

FUNCTIONAL 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



THE MATERIAL IN THIS REPORT REFLECTS BEST JUDGMENT IN LIGHT OF THE INFORMATION AVAILABLE AT THE TIME OF PREPARATION. ANY USE WHICH A THIRD PARTY MAKES OF THIS REPORT, OR ANY RELIANCE ON OR DECISIONS MADE BASED ON IT, ARE THE RESPONSIBILITIES OF SUCH THIRD PARTIES. C.F. CROZIER & ASSOCIATES INC. ACCEPTS NO RESPONSIBILITY FOR DAMAGES, IF ANY, SUFFERED BY ANY THIRD PARTY AS A RESULT OF DECISIONS MADE OR ACTIONS BASED ON THIS REPORT.

TABLE OF CONTENTS

1.0	INTRODUCTION	1
2.0	BACKGROUND.....	1
3.0	SITE DESCRIPTION	2
4.0	TRANSPORTATION	3
5.0	GRADING	4
6.0	SANITARY SERVICING	5
6.1	Existing Sanitary System Infrastructure	5
6.2	Proposed Sanitary Servicing Strategy	5
7.0	WATER SERVICING	7
7.1	Existing Water Infrastructure.....	7
7.2	Proposed Water Servicing Strategy	7
8.0	UTILITIES	9
9.0	CONCLUSIONS & RECOMMENDATIONS	9

LIST OF TABLES

Table 1:	Evaluation of Road Crossing Alternatives
Table 2:	Sanitary Design Criteria
Table 4:	Summary of Well Production Capacities
Table 3:	Watermain Design Criteria

LIST OF FIGURES

Figure 1:	Site Location Plan
Figure 2:	Concept Plan
Figure 3:	Preliminary Grading Plan
Figure 4:	Preliminary Servicing Plan

LIST OF APPENDICES

Appendix A:	Sanitary Flow Calculations
Appendix B:	Water Demand Calculations

Revision No.	Submission	Submission Date
0	1 st 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 Functional 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. The municipal boundary between the Township of Severn and City of Orillia is located west of the site, along Highway 11. Approximately 26 ha of the Subject Lands are proposed for re-development. Refer to **Figure 1** for the Site Location Plan.

The Concept Plan for the Subject Development was prepared by Biglieri Group (August 2024) and has been included as **Figure 2**. The elements envisioned within the Concept Plan include a mix of low density single detached units (290) and medium density townhouse units (560) for a total of 850 units. The Concept Plan also includes two (2) stormwater management blocks, a series of municipal infrastructure blocks to support sanitary and water servicing, 20 m right-of-way allowances and parkland/natural heritage 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.

This Functional Servicing Report has been prepared to outline the proposed servicing and grading strategy for the site. The reader is directed to the Master Servicing Report, Stormwater Management Report, Flow Assessment Report and Traffic Impact Study provided under separate cover for additional details regarding the Subject Lands.

2.0 BACKGROUND

The Subject Lands are currently designated as Open Space and Environmental Protection Area per Schedule D of the Township of Severn Official Plan (June 2024) and as Commercial per Schedule G4 of the Township of Severn Zoning By-Law 2010-65. The Subject Lands also fall within the South of Division Road Secondary Plan Area, that lies between Highway 11 (east), Highway 12 (south) and Division Road (west). Per Section 3.7.13 of the County of Simcoe Official Plan (2023), development within this area should follow the policies outlined in the Township of Severn's South of Division Road Secondary Plan. The purpose of the Secondary Plan is to outline major road systems and future land use patterns prior to the occurrence of major development. The Subject Lands are currently located outside of the Township of Severn's Settlement Boundary.

A Pre-Consultation Meeting with the Township of Severn was held on June 21, 2024. It was identified during the meeting that the preferred method to bring the Subject Lands into the Township's settlement boundary is via an Official Plan Amendment (OPA) and Zoning By-Law Amendment (ZBA) Application. As the Subject Lands are located within the Secondary Plan, there is an increased priority to develop as this area has been selected for targeted growth. With that being said, growth within the Subject Lands must not impede the future development of other currently zoned areas within the Secondary Plan.

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 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). Civic Infrastructure (Civica) was retained by the Township to complete the Servicing Master Plan and it is our understanding that the Subject Lands and the South of Division Road Secondary Plan Area will be evaluated as part of this assessment. Through correspondence with the Township and Civica, it is understood that servicing this area of Severn, herein, referred to as the Study Area, from existing municipal systems is not a feasible alternative. As there is no existing municipal infrastructure within the Study Area, new infrastructure and systems 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.

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:

- 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)

3.0 SITE DESCRIPTION

The Subject Lands are currently characterized an active golf 36-hole golf course featuring tee decks, bunkers and offline irrigation ponds. The main branch of the Silver Creek traverses through the center of the Subject Lands flowing in a northwesterly direction, as does the general topography of the lands. There are several smaller tributaries of the Silver Creek which also traverse the Subject Lands. As such, a portion of the lands is designated Environmental Protection Area and restricted from development. Silver Creek is a gently winding watercourse that is contained in a shallow well-defined channel.

A Geotechnical Investigation was completed by Green Geotechnical Ltd. in September of 2024 for the Subject Lands. Within the investigation, twenty-four (24) boreholes and twenty-three (23) monitoring wells were advanced across the site to determine subsurface conditions and understand groundwater conditions across the site. The boreholes revealed that the site is underlain by silt and sand content ranging from some sand to sandy and trace to some clay content. Groundwater levels were recorded between 223.10 m and 239.45 m. The reader is directed to the *Preliminary Geotechnical Investigation Report (Green Geotechnical Ltd., September 2024)* for further details.

A Hydrogeological Assessment Report was completed by Crozier in September of 2024 for the Subject Lands. The purpose of this report was to outline the hydrogeological regime of the site and identify the seasonal high groundwater levels. The Subject Lands are located within the Severn Sound Source

Protection Area. A portion of the site is classified as Highly Vulnerable Aquifers (HVA) and approximately 50% of the site is a Significant Groundwater Recharge Area (SGRA). As a result of the HVA and SGRA presence, a Best Management Practice approach will need to be implemented and mitigative strategies should be considered to prevent impacts to drinking water sources in the area. As mentioned above, 23 monitoring wells were installed by Green Geotechnical. Three (3) sets of groundwater readings were collected by Crozier between March and September of 2024. Based on the readings taken to date, the seasonal highs range from -0.09 mbgl to 0.18 mbgl and seasonal lows from 0.19 mbgl to 2.17 mbgl (metres below ground level). The reader is directed to the *Hydrogeological Assessment Report (Crozier, September 2024)* for further information regarding best management practices and implications of high groundwater levels on the proposed design. This report has been provided under separate cover.

4.0 TRANSPORTATION

The Subject Development is divided into two separate areas with independent connections to Uthoff Line. These areas are herein referred to as the north and south parcels. The road network meanders through the residential area, a common layout for golf course communities. The curvature of the roadways is intended to encourage slower speeds and navigate natural heritage areas. Internal roadways will be constructed to the Township Standard for a Local Residential Road (Township Standard No. 202), and it is recommended that a posted speed limit of 40 km/h be implemented on all internal roadways.

In development of the Concept Plan, several alternatives were considered to determine the optimal location for the road network connections and natural heritage crossings. This crossing analysis has been outlined in further detail below.

Alternative 1 – No Crossing of Silver Creek

This option does not allow for connectivity of roads within all areas of the Subject Development and has thus been eliminated from further analysis.

Alternative 2 – Silver Creek Crossing (North-South)

This option considers providing two access connections to Uthoff Line within the north parcel. Hurlwood Lane would continue through the south parcel to the northwest, connecting the two parcels by crossing Silver Creek.

Under this configuration the Golf Villas along Uthoff Line would have their own independent access, separate from the south parcel. This road network layout would send volumes to and from the south parcel along Hurlwood Lane and up into the north parcel, increasing the overall volume at its proposed accesses. As detailed in the *Transportation Impact Study (Crozier, September 2024)* there is adequate spacing and sight distance available on Uthoff Line for three connections.

This road network layout would require a non-perpendicular crossing of the widest natural heritage area resulting in more environmental constraints. According to Azimuth, the crossing would require two segments, Silver Creek and a tributary, as well as the removal of significantly more vegetation and the infill of an offline pod that contains turtles and amphibians.

This alternative was eliminated based on the impact to the natural heritage system and indirect layout for access to the external road network system.

Alternative 3 – Silver Creek Crossing (East-West)

This option considers providing two access connections to Uthoff Line within the north parcel. Hurlwood Lane would continue through the south parcel and the Golf Villas, connecting directly to Uthoff Line. This road layout does not connect the north and south parcels, however both parcels will have two independent accesses.

The south parcel and the Golf Villas are connected by a perpendicular narrow natural heritage crossing of Silver Creek. According to Azimuth, the east-west crossing location is preferred as the natural vegetation has already been removed due to the existing golf course landscaping.

Based on the crossing location, number of access points and direct connections between Hurlwood Lane and Uthoff Line this alternative was selected and carried forward.

Ranking Alternatives

As part of the evaluation a rating out of five was given to each alternative for a variety of criteria. **Table 1** outlines the rankings and summarizes the final score for each alternative.

Table 1: Evaluation of Crossing Alternatives

Criteria	Alternative 1	Alternative 2	Alternative 3
Supports Development Access	0/5 Access not Supported	4/5 Adequate Access Provided	4/5 Adequate Access Provided
Supports Function of Roadways	0/5 Function not Supported	5/5 Roadway Function Supported	5/5 Roadway Function Supported
Ecological Impacts	5/5 No Further Impacts	1/5 Large Impact on Natural Vegetation and Animal Habitat	4/5 Limited Impact on Existing Vegetation
Construction Impact	5/5 No Crossing Required	1/5 Two Segment, Wide, Angled, Natural Heritage Crossing Required	3/5 Single Segment, Narrow, Perpendicular Natural Heritage Crossing Required
Score	10/20	11/20	16/20

The reader is directed to the *Transportation Impact Study (Crozier, September 2024)* for further discussion regarding the impact the proposed development will have on the boundary road network.

5.0 GRADING

The site grading will be influenced by the existing and proposed drainage systems within the Subject Development. Grading will tie into the existing elevations along the property limits, environmental and watercourse buffers, floodplain limits and will match the pre-development overland stormwater flow patterns where possible. Grading will also provide sufficient cover for the proposed water, sanitary and storm servicing networks.

The road network will have slopes at or greater than 0.5% and less than 5.0%, in accordance with Township Standards. Grading of roadways will be completed to ensure no flooding of private

property, nor will flow depths greater than 0.30 m occur during the 100-year storm event to ensure that safe access and egress is provided. Due to high groundwater levels across the site, proposed grades have been set above existing grade, where possible. Best efforts were also utilized to minimize cut/fill volumes across the site and reduce the area of uncontrolled stormwater runoff to adjacent municipal roadways.

Drainage will be directed away from adjacent land using interceptor swales and drainage infrastructure. Detailed design of this drainage infrastructure, including lot grading and supporting stormwater management (SWM) modelling, will be completed at the detailed design stage to secure approval for construction.

Refer to **Figure 3** for the Preliminary Grading Plan.

6.0 SANITARY SERVICING

6.1 Existing Sanitary System 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, it 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.

6.2 Proposed Sanitary 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. Connection to the Westshore infrastructure has also not been considered a viable solution, due to the distance between this infrastructure and the Subject Lands. 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 Subject Lands. The following investigation has been formed off this assumption.

The proposed sanitary servicing solution for the Subject Development will be to construct a new Wastewater Treatment Plan (WWTP) near the low point of the site, adjacent to the Silver Creek. Construction of a new WWTP will trigger the need for a Schedule C Class Environmental Assessment (EA) to further investigate sanitary servicing alternatives, a preferred solution, and the impact of the proposed development on the environment. Per request of the Township and County, the preparation of the Class EA has been deferred and the sanitary servicing strategy for the Subject Lands and adjacent future development lands has been evaluated within a Master Servicing Report (MSR) provided under separate cover. This Functional Servicing Report has been prepared in accordance with the MSR.

Hutchinson is currently in the process of completing an Assimilative Capacity Study (ACS) to determine effluent treatment limits of the proposed WWTP and capacity of Silver Creek. This will not only further the design of the proposed sanitary servicing system but influence the development potential for the site. The results of the ACS are anticipated to be available by early 2025.

The preliminary design concept for the proposed WWTP is to utilize a membrane bioreactor wastewater treatment process that will be modular and able to be expanded in phases as development progresses over time. Further details regarding the design of the WWTP will be provided

As more information becomes available regarding the ACS and Township of Severn Servicing Master Plan.

Internal sanitary servicing for the Subject Development will be provided via a network of gravity sewers that follow the alignment of the internal roadways and 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. The preliminary sanitary sewer layout has been presented in **Figure 4**.

As demonstrated in **Figure 4**, there are two (2) servicing alignments proposed for the routing of the gravity sanitary sewers. The first alignment presented in **Figure 4** as "Option 1" proposes connection of the northern and southern parcels via a north-south crossing of Silver Creek. This servicing option will also require two (2) crossings below the existing high-pressure gas main that traverses the site; one internal to the site and one along Uthhoff Line. The primary crossing of the Silver Creek and the trunk gas main easement is approximately 100 m and will require a servicing easement between the single detached lots proposed on both sides of the crossing. To service the proposed Golf Villas located in the southwestern portion of the site, extension of gravity sewer will be required on Uthhoff Line from the northern development parcel, as a secondary crossing of Silver Creek is not proposed in this option.

The second alignment presented as "Option 2" on **Figure 4** proposes connection of the southeastern and southwestern portions of the site via an east-west crossing of Silver Creek. To connect the proposed gravity sewers to the WWTP, extension of sewer along Uthhoff line will be required. As such, one (1) crossing of the existing high-pressure gas main is required on Uthhoff line. The proposed crossings within this alignment are all shorter in length than Option 1.

Both servicing alignments (Option 1 and Option 2) will need to be coordinated with the Township as the sanitary sewer would be located within the public right-of-way on Uthhoff Line. This extension of sewer could also provide a sanitary outlet for future lands west of Uthhoff Line. Since the routing of the sanitary sewer is longer for Option 2, the invert at the wastewater treatment plant is 1.83 m deeper than Option 1. The proposed slope of sewer upstream of the wastewater treatment plant will be refined as the design progresses in future submissions. For functional design purposes, a minimum of 0.50% was maintained.

Preliminary sanitary flows for the Subject Development 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)	350
Infiltration (L/s/ha)	0.23
Townhouse Unit Density (PPU)	2.707
Detached Unit Density (PPU)	2.416

Based on above criteria and the proposed unit totals, it is estimated that peak sanitary flow from the Subject Development is 39 L/s. Refer to **Appendix A** for sanitary demand calculations.

7.0 WATER SERVICING

7.1 Existing Water Infrastructure

Currently there is no municipal drinking water system within the vicinity of the development. Adjacent 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 site, within the municipal boundary of City of Orillia.

The nearest Township of Severn municipal water well system is located within the Bass Lake Woodlands Community west of Wainman Line, south of Division Road at 1852 Ridley Boulevard. The Bass Lake Woodlands system consists of three (3) wells, a pumphouse/treatment facility and buried reservoir. This system is approximately 5.5 km away from the proposed Well Pump House Block within the Subject Development. The Township of Severn is currently in the process of completing upgrades to the Bass Lake Woodlands system by replacing Well 2 and Well 3.

7.2 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 Subject Lands. Establishment of a new supply and treatment system will trigger the need for a Class C Environmental Assessment; however, this has been deferred at this time.

The proposed water servicing solution for the Subject Development will be to drill (3) three to (4) four wells on-site and construct a well pump house, water storage facility (i.e., water reservoir) and a water treatment plant to provide clean drinking water to the Subject Development. The location of these facilities has been illustrated on **Figure 4**.

A Well Exploration Program was undertaken by Crozier in between 2023 and 2024 to determine the potential to establish a new municipal drinking water system by way of a groundwater source. The results of this program have been summarized in the document entitled *Well Exploration Summary Report (Crozier, July 2024)* provided under separate cover. 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 locations concluded that the test wells adjacent to Uthoff 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 Subject Development 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.

The installed test wells (TW24-1 and TW24-2) are each capable of providing water at a rate of 7.6 L/s for a total of 15.2 L/s. Firm capacity of a system with only wells TW24-1 and TW24-2 online would be 7.6 L/s in total.

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 maximum daily demand for the Hawk Ridge Development is 19.49 L/s. By utilizing a four (4) well approach, as summarized in **Table 3** below, the well system could support a total capacity of 35.20 L/s and a firm capacity of 25.20 L/s.

Table 3: Summary of Well Production Capacities

Number of Wells	Well Identification	Well Capacity (L/sec)	Total Capacity (L/sec)	Firm Capacity (L/sec)
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

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

Two (2) watermains will also need to be extended from the on-site well pump house which will follow the alignment of the internal road network. One (1) watermain will be a low pressure watermain that connects the well pump house to the proposed water reservoir for the purpose of filling the water reservoir during off peak times. The other watermain will distribute treated water to the Subject Development. A proposed water reservoir has been located at the south end of the development will provide water storage and fire flows to the Subject 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 m³. A 2,800 m³ reservoir is recommended on-site at this time.

The distribution watermain internal to the Subject Development will follow the alignment of the road network complete with individual service connections for each lot and building. Fire hydrants will be spaced as required to provide the necessary fire protection and to meet municipal standards. There will be two (2) watermain crossings under Silver Creek and as well as an extension of watermain along Uthoff Line. This will facilitate a looped distribution network and satisfy the Township and Ministry of Environment, Conservation and Park's (MECP) requirements for a looped water distribution system. The proposed Concept Plan does not include any dead-ends and therefore there should be no issue with respect to providing adequate water circulation and preventing the potential for stagnant potable water.

The preliminary water distribution layout has been presented in **Figure 4**.

As mentioned in the section above, the Township is currently competing upgrades to the Bass Lake Woodlands well system. Connection of the two systems (Bass Lake Woodlands and Hawk Ridge) could help to alleviate capacity concerns and provide an emergency contingency plan for both communities. A potential connection will be assessed as part of the forthcoming EA process.

Preliminary water demands for the Subject Development have been estimated in conjunction with Township of Severn standards that concur with Table 3-1 of the MECP Design Guidelines for Drinking Water Systems. Applicable design criteria have been summarized in **Table 4** below.

Table 4: Watermain Design Criteria

Criteria	Standard
Average Flow Rate (L/cap/day)	350
Maximum Day/Peak Hour	2.25/4.5

The following water demands have been calculated for the Subject Development per Township standards identified above:

- Average Daily Flow Rate – 8.66 L/s
- Maximum Daily Flow Rate – 19.49 L/s
- Peak Hour Flow Rate – 38.97 L/s

Refer to **Appendix C** for 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)* will be used to estimate fire flows for the Subject Development. Estimated flows are based on building floor area, construction type and structure exposure distance.

Fire flow calculations have been provided in **Appendix C**. In the absence of a lotted Draft Plan, preliminary fire flow calculations were completed using the following assumptions and made in reference to Township of Severn By-law 2010-65: General Considerations:

- 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.

Based on the above, the required fire flow was found to be 200.00 L/s for a duration of 2.50 hours.

8.0 UTILITIES

The Subject Development 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, with individual service connections to each lot.

9.0 CONCLUSIONS & RECOMMENDATIONS

Based on the foregoing we conclude that the proposed development can be adequately serviced.

1. Access to the Subject Development will be provided via three (3) connections off Uthhoff Line and an extension of Hurlwood Lane. Municipal roads will be designed in accordance with Township of Severn Standards.
2. The Subject Development will be serviced via an internal gravity sanitary sewer system that will discharge to the proposed on-site wastewater treatment plant.
3. On-site wells will provide water supply for the Subject Development that will be treated in an on-site water treatment plant.

4. Internal watermain will follow the alignment of the internal road network complete with all valving, appurtenances, and hydrants to meet Township of Severn Standards.
5. The ultimate water and wastewater servicing solution for the site will be determined through the Class E Environmental Assessment process.
6. The capacity of Silver Creek and development potential for the site is dependant on the forthcoming results of the Assimilative Capacity Study.
7. Utilities are available to service the Subject Development.

Respectfully submitted,

C.F. CROZIER & ASSOCIATES INC.



Haley Birrell, P.Eng.
Project Engineer

C.F. CROZIER & ASSOCIATES INC.



Adrian Mysliwiec, E.I.T.
Engineering Intern

J:\1900\1935- LIV Communities\6133- Hawk Ridge\Reports\1st Submission Draft Plan Approval\FSR\2024.09.19_Functional Servicing Report.docx

APPENDIX A

Sanitary Demand Calculations



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 m³/day

Maximum Daily Flow 17.3 L/sec
 1,497 m³/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 m³/day

Total Peak Daily Flow 39.04 L/sec

APPENDIX B

Water Demand & Fire Flow Calculations



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 = Equalization 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

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:

$$RFF = 220 * C * \text{sqrt } A$$

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)	Assumptions:
Basement	597	0%	0.0	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
Ground Floor	597	100%	596.8	
Level 2	597	100%	596.8	
Total	1790		1193.6	
Total Effective Floor Area			1194 m²	

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.

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

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

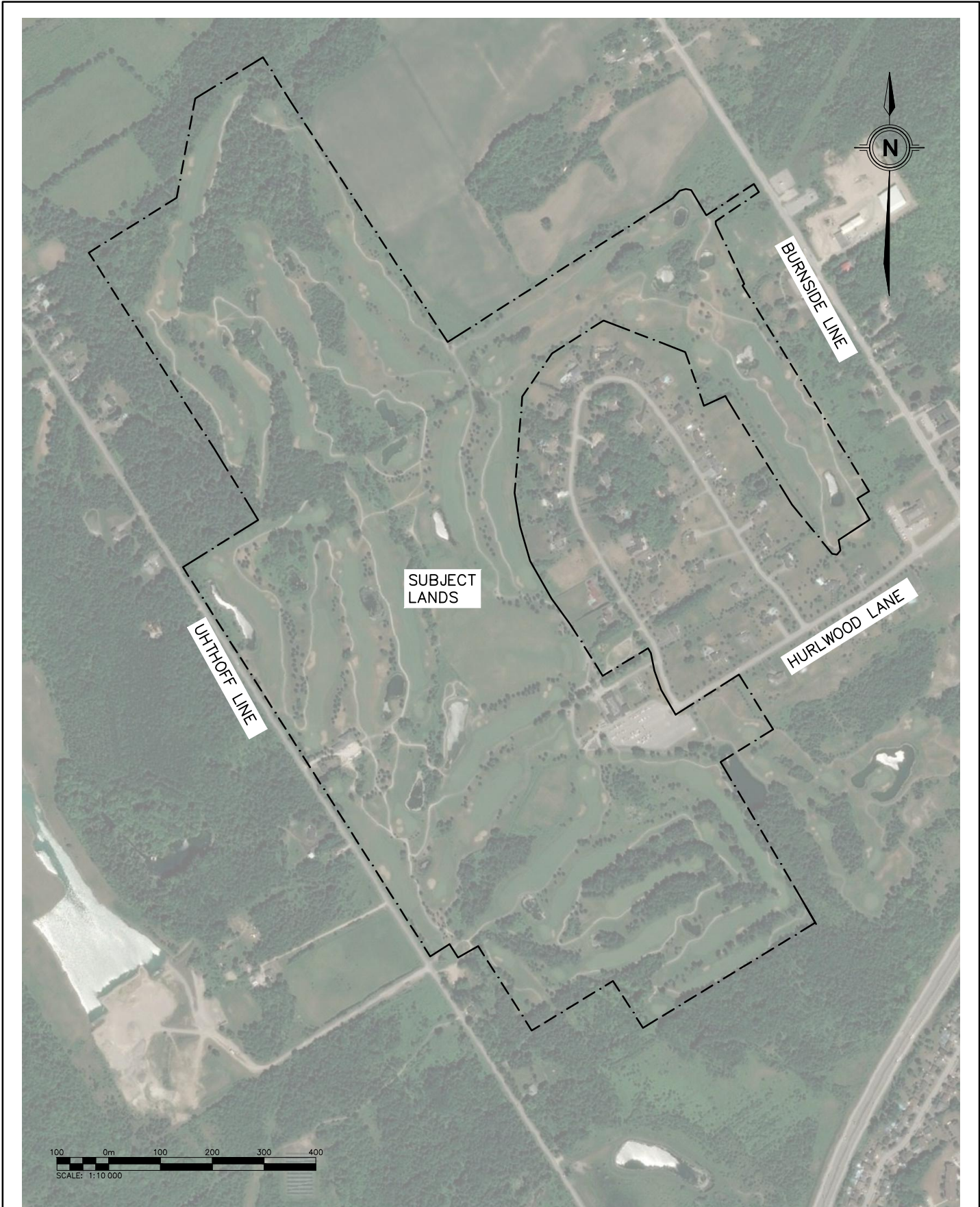
Table 1 - FUS 2020

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


FIGURES

- Figure 1:** Site Location Plan
- Figure 2:** Concept Plan
- Figure 3:** Preliminary Grading Plan
- Figure 4:** Preliminary Servicing Plan



Legend	<p>--- PROPERTY LINE</p>
--------	--------------------------

Project	<p>HAWK RIDGE GOLF COURSE TOWNSHIP OF SEVERN</p>	
Drawing	<p>SITE LOCATION</p>	



CROZIER
CONSULTING ENGINEERS

Drawn By	T.M.	Design By	T.M.	Project	1935-6133	
Scale	N.T.S.	Date	2024.01.11	Check By	B.H.	
					Drawing	FIGURE 1



LEGEND

- SINGLE
- TOWNHOUSES
- GOLF VILLA
- PARKLAND AND OPEN SPACE
- SWM POND
- BUFFER
- NHS
- TREATMENT PLANT / UTILITIES
- FOREST
- WOODLAND
- MIXED MEADOW - MEMM3
- POND (BASKING TURTLE HABITAT/SURVEY)
- POND
- 30m BUFFER TO WATERCOURSE
- BLACK ASH LOCATION
- WATERCOURSE
- FLOODPLAIN LINE
- PROPOSED FLOODPLAIN ADJUSTMENT FOR NEW DEVELOPABLE AREA
- SITE BOUNDARY

Schedule of Land Use		
Description	Residential Units	Area (ha)
Single detached	290	11.95
Total Single Detached	290	11.95
Townhouses	310	6.65
Golf Villas (Stacked Townhouses)	250	4.05
Net Developable Total	850	22.65
Stormwater Management Pond		2.70
Parkland and Trails		2.17
Buffer		0.25
Natural Heritage System		3.92
Right of Way		9.29
Treatment Plant		0.97
Utility		0.20
Water Tower		0.28
Golf Course		83.15
Total Site Area		125.58

C:\Users\mpetigrew\The Biglieri Group\TBG_Project - 2020-2024\2023\23979\2 - TBG Design\1 - TBG Working Drawings\1 - AutoCAD\2024-08\23979_DP_24.08.22

CONCEPT DRAFT PLAN

ADDRESS: HAWKRIDGE GOLF COURSE

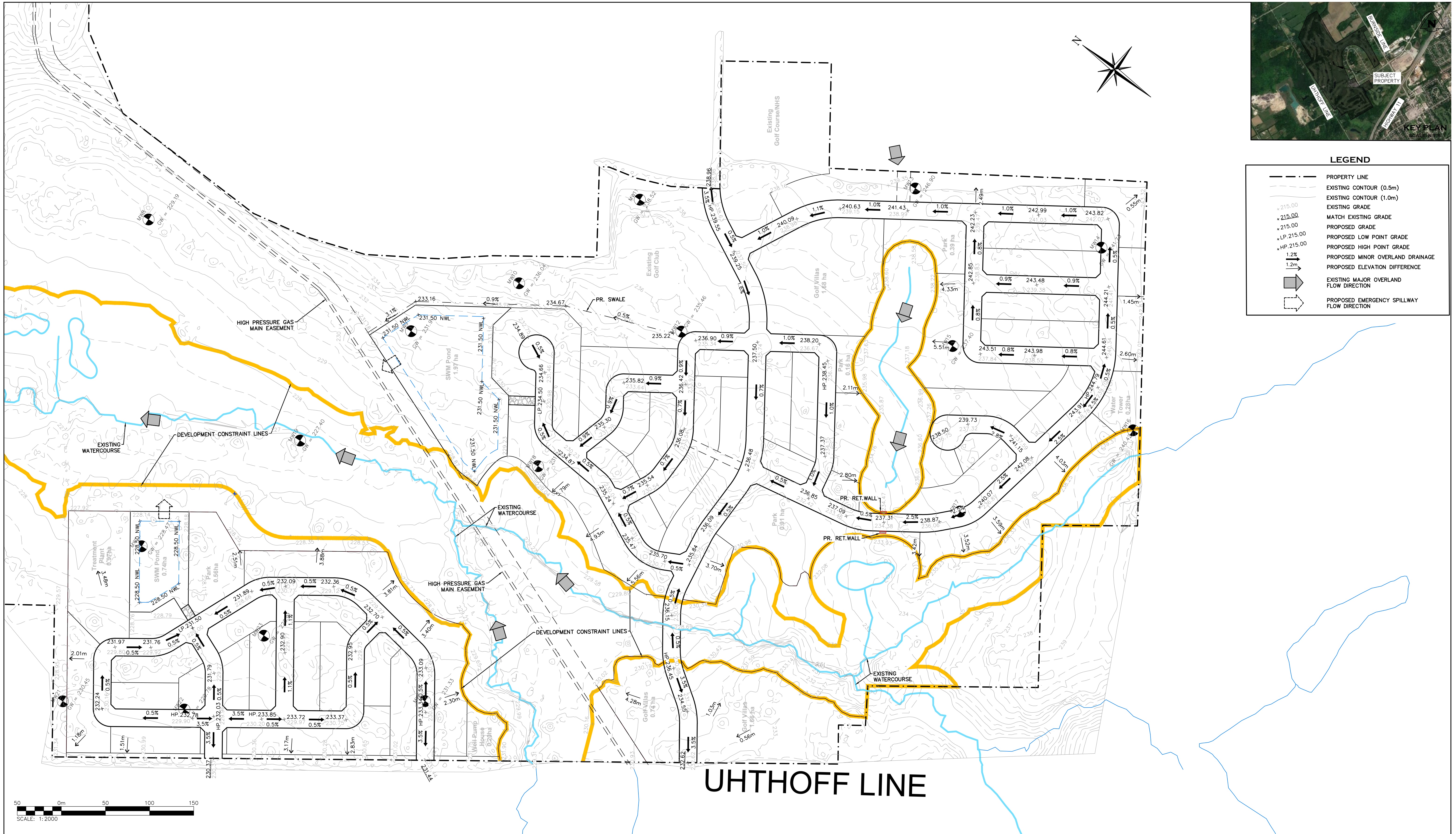
Project No:
23979
Scale:
1:2500

August 22, 2024

Designed By: MP

Urbantypology
Jeff Mingay
GOLF COURSE ARCHITECT

BIGLIERI GROUP



LEGEND

	PROPERTY LINE
	EXISTING CONTOUR (0.5m)
	EXISTING CONTOUR (1.0m)
	EXISTING GRADE
	MATCH EXISTING GRADE
	PROPOSED GRADE
	PROPOSED LOW POINT GRADE
	PROPOSED HIGH POINT GRADE
	PROPOSED MINOR OVERLAND DRAINAGE
	PROPOSED ELEVATION DIFFERENCE
	EXISTING MAJOR OVERLAND FLOW DIRECTION
	PROPOSED EMERGENCY SPILLWAY FLOW DIRECTION

1. THIS DRAWING IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC. AND THE REPRODUCTION OF ANY PART WITHOUT PRIOR WRITTEN CONSENT OF THIS OFFICE IS STRICTLY PROHIBITED.

2. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, LEVELS, AND DATUMS ON SITE AND REPORT ANY DISCREPANCIES OR OMISSIONS TO THIS OFFICE PRIOR TO CONSTRUCTION.

3. THIS DRAWING IS TO BE READ AND UNDERSTOOD IN CONJUNCTION WITH ALL OTHER PLANS AND DOCUMENTS APPLICABLE TO THIS PROJECT.

4. DO NOT SCALE THE DRAWINGS.

5. ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.

Town

SEVERN

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.

No.	ISSUE	DATE: MM/DD/YYYY
0	ISSUED FOR 1ST OPA, ZBA, & DPA SUBMISSION	09/30/2024

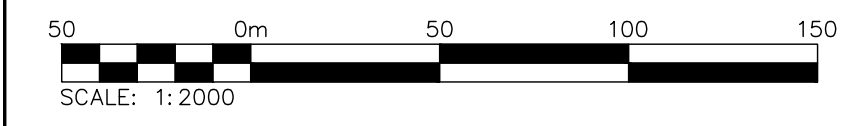
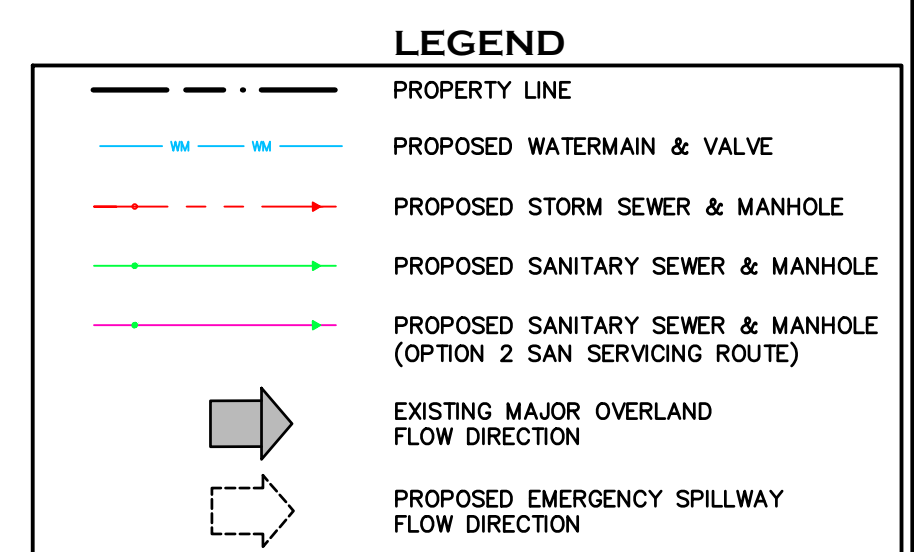
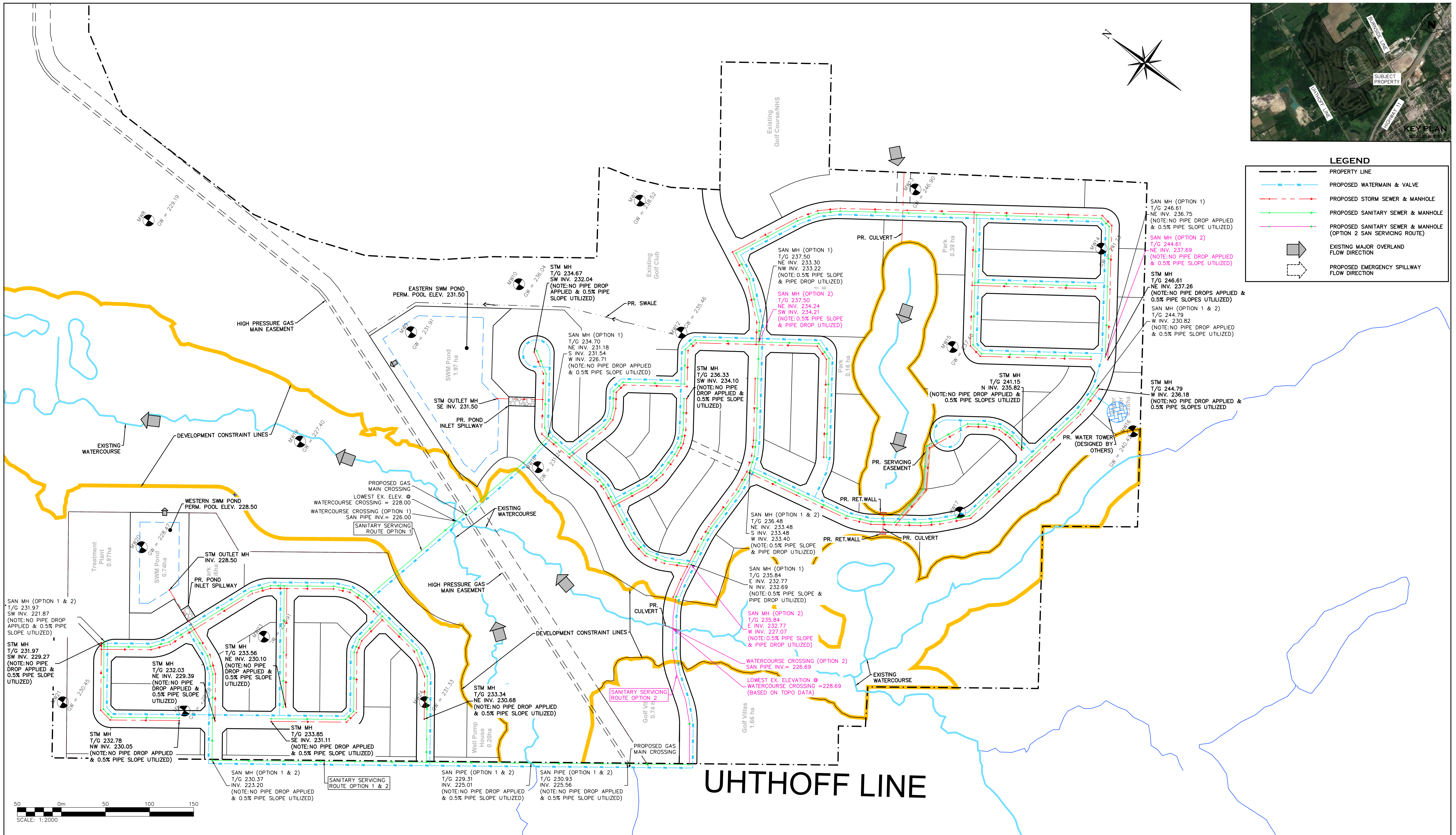
DRAFT
FOR DISCUSSION PURPOSES ONLY

Project: HAWK RIDGE GOLF COURSE
TOWNSHIP OF SEVERN

Drawing: PRELIMINARY GRADING PLAN

CROZIER
CONSULTING ENGINEERS

Drawn By: T.M./C.E.C.	Design By: T.M./C.E.C.	Project: 1935-6133
Check By: B.N.W./D.L./B.H.	Scale: 1:2000	Drawing: FIG.3



1. THIS DRAWING IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC. AND THE REPRODUCTION OF ANY PART WITHOUT PRIOR WRITTEN CONSENT OF THIS OFFICE IS STRICTLY PROHIBITED.

2. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, LEVELS, AND DATUMS ON SITE AND REPORT ANY DISCREPANCIES OR OMISSIONS TO THIS OFFICE PRIOR TO CONSTRUCTION.

3. THIS DRAWING IS TO BE READ AND UNDERSTOOD IN CONJUNCTION WITH ALL OTHER PLANS AND DOCUMENTS APPLICABLE TO THIS PROJECT.

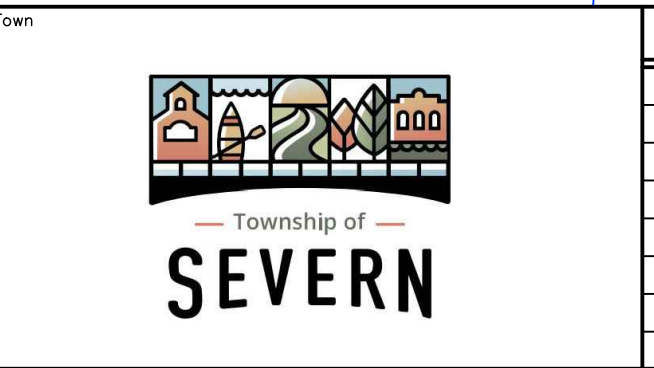
4. DO NOT SCALE THE DRAWINGS.

5. ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.

Town

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.



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

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

Project: HAWK RIDGE GOLF COURSE TOWNSHIP OF SEVERN

Drawing: PRELIMINARY SERVICING PLAN

Drawn By: T.M./C.E.C. Design By: T.M./C.E.C. Project: 1935-6133

Check By: B.N.W./D.L./B.H. Scale: 1:2000 Drawing: FIG.4