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Summit View Residential Subdivision, Phase 3

FUNCTIONAL SERVICING REPORT

Poplar Developments I Inc.

Document Control

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Date:

August 23,
2024

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Issue	Date	Description
1	May 4, 2023	Draft Plan Submission
2	August 23, 2024	Draft Plan Submission Rev.1

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1 Introduction

Tatham Engineering Limited (Tatham) has been retained by Poplar Developments I Inc. to complete a Functional Servicing Report in support of an application for Draft Plan of Subdivision for Phase 3 of the Summit View Residential Development, in the Town of Collingwood.

1.1 PURPOSE

This servicing report summarizes the engineering review completed to date for the proposed development and provides a guide to establish the servicing requirements associated with it. More specifically, the requirements address water supply, sanitary sewage servicing, stormwater management, transportation, and utility distribution (hydro, telephone, cable TV and gas).

While the stormwater management and traffic impact components are summarized herein, more detailed assessments and reports have been prepared under separate cover by Tatham.

1.2 GUIDELINES AND BACKGROUND INFORMATION

This report was prepared recognizing the pertinent agencies/authorities as well as applicable Municipal and Provincial guidelines and reports including the following publications:

- Design Guidelines for Drinking-Water Systems, Ministry of Environment (2008);
- Design Criteria for Sanitary Sewers, Storm Sewers, and Force mains for Alterations under Environmental Compliance Approval, Ministry of Environment, Conservation, and Parks, (V.2.0, March 31, 2023);
- Stormwater Management Planning and Design Manual, Ministry of the Environment (March 2003);
- Corporation of the Town of Collingwood Development Standards, (July 2007, including amendment August 5, 2022);
- Town of Collingwood Staff Report PW2024-05, Semi-Annual Water and Wastewater Uncommitted Hydraulic Reserve Capacity Update (March 4, 2024);
- Town of Collingwood, Watermain Hydraulic Assessment of the Proposed Developments at Summit View, C3W Water Inc. (August 29, 2018); and
- Water Supply for Public Fire Protection, Fire Underwriters Survey (FUS), (2020).



2 Proposed Site Development

2.1 SITE LOCATION AND ACCESS

The development lands consist of approximately 6.9 ha of land with frontages along Poplar Sideroad and High Street, situated northwest of the roundabout at this intersection. The legal description of the subject property is more conveniently summarized as Part of Lot 40, Concession 10, Geographic Township of Nottawasaga, Town of Collingwood, County of Simcoe.

Access to the proposed development will be provided via 3 connection points as follows:

- Street D connection to Bassett Street (Phase 1);
- Street B connection to Mitchell Avenue (Phase 2); and
- Street B to High Street.

The configuration of the proposed connection points is illustrated on the Concept Servicing and Grading Plan (Appendix B).

Figure 1 is a Site Location Plan showing the location of the subject property, herein recognized as the development lands.

2.2 EXISTING SITE CONDITIONS

The development lands are currently vacant with a portion being utilized for agricultural purposes. The northern portion of the development lands are currently being utilized temporarily for staging and stockpiling related to Phase 2 of the Summit View development.

The development lands generally convey runoff as sheet flow in a northeast direction and outlet to the existing High Street ditch and storm sewer system.

A detailed topographic survey of the development will be completed upon removal of the existing stockpiles. Geotechnical investigations and reports have been completed for the Summit View development and listed in Section 2.4 of this report. The investigations generally describe the upper soils as consisting of 125 mm to 350 mm of topsoil underlain by a native subgrade soil of sandy silt and silty sand.

2.3 LAND USES

The development lands are designated and zoned residential. A Draft Plan of Subdivision is proposed for the development lands.



The development lands are bordered by the existing Summit View Subdivision (Phases 1 and 2) to the north and west, High Street and the exiting Mountaincroft subdivision to the east, and Poplar Sideroad and Township of Clearview residential lands to the south.

2.4 SITE GEOLOGY AND HYDROGEOLOGY

Geotechnical and hydrogeological investigations and reports have been completed. At the time of preparation of this report, the following reports were available:

- Report on Geotechnical Investigation and Slope Stability Analysis Charleston Homes Residential Subdivision Development High Street and Poplar Sideroad, Collingwood, Ontario., Project No. 2103839, December 2015, SPL Consultants Limited;
- Hydrogeological Assessment Report, Summit View Phase 3, High Street and Poplar Sideroad, Town of Collingwood, May 2, 2023, Soil Engineers Limited.
- Preliminary design and layout of the proposed development have been completed in accordance with the findings and recommendations detailed in these reports. Further, a letter of opinion has been prepared by Soil Engineers Ltd. entitled:
- Letter of Opinion – Geotechnical, Proposed Residential Development, Summit View Phase 3, Poplar Sideroad and High Street, Town of Collingwood, January 18, 2023, Soil Engineers Ltd.

This letter of opinion confirms the investigation and report prepared by SPL Consultants (December 2015) is applicable for the proposed development.

2.5 PROPOSED DEVELOPMENT PLAN

It is proposed to develop the 6.9 ha property with 38 semi-detached and 98 townhouse residential units. The proposed development is illustrated on the Draft Plan of Subdivision prepared by MHBC Planning (Appendix A).

If a household density of 2.7 persons per unit is applied for semi-detached units and 2.4 persons per unit is applied for townhouse units, the development would yield a total population of 338 persons.

The development's internal streets will have a 20-metre right-of-way, as illustrated on the Concept Servicing and Grading Plan (Appendix B). To accommodate the required 7.5 m setback (Simcoe County By-Law No. 5604, Schedule A) from the limit of the County Road (Poplar Sideroad) allowance to the traveled portion of the proposed window street (Street D), a modified 20 m right-of-way cross-section is proposed. The standard and modified cross-sections are detailed on the Concept Servicing and Grading Plan (Appendix B).



All rights-of-way will be complete with municipal services in accordance with the *Corporation of the Town of Collingwood Development Standards*. The proposed servicing arrangement is illustrated on Concept Servicing and Grading Plan (Appendix B), whereas additional details on how the development will be serviced are included in the following sections.

2.6 DEVELOPMENT PHASING

The subject development lands are an extension of the existing Summit View subdivision. Servicing of Phases 1 and 2 of the Summit View subdivision was substantially performed in 2021.



3 Water Network

3.1 WATER DEMANDS

Water demands associated with the proposed development have been calculated based on the *Town of Collingwood Development Standards and the Fire Underwriters Survey (2020)*. The following design criteria have been utilized:

- Average daily domestic flow = 260 L/cap/day;
- Maximum daily demand factor = 1.77;
- Peak hourly demand = 2.70; and
- Household Density = 2.7 (Semi-Detached), 2.4 (Townhouse)

The proposed water demands utilizing a household density of 2.4 persons/unit for townhouses, and 2.7 persons/unit for semi-detached, are summarized as follows:

- | | |
|-----------------------------------|---|
| ▪ Design Population (Residential) | 338 people |
| ▪ Average Day Demand (ADD) | 87.9 m ³ /day (1.0 L/s) |
| ▪ Maximum Day Demand (MDD) | 155.5 m ³ /day (1.8 L/s) |
| ▪ Peak Hour Demand (PHD) | 237.3m ³ /day (2.7 L/s) |
| ▪ Fire Flow Demand | 133 L/s |
| ▪ Maximum Day Plus Fire Flow | 134.8 L/s (1.8 L/s + 133 L/s) for 2 hours |

Detailed water demand calculations are included in Appendix C.

Per the Town of Collingwood Development Standards, watermains shall be designed to carry the maximum day demand plus fire flows based on the latest publication of the Fire Underwriters Survey, or peak hourly flow, whichever is greater. The design flow for the proposed development is 134.8 L/s.

3.2 WATER SUPPLY

Water supply for the development will be provided by connecting to the existing municipal water distribution system.

Upon review of the *Town of Collingwood Staff Report PW2024-05 (March 4, 2024)* (Appendix E), the rated capacity of the Town of Collingwood water treatment plant is 31,140 m³/day. The uncommitted hydraulic reserve capacity is 1,816 m³/day. There exists capacity to service the



proposed development. Detailed assessment of the hydraulic reserve capacity is included in Appendix C.

3.3 WATER DISTRIBUTION

The distribution system is proposed to consist of a combination of 150 mm and 200 mm diameter watermain as illustrated on the Concept Servicing and Grading Plan (Appendix B). Individual 25 mm diameter water services will be provided to each dwelling unit.

Connection to the existing municipal system is proposed by extending the existing 200 mm diameter watermain stubbed on High Street, south of the intersection of Plewes Drive and Findlay Drive. The 200mm diameter watermain will be extended through the High Street entrance along Street B and Street D. All other watermain in the proposed development will be 150 mm diameter. The watermain, services, connections, fittings, and fire hydrants will be installed as specified by the Town of Collingwood Development Standards. The proposed water distribution system is illustrated on the Concept Servicing and Grading Plan (Appendix B).

The proposed servicing strategy is a modified version of 'Alternative A' outlined in the Report prepared by 3CW (Appendix E) entitled *Town of Collingwood, Watermain Hydraulic Assessment of the Proposed Developments at Summit View (August 29, 2018)*. Based on the modelling completed to date, Figure 2-3 included in the Report prepared by C3W (Appendix E) indicates available fire flow in Phases 1 & 2 ranges from 164 L/s to 195 L/s in the vicinity of the proposed Phase 3 connection points.

It is noted that the 200 mm diameter watermain extension along Poplar Sideroad to Rowland Street has not been included in the proposed servicing strategy. We request the Town's modelling consultant include this scenario in their modelling exercise to confirm the available fire flow.

3.4 FIRE PROTECTION FLOW

The required fire flow was determined based on the worst case obtained from either the Town of Collingwood recommended value of 57 L/s (Residential Single-Family Streets) or as determined using the Fire Underwriters Survey, Water Supply for Fire Protection (2020) (FUS).

Applying the FUS guidelines to the proposed building types (Semi-Detached and Townhouse) the following fire protection flow rates were determined:

- Semi-Detached = 100 L/s
- Townhouse = 133 L/s



The maximum fire flow for the proposed development is taken as 133 L/s. The fire flow calculations are based on assumptions related to dwelling size and construction offered in phases 1 and 2 of the Summit View subdivision.

It is noted that the 200 mm diameter watermain extension along Poplar Sideroad to Rowland Street has not been included in the proposed servicing strategy. We request the Town's modelling consultant include this scenario in their modelling exercise to confirm the available fire flow.



4 Sanitary Sewer Network

4.1 SEWAGE DEMANDS

As noted previously, the proposed 136-unit development is expected to yield a total population of 338 persons. Based on the Town of Collingwood Development Standards, the following design criteria have been utilized:

- Average flow = 260 L/cap/day;
- Peaking Factor = 4.06 (Harmon); and
- Infiltration = 0.23 L/ha/s

The peak sewage demand generated by Phase 3 of the development is 5.7 L/s. Detailed calculations are included in Appendix D.

4.2 EXTERNAL SEWAGE TREATMENT PLANT

As per *Town of Collingwood Staff Report PW2024-05* (Appendix E), the average maximum daily flow of sewage into the wastewater treatment plant is approximately 75% of its rated design capacity.

The capacity assessment notes that there are 1,338 m³/day of previously committed flows. Additionally, 1,227 m³/day is allocated to provide a 5% factor of safety. The remaining uncommitted capacity at the wastewater treatment plant is 3,987 m³/day. The proposed development will generate an average daily flow of 87.9 m³/day.

Based on the review of the current uncommitted capacity of the wastewater treatment plant, there exists capacity to service the proposed development.

4.3 PROPOSED SEWER NETWORK

The internal sanitary sewers will include minimum 200 mm diameter pipes located within the proposed right-of-way. Each lot and townhouse unit will have its own 125 mm diameter sanitary service connection.

The sewage generated will be conveyed to a connection at Bassett Street (Phase 1) and eventually into the existing municipal system on High Street. A flow split at the intersection of Plewes Drive and High Street exists where a 200 mm diameter sanitary sewer conveys flow north on High Street and a 300 mm sanitary sewer travels into the Mountaincroft Development on the east side of High Street. The proposed sanitary servicing strategy is illustrated on the Concept Servicing and Grading Plan (Appendix B). A detailed design sheet and sanitary catchment plan



is included in Appendix D demonstrating sufficient capacity is available in the existing collection system. We trust the information provided is sufficient for the Towns consultant to initiate their analysis of the downstream collection system.



5 Stormwater Management

A stormwater management assessment and report has been prepared entitled *Stormwater Management Report Summit View Residential Development, Phase 3, Tatham Engineering, 2022* and should be referred to for details regarding the stormwater management (SWM) plan for the proposed development. Key findings/conclusions of the SMW report are detailed below:

- The stormwater management plan developed for the subject lands is in accordance with the criteria set forth by the *Corporation of the Town of Collingwood Development Standards, (as amended 2022)*, the *Ministry of the Environment Stormwater Management Planning and Design Manual (March 2003)* and the *Nottawasaga Valley Conservation Authority Stormwater Technical Guide (2013)*;
- When implemented, the stormwater management plan will allow the development to proceed without negatively impacting the local drainage systems;
- The majority of the impervious developed area will be conveyed to the existing Summit View SWM facility. Runoff will be conveyed to the facility via a combination of storm sewer (minor system) and overland flow routes (major system);
- Water quality treatment to an Enhanced Level with 80% total suspended solids removal and extended detention for the purpose of erosion control will be provided by the existing Summit View SWM facility;
- A portion of the east side of the proposed development will continue to drain to High Street as under pre-development conditions. The minor system will be collected by a proposed storm sewer system connected to the High Street/Mountaincroft system. Quality control for this runoff will be provided by the existing Mountaincroft SWM facility; and
- Siltation and erosion controls will be implemented for all constructions activities, including topsoil stripping, material stockpiling, road construction and grading operations.

5.1 STORM SEWER NETWORK

An internal storm sewer network will service the proposed development. The storm sewer network will be sized to collect and convey the 1:5 year event with no ponding per the Town of Collingwood Engineering Development Standards. Individual 100 mm diameter storm service connections will be provided for each unit within the proposed development.



6 Transportation Network

Traffic and Transportation issues related to the development must be addressed to accommodate the development and surrounding land use. A standalone Traffic Impact Study (TIS) has been prepared for the proposed development entitled:

Summit View Residential Subdivision, Phase 3, Traffic Impact Study, Tatham, April 13, 2023 (Revised to address Town Comments, August 19, 2024).

A summary of the findings and recommendations of the report are as follows:

- This study has addressed the transportation impacts associated with the Summit View - Phase 3 residential development. Upon completion, the development is expected to generate 65 trips during the AM peak hour and 78 trips during the PM peak hour.
- The intersection of High Street with Plewes Drive/Findlay Drive will experience poor operations (LOS F) in 2030 under background conditions. While traffic signals are not warranted based on traffic signal justification criteria, such are nonetheless recommended to address the poor operating conditions, which result largely due to the increased volumes on High Street. This recommendation is consistent with that of the Town's current *High Street Class EA Update*. Recognizing the benefits that signalization of this intersection will provide to both the future background and future total traffic volumes, and understanding that such is recommended to serve the future background volumes (i.e. without the Phase 3 development), the associated costs should be addressed in conjunction with the widening of High Street through the Town's development charges.
- The intersection of High Street with Campbell Street will experience poor operations under 2035 background conditions. To remedy such, traffic signals are also recommended at this intersection, in addition to the provision of separate westbound left and right turn lanes to maximize the efficiency of the signals. This recommendation is consistent with that of the Town's current *High Street Class EA Update*.
- Under the 2040 background conditions, consideration should be given to the provision of an exclusive eastbound right turn lane on Poplar Sideroad at Hurontario Street to improve operations (to be undertaken by the County given the prevailing road jurisdiction of the intersection).
- Despite the limited left turn volumes, a northbound left turn lane on High Street at Street B to serve Summit View Phase 3 is warranted under the 2040 PM peak hour conditions (not otherwise warranted under 2030 or 2035 conditions, or the 2040 AM conditions). It is expected that any widening of High Street (to 3 or 4 lanes) will be realized by 2040 (identified



as needed by 2032 as per the *High Street Class EA Update*) thus addressing this need. The left turn lane is not otherwise required to support the completion of the development under the 2030 and 2035 horizons.

- The available sight lines along High Street at Street B were reviewed and are considered acceptable in consideration of TAC design guidelines for minimum stopping and intersection sight distances.

6.1 SITE ACCESS

Access to the development will be provided via Street B connection to High Street. While the proposed separation between the new access and Plewes Drive satisfies the TAC guidelines, the separation between the access and the roundabout at Poplar Sideroad does not satisfy the recommended 200 m separation.

Given that the site access will serve relatively low volumes (particularly northbound left turns), and further noting the roundabout configuration at High Street and Poplar Sideroad, back-to-back left turn storage is not a concern. In this respect, the proposed 180 m separation is considered acceptable.

Additional site access points are provided by Phases 1 and 2 of the existing Summit View Subdivision as follows:

- Street D connection to Bassett Street (Phase 1); and
- Street B connection to Mitchell Avenue (Phase 2).

6.2 INTERNAL ROAD NETWORK

A 20.0m wide urban road cross-section (STD. No. 201) is proposed for the development with the exception of the modified east-west window street (Street D). The right-of-way would be municipally owned. Daylighting triangles will be incorporated, and minimum sightline requirements are satisfied for major entrances and intersections associated with the development. Additional details are illustrated on the included Draft Plan (Appendix A).



7 Utility Network

Utilities servicing for the proposed development will be installed in accordance with the municipal engineering standards. Utility servicing design will be provided during the detailed engineering submission stage and include connection strategies and any required external upgrades to service the proposed development. The following sections outline our preliminary assessment of the existing utility networks associated with the subject property.

7.1 NATURAL GAS

There are existing Enbridge gas mains on the east side of High Street, Bassett Street (Phase 1) and Mitchell Avenue (Phase 2). It is expected that a connection will be made to the existing mains to service the proposed development. Enbridge has been contacted to comment on their immediate capacity and/or any external upgrades that will be required to service the proposed development. Detailed connection strategies will be provided during detailed design.

7.2 HYDRO

Based on information provided by Epcor, it is anticipated that a connection will be made to the existing Epcor overhead hydro lines on High Street and transition to an underground service for the proposed development. Epcor has been contacted to comment on their immediate capacity and has indicated minor external upgrades will be required to service the proposed development. Detailed connection strategies will be provided during detailed design.

7.3 COMMUNICATIONS

Bell and Rogers have existing infrastructure in the vicinity of the proposed development. It is anticipated that the communication utility service providers will connect and/or extend their existing infrastructure from Phases 1 and 2 to service the proposed development. The local utility providers have been contacted have indicated there is capacity to service the proposed development. Detailed connection strategies will be provided during detailed design.



8 Summary

Based on the preceding analysis, the proposed development can be appropriately serviced. A summary of the findings and recommendations are as follows:

1. An internal water distribution system can be constructed to service the proposed development. Connection to the existing Town water distribution system will be provided via an extension of the existing 200mm diameter watermain on High Street and connection to the exiting 150mm diameter watermain on Mitchell Avenue. There is capacity in the existing municipal water treatment system to service the proposed development.
2. An internal sanitary sewer can be constructed and will convey the sewage via gravity to the existing sanitary sewer system via Phase 1 of the Summit View Development. There is capacity within the existing wastewater treatment plant to service the proposed subdivision.
3. An internal storm sewer system to collect and convey surface water runoff for the development will be constructed. The majority of runoff will be discharged to an existing stormwater management facility located in the Summit View development. The existing Summit View SWM pond will provide quality treatment and extended detention for erosion control. A small portion of runoff will be directed to High Street and be conveyed through the High Street/Mountaincroft system to the existing SWM facility.
4. The proposed internal roadway network will consist of 20m wide urban road cross-section. The east-west window street (Street D) will feature a modified 20 m wide urban road cross-section.
5. The development is expected to generate 65 trips during the AM peak hour and 77 trips during the PM peak hour.
6. Although, the traffic signals at the High Street and Plewes/Findlay Drive intersection are not warranted due to low volumes, they are recommended to better the operations. It is noted that this requirement is the result of background growth.
7. The available sight lines along High Street at Street B were reviewed and are considered acceptable in consideration of TAC design guidelines for minimum stopping and intersection sight distances.
8. Existing utilities are available in the immediate vicinity and provide feasible connection opportunities for the proposed development. Existing utility providers have been contacted to comment on their immediate capacity and/or any external upgrades required to service



the proposed development. Connection and servicing strategies will be provided during the detailed design phase.





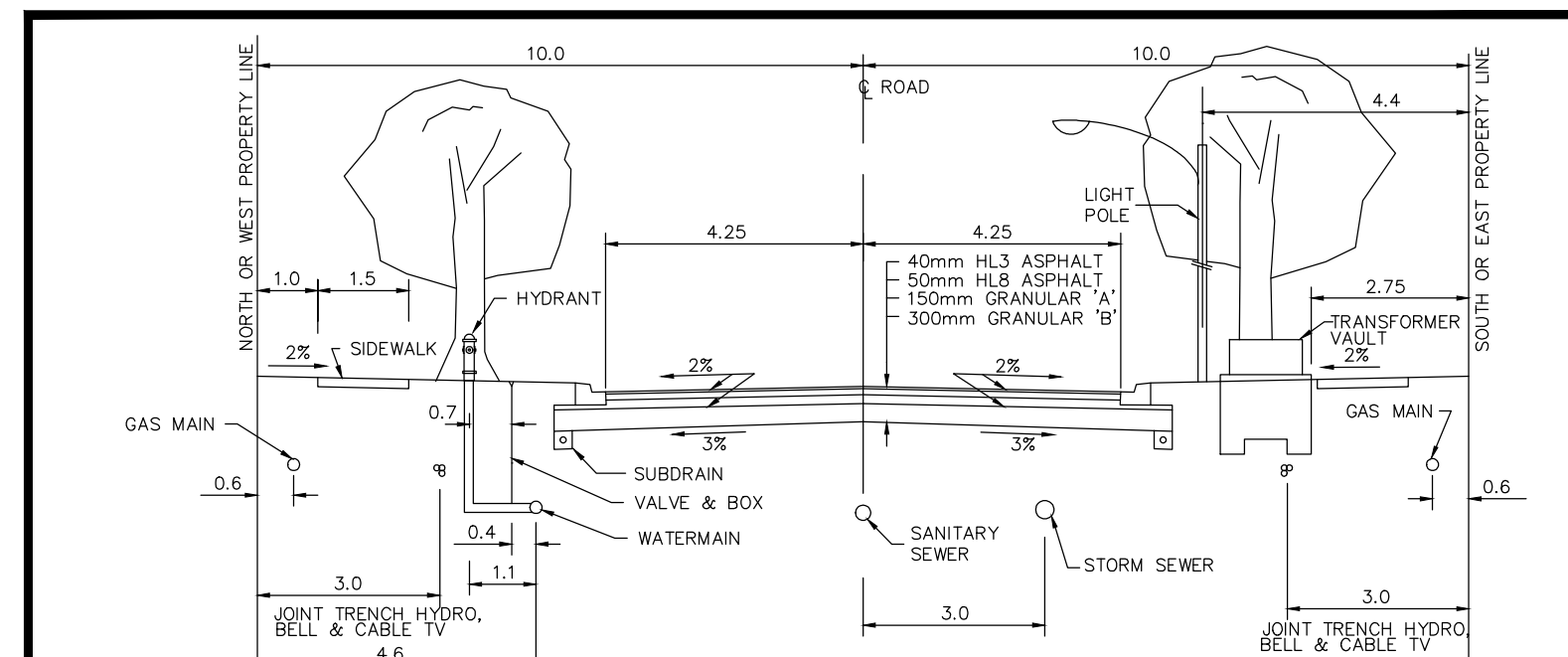
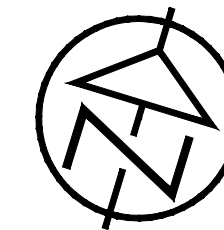
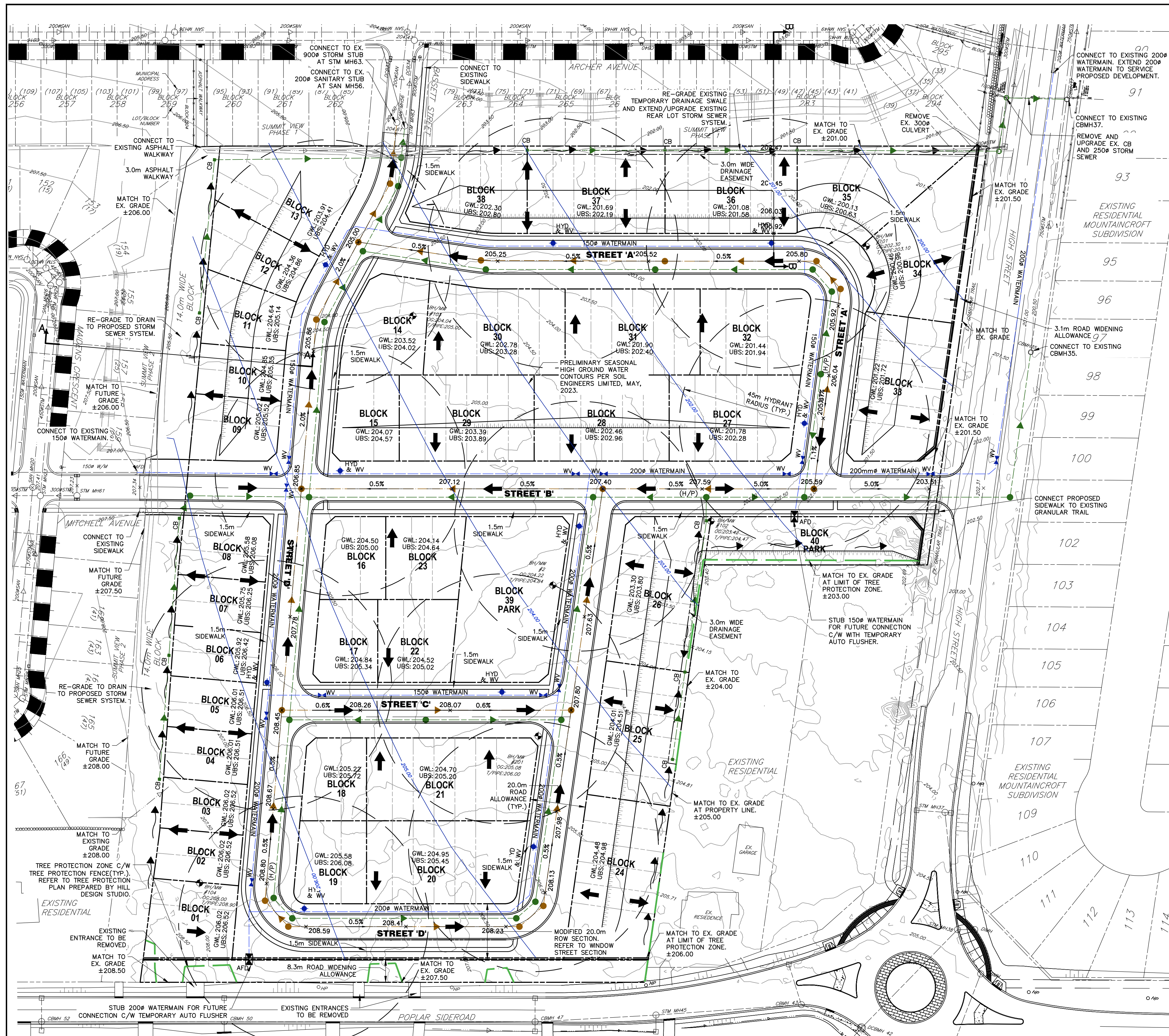
SUMMIT VIEW RESIDENTIAL DEVELOPMENT

Figure 1: Site Location Plan

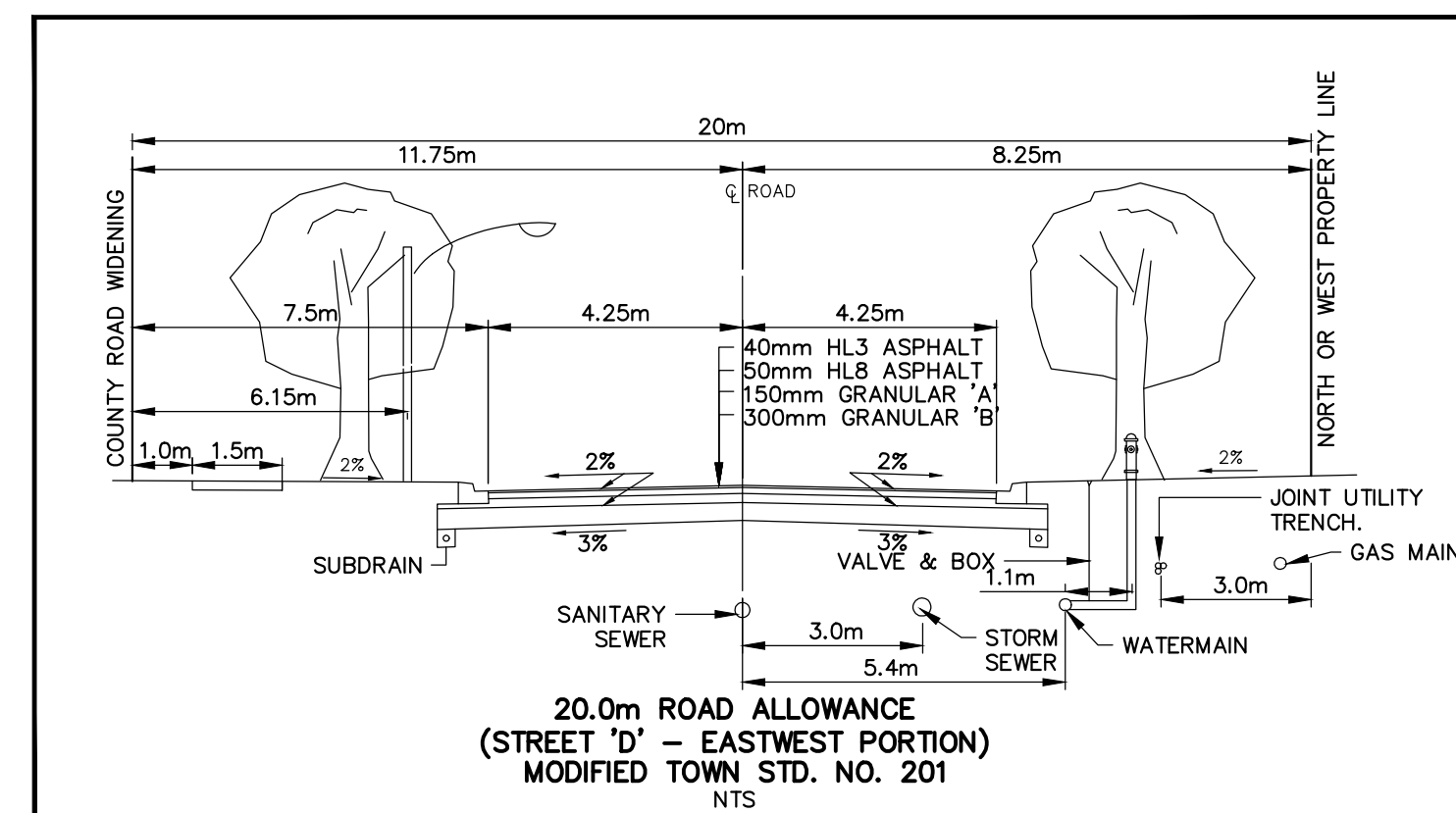


Appendix A: Draft Plan

Appendix B: Concept Servicing and Grading Plan



TOWN OF COLLINGWOOD				APR'D: EDH	DATE: JAN/03
URBAN - LOCAL RESIDENTIAL				DRAWN: NTS	SCALE: NTS
20.0m ROAD ALLOWANCE				STD. No.	201
8.5m ASPHALT SURFACE					



LEGEND	
OVERLAND FLOW DIRECTION	←
SWALE	—
EXISTING CONTOUR LINE	— 100.00
EXISTING ELEVATION	x 100.00
PROPOSED ELEVATION	x 100.00
SANITARY SEWER	—
SANITARY MAINTENANCE HOLE	● SAN MH
STORM MAINTENANCE HOLE	● STM MH
STORM CATCHBASIN MAINTENANCE HOLE	○ CBMH
STORM CATCHBASIN	□ CB
STORM SEWER	—
WATERMAIN	—
HYDRANT & VALVE SET	● HYD & WV
WATER VALVE	● WV
BLOWOFF	● BO
PROPOSED BANK AND SLOPE	—
EXISTING BOREHOLE/MONITORING WELL	● BOREHOLE
TREE PROTECTION FENCE	—

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DRAWING REFERENCES

LEGAL SURVEY INFORMATION SHOWN ON THIS PLAN PREPARED BY VAN HARTEN SURVEY INC., PLAN OF SUBDIVISION, DATED SEPTEMBER 26, 2019.

TOPOGRAPHIC INFORMATION SHOWN ON THIS PLAN BASED ON LAND INFORMATION ONTARIO BASE MAPPING.

RIGHT-OF-WAY AND LOT FABRIC SHOWN ON THIS PLAN HAVE BEEN TAKEN FROM SUMMIT VIEW PHASE 3 DRAFT PLAN OF SUBDIVISION, PREPARED BY MHBC PLANNING, DATED JUNE 24, 2024.

BENCHMARKS

No.	REVISION DESCRIPTION	DATE
1.	REVISED PER TOWN COMMENTS	AUG./24

ENGINEER STAMP

DRAFT PLAN SUBMISSION
AUGUST 23, 2024

SUMMIT VIEW - PHASE 3
RESIDENTIAL DEVELOPMENT
TOWN OF COLLINGWOOD

CONCEPT SERVICING AND
GRADING PLAN



DESIGN: EL	FILE: 118039	DWG:
DRAWN: KRL	DATE: DEC 2022	CSG-1
CHECK: JRA	SCALE: 1:750	

Appendix C: Water Demand Calculations

PROJECT	Summitview Phase 3		FILE	118039
			DATE	July 30, 2024
SUBJECT	Water Demand Calculations		NAME	KRL/EL
			PAGE	1 OF 2

WATER SUPPLY

1.1 Residential Design Flows

Residential Units (Townhouse)	=	98	Draft Plan by MHBC Planning
Residential Units (Semi Detached)	=	38	Draft Plan by MHBC Planning
Population per Unit (Townhouse)	=	2.4	Collingwood Development Standards
Population per Unit (Semi Detached)	=	2.7	Collingwood Development Standards
Population	=	338	

Average Daily per capita Flow = 260 L/cap/day Collingwood Development Standards

$$\begin{aligned}
 \text{Average Daily Flow} &= 338 \times (260 \text{ L/cap/day}/1000) \\
 &= 87.9 \text{ m}^3/\text{day} \\
 &= 1.0 \text{ L/s}
 \end{aligned}$$

Design Factors

Residential Population	=	338	
Residential Max. Day Factor	=	1.77	Collingwood Development Standards
Residential Peak Hour Factor	=	2.70	Collingwood Development Standards

Design Flows

$$\begin{aligned}
 \text{Max. Daily Flow} &= 1.0 \times 1.8 \\
 &= 1.8 \text{ L/s} \quad 155.5 \text{ m}^3/\text{day} \\
 \\
 \text{Peak Hour Flow} &= 1.0 \times 2.7 \\
 &= 2.7 \text{ L/s} \quad 237.3 \text{ m}^3/\text{day} \\
 \\
 \text{Fire Flow} &= 133 \text{ L/s} \quad \text{Fire Flow Demand Calculations} \\
 \\
 \text{Max. Day + Fire Flow} &= 133 + 1.8 \\
 &= 134.8 \text{ L/s}
 \end{aligned}$$

PROJECT	Summitview Phase 3	FILE	118039
		DATE	July 30, 2024
SUBJECT	Water Demand Calculations	NAME	KRL/EL
		PAGE	2 OF 2

1.2 Uncommitted Hydraulic Reserve Capacity

System Capacity =	31,140 m ³ /day	
Current Utilization =	14,800 m ³ /day	
Municipal Commitments =	10,750 m ³ /day	
Committed to Development =	2,217 m ³ /day	
Factor of Safety (5%) =	1,557 m ³ /day	
Uncommitted Hydraulic Reserve =	1,816 m³/day	
Proposed Development (Max Day) =	156 m ³ /day	
% Utilization Ultimate Conditon	$= \frac{\text{MDF} + \text{Committed Flows} + \text{Proposed Development (136 Units)}}{\text{System Capacity}}$	
	$= \frac{29,480}{31140} = \mathbf{94.7\%} < 100\%$	

Note:

Hydraulic reserve capacity based on Town of Collingwood Staff Report PW2024-05, March 4, 2024



Project: Summit View Phase 3	Date: March 17, 2023
File No.: 118039	Designed: KRL
Subject: Fire Flow Demand Calculations	Checked: EL
Revisions:	

Fire Flow Demands prepared for standard townhouse block

Calculation Based on 2020 Publication "Water Supply for Public Fire Protection" by Fire Underwriters Survey (FUS).

Step	Description	Term	Options	Multiplier Associated with Option	Choose	Value used	Unit	Total Fire Flow (L/min)	
1	Frame Use for Construction of Unit	Coefficient related to type of construction (C)	Framing Material						
			Wood Frame	1.5	Ordinary Construction	1	-	N/A	
			Ordinary Construction	1					
			Non-combustible construction	0.8					
			Fire resistive construction (< 2 hrs)	0.7					
			Fire resistive construction (> 2 hrs)	0.6					
2	Type of Housing (if Townhouse, enter number of units per TH block)	Type of Housing	Floor Space Area						
			Single Family	1		0	Units	N/A	
			Townhouse / Apartment- inform # of units	1		6			
			Other (Comm. Ind., etc.)	1					
			2 hour Fire Separation Between Units	1	No	6			
2.1	Number of Storeys	Number of Floors / Storeys in the unit (do not include basement)				2	Storeys	N/A	
3	Floor Area (exclude basements, per unit for townhouses, per single family dwelling or per building for apartments, commercial or institutional)	Ground Floor Area (assume fire stop separation is being provided per unit)				70	Square Metres (m2)	N/A	
		Total Floor Area - One Storey of Townhouse/Apartment Block				420			
		Total Floor Area - All Storeys				840			
		Does the building have fire-resistive design?			No	840			
		Are vertical openings/communications properly protected (1 hour rating)?			No	840			
		Total Floor Area (A) - for all storeys excluding basement - Single Family				840			
		Measurement Unis	Square Feet (ft²)	0.093		840	m²		
			Square Metres (m²)	1					
			Hectares (ha)	10000					
4	Required Fire Flow without Reductions or Increases	Required Fire Flows without Reductions or Increases per FUS): (FF= 220 x C x A ^{0.5})					L/min	6,000	
5	Factors Affecting Burning								Reductions / Increases Due to Factors Affecting Burning
5.1	Combustibility of Building Contents	Occupancy content hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15	N/A	(900)	5,100
			Limited combustible	-0.15					
			Combustible	0.00					
			Free burning	0.15					
			Rapid burning	0.25					
5.2	Reduction Due to Presence of Sprinklers	Sprinkler reduction	Fully supervised system	-0.5	None	0.0	N/A	-	5,100
			Water supply system/hose connections	-0.4					
			Automatic sprinkler protection	-0.3					
			None	0					
5.3	Separation Distance Between Units (Use 10% for 2 hour Fire Separation between adjacent units)	Exposure distance between units	North Side	30.1 to 45.0 m	0.00	0.55	%	2,805	7,905
			East Side	3.1 to 10.0 m	0.20				
			South Side	10.1 to 20.0 m	0.15				
			West Side	3.1 to 10.0 m	0.20				
Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied:								8,000	
6	Required Fire Flow, Duration and Volume	Total Required Fire Flow (above) in L/s:						133	
		Required Duration of Fire Flow of 8,000 L/min (hrs):						2	
		Required volume for Fire Flow of 8,000 L/min (m³):						960	



Project: Summit View Phase 3	Date: March 17, 2023
File No.: 118039	Designed: KRL
Subject: Fire Flow Demand Calculations	Checked: EL
Revisions:	

Fire Flow Demands prepared for standard semi-detached home

Calculation Based on 2020 Publication "Water Supply for Public Fire Protection" by Fire Underwriters Survey (FUS).

Step	Description	Term	Options	Multiplier Associated with Option	Choose	Value used	Unit	Total Fire Flow (L/min)	
1	Frame Use for Construction of Unit	Coefficient related to type of construction (C)	Framing Material						
			Wood Frame	1.5	Ordinary Construction	1	-	N/A	
			Ordinary Construction	1					
			Non-combustible construction	0.8					
			Fire resistive construction (< 2 hrs)	0.7					
			Fire resistive construction (> 2 hrs)	0.6					
2	Type of Housing (if Townhouse, enter number of units per TH block)	Type of Housing	Floor Space Area						
			Single Family	1		0	Units	N/A	
			Townhouse / Apartment- inform # of units	1		2			
			Other (Comm. Ind., etc.)	1					
			2 hour Fire Separation Between Units	1	No	2			
2.1	Number of Storeys	Number of Floors / Storeys in the unit (do not include basement)				2	Storeys	N/A	
3	Floor Area (exclude basements, per unit for townhouses, per single family dwelling or per building for apartments, commercial or institutional)	Ground Floor Area (assume fire stop separation is being provided per unit)				81	Square Metres (m2)	N/A	
		Total Floor Area - One Storey of Townhouse/Apartment Block				161			
		Total Floor Area - All Storeys				323			
		Does the building have fire-resistive design?			No	323			
		Are vertical openings/communications properly protected (1 hour rating)?			No	323			
		Total Floor Area (A) - for all storeys excluding basement - Semi-Detached				323			
		Measurement Unis	Square Feet (ft²)	0.093		323	m²		
			Square Metres (m²)	1					
			Hectares (ha)	10000					
4	Required Fire Flow without Reductions or Increases	Required Fire Flows without Reductions or Increases per FUS): (FF= 220 x C x A ^{0.5})					L/min	4,000	
5	Factors Affecting Burning	Reductions / Increases Due to Factors Affecting Burning							
5.1	Combustibility of Building Contents	Occupancy content hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15	N/A	(600)	3,400
			Limited combustible	-0.15					
			Combustible	0.00					
			Free burning	0.15					
			Rapid burning	0.25					
5.2	Reduction Due to Presence of Sprinklers	Sprinkler reduction	Fully supervised system	-0.5	None	0.0	N/A	-	3,400
			Water supply system/hose connections	-0.4					
			Automatic sprinkler protection	-0.3					
			None	0					
5.3	Separation Distance Between Units (Use 10% for 2 hour Fire Separation between adjacent units)	Exposure distance between units	North Side	30.1 to 45.0 m	0.05	0.7	%	2,380	5,780
			East Side	0 to 3.0 m	0.25				
			South Side	10.1 to 20.0 m	0.15				
			West Side	0 to 3.0 m	0.25				
Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied:								6,000	
6	Required Fire Flow, Duration and Volume	Total Required Fire Flow (above) in L/s:						100	
		Required Duration of Fire Flow of 6,000 L/min (hrs):					2		
		Required volume for Fire Flow of 6,000 L/min (m³):					720		

Appendix D: Wastewater Calculations

PROJECT	Summitview Phase 3	FILE	118039
		DATE	June 24, 2024
SUBJECT	Wastewater Calculations	NAME	KRL
		PAGE	1 OF 2

Design Criteria

Residential Units (Townhouse)	=	98	Per Draft Plan by MHBC Planning
Residential Units (Semi Detached)	=	38	Per Draft Plan by MHBC Planning
Population per Unit (Townhouse)	=	2.4	(Collingwood Design Standards)
Population per Unit (Semi Detached)	=	2.7	(Collingwood Design Standards)
Population	=	338	
Harmon Peaking Factor	=	4.06	(MECP design guidelines)
Average Daily per capita Flow	=	260 L/cap/day	(Collingwood Design Standards)
Average Daily Flow	=	338 x (260 L/cap/day/1000)	
	=	87.9 m ³ /day	
	=	1.0 L/s	

Sewage Flows

$$\begin{aligned} \text{Average Daily Flow} &= 87,880.0 \text{ L/day} & 87.9 \text{ m}^3/\text{day} \\ &= 1.0 \text{ L/s} \end{aligned}$$

$$\begin{aligned} \text{Peak Sewage Flow} &= \text{Avg Daily Flow} \times \text{Peaking Factor} \\ &= 4.1 \text{ L/s} & 356.428 \text{ m}^3/\text{day} \end{aligned}$$

Infiltration Flows

$$\begin{aligned} \text{Per Hectare Flow} &= 0.23 \text{ L/s} & (\text{MECP design guidelines}) \\ \text{Development Area} &= 6.90 \\ \text{Infiltration Flow} &= 1.6 \text{ L/s} \end{aligned}$$

$$\begin{aligned} \text{Peak Flow} &= \text{Peak Sewage Flow} + \text{Infiltration} \\ &= 5.7 \text{ L/s} \\ &= 493.5 \text{ m}^3/\text{day} \end{aligned}$$

PROJECT	Summitview Phase 3	FILE	118039
		DATE	June 24, 2024
SUBJECT	Wastewater Calculations	NAME	KRL
		PAGE	2 OF 2

Sewage Treatment Capacity

Hydraulic Reserve Capacity = 6,611 m³/day
 Committed to Development = 1338.0 m³/day
 Factor of Safety (5%) = 1227.0 m³/day
 Uncommitted Hydraulic Reserve = 4046.0 m³/day
 Proposed Development (Max Day) = 87.9 m³/day

$$\begin{aligned}
 \text{Ultimate Condition} &= \frac{\text{Committed Flows} + \text{Proposed Development (136 Units)}}{\text{Hydraulic Reserve Capacity}} \\
 &= \frac{2,653}{6,611} = 40.1\% < 100\%
 \end{aligned}$$

Note:

Hydraulic reserve capacity based on Town of Collingwood Staff Report PW2024-05, March4 , 2024

Project Information

118039

Drawing Reference

July 30/24

Prepared By

July 30/24

Reviewed By

July 30/24

Municipality

Town of Collingwood

Population Density

Low

Infiltration

0.23

Flow

Average (L/cap/d)

Manning's Coefficient

Pipe Material

Engineer Stamp

Street Name	Area Label/ID	Upstream Maintenance Hole	Downstream Maintenance Hole	Development Type	Population Density	Number of Units	Population (cap)	Accumulated Population (cap)	Peaking Factor	Area (ha)	Cumulative Area (ha)	Average Flow (L/s)			Peak Flow (L/s)			Proposed Sanitary Sewer							
												Development	Infiltration	Total	Development	Infiltration	Total	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (L/s)	Actual Velocity (m/s)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
Plewes Drive	A1	-	SAN MH40	Residential	Low	239	573.6	573.6	3.94	15.35	15.35	1.73	3.53	5.26	6.81	3.53	10.34	83.7	0.4%	200	0.66	20.74	0.63	154	49.8%
Phase 3	A2	-	SAN MH56	Residential	Low	141	338.0	338.0	4.06	6.90	6.90	1.02	1.59	2.60	4.13	1.59	5.71	8.6	0.3%	200	0.57	17.96	0.48	130	31.8%
Bassett Street	A3	SAN MH56	SAN MH41	Residential	Low	0	0.0	338.0	4.06	0.07	6.97	1.02	1.60	2.62	4.13	1.60	5.73	32.8	0.4%	200	0.66	20.74	0.54	123	27.6%
Archer Avenue	A4	-	SAN MH41	Residential	Low	25	60.0	60.0	4.30	1.20	1.20	0.18	0.28	0.46	0.78	0.28	1.05	83.7	0.4%	200	0.66	20.74	0.34	65	5.1%
Basssett Street	A5	SAN MH41	SAN MH42	Residential	Low	8	20.0	418.0	4.01	0.70	8.87	1.26	2.04	3.30	5.14	2.04	7.18	66.8	2.0%	200	1.48	46.38	1.03	99	15.5%
Bassett Street	A6	SAN MH42	SAN MH40	Residential	Low	8	20.0	438.0	4.00	0.74	9.61	1.32	2.21	3.53	5.38	2.21	7.59	66.8	0.7%	200	0.87	27.44	0.71	123	27.7%
Plewes Drive	A7	SAN MH40	SAN MH43	Residential	Low	9	22.0	1033.6	3.79	0.46	25.42	3.11	5.85	8.96	12.44	5.85	18.29	90.7	0.4%	250	0.77	37.61	0.73	191	48.6%
Plewes Drive	A8	SAN MH43	SAN MH44	Residential	Low	6	15.0	1048.6	3.79	0.28	25.70	3.16	5.91	9.07	12.61	5.91	18.52	76.8	0.4%	250	0.77	37.61	0.73	192	49.2%
Archer Avenue	A9	-	SAN MH44	Residential	Low	53	128.0	128.0	4.21	2.47	2.47	0.39	0.57	0.95	1.62	0.57	2.19	63.3	1.0%	200	1.04	32.80	0.58	72	6.7%
Foley Crescent	A10	-	SAN MH44	Residential	Low	57	137.0	137.0	4.20	2.54	2.54	0.41	0.58	1.00	1.73	0.58	2.32	74.9	0.4%	200	0.66	20.74	0.42	88	11.2%
Plewes Drive	A11	SAN MH44	SAN MH52	Residential	Low	0	0.0	1313.6	3.72	0.08	30.79	3.95	7.08	11.03	15.97	7.08	23.05	59.1	0.4%	250	0.77	37.61	0.77	208	61.3%
FLOW SPLIT																									
Findlay Drive		SANMH52	MCROFT	Residential	Low	273	655.8	655.8	3.91	0.00	0.00	1.97		1.97	7.72		7.72	3.5	5.1%	250	2.74	134.30	1.45	86	5.7%
High Street		SANMH52	SAN MH54	Residential	Low	273	655.8	655.8	3.91	0.00	0.00	1.97		1.97	7.72		7.72	111.1	0.4%	250	0.77	37.61	0.57	138	20.5%

Sanitary Sewer Design Sheet

Version Number:2

Version Date:July 30, 2024

Project Information

Summitview Phase 3

118039

Drawing Reference

118039 - SAN01

July 30/24

Prepared By

Evan Lundquist

July 30/24

Reviewed By

Andrew Overholt

July 30/24

Municipality

Town of Collingwood

Population Density

Capita per Unit

Low

Medium

High

2.40

2.70

2.90

Infiltration

Infiltration (L/s/ha)

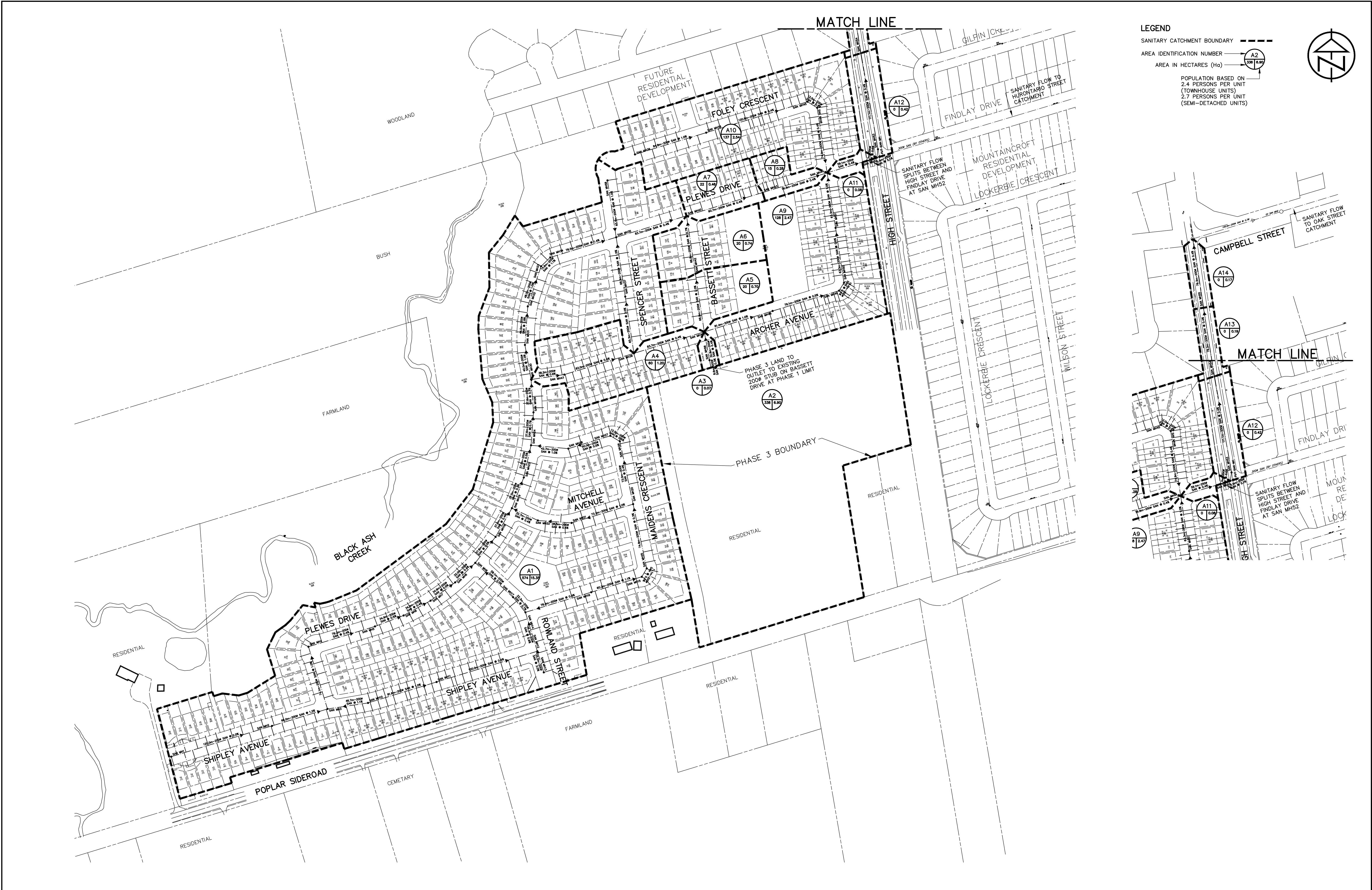
0.23

Development Type	Average (L/cap/day)	Peaking Factor
Residential	260	Harmon
Development Type	Average (L/ha/day)	Peaking Factor
Institution	-	-
Commercial	-	-
Industrial High Intensity	-	-
Industrial Low Intensity	-	-

Manning's Coefficient	
Pipe Material	Value
Concrete	0.013
PVC	0.013
Applied	0.013

Engineer Stamp

Street Name	Area Label/ID	Upstream Maintenance Hole	Downstream Maintenance Hole	Development Type	Population Density	Number of Units	Population (cap)	Accumulated Population (cap)	Peaking Factor	Area (ha)	Cumulative Area (ha)	Average Flow (L/s)			Peak Flow (L/s)			Proposed Sanitary Sewer							
												Development	Infiltration	Total	Development	Infiltration	Total	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (L/s)	Actual Velocity (m/s)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
High Street	A13	SAN MH54	SAN MH55	Residential	Low	0	0.0	655.8	3.91	0.19	0.19	1.97	0.04	2.02	7.72	0.04	7.76	79.2	0.4%	250	0.77	37.61	0.58	138	20.6%
High Street	A14	SAN MH55	X. SAN MH	Residential	Low	0	0.0	655.8	3.91	0.17	0.36	1.97	0.08	2.06	7.72	0.08	7.80	79.3	0.4%	250	0.77	37.61	0.58	139	20.7%



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			1.	DRAFT PLAN SUBMISSION	MAY/23								
										DESIGN: EL	FILE: 118039	DWG:	SAN-1
									DRAWN: KRL	DATE: MAR./23			
									CHECK: JRA	SCALE: 1:2,000			

Appendix E: Background Documents



Staff Report PW2024-05

Standing Committee 2024-03-04

Council 2024-03-18

Amendments **1**

Submitted To: Committee of the Whole | Council

Submitted By: Peggy Slama, Director of Public Works, Engineering and Environmental Services

Prepared By: Ken Kaden, Manager of Environmental Services (Acting)
Matt Cameron, Project Coordinator of Environmental Services

Subject: **Semi-Annual Water and Wastewater Uncommitted Hydraulic Reserve Capacity Update**

Recommendation

THAT Staff report PW2024-05 Semi-Annual Water and Wastewater Uncommitted Hydraulic Reserve Capacity Update, dated March 4, 2024, be received.

Amendments

Appendix A was revised to remove data related to “winter” considerations for water. With the installation and commissioning of ultraviolet disinfection (UV) process at the water treatment plant (WTP), the total rated capacity of the WTP is available during cold water conditions and there is no longer a need to differentiate available capacity.

1. Executive Summary

The purpose of this report is to fulfill the requirement to present semi-annual updates to Council and the public on the remaining hydraulic reserve capacity at the drinking water and wastewater treatment plants, in accordance with the Town's Servicing Capacity Allocation Policy (SCAP).

As of January 31, 2024, the uncommitted hydraulic reserve capacity for the drinking water system is approximately 1,816 m³/d (1,365 Single Dwelling Units or SDUs) and the uncommitted hydraulic reserve capacity for the wastewater system is approximately 3,987 m³/d (3,928 SDUs).

Based on the updated uncommitted hydraulic reserve capacity calculations, recommended servicing capacity allocation forecast has also been updated for 2024. Based on the updated forecast staff have assigned 400 SDUs of water servicing capacity and 490 SDUs of wastewater servicing capacity be made available for major and minor development.

Staff continue to recommend a factor of safety be applied to capacity being made available to new development in the short term to allow for potential unanticipated fluctuations in maximum day demands and average day flows, margins of error on servicing capacity requirements for approved development, and uncertainty around the timing of the water treatment plant expansion commissioning.

Following the receipt of this Report by Council, staff will bring forward a report on the first batch of approved planning applications recommended to receive allocation. Please note that at this time, there is only one application in the queue for servicing capacity allocation in the spring 2024 batch. The batch process will advance once additional proposals have proceeded through the land use planning process.

Staff are also examining the potential to produce additional interim drinking water capacity, and the proposed project and information will come forward in a separate

report. Overall servicing allocations must consider both water and wastewater allocations.

2. Analysis

Over the past three years, the Town has moved forward with a comprehensive strategy to ensure water and wastewater servicing capacity is allocated and managed transparently and consistently while ensuring the available servicing capacity is not overallocated. Key milestones of this process are noted below.

April 26, 2021:	Council passed an Interim Control By-Law (ICBL) to remain in place while the Town completed a Land Use Planning Study (the “Study”) to ensure tools are in place to manage allocation of water and wastewater servicing capacity for development.
December 20, 2021:	Council endorsed the recommendation to implement the completed Study and move toward the finalization of a servicing capacity allocation framework.
February 28, 2022:	Zoning By-law Amendment 2022-007 was passed, requiring that adequate water and wastewater services, including available capacity be confirmed by the Town before most development and construction may proceed.
March 28, 2022:	Servicing Capacity Allocation Policy (SCAP) approved by Council.
May 16, 2022:	Council enacted a by-law to set the effective date for the Town’s SCAP as May 17, 2022.
September 19, 2022:	Council received Report PW2022-18 , which provided the first update on uncommitted hydraulic reserve capacity based on the criteria identified in the SCAP.

- December 19, 2022: Council approved an extension to the Town's short-term ICBL exemption program for 2023, and agreed to an interpretation of an accessory residential unit would no longer need to obtain an ICBL exemption.
- January 30, 2023: Council approved changes to the SCAP, including increasing clarity, streamlining processes, decoupling servicing allocation from planning approvals and making it easier for smaller-scale and lower-risk developments to proceed.
- July 19, 2023: Appeals of Zoning By-law Amendment 2022-007 are resolved and the ICBL is no longer in effect.

In accordance with the SCAP, staff are required to report on the uncommitted hydraulic reserve capacity twice each year. The second update for 2023 was received by Council on September 25, 2023 (PW2023-15).

Key Terminology

The SCAP defines the water and wastewater hydraulic reserve capacity and uncommitted hydraulic reserve capacity as follows:

Water Hydraulic Reserve Capacity – Design capacity of the Raymond A. Barker Water Treatment Plant (WTP) minus the existing 3-year running average recorded maximum day demand (MDD) and any capacity reserved to service municipalities outside the Town of Collingwood.

Wastewater Hydraulic Reserve Capacity – Design capacity of the Collingwood Wastewater Treatment Plant (WWTP) minus the existing 3-year running average recorded annual average day wastewater flow (ADF).

Uncommitted Hydraulic Reserve Capacity – Obtained by subtracting any committed water and wastewater allocation, including through draft approved and registered plans of subdivision and condominium plans and site plan approvals (where the conditions of any individual approval commits capacity and this approval has not expired), any

capacity reserved for government projects, projects that do not require a Planning Act application or the treatment of hauled sewage if applicable, plus a safety factor, from the existing hydraulic reserve capacity

To help determine the remaining servicing capacity available for allocation for future development applications, the uncommitted hydraulic reserve capacity can be converted to a Single Dwelling Unit (SDU) equivalent based on the Town's Development Standards and 2019 Water and Wastewater Master Servicing Plan (Table 1).

Table 1 SDU Conversion Factors

Criterion	Drinking Water	Wastewater
People Per Single Detached Dwelling	2.9	2.9
Servicing Requirements (L/cap/day)	260	260
Maximum Day Factor	1.77	n/a
Extraneous Flows (L/cap/d)	n/a	90
One SDU Equivalent (m³/d)	1.33	1.02

Hydraulic Reserve Capacity Calculations

The water hydraulic reserve capacity is calculated using the average maximum day demand in Collingwood between 2021 and 2023 and considers the contractual commitments to provide drinking water to the Town of the Blue Mountains (TBM) and the Town of New Tecumseth (NT).

The hydraulic reserve capacity at the WTP and WWTP have been updated since the September 25, 2023 PW2023-15 report to include a 3-year average MDD which includes the previous year (2023). The updated hydraulic reserve capacity at the WTP and WWTP as of January 31, 2024 is approximately 5,590 m³/d (4,189 SDUs) and 6,611 m³/d (6,513 SDUs) respectively (Appendix A).

The uncommitted hydraulic reserve capacity is determined by incorporating information from the Planning and Building Divisions, and considers:

- Approved Site Plans,
- Approved developments with no further Planning approvals required (e.g. Registered Plans of Subdivision that do not require further Site Plan approvals),
- Approved Building Permits,
- Building Permits that have been closed, and
- ICBL exemptions.

Properties where no Planning application would be required prior to consideration of a building permit application, usually small-scale vacant residential lots, also need to be considered when determining the uncommitted hydraulic reserve capacity. The number of unconnected residential lots with access to existing municipal services was not revised from the September 25, 2023 estimate as part of this update to the uncommitted hydraulic reserve capacity.

In 2024, including a five percent (5%) factor of safety, the uncommitted hydraulic reserve capacity for the drinking water system as of January 31, 2024 is approximately 1,816 m³/d (1,365 SDUs), and the uncommitted hydraulic reserve capacity for the wastewater system is approximately 3,987 m³/d (3,928 SDUs), as shown in Table 2. If the factor of safety is excluded from uncommitted hydraulic reserve capacity calculations, the committed capacity of the drinking water system is approximately 90%, and the committed capacity of the wastewater system is approximately 80%. It should be noted that there is currently no formal tracking for accessory dwelling units being added to existing properties which adds additional draw to the water system. However, minor development, including accessory dwelling units are captured in the annual capacity amount set aside to support minor projects (i.e. 80 SDUs of water capacity and 90 SDUs of wastewater capacity) to ensure that additional capacity used is accounted for. The water demand and wastewater flow from accessory dwelling units will ultimately be captured in the actual water demands and wastewater flows and will decrease the SDU's available.

Table 2 Uncommitted Hydraulic Reserve Capacity Calculations

Criterion	Units	Drinking Water	Wastewater
Hydraulic Reserve Capacity	m³/d	5,590	6,611
No Planning Application Required	m ³ /d	338	59
Committed Servicing Capacity Allocation (SCAP and/or ICBL Exemption)	m ³ /d	1,880	1,338
Uncommitted Hydraulic Reserve Capacity (No Factor of Safety)	m³/d	3,372	5,214
Uncommitted Hydraulic Reserve Capacity (No Factor of Safety)	SDUs	2,535	5,137
Factor of Safety (5% of Rated Capacity)	m ³ /d	1,557	1,227
Uncommitted Hydraulic Reserve Capacity (Including Factor of Safety)	m³/d	1,815	3,987
Uncommitted Hydraulic Reserve Capacity (Including Factor of Safety)	SDUs	1,365	3,928

23 SDUs were not allocated in 2023 from the identified available SDUs as per report PW 2023-09. Any capacity allocation not used from the annual allotment is incorporated into the annual calculations of overall uncommitted hydraulic reserve capacity in the following year.

As presented in Table 2, staff continue to recommend a factor of safety be applied to capacity being made available to new development in the short term to allow for potential fluctuations in maximum day demands and average day flows, margins of error on servicing capacity requirements for approved development, potential for council decisions to allocate servicing capacity outside of the SCAP process (e.g. private-public partnership projects related to Grain Terminals or affordable housing, Ontario Land Tribunal settlements, etc.) and uncertainty around the timing of the water treatment plant expansion commissioning.

In accordance with SCAP, several development approvals have included conditions outlining a commitment from the Town to allocate servicing capacity to the development in the future. These commitments are not included in the uncommitted hydraulic reserve capacity calculations; however, they should be considered by the Town when servicing capacity is made available to other development applications in the future. A summary of the Town's commitments to allocate servicing capacity are provided in Table 3.

Table 3 Developments with Future Servicing Capacity Commitments

Development Name	Drinking Water (SDUs)	Wastewater (SDUs)	Estimated Capacity Allocation Year*
Trails of Collingwood	182	249	Not specified
50 Saunders Drive	62	122	Not specified
Huntingwood West	106	106	Not specified
452 Raglan (Eden Oak)	110	181	Not specified
Panorama North	510	739	After WTP Expansion
560, 580, 590 Sixth Street	259	347	Not specified
Total	1,229	1,744	-

* Subject to change based on developer/landowner activities.

Planning report P2022-08 outlined a proposed framework for allocating the remaining uncommitted water hydraulic reserve capacity until the expansion of the water treatment plant is completed. Based on the updated uncommitted hydraulic reserve capacity calculations, this recommended allocation framework was updated in September 2022 and was revised again in March 2023.

As per report CAO2023-02, small-scale (minor) development servicing capacity allocations are now being managed within a separate annual bucket to eliminate the staff time associated with tracking these lower risk proposals.

Staff recommend a total of 400 SDUs of water servicing capacity and 490 SDUs for wastewater servicing capacity be allocated for development in 2024 as stated in Table 4 below.

Table 4 Recommended Water Servicing Capacity Allotment

2024	Recommended Water Servicing Capacity Allotment (SDUs)	Recommended Wastewater Servicing Capacity Allotment (SDU)
Major Development	320	400
Minor Development	80	90
Total	400	490

It is industry practice to initiate the process for determining the best option to meet future demands and flows when a treatment plant is consistently operating at 80% of the facility rated capacity. The Town completed a Municipal Class Environmental Assessment (EA) for the water treatment plant in 2019 and an expansion has been designed and tendered. The three-year average of the average day flows to the WWTP are at approximately 75% of the facility rated capacity; however, the committed hydraulic reserve capacity for the wastewater system (excluding the factor of safety) is approximately 80%; therefore, staff are preparing to begin a Municipal Class EA for an expansion of the WWTP in 2024. The planning, design and construction of these critical infrastructure facilities takes time. These timelines must be considered when determining the annual capacity allotment such that remaining available capacity is managed during the years of planning, design and construction and development is consistently and fairly supported. Table 5 shows a conceptual annual allotment forecast of SDUs corresponding to the expansion of both the water and wastewater treatment plants. This conceptual forecast considers the allocation of the factor of safety when the

treatment plant expansion is well underway and is subject to change based on commissioning timeline for both plant expansions.

Table 5 Conceptual Annual Servicing Capacity Forecast

WTP Expansion	WWTP Expansion	Year	Water SDU	Wastewater SDU
Phase 1 Construction	Class EA	2024	400	490
Phase 1 Construction	Class EA	2025	400	490
Phase 1 Construction	Design	2026	400	490
Phase 1 Construction*	Design	2027	280	490
Phase 1 Construction	Design / Construction	2028	280	490
Phase 1 Commissioning	Construction	2029	280	490
	Construction	2030		490
	Construction*	2031		400
	Construction	2032		400
	Construction	2033		400
Total			2040	4,630
*Release of the factor of safety Note: 500 SDUs have been set aside for municipal projects				

Related to the remaining water capacity allocation, the Town has discussed investigating opportunities to achieve interim capacity through modifications and/or additions to the existing water treatment plant during the construction of the WTP expansion. Any interim capacity achieved would increase the available capacity for allocation prior to the commissioning of the WTP expansion. Staff will be bringing a proposal to investigate interim capacity options to Council for direction and budget approval.

The future annual water and wastewater capacity allocation forecasts will continue to be re-evaluated and adjusted as needed through the semi-annual monitoring and reporting

on the Uncommitted Hydraulic Reserve Capacity. This review will continue to take into consideration the average maximum daily demands (which will change as development is occupied) if the previous annual allocation is not fully committed or if developments do not proceed (based on performance requirements) and some allocation is expired or withdrawn. The regular monitoring and review will provide for flexibility in setting the next year's allocation allotment.

Financial Impacts

No change to projects or financial approvals provided by Council through the budgeting process.

Conclusion

Sufficient servicing capacity remains in the Town's water and wastewater uncommitted hydraulic reserve capacity to support growth within the Town. However, the remaining uncommitted hydraulic reserve capacity in the water and wastewater systems is limited and needs to be managed in accordance with the Town's SCAP to ensure sustainable growth, especially during times of limited capacity while infrastructure upgrades are in progress.

3. Input from Other Sources

Environmental Services staff consulted with Planning and Building staff to verify the status of development applications and building permits.

Department Heads reviewed this report at their regular meeting on February 20, 2024, and the report was recommended to proceed to the Committee of the Whole Standing Committee meeting.

4. Applicable Policy or Legislation

- Safe Drinking Water Act
- Planning Act

- Provincial Policy Statement
- Town of Collingwood Servicing Capacity Allocation Policy

5. Considerations

- ☐ Community Based Strategic Plan: Consistent with CBSP
- ☐ Services adjusted if any
- ☐ Climate Change / Sustainability: No net effect on climate change/sustainability
- ☐ Communication / Engagement: Advertisement/Notice will be provided
- ☐ Accessibility / Equity, Diversity, Inclusion: Not Applicable
- ☐ Registered Lobbyist(s) relating to content: [add content and meeting dates]

Next steps and future action required following endorsement:

Following Council receipt of this report, new development capacity allocations will be recommended to Council through a batch process.

6. Appendices and Other Resources

Appendix A: Hydraulic Reserve Capacity Data Assumptions – Water & Wastewater

Appendix B: Committed Hydraulic Reserve Capacity Calculations – Water & Wastewater

Appendix C: Developments with Committed Water and Wastewater Servicing Capacity and/or an ICBL Exemption

7. Approval

Prepared By:

Ken Kaden, P.Eng., Manager, Environmental Services (Acting)

Matt Cameron, P.Eng., Project Coordinator, Environmental Services

Reviewed By:

Peggy Slama, P.Eng., Director of Public Works, Engineering and Environmental Services

CAO Comments:

Endorsed on February 28th to proceed to Committee

Appendix A
Hydraulic Reserve Capacity Data Assumptions - Water

Reference or Calculation
User Input/ Variable

Data Assumptions:

Collingwood WTP MDD Capacity (m3/d):	31,140	Current Available Capacity (m3/d)	5,590
Collingwood WTP MDD Capacity Future Upgrades (m3/d):	59,000	% Available Capacity	18.0%
		Available SDU-Es	4,189
2021 Collingwood MDD	15,119		
2022 Collingwood MDD	14,972		
2023 Collingwood MDD	14,309		
3-year Average MDD (m3/d):	14,800		
		5% Factor of Safety - (m3/d)	1,557
Town of Blue Mountains Supply Commitment (m3/d)	1,250		
Town of New Tecumseth Supply Commitment (m3/d)	9,500		
External Supply MDD Commitments (m3/d):	10,750		

Assumptions:

ADD/ Capita Consumption (L/day):	260		
Residential Peaking Factor (ADD:MDD Ratio):	1.77		
ICI Peaking Factor (ADD:MDD Ratio):	2.5		
Commercial Area ADD (m3/ha/day)	28		
Industrial Area ADD (m3/ha/day)	35		
Institutional Area ADD (m3/ha/day)	28		
Residential Types Legend	MDD (m3/d)	Residential Types Legend	SDU-E
Residential - Single Detached Home (2.9 ppl/unit)	1.33	Residential - Single Detached Home (2.9 ppl/unit)	1.00
Residential - Semi Detached (2.7 ppl/unit)	1.24	Residential - Semi Detached (2.7 ppl/unit)	0.93
Residential - Townhouse/ Row-House (2.4 ppl/unit)	1.10	Residential - Townhouse/ Row-House (2.4 ppl/unit)	0.83
Residential - Condo/ Apartment (1.9 ppl/unit)	0.87	Residential - Condo/ Apartment (1.9 ppl/unit)	0.66

Appendix B
Committed and Uncommitted Hydraulic Reserve Servicing Capacity Calculations - Water and Wastewater

Table B-1 Committed Servicing Capacity

	Water		Wastewater	
	MDD (m ³ /d)	SDUs-W	ADF (m ³ /d)	SDUs-WW
A. Existing Development Lands with Servicing Available				
A.1 Existing Development Lands - Unconnected	75	56	0	0
A.2 Existing Development Lands - Vacant	263	197	59	58
B. Development with Capacity Allocation				
B.1 Development with Capacity Allocation - Planning Approval Not Required & Building Permit Issued	40	30	24	24
B.2 Development with Capacity Allocation - Planning Approvals Obtained & Building Permit Issued	876	657	611	602
B.3 Development with Capacity Allocation - Planning Approvals Obtained & No Building Permit Issued	903	677	664	654
B.4 Government-Led Projects	40	30	23	22
B.5 ICBL Exemption - No Building Permit Issued	20	15	16	15
Grand Total	2,217	1,662	1,397	1,376

Table B-2 Uncommitted Servicing Capacity

	Water		Wastewater	
	MDD (m ³ /d)	SDUs-W	ADF (m ³ /d)	SDUs-WW
C. Conditionally Approved Development				
C.1 Commitment to Allocate - Draft Plan of Subdivision	1784	1337	1923	1895
C.2 Commitment to Allocate - Other	2822	2115	1615	1591
D. Unapproved Development Proposals				
D.1 Registered Subdivision - Active Site Plan Application	95	71	103	101
D.2 Registered Subdivision - No Active Site Plan Application	125	93	98	97
D.3 Draft Plan of Subdivision - No Commitment to Allocate	3487	2612	4100	4039
D.4 Unapproved Development Proposals - Active in Planning Process	891	667	867	854
Grand Total	9,203	6,895	8,706	8,577

Appendix C

Development with Committed Water and Wastewater Servicing Capacity and/or an ICBL Exemption

B.1 Development with Capacity Allocation - Planning Approval Not Required & Building Permit Issued

18 Hickory St
98 Rodney St
112 Glenlake Blvd
115 Hurontario St
2624 Sixth Line
90 Findlay Dr
12 Niagara St
395 Raglan St
699 Sixth St
146 Hurontario St
30 Ninth St
795843 Grey Road 19
22 Woodcrest Avenue
2935 Concession 10
461 Birch St
58 Hurontario St
61 Slalom Gate Road
65 Simcoe St
135 Hurontario St
431 Ontario St
11 Golfview Dr
1 Nettleton Ct
68 Georgian Manor Drive
40 Georgian Manor Drive
65A & 65B St. Vincent St
132 Bartlett Blvd
10 Golfview Dr
142 Sixth St
91 Summer View Ave
19 Currie Avenue
12 Lindsay Lane
10 Keith Avenue, Unit #406
43A Hurontario Street
360 Raglan Street
172 Hurontario Street
40 Huron Street, Unit 202

B.2 Development with Capacity Allocation - Planning Approvals Obtained & Building Permit Issued

1 Hume St (Monaco) - Residential
Memory Care Facility (92 Raglan)
Balmoral Block 2
31, 39 Dawson Dr; 11299, 11313, 11317 Hwy 26 (Waterstone)
19 Keith Ave (Living Stone retirement addition)
502 Hume Street (Candlewood Suites Hotel - Pad 2)
Shipyards Block 11 - Harbour House (31 Huron St) - Residential
Shipyards Block 11 - Harbour House (31 Huron St) - Commercial
Summit View Phase 3A (51M-1170: Lots 42-47, 181-195, Blocks 236-254, 294, 295)
Summit View Phase 3B (51M-1170: Lots 1-41, Blocks 234,235)
72-76 Hurontario Street
64 Third St (VanderMarck Boutique Hotel/Coach House)
180 Mountain Rd (Georgian Bay Biomedical)

B.3 Development with Capacity Allocation - Planning Approvals Obtained & No Building Permit Issued

93/95 Sandford Fleming Dr -Collingwood Business Park (3rd of 3 pads)
500 Hume Street (Proposed Office Bldg - Pad 1)
65 First St (1 of 2 buildings remaining)
84 Hurontario St (The Regent)
121 Hume St (Innovation Hub)
40 Sandford Fleming (Isowater)
510 Hume St - Car Wash
Residences at Silver Creek (Skydevco) - Phase 1
80 Madeline Dr
Residences at Silver Creek (Skydevco) - Phase 2 (1, 17 and 33 Prince of Wales Dr)
26 Elm St (Endswell Beer)
400 Maple (Victoria Annex) Subdivision
120 Mountain Road (Manorwood Business Park)
25 Sandford Fleming
655 Hurontario St Apartments
17 Portland (Pretty River Estates Block 181 - Townhomes of Pretty River)
507 Tenth Line - Greenhouse
32 Oak Street (Mixed Use - Commercial, Apts on upper level)
Shipyards Block 6 - Collingwood Quay (mixed use)

B.4 Government-Led Projects

Affordable Housing Reserve

B.5 ICBL Exemption - No Building Permit Issued

58 George St
650 Mountain Road
9520 Beachwood Road
207 Longpoint Road
9833 Beachwood Road
276/278 Pine Street
26 St. Clair Street
325 Ontario Street
65 Raglan Street
594 Oak Street
245 Raglan Street
113 Stanley Street
49 Broadview Avenue
22 Lane C
795847 Osler Bluff Road
115 Sandford Fleming Drive
20 Ronell Crescent
70 First Street
510 First Street



TECHNICAL MEMORANDUM

To: **Peggy Slama, P.Eng.**
Manager, Environmental Services

Company: **Town of Collingwood**

From: **Sam Ziemann, P.Eng.**

Our File: **75-41-171235**

Cc:

Date: **August 29, 2018**

Subject: **Watermain Hydraulic Assessment of the Proposed Developments at Summit View**

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TOWN OF COLLINGWOOD

Watermain Hydraulic Assessment of the Proposed Developments at Summit View

C3 WATER INC.

August 29, 2018



TECHNICAL MEMORANDUM

VERSION	DATE	DESCRIPTION OF REVISIONS	REVISED BY	REVIEWED BY
1	June 8, 2018	Draft 1	Kelsey Shaw Emma Thompson	Sam Ziemann Peggy Slama
2	June 22, 2018	Draft 2	Emma Thompson	Sam Ziemann Peggy Slama
3	August 10, 2018	Draft 3	Emma Thompson	Sam Ziemann Peggy Slama
4	August 29, 2018	Final	Emma Thompson	Sam Ziemann



TECHNICAL MEMORANDUM

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APPENDIX A	Site Layout
APPENDIX B	Demand and Fire Flow Calculations



1.0 INTRODUCTION AND BACKGROUND

The proposed development at Summit View (formerly Charleston Homes) includes the construction of new residential buildings with a total of 367 units. The site was originally zoned as agricultural land with a portion encompassing the Black Ash Creek water corridor. The site has a total area of 31.4 hectares with a developable portion of 25.6 ha. The residential portions will consist of single detached homes and street townhomes. C3 Water (C3W) has been asked to conduct a watermain hydraulic assessment of the proposed development and its impacts on the existing distribution system. Figure 1-1 below provides an overview of the proposed development area. A detailed site plan with proposed watermains, roads and lot types are included in Appendix A.

The Town is supplied by the R.A.B. Water Treatment Plant (WTP), where the pumps operate based on water levels at the Collingwood Water Tower and are triggered when levels in the tower drop due to high demand in the network. The Carmichael Pumping Station (PS) located in the north-west part of Town is also operated based on water tower levels, and the pumps are triggered to assist the WTP. Figure 1-2 shows the relative location of the Summit View development to the Town's existing infrastructure, as well as current watermain diameters.

The Summit View development is proposed to be located in Pressure Zone 2, which operates at a hydraulic grade line (HGL) of 250m or slightly less depending on system operation and demands. Pressures in this portion of Zone 2 are maintained by the Bob Davey Pumping Station (PS), which receives water from the Regional Pipeline connected to RAB Water Treatment Plant. Typically, there is one pump operating continuously at Bob Davey, and pump flows change to maintain constant downstream pressures through a variable frequency drive. Additional pumping capacity is available from other pumps for large demand events such as fires, and the pump station's firm capacity is 170 L/s (Table 1.1).

Existing water distribution infrastructure near the Summit View site consists of a 450mm diameter main at the intersection of Findlay Drive and High Street. The new development is proposed to be serviced by a 150mm single connection to the 450mm on Findlay Drive. Each lot will be serviced via a local watermain following the alignment of the internal roads. C3W has proposed several additional connection locations for different development scenarios, as shown Figure 1-1. These connections have been included in the modeling results and are discussed in further detail in Section 2.0.

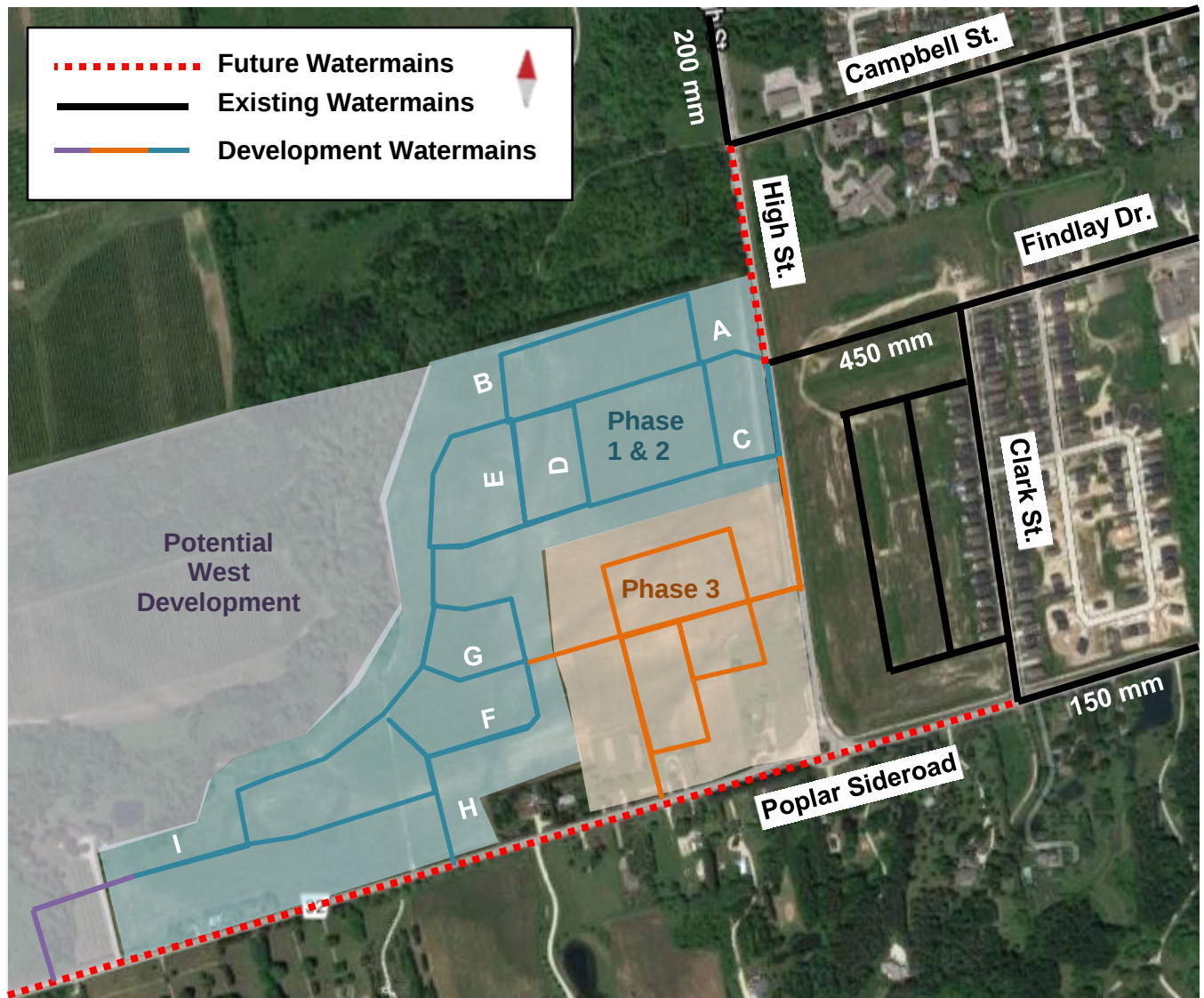


Figure 1-1: Proposed Development Area Site Overview (NTS)

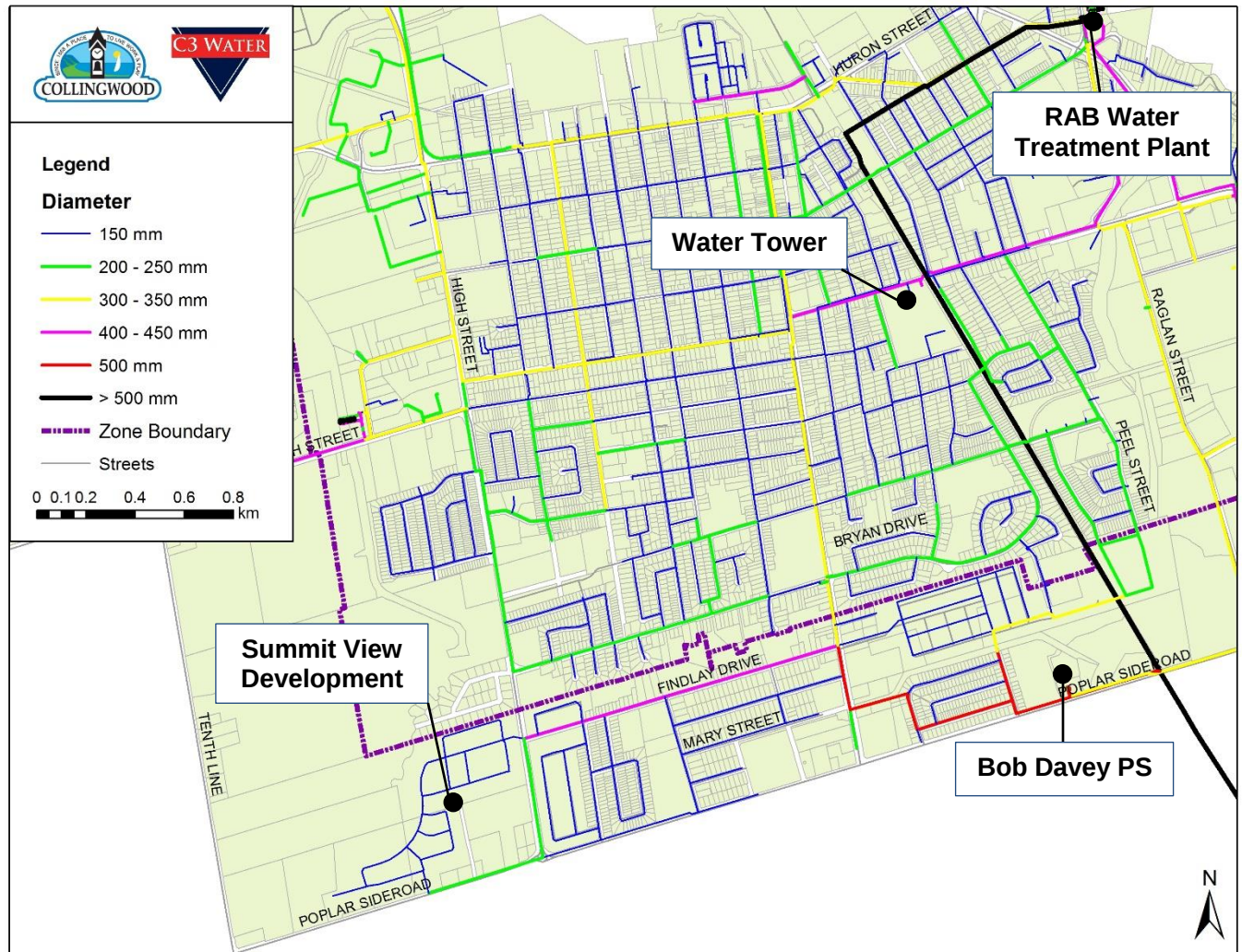


Figure 1-2: Watermain Diameters

Table 1.1: Bob Davey Pump Station Capacity

# Units	Pump Type	Rated Flow (L/s)	Firm Capacity (L/s)	Rated Head (m)	HGL (m)	Drive Type
1	vertical high lift turbine	25	172	60	250	variable speed
1	vertical high lift turbine	55		60		constant speed
2	vertical high lift turbine	92		60		constant speed

1.1 Design Standards

The Town of Collingwood Development Standards provide design criteria for assessing the impact of proposed developments. The standards recommend that watermains be designed to provide maximum day demands plus fire flows according to the land use type. The standards also outline minimum pressure requirements, as shown in Table 1.2 below.

Table 1.2 Town of Collingwood Design Standards

	Minimum	Preferred
Fire Flow Requirements		
Single-Family Residential	57 L/s	76 L/s
Industrial/Commercial Subdivisions	136 L/s	154 L/s
Downtown Commercial	136 L/s	189 L/s
Pressure Requirements		
Maximum Day Demands + Fire Flows	20 psi	
Standard Operating Conditions	40 psi (Peak Hour)	50 - 80 psi

1.2 Demand and Fire Flow Calculations

C.C. Tatham & Associates (CCTA) completed calculations for the anticipated water demands for the buildings in the development, but were modified by C3W based on CCTA's updated site plan. The calculations are based on recommended values from the Ontario Ministry of the Environment (MOE) and the Town Standards. The Max Day Demands (MDD) and Peak Hour Demands (PHD) were calculated based on the average flows, and recommended peaking factors of 2.0 for MDD and 4.5 for PHD as per MOE Design of Water Works 3.4.2 and Town Standards.

Fire Flow calculations were also completed by CCTA. Their methods included adding MDD to the Town minimum standard of 57.0 L/s for single family homes based on a period of 2 hours. The Town recommends using the preferred fire flow of 76 L/s in the absence of FUS fire flow information, resulting in a total fire flow of 87.14 L/s. This required fire flow is recommended for single family homes, but may be low for semi-detached and townhouses compared to typical FUS calculations. The fire flow and domestic demands for the proposed development are summarized in Table 1.3 below and provided in Appendix B.

Table 1.3 Fire Flow and Demand Calculated Values

	Detached Homes	Semi-Detached	Townhouse Units
Number of Units (Phase 1 & 2)	233	86	87
Average Day Demand (ADD) (CCTA, Appendix B)	5.57 L/s		
Maximum Day Demand (MDD)	11.14 L/s		
Peak Hour Demand (PHD)	25.1 L/s		
MDD and Fire Flow (FF) Phase 1 & 2	MDD = 11.14 L/s; FF = 87.14 L/s		
MDD and Fire Flow (FF) Phase 3	MDD = 5.71 L/s; FF = 92.85 L/s		
MDD and Fire Flow (FF) Potential West Development	MDD = 15 L/s; FF = 107.85 L/s		

2.0 MODELLING RESULTS

C3W has reviewed the Town's existing water model as part of the Town's ongoing water and wastewater master planning project, and made updates based on information from GIS and current operating conditions.

The proposed development area was assessed using the model's existing 2016 Maximum Day Demand (MDD) + Fire Flow conditions. New watermain lines were added to represent the proposed watermain lines through the Summit View development. A 200mm watermain was also added along Poplar Sideroad and High Street to connect the south and east ends of development in the Future West Development Scenario. The model also included the proposed watermain lines and demands for the Eden Oaks and Pretty River Village Developments since these are expected to be completed in the near future and will impact the Summit View development. Modelling was conducted using a steady-state analysis of available fire flows at a residual pressure of 20psi for a 2-hour fire flow scenario at 12:00pm under MDD conditions.

2.1 Pressures

The range of elevations in the Summit View development is approximately 199 - 212 mASL, which aligns with preferred Zone 2 elevations of 192 – 215 m. Based on the Zone 2 HGL of approximately 250m, it is expected that static pressures would be 38 – 51m of head, or 54 - 72 psi.

The average operating condition with Maximum Day Demands was found to be in the range of 56 – 73 psi for Phase 1 and 2 of the Summit View development, and 62 - 73 psi in Phase 3. The pressures in the Summit View development meet the Town's preferred operating criteria of 50 – 80 psi. The ground elevations in the Potential Development to the West are expected to be higher than in Summit View, resulting in pressures of 52 - 61 psi. The model results showed that up to three pumps were required at Bob Davey to meet MDD and PHD demands with a pumping rate of 20 - 140 L/s.

2.2 Fire Flows

The operation of the Bob Davey pumping station was maintained constant for all fire flow scenarios, with up to three pumps operating to the maximum firm capacity of 170L/s. The results from the fire flow modelling are provided in Table 2-1 for the following development phases:

1. Summit View Phase 1 & 2

Proposed

- 450mm along High Street from Findlay to Street C
- 150mm throughout Summit View Development
- Existing Zone Boundary

Alternative A

- 400mm extended into Summit View, 150mm throughout Summit View Development
- 200mm along High Street to Street C
- Existing Zone Boundary

2. Summit View Phase 3:

Proposed

- 450mm along High Street from Findlay to Phase 3
- 150mm throughout Summit View Development and Phase 3.
- Existing Zone Boundary

Alternative A

- 400mm extended into Summit View, 150mm throughout Summit View Development
- 200mm along High Street, through Phase 3 to Poplar Sideroad
- Existing Zone Boundary

3. Future West Development

Alternative A

- 200 mm along High Street
- 400mm extended into Summit View
- 200mm along High Street, through Phase 3 to Poplar Sideroad
- 450 mm connection from Poplar Sideroad to Potential West Development
- Modified Zone Boundary

Alternative B

- 200 mm along High Street
- 450mm extended into Summit View
- 200mm along High Street, through Phase 3 to Poplar Sideroad
- 450 mm connection from Poplar Sideroad to Potential West Development
- Modified Zone Boundary

The fire flows results predicted by the model are representative of the amount of water available in a watermain and not the extent of flow available from a hydrant. Several hydrants may need to be operated to provide the desired fire flows. For modelling purposes, it was assumed that fires would not occur at multiple locations simultaneously, and therefore the results demonstrate the available flow at each location when run independently. The available fire flows were determined when three pumps were operating at Bob Davey PS with a total pumping rate near the firm capacity.

The modelling results indicated that the required fire flow of 87.14 L/s calculated by CCTA could not be met with the proposed 150 mm watermain for the Phase 1, 2 and 3 development scenarios (see Table 2.1, Figures 2-1 and 2-2).

Two sizing alternatives were tested in the model to determine the impact of building a 400mm or 450mm extension through the development under the final development scenario (Figure 2-5 and 2-6). Under both alternatives, the available fire flows increased to over 200 L/s in many locations in Summit View, and a higher fire flow of 209 - 215 L/s was available at the location of potential future development. This scenario also incorporated the future zone boundary change that will connect separate areas of Pressure Zone 2 along High Street.

Alternative A was also tested under Phase 1, 2 and 3 to determine the short-term impact of the increased main sizes on the extremities of the development, and the results are shown in Figure 2-3 and 2-4. The 400mm provided improved fire flow at the Dead End on Street I in the initial phases, with a fire flow of approximately 82 L/s. This dead-end location does not meet the Phase 1, 2 & 3 required fire flows, however; the other location all exceed the required fire flow by almost 50 L/s. Although this alternative sizing resulted in higher fire flows, larger watermain sizes may impact residency times and water quality, which was investigated in the following section.

Alternative A provides the continuation of the large 400mm or 450mm watermain in Zone 2. The purpose of the 400mm or 450mm watermain on Poplar Sideroad is to provide a strong loop for the future integration of Zone 2 between the Bob Davey PS and the Stewart Rd PS from Poplar Side Road, along the Tenth Line, to Sixth Street. Both watermain diameters was tested in the model to determine appropriate sizing based on high level master planning information. The model was used to estimate the flow that could be transported between the two parts of Zone 2 under the scenario with developments up to the Built Boundary.

Based on available information, it is possible that the watermain would carry 90 – 150 L/s under various conditions including MDD, ADD, and an emergency such as Stewart Road PS being out of service.

Typical feedermain capacity can be calculated for different pipe sizes based on head loss criteria, C-factors and other hydraulic parameters. At a head loss of 2.0m/km and C-factor of 130, the approximate capacity of watermain are shown in Table 2.1. Based on the expected flows in the Future Built Boundary Scenario and the feedermain capacity below, it is recommended that the watermain on Poplar Sideroad be 450mm in diameter to avoid head losses above 2.0m/km.

Table 2.1 Feedermain Capacity

Pipe Diameter (mm)	Capacity (L/s)
150	18
200	33
300	53
400	113
450	155
500	204
600	329

Table 2.1 Fire Flow Model Results MDD Scenario

Description		Pressures (psi)		Fire Flows (L/s)			
		All scenarios		Phase 1 & 2	Phase 3	Potential West Development	
Location	Node ID	Min (psi)	Max (psi)	Proposed Design (150mm)		Alternative A (400 mm)	Alternative B (450mm)
Street B	6900	73	76	146	159	170	170
Street I (Dead End)	6912	56	62	61	69	133	134
Street C	6913	70	73	172	209	205	205
Street A	6947	66	70	88	162	225	227
Phase 3	6924	70	73	-	202	211	212
Potential Development	6914	52	61	-	-	210	215

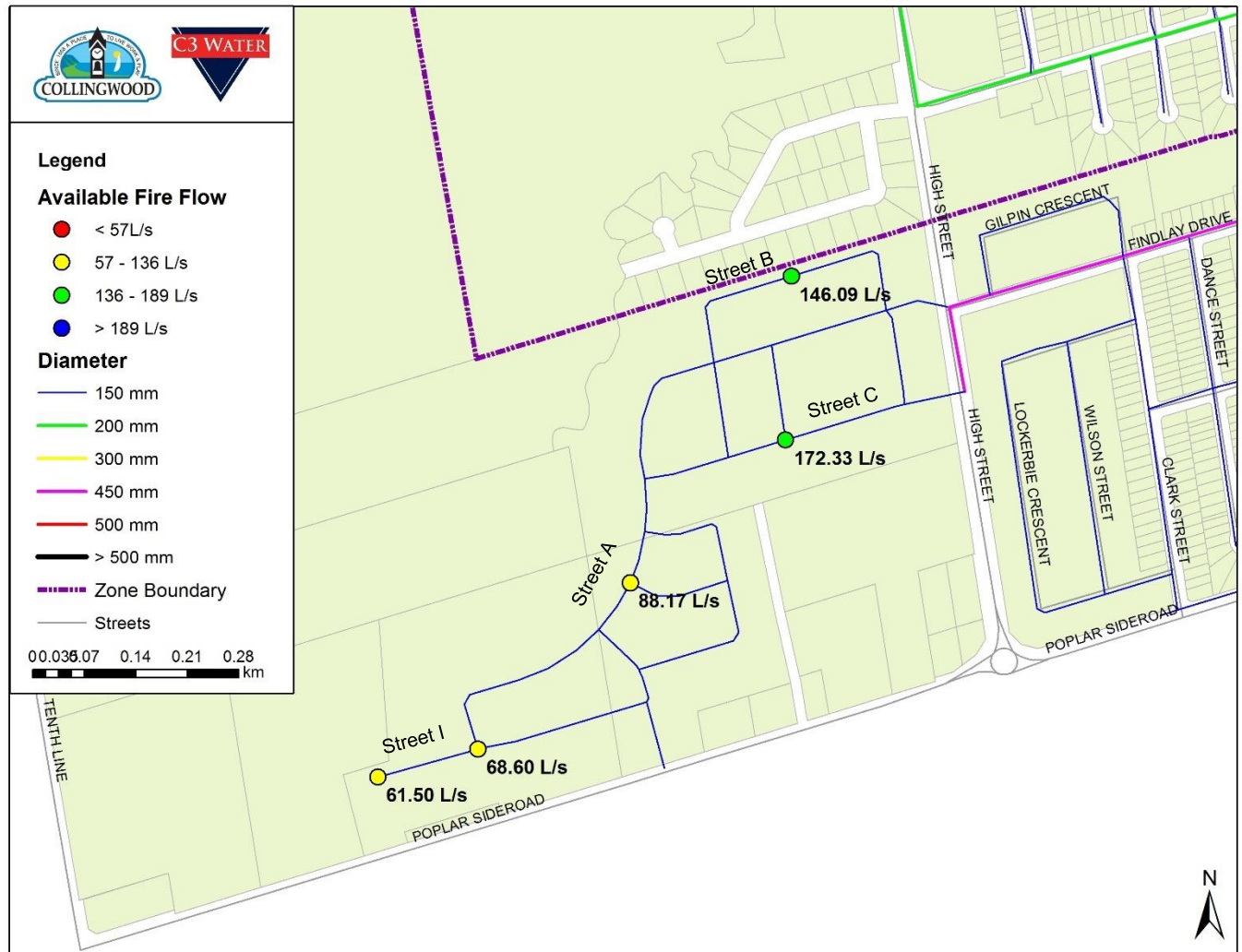


Figure 2-1 Available Fire Flows – Phase 1 & 2 Proposed (150 mm)

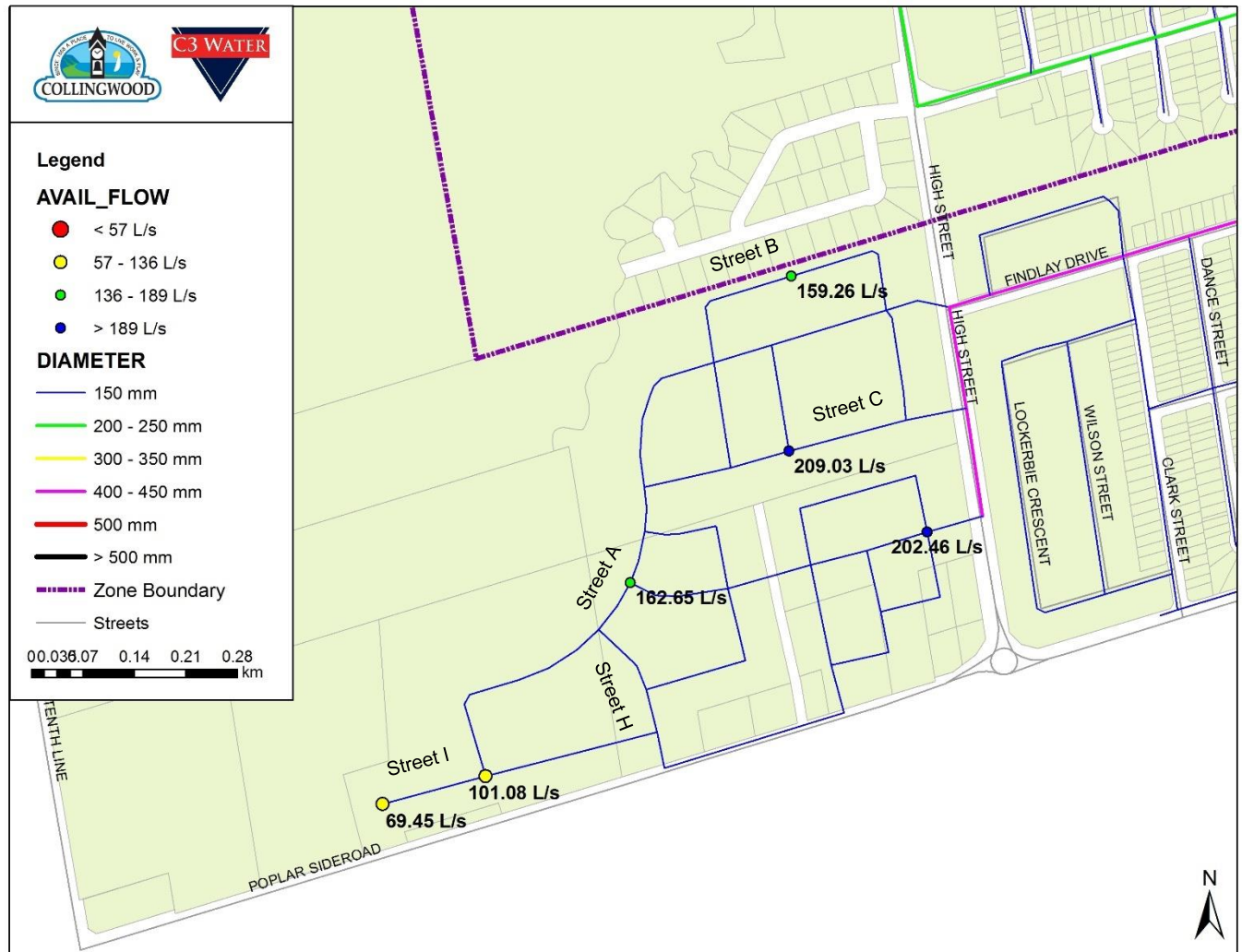


Figure 2-2 Available Fire Flows – Phase 3 Proposed (150 mm)

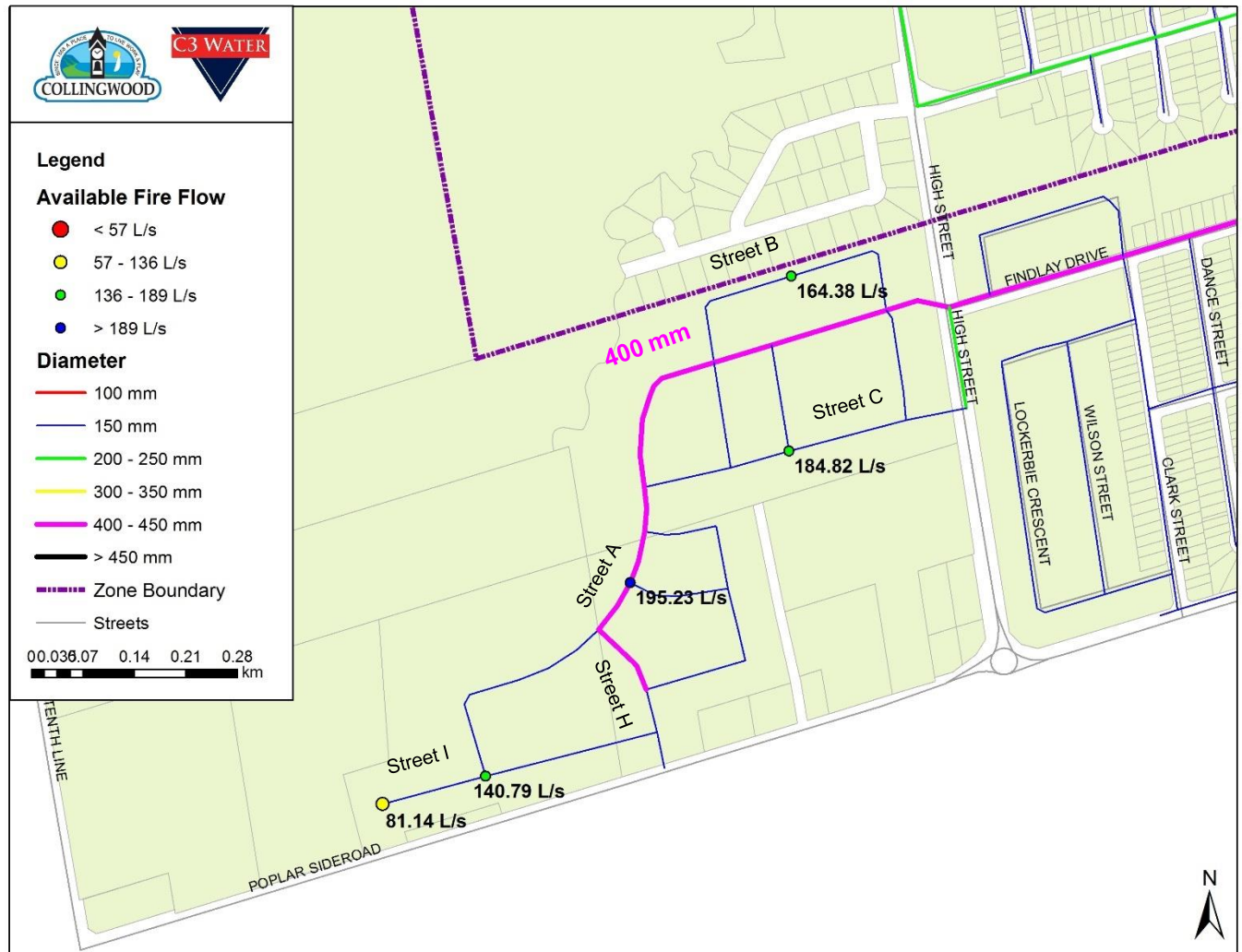


Figure 2-3 Available Fire Flows – Phase 1 & 2 Alternative A (400 mm)

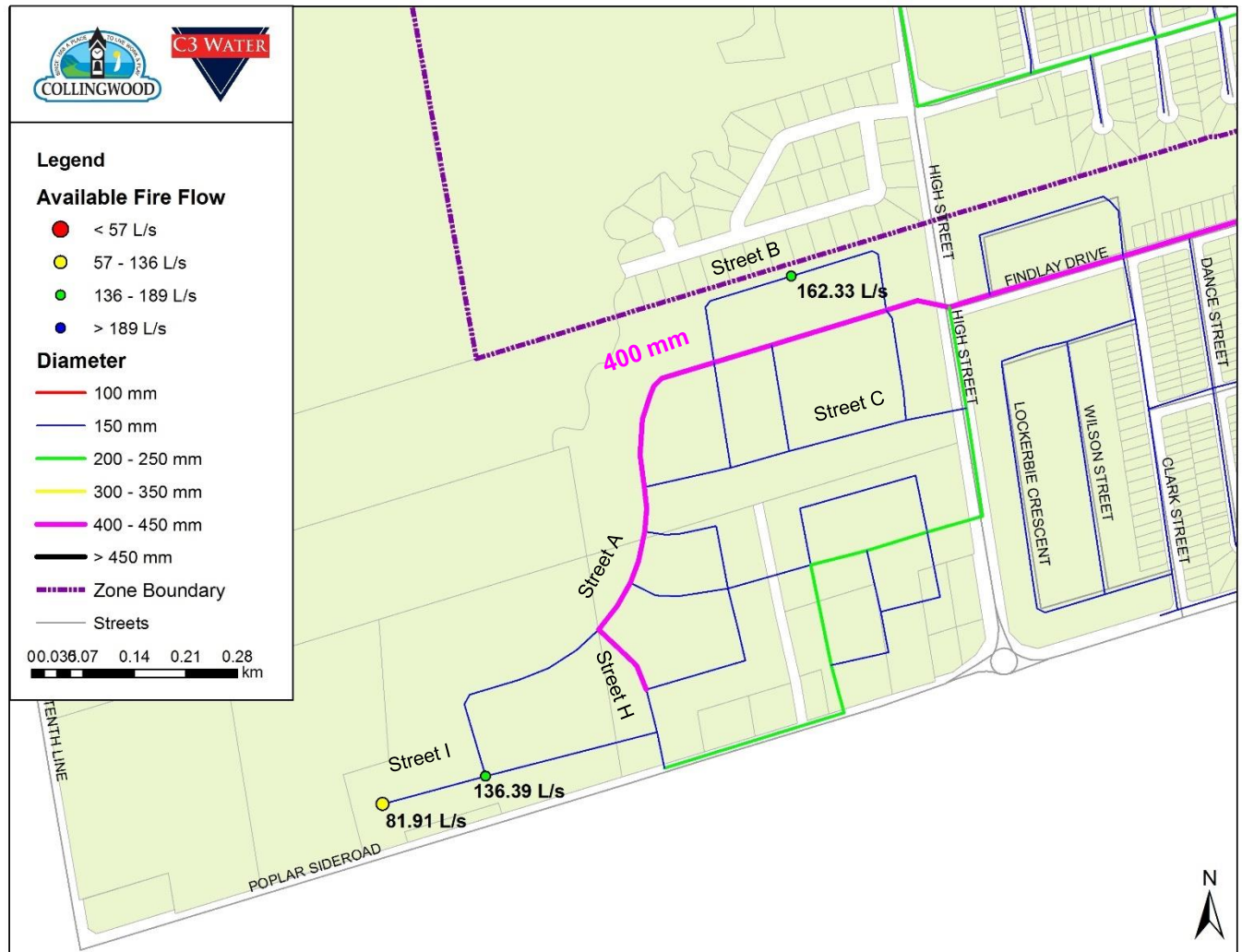
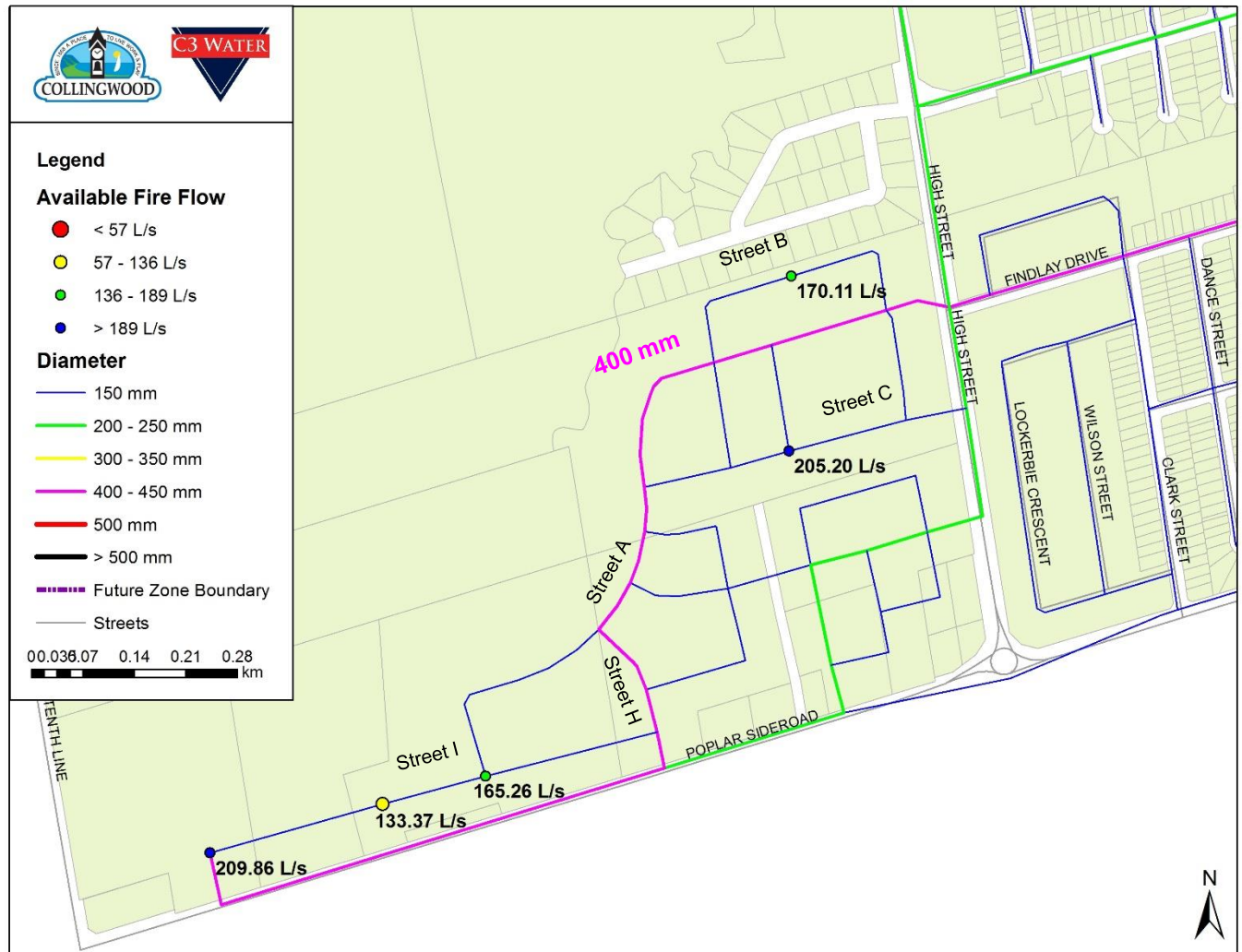


Figure 2-4 Available Fire Flows – Phase 3 Alternative A (400mm)



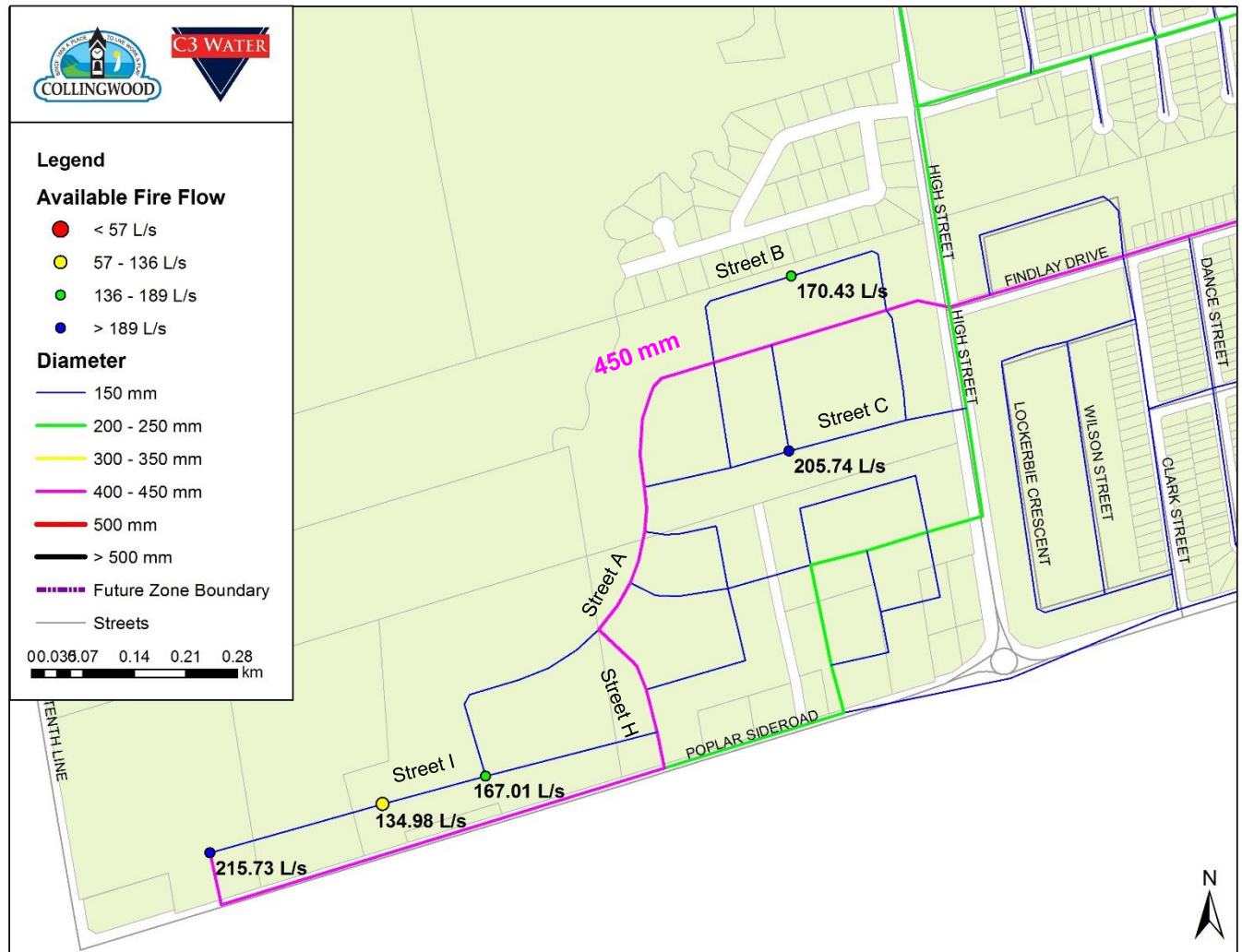


Figure 2-6 Available Fire Flows – Alternative B (450 mm)

2.3 Water Age

Using the hydraulic model, it was possible to approximate the residency times of water in the distribution system based on water age over an extended period simulation. Since the initial water age in the model is “zero”, the simulation was run for 8 days to allow the results to stabilize. Water age is calculated from the surface water source at the Water Treatment Plant, and does not consider that water is refreshed with chlorine at pressure boosting stations. High water age results are therefore not a direct indication of low chlorine residuals but provide an approximation of residency times. It should also be noted that the decay of chlorine residual does not occur linearly over time and may accelerate at low residuals.

The average water age from the last 24 hours of the 8 day simulation were recorded for the different sizing options and are provided in Table 2.2. The relative water age at the Bob Davey Discharge and Findlay Drive are provided for comparison. A 400mm and 450mm diameter pipe were tested on Street A in the initial Phase 1 & 2 development. The model results showed that the alternate sizing options had little impact on the water age at the extremities of the development. The smaller size improved average water age by less than approximately 3 hrs at both locations on Street I and H.

Table 2.2 Water Age Model Results

Location	Node ID	450 mm	400 mm
Bob Davey Discharge	2074	42.5	
Findlay Dr. & High St.	2429-B	60.36	
Street H & Street I	6936	75.17	72.75
Street I (Dead End)	6912	79.75	77.61

3.0 MODEL FINDINGS

1. Pressures in this development will be controlled by the Bob Davey Pumping Station to maintain a Zone 2 HGL of 250mASL under standard operating conditions. The watermain sizing has minimal impact on available water pressure, which are more dependent on ground elevation and looped connections. Under all alternatives, the pressures were found to meet Town guidelines.
2. The required fire flow of 87.14 L/s cannot be achieved at all locations in the Summit View development with the proposed 150mm watermain design for Phase 1 & 2. The sizing recommended in Alternative A provided increased fire flow to 81 L/s at the dead end on Street I, and over 140 L/s at all other locations.
3. The required fire flow of 92.85 L/s cannot be achieved at all locations in the Summit View development with the proposed 150mm watermain design for Phase 3. The sizing recommended in Alternative A provided increased fire flow to 82 L/s at the dead end on Street I, and over 136 L/s at all other locations.
4. The required fire flow of 107.85 L/s can be met at all locations under Alternative A with the extension of a 400mm and 200 mm watermain to service Summit View and potential development to the West.
5. Alternative A extends the 400mm into the Summit View development, increasing available fire flows during the initial phases before looped connections are installed along High Street and Poplar Sideroad. This option also avoids dead ending a large diameter watermain and potential water quality issues, while providing a strong connection for potential future development to the West.
6. The results of the water age analysis showed that increasing the watermain to 450mm had minimal impact on water age. Increasing the small section on Street H from a 150mm to 200mm also had minimal impact on water age.
7. The results of the future built boundary scenario indicated that a 450mm watermain is recommended on Poplar Sideroad.
8. The recommended sizing of all watermain is shown in Figure 3.1 below.

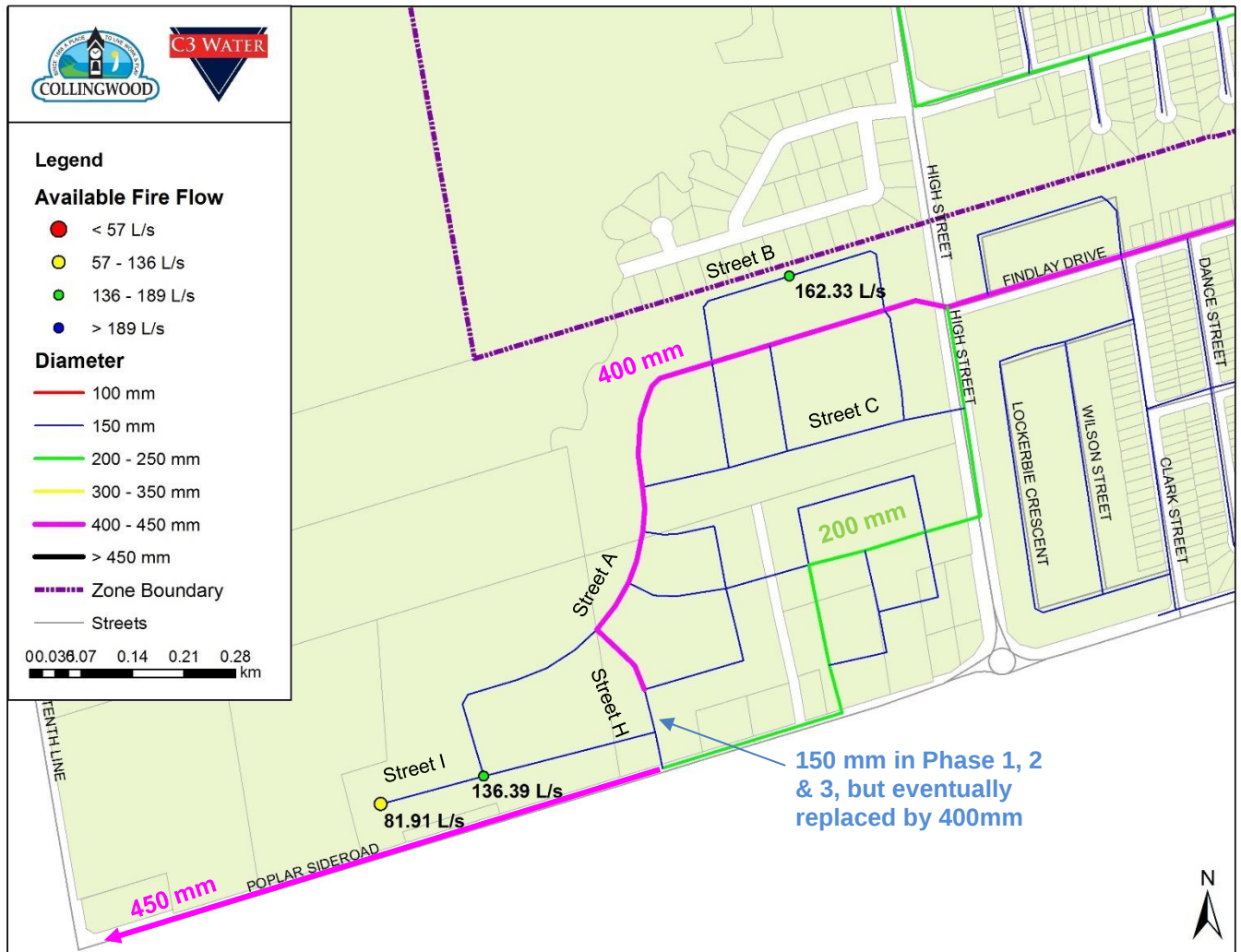
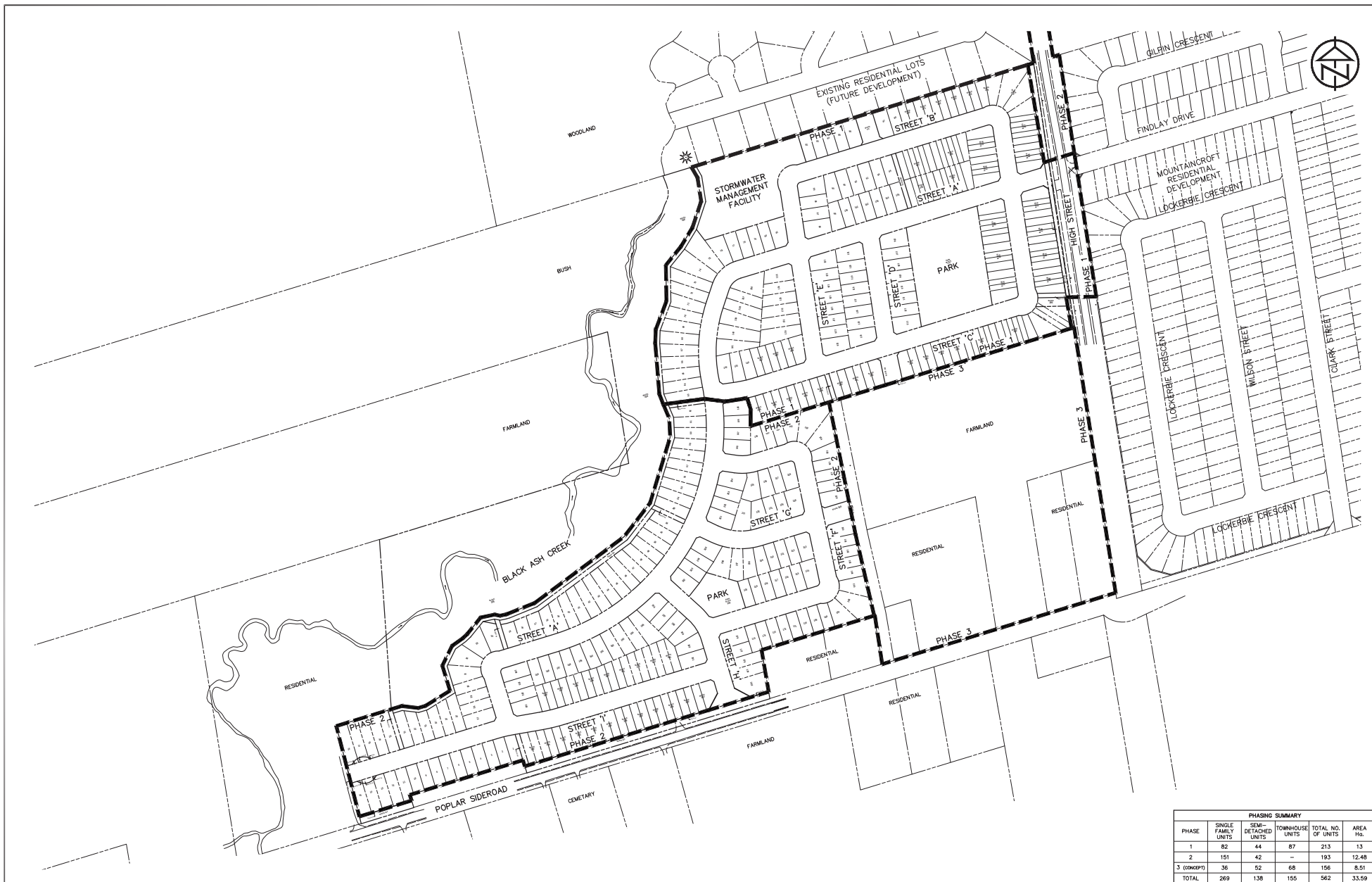


Figure 3-1 Recommended Watermain Sizing

APPENDIX A - *Site Layout*



PHASING SUMMARY					
PHASE	SINGLE FAMILY UNITS	SEM-DETACHED UNITS	TOWNHOUSE UNITS	TOTAL NO. OF UNITS	AREA Ha.
1	82	44	87	213	1.3
2	151	42	--	193	12.48
3 (CONCEPT)	36	52	68	156	8.51
TOTAL	269	138	155	562	33.59

CONTRACT DRAWINGS

CONTRACTOR MUST VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER BEFORE COMMENCING WORK. DRAWINGS ARE NOT TO BE SCALED.

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DRAWING REFERENCES

LEGAL SURVEY INFORMATION SHOWN ON THIS PLAN PREPARED BY VAN HARTEN SURVEY INC., PLAN 51R-35424, DATED JULY 7, 2017.

TOPOGRAPHIC INFORMATION SHOWN ON THIS PLAN BASED ON FIELD SURVEY COMPLETED BY C.C. TATHAM & ASSOCIATES LTD. ON SEPTEMBER 8, 2015.

SERVICING AND GRADING INFORMATION SHOWN FOR GRANDVIEW/MOUNTAINCROFT SUBDIVISION BASED ON ACCEPTED FOR CONSTRUCTION DRAWINGS PREPARED BY C.C. TATHAM & ASSOCIATES LTD., DATED APRIL 4, 2016.

BENCHMARKS

TBM#1 ELEV. 200.704 m
NAIL & WASHER IN HYDRO POLE ON EAST SIDE OF HIGH STREET, 6TH HYDRO POLE NORTH OF POPLAR SIDEROAD ROUNDABOUT.

TBM#2 ELEV. 199.103 m
NAIL & WASHER IN HYDRO POLE ON EAST SIDE OF HIGH STREET, 11TH HYDRO POLE NORTH OF POPLAR SIDEROAD ROUNDABOUT.

NO.	REVISIONS	DATE	INITIAL
2.	SECOND ENGINEERING SUBMISSION	APR. 12/16	JRA
1.	FIRST ENGINEERING SUBMISSION	OCT. 30/17	JRA

APPROVED



SUMMIT VIEW RESIDENTIAL DEVELOPMENT TOWN OF COLLINGWOOD

PHASING PLAN



C.C. Tatham & Associates Ltd.
Consulting Engineers

Collingwood Bracebridge Orillia Barrie Ottawa

SCALE: 1:2,000

DESIGN: LC
DRAWN: LC

JOB NO. 114056

CHECKED: JRA
DATE: SEPT. 2017

DWG. **PH-1**

APPENDIX B – *Demand and Fire Flow Calculations*

re: Updated Phasing Plan sept. 2017

 C.C. Tatham & Associates Ltd. Consulting Engineers Collingwood Bracebridge Orillia Barrie Ottawa	Project:	Charleston Homes - Residential Development	Date:	04-Nov-15
	File No.:	114056	Designed:	CFM
	Subject:	Water Distribution Calculations	Checked:	JRA

WATER SUPPLY

1.1 Single Family Units

Single Lots (Units) =	281 233	(Per Draft Plan)
Population per Unit =	2.43	(Per County of Simcoe's Land Budget for Town of Collingwood)
Population =	281 233 x 2.43 =	683 566
Average daily per capita flow =	450 L/cap/day	(Per Town of Collingwood Development Standards, July 2007)
Average Daily Flow =	566 566 x 450 /1000	
=	255.7 255 m ³ /day	
=	3.56 2.95 L/s	

1.2 Townhouse Units

Townhouse Lots (Units) =	86 87	(Per Draft Plan)
Population per Unit =	2.18	(Per County of Simcoe's Land Budget for Town of Collingwood)
Population =	86 x 2.18 =	188 190
Average daily per capita flow =	450 L/cap/day	
Average Daily Flow =	188 190 x 450 /1000	
=	84.6 m ³ /day	85.3 m ³ /d
=	0.98 L/s	0.99 L/s

1.3 Total Residential Design Flows

<u>Total Average Daily Flow</u> =	Single Family + Townhouse + Semi-detached
=	3.56 + 0.98 + 1.03
=	4.54 5.57 L/s (392.3 m ³ /day)

Design Factors

Residential Population =	871	
Residential Max. Day Factor =	2.00	
Residential Peak Hour Factor =	4.50	(Per Town of Collingwood Development Standards, July 2007)

Design Flows

Max. Daily Flow =	4.54 5.57 x 2.00	
=	9.08 11.14 L/s (784.5 m ³ /day)	
Peak Hour Flow =	4.54 5.57 x 4.50	
=	20.43 25.1 L/s	
Fire Flow =	57.00 L/s	(Per Town of Collingwood Development Standards, July 2007)
Max. Day plus Fire =	9.08 11.14 + 57.0	
=	66.08 68.14 L/s (5,709 m ³ /day)	

Semi - detached

$$\begin{aligned}
 \text{Units} &= 86 \\
 \text{Pop / unit} &= 2.3 \\
 \text{Pop} &= 198 \\
 \text{Avg. flow} &= 450 \text{ L/cap/d}
 \end{aligned}$$

$$\begin{aligned}
 \text{Avg. Daily flow} &= 198 \times 450 / 1000 \\
 &= 89.1 \text{ m}^3/\text{d} \\
 &= 1.03 \text{ L/s}
 \end{aligned}$$

Phase 3 (Concept)

$$\begin{aligned}
 \text{Population} &= \text{Single family} + \text{Semi} + \text{Townhouse} \\
 &= (36 \times 2.43) + (52 \times 2.3) + (156 \times 2.18) \\
 &= 548
 \end{aligned}$$

$$\begin{aligned}
 \text{ADD} &= 548 \times 450 \text{ L/cap/d} / 1000 \\
 &= 246.6 \text{ m}^3/\text{d} \\
 &= 2.85 \text{ L/s}
 \end{aligned}$$

$$\text{MDD} = 5.71 \text{ L/s}$$