Water and Wastewater Capacity Assessment 2022 Year End Report

Town of The Blue Mountains

Water and Wastewater Services Division

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Abbreviations, Definitions and Units

Term or Abbreviation	Definition
ADD	Average Day Demand m^3/d (water): Total yearly demand divided by 365 days.
ADF	Average Day Flow m^3/d (wastewater): Total yearly flow divided by 365 days.
Built Capacity	Servicing capacity of existing built Town water and WWTP facilities and associated infrastructure.
BPS	Water Booster Pumping Station
CPUB	Town of Collingwood
Design Capacity	Servicing capacity of planned Town water capacity and wastewater treatment facilities and associated infrastructure based on designed and approved capacity, typically available when an ECA is obtained.
ICI	Industrial, Commercial, and Institutional
ILI	Infrastructure Leak Index
I&I	Inflow and Infiltration
EA	Environmental Assessment
ECA	Environmental Compliance Approval issued by MOECC
ESR	Environmental Study Report
Firm Capacity	Capacity available from infrastructure with largest component out of service.
kg/d	Kilograms per day
L/s	Litres per second
L/unit/day	Litres per equivalent unit per day
Leachate	A solution resulting from downward percolation of ground water through material.
m^3/d	Cubic meters per day
m^3/unit/d	Cubic meters per equivalent unit per day
MDD	Maximum Day Demand m^3/d (water)
MDF	Maximum Day Flow m^3/d (wastewater)
MECP	Ministry of the Environment, Conservation and Parks
PDF	Peak Day Flow m^3/d (wastewater)
Pressure Zone	Area including a lower and upper elevation that receives water from a hydraulic grade line.
psi	Pounds per square inch
Res.	Residential
Service Area	Settlement area identified in the Town's Official Plan that includes water and wastewater servicing.
Town	Town of The Blue Mountains
WTP	The Blue Mountains Water Treatment Plant
WW	Wastewater
WWPS	Wastewater Pumping Station
WWTP	Wastewater Treatment Plant

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Executive Summary

This report provides an assessment of water and wastewater treatment systems capacity within the Town for 2022. Current Town water supply and wastewater treatment infrastructure includes:

- The Blue Mountains Water Treatment Plant & Distribution System
- Supplemental water supply from the Town of Collingwood
- Thornbury Wastewater Treatment Plant & Collection System
- Craigleith Wastewater Treatment Plant & Collection System

According to Ministry of the Environment Conservation and Parks (MECP) Guideline D-5-1 entitled "Calculating and Reporting Uncommitted Reserve Capacity at Sewage and WTPs", "The number of lots in approved plans of subdivisions, developments committed by virtue of approved zoning, new official plans or site-specific official plan amendments, should not exceed the design capacity of the sewage and/or water system. To ensure that capacity is not exceeded it is necessary to determine what uncommitted reserve capacity is available. This procedure provides a means for determining uncommitted reserve capacity."[1] *** See note in TWWTP for modified calculation method.

Key Definitions: Allocations versus Reservations

Built capacity	Servicing capacity of existing built Town WTP and WWTP facilities and associated infrastructure (e.g. distribution and collections systems).
Design capacity	Servicing capacity of planned Town water supply and wastewater treatment facilities and associated infrastructure based on designed and approved capacity, typically available when an ECA is obtained.

Allocation* Commitment of built plant capacity; and "allocation of servicing capacity" or "allocated servicing capacity" shall have a corresponding meaning.

Reservation* Commitment of approved design capacity, available when design is completed, and approvals are obtained and "reservation of servicing capacity" or "reserved servicing capacity" shall have a corresponding meaning.

* To determine units available for allocation, built capacity will be used. To determine units available for reservation, planned and approved capacity (e.g. facility design complete, ECA obtained) will be used. If no planned or approved capacity is available, the total capacity for reservation and allocation is the built capacity.

[1] MECP guideline D-5-1 entitled, "Calculating and Reporting Uncommitted Reserve Capacity at Sewage and WTPs", updated March 1995.

Water Supply

1. Total Blue Mountains WTP Capacity

The firm capacity available from the Blue Mountains WTP is 15,140 m^3/day. The Town receives up to 1,250 m^3/day supplemental supply from the Town of Collingwood.

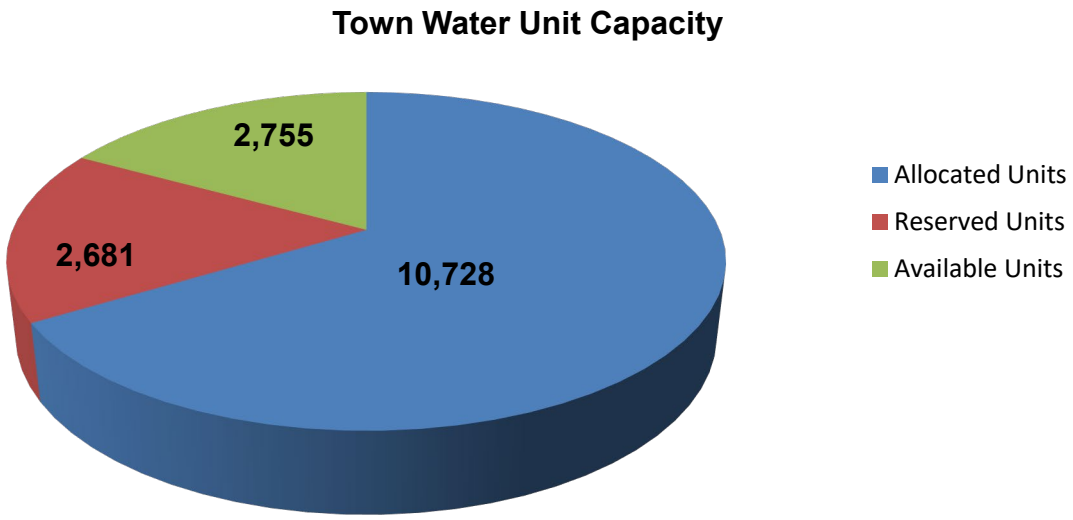
Therefore, the total firm water capacity available is 16,390 m^3/day or 16,164 units based on the 5-year rolling MDD of 1.014 m^3/unit/day.

2. Available Water Capacity

A total demand of 10,878 m^3/day (10,728 units) is currently connected or allocated to the water system based on a 5-year rolling average maximum daily demand of 1.014 m^3/unit/day.

A total flow of 2,764 m^3/day (2,681 units) is currently reserved at 1.014 m^3/unit/day.

Of the 16,164 total units of water supply available, there are currently 13,409 units allocated and reserved. Therefore, the current available capacity of the Town's water supply is 2,755 units.



Thornbury Wastewater Treatment Plant

1. Total Thornbury WWTP Capacity

The total firm ADF built capacity available at the Thornbury WWTP is 3,580 m^3/day or 3,925 units based on the 5-year rolling ADF of 0.912 m^3/unit/day.

2. Available Wastewater Capacity Based on Planning Projections

A total flow of 3,325 m^3/day (3,646 units) is currently connected or allocated to the Thornbury WWTP based on a 5-year rolling ADF. There are currently 3,646 units allocated and 187 reserved. Therefore, using planning projections the current available uncommitted reserve capacity based on built capacity is 92 units. However, as shown below not all units are physically connected.

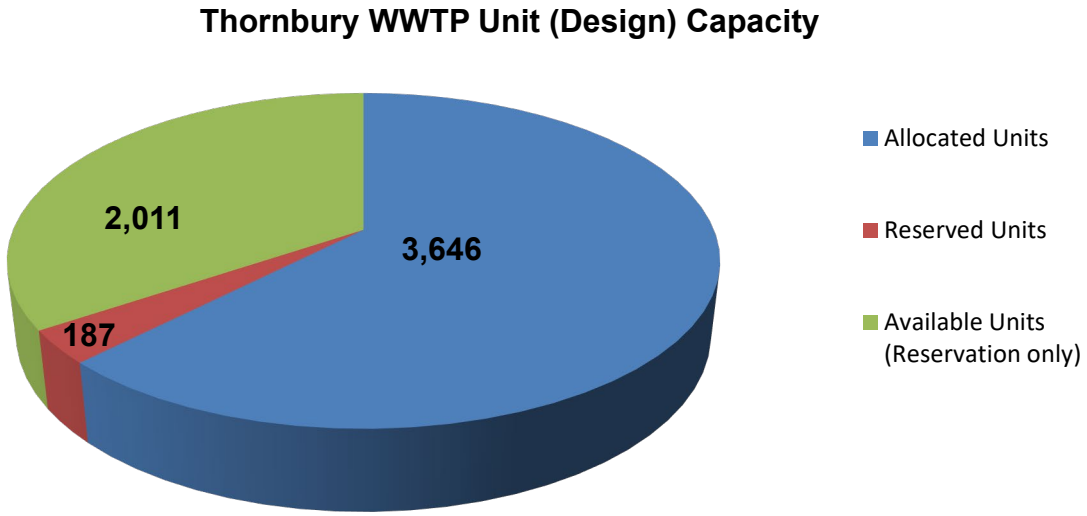
The Thornbury WWTP is quickly approaching capacity based on allocated and reserved units. However, there are 559 units (187 reserved + 372 can connect) which are not physically connected to the Thornbury WWTP.

The MECP guideline for Year End reporting has been modified through discussion between the Town, Grey County and the MECP. The purpose of the modified method is to optimize the use of the Thornbury WWTP built capacity prior to commencing construction of additional capacity. Upon completion of construction of all proposed Phase 1A works, for which the Town has approval to construct, the ADF Design Capacity available will be 5,330 m^3/d or 5,844 units based on an ECA received in 2019. Therefore, the current available uncommitted reserve capacity based on design capacity is 2,011 units.

The PDF flow at the Thornbury WWTP in 2022 was 6,928 m^3/day. The design PDF for the Thornbury WWTP is 7,196 m^3/d. The PDF typically occurs during a period of snow melt or a significant wet weather event. The peak day occurred on February 17, 2022, during an unprecedent rain event. The peak flow event did exceed the peak capacity of the treatment plant.

3. Thornbury WWTP Estimated Expansion Timeline

The Town has commenced with the expansion of the Thornbury WWTP. It is anticipated that the work will be completed in the fourth quarter of 2024. The Thornbury WWTP is operating at 76% of the built capacity based on a five (5) year rolling average.



Craigleith Wastewater Treatment Plant

1. Total Craigleith WWTP Capacity

The total firm ADF built capacity available at the Craigleith WWTP is 8,133 m^3/day or 12,609 units based on the five-year rolling ADF of 0.645 m^3/unit/day.

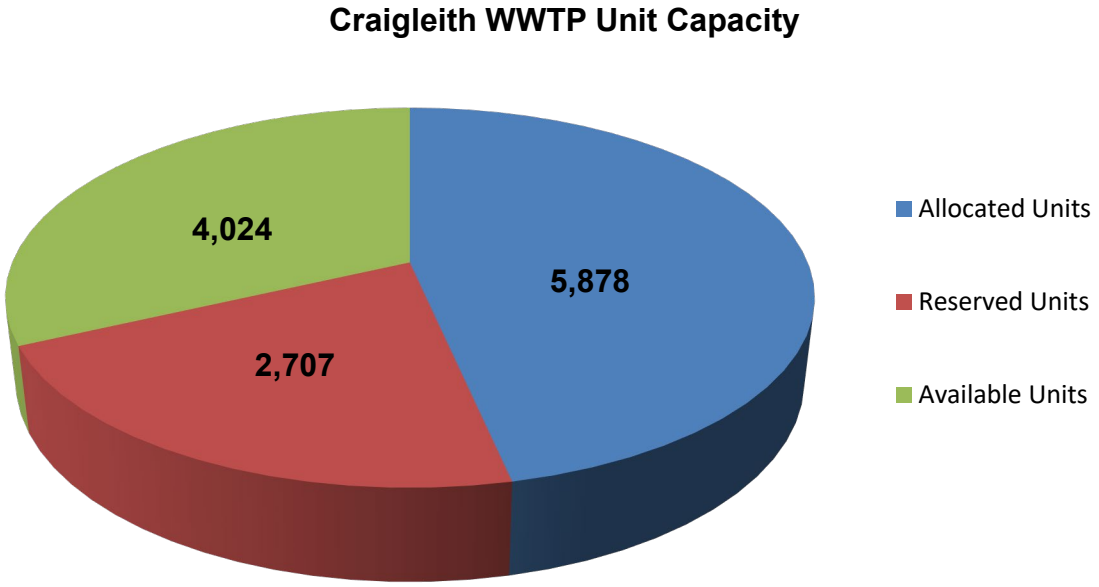
2. Available Wastewater Capacity

A total flow of 3,791 m^3/day (5,878 units) is currently connected or allocated to the Craigleith WWTP, based on a five-year rolling ADF. There are currently 5,878 units allocated and 2,707 units reserved. Therefore, the current uncommitted reserve capacity on built capacity is 4,024 units.

The PDF flow at the Craigleith WWTP in 2022 was 9,767 m^3/day. This was on February 17, 2022. The design PDF for the Craigleith WWTP is 19,640 m^3/d. The PDF typically occurs during a period of significant wet weather or a snow melt event.

3. Craigleith WWTP Estimated Expansion Timeline

Based on the 2022 five year rolling ADF of 3,385 m^3/day, the Craigleith WWTP is operating at 42% of the built capacity and as such, there is no immediate need to expand the Craigleith WWTP.



1.0 Introduction

1.1 Purpose

This report provides an assessment of water and wastewater treatment capacity within the Town of The Blue Mountains (Town) for 2022. Current Town water and wastewater supply and treatment infrastructure includes:

- The Blue Mountains Water Treatment Plant & Distribution System
- Supplemental water supply from the Town of Collingwood
- Thornbury Wastewater Treatment Plant & Collection System
- Craigleith Wastewater Treatment Plant & Collection System

In addition, this report provides a review of the capacity of water storage reservoirs, BPS, WWPS and identifies current or proposed system upgrades or expansion projects.

1.2 The Blue Mountains Official Plan

1.2.1 Servicing Policies

Section D1 of the Official Plan outlines the Town's servicing policies. It identifies the preference for municipal water and wastewater servicing requirements for each Service Area within the Town, establishes policies for the provision of private or municipal water and wastewater servicing, defines requirements for servicing of existing residents, as well as reservation and allocation limitations and requirements for new development.

Section D1.4 of the Official Plan describes five development-staging categories based on development approval status and the corresponding level of commitment of WTP or WWTP infrastructure capacity. The process makes commitment of capacity for existing unserviced development. Figure 1 in Appendix A provides an overview of the development staging process and requirements for moving through the process for both new and existing unserviced development. Development is identified as having "No Capacity", "Reservation", or "Allocation" depending on the stage.

Development staging categories identified in Section D of the Official Plan correspond with the development categories used in the Year End Report as identified in Figure 1, and as discussed below.

1.2.2 Development Categories

The Town's Year End Reports have historically identified 7 categories of connection status within the Town. See Appendix A.

1. Connected – includes all connected units
2. Can connect – includes all existing units and vacant lots fronting servicing that are not connected
3. Committed – includes all new units that are identified in an executed development agreement
4. Not fronting, Not Serviced – includes existing units and vacant lots within a service area that do not front servicing
5. Designated active lands – includes units in areas with draft plan approval
6. Other lands designated – includes units in areas that are designated but do not have draft plan approval

7. Other lands not designated – includes units in areas that require Official Plan Amendments and have no approval

1.3 Key Definitions: Allocations versus Reservations

Built capacity	Servicing capacity of existing built Town WTP and WWTP facilities and associated infrastructure (e.g. distribution and collections systems).
Design capacity	Servicing capacity of planned Town water supply and wastewater treatment facilities and associated infrastructure based on designed and approved capacity, typically available when an ECA is obtained.

Allocation* Commitment of built plant capacity; and "allocation of servicing capacity" or "allocated servicing capacity" shall have a corresponding meaning.

Reservation* Commitment of approved design capacity, available when design is completed, and approvals are obtained and "reservation of servicing capacity" or "reserved servicing capacity" shall have a corresponding meaning.

* To determine units available for allocation, built capacity will be used. To determine units available for reservation, planned and approved capacity (e.g. facility design complete, ECA obtained) will be used. If no planned or approved capacity is available, the total capacity for reservation and allocation is the built capacity.

1.4 Methodology for Calculating Available Capacity

The following sections describe the methodology used to calculate the uncommitted capacity available for "reservation" and "allocation" as defined above. The approach has been adapted from the MECP Guideline as described below.

1.4.1 MECP Guideline for Calculating Reserve Capacity

The MECP has a Guideline D-5-1 entitled "Calculating and Reporting Uncommitted Reserve Capacity at Sewage and WTPs". The latest revision is March 1995. The reserve capacity calculation is intended to ensure that committed developments do not exceed the design capacity of the wastewater and/or water works.

In general, the Guideline recommends calculating reserve capacity as follows:

Reserve Capacity = Approved Design Capacity – Existing Flows – Committed Flows

Where: Approved Design Capacity of a WTP or a WWTP is described as the capacity that may be defined in a Design Report or the Environmental Compliance Approval.

Existing Flows is the flow based on a rolling average of five (5) year historical flow (average inflow for WWTPs, peak inflow for wastewater pumping stations, maximum day demand for WTPs and peak day demand for BPS).

Committed Flows includes all units identified as can connect, committed, not fronting, not serviced and designated active lands.

The MECP suggests that the calculation may be modified to account for any of the following deviations:

- Widely variable seasonal flow fluctuations due to infiltration or seasonal population.
- Rapid development/growth which may dramatically increase the forecasted flows.
- Large industrial facilities which may impact flows.

- Per capita flow projection which may be substantially different from historical flows.

In addition, operating conditions at water and wastewater treatment facilities may necessitate the need to modify the formula to account for capacity loss. For example, a facility may have a deficiency and is not capable of meeting its approved design capacity, or water quality/effluent quality parameter.

1.4.2 Adaptation of MECP Guideline D-5-1 for Year End Reporting

The MECP Guideline D-5-1 entitled "Calculating and Reporting Uncommitted Reserve Capacity at Sewage and WTPs", as discussed above, has been adapted for use in calculating capacity at the Town's treatment facilities.

The following provides an overview of the formula and method of applying historical data to be used in the subsequent sections of this document. The MECP Procedure for Calculating and Reporting Uncommitted Reserve Capacity, permits three to five years of records to be used in establishing representative MDDs. The Town has utilized a five (5) year rolling average in its Year End Reports.

The following calculation is used to determine total facility capacity (units):

$$\text{Total Facility Capacity (units)} = \frac{\text{Facility Built or Design Capacity (m3/day)}}{\text{5 Year Rolling Per Unit Flow Rate (m3/unit/day)}}$$

The Facility Built Capacity (m^3/day) – The total flow that can be treated by the built capacity of the facility based on historical average flows.

Total Facility Design Capacity (units) – Units available for reservation based on planned and approved capacity (design complete, ECA obtained, but not built). If no planned or approved capacity is available, the capacity available for reservation and allocation is the plant-built capacity. It is recognized that the number of units that can be serviced will change from year to year because the per unit flow rate will change with time.

Per Unit Flow Rate (m^3/unit/day) - Determined based on a review of historical data as discussed in Section 1.4.3.

If the units available for allocation is negative (e.g. Total Facility Built Capacity (Units) < total units allocated), the facility is over allocated and additional capacity is required. Although this would indicate that the facility would receive flows or demands higher than the operating capacity, it is noted that units identified in Categories 2 and 3 are not necessarily connected. However, the Town is obligated to service units in Categories 2 and 3 and thus must ensure that the capacity is available when a connection is made.

If the units available for reservation is negative (e.g. Total Facility Design Capacity (Units) < total units allocated + total units reserved), then an ECA is required to increase the Design Capacity of facility to allow for additional reservation of servicing capacity.

Total Units Allocated*…. is the sum of units identified in development categories 1 to 3.

Total Units Reserved*….is the sum of units identified in development category 5.

* Note: Development categories are defined under section 1.2.2

The above methods for calculations have been further modified for the Thornbury WWTP (see section 5.0)

1.4.3 Application of Historical Data to Determine Per Unit Flow Rates

To ensure that the per unit flow rate adequately represents credible flows / demands, an assessment of monthly and peak data for five years is analysed to determine a five (5) year rolling average. There are two main reasons for adopting this approach. Firstly, to accommodate for variances in flows and

demands based on weather patterns and reduce fluctuation in the per unit flow rate on a yearly basis; and secondly, to ensure that changes in demands related to demographic shifts and changing development do not overly influence the criteria. These two issues are further discussed below.

Water

Maximum day water demands are used to size water treatment facilities and are generally influenced by seasonal factors because peak per unit demands during hot, dry summer periods are higher than those experienced during wet, cooler summers. Using a historical 5 year rolling average to establish the per unit MDD rate will ensure that yearly changes in demands due to weather patterns do not unduly influence the MDD rate and the potential impact of anomalies in data can be mitigated.

Wastewater

Wastewater average daily flows are used to size wastewater treatment facilities and are generally influenced by seasonal factors due to use of summer and winter facilities by residents and tourists. Typical wet weather flows occur in the spring and fall of each year. Using a five (5) year rolling ADF to establish the per unit ADF rate will ensure that yearly changes in demands due to weather patterns do not unduly influence the ADF rate and potential impact of anomalies in data can be mitigated.

The calculation of WWPS capacity is based on historical instantaneous peak flows since there is quite limited capacity to store wastewater or mitigate an increase in flow like a WWTP.

In summary, the following data will be reported and used to determine the per unit flow rate.

Per Unit Maximum Day Water Demand (MDD/unit) – five (5) year rolling average maximum day demand that occurred within the record period.

Per Unit Average Day Wastewater Flow (ADF/unit) – five (5) year rolling average daily flow that occurred over the record period.

Per Unit Peak Wastewater Flow (PDF/unit) - Maximum instantaneous peak daily flow that occurred over the record period.

Firm Capacity - Capacity of a facility with the largest mechanical unit out of service.

1.4.4 Variations in Planning Versus Actual Units

Throughout the Report there is a small variation noted in the Planning projections versus actual number of units. In 2009, the way the connected units were compiled resulted in a slight discrepancy in the numbers from Planning and the numbers from Infrastructure & Public Works. Recently the numbers were migrated from previous spread sheets to the current GIS format and the discrepancy has followed.

Planning Staff undertook a thorough investigation and a comprehensive analysis of the connected units to both the water and wastewater systems for the 2021-unit count. This analysis included utilizing the Town's GIS database, billing database, Google Earth and in some instances, an actual walk through of areas. Significant changes were made, and when it was apparent that unit count had been incorrect for several years, the connected units were changed back to 2012.

2.0 Population and Service Areas

The following sections review population data for the Town and discuss the service areas within the Town and their respective servicing requirements as identified in the Official Plan. The different service areas are outlined on the maps in Appendix B. The population data reviewed in this section is used to project total equivalent population. Capacity status reporting is done on a per equivalent unit basis to account for fluctuations in permanent population. However, it is important to monitor population density with time because a change in per unit density may correspond with a change in per unit flow rates. The Town may experience changes in unit densities due to demographic shifts and as seasonal residences become permanent residences.

2.1 Historical and Services Population

Table 2.1 tabulates the number of units and population from Census Canada for 2001, 2006, 2011, 2016 and 2021. The table represents only the permanent residential units and population. Census Canada only tabulates occupants at their principal residence (not seasonal residences).

Table 2.1 Census Canada Population Data

	Grey County			**The Blue Mountains**		
Year	**Total Units**	**Population**	**Persons/Unit**	**Total Units**	**Population**	**Persons/Unit**
2001	35,325	89,073	2.52	2,585	6,116	2.37
2006	37,185	92,411	2.49	2,939	6,825	2.33
2011	38,042	92,568	2.43	2,846	6,452	2.27
2016	39,563	93,830	2.37	3,271	7,025	2.15
2021	42,704	100,905	2.36	4,350	9,390	2.15

From Table 2.1, the unit density for permanent residents in the Town was 2.15 persons per unit in 2021. This figure is slightly lower than the Grey County density of 2.36 persons per unit, which dropped slightly from the previous census. Although these figures do not include the significant seasonal component of the Town's population, they are the most accurate figures available for estimating the unit density at this time. Thus, the unit residential density of 2.15 will be used for permanent and part time units.

Tables 2.2 and 2.3a, 2.3b and 2.3c tabulate the number of equivalent units and population serviced by the Town's water and wastewater systems. Industrial, Commercial, and Institutional units are included as equivalent units, whereas the residential component is actual units (including permanent and seasonal units).

Table 2.2 Town Water System Equivalent Serviced Population

Water Units				
Year	Residential Water Units	Equivalent ICI Water Units**	Total Equivalent Water Units	Total Equivalent Serviced Population*
2013	4,857	3,235	8,092	18,369
2014	4,934	3,236	8,170	18,546
2015	5,018	3,241	8,259	18,748
2016	5,144	3,261	8,405	18,071
2017	5,485	3,124	8,609	18,509
2018	5,718	3,136	8,854	19,036
2019	5,977	3,076	9,053	19,464
2020	6,269	3,088	9,357	20,118
2021	6,631	3,088	9,719	20,896
2022	6,888	3,094	9,982	21,461

*Equivalent service population is based on the Census Canada unit density for the Town of The Blue Mountains as described in Table 2.1. The Total Equivalent Water Units is multiplied by the current unit density of 2.15.

**Equivalent ICI Water units are based on Ainley and Associates 1985 "Basis for Equivalent Units" File No. 81170 (see Appendix H).

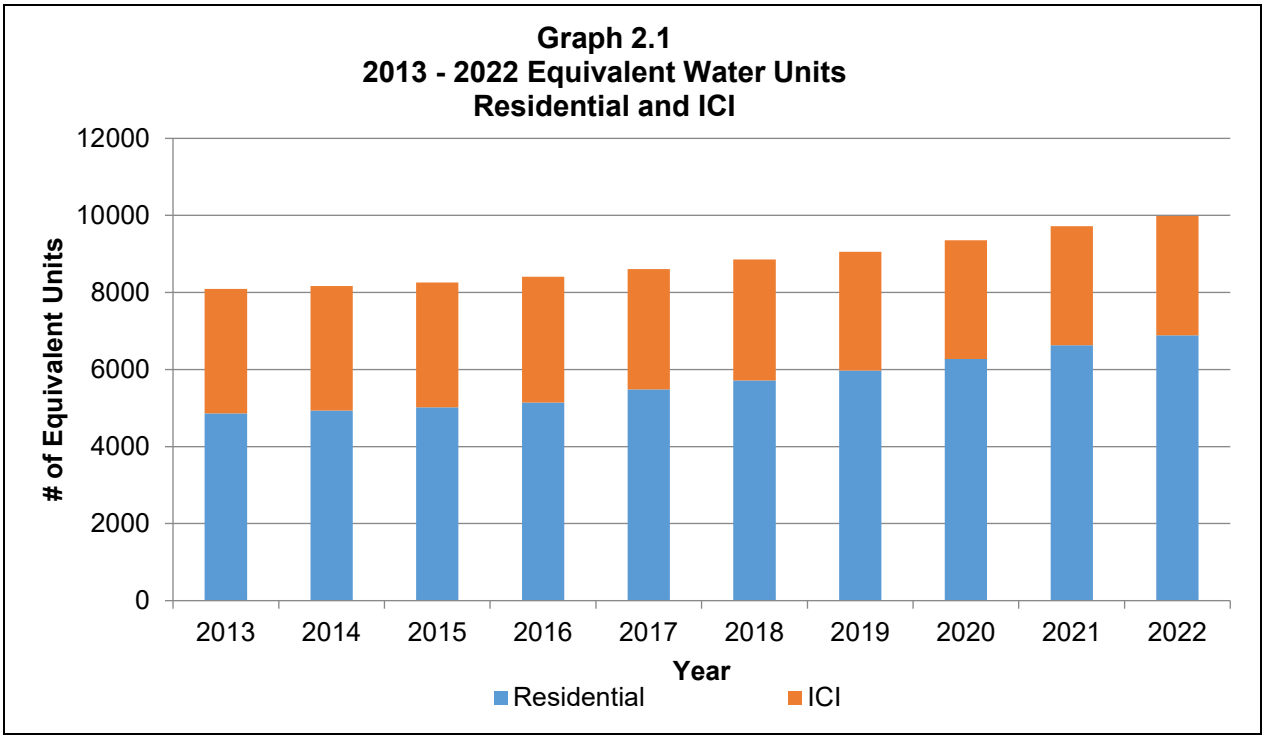


Table 2.3a Thornbury Wastewater System Equivalent Serviced Population

Wastewater Units – Thornbury WWTP				
Year	**Thornbury Residential WW Units**	**Thornbury Equivalent ICI WW Units**	**Thornbury Total Equivalent WW Units**	**Equivalent Serviced Population* Thornbury WWTP**
2013	1,832	615	2,447	5,555
2014	1,903	615	2,518	5,716
2015	1,942	579	2,521	5,723
2016	1,993	579	2,572	5,530
2017	2,088	580	2,668	5,736
2018	2,161	582	2,743	5,897
2019	2,256	582	2,541	5,463
2020	2,333	612	2,945	6,332
2021	2,518	612	3,130	6,729
2022	2,662	612	3,274	7,039

*Equivalent service population is based on the Census Canada unit density for the Town of The Blue Mountains as described in Table 2.1. The Total Equivalent WW Units is multiplied by the current unit density of 2.15.

Table 2.3b Craigleith Wastewater System Equivalent Serviced Population

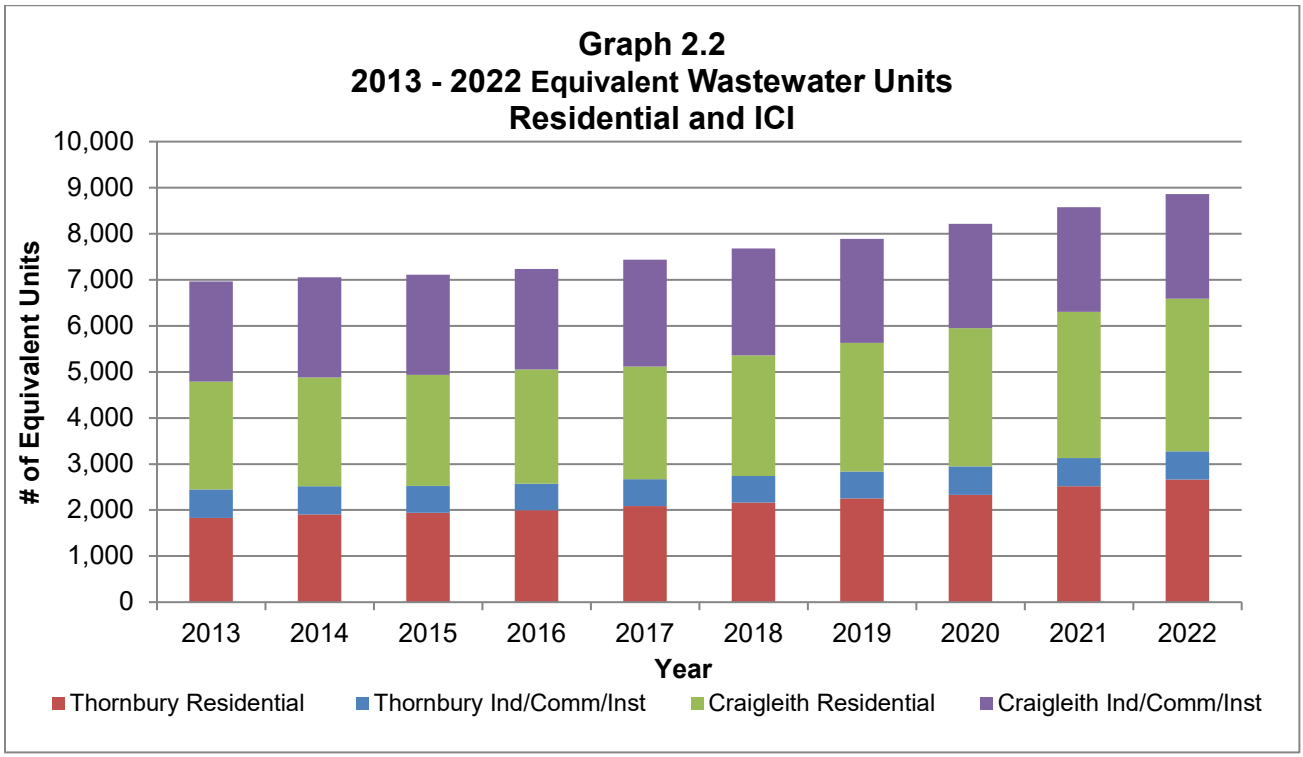
Wastewater Units – Craigleith WWTP				
Year	**Craigleith Residential WW Units**	**Craigleith Equivalent ICI WW Units**	**Craigleith Total Equivalent WW Units**	**Equivalent Serviced Population* Craigleith WWTP**
2013	2,340	2,176	4,516	10,251
2014	2,361	2,176	4,537	10,299
2015	2,415	2,176	4,591	10,421
2016	2,483	2,178	4,661	10,021
2017	2,448	2,318	4,766	10,247
2018	2,617	2,318	4,935	10,610
2019	2,794	2,256	5,050	10,858
2020	3,005	2,268	5,273	11,337
2021	3,175	2,268	5,443	11,702
2022	3,312	2,275	5,587	12,012

*Equivalent service population is based on the Census Canada unit density for the Town of The Blue Mountains as described in Table 2.1. The Total Equivalent WW Units is multiplied by the current unit density of 2.15.

Table 2.3c Town Wastewater Systems Equivalent Serviced Population (Thornbury & Craigleith)

	Wastewater Units			Equivalent Serviced Population*		
Year	Residential WW Units Craigleith & Thornbury	Equivalent ICI WW Units Craigleith & Thornbury	Total Equivalent WW Units	Craigleith WWTP	Thornbury WWTP	Total Population
2013	2,340 + 1,832 = **4,172**	2,176 + 615 = **2,791**	6,963	10,251	5,555	15,806
2014	2,361 + 1,903 = **4,264**	2,176 + 615 = **2,791**	7,055	10,299	5,716	16,015
2015	2,415 + 1,942 = **4,357**	2,176 + 579 = **2,755**	7,112	10,421	5,723	16,144
2016	2,483 + 1,993 = **4,476**	2,178 + 579 = **2,757**	7,233	10,021	5,530	15,951
2017	2,448 + 2,088 = **4,536**	2,318 + 580 = **2,898**	7,434	10,247	5,736	15,983
2018	2,617 + 2,161 = **4,778**	2,318 + 582 = **2,900**	7,678	10,610	5,897	16,507
2019	2,794 + 2,256 = **5,050**	2,256 + 582 = **2,838**	7,888	10,858	5,463	16,321
2020	3,005 + 2,333 = **5,338**	2,268 + 612 = **2,880**	8,218	11,337	6,332	17,669
2021	3,175 + 2,518 = **5,693**	2,268 + 612 = **2,880**	8,573	11,702	6,729	18,431
2022	3,312 + 2,662 = **5,974**	2,275 + 612 = **2,887**	8,861	12,012	7,039	19,051

*Equivalent service population is based on the Census Canada unit density for the Town of The Blue Mountains as described in Table 2.1. The Total Equivalent WW Units is multiplied by the current unit density of 2.15.



3.0 Water Capacity Assessment

3.1 The Blue Mountains WTP Capacity

The Blue Mountains WTP draws water from Georgian Bay for treatment and distribution. The WTP uses microfiltration, ultraviolet irradiation and gas chlorine disinfection for the treatment of water. The firm capacity of the WTP is 15,140 m^3/day.

3.1.1 Collingwood Supply

A water supply agreement was signed in 2015 by the Town and the Town of Collingwood for the purchase of up to 1,250 m^3/day on a permanent basis from Collingwood. Water is supplied from the Collingwood Water System via the Mountain Road BPS. In addition to the Mountain Road BPS, the Collingwood Water System provides water to the Crestview development on Grey Road 21. The Town of Blue Mountains provides water to Collingwood residents along Long Point Road.

3.1.2 Total Water Supply

The total available firm capacity including the WTP and supply from Town of Collingwood is 16,390 m^3/day, (15,140 + 1,250).

3.2 Water Demand

3.2.1 Water Daily Demand

The following table, which includes the supplemental supply from Town of Collingwood, summarizes the annual average day demand (ADD) and maximum day demand (MDD) from 2013 to 2022. For the purposes of calculating the total capacity required, the MDD is used.

Table 3.1 Five Year Rolling Average Water Demands

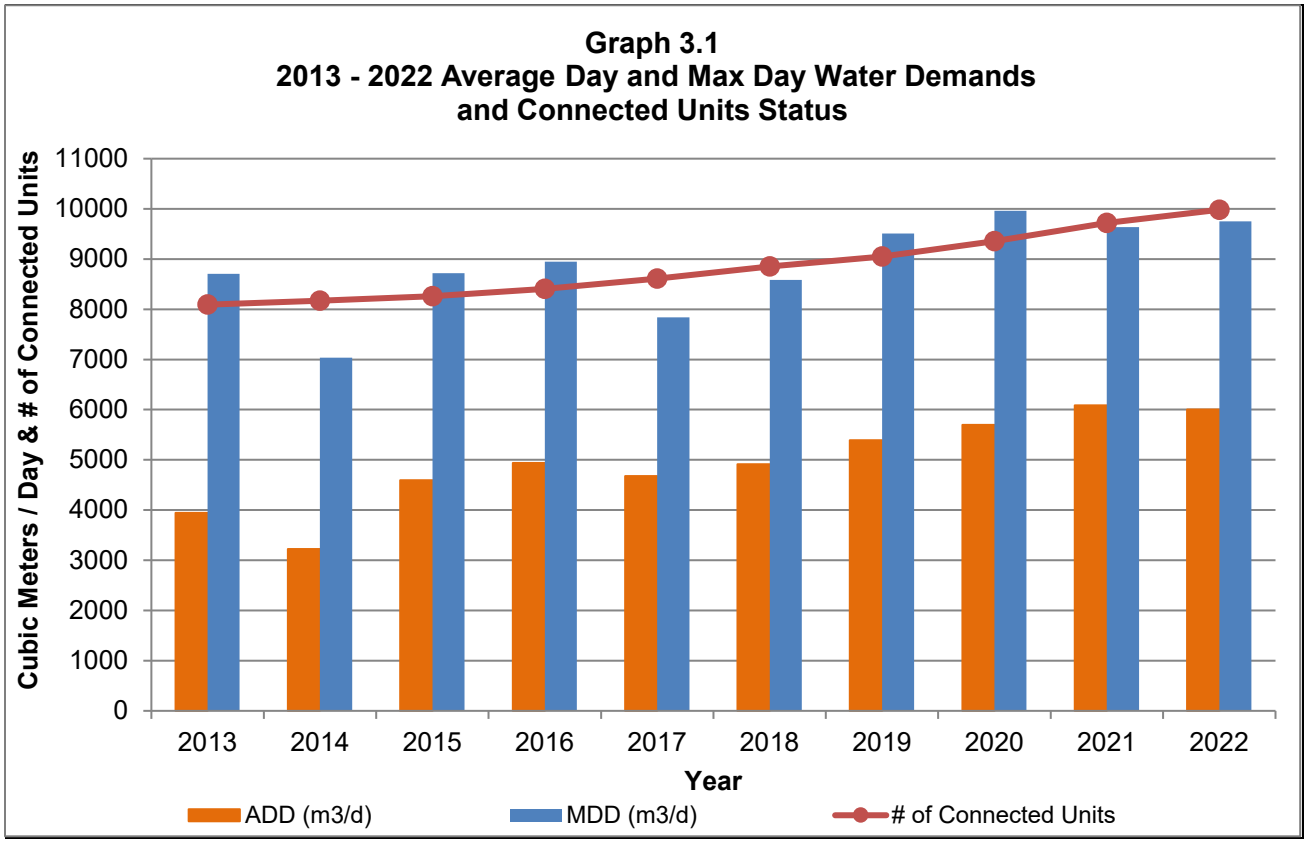
Year	# of Units	ADD (m^3/d)	ADD (m^3/unit/d)	5 Year Rolling Average ADD (m^3/unit/d)	MDD (m^3/d)	MDD (m^3/unit/d)	5 Year Rolling Average MDD (m^3/unit/d)
2013	8,092	3,941	0.487	0.490	8,704	1.076	1.108
2014	8,170	3,224	0.395	0.512	7,035	0.861	1.033
2015	8,259	4,591	0.556	0.511	8,721	1.056	1.036
2016	8,405	4,940	0.588	0.518	8,950	1.065	0.994
2017	8,609	4,680	0.544	0.514	7,838	0.910	1.044
2018	8,854	4,911	0.555	0.528	8,582	0.969	0.972
2019	9,053	5,389	0.595	0.568	9,507	1.050	1.010
2020	9,357	5,699	0.609	0.578	9,959	1.064	1.012
2021	9,719	6,087	0.626	0.586	9,635	0.991	0.997
2022	9,982	6,005	0.602	0.597	9,753	0.997	1.014
		2022 5 Year Rolling ADD/Unit = 0.597 m3/unit/day			2022 5 Year Rolling MDD/Unit = 1.014 m3/unit/day		

3.2.2 Top 10 Yearly Maximum Day Demands

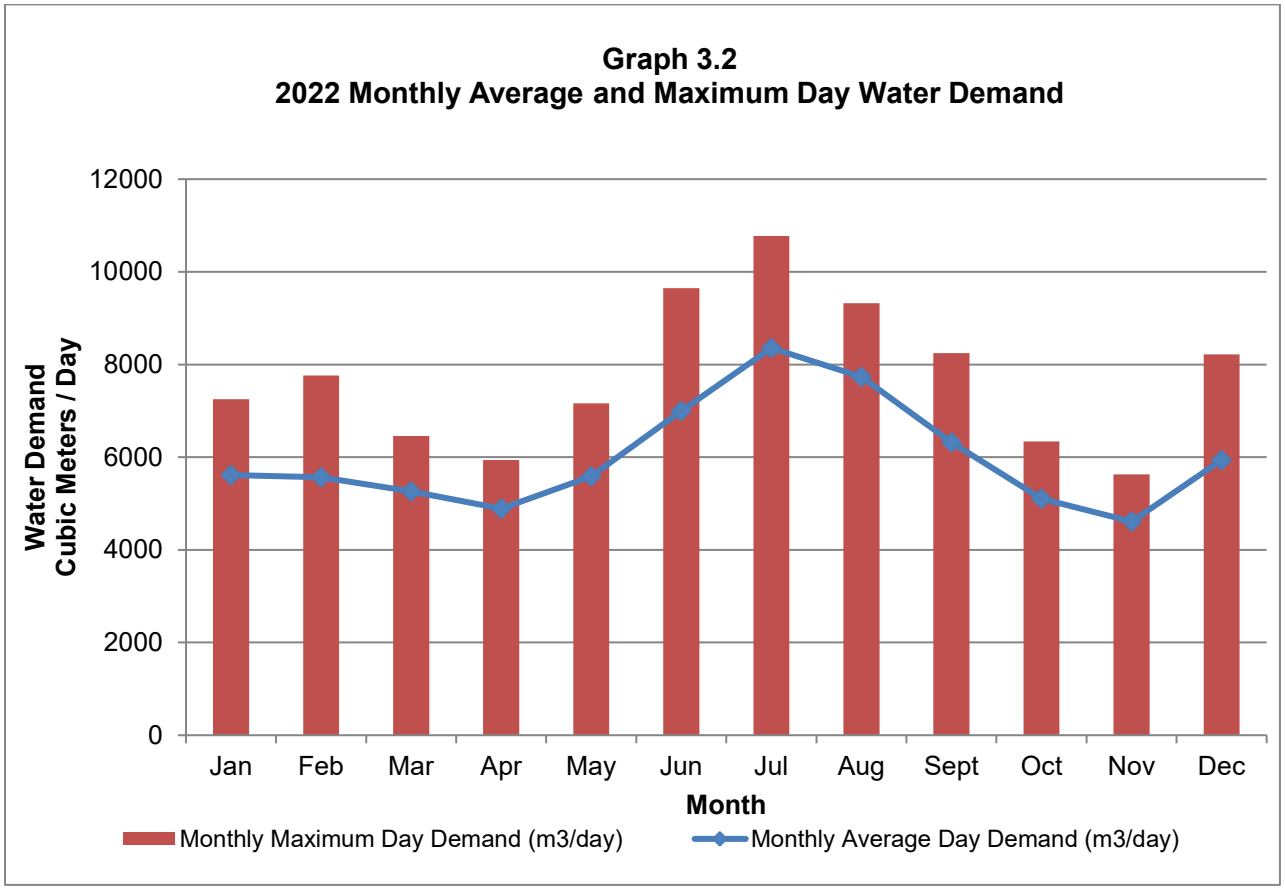
Tables A16 to A17 in Appendix E summarize the top ten highest demands that occurred in 2021 and 2022. Maximum day water demands typically occur during the summer period when water use increases due to activities such as lawn watering, the ten highest demand days for 2022 were in June, July and August. The MDD in 2022 was on July 2, 2022 (10,775m^3).

3.2.3 Monthly Average and Maximum Demand Data

Graph 3.1 below illustrates the comparison of average and maximum day water demands from 2013-2022. While the number of connected units rises gradually each year, there is a slight increase in the average water demand since 2015. The maximum daily water demand has been increasing since 2017, however, in 2021, it was slightly lower than the previous year. Cooler wet summers result in slightly lower maximum daily water demand, while hot dry summers result in a slightly higher maximum daily water demand, due to increase water taking for irrigation purposes.



A comparison of average to maximum day water consumption for 2022 is illustrated in Graph 3.2 below. The monthly demands tend to decline during spring and fall months and increase during summer and winter months.



3.3 The Blue Mountains WTP and Collingwood Supply Capacity

As discussed in Section 3.1, the firm capacity available from The Blue Mountains WTP in 2022 was 15,140 m³/day and the supplemental supply from Collingwood was 1,250 m³/day. Therefore, the total built capacity is 16,390 m³/day.

Using the per unit rolling five (5) year MDD from Table 3.1 to determine the total number of units that can be supplied, results in the following:

Built Capacity: $\frac{16{,}390\ \mathrm{m^3/day}}{1.014\ \mathrm{m^3/unit/day}} = 16{,}164\ units$

Therefore, the Total Built Capacity is 16,164 units.

3.3.1 Water Capacity Status

Table 3.2 summarizes the 2022 capacity status. A breakdown of the water supply capacity status is included in Appendix D.

Table 3.2 2022 Water Unit Status

Year End Report Category	Official Plan Capacity Status	Number of Units	Demand (m^3/d)*
1. Connected	Allocated	9,982	10,122
2. Can Connect	Allocated	746	756
3. Committed	Allocated	0	0
Sub-Total Allocated (1+2+3)		10,728	10,878
4. Not Fronting, Not Serviced	Reserved	821	832
5. Designated Lands – Active	Reserved	1,860	1,886
Sub-Total Reserved (4+5)		2,681	2,718
Total Can Connect + Committed + Not Fronting, Not Serviced + Designated Lands Active (2+3+4+5)		3,427	3,475
Total Allocated + Reserved (1+2+3+4+5)		13,409	13,597
6. Designated Lands – Other	Not Recognized	6,962	7,059
7. Not Designated	Not Recognized	3,030	3,072
Sub-Total Not Recognized (6+7)		9,992	10,132
Grand Total (1+2+3+4+5+6+7)		23,401	23,729

* number of units multiplied by the 5-year rolling average MDD identified in Table 3.1

3.3.2 Allocated and Reserve Capacity

Using data from Tables 3.1 and 3.2, reserve capacity for the Town's Water Supply is determined using the calculation from Section 1.4.2

Total Built Capacity = 16,164 units (as identified in Section 3.3)

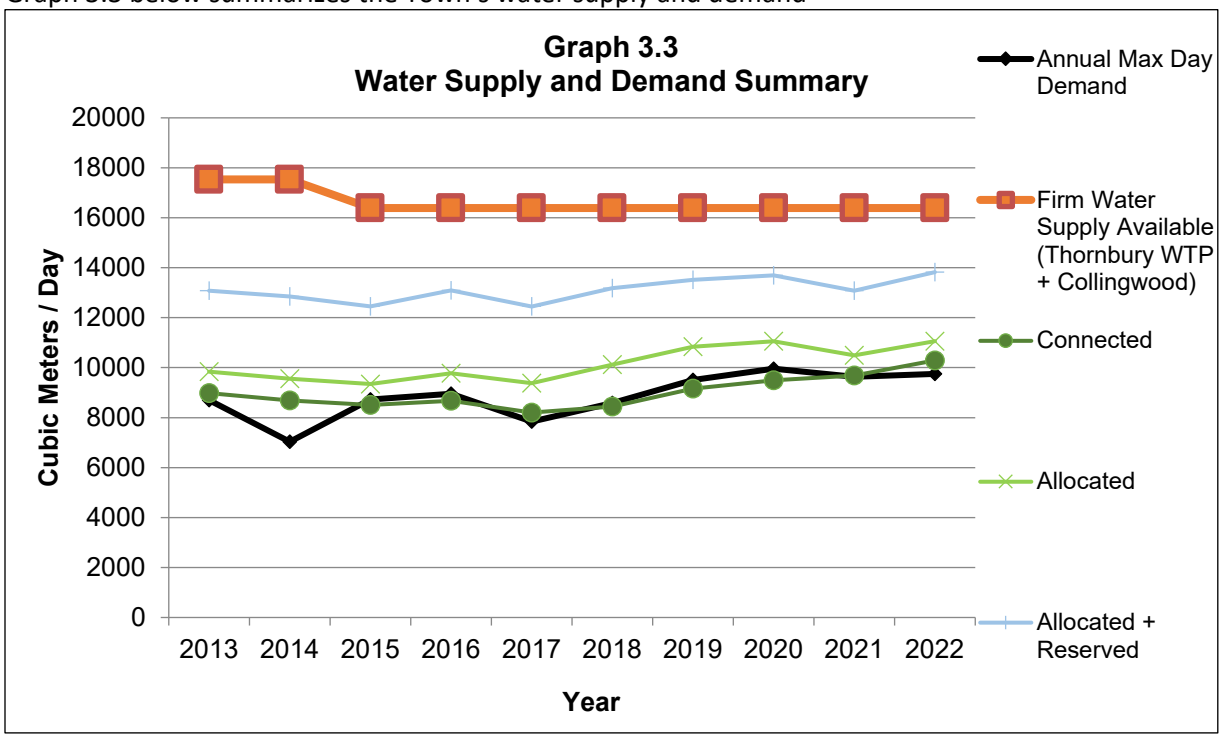
Connected Demand = 9,982 units (connected units as identified in Table 3.2)

Reserved Demand = 3,427 units (total reserved units as identified in Table 3.2)

Therefore: **Units Available for Reservation** = 16,164 – 9,982 – 3,427 = 2,755 units

3.3.3 Flow & Unit Summary

Graph 3.3 below summarizes the Town's water supply and demand



The WTP has adequate capacity to support existing system users and development. Consideration for additional capacity will be required as demand and the user base continues to grow.

Currently the WTP has three (3) microfiltration trains providing a firm capacity of 15,140 m^3/day. Ultimate built WTP capacity will include an additional two (2) microfiltration trains for a total of five (5). These five (5) trains will provide the Town with a firm capacity of 30,280 m^3/day. However, other modifications to the WTP to realize this capacity, including modifications to the clearwell, pumping capacity and transmission capacity. A solution to the Town's long-term water supply needs is currently being assessed through the Eastside Water Supply and Storage Class Environmental Assessment project.

3.4 Existing Infrastructure by Pressure Zone

Although the water supply is adequate for the Town's water demand, individual components of the distribution system can be inadequate and therefore a review of key components is warranted.

3.4.1 Firm Capacity of Existing Water Booster Stations by Pressure Zone

The following is a list of existing storage facilities and booster stations within each Pressure Zone currently receiving the Town's water supply and their respective firm capacities. Appendix C Water Pressure Zone Boundary Map illustrates the boundaries of Pressure Zones 1-5.

Craigleith – Pressure Zone 4

- Existing storage reservoir capacity is 5,000 m^3.
- Arrowhead Road Booster Station has a firm capacity of 68 L/s.
- Mountain Road Booster Station has an operating limit of 14.5 L/s reflecting the Collingwood Agreement but is physically capable of supplying 46 L/s that may be utilized with prior consent from Collingwood.

Swiss Meadows – Pressure Zone 5

- Water Storage Standpipe has a reservoir capacity of 536 m³.
- Happy Valley Booster Station has a firm capacity of 5 L/s.

Camperdown – Pressure Zone 1 & 3

- Camperdown Reservoir and Booster Station has a reservoir capacity of 2,662 m³ and a firm capacity of 25 L/s
- Camperdown Court Booster Station has a firm capacity of 85 L/s
- Wards Road Booster Station has a firm capacity of 16 L/s

Thornbury – Pressure Zone 1

- Elevated Water Tower has a capacity of 747 m³
- Thornbury Reservoir and BPS has a reservoir capacity of 3,400 m³ and a firm capacity of 174 L/s

Lora Bay – Pressure Zone 2

- 10th Line Booster Station has a firm capacity of 100 L/s

3.4.2 Pressure Zone 4 (Arrowhead Road BPS)

The Arrowhead Road BPS and the supplemental water supply from Collingwood provide water to the Craigleith Service Area (Pressure Zone 4) and Swiss Meadows (Pressure Zone 5). The BPS is also able to direct supplemental water supply from Collingwood to pass through the station to Pressure Zone 1 when necessary.

As noted in Section 3.3.1, the firm capacity of the Arrowhead Road BPS is 68 L/s or 5,875 m^3/day and the supply available from Collingwood is 14.5 L/s or 1,250 m^3/day. Therefore, a total of 7,125 m^3/day can be supplied to Pressure Zone 4 and Pressure Zone 5.

Using the 5-year rolling average of the per unit MDD to determine the total number of units that can be supplied results in the following:

$$\frac{7{,}125\ m3/day}{1.014\ m3/day} = 7{,}027 \text{ units}$$

Currently, 6,648 units in Pressure Zones 4 and 5 are connected or have received allocation (Categories 1 to 3). Based on the design capacity reported above, the current available allocation capacity for the Zone 4 and 5 is 263 units or 271 m³/day (7,027 – 6,648 = 379 units).

Existing reservoirs and Pump Stations are capable of meeting historical water demands. The findings of the East Side Storage and Supply Class Environmental Assessment will determine the upgrade requirements.

3.4.3 Water Storage Facilities

Table 3.3 summarizes the existing water storage facilities within the Town's water system, the servicing capacity of each facility and the number of approved units within the Pressure Zones.

Storage capacity has three main components: emergency, fire, and equalization storage.

Table 3.3 Summary of Water Storage Capacity by Pressure Zone

Pressure Zone	Storage Capacity (m^3)
Craigleith (Pressure Zone 4)	5,000
Swiss Meadows (Pressure Zone 5)	536
Camperdown (Pressure Zone 3)	2,662
Thornbury (Pressure Zone 1)	4,180
Total Existing	12,378 m^3

A Pressure Zone analysis completed by C3 Water Inc. in "Technical Memorandum 6: Upgrade Implementation Plan" dated August 9, 2016 stated that:

- Pressure Zones 1 & 2 have an existing deficit of 2,500 m^3 requiring the addition of storage.
- Pressure Zones 3 & 5 have sufficient storage to meet present and future demands (to build out in 2033).
- Pressure Zone 4 will have sufficient storage to meet 2033 requirements if the pumping capacity of Arrowhead BPS is upgraded.

In 2018, the Town undertook a Town-Wide Water Distribution Master Plan Class Environmental Assessment, (Water MPEA), to establish a long-term solution for the provision of water servicing. Followed by the West-side Water Storage Municipal Class Environmental Assessment (MCEA) to address the drinking water storage and pumping capacity deficiencies in West Pressure Zones 1, 2 and 3. The preferred solutions included rehabilitation of the existing Victoria Street water towns, construction of a new water reservoir at the 10th Line Booster Station, an additional new feedermain from the 10th Line Booster Station to the intersection of Lora Bay Drive and West Ridge Drive, and pump upgrades at the Upper Camperdown Booster Pumping Station.

In 2021, the Town has initiated an East-side Water Storage and Supply MCEA to select the preferred solution to address the Town's water storage needs and supply deficiencies in the Town's Eastern Pressure Zones.

3.5 Infrastructure Leak Index

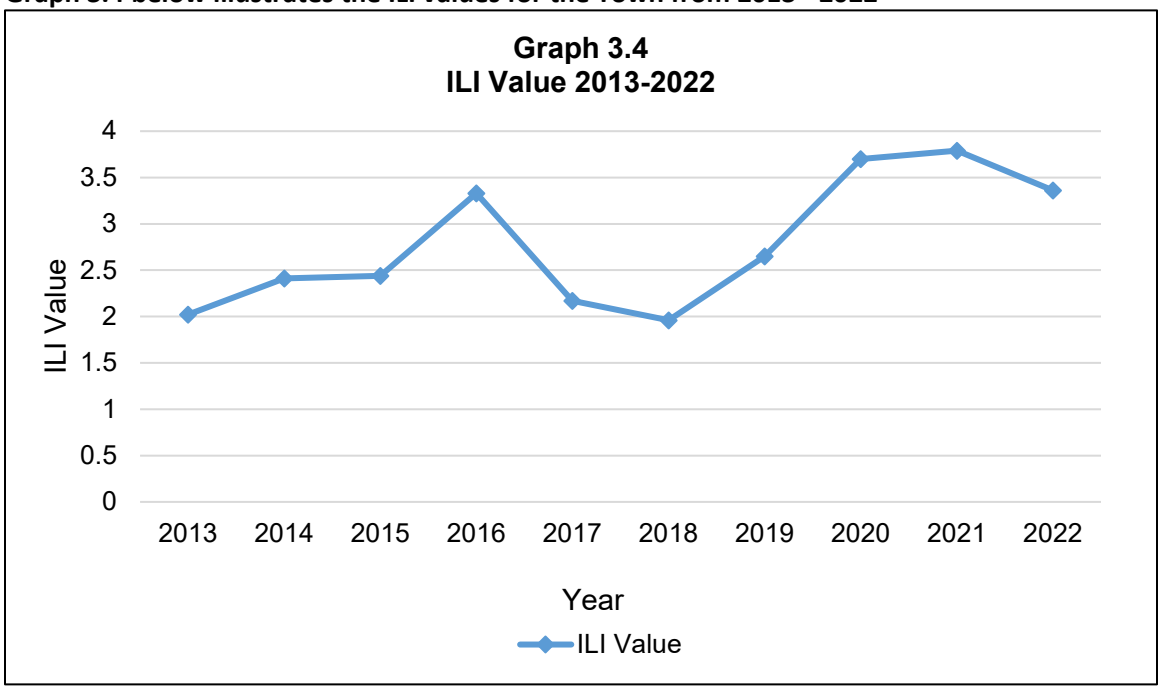
The Infrastructure Leakage Index (ILI) is a performance indicator of a system's water loss. ILI was developed by the International Water Association. The ILI is the ratio of current annual real losses to unavoidable annual real losses. It is derived from the structural and operational characteristics of the distribution system and is considered by the industry as a better indicator of a system's condition. The ILI calculation considers the length of service connections, the operating pressures, the length of the system and the number of users on the system.

There are four technical performance categories utilized for ILI values by the International Water Association Water Loss Task Force:

ILI 1 to 2	EXCELLENT	Further loss reduction may be uneconomical unless there are shortages.
ILI 2 to 4	GOOD	Potential for marked improvements, consider pressure management, better active leakage control practices and improved network maintenance.

ILI 4 to 8	POOR	Poor leakage record, tolerable only if water is plentiful and cheap, analyze level and nature of leakage and intensify leakage reduction efforts.
ILI >8	VERY BAD	Very inefficient use of resources; leakage reduction programs imperative and high priority.

Graph 3.4 below illustrates the ILI values for the Town from 2013 - 2022



The Town falls within the 'Good' range for managing non-revenue water or real losses. However, this category also identifies room for improvement and continual monitoring to further reduce the losses.

In 2022, the Town has undertaken a Water Loss Gap Analysis. This work includes a comprehensive review of water loss control initiatives and highlights opportunities to improve water loss management. The work includes a water audit review, billing data analysis, and production meter assessment.

Table 3.4 Summary of Water Produced, Consumed and Lost

Year	2014	2015	2016	2017	2018	2019	2020	2021	2022
Water Produced (TBM) (ML)	1176.8	1452.9	1618.2	1541.0	1585.3	1793.4	1899.8	2033.7	2004.1
Imported Water (ML)	312.8	222.9	190.0	171.0	212.7	185.0	198.4	198.7	199.6
Exported Water (ML)	2.6	54.8	24.0	25.9	31.5	32.9	35.5	42.9	40.3
Total Water Available (ML)	1487.0	1621.0	1784.2	1686.2	1766.5	1945.5	2062.7	2189.4	2163.5
Billed Authorized Consumption (ML)	967.9	1054.3	1124.3	1057.0	1164.6	1335.6	1281.7	1258.2	1292.0
Unbilled Authorized Consumption (ML)	172.2	208.3	202.1	288.5	202.6	194.9	218.7	331.4	323.7
Apparent Losses* (ML)	100.7	101.1	101.5	102.2	102.4	102.9	103.2	103.4	103.4
Real Losses** (ML)	246.3	257.3	356.3	238.4	296.9	312.1	562.4	599.8	547.8
Real Water Loss (%)	16.6%	15.9%	20.0%	14.1%	16.8%	16.0%	27.26%	27.39%	25.32%
Total Water Loss (%)	23.3%	22.1%	25.7%	20.2%	22.6%	21.3%	32.26%	32.11%	30.10%

* Apparent Losses includes unauthorized consumption, customer metering inaccuracies and systematic data handling errors.

** Real Losses includes the total volume of water that cannot be accounted for.

The total percentage of water loss for 2022 was 30.10%. This was slightly lower than 2021.The Town is currently undertaking a leak detection program to identify and repair leaks to reduce the water loss. In addition, the Town has started a program to install flow meters on the watermains entering large developments on private lands. A mass balance with the individual residential meters will assist in identifying leaks on private lands.

In 2022, Staff repaired 3 watermain breaks and21 service connection leaks. One of the watermain breaks was identified on the transmission main between Thornbury and the Arrowhead Booster Station. This was a significant break, that was challenging to repair, due to its location and depth. The break was identified on the July 1st long weekend. The water usage over this weekend was significantly higher than any other single day. While the two max-day demands occurred over this weekend, it was significantly higher than the next highest max-day demand, and previous years. Staff choose to use the max-day demand from July 8th, which appears to be more aligned with previous years, and not influenced by a significant leak in the transmission main.

Staff continue to search for leaks, and evidence of water theft. Water theft has been found in new developments, with Construction Companies illegally operating curbstops, utilizing unmetered connections for water during construction, leaving curbstops running during winter months to prevent freezing and establishing stations to facilitate water theft.

4.0 Thornbury Wastewater Capacity Assessment

4.1 Thornbury WWTP Capacity

The Thornbury WWTP utilizes the activated sludge process, a variation of extended aeration, aerated grit removal, phosphorus removal by alum addition, secondary clarification, and disinfection by ultraviolet irradiation to treat wastewater. Treated effluent is discharged to the Beaver River via a gravity outfall. The Thornbury WWTP ADF capacity is 3,580 m^3/day. The rated PDF capacity is 7,196 m^3/day.

4.2 Inflow Rates

Table 4.1 summarizes the ADF and PDF that occurred over the period from 2013 to 2022.

Table 4.1 Thornbury WWTP Historical Flows

Year	# of Units	ADF (m^3/day)	ADF (m^3/unit/day)	5 Year Rolling ADF (m^3/unit/day)	PDF (m^3/day)	PDF (m^3/unit/day)	5 Year Rolling PDF (m^3/unit/day)
2013	2,447	2,540	1.038	0.995	7,448	3.043	3.212
2014	2,518	2,055	0.816	0.963	7,327	2.910	3.086
2015	2,559	1,836	0.717	0.911	4,546	1.776	2.738
2016	2,626	2,332	0.888	0.870	10,580	4.023	2.903
2017	2,668	2,767	1.037	0.899	7,617	2.854	2.921
2018	2,743	2,660	0.970	0.885	7,656	2.791	2.871
2019	2,868	2,780	0.969	0.916	6,696	2.334	2.756
2020	2,945	3,123	1.060	0.985	8,397	2.851	2.971
2021	3,130	2,567	0.820	0.971	9,118	2.913	2.749
2022	3,274	2,430	0.742	0.912	6,928	2.116	2.601
		2022 5 Year Rolling ADF/Unit = 0.912m^3/day 2022 5 Year Rolling ADF = 2,712m^3/day			2021 5 Year Rolling PDF/Unit = 2.601m^3/day 2021 5 Year Rolling PDF = 7,759m^3/day Peaking Factor = 2.86		

The Thornbury WWTP rated capacity is 3580 m^3/day. The above data shows that the ADFs over the past five-year period have remained relatively constant, although there have been increased connections to the Thornbury WWTP. The ADF per unit has remained relatively consistent, with minor fluctuations. The 2022 ADF per unit is 0.742 m^3/day. The five-year rolling ADF is 2,712 m^3/day.

The PDFs are influenced by wet weather events. The total rainfall for 2020 and 2021 was average for the Thornbury area. The PDFs remained in an acceptable range. The ADF per unit in 2022 and 2021 was significantly lower than in 2020. The PDF per unit was significantly lower in 2022 than previous year. The PDF is often influenced by heavy rain events. The five-year rolling average PDF per unit is 2.116 m^3/day. The five-year rolling average PDF per unit is 2.601 m^3/day. The five-year rolling average PDF slightly exceeds the Thornbury WWTP's rated PDF capacity of 7,196 m^3/day, as this plant is reaching its rated capacity. During heavy rain events, excess influent is diverted to the lagoon system.

The existing flow to the Thornbury WWTP is utilizing 76% of the available ADF built capacity based on the 2022 five year rolling average.

5 Year ADF 2,712 m^3/day x 100% = 76%

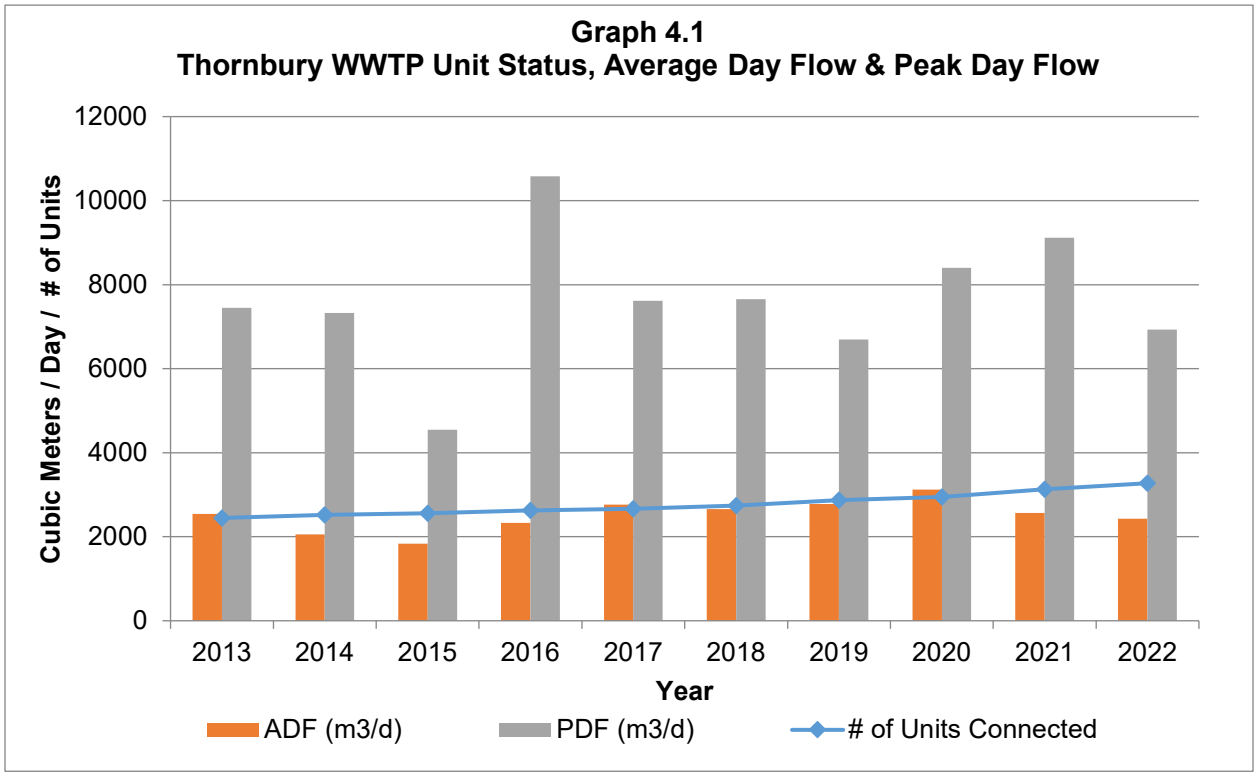
Built Capacity 3,580 m^3/day

The Town has completed the final design of the Phase 1A Plant Expansion. Construction is expected to commence in the second quarter of 2023 and completed in the fourth quarter of 2024. The Phase 1A expansion will increase the capacity to the facility to 5330 m^3/day. The engineering for Phase 1B will commence in 2024. The Phase 1B expansion will increase the capacity to 7,080 m^3/day.

Tables B16 and B17 in Appendix F show the ten highest PDFs for 2021 and 2022. General findings that can be drawn for the data are:

- In 2022 the PDF of 6,928 m^3 occurred on February 17, 2022. This was during a heavy rain event.
- Five of the ten highest peak flow events in 2022 occurred in the March, following rainfall events.
- Inflow and Infiltration in the Thornbury WWTP sewer shed significantly influence the flows to the WWTP.

Graph 4.1 illustrates a comparison of the number of wastewater units, the ADF and the PDF from 2013 to 2022.



4.3 Total Thornbury WWTP Capacity

4.3.1 Built & Design Capacity

As discussed in Section 4.1 the ADF built capacity of the Thornbury WWTP is 3,580 m^3/day. Using the five-year rolling ADF per unit flow rate to determine the total number of units that can be serviced results in the following:

Total Facility Built Capacity: $\frac{3{,}580\ \mathrm{m^3/day}}{0.912\ \mathrm{m^3/unit/day}} = 3{,}925\ \mathrm{units}$

As discussed in Section 4.1, the Town currently has an Environmental Compliance Approval (ECA) that allows for the ADF capacity of the Thornbury WWTP to increase to 5,330 m³/day upon completion of the Phase 1A expansion. The Town has currently incorporated into the 2022 budget the Phase 1A. The Town will commence with the final design for Phase 1B in 2024. This will increase the ADF to 7,080 m³/day when the work is completed. In consideration that the Town only has an ECA with an approved expansion of 5,330 m³/day, this capacity will be used to determine the capacity of the Thornbury WWTP. Using the historical five-year ADF per unit flow rate to determine the total number of units that can be serviced results in the following:

Total Facility Design Capacity $\frac{5{,}330\ \mathrm{m^3/day}}{0.912\ \mathrm{m^3/unit/day}} = 5{,}844\ \mathrm{units}$

4.3.2 Thornbury WWTP Capacity Status

Graph 4.2 summarizes the 2022 capacity status. A breakdown of the Thornbury WWTP capacity status is included in Appendix D.

Table 4.22022 Thornbury WWTP Unit Status

Year End Report Category	Official Plan Capacity Status	Number of Units	Flow (m³/d)*
1. Connected	Allocated	3274	2,986
2. Can Connect	Allocated	372	339
3. Committed	Allocated	0	0
Sub-Total Allocated (1+2+3)		3,646	3,325
4. Not Fronting, Not Serviced	Not Recognized	986	899
5. Designated Lands – Active	Reserved	187	171
Sub-Total Reserved(4+5)		1,173	1,070
Total Allocated + Reserved (2+3+5)		1,545	1,409
6. Designated Lands – Other	Not recognized	1,746	1,592
7. Designated Lands – No Proposal	Not recognized	2,715	2,476
Sub-Total Not Recognized (6+7)		4,461	4,068
Grand Total (1+2+3+4+5+6+7)		9,280	8,463

*number of units multiplied by the 5-year rolling average ADF identified in Table 4.1

The "MECP Guideline for Year End Reporting" has been modified through discussions between the Town, Grey County and the MECP. The purpose of the modified method is to optimize the use of the Thornbury WWTP built capacity prior to commencing construction of additional capacity. The capacity calculation described below will outline the methodology used to calculate the uncommitted capacity available for Thornbury WWTP reservation.

4.3.3 Allocated and Reserve Capacity

For the purposes of calculating Committed Flows for the Thornbury WWTP only, the following definitions will be used:

Connected Servicing Capacity = Built Capacity – ADF

Built Capacity = 3,580 m^3/day (Section 4.1)
Connected Flows = 2,986 m^3/day (Table 4.1)

Therefore:

Allocated Servicing Capacity = 3,580 – 2,986 = 594 m^3/day

Units available for allocation is $\frac{594\ \mathrm{m3/day}}{0.912\ \mathrm{m3/unit/day}} = 651\ \mathrm{units}$

Allocated Servicing Capacity = Built Capacity – ADF – Allocated Flows

Built Capacity = 3,580 m^3/day (Section 4.1)
Connected Flows = 2,986 m^3/day (Table 4.1)
Allocated Flows = 339 m^3/day (Can Connect + Committed Table 4.2)

Therefore:

Allocated Servicing Capacity = 3,580 – 2,986 – 339 (Committed Flows) = 255 m^3/day

Units available for allocation is $\frac{255\ \mathrm{m3/day}}{0.912\ \mathrm{m3/unit/day}} = 279\ \mathrm{units}$

Reserved Servicing Capacity

The Reserved Servicing Capacity is determined as follows:

Design Capacity = 5,330 m^3/day (Section 4.1)
Connected Flows = 2,986 m^3/day (Table 4.2)
Reserved Flows = 510 m^3/day (Can Connect + Designated Lands Active Table 4.2)

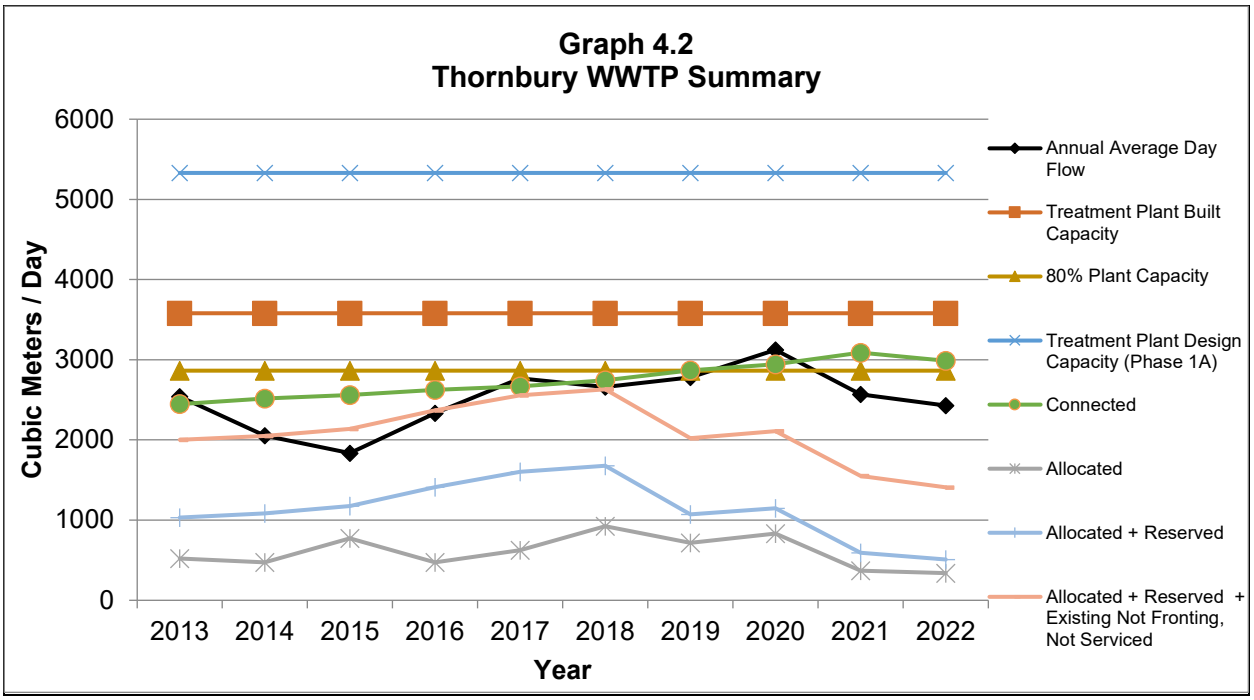
Therefore:

Reserved Servicing Capacity = 5,330 – 2,986 – 510 = 1,834 m^3/day

Units Available for reservation is $\frac{1{,}834\ \mathrm{m3/day}}{0.912\ \mathrm{m3/unit/day}} = 2{,}011\ \mathrm{units}$

4.3.4 Flow & Unit Summary

Graph 4.2 below summarizes the Thornbury WWTP flows and units.



4.4 Flow Projections and Estimated Expansion Timeline

Graph 4.3 below provides a projection of the Thornbury WWTP connected, allocated and reserved units. The Thornbury WWTP is currently at 76% of capacity.

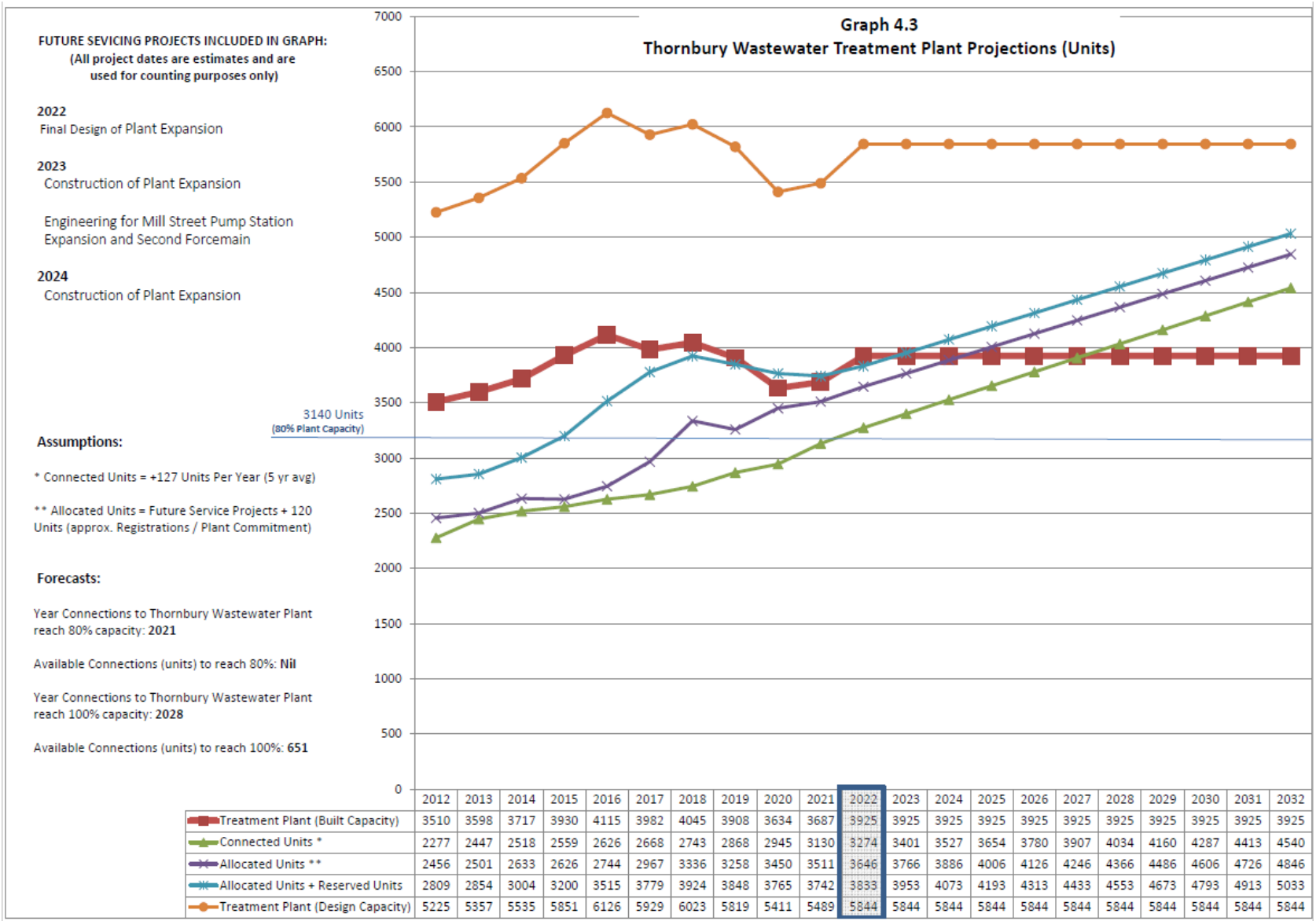
4.4.1 Phasing of WWTP Expansion

The Phase 4 ESR from the Comprehensive EA identified that the first phase of the works to expand the Thornbury WWTP facility would provide an additional average day capacity of approximately 3,500 m^3/day for a total average day capacity of 7,080 m^3/day. Further to that report Stantec Consulting Ltd. prepared a 90% Design Report which identified that Phase 1 will be split into two (2) sub-phases with Phase 1A having an ADF capacity of 5,330 m^3/day. Phase 1B will expand Thornbury WWTP ADF capacity to 7,080 m^3/day and a PDF capacity of 16,187 m^3/day.

In 2017, the Town completed an Addendum to the 2006 Environmental Assessment for the Thornbury Wastewater treatment plant. This Addendum looked at what had changed between 2006, when the initial EA was completed, and 2017. Upon completion of the EA, the Town applied for and acquired an ECA for the construction of Phase 1A of the Thornbury WWTP upgrades to enable the expansion when inflow reaches 80% of built capacity. The final design of the Phase 1A commenced in 2021, with construction to begin in the second quarter of 2023 and to be completed by the fourth quarter of 2024. The prequalification of the construction contractor was completed in the fourth quarter of 2022, with the award for construction to be completed in the second quarter of 2023.

The PDF into the plant did not exceeded the design PDF in 2022. The collection system for this plant has significant inflow and infiltration (I&I) issues. The I&I issues have created large fluctuations in the ADF received by the Plant impacting the total number of equivalent units that can be connected to the Plant. The Town has committed to a comprehensive program to address and reduce the I&I.

Graph 4.3 Thornbury Wastewater Treatment Plant Projections



	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Treatment Plant (Built Capacity)	3510	3598	3717	3930	4115	3982	4045	3908	3634	3687	3925	3925	3925	3925	3925	3925	3925	3925	3925	3925	3925
Connected Units *	2277	2447	2518	2559	2626	2668	2743	2868	2945	3130	3274	3401	3527	3654	3780	3907	4034	4160	4287	4413	4540
Allocated Units **	2456	2501	2633	2626	2744	2967	3336	3258	3450	3511	3646	3766	3886	4006	4126	4246	4366	4486	4606	4726	4846
Allocated Units + Reserved Units	2809	2854	3004	3200	3515	3779	3924	3848	3765	3742	3833	3953	4073	4193	4313	4433	4553	4673	4793	4913	5033
Treatment Plant (Design Capacity)	5225	5357	5535	5851	6126	5929	6023	5819	5411	5489	5844	5844	5844	5844	5844	5844	5844	5844	5844	5844	5844

4.5 Wastewater Pumping Stations

4.5.1 Firm Capacity of Pumping Stations

The Thornbury Collection System has multiple Wastewater Pumping Stations. Each Pumping Station's capacity is listed below.

Camperdown Service Area

- Delphi Point WWPS firm pumping capacity is 53 L/s
- Lake Shore WWPS firm pumping capacity is 82 L/s
- Shore Acres WWPS firm pumping capacity is 10 L/s

Thornbury Service Area

- Moore Crescent WWPS has a firm pumping capacity of 13 L/s
- Peel Street WWPS has a firm pumping capacity of 14 L/s. The Town has identified issues with the pumps in this station being able to keep up to the flows entering the station. The Town is addressing the situation and will be upgrading this pumping station. In the meantime, the flows from the Water Treatment Plant are being throttled back during high flows.
- Elgin Street WWPS has a firm pumping capacity of 9 L/s
- The Mill Street Main WWPS has a firm pumping capacity is 160 L/s, however, the associated forcemain that conveys wastewater flow to the Thornbury WWTP has a capacity of 141 L/s, therefore, the rated capacity of Mill Street Main WWPS is 141 L/s

Lora Bay Service Area

- Sunset WWPS has a firm pumping capacity of 73 L/s

Cole Engineering Group completed a Needs Study of the sanitary system. This study identified the following:

Pumping Station	Dry Weather Flow Criteria Existing and future Conditions	Wet Weather flow Criteria – Existing and Future Conditions			
		2 Year Event	5 Year Event	25 Year Event	100-year Event
Delphi	Criteria met for existing and future conditions	Criteria met for existing and future conditions	Criteria met for existing and future conditions	Criteria met for existing and future conditions	Criteria met for existing and future conditions
Elgin	Criteria met for existing and future conditions	Criteria not met for existing and future conditions	Criteria not met for existing and future conditions	Criteria not met for existing and future conditions	Criteria not met for existing and future conditions
Lakeshore	Criteria met for existing and	Criteria met for existing and	Criteria met for existing	Criteria met for existing	Criteria met for existing

	future conditions	future conditions	and future conditions	and future conditions	and future conditions
Mill Street	Criteria met for existing and future conditions	Criteria not met under existing and future conditions	Criteria not met under existing and future conditions	Criteria not met under existing and future conditions	Criteria not met under existing and future conditions
Moore	Criteria met for existing and future conditions	Criteria partially met under existing and future conditions	Criteria partially met under existing and future conditions	Criteria partially met under existing and future conditions	Criteria partially met under existing and future conditions
Peel	Criteria met for existing and future conditions	Criteria partially met under existing and future conditions	Criteria partially met under existing and future conditions	Criteria partially met under existing and future conditions	Criteria partially met under existing and future conditions
Shore Acres	Criteria met for existing and future conditions	Criteria met for existing and future conditions	Criteria met for existing and future conditions	Criteria met for existing and future conditions	Criteria met for existing and future conditions
Sunset	Criteria met for existing and future conditions	Criteria met for existing and future conditions	Criteria met for existing and future conditions	Criteria met for existing and future conditions	Criteria met for existing and future conditions

- The Delphi, Lakeshore, Shore Acres and Sunset pumping stations all have adequate capacity to The Town's level of service requirements under future conditions. Therefore, no additional capacity will be required at these stations.
- The Elgin pumping station was determined to not meet level of service requirements under wet weather flow conditions. The station capacity is exceeded and a high-level alarm is predicted to occur as a result of the 5 year, 25 year and 100 year storm events during the existing conditions. It is unlikely that the pumping station will overflow to the natural environment as a result of a 100-year event as the overflow invert is 5.3 meters about the wet well invert and the peak wet well level in a 100-year storm is predicted to reach 3.8 meters.
- The Mill Street pumping station was determined to not to meet level of service requirements under all wet weather flow conditions. Under existing and future wet weather flow conditions, the firm capacity is not sufficient to pump the 5-year incoming peak flows. There is also growth planned in the Mill Street pumping station service area. Addition capacity will be required at this station.
- The Moore Street pumping station partially met level of service requirements as the peak flow entering the station. No growth has been identified for this service area, and an upgrade to the station in not required.
- The Peel Street pumping station partially met level of service requirements as the peak flow entering the station for the 5-year design storm event was less than the firm capacity of the station. The Town has undertaken the final design and the construction will commence in 2023.

- The existing sanitary sewers on Victoria Street north of Huron Street, on Bay Street east of Mill Street, on Elgin Street south of King Street, on Arthur Street south of Peel and upstream of the Lakeshore PS, on Grey Road 40 upstream of the Shore acres PS and on High Bluff Lane did not meet the wet weather criteria for the 5-year storm under future conditions.
- Two sanitary sewers in Lora Bay on High Bluff Lane were identified that did not met the criteria for the 5-year design storm event.

The Town tendered the design for the Mill Street PS upgrades and an additional forcemain to the Thornbury WWTP in Q4 of 2022.

4.6 Peak Day Flow Observations

The Thornbury WWTP has an approved ADF capacity of 3,580 m^3/day and a peak day flow (PDF) capacity of 7,196 m^3/day. The Mill Street and Lake Shore WWPSs in Thornbury convey all sanitary sewage to the Thornbury WWTP.

Peak Daily Flows typically occur with a significant weather-related event such as excessive rainfall or run off from melting snow due to unusually high temperatures. These events typically cause very high flows for a short duration (usually less than one to two days). The Thornbury WWTP has significant hydraulic capacity in tankage which enables the facility to handle excess flows however the WWPSs are limited to capacities of pumps, forcemains and wet wells and as such need to transfer instantaneous flows.

4.6.1 Wastewater Inflow & Infiltration Study (2014)

In 2014 an Inflow and Infiltration (I&I) Study Report was received from Cole Engineering which includes a number of recommendations to address I&I issues identified throughout the course of the study. The Town is acting on a number of the recommendations including the replacement of sanitary sewer in the Elma Street, Alice Street, Louisa Street and Victoria Street area as it is identified as a point in the Thornbury Collection System that reacts almost instantly to weather related events. The Town has also completed a Calibrated Sanitary Model for both the Thornbury and the Craigleith collection systems. This model will assist with planning of future flows.

In order to determine yearly PDF information at Wastewater Pumping Stations not outfitted with flow meters, Staff utilize pump hours to calculate flow rates. Staff will be recommending, during the budget process, that all pump stations include the addition of flow meters to accurately determine flow rates.

The Town commenced Wastewater Collection System Master Plan Environmental Assessment (MPEA) in 2022. The MPEA is reviewing and building on past studies plus incorporate current growth projections to determine the wastewater collection network to build out of the Official Plan. This study builds upon the Needs Assessment completed in 2019. The MPEA is anticipated to be completed in 2024. The work includes 12 months of flow data to calibrate the wastewater model.

5.0 Craigleith Wastewater Capacity Assessment

5.1 Craigleith WWTP Capacity

The Craigleith WWTP's Built ADF treatment capacity is 8,133 m^3/day and the PDF capacity is 19,640 m^3/day. The Craigleith WWTP utilizes an extended aeration process, incorporates tertiary effluent filtration and includes comminution, aerated grit removal, phosphorus removal by alum addition, secondary clarification, 2 stage aerobic sludge digestion and effluent disinfection by ultraviolet

irradiation. All raw WW is pumped to the WWTP from the Craigleith Main WWPS and treated effluent is discharged into Georgian Bay via a staged diffuser.

The Craigleith WWTP is operating at 42% of the built capacity.

5.2 Inflow Rates

Table 5.1 summarizes the ADF and PDF recorded at the Craigleith WWTP over the period from 2013 to 2022.

Table 5.1 Craigleith WWTP Historical Flows

Year	# of Units	ADF (m^3/day)	ADF (m^3/unit/d)	5 Year Rolling ADF (m^3/unit/d)	PDF (m^3/day)	PDF (m^3/unit/d)	5 Year Rolling PDF (m^3/unit/d)
2013	4,516	3,139	0.695	0.614	9,438	2.090	2.021
2014	4,538	3,102	0.683	0.640	6,860	1.512	1.912
2015	4,591	2,865	0.624	0.655	6,529	1.422	1.823
2016	4,661	3,202	0.689	0.662	12,428	2.666	1.912
2017	4,793	3,377	0.705	0.679	8,956	1.868	1.993
2018	4,935	3,284	0.665	0.673	10,491	2.126	1.970
2019	5,050	3,440	0.681	0.673	8,931	1.768	2.107
2020	5,273	3,579	0.679	0.684	10,558	2.002	2.086
2021	5,443	3,376	0.620	0.670	14,461	2.657	2.084
2022	5,587	3,248	0.581	0.645	9,767	1.748	2.060
		2022 5-Year Rolling ADF/Unit = 0.645 m^3/day 2022 5-Year Rolling ADF = 3,385 m^3/day			2022 5-Year Rolling PDF/Unit = 2.060 m^3/day 2022 5-Year Rolling PDF = 10,842 m^3/day Peaking Factor = 3.20		

The above data shows that the ADFs over the five-year period fluctuate when wetter years are experienced. The year 2022 experienced was a fairly dry year. The ADF was slightly lower than the previous year, however, the PDF was significantly lower than the previous year. The 2022 ADF was 3,248 m^3/day and the PDF was 9,767 m^3/day. The five-year rolling ADF is 3,385 m^3/day and the five-year rolling average PDF is 10,842 m^3/day. Based on the 2022 five year rolling ADF of 3,385 m^3/day, the Craigleith WWTP is operating at 42% of the built capacity.

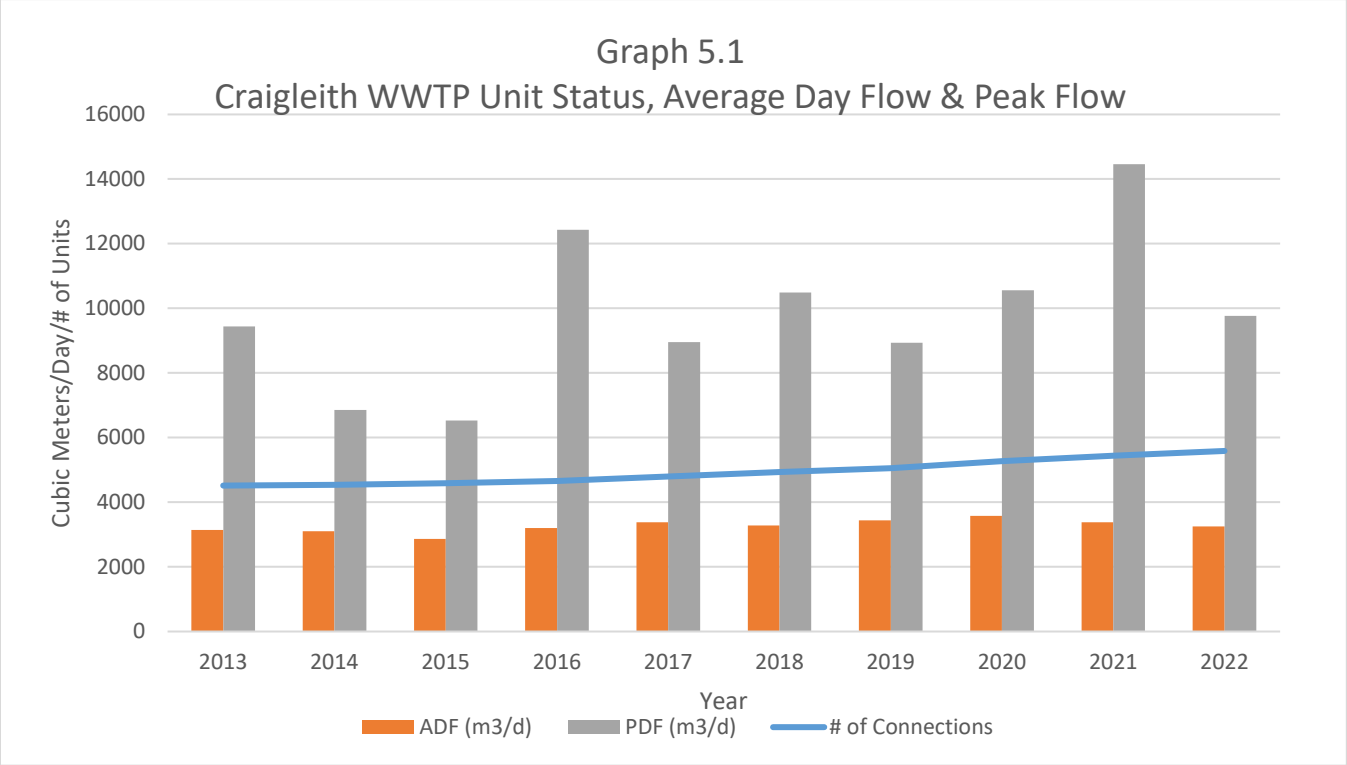
The five-year rolling average PDF falls within the Craigleith WWTP's rated PDF capacity of 19,640 m^3/day.

Tables C13 to C14 in Appendix G summarize the ten highest daily flows for 2021 and 2022. The occurrences of peak flows were reviewed for 2022 with the key findings as follows:

- In 2022 the highest flow occurred on February 17, 2022, during a warm weather and snow melt event.

- Six of the ten peak influent events occurred during the spring thaw, corresponding with warmer temperatures and snow melt.

Graph 5.1 Illustrates a comparison of the number of WW units, the ADF and the PDF from 2013 to 2022.



ADF Treatment Capacity is 8,133 m^3/day and PDF Treatment Capacity is 19,640 m^3/day.

5.3 Total Craigleith WWTP Capacity

5.3.1 Built Capacity

As discussed in Section 5.1, the average day capacity of the Craigleith WWTP is 8,133 m^3/day. Using the historical 5 year rolling ADF per unit flow rate to determine the total number of units that can be serviced results in the following:

Total Built Capacity $\frac{8{,}133\ m^3/day}{0.645\ m^3/unit/day} =$ 12,609 units

Table 5.2 and Graph 5.2 summarize the 2022 connection status. A breakdown of connection status is included in Appendix D.

5.3.2 Craigleith WWTP Capacity Status

Table 5.2 summarizes the 2022 capacity status. A breakdown of the Craigleith WWTP capacity status is included in Appendix D.

Table 5.2 2022 Craigleith WWTP Unit Status

Year End Report Category	Official Plan Capacity Status	Number of Units	Flow (m^3/d) *
1. Connected	Allocated	5,587	3,604
2. Can Connect	Allocated	291	188
3. Committed	Allocated	0	0
Sub-Total Allocated(1+2+3)		5,878	3,791
4. Not Fronting, Not Serviced	Reserved	1,034	667
5. Designated Lands – Active	Reserved	1,673	1,079
Sub-Total Reserved (4+5)		2,707	1,746
Total Allocated + Reserved (2+3+4+5)		2,998	1,934
6. Designated Lands – Other	Not recognized	35	23
7. Designated Lands – No Proposal	Not recognized	5,496	3,545
Sub-Total Not Recognized (6+7)		5,531	3,567
Grand Total (1+2+3+4+5+6+7)		14,116	9,105

* number of units multiplied by the five-year rolling average ADF identified in Table 5.1

5.3.3 Allocated and Reserve Capacity

Using data from Tables 5.1 and 5.2, reserve capacity for the Craigleith WWTP is determined using the calculation below from Section 1.4.

Allocated Servicing Capacity = Built Capacity – Connected Flows – Allocated Flows

Built Capacity = 8,133 m^3/day (Section 5.2.2)

Connected Flows = 3,604 m^3/day (Table 5.2)

Allocated Flows = 1,934 m^3/day (Can Connect [2] + Sub-Total Reserved [4+5] Table 5.2)

Therefore:

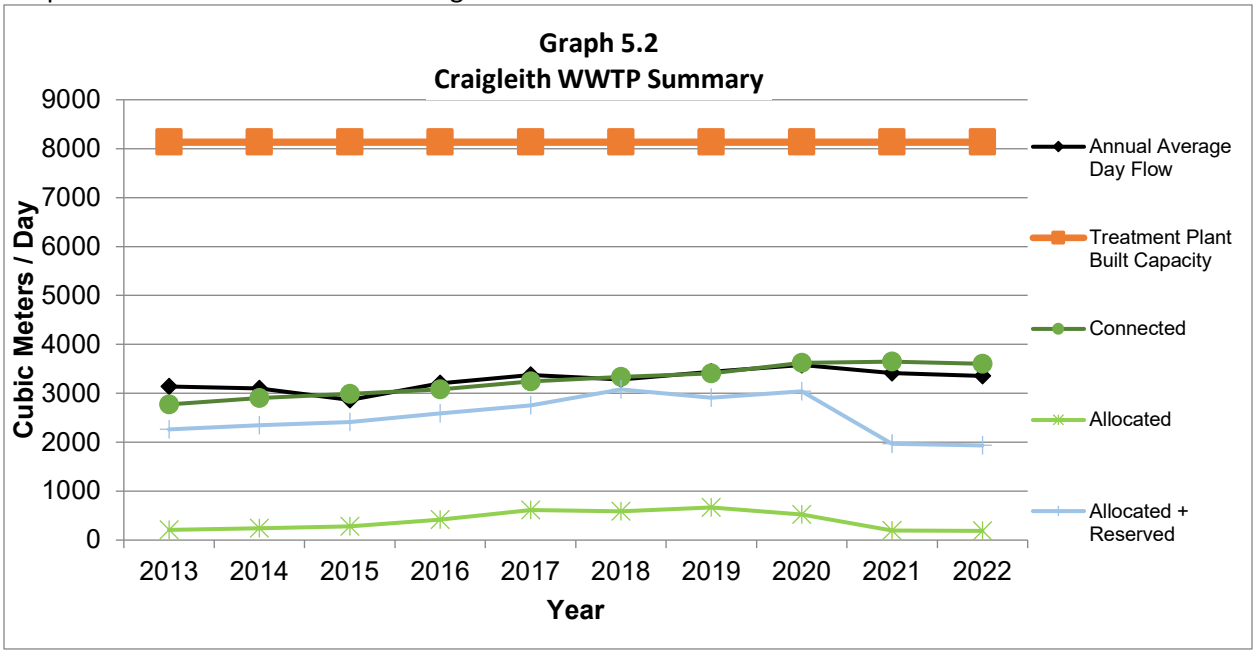
Reserved Servicing Capacity Flow = 8,133 – 3,604 – 1,934 = 2,595 m^3/day

$$\text{Units available for reservation} = \frac{\text{Reserved Servicing Capacity Flow (m3/day)}}{\text{Flow per unit per day (m3/unit/day)}}$$

$$\text{Units available for reservation} = \frac{2{,}595\ \text{m3/day}}{0.645\ \text{m3/unit/day}} = 4{,}023\ \text{units}$$

5.3.4 Flow & Unit Summary

Graph 5.2 below summarizes the Craigleith WWTP flows and units.



5.4 Wastewater Pumping Stations

5.4.1 Firm Capacity of Pumping Stations

The Craigleith Collection System has multiple Wastewater Pumping Stations. Each Pumping Station's capacity is listed below.

Craigleith Service Area

- Craigleith Main WWPS installed pumping capacity is 180 L/s (15,552 m^3/day). Forcemain capacities are 227 L/s (19,639 m^3/day). Pump capacity can be upgraded to 215 L/s (18,576 m^3/day) when necessary
- Summit Green WWPS firm pumping capacity is 4 L/s (346 m^3/day)
- Margaret Drive WWPS firm pumping capacity is 60 L/s (5,184 m^3/day)
- Alta WWPS firm pumping capacity is 6 L/s (518 m^3/day)

In 2019 The Town undertook a Sanitary Needs Assessment. This work assessed the performance of the existing sanitary sewer system, including the sanitary sewers, pumping station and forcemains.

- The following areas where assessed:

Pumping Station	Dry Weather Flow Criteria Existing and future Conditions	Wet Weather flow Criteria – Existing and Future Conditions			
		2 Year Event	5 Year Event	25 Year Event	100-year Event
Alta	Criteria met for existing and future	Criteria met for existing and future	Criteria met for existing and future	Criteria met for existing and future	Criteria met for existing and future

	conditions, but not when s=planned service extension is included.	conditions, but not when s=planned service extension is included.	conditions, but not when s=planned service extension is included.	conditions, but not when s=planned service extension is included.	conditions, but not when s=planned service extension is included.
Craigleith	Criteria met for existing, not met for future conditions	Criteria not met for existing and future conditions	Criteria not met for existing and future conditions	Criteria partially met for existing and future conditions	Criteria partially met for existing and future conditions
Margaret	Criteria met for existing and future conditions	Criteria met for existing and future conditions	Criteria met for existing and future conditions	Criteria met for existing and future conditions	Criteria met for existing and future conditions
Summit Green	Criteria met for existing and future conditions	Criteria partially met under existing and future conditions	Criteria partially met under existing and future conditions	Criteria met for existing and future conditions	Criteria met for existing and future conditions

- The Alta and Margaret PSs have adequate capacity to the Tow's level of service requirements under future conditions. However, the Alta PS does not have adequate capacity to accommodate additional flow from the Tow's planned service extensions. Additional capacity will be required at the Alta PS.
- At the Summit Green PS, the criteria is partially met under existing and future conditions for a 2-year and 5-year design storm event. Although the firm capacity is adequate to meet future needs, the peak wet well level exceeds the high-level alarm for these storm events. Modifications to the pump settings will be required. This station does not require an upgrade.
- The Craigleith PS, the criteria is not met for future dry weather conditions and for both existing and future wet weather conditions.
- Sanitary sewers located upstream of the Craigleith PS were also identified as not meeting the required level of service under existing and future conditions. Under a 25-year and 100-year design storms, the sanitary sewers on Grey Road 19 between Monterra Road and Kandahar Lane do not meet the criteria under future conditions.
- In 2021, the Town undertook an optimization program on the Craigleith WWSP. The optimization program looked at the needed upgrades to the station, as well as energy efficiencies. The Town tendered the design of the upgrades for the station in Q4 of 2022.

In 2022, the Town proceeded with the Long Point Road Municipal Class Environmental Assessment (MCEA). This work was to determine the preferred solution for the 300 mm Jumper sewer between Grey 21 and Timmons Street. The preferred solution is the construction of a gravity sewer on Long Point Road and a lift station at the Craigleith WWTP. Also considered through this MCEA process was the preferred solution for the Town's Septic Receiving Station. The station will be relocated to the Craigleith WWTP. The preliminary design for the lift station and the septic receiving station will be completed in 2023.

5.4.2 Craigleith Main Wastewater Pumping Station

The Craigleith Main WWPS as noted in Section 5.4.1 has an installed capacity of 180 L/s or 15,552 m^3/day and a firm capacity of 90 L/s or 7,776 m^3/day. Using the 5-year historical per unit PDF of 2.084 m^3/unit/day to determine units that can be serviced results in the following:

$$\text{Total Built Capacity} = \frac{\text{Installed pumping capactiy (m3/day)}}{\text{5 year historical per unit PDF (m3/day/unit)}}$$

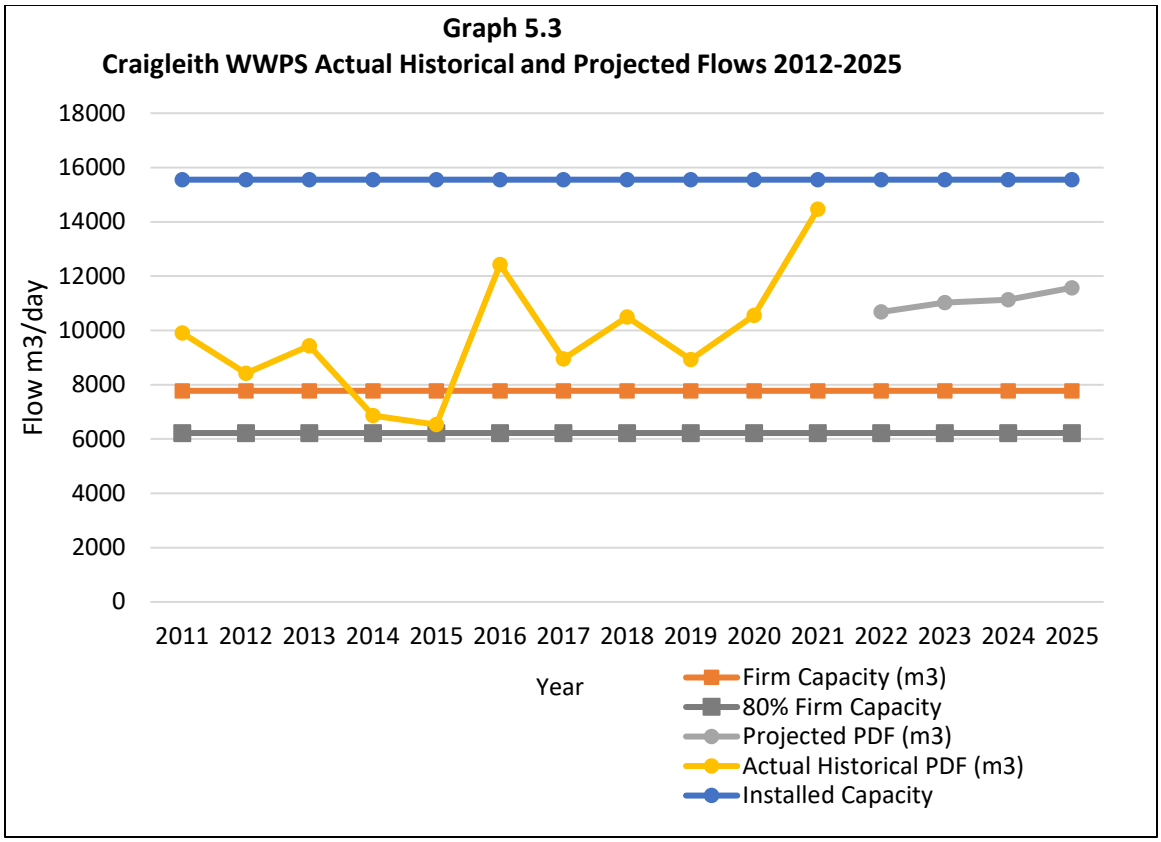
$$\text{Total Built Capacity} = \frac{\text{15,552 m3/day}}{\text{2.084 m3/day/unit}} = 7{,}462 \text{ units}$$

There are currently 8,383 units allocated or reserved. The Craigleith Main WWPS is over allocated by 921 units with the largest pumping unit out of service (firm capacity). With both pumps in service the built capacity is doubled to 14,924 units and thus there is surplus capacity 4,827 units. The risk is that there will be one pump out of service during a large flow event. Therefore, a review of the historical and projected flows is warranted.

Graph 5.3 below outlines both historical and projected flows from 2011-2025. Historical information from 2011-2021 is based on actual recorded flows, while 2022-2025 are projected based on a five-year rolling historical average. The long-term trending illustrates a reduction in PDF prior to 2016. The 2016 PDF indicates a sharp increase and can be attributed to significant wet weather events. The PDF for 2018 was slightly higher than 2017, however dropped off again in 2019. An immediate expansion of the Craigleith Main WWPS is not necessary however, the actual flows will continue to be monitored closely.

The Town commenced Wastewater Collection System Master Plan Environmental Assessment (MPEA) in 2022. The MPEA is reviewing and building on past studies plus incorporating current growth projections to determine the wastewater collection network to build out of the Official Plan. This study builds upon the Needs Assessment completed in 2019. The MPEA is anticipated to be completed in 2024. The work includes 12 months of flow data, including a flow analysis of the flows from Short Term Accommodations (STAs) to ensure we are using the best available information when determining the impact from STAs.

Graph 5.3 Craigleith WWPS Historical and Projected Flows 2013-2026



Note 1: Installed capacity is 15,552 m^3/day
Note 2: Firm capacity is 7,776 m^3/day
Note 3: Projected PDF is estimated by calculating the rolling average of the five-year rolling actual historical PDF

5.5 Peak Day Flow Observations

The Craigleith WWTP has an approved ADF capacity of 8,133 m^3/day and PDF of 19,650 m^3/day. The Craigleith Main WWPS conveys all sanitary sewage to the Craigleith WWTP.

Peak Daily Flows typically occur with a significant weather-related event such as excessive rainfall or run off from melting snow due to unusually high temperatures. These events typically cause very high flows for a short duration (usually less than one to two days). The Craigleith WWTP has significant hydraulic capacity in tankage which enables the facility to handle excess flows however the WWPSs are limited to capacities of pumps, forcemains and wet wells and as such need to transfer instantaneous flows.

The peak daily flow for the Craigleith WWTP in 202 occurred on February 17, 2022, the flow was 9,767 m^3/day, and this is lower than the peak daily flow in 2021, which was 14,461 m^3/day. The peak daily flow occurred during a mild weather event with significant snowmelt. The flow was much less than Craigleith WWTP design PDF of 19,650 m^3/day. There was adequate capacity at the WWTP to deal with peak flow.

5.5.1 Wastewater Inflow & Infiltration Study (2014)

In 2014 an Inflow and Infiltration (I&I) Study Report was received from Cole Engineering which put forward a number of recommendations to address I&I issues identified throughout the course of the

study. The Town has also developed a calibrated sanitary model with Cole Engineering. The model will be a valuable tool for planning.

In 2018, the Town initiated the first year of a seven-year sanitary sewer condition assessment program. The program includes CCTV inspection and condition assessment in accordance with the National Association of Sewer Services Companies (NASSCO's) Pipeline Assessment and Certification Program.

6.0 Conclusions and Recommendations

The following table summarizes the capacity status of the water supply and wastewater treatment facilities based on units.

Table 6.1 Summary of Capacity Status for Key Infrastructure (Units) for 2022

Infrastructure	A Total Plant Capacity	B Total units Allocated	C Total units Reserved	D Total Allocated + Reserved (B+C)	E Units Available (A-D)
Water Supply (The Blue Mountains WTP + Collingwood Supply)	16,164	10,728	2,681	13,409	2,755
Thornbury WWTP (Built Capacity) *	3,925	3,646	187	3,833	92
Thornbury WWTP (Design Capacity)	5,844	3,646	187	3,833	2,011
Craigleith WWTP	12,609	5,878	2,707	8,585	4,024

The highlights of the Water Supply and WWTPs is provided below.

Water Supply

- ADD (6,005 m3/day) and the MDD (9,753 m3/day) the ADD decreased from 2021 to 2022, however, the MDD increased slightly. To be noted, the value used for the MDD is the third highest water usage day. The water usage on July 2 and 4 were not used as MDD as there was a significant watermain break on the transmission watermain, and it's estimated the water loss for this break was approximately 1000m3/day.
- In 2021, the number of connected water units increased by 263 units to 9,982 units.
- Capacity is currently available for an additional 2,755 units and a system increase is not necessary, however the Town has initiated an Environmental Assessment to evaluate the long-term supply needs for the Town.
- This evaluation does not include the capacity required for the Campus of Care, or the additional units proposed at Sites B, E & F. At the end of 2022, these sites were not far enough along in their planning for the units to be considered in the 2022 capacity assessment.

Thornbury WWTP

- ADF (2,430 m3/day), decreased from 2021 and the PDF (6,928 m3/day) decreased from 2021.
- In 2022 the number of connected wastewater units increased by 144 units to 3,274 units.
- Thornbury WWTP is currently operating at 76% ADF built capacity based on five-year rolling average of recorded flow.
- This evaluation does not include the capacity required for the Campus of Care. At the end of 2022, this site was not far enough along in their planning for the units to be considered in the 2022 capacity assessment.
- High peak wastewater flows in Thornbury throughout 2022 can be attributed to wet weather events.
- A new ECA for the Thornbury WWTP was issued March 23, 2023. The Proposed Construction Clause expires in March 2028. This ECA includes provisions for the Phase 1A expansion.
- Construction of the proposed works will commence in Q2 2023.
- The design of a new effluent outfall to Georgian Bay commenced in 2022.

Craigleith WWTP

- ADF (3,248 m3/day) decreased slightly from 2021 and PDF (9,767 m3/day) decreased significantly from 2021.
- In 2022 the number of connected wastewater units increased by 144 units to 5,587 units.
- There are 7,022 units which can be physically connected to the Craigleith WWTP.
- This evaluation does not include the capacity required for the additional units proposed at Sites B, E & F. At the end of 2022, these sites were not far enough along in their planning for the units to be considered in the 2022 capacity assessment.
- High peak wastewater flows in Craigleith over the past few years have generally corresponded with peak ski season, particularly Christmas and March Break, however in 2022, the peak flows occurred mostly during heavy rain events and snow melt.

Appendix A – Figure 1 – Development Staging Process

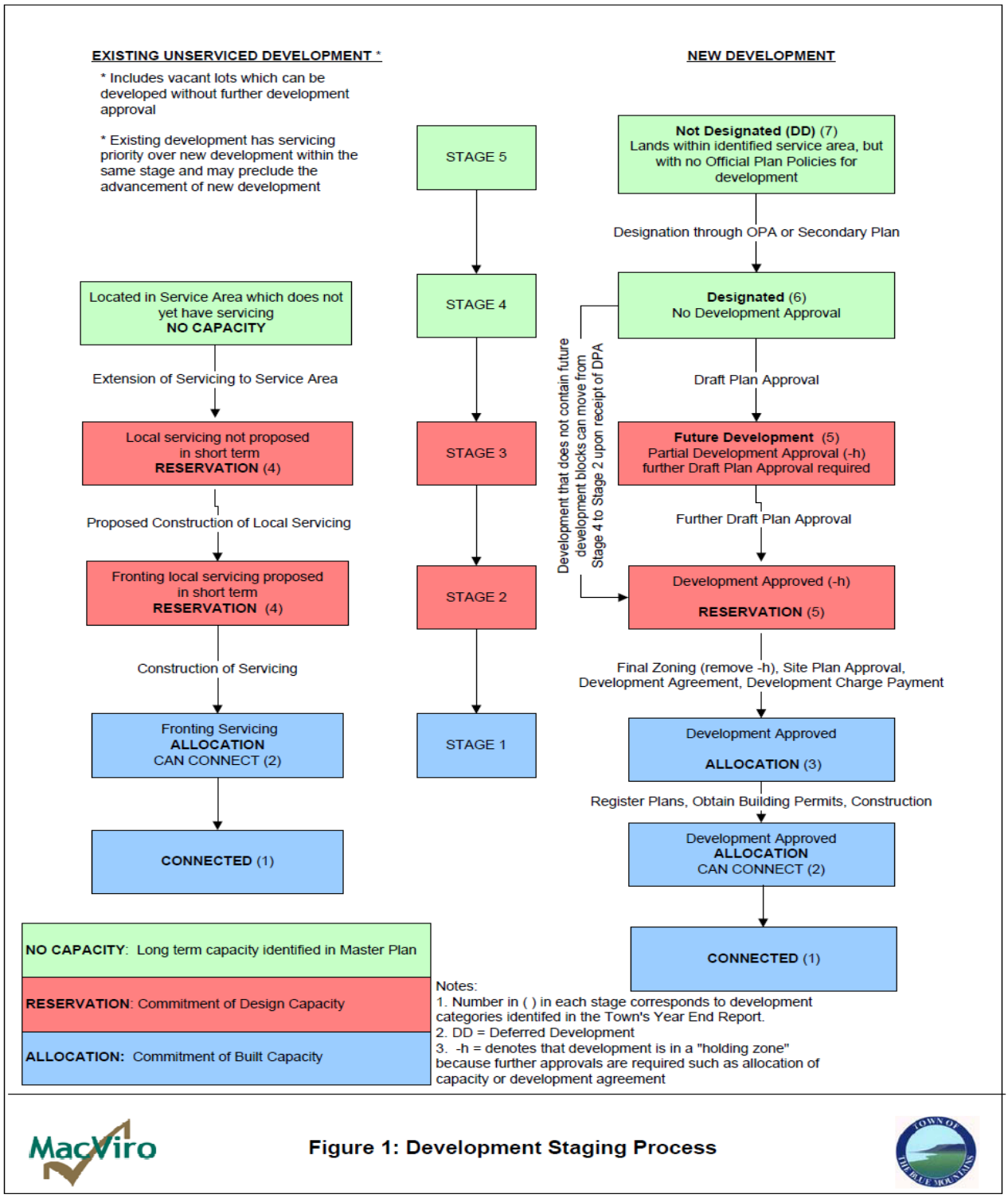
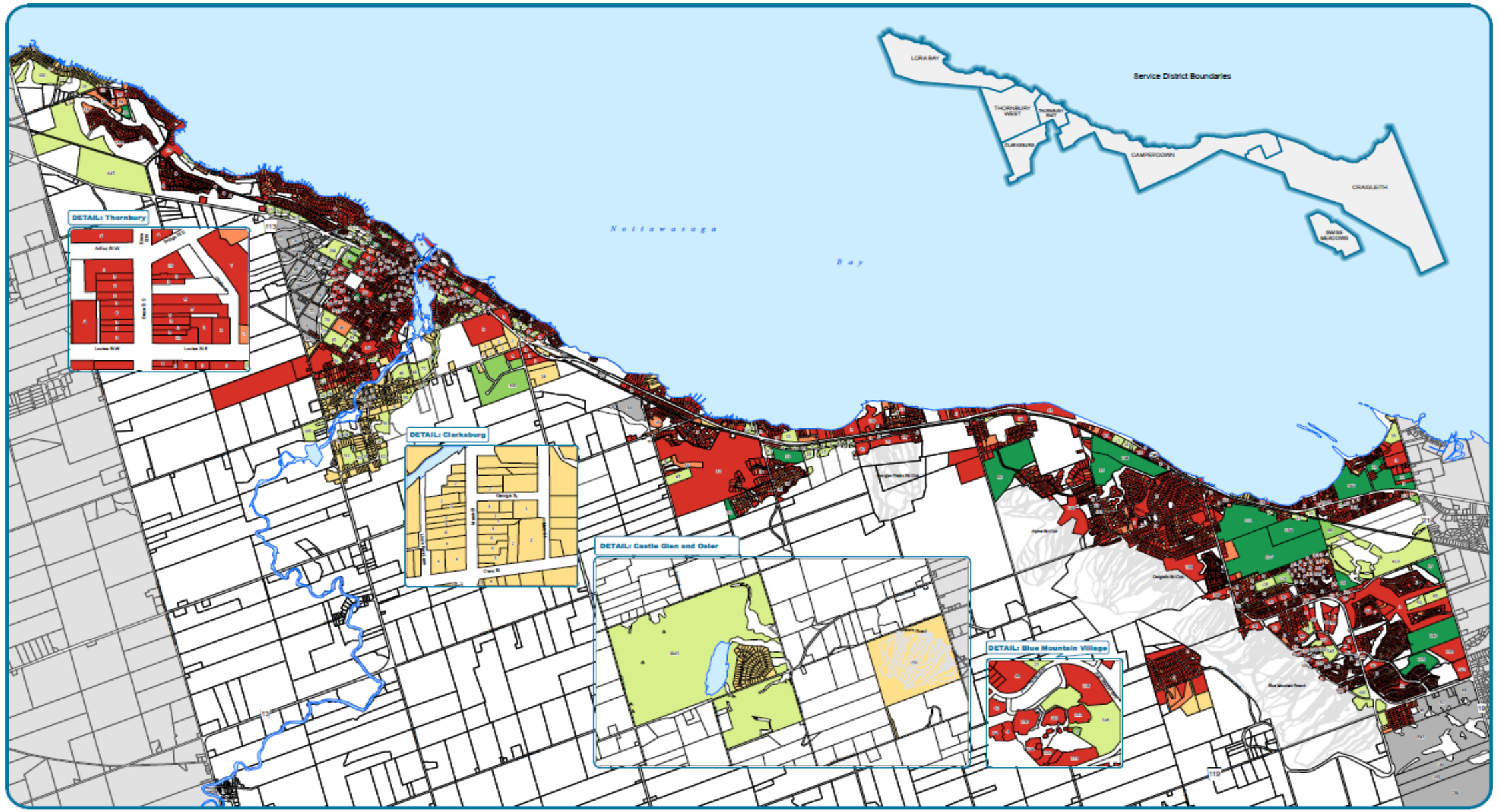
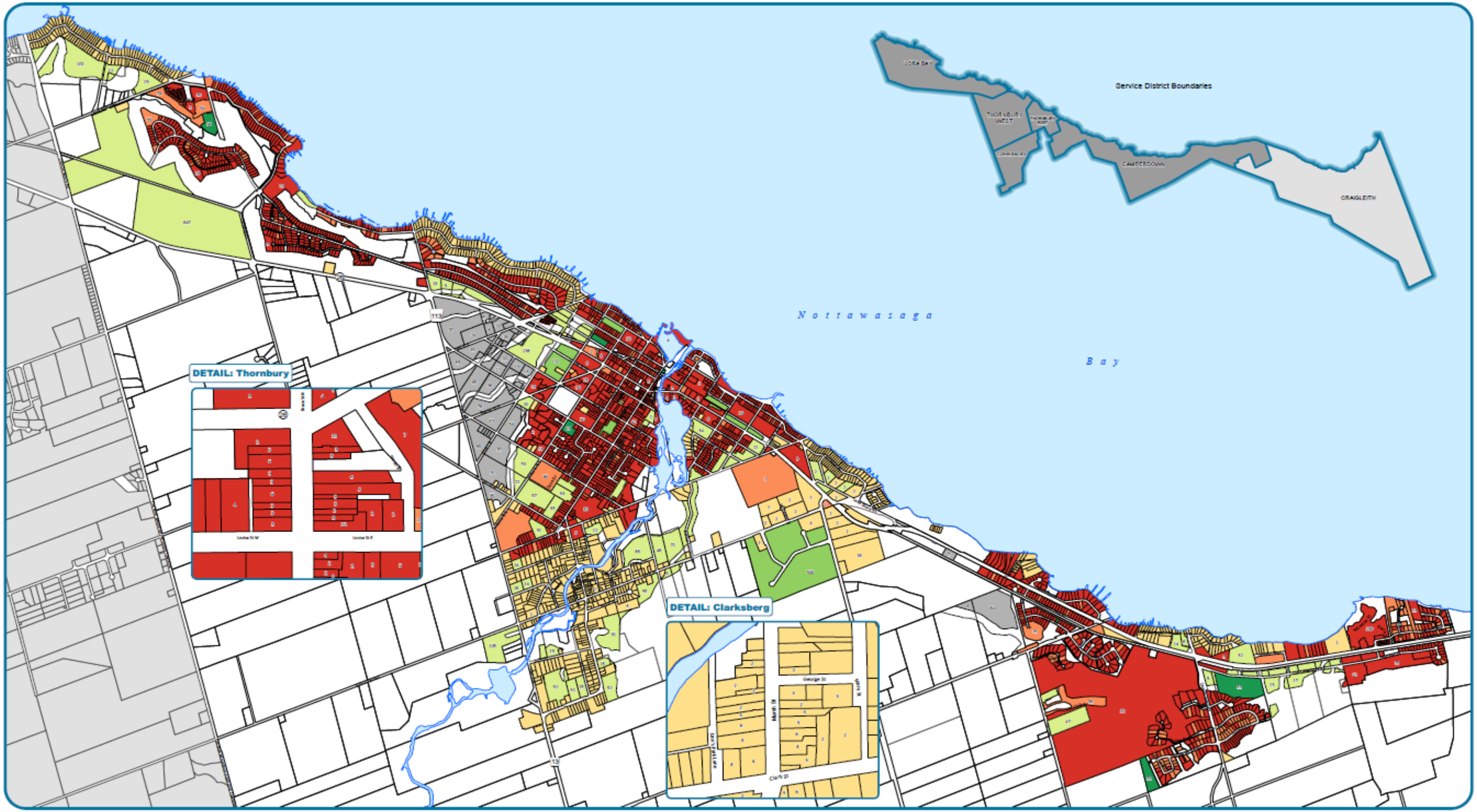
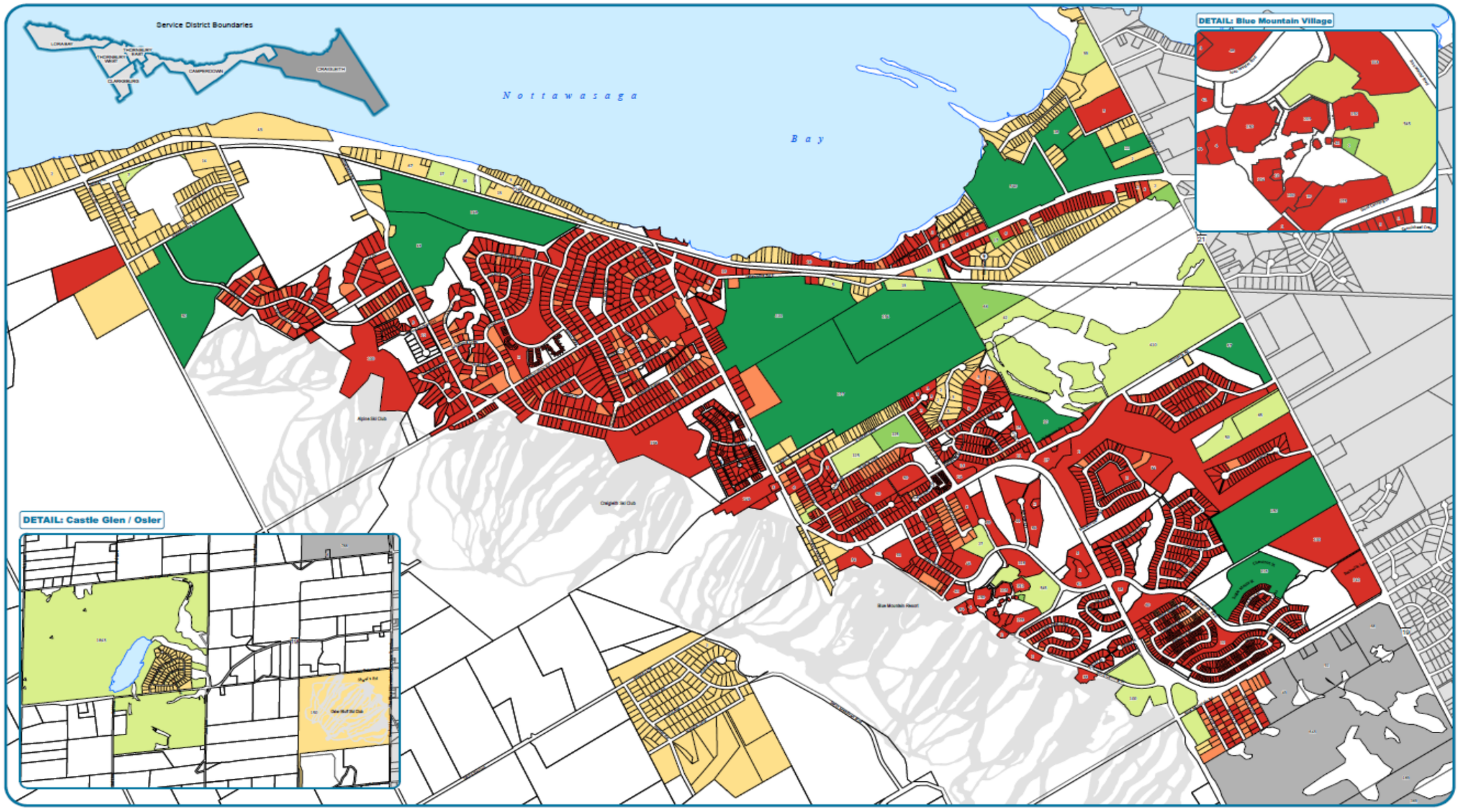


Figure 1: Development Staging Process

Appendix B – 2022 Water and Wastewater Servicing Maps




Service District Boundaries
LORA BAY
THORNBURY WEST
THORNBURY EAST
CAMPBELDOWN
CRAIGLEITH
Nottawasaga
Bay
DETAIL: Thornbury
DETAIL: Clarksberg
Sewer Class
Not Assigned
1 Connected
2 Can Connect
4 Existing Not Fronting
5 Reserved -Planning Approvals
6 Designated (With Proposal
7 Designated (No Proposal)
8 Future Development
Town of The Blue Mountains - 2022 Year End Report
SANITARY SEWER COLLECTION
Thornbury Waste Water Treatment Plant
Meters
0
375
750
1,500

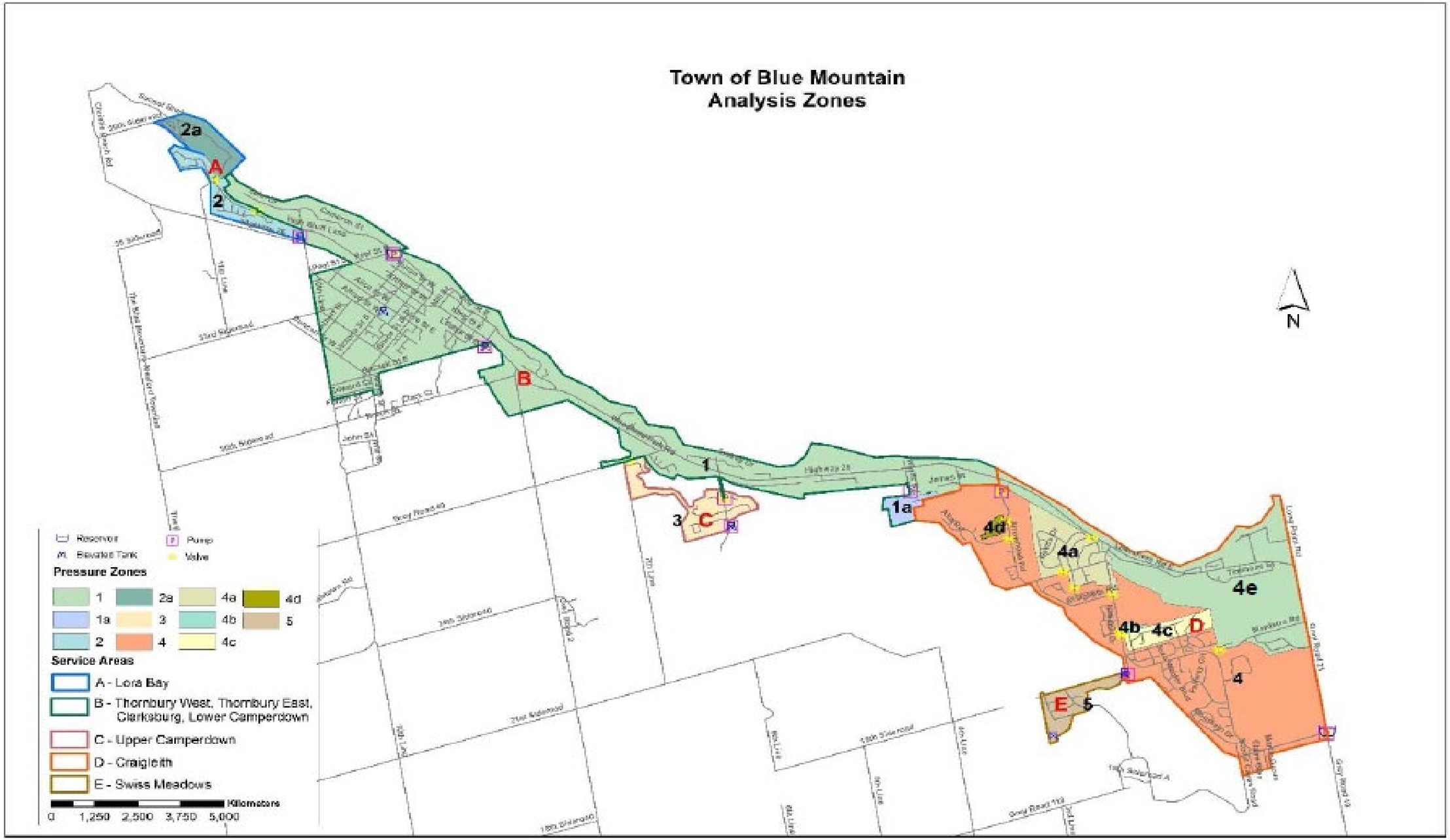


Town of The Blue Mountains - 2022 Year End Report

SANITARY SEWER COLLECTION

Craigleith Waste Water Treatment Plant

Appendix C – Water Pressure Zone Boundary Map



Appendix D – 2022 Capacity Chart

2022 Thornbury Waste Water Treatment Plant

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	Service Area	Connected	Connected (Eq. Units)	TOTAL CONNECTED UNITS	Can Connect	CanConnectEU	TOTAL ALLOCATED UNITS	Reserved	TOTAL ALLOCATED + RESERVED UNITS	Existing Not Fronting	Existing Not Fronting (Eq. Units)	Designated (With Proposal)	Designated (No Proposal)	Future Development (DD Lands)	TOTAL FUTURE CONNECTIONS	GRAND TOTAL
0	RURAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	Camperdown	581	115	696	145	2	843	113	956	163	56	300	233	98	850	1806
5	Lora Bay	599	22	621	151	0	772	35	807	244	4	0	839	147	1234	2041
6	Clarksburg	23	2	25	1	0	26	0	26	346	71	0	840	0	1257	1283
8	Thornbury (east)	247	86	333	8	4	345	0	345	19	6	169	124	0	318	663
9	Thornbury (west)	1212	387	1599	46	15	1660	39	1699	77	0	250	679	782	1788	3487
Total		2662	612	3274	351	21	3646	187	3833	849	137	719	2715	1027	5447	9280

2022 Craigleith Waste Water Treatment Plant

	Service Area	Connected	Connected (Eq. Units)	TOTAL CONNECTED UNITS	Can Connect	CanConnectEU	TOTAL ALLOCATED UNITS	Reserved	Existing Not Fronting	Existing Not Fronting (Eq. Units)	TOTAL ALLOCATED + RESERVED UNITS	Designated (With Proposal)	Designated (No Proposal)	Future Development (DD Lands)	TOTAL FUTURE CONNECTIONS	GRAND TOTAL
0	RURAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	Craigleith	3312	2275	5587	253	38	5878	1673	472	194	8217	35	1650	2003	3688	11905
3	Castle Glen	0	0	0	0	0	0	0	86	1	87	0	1843	0	1843	1930
4	Swiss Meadows	0	0	0	0	0	0	0	129	2	131	0	0	0	0	131
7	Osler	0	0	0	0	0	0	0	0	150	150	0	0	0	0	150
Total		3312	2275	5587	253	38	5878	1673	687	347	8585	35	3493	2003	5531	14116

2022 Town of The Blue Mountains Water Supply

	Service Area	Connected	Connected (Eq. Units)	TOTAL CONNECTED UNITS	Can Connect	Can ConnectEU	TOTAL ALLOCATED UNITS	Reserved	Existing Not Fronting	Existing Not Fronting (Eq. Units)	TOTAL ALLOCATED + RESERVED UNITS	Designated (With Proposal)	Designated (No Proposal)	Future Development (DD Lands)	TOTAL FUTURE CONNECTIONS	GRAND TOTAL
0	RURAL	6	0	6	4	0	10	0	0	0	10	0	0	0	0	10
1	Craigleith	3756	2451	6207	255	57	6519	1673	25	0	8217	35	1650	2003	3688	11905
2	Camperdown	709	136	845	155	4	1004	113	16	37	1170	300	233	98	631	1801
3	Castle Glen	0	0	0	0	0	0	0	86	1	87	0	1843	0	1843	1930
4	Swiss Meadows	114	2	116	13	0	129	0	2	0	131	0	0	0	0	131
5	Lora Bay	707	22	729	167	0	896	35	120	4	1055	0	839	147	986	2041
6	Clarksburg	81	6	87	15	0	102	0	274	67	443	0	840	0	840	1283
7	Osler	0	0	0	0	0	0	0	0	150	150	0	0	0	0	150
8	Thornbury (east)	260	90	350	9	6	365	0	5	0	370	169	124	0	293	663
9	Thornbury (west)	1255	387	1642	46	15	1703	39	34	0	1776	250	679	782	1711	3487
Total		6888	3094	9982	664	82	10728	1860	562	259	13409	754	6208	3030	9992	23401

Appendix E – WTP 10 Water Demands

Thornbury Water Treatment Plant

Tables A16 & A17: Top 10 Highest Water Demands, 2021 – 2022

Table A16 – 2021

Rank	Month	Day	Flow (m^3)	Units	m^3/d/unit
1	June	10	9,635	9,719	0.99
2	June	20	9,228	9,719	0.95
3	August	26	9,146	9,719	0.94
4	November	6	9,144	9,719	0.94
5	August	28	9,079	9,719	0.93
6	June	16	9,072	9,719	0.93
7	August	22	8,976	9,719	0.92
8	June	13	8,879	9,719	0.91
9	August	27	8,869	9,719	0.91
10	September	3	8,849	9,719	0.91

Table A17 – 2022

Rank	Month	Day	Flow (m^3)	Units	m^3/d/unit
1	July	2	10,775	9,982	1.08
2	July	4	10,330	9,982	1.04
3	July	8	9,753	9,982	0.98
4	June	25	9,649	9,982	0.97
5	August	17	9,323	9,982	0.93
6	July	17	9,204	9,982	0.92
7	July	30	9,188	9,982	0.92
8	August	1	9,141	9,982	0.92
9	August	19	9,135	9,982	0.92
10	June	24	9,125	9,982	0.91

2021 Average 9,562 m^3

2022 Average 9,088 m^3

Peak Season (Christmas, Family Day & March Break)

Summer Season

Winter Season

Appendix F – Thornbury WWTP 2021 and 2022 Top 10 Peak Flows

Thornbury WWTP

Tables B16 and B17: Top 10 Highest Peak Flows, Thornbury WWTP 2021 – 2022

Table B16 – 2021

Rank	Month	Day	Flow (m^3)	Units	m^3/d/unit
1	September	22	9,118	3,130	2.91
2	December	11	7,876	3,130	2.52
3	March	26	6,047	3,130	1.93
4	December	12	5,900	3,130	1.88
5	July	8	5,157	3,130	1.65
6	July	13	5,082	3,130	1.62
7	December	13	4,989	3,130	1.59
8	December	6	4,914	3,130	1.57
9	December	2	4,692	3,130	1.50
10	September	23	4,671	3,130	1.49

Table B17 – 2022

Rank	Month	Day	Flow (m^3)	Units	m^3/d/unit
1	February	17	6,928	3,274	2.12
2	December	31	6,867	3,274	2.10
3	June	15	6,221	3,274	1.90
4	December	30	5,645	3,274	1.72
5	March	6	5,603	3,274	1.71
6	March	19	5,400	3,274	1.65
7	March	20	5,176	3,274	1.58
8	March	18	5,102	3,274	1.56
9	March	7	4,943	3,274	1.51
10	June	16	4,816	3,274	1.47

2021 Average 5,845 m^3

2022 Average 5,220 m^3

	Peak Season (Christmas, Family Day & March Break)
	Summer Season
	Winter Season

Appendix G – Craigleith WWTP – 2021 and 2022, Top 10 Peak Flows

Craigleith WWTP

Tables C16 C17: Top 10 Highest Peak Flows, Craigleith WWTP 2021 – 2022

Table C16 – 2021

Rank	Month	Day	Flow (m^3)	Units	m^3/d/unit
1	September	22	14,461	5,443	2.66
2	September	23	10,169	5,443	1.87
3	December	11	9,298	5,443	1.71
4	March	11	7,900	5,443	1.45
5	March	26	6,480	5,443	1.19
6	March	10	6,097	5,443	1.12
7	September	24	5,950	5,443	1.09
8	March	12	5,740	5,443	1.05
9	July	1	5,541	5,443	1.02
10	September	25	5,423	5,443	1.00

Table C17 – 2022

Rank	Month	Day	Flow (m^3)	Units	m^3/d/unit
1	February	17	9,767	5,587	1.75
2	December	31	8,887	5,587	1.59
3	March	6	7,144	5,587	1.28
4	December	30	7,113	5,587	1.27
5	June	12	6816	5,587	1.22
6	March	17	6,617	5,587	1.18
7	March	19	6,540	5,587	1.17
8	March	18	6,471	5,587	1.16
9	March	25	6,319	5,587	1.13
10	March	24	6,315	5,587	1.13

2021 Average 7,199 m^3

2021 Average 7,706 m^3

Peak Season (Christmas, Family Day & March Break)

Summer Season

Winter Season

Appendix H – Basis for Calculating Equivalent Units

APPENDIX "A"

TOWNSHIP OF COLLINGWOOD

CRIAGLEITH - CAMPERDOWN AREA SERVICES

WATER WORKS PROJECT NO. 3-0174

SEWAGE WORKS PROJECT NO. 7-0242

CUSTOMER INVENTORY REVIEW

Basis for Equivalent Units

Facility	Units
Dwelling - single family unit	1
Multiple Unit, Apartment, Condominium, Efficiency Unit - unit	1
Hotel, Motel (No cooking facilities) - 1 room	1/2
Lodge, Hostel, Dormatory accommodation (More than 4 beds/room)-4 beds	1
Restaurants, Licenced Lounges, Cocktail Bars -12 seats	1
Commercial, Professional Offices, Retail Outlets (Take out restaurant, variety store) up to 7,000 sq. ft.-building	2
Major Retail/Offices 7,000 sq. ft. and over - building	3
Gas Bar (no repair service)	1
Service Station	3
Storage/Private Garage with washroom facilities	1
Laundromat Commercial - 1 machine	1
Campground -4 sites	1

Residential unit attached to commercial building add 1 unit to commercial value.

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105 Hurontario Street
COLLINGWOOD, Ontario
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File No. 81170
February, 1982