5. System Infrastructure Assessment and Evaluation

In Section 4, the water and wastewater servicing concepts were evaluated and confirmed to be feasible to provide sufficient services to meet the urban boundary expansion. For each stage (e.g. Stages 1 to 4), the proof of concepts completed in Section 4 led to the water and wastewater infrastructure assessment for identifying the implementation strategy.

5.1 Water and Wastewater Infrastructure Assessment Basis

Basis for Overall Recommended MCP Water and Wastewater Servicing Strategy

- Strategy for urban boundary expansion must not impact the growth within existing urban boundary developments.
- Assumes Smithville SPS upgrades in place by 2030 (as per Region's DC study).
- Also, in sync with Region's Water and Wastewater Servicing Master Plan strategy
- Requires Region's Smithville forcemain twinning between Smithville and
- Grimsby systems and Grimsby WTP and WWTP capacity upgrades. Assume these works would be implemented between 2030 and 2040.
- Requires Smithville elevated tank replacement and London Road water pump station capacity upgrade.

Utilizing the preliminary water servicing concept presented in Section 4.1.3.3, various infrastructure strategies / alignment options were reviewed. The strategies were developed based on the following considerations.

- Region's DC Projects (W-M-006 & W-M-018);
- Future road improvement works;
- Creek and railway crossing;
- Urban boundary expansion location;
- Opportunity to improve existing infrastructures; and

- Construction complexity.

Figure 5-1 and Figure 5-2 present the water and wastewater infrastructure options, respectively. The following sub-sections provided detailed water and wastewater infrastructure options assessment for each staging of the urban boundary expansion concept.

Figure 5-1: Water Servicing Strategy Options

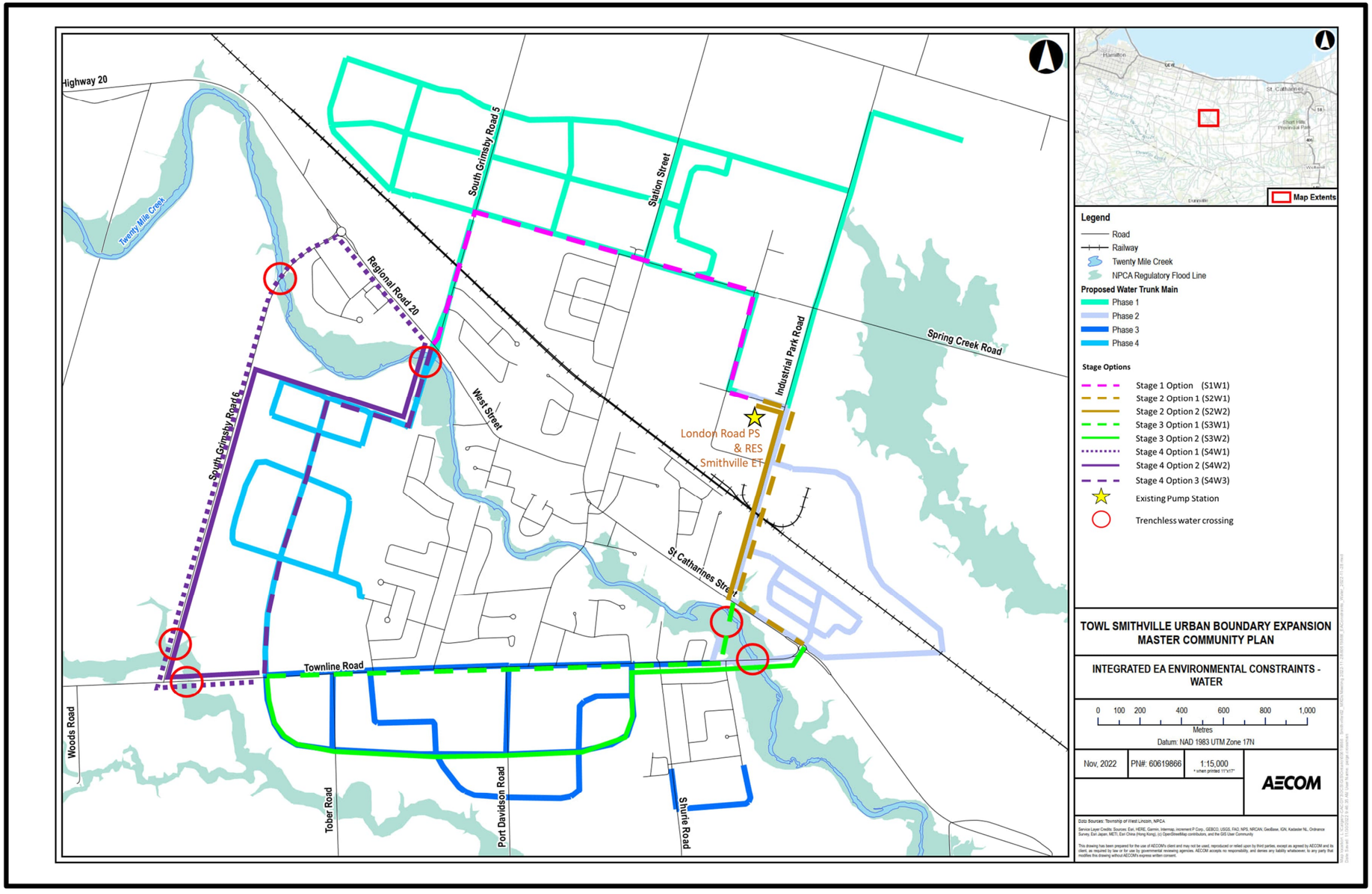
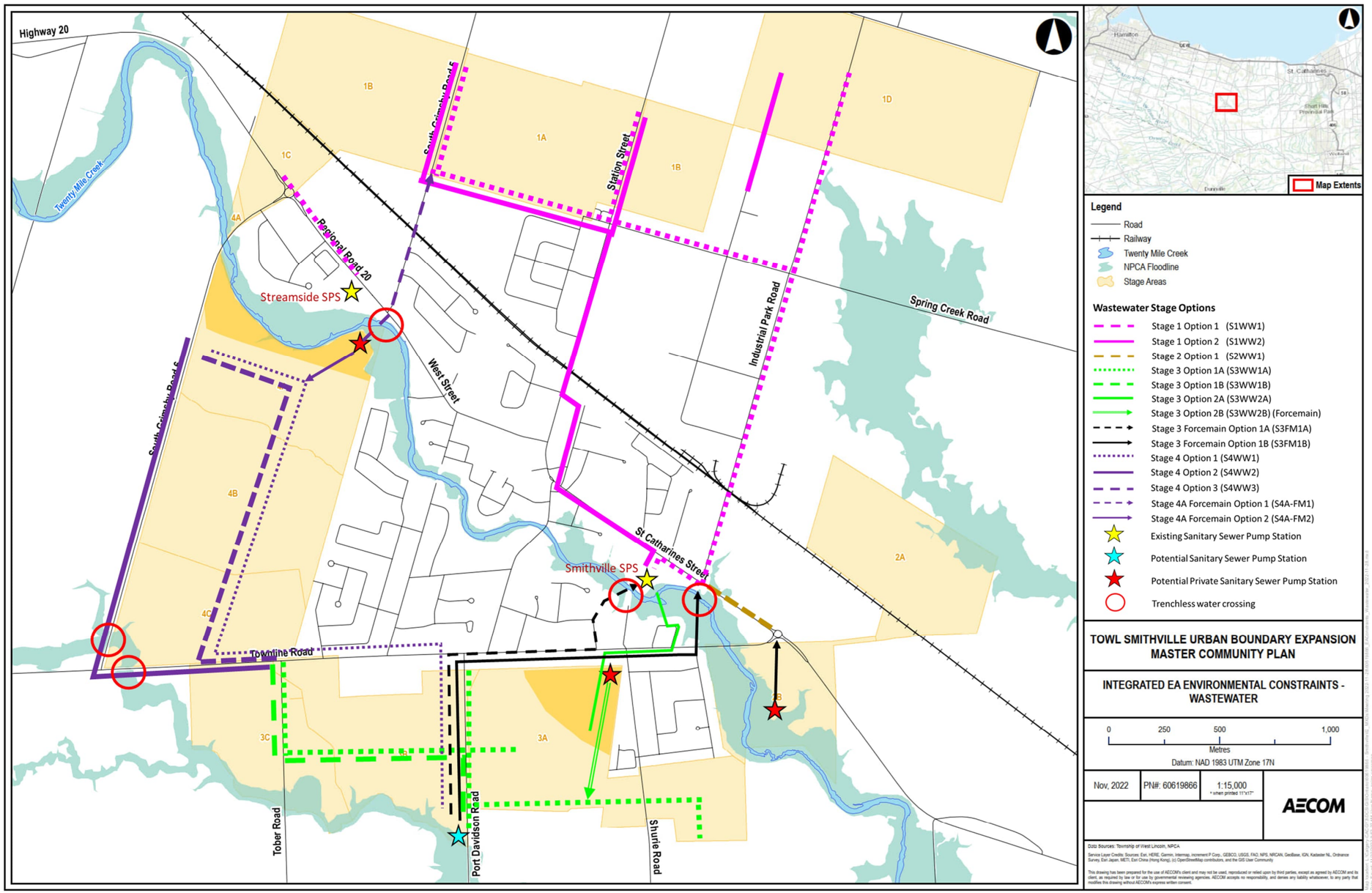


Figure 5-2: Wastewater Servicing Strategy Options



5.2 Water and Wastewater Infrastructure Assessment for Stage 1

The assessment results indicated that S1W1 and S1WW1 would be considered a most preferable strategies to meet the water and wastewater service, respectively, for the urban boundary expansion for Stage 1 as well as the expected growth for the Spring Creek Heights Secondary Plan area. The following summarizes the rationale for selecting these preferred solutions and Table 5-1 presents the detailed assessment results.

5.2.1 Preferred Solutions and Rationale for Stage 1 Water Service

As only one option was evaluated for the watermain expansion for Stage 1, S1W1 is the preferred solution.

5.2.2 Preferred Solutions and Rationale for Stage 1 Wastewater Service

Two alternatives were evaluated to address wastewater servicing for the Stage 1 urban boundary expansion area.

S1WW1

- New sewer gravity main on Spring Creek Road from South Grimsby Road 5 and easterly to Industrial Park Road
- Gravity sewer continues southernly down Industrial Park Road
- Industrial Park to Regional Road 20
- Westerly on Regional Road 20 to Smithville Pumping Station

S1WW2

- New sewer gravity main on Spring Creek Road from South Grimsby Road 5 and easternly towards Station Street
- Station Street south to Regional Road 20
- Westerly on Regional Road 20 to Smithville Pumping Station

Rationale for preferred solution for Stage 1 Wastewater Service

S1WW1 is the preferred solution, and the rationale is summarized as follows:

1. Can be easily coordinated with near term development
2. Alignment can be coordinated with preferred watermain length (S1W1)
3. Reduced construction complexity and avoids significant utility conflicts and community disruption within the existing Smithville urban area
4. Alignment can also provide service to the Spring Creek Heights Secondary Plan development area

In addition to the above noted rationale for selecting S1WW1 as the preferred solution, Industrial Park Road has a number of existing services within its ROW as well as the future Regional Forcemain. The detailed design for the S1WW1 must consider these services prior to the implementation of the infrastructure.

Table 5-1: Stage 1 Water and Wastewater Strategy Assessment Results

Category & Criteria		Stage 1 Water: S1W1	Stage 1 Wastewater: S1WW1	Stage 1 Wastewater: S1WW2
Details		• Watermain extends northernly on South Grimsby Road 5 from Regional Road 20 to Spring Creek Road • Easternly along Spring Creek Road to Thompson Road • Southernly on Thompson Road and easternly to London Road pumping station • No crossing of Twenty Mile Creek • Crossing of rail tracks on South Grimsby Road 5 Preferred Solution	• New sewer gravity main on Spring Creek Road from South Grimsby Road 5 and easterly to Industrial Park Road • Gravity sewer continues southernly down Industrial Park Road • Industrial Park to Regional Road 20 • Westerly on Regional Road 20 to Smithville Pumping Station • No crossing of Twenty Mile Creek required • Crossing of rail tracks on Industrial Park Road Preferred Solution	• New sewer gravity main on Spring Creek Road from South Grimsby Road 5 and easternly towards Station Street • Station Street south to Regional Road 20 • Westerly on Regional Road 20 to Smithville Pumping Station • No crossing of Twenty Mile Creek required • Crossing of rail tracks on Station Street
Technical Environment	a. Potential degree of construction complexities, including number and type of water crossings, anticipated rock removal, access, working area and duration to build.	• One crossing of rail tracks • No crossings of Twenty Mile Creek • Anticipate in rock • Access from South Grimsby Road 5 and Spring Creek Road • Relative construction duration has not been determined due to single option for water	• One crossing of rail tracks • No crossings of Twenty Mile Creek • Anticipate in rock • Access from Industrial Park Road, South Grimsby Road 5, and Spring Creek Road • Shorter construction duration	• One crossing of rail tracks • No crossings of Twenty Mile Creek • Anticipate in rock • Access from South Grimsby Road 5 and Spring Creek Road • Longer construction duration due to work in urbanized area along Station Street / Brock Street
	b. Potential effects on roadway and utility infrastructure.	• Lower impacts to paved surfaces • Potential for railway conflicts on South Grimsby Road 5 • Potential for utility conflicts on Thompson Road and London Road	• Lower impacts to paved surfaces • Potential for railway conflicts on South Grimsby Road 5	• Greater impacts to paved surfaces on Station Street • Potential for railway conflicts on Station Street
	c. Provides good site access for maintenance vehicles, future operation and maintenance and servicing.	• Access from existing road allowances and existing utility corridor / easement / multi use path •	• Access from existing road allowances and existing utility corridor/easement/multi use path • Provides better access from existing and future road ROW	• Access from existing road allowances and existing utility corridor/ easement / multi-use path • Provides more difficult access from existing ROW (Station Street)
	d. Operation efficiency.	• Not applicable	• Not applicable	• Not applicable
	e. Potential opportunity for current infrastructure to be decommissioned in favour of gravity solutions	• Not applicable	• Not applicable	• Not applicable
	f. Potential effects on traffic.	• Lower impacts to the travelling public	• Lower impacts to the travelling public	• Greater impacts to the travelling public
	g. Dependency on the completion of other Stages	• Independent of all other Staging Strategies	• Independent of all other Staging Strategies	• Independent of all other Staging Strategies
	h. Degree of permitting and approvals complexity	• CPR permitting anticipated due to railway crossing • SAR permitting anticipated due to SAR habitat in area (Spring Creek Road extension)	• CPR permitting anticipated due to railway crossing • SAR permitting anticipated due to SAR habitat in area (Spring Creek Road extension)	• CPR permitting anticipated due to railway crossing • SAR permitting anticipated due to SAR habitat in area (Spring Creek Road extension)
Land Use	i. Potential to conform to approved local (e.g., OP and MCP), provincial (e.g., PPS) plans and policies. j. Identify existing official plans and schedule B1, B3 and B4 Natural Heritage	• Conforms • Utilities permitted in future ROW • Pipe does not cross natural heritage system	• Conforms • Pipe does not cross natural heritage system	• Conforms • Pipe does not cross natural heritage system

Category & Criteria		Stage 1 Water: S1W1	Stage 1 Wastewater: S1WW1	Stage 1 Wastewater: S1WW2
	k. Potential effects on current land uses, including development plans.	• None anticipated	• None anticipated	• None anticipated
Natural Environment	l. Potential effects on terrestrial/aquatic habitat and species.	• No anticipated effects on terrestrial / aquatic habitat and species	• No anticipated effects on terrestrial / aquatic habitat and species	• No anticipated effects on terrestrial / aquatic habitat and species
	m. Potential effects on species at risk (SAR) and SAR habitat.	• Potential to encounter Species at Risk within Spring Creek Road extension area. Species may include Bobolink and Eastern Meadowlark.	• Potential to encounter Species at Risk within Spring Creek Road extension area. Species may include Bobolink and Eastern Meadowlark.	• Potential to encounter Species at Risk within Spring Creek Road extension area. Species may include Bobolink and Eastern Meadowlark.
	n. Potential to encounter soil and water contamination and waste disposal.	• None identified	• None identified	• None identified
	o. Anticipated environmental permitting and approval considerations.	• SAR permitting anticipated due to SAR habitat in area (Spring Creek Road extension)	• SAR permitting anticipated due to SAR habitat in area (Spring Creek Road extension)	• SAR permitting anticipated due to SAR habitat in area (Spring Creek Road extension)
	p. Potential effects on surface water and groundwater due to construction (i.e., dewatering of trenches during installation of watermain and/or sanitary forcemain/sewer, control of erosion and sedimentation).	• The installation of watermain can lead to the interception of the shallow water table altering shallow groundwater flow paths • Installation of infrastructure below the water table leads to the potential need for dewatering during construction and post construction and a decrease in groundwater levels	• The installation of sewer infrastructure can lead to the interception of the shallow water table altering shallow groundwater flow paths • Installation of infrastructure below the water table leads to the potential need for dewatering during construction and post construction and a decrease in groundwater levels	• The installation of sewer infrastructure can lead to the interception of the shallow water table altering shallow groundwater flow paths • Installation of infrastructure below the water table leads to the potential need for dewatering during construction and post construction and a decrease in groundwater levels
	q. Source water protection considerations.	• Drainage features within the study area are primarily headwater drainage (HDF) features, with some defined and regulated watercourses	• Drainage features within the study area are primarily headwater drainage (HDF) features, with some defined and regulated watercourses	• Drainage features within the study area are primarily headwater drainage (HDF) features, with some defined and regulated watercourses
Socio-Economic Environment	r. Potential nuisance impacts (e.g., disruption to access, air, dust, noise, and vibration) from construction and operations.	• Potential disruption to fronting properties	• Lower potential disruption to fronting properties	• Greater potential disruption to fronting properties
	s. Potential property requirements (temporary and permanent).	• None anticipated	• None anticipated	• None anticipated
Climate Change	t. Potential carbon footprint (e.g., energy usage, use of construction materials, construction methods and operations).	• Relative carbon footprint not determined due to single option for water	• Lower carbon footprint based on shorter construction duration	• Higher carbon footprint based on longer construction duration
Cultural Environment	u. Potential effects on archaeological resources.	• Works outside road right of way contains areas of moderate to high archaeological potential.	• Works outside road right of way contains areas of moderate to high archaeological potential.	• Works outside road right of way contains areas of moderate to high archaeological potential
	v. Potential for disruption of built heritage resources and cultural heritage landscapes.	• No potential or designated heritage resources within area.	• No potential or designated heritage resources within area.	• No potential or designated heritage resources within area.

Category & Criteria		Stage 1 Water: S1W1	Stage 1 Wastewater: S1WW1	Stage 1 Wastewater: S1WW2
Cost	w. Cost of construction (including property acquisition).	• Relative cost of construction not determined due to single option for water	• Lower cost of construction than S1WW2 due to shorter construction duration	• Higher cost of construction than S1WW1 due to shorter construction duration
	x. Cost of operation / maintenance.	• Relative cost of operation not determined due to single option for water	• Lower than S1WW2	• Higher than S1WW1

5.3 Water and Wastewater Infrastructure Assessment for Stage 2

The assessment results indicated that S2W2 and S2WW1 would be considered a most preferable strategies to meet the water and wastewater service, respectively, for the Stage 2 urban boundary expansion as well as the expected growth for the East Smithville Secondary Plan area. The following summarizes the rationale for selecting these preferred solutions and Table 5-1 presents the detailed assessment results.

5.3.1 Preferred Solutions and Rationale for Stage 2 Water Service

Two alternatives were evaluated to address water servicing for the Stage 2 urban boundary expansion area.

S2W1

- Watermain extends southernly from London Road Pumping Station down Industrial Park Road
- Industrial Park Road easternly towards Regional Road 20 and Townline Road roundabout

S2W2

- Watermain extends southernly from London Road Pumping Station towards Industrial Park Road and Regional Road 20 (St Catharines Street) intersection

Rationale for preferred solution for Stage 2 Water Service

S2W2 is the preferred solution, and the rationale is summarized as follows:

1. Reduced construction complexity and avoids significant community disruption within the existing Smithville urban area
2. No potential of cultural heritage sites in area

5.3.2 Preferred Solutions and Rationale for Stage 2 Wastewater Service

As only one option was evaluated for the wastewater servicing for Stage 2, S2WW1 is the preferred solution. To service Stage area 2B a private pumping system will be required. Alternatively, the area can be serviced by utilising a low pressure system whereby individual buildings pump their wastewater to a pressurized sewer main which

will be owned and maintained by the Township; individual building pumps will be considered a private system with individual building owner responsibility.

Table 5-2: Stage 2 Water and Wastewater Strategy Assessment Results

Category & Criteria		Stage 2 Water: S2W1	Stage 2 Water: S2W2	Stage 2 Wastewater: S2WW1
Details		• Watermain extends southernly from London Road Pumping Station down Industrial Park Road • Industrial Park Road easternly towards Regional Road 20 and Townline Road roundabout • No crossing of Twenty Mile Creek • Crossing of rail tracks on Industrial Park Road	• Watermain extends southernly from London Road Pumping Station towards Industrial Park Road and Regional Road 20 (St Catharines Street) intersection • No crossing of Twenty Mile Creek • Crossing of rail tracks on Industrial Park Road Preferred Solution	• New sewer gravity main from Smithville sanitary pumping station on east side from Regional Road 20 (St Catharines Street) towards Townline Road • No crossing of Twenty Mile Creek required • No crossing of rail tracks Preferred Solution
Technical Environment	a. Potential degree of construction complexities, including number and type of water crossings, anticipated rock removal, access, working area and duration to build.	• One crossing of rail tracks • No crossings of Twenty Mile Creek • Anticipate in rock • Access from Industrial Park Road • Longer construction duration related to longer watermain length • Potential temporary easement required which could delay construction commencement	• One crossing of rail tracks • No crossings of Twenty Mile Creek • Anticipate in rock • Access from Industrial Park Road • Shorter construction duration related to shorter watermain length • Potential temporary easement required which could delay construction commencement	• No crossings of rail tracks • No crossings of Twenty Mile Creek • Anticipate in rock • Access from Regional Road 20 (St Catharines Street) • Relative construction duration has not been determined due to single option for wastewater
	b. Potential effects on roadway and utility infrastructure.	• Greater impacts to recently paved surfaces on Regional Road 20 (St Catharines Street) and Townline Road roundabout • Potential for utility conflicts on Townline Road and Regional Road 20 (St Catharines Street • Potential for railway conflicts on Industrial Park Road	• Lower impacts to paved surfaces • Potential for railway conflicts on Industrial Park Road • Potential for utility conflicts on London Road	• Greater impacts to recently paved surfaces on Regional Road 20 (St Catharines Street) and Townline Road roundabout • Potential for utility conflicts on Townline Road and Regional Road 20 (St Catharines Street
	c. Provides good site access for maintenance vehicles, future operation and maintenance and servicing.	• Access from existing road allowances	• Access from existing road allowances	• Access from existing road allowances
	d. Operation efficiency.	• Higher energy use related to long watermain and number of bends	• Lower energy use related to short watermain and no bends	• Relative operation efficiency not determined due to single option for wastewater
	e. Potential opportunity for current infrastructure to be decommissioned in favour of gravity solutions	• Not applicable	• Not applicable	• Not applicable
	f. Potential effects on traffic.	• Greater impacts to traveling public •	• Lower impacts to traveling public	• Relative traffic effects not determined due to single option for wastewater
	g. Dependency on the completion of other Stages	• Independent of all other Staging Strategies	• Independent of all other Staging Strategies	• Independent of all other Staging Strategies
	h. Degree of permitting and approvals complexity	• CPR permitting anticipated due to railway crossing • SAR permitting anticipated due to SAR habitat in area (Industrial Park Road agricultural fields)	• CPR permitting anticipated due to railway crossing • SAR permitting anticipated due to SAR habitat in area (Industrial Park Road agricultural fields)	• SAR permitting anticipated due to SAR habitat in area (Regional Road 20 agricultural fields)
Land Use	i. Potential to conform to approved local (e.g., OP and MCP), provincial (e.g., PPS) plans and policies. j. Identify existing official plans and schedule B1, B3 and B4 Natural Heritage	• Conforms • Utilities permitted in future ROW • Pipe does not cross natural heritage system • Work in regulated area to comply with NPCA policy document – November 2022	• Conforms • Utilities permitted in future ROW • Pipe does not cross natural heritage system • Work in regulated area to comply with NPCA policy document – November 2022	• Conforms • Pipe does not cross natural heritage system • Work in regulated area to comply with NPCA policy document – November 2022
	k. Potential effects on current land uses, including development plans.	• Potential to impact industrial area along Industrial Park Road • Potential to impact Tim Hortons landscaping and parking	• Potential to impact industrial area along Industrial Park Road • Potential to impact Tim Hortons landscaping and parking	• Potential to impact residential and industrial area along Regional Road 20 (St Catharines Street)

Category & Criteria		Stage 2 Water: S2W1	Stage 2 Water: S2W2	Stage 2 Wastewater: S2WW1
Natural Environment	l. Potential effects on terrestrial/aquatic habitat and species.	• Provincially Significant wetland consisting of swamp community south of Regional Road 20. • Twenty Mile Creek includes wetland amphibian breeding habitat and turtle wintering. • Habitat for several species of Conservation concern and deer wintering.	• Provincially Significant wetland consisting of swamp community south of Regional Road 20 (St Catharines Street). • Twenty Mile Creek includes wetland amphibian breeding habitat and turtle wintering. • Habitat for several species of Conservation concern and deer wintering.	• Provincially Significant wetland consisting of swamp community south of Regional Road 20. • Twenty Mile Creek includes wetland amphibian breeding habitat and turtle wintering. • Habitat for several species of Conservation concern and deer wintering.
	m. Potential effects on species at risk (SAR) and SAR habitat.	• Potential to encounter Species at Risk in agricultural fields east of Industrial Park Road. Species may include Bobolink and Eastern Meadowlark.	• Potential to encounter Species at Risk in agricultural fields east of Industrial Park Road. Species may include Bobolink and Eastern Meadowlark.	• Potential to encounter Species at Risk in agricultural fields north of Regional Road 20 (St Catharines Street). Species may include Bobolink and Eastern Meadowlark.
	n. Potential to encounter soil and water contamination and waste disposal.	• None identified	• None identified	• None identified
	o. Anticipated environmental permitting and approval considerations.	• Requires Niagara Peninsula Conservation Authority work permit • Potential Species at Risk related to sending and receiving pits outside travel portion of ROW	• Requires Niagara Peninsula Conservation Authority work permit • Potential Species at Risk related to sending and receiving pits outside travel portion of ROW	• Requires Niagara Peninsula Conservation Authority work permit • Potential Species at Risk related to sending and receiving pits outside travel portion of ROW
	p. Potential effects on surface water and groundwater due to construction (i.e., dewatering of trenches during installation of watermain and/or sanitary forcemain/sewer, control of erosion and sedimentation).	• The installation of water infrastructure can lead to the interception of the shallow water table altering shallow groundwater flow paths • Installation of infrastructure below the water table leads to the potential need for dewatering during construction and post construction and a decrease in groundwater levels	• The installation of water infrastructure can lead to the interception of the shallow water table altering shallow groundwater flow paths • Installation of infrastructure below the water table leads to the potential need for dewatering during construction and post construction and a decrease in groundwater levels	• The installation of sewer infrastructure can lead to the interception of the shallow water table altering shallow groundwater flow paths Installation of infrastructure below the water table leads to the potential need for dewatering during construction and post construction and a decrease in groundwater levels
	q. Source water protection considerations.	• Drainage features within the study area are primarily headwater drainage (HDF) features, with some defined and regulated watercourses • Twenty Mile Creek is the most significant watercourse and valley system within Smithville, with confined corridors and floodplains	• Drainage features within the study area are primarily headwater drainage (HDF) features, with some defined and regulated watercourses • Twenty Mile Creek is the most significant watercourse and valley system within Smithville, with confined corridors and floodplains	• Drainage features within the study area are primarily headwater drainage (HDF) features, with some defined and regulated watercourses • Twenty Mile Creek is the most significant watercourse and valley system within Smithville, with confined corridors and floodplains
Socio-Economic Environment	r. Potential nuisance impacts (e.g., disruption to access, air, dust, noise, and vibration) from construction and operations.	• Greater potential disruption to fronting properties	• Lower potential disruption to fronting properties	• Potential disruption to fronting properties
	s. Potential property requirements (temporary and permanent).	• Potential temporary easements on northern section Industrial Park Road for railway crossing • Potential temporary easements on northwest corner of Industrial Park Road and Regional Road 20 (St Catharines Street)	• Potential temporary easements on northern section Industrial Park Road for railway crossing • Potential temporary easements on northwest corner of Industrial Park Road and Regional Road 20 (St Catharines Street)	• Potential temporary easements on northwest corner of Industrial Park Road and Regional Road 20 (St Catharines Street) Twenty Mile Creek for sewer crossing
Climate Change	t. Potential carbon footprint (e.g., energy usage, use of construction materials, construction methods and operations).	• Higher carbon footprint related to longer length of watermain and construction duration.	• Lower carbon footprint related to shorter length of watermain and construction duration.	• Relative carbon footprint not determined due to single option for wastewater
Cultural Environment	u. Potential effects on archaeological resources.	• Works outside road right of way contains areas of moderate to high archaeological potential.	• Works outside road right of way contains areas of moderate to high archaeological potential.	• Works outside road right of way contains areas of moderate to high archaeological potential.

Category & Criteria		Stage 2 Water: S2W1	Stage 2 Water: S2W2	Stage 2 Wastewater: S2WW1
	v. Potential for disruption of built heritage resources and cultural heritage landscapes.	• Potential heritage resources within area.	• No potential or designated heritage resources within area.	• Potential heritage resources within area.
Cost	w. Cost of construction (including property acquisition).	• Higher cost relative to longer construction duration	• Lower cost relative to shorter construction duration	• Relative cost of construction not determined due to single option for wastewater
	x. Cost of operation / maintenance.	• Higher than S2W2	• Lower than S2W1	• Relative cost of operation not determined due to single option for wastewater

5.4 Water and Wastewater Infrastructure Assessment for Stage 3

The assessment results indicated that S3W1 would be considered a most preferable strategies to meet the required water service for the Stage 2 urban boundary expansion. For meeting the required wastewater service, a combination of three (3) wastewater infrastructure strategies were identified as the most preferable solutions; S3WW1A. S3WW2A and S3FM1B. The following summarizes the rationale for selecting these preferred solutions and Table 5-3 and Table 5-4 present the detailed assessment results for water and wastewater servicing strategy, respectively.

5.4.1 Preferred Solutions and Rationale for Stage 3 Water Service

Two alternatives were evaluated to address water servicing for the Stage 3 urban boundary expansion area.

S3W1

- New watermain extends easternly along Townline Road to existing North South easement east of Anderson Crescent
- Northernly from easement to Industrial Park Road / Regional Road 20 and connection future Stage 2 watermain

S3W2

- New watermain extends southernly from Townline Road and Stage 4 North South local collector road
- Southernly / easterly / northernly following internal stage 3 local collector road to Townline Road
- Easternly along Townline Road to Townline Road and Regional Road 20 roundabout and connection to future Stage 2 watermain

Rationale for preferred solution for Stage 3 Water Service

S3W1 is the preferred solution, and the rationale is summarized as follows:

1. Reduced construction complexity and avoids significant community disruption specifically for the roundabout located at Townline Road and Regional Road 20
2. Lower capital and operation maintenance costs

3. Alignment follows road allowances and does not need to be coordinated with Stage 3 developments

4. Allows for decommissioning of existing watermain within current easement between Townline Road and Regional Road 20

5. Can be coordinated with future upgrades to Townline Road

6. Stage 3A could connect to the existing watermain on Townline Road until the Region's Ring System is implemented. Therefore Stage 3A can be implemented in the near term.

The preferred solution for Stage 3 water service includes a crossing of Twenty Mile Creek and Figure 5-3 presents the location of the crossing for this solution as well as the property access requirements.

5.4.2 Preferred Solutions and Rationale for Stage 3 Wastewater Service

A total of six (6) alternatives were evaluated to address wastewater servicing for the Stage 3 urban boundary expansion area.

5.4.2.1 Gravity Sewer System Options for Stage 3

S3WW1A

- New Gravity Sewer follows Stage 3 North South and easterly local collector road starting at Townline Road
- Connection to new SPS at Port Davidson Road / Creek
- Also includes flow from new gravity sewers within Stage 3 east of Port Davidson Road
- Does not service Stage 4

S3WW1B

- New Gravity Sewer follows Stage 3 North South and easterly local collector road starting at Townline Road
- Connection to new SPS at Port Davidson Road / Creek
- Also includes flow from new gravity sewers within Stage 3 east of Port Davidson Road

- Deeper gravity sewer at the westside of the new SPS to allow for Stage 4 Wastewater to be completed

Rationale for preferred solution for Stage 3 gravity sewer system

S3WW1A is the preferred solution, and the rationale is summarized as follows:

1. Reduced construction complexity as gravity sewer exists closer to surface
2. Lower capital and operation maintenance costs

5.4.2.2 Wastewater Servicing Options for Stage 3A

S3WW2A

- New gravity sewer northernly from Stage 3A area to Townline Road
- Replace existing gravity sewer with larger size along Townline Road to Anderson Crescent and northernly on Anderson Crescent via existing easement to southside of Twenty Mile Creek

S3WW2B

- New SPS for Stage 3A service area and forcemain southerly to Stage 3 development area connecting to east west gravity sewer that sends flow to new SPS at Port Davidson Road and Creek

Rationale for preferred solution for Stage 3A wastewater service

S3WW2A is the preferred solution, and the rationale is summarized as follows:

1. Reduced construction complexity and avoids significant community disruption within the existing urban area
2. Lower capital and operation maintenance costs relating to new gravity sewer and no pumping system is required
3. Alignment follows road allowances and does not need to be coordinated with Stage 3 developments
4. Can be coordinated with future upgrades to Townline Road

5.4.2.3 Forcemain Options for Stage 3

S3FM1A

- New forcemain extending Northernly on port Davidson Road from SPS towards Townline road
- Easternly along Townline Road to Rock Street. Northernly up Rock Street towards Twenty Mile Creek crossing Rock Street Park
- Trenchless crossing of Twenty Mile Creek
- Connects to pumping station at Regional Road 20 and Industrial Park Road

S3FM1B

- New forcemain extending Northernly on port Davidson Road from SPS towards Townline road
- Easternly along Townline Road to watermain easement. Northernly through easement towards Twenty Mile Creek
- Trenchless crossing of Twenty Mile Creek
- Connects to future gravity sewer at Regional Road 20 and Industrial Park Road
- New SPS is a private pumping station

Rationale for preferred solution for Stage 3 Forcemain System

S3FM1B is the preferred solution, and the rationale is summarized as follows:

1. Reduced construction complexity and avoids significant community disruption within the existing urban area as it avoids Rock Park
2. Avoids potential soil and groundwater contamination associated with former landfill
3. Can be coordinated with the preferred Stage 3 water projects and Twenty Mile Creek crossing
4. Utilises existing north south easement between Townline Road and Regional Road 20

The preferred solution for Stage 3 forcemain system includes a crossing of Twenty Mile Creek and Figure 5-3 presents the location of the crossing for this solution as well as the property access requirements.

Figure 5-3: Location of Twenty Mile Creek Crossing for S3FM1B

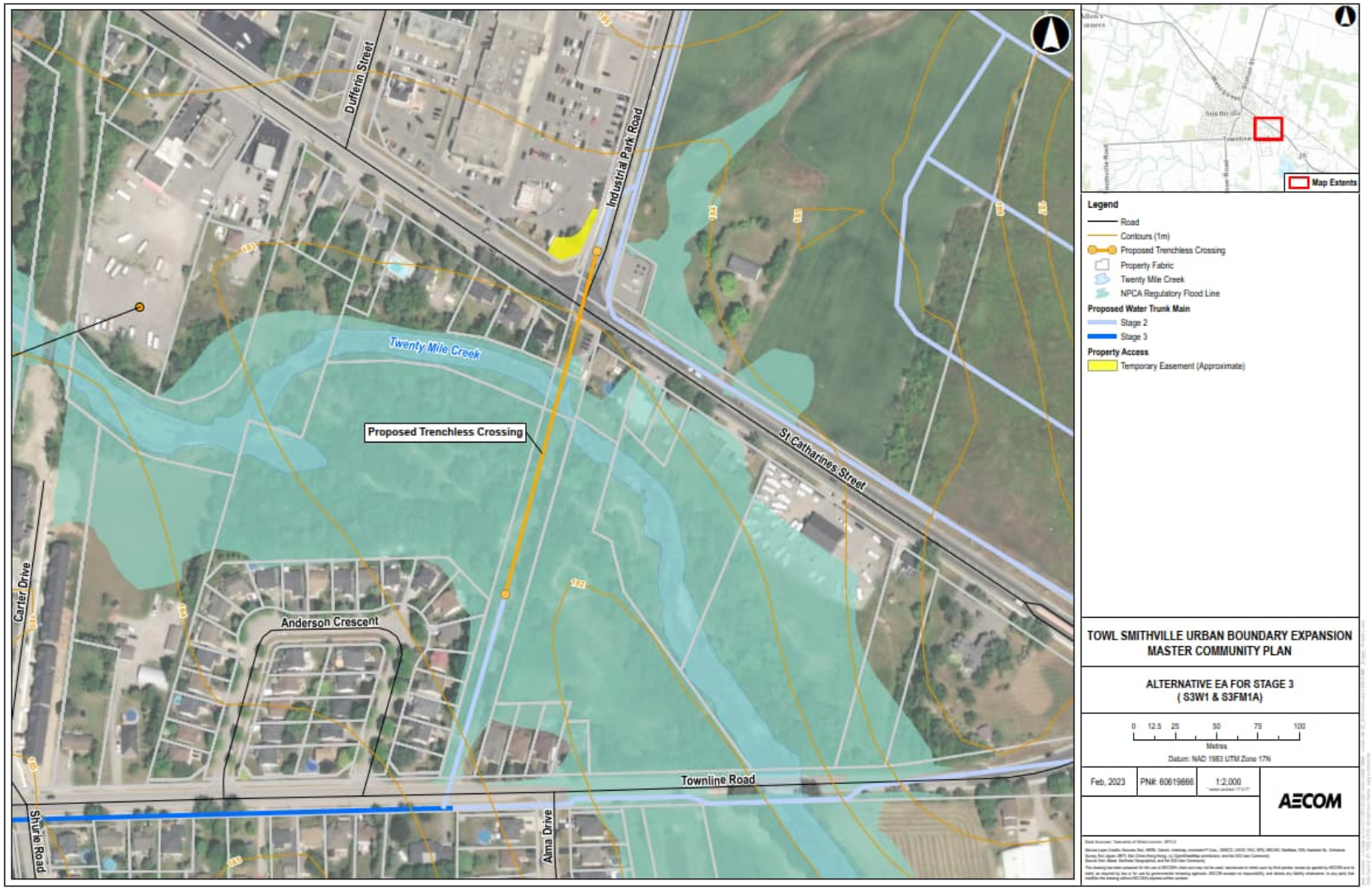


Table 5-3: Stage 3 Water Servicing Strategy Assessment Results

Category & Criteria		Stage 3 Water: S3W1	Stage 3 Water: S3W2
Details		• New watermain extends easternly along Townline Road to existing North South easement east of Anderson Crescent • Northernly from easement to Industrial Park Road / Regional Road 20 and connection future Stage 2 watermain • Trenchless crossing of Twenty Mile Creek south of Industrial Park Road and Regional Road 20 Preferred Solution	• New watermain extends southernly from Townline Road and Stage 4 North South local collector road • Southernly / easterly / northernly following internal stage 3 local collector road to Townline Road • Easternly along Townline Road to Townline Road and Regional Road 20 roundabout and connection to future Stage 2 watermain • Trenchless crossing of Twenty Mile Creek along Townline Road
Technical Environment	a. Potential degree of construction complexities, including number and type of water crossings, anticipated rock removal, access, working area and duration to build.	• One crossing of Twenty Mile Creek • Anticipate in rock • Access from Townline Road and from existing watermain easement (South side of Twenty Mile Creek) • Shorter construction duration due to shorter watermain length and without requirement to coordinate construction with Stage 3 development • Potential easement required for Twenty Mile Creek crossing	• One crossing of Twenty Mile Creek • Anticipate in rock • Access from Townline Road and from existing watermain easement (South side of Twenty Mile Creek) • Longer construction duration due to longer watermain length and requirement to coordinate construction with Stage 3 development • Potential easement required for Twenty Mile Creek crossing
	b. Potential effects on roadway and utility infrastructure.	• Lower impacts to paved surfaces and utilities (i.e. shorter length) •	• Greater impacts to paved surfaces and utilities (i.e. roundabout located at Regional Road 20 and Townline Road)
	c. Provides good site access for maintenance vehicles, future operation and maintenance and servicing.	• Access from existing utility corridor/easement / roads	• Access from existing roads
	d. Operation efficiency.	• Lower operation and maintenance effort required related to shorter watermain distance •	• Higher operation and maintenance effort related to longer watermain distance
	e. Potential opportunity for current infrastructure to be decommissioned in favour of gravity solutions	• Allows for decommissioning of existing 150 mm watermain in current easement between Townline Road and Regional Road 20	• Does not allow for decommissioning
	f. Potential effects on traffic.	• Lower impacts to traveling public (avoids roundabout at Townline Road and Regional Road 20)	• Greater impacts to traveling public on Townline Road and Regional Road 20 (roundabout)
	g. Dependency on the completion of other Stages	• Water strategy requires Stage 2 water infrastructure to be in place prior to developing Stage 3	• Water strategy requires Stage 2 water infrastructure to be in place prior to developing Stage 3
	h. Degree of permitting and approvals complexity	• Species at risk habitat in area of water crossings • NCPA permits for trenchless crossing • Avoids coordination with block plan development process	• Species at risk habitat in area of water crossings • NCPA permits for trenchless crossing • Watermain to be captured with block plan development process
Land Use	i. Potential to conform to approved local (e.g., OP and MCP), provincial (e.g., PPS) plans and policies. j. Identify existing official plans and schedule B1, B3 and B4 Natural Heritage	• Conforms • Utilities permitted in future ROW • Pipe crosses natural heritage system (current official plan Schedule E-12 and proposed OPA schedule 63) between Regional Road 20 (St Catharines Street) and Townline Road • Work in regulated area to comply with NPCA policy document – November 2022	• Conforms • Utilities permitted in future ROW • Pipe crosses natural heritage system (current official plan Schedule E-12 and proposed OPA schedule 63) between Regional Road 20 (St Catharines Street) and Townline Road • Work in regulated area to comply with NPCA policy document – November 2022

Category & Criteria		Stage 3 Water: S3W1	Stage 3 Water: S3W2
	k. Potential effects on current land uses, including development plans.	• Potential to disrupt parking lot at northwest corner of Industrial Park Road and Regional Road 20 (Temporary easement for watercrossing)	• Potential to disrupt agricultural land use (Southside Twenty Mile Creek) (Temporary easement for watercrossing)
Natural Environment	l. Potential effects on terrestrial/aquatic habitat and species.	• Trenchless crossing minimizes impacts • Minor vegetation removal in existing easement between Townline Road and Regional Road 20 • Provincially Significant wetland consisting of swamp community south of Industrial Park Road. • Twenty Mile Creek includes wetland amphibian breeding habitat and turtle wintering. • Habitat for several species of Conservation concern and deer wintering.	• Trenchless crossing minimizes impacts • Potential vegetation removal on Townline Road for Twenty Mile Creek crossing • Provincially Significant wetland consisting of swamp community between Regional Road 20 (St Catharines) and Townline Road. • Twenty Mile Creek includes wetland amphibian breeding habitat and turtle wintering. • Habitat for several species of Conservation concern and deer wintering.
	m. Potential effects on species at risk (SAR) and SAR habitat.	• Potential to encounter Species at Risk in existing easement between Townline Road and R 20 • Grass Pickerel and Snapping Turtle habitat in creek.	• Potential to encounter Species at Risk in agricultural fields south of Townline Road. Species may include Bobolink and Eastern Meadowlark.
	n. Potential to encounter soil and water contamination and waste disposal.	• None identified	• None identified
	o. Anticipated environmental permitting and approval considerations.	• Requires Niagara Peninsula Conservation Authority work permit • Anticipated Permit to Take Water • Potential Species at Risk related to sending and receiving pits outside travel portion of ROW	• Requires Niagara Peninsula Conservation Authority work permit • Anticipated Permit to Take Water • Potential Species at Risk related to sending and receiving pits outside travel portion of ROW
	p. Potential effects on surface water and groundwater due to construction (i.e., dewatering of trenches during installation of watermain and/or sanitary forcemain/sewer, control of erosion and sedimentation).	• The installation of water infrastructure can lead to the interception of the shallow water table altering shallow groundwater flow paths • Installation of infrastructure below the water table leads to the potential need for dewatering during construction and post construction and a decrease in groundwater levels	• The installation of water infrastructure can lead to the interception of the shallow water table altering shallow groundwater flow paths • Installation of infrastructure below the water table leads to the potential need for dewatering during construction and post construction and a decrease in groundwater levels
	q. Source water protection considerations.	• Drainage features within the study area are primarily headwater drainage (HDF) features, with some defined and regulated watercourses • Twenty Mile Creek is the most significant watercourse and valley system within Smithville, with confined corridors and floodplains	• Drainage features within the study area are primarily headwater drainage (HDF) features, with some defined and regulated watercourses • Twenty Mile Creek is the most significant watercourse and valley system within Smithville, with confined corridors and floodplains
Socio-Economic Environment	r. Potential nuisance impacts (e.g., disruption to access, air, dust, noise, and vibration) from construction and operations.	• Greater potential to impact fronting properties and access to businesses (Regional Road 20 and Industrial Park Road area)	• Lower potential to impact fronting properties and businesses
	s. Potential property requirements (temporary and permanent).	• Potential temporary easements on northwest corner of Industrial Park Road and Regional Road 20 (St Catharines Street) • Potential permanent easement between St Catharines Street and Townline Road for watermain crossing	• Potential permanent easements on Townline Road at Twenty Mile Creek for watermain crossing

Category & Criteria		Stage 3 Water: S3W1	Stage 3 Water: S3W2
Climate Change	t. Potential carbon footprint (e.g., energy usage, use of construction materials, construction methods and operations).	• Lower carbon footprint related to shorter length of watermain and construction duration.	• Higher carbon footprint related to longer length of watermain and construction duration.
Cultural Environment	u. Potential effects on archaeological resources.	• Works outside road right of way contains areas of moderate to high archaeological potential.	• Works outside road right of way contains areas of moderate to high archaeological potential.
	v. Potential for disruption of built heritage resources and cultural heritage landscapes.	• Potential heritage resources within area.	• Potential heritage resources within area.
Cost	w. Cost of construction (including property acquisition).	• Lower than S3W2 due to shorter length and less road restoration required	• Higher than S3W1 due to longer length and greater road restoration required (roundabout at Regional Road 20 and Townline Road)
	x. Cost of operation / maintenance.	• Lower than S3W2 due to shorter length • Allows for decommissioning of existing watermain with a higher efficiency system	• Higher than S3W1 due to shorter length

Table 5-4: Stage 3 Wastewater Servicing Strategy Assessment Results

Category & Criteria		Stage 3: S3WW1A	Stage 3: S3WW1B	Stage 3 S3FM1A	Stage 3 S3FM1B	Stage 3: S3WW2A	Stage 3: S3WW2B
Details		• New Gravity Sewer follows Stage 3 North South and easterly local collector road starting at Townline Road • Connection to new SPS at Port Davidson Road / North Creek • Also includes flow from new gravity sewers within Stage 3 east of Port Davidson Road • Trenchless crossing of Twenty Mile Creek required • Does not service Stage 4 Preferred Solution	• New Gravity Sewer follows Stage 3 North South and easterly local collector road starting at Townline Road • Connection to new SPS at Port Davidson Road / North Creek • Also includes flow from new gravity sewers within Stage 3 east of Port Davidson Road • Deeper gravity sewer to allow for Stage 4 Wastewater to be completed	• New forcemain extending Northernly on port Davidson Road from SPS towards Townline road • Easternly along Townline Road to Rock Street. Northernly up Rock Street towards Twenty Mile Creek crossing Rock Street Park • Trenchless crossing of Twenty Mile Creek • Connects to pumping station at Regional Road 20 and Industrial Park Road	• New forcemain extending Northernly on port Davidson Road from SPS towards Townline road • Easternly along Townline Road to watermain easement. Northernly through easement towards Twenty Mile Creek • Trenchless crossing of Twenty Mile Creek • Connects to future gravity sewer at Regional Road 20 and Industrial Park Road Preferred Solution	• New gravity sewer northernly from Stage 3A area to Townline Road • Easternly along Townline Road to Anderson Crescent • Northernly on Anderson Crescent via existing easement to southside of Twenty Mile Creek Preferred Solution	• New SPS for Stage 3A service area and forcemain southerly to Stage 3 development area connecting to east west gravity sewer that sends flow to new SPS at Port Davidson Road and North Creek • New SPS is a private pumping station
Technical Environment	a. Potential degree of construction complexities, including number and type of water crossings, anticipated rock removal, access, working area and duration to build.	• No crossings of Twenty Mile Creek • Anticipate in rock • Access from Townline Road • Shorter construction duration relative to 1B due to sewer being closer to the surface	• No crossings of Twenty Mile Creek • Greater amount of in rock due to deeper gravity sewer • Access from Townline Road • Longer construction duration relative to 1A due to deeper sewer	• One crossing of Twenty Mile Creek to connect with new SPS and forcemain • Anticipate in rock • Access from Townline Road • Comparable construction duration relative to FM1B due to park restoration required • Potential conflict with storm outlet (Northside of Twenty Mile Creek) • Potential temporary easement required in area of Smithville SPS connection	• One crossing of Twenty Mile Creek to connect with new SPS and forcemain • Anticipate in rock • Access from Townline Road • Comparable construction duration relative to FM1A due to longer forcemain length • Potential conflict with storm outlet (Northside of Twenty Mile Creek) • Potential temporary easement required at northwest intersection of Regional Road 20 and Industrial Park Road	• No crossings of Twenty Mile Creek • Anticipate in rock • Access from Townline Road • Existing easement between houses on north side of Anderson Crescent has limited spacing • • Comparable construction duration relative to 2B due to same sewer main length	• No crossings of Twenty Mile Creek • Anticipate in rock • Access from Townline Road • Comparable construction duration relative to 2A due to same sewer main length
	b. Potential effects on roadway and utility infrastructure.	• H impacts to paved surfaces	• Lower impacts to paved surfaces	• Lower impacts to paved surfaces • Potential conflict with storm outlet (Northside of Twenty Mile Creek)	• Lower impacts to paved surfaces • Potential conflict with storm outlet (Northside of Twenty Mile Creek)	• Greater impacts to paved surfaces (Anderson Crescent)	• Low impacts to paved surfaces (Avoids Anderson Crescent)
	c. Provides good site access for maintenance vehicles, future operation and maintenance and servicing.	• Access from existing roads	• Access from existing roads	• Access from existing roads and Rock Park	• Access from existing utility corridor / roads	• Access from existing roads	• Access from existing roads
	d. Operation efficiency.	• Lower operation and maintenance effort use compared to 1B	• Higher operation and maintenance effort compared to 1A related to deeper sewer	• Comparable operation and maintenance effort relative to FM1B due to same length	• Comparable operation and maintenance effort relative to FM1A due to same length	• Higher operation and maintenance effort relative to W3WW2B due to SPS	• Lower operation and maintenance effort relative to W3WW2A due to avoidance of SPS • Requires operations and maintenance by private entity

Category & Criteria		Stage 3: S3WW1A	Stage 3: S3WW1B	Stage 3 S3FM1A	Stage 3 S3FM1B	Stage 3: S3WW2A	Stage 3: S3WW2B
	e. Potential opportunity for current infrastructure to be decommissioned in favour of gravity solutions f. Potential effects on traffic	• Not Applicable	• Not Applicable	• Not Applicable	• Consolidates water and wastewater in existing utility corridor (existing easement between Townline Road and Regional Road 20)	• Not applicable	• Not Applicable
	g. Potential effects on traffic.	• Lower impacts to traveling public Townline Road	• Lower impacts to traveling public Townline Road	• Lower impacts to traveling public Townline Road	• Lower impacts to traveling public Townline Road	• Greater impacts to traveling public on Anderson Crescent and Townline Road	• Lower impacts to traveling public Townline Road
	h. Dependency on the completion of other Stages	• Wastewater strategy could be implemented independently to Stages 1 and 2 with a new sanitary pump station / forcemain in place.	• Wastewater strategy could be implemented independently to Stages 1 and 2 with a new sanitary pump station / forcemain in place.	• Implementation would allow S3WW1 or S3WW2 to be implemented independently of Stages 1 and 2	• Requires gravity sewer from Stage 1 (S1WW1) • Implementation would allow S3WW1 or S3WW2 to be implemented independently of Stages 1 and 2	• Stage 3 northeast area can be implemented in near term with replacement of existing sewer line (Anderson Crescent sanitary sewer easement deficiency and maintenance of capacity).	• Stage 3 northeast area can be implemented with a new Stage 3 gravity sewer, pump station and forcemain in place
	i. Degree of permitting and approvals complexity	• SAR permitting anticipated due to SAR habitat in area (Townline Road agricultural fields) • Sewer to be captured with block plan development process	• SAR permitting anticipated due to SAR habitat in area (Townline Road agricultural fields) • Sewer to be captured with block plan development process	• Species at risk habitat in area of water crossings • NCPA permits for trenchless crossing • Forcemain to be captured with block plan development process	• Species at risk habitat in area of water crossings • NCPA permits for trenchless crossing • Forcemain to be captured with block plan development process	• SAR permitting anticipated due to SAR habitat in area (Townline Road agricultural fields) • Sewer to be captured with block plan development process	• SAR permitting anticipated due to SAR habitat in area (Townline Road agricultural fields) • Forcemain to be captured block plan development process
Land Use	j. Potential to conform to approved local (e.g., OP and MCP), provincial (e.g., PPS) plans and policies. k. Identify existing official plans and schedule B1, B3 and B4 Natural Heritage	• Conforms • Pipe does not cross natural heritage system • Work in regulated area to comply with NPCA policy document – November 2022	• Conforms • Pipe does not cross natural heritage system • Work in regulated area to comply with NPCA policy document – November 2022	• Conforms • Pipe crosses natural heritage system (current official plan Schedule E-12 and proposed OPA schedule 63) between Regional Road 20 (St Catharines Street) and Townline Road • Work in regulated area to comply with NPCA policy document – November 2022	• Conforms • Pipe crosses natural heritage system (current official plan Schedule E-12 and proposed OPA schedule 63) between Regional Road 20 (St Catharines Street) and Townline Road • Work in regulated area to comply with NPCA policy document – November 2022	• Conforms • Pipe does not cross natural heritage system • Work in regulated area to comply with NPCA policy document – November 2022	• Conforms • Pipe does not cross natural heritage system • Work in regulated area to comply with NPCA policy document – November 2022
	l. Potential effects on current land uses, including development plans.	• Sewer line is located within future development lands	• Sewer line is located within future development lands	• Forcemain is located within future development lands	• Forcemain is located within future development lands	• Sewer line is located within future development lands	• Sewer line is located within future development lands

Category & Criteria		Stage 3: S3WW1A	Stage 3: S3WW1B	Stage 3 S3FM1A	Stage 3 S3FM1B	Stage 3: S3WW2A	Stage 3: S3WW2B
Natural Environment	m. Potential effects on terrestrial/aquatic habitat and species.	• No anticipated effects on terrestrial / aquatic habitat and species	• No anticipated effects on terrestrial / aquatic habitat and species	• Trenchless crossing minimizes impacts • Minor vegetation removal in existing easement between Townline Road and Regional Road 20 • Provincially Significant wetland consisting of swamp community south of Industrial Park Road. • Twenty Mile Creek includes wetland amphibian breeding habitat and turtle wintering. • Habitat for several species of Conservation concern and deer wintering.	• Trenchless crossing minimizes impacts • Minor vegetation removal in existing easement between Townline Road and Regional Road 20 • Provincially Significant wetland consisting of swamp community south of Industrial Park Road. • Twenty Mile Creek includes wetland amphibian breeding habitat and turtle wintering. • Habitat for several species of Conservation concern and deer wintering.	• Minor vegetation removal between Townline Road and Regional Road 20 • Provincially Significant wetland consisting of swamp community south of Industrial Park Road. • Twenty Mile Creek includes wetland amphibian breeding habitat and turtle wintering. • Habitat for several species of Conservation concern and deer wintering.	• Minor vegetation removal between Townline Road and Regional Road 20 • Provincially Significant wetland consisting of swamp community south of Industrial Park Road. • Twenty Mile Creek includes wetland amphibian breeding habitat and turtle wintering. • Habitat for several species of Conservation concern and deer wintering.
	n. Potential effects on species at risk (SAR) and SAR habitat.	• Potential to encounter Species at Risk in agricultural fields south of Townline Road. Species may include Bobolink and Eastern Meadowlark.	• Potential to encounter Species at Risk in agricultural fields south of Townline Road. Species may include Bobolink and Eastern Meadowlark.	• Potential to encounter Species at Risk in agricultural fields south of Townline Road. Species may include Bobolink and Eastern Meadowlark.	• Potential to encounter Species at Risk in agricultural fields south of Townline Road. Species may include Bobolink and Eastern Meadowlark.	• Potential to encounter Species at Risk in agricultural fields south of Townline Road. Species may include Bobolink and Eastern Meadowlark.	• Potential to encounter Species at Risk in agricultural fields south of Townline Road. Species may include Bobolink and Eastern Meadowlark.
	o. Potential to encounter soil and water contamination and waste disposal.	• None identified	• None identified	• Potential to encounter soil and groundwater contamination due to work within / adjacent to former landfill in the area	• None identified	• None identified	• None identified
	p. Anticipated environmental permitting and approval considerations.	• Requires Niagara Peninsula Conservation Authority work permit • Potential Species at Risk related to sending and receiving pits outside travel portion of ROW	• Requires Niagara Peninsula Conservation Authority work permit • Potential Species at Risk related to sending and receiving pits outside travel portion of ROW	• Requires Niagara Peninsula Conservation Authority work permit • Anticipated Permit to Take Water • Potential Species at Risk related to sending and receiving pits outside travel portion of ROW	• Requires Niagara Peninsula Conservation Authority work permit • Anticipated Permit to Take Water • Potential Species at Risk related to sending and receiving pits outside travel portion of ROW	• Requires Niagara Peninsula Conservation Authority work permit • Potential Species at Risk related to sending and receiving pits outside travel portion of ROW	• Requires Niagara Peninsula Conservation Authority work permit • Potential Species at Risk related to sending and receiving pits outside travel portion of ROW
	q. Potential effects on surface water and groundwater due to construction (i.e., dewatering of trenches during installation of watermain and/or sanitary forcemain/sewer, control of erosion and sedimentation).	• The installation of sewer infrastructure can lead to the interception of the shallow water table altering shallow groundwater flow paths • Installation of infrastructure below the water table leads to the potential need for dewatering during construction and post construction and a decrease in groundwater levels	• The installation of sewer infrastructure can lead to the interception of the shallow water table altering shallow groundwater flow paths • Installation of infrastructure below the water table leads to the potential need for dewatering during construction and post construction and a decrease in groundwater levels	• The installation of sewer infrastructure can lead to the interception of the shallow water table altering shallow groundwater flow paths • Installation of infrastructure below the water table leads to the potential need for dewatering during construction and post construction and a decrease in groundwater levels	• The installation of sewer infrastructure can lead to the interception of the shallow water table altering shallow groundwater flow paths • Installation of infrastructure below the water table leads to the potential need for dewatering during construction and post construction and a decrease in groundwater levels	• The installation of sewer infrastructure can lead to the interception of the shallow water table altering shallow groundwater flow paths • Installation of infrastructure below the water table leads to the potential need for dewatering during construction and post construction and a decrease in groundwater levels	• The installation of sewer infrastructure can lead to the interception of the shallow water table altering shallow groundwater flow paths • Installation of infrastructure below the water table leads to the potential need for dewatering during construction and post construction and a decrease in groundwater levels

Category & Criteria		Stage 3: S3WW1A	Stage 3: S3WW1B	Stage 3 S3FM1A	Stage 3 S3FM1B	Stage 3: S3WW2A	Stage 3: S3WW2B
	r. Source water protection considerations.	• Drainage features within the study area are primarily headwater drainage (HDF) features, with some defined and regulated watercourses • Twenty Mile Creek is the most significant watercourse and valley system within Smithville, with confined corridors and floodplains	• Drainage features within the study area are primarily headwater drainage (HDF) features, with some defined and regulated watercourses • Twenty Mile Creek is the most significant watercourse and valley system within Smithville, with confined corridors and floodplains	• Drainage features within the study area are primarily headwater drainage (HDF) features, with some defined and regulated watercourses • Twenty Mile Creek is the most significant watercourse and valley system within Smithville, with confined corridors and floodplains	• Drainage features within the study area are primarily headwater drainage (HDF) features, with some defined and regulated watercourses • Twenty Mile Creek is the most significant watercourse and valley system within Smithville, with confined corridors and floodplains	• Drainage features within the study area are primarily headwater drainage (HDF) features, with some defined and regulated watercourses • Twenty Mile Creek is the most significant watercourse and valley system within Smithville, with confined corridors and floodplains	• Drainage features within the study area are primarily headwater drainage (HDF) features, with some defined and regulated watercourses • Twenty Mile Creek is the most significant watercourse and valley system within Smithville, with confined corridors and floodplains
Socio-Economic Environment	s. Potential nuisance impacts (e.g., disruption to access, air, dust, noise, and vibration) from construction and operations.	• Lower potential disruption to fronting properties due to avoidance of work within existing ROW	• Lower potential disruption to fronting properties due to avoidance of work within existing ROW	• Greater potential disruption to fronting properties than FM2 due to passage through Rock Park	• Lower potential disruption to fronting properties than FM1	• Greater potential disruption to fronting properties along Anderson Crescent and Townline Road	• Lesser potential disruption to fronting properties along Towline Road
Socio-Economic Environment	t. Potential property requirements (temporary and permanent).	• None anticipated	• None anticipated	• Potential temporary easements on Townline Road at Twenty Mile Creek for forcemain crossing	• Potential temporary easements on Townline Road at Twenty Mile Creek for forcemain crossing	• Existing easement between houses is insufficient for new gravity sewer installation (May require new easement)	• None anticipated
Climate Change	u. Potential carbon footprint (e.g., energy usage, use of construction materials, construction methods and operations).	• Lower carbon footprint relative to S3WW1B	• Higher carbon footprint relative to S3WW1A	• Comparable carbon footprint relative to S3FM2	• Comparable carbon footprint relative to S3FM1	• Higher carbon footprint relative to S3WW2B due to construction of gravity sewer	• Lower carbon footprint relative to S3WW2A
Cultural Environment	v. Potential effects on archaeological resources.	• Works outside road right of way contains areas of moderate to high archaeological potential.	• Works outside road right of way contains areas of moderate to high archaeological potential.	• Works outside road right of way contains areas of moderate to high archaeological potential.	• Works outside road right of way contains areas of moderate to high archaeological potential.	• Works outside road right of way contains areas of moderate to high archaeological potential.	• Works outside road right of way contains areas of moderate to high archaeological potential.
Cultural Environment	w. Potential for disruption of built heritage resources and cultural heritage landscapes.	• Potential heritage resources within area.	• Potential heritage resources within area.	• Potential heritage resources within area.	• Potential heritage resources within area.	• No potential or designated heritage resources within the area	• No potential or designated heritage resources within the area
Cost	x. Cost of construction (including property acquisition).	• Lower cost of construction relative to S3WW1B due to sewer depth	• Higher cost of construction relative to S3WW1B due to deeper sewer	• Relatively comparable cost relative to S3FM1B	• Relatively comparable cost relative to S3FM1A	• Higher cost of construction relative to S3WW2B due to new gravity sewer	• Lower cost of construction relative to S3WW2A due to reduce infrastructure requirements

Category & Criteria		Stage 3: S3WW1A	Stage 3: S3WW1B	Stage 3 S3FM1A	Stage 3 S3FM1B	Stage 3: S3WW2A	Stage 3: S3WW2B
	y. Cost of operation / maintenance.	• Lower cost relative to 1B due to sewer depth	• Higher cost relative to 1A due to deeper sewer	• Comparable cost relative to S3FM2 due to similar length forcemains and construction requirements	• Comparable cost relative to S3FM1 due to similar length forcemains and construction requirements	• Lower maintenance cost relative to 2B as new gravity sewer will likely not have maintenance costs for a few years	• Higher maintenance cost relative to 2A due to routine maintenance needed on existing gravity sewer

5.5 Water and Wastewater Infrastructure Assessment for Stage 4

The assessment results indicated that S4W3 would be considered a most preferable strategies to meet the water for the Stage 4 urban boundary expansion. For meeting the required wastewater service for Stage 4, two infrastructure options were determined to be the most preferable strategy; S4WW1 and S4A-FM2. The following summarizes the rationale for selecting these preferred solutions. Table 5-5 and Table 5-6 present the detailed assessment results for Stage 4 water and wastewater strategy, respectively.

5.5.1 Preferred Solutions and Rationale for Stage 4 Water Service

Three (3) alternatives were evaluated to address the need to expand the watermain length to Stage 4 of the Township of Lincoln Urban Expansion Project.

S4W1

- Watermain follows Regional Road 20 from South Grimsby Road 5 to South Grimsby Road 6
- Southernly on South Grimsby Road 6
- Trenchless crossing of Twenty Mile Creek on South Grimsby Road 6
- Watermain continues on South Grimsby Road 6 to Townline Road
- Two trenchless crossings of North Creek

S4W2

- Watermain extends southernly from Regional Road 20 and South Grimsby Road 5 intersection along future development lands to South Grimsby Road 6
- Trenchless crossing of Twenty Mile Creek on South Grimsby Road 5
- Within planned utility / active transportation corridor and planned Stage 4 local collector road
- Westerly on collector road to connect on South Grimsby Road 6
- Southernly on South Grimsby Road 6 to Townline Road
- Two trenchless crossings of North Creek

S4W3

- Watermain extends southernly from Regional Road 20 along future development lands to Townline Road
- Trenchless crossing of Twenty Mile Creek on South Grimsby Road 5
- Within planned utility / active transportation corridor and planned Stage 4 local collector road
- Southernly on local north south collector road to Townline Road

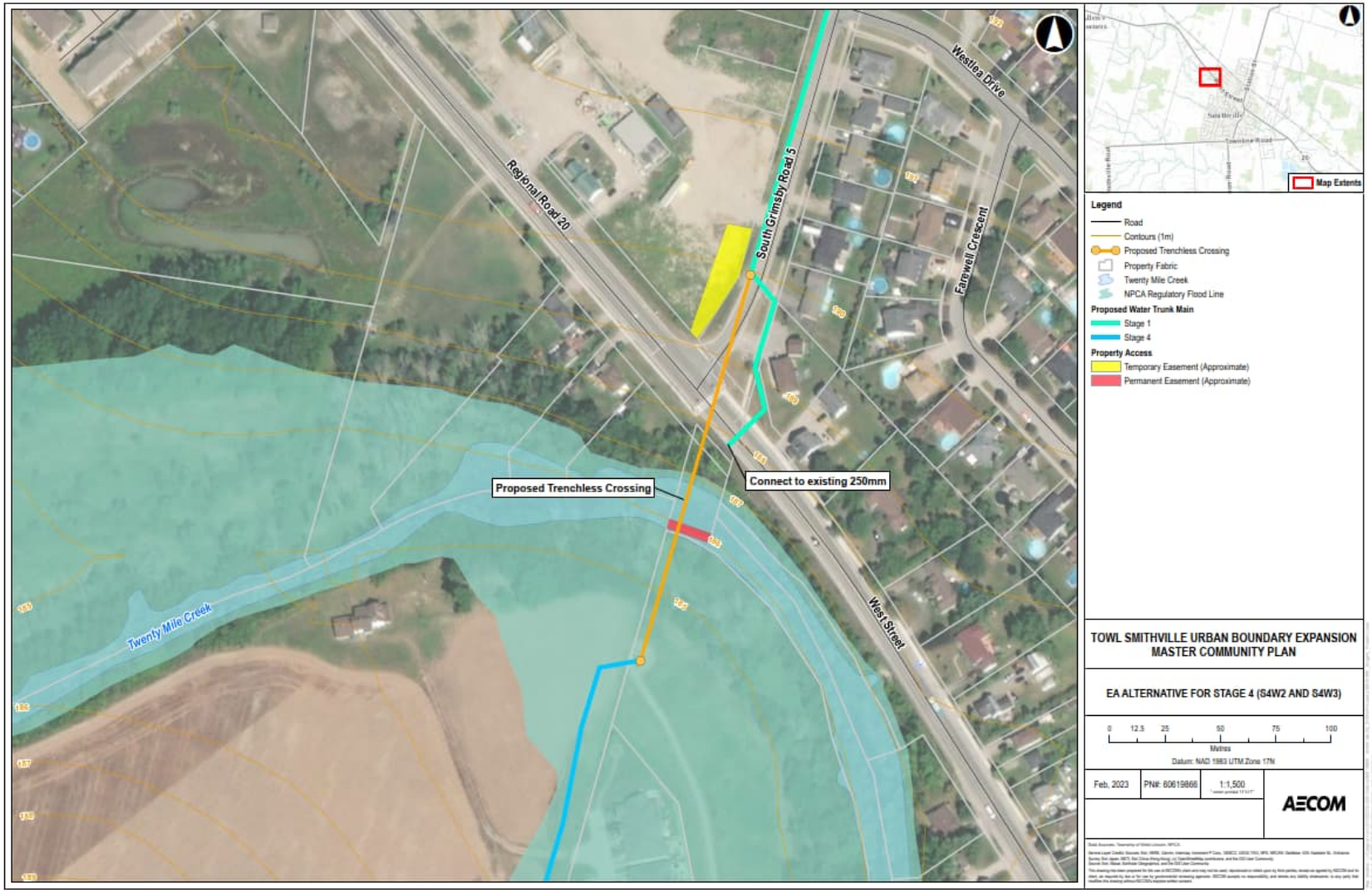
Rationale for preferred solution for Stage 4 Water Servicing

S4W3 is the preferred solution, and the rationale is summarized as follows:

1. Reduced construction complexity including fewest trenchless water crossings, avoids significant utility conflicts and community disruption within the existing Smithville urban area
2. Lowest carbon footprint associated with the construction and maintenance of system
3. Lowest cost in construction, operation and maintenance

The preferred solution for Stage 4 water servicing includes a crossing of Twenty Mile Creek and presents the location of the crossing for this solution as well as the property access requirements (temporary easement at Northwest corner of South Grimsby Road 5 and Region Road 20).

Figure 5-4: Location of Twenty Mile Creek Crossing for Stage 4 Water Servicing



5.5.2 Preferred Solutions and Rationale for Stage 4 Wastewater Service

A total of five (5) alternatives were evaluated to address the need to expand the sanitary sewer system to Stage 4 of the Township of Lincoln Urban Expansion Project; three alternatives for the gravity sewer system for the majority of Stage 4 and two alternatives for the northern part of Stage 4A.

5.5.2.1 Gravity Sewer System for Stage 4

S4WW1

- Gravity sewer starting at north end of South Grimsby Road 6
- Easternly across the Stage 4 local collector road
- Southernly on north south local collector road to Townline Road
- Connects directly to future Port Davidson SPS

S4WW2

- Gravity sewer south on South Grimsby Road 6 connecting to Townline Road
- Easternly on Townline Road to connect to future stage 3 gravity sewer S3WW1A
- Two crossings of a creek

S4WW3

- Gravity sewer starting at north end of South Grimsby Road 6
- Gravity sewer easternly through Stage 4 local collector road
- Southernly on north south local collector road to Townline Road
- Easternly on Townline Road to connect to future stage 3 gravity sewer S3WW1A

Rationale for preferred solution for Stage 4 Gravity Sewer System

S4WW1 is the preferred solution, and the rationale is summarized as follows:

1. Alignment can be directly connected to future Port Davidson SPS
2. Does not rely on Stage 3 gravity sewer to be in place
3. Avoids trenchless crossings

4. Minimizes impacts to paved surfaces and travelling public (Townline Road)
5. Can be coordinated with Townline Road expansion
6. Optimizes overall capital investment as deeper gravity sewer for Stage 3 will not be required

5.5.2.2 Wastewater Servicing for Stage 4A

S4FM1

- New SPS on south side of Twenty Mile Creek within staging area 4A; this station is considered a private pumping system
- Forcemain going north on South Grimsby Road 5 connecting northernly to Spring Creek Road
- Trenchless crossing of Twenty Mile Creek
- One crossing of railway

S4FM2

- New SPS on south side of Twenty Mile Creek within staging area 4A; this station is considered a private pumping system
- New forcemain connects to future gravity sewer system for Stage 4

Rationale for preferred solution for Stage 4A

S4-FM2 is the preferred solution, and the rationale is summarized as follows:

1. Reduced construction complexity associated with no crossings of Twenty Mile Creek and railway are required
2. Lower maintenance and operation cost
3. Lower carbon footprint for construction

Alternatively, the area can be serviced by utilising a low pressure system whereby individual buildings pump their wastewater to a pressurized sewer main which will be owned and maintained by the Township; individual building pumps will be considered a private system with individual building owner responsibility .

Table 5-5: Stage 4 Water Infrastructure Strategy Assessment Results

Category & Criteria		Stage 4: S4W1	Stage 4: S4W2	Stage 4: S4W3
Details		• Watermain follows Regional Road 20 from South Grimsby Road 5 to South Grimsby Road 6 • Southernly on South Grimsby Road 6 • Trenchless crossing of Twenty Mile Creek on South Grimsby Road 6 • Watermain continues on South Grimsby Road 6 to Townline Road • Two trenchless crossings of North Creek	• Watermain extends southernly from Regional Road 20 and South Grimsby Road 5 intersection along future development lands to South Grimsby Road 6 • Trenchless crossing of Twenty Mile Creek on South Grimsby Road 5 • Within planned utility / active transportation corridor and planned Stage 4 local collector road • Westerly on collector road to connect on South Grimsby Road 6 • Southernly on South Grimsby Road 6 to Townline Road • Two trenchless crossings of North Creek	• Watermain extends southernly from Regional Road 20 along future development lands to Townline Road • Trenchless crossing of Twenty Mile Creek on South Grimsby Road 5 • Within planned utility / active transportation corridor and planned Stage 4 local collector road • Southernly on local north south collector road to Townline Road Preferred Solution
Technical Environment	a. Potential degree of construction complexities, including number and type of water crossings, anticipated rock removal, access, working area and duration to build.	• One crossing of Twenty Mile Creek • Two crossings of North Creek at the northeast corner of Townline Road and South Grimsby Road 6 • Anticipate in rock • Access from South Grimsby Road 6 and Regional Road 20 (West Street) • Longer construction duration associated with longer watermain length	• One crossing of Twenty Mile Creek • Two crossings of North Creek at the northeast corner of Townline Road and South Grimsby Road 6 • Anticipate in rock • Access from South Grimsby Road 6 and Future Development lands (South side of Twenty Mile Creek) • Shorter construction duration associated with shorter watermain length	• One crossing of Twenty Mile Creek • Anticipate in rock • Access from South GR5 (North side of Twenty Mile Creek) • Access from Future Development Lands (South side of Twenty Mile Creek) • Shortest construction duration associated with shortest watermain length
	b. Potential effects on roadway and utility infrastructure.	• Greater potential to impact recently paved surfaces on Regional Road 20 (West Street) and South Grimsby Road 6 roundabout	• Lower impacts to paved surfaces	• Lowest impacts to paved surfaces
	c. Provides good site access for maintenance vehicles, future operation and maintenance and servicing.	• Access from existing roads (South Grimsby Road 6 and West Street)	• Access from future development lands, local collector road, utility corridor (South of Twenty Mile Creek), and existing roads (South Grimsby Road 6)	• Access from future development lands, local collector road, and utility corridor (South of Twenty Mile Creek)
	d. Operation efficiency.	• Highest operation and maintenance effort related to longest watermain	• Higher operation and maintenance effort related to longer watermain	• Lower operation and maintenance effort related to shorter watermain
	e. Potential opportunity for current infrastructure to be decommissioned in favour of gravity solutions f. Potential effects on traffic	• Not applicable	• Not applicable	• Not applicable
	g. Potential effects on traffic.	• Greater impacts to traveling public due to road restoration required (Roundabout at Regional Road 20 and South Grimsby Road 6)	• Lower impacts to traveling public	• Lowest impacts to traveling public
	h. Dependency on the completion of other Stages	• Water strategy for Stage 4 will require Stage 1 or Stage 3 water infrastructure to form the Region's Ring system concept.	• Water strategy for Stage 4 will require Stage 1 or Stage 3 water infrastructure to form the Region's Ring system concept.	• Water strategy for Stage 4 will require Stage 1 or Stage 3 water infrastructure to form the Region's Ring system concept.
	i. Degree of permitting and approvals complexity	• Avoids coordination with block plan development process • Species at risk habitat in area of water crossings • NCPA permits for trenchless crossing	• Watermain to be captured with block plan development process • Species at risk habitat in area of water crossings • NCPA permits for trenchless crossing •	• Watermain to be captured with block plan development process • Species at risk habitat in area of water crossings • NCPA permits for trenchless crossing •

	Category & Criteria	Stage 4: S4W1	Stage 4: S4W2	Stage 4: S4W3
Land Use	j. Potential to conform to approved local (e.g., OP and MCP), provincial (e.g., PPS) plans and policies. k. Identify existing official plans and schedule B1, B3 and B4 Natural Heritage	• Conforms • Utilities permitted in future ROW • Pipe crosses natural heritage system (current official plan Schedule E-12 and proposed OPA schedule 63) along South Grimsby Road 6 • Work in regulated area to comply with NPCA policy document – November 2022	• Conforms • Utility corridor permitted within MCP Natural Heritage System or restoration area (south side of Twenty Mile Creek) • Pipe crosses natural heritage system (current official plan Schedule E-12 and proposed OPA schedule 63) at the intersection of Regional Road 20 and South Grimsby Road 5 • Work in regulated area to comply with NPCA policy document – November 2022	• Conforms • Utility corridor permitted within MCP Natural Heritage System or restoration area (south side of Twenty Mile Creek) • Pipe crosses natural heritage system (current official plan Schedule E-12 and proposed OPA schedule 63) at the intersection of Regional Road 20 and South Grimsby Road 5 • Work in regulated area to comply with NPCA policy document – November 2022
	l. Potential effects on current land uses, including development plans.	• Greater impact to fronting properties on West Street and South Grimsby Road 6 (Roundabout)	• Potential impact to fronting properties • Potential to impact future development plans related to sending and receiving pits at northwest corner of South Grimsby Road 5 and Regional Road 20 (West Street)	• Potential to impact future development plans related to sending and receiving pits at northwest corner of South Grimsby Road 5 and Regional Road 20 (West Street) development plans
Natural Environment	m. Potential effects on terrestrial/aquatic habitat and species.	• Trenchless crossing minimizes impacts • Minor vegetation removal • Provincially Significant wetland consisting of swamp community along South Grimsby Road 6 • Twenty Mile Creek includes wetland amphibian breeding habitat and turtle wintering. • Habitat for several species of Conservation concern and deer wintering.	• Trenchless crossing minimizes impacts • Minor vegetation removal within future utility corridor south of West Street and South Grimsby Road 5 intersection • Provincially Significant wetland consisting of swamp community south of West Street and South Grimsby Road 5 intersection • Twenty Mile Creek includes wetland amphibian breeding habitat and turtle wintering. • Habitat for several species of Conservation concern and deer wintering.	• Trenchless crossing minimizes impacts • Minor vegetation removal within future utility corridor south of West Street and South Grimsby Road 5 intersection • Provincially Significant wetland consisting of swamp community south of West Street and South Grimsby Road 5 intersection • Twenty Mile Creek includes wetland amphibian breeding habitat and turtle wintering. • Habitat for several species of Conservation concern and deer wintering.
	n. Potential effects on species at risk (SAR) and SAR habitat.	• Potential to encounter Species at Risk in meadow east related to water crossings. Species may include Barn Swallow, Monarchs and Eastern Wood-Pewee. • Grass Pickerel and Snapping Turtle habitat in creek.	• Potential to encounter Species at Risk within the future utility corridor. Species may include Bobolink and Eastern Meadowlark. • Grass Pickerel and Snapping Turtle habitat in creek.	• Potential to encounter Species at Risk within the future utility corridor. Species may include Bobolink and Eastern Meadowlark. • Grass Pickerel and Snapping Turtle habitat in creek.
	o. Potential to encounter soil and water contamination and waste disposal.	• None identified	• None identified	• None identified
	p. Anticipated environmental permitting and approval considerations.	• Requires Niagara Peninsula Conservation Authority work permit • Anticipated Permit to Take Water • Potential Species at Risk related to sending and receiving pits outside travel portion of ROW	• Requires Niagara Peninsula Conservation Authority work permit • Anticipated Permit to Take Water • Potential Species at Risk related to sending and receiving pits outside travel portion of ROW	• Requires Niagara Peninsula Conservation Authority work permit • Anticipated Permit to Take Water • Potential Species at Risk related to sending and receiving pits outside travel portion of ROW
	q. Potential effects on surface water and groundwater due to construction (i.e., dewatering of trenches during installation of watermain and/or sanitary forcemain/sewer, control of erosion and sedimentation).	• The installation of water infrastructure can lead to the interception of the shallow water table altering shallow groundwater flow paths • Installation of infrastructure below the water table leads to the potential need for dewatering during construction and post construction and a decrease in groundwater levels	• The installation of water infrastructure can lead to the interception of the shallow water table altering shallow groundwater flow paths • Installation of infrastructure below the water table leads to the potential need for dewatering during construction and post construction and a decrease in groundwater levels	• The installation of water infrastructure can lead to the interception of the shallow water table altering shallow groundwater flow paths • Installation of infrastructure below the water table leads to the potential need for dewatering during construction and post construction and a decrease in groundwater levels
	r. Source water protection considerations.	• Drainage features within the study area are primarily headwater drainage (HDF) features, with some defined and regulated watercourses • Twenty Mile Creek is the most significant watercourse and valley system within Smithville, with confined corridors and floodplains	• Drainage features within the study area are primarily headwater drainage (HDF) features, with some defined and regulated watercourses • Twenty Mile Creek is the most significant watercourse and valley system within Smithville, with confined corridors and floodplains	• Drainage features within the study area are primarily headwater drainage (HDF) features, with some defined and regulated watercourses • Twenty Mile Creek is the most significant watercourse and valley system within Smithville, with confined corridors and floodplains

Category & Criteria		Stage 4: S4W1	Stage 4: S4W2	Stage 4: S4W3
Socio-Economic Environment	s. Potential nuisance impacts (e.g., disruption to access, air, dust, noise, and vibration) from construction and operations.	• Greater potential disruption to fronting properties on West Street and South Grimsby Road 6 including businesses and St Martin Catholic Elementary School • Potential to disrupt West Lincoln Leisureplex and Smithville Sports Complex	• Lower potential disruption to fronting properties • Potential to disrupt West Lincoln Leisureplex and Smithville Sports Complex	• Lowest potential disruption to fronting properties • Less potential to disrupt West Lincoln Leisureplex and Smithville Sports Complex
	t. Potential property requirements (temporary and permanent).	• Potential temporary easements on South Grimsby Road 6 and Townline Road at creeks for watermain crossings	• Requires temporary easement on south side of Regional Road 20 (West Street) at foot of South Grimsby Road 5 for Twenty Mile Creek watermain crossing and at Townline Road for watermain crossing • Avoid permanent easement from property owner on southside of Regional Road 20 (West Street) directly south of South Grimsby Road 5 as trenchless crossing goes through residential property • Requires permanent minor easement on southside of Twenty Mile Creek (land not developable).	• Requires temporary easement on north side of West Street and east side of South Grimsby Road 5 for Twenty Mile Creek watermain crossing • Avoid permanent easement from property owner on southside of Regional Road 20 (West Street) directly south of South Grimsby Road 5 as trenchless crossing goes through residential property • Requires permanent minor easement on southside of Twenty Mile Creek (land not developable).
Climate Change	u. Potential carbon footprint (e.g., energy usage, use of construction materials, construction methods and operations).	• Highest carbon footprint related to longest length of watermain and construction duration.	• Higher carbon footprint related to longer length of watermain and construction duration.	• Lower carbon footprint related to shorter length of watermain and construction duration.
Cultural Environment	v. Potential effects on archaeological resources.	• Works outside road right of way contains areas of moderate to high archaeological potential.	• Works outside road right of way contains areas of moderate to high archaeological potential.	• Works outside road right of way contains areas of moderate to high archaeological potential.
	w. Potential for disruption of built heritage resources and cultural heritage landscapes.	• Potential heritage resource west of South Grimsby Road 6.	• Potential heritage resource south of West Street.	• Potential heritage resource south of West Street.
Cost	x. Cost of construction (including property acquisition).	• Highest cost relating to multiple water crossings, road restoration required, and longest watermain length	• Higher cost relating to multiple water crossings and length of watermain • Minor cost associated with permanent easement southside of West Street at South Grimsby Road 5	• Lower cost relating to single water crossing and shorter length of watermain • Minor cost associated with permanent easement southside of West Street at South Grimsby Road 5
	y. Cost of operation / maintenance.	• Highest related to length of watermain length	• Higher than option 3 related to intermediate length of watermain length	• Lower related to shorter length of watermain length

Table 5-6: Stage 4 Wastewater Infrastructure Strategy Assessment Results

Category & Criteria		Stage 4: S4A-FM1	Stage 4: S4A-FM2	Stage 4 S4WW1	Stage 4: S4WW2	Stage 4: S4WW3
Details		• New SPS on south side of Twenty Mile Creek within staging area 4A; this station is considered a private pumping system • New forcemain going north on South Grimsby Road 5 connecting northernly to Spring Creek Road • Trenchless crossing of Twenty Mile Creek • One crossing of railway	• New SPS on south side of Twenty Mile Creek within staging area 4A; this station is considered a private pumping system • New forcemain connect to future gravity sewer within Stage 4 Preferred Solution	• Gravity sewer starting at north end of South Grimsby Road 6 • Easternly across the Stage 4 local collector road • Southernly on north south local collector road to Townline Road • Connects directly to future Port Davidson SPS Preferred Solution	• Gravity sewer south on South Grimsby Road 6 connecting to Townline Road • Easternly on Townline Road to connect to future stage 3 gravity sewer S3WW1A • Two crossings of North Creek	• Gravity sewer starting at north end of South Grimsby Road 6 • Gravity sewer easternly through Stage 4 local collector road • Southernly on north south local collector road to Townline Road • Easternly on Townline Road to connect to future stage 3 gravity sewer S3WW1A
Technical Environment	a. Potential degree of construction complexities, including number and type of water crossings, anticipated rock removal, access, working area and duration to build.	• One crossing of Twenty Mile Creek • One crossing of railway • Anticipate in rock • Access from Future Development Lands (South side of Twenty Mile Creek) and South Grimsby Road 5 • Longer construction duration due to length of forcemain system.	• No crossing of Twenty Mile Creek • Anticipate in rock • Access from Future Development Lands (South side of Twenty Mile Creek) • Shorter construction duration due to length of forcemain system.	• No crossing of Twenty Mile Creek • Anticipate in rock • Access from Future Development Lands (South side of Twenty Mile Creek) • Longer construction duration associated with longer sewer main length	• Two crossings of North Creek • Anticipate in rock • Access from South Grimsby Road 6 • Longer construction duration associated with multiple creek crossings	• No crossing of Twenty Mile Creek • Anticipate greater in rock due to deeper sewer • Access from Future Development Lands (South side of Twenty Mile Creek) • Shorter construction duration associated with shorter sewer main length
	b. Potential effects on roadway and utility infrastructure.	• Greater impacts to paved surfaces	• Lower impacts to paved surfaces	• Lower impacts to paved surfaces	• Greater impacts to paved surfaces • Potential to impact utilities	• Lower impacts to paved surfaces
	c. Provides good site access for maintenance vehicles, future operation and maintenance and servicing.	• Access from future utility corridor/easement/multi use path / road	• Access from future utility corridor /multi use path	• Access from future utility corridor /multi use path	• Access from existing road allowances	• Access from future utility corridor/ multi use path
	d. Operation efficiency.	• Higher operation and maintenance effort relative to FM2 due to longer forcemain length • Requires operations and maintenance by private entity	• Lower operation and maintenance effort relative to FM1 due to shorter forcemain length • Requires operations and maintenance by private entity	• Highest operation and maintenance effort	• Higher operation and maintenance effort	• Lower operation and maintenance effort
	e. Potential opportunity for current infrastructure to be decommissioned in favour of gravity solutions f. Potential effects on traffic	• Not applicable	• Not applicable	• Not applicable	• Not applicable	• Not applicable
	g. Potential effects on traffic.	• Greater impacts on travelling public	• Lower impacts on travelling public	• Lower impacts on travelling public	• Greater impacts on travelling public	• Lower impacts on travelling public
	h. Dependency on the completion of other Stages	• Stage 4A could be implemented without relying on the rest of Stage 4 and Stage 3 but requires Stage 1 to be in place.	• Stage 4A could be implemented with Stage 4 local sewer in place. .	• Stage 4 could be implemented without relying on Stage 3 local collection being in place. • Requires new Stage 3 SPS and forcemain across Twenty Mile Creek to upgraded Smithville SPS.	• Stage 4 can only be implemented with Stage 3 local collection in place. • Requires new Stage 3 SPS and forcemain across Twenty Mile Creek to upgraded Smithville SPS.	• Stage 4 can only be implemented with Stage 3 local collection in place. • Requires new Stage 3 SPS and forcemain across Twenty Mile Creek to upgraded Smithville SPS.

Category & Criteria		Stage 4: S4A-FM1	Stage 4: S4A-FM2	Stage 4 S4WW1	Stage 4: S4WW2	Stage 4: S4WW3
	i. Degree of permitting and approvals complexity	• Species at risk habitat in area of water crossings • Species at risk habitat in area of water crossings • NCPA permits for trenchless crossing	• Forcemain to be captured with block plan development process • Species at risk habitat in area of future development lands • NCPA permits for trenchless crossing	• Sewer to be captured with block plan development process • Species at risk habitat in area of future development lands • NCPA permits for trenchless crossing	• Avoids coordination with block plan development process • Species at risk habitat in area of water crossings • NCPA permits for trenchless crossing	• Sewer to be captured with block plan development process • Species at risk habitat in area of development lands • NCPA permits for trenchless crossing
Land Use	j. Potential to conform to approved local (e.g., OP and MCP), provincial (e.g., PPS) plans and policies. k. Identify existing official plans and schedule B1, B3 and B4 Natural Heritage	• Conforms • Utility corridor permitted within MCP Natural Heritage System or restoration area (south side of Twenty Mile Creek) • Pipe crosses natural heritage system (current official plan Schedule E-12 and proposed OPA schedule 63) at Regional Road 20 (St Catharines Street) • Work in regulated area to comply with NPCA policy document – November 2022 • Requires CPR approval	• Conforms • Utility corridor permitted within MCP Natural Heritage System or restoration area (south side of Twenty Mile Creek) • Pipe does not cross a natural heritage area • Work in regulated area to comply with NPCA policy document – November 2022	• Conforms • Utility corridor permitted within MCP Natural Heritage System or restoration area (south side of Twenty Mile Creek) • Pipe does not cross a natural heritage area • Work in regulated area to comply with NPCA policy document – November 2022	• Conforms • Utilities permitted in future ROW • Pipe does not cross a natural heritage area • Work in regulated area to comply with NPCA policy document – November 2022	• Conforms • Utility corridor permitted within MCP Natural Heritage System or restoration area (south side of Twenty Mile Creek) • Pipe does not cross a natural heritage area • Work in regulated area to comply with NPCA policy document – November 2022
	l. Potential effects on current land uses, including development plans.	• Potential to impact future development plans at Northwest corner of West Street and South Grimsby Road 5 (related to watercrossing)	• Not applicable	• Not applicable	• Not applicable	• Not applicable
Natural Environment	m. Potential effects on terrestrial/aquatic habitat and species.	• Trenchless crossing minimizes impacts • Minor vegetation removal within future utility corridor south of West Street and South Grimsby Road 5 intersection • Provincially Significant wetland consisting of swamp community between South Grimsby Road 6 and Townline Road. • Creek includes wetland amphibian breeding habitat and turtle wintering. • Habitat for several species of Conservation concern and deer wintering.	• Minor vegetation removal within future utility corridor south of West Street and South Grimsby Road 5 intersection • Habitat for several species of Conservation concern and deer wintering.	• Minor vegetation removal within future utility corridor south of West Street and South Grimsby Road 5 intersection • Habitat for several species of Conservation concern and deer wintering.	• Trenchless crossing minimizes impacts • Minor vegetation removal on South Grimsby Road 6 and Townline Road for creek crossing • Provincially Significant wetland consisting of swamp community between South Grimsby Road 6 and Townline Road. • Creek includes wetland amphibian breeding habitat and turtle wintering. • Habitat for several species of Conservation concern and deer wintering.	• Minor vegetation removal within future utility corridor south of West Street and South Grimsby Road 5 intersection • Habitat for several species of Conservation concern and deer wintering.
	n. Potential effects on species at risk (SAR) and SAR habitat.	• Potential to encounter Species at Risk within future utility corridor south of West Street and South Grimsby Road 5 intersection • Grass Pickerel and Snapping Turtle habitat in creek.	• Potential to encounter Species at Risk within future utility corridor south of West Street and South Grimsby Road 5 intersection • Grass Pickerel and Snapping Turtle habitat in creek.	• Potential to encounter Species at Risk within future utility corridor south of West Street and South Grimsby Road 5 intersection • Grass Pickerel and Snapping Turtle habitat in creek.	• Potential to encounter Species at Risk in agricultural fields west of South Grimsby Road 6. Species may include Bobolink and Eastern Meadowlark. •	• Potential to encounter Species at Risk within future utility corridor south of West Street and South Grimsby Road 5 intersection • Grass Pickerel and Snapping Turtle habitat in creek.
	o. Potential to encounter soil and water contamination and waste disposal.	• None identified	• None identified	• None identified	• None identified	• None identified

	Category & Criteria	Stage 4: S4A-FM1	Stage 4: S4A-FM2	Stage 4 S4WW1	Stage 4: S4WW2	Stage 4: S4WW3
	p. Anticipated environmental permitting and approval considerations.	• Requires Niagara Peninsula Conservation Authority work permit • Anticipated Permit to Take Water • Potential Species at Risk related to sending and receiving pits outside travel portion of ROW	• Requires Niagara Peninsula Conservation Authority work permit • Anticipated Permit to Take Water	• Requires Niagara Peninsula Conservation Authority work permit • Anticipated Permit to Take Water	• Requires Niagara Peninsula Conservation Authority work permit • More permitting required due to more water crossings • Anticipated Permit to Take Water • Potential Species at Risk related to sending and receiving pits outside travel portion of ROW	• Requires Niagara Peninsula Conservation Authority work permit • Anticipated Permit to Take Water
	q. Potential effects on surface water and groundwater due to construction (i.e., dewatering of trenches during installation of watermain and/or sanitary forcemain/sewer, control of erosion and sedimentation).	• The installation of infrastructure can lead to the interception of the shallow water table altering shallow groundwater flow paths • Installation of infrastructure below the water table leads to the potential need for dewatering during construction and post construction and a decrease in groundwater levels study)	• The installation of infrastructure can lead to the interception of the shallow water table altering shallow groundwater flow paths • Installation of infrastructure below the water table leads to the potential need for dewatering during construction and post construction and a decrease in groundwater levels	• The installation of infrastructure can lead to the interception of the shallow water table altering shallow groundwater flow paths • Installation of infrastructure below the water table leads to the potential need for dewatering during construction and post construction and a decrease in groundwater levels)	• The installation of infrastructure can lead to the interception of the shallow water table altering shallow groundwater flow paths • Installation of infrastructure below the water table leads to the potential need for dewatering during construction and post construction and a decrease in groundwater levels	• The installation of infrastructure can lead to the interception of the shallow water table altering shallow groundwater flow paths • Installation of infrastructure below the water table leads to the potential need for dewatering during construction and post construction and a decrease in groundwater levels)
	r. Source water protection considerations.	• Drainage features within the study area are primarily headwater drainage (HDF) features, with some defined and regulated watercourses • Twenty Mile Creek is the most significant watercourse and valley system within Smithville, with confined corridors and floodplains	• Drainage features within the study area are primarily headwater drainage (HDF) features, with some defined and regulated watercourses • Twenty Mile Creek is the most significant watercourse and valley system within Smithville, with confined corridors and floodplains	• Drainage features within the study area are primarily headwater drainage (HDF) features, with some defined and regulated watercourses • Twenty Mile Creek is the most significant watercourse and valley system within Smithville, with confined corridors and floodplains	• Drainage features within the study area are primarily headwater drainage (HDF) features, with some defined and regulated watercourses • Twenty Mile Creek is the most significant watercourse and valley system within Smithville, with confined corridors and floodplains	• Drainage features within the study area are primarily headwater drainage (HDF) features, with some defined and regulated watercourses • Twenty Mile Creek is the most significant watercourse and valley system within Smithville, with confined corridors and floodplains
Socio-Economic Environment	s. Potential nuisance impacts (e.g., disruption to access, air, dust, noise, and vibration) from construction and operations.	• Greater potential disruption to fronting properties	• Lower potential disruption to fronting properties	• Lower potential disruption to fronting properties	• Greater potential disruption to fronting properties	• Lower potential disruption to fronting properties
	t. Potential property requirements (temporary and permanent).	• Temporary easement required for Twenty Mile Creek crossing • Requires permanent easement from property owner on southside of Regional Road 20 (West Street) directly south of South Grimsby Road 5 as trenchless crossing goes through residential property • Requires easement on south side of Twenty Mile Creek (to be captured in future development application) for forcemain crossing	• None anticipated	• None anticipated	• Temporary easement required for North Creek crossing • Potential temporary easements on northwest corner of South Grimsby Road 6 and Townline Road for Creek for forcemain crossing •	• None anticipated
Climate Change	u. Potential carbon footprint (e.g., energy usage, use of construction materials, construction methods and operations).	• Higher carbon footprint relative to FM1A due to longer length of forcemain and construction duration	• Lower carbon footprint relative to FM1B due to shorter length of forcemain and construction duration	• Highest carbon footprint relative to S4WW2 and 3 due to the length of sewer and construction duration.	• Higher carbon footprint relative to S4WW1 due to the construction duration	• Lower carbon footprint relative to S4WW1 due to the length of the sewer and construction duration

Category & Criteria		Stage 4: S4A-FM1	Stage 4: S4A-FM2	Stage 4 S4WW1	Stage 4: S4WW2	Stage 4: S4WW3
Cultural Environment	v. Potential effects on archaeological resources.	• Works outside road right of way contains areas of moderate to high archaeological potential.	• Works outside road right of way contains areas of moderate to high archaeological potential.	• Works outside road right of way contains areas of moderate to high archaeological potential.	• Works outside road right of way contains areas of moderate to high archaeological potential.	• Works outside road right of way contains areas of moderate to high archaeological potential.
	w. Potential for disruption of built heritage resources and cultural heritage landscapes.	• Potential heritage resources within area south of West Street.	• Potential heritage resources within area south of West Street.	• Potential heritage resources within area south of West Street.	• No potential or designated heritage resources within area.	• Potential heritage resources within area south of West Street.
Cost	x. Cost of construction (including property acquisition).	• High cost	• Low cost	• Highest	• High	• Lowest
	y. Cost of operation / maintenance.	• Higher related to longer length of forcemain	• Lower related to shorter length of forcemain	• Highest related to longer sewer	• Higher related to creek crossings	• Lower related to shorter sewer

5.6 Recommended Water and Wastewater Servicing Strategy

The recommended strategy for water and wastewater system to accommodate the urban boundary expansion concept was identified based on the overall environment assessment results, technical feasibility and financial implications. According to the assessment results presented in the previous sections, the preferred strategy for water and wastewater system was as follow:

Preferred Water Strategy:

- Stage 1: S1W1
- Stage 2: S2W2
- Stage 3: S3W1
- Stage 4: S4W3

Preferred Wastewater Strategy:

- Stage 1: S1WW1
- Stage 2: S2WW1
- Stage 3: S3WW1A, S3WW2A and S3FM1B
- Stage 4: S4WW1 and S4A-FM2

Figure 5-5 and Figure 5-6 present the preferred water and wastewater strategy, respectively. The required infrastructures for each strategy were colour code based on the associated staging as per the urban boundary expansion concept.

Figure 5-5: Recommended Water Servicing Strategy

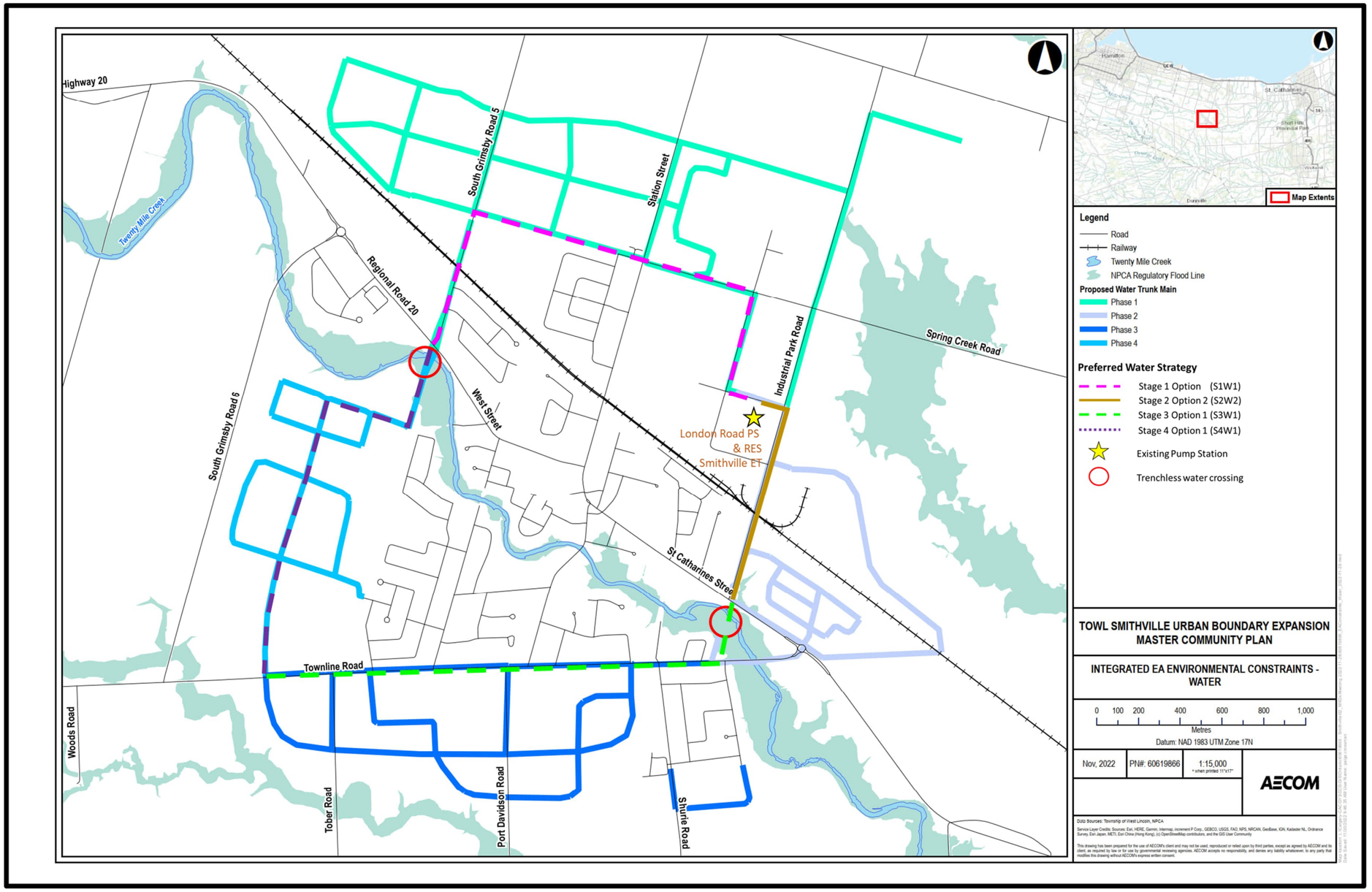
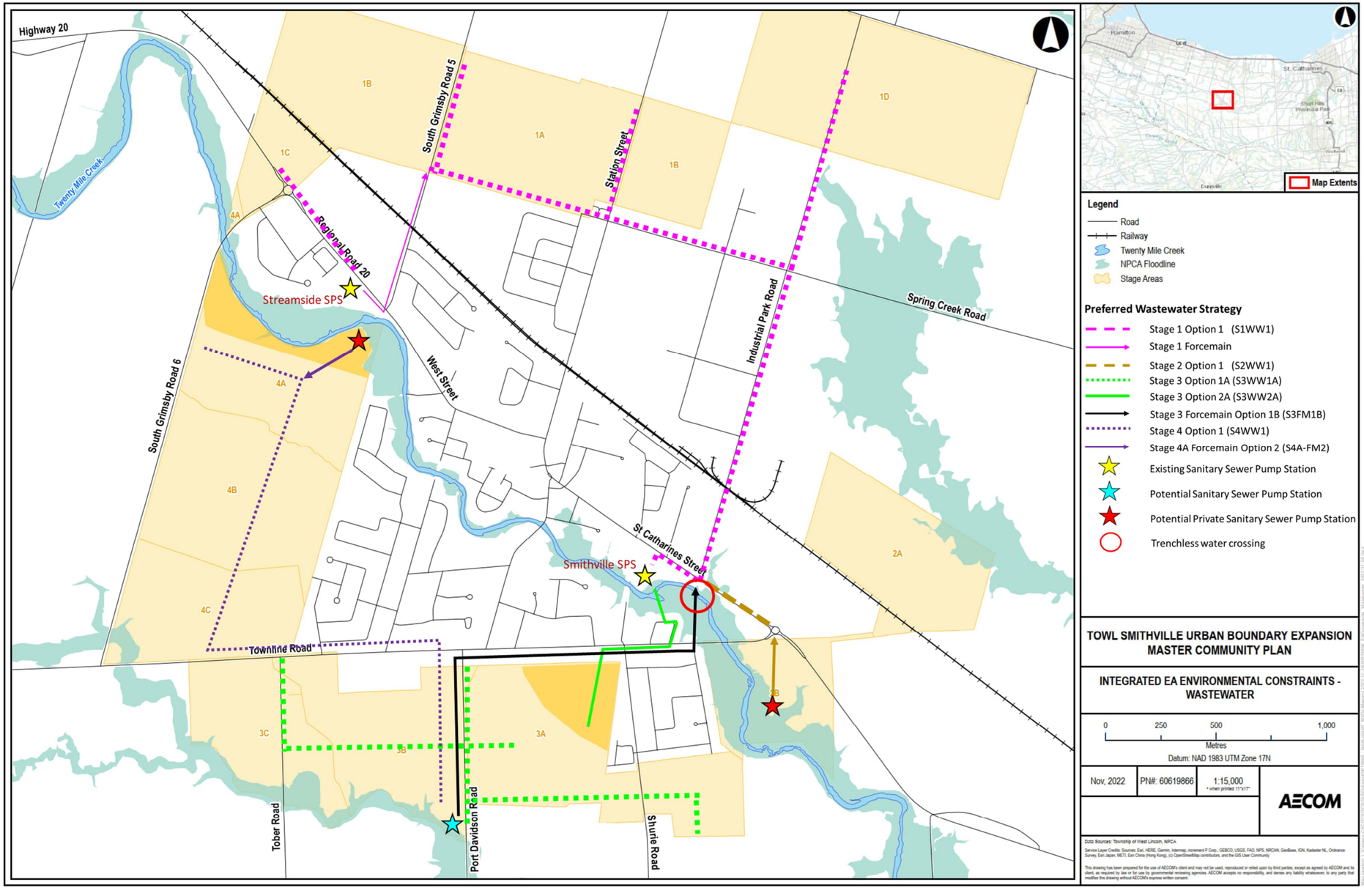


Figure 5-6: Recommended Wastewater Servicing Strategy



6. Future Work Requirements

Detailed costs were identified for each infrastructure option based on the recommended water and wastewater servicing strategy. The detailed costs for the future capital works were formulated based on the following:

- Engineering design costs: 15% of the construction costs;
- Contingency costs: 20% of the construction costs;
- Interconnection to existing local system: $500,000 each;
- Railway Crossing: $2,000,000 each;
- Creek Crossing: $5,000,000 each;
- Pumping Station: $2,500,000 per new building or building expansion + $5,000 per L/s of pumping capacity; and
- Construction Costs for new watermains and sanitary sewer mains as listed below.

Watermain		**Sanitary Sewerline**	
Size	$ per meter	Size	$ per meter
200mm	$950	300mm	$1,060
300mm	$1,050	375mm	$1,200
400mm	$1,120	450mm	$1,230
500mm	$1,320	525mm	$1,300
600mm	$1,650	600mm	$1,350
		675mm	$1,400
		750mm	$1,450

6.1 Future Water Infrastructure

Table 6-1 and Table 6-2 present the recommended water infrastructure projects to be implemented over the 30 year planning horizon for the Township of West Lincoln and the Region of Niagara, respectively. Figure 6-1 presents the overall preferred water infrastructures.

Table 6-1: Recommended Water Infrastructure Projects for the Township of West Lincoln Over the 30-Year Planning Horizon

Capital Project ID	Stage	Preferred Servicing Strategy ID	Descriptions	Region's DC project ID	Size	Length	Railway / Creek Crossing	Construction Costs	Design Costs	Contingency Costs	Costs (2022$)	Class EA Project Schedule[15]	Anticipated Implementation Schedule
W-D-001	1	S1W1	Local distribution mains for Stage 1	-	300mm	9,580m	-	$ 10,059,000	$ 1,508,850	$ 2,011,800	$ 13,579,650	A	Next 10 years
W-D-002	2	S2W2	Local distribution mains for Stage 2	-	300mm	3,745m	-	$ 3,932,250	$ 589,838	$ 786,450	$ 5,308,538	A	Next 10 years
W-D-003	3	S3W1	Local distribution mains for Stage 3	-	300mm	5,477m	-	$ 5,750,850	$ 862,628	$ 1,150,170	$ 7,763,648	A	10 – 20 years
W-D-004	4	S4W3	Local distribution mains for Stage 4	-	300mm	2,988m	-	$ 3,137,400	$ 470,610	$ 627,480	$ 4,235,490	A	> 20 years
Total Estimated Costs for Water Capital Projects (2022$)											**$ 30,887,326**		

[15] *(as approved under the integrated MCEA process and subject to no OPA 63 appeal*

Table 6-2: Recommended Water Infrastructure Projects for the Region of Niagara Over the 30-Year Planning Horizon

Capital Project ID	Stage	Preferred Servicing Strategy ID	Descriptions	Region's DC project ID	Size	Length	Railway / Creek Crossing	Construction Costs	Design Costs	Contingency Costs	Costs (2022$)	Class EA Project Schedule[16]	Anticipated Implementation Schedule
W-TM-001	1	S1W1	• Watermain extends northernly on South Grimsby Road 5 from Regional Road 20 to Spring Creek Road • Easternly along Spring Creek Road to Thompson Road • Southernly on Thompson Road and easternly to London Road pumping station • No crossing of Twenty Mile Creek • Crossing of rail tracks on South Grimsby Road 5	W-M-006	400mm	2,548m	$ 2,000,000 (1 railway crossing)	$ 2,853,760	$ 428,064	$ 570,752	$ 5,852,576	A	Next 10 years
W-TM-002	2	S2W2	• Watermain extends southernly from London Road Pumping Station towards Industrial Park Road and Regional Road 20 (St Catharines Street) intersection • No crossing of Twenty Mile Creek • Crossing of rail tracks on Industrial Park Road	W-M-018	400mm	1,182m	$ 2,000,000 (1 railway crossing)	$ 1,323,840	$ 198,576	$ 264,768	$ 3,787,184	A	Next 10 years
W-TM-003	3	S3W1	• New watermain extends easternly along Townline Road to existing North South easement east of Anderson Crescent • Northernly from easement to Industrial Park Road / Regional Road 20 and connection future Stage 2 watermain • Trenchless crossing of Twenty Mile Creek south of Industrial Park Road and Regional Road 20	W-M-018	400mm	1,633m	$ 5,000,000 (1 creek crossing)	$2,721,600	$ 408,240	$ 544,320	$ 8,674,160	A	10 – 20 years
W-TM-004	4	S4W3	• Watermain extends southernly from Regional Road 20 along future development lands to Townline Road • Trenchless crossing of Twenty Mile Creek on South Grimsby Road 5 • Within planned utility / active transportation corridor and planned Stage 4 local collector road • Southernly on local north south collector road to Townline Road	-	400mm	2,190m	$ 5,000,000 (1 creek crossing)	$ 2,452,800	$ 367,920	$ 490,560	$ 8,311,280	A	> 20 years

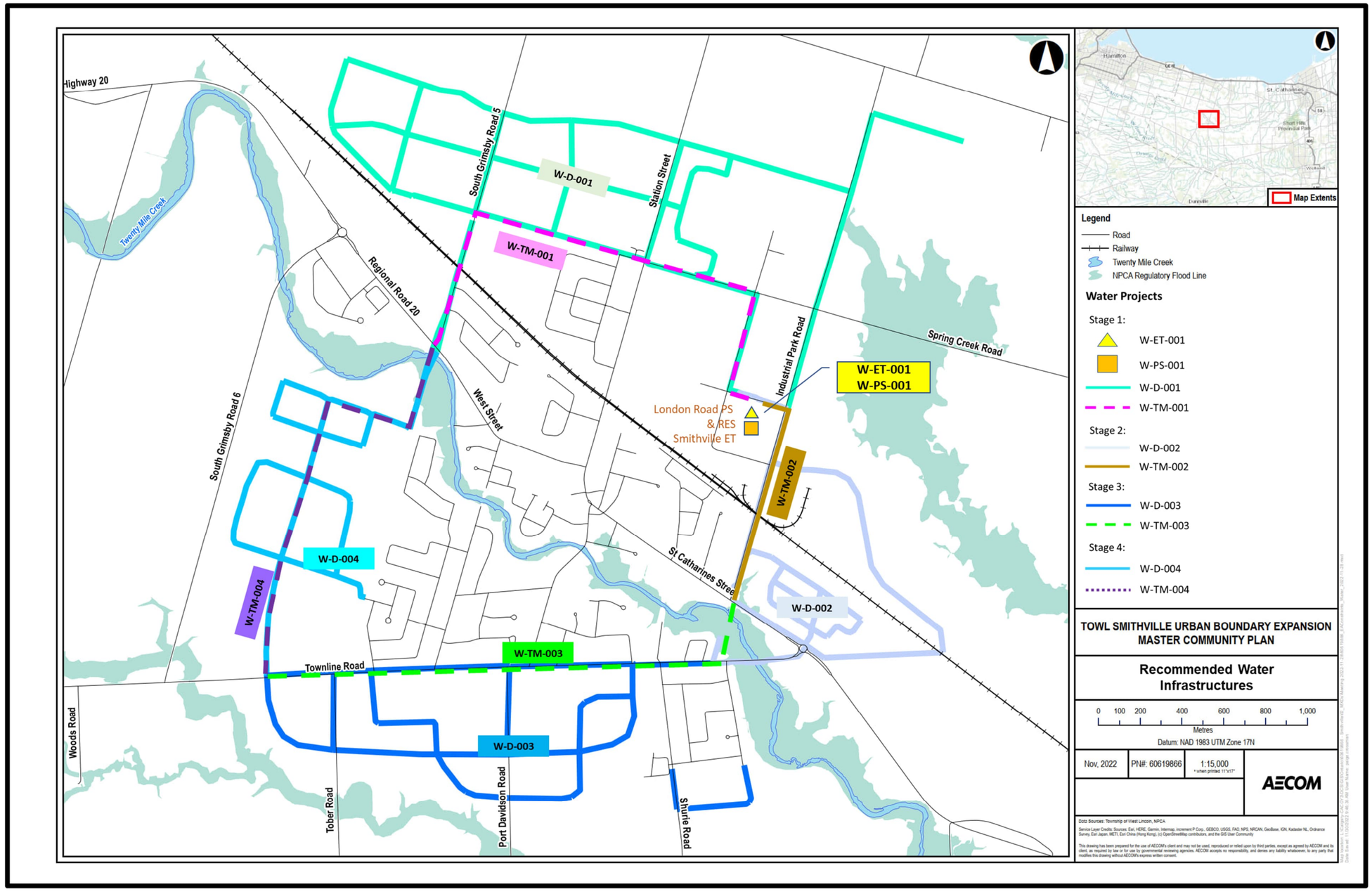
[16] *(as approved under the integrated MCEA process and subject to no OPA 63 appeal*

Capital Project ID	Stage	Preferred Servicing Strategy ID	Descriptions	Region's DC project ID	Size	Length	Railway / Creek Crossing	Construction Costs	Design Costs	Contingency Costs	Costs (2022$)	Class EA Project Schedule[16]	Anticipated Implementation Schedule
W-ET-001	1	-	New elevated tank (8.8ML)	W-S-010[17]	8.8ML	-	-	$ 11,000,000	$ 1,650,000	$ 2,200,000	$ 14,850,000	B	Next 10 years
W-PS-001	1	-	Dedicated fire pump (356L/s)	W-P-004[18]	356L/s	-	-	$ 500,000	$ 75,000	$ 100,000	$ 675,000	A	Next 10 years
Total Estimated Costs for Water Capital Projects (2022$)											**$ 42,150,200**		

[17] Region of Niagara DC Study 2022 indicated that the estimated budget for W-S-010 was $12,570,000. The Schedule B Class EA study should be completed by the Region.

[18] Region of Niagara DC Study 2022 indicated that the estimated budget for W-P-004 was $1,544,400. Based on the descriptions for W-P-004 from the Region's DC study, the recommended dedicated fire pump was not part of the project and therefore the estimated costs presented herein would be considered an additional costs for W-P-004 ($1,544,400 + $675,000 =$2,219,400)

Figure 6-1: Preferred Water Infrastructures



6.2 Future Wastewater Infrastructure

Table 6-3 and Table 6-4 present the recommended wastewater infrastructure projects to be implemented over the 30 year planning horizon for the Township of West Lincoln and the Region of Niagara, respectively. Figure 6-2 presents the overall preferred wastewater infrastructures.

Table 6-3: Recommended Wastewater Infrastructure Projects for the Township of West Lincoln Over the 30 Year Planning Horizon

Capital Project ID	Stage	Preferred Servicing Strategy ID	Descriptions	Size	Length	Railway / Creek Crossing	Construction Costs	Design Costs	Contingency Costs	Costs (2022$)	Class EA Project Schedule[19]	Anticipated Implementation Schedule
WW-SL-001	1	S1WW1	• New sewer gravity main on Spring Creek Road from South Grimsby Road 5 and easterly to Industrial Park Road • Gravity sewer continues southernly down Industrial Park Road • Industrial Park to Regional Road 20 • Westerly on Regional Road 20 to Smithville Pumping Station • No crossing of Twenty Mile Creek required • Crossing of rail tracks on Industrial Park Road	375 - 525mm	2,548m	$ 2,000,000 (railway crossing)	$ 6,186,843	$ 928,026	$ 1,237,369	$ 10,352,238	A	Next 10 years
WW-SL-002	1	S1WW1	• New gravity main on Regional Road 20 to Streamside Sanitary Pumping Station	375mm	961m	$ 0	$ 1,153,200	$ 172,980	$ 230,640	$ 1,556,820	A	Next 10 years
WW-SL-003	2	S2WW1	• New sewer gravity main from Smithville sanitary pumping station on east side from Regional Road 20 (St Catharines Street) towards Townline Road • No crossing of Twenty Mile Creek required • No crossing of rail tracks	375 - 525mm	1,633m	$ 0	$ 1,353,262	$ 202,989	$ 270,652	$ 1,826,904	A	Next 10 years
WW-SL-004	3	S3WW1A	• New Gravity Sewer follows Stage 3 North South and easterly local collector road starting at Townline Road • Connection to new SPS at Port Davidson Road / North Creek • Also includes flow from new gravity sewers within Stage 3 east of Port Davidson Road • Trenchless crossing of Twenty Mile Creek required • Does not service Stage 4	375-525mm	4,543m	$ 0	$ 6,891,578	$ 1,033,737	$ 206,747	$ 8,132,061	A	10 – 20 years

[19] *(as approved under the integrated MCEA process and subject to no OPA 63 appeal*

Capital Project ID	Stage	Preferred Servicing Strategy ID	Descriptions	Size	Length	Railway / Creek Crossing	Construction Costs	Design Costs	Contingency Costs	Costs (2022$)	Class EA Project Schedule[19]	Anticipated Implementation Schedule
WW-SL-004B	3	S3WW2A	• New gravity sewer northernly from Stage 3A area to Townline Road • Easternly along Townline Road to Anderson Crescent • Northernly on Anderson Crescent via existing easement to southside of Twenty Mile Creek	New gravity sewerline: 250mm Ex. Gravity sewerline replacement 250mm / 300mm	New Gravity sewerline: 380m Ex. Gravity sewerline replacement 513m	$ 0[20]	$ 539,211	$ 80,882	$ 107,843	$ 727,935	A	Next 10 years
WW-SL-005	4	S4WW1	• Gravity sewer starting at north end of South Grimsby Road 6 • Easternly across the Stage 4 local collector road • Southernly on north south local collector road to Townline Road • Connects directly to future Port Davidson SPS	300-525mm	3,531m	$ 0	$ 4,399,500	$ 659,925	$ 879,900	$ 5,939,325	A	> 20 years
WW-PS-002	2	S2WW1	• New SPS for Stage 2B • Assumed to be privately owned / operated pumping system	4.8L/s	-	$ 0	$ 0	$ 0	$ 0	$ 0	Subject to Town's / Region's approval	Next 10 years
WW-PS-003[21]	3	S3WW1A	• Infrastructure Option S1; New SPS for Stages 3 & 4	148L/s	-	$ 0	$ 3,240,000	$ 486,000	$ 648,000	$ 4,374,000	A	10 – 20 years
WW-PS-004 / WW-PM-004	4A	S4A-FM2	• New SPS on south side of Twenty Mile Creek within staging area 4A; this station is considered a private pumping system • New forcemain on Regional Road 20 to future gravity sewer within Stage 4	7.0 L/s / 200mm	210m	$ 0	$ 0	$ 0	$ 0	$ 0	Subject to Town's / Region's approval	> 20 years

[20] The existing gravity sewer that crosses the Twenty Mile Creek will be maintained as 250mm as higher flow / velocity would be beneficial in archiving higher scouring velocity and also it was a cost-effective method for accommodating Stage 3A

[21] Based on the required capacity for the SPS, the implementation of WW-PS-003 would be completed by the Township and the Region of Niagara will assume the ownership, O&M of the station in accordance with the Region's SPS policy.

Capital Project ID	Stage	Preferred Servicing Strategy ID	Descriptions	Size	Length	Railway / Creek Crossing	Construction Costs	Design Costs	Contingency Costs	Costs (2022$)	Class EA Project Schedule[19]	Anticipated Implementation Schedule
WW-PM-002	2	S2WW1	• New FM for future SPS to future gravity sewer on RR20 • Assumed to be privately owned / operated pumping system	150mm	516m	$ 0	$ 0	$ 0	$ 0	$ 0	Subject to Town's / Region's approval	Next 10 years
WW-PM-003	3	S3FM1B	• New forcemain extending Northernly on port Davidson Road from SPS towards Townline road • Easternly along Townline Road to watermain easement. Northernly through easement towards Twenty Mile Creek • Trenchless crossing of Twenty Mile Creek • Connects to future gravity sewer at Regional Road 20 and Industrial Park Road	500mm	2,030m	$ 5,000,000 (1 creek crossing)	$ 2,491,364	$ 373,705	$ 498,273	$ 8,363,342	A	10 – 20 years
Total Estimated Costs for Wastewater Capital Projects (2022$)										**$ 41,272,625**		

Table 6-4: Recommended Wastewater Infrastructure Projects for the Region of Niagara Over the 30 Year Planning Horizon

Capital Project ID	Stage	Preferred Servicing Strategy ID	Descriptions	Region's DC project ID	Size	Length	Railway / Creek Crossing	Construction Costs	Design Costs	Contingency Costs	Costs (2022$)	Class EA Project Schedule [22]	Anticipated Implementation Schedule
WW-PS-001	1	S1WW1	• Streamside SPS Upgrade; Increase capacity to 42.6L/s	WW-SPS-041	42.6L/s	-	$ 0	$ 2,675,000	$ 401,250	$ 535,000	$ 3,611,250	A	Next 10 years
WW-PM-001	1	S1WW1	• New FM on South Grimsby Road 5 for Streamside SPS connect to future gravity sewer on Spring Creek Road	WW-FM-017	250mm	953m	$ 2,000,000 (railway crossing)	$ 1,013,645	$ 152,047	$ 202,729	$ 3,368,421	A	Next 10 years
Total Estimated Costs for Wastewater Capital Projects (2022$)											**$ 6,979,671**		

[22] *(as approved under the integrated MCEA process and subject to no OPA 63 appeal*

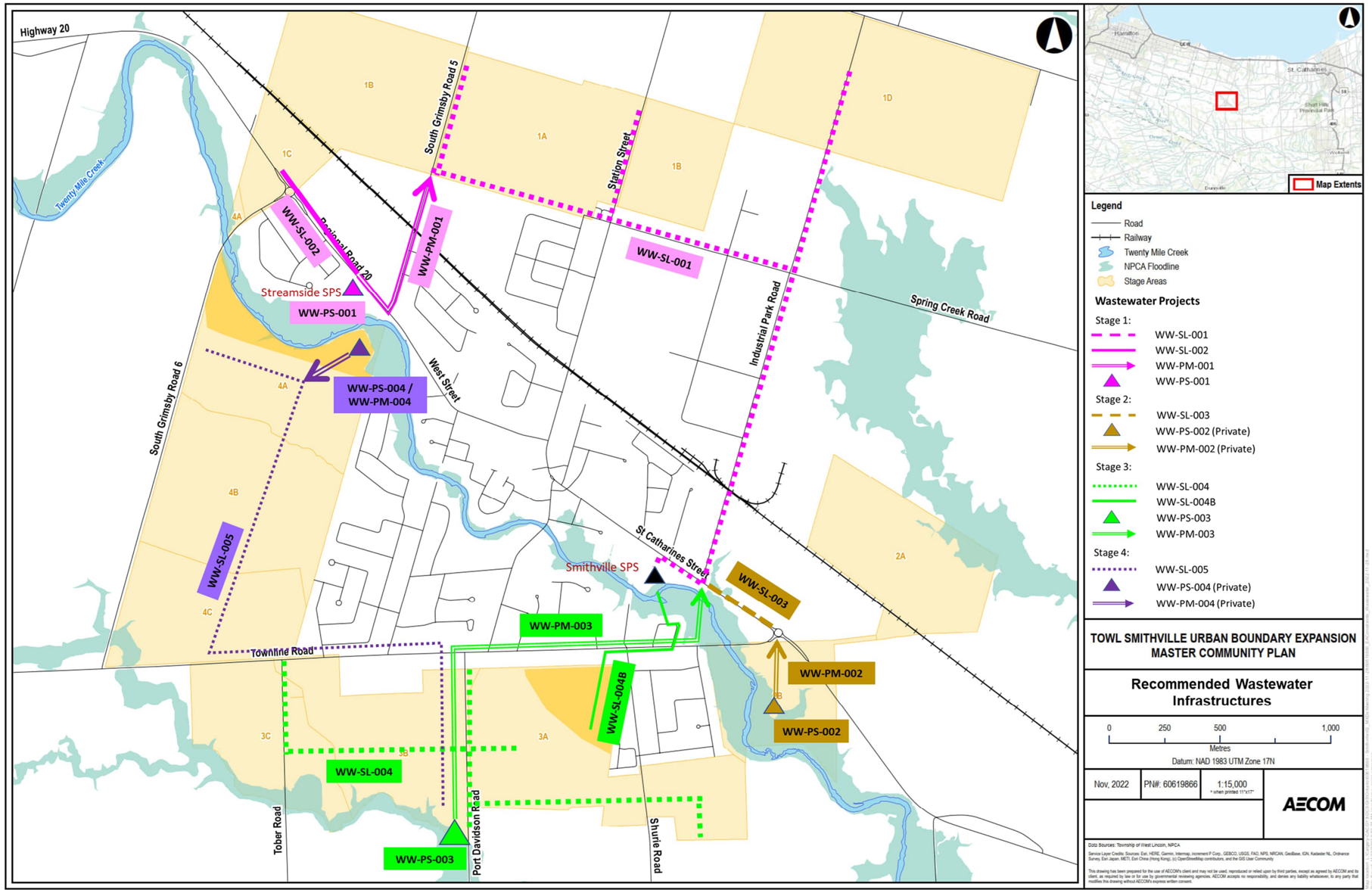


Figure 6-2: Preferred Wastewater Infrastructures