MASTER SERVICING REPORT

HAWK RIDGE DEVELOPMENT
LIV (HAWKRIDGE) LP
TOWNSHIP OF SEVERN

PREPARED BY:

C.F. CROZIER & ASSOCIATES INC.
70 HURON STREET, SUITE 100
COLLINGWOOD, ONTARIO
L9Y 4L4

CFCA FILE NO. 1935-6133

CROZIER
CONSULTING ENGINEERS

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

Revision No.	Submission	Submission Date
0	1st Submission Draft Plan Approval	September 2024

1.0 INTRODUCTION

C.F. Crozier & Associates Inc. (Crozier) has been retained by LIV (Hawk Ridge) LP (LIV Communities) to complete a Master Servicing Report in support of an Official Plan Amendment (OPA), Zoning By-Law Amendment (ZBA) and Draft Plan of Subdivision Application (DPA) for the proposed development located at 1151 Hurlwood Lane in the Township of Severn (Township), County of Simcoe (County). The proposed development will herein be referred to as the Subject Development/Subject Lands.

The Subject Lands are approximately 126 ha and are bounded by agricultural lands and open space to the north, Burnside Line to the east, the proposed Inch Farm Development Lands and Highway 11 to the south, and Uhthoff Line to the west. Approximately 26 ha of the Subject Lands are proposed for re-development. The location of the Subject Lands has been illustrated in **Figure 1**.

A Master Servicing Report (MSR) for the Subject Lands and surrounding area was requested by the Township of Severn and County of Simcoe during a meeting held on August 13, 2024, to support the proposed zoning and DPA Applications and demonstrate that development of the Subject Lands does not impede future growth of other lands within the South of Division Road Secondary Plan Area (Secondary Plan). The direction for the scope of the MSR was clarified in this meeting and the following report should be read in context with the direction outlined by the Township and County. Meeting minutes have been provided in **Appendix A**. The request to review the servicing strategy for the lands within the Secondary Plan was also requested during the Council Meeting on May 3, 2023. As such, the following Master Servicing Report has been prepared to recommend water and wastewater servicing solutions for the remaining undeveloped lands within the Secondary Plan. The lands being analyzed will herein be referred to as the Study Area. This Master Servicing Report has been prepared in accordance with Section 2.3.2.1 and Section 2.3.2.2 of the Provincial Policy Statement. Further detail regarding the scope of the Study Area has been provided in Section 2.0 and 3.0 below. Refer to **Figure 2** for the location of the Study Area.

Crozier is part of a team of consultants providing support for this development. Other members of the consulting team include:

- Biglieri Group (Planning)
- Azimuth Environmental Consulting Inc. (Azimuth) (Environmental)
- Green Geotechnical Ltd. (Geotechnical)
- Crozier (Civil, Transportation Engineering & Hydrogeological)
- Hutchinson Environmental Sciences (Hutchinson) (Assimilative Capacity Study)

These consultants have prepared studies/ plans to support the planning application. This report prepared by Crozier should be read in conjunction with the work of the other team members.

2.0 SITE DESCRIPTION

The lands subject to this study are located in the southeast quadrant of the Township of Severn, adjacent to the municipal border of the Township of Severn and City of Orillia. The Study Area includes three (3) land holdings: 1) Hawk Ridge Lands, 2) Area 2 Lands and 3) Area 3 Lands. A description of each of the land holdings has been provided below.

- **Hawk Ridge Lands** – These lands are approximately 126 ha and are bounded by agricultural lands and open space to the north, Burnside Line to the east, the proposed Inch Farm Development Lands and Highway 11 to the south, and Uhthoff Line to the west. Approximately 26 ha of the Subject Lands are proposed for re-development.
    - Per Schedule D of the Township of Severn Official Plan (June 2024), these lands are designated as Open Space and Environmental Protection Area.
    - The Concept Plan for these lands includes 850 single detached and townhouse units.
    - These lands do not have Draft Plan Approval.

- **Area 2 Lands** – These lands are approximately 97 ha and are bounded by Burnside Line to the east, the Hawk Ridge Lands to the south, Uhthoff Line to the west and Division Road West to the north.
    - Per Schedule D of the Township of Severn Official Plan (June 2024), these lands are designated as Countryside Residential.
    - The Concept Plan for these lands currently proposes 285 condominium units.
    - These lands do not have Draft Plan Approval, however, have been zoned accordingly per approval from the Ontario Municipal Board.

- **Area 3 Lands** – These lands are approximately 31 ha and are bounded by Burnside Line to the east, the Highway 11 to the south, Hawk Ridge Lands to the west and existing residential area to the north.
    - Per Schedule D of the Township of Severn Official Plan (June 2024), these lands are designated as Countryside Residential.
    - The Draft Plan of Subdivision includes 297 condominium units.
    - These lands are Draft Plan approved and are currently undergoing detailed design.
    - Current servicing for these lands, as per the Ontario Municipal Board decision, is planned to be through the City of Orillia and facilitated by a Cross-Boundary Servicing Agreement.

The main branch of the Silver Creek traverses through the center of the Study Area flowing in a northwesterly direction, as does the general topography of the lands. Silver Creek is a gently winding watercourse that is contained in a shallow well-defined channel. There are several smaller tributaries of the Silver Creek which also traverse the Study Area. As such, a portion of the Study Area has been zoned as Environmental Protection and is restricted from development.

The lands within the Study Area are currently occupied by a 36-hole golf course, 9-hole golf course and active agricultural lands.

Refer to **Figure 2** for the location of the Study Area.

3.0 BACKGROUND

As mentioned previously, this Master Servicing Report was requested by the Township of Severn and County of Simcoe during a Pre-Consultation Meeting held on June 21, 2024, for the Subject Lands. It was identified during the meeting that the preferred method to designate the Subject Lands is via an Official Plan Amendment (OPA) and Zoning By-Law Amendment (ZBA) Application, followed by the required Environmental Assessment (EA) and Draft Plan of Subdivision Application process. It should be noted that that the OPA and ZBA process can occur simultaneously with the Draft Plan of Subdivision Application process.

As the Subject Lands are located within the South of Division Road Secondary Plan, there is an increased priority to develop, as this area has been selected for targeted growth. With that being said, it is imperative that growth within the Subject Lands does not impede the future development of

other areas within the Secondary Plan. These additional areas include the Area 2 and Area 3 Lands, which have already been zoned for development. Please refer to **Appendix B** for the map of the South of Division Road Secondary Plan Area.

Two (2) growth scenarios have been analyzed within this report:

- **Growth Scenario 1** – Development of Subject Lands (Hawk Ridge) and Area 2 Lands.
- **Growth Scenario 2** – Development of Subject Lands (Hawk Ridge), Area 2 Lands and Area 3 Lands.

Servicing capacity for Growth Scenario 1 is the current priority of the Township and County. The Area 3 Lands have been included within this study to determine upper range of what the proposed servicing strategies contained within this study can accommodate.

The Township of Severn is currently undertaking a Servicing Master Plan to evaluate the water, wastewater, and stormwater servicing strategies to accommodate future growth within the Township over the next 30 years. The Servicing Master Plan is being completed in accordance with the requirements set out in Phase 1 and 2 of the Municipal Class Environmental Assessment (2015) (MCEA). Civica Infrastructure (Civica) was retained by the Township to complete the Servicing Master Plan and it is our understanding that lands within the South of Division Road Secondary Plan Area will be evaluated as part of this assessment in accordance with Council direction. Through correspondence with the Township and Civica, it is understood that servicing this area of Severn from existing municipal systems is not a feasible servicing solution. As there is no existing municipal infrastructure within the Study Area, new infrastructure systems and facilities will be required to service these lands. As such, a Schedule C Municipal Class Environmental Assessment (EA) will be required for the water and wastewater systems, in accordance with the policies outlined in the MCEA (2015). Per direction from the Township and County, the Official Plan Amendment process will be required in advance of the completion of an Environmental Assessment. As such, this MSR is required to identify these servicing solutions.

The current investigation has been undertaken based on the pre-consultation meeting and follow-up discussions, as well as a review of material acquired from the Township. In addition, several documents/plans were reviewed during this engineering assessment. They include:

- Township of Severn Official Plan (June 2024)
- Design Guidelines for Drinking Water Systems (Ministry of Environment, 2008)
- Design Guidelines for Sewage Works (Ministry of Environment, 2008)
- Township of Severn Engineering Standards (Ainley Group, 2023)
- Township of Severn By-law 2010-65: General Considerations (2022)

4.0 WASTEWATER COLLECTION AND TREATMENT

4.1 OVERVIEW OF EXISTING WASTEWATER INFRASTRUCTURE

Currently, there is no existing sanitary system infrastructure in the vicinity of the Subject Lands. The nearest municipal infrastructure is located south of Highway 11 and along Murphy Road, however, is located within the City of Orillia municipal boundary. The closest municipal infrastructure within the Township of Severn is located approximately 10 km away, within the Westshore Settlement Area.

4.2 PROPOSED WASTEWATER SERVICING STRATEGY

As mentioned above, the nearest municipal infrastructure is located approximately 1 km from the Subject Lands within the City of Orillia. To avoid the need for a Cross Boundary Servicing Agreement, connection to this infrastructure has not been evaluated within this investigation. Additionally, connection to the existing infrastructure within Westshore Settlement Area has not been considered a viable solution due to the distance of external servicing that would be required to connect the two systems. In line with the ongoing Servicing Master Plan being undertaken by Civica Infrastructure, it has been assumed that a new, standalone servicing system will be required to facilitate development of the lands within the Study Area. The following investigation has been formed off this assumption.

The proposed sanitary servicing solution for the Study Area will be to design and construct a new municipal sanitary collection and treatment system. The optimal location for a treatment facility was determined to be the north end of the developable limits within the Hawk Ridge Development Lands, near the low point of the site and adjacent to the Silver Creek. A Schedule C Class Environmental Assessment (EA) will be required to investigate sanitary treatment alternatives and establish a preferred solution for the Study Area, however, per direction from the Township and County this process has been deferred at this time.

Hutchinson is currently in the process of completing an Assimilative Capacity Study (ACS) to determine effluent treatment limits for the proposed Wastewater Treatment Plant (WWTP) and the capacity of Silver Creek. Full results of the ACS are anticipated to be available in early 2025 and will be critical to determining the optimal servicing strategy and the development potential for each of the land holdings within the Study Area. For the purposes of this report, it has been assumed that the Silver Creek receiver has capacity to accommodate the proposed development concept for each of the land holdings outlined in Section 2.0 above.

Until the results of the Environmental Assessment and ACS are available, Silver Creek has been assumed to be the ultimate receiver.

It is anticipated that the proposed design of the WWTP will be a membrane bioreactor wastewater treatment plant that will be modular and thus scalable to expand as development progresses in the area. Further details regarding the design of the WWTP will be provided through the forthcoming EA process as more information becomes available regarding the results of the ACS and Township of Severn Servicing Master Plan. The location of the WWTP municipal infrastructure block has been illustrated in **Figure 2**.

4.2.1 SERVICING CONNECTIONS

Internal sanitary servicing for each of the land holdings will be provided via a network of gravity sewers that follow the alignment of the internal roadways and ultimately discharge to the WWTP. Sanitary sewers will be designed and constructed in accordance with the Township design standards, at a size and depth sufficient to service each lot and building.

As a development concept for the Area 2 Lands is not available at this time, preliminary servicing routes and connections have been evaluated. These connections are subject to change and will be refined once the internal road network for the Area 2 Lands becomes available.

To connect the future sanitary network within the Area 2 Lands to the WWTP within Hawk Ridge, two (2) servicing alignments have been considered:

- Option 1: Connect to WWTP via Silver Creek Crossing
    - This option would involve extension of sanitary infrastructure from the southwest quadrant of Area 2, across Silver Creek for a direct connection to the WWTP.
    - Due to grading constraints, it is anticipated that this option would require an on-site sanitary pumping station and forcemain.

- Option 2: Connect to WWTP via Uhthoff Line
    - This option would involve extension of sanitary infrastructure from the northwest quadrant of the site, along Uhthoff Line to facilitate a connection with the northernmost access to Hawk Ridge off Uhthoff Line.
    - Due to grading constraints, it is anticipated that this option would require an on-site sanitary pumping station and forcemain.
    - The gravity sewers within Hawk Ridge from this access to the WWTP would need to be sized to accommodate this flow, should the forcemain not make a direct connection with the WWTP.

Potential servicing alignments have been presented in **Figure 3**.

As mentioned in Section 2.0, the Draft Plan of Subdivision for Area 3 has been approved. Although the Area 3 Lands are currently planned to be serviced via connection to City of Orillia infrastructure, should connection to Township of Severn infrastructure be required, the following connections could be made.

Due to grading constraints, a connection to the Hawk Ridge gravity sewer system would likely be required at two (2) locations.

- Option 1: Connect to Hawk Ridge Gravity System via Hurlwood Lane
    - This option would involve extension of gravity sewer from the northeast quadrant of the site along Hurlwood Lane to facilitate a connection with the Hawk Ridge gravity system.
    - The gravity sewer system within Hawk Ridge would need to be sized to accommodate this flow.

- Option 2: Connect to Hawk Ridge Gravity System via Servicing Easement
    - This option would involve extension of gravity sewer from the southwest quadrant of the site, adjacent to the SWM Facility through a proposed servicing easement on the Hawk Ridge/Area 3 property line.
    - The gravity sewer system within Hawk Ridge would need to be sized to accommodate this flow.

The potential servicing alignments have been presented in **Figure 3**.

4.2.2 SANITARY DEMAND

Preliminary sanitary flows for the Study Area were estimated in conjunction with Township of Severn Standards. Applicable design criteria have been summarized in **Table 1**.

Table 1: Sanitary Design Criteria

Criteria	Standard
Average Flow Rate (L/cap/day)[1]	350
Infiltration (L/s/ha)	0.23
Residential Density - Detached (PPU)	2.707
Residential Density – Townhome (PPU)	2.416

1. Township of Severn staff have advised that the municipal engineering standards are being updated from 400 L/cap/day to 350 L/cap/day as part of the forthcoming update to their standards. As such, the revised rate has been utilized for demand calculations.

Table 2 below summarizes the calculated sanitary flows for the two (2) growth scenarios. Refer to **Appendix C** for detailed sanitary flow calculations.

Table 2: Summary of Sanitary Demand for Study Area

Design Area	Average Residential Daily Flow (L/sec)	Total Peak Daily Flow (Dry) (L/sec)	Infiltration/Extraneous Flow (L/sec)	Total Peak Daily Flow (Wet) (L/sec)
Hawk Ridge Lands				
Total	**8.66**	**16.84**	**8.18**	**39.04**
Growth Scenario 1: Hawk Ridge Lands + Area 2 Lands				
Hawk Ridge	8.66	16.84	8.18	39.04
Area 2	3.13	23.68	20.55	32.64
Total	**11.79**	**40.52**	**28.73**	**71.68**
Growth Scenario 2: Hawk Ridge Lands + Area 2 Lands + Area 3 Lands				
Hawk Ridge	8.66	16.84	8.18	39.04
Area 2	3.13	23.68	20.55	32.64
Area 3	5.55	9.99	4.44	23.68
Total	**14.70**	**50.51**	**33.17**	**95.36**

5.0 WATER SUPPLY, STORAGE AND DISTRIBUTION

5.1 OVERVIEW OF EXISTING WATER SUPPLY SYSTEM

Currently there is no existing municipal drinking water system within the vicinity of the Study Area. The adjacent residential properties rely on drilled wells to supply drinking water. The closest municipal infrastructure is a 400 mm diameter watermain along Murphy Road located 1 km southwest of the Study Area, within the municipal boundary of City of Orillia.

The nearest municipal water well system within the Township of Severn is located within the Bass Lake Woodlands Community. This community is located south of the South of Division Road Secondary Plan area and is bounded by Division Road West and Wainman Line. The Community is serviced by a groundwater-based water system known as the Bass Lake Woodlands Water System. The Bass Lake Woodlands system serves approximately 300 residents via 161 service connections and is classified as a Class 2 municipal drinking water system under Ontario Regulation 129/04. The system consists of

three (3) wells, a pumphouse/treatment facility and buried reservoir located at Lot 2 Concession 1, Township of Severn, Simcoe County (1853 Ridley Blvd, Severn, ON).

The three (3) wells within the Bass Lake Woodlands system are named Well 1, Well 2 and Well 3 and have permitted rates of 655.2 m^3/day, 280.8 m^3/day and 741.6 m^3/day respectively. The total water taking limit is 1,211.2 m^3/day and the Drinking Water License Limit is 818 m^3/day. If the concept of firm capacity were applied to the Bass Lake Woodland System where the total capacity is the total permitted amount with the largest well out of service the firm capacity of the Bass Lake Woodlands system would be 936.0 m^3/day.

A review of the Bass Lake Woodlands 2023 Summary Report shows that the 2023 Average Daily Flow was 105 m^3/day and the 2023 Maximum Daily Flow was 256 m^3/day, indicating that there is ample supply within the Bass Lake Woodlands system.

The Township of Severn identified in 2019 that Well 2 and Well 3 were experiencing significant structure issues which were greatly impacting the water quality and quantity available to the system. The Township began the process to address the concerns around water system capacity and system redundancy in 2020 by retaining a consultant to complete the design, tendering and approvals to replace these two (2) wells. The Township is currently in the process of completing upgrades to the Bass Lake Woodlands system by replacing Well 2 and Well 3. No work has been planned for Well 1 which remains a concern for overall system redundancy due to the age and structural condition of the well.

5.2 PROPOSED WATER SERVICING STRATEGY

As mentioned above, the nearest municipal water infrastructure is located within the City of Orillia along Murphy Road. To avoid the need for the Township of Severn to enter into a Cross-Boundary Servicing Agreement with the City of Orillia, connection to this infrastructure has not been evaluated as part of this investigation. To comply with the ongoing Servicing Master Plan being undertaken by Civica Infrastructure, it has been assumed a new water supply and treatment system will be required to service the Study Area. The following investigation has been formed off this assumption.

It should be noted that the establishment of a new supply and treatment system will necessitate a Schedule C Class Environmental Assessment (EA) to thoroughly explore potential alternatives, identify a preferred solution, and assess environmental impacts. Per request of the Township and County, the EA process has been deferred at this time.

A Well Exploration Program was undertaken by Crozier between 2023 and 2024 to determine the potential to develop a new municipal drinking water system by way of a groundwater source for the Hawk Ridge Lands. Three (3) test wells were drilled within the site to determine if a new groundwater supply, with suitable quality, could be established to satisfy the quantity requirements for the development lands. Analysis of the three (3) locations concluded that the test wells adjacent to Uhthoff Line had greater potential than the test well adjacent to the existing club house from a supply and quality perspective. As such, the recommended servicing strategy for the Hawk Ridge Lands was to construct three (3) to four (4) wells, accompanied by the establishment of a well pumphouse, treatment facility and storage reservoir to provide drinking water for the site.

To ensure adequate water supply for the remaining lands within the Study Area, a wellfield approach, where multiple production wells are placed near each other, is considered the most feasible method for developing these lands. The test wells installed (TW24-1 and TW24-2) can each supply water at a rate of 7.60 L/s, totaling 15.20 L/s. When only wells TW24-1 and TW24-2 are operational, the system's firm capacity would be 7.60 L/s overall.

Crozier believes that additional large diameter wells (PW24) can be integrated into the system near TW24-1 and TW24-2. These larger wells could provide an extra capacity of 10.00 L/s each.

The required number of wells changes with each Growth Scenario due to rising daily demands from new developments. **Table 3** below details the recommended number of wells to meet firm capacity needs for each growth scenario. **Table 5** outlines the maximum daily demands, which serve as the basis of design.

Table 3: Summary of Well Production Capacities

Number of Wells	Well Identification	Well Capacity (L/sec)	Total Capacity (L/sec)	Firm Capacity (L/sec)	Growth Scenario
1	**PW24-1[A]**	**7.60**	**7.60**	**-**	**-**
2	**PW24-2[A]**	**7.60**	**15.20**	**7.60**	**-**
3	**PW24-3**	**10.00**	**25.20**	**15.20**	**-**
4	**PW24-4**	**10.00**	**35.20**	**25.20**	**Hawk Ridge**
5	**PW24-5**	**10.00**	**45.20**	**35.20**	**GS1**
6	**PW24-6**	**10.00**	**55.20**	**45.20**	**GS2**

A. Previously identified as TW24-1 and TW24-2. These test wells would be converted to production wells.

Based on the above:

- Four (4) wells will be required to meet the demands for the Hawk Ridge Development,
- Five (5) wells will be required to meet the demands for Growth Scenario 1; and,
- Six (6) wells will be required to meet the demands for Growth Scenario 2.

It should be noted that the proposed storage reservoir for the Hawk Ridge Lands, illustrated on **Figure 2,** will be designed to meet the water storage requirements exclusively for the Hawk Ridge Development. Given the preliminary nature of the remaining parcels in the Secondary Plan Area, it is recommended that future development of these lands include provisions for adequate storage internal to each development. Based on the Ministry of Environment, Conservation and Parks (MECP) *Design Guidelines for Drinking Water Systems Section 8.4.2* pertaining to Sizing Treated Water Storage for Systems Providing Fire Protection, the total required storage volume for the Hawk Ridge Development is 2,776 m^3. A 2,800 m^3 reservoir is recommended on-site currently.

5.2.1 SERVICING CONNECTIONS

The watermain network for each development within the Study Area will be designed to follow the alignment of the internal road network, incorporating individual service connections for each unit. Fire hydrants will be strategically positioned in accordance with municipal standards to ensure adequate fire protection coverage. Connection stubs will be installed to facilitate future expansion to the adjacent developments as outlined in Growth Scenario 1 and Growth Scenario 2.

To facilitate a connection with the Area 2 Lands, a distribution watermain will need to be extended external to the Area 2 property limits. As a concept plan is not available for the Area 2 Lands at this time, the following servicing alignments are considered preliminary and are subject to change.

- Option 1: Connect to Hawk Ridge Watermain via Silver Creek Crossing
    - Within this option, watermain will need cross Silver Creek from the southeast quadrant of the site to facilitate a connection with the internal watermain network within Hawk Ridge.

- Option 2: Connect to Hawk Ridge Watermain via Uhthoff Line
    - Within this option, watermain will need to be extended south along Uhthoff Line to facilitate a connection with the northernmost access to Hawk Ridge off Uhthoff Line.

As mentioned previously, the Area 3 Lands servicing strategy currently relies on connection to City of Orillia infrastructure. Should a connection to Township of Severn infrastructure be required, a watermain connection could be made via the servicing easement adjacent to the Area 3 SWM Facility or via Hurlwood Lane. To facilitate a looped distribution network per MECP requirements, a connection at both locations has been proposed.

The preliminary layout of the proposed water connections has been depicted in **Figure 3**.

5.2.2 WATER DEMAND

Preliminary water demands for the Study Area have been estimated in conjunction with Township of Severn standards that concur with Table 3-1 of the Ministry of Environment, Conservation and Parks (MECP) Design Guidelines for Drinking Water Systems. Applicable design criteria have been summarized in **Table 4** below.

Table 4: Summary of Watermain Design Criteria

Criteria	Standard
Residential Flow Rate (L/cap/day)	350
Industrial Flow Rate (L/ha-sec)	0.42
Maximum Day/Peak Hour Factor	Varies – Refer to MECP Table 3.1
Residential Density - Detached (PPU)	2.707
Residential Density – Townhouse (PPU)	2.416

Water demands for the Study Area have been calculated and summarized in **Table 5** below per Township standards identified above.

Table 5: Summary of Water Demand for Study Area

Design Area	Average Daily Demand (ADD) (L/sec)	Max Daily Demand (MDD) (L/sec)	Peak Hour Demands PHD (L/sec)
Hawk Ridge Lands			
Total	**8.66**	**19.49**	**38.97**
Growth Scenario 1: Hawk Ridge Lands + Area 2 Lands			
Hawk Ridge	8.66	19.49	38.97
Area 2	3.13	8.59	14.06
Total	**11.79**	**28.08**	**53.04**
Growth Scenario 2: Hawk Ridge Lands + Area 2 Lands + Area 3 Lands			
Hawk Ridge	8.66	19.49	38.97
Area 2	3.13	8.59	14.06
Area 3	5.57	10.66	15.75
Total	**17.36**	**38.74**	**68.78**

Refer to **Appendix D** for the water demand calculations.

Fire Flow Estimates

Per municipal requirements, the *Water Supply for Fire Protection, A Guide to Recommend Practice (Fire Underwriters Survey (FUS), 2020)* is used to estimate fire flows for the Study Area. Estimated flows are based on building floor area, construction type and structure exposure distance.

Given the preliminary nature of this report, detailed layouts of lots and buildings are not yet available, and thus fire flow estimates have not been analyzed in detail. The Township of Severn By-Law 2010-65: General Considerations was referenced to determine assumed lot sizes and setback limitations for the proposed Townhouse blocks. For conservative planning purposes, the following assumptions were made with respect to each development parcel.

- Hawk Ridge Lands
  - It was assumed that a maximum of eight (8) townhouse units would be built within one (1) block. This block was presumed to be constructed without firewalls.
  - There were assumed to be 39 townhouse blocks forming the total of 310 townhouse units.
  - The maximum lot coverage for a townhouse block was estimated at 35% of the total townhouse area.
  - Each assumed townhouse block was considered to have a Gross Floor Area (GFA) of 597 sq.m., spread over two floors above ground level.
  - The minimum setbacks between townhouse blocks were assumed as:
    - 1.5 m at side yards for each block,
    - 7.5 m rear and front yard setback for each block,
    - 20 m right-of-ways.
- Area 2 Lands
  - The assumptions were the same as Hawk Ridge due to the lack of a development concept.
- Area 3 Lands
  - Lot coverage of 40% was applied for industrial areas.

Detailed fire flow calculations will be provided as part of detailed design for the individual subdivision applications. Fire flow calculations have been provided in **Appendix D**. The required fire flow for the Growth Scenarios has been summarized below in **Table 6**.

Table 6: Fire Flow Calculations

Design Area	Final Fire Flow (FF) (L/sec)	Require Duration (DUR.) (HR)
Hawk Ridge Lands		
Total	**200.00**	**2.50**
Growth Scenario 1: Hawk Ridge Lands + Area 2 Lands		
Hawk Ridge	200.00	2.50
Area 2	200.00	2.50
Total	**400.00**	**-**
Growth Scenario 2: Hawk Ridge Lands + Area 2 Lands + Area 3 Lands		
Hawk Ridge	200.00	2.50
Area 2	200.00	2.50
Area 3	116.67	2.00
Total	**650.00**	**-**

6.0 UTILITIES

The Study Area will be serviced with natural gas, telephone, cable TV, and hydro. The design of such utilities will be coordinated with the local utility companies servicing the Township of Severn. Utilities are proposed to follow the alignment of the internal road network for each development parcel, with individual service connections to each lot.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the foregoing, our conclusions and recommendations are as follows:

1. The purpose of this Master Servicing Report was to analyze the servicing opportunities for the remaining, undeveloped lands within the South of Division Road Secondary Plan Area. This includes the Hawk Ridge Development Lands, Area 2 Lands and Area 3 Lands.
2. Two (2) growth scenarios were analyzed within this report; Growth Scenario 1 included development of the Hawk Ridge Lands and Area 2 Lands and Growth Scenario 2 included development of the Hawk Ridge Lands, Area 2 Lands and Area 3 Lands, respectively.
3. As there is no existing municipal sanitary or water infrastructure within the immediate vicinity of the Study Area, it has been assumed that a new collection, supply and treatment system will need to be designed to service the lands within the Study Area.
4. Connection to nearby City of Orillia infrastructure has not been included within this analysis to avoid the need to enter into a Cross-Boundary Servicing Agreement.
5. The Study Area will be serviced via internal gravity sanitary sewer networks within each of the development lands, which discharge to a proposed on-site wastewater treatment plant on the Hawk Ridge Lands. Extension of sewer external to the Area 2 and Area 3 Lands will be required.
6. A Well Exploration Study completed on the Hawk Ridge Lands revealed that construction of four (4) wells will be required to service the water demands for the Hawk Ridge Lands. It is anticipated that construction of five (5) and six (6) large diameter wells will be required to service the Growth Scenario 1 and Growth Scenario 2, respectively.
7. Extension of watermain external to the Area 2 and Area 3 Lands will be required.
8. An on-site well pumphouse and treatment plant is proposed within the Hawk Ridge Lands.
9. Future storage requirements for Area 2 and Area 3 will need to be provided within the limits of each respective property.
10. Watermain will follow the alignment of the internal road network of each development complete with all valving, appurtenances, and hydrants to meet Township of Severn Standards.
11. Utilities are available to service the Study Area.

Respectfully submitted,

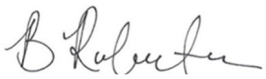
C.F. CROZIER & ASSOCIATES INC.

Haley Birrell, P.Eng.
Project Engineer

C.F. CROZIER & ASSOCIATES INC.

David Crozier, E.I.T.
Engineering Intern

C.F. CROZIER & ASSOCIATES INC.



Brittany Robertson, P.Eng.
Partner, Manager of Land Development

J:\1900\1935- LIV Communities\6133- Hawk Ridge\Reports\1st Submission Draft Plan Approval\Master Servicing Report\2024.09.18_ Master Servicing Report.docx

APPENDIX A

Meeting Minutes

BIGLIERI GROUP

Meeting Minutes

Meeting Date:	August 13, 2024	**Prepared By:**	Robert McQuillan
Meeting Time:	11:30 AM – 12:00 PM	**Project Name:**	Hawk Ridge Redevelopment
Meeting Location:	Microsoft Teams	**TBG Project No.:**	23979

ATTENDEES

Name	Firm	Email
Ben Jones	L!V Communities	bjones@livhere.ca
Dan Amadio	County of Simcoe	dan.amadio@simcoe.ca
Ishan Maggo	County of Simcoe	ishan.maggo@simcoe.ca
Andrea Woodrow	Township of Severn	awoodrow@townshipofsevern.ca
Jamie Robinson	MHBC	jrobinson@mhbcplan.com
Brittany Robertson	Crozier	brobertson@cfcrozier.ca
Rachelle Larocque	The Biglieri Group	rlarocque@thebiglierigroup.com
Robert McQuillan	The Biglieri Group	rmcquillan@thebiglierigroup.com

DISCUSSION ITEMS

Item #	Item Description	Party Responsible
1.0	**Servicing Approach for Hawk Ridge Redevelopment**	
1.1	LIV Communities, Crozier and The Biglieri Group sought this meeting with County of Simcoe and Township of Severn staff to discuss the proposed servicing approach for the Hawk Ridge redevelopment program to understand their preliminary feedback prior to a formal submission. It is noted that a new standalone servicing system is proposed to service the development area.	Information
1.2	Through a pre-consultation meeting held on June 10, 2024, the Township of Severn and County of Simcoe requested the following reports be submitted as part of the application for Official Plan Amendment, Zoning By-law Amendment, and Draft Plan of Subdivision:	Information

2472 Kingston Road, Toronto Ontario M1N 1V3
21 King Street W Suite 1502, Hamilton, Ontario L8P 4W7
Office: (416) 693-9155 Fax: (416) 693-9133
tbg@thebiglierigroup.com

	- Stormwater Management Report, - Functional Servicing Report, and - Master Servicing Report.	
2.0	Master Servicing Report (MSR)	
2.1	Crozier notes that a Class Environmental Assessment (EA) will be required to facilitate the proposed development but has been deferred at this time at the request of the Township of Severn. The EA will identify the preferred servicing solution for the area. As such, the MSR can only outline the general roadmap to servicing for the area. The servicing approach will be refined through the EA process and implemented in detailed design.	Crozier
2.2	County of Simcoe and Township of Severn staff agree with the proposed MSR approach, acknowledging it will be high level as the EA has not been completed.	County of Simcoe Township of Severn
3.0	Adjacent Lands	
3.1	County of Simcoe and Township of Severn staff note that the proposed standalone servicing approach for Hawk Ridge must: - Not impede future development of other areas in the South of Division Road Secondary Plan Area; - Consider possibilities for accommodating additional growth in the South of Division Road Secondary Plan Area, where possible. Staff request that this be reflected in the MSR.	County of Simcoe Township of Severn
3.2	LIV Communities and Crozier note the following about other development areas in the South of Division Road Secondary Plan Area: - Area 1 is already serviced; - Area 2 is not serviced; - Area 3 is draft approved with servicing from City of Orillia.	LIV Communities & Crozier

3.3	LIV Communities and Crozier commit to demonstrating in the high-level MSR that the proposed standalone servicing approach for Hawk Ridge will not impede future development of surrounding lands in the South of Division Road Secondary Plan Area.	LIV Communities & Crozier
3.4	LIV Communities and Crozier commit to exploring possibilities for enabling future servicing capacity for Area 2 lands, to be included in the high-level MSR.	LIV Communities & Crozier
4.0	**Submission**	
4.1	LIV Communities note that they anticipated a submission in Fall, 2024, likely October.	LIV Communities

APPENDIX B

South of Division Road Secondary Plan Area Map

Map Projection: NAD 1983 UTM Zone 17N

The Township of Severn does not warrant the accuracy, completeness, content, or currency of the information provided.

This is not a legal Plan of Survey.

OCTOBER 26, 2022

TOWNSHIP OF SEVERN

OFFICIAL PLAN | SCHEDULE D

SOUTH OF DIVISION ROAD SECONDARY PLAN AREA

LEGEND

- Highway
- County Road
- Local Road
- Private Road
- Railway
- Watercourse
- Waterbody
- Municipal Boundary
- Settlement Boundary
- Parcel Fabric
- Woodlot Policy Area
- Shore Clliff
- Residential Area (1, 2, 3, 4)
- Countryside Residential
- Mobile Home Residential
- Rural
- Open Space
- Environmental Protection Area
- Highway Commercial
- Industrial
- Extractive Industrial

N

SCALE: 1:9,000

0 0.2 0.4 0.6 0.8

KILOMETERS

— Township of —
SEVERN

WARREN CT.
RIVERWOOD LN.
CARRIAGE CT.
SURREY CRES
DIVISION RD. W.
JILEM CT.
ABBEY RD.
FERN GLEN CT.
BIRKESHIRE WOODS LN.
ELANA DR.
CONFEDERATION DR.
PINE AVE.
KENSINGTON PL.
GLEN OAK LN.
RIDLEY BLVD.
ELANA DR.
HIGHWAY 12
TOWNSHIP OF ORO-MEDONTE
BASS LAKE
LORETTA AVE.
RICHMOUNT LN.
WINDEMERE LN.
N VALLEY LN.
FAWN LN.
OSPREY LN.
PINE VALLEY LN.
FAIRGROUNDS RD.
UNTHOFF LINE
HAWK RIDGE CRES.
HURLWOOD LN.
BURNSIDE LINE
BONNYBROOK DR.
CARLYON LINE
DIVISION RD. E.
ANTONIO CT.
BRODIE DR.
RYERSON BLVD.
CLEARVIEW DR.
ELM AVE.
CITY OF ORILLIA
HIGHWAY 11
PENLEY RD.
HAMPSHIRE HILLS LINE
FOREST WOOD DR.
HOLCROFT RD.
LAKE COUCHICHING
BURIOAK RD.
WILSON POINT RD.
WILSON POINT RD.
CUNNINGHAM CRES.

APPENDIX C

Sanitary Demand Calculations

CROZIER
CONSULTING ENGINEERS

Project Number: 1935-6133
Project Name: Hawk Ridge
Date: 8/16/2024
Prepared By: AM
Checked By: HB

Preliminary Sanitary Design Flow - Hawk Ridge Development

Developed Site Area			
Infiltration Area		35.6	ha
Number of Residential Units			
Detached Units		290	units
Townhouse Units		560	units
	Total Residential:	**850**	**units**
Person Per Residential Unit			
Per Township of Severn Standard 5.2			
	Detached Unit	2.707	persons/unit
	Townhouse Unit	2.416	persons/unit
Residential Population	**Total Population:**	**2,138**	**persons**
Unit Sewage Flows			
Residential	*(Per Township of Severn Standard 5.2)*	350	L/C-day
Infiltration Allowance - Residential	*(Per Township of Severn Standard 5.2)*	0.23	L/s/ha
Total Flows			
Average Residential Daily Flow		8.66	L/sec
		748	m^3/day
Maximum Daily Flow		17.3	L/sec
		1,497	m^3/day
Residential Peak Factor	(Harmon Formula)	3.6	
Infiltration/Extraneous Flow		8.2	L/sec
Total Average Daily Flow		16.8	L/sec
		1,455	m^3/day
Total Peak Daily Flow		**39.04**	**L/sec**

CROZIER
CONSULTING ENGINEERS

Project Number: 1935-6133
Project Name: Hawk Ridge
Date: 8/16/2024
Prepared By: AM
Checked By: HB

Preliminary Sanitary Design Flow - Hawk Ridge Development

Developed Site Area			
Infiltration Area		35.6	ha
Number of Residential Units			
Detached Units		290	units
Townhouse Units		560	units
	Total Residential:	**850**	**units**
Person Per Residential Unit			
Per Township of Severn Standard 5.2			
	Detached Unit	2.707	persons/unit
	Townhouse Unit	2.416	persons/unit
Residential Population	**Total Population:**	**2,138**	**persons**
Unit Sewage Flows			
Residential	*(Per Township of Severn Standard 5.2)*	350	L/C-day
Infiltration Allowance - Residential	*(Per Township of Severn Standard 5.2)*	0.23	L/s/ha
Total Flows			
Average Residential Daily Flow		8.66	L/sec
		748	m^3/day
Maximum Daily Flow		17.3	L/sec
		1,497	m^3/day
Residential Peak Factor	(Harmon Formula)	3.6	
Infiltration/Extraneous Flow		8.2	L/sec
Total Average Daily Flow		16.8	L/sec
		1,455	m^3/day
Total Peak Daily Flow		**39.04**	**L/sec**

CROZIER
CONSULTING ENGINEERS

Project Number: 1935-6133
Project Name: Hawk Ridge
Date: 9/16/2024
Prepared By: AM
Checked By: HB

Preliminary Sanitary Design Flow - Area 3 Lands

Developed Site Area

Infiltration Area	19.3	ha
Industrial Infiltration Area	6.4	ha

Number of Residential Units

Townhouse Units	297	units
Total Residential:	**297**	**units**

Person Per Residential Unit
(Per Township of Severn Standard 5.2)

Townhouse Unit	2.416	persons/unit

Residential Population — **Total Population: 718 persons**

Unit Sewage Flows

Residential	*(Per Township of Severn Standard 5.2)*	350	L/C-day
Industrial	*(Per Township of Severn Standard 5.4)*	36	m^3/ ha * d
Infiltration	*(Per Township of Severn Standard 5.2)*	0.23	L/s/ha

Total Flows

Average Residential Daily Flow	2.91	L/sec
Average Industrial Daily Flow	2.65	L/sec
Residential Peak Factor (Harmon Formula)	3.89	
Industrial Peak Factor *(MOE Drinking Water Systems Section 3.4.4)*	3.00	
Infiltration/Extraneous Flow	4.44	L/sec
Total Average Daily Flow	9.99	L/sec
Total Peak Daily Flow	**23.68**	**L/sec**

CROZIER
CONSULTING ENGINEERS

Project Number: 1935-6133
Project Name: Hawk Ridge
Date: August 12, 2024
Prepared By: AM
Checked By: HB

Preliminary Sanitary Design Flow - Summary

Design Area	Average Daily Flow (L/sec)	Peak Flow (Dry Conditions) (L/sec)	Infiltration (L/sec)	Peak Flow (Wet Conditions) (L/sec)
Hawk Ridge ONLY				
Total	**8.66**	**16.84**	**8.18**	**39.04**
Scenario 1: Hawk Ridge + Area 2				
Hawk Ridge	8.66	16.84	8.18	39.04
Area 2	3.13	23.68	20.55	32.64
Total	**11.79**	**40.52**	**28.73**	**71.68**
Scenario 2: Hawk Ridge + Area 2 + Area 3				
Hawk Ridge	8.66	16.84	8.18	39.04
Area 2	3.13	23.68	20.55	32.64
Area 3	5.55	9.99	4.44	23.68
Total	**17.34**	**50.51**	**33.17**	**95.36**

APPENDIX D

Water Demand & Fire Flow Calculations

CROZIER
CONSULTING ENGINEERS

Project Number: 1935-6133
Project Name: Hawk Ridge
Date: August 12, 2024
Prepared By: AM/DJC
Checked By: DL

Preliminary Water Design Flow and Volume - Summary

Design Area	Average Daily Demand (ADD) (L/sec)	Max Daily Demand (MDD) (L/sec)	Peak Hour Demands PHD (L/sec)
Hawk Ridge Development			
Total	**8.66**	**19.49**	**38.97**
Growth Scenario 1: Hawk Ridge + Area 2			
Hawk Ridge	8.66	19.49	38.97
Area 2	3.13	8.59	14.06
Total	**11.79**	**28.08**	**53.04**
Growth Scenario 2: Hawk Ridge + Area 2 + Area 3			
Hawk Ridge	8.66	19.49	38.97
Area 2	3.13	8.59	14.06
Area 3	5.57	10.66	15.75
Total	**17.36**	**38.74**	**68.78**

Design Area	Storage Volume (VOL.) (cu.m)	Fire Flow (FF) (L/sec)	Required Duration (DUR.) (HR)
Hawk Ridge	2776.15	200.00	2.50
Area 2	2482.05	200.00	2.50
Area 3	1337.83	116.67	2.00

CROZIER
CONSULTING ENGINEERS

Project Number: 1935-6133
Project Name: Hawk Ridge
Date: August 12, 2024
Prepared By: AM/DJC
Checked By: DL

Preliminary Water Design Flow - Hawk Ridge Development

Number of Residential Units

Detached Units (Per Concept Plan dated August 20, 2024, prepared by Biglieri Group)		290	units
Townhouse Units (Per Concept Plan dated August 20, 2024, prepared by Biglieri Group)		560	units
	Total Residential:	**850**	**units**

Person Per Residential Unit

Detached Unit	(Per Township of Severn Sanitary Standard 5.2)	2.707	persons/unit
Townhouse Unit	(Per Township of Severn Sanitary Standard 5.2)	2.416	persons/unit

Total Residential Population	**Total Population:**	**2,138**	**persons**

Unit Water Flows

Residential	(Assumed value based on experience)	350	L/C-day

Total Design Water Flows

Average Daily Residential Flow		8.66	L/sec
Total Average Flow		**8.7**	**L/sec**
Minimum Hour Factor	(Per MECP Guidelines for Drinking Water Systems 3.4.2)	0.45	
Min Hour Demand Flow		**3.9**	**L/sec**
Max Day Peak Factor	(Per MECP Guidelines for Drinking Water Systems 3.4.2)	2.25	
Max Day Demand Flow		**19.5**	**L/sec**
Peak Hour Factor	(Township of Severn Water System Standard 4.1)	4.50	
Peak Hour Flow		**39.0**	**L/sec**

Required Fire Flow		**200**	**L/sec**
Fire Flow Duration		2.50	hrs.

Water Storage Requirements (Per MECP Guidelines for Drinking Water Systems 8-4)

Total Water Storage =	A + B + C		
A =	Fire Storage	1800.0	cu.m
B =	Equialization Storage (25% of MDD)	420.9	cu.m
C =	Emergency Storage (25% of A + B)	555.2	cu.m
Total Water Storage		**2,776**	**cu.m**

CROZIER
CONSULTING ENGINEERS

Project Number: 1935-6133
Project Name: Hawk Ridge
Date: August 12, 2024
Prepared By: AM/DJC
Checked By: DL

Preliminary Water Design Flow - Area 2

Number of Residential Units			
	Total Residential:	**285**	**units**
Person Per Residential Unit			
Detached Unit	(Township of Severn Sanitary Standard 5.2)	2.707	persons/unit
Townhouse Unit	(Township of Severn Sanitary Standard 5.2)	2.416	persons/unit
Residential Population	**Total Population:**	**771**	**persons**
Unit Water Flows			
Residential	(Assumed value based on experience)	350	L/C-day
Total Design Water Flows			
Average Daily Residential Flow		3.13	L/sec
Total Average Flow		**3.1**	**L/sec**
Minimum Hour Factor	(Per MECP Guidelines for Drinking Water Systems 3.4.2)	0.40	
Min Hour Demand Flow		**1.3**	**L/sec**
Max Day Peak Factor	(Per MECP Guidelines for Drinking Water Systems 3.4.2)	2.75	
Max Day Demand Flow		**8.6**	**L/sec**
Peak Hour Factor	(Township of Severn Water System Standard 4.1)	4.50	
Peak Hour Flow		**14.1**	**L/sec**
Required Fire Flow		**200**	**L/sec**
Fire Flow Duration		2.50	hrs.
Water Storage Requirements	(Per MECP Guidelines for Drinking Water Systems 8-4)		
Total Water Storage =	A + B + C		
A =	Fire Storage	1800.0	cu.m
B =	Equalization Storage (25% of MDD)	185.6	cu.m
C =	Emergency Storage (25% of A + B)	496.4	cu.m
Total Water Storage		**2,482**	**cu.m**

CROZIER CONSULTING ENGINEERS

Project Number: 1935-6133
Project Name: Hawk Ridge
Date: August 12, 2024
Prepared By: AM/DJC
Checked By: DL

Preliminary Water Design Flow - Area 3

Number of Residential Units

Per Draft Plan dated May 2022, prepared by Biglieri Group

Block 1			
20' Townhouse		82	
30' Townhouse		51	
Block 2			
20' Townhouse		8	
20' Dual Frontage Townhouse		24	
30' Townhouse		9	
Block 3			
20' Dual Frontage Townhouse		26	
30' Townhouse		17	
Block 4			
20' Townhouse		68	
20' Dual Frontage Townhouse		8	units
30' Townhouse		4	units
	Total Residential:	**297**	**units**

Industrial Area

Industrial		6.4	ha
	Total Industrial	**6.4**	**ha**

Person Per Residential Unit

Townhouse and Duplex	(Township of Severn Sanitary Standard 5.2)	2.416	persons/unit

Residential Population — **Total Population:** **718** **persons**

Unit Water Flows

Residential	(Assumed value based on experience)	350	L/C-day
Industrial	(Township of Severn Water System Standard 4.3)	0.42	L/ha-sec

Total Design Water Flows

Average Daily Residential Flow		2.91	L/sec
Average Daily Industrial Flow		2.67	L/sec
Total Average Flow		**5.6**	**L/sec**
Minimum Hour Factor	(Per MECP Guidelines for Drinking Water Systems 3.4.2)	0.40	
Min Hour Residential Demand Flow		1.2	L/sec
Average Daily Industrial Flow		2.7	L/sec
Min Hour Demand Flow		**3.8**	L/sec
Max Day Peak Factor	(Per MECP Guidelines for Drinking Water Systems 3.4.2)	2.75	
Max Day Residential Demand Flow		8.0	L/sec
Average Daily Industrial Flow		2.7	L/sec
Max Day Demand Flow		**10.7**	**L/sec**
Peak Hour Factor	(Township of Severn Water System Standard 4.1)	4.50	
Peak Hour Residential Demand Flow		13.08	
Average Daily Industrial Flow		2.67	
Peak Hour Demand Flow		**15.7**	**L/sec**

Required Fire Flow		**117**	**L/sec**
Fire Flow Duration		2.00	hrs.

Water Storage Requirements (Per MECP Guidelines for Drinking Water Systems 8-4)

Total Water Storage =	A + B + C		
A =	Fire Storage	840.0	cu.m
B =	Equialization Sotrage (25% of MDD)	230.3	cu.m
C =	Emergency Storage (25% of A + B)	267.6	cu.m
Total Water Storage		**1,338**	**cu.m**

CROZIER
CONSULTING ENGINEERS

Project Number: 1935-6133
Project Name: Hawk Ridge
Date: September 5, 2024
Prepared By: AM/DJC
Checked By: DL

Preliminary Fire Flow and Duration - Summary

Design Area	Final Fire Flow (FF) (L/sec)	Require Duration (DUR.) (HR)
Hawk Ridge ONLY		
Total	**200.00**	**2.50**
Growth Scenario 1: Hawk Ridge + Area 2		
Hawk Ridge	200.00	2.50
Area 2	200.00	2.50
Total	**400.00**	**-**
Growth Scenario 2: Hawk Ridge + Area 2 + Area 3		
Hawk Ridge	200.00	2.50
Area 2	200.00	2.50
Area 3	116.67	2.00
Total	**516.67**	**-**

CROZIER CONSULTING ENGINEERS

PROJECT NAME: Hawk Ridge
PROJECT NUMBER: 1935-6133
PREPARED BY: DJC
CHECKED BY: DL
DATE: 16-Sep-24

Fire Flow Determination Per Fire Underwriters Survey (2020) - Hawk Ridge Development

Water Supply for Public Fire Protection - 2020
Fire Underwriters Survey
Part II - Guide for Determination of Fire Flows for Public Fire Protection in Canada

An estimate of fire flow required for a given area may be determined by the formula:

RFF = 220 * C * sqrt A

where:

RFF = the required fire flow in litres per minute (L/min)
C = the construction coefficient is related to the type of construction of the building
= 1.5 for Type V Wood Frame Construction
= 0.8 for Type IV-A Mass Timber Construction
= 0.9 for Type IV-B Mass Timber Construction
= 1.0 for Type IV-C Mass Timber Construction
= 1.5 for Type IV-D Mass Timber Construction
= 1.0 for Type III Ordinary Construction
= 0.8 for Type II Non-combustible Construction
= 0.6 for Type I Fire Resistive Construction
A = the total effective floor area (effective building area) in square metres (excluding basements at least 50 percent below grade) in the building considered

STEP A: Construction Coefficient (C) 1.0 Ordinary Construction is Assumed

STEP B: Total Effective Floor Area
Proposed Building **Hawk Ridge**

	Yes/No/Unknown	
Is basement at least 50% below grade?	Yes	If yes, basement floor area excluded
Vertical openings protected?	Unknown	*For consideration for effective area calculations

Calculate Effective Floor Area based on the highlighted cell
-C value from 1.0 to 1.5: 100% of all floor areas are used
-C value below 1 and vertical openings are not protected: Consider two largest floors plus 50% of all floor above to a max of eight
-C value below 1 and vertical openings are protected: Consider single largest floor plus 25% of the two immediately adjoining floors

*A building may be subdivided if there is a vertical firewall with a fire-resistance rating greater than 2 hours, and meets the requirements of the National Building Code.

Township of Severn By-Law 2010-65: General Zoning Considerations
- Maximum 8 units per townhouse block before firewall
- Maximum townhouse lot coverage of 35%

Floors Above Grade	Total Floor Area (m^2)	% of Area Considered	Effective Floor Area (m^2)
Basement	597	0%	0.0
Ground Floor	597	100%	596.8
Level 2	597	100%	596.8
Total	**1790**		**1193.6**

Assumptions:
Biglieri Concept Plan (Aug. 2024): 310 TH, 6.65ha
# of Blocks = 310 units / 8 units per block ~ 39 blocks
Block Area = (6.65ha*35%)/39

Total Effective Floor Area **1194** m^2

STEP C: Therefore RFF = **8,000** **L/min (rounded to nearest 1000 L/min)**

STEP D: Occupancy Contents Adjustment Factor

The required fire flow may be reduced by as much as -25% for occupancies having contents with very low fire hazard or may be increased by up to 25% surcharge for occupancies having a high fire hazard.

Occupancy and Contents Adjustment Factor	
Non-Combustible	-25%
Limited Combustible	-15%
Combustible	0%
Free Burning	15%
Rapid Burning	25%

*Refer to Table 3 for recommended Occupancy and Contents Charges by major occupancy examples.

Type of Occupancy	Adjustment Factor	
Residential Occupancy	Limited Combustible	-15%

Total Reduction % **-1,200** **L/min (reduction)**

RFF = **6,800** **L/min (not rounded)**

Note: The RFF flow 6800 L/min is used in Step E and F.

CROZIER CONSULTING ENGINEERS

PROJECT NAME: Hawk Ridge
PROJECT NUMBER: 1935-6133
PREPARED BY: DJC
CHECKED BY: DL
DATE: 16-Sep-24

Fire Flow Determination Per Fire Underwriters Survey (2020) - Hawk Ridge Development

STEP E: Automatic Sprinkler Protection

Sprinklers - The required fire flow may be reduced by up to 50% for complete automatic sprinkler protection depending upon adequacy of system.

	Yes/No/Unknown	*Possible Reduction Available	Actual Reduction Provided
Automatic sprinkler protection designed and installed in accordance with NFPA 13?	No	-30%	0%
Water supply is standard for both the system and Fire Department hose lines?	Unknown	-10%	0%
Fully supervised system?	No	-10%	0%

*Reduction available assumes complete building coverage
*30% reduction typical for building requiring sprinkler system

Total Reduction % 0% **(reduction)**

Total Reduced Flow 0 **L/min (reduction, not rounded)**

STEP F: Exposure Adjustment Charge

Exposure - A percentage of water for the exposures should be added to the required fire flow for the subject building to provide adequate flow rates for hose streams used to reduce the spreading of fire from the subject building to exposed risks. The required fire flow of a subject building may be increased depending on the severity of exposed risks to the subject building and the distance between the exposed risks and the subject building. This charge considers the usage of water supplies to prevent exposed risks from igniting or being damaged during a major fire incident in the subject building.

Separation Distance	Maximum Exposure Adjustment Charge
0 to 3m	25%
3.1 to 10m	20%
10.1 to 20m	15%
20.1 to 30m	10%
Greater than 30m	0%

*If a vertical fire wall is properly constructed and has a rating of no less than 2 hours, then the boundary can be treated as protected with no exposure charge
*The maximum exposure adjustment charge to be applied to a subject building is 75%
*The distance in metres from the subject building facing wall to the exposed building facing wall, measured to the nearest metre, between the nearest points of the buildings. Where either the subject building or the exposed building is at a diagonal to the other building, the shortest distance should be increased by 3 metres and this adjusted value used as exposure distance.

Township of Severn By-Law 2010-65: General Zoning Considerations

- Townhouse end wall minimum setbacks =1.5m (each side)
- Townhouse rear minimum setback = 7.5m (each side)

Exposed buildings		Distance	Surcharge Factor	Surcharge (L/min)	
North	Adjacent Dwelling	3	25%	1700	Assumed end wall setback value
East	Adjacent Dwelling	15	15%	1020	Assumed Rear setback value
South East	Diagonal Dwelling	19	15%	1020	Assumed diagonal distance
South	Adjacent Dwelling	3	25%	1700	Assumed end wall setback value
South West	Diagonal Dwelling	19	15%	1020	Assumed diagonal distance
West	Adjacent Dwelling	35	0%	0	Assumed ROW setback

Total Reduced Flow 5,100 **L/min Surcharge (not rounded)**

STEP G: Final Required Fire Flow

Step D - Occupancy Adjusted Fire Flow Demand	6,800 L/min
Step E - Sprinkler (Reduction)	0 L/min
Step F - Exposure Charge	5,100 L/min
Final Fire Flow:	**11,900 L/min**
	12,000 L/min (rounded to nearest 1000L/min)
or	**200 L/s**
or	**3,170 USGPM**
Required duration:	**2.50 hours**

Refer to Table 1 for Duration

Table 1 - FUS 2020

Required Duration of Fire Flow	
Flow Required (L/min)	**Duration (hours)**
2,000 or less	1.00
3,000	1.25
4,000	1.50
5,000	1.75
6,000	2.00
8,000	2.00
10,000	2.00
12,000	2.50
14,000	3.00
16,000	3.50
18,000	4.00
20,000	4.50
22,000	5.00
24,000	5.50
26,000	6.00
28,000	6.50
30,000	7.00
32,000	7.50
34,000	8.00
36,000	8.50
38,000	9.00
40,000 and over	9.50

Interpolate for intermediate figures

CROZIER CONSULTING ENGINEERS

PROJECT NAME: Hawk Ridge
PROJECT NUMBER: 1935-6133
PREPARED BY: DJC
CHECKED BY: DL
DATE: 16-Sep-24

Fire Flow Determination Per Fire Underwriters Survey (2020) - Area 2

Water Supply for Public Fire Protection - 2020
Fire Underwriters Survey
Part II - Guide for Determination of Fire Flows for Public Fire Protection in Canada

An estimate of fire flow required for a given area may be determined by the formula:

RFF = 220 * C * sqrt A

where:

RFF = the required fire flow in litres per minute (L/min)
C = the construction coefficient is related to the type of construction of the building
= 1.5 for Type V Wood Frame Construction
= 0.8 for Type IV-A Mass Timber Construction
= 0.9 for Type IV-B Mass Timber Construction
= 1.0 for Type IV-C Mass Timber Construction
= 1.5 for Type IV-D Mass Timber Construction
= 1.0 for Type III Ordinary Construction
= 0.8 for Type II Non-combustible Construction
= 0.6 for Type I Fire Resistive Construction
A = the total effective floor area (effective building area) in square metres (excluding basements at least 50 percent below grade) in the building considered

STEP A: Construction Coefficient (C) 1.0 Ordinary Construction is Assumed

STEP B: Total Effective Floor Area
Proposed Building **Hawk Ridge**

	Yes/No/Unknown	
Is basement at least 50% below grade?	Yes	If yes, basement floor area excluded
Vertical openings protected?	Unknown	*For consideration for effective area calculations

Calculate Effective Floor Area based on the highlighted cell
-C value from 1.0 to 1.5: 100% of all floor areas are used
-C value below 1 and vertical openings are not protected: Consider two largest floors plus 50% of all floor above to a max of eight
-C value below 1 and vertical openings are protected: Consider single largest floor plus 25% of the two immediately adjoining floors

*A building may be subdivided if there is a vertical firewall with a fire-resistance rating greater than 2 hours, and meets the requirements of the National Building Code.

Township of Severn By-Law 2010-65: General Zoning Considerations
- Maximum 8 units per townhouse block before firewall
- Maximum townhouse lot coverage of 35%

Floors Above Grade	Total Floor Area (m^2)	% of Area Considered	Effective Floor Area (m^2)
Basement	597	0%	0.0
Ground Floor	597	100%	596.8
Level 2	597	100%	596.8
Total	**1790**		**1193.6**

Assumptions:
Same Townhouse Block size as Hawk Ridge

Total Effective Floor Area **1194** m^2

STEP C: Therefore RFF = **8,000** **L/min (rounded to nearest 1000 L/min)**

STEP D: Occupancy Contents Adjustment Factor

The required fire flow may be reduced by as much as -25% for occupancies having contents with very low fire hazard or may be increased by up to 25% surcharge for occupancies having a high fire hazard.

Occupancy and Contents Adjustment Factor	
Non-Combustible	-25%
Limited Combustible	-15%
Combustible	0%
Free Burning	15%
Rapid Burning	25%

*Refer to Table 3 for recommended Occupancy and Contents Charges by major occupancy examples.

Type of Occupancy	Adjustment Factor	
Residential Occupancy	Limited Combustible	-15%

Total Reduction % **-1,200** **L/min (reduction)**

RFF = **6,800** **L/min (not rounded)**

Note: The RFF flow 6800 L/min is used in Step E and F.

CROZIER CONSULTING ENGINEERS

PROJECT NAME: Hawk Ridge
PROJECT NUMBER: 1935-6133
PREPARED BY: DJC
CHECKED BY: DL
DATE: 16-Sep-24

Fire Flow Determination Per Fire Underwriters Survey (2020) - Area 2

STEP E: Automatic Sprinkler Protection

Sprinklers - The required fire flow may be reduced by up to 50% for complete automatic sprinkler protection depending upon adequacy of system.

	Yes/No/Unknown	*Possible Reduction Available	Actual Reduction Provided
Automatic sprinkler protection designed and installed in accordance with NFPA 13?	No	-30%	0%
Water supply is standard for both the system and Fire Department hose lines?	Unknown	-10%	0%
Fully supervised system?	No	-10%	0%

*Reduction available assumes complete building coverage
*30% reduction typical for building requiring sprinkler system

Total Reduction % 0% **(reduction)**

Total Reduced Flow 0 **L/min (reduction, not rounded)**

STEP F: Exposure Adjustment Charge

Exposure - A percentage of water for the exposures should be added to the required fire flow for the subject building to provide adequate flow rates for hose streams used to reduce the spreading of fire from the subject building to exposed risks. The required fire flow of a subject building may be increased depending on the severity of exposed risks to the subject building and the distance between the exposed risks and the subject building. This charge considers the usage of water supplies to prevent exposed risks from igniting or being damaged during a major fire incident in the subject building.

Separation Distance	Maximum Exposure Adjustment Charge
0 to 3m	25%
3.1 to 10m	20%
10.1 to 20m	15%
20.1 to 30m	10%
Greater than 30m	0%

*If a vertical fire wall is properly constructed and has a rating of no less than 2 hours, then the boundary can be treated as protected with no exposure charge
*The maximum exposure adjustment charge to be applied to a subject building is 75%
*The distance in metres from the subject building facing wall to the exposed building facing wall, measured to the nearest metre, between the nearest points of the buildings. Where either the subject building or the exposed building is at a diagonal to the other building, the shortest distance should be increased by 3 metres and this adjusted value used as exposure distance.

Township of Severn By-Law 2010-65: General Zoning Considerations

- Townhouse end wall minimum setbacks =1.5m (each side)
- Townhouse rear minimum setback = 7.5m (each side)

Exposed buildings		Distance	Surcharge Factor	Surcharge (L/min)	
North	Adjacent Dwelling	3	25%	1700	Assumed end wall setback value
East	Adjacent Dwelling	15	15%	1020	Assumed Rear setback value
South	Adjacent Dwelling	3	25%	1700	Assumed end wall setback value
West	Adjacent Dwelling	20	15%	1020	Assumed ROW setback

Total Reduced Flow 5,100 **L/min Surcharge (not rounded)**

STEP G: Final Required Fire Flow

Step D - Occupancy Adjusted Fire Flow Demand	6,800 L/min
Step E - Sprinkler (Reduction)	0 L/min
Step F - Exposure Charge	5,100 L/min
Final Fire Flow:	**11,900 L/min**
	12,000 L/min (rounded to nearest 1000L/min)
or	**200 L/s**
or	**3,170 USGPM**
Required duration:	**2.50 hours**

Refer to Table 1 for Duration

Table 1 - FUS 2020

Required Duration of Fire Flow	
Flow Required (L/min)	**Duration (hours)**
2,000 or less	1.00
3,000	1.25
4,000	1.50
5,000	1.75
6,000	2.00
8,000	2.00
10,000	2.00
12,000	2.50
14,000	3.00
16,000	3.50
18,000	4.00
20,000	4.50
22,000	5.00
24,000	5.50
26,000	6.00
28,000	6.50
30,000	7.00
32,000	7.50
34,000	8.00
36,000	8.50
38,000	9.00
40,000 and over	9.50

Interpolate for intermediate figures

CROZIER CONSULTING ENGINEERS

PROJECT NAME: Hawk Ridge
PROJECT NUMBER: 1935-6133
PREPARED BY: AM
CHECKED BY: DL
DATE: 16-Sep-24

Fire Flow Determination Per Fire Underwriters Survey (2020) - Area 3 (Industrial)

Water Supply for Public Fire Protection - 2020
Fire Underwriters Survey
Part II - Guide for Determination of Fire Flows for Public Fire Protection in Canada

An estimate of fire flow required for a given area may be determined by the formula:

RFF = 220 * C * sqrt A

where:

RFF = the required fire flow in litres per minute (L/min)
C = the construction coefficient is related to the type of construction of the building
= 1.5 for Type V Wood Frame Construction
= 0.8 for Type IV-A Mass Timber Construction
= 0.9 for Type IV-B Mass Timber Construction
= 1.0 for Type IV-C Mass Timber Construction
= 1.5 for Type IV-D Mass Timber Construction
= 1.0 for Type III Ordinary Construction
= 0.8 for Type II Non-combustible Construction
= 0.6 for Type I Fire Resistive Construction
A = the total effective floor area (effective building area) in square metres (excluding basements at least 50 percent below grade) in the building considered

STEP A: Construction Coefficient (C) 1.0 Ordinary Construction is Assumed

STEP B: Total Effective Floor Area
Proposed Building **Area 3 Industrial**

	Yes/No/Unknown	
Is basement at least 50% below grade?	Yes	If yes, basement floor area excluded
Vertical openings protected?	No	*For consideration for effective area calculations

Calculate Effective Floor Area based on the highlighted cell
-C value from 1.0 to 1.5: 100% of all floor areas are used
-C value below 1 and vertical openings are not protected: Consider two largest floors plus 50% of all floor above to a max of eight
-C value below 1 and vertical openings are protected: Consider single largest floor plus 25% of the two immediately adjoining floors

*A building may be subdivided if there is a vertical firewall with a fire-resistance rating greater than 2 hours, and meets the requirements of the National Building Code.

Floors Above Grade	Total Floor Area (m^2)	% of Area Considered	Effective Floor Area (m^2)	
Basement	0	0%	0.0	1 Floor
Ground Floor	1880	100%	1880.0	*assume 40% of 0.47ha
Total	**10227200**		**1880.0**	

Total Effective Floor Area **1880** m^2

STEP C: Therefore RFF = **10,000** **L/min (rounded to nearest 1000 L/min)**

STEP D: Occupancy Contents Adjustment Factor

The required fire flow may be reduced by as much as -25% for occupancies having contents with very low fire hazard or may be increased by up to 25% surcharge for occupancies having a high fire hazard.

Occupancy and Contents Adjustment Factor	
Non-Combustible	-25%
Limited Combustible	-15%
Combustible	0%
Free Burning	15%
Rapid Burning	25%

*Refer to Table 3 for recommended Occupancy and Contents Charges by major occupancy examples.

Type of Occupancy	Adjustment Factor	
Industrial	Limited Combustible	-15%

Total Reduction % **-1,500** **L/min (reduction)**

RFF = **8,500** **L/min (not rounded)**

Note: The RFF flow 8500 L/min is used in Step E and F.

CROZIER CONSULTING ENGINEERS

PROJECT NAME: Hawk Ridge
PROJECT NUMBER: 1935-6133
PREPARED BY: AM
CHECKED BY: DL
DATE: 16-Sep-24

Fire Flow Determination Per Fire Underwriters Survey (2020) - Area 3 (Industrial)

STEP E: Automatic Sprinkler Protection

Sprinklers - The required fire flow may be reduced by up to 50% for complete automatic sprinkler protection depending upon adequacy of system.

	Yes/No/Unknown	*Possible Reduction Available	Actual Reduction Provided
Automatic sprinkler protection designed and installed in accordance with NFPA 13?	Yes	-30%	-30%
Water supply is standard for both the system and Fire Department hose lines?	Yes	-10%	-10%
Fully supervised system?	Yes	-10%	-10%

*Reduction available assumes complete building coverage
*30% reduction typical for building requiring sprinkler system

Total Reduction % **-50%** **(reduction)**

Total Reduced Flow **-4,250** **L/min (reduction, not rounded)**

STEP F: Exposure Adjustment Charge

Exposure - A percentage of water for the exposures should be added to the required fire flow for the subject building to provide adequate flow rates for hose streams used to reduce the spreading of fire from the subject building to exposed risks. The required fire flow of a subject building may be increased depending on the severity of exposed risks to the subject building and the distance between the exposed risks and the subject building. This charge considers the usage of water supplies to prevent exposed risks from igniting or being damaged during a major fire incident in the subject building.

Separation Distance	Maximum Exposure Adjustment Charge
0 to 3m	25%
3.1 to 10m	20%
10.1 to 20m	15%
20.1 to 30m	10%
Greater than 30m	0%

*If a vertical fire wall is properly constructed and has a rating of no less than 2 hours, then the boundary can be treated as protected with no exposure charge
*The maximum exposure adjustment charge to be applied to a subject building is 75%
*The distance in metres from the subject building facing wall to the exposed building facing wall, measured to the nearest metre, between the nearest points of the buildings. Where either the subject building or the exposed building is at a diagonal to the other building, the shortest distance should be increased by 3 metres and this adjusted value used as exposure distance.

Exposed buildings		Distance	Surcharge Factor	Surcharge (L/min)
North	Adjacent Dwelling	15	15%	1275
East	Adjacent Dwelling	45	0%	0
South	Adjacent Dwelling	15	15%	1275
West	Adjacent Dwelling	45	0%	0

Total Reduced Flow **2,550** **L/min Surcharge (not rounded)**

STEP G: Final Required Fire Flow

Step D - Occupancy Adjusted Fire Flow Demand	8,500	L/min
Step E - Sprinkler (Reduction)	-4,250	L/min
Step F - Exposure Charge	2,550	L/min
Final Fire Flow:	**6,800**	**L/min**
	7,000	**L/min (rounded to nearest 1000L/min)**
or	**117**	**L/s**
or	**1,849**	**USGPM**
Required duration:	**2.00**	**hours**
	Refer to Table 1 for Duration	

Table 1 - FUS 2020

Required Duration of Fire Flow	
Flow Required (L/min)	**Duration (hours)**
2,000 or less	1.00
3,000	1.25
4,000	1.50
5,000	1.75
6,000	2.00
8,000	2.00
10,000	2.00
12,000	2.50
14,000	3.00
16,000	3.50
18,000	4.00
20,000	4.50
22,000	5.00
24,000	5.50
26,000	6.00
28,000	6.50
30,000	7.00
32,000	7.50
34,000	8.00
36,000	8.50
38,000	9.00
40,000 and over	9.50

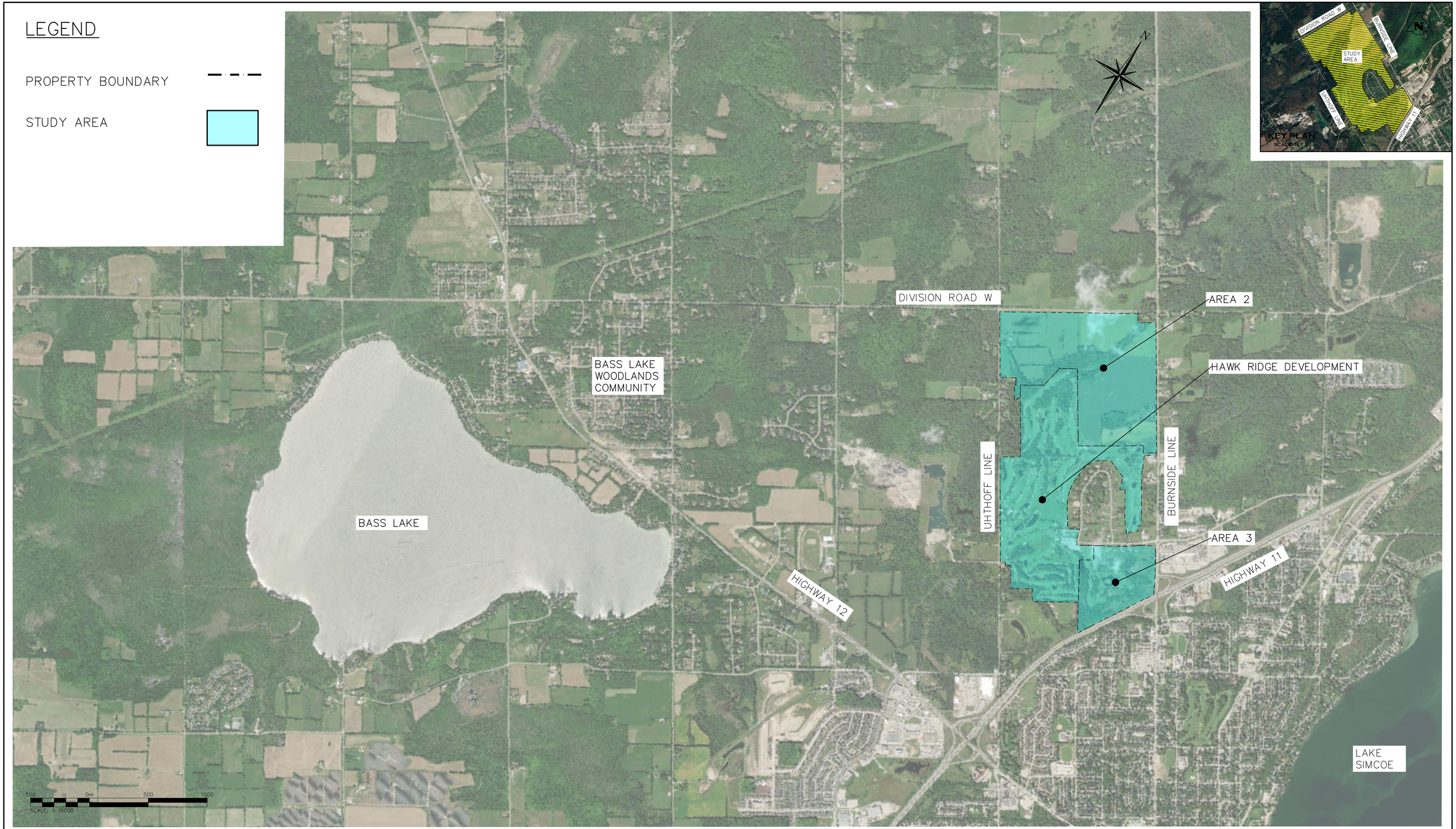
Interpolate for intermediate figures

FIGURES

LEGEND

PROPERTY BOUNDARY

STUDY AREA



SURVEY RECEIVED ON NOVEMBER 6th, 2023 FROM RUDY MAK SURVEYING LTD.

SATELLITE LiDAR TOPOGRAPHY DATA (DATED SPRING, 2002) PURCHASED FROM FIRST BASE MAPPING SOLUTIONS ON FEBRUARY 1st 2023

Town — Township of — SEVERN

No.	ISSUE	DATE: YYYY/MM/DD
0	ISSUED FOR CLIENT COORDINATION	2024/09/16
1	ISSUED FOR FIRST SUB OFFICIAL PLAN AMENDMENT	2024/09/30

Engineer

Engineer

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

Project
HAWK RIDGE DEVELOPMENT
SEVERN, ONTARIO

Drawing
MASTER SERVICING REPORT
STUDY AREA LOCATION PLAN

CROZIER CONSULTING ENGINEERS

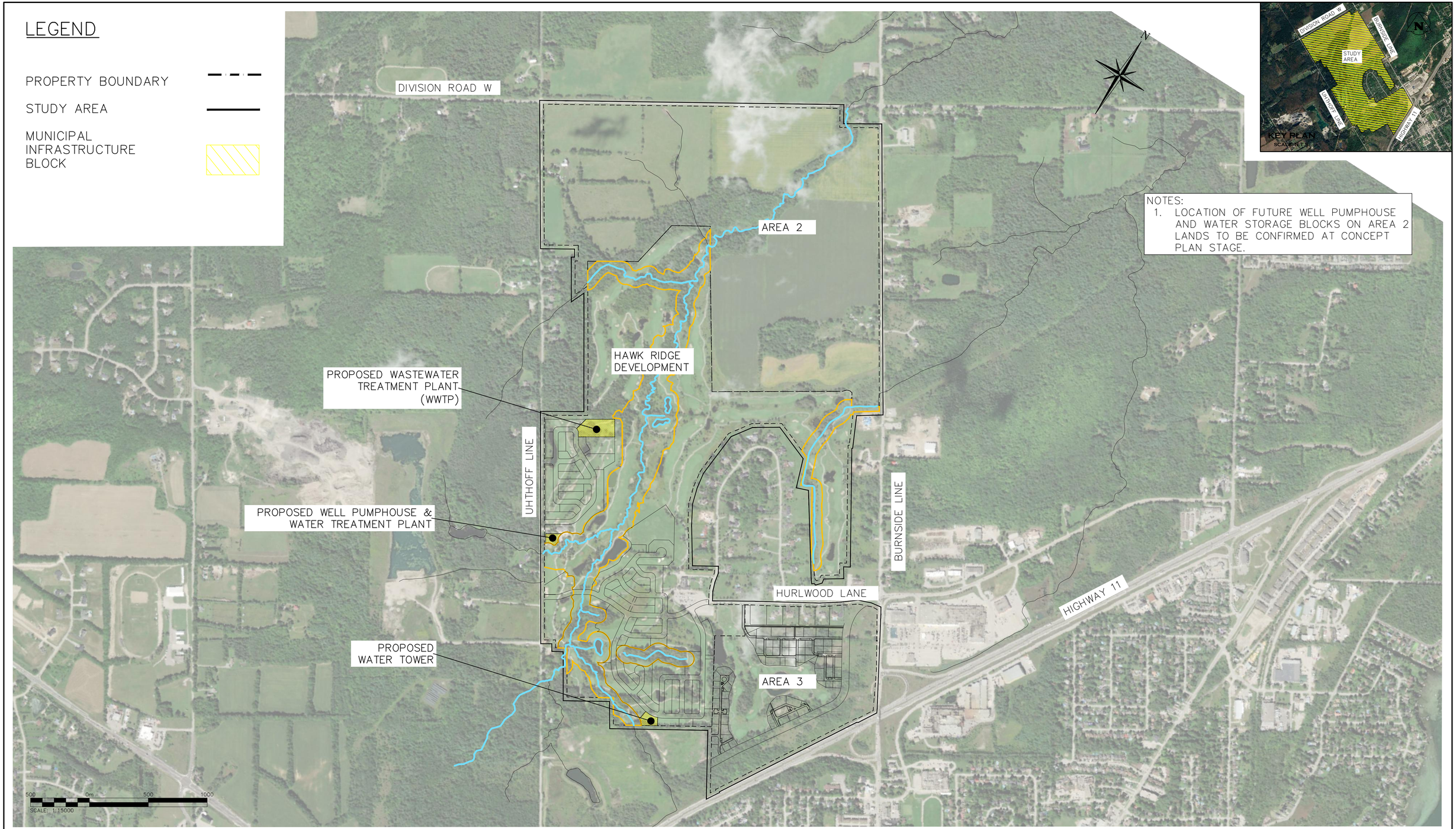
Drawn By	Design By	Project
T.M.	T.M.	1935-6133
Check By	Check By	Drawing
H.B.	H.B.	FIGURE 1

LEGEND

PROPERTY BOUNDARY

STUDY AREA

MUNICIPAL INFRASTRUCTURE BLOCK



NOTES:
1. LOCATION OF FUTURE WELL PUMPHOUSE AND WATER STORAGE BLOCKS ON AREA 2 LANDS TO BE CONFIRMED AT CONCEPT PLAN STAGE.

SURVEY RECEIVED ON NOVEMBER 6th, 2023 FROM RUDY MAK SURVEYING LTD.

SATELLITE LIDAR TOPOGRAPHY DATA (DATED SPRING, 2002) PURCHASED FROM FIRST BASE MAPPING SOLUTIONS ON FEBRUARY 1st 2023

Township of SEVERN

No.	ISSUE	DATE: YYYY/MM/DD
0	ISSUED FOR CLIENT COORDINATION	2024/09/16
1	ISSUED FOR FIRST SUB OFFICIAL PLAN AMENDMENT	2024/09/30

Engineer

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

Engineer

Project: HAWK RIDGE DEVELOPMENT
SEVERN, ONTARIO

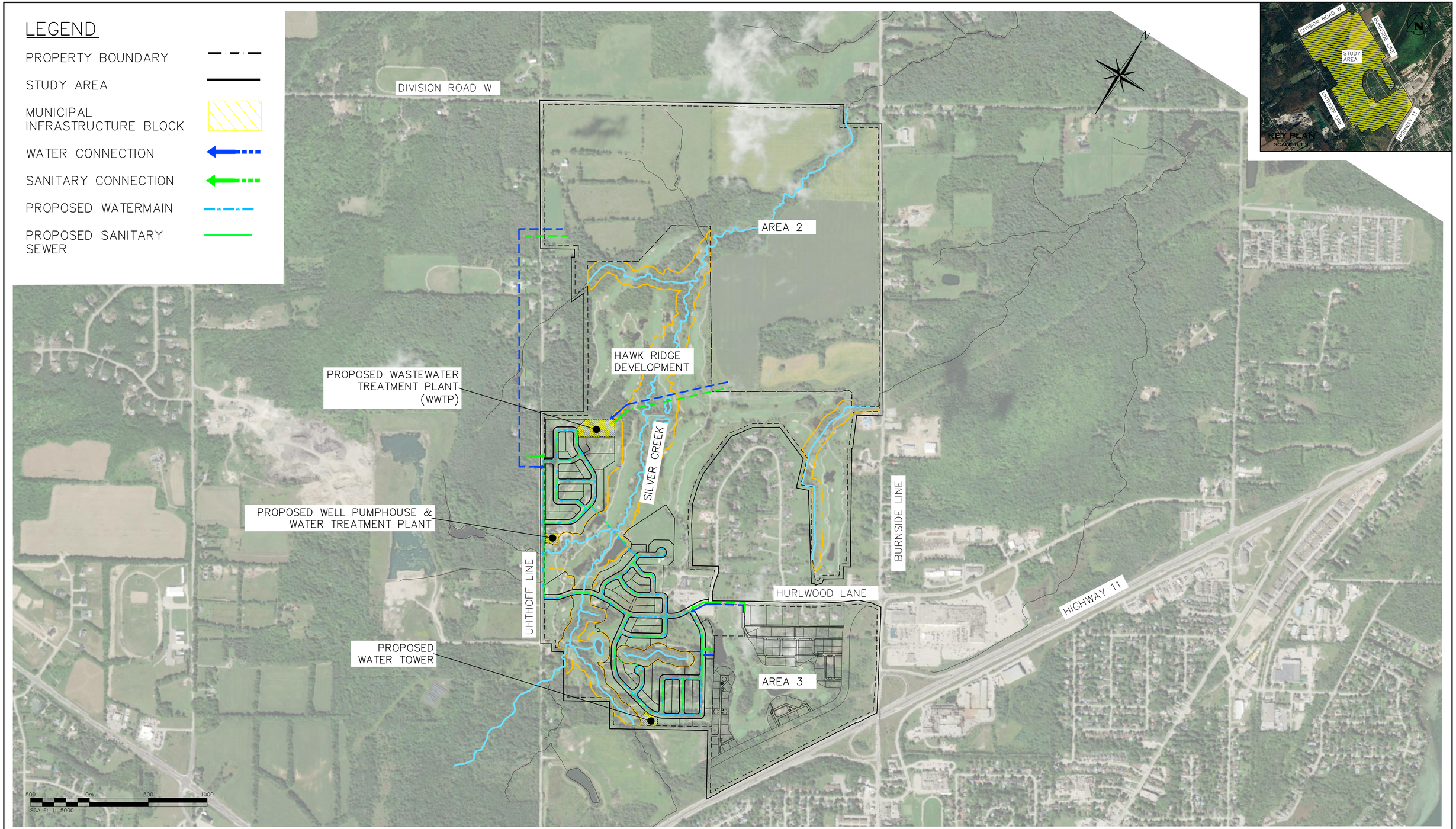
Drawing: MASTER SERVICING REPORT
MUNICIPAL INFRASTRUCTURE PLAN

CROZIER CONSULTING ENGINEERS

Drawn By T.M.	Design By T.M.	Project 1935-6133
Check By H.B.	Check By H.B.	Drawing FIGURE 2

LEGEND

- PROPERTY BOUNDARY
- STUDY AREA
- MUNICIPAL INFRASTRUCTURE BLOCK
- WATER CONNECTION
- SANITARY CONNECTION
- PROPOSED WATERMAIN
- PROPOSED SANITARY SEWER



1. THIS DRAWING IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC. AND THE MODIFICATION AND/OR REPRODUCTION OF ANY PART OF THIS DRAWING IS STRICTLY PROHIBITED WITHOUT WRITTEN AUTHORIZATION FROM THIS OFFICE.
2. THE DIGITAL FILES CONTAIN INTELLECTUAL AND DIGITAL DATA PROPERTY THAT IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC.
3. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, LEVELS, AND DATUMS ON SITE AND REPORT ANY DISCREPANCIES OR OMISSIONS TO C.F. CROZIER & ASSOCIATES INC. PRIOR TO CONSTRUCTION.
4. THIS DRAWING IS TO BE READ AND UNDERSTOOD IN CONJUNCTION WITH ALL OTHER PLANS AND DOCUMENTS APPLICABLE TO THIS PROJECT.
5. ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
6. DO NOT SCALE DRAWINGS.

SURVEY RECEIVED ON NOVEMBER 6th, 2023 FROM RUDY MAK SURVEYING LTD.

SATELLITE LIDAR TOPOGRAPHY DATA (DATED SPRING, 2002) PURCHASED FROM FIRST BASE MAPPING SOLUTIONS ON FEBRUARY 1st 2023

Town: Township of SEVERN

No.	ISSUE	DATE: YYYY/MM/DD
0	ISSUED FOR CLIENT COORDINATION	2024/09/16
1	ISSUED FOR FIRST SUB OFFICIAL PLAN AMENDMENT	2024/09/30

Engineer

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

Engineer

Project: HAWK RIDGE DEVELOPMENT
SEVERN, ONTARIO

Drawing: MASTER SERVICING REPORT
PRELIMINARY SERVICING PLAN

CROZIER CONSULTING ENGINEERS

Drawn By T.M.	Design By T.M.	Project 1935-6133
Check By H.B.	Check By H.B.	Drawing FIGURE 3