Joint Lands Needs Analysis and Study – Stage 3

Engineering Analysis Technical Memorandum

Prepared for:
Hemson Consulting Ltd.

RVA 247630

October 31, 2025

R.V. Anderson Associates Limited
2001 Sheppard Avenue East, Suite 300
Toronto ON M2J 4Z8 Canada
T 416 497 8600 **F** 855 833 4022
rvanderson.com

RVA 247630

October 31, 2025

Hemson Consulting Ltd.
30 St. Patrick Street, Suite 1000
Toronto, ON, M5T 3A3

Attention: Stefan Krzeczunowicz
Associate Partner

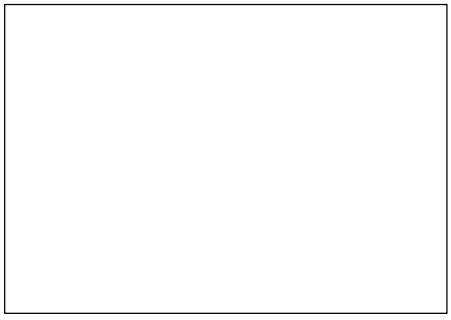
Dear Mr. Krzeczunowicz:

Re: Joint Lands Needs Analysis and Study – Stage 3
Engineering Analysis Technical Memorandum

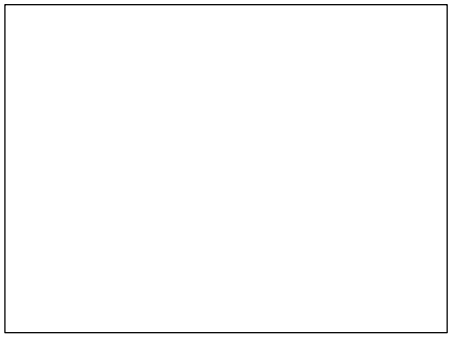
Please find enclosed the Engineering Analysis Technical Memorandum (TM) that supports Stage 3 of the Joint Lands Needs Analysis and Study conducted by Hemson. The TM presents the methodology, assumptions and findings of the engineering analysis conducted between April and October 2025.

Yours very truly,

R.V. ANDERSON ASSOCIATES LIMITED



Walid Abi Akar, P.Eng
Project Manager



Ken W. Campbell, P.Eng
Senior Specialist - QAQC Lead

Encls.

JOINT LANDS NEEDS ANALYSIS AND STUDY – STAGE 3

ENGINEERING ANALYSIS TECHNICAL MEMORANDUM

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

APPENDICES

1.0 INTRODUCTION

The City of Barrie is forecast to experience significant population and employment growth to 2051. To address this anticipated growth, the City of Barrie, the Township of Oro-Medonte, the Township of Springwater, and the County of Simcoe have agreed to engage in facilitated discussions to develop mutually acceptable growth management solutions for the broader region.

The Minister of Municipal Affairs and Housing has tasked the Office of the Provincial Land and Development Facilitator with assisting in these municipal discussions, ensuring that they align with provincial priorities such as housing creation and maximizing employment growth opportunities.

The Joint Land Needs Analysis and Study, led by Hemson Consulting Ltd. (Hemson) and supported by R.V. Anderson Associates Limited (RVA) aims to determine the need and locations for additional employment and/or residential lands within and around the City of Barrie, the Township of Oro-Medonte, and the Township of Springwater. The study will also evaluate options for accommodating this growth. The results are intended to inform future facilitation processes and decision-making.

This Technical Memorandum (TM) summarizes the processes, methodology and findings of the engineering analysis conducted between April and October, 2025. The analysis looked at the servicing needs on a 'high-level' basis for three (3) growth scenarios identified by Hemson. The analysis looked at the required infrastructure in terms of water supply and distribution systems, wastewater treatment and collection, stormwater management, traffic implications as well as power requirements and natural gas considerations. Opinions of probable cost were also developed for the required upgrades of the water, wastewater, roads and stormwater management systems for each growth scenario. Hemson identified six (6) blocks to accommodate growth and used a combination of the blocks for each scenario. During the planning analysis process, Block 1 was removed from the study as majority of the land could not be used for development and therefore total number of blocks was brought down to five (5). The scenarios are:

- Scenario 1 includes blocks 2, 3, 4, and 5 remaining in Springwater and being serviced by the Midhurst system
- Scenario 2 includes blocks 2, 3, 4, and 5 being serviced by Barrie. Blocks 2, 3, and 4 will become a part of Barrie and Block 5 will remain in Midhurst
- Scenario 3 includes blocks 4 and 6 becoming a part of, and being serviced by the City of Barrie.

These blocks and existing settlement areas are illustrated in **Figure 1.1**. The Employment Area Block was considered in all scenarios and is part of Block 4.

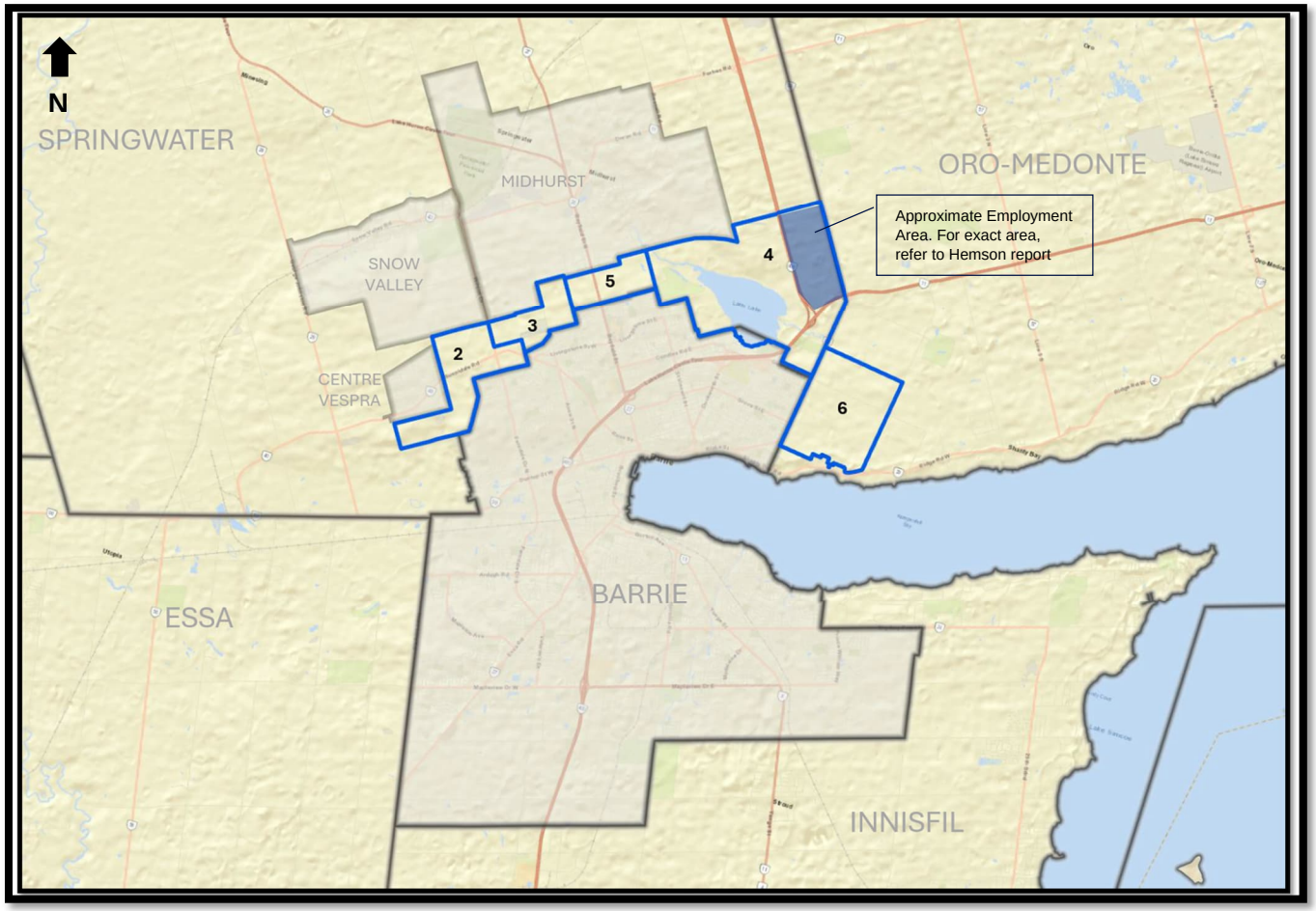


Figure 1.1 – Identified Growth Blocks in the Study Area

All proposed infrastructure presented in this TM, including maps, quantities and opinions of probable cost is based on a high-level preliminary analysis and requires further study (e.g. Master Servicing Plan or Municipal Class EA) before any size, locations or costs can be confirmed. This analysis is being shared with the intention of facilitating the decision-making process and is not considered final.

2.0 WATER SUPPLY AND DISTRIBUTION

2.1 Background Information

The following studies and documentation were reviewed and considered in this analysis:

- 2019 City of Barrie Water Storage & Distribution Master Plan
- 2019 City of Barrie Water Supply Master Plan
- 2020 Township of Springwater Midhurst Water, Wastewater & Transportation Class EA
- 2025 Township of Springwater Master Plan Study Existing Water and Wastewater Systems TM
- 2019 Township of Springwater Engineering Design Standards
- City of Barrie Engineering Design Standards
- 2024 Midhurst Drinking Water System Summary Report
- City of Barrie 2024 Annual Report
- 2023 City of Barrie Development Charges Background Study

2.2 Existing Conditions

City of Barrie

The City of Barrie's water system has several pressure zones. Some pressure zones are serviced from wells while others are serviced from water from Lake Simcoe through the Barrie Surface Water Treatment Plant. All the proposed blocks are located near pressure zones serviced by wells (Zones 1, 2N, and 3N). The groundwater system has a total capacity of 78,000 m^3/day according to the 2019 City of Barrie Water Supply Master Plan. The surface water system has a firm capacity of 60 MLD.

Township of Springwater

The existing water system in Midhurst consists of two (2) groundwater water treatment plants located on Idlewood Dr, Greenpine, and Carson Road and four (4) supply wells with

pump houses located in the Carson Road Area and Doran Road Area. There are two (2) elevated tanks and two (2) booster pumping stations located in Forest Hill and Park Trail. The existing plants have a combined capacity of 6,480 m^3/day according to the 2024 Midhurst Drinking Water System Summary Report. The Town of Springwater also owns and operates other water systems including Anten Mills, Del Trend, Elmvale, Hillsdale, Minesing, Phelpston, Snow Valley Lowlands, Snow Valley Highlands, Centre Vespra, and Vespra Downs. However, these systems are far from the Midhurst system, and the proposed blocks are therefore not considered for connection.

Township of Oro-Medonte:

The Township of Oro-Medonte owns multiple water systems including Shanty Bay, Harbourwood, Canterbury, Cedarbrook, Maplewood, Braestone, Sugarbush, Horseshoe Highlands, Craighurst, Warminster, Robincrest, and Medonte Hills. However, these systems are far from the study area and therefore not considered for analysis.

Figure 2.1 illustrates the existing water distribution network in the City of Barrie and Midhurst. **Table 2.1** highlights the existing water supply capacities in Barrie's groundwater (GW) system and the Midhurst system. Capacities of other systems that do not come into play in this analysis have not been considered.

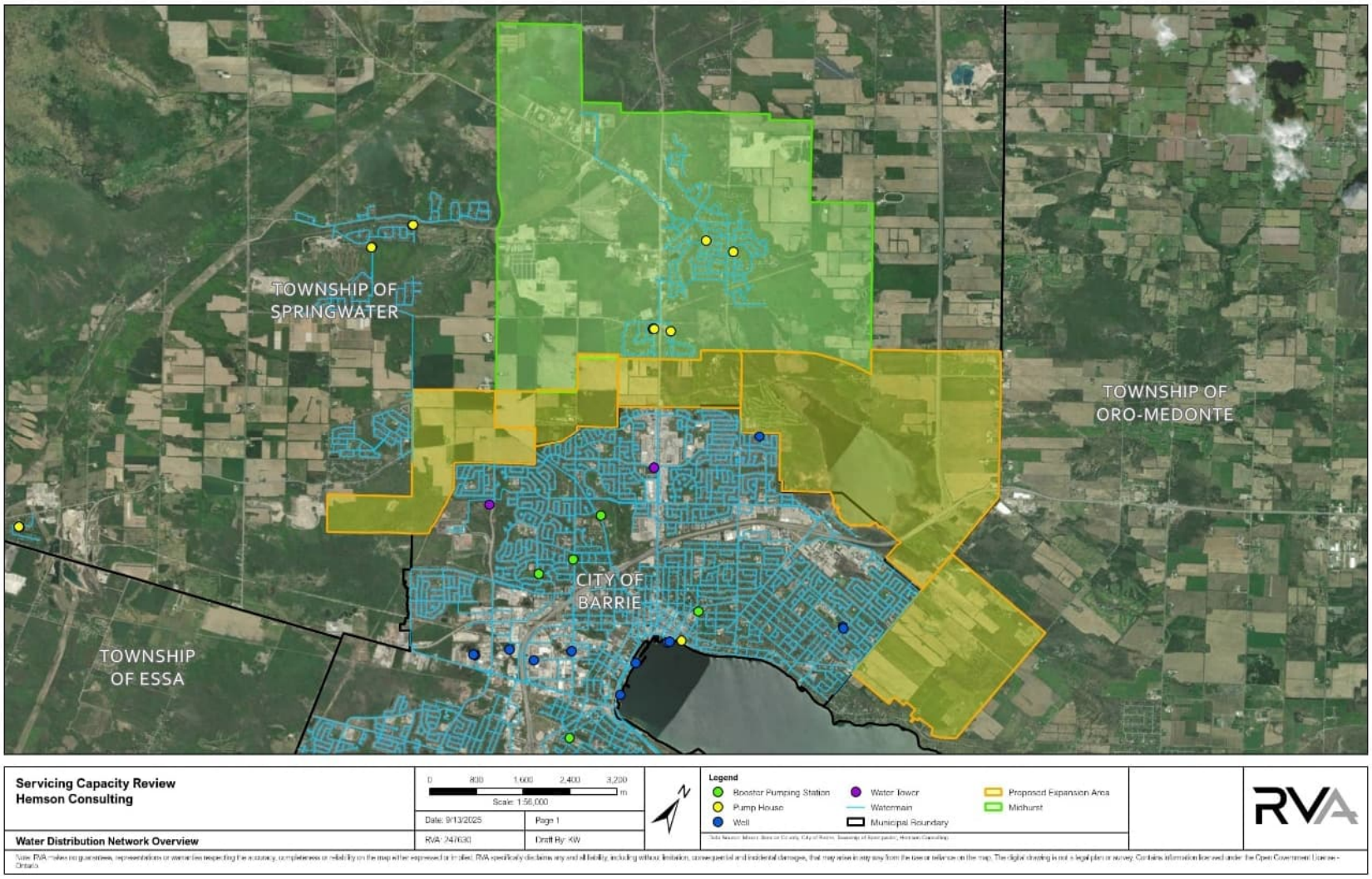


Figure 2.1 – Existing Water Distribution Network Overview

Table 2.1 – Existing Water Supply Capacities and Demands

Municipality	System	Firm Capacity (m^3/day)	Max Day Demand (MDD) (m^3/day)	% of Capacity Used
Barrie[1]	GW (Zones 1, 2N, 3N)	78,146	39,223	50
Springwater[2]	Midhurst	6,480	1,937	30

Notes:

1. **The Barrie Water Supply Capacity is per the 2019 Water Supply Master Servicing Plan (MSP). The Barrie Max Day Demand is from the 2017 data per the 2019 Water Supply MSP.**
2. **As per 2024 Midhurst Drinking Water System Schedule 22 Summary Report.**

2.3 Planned Capacities and Projected Demands

2.3.1 Planned Water Treatment Capacities

There are currently plans to install one (1) new treatment water plant and wells in the Midhurst Height Development Area as well as upgrade to Midhurst's water distribution system. Midhurst has a future planned capacity of 19,094 m^3/day. The planned capacity and design criteria for the Midhurst system is based on the 2020 Midhurst Class EA.

Barrie's Water Supply systems have a future planned capacity of 152,600 m^3/day. The planned capacity for the Barrie system is based on the City of Barrie's 2019 MSP.

2.3.2 Water Demand Calculations

For Scenario 1, where Blocks 2, 3, 4, and 5 are serviced by Midhurst, the following criteria were used to determine the projected demands for each scenario. These were based on the 2019 Township of Springwater Engineering Design Standards:

- employment density of 20 cap/ha,
- average demand per person of 380 L/cap/day,
- maximum day factor of 1.95.

For Scenario 2 and 3, where Blocks 2 to 6 are serviced by Barrie (in the case of Scenario 3 it's only blocks 4 and 6), the following criteria were used to determine the projected demands for each scenario. These were based on the City of Barrie's design criteria:

- employment density of 35 cap/ha,
- average demand per person of 225 L/cap/day,
- maximum day factor of 1.8.

Based on the above criteria and growth forecasts determined by Hemson, the future maximum day demands of each scenario and entire system have been calculated. Table 2.2 illustrates the future water demands for each scenario and the planned capacities in the existing servicing systems. The indicated planned firm capacities and projected MDD are for the entire system. Detailed water demand calculations for each scenario are shown in Appendix A.

Table 2.2 – Future Water Demands and Planned Capacities to 2051

Scenario	Servicing System	Planned Firm Capacity (m^3/day)	Projected Additional MDD (m^3/day)	Existing Area MDD Projections (m^3/day)	Capacity Gap Analysis
Scenario 1	Midhurst	19,094[2]	31,727[1]	12,096[2]	-12,633
Scenario 2	Barrie	152,600[3,4]	4,040[6]	143,546[5,6]	5,014
Scenario 3	Barrie	152,600[3,4]	4,040[6]	143,546[5,6]	5,014

Notes:

1. **Scenario 1 residential population includes forecasted population growth for Midhurst and forceasted "spillover" populations (Blocks 2 to 5)**
2. **Planned capacity and design criteria per the 2020 Midhurst Class EA**
3. **Planned capacity per the City of Barrie's 2019 MSP and communications on on-going MSP update**
4. **Prior to 2062 the capacity will be 138,000 m3/day per the City of Barrie's 2019 MSP**
5. **Design criteria per the City of Barrie's design criteria**
6. **The residential population forecasted in Blocks 1-6 is already considered in Barries's forecasts and water demand projections. Only the employment area is considered as additional.**

The projected demands from the blocks along with projected growth demands in the existing settlement area from the Class EA/MSP were used to determine the required firm capacity of the water supply system for the whole of the service areas. As shown in Table 2.2, there is not enough planned capacity to accommodate the Scenario 1 growth from the planned Midhurst water system upgrade, however scenarios 2 and 3 can be serviced through the planned water supply and treatment capacity upgrades in Barrie assuming the timeline of the 2062 expansion of the Barrier system is moved forward.

2.4 Infrastructure Needs

2.4.1 Infrastructure Needs considerations

In terms of water supply and treatment needs, these are based on the determined capacity gaps presented in Table 2.2.

The total required storage was determined based on the Ministry of Environment, Conservation, and Parks (MECP) requirements and compared to the existing infrastructure

in Midhurst and Barrie. It was determined that there is sufficient storage capacity in the City of Barrie to accommodate future growth and the blocks. It was determined that there is not sufficient capacity in Midhurst to accommodate growth in the blocks for Scenario 1. Even though there is availability of storage in Scenarios 2 and 3, it is recommended to have a dedicated storage for the employment area as it is relatively distant from the existinf storage facilities in Barrie. Table 2.3 highlights the required storage calculations according to the MECP guidelines.

Table 2.3 – Storage Needs per Servicing System and per Scenario

Storage Requirements per servicing system	Scenario 1	Scenario 2	Scenario 3	Employment
Required Fire Storage	8,165	8,165	8,165	2,041
Required Equalization Storage	6,771	39,714	38,193	536
Required Emergency Storage	3,734	11,970	11,589	644
Total Required Storage	18,670	59,848	57,947	3,221
Total Available Storage	9,300	79,900	79,900	-
Gap / Surplus	**- 9,370**	**20,052**	**21,953**	**- 3,221**

For Scenario 1, the need for a booster pumping station (BPS) was determined by looking at elevation differences between plant location and the growth blocks. As for scenarios 2 and 3, we looked at the residual pressure for the 2051 MDD scenario in Barries's 2019 MSP and assessed whether a BPS would be required to service the furthest and highest point in each block. If the water pressure would drop below 40 psi at the end of the watermain route to the furthest or highest point in each block, then a BPS would be required.

Finally, in terms of linear infrastructure, hydraulic modeling results of the available fire flow under MDD scenario from Barrie's Masterplan were looked at for the watermains identified to service the growth areas. It was determined that none of the existing primary watermains in Barrie need to be upgraded and only watermain extensions to the growth areas need to be considered.

2.4.2 Scenario 1 infrastructure needs

Figure 2.2 illustrates the requirement water infrastructure for Scenario 1. Table 2.4 summarises the required infrastructure for Scenario 1. Three (3) Booster Pumping Stations (BPSs) are needed along with several watermains. In additions, new storage facilities, wells, and upgrades to the WTP are required. Proposed wells and storage facilities are not shown in the below figure as their locations cannot be determined in this analysis and required further studies.

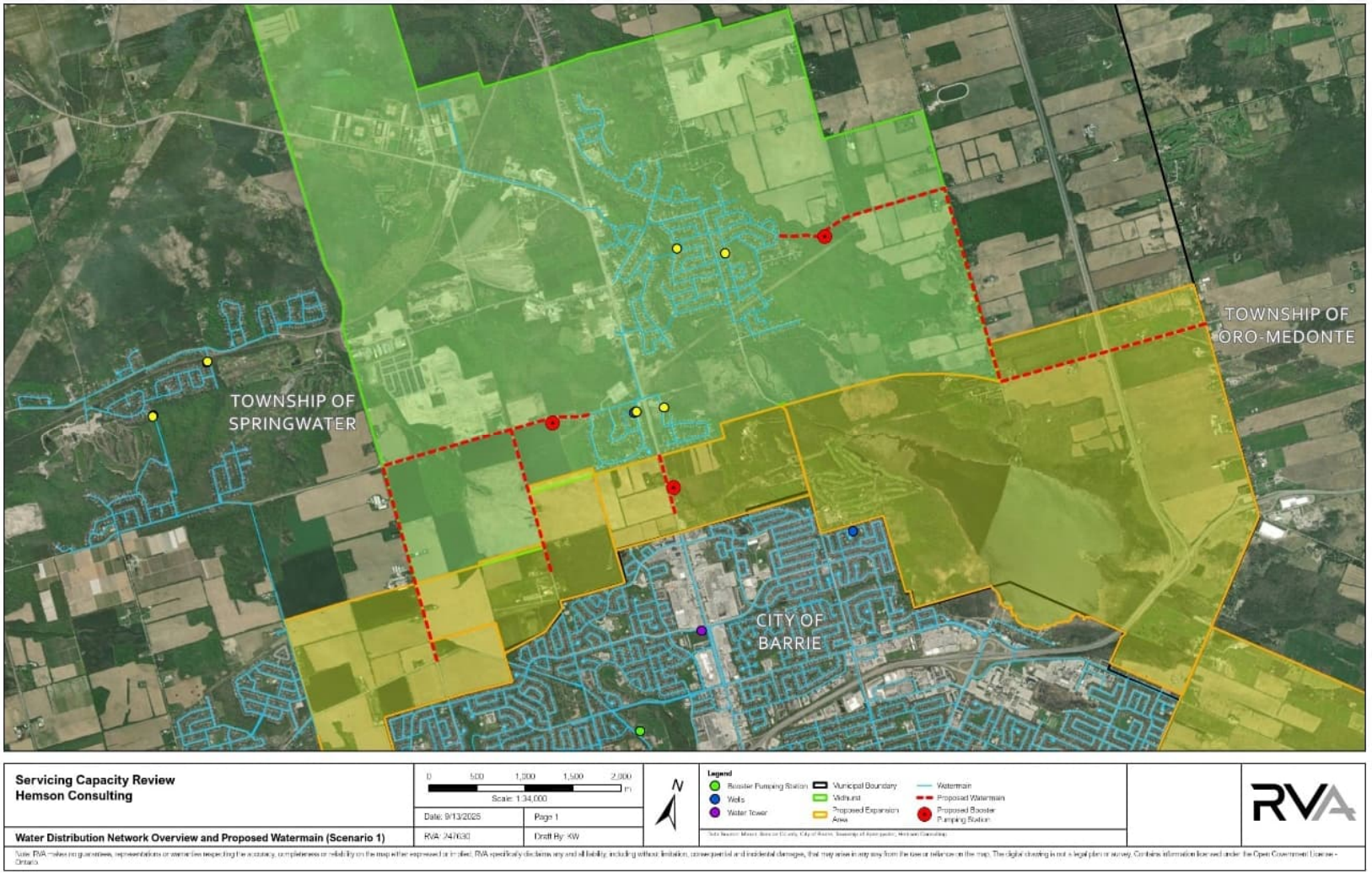


Figure 2.2 – Water Distribution Network Overview and Proposed Trunk Watermains for Scenario 1

Table 2.4 – Summary of Water Infrastructure Needs for Scenario 1

Component	Description
Water Treatment Plant (WTP)	• Additional upgrades from 19,094[1] m^3/day to 30,941 m^3/day • (70 L/s expansion at each existing WTP)
Supply Wells	• Total 6 additional wells required: • Doran Road Area - 3 Wells (2 Duty, 1 Standby, Firm Capacity 70 L/s) • Carson Road Area - 3 Wells (2 Duty, 1 Standby, Firm Capacity 70 L/s)
Booster Pumping Stations (BPS)	• 3 BPSs will be required to service the following areas: o Block 2 – 107 L/s o Block 3 – 107 L/s o Employment Area – 47 L/s
Storage Facilities	• Additional storage volume of 9,300 m^3 is required in Midhurst • Additional storage volume of 3,200 m^3 is required in Employment Area
Watermain Trunks	• Estimated 12.9 km of watermains trunks are required. Does not include local watermains

Notes:

1. **Total planned capacity per the 2020 Midhurst Class EA**

2.4.3 Table 2.5Scenarios 2 and 3 infrastructure needs

Figure 2.3 illustrates the requirement water infrastructure for Scenario 1.

Table 2.5 summarises the required infrastructure for scenarios 2 and 3. Although there is sufficient storage volume available in the city of Barrie, it is recommended that the proposed Employment Block has its dedicated storage facility being relatively distant from Barries's water system. Furthermore, several watermain trunks need to be extended from the existing system to the proposed growth areas. Proposed storage facility of for the employment area is not shown in the below figure as its location cannot be determined in this analysis and required further studies.

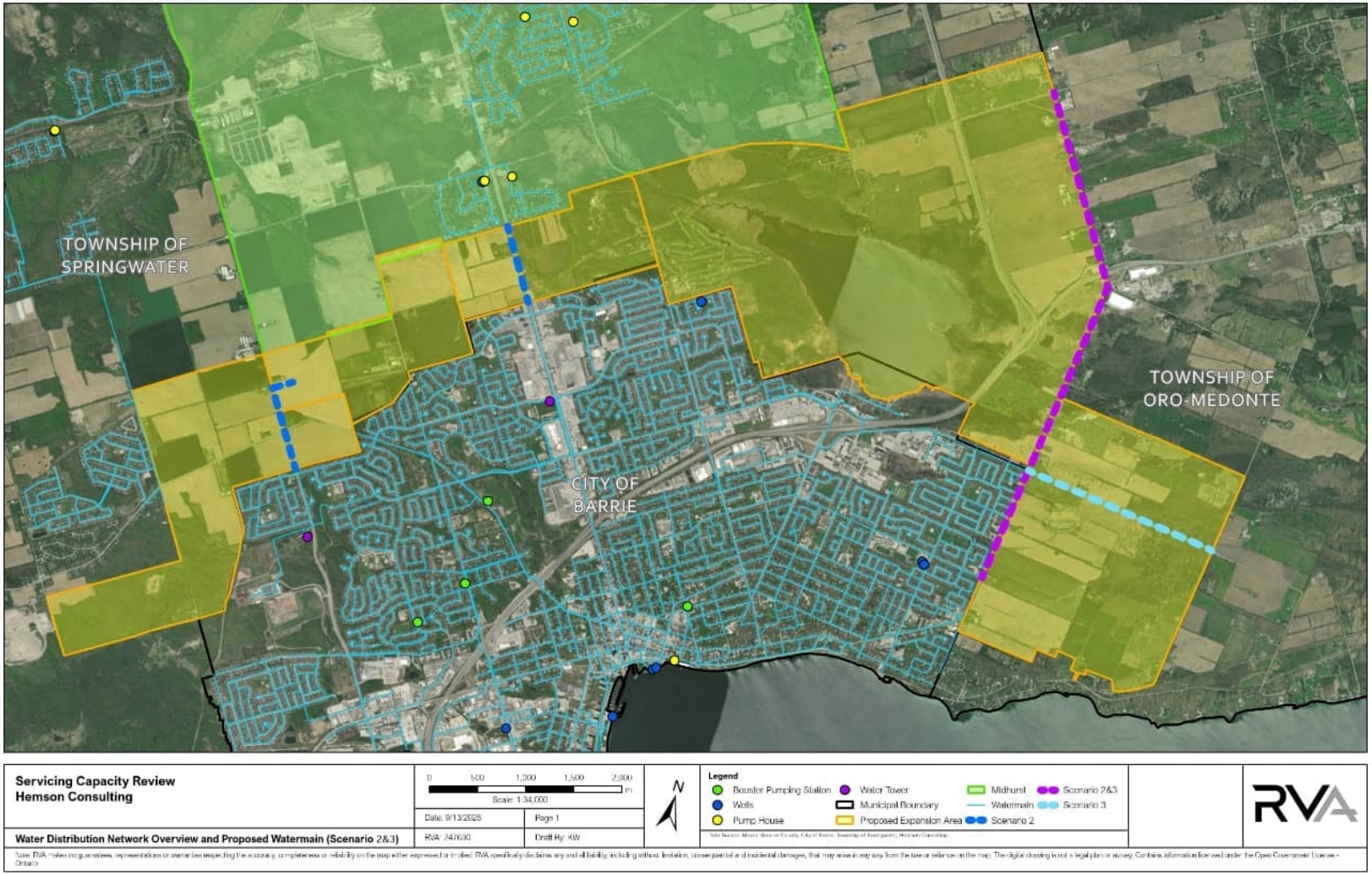


Figure 2.3 – Water Distribution Network Overview and Proposed Watermains for Scenarios 2 and 3

Table 2.5 – Summary of Water Infrastructure Needs for Scenarios 2 and 3

Component	Description – Scenario 2	Description – Scenario 3
Water Treatment Plant (WTP)	No additional upgrade to Barrie's planned upgrades is required. However, timelines will need to be advanced.	No additional upgrade to Barrie's planned upgrades is required. However, timelines will need to be advanced.
Supply Wells	No additional upgrade to Barrie's planned upgrades is required. However, timelines will need to be advanced.	No additional upgrade to Barrie's planned upgrades is required. However, timelines will need to be advanced.
Booster Pumping Stations (BPS)	No additional upgrade to Barrie's planned upgrades is required. However, anticipated timelines may need to be advanced.	No additional upgrade to Barrie's planned upgrades is required. However, anticipated timelines may need to be advanced.
Storage Facilities	Additional storage volume of 3,200 m^3 is recommended in Employment Area	Additional storage volume of 3,200 m^3 is recommended in Employment Area
Watermain Trunks	7.6 km of watermain trunks required. All watermain extensions. Does not include local watermains	7.5 km of watermain trunks required. All watermain extensions. Does not include local watermains

2.5 Opinion of Probable Cost

An opinion of probable cost was developed for each of the scenarios. This is a high-level preliminary opinion of probable cost, intended to facilitate decision-making process. The opinions of probable cost were based on RVA's experience on similar projects, supplier information as well as Midhurst EA and Barrie MSP and EA estimates. The following assumptions were made for the opinion of probable cost:

- Land/property acquisition were not included in opinion of probable cost
  Modelling, field studies, background studies, etc. were not included in the opinion of probable cost
- An approximate contingency of 50% was added to all costs

Detailed breakdown of costs for each identified upgrade in each scenario is presented in Appendix B.

Although no additional treatment capacity upgrades have been identified beyond the planned improvements to the Barrie Water Treatment Plant (WTP), a portion of these upgrades will support projected growth. In the absence of information regarding estimated costs of Barrie's WTP capacity upgrades, representative treatment costs must be included

in Scenarios 2 and 3. To estimate these costs, the total forecasted capital cost for water facilities from the 2023 Development Charges Background Study was used, with a percentage applied based on Scenarios 2 and 3 MDD relative to the total planned plant capacity upgrade. It must be noted that the details of forecasted capital cost for water facilities are not available and may include costs associated with other existing and planned water facilities within the City of Barrie (e.g. storage facilities). Moreover, the opinion of probable treatment cost included in the tables here-under for Scenarios 2 and 3 are a representation of the capital cost of the facilities providing water treatment. Construction and contingency costs are included as detailed in Appendix B.

2.5.1 Scenario 1

Table 2.6 illustrates the opinion of probable cost of required water upgrades for Scenario 1 not including the employment area. Table 2.7 illustrates the opinion of probable cost for the employment area only in Scenario 1. Table 2.8 illustrates the total opinion of probable cost for Scenario 1. Vertical includes Booster Pumping Stations (BPSs) and Storage facilities, linear includes watermains.

Table 2.6 – Scenario 1 Opinion of Probable Cost, excluding Employment Area

Component	Water Cost
Treatment (includes WTPs and Wells)	$82
Vertical (includes BPS and Storage)	$76
Linear (includes Water Trunkmains only)	$17
Subtotal	**$175 M**

Table 2.7 – Scenario 1 Employment Area Opinion of Probable Cost

Component	Water Cost
Treatment (includes WTPs and Wells)	-
Vertical (includes BPS and Storage)	$27 M
Linear (includes Water Trunkmains only)	$15 M
Subtotal	**$42 M**

Table 2.8 – Scenario 1 Total Opinion of Probable Cost - Water

Component	Water Cost
Treatment (includes WTPs and Wells)	$82 M
Vertical (includes BPS and Storage)	$103 M
Linear (includes Water Trunkmains only)	$32 M
Total Cost	**$217 M**

2.5.1.1 ADDITIONAL COST AND FEASIBILITY CONSIDERATIONS FOR SCENARIO 1 WATER SERVICING:

While the opinion of probable cost indicated in Tables 2.9 to 2.11 is the estimated capital cost of the required water and wastewater systems upgrades in Midhurst, there are additional cost and feasibility considerations that need to be mentioned. The list below is a non-exhaustive list of additional studies that need to be undertaken to prove wastewater treatment and waste supply feasibility if Midhurst were to service the growth areas in this study.

- Water supply feasibility to be proven:
  - A Schedule C Class Environmental Assessment Study need to be undertaken for the required additional expansion of the WTP (or new WTP)
  - A Hydrogeological Assessment including well testing, production well drilling and pump testing needs to be undertaken, and any expansion of water supply capacity will be contingent on the study findings. Additionally, source water protection modelling updates may be needed.
  - Discussions and consultations with Approval Authorities will be required, namely MECP and Nottawasaga Valley Conservation Authority (or even Lake Simcoe Region Conservation Authority or Department of Fisheries and Oceans)
  - An assessment to determine the availability of water supply will be required
  - Results from public consultation need to be considered

2.5.2 Scenario 2

Table 2.9 illustrates the opinion of probable cost of required water upgrades for Scenario 2 not including the employment area. Table 2.10 illustrates the opinion of probable cost for the employment area only in Scenario 2. Table 2.11 illustrates the opinion of probable cost for Block 5. Block 5 is being separated out because in Scenario 2, Block 5 would remain in the township of Springwater but would be serviced by the City of Barrie.

Table 2.12 illustrates the total opinion of probable cost for Scenario 2. Vertical includes BPSs and Storage facilities, linear includes watermains.

Table 2.9 – Scenario 2 Opinion of Probable Cost, excluding Employment Area

Component	Water Cost
Treatment (includes WTPs and Wells)	$17 M[1]
Vertical (includes BPS and Storage)	-
Linear (includes Water Trunkmains only)	$6 M
Subtotal	**$23 M**

Notes:

1. ***Representative Treatment Cost based on* total forecasted capital cost for water facilities from the 2023 Development Charges Background Study *and percentage of Scenario 2 MDD* relative to the total planned plant capacity upgrade*. The percentage is equivalent to 10%.***

Table 2.10 – Scenario 2 Employment Area Opinion of Probable Cost

Component	Water Cost
Treatment (includes WTPs and Wells)	-
Vertical (includes BPS and Storage)	$19 M
Linear (includes Water Trunkmains only)	$13 M
Subtotal	**$32 M**

Table 2.11 – Scenario 2 - Block 5 Opinion of Probable Cost

Component	Water Cost
Treatment (includes WTPs and Wells)	-
Vertical (includes BPS and Storage)	-
Linear (includes Water Trunkmains only)	$2.5 M
Subtotal	**$2.5 M**

The probable cost to service Block 5 under a possible servicing agreement is $22 M and includes an estimated 1,545 Units.

Table 2.12 – Scenario 2 Total Costs

Component	Water Cost
Treatment (includes WTPs and Wells)	$17 M[1]
Vertical (includes BPS and Storage)	$19 M
Linear (includes Water Trunkmains only)	$19 M
Total Cost	**$55 M**

Notes:

1. **Representative Treatment Cost based on total forecasted capital cost for water facilities from the 2023 Development Charges Background Study and percentage of Scenario 2 MDD relative to the total planned plant capacity upgrade. The percentage is equivalent to 10%.**

2.5.3 Scenario 3

Table 2.13 illustrates the opinion of probable cost of required water upgrades for Scenario 3 not including the employment area. Table 2.14 illustrates the opinion of probable cost for the employment area only in Scenario 3. Table 2.15 illustrates the total opinion of probable cost for Scenario 3. Vertical includes BPSs and Storage facilities, linear includes watermains.

Table 2.13 – Scenario 3 Opinion of Probable Cost, excluding Employment Area

Component	Water Cost
Treatment (includes WTPs and Wells)	$11 M[1]
Vertical (includes BPS and Storage)	-
Linear (includes Water Trunkmains only)	$5 M
Subtotal	**$16 M**

Notes:

1. **Representative Treatment Cost based on total forecasted capital cost for water facilities from the 2023 Development Charges Background Study and percentage of Scenario 3 MDD relative to the total planned plant capacity upgrade. The percentage is equivalent to 7%.**

Table 2.14 – Scenario 3 Employment Area Opinion of Probable Cost

Component	Water Cost
Treatment (includes WTPs and Wells)	-
Vertical (includes BPS and Storage)	$19 M
Linear (includes Water Trunkmains only)	$13 M
Subtotal	**$32 M**

Notes:

1. **Water Treatment allocation costs for Block 6 and Employment Block are not included in opinion of probable cost. They can be considered as 7% of the total Barrie planned treatment expansion costs based on the percentage of estimated flows of Block 6 and Employment Block relative to the total treatment expansion in Barrie.**

Table 2.15 – Scenario 3 Total Costs

Component	Water Cost
Treatment (includes WTPs and Wells)	$11 M[1]
Vertical (includes BPS and Storage)	$19 M
Linear (includes Water Trunkmains only)	$18 M
Total Cost	**$48 M**

Notes:

1. **Representative Treatment Cost based on total forecasted capital cost for water facilities from the 2023 Development Charges Background Study and percentage of Scenario 3 MDD relative to the total planned plant capacity upgrade. The percentage is equivalent to 7%.**

2.5.4 Summary of Water Costs

Table 2.16 illustrates a summary of the opinion of probable cost for each Scenario. Scenario 1 requires significantly higher water and wastewater infrastructure investments than Scenarios 2 and 3. Scenario 3 presents the lowest investment cost, although it also corresponds to a lower forecasted population compared to the blocks included in Scenario 2.

Table 2.16 – Summary Opinion of Probable Cost

Component	Scenario 1	Scenario 2	Scenario 3
Treatment	$82 M[1]	$17 M[2]	$11 M[2]
Vertical	$103 M	$19 M	$19 M
Linear	$32 M	$19 M	$18 M
Total Cost	$217 M	$55 M	$48 M

Notes:

1. **Scenario 1: Water Supply feasibilities need to be proven**
2. **Representative Treatment Cost based on total forecasted capital cost for water facilities from the 2023 Development Charges Background Study and percentage of Scenarios 2 and 3 MDD relative to the total planned plant capacity upgrade.**

3.0 WASTEWATER TREATMENT AND COLLECTION

3.1 Background Information

The following studies and documentation were reviewed and considered in this analysis :

- 2019 City of Barrie Wastewater Collection Master Plan
- 2019 City of Barrie Wastewater Treatment Master Plan
- 2020 Township of Springwater Midhurst Water, Wastewater & Transportation Class EA
- 2025 Township of Springwater Master Plan Study Existing Water and Wastewater Systems TM
- 2019 Township of Springwater Engineering Design Standards
- City of Barrie Engineering Design Standards
- 2024 Township of Springwater Sewage Collection System Report
- 2024 Midhurst Valley Interim WWTP Annual Performance Report
- Hemson Annexation Area Forecast
- City of Barrie 2024 Annual Report
- 2023 City of Barrie Development Charges Backgorund Study

3.2 Existing Conditions

City of Barrie:

The Barrie wastewater collection system includes a WWTP with a capacity of 76,000 m^3/day located on Bradford Street, 15 SPSs, and network of 600 km of sewers and forcemains extending to the City's northern boundary.

Township of Springwater:

Currently, the majority of the Midhurst population is currently serviced by on-site sewage systems such as septic systems. There is only an interim wastewater treatment plant (WWTP) in operation in Midhurst located on Carson Road. The interim WWTP capacity is 1,032 m^3/day but only half of this capacity is currently in operation. The design phase of the WWTP's Phase 1 is finalized and awaiting beginning of construction. Additionally, a Sewage Pumping Station (SPS) is also being constructed in the Doran Road Development Area. There isn't currently any existing wastewater collection system in Midhurst except for a small system for newly built developments south of the WWTP (Southeast of Snow Valley Road and Wilson Drive). The township of Springwater also owns wastewater systems in communities of Elmvale, Royal Oaks, Snow Valley Highlands, and Centre Vespra. However, these systems are too far and/or have inadequate treatment and/or inadequate discharge capacity from the studied area and were not considered as potential servicing systems.

Township of Oro-Medonte:

The township of Oro-Medonte owns and operates the Craighurst Crossing and the Horseshoe Valley Wastewater Systems, however both systems are too far from the proposed blocks are were not considered in the analysis.

Figure 3.1 illustrates the existing wastewater collection system in the City of Barrie and Midhurst. **Table 3.1** highlights the existing wastewater flows in the Barrie's and Midhurst Wastewater Treatment Facilities (WwTF) and systems.

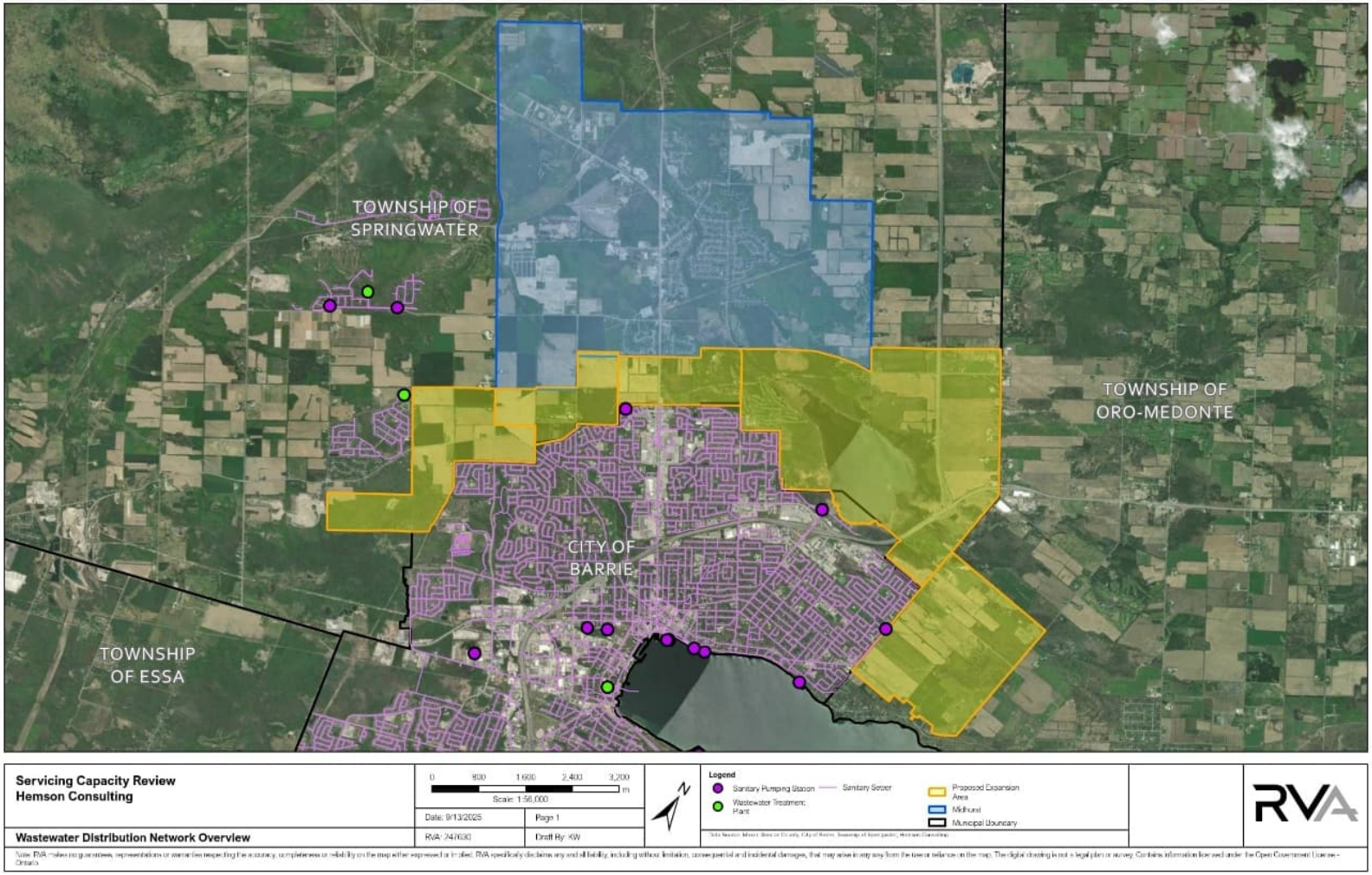


Figure 3.1 – Existing Wastewater Collection System Overview

Table 3.1 – Existing Wastewater Treatment Capacities

Municipality	System	Capacity (m^3/day)	Average Day Flow (MDF) (m^3/day)	% of Capacity Used
Barrie[1]	Barrie WWTP	76,000	42,683	56
Springwater	Midhurst WWTP	1,032[2]	165[3]	16

Notes:

1. **Barrie Wastewater System Capacity per 2019 Wastewater Treatment MSP. Barrie Average Day Flow from 2017 data per 2019 Wastewater Treatment MSP.**
2. **As per Township communications, the interim plant capacity is 1,032 m^3/d but as per the annual report the capacity is 516 m^3/d**
3. **Midhurst System Capacity per the 2024 Midhurst Valley Interim Wastewater Treatment Plant Annual Performance Report.**

3.3 Planned Capacities and Projected Flows

3.3.1 Planned Wastewater Treatment Capacities

The new Midhurst Wastewater Treatment Plant has a planned capacity upgrade to 12,314 m^3/day as per the 2020 Midhurst Class EA.

The Barrie WWTP is planned to be upgraded to 116,000 m^3/day along with plans to upgrade several SPSs. The planned capacity for the Barrie's wastewater system is based on the City of Barrie's 2019 MSP. Barrie has also confirmed that the on-going MSP does not identify further capacity upgrades to its main facilities post 2062.

3.3.2 Wastewater flows calculations

The design criteria used for Scenario 1 are based on the 2020 Midhurst Class EA. The following was used to determine the projected flows for each block/scenario:

- employment density of 20 cap/ha
- average demand per person of 430 L/cap/day.

The design criteria used for Scenarios 2 and 3 are based on the City of Barrie's design criteria. The following was used to determine the projected flows for each block/scenario:

- employment density of 35 cap/ha
- average demand per person of 225 L/cap/day.

The Harmon formula was used to determine peak flows in order to assess upgrade requirements for SPSs, gravity sewers and forcemains.

Based on the above criteria and growth forecasts determined by Hemson, the future wastewater average daily flows (ADF) of each scenario and entire system have been calculated. Table 3.2 illustrates the future wastewater ADF for each scenario and the planned capacities in the existing servicing systems. Detailed wastewater flow calculations for each scenario are shown in Appendix A.

Table 3.2 – Future Wastewater Flows and Planned Capacities

Scenario	Servicing System	Planned Capacity (m^3/day)	Projected Additional ADF (m^3/day)	Existing Area ADF Projections (m^3/day)	Capacity Gap Analysis (m3/day)
Scenario 1	Midhurst	12,314[1,4]	20,037[4]	-	-7,723
Scenario 2	Barrie	116,000[2]	2,245[5]	114,211[3,5]	-456
Scenario 3	Barrie	116,000[2]	2,245[5]	114,211[3,5]	-456

Notes:

1. **Planned capacity and design criteria per the 2020 Midhurst Class EA**
2. **Planned capacity per City of Barrie's 2019 MSP and communications on on-going MSP update**
3. **Existing Area ADF Projections as per 2019 MSP**
4. **Scenario 1 residential population includes existing and planned developments to be serviced by the WWTP, forecasted population growth for Midhurst and forecasted "spillover" populations (Blocks 2 to 5**
5. **The residential population forecasted in Blocks 1-6 is already considered in Barries's forecasts and wastewater flow projections. Only the employment area is considered as additional.**

As indicated in Table 3.2, there is not enough planned capacity to accommodate the Scenario 1 growth in the future planned system in Midhurst. For scenarios 2 and 3, only a small gap under 500 m^3/day is identified for Barrie's planned capacity upgrade at ultimate conditions (i.e. beyond 2051). Therefore, no additional upgrades to the planned capacity upgrades in Barrie's wastewater treatment plant system are recommended.

3.4 Infrastructure Needs

3.4.1 Infrastructure Needs Considerations

In terms of wastewater treatment needs, these are based on the determined capacity gaps presented in Table 3.2.

The need for sewage pumping stations was determined by looking at topographic maps in the area. If the wastewater was required to travel up a 10 m elevation difference to connect to the existing system, it was determined that an SPS would be required.

As for the assessment of Barrie's existing linear infrastructure, the projected flows from each of the blocks and their assumed discharge locations were sent to the City of Barrie who inputted the flows into their existing future growth model. This was used to determine

the required sanitary sewer pipe upgrades within the existing City of Barrie boundaries as a result of the blocks being connected to the Barrie collection system. The only additional upgrades required directly as a result of generated flows from the scenarios 2 and 3 blocks were estimated (upgrades in the 2019 wastewater masterplan and the on-going masterplan update had already been identified).

3.4.2 Scenario 1

Figure 3.2 illustrates the requirement water infrastructure for Scenario 1. Table 3.3 summarises the required infrastructure for Scenario 1. Six (6) SPSs are needed along with 14.0 km of sanitary sewer trunks and forcemains. Furthermore, additional upgrades to the planned WWTP are required.

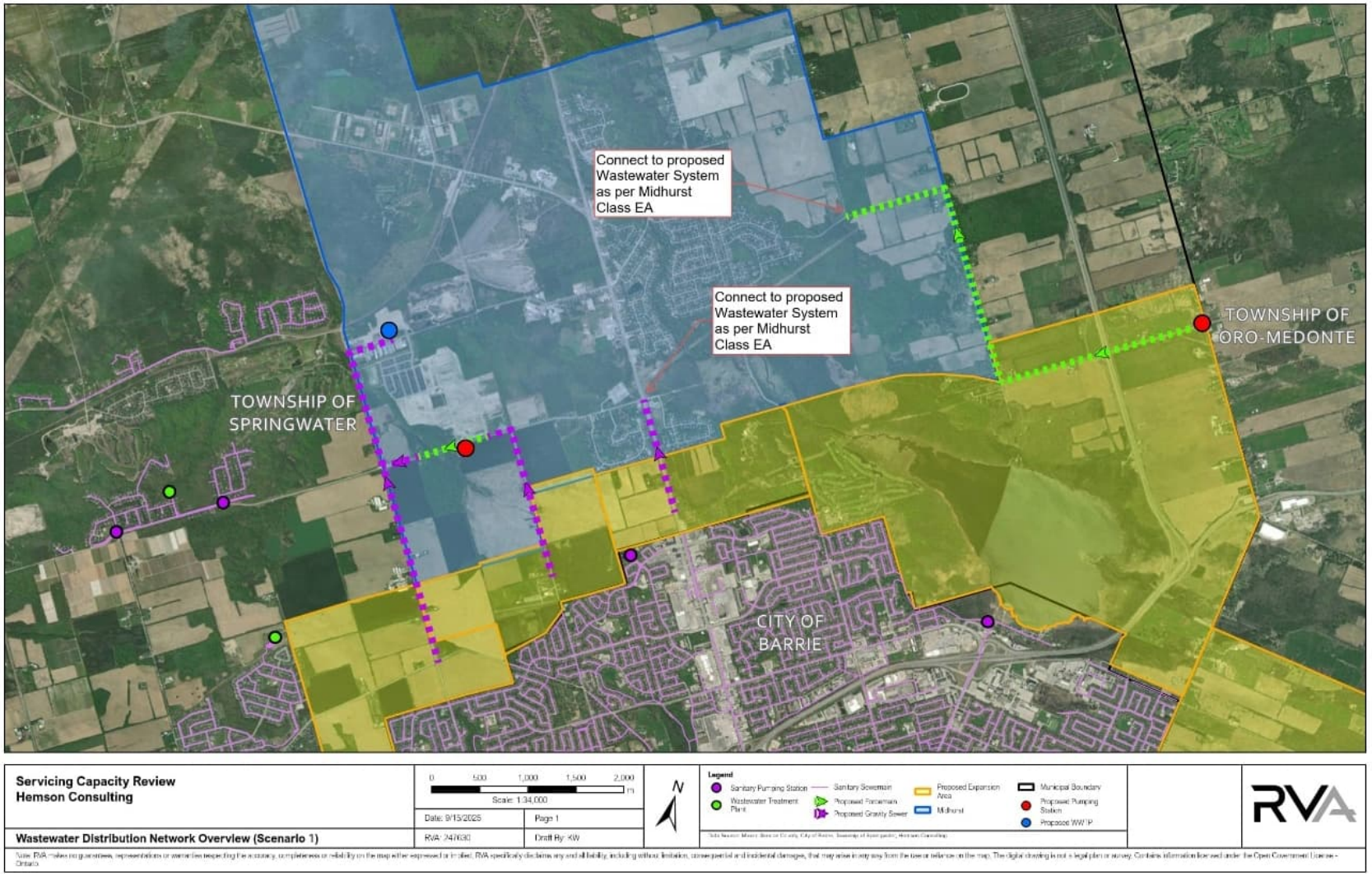


Figure 3.2 – Wastewater Distribution Network Overview and Proposed Watermains for Scenario 1

Table 3.3 – Summary of Wastewater Infrastructure Needs for Scenario 1

Component	Description
Wastewater Treatment Plant	• Additional upgrades from 12,314 m^3/day to 19,585 m^3/day
Sanitary Pumping Stations (SPS)	• 2 SPS will be required including: o Block 3 – 151 L/s o Employment Block – 121 L/s
Sanitary Sewer Trunks and Forcemains	• Estimated 14.0 km of sanitary sewer trunks / forcemains are required to service the studied growth areas. Does not include local sewers

Notes:

1. **Planned capacity per the 2020 Midhurst Class EA**

3.4.3 Scenario 2&3

Figure 3.3 illustrates the requirement water infrastructure for scenarios 2 and 3. Table 3.4 summarises the required infrastructure for Scenario 2 & 3. Four (4) SPSs are required in Scenario 2 and three (3) SPSs are needed for Scenario 3 along with 11.2 km for Scenario 2 and 9.3 km for Scenario 3 of sanitary sewer trunks and forcemains.

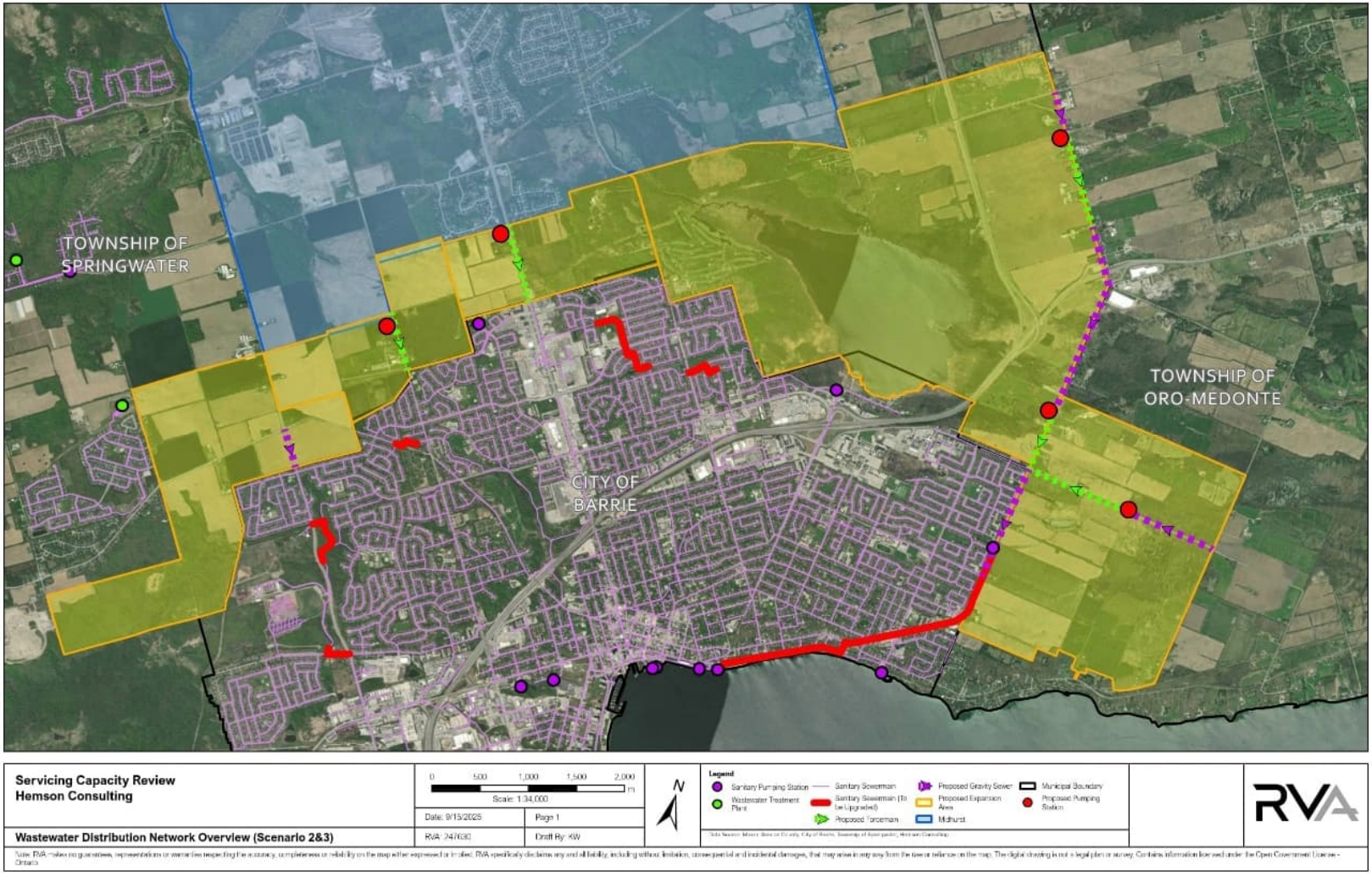


Figure 3.3 – Wastewater Distribution Network Overview and Proposed Watermains for Scenario 2&3

Table 3.4 – Summary of Wastewater Infrastructure Needs for Scenario 2 and 3

Component	Description – Scenario 2	Description – Scenario 3
Wastewater Treatment Plant	• No additional upgrade to Barrie's planned upgrades is required, however the planned 2062 upgrades may need to be moved forward	• No additional upgrade to Barrie's planned upgrades is required, however the planned 2062 upgrades may need to be moved forward
Sanitary Pumping Stations (SPS)	• 4 new SPSs required: o Block 3 – 151 L/s o Block 4 – 121 L/s o Block 5 – 72 L/s o Employment Block – 121 L/s	• 3 new SPSs required: o Block 6 – 221 L/s o Block 4 – 121 L/s o Employment Block – 121 L/s
Sanitary Sewer Trunks and Forcemains	• Estimated 11.2 km of new sanitary sewer trunks / forcemains and upgrades are required to service the studied growth areas. Does not include local sewers	• Estimated 9.3 km of new sanitary sewer trunks / forcemains and upgrades are required to service the studied growth areas. Does not include local sewers

3.5 Opinion of Probable Cost

An opinion of probable cost was developed for each of the scenarios. This is a high-level preliminary opinion of probable cost, intended to facilitate decision-making process. The opinions of probable cost were based on RVA's experience on similar projects, supplier information as well as Midhurst EA and Barrie MSP and EA estimates. The following assumptions were made for the Opinion of Probable Cost:

- Land/property acquisition were not included in opinion of probable cost
- Modelling, field studies, background studies, etc. were not included in the opinion of probable cost
- An approximate contingency of 50% was added to all costs
- Forcemains were twinned, per policy

Detailed breakdown of costs for each identified upgrade in each scenario is presented in Appendix B.

Although no additional treatment capacity upgrades have been identified beyond the planned improvements to the Barrie WWTP, a portion of these upgrades will support projected growth. In the absence of information regarding estimated costs of Barrie's WWTP capacity upgrades, representative treatment costs must be included in Scenarios 2 and 3. To estimate these costs, the total forecasted capital cost for wastewater facilities

from the 2023 Development Charges Background Study was used, with a percentage applied based on Scenarios 2 and 3 ADF relative to the total planned plant capacity upgrade. It must be noted that the details of forecasted capital cost for wastewater facilities are not available and may include costs associated with other existing and planned wastewater facilities within the City of Barrie. Moreover, the opinion of probable treatment cost included in the tables here-under for Scenarios 2 and 3 are a representation of the capital cost of the facilities providing wastewater treatment. Construction and contingency costs are included as detailed in Appendix B.

3.5.1 Scenario 1

Table 3.5 illustrates the opinion of probable cost of required wastewater upgrades for Scenario 1 not including the employment area.
Table 3.6 illustrates the opinion of probable cost for the employment area only in Scenario 1.

Table 3.7 illustrates the total opinion of probable cost for Scenario 1. Vertical includes Sewage Pumping Stations (SPSs), linear includes forcemains and sanitary sewers.

Table 3.5 – Scenario 1 Opinion of Probable Cost, excluding Employment Area

Component	Wastewater Cost (Millions)
Treatment (WWTP)	$153 M
Vertical (SPS)	$20 M
Linear (includes sewer trunks only)	$21 M
Subtotal	**$194 M**

Table 3.6 – Scenario 1 Employment Area Opinion of Probable Cost

Component	Wastewater Cost
Treatment (WWTP)	-
Vertical (SPS)	$16 M
Linear (includes sewer trunks only)	$19 M
Subtotal	**$35 M**

Table 3.7 – Scenario 1 Total Costs

Component	Wastewater Cost
Treatment (WWTP)	$153 M
Vertical (SPS)	$36 M
Linear (includes sewer trunks only)	$40 M
Total Cost	**$229 M**

3.5.1.1 ADDITIONAL COST AND FEASIBILITY CONSIDERATIONS:

While the opinion of probable cost indicated in Tables 2.9 to 2.11 is the estimated capital cost of the required water and wastewater systems upgrades in Midhurst, there are additional cost and feasibility considerations that need to be mentioned. The list below is a non-exhaustive list of additional studies that need to be undertaken to prove wastewater treatment and waste supply feasibility if Midhurst were to service the growth areas in this study.

- Wastewater treatment:
  - A Schedule C Class Environmental Assessment Study need to be undertaken for the required additional expansion of the WWTP
    - Assessments of the Receiving Water Body need to be conducted and these include namely:
    - an Assimilative Capacity Study for Willow Creek to assess whether the creek can receive the additional treated effluent
    - Identification of an alternate receiving bodies and an Assimilative Capacity Study for these receiving water bodies if Willow Creek is not viable
  - Discussions and consultations with Approval Authorities will be required, namely MECP and Nottawasaga Valley Conservation Authority (or even Lake Simcoe Region Conservation Authority)
  - requirements for phosphorus offsets may need to be considered
  - Results from public consultation need to be considered

3.5.2 Scenario 2

Table 3.8 illustrates the opinion of probable cost of required wastewater upgrades for Scenario 2 not including the employment area. Table 3.9 illustrates the opinion of probable cost for the employment area only in Scenario 2. Table 3.10illustrates the opinion of probable cost for Block 5. Block 5 is being separated out because in Scenario 2, Block 5 would remain in the township of Springwater but would be serviced by the City of Barrie. Table 3.11 illustrates the total opinion of probable cost for Scenario 2. Vertical includes SPSs, linear includes forcemains and sanitary sewers.

Table 3.8 – Scenario 2 Cost Estimate, excluding Employment Area

Component	Wastewater Cost
Treatment (WWTP)	$46 M[1]
Vertical (SPS)	$31 M
Linear (includes sewer trunks only)	$25 M

Component	Wastewater Cost
Subtotal	**$102 M**

Notes:

1. **Representative Treatment Cost based on total forecasted capital cost for wastewater facilities from the 2023 Development Charges Background Study and percentage of Scenario 2 ADF relative to the total planned plant capacity upgrade. The percentage is equivalent to 7%.**

Table 3.9 – Scenario 2 Employment Area Cost Estimate

Component	Wastewater Cost
Treatment (WWTP)	-
Vertical (SPS)	$35 M
Linear (includes sewer trunks only)	$23 M
Subtotal	**$58 M**

Table 3.10 – Scenario 2 Block 5 Cost Estimate

Component	Wastewater Cost
Treatment (WWTP)	-
Vertical (SPS)	$11 M
Linear (includes sewer trunks only)	$8.5 M
Subtotal	**$19.5 M**

The probable cost to service Block 5 under a possible servicing agreement is $22 M and includes an estimated 1,545 Units.

Table 3.11 – Scenario 2 Total Costs

Component	Wastewater Cost
Treatment (WWTP)	$46 M[1]
Vertical (SPS)	$66 M
Linear (includes sewer trunks only)	$48 M
Total Cost	**$160 M**

Notes:

1. **Representative Treatment Cost based on total forecasted capital cost for wastewater facilities from the 2023 Development Charges Background Study and percentage of Scenario 2 ADF relative to the total planned plant capacity upgrade. The percentage is equivalent to 7%.**

3.5.3 Scenario 3

Table 3.12 illustrates the opinion of probable cost of required wastewater upgrades for Scenario 3 not including the employment area. Table 3.13 illustrates the opinion of probable

cost for the employment area only in Scenario 3. Table 3.14 illustrates the total opinion of probable cost for Scenario 3. Vertical includes SPSs, linear includes forcemains and sanitary sewers.

Table 3.12 – Scenario 3 Cost Estimate, excluding Employment Area

Component	Wastewater Cost
Treatment (WWTP)	$31 M[1]
Vertical (SPS)	$25 M
Linear (includes sewer trunks only)	$17 M
Subtotal	**$73 M**

Notes:

1. **Representative Treatment Cost based on total forecasted capital cost for wastewater facilities from the 2023 Development Charges Background Study and percentage of Scenario 3 ADF relative to the total planned plant capacity upgrade. The percentage is equivalent to 5%.**

Table 3.13 – Scenario 3 Employment Area Cost Estimate

Component	Wastewater Cost
Treatment (WWTP)	-
Vertical (SPS)	$35 M
Linear (includes sewer trunks only)	$24 M
Subtotal	**$59 M**

Table 3.14 – Scenario 3 Total Costs

Component	Wastewater Cost
Treatment (WWTP)	$31 M[1]
Vertical (SPS)	$60 M
Linear (includes sewer trunks only)	$41 M
Total Cost	**$132 M**

Notes:

1. **Representative Treatment Cost based on total forecasted capital cost for wastewater facilities from the 2023 Development Charges Background Study and percentage of Scenario 3 ADF relative to the total planned plant capacity upgrade. The percentage is equivalent to 5%.**

3.5.4 Summary of Wastewater Costs

Table 3.15 illustrates a summary of the opinion of probable cost for each Scenario. Scenario 1 requires higher water and wastewater infrastructure investments than Scenarios 2 and 3. Scenario 3 presents the lowest investment cost, although it also corresponds to a lower forecasted population compared to the blocks included in Scenario 2.

Table 3.15 – Summary Opinion of Probable Cost

Component	Scenario 1	Scenario 2	Scenario 3
Treatment	$153 M[1]	$46 M[2]	$31 M[2]
Vertical	$36 M	$66 M	$60 M
Linear	$40 M	$48 M	$41 M
Total Cost	**$229 M**	**$160 M**	**$132 M**

Notes:

1. **Scenario 1: Wastewater Treatment feasibilities need to be proven**
2. **Representative Treatment Cost based on total forecasted capital cost for wastewater facilities from the 2023 Development Charges Background Study and percentage of Scenarios 2 and 3 ADF relative to the total planned plant capacity upgrade.**

4.0 STORMWATER MANAGEMENT

4.1 Existing Conditions

Existing watershed conditions are illustrated in Figure 4.1, which shows the existing waterbodies, streams, and watershed divide within the context of the proposed expansion blocks. Most of the expansion area is situated within the jurisdiction of the Nottawasaga Valley Conservation Authority (NVCA). A portion of the Blocks 2, 3, and 6 expansion area is situated within the jurisdiction of the Lake Simcoe and Region Conservation Authority (LSRCA). Surface runoff from these areas flow south towards Barrie.

The expansion areas do not have any existing SWM infrastructure. There are existing SWM facilities in Barrie and south of Blocks 2 and 3. However, these existing SWM facilities would not have been sized to service runoff from the expansion areas.

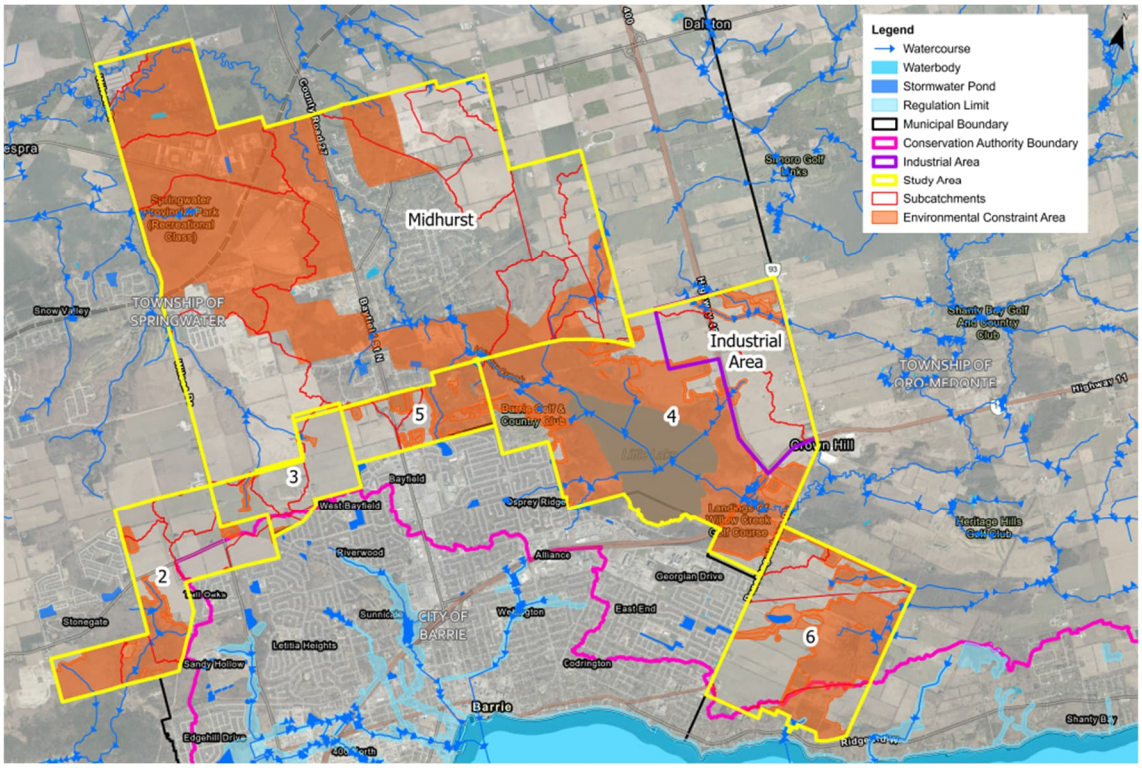


Figure 4.1 – Existing Watershed Conditions

4.2 Infrastructure needs

The approach to stormwater management (SWM) is predominantly based on the policies and criteria established by the NVCA and LSRCA. Both Conservation Authorities have well established SWM criteria applied to new developments. The conventional requirements include SWM controls to address potential development impacts on water quantity, water quality, stream erosion, and water balance. More specific criteria would be defined following subsequent planning stages.

Given the early stage of planning, it is not feasible to identify localized, specific SWM infrastructure. However, for the purposes of comparing the three urban boundary expansion options, a series of end of pipe facilities have been assumed to approximate the required SWM infrastructure to meet the conventional SWM criteria. End of pipe facilities are a reasonable starting point for this high-level assessment. But it should be noted that a more robust SWM strategy, e.g., adoption of a treatment train approach, would be necessary when additional planning details become available, e.g., finer resolution of the land use breakdown, development of the road network, additional environmental constraints mapping, etc.

A simplified approach was developed to size and locate SWM facilities, described herein. Within the extents of each expansion block, a series of sub-catchments were delineated to identify topographic highs and lows. The sub-catchments are necessary to inform future planning stages, specifically by preserving existing drainage patterns and watershed divides. The sub-catchment low points represent likely locations for SWM facilities. The result is a count of potential SWM facilities required in each expansion block. Refer to **Figure 4.2**, **Figure 4.3**, and **Figure 4.4**, which respectively illustrate the sub-catchment breakdown for expansion scenarios 1, 2, and 3. Each sub-catchment was further discretized based on the land use information developed under this planning exercise, i.e., targeted areas for residential and commercial/industrial land uses. Desktop mapping also delineated the following existing constraints:

- Existing environmental constraints, which conservatively assumed all lands designated as low, medium, and high constraint as non-developable;
- Existing development areas to remain; and
- Existing undeveloped lands potentially available for future development.

With respect to the available lands potentially available for future development, the land use breakdown in each expansion block was used to estimate the potential development impacts in terms of water quantity and the aggregate storage requirements for flood control and quality control. The future land use breakdown, e.g., the targeted areas for residential and commercial/industrial development, were each assigned a runoff coefficient to represent the change in runoff characteristics under future conditions. While only one SWM facility was assigned to each sub-catchment, it should be noted that the SWM facility placement is an approximation and could represent an aggregate of several upstream facilities. This could be the case for the very large sub-catchment areas. The actual number, location, and size of SWM facilities would depend on the future road network and more refined land use plan. **Table 4.1** and **Table 4.2** respectively summarize the existing and future land use characteristics and estimated 100-year peak flow (based on Rational Method calculations) on a block level. **Table 4.2** includes the estimated storage requirements to meeting water quantity (assuming 100-year post-to-pre controls) and quality (assuming Enhance controls) criteria.

Table 4.1 – Existing Land Use Breakdown and Estimated 100-year Peak Flow

	Runoff Coefficent >>>	0.95	0.35	0.70	0.40			
Block	Gross Area (ha)	Highway ROW (ha)	Natural Heritage Systems / Constraint Areas (ha)	Existing Developed Areas Residential - Multiple (ha)	Developable Area (ha)	Weighted C	C*A	Q_{100} (m^3/s)
2	381.82		148.88		232.94	0.38	145.28	72.8
3	192.43		9.81		182.62	0.40	76.48	38.3
4 (Employment Lands only)	1,225.78	36.40	807.15	39.23	343.00	0.39	481.74	241.5
Total (Springwater Annex Areas)	1,800.03	36.40	965.84	39.23	758.56	0.39	703.51	352.6
5: Springwater Area To Be Serviced by Barrie	183.32		102.01		81.31	0.37	68.23	34.2
6: Proposed Oro-Medonte Annexation Area	533.44		244.32		289.12	0.38	201.16	100.8
x: Midhurst	2,804.00		1,248.00	809.20	746.81	0.46	1301.96	652.6

Table 4.2 – Proposed Land Use Breakdown, Estimated 100-year Peak Flow, and Estimated Storage Requirements

	Runoff Coefficent >>>	0.95	0.95	0.35	0.70	0.90						
Block	Gross Area (ha)	Highway ROW (ha)	Natural Heritage Systems (ha)	Existing Developed Areas Residential - Multiple (ha)	Dev Area (ha) (Residential, assumed multiple)	Dev Area (ha) (Commercial, Industrial-light)	Weighted C	C*A	Q_{100} (m^3/s)	%-Increase in Peak Flows (100-yr Estimate)	* Estimated Quantity Control Volume (m^3) To service developable area only	* Estimated Quality Control Volume (m^3) To service developable area only
2	381.82	0.00	148.88	0.00	232.94	0.00	0.80	304.49	152.6	210%	25,300	42,700
3	192.43	0.00	9.81	0.00	182.62	0.00	0.71	137.15	68.7	179%	18,700	33,000
4	1,225.78	36.40	807.15	39.23	10.46	332.54	0.92	1121.71	562.2	233%	57,200	66,200
Total (Springwater Annex Areas)	1,800.03	36.40	965.84	39.23	426.02	332.54	**0.87**	**1563.36**	**783.6**	**222%**		
5: Springwater Area To Be Serviced by Barrie	183.32	0.00	102.01	0.00	81.31	0.00	0.84	153.83	77.1	225%	9,900	14,300
6: Proposed Oro-Medonte Annexation Area	533.44	0.00	244.32	0.00	289.12	0.00	0.81	434.49	217.8	216%	31,900	50,890
x: Midhurst	2,804.00	0.00	1,248.00	809.20	746.81		0.71	1991.58	998.2	153%	58,300	137,300

4.2.1 Scenario 1

Scenario 1 consists of expansion in Midhurst and Block 4 (employment lands only). The SWM infrastructure requirements for Scenario 1, i.e., aggregate SWM facilities, are illustrated in **Figure 4.2** and summarized in **Table 4.3**. The SWM facility property block was assumed as 5% of catchment area to pond.

Table 4.3 – Scenario 1 Aggregate SWM Facilities and Approximate Upstream Service Area (Developable lands only)

Block	Pond ID	Catchment Area (ha)	* SWM Block Requirement (ha)
4	P4_1	162	8.1
4	P4_2	168	8.5
Midhurst	P7_1	397	19.9
Midhurst	P7_5	27	1.4
Midhurst	P7_6	110	5.6
Midhurst	P7_8	133	6.7
Midhurst	P7_9	30	1.6
Midhurst	P7_10	97	4.9
Midhurst	P7_11	108	5.5
Midhurst	P7_12	45	2.3

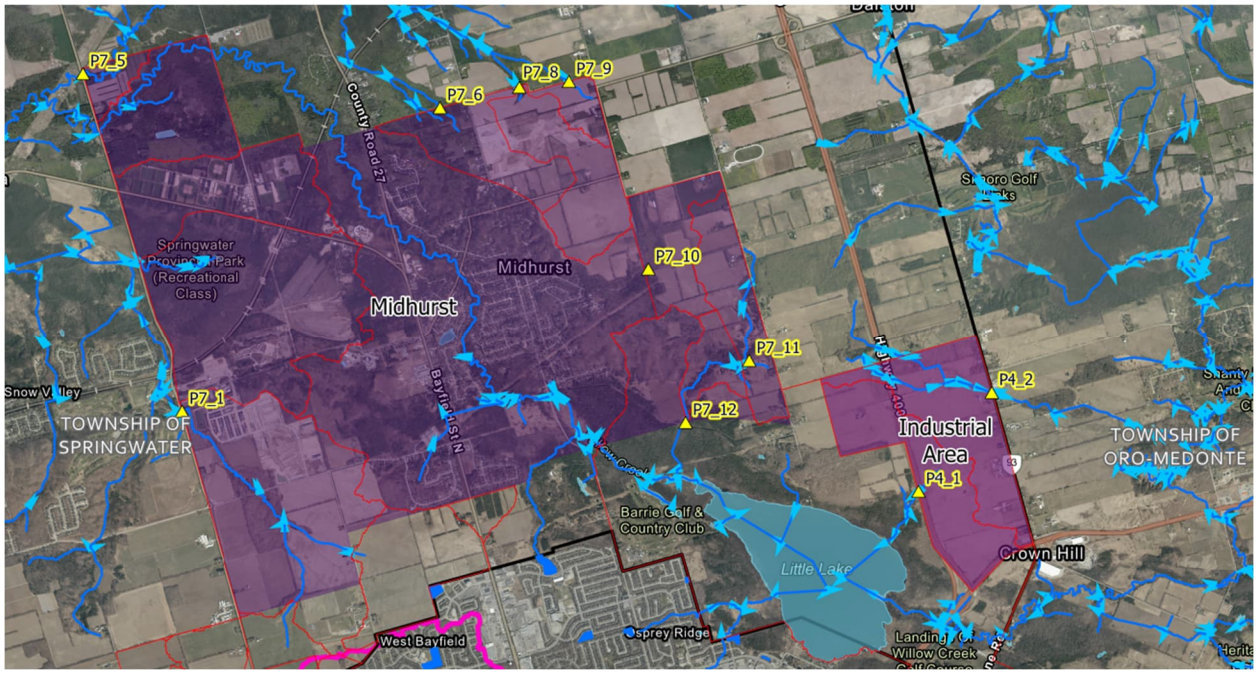


Figure 4.2 – Location of Aggregate SWM Facilities for Scenario 1

4.2.2 Scenario 2

Scenario 2 consists of expansion in Blocks 2, 3, 4, and 5. The SWM infrastructure requirements for Scenario 2, i.e., aggregate SWM facilities, are illustrated in **Figure 4.3** and summarized in **Table 4.4**. The SWM facility property block was assumed as 5% of catchment area to pond.

Table 4.4 – Scenario 2 Aggregate SWM Facilities and Approximate Upstream Service Area (Developable lands only)

Block	Pond ID	Catchment Area (ha)	* SWM Block Requirement (ha)
2	P2_1	119	6.0
2	P2_2	24	1.3
2	P2_3	49	2.5
2	P2_4	64	3.2
2	P2_5	28	1.5
3	P3_1	41	2.1
3	P3_2	8	0.5
3	P3_3	4	0.2
3	P3_4	142	7.1
4	P4_1	162	8.1
4	P4_2	168	8.5
5	P5_2	22	1.2

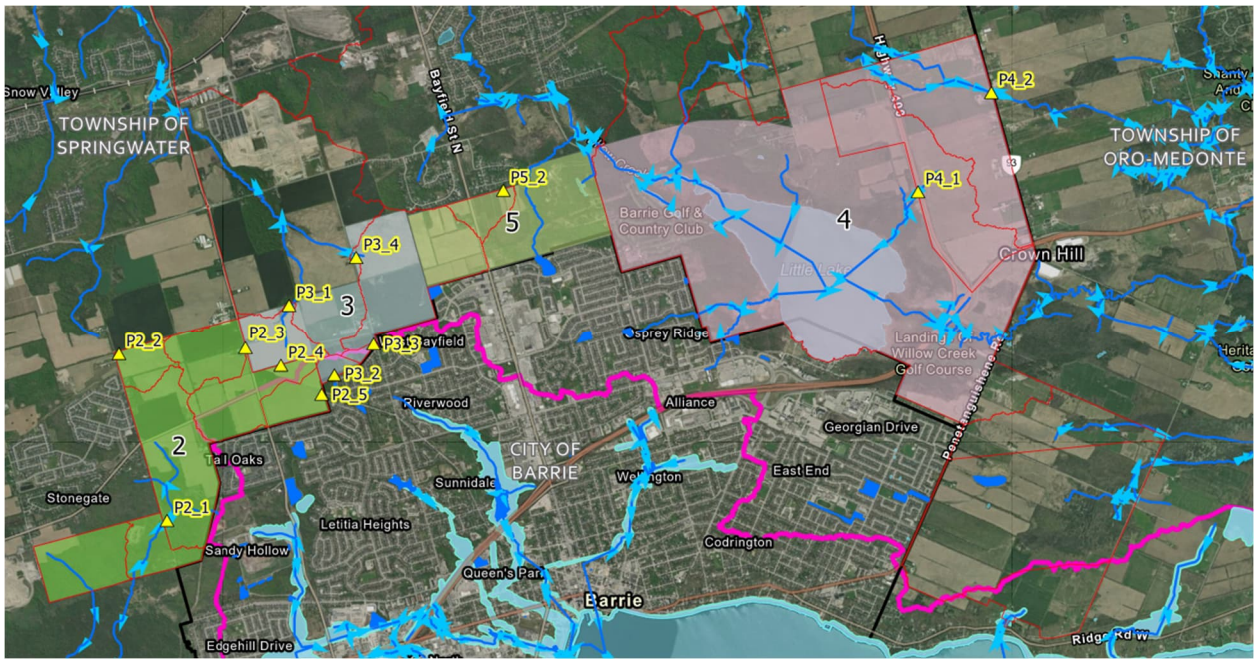


Figure 4.3 – Location of Aggregate SWM Facilities for Scenario 2

4.2.3 Scenario 3

Scenario 3 consists of expansion in Blocks 4 (employment lands only) and 6. The SWM infrastructure requirements for Scenario 3, i.e., aggregate SWM facilities, are illustrated in Figure 4.4 and summarized in Table 4.5. The SWM facility property block was assumed as 5% of catchment area to pond.

Table 4.5 – Scenario 1 Aggregate SWM Facilities and Approximate Upstream Service Area (Developable lands only)

Block	Pond ID	Catchment Area (ha)	* SWM Block Requirement (ha)
4	P4_1	162	8.1
4	P4_2	168	8.5
6	P6_1	3	0.2
6	P6_2	96	4.8
6	P6_3	324	16.3
6	P6_4	74	3.7

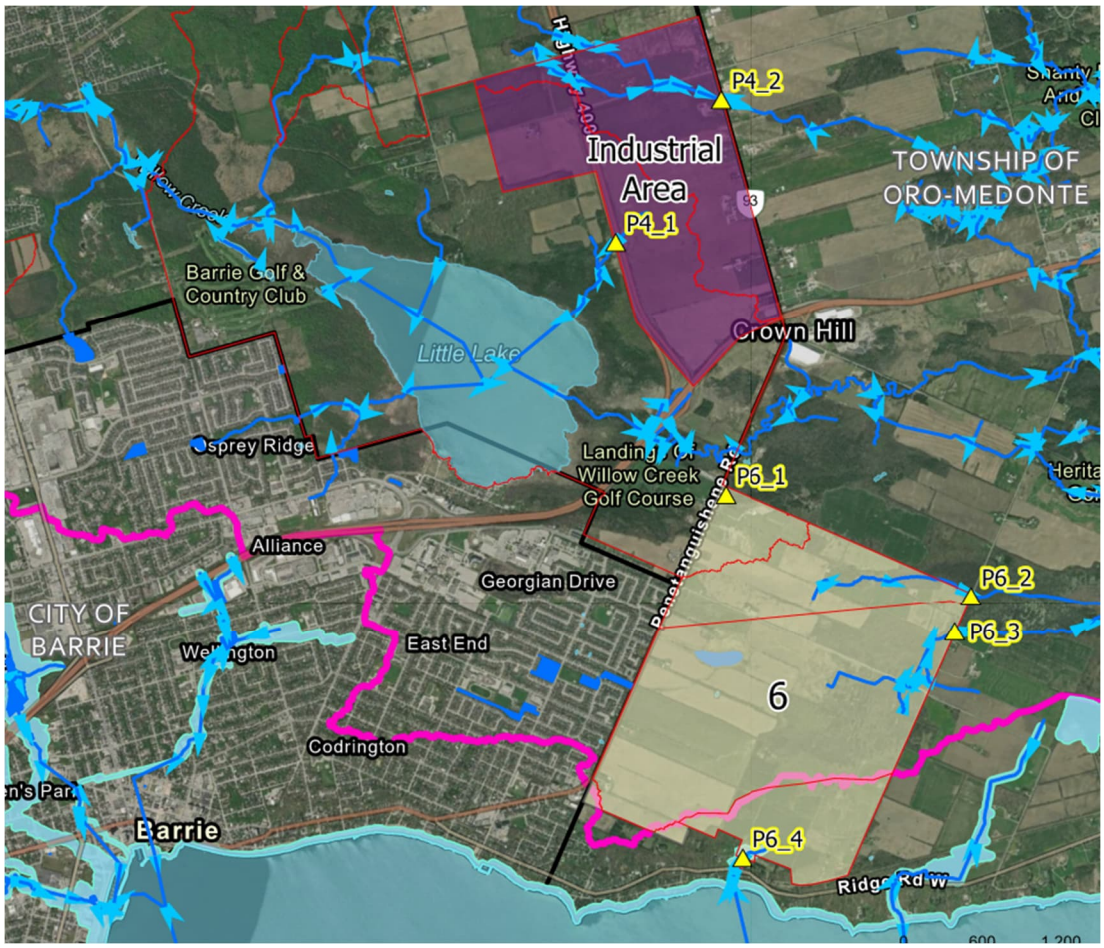


Figure 4.4 – Location of Aggregate SWM Facilities for Scenario 3

4.3 Opinion of Probably Cost

The opinion of probable cost for the SWM infrastructure is summarized in Table 4.6 and was based on the estimated costs associated with the SWM facility construction. As discussed in the above sections, the count of SWM facilities is an aggregate number based on the sub-catchment delineation. The actual number of SWM facilities required would depend on a more detailed land use plan and road network. Opinion of Probable Cost excludes other storm infrastructure such as SWM LIDs and storm sewers. Estimates for such infrastructure will depend on a more detailed land use plan and road network. The land value for the pond block is also excluded from this estimate.

Table 4.6 – Opinion of Probable Cost for SWM Infrastructure

Description	Development Scenario 1	Development Scenario 2	Development Scenario 3
# of SWM Facilities	10	12	6
Approximate Cost (Mil.)	$83.1M	$69.7M	$53.7M

5.0 TRANSPORTATION

5.1 Existing conditions

Annual Average Daily Traffic (AADT) volumes were obtained from multiple data sources, including the Ministry of Transportation of Ontario (MTO) AADT database, the City of Barrie, and the Simcoe County. Utilizing the AADT volumes, peak hour one-way traffic volumes were then developed based on generally accepted engineering assumptions including relative peak hour proportions of AADT volumes and directional splits.

Existing roadway volume to capacity ratios (V/C) were then estimated by comparing the developed peak hour volumes with roadway capacity thresholds found in the City of Barrie Transportation Master Plan (TMP) Appendix E Table 3-1 EMME model. Those capacity thresholds are illustrated below in Table 5.1.

Table 5.1 – General Roadway Capacity from City of Barrie TMP

Road Classification	Capacity (Veh/h/l)
Freeway	1800
Major Rural Arterial	850
Urban Arterial	750
Urban Collector	500
Highway 26 (Secondary Highway)	1000

Figure 5.1 presents the V/C ratio analysis for existing (2025) conditions. As can be seen from the figure, several key corridors are currently operating over capacity, specifically Dunlop Street (V/C=1.12), County Road 27 (V/C=1.1), Highway 11 (V/C=1.06), and Highway 400 (V/C=1.08).

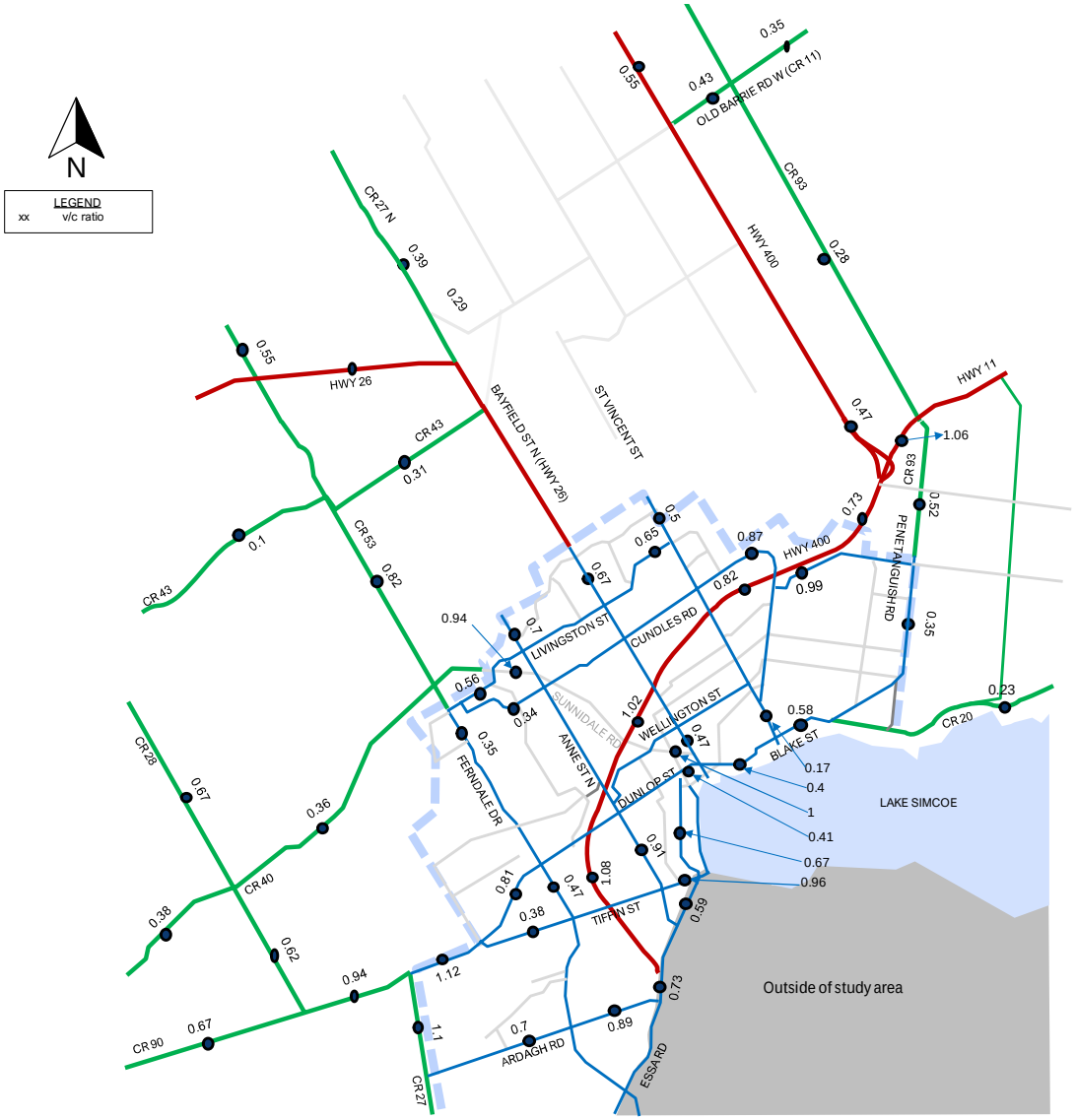


Figure 5.1 – Existing (2025) Roadway Corridors Estimated V/C Ratios

5.2 Future (2051) Background Traffic Conditions

For the future background (2051) horizon year analysis, all study corridors including Highway 400 were projected to grow using growth rate of 1% per annum because actual traffic volumes from both the background and future developments were used.

Site traffic volumes from known planned background developments within the City of Barrie were estimated utilizing Institute of Transportation Engineers (ITE) Trip Generation rates. These volumes were then assigned to the roadway based on engineering judgment and Transportation Tomorrow Survey (TTS) information. Location of the planned developments and planned road improvements information are provided in **Figure 5.2** and **Figure 5.3**, respectively.

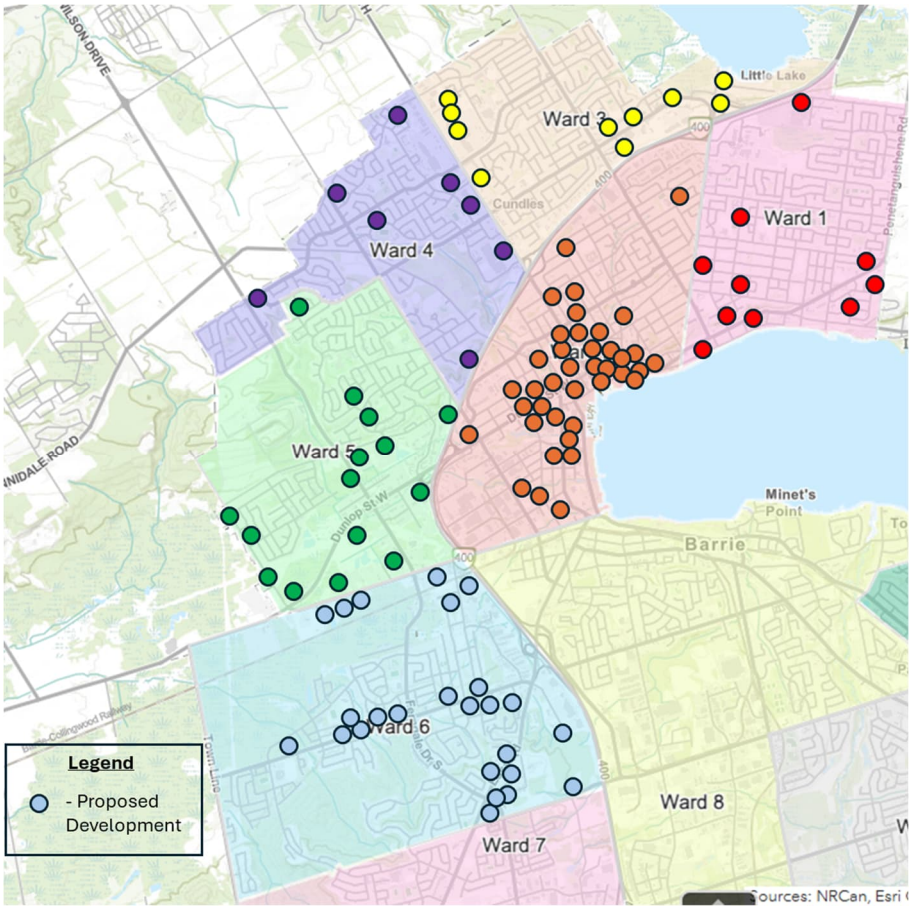


Figure 5.2 – Planned Developments, City of Barrie

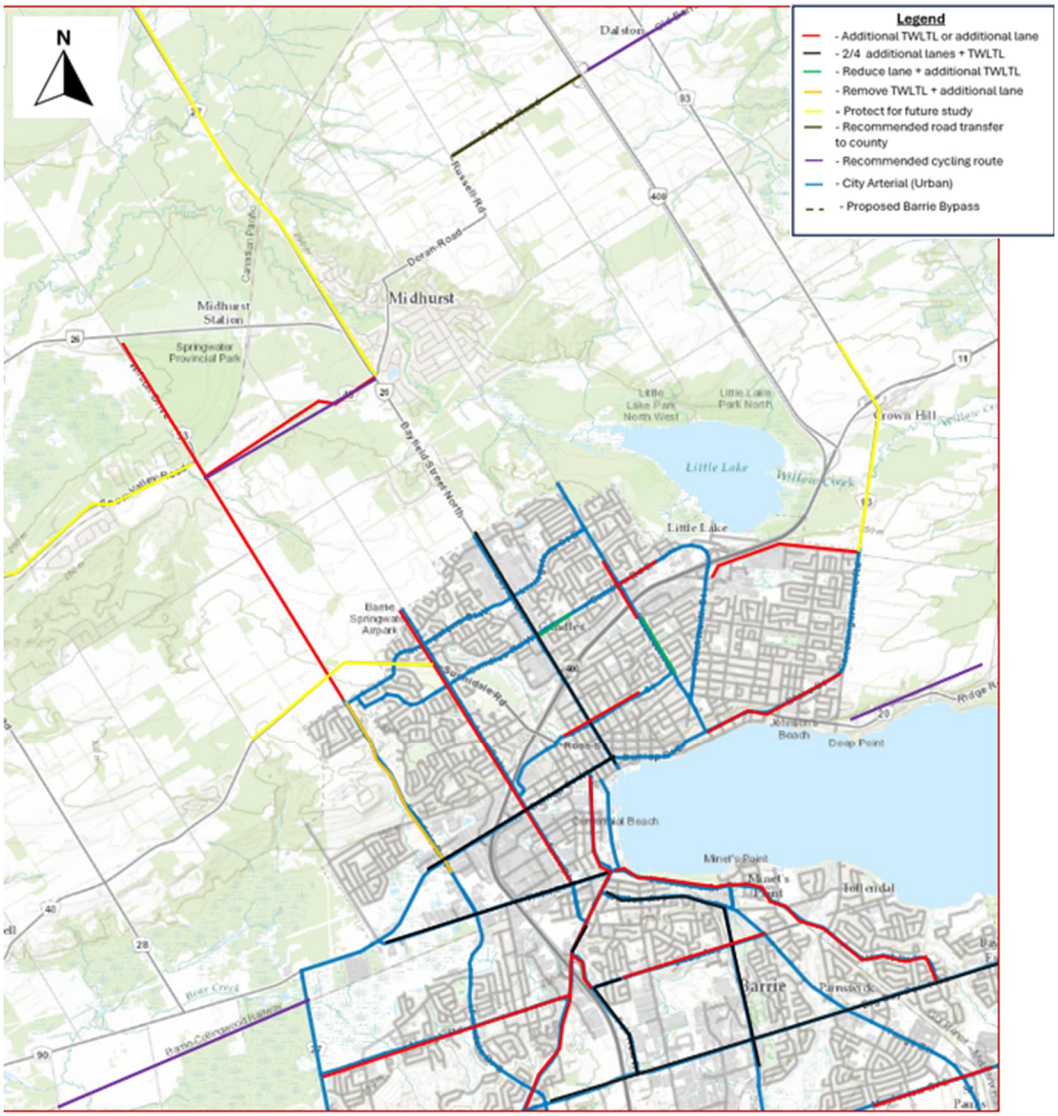


Figure 5.3 – Planned Road Improvements, City of Barrie

Future (2051) background roadway volume to capacity ratios (V/C) were then determined by comparing the established future (2051) background peak hour traffic volumes with the roadway capacity threshold presented in **Table 5.2**. This analysis incorporated proposed capacity improvements from the City of Barrie's TMP (2019) found in **Figure 5.4** of the document. **Figure 5.4** presents a snippet of the figure. **Figure 5.5** illustrates the resulting estimated V/C for key corridors within the study area. Some roadways have shown improvements to V/C because these will have improvement as part of the background improvements.

Figure 5-5
Total Number of Vehicle Lanes, Proposed Preferred Network – 2041
City of Barrie Transportation Master Plan

Figure 5.4 – TMP (2019) Proposed Preferred Network - 2041

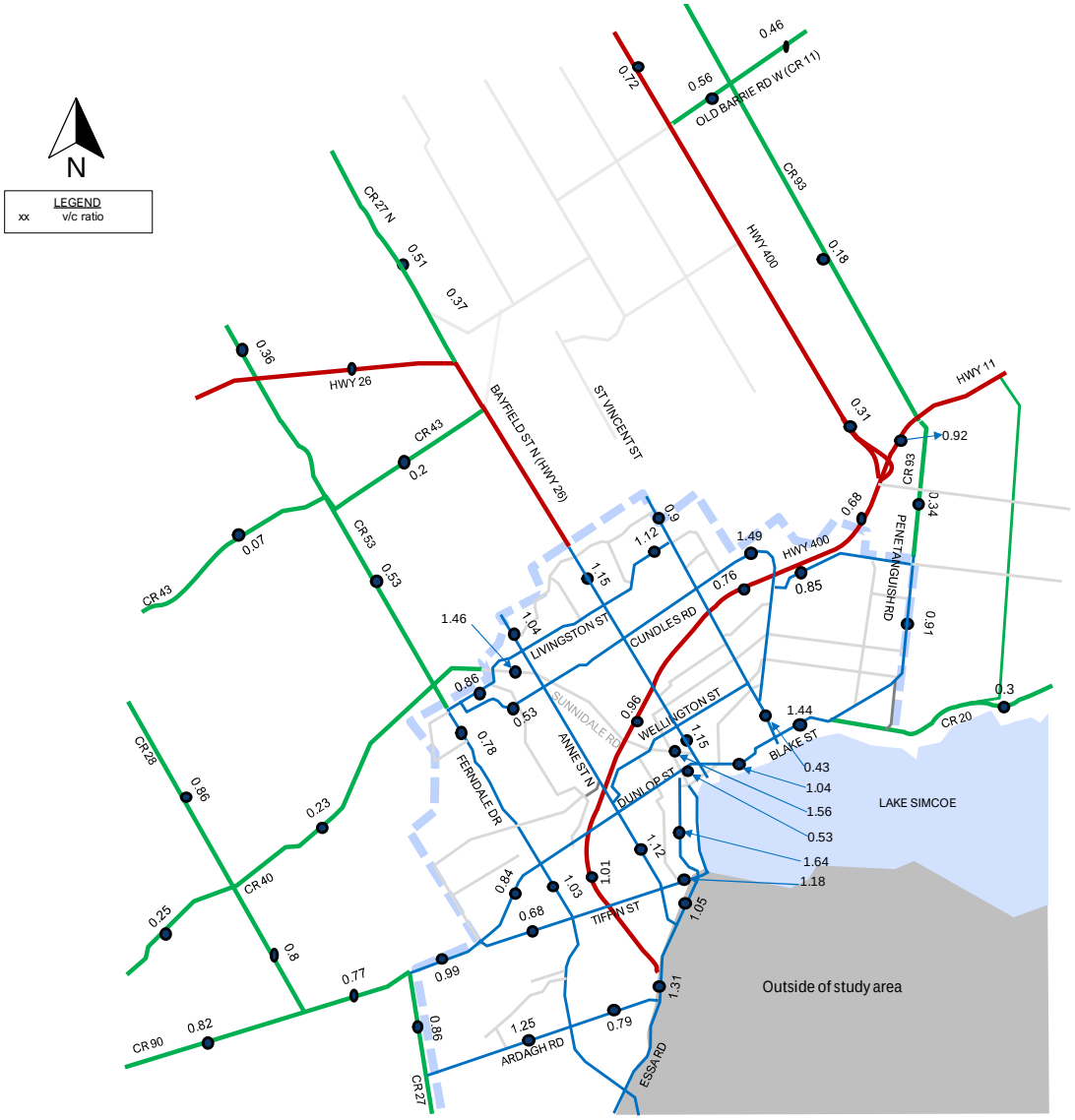


Figure 5.5 – Future (2051) Background Estimated V/C Ratios

Table 5.2 below summarizes corridors that are forecasted to be operated over capacity with v/c over 1.05.

Table 5.2 – Future (2051) Background Estimated Volumes to Capacity

Road	TMP Proposed Lane Configuration Per Direction	Forecasted v/c
Anne Street South	2 lanes + TWLTL	1.12
Ardagh Road	1 lane + TWLTL	1.25
Anne Street North	2 lanes + TWLTL	1.04
Bayfield Street North	3 lanes + TWLTL	1.15
Bayfield Street South	2 lanes + TWLTL	1.15
Blake Street	1 lane + TWLTL	1.44
Bradford Street	1 lane + TWLTL	1.64
Cundles Road East	2 lanes + TWLTL	1.49
Essa Road South	2 lanes + TWLTL	1.31
Livingstone Street East	1 lane + TWLTL	1.12
Sunnidale Road East	1 lane	1.12
Sunnidale Road West	1 lane	1.08
Tiffin Street East	2 lanes + TWLTL	1.18

5.3 Future (2051) Total Traffic Conditions

Proposed development scenarios including land uses were provided by Hemson with estimated residential units and employment forecasts. Growth areas, land uses and estimated trips for morning and afternoon peak hours for Scenarios 1 to 3 are presented in Tables 5.3 to 5.5, respectively.

Table 5.3 – Scenario 1 Estimated Trips

Growth Area	Land Use	Trip Generation	
		AM (# of trips)	PM (# of trips)
Midhurst	Residential	3,646	3,773
Block 4 (Industrial Park)	Industrial	2,416	1,846
Total		**6,062**	**5,619**

Table 5.4 – Scenario 2 Estimated Trips

Block	Land Use	Trip Generation	
		AM (# of trips)	PM (# of trips)
2	Residential	1,759	1,818
	Commercial	221	479
3	Residential	1,389	1,435
	Commercial	173	376
4	Residential	80	86
	Industrial	2,416	1,846
5	Residential	628	652
Total		**6,666**	**6,692**

Table 5.5 – Scenario 3 Estimated Trips

Block	Land Use	Trip Generation	
		AM (# of trips)	PM (# of trips)
6	Residential	2,169	2,241
	Commercial	263	569
4 (Industrial Park)	Industrial	2,416	1,846
Total		4,848	4,656

The development areas were broken down into six blocks as presented in Figure 5.6 (block shapes shown in the figure are schematic; for exact block shapes and boundaries, refer to introduction figure). Utilizing the estimated residential units and employment forecasts for each of the blocks identified, anticipated traffic volumes were developed and assigned to study area roadways based on Transportation Tomorrow Survey (TTS) information the most direct and desired routes. Based on the land uses, development scenarios with varying block combinations were then evaluated.

- Scenario 1 – Midhurst Land + Industrial Land from Block 4
- Scenario 2 – Block 2, 3, 4, 5
- Scenario 3 – Block 6 + Industrial Land from Block 4

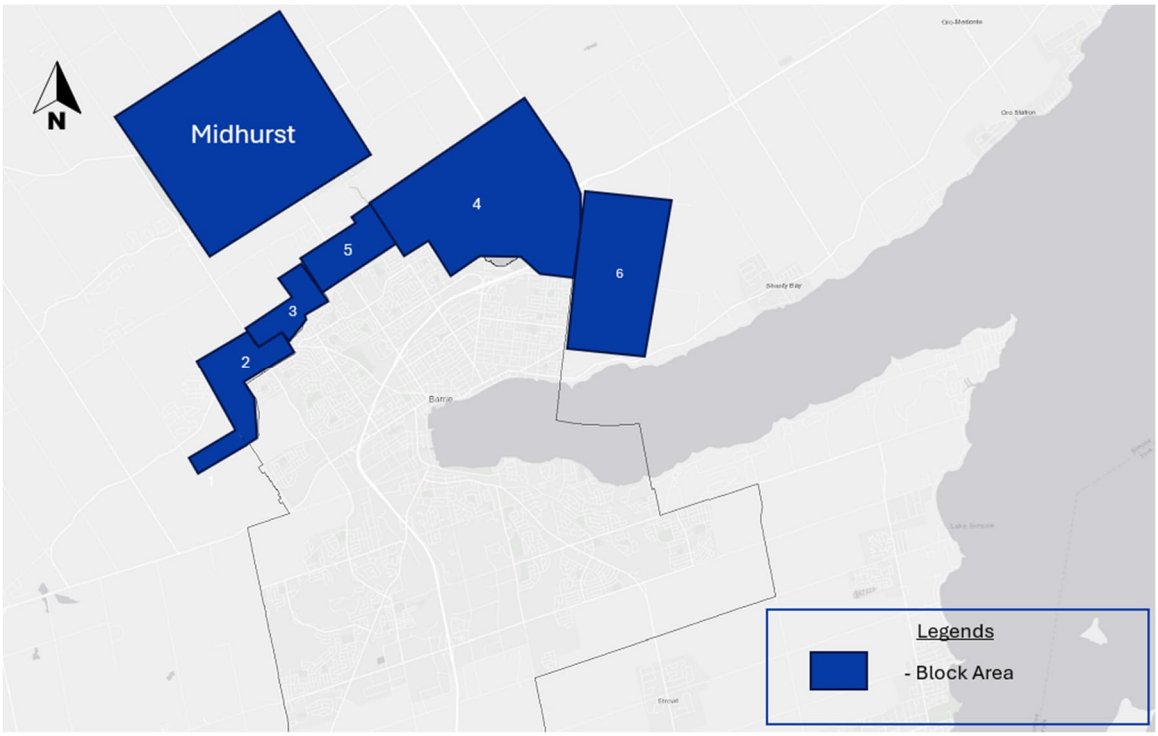


Figure 5.6 – Development Areas Block Map

The volume to capacity (V/C) analysis incorporated future (2051) background traffic volumes combined with the projected scenario-generated traffic volumes. The TMP (2019) proposed lane configurations for were used to identify specific locations impacted by the new development blocks.

The Scenario 1 for new developments is to acquire the Midhurst Land and Industrial Land from Block 4, as illustrated below in **Figure 5.7**. The figure also shows the projected roadway capacity in Scenario 1.

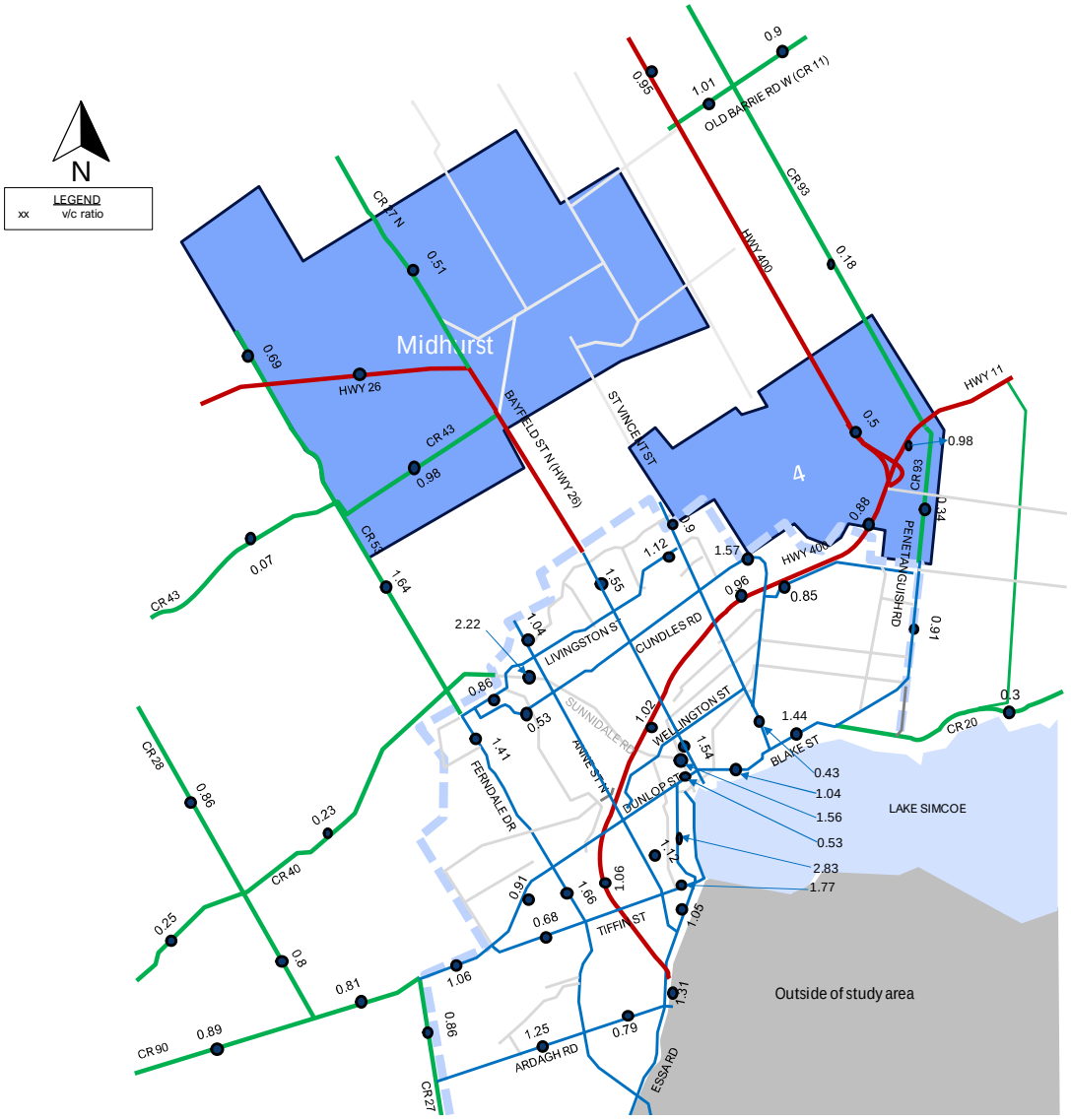


Figure 5.7 – Scenario 1 Estimated V/C Ratios

Scenario 2 includes lands of block 2, block 3, block 4 and block 5 as shown below in **Figure 5.8**, as well as the projected roadway capacity in Scenario 2.

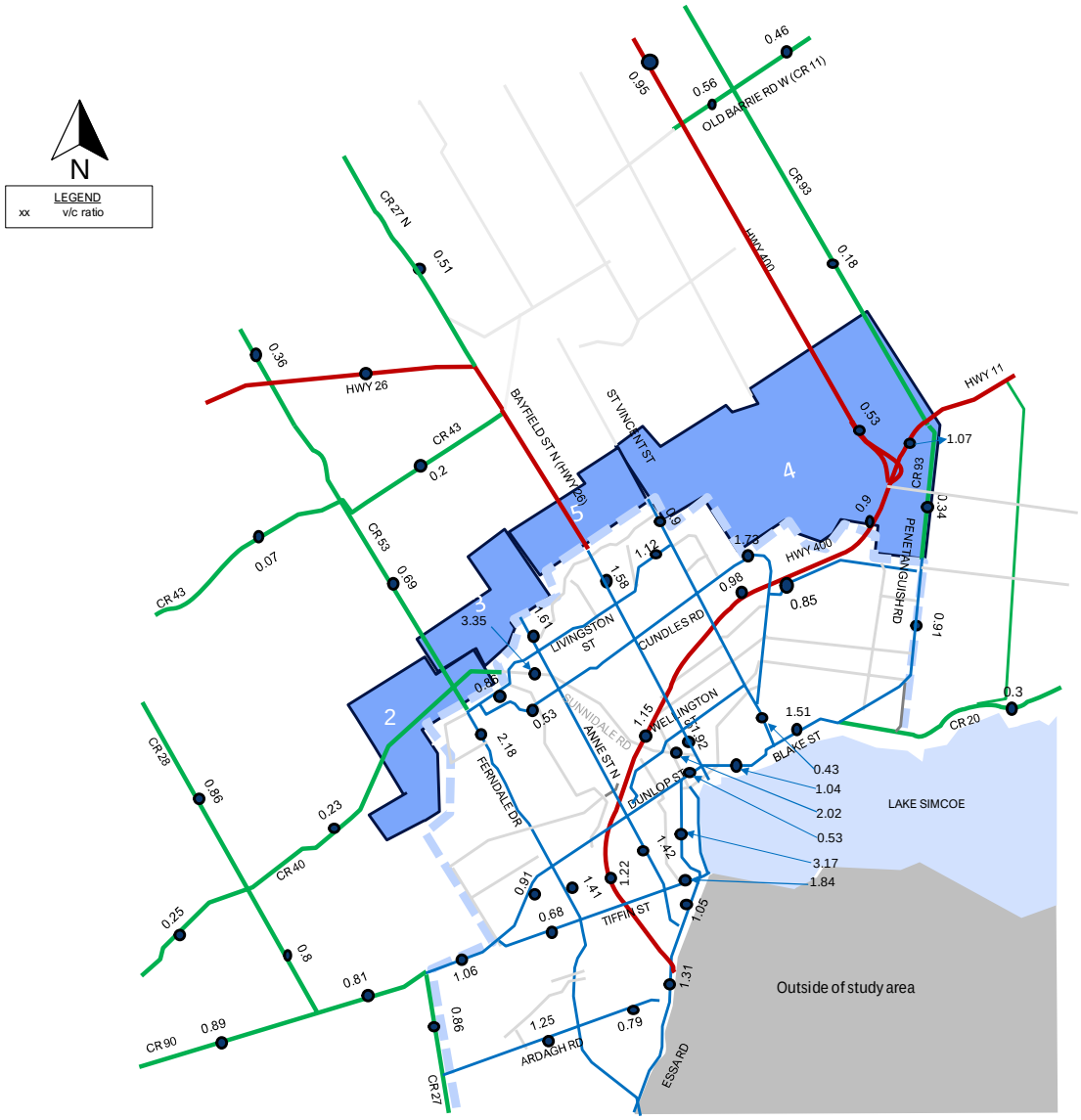


Figure 5.8 – Scenario 2 Estimated V/C Ratios

The Scenario 3 consists of Block 6 and industrial land from Block 4, as illustrated in **Figure 5.9**, as well as the projected roadway capacity in Scenario 3.

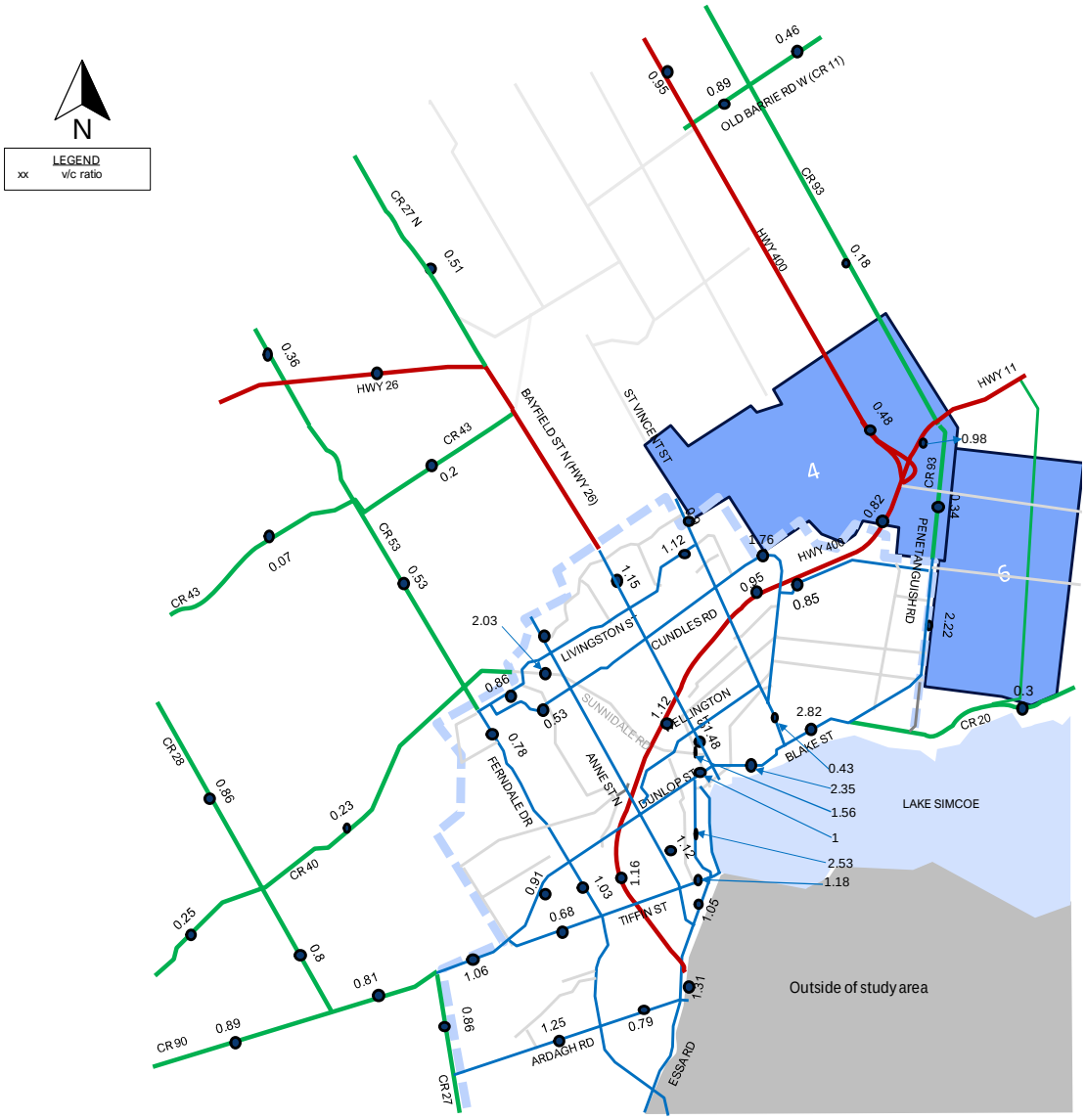


Figure 5.9 – Scenario 3 Estimated V/C Ratios

Table 5.6 summarizes the V/C ratios where corridors are impacted under Scenario 1 to 3 by integrating the projected future (2051) peak-hour background traffic volumes as well as potential roadway improvements.

Table 5.6 – Key Roadway Estimated V/C Ratios – Development Scenarios 1 through 3

Roadway	Number of Lanes Per Direction	Background Estimated V/C	Scenario 1 Estimated V/C	Scenario 2 Estimated V/C	Scenario 3 Estimated V/C	Potential Improvements
Anne Street North	1 lane + TWLTL	1.04	-	1.61	-	Scenario 2 - Add 1 lane in each direction
Anne Street North Extension	-	-	New	New	-	Scenario 1 –Add 1 lane in each direction between Carson Rd and City north limit. Scenario 2 –Add 1 lane in each direction between City north limit and 1km north of city limit.
Anne Street South	2 lanes + TWLTL	1.12	-	1.42	-	Scenario 2- Add 1 lane in each direction
Bayfield Street N (Hwy 26)	2 lanes + TWLTL	*	*	*	-	Scenarios 1 and 2 – Add 1 lane in each direction
Bayfield Street North	3 lanes + TWLTL	1.15	1.55	1.58	-	Scenarios 1 and 2 – Add 1 lane per direction or extend St. Vincent St Northerly.
Bayfield Street South	2 lanes + TWLTL	1.15	1.54	1.92	1.48	Scenarios 1 and 2 – Add 1 lane in each direction

Roadway	Number of Lanes Per Direction	Background Estimated V/C	Scenario 1 Estimated V/C	Scenario 2 Estimated V/C	Scenario 3 Estimated V/C	Potential Improvements
Blake Street	1 lane + TWLTL	1.44	-	1.51	2.82	Scenario 3 – Add 1 lane in each direction
Bradford St	1 lane + TWLTL	1.64	2.83	3.17	2.53	Scenario 1 – Add 1 lane in each direction Scenario 2 – Add 2 lanes in each direction Scenario 3 – Add 1 lane in each direction
County Road 11 East	1	0.56	1.01	-	0.89	Scenario 1- Add 1 lane in each direction
County Road 11 West	1	0.46	0.90	-	-	NA
County Road 43	2	0.20	0.98	-	-	NA
County Road 53 South	2	0.53	1.64	0.69	-	Scenario 1 – Add 1 lane in each direction
County Road 90 E	2 lanes + TWLTL	0.77	0.81	0.81	0.81	NA
County Road 90 W	2 lanes + TWLTL	0.82	0.89	0.89	0.89	NA
Cundles Road East	2 lanes + TWLTL	1.49	1.57	1.73	1.76	Scenario 3 – Add 1 lane in each direction
Dunlop Street East	1	1.04	-	-	2.35	Scenario 3 – Add 1 lane in each direction

Roadway	Number of Lanes Per Direction	Background Estimated V/C	Scenario 1 Estimated V/C	Scenario 2 Estimated V/C	Scenario 3 Estimated V/C	Potential Improvements
Dunlop Street West	2 lanes + TWLTL	0.99	1.06	1.06	1.06	No Improvements
Ferndale Drive North	2	0.78	1.41	2.18	-	Scenarios 1 and 2 - Add 1 lane in each direction
Ferndale Drive South	2	1.03	1.66	1.41	-	Scenario 1 - Add 1 lane in each direction
Highway 11	3	0.92	0.98	1.07	0.98	No Improvements
Highway 400	5	0.68-1.01	0.88-1.06	0.90-1.22	0.82-1.16	No Improvements
Penetanguishene Road	1	0.91	-	-	2.22	Scenario 3 – Add 1 lane in each direction
St. Vincent Street Extension	-	-	New	New	-	Scenarios 1 – Add 1 lane in each direction between City Limits to Wattie Rd. Scenarios 2 – Add 1 lane in each direction from City Limits to 2km north of city limit.
Sunnidale Road East	1	1.56	1.56	2.02	1.56	All Scenarios – Add 1 lane in each direction
Sunnidale Road West	1	1.46	2.22	3.35	2.03	All Scenarios – Add 1 lane in each direction

Roadway	Number of Lanes Per Direction	Background Estimated V/C	Scenario 1 Estimated V/C	Scenario 2 Estimated V/C	Scenario 3 Estimated V/C	Potential Improvements
Tiffin Street East	2 lanes + TWLTL	1.18	1.77	1.84	-	Scenarios 1 and 2 – Add 1 lane in each direction

***No exising traffic data was for Hwy 26. However, based on the Scenarios 1 and 2 improvements to Bayfiled Street N, improvements to Hwy 26 (Bayfiled St N) are recommended in addition to its change of classification from Provincial Secondary Highway to Urban Arterail**

Scenario 1 is expected to increase traffic demand on north-south roadways within the City Barrie, including Bayfield Street, Ferndale Drive, and the County Roads to the north. Segment of Highway 400 is also expected to face capacity issue. Traffic impacts on Barrie's internal road network could be mitigated by extending additional north-south routes, such as Anne Street, extending to Carson Road and provide extra travel lane per direction to increase roadway capacity, or by upgrading and reclassifying existing corridors, such as St. Vincent Street, to arterial road and provide an extra travel lane per direction.

Scenario 2 is expected to place significant demand on internal roadways within Barrie due to their relative distance from Highway 400. As there are no feasible opportunities to introduce an additional corridor providing direct access to Highway 400 in downtown area, the possible mitigation measures would involve widening existing roads or reclassifying certain routes to accommodate the increased traffic volumes, such as reclassifying St. Vincent Street to arterial road and provide an extra travel lane per direction to approximately 2km north of the city limit, or provide an extra travel lane from the city's north limit to approximately 1km north along Anne Street, to increase roadway capacity.

It is expected that Scenario 3 would increase traffic demand along major corridors and place additional pressure on collector roads due to northbound traffic destinated for Highway 400 and the industrial park, as there is currently no direct west-to-north connection to Highway 400. Highway 400 is also expected to generally operate over capacity under Scenario 3. If the interchange configuration can be modified or an alternative route to the industrial park is provided, traffic volumes on St. Vincent Street and other collector roads could be reduced. Additionally, westbound traffic traveling through the downtown area via Blake Street, Dunlop Street, and Bayfield Street South is estimated to operate over capacity.

5.4 Opinion of Probable Cost

Opinions of probable costs were prepared considering an urban arterial cross section containing other infrastructures including storm sewer, sanitary sewer, watermain and street lighting. Additional costs of 30% and 50% of the base cross section cost were assumed to consider additional items and contingencies. A cost rate of $8,700 and $11,000 per metre were used to estimate costs for the 2-lane and 4-lane potential road improvements as shown in Table 5.7.

Table 5.7 – Opinion of Probable Costs for Potential Road Improvements

Road Improvement	Scenario 1	Scenario 2	Scenario 3
Approximate Cost (Millions)	$295	$235	$120
Total Road Length (Km)	33.9	26.6	12.3

Details of opinion of probable cost information are provided in Appendix C.

6.0 CONSIDERATIONS FOR POWER REQUIREMENTS

The purpose of this section is to provide a preliminary estimate of the power demand resulting from the development of Blocks 2 through 6. These estimates are intended solely as an indication of the order of magnitude and should not be used for detailed planning or design purposes. Local electrical utility providers—HydroOne (serving Springwater and Oro-Medonte) and Alectra (serving Barrie)—will supply information regarding existing and planned infrastructure, such as the locations of substations and high-voltage cable routes, as well as current and projected power demands in the area.

Table 6.1 present a detailed breakdown of the estimated power demand in every block. Due to lack of information on the forecasted land use types in the employment area, power requirements for the employment area were not calculated. Table 6.2 presents the rates used for the power demand calculations.

Table 6.1 – Breakdown of Power Demand per Block

Block	Total Units	Singles	Semis	Rows	Apts	Power Demand (MW)
2	4,425.9	1,770	443	1,770	443	17,040
3	3,470	1,388	347	1,388	347	13,358
4	199	79	20	79	20	765
Total (Springwater Annex Areas)	**8,094**	**3,238**	**809**	**3,238**	**809**	**31,163**
5: Springwater Area To Be Serviced by Barrie	**1,545**	**618**	**154**	**618**	**154**	**5,948**

6: Proposed Oro-Medonte Annexation Area	**5,493**	**2,197**	**549**	**2,197**	**549**	**21,149**
6a: Mclean Lands in Oro	983	393	98	393	98	3,784
6b: Remaining Lands in Oro	4,510	1,804	451	1,804	451	17,365
Grand Total	**15,133**	**6,053**	**1,513**	**6,053**	**1,513**	**58,261**

Table 6.2 – Power Estimation Methodology

Dwelling Type	Peak kW Demand	Factors Influencing Power Demand
Single Unit	5	Larger living area, individual major loads, EV chargers
Semi Detached	4	Smaller living area, common warm wall, less major appliances, EV chargers
Row Unit	3	Small living area, multiple warm walls, benefit of load diversity for building, no individual EV charger per unit
Apartment	2.5	Small living area, multiple warm walls, floors and ceilings, benefit of load diversity for building, no EV charger per unit
1.	Power requirements for employment are not estimated due to lack of data	
2.	Dwelling peak kW demand are based on published utility peak power data for Ontario. Nationally customer peak power varies by region from 5-9 kW depending on percentage of load influenced by electric heating. In Ontario electric heating natural gas accounts for 75-80% residential heating and electricity only 15-20%.	

As shown, power demand of forecasted residential growth blocks in Springwater (Blocks 2 to 5) are estimated at around 36,000 MW while power demand of forecasted residential growth blocks in Oro-Medonte (Block 6) is estimated at 21,000 MW.

HydroOne being the utility company providing power to Springwater and Oro-Medonte and Alectra the utility company providing power to Barrie, it is currently unclear which utility will ultimately provide power to each of the proposed blocks. Determining utility service boundaries is beyond the scope of this analysis.

7.0 NATURAL GAS CONSIDERATIONS

As shown in the figures below, Enbridge is the current provider for all the blocks located in the study area.

Figure 7.1 – Enbridge Gas Distribution Area - Ontario

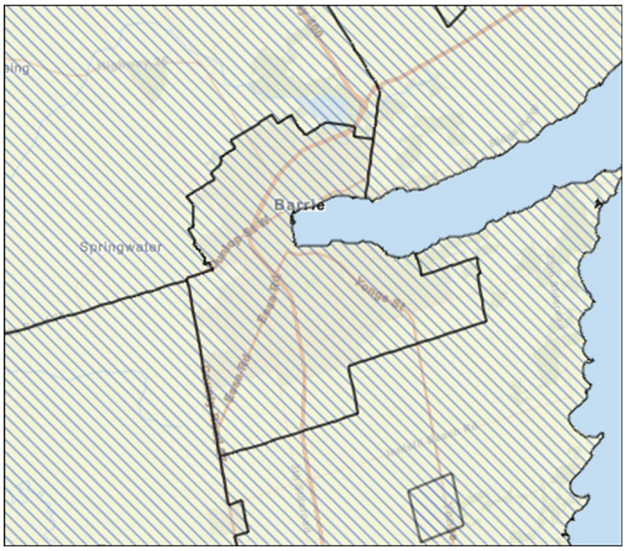


Figure 7.2 – Enbridge Gas Distribution Area – Barrie Municipal Area

Transmission Considerations:

The supply of natural gas from a production or storage facility to a municipality is generally covered by large transmission lines that range in pressure from 250 to 900 psi. Ontario is covered by a network of lines that are owned and operated by Enbridge gas as a regulated monopoly. These pipelines require significant planning and installation time for additions and upgrades.

Barrie is already serviced by existing transmission lines that have significant reserve capacity. The planned residential and employment currently envisioned in the study area will not require any changes to the current transmission system. There would be no schedule or cost impacts to the transmission system by the planned growth.

Distribution Considerations:

The natural gas distribution network is local to a municipality and is run at an intermediate pressure of 60 psi. This system consists of smaller pipes and is usually installed in the municipal road allowance near the property line under a local franchise agreement with the municipality. Most agreements follow a standard format and are described as a model agreement. This standard network can provide space heating and small industrial loads. The delivery pressure varies between ounces for a residential application and up to 10 pounds for a small industrial or large commercial load. The network does not require a significant amount of planning and installation can normally meet the typical build-out timeframes that occur with development.

Larger industrial uses such as asphalt production facilities would require a specialized planning and supply solution, however, at the moment no such facilities are planned for the expansion areas.

The gas distribution in Barrie is supplied on a regulated monopoly basis by Enbridge Gas. Costs for installation are covered in the regulated return on capital investment and recovered in ongoing consumer charges. Customer bills include a base opportunity or connection cost and a cost for the product. These charges are fixed by the regulator to ensure a return for Enbridge and continued maintenance of the existing asset base.

For the planned expansion options being considered for Barrie, distribution will not need any special level of co-ordination and initial installation costs will be absorbed by Enbridge as part of their normal regulated servicing.

Expansion Surcharge:

In less dense or rural locations the costs of expansion of the distribution network may not be justified with the normal returns. In order to service these areas Enbridge may apply a surcharge to the monthly bills. This surcharge can be carried for a period of up to 40 years to keep the service affordable. On initial review, the density and proximity of the planned expansion suggests that no surcharge will be required.

Franchise:

Enbridge currently has a franchise agreement with the municipalities surrounding Barrie, including Springwater and Oro-Medonte. These would continue to be in force for the remaining areas after expansion. A new revised agreement would be required for Barrie to cover the additional areas if a boundary adjustment is executed.

Climate Change Risks:

Over the past 5-10 years, there have been a number of changes in the natural gas political environment to consider. Governments have taken steps to reduce or even eliminate natural gas consumption usually by attempting to limit the supply. Carbon taxes and municipal by-laws banning natural gas in new builds have both been used to influence consumer choice about natural gas usage. Recently both directions have been largely reversed and the current general political position suggests that natural gas is now seen as a cleaner alternative and will still have a significant period of continued future use.

Barrie does not currently have a bylaw against natural gas use in new development and there is no indication that Council would move in that direction. However, any planning exercise should acknowledge the possibility of push back against the use of natural gas.

8.0 CONCLUSION

This Technical Memorandum provided a high-level analysis of the infrastructure servicing requirements to support the additional employment and/or residential developments within and around the City of Barrie, the Township of Oro-Medonte, and the Township of Springwater and as per the locations determined by Hemson and presented in **Figure 1.1**. The assessment focused on key infrastructure systems, including:

- Water supply, treatment and distribution
- Wastewater treatment and collection
- Stormwater management (SWM)
- Road networks

Power and natural gas considerations are also discussed in this TM.

The analysis was conducted to determine the servicing needs for three (3) growth scenarios identified by Hemson. Five (5) blocks were identified to accommodate growth and used a combination of the blocks for each scenario. The scenarios are:

- **Scenario 1** includes blocks 2, 3, 4, and 5 remaining in Springwater and being serviced by the Midhurst system
- **Scenario 2** includes blocks 2, 3, 4, and 5 being serviced by Barrie. Blocks 2, 3, and 4 will become a part of Barrie and Block 5 will remain in Midhurst
- **Scenario 3** includes blocks 4 and 6 becoming a part of and being serviced by the City of Barrie.

An Employment Area Block, located within Block 4, is included in all scenarios.

Taking into account the existing and planned upgrades to water and wastewater systems by both Barrie and Midhurst, RVA identified a gap in the water and wastewater treatment capacities in Midhurst existing and planned systems if the community were to service the growth from the blocks under scenario 1. To address servicing needs across all three growth scenarios, additional infrastructure and capacity enhancements have been identified. These requirements are summarized in Table 8.1 and discussed in detail throughout this Technical Memorandum. The traffic analysis highlighted the need for upgrades to existing road capacities, while the SWM assessment identified proposed locations for SWM pond blocks and estimated their area requirements. A comprehensive summary of probable costs associated with each scenario and servicing component is provided in

Table 8.2.

Table 8.1 – Summary Opinion of Required Infrastructure

Component	Scenario 1	Scenario 2	Scenario 3
Water Systems	Additional 12,000 m3/day upgrade 6 Additional Supply Wells 3 Booster Pumping Stations 12,500 m3 additional storage Volume 12.9 km of watermains trunks	3,200 m3 of additional storage volume 7.6 km of watermains trunks	3,200 m3 of additional storage volume 7.5 km of watermains trunks
Wastewater Systems	Additional 7,300 m3/day upgrade 2 additional Sanitary Pumping Stations 14.0 km of sanitary sewer trunks / forcemains	4 additional Sanitary Pumping Stations 11.2 km of sanitary sewer trunks / forcemains	3 additional Sanitary Pumping Stations 9.3 km of sanitary sewer trunks / forcemains
Stormwater Management	Estimated 10 SWM ponds of total 64.5 ha area	Estimated 12 SWM ponds of total 42.2 ha area	Estimated 6 SWM ponds of total 41.6 ha area
Roads	33.9 km of additional road length	26.6 of additional road length	12.3 of additional road length

Table 8.2 – Summary Opinion of Probable Cost

Component	Scenario 1	Scenario 2	Scenario 3
Water Supply and Distribution	$217 M	$55.0M	$48.0 M
Wastewater Treatment and Collection	$229 M	$160 M	$132 M
Subtotal Water and Wastewater	**$446 M**	**$215 M**	**$180 M**
Stormwater Management	$83M	$70 M	$54 M
Transportation	$295 M	$235 M	$120 M
Total Cost	**$824 M**	**$520 M**	**$354 M**

As highlighted in Table 8.2, Scenario 1—which assumes no boundary adjustments and municipal servicing provided by the Township of Springwater—represents the highest overall investment cost among the three scenarios, particularly in relation to water and wastewater infrastructure. In contrast, Scenario 3 presents the lowest investment cost,

although it also corresponds to a lower forecasted population compared to the blocks included in Scenario 2.

Beyond the financial implications, Scenario 1 would require additional feasibility studies to assess the potential for expanding the water supply and treatment capacities of the existing Midhurst Water and Wastewater Treatment Plants.

It is important to note that all proposed infrastructure, including maps, quantities, and cost estimates presented in this TM, are based on a high-level preliminary analysis. Further detailed studies—such as a Master Servicing Plan or a Municipal Class Environmental Assessment—are necessary to confirm infrastructure sizing, locations, and cost estimates. This analysis is intended to support the decision-making process and should not be considered final.

APPENDIX A

WATER DEMAND AND WASTEWATER FLOW CALCULATIONS

Projected Water Demands

Water	Future Growth		Design Criteria[4]		Water Demand Projections				
	Residential Population[1,3]	Employment Jobs[2]	Average Demand Per Person (L/cap/d)	Max Day Factor (MDF)	Total ADD Residential (m3/day)	Total ADD Employment (m3/day)	Total MDD Residential (m3/day)	Total MDD Employment (m3/day)	Total MDD (m3/day)
Scenario 1	36,464	10,876	380	1.95	13,856	2,587	27,020	4,707	31,727
Scenario 2	27,814	9,976	225	1.80	6,258	2,245	11,265	4,040	15,305
Scenario 3	15,170	9,976	225	1.80	3,413	2,245	6,144	4,040	10,184

Notes:

1. Scenario 1 residential population includes forecasted population growth for Midhurst and forceasted "spillover" populations (Blocks 2 to 5)
2. Employment Jobs under scenario 1 include estimated forecasted growth for Midhurst and forceasted employment "spillover" growth in Block 4
3. Residential Population Growth in the Study Area is already considered in Barrie's population and water demand forecasts
4. Scenario 1 Design criteria per Township of Springwater Engineering Design Standards. Scnearios 2 and 3 Design Criteria as per the City of Barrie's design criteria

Projected Wastewater Flows

Wastewater	Future Growth		Design Criteria[4]	Wastewater Flow Projections		
	Residential Population[1,3]	Employment Jobs[2]	Average Day Flow Per Person (L/cap/d)	Total ADF for Pop (m3/day)	Total ADF for Employment (m3/day)	Total ADF (m3/day)
Scenario 1	40,478	10,876	430	17,406	2,632	20,037
Scenario 2	27,814	9,976	225	6,258	2,245	8,503
Scenario 3	15,170	9,976	225	3,413	2,245	5,658

Notes:

1. Scenario 1 residential population includes existing and planned developments to be serviced by the WWTP, forecasted population growth for Midhurst and forceasted "spillover" populations (Blocks 2 to 5)
2. Employment Jobs under scenario 1 include estimated forecasted growth for Midhurst and forceasted employment "spillover" growth in Block 4
3. Residential Population Growth in the Study Area is already considered in Barrie's population and wastewater flows forecasts
4. Scenario 1 Design criteria per Township of Springwater Engineering Design Standards. Scnearios 2 and 3 Design Criteria as per the City of Barrie's design criteria

Planned Capacities vs Projected Demands and Flows

Water	Servicing system	Planned Capacity[1,2] (m3/day)	Projected Additional MDD[3] (m3/day)	Existing area MDD Projections[4] (m3/day)	Gap between planned Capacity and total Future MDD (m3/day)
Scenario 1	Midhurst	19,094	31,727	12,096	- 12,633
Scenario 2	Barrie	152,600	4,040	143,546	5,014
Scenario 3	Barrie	152,600	4,040	143,546	5,014

Notes:

1. Planned capacity in Scenario 1 as per 2020 Midhurst Class EA. Planned capacity in Scenarios 2 and 3 as per City of Barrie 2019 Water Masterplan
2. Prior to 2062 the capacity will be 138,000 m3/day per the City of Barrie's 2019 MSP
3. Residential Population Growth in the Study Area is already accounted for in Barrie's population and water demand projections and therefore ony additional employment block demand is considered as "additional" in Scenarios 2 and 3
4. Midhurst and Barries MDD Projections as per ultimate conditions in the Midhurst Class EA and 2071 conditions in Barrie's Water Master Plan

Wastewater	Servicing system	Planned Capacity[1] (m3/day)	Projected Additional ADF[2] (m3/day)	Existing area ADF Projections[3] (m3/day)	Gap between planned Capacity and total Future MDD (m3/day)
Scenario 1	Midhurst	12,314	20,037		- 7,723
Scenario 2	Barrie	116,000	2,245	114,211	- 456
Scenario 3	Barrie	116,000	2,245	114,211	- 456

Notes:

1. Planned capacity in Scenario 1 as per 2020 Midhurst Class EA. Planned capacity in Scenarios 2 and 3 as per City of Barrie 2019 Water Masterplan
2. Residential Population Growth in the Study Area is already accounted for in Barrie's population and wastewater flow projections and therefore ony additional employment block demand is considered as "additional" in Scenarios 2 and 3
4. Midhurst and Barries ADF Projections as per ultimate conditions in the Midhurst Class EA and 2071 conditions in Barrie's Wastewaterr Master Plan

Projections by Block

Wastewater	Residential Land (ha)	Residential pop	Employment Land	Employment Jobs	Average Day Flow Per Person (L/cap/d)	Total ADF for Pop (m3/day)	Total ADF for Employment (m3/day)	Total ADF (m3/day)	Harmon Peaking Factor	Total PF for Pop (m3/day)	Total PF (m3/day)	I/I Rate (L/s/ha)	I/I Flow (m3/day)	Total PF+ I/I (m3/day)
Block 2	233	12,771	-	-	225	2,873	-	2,873	2.85	8,185	8,185	0.26	5,233	13,418
Block 3	183	10,012	-	-	225	2,253	-	2,253	2.95	6,655	6,655	0.26	4,102	10,757
Block 4	10	573	-	-	225	129	-	129	3.94	508	508	0.26	235	743
Block 5	81	4,458	-	-	225	1,003	-	1,003	3.29	3,301	3,301	0.26	1,827	5,127
Block 6	289	15,170	-	-	225	3,413	-	3,413	2.77	9,466	9,466	0.26	6,495	15,961
Employment Block	-	-	333	9,976	225	-	2,245	2,245	4.50	-	2,245	0.26	7,470	9,715

Water	Residential Land (ha)	Residential pop	Employment Land	Employment Jobs	Average Demand Per Person (L/cap/d)	Max Day Factor (MDF)	Total ADD Pop (m3/day)	Total ADD Employment (m3/day)	Total ADD	Total MDD Pop	Total MDD Empl	Total MDD
Block 2	233	12,771	-	-	225	1.8	2,873	-	2,873	5,172	-	5,172
Block 3	183	10,012	-	-	225	1.8	2,253	-	2,253	4,055	-	4,055
Block 4 - Res	10	573	-	-	225	1.8	129	-	129	232	-	232
Block 5	81	4,458	-	-	225	1.8	1,003	-	1,003	1,805	-	1,805
Block 6	289	15,170	-	-	225	1.8	3,413	-	3,413	6,144	-	6,144
Employment	-	-	333	9,976	225	1.8	-	2,245	2,245	-	4,040	4,040

APPENDIX B

OPINION OF PROBABLE COST – WATER AND WASTEWATER SYSTEMS

Estimated Project Costs (Base, Construction, Engineering and Contingency Costs) - Less than $10 Million

(A)	Base Capital Costs	Specific to Project	
(B)	Total Construction Cost, Including		
(B-1)	Construction General Requirements	3%	of (A)
(B-2)	Contractor Overhead & Profit	10%	of (A)+(B-1)
(B-3)	MOB/Bond/Insurance	5%	of (A)+(B-1)
(C)	Engineering Cost - includes EA, Design, CA	15%	of (A+B)
(D)	Client Internal Costs	5%	of (A+B)
(E)	Project Overall Contingency*	10%	of (A+B)
(F)	Total Estimated Project Costs (no HST)	A+B+C+D+E	Roundup
(G)	Total Estimated Project Costs (w/ HST)	102%	of (F)

Estimated Project Costs (Base, Construction, Engineering and Contingency Costs) - More than $10 Million

(A)	Base Capital Costs	Specific to Project	
(B)	Total Construction Cost, Including		
(B-1)	Construction General Requirements	3%	of (A)
(B-2)	Contractor Overhead & Profit	10%	of (A)+(B-1)
(B-3)	MOB/Bond/Insurance	5%	of (A)+(B-1)
(C)	Engineering Cost - includes EA, Design, CA	10%	of (A+B)
(D)	Client Internal Costs	5%	of (A+B)
(E)	Project Overall Contingency*	10%	of (A+B)
(F)	Total Estimated Project Costs (no HST)	A+B+C+D+E	Roundup
(G)	Total Estimated Project Costs (w/ HST)	102%	of (F)

Water/Wastewater Linear Project Base Costs

Watermain/Forcemain Base Cost

Nominal Pipe Size (mm)	
100	$ 870
150	$ 1,020
200	$ 1,160
250	$ 1,360
300	$ 1,550
400	$ 1,650
500	$ 2,060
600	$ 2,410
650	$ 2,270
750	$ 3,020
900	$ 3,400

RVA Linear Costs - Watermain Replacement - 3m depth (Assume same cost for 5m deep FM)

Nominal Pipe Size	2000 Earthwork Cost ($/m)	2000 Other Site Cost ($/m)	2000 Total Base Unit Cost ($/m)	Annual Inflation	2025 Total Base Unit Cost ($/m)
100	No info - 75% of 200				870
150	No info - average between 100 & 200				1020
200	No info - 75% of 300				1160
250	No info - average between 200 & 300				1360
300	222	520	742	0.03	1550
400	264	526	790	0.03	1650
500	452	534	986	0.03	2060
600	607	542	1149	0.03	2410
650	No info - 75% of 750				2270
750	876	566	1442	0.03	3020
900	1043	582	1625	0.03	3400

Sanitary Sewer Base Cost

Nominal Pipe Size (mm)	
200	$ 1,030
250	$ 1,200
300	$ 1,370
375	$ 1,600
400	$ 1,820
450	$ 2,370
525	$ 2,420
600	$ 2,510
675	$ 2,670
750	$ 2,800

RVA2000 Linear Costs - Sewer Replacement - 5m depth

Nominal Pipe Size	2000 Earthwork Cost ($/m)	2000 Other Site Cost ($/m)	2000 Total Base Unit Cost ($/m)	Annual Inflation	2025 Total Base Cost
0	No info - 75% of 300				1030
0	No info - average between 200 & 300				1200
0	No info - 75% of 400				1370
0	No info - average between 300 & 400				1600
0	No info - 75% of 500				1820
0	449	685	1134	0.03	2370
0	464	693	1157	0.03	2420
0	500	698	1198	0.03	2510
0	567	706	1273	0.03	2670
0	625	713	1338	0.03	2800

Water - Supply and Teatment

Infrastructure	Scenario	Current size	Future Size	Base Capital Costs	Total Construction Cost	Engineering Cost	Client Internal Cost	Project Contingency	Overall Cost	Overall Cost (HST incl)
WTP Expansion Doran	1		Adding 70 L/s	$ 20,000,000	$ 3,690,000	$ 2,370,000	$ 1,190,000	$ 2,370,000	$ 29,620,000	$ 30,150,000
WTP Expansion Carson	1		Adding 70 L/s	$ 20,000,000	$ 3,690,000	$ 2,370,000	$ 1,190,000	$ 2,370,000	$ 29,620,000	$ 30,150,000
3 Wells (Twin Wells, 1 Standby, Firm Capacity 140 L/s)	1	N/A	70 L/s	$ 7,500,000	$ 1,390,000	$ 890,000	$ 450,000	$ 890,000	$ 11,120,000	$ 11,320,000
3 Wells (Twin Wells, 1 Standby, Firm Capacity 80 L/s)	1	N/A	70 L/s	$ 7,500,000	$ 1,390,000	$ 890,000	$ 450,000	$ 890,000	$ 11,120,000	$ 11,320,000
Subtotal Water - Supply and Teatment										**$ 82,940,000**

Water - Vertical

Infrastructure	Scenario	Current size	Additional Capacity	Base Capital Costs	Total Construction Cost	Engineering Cost	Client Internal Cost	Project Contingency	Overall Cost	Overall Cost (HST incl)
Block 2 &3 BPS	1	N/A	107 L/s	$ 10,000,000	$ 1,850,000	$ 1,780,000	$ 600,000	$ 1,190,000	$ 15,420,000	$ 15,700,000
Block 5 BPS	1	N/A	21 L/s	$ 3,500,000	$ 650,000	$ 630,000	$ 210,000	$ 420,000	$ 5,410,000	$ 5,510,000
Employment Block BPS	1 - Employment	N/A	47 L/s	$ 5,000,000	$ 930,000	$ 890,000	$ 300,000	$ 600,000	$ 7,720,000	$ 7,860,000
Storage in Midurst	1	N/A	9300 m3	$ 35,000,000	$ 6,460,000	$ 6,220,000	$ 2,080,000	$ 4,150,000	$ 53,910,000	$ 54,860,000
Storage - Employment	1,2&3	N/A	3200 m3	$ 12,000,000	$ 2,220,000	$ 2,140,000	$ 720,000	$ 1,430,000	$ 18,510,000	$ 18,840,000
Subtotal Water - Vertical										**$ 102,770,000**

Water - Linear

Infrastructure	Scenario	Status	Pipe Length (m)	Pipe Size (mm)	Base Capital Cost (open cut)	Total Construction Cost	Engineering Cost	Client Internal Cost	Project Contingency	Overall Cost	Overall Cost (HST incl)
Block 2	1	New	4300	300	$ 6,700,000	$ 1,240,000	$ 1,200,000	$ 400,000	$ 800,000	$ 10,340,000	$ 10,530,000
Block 3	1	New	1600	300	$ 2,500,000	$ 470,000	$ 450,000	$ 150,000	$ 300,000	$ 3,870,000	$ 3,940,000
Block 5	1	New	900	300	$ 1,400,000	$ 260,000	$ 250,000	$ 90,000	$ 170,000	$ 2,170,000	$ 2,210,000
Employment Block	Employment	New	6141	300	$ 9,600,000	$ 1,780,000	$ 1,710,000	$ 570,000	$ 1,140,000	$ 14,800,000	$ 15,070,000
Subtotal Water - Linear											**$ 31,750,000**
GRAND TOTAL WATER											**$ 217,460,000**

Wastewater - Teatment

Infrastructure	Scenario	Current size	Future Size	Base Capital Costs	Total Construction Cost	Engineering Cost	Client Internal Cost	Project Contingency	Overall Cost	Overall Cost (HST incl)
WWTP	1	12,314 m3/day	19585 m3/day	$ 100,000,000	$ 18,450,000	$ 14,220,000	$ 5,930,000	$ 11,850,000	$ 150,450,000	$ 153,100,000
Subtotal Wastewater - Teatment										**$ 153,100,000**

Wastewater - Vertical

Infrastructure	Scenario	Current size	Future Size (L/s)	Base Capital Costs	Total Construction Cost	Engineering Cost	Client Internal Cost	Project Contingency	Overall Cost	Overall Cost (HST incl)
Block 3 PS	1	N/A	151	$ 13,000,000	$ 2,400,000	$ 2,310,000	$ 770,000	$ 1,540,000	$ 20,020,000	$ 20,380,000
Employment Block PS	Employment 1	N/A	121	$ 10,000,000	$ 1,850,000	$ 1,780,000	$ 600,000	$ 1,190,000	$ 15,420,000	$ 15,700,000
Subtotal Wastewater - Vertical										**$ 36,080,000**

Wastewater - Linear

Infrastructure	Scenario	Status	Pipe Length (m)	Pipe Size (mm)	Base Capital Cost (open cut)	Total Construction Cost	Engineering Cost	Client Internal Cost	Project Contingency	Overall Cost	Overall Cost (HST incl)
Block 2	1	New	4096	300	$ 6,400,000	$ 1,190,000	$ 1,140,000	$ 380,000	$ 760,000	$ 9,870,000	$ 10,050,000
Block 3	1	New	2600	300	$ 4,100,000	$ 760,000	$ 730,000	$ 250,000	$ 490,000	$ 6,330,000	$ 6,450,000
Block 5	1	New	1220	200	$ 1,500,000	$ 280,000	$ 270,000	$ 90,000	$ 180,000	$ 2,320,000	$ 2,370,000
Block 3 PS	1	New	722	300	$ 1,200,000	$ 230,000	$ 220,000	$ 80,000	$ 150,000	$ 1,880,000	$ 1,920,000
Employment Block PS	Employment -1	New	5403	525	$ 12,200,000	$ 2,260,000	$ 2,170,000	$ 730,000	$ 1,450,000	$ 18,810,000	$ 19,150,000
Subtotal Wastewater - Linear											**$ 39,940,000**
GRAND TOTAL WATER											**$ 229,120,000**

GRAND TOTAL SCENARIO 1	**$ 446,580,000**

Water - Supply and Teatment

Infrastructure	Scenario	Current size	Future Size	Base Capital Costs	Total Construction Cost	Engineering Cost	Client Internal Cost	Project Contingency	Overall Cost	Overall Cost (HST incl)
WTP Expansion										$ 16,560,231
Subtotal Water - Supply and Teatment										**$ 16,560,231**

Water - Vertical

Storage - Employment	1,2&3	N/A	3200 m3	$ 12,000,000	$ 2,220,000	$ 2,140,000	$ 720,000	$ 1,430,000	$ 18,510,000	$ 18,840,000
Subtotal Water - Vertical										**$ 18,840,000**

Water - Linear

Infrastructure	Scenario	Status	Pipe Length (m)	Pipe Size (mm)	Base Capital Cost (open cut)	Total Construction Cost	Engineering Cost	Client Internal Cost	Project Contingency	Overall Cost	Overall Cost (HST incl)
Block 2&3	2	New	1200	300	$ 1,900,000	$ 360,000	$ 340,000	$ 120,000	$ 230,000	$ 2,950,000	$ 3,010,000
Block 4	2&3	New	5375	300	$ 8,400,000	$ 1,550,000	$ 1,500,000	$ 500,000	$ 1,000,000	$ 12,950,000	$ 13,180,000
Block 5	Block 5	New	1000	300	$ 1,600,000	$ 300,000	$ 290,000	$ 100,000	$ 190,000	$ 2,480,000	$ 2,530,000
Subtotal Water - Linear											**$ 18,720,000**
GRAND TOTAL WATER											**$ 54,120,231**

Wastewater - Teatment

Infrastructure	Scenario	Current size	Future Size	Base Capital Costs	Total Construction Cost	Engineering Cost	Client Internal Cost	Project Contingency	Overall Cost	Overall Cost (HST incl)
WWTP Expansion										$ 46,400,926
Subtotal Wastewater - Teatment										**$ 46,400,926**

Wastewater - Vertical

Infrastructure	Scenario	Current size	Future Size (L/s)	Base Capital Costs	Total Construction Cost	Engineering Cost	Client Internal Cost	Project Contingency	Overall Cost	Overall Cost (HST incl)
Block 3 PS	2	N/A	151	$ 13,000,000	$ 2,400,000	$ 2,310,000	$ 770,000	$ 1,540,000	$ 20,020,000	$ 20,380,000
Block 4 PS - Scenario 2&3	2&3	N/A	121	$ 11,000,000	$ 2,030,000	$ 1,960,000	$ 660,000	$ 1,310,000	$ 16,960,000	$ 17,260,000
Block 5 PS	Block 5	N/A	72	$ 7,000,000	$ 1,300,000	$ 1,250,000	$ 420,000	$ 830,000	$ 10,800,000	$ 11,000,000
Employment Block PS	Employment 2&3	N/A	121	$ 11,000,000	$ 2,030,000	$ 1,960,000	$ 660,000	$ 1,310,000	$ 16,960,000	$ 17,260,000
Subtotal Wastewater - Vertical										**$ 65,900,000**

Wastewater - Linear

Infrastructure	Scenario	Status	Pipe Length (m)	Pipe Size (mm)	Base Capital Cost (open cut)	Total Construction Cost	Engineering Cost	Client Internal Cost	Project Contingency	Overall Cost	Overall Cost (HST incl)
Sandy Hallow Ravine, east of Ferndsale Dr	2	Upgrade	382	375	$ 700,000	$ 130,000	$ 130,000	$ 50,000	$ 90,000	$ 1,100,000	$ 1,120,000
Edgehill Dr	2	Upgrade	300	525	$ 800,000	$ 150,000	$ 150,000	$ 50,000	$ 100,000	$ 1,250,000	$ 1,280,000
Sunnidale Rd, Janice Dr, and Anne St	2	Upgrade	480	375	$ 800,000	$ 150,000	$ 150,000	$ 50,000	$ 100,000	$ 1,250,000	$ 1,280,000
Blake St, Kempenfelt Dr	2&3	Upgrade	1500	0	$ 4,700,000	$ 870,000	$ 840,000	$ 280,000	$ 560,000	$ 7,250,000	$ 7,380,000
Michael Cres, Celeste Dr, Birchwood Dr, Livia Herman Way, and Simposon St	2 - Block 5	Upgrade	620	0	$ 1,800,000	$ 340,000	$ 320,000	$ 100,000	$ 210,000	$ 2,770,000	$ 2,820,000
Osprey Rd, Snowy Owl Cres	2 - Block 5	Upgrade	310	525	$ 800,000	$ 150,000	$ 150,000	$ 50,000	$ 100,000	$ 1,250,000	$ 2,560,000
Block 2	2	New	477	300	$ 700,000	$ 130,000	$ 130,000	$ 50,000	$ 90,000	$ 1,100,000	$ 1,120,000
Block 4 - Scenario 2 Gravity main	2	New	1200	450	$ 2,900,000	$ 540,000	$ 520,000	$ 180,000	$ 350,000	$ 4,490,000	$ 4,570,000
Employment Block Gravity Main	Employment - 2&3	New	2475	450	$ 5,900,000	$ 1,090,000	$ 1,050,000	$ 350,000	$ 700,000	$ 9,090,000	$ 9,250,000
Block 3 PS	2	New	710	300	$ 1,200,000	$ 230,000	$ 220,000	$ 80,000	$ 150,000	$ 1,880,000	$ 3,840,000
Block 4 PS - Scenario 2 - Forcemain	2	New	850	300	$ 1,400,000	$ 260,000	$ 250,000	$ 90,000	$ 170,000	$ 2,170,000	$ 4,420,000
Block 5 PS	Block 5	New	831	200	$ 1,000,000	$ 190,000	$ 180,000	$ 60,000	$ 120,000	$ 1,550,000	$ 3,160,000
Employment Block Forcemain	Employment - 2&3	New	1050	300	$ 1,700,000	$ 320,000	$ 310,000	$ 110,000	$ 210,000	$ 2,650,000	$ 5,400,000
Subtotal Wastewater - Linear											**$ 48,200,000**
GRAND TOTAL WASTEWATER											**$ 160,500,926**

GRAND TOTAL SCENARIO 2	**$ 214,621,156**

Water - Supply and Teatment

Infrastructure	Scenario	Current size	Future Size	Base Capital Costs	Total Construction Cost	Engineering Cost	Client Internal Cost	Project Contingency	Overall Cost	Overall Cost (HST incl)
WTP Expansion										$ 11,019,235
Subtotal Water - Supply and Teatment										**$ 11,019,235**

Water - Vertical

Storage - Employment	1,2&3	N/A	3200 m3	$ 12,000,000	$ 2,220,000	$ 2,140,000	$ 720,000	$ 1,430,000	$ 18,510,000	$ 18,840,000
Subtotal Water - Vertical										**$ 18,840,000**

Water - Linear

Infrastructure	Scenario	Status	Pipe Length (m)	Pipe Size (mm)	Base Capital Cost (open cut)	Total Construction Cost	Engineering Cost	Client Internal Cost	Project Contingency	Overall Cost	Overall Cost (HST incl)
Block 4	2&3	New	5375	300	$ 8,400,000	$ 1,550,000	$ 1,500,000	$ 500,000	$ 1,000,000	$ 12,950,000	$ 13,180,000
Block 6	3	New	2100	300	$ 3,300,000	$ 610,000	$ 590,000	$ 200,000	$ 400,000	$ 5,100,000	$ 5,190,000
Subtotal Water - Linear											**$ 18,370,000**
GRAND TOTAL WATER											**$ 48,229,235**

Wastewater - Teatment

Infrastructure	Scenario	Current size	Future Size	Base Capital Costs	Total Construction Cost	Engineering Cost	Client Internal Cost	Project Contingency	Overall Cost	Overall Cost (HST incl)
WWTP Expansion										$ 30,879,374
Subtotal Wastewater - Teatment										**$ 30,879,374**

Wastewater - Vertical

Infrastructure	Scenario	Current size	Future Size (L/s)	Base Capital Costs	Total Construction Cost	Engineering Cost	Client Internal Cost	Project Contingency	Overall Cost	Overall Cost (HST incl)
Block 6 PS	3	N/A	221	$ 16,000,000	$ 2,960,000	$ 2,850,000	$ 950,000	$ 1,900,000	$ 24,660,000	$ 25,100,000
Block 4 PS - Scenario 2&3	2&3	N/A	121	$ 11,000,000	$ 2,030,000	$ 1,960,000	$ 660,000	$ 1,310,000	$ 16,960,000	$ 17,260,000
Employment Block PS	Employment 2&3	N/A	121	$ 11,000,000	$ 2,030,000	$ 1,960,000	$ 660,000	$ 1,310,000	$ 16,960,000	$ 17,260,000
Subtotal Wastewater - Vertical										**$ 59,620,000**

Wastewater - Linear

Infrastructure	Scenario	Status	Pipe Length (m)	Pipe Size (mm)	Base Capital Cost (open cut)	Total Construction Cost	Engineering Cost	Client Internal Cost	Project Contingency	Overall Cost	Overall Cost (HST incl)
Blake St, Kempenfelt Dr	2&3	Upgrade	1500	0	$ 4,700,000	$ 870,000	$ 840,000	$ 280,000	$ 560,000	$ 7,250,000	$ 7,380,000
Block 4 - Scenario3 Gravity main	2	New	1200	450	$ 2,900,000	$ 540,000	$ 520,000	$ 180,000	$ 350,000	$ 4,490,000	$ 4,570,000
Employment Block Gravity Main	Employment - 2&3	New	2475	450	$ 5,900,000	$ 1,090,000	$ 1,050,000	$ 350,000	$ 700,000	$ 9,090,000	$ 9,250,000
Block 4 PS - Scenario 2 - Forcemain	2	New	850	300	$ 1,400,000	$ 260,000	$ 250,000	$ 90,000	$ 170,000	$ 2,170,000	$ 4,420,000
Employment Block Forcemain	Employment - 2&3	New	1050	300	$ 1,700,000	$ 320,000	$ 310,000	$ 110,000	$ 210,000	$ 2,650,000	$ 5,400,000
Block 6 Gravity Main	3	New	950	450	$ 2,300,000	$ 430,000	$ 410,000	$ 140,000	$ 280,000	$ 3,560,000	$ 3,630,000
Block 6 Forcemain	3	New	1250	300	$ 2,000,000	$ 370,000	$ 360,000	$ 120,000	$ 240,000	$ 3,090,000	$ 6,300,000
Subtotal Wastewater - Linear											**$ 40,950,000**
GRAND TOTAL WASTEWATER											**$ 131,449,374**

GRAND TOTAL SCENARIO 3	**$ 179,678,609**

APPENDIX C

OPINION OF PROBABLE COST – ROADS

Cost Estimate for Potential Road Improvements

Roadway	Segment		No. of New Lanes	Approximate Length (km)	Scenario 1	Scenario 2	Scenario 3
	West/North Limit	East/South Limit					
Anne Street North	City north limit	Sunnidale Rd	1	1.0		$8,700,000	
Anne Street North Extension	Carson Rd	City north limit	1	2	$17,400,000		
	Approximately 1km north of city limit	City north limit	1	1		$8,700,000	
Anne Street South	Sunnidale Rd	Tiffin St	1	3.7		$31,755,000	
Bayfield Street North	City north limit	Coulter St	1	2.1	$18,270,000	$18,270,000	
Bayfield Street North (Hwy 26)	Spence Ave	City north limit	1	3.5	$30,450,000	$30,450,000	
Bayfield Street South	Coulter St	Simcoe St	1	1.6	$13,920,000	$13,920,000	
Blake Street	Dunlop St E	Penetanguishene Rd	1	2.4			$20,880,000
Bradford St	Dunlop St W	Tiffin St	1,2,1	1.5	$13,398,000	$16,940,000	$13,398,000
County Road 11 East	Hwy 400 Interchange	CR 93	1	1.0	$8,700,000		
County Road 11 West	CR 93	Project Limits	-	2.1			
County Road 43	Anne St N	Bayfield St	-	1.4			
County Road 53 South	CR 43	Ferndale Dr	1	4.1	$36,018,000		
County Road 90 E	CR 28(Geroge Johnston Rd)	CR 27	-	1.8			
County Road 90 W	10th Line	CR 28 (George Johnstone Rd)	-	2.0			
Cundles Road East	Lions Gate Blvd	Duckworth St	1	0.5			$4,350,000
Dunlop Street East	Bayfield St	Blake St	1	1.1			$9,831,000
Dunlop Street West	CR 27	Tiffin St	-	1.2			
Ferndale Drive North	City north limit	Dunlop St W	1	2.6	$22,968,000	$22,968,000	
Ferndale Drive South	Dunlop St W	Essa Rd	1	3.8	$33,147,000		
Highway 11	Hwy400	Line 1 N	-	3.0			
Highway 400	City north limit	City south limit	-	-			
Pentaguish Road	Blake St	CR 93	1	1.7			$14,529,000
St. Vincent Street Extension	Wattie Rd	City north limit	1	4.0	$34,800,000		
	Approximately 2km north of city limit	City north limit	1	2.0		$17,400,000	
Sunnidale Road East	City north limit	Bayfield St	1	3.3	$28,710,000	$28,710,000	$28,710,000
Sunnidale Road West	City north limit	Bayfield St	1	3.3	$28,710,000	$28,710,000	$28,710,000
Tiffin Street East	Anne St S	Lakeshore Dr	1	1.0	$8,700,000	$8,700,000	
Totals					**$295,191,000**	**$235,223,000**	**$120,408,000**