey Pumping Station	High	High	Low	Low	
Alternative 1B: Existing Flow Split with New Downtown Trunk Sewer to Wastewater Treatment Plant	Low	High	Low	Med	
Alternative 2: Redirect Flows to Empey Pumping Station and New Deep Tunnel to Replace Empey Pumping Station	Low	High	Low	Low	
Alternative 3: Redirect Flows to Empey Pumping Station and Upgrade Empey Pumping Station	High	High	High	High	R
St CORPORATION OF THE CITY OF					



Alternative 1B: Existing Flow Split with New Downtown Trunk Sewer to Wastewater Treatment Plant

High costs and construction to new downtown sewers

Alternative 2: Redirect Flows to Empey Pumping Station and New Deep Tunnel to Replace Empey **Pumping Station**



Advantages:

- Optimizes flow split to relieve sewer constraints in downtown
- Minimizes upgrades and pump needs at **Empey Pumping Station**

Disadvantages:

- High costs and complex construction
- Higher peak flows to the wastewater
 - treatment plant

Alternative 3: Redirect Flows to **Empey Pumping Station and** Upgrade Empey Pumping Station



Advantages:

- Optimizes flow split to relieve sewer constraints in downtown
- Short term capacity is available at **Empey Pumping Station**

Disadvantages:

Upgrades are necessary at Empey Pumping Station

Recommended Alternative

Not recommended: Substantial sewer upgrades and high construction needs

Not recommended: High construction needs and costs associated with new sewer

Not recommended: High costs and complex construction associated with tunneled sewer

ecommended: Alternative is the easiest to implement with the lowest upgrade costs

Brantford MSP & TMP Updates

Wastewater Servicing – Planned Upgrades

Fifth Avenue Pumping Station

- 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 pumping station and sewers



Planned Upgrades:

- Pumping station capacity upgrades are needed to meet 2041 flow targets
- Construct emergency 1-hour peak flow storage
- New forcemain (twinned)



Johnson Road Pumping Station Catchment

- Johnson Road Pumping Station catchment has high rates of inflow and infiltration and existing Pumping Station is operating below firm capacity
- Growth occurring in northwest area of catchment



Planned Upgrades:

- Implement inflow and infiltration reduction in catchment to reduce flows to Pumping Station
- Pump rehabilitation at Pumping Station to re-establish installed capacity to meet 2041 flow targets



Oakhill Drive

Oakhill Drive trunk sewer will support northwest growth flows from Oak Park Road Existing Oakhill Drive sewer between Jennings Road and Colborne Street West downsizes from 1,050 mm to 675/750 mm



Planned Upgrades:

Upsize sewer between Jennings Road and Colborne Street West to accommodate 2041 growth flows and mitigate potential operational issues

Wastewater Servicing – Planned Upgrades

Downtown Growth

- Substantial growth identified in downtown core
- Impacts to existing sewers are dependent on location and density of growth

Planned Upgrades:

- Policy in place to establish minimum sewer capacity requirement to accommodate future intensifications based on L/s/ha of upstream catchment
- Upgrade costs to be split between City and growth

Coulbeck Trunk Sewer

- North Expansion Lands east of King George Road directed to Coulbeck Road Trunk Sewer
- East Expansion Lands along eastern boundary directed to Lynden Road and Coulbeck Road Trunk Sewer

Planned Upgrades:

- Coulbeck Road trunk sewer under Highway 403 crossing to be upsized to support growth
- Ongoing flow monitoring in sewer to ensure inflow and infiltration doesn't trigger project earlier
- Lynden Road sewer upgrade from proposed East Expansion Lands forcemain to Coulbeck Road

Planned Upgrades:

- \bullet

Northwest Area Trunk Alignment

- North Expansion Lands west of King George directed to Oak Park Road Trunk sewer
- Oak Park Road and Powerline Road alignment
 - constrained due to overhead powerlines and railway crossing
 - Potential alignment through future employment lands

Oak Park Road and Powerline Road alignment will be determined through subsequent Schedule 'B' EA Opportunity to optimize with development draft plans

Brantford MSP & TMP Updates

Wastewater Servicing – Inflow and Infiltration Reduction

- Inflow and Infiltration is an ongoing issue that is difficult to isolate and repair

Reduction will provide resiliency for larger storm events while reducing ongoing pumping & treatment costs

Johnson Road Pumping Station Catchment

- station upgrades

Fifth Ave Pumping Station Catchment

- Seasonal high groundwater infiltration
- Moderate inflow and infiltration
- Station capacity sized to accommodate
- Upgrades to reduce sewer surcharging and flows to the Wastewater Treatment Plant

Greenwich Pumping Station Catchment

North Brantford (Empey Pumping Station Catchment)

Citywide

• Very high rainfall derived inflow and infiltration

• Needed to support growth without major pumping

 Moderate rainfall derived inflow and infiltration Suspect seasonal high groundwater infiltration Potential to minimize pumping station upgrades • Reduce flows to Wastewater Treatment Plant

 Moderate rainfall derived inflow and infiltration • Empey Pumping Station and sewer upgrades still needed • Support reduction of existing sewer surcharging

Aligning with State of Good Repair Program

Brantford MSP & TMP Updates

Wastewater Servicing – Preliminary Preferred Recommendation

Treatment

Pumping

- Upgrades to the Fifth Avenue Pumping Station • Upgrades to the Greenwich Pumping Station
- Upgrades to the Empey Pumping Station

Sanitary Sewers

- Coulbeck Road: Upsize Highway 403 crossing sewer
- Lynden Road: Upsize sewer from eastern growth area to Coulbeck Road
- Memorial Drive and Ashgrove Avenue: Upsize sewer on Kensington Avenue to Park Road
- Grand River Avenue: Upsize sewer on Jubilee Avenue to Icomm Drive
- Oakhill Drive: Upsize sewer on Jennings Street to **Colborne Street West**
- Reconfiguration and optimization of the Henry Street Flow Split

Inflow and Infiltration

City wide

• Upgrades to the Wastewater Treatment Plant to re-establish and maintain the rated capacity

Targeted inflow and infiltration reduction programs

Brantford MSP & TMP Updates

Wastewater Servicing – Servicing Expansion Lands

Treatment

• Upgrades to the Wastewater Treatment Plant to re-establish and maintain the rated capacity to accommodate growth within existing City Lands as well as the expansion lands

Pumping

- Four new pumping stations in the north expansion lands to convey flows to either the Oak Park Road or Coulbeck Road trunk sewers
- One new pumping station in the east expansion lands to convey flows to Lynden Road
- One new pumping station in Tutela Heights to convey flows to Mount Pleasant Road

Sanitary Sewers

- North expansion lands flows will be conveyed by gravity to either the Oak Park Road or Coulbeck Road trunk sewers
- East expansion lands flows will be conveyed by gravity to the Lynden Road sewer
- Tutela Heights flows will be conveyed by gravity to the Mount Pleasant Road sewer

Inflow and Infiltration

• Development must satisfy inflow and infiltration targets of 0.3 L/s/ha

Brantford MSP & TMP Updates

Stormwater Servicing - Map Legend

 \bullet increased legibility

These stormwater legends are applicable to all upcoming maps in the Stormwater Servicing Section, and is included here for

Stormwater Pipes < 450 mm) Stormwater Pipes >= 450 mm)

Stormwater Servicing Concept

- Applicable
 - Not Applicable

Stormwater System Upgrades

New Stormwater Management Pond

Stormwater Flow

Six Nations of the Grand River

Virtual PIC – June 9, 2020 & June 30, 2020

Stormwater Scope – Strategy and Objectives

- •2-year Level of Service within old infrastructure areas
- •5-year Level of Service within newer infrastructure areas, greenfield areas, and all replacements or upgrades

Overland Flow (Major System)

 Areas where natural grading does not accommodate large event outlet

Water Quality

 Protect local watercourses from Total Suspended Solids and contaminants

Dike Network

- Review low-lying areas susceptible to flooding due to dike network
- Determine further studies to mitigate existing flooding risk

Level of Service (Minor System)

Stormwater Servicing – Screening of Stormwater Servicing Concepts

Status Quo

- Leave existing system as-is
- Certain areas do not have \bullet any existing or growth related issues
- Certain areas the benefit does not justify costs
- Focus on minimizing risk and use of on site management controls to limit impacts of growth

- Upgrade the sewers to increase capacity
- Addresses localized flooding issues but can create downstream issues

All Concepts Carried Forward

All Concepts Carried Forward All Concepts Carried Forward

Five stormwater servicing concepts were presented at the previous public information centre All servicing concepts, for each stormwater area, were carried forward and further developed into alternatives

Minor System Upgrades Quantity Control Low Impact Development

- Post-development peak flow rates are not to exceed corresponding predevelopment peak flow rates
- Stormwater management ponds or on-site underground storage
- Addresses localized flooding issues by reducing sewer capacity needs and/or safely managing local floodwaters
- Mitigates impacts of increased runoff and stormwater quality, managing runoff as close to its source as possible
- Rely on decentralized stormwater management facilities
- Can reduce peak flows to storm network by reducing total runoff or providing storage function

All Concepts Carried Forward

Major System Upgrades

- Reduce risk to life and property damage under 1 in 100 year storms (infrequent)
- Improves surface drainage routes
- Limited by existing topography and by features such as available outlets and river dikes

All Concepts Carried Forward

Stormwater Servicing – Implementation Plan

- \bullet can be implemented
- - Key Areas of Concern and Implementation Needs
 - Preliminary Upgrade Strategies and Capital Needs Projections
 - Future Investigation and Study Needs \bullet

Investigation & Data Collection

Tools & Framework

Study and Consultation

Implementation

City is improving its stormwater system understanding; however, additional investigation and studies are needed before upgrades

MSP Upgrade Strategy is based on the Best Available Information with the goals of Identifying :

Asset Inventory System Performance

> Modeling Policy Controls

MSP Update Area Specific Studies GRCA Partnership/Consultation

Implementation Plan

- Investigate and collect inadequate or missing data
- Determine system performance via monitoring and testing
- Build and update tools (models) and build/adjust framework as required (City policy)
- Prepare interconnected studies (area specific or City wide, dependent on specific study and impacts)

Scoping

- Identify data needs
- Identify expectations (scope and objectives)
- Determine budget to fit within scope
- Identify timeline and prerequisite Investigations/Studies

For each Investigation/Study:

Stormwater Servicing – Grand River Holmedale Alternatives

- Trunk sewer restrictions along St. Paul Avenue and Albion Street
- Pockets of local flooding and surcharging infrastructure

Alternative 1: Diversion to St. Paul Avenue sewer and Upgrade St. Paul Avenue to Trunk

Alternative	Technical Ranking	Environmental Ranking	Social and Cultural Ranking	Financial Ranking
Alternative 1: Stormwater Diversion to St. Paul Avenue	Med	High	Med	Med
Alternative 2: Upgrade Existing Sewers Along Albion Street	High	High	High	High

enue and Albion Street nfrastructure

Advantages:

Provides capacity for localupgrades near St. Paul Ave.Frees capacity in Albion St.trunk for nearby localupgrades

Disadvantages:

Complex construction beneath railway Higher traffic impacts along St. Paul Avenue

Alternative 2: Upgrade Existing Trunk Sewer along Albion Street

Advantages:

- Minimizes sewer upgrades and construction
- Lower capital cost
- Replacement of existing storm sewer

Disadvantages:

- Increases flow to downstream intensification corridor
- Does not provide additional St. Paul Avenue capacity for future local upgrades

Recommended Alternative

Not Recommended: Higher construction complexity and higher costs

Recommended: Lower construction complexity, construction disruptions, and costs

Brantford MSP & TMP Updates

Stormwater Servicing – Grand River Eagle Place Alternatives

- Trunk sewer restrictions along Division Street, Sixth Avenue, and Fifth Avenue
- Pockets of local flooding and surcharging infrastructure

Alternative 1: Diversion West at Seventh Avenue

- Manages local and
- upstream capacity
- requirements
- Diverts stormwater directly to Grand River
- outlet

Disadvantages:

- Complications with dike system outlet elevations Potential impacts to growth area capacity

Alternative	Technic Rankir
Alternative 1: Stormwater Diversion West to Seventh Avenue	High
Alternative 2: Upgrade Existing Sewers East Along Seventh Avenue to Sanderson Street	High

Alternative 2: Upgrade Existing Sewer from Seventh Avenue Easterly to Sanderson Street

Advantages:

- Manages local and upstream capacity requirements
- Existing interaction with storm system

Disadvantages:

- Existing outlet to local ditch prior to release to Grand River
- Concerns with capacity and interaction with additional flows to existing ditch

Recommended Alternative

Recommended: Lower construction costs, minimal environmental impacts

Not Recommended: Higher construction costs and potential for outlet complications

Brantford MSP & TMP Updates

Stormwater Servicing – Grand River Northwest Alternatives

• Northwest Employment Lands north of Highway 403 have no existing stormwater outlets

Alternative 1: Flow Split at Oak Park Road with Multiple Ponds and Outlets

Alternative	Technical Ranking	Environmental Ranking	Social and Cultural Ranking	Financial Ranking
Alternative 1: Oak Park Road Flow Split	Low	Med	High	Low
Alternative 2: Stormwater Directed to Grand River	Med	High	High	Med

Advantages:

 Additional opportunity for site specific infrastructure and treatment train
 Minimal coordination between private entities
 Disadvantages:

Wetland/environmentally sensitive land to east Requires Highway 403 crossing

Alternative 2: Direct all Stormwater to Grand River Pond and Outlet

Advantages:

- Simple one-outlet system
- Minimal interaction with existing infrastructure

Disadvantages:

- Requires extensive landowner cooperation and coordination
- Requires grading validation for long stretch of pipe and overland flow

Recommended Alternative

Not Recommended: Higher construction complexity and higher costs

Recommended: Lower construction complexity and costs

Brantford MSP & TMP Updates

Stormwater Servicing – Fairchild Creek Garden Alternatives

- Highway 403 drainage infrastructure serves as a major stormwater trunk

Alternative 1: Diversion Along Fairview Drive

Advantages:

- Minimal construction impacts compared to Ministry of Transportation corridor construction
- Frees capacity in Highway 403 trunk to manage upstream capacity constraints

Disadvantages:

Requires multiple new connections and diversions to Fairview Drive

	Alternative	Technical Ranking	Environmental Ranking	Social and Cultural Ranking	Financial Ranking	
	Alternative 1: Fairview Drive Diversion	High	High	Med	Low	Recom
	Alternative 2: Highway 403 Drainage	Med	High	Low	Low	Not re
	Alternative 3: Morton Avenue Diversion	Low	High	Med	Med	Not re
ON OF THE CI	2					-

Increasing local sewer capacity, to address local flooding and surcharging infrastructure, may trigger flooding to Highway 403 drainage infrastructure

Recommended Alternative

mended: Deep sewers and high cost but effectively manages capacity constraints

ecommended: High costs and complex construction associated with Highway 403 construction

commended: Does not effectively manage existing capacity constraints

Stormwater Servicing – Local Stormwater Servicing

Mohawk Lake (Downtown)

- Downtown area contains predominantly local flooding and surcharging infrastructure
- Small (relative) storm sewer infrastructure with multiple conveyance pathways
- Trunk sewers have sufficient capacity

Planned Upgrades:

- Significant trunk upgrades not required \bullet
- Potential for Low Impact Development (LID) mitigation to supplement local pipe upgrades
- Water Quality Governed by Mohawk Lake and Mohawk Canal Functional Master Drainage and Restoration Study (Wood, 2019)

Fairchild Creek North

- Site specific report initiated by City from residential observation/information
- Area specific flooding and solutions/recommendations

Planned Upgrades:

Preliminary report being prepared by Aquafor Beech

Planned Upgrades:

- \bullet

Greenfield Growth Areas

Local stormwater management for greenfield growth areas governed by local stormwater drainage studies and servicing reports.

Works and studies to be developer led.

Eagle Place (Special Policy Area 2) North West TCA Lands West of Conklin (OPA 144)

Brantford MSP & TMP Updates

Stormwater Scope – Dike System

Constraints

•Low areas upstream of dikes do not have outlet when gates are closed

Potential Solutions / Alternatives

•Status Quo Flood management is reactive and system at risk due to climate change

- Storage
- Pumping

• Expensive and pump stations are idle majority of the time

Implementation

- implementation

• Expensive, limited land available, and at the mercy of topography

Additional studies required for

Many existing unknowns and uncertainties

Stormwater Servicing – Servicing Expansion Lands

Virtual PIC – June 9, 2020 & June 30, 2020

Level of Service (Minor System)

- 5-year Level of Service for all expansion lands areas
- Peak flow control postdevelopment peak flowrates controlled to pre-development peak flowrates

Overland Flow (Major System)

 100-year Level of Service for major system storm events

Water Quality

- Ministry of Environment, Conservation, and Parks
 Enhanced Total Suspended Solids (TSS) removal (80% TSS removal)
- Thermal mitigation required for outlets to coldwater creeks
- Erosion control retain 25mm event with 48-72 hour extended detention

Brantford MSP & TMP Updates

Thank you for your participation!

We want to hear from you! Please let us know your thoughts or questions by filling out a comment form and/or you may contact the City of Brantford **Project Manager:**

Please note that information related to this study will be collected in accordance with the Municipal Freedom of Information and Protection of Privacy Act. All comments received will become part of the public record and may be included in the study documentation prepared for public review.

Virtual PIC – June 9, 2020 & June 30, 2020

Master Plan Update

JOIN THE CONVERSATION

facebook.com/CityofBrantford

@CityofBrantford

