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5400 APPLETON SIDE ROAD DEMENTIA VILLAGE AND RETIREMENT COMMUNITY

Serviceability and Conceptual Stormwater Management Report

Prepared for: Chello Building Corp.

5400 Appleton Side Road

Dementia Village and Retirement Community

Mississippi Mills, Ontario

Serviceability and Conceptual Stormwater Management Report

Prepared By:

NOVATECH
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario
K2M 1P6

October 13, 2023

Novatech File: 123044
Ref: R-2023-138

NOVATECH
Engineers, Planners & Landscape Architects

October 13, 2023

Municipality of Mississippi Mills
3131 Old Perth Road
Box 400
Almonte, ON K0A 1A0

Attention: **Melanie Knight, Senior Planner**

Reference: **5400 Appleton Side Road**
Dementia Village and Retirement Community
Serviceability and Conceptual Stormwater Management Report
Our File No.: 123044

Please find enclosed the report entitled "Serviceability and Conceptual Stormwater Management Report" prepared for the 5400 Appleton Side Road Dementia Village and Retirement Community.

This report demonstrates the feasibility of servicing the proposed Dementia Village and Retirement Community development with respect to water distribution, sanitary servicing and storm drainage, as well as a preliminary approach to stormwater management. This report is submitted in support of an application for a Community Infrastructure and Housing Accelerator (CIHA).

If you require any additional information, please contact the undersigned.

Yours truly,

NOVATECH

Drew Blair, P.Eng.
Senior Project Manager

Suite 200, 240 Michael Cowpland Drive, Ottawa ON K2M 1P6 Tel: 613.254.9643 Fax: 613.254.5867 www.novatech-eng.com

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Appendices

Tables

Figures

1.0 INTRODUCTION

Novatech has been retained to prepare a serviceability and conceptual stormwater management report in support of an application for a Communitry Infrastructure and Housing Accelerator (CIHA) for the proposed 5400 Appleton Side Road Dementia Village and Retirement Community.

1.1 Purpose

This report outlines the conceptual servicing design for the proposed development with respect to water distribution, sanitary servicing, and storm drainage, as well as the approach to stormwater management. Pre-consultation meeting notes and a letter from Ken Kelly from the municipality dated June 15, 2021, outline the purpose and requirements of this report and are provided in **Appendix A**.

1.2 Site Location and Description

The property, approximately 24.3 ha in size, is located in the rural area. The parcel is bound by Appleton Side Road and Industrial Drive intersection to the west, undeveloped lands to the south, rural residential lots to the north, and an existing residential estate lot subdivision to the east. Additionally, the Appleton Trail runs adjacent to the northeastern property boundary. A large subdivision, Mill Valley Estates, is proposed south of the subject site off Appleton Side Road.

Refer to **Figure 1** – Key Plan for more details of the site's location.

The site is currently unoccupied and undeveloped with dense small tree coverage.

Refer to **Figure 2** – Existing Conditions Plan for more details.

1.3 Proposed Development

For the CIHA application, only 8.1 ha of the property is proposed to be developed. The intended use is as a dementia village and retirement community which will require water, sanitary and storm servicing including a stormwater management facility. The development will include one new 24-meter right-of-way street extending east from the Appleton Side Road and Industrial Drive intersection.

The proposed development will consist of a 4-storey Long-Term Care Facility (192 beds) including surface parking, and a 4-storey seniors apartment building (66 units) with surface and underground parking. Additionally, the development will include a dementia village (8 pods with 84 beds and a community center building) and 21 semi-detached blocks (42 townhouse units).

Refer to **Figure 3** – Concept Plan for more details.

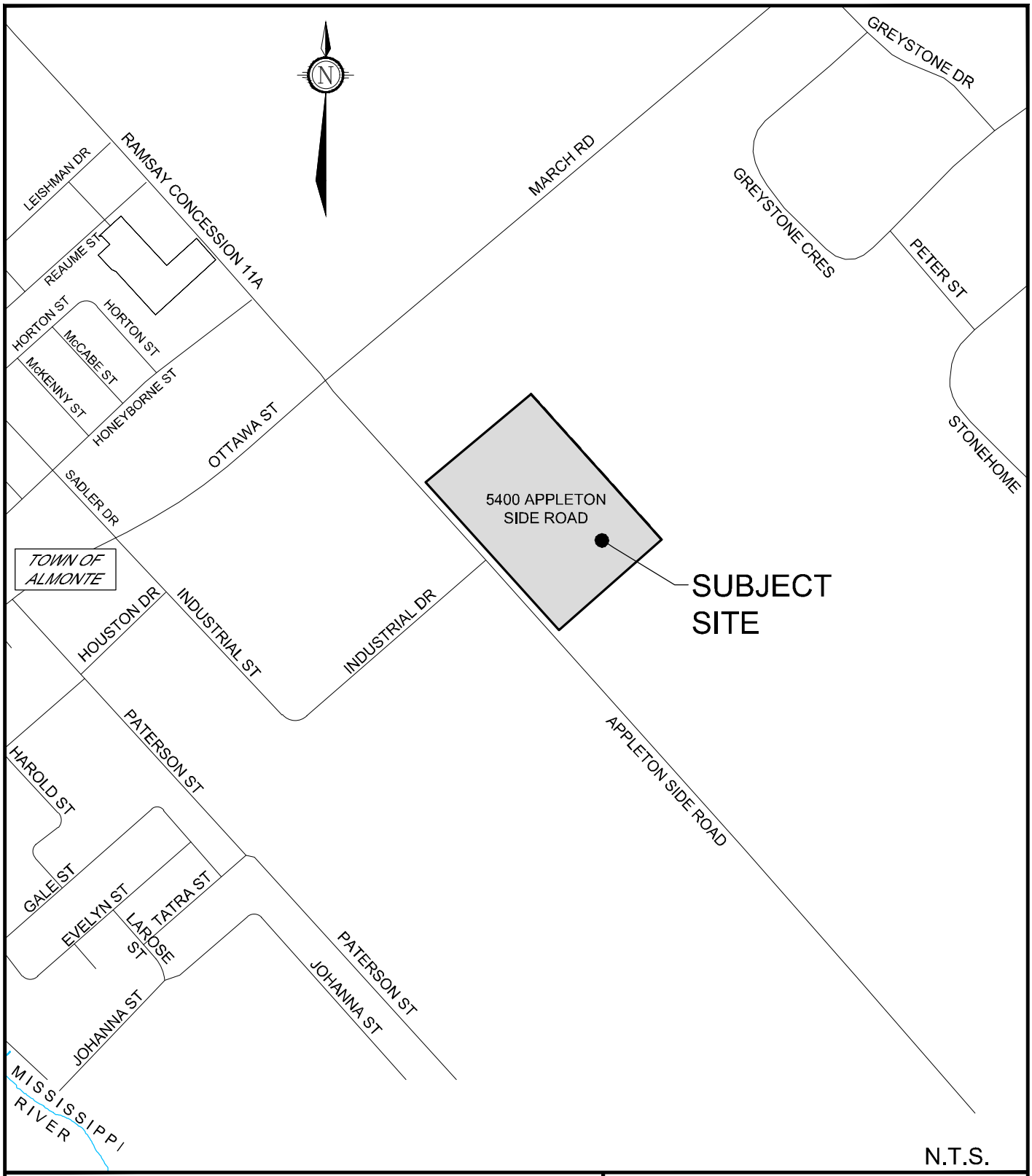
A conceptual unit breakdown summary is shown below in **Table 1.1**.

Table 1.1: Conceptual Unit Breakdown

Unit Type	Number of Units/Beds
Long-term Care Facility	192 beds
Dementia Village	84 beds
Apartments	66 units
Semi-detached Units	42 units

Sanitary and watermain connections are proposed to connect to the existing infrastructure west of the development within Industrial Drive. Stormwater will be stored onsite within a SWM pond and ultimately outlet to the existing Appleton Side Road ditch from the south corner of the property.

The CIHA application is the first step in the process. It is anticipated that an application for Draft Plan Approval then Site Plan Approval would follow.



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MUNICIPALITY OF MISSISSIPPI MILLS

5400 APPLETON SIDE ROAD

KEY PLAN

SEPT 2023 123044 FIGURE 1

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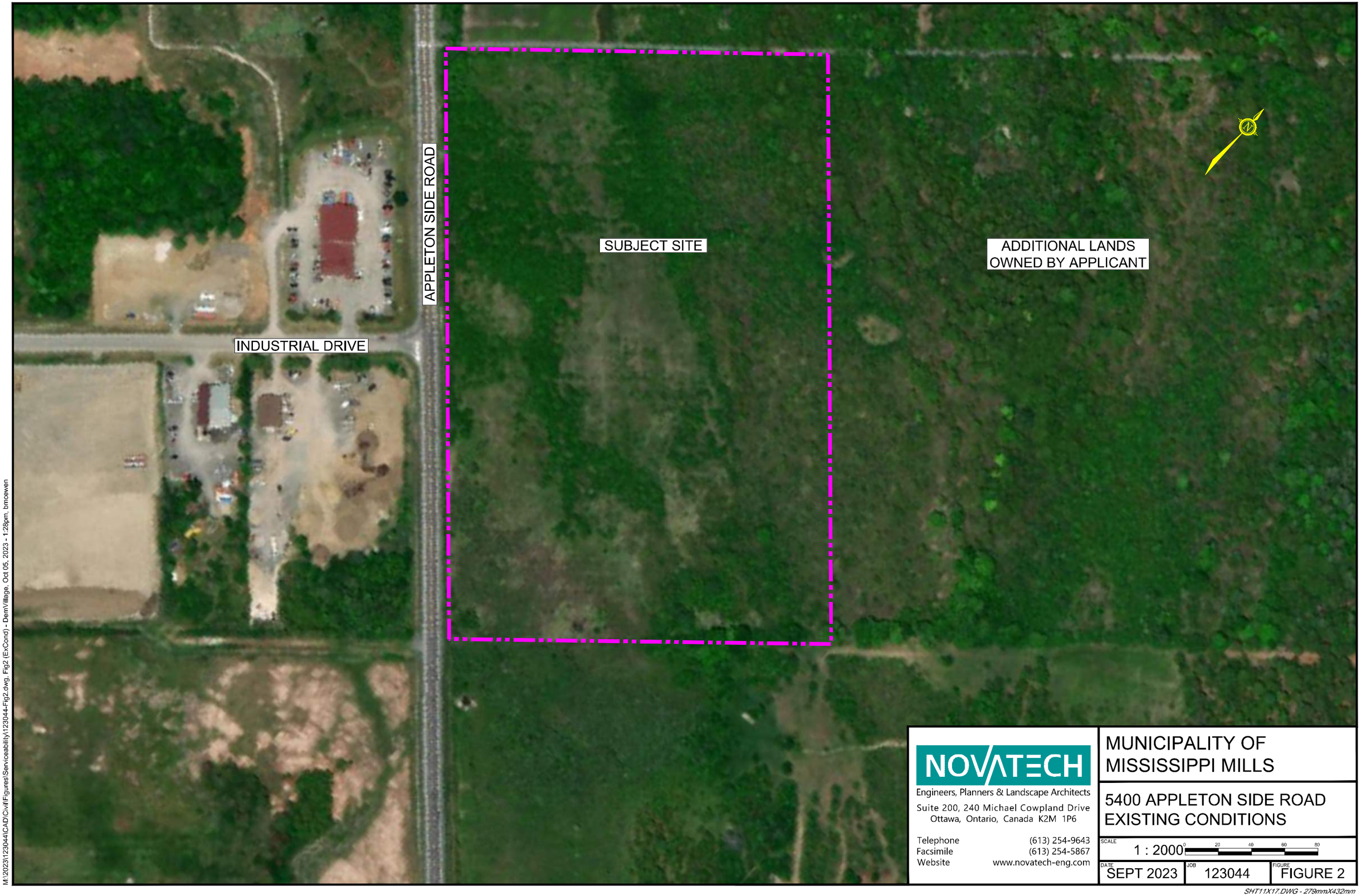

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MUNICIPALITY OF MISSISSIPPI MILLS

5400 APPLETON SIDE ROAD
EXISTING CONDITIONS

SCALE 1 : 2000 (0, 20, 40, 60, 80)

DATE SEPT 2023 | JOB 123044 | FIGURE FIGURE 2

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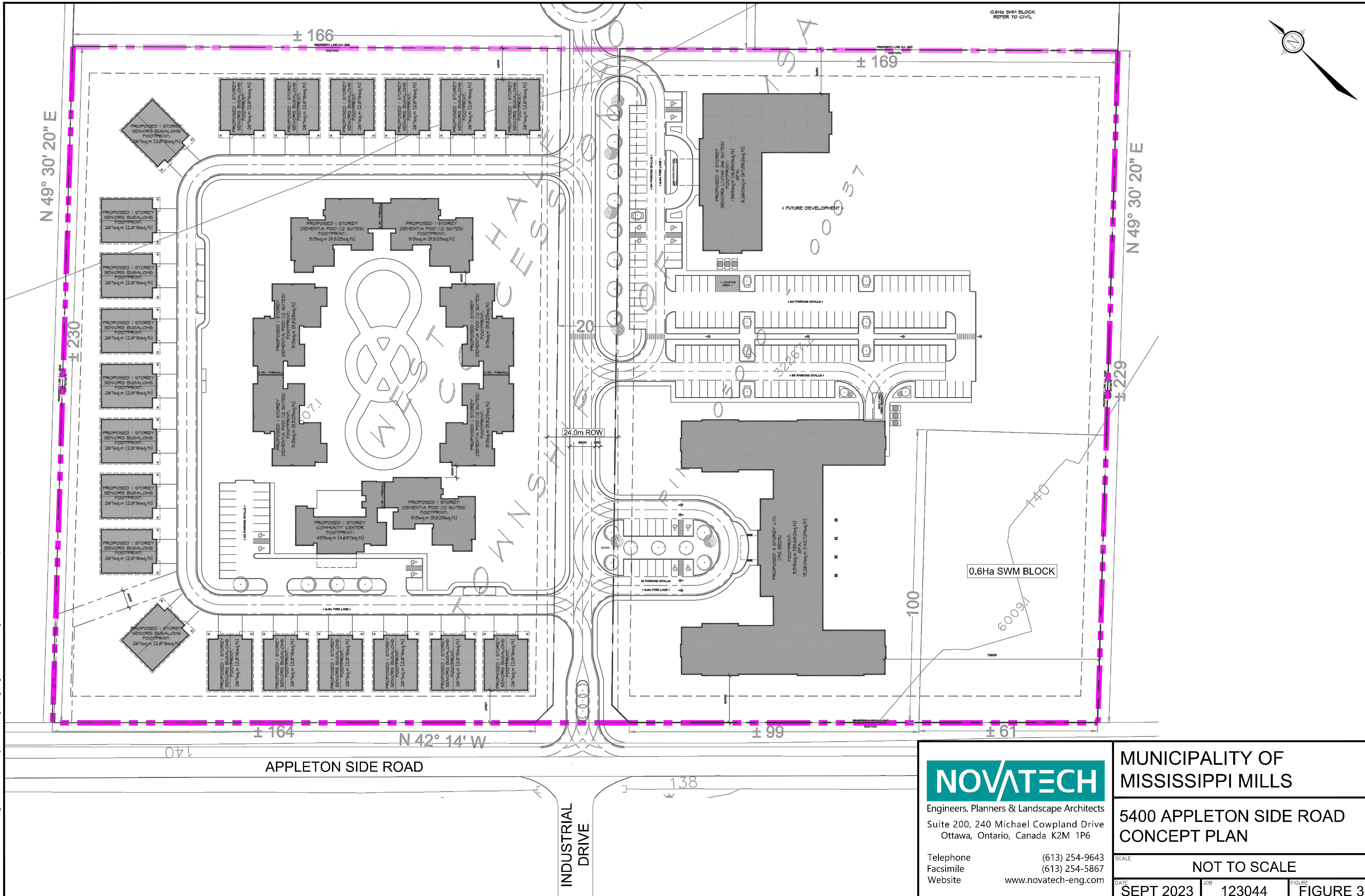

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MUNICIPALITY OF MISSISSIPPI MILLS

5400 APPLETON SIDE ROAD
CONCEPT PLAN

SCALE: NOT TO SCALE

DATE	JOB	FIGURE
SEPT 2023	123044	FIGURE 3

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2.0 SITE SERVICING

2.1 Watermain

To service the site, it is proposed to extend the existing 250mm dia. municipal watermain within Industrial Drive northeasterly to Appleton Side Road to connect to the proposed development. A second connection to the 300mm dia. municipal watermain north of the site on Appleton Side Road may be required for redundancy. A 250mm dia. watermain will be installed within the proposed 24-meter right-of-way to service the buildings within the proposed development.

Refer to **Figure 4** – Conceptual Servicing Plan for more details.

Hydrants will be installed along the proposed 24-meter right-of-way to provide fire protection for the site. Preliminary fire flow calculations using Fire Underwriters Survey (FUS) and a worst-case scenario for apartments and townhouse blocks result in fire flow demands of 117 – 133 L/s. It has been confirmed by the architect that specific construction details used to calculate FUS fire flows will be utilized during construction. Correspondence confirming the FUS construction details and FUS calculations are included in **Appendix B**.

Conceptual water demands for the proposed development have been calculated based on design criteria in the *Mississippi Mills Master Plan Update Report* prepared by J.L. Richards dated February 2018 (2018 Master Report) and the *City of Ottawa Design Guidelines – Water Distribution* (2012). It is acknowledged that the future update to the Master Plan Update Report may include updates to water distribution design criteria which will be utilized in the Draft Plan of Subdivision stage.

A summary of the conceptual water demands can be found below in **Table 2.1** and detailed calculations are included in **Appendix B**.

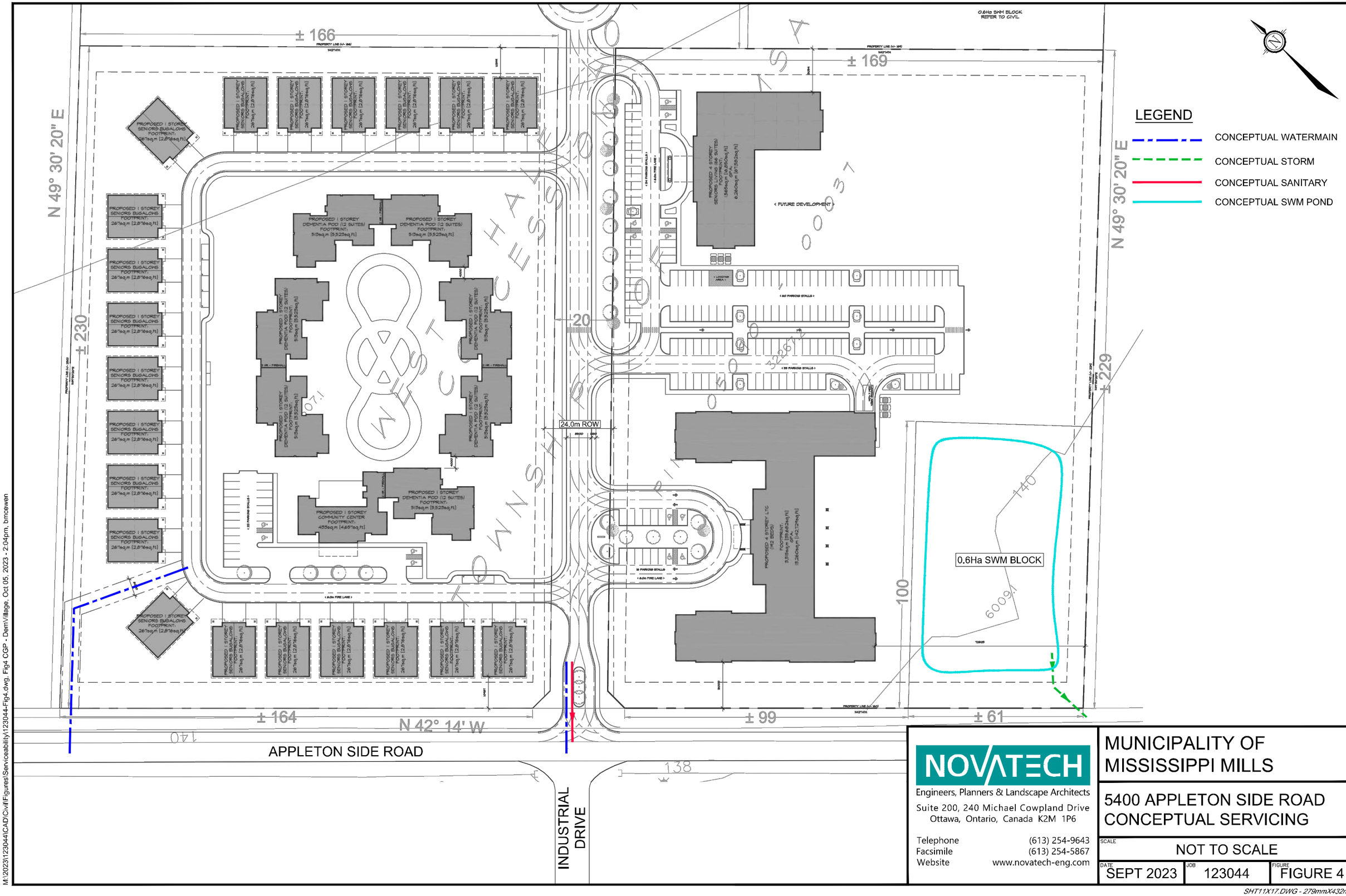
Table 2.1: Summary of Conceptual Water Demands

Flow Type	Population	Demand Scenarios			FUS Fire Flow (L/s)
		Avg. Day (L/s)	Max. Day (L/s)	Peak Hour (L/s)	
Residential	232	0.94	2.35	5.17	117-133
Institutional	276	2.54	4.31	7.76	
Development Total		**3.82**	**6.66**	**12.94**	**133**

Water distribution for the proposed development is expected to demand a daily average of 3.82 L/s and a fire flow of 133 L/s.

A hydraulic boundary conditions request has been completed by J.L. Richards which outlines available hydraulic pressures for the proposed development utilizing the two proposed connections. The J.L. Richards analysis concluded that the simulated maximum available fire flow available to the proposed development is in the order of 144 L/s. As a maximum fire flow of 133 L/s using FUS was calculated to govern the proposed development, the site can adequately be serviced for fire flows calculated using the FUS method. The boundary conditions request completed by J.L. Richards can be found in **Appendix B**.

The upcoming revisions by J.L. Richards to the Master Plan Report should be a wholesome examination of the contributing demands from the proposed developments in the service area and the available capacity in the municipal water supply system and provide a more accurate report of the existing municipal water supply system capacity and if any watermains/wells/pumps/storage will require upsizing to accommodate future growth. Based on the current analysis in this report and from J.L. Richards, the proposed development can be



LEGEND

- CONCEPTUAL WATERMAIN
- CONCEPTUAL STORM
- CONCEPTUAL SANITARY
- CONCEPTUAL SWM POND

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MUNICIPALITY OF MISSISSIPPI MILLS

5400 APPLETON SIDE ROAD CONCEPTUAL SERVICING

SCALE: NOT TO SCALE

DATE: SEPT 2023 | JOB: 123044 | FIGURE: FIGURE 4

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accommodated under current conditions. A hydraulic network analysis of the proposed watermain layout will be completed at the Draft Plan of Subdivision stage.

2.2 Sanitary Sewer

In order to service the 5400 Appleton Side Road development, it is proposed to extend the existing 300mm dia. municipal sanitary sewer within Industrial Drive northeasterly to Appleton Side Road to connect to the proposed development. On-site 250mm dia. sanitary sewers will be installed within the 24-meter right-of-way with service connections to buildings within the proposed development.

For more details, refer to **Figure 4** – Conceptual Servicing Plan.

Conceptual sanitary demands for the proposed development have been calculated based on design criteria outlined in the *Mississippi Mills Master Plan Update Report* prepared by J.L. Richards dated February 2018 (2018 Master Report) and the *City of Ottawa Sewer Design Guidelines* (2012). It is acknowledged that the future update to the Master Plan Update Report may include updates to the sanitary sewer design criteria which will be utilized in the Draft Plan of Subdivision stage.

A summary of the conceptual sanitary demands can be found below in **Table 2.2** and detailed calculations are included in **Appendix C**.

Table 2.2: Summary of Conceptual Sanitary Peak Flows

Flow Type	Population / Beds	Area (ha)	Peak Sanitary Flows (L/s)
Residential	232	-	3.76
Institutional	276	-	2.16
Infiltration	-	8.1	2.67
		Development Total	**8.59**

Peak sanitary flows for the proposed development will be approximately 8.59 L/s.

A sanitary analysis has been completed by J.L. Richards indicating that the downstream sanitary trunk sewers at the Industrial Drive / Ottawa Street intersection currently has capacity for the proposed development at 5400 Appleton Side Road. Refer to **Appendix C** for more details.

Based on a high-level review of the adjacent Mill Valley Estates development, it appears that site will outlet to the existing sanitary sewer within Industrial Drive. The existing sewer on Industrial Drive and the downstream sewer system may be at or near capacity limits with the proposed Mill Valley Estates development peak design flows. A surcharge analysis may be completed to determine the impacts on the existing Industrial Drive sanitary sewer from all the developments in the tributary area. The commercial sites on Industrial Drive are typically slab-on-grade construction and should not be impacted even if there is some localized surcharging in the sanitary sewer. The sanitary sewer on Industrial Drive may need to be upsized to accommodate the additional flows. Some of the downstream sewer segments were already identified to be upsized in the 2018 Master Servicing Report. A second option may be a new sanitary sewer installed on Appleton Side Road north to the Ottawa Street intersection and connect a new and upsized sanitary trunk sewer within Ottawa Street.

The upcoming revisions by J.L. Richards to the Master Plan Report should be a wholesome examination of the contributing flows from the proposed developments in the tributary area and the available capacity in the downstream sewers and provide a more accurate report of the existing sanitary sewer capacity and if any sanitary sewers will require upsizing to accommodate

future growth. Based on the current analysis in this report and from J.L. Richards, the proposed development can be accommodated under current conditions. Detailed analysis of the downstream sanitary sewer systems will be completed in the Draft Plan of Subdivision Stage.

2.3 Storm Drainage

Under existing conditions, storm runoff from the proposed development lands generally flows from east to west towards Appleton Site Road. The site is generally comprised of meadows and mixed forests.

Refer to **Figure 5** – Existing Drainage Pattern for more details.

Storm drainage for the minor system will be captured with an on-site gravity storm sewer system. Storm drainage from both the minor and major systems will be directed to a proposed stormwater management pond along the east side of the development. The stormwater management facility will provide quantity and quality control prior to discharging to the Appleton Side Road ditch from the south corner of the site.

Refer to **Figure 4** – Conceptual Servicing Plan for more details.

Stormwater flows from the proposed development will discharge into the existing Appleton Side Road ditch along the north side of Appleton Side Road. The ditch crosses Appleton Side Road south of the site in a 1100mm dia. CSP culvert at the future Mill Valley Estates development. As part of the Mill Valley Estates development, it has been proposed to realign the ditch around the Mill Valley Estates property. An excerpt from the *Mill Valley Estates Development Functional Servicing and Stormwater Management Report* prepared by Stantec (December 2022) has been included in **Appendix D** which outlines the Appleton Side Road ditch outlet and upstream stormwater design parameters.

2.3.1 Storm Sewers (Minor System)

Storm sewers for the proposed development will be designed and sized using the Rational Method to convey peak flows associated with a 5-year storm event. Detailed storm sewer design sheets will be completed during the Draft Plan of Subdivision stage.

Inlet Control Devices

Inlet control devices (ICDs) will be used to restrict inflows to the minor storm system. Rearyard catch basins will be connected in series with an ICD installed at the outlet of the most downstream structure. ICDs will be sized to control minor system peak flows without causing surface ponding during a 5-year storm event. ICD's will be sized during site plan application. Roof drain control will be sized during site plan application.

Roof Drains

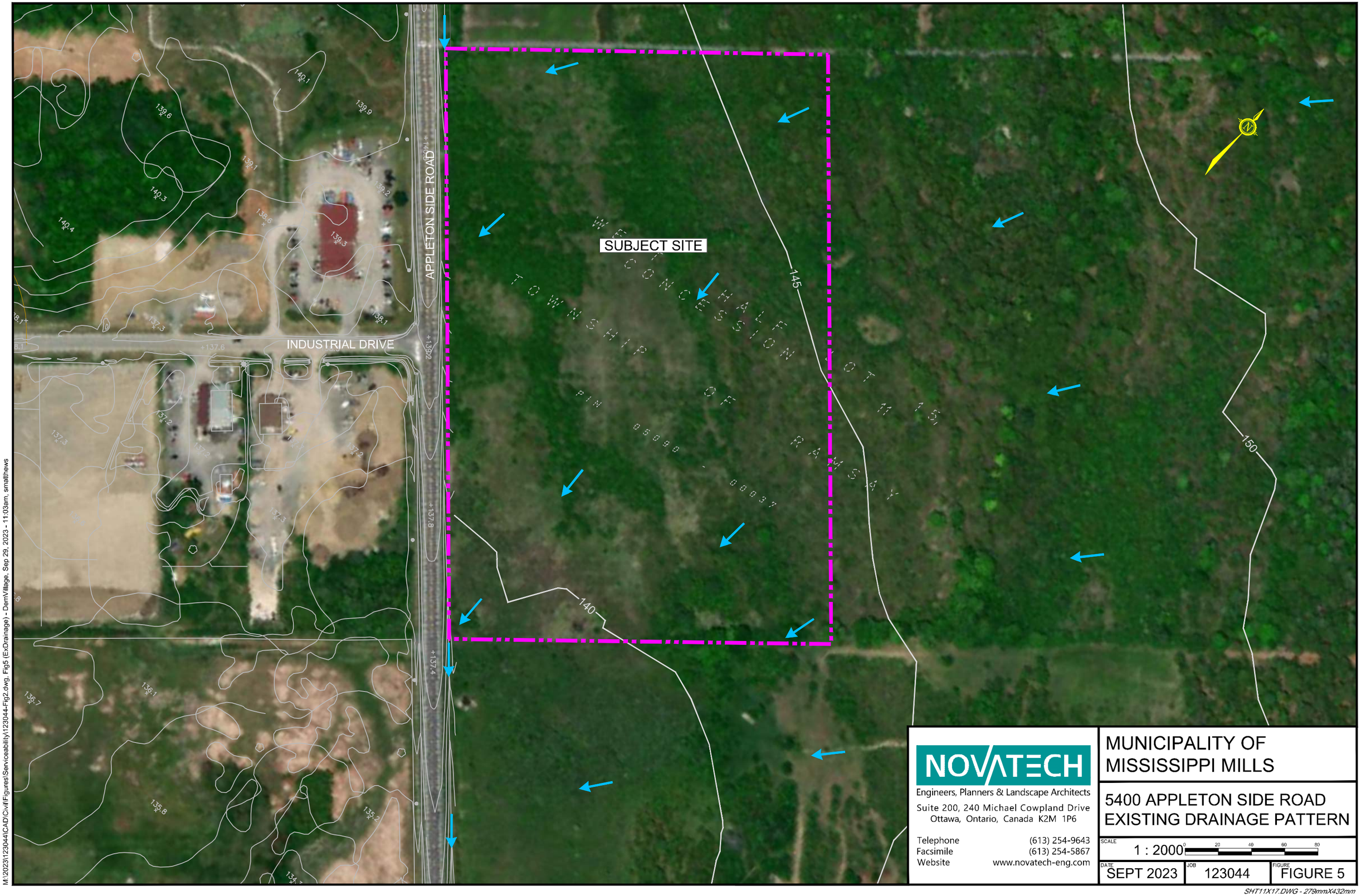
Some buildings within the proposed development may require roof drains to convey stormwater to the SWM facility. The stormwater being released from the roof drains will be controlled to limit the peak stormwater flows within the minor system during a 5-year storm event.

Runoff Coefficients / Impervious Values

Approximate percent impervious (%IMP) values for the proposed development were calculated based on the runoff coefficients using the following equation:

$$\%IMP = \frac{(C - 0.2)}{0.7}$$

This equation is based on the "blended runoff coefficient" equation from Section 5.4.5.2 of the *City of Ottawa Sewer Design Guidelines* (October 2012), reproduced below.



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MUNICIPALITY OF MISSISSIPPI MILLS

5400 APPLETON SIDE ROAD EXISTING DRAINAGE PATTERN

SCALE 1 : 2000 (0, 20, 40, 60, 80)

DATE SEPT 2023 | JOB 123044 | FIGURE FIGURE 5

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$$C = [imp\ x\ (C\ impervious)] + [(1.0 - imp)\ x\ (C\ pervious)]$$

$$Where: imp = \frac{impervious\ area}{total\ area}$$

Applying the C-values 0.2 and 0.9 for the pervious and impervious runoff coefficients respectively, the "blended runoff coefficient" equation can be rearranged to the %IMP equation above.

As the pre-development condition of the site is entirely undeveloped land, the %IMP value can be considered 0% for the 8.1 ha site in the pre-development condition.

In the post-development condition, roughly 45.3% of the 8.1 ha site can be considered as impervious areas. Using the equations described above, the %IMP value for the site is calculated to be approximately 45.3% with a C-value of 0.52 in the post-development condition.

2.3.2 Major System Drainage

Major system drainage on the site will be graded to provide an overland flow route to the minor storm sewer system and the proposed SWM facility. The storm sewer system will direct all minor storm runoff to each proposed SWM facility. Runoff from the major system will be directed to the SWM facility or along the 24m right-of-way to the existing Appleton Side Road. The SWM facility will be designed to provided stormwater quality and quantity control prior to outletting to the Appleton Side Road ditch.

3.0 STORMWATER MANAGEMENT

All storm runoff (major and minor systems) from the proposed development will be directed to the proposed SWM pond. The proposed SWM facility for the site will be designed during the Draft Plan of Subdivision stage with a goal to achieve a high level of treatment of urban stormwater runoff. Design criteria outlined by the Ministry of Environment, Conservation and Parks (MECP) will be followed resulting in a removal of 80% of total suspended solids (TSS) within the stormwater runoff.

3.1 Quality Control

Water quality treatment will be provided by the proposed on-site SWM pond. To achieve an 80% TSS removal, the proposed SWM pond will be designed during the Draft Plan of Subdivision stage following MECP design criteria.

3.2 Quantity Control

Stormwater runoff within the proposed development will be quantity controlled by the proposed SWM pond. Flows entering the minor system will be controlled to the design capacity of the proposed storm sewer system. The proposed SWM pond's outlet to the existing Appleton Side Road ditch will be quantity controlled from the 100-year post-development release rate to the 5-year pre-development release rate for the site. Buildings within the proposed development that require roofs drains will be controlled to reduce the time of flow of storm runoff being conveyed to the SWM facility.

The design of quantity control measures for the proposed development will be completed during the Draft Plan of Subdivision stage.

4.0 CONCLUSION AND RECOMMENDATIONS

This Serviceability and Conceptual SWM Report has evaluated the serviceability (water, sanitary and storm servicing) and conceptual stormwater management for 5400 Appleton Side Road Development within Mississippi Mills, Ontario.

The principal findings and conclusions of this report are as follows:

- Water service for the proposed development will be provided by extending the existing watermain within Industrial Drive northeasterly to Appleton Side Road and a second connection north of the site on Appleton Side Road. Watermain boundary conditions provided by J.L. Richards confirms adequate water supply exists in the downstream water system for the average daily demand of 3.82 L/s and FUS fire flow demand (max 144 L/s) for this proposed development.

- Sanitary servicing will be accommodated by connecting to the existing sanitary sewer system within Industrial Drive. J.L. Richards has provided wastewater flow analysis in the downstream trunk sewer at the Industrial Drive / Ottawa Street Intersection. The J.L. Richards wastewater analysis confirms there is adequate capacity in the downstream sanitary sewer system under current conditions for this proposed development.

- Stormwater runoff within the site will be captured by an on-site storm sewer system and outlet to the proposed on-site SWM pond providing quantity control. The 100-year post-development release rate will be controlled to the 5-year pre-development release rate.

- The proposed on-site SWM pond will provide 80% TSS removal rate as per MECP Guidelines.

- The proposed on-site SWM pond will outlet to the existing Appleton Side Road ditch at the south corner of the property.

- The 5400 Appleton Side Road Dementia Village and Retirement Community will be designed in accordance with the J.L. Richards Master Plan Update Report (February 2018) and conform to any updates made to the Master Plan Update Report.

5.0 CLOSURE

This report has been prepared in support of an application for Community Infrastructure and Housing Accelerator (CIHA).

Please contact the undersigned should you have and questions or require additional information.

NOVATECH

Prepared by:

Billy McEwen, B.A.Sc.
EIT

Reviewed by:

Drew Blair, P.Eng.
Senior Project Manager

Appendix A
Correspondence

CORPORATION OF THE MUNICIPALITY OF MISSISSIPPI MILLS

3131 OLD PERTH ROAD • PO BOX 400 • RR2 • ALMONTE ON • K0A 1A0

PHONE: 613-256-2064
FAX: 613-256-4887
WEBSITE: www.mississippimills.ca

June 15, 2021

Mr. Joe Princiotta,
Princiotta Group Inc.,
1491 Manotick Station Rd,
Greely, ON K4P 1P6

Via email : joe@ovlc.com

Dear Mr. Princiotta,

We are writing to you in regards to your proposed development of a 175 unit Seniors Retirement Community and Dementia Facility on Appleton Side Road, Mississippi Mills. This parcel of land is designated as rural and is outside of the urban boundary of the community.

Council is supportive of exploring your concept and looks forward to receiving further information on the development. Staff and our consultant team, along with County planning staff, have held a development pre-consultation meeting with you and your consultant on April 8, 2021. This is generally the initial step in the development process and the prelude to the submission of additional materials to support any applications for zoning amendments, official plan amendments, plan of subdivision, site plan etc... depending on the unique circumstances of each project. Given your experience developing similar projects both in Mississippi Mills and elsewhere in Eastern Ontario we trust you are familiar with the development process.

A summary of the pre-consultation meeting held on April 8, 2021 is as follows:

- The Community Official Plan does not contemplate zoning rural land with urban zoning designations to allow urban development. This is a dense residential / institutional care facility and if the intention is to access municipal infrastructure, this development would need to be part of the urban boundary.
- The Infrastructure Master Plan for water and sewer does not include extending services to this rural parcel.
- An expansion of the urban boundary of the Municipality would be required in order to service this parcel of land for this type of development.
- The timing of the project was discussed in the context of the current Official Plan Amendment to expand the urban boundary. A timeline for the next consideration of boundary expansion was put forward and estimated to be 3-4 years.
- Lanark County is starting a review of the County Plan and in particular the population projects for that plan. The revision of population estimates and the

allocation to each municipality will be the foundation of any future analysis to expand the urban boundary.

- Therefore, this project will have to wait until the process is complete in order to start another process to expand the urban boundary and change the zoning of this parcel from Rural to a more suitable urban designation.
- The Minister of Municipal Affairs and Housing has the authority under Section 47 of the *Planning Act* to issue a Ministerial Zoning Order to address some of these concerns.

Following the pre-consultation meeting there have been additional efforts made by both municipal staff and you to understand the powers conferred on the Minister through Section 47.

Staff and our consultant team met with Ministry of Municipal Affairs and Housing staff in a meeting arranged and attended by you and your team members. It was clear in that meeting that the process for the Minister to exercise the authority granted in Section 47 will require a formal request from the Municipality. For Council to consider submitting a request to the Minister additional information is required that addresses key concerns of the Municipality. At a minimum this should include:

- Detailed concept plan for the full parcel or definition of the portion to be developed through this process and the plan for the remainder of the lot,
- Planning brief including rationale and justification for:
    - the proposed use,
    - the need for the use,
    - opinion as to Provincial Policy Statement Consistency,
    - opinion as to conformity to both County and Community Official Plans,
    - the need for the use of Section 47 of the *Planning Act* Order by the Minister,
- Draft of a possible Minister's Zoning Order including all aspects to be addressed in the order including zoning, density, height, setbacks, parking, landscaping and all other constraints generally included in a zoning designation, along with provisions for how servicing would be accommodated as noted below,
- Servicing Analysis of the existing capacity of the Municipal urban water and sewer system and the existence of capacity to service this development including any upgrades that would be required to service the development to the satisfaction of the Municipality,
- Boundary Conditions Study to the satisfaction of the Municipality,
- Stormwater Management Analysis to the satisfaction of the Municipality,
- Transportation Impact Study to the satisfaction of the Municipality,
- Market Analysis of the need for this type of development and its impact on the existing local market for available housing to the satisfaction of the Municipality,

- Environmental Impact Study and Tree Conservation Plan prepared by a qualified Biologist, licensed in the Province of Ontario, to address the environmental impacts of development to the satisfaction of the Municipality,
- Energy Efficiency Report to the satisfaction of the Municipality, and
- Any other supporting materials required, as determined through consultation with staff.

Until Council has the above information it is premature to consider whether Council will make a request to the Minister to use the authority in Section 47 of the *Planning Act*. At this point in time the Municipality has not received an application for development on this parcel. Council does appreciate your efforts to develop additional options for seniors housing and care for our community and looks forward to receiving the necessary information that will assist it in this process. Staff will continue to support and address your concerns/questions with the process. As the developer, it is your responsibility to ensure that the materials you submit for Council consideration contain the appropriate level of information to allow Council to address your request. It was clear in our meeting with Ministerial staff that the Municipality is responsible to conduct its due diligence on this project in the same manner that it would for any project of a similar nature. The Ministerial order does not reduce the liability of the Municipality.

I suggest that we schedule a second pre-consultation meeting so that your consultant team and Municipal staff can discuss the details to be contained in each of the items identified above and any other supporting materials that will form the submission for this project.

Kindest regards,

Ken T. Kelly
Chief Administrative Officer,
Municipality of Mississippi Mills
CC;

The Honourable Steve Clark, Minister of Municipal Affairs and Housing
Mayor and Council, Corporation of the Municipality of Mississippi Mills
Mr. Marc Rivet, JL Richards & Associates Limited
Mr. Tim Chadder, JL Richards & Associates Limited
Mr. Tony Fleming, Cunningham Swan, Carty, Little, and Bonham LLP
Mr. Cory Smith, A/Director Roads and Public Works

Appendix B
Water Distribution

5400 Appleton Side Road Dementia Village
Water Demand Summary

Demand Type	Total No. Units	Total No. Beds	Design Population	Average Day Demand (L/s)	Maximum Day Demand (L/s)	Peak Hour Demand (L/s)
Residential	108	-	232	0.94	2.35	5.17
Institutional	-	276	-	2.88	4.31	7.76
Development Totals			232	**3.81**	**6.66**	**12.93**

Water Demand Parameters

Residential Demand	350	L/c/day
Residential Max Day	2.5	x Avg Day
Residential Peak Hour	2.2	x Max Day
Institutional (Hospital) Demand	900	L/bed/day
Institutional Max Day	1.5	x Avg Day
Institutional Peak Hour	1.8	x Max Day

Fire Flows (per FUS calculations)

Semis -	**117**	L/s
Long-term Care Facility -	**133**	L/s
Apartments -	**133**	L/s
Dementia Pods -	**133**	L/s

Notes:
1) Residential water demand based on J.L. Richards Master Servicing Plan Update Report (2018)
2) Institutional water demand based on City of Ottawa Design Guidelines - Water Distribution (2010)
3) Fireflows calculated as per 2020 Fire Underwriter's Survey Guidelines.

Project No. 123044
Project Name: 5400 Appleton Side Road Dementia Village
Project Location: Almonte, ON

Date: September 2023

Preliminary Water Demands

Daily Demands

Type of Use	Daily Demand Volume		
Residential	350	L/pers./day	from Master Plan Update Report - FINAL - Table 25
Institutional (Hospitals)	900	L/bed/day	from Table 4.2, Ottawa Design Guidelines - Water Distribution

Population Densities

Unit Type	Persons Per Unit
Apartments	1.8
Semi-detached Townhouse Units	2.7

Maximum Day / Peak Hour Factor

Conditions	Residential Factor	Institutional/Commercial Factor
Maximum Day	2.5 x Avg Day	1.5 x Avg Day
Peak Hour	2.2 x Max Day	1.8 x Max Day

Proposed Development Conditions - Dementia Village

			Demand Scenarios		
	No. Units	Population Equivalent	Avg Day (L/s)	Max Day (L/s)	Peak Hour (L/s)
Apartments	66	119	0.48	1.20	2.65
Semi-detached Townhouse Units	42	113	0.46	1.15	2.53
Residential Demand Totals	**108**	**232**	**0.94**	**2.35**	**5.17**
	No. Beds				
Long-term Care Facility	192		2.00	3.00	5.40
Dementia Village	84		0.88	1.31	2.36
Institutional Demand Totals	**276**		**2.88**	**4.31**	**7.76**
Total Water Demands (L/s)			**3.82**	**6.66**	**12.94**

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 123044
Project Name: 5400 Appleton Side Road
Date: 7/11/2023
Input By: Billy McEwen
Reviewed By: Drew Blair

Legend: Input by User; No Information or Input Required

Building Description: 4-Storey Apartments
Fire Resistive Construction

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction C	Wood frame		1.5	0.8	
		Ordinary construction		1		
		Non-combustible construction	Yes	0.8		
		Modified Fire resistive construction (2 hrs)		0.6		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	1565			
		Number of Floors/Storeys	4			
		Protected Openings (1 hr)	No			
		Area of structure considered (m^2)			**4,695**	
	F	**Base fire flow without reductions**				**12,000**
		$F = 220\ C\ (A)^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**			**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**10,200**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**			**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-4,080**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	No	-10%		
				Cumulative Total	**-40%**	
5	**Exposure Surcharge (cumulative %)**				**Surcharge**	
	(3)	North Side	10.1 - 20 m		15%	**1,530**
		East Side	> 45.1m		0%	
		South Side	> 45.1m		0%	
		West Side	> 45.1m		0%	
				Cumulative Total	**15%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**8,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**133**
				or	USGPM	2,114
7	**Storage Volume**	Required Duration of Fire Flow (hours)			Hours	2
		Required Volume of Fire Flow (m^3)			m^3	960

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 123044
Project Name: 5400 Appleton Side Road
Date: 7/11/2023
Input By: Billy McEwen
Reviewed By: Drew Blair

Legend: Input by User; No Information or Input Required

Building Description: 4-Storey Long-term Care Facility
Fire Resistive Construction

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction C	Wood frame		1.5	0.8	
		Ordinary construction		1		
		Non-combustible construction	Yes	0.8		
		Modified Fire resistive construction (2 hrs)		0.6		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	3315			
		Number of Floors/Storeys	4			
		Protected Openings (1 hr)	No			
		Area of structure considered (m^2)			**9,945**	
	F	**Base fire flow without reductions**				**18,000**
		$F = 220\ C\ (A)^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**			**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**15,300**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**			**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-7,650**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	Yes	-10%	-10%	
				Cumulative Total	**-50%**	
5	**Exposure Surcharge (cumulative %)**				**Surcharge**	
	(3)	North Side	> 45.1m		0%	**0**
		East Side	> 45.1m		0%	
		South Side	> 45.1m		0%	
		West Side	> 45.1m		0%	
				Cumulative Total	**0%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**8,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**133**
				or	USGPM	2,114
7	**Storage Volume**	Required Duration of Fire Flow (hours)			Hours	2
		Required Volume of Fire Flow (m^3)			m^3	960

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 123044
Project Name: 5400 Appleton Side Road
Date: 7/11/2023
Input By: Billy McEwen
Reviewed By: Drew Blair

Legend: Input by User; No Information or Input Required

Building Description: 1-Storey Dementia Pods
Fire Resistive Construction

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction C	Wood frame	Yes	1.5	1.5	
		Ordinary construction		1		
		Non-combustible construction		0.8		
		Modified Fire resistive construction (2 hrs)		0.6		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	515			
		Number of Floors/Storeys	1			
		Protected Openings (1 hr)	No			
		Area of structure considered (m^2)			**515**	
	F	**Base fire flow without reductions**				**7,000**
		$F = 220\ C\ (A)^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**			**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**5,950**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**			**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	No	-30%		**0**
		Standard Water Supply	No	-10%		
		Fully Supervised System	No	-10%		
				Cumulative Total	**0%**	
5	**Exposure Surcharge (cumulative %)**				**Surcharge**	
	(3)	North Side	2Hr Fire Wall		10%	**2,083**
		East Side	> 45.1m		0%	
		South Side	3.1 - 10 m		20%	
		West Side	30.1- 45 m		5%	
				Cumulative Total	**35%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**8,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**133**
				or	USGPM	2,114
7	**Storage Volume**	Required Duration of Fire Flow (hours)			Hours	2
		Required Volume of Fire Flow (m^3)			m^3	960

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 123044
Project Name: 5400 Appleton Side Road
Date: 7/11/2023
Input By: Billy McEwen
Reviewed By: Drew Blair

Legend: Input by User; No Information or Input Required

Building Description: 1-Storey Semi-Detached Bungalow
Wood frame

Step			Input		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction **C**	Wood frame	Yes	1.5	1.5	
		Ordinary construction		1		
		Non-combustible construction		0.8		
		Modified Fire resistive construction (2 hrs)		0.6		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	267			
		Number of Floors/Storeys	1			
		Area of structure considered (m^2)			**267**	
	F	**Base fire flow without reductions**				**5,000**
		F = 220 C (A)$^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**			**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**4,250**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**			**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	No	-30%		**0**
		Standard Water Supply	No	-10%		
		Fully Supervised System	No	-10%		
				Cumulative Total	**0%**	
5	**Exposure Surcharge (cumulative %)**				**Surcharge**	
	(3)	North Side	10.1 - 20 m		15%	**2,763**
		East Side	3.1 - 10 m		20%	
		South Side	20.1 - 30 m		10%	
		West Side	3.1 - 10 m		20%	
				Cumulative Total	**65%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**7,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**117**
				or	USGPM	1,849
7	**Storage Volume**	Required Duration of Fire Flow (hours)			Hours	2
		Required Volume of Fire Flow (m^3)			m^3	840

Billy McEwen

From: Drew Blair
Sent: Tuesday, August 22, 2023 3:46 PM
To: Billy McEwen
Subject: FW: 5400 Appleton Side Road - Watermain Boundary Condition Request (123044)
Attachments: SL_1100_A1.0_Option 01_2023.08.22.pdf

FYI

Drew Blair, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH
Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 236
The information contained in this email message is confidential and is for exclusive use of the addressee.

From: Brandon Lawrence <brandon@sjlarchitect.com>
Sent: Tuesday, August 22, 2023 3:18 PM
To: Drew Blair <D.Blair@novatech-eng.com>; Greg Winters <G.Winters@novatech-eng.com>; James Ireland <j.ireland@novatech-eng.com>; Jennifer Luong <j.luong@novatech-eng.com>
Cc: Enzo DiChiara <enzo@prestigeottawa.com>; Claudio Mazzarello <claudio@prestigeottawa.com>; Joe Princiotta <joe@ovlc.com>
Subject: RE: 5400 Appleton Side Road - Watermain Boundary Condition Request (123044)

Hi All,

Attached please find our revised master site plan for your review. I believe we caught all the revisions but please let me know if I missed anything, thank you.

@Drew Blair – please see response below in blue.

@Greg Winters – any update on the recommended secondary emergency access?

Please advise, thank you.

Regards,

Brandon Lawrence, Architect, B.AS, M.Arch, OAA, MRAIC
S.J. Lawrence Architect Incorporated

18 Deakin Street, Suite 205
Nepean, ON K2E 8B7
T: 613.739.7770
E: brandon@sjlarchitect.com
W: sjlarchitect.com

From: Drew Blair <D.Blair@novatech-eng.com>
Sent: Tuesday, August 8, 2023 4:26 PM
To: Brandon Lawrence <brandon@sjlarchitect.com>

Cc: Enzo DiChiara <enzo@prestigeottawa.com>; Greg Winters <G.Winters@novatech-eng.com>
Subject: FW: 5400 Appleton Side Road - Watermain Boundary Condition Request (123044)

Hi Brandon,

We are hoping you can provide some further information on the proposed buildings for the 5400 Appleton Side Road Dementia Village project.

Based on the fire flow results below from JL Richards for our proposed site at 5400 Appleton Side Road, the maximum modelled available fire flow is approximately 144 L/s. Based on Fire Underwriter Survey (FUS) calculations, we can achieve the following required fire flow for each building type:

1) Bungalow Towns – Required FUS Fire Flow = 117 L/s – based on each building spaced a minimum 3m apart. It appears we meet that currently. Correct, we're proposing 4m.
2) 4-Storey Senior's Living Building – Required FUS Fire Flow = 133 L/s – assuming the building will have a fully automated and monitored fire sprinkler system. Please confirm. Yes, it will be sprinklered.
3) 4-Storey Long Term Care Building – Required FUS Fire Flow = 133 L/s – assuming the building will have a fully automated and monitored fire sprinkler system. Please confirm. Yes, it will be sprinklered.
4) Dementia Pods – Required FUS Fire Flow = 133 L/s – To achieve this fire flow, these pods **must** have a 2-hour fire wall constructed between the co-joined buildings so that each building is a maximum of 515 m2 of footprint before being separated by a 2-hour firewall (see attached sketch). OBC fire wall is typically only 1-hour. We have assumed these buildings are wood frame construction and have no sprinklers installed. Please confirm a 2-hour firewall can be installed between pods to limit maximum footprint to 515 m2. Yes, we will provide a 2-hour firewall between the pods.

We would ask if you could please confirm all the above requirements so that the FUS fire flows can be calculated and the hydraulic analysis prepared.

Please let me know if you have any questions and we can discuss further.

Thanks,

Drew

Drew Blair, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH
Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 236
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From: Annie Williams <awilliams@jlrichards.ca>
Sent: Tuesday, August 8, 2023 8:42 AM
To: Drew Blair <D.Blair@novatech-eng.com>; David Shen <dshen@mississippimills.ca>
Cc: Luke Harrington <lharrington@mississippimills.ca>; Greg Winters <G.Winters@novatech-eng.com>; Ahrani Gnananayakan <agnananayakan@jlrichards.ca>; Mark Buchanan <mbuchanan@jlrichards.ca>
Subject: RE: 5400 Appleton Side Road - Watermain Boundary Condition Request (123044)

Hello Drew, David,

Please find attached the requested hydraulic boundary conditions for the following connections as requested by the Developer's Engineer:

- One (1) connection to the existing 250 mm watermain on Industrial Drive, east of Appleton Side Road; and

- One (1) connection to an extension of the existing 300 mm watermain on Appleton Side Road between Ottawa Street and Industrial Drive.

The proposed Development ("5400 Appleton Side Road"), located east of Appleton Side Road and south of Ottawa Street in the Municipality of Mississippi Mills (Municipality), was simulated using the Municipality's existing hydraulic water model (2017) to determine hydraulic boundary conditions based on theoretical water demands and fire flows provided by the Developer's Engineer (refer to attached).

Table 1 summarizes the theoretical water demands that were included in the model.

Table 1: Theoretical Water Demands

Scenario	Demand (L/s)
Average Day	6.6
Maximum Day	14.1
Peak Hour	29.4

The development was modelled with a representative 250 mm diameter on-site watermain loop and junction node J-599 (Elev 150.00 m). The hydraulic boundary conditions were generated at the connection locations labelled as junction nodes J-598 and J-600 in the model and are summarized in Table 2, with the WaterCAD model outputs provided in the attached. The average day scenario assumes an elevated tank level of 180.84 m with all well pumps off. The maximum day plus fire flow and peak hour scenarios assume an elevated tank level of 180.00 m with all well pumps on. **The simulated maximum available fire flow at the representative node is 144 L/s.** Therefore, a fire flow of 117 L/s as calculated by the Developer's Engineer was modelled at the representative node.

Table 2: 5400 Appleton Side Rd. Boundary Conditions

Demand Scenario	Connection 1 – Industrial		Connection 2 – Appleton	
	Junction Node J-598 (Elev 138.35 m)		Junction Node J-600 (Elev 142.50 m)	
	Pressure (kPa)	HGL (m)	Pressure (kPa)	HGL (m)
Average Day (6.6 L/s)	414	180.65	373	180.62
Max Day (14.1 L/s)	406	179.85	365	179.82
Max Day (14.1 L/s) + Fire Flow (117 L/s)	355	174.62	309	174.02
Peak Hour (29.4 L/s)	398	179.06	357	178.95

Note that the foregoing model results are for current conditions and are based on computer model simulation. We have not reviewed the adequacy of the domestic demand nor the fire flow requirements for the proposed development, which remains the responsibility of the Developer's Engineer.

Disclaimer: The model results are based on current simulated operation of the Municipality's water distribution system. The computer model simulation is based on the best information available at this time. The operation of the water distribution system can change on a regular basis, resulting in a variation in the boundary conditions. It is further noted that the operational characteristics of the water supply system and physical properties of the watermains can change and/or deteriorate over time. These changes may affect the supply characteristics of the system and the assumptions made in developing the model, which in turn could lead to variations in the simulation results. This should be considered by any third party undertaking simulation of system upgrades.

Please do not hesitate to contact me should you have any questions regarding the foregoing.

Regards,
Annie

Annie Williams, P.Eng.
Civil Engineer

J.L. Richards & Associates Limited
1000-343 Preston Street, Ottawa, ON K1S 1N4
Direct: 343-803-4523

J.L. Richards & Associates Limited
ENGINEERS · ARCHITECTS · PLANNERS

BEST MANAGED COMPANIES Platinum member

From: Drew Blair <D.Blair@novatech-eng.com>
Sent: Thursday, July 20, 2023 3:55 PM
To: Annie Williams <awilliams@jlrichards.ca>
Cc: David Shen <dshen@mississippimills.ca>; Luke Harrington <lharrington@mississippimills.ca>; Greg Winters <G.Winters@novatech-eng.com>; Ahrani Gnananayakan <agnananayakan@jlrichards.ca>
Subject: RE: 5400 Appleton Side Road - Watermain Boundary Condition Request (123044)

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Hi Annie,

Thanks for this. The owner of 5400 Appleton authorizes you to proceed based on the upset limit costs provided below.

Can the billing please be sent directly to them at the following address:

Chello Building Corp.
c/o Prestige Design and Construction Ltd.
50 Camelot Drive,
Ottawa, ON
K2G 5X8
Attn: Enzo DiChiara

Please let us know if you need anything else.

Thanks,

Drew

Drew Blair, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH
Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 236
The information contained in this email message is confidential and is for exclusive use of the addressee.

From: Annie Williams <awilliams@jlrichards.ca>
Sent: Thursday, July 20, 2023 1:20 PM
To: Drew Blair <D.Blair@novatech-eng.com>

Cc: David Shen <dshen@mississippimills.ca>; Luke Harrington <lharrington@mississippimills.ca>; Greg Winters <G.Winters@novatech-eng.com>; Ahrani Gnananayakan <agnananayakan@jlrichards.ca>
Subject: RE: 5400 Appleton Side Road - Watermain Boundary Condition Request (123044)

Hi Drew,

I have spoken with David Shen at the Municipality and he has given approval for JLR to proceed with this request as follows:

Basic Scope for 5400 Appleton Side Road

1. Proceed with modelling assuming flow rate calculations are correct, to be confirmed by David Shen prior to submission.
2. Provide hydraulic boundary conditions at the two (2) requested connection points, under the following demand scenarios:
    a. Average Day
    b. Peak Hour
    c. Maximum Day + Fire Flow (3 requested fire flows)
3. For Maximum Day + Fire Flow, we will confirm the existing available fire flow if the requested flows exceed the supply capacity.

We will provide the Basic Scope within seven (7) business days. We will work on a time basis to an upset limit of **$3,000** (excl. disbursement and tax).

Thank you,
Annie

Annie Williams, P.Eng.
Civil Engineer

J.L. Richards & Associates Limited
1000-343 Preston Street, Ottawa, ON K1S 1N4
Direct: 343-803-4523

From: Drew Blair <D.Blair@novatech-eng.com>
Sent: Friday, July 14, 2023 10:44 AM
To: David Shen <dshen@mississippimills.ca>
Cc: Greg Winters <G.Winters@novatech-eng.com>; Luke Harrington <lharrington@mississippimills.ca>
Subject: 5400 Appleton Side Road - Watermain Boundary Condition Request (123044)

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi David,

In support of the Ministerial Zoning Order for 5400 Appleton Side Road, we are requesting watermain boundary conditions. The attached information provides the water demands and fire flows, the location and scope of the development and the proposed connection points.

The water demands (excluding fire flow) are:

1. high pressure = 6.6L/s
2. maximum daily = 14.1L/s
3. peak hour = 29.4L/s

The requested fire flows (FUS) are:

1. 117L/s
2. 150L/s
3. 250L/s.

Can you please provide the boundary conditions for:

1. The high pressure and peak hour conditions with the two proposed connection points: one at Industrial Drive and one to the north on Appleton Side Road.
2. The max. daily demand and all noted fire flows with the two proposed connection points: one at Industrial Drive and one to the north on Appleton Side Road.

Please let us know if you have any questions and/or concerns.

Thanks,

Drew

Drew Blair, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH
Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 236
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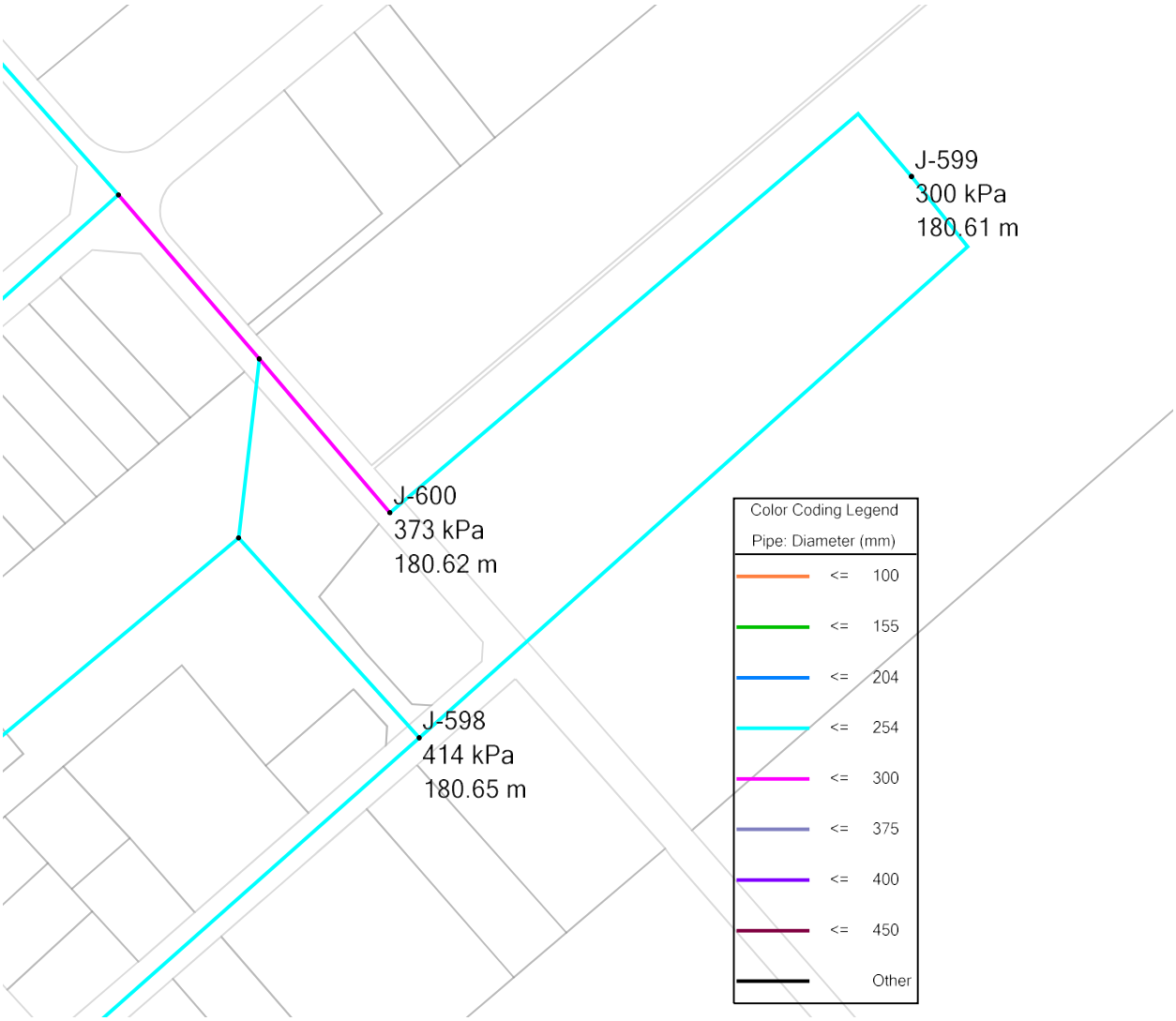
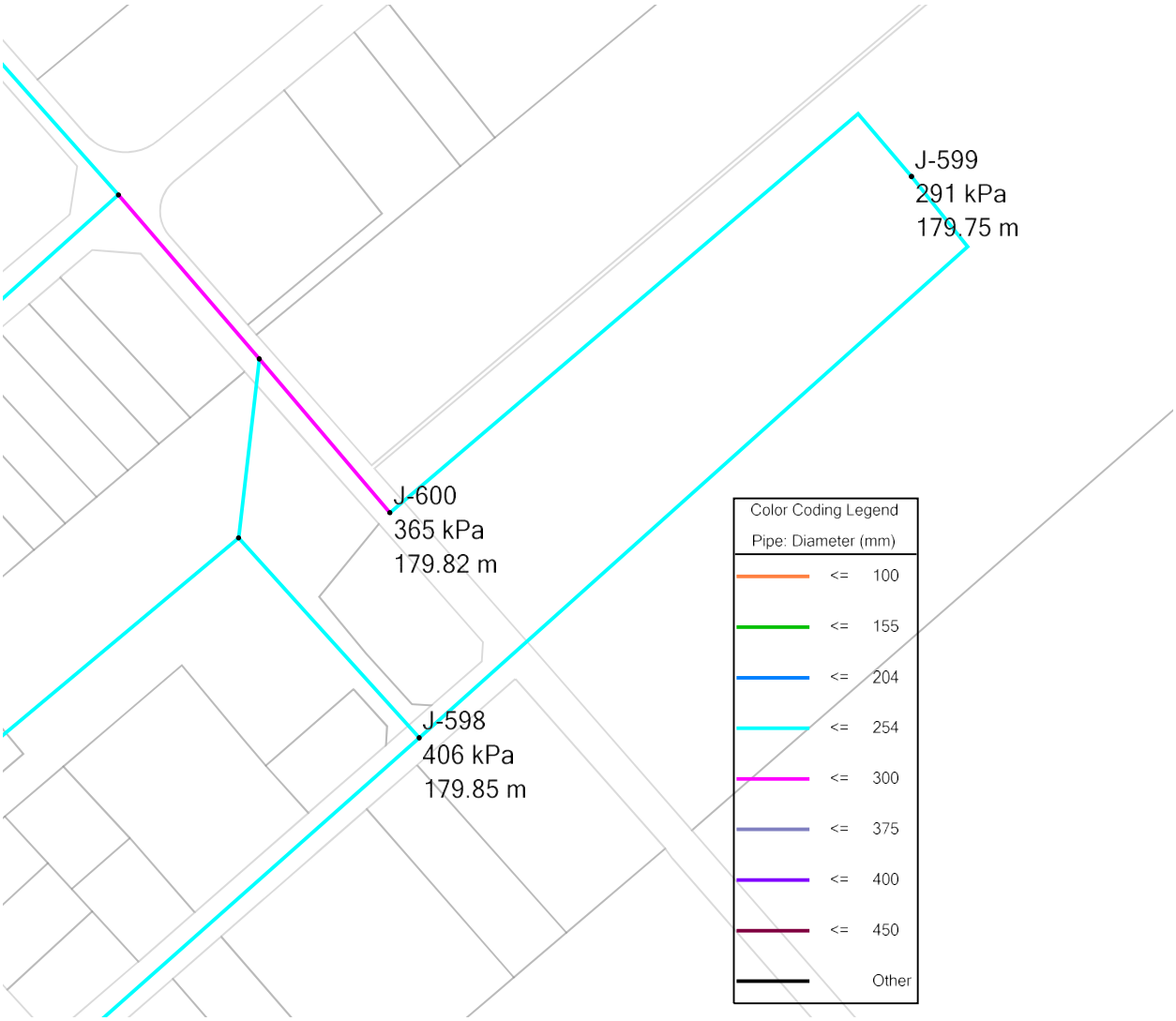
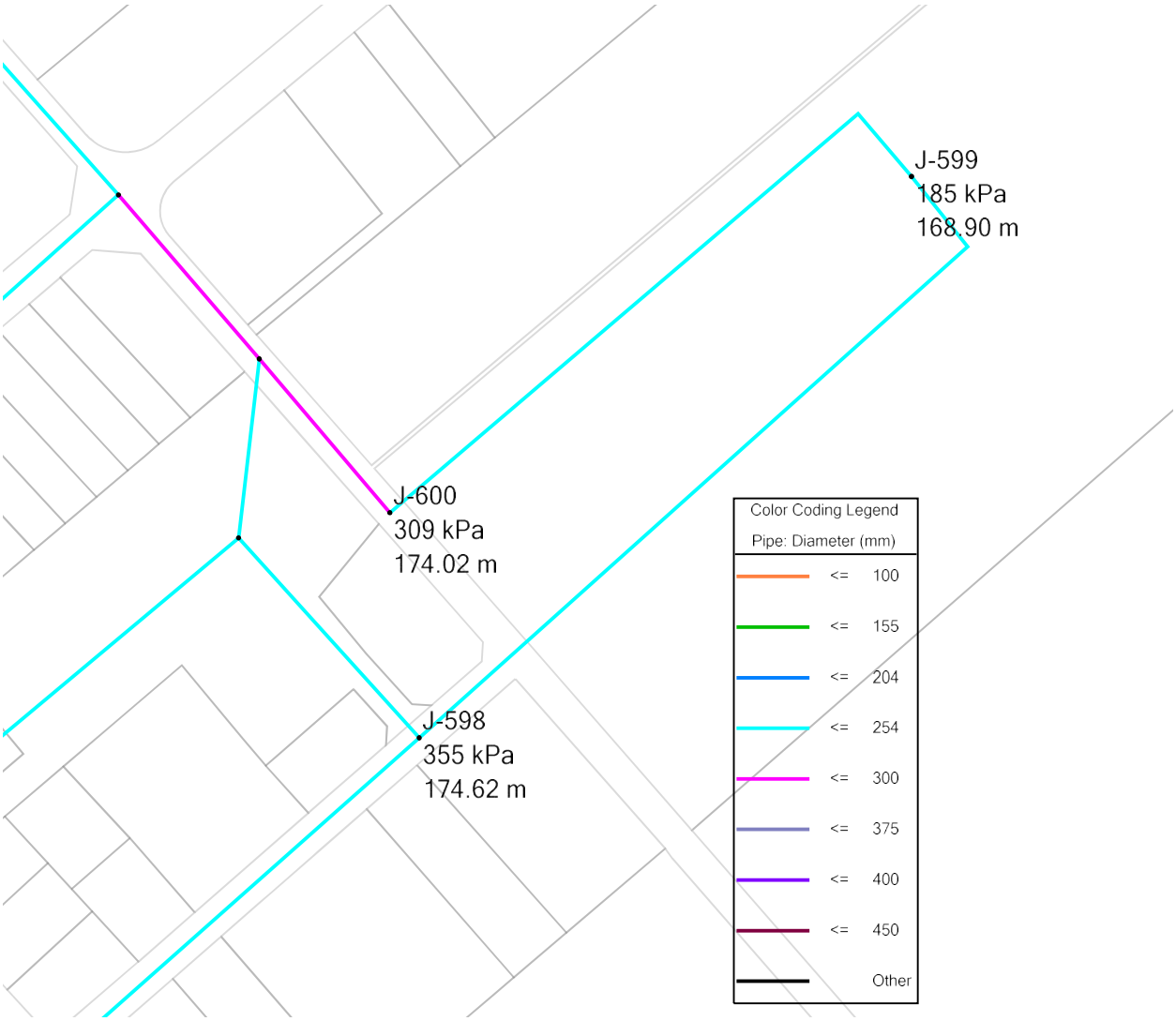
29920-021 5400 Appleton
Average Daily Demand



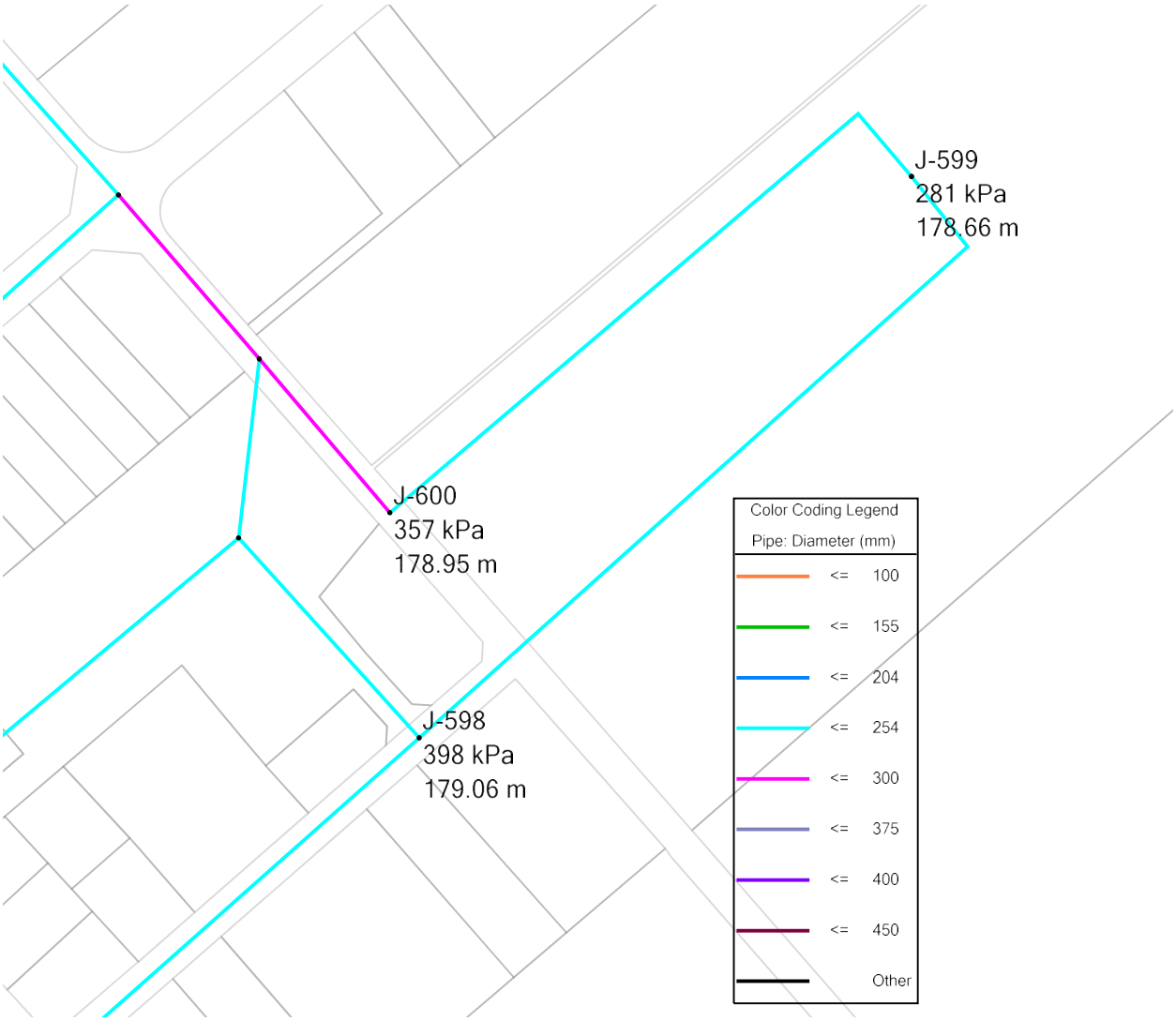
29920-021 5400 Appleton
Maximum Daily Demand



29920-021 5400 Appleton
MDD and 117 L/s Fire Flow



29920-021 5400 Appleton
Peak Hourly Demand



Appendix C
Sanitary Servicing

5400 Appleton Side Road Dementia Village
Sanitary Demand Summary

Demand Type	Total No. Units	Total No. Beds	Design Population	Area (ha)	Peak Sanitary Flow (L/s)
Residential	108	-	232	-	3.76
Institutional	-	276	-	-	2.16
Infiltration	-	-	-	8.10	2.67
			232	**8.10**	**8.59**

Sanitary Demand Parameters

Residential Demand	350	L/c/day
Residential Peak Factor	4.0	
Institutional (Nursing & Rest Homes) Demand	450	L/bed/day
Institutional Peak Factor	1.5	
Infiltration Flow	0.33	L/s/ha

Notes:

1) Residential sanitary demand based on J.L. Richards Master Servicing Plan Update Report (2018)
2) Institutional sanitary demand based on City of Ottawa Sewer Design Guidelines (2010)

Project No. 123044
Project Name: 5400 Appleton Side Road Dementia Village
Project Location: Almonte, ON

NOVATECH
Engineers, Planners & Landscape Architects

Date: Sept 2023

Preliminary Peak Sanitary Flows

Daily Demands

Type of Use	Daily Demand Volume		
Residential	350	L/pers./day	from Master Plan Update Report - FINAL - Table 25
Institutional (Nursing & Rest Homes)	450	L/bed/day	from Appendix 4-A, Ottawa Sewer Design Guidelines

Population Densities

Unit Type	Persons Per Unit
Apartments	1.8
Semi-detached Townhouse Units	2.7

Residential & Industrial Sanitary Peaking Factors

Conditions	Peaking Factor
Residential	4.0
Institutional	1.5

Proposed Development Conditions - Dementia Village

	No. Units	Population Equivalent	Peak Sanitary Flows (L/s)
Apartments	66	119	1.93
Semi-detached Townhouse Units	42	113	1.84
Residential Flow Totals	**108**	**232**	**3.76**
	No. Beds		
Long-term Care Facility	192		1.50
Dementia Village	84		0.66
Institutional Flow Totals	**276**		**2.16**
	Site Area (ha)		
Extraneuos Flows (0.33 L/s/ha)	**8.10**		**2.67**
Total Peak Sanitary Flows (L/s)			**8.59**

Drew Blair

From: Bobby Pettigrew <bpettigrew@jlrichards.ca>
Sent: Tuesday, August 29, 2023 3:15 PM
To: Drew Blair
Cc: David Shen; Mark Buchanan; Greg Winters
Subject: RE: Wastewater Assessment - 5400 Appleton Side Road

Hi David / Drew

Based on the development parameters and '123044-SAN Plan Combined' pdf package provided in the email from Novatech on August 23, we have analysed the wastewater system using the Master Plan modelling.

In the '123044-SAN Plan Combined' pdf package the peak sanitary flow from the site is 26.32 L/s based on a residential population of 1012 (at 350 L/cap/day) and 244 beds (at 450 L/bed/day) with peaking factors at a respective 4 and 1.5, and infiltration at 0.33 L/s/ha for the 24.3 ha development area. The same loading parameters are used in the modelling analysis. However, the master planning level modelling being carried out applies a calibrated daily flow pattern to provide a dynamic input into the model, therefore the average flow based on population and beds will be used rather than peak flow rates incorporating the peaking factor. The extraneous flow is added to the model as a constant. Loading was added to the trunk model at the intersection of Industrial Drive and Ottawa Street, SA4MH-107, based on the proposed connection in the pdf package.

In assessing future capacity two constraints were assessed:

- Maintaining free flow capacity in the dry weather flow scenario; and,
- Maintaining 1.8 metre freeboard to the ground elevation in the 1:25 year return period event storm to protect basements. Where the current sewer is already within the basement elevation the HGL is restricted to 0.3m above the sewer.

In summary:
DWF Event Scenarios:

- No capacity concerns under the DWF event have been triggered by the development in the dynamic calibrated dry weather flow event. There is one downstream sewer segment which is recorded in the model as being on a reverse slope and is flagged under existing conditions.

25-year Storm Events:

- No capacity concerns under the 25-year storm event, have been triggered by the development in the dynamic calibrated dry weather flow event.

Note that the development was simulated in the existing conditions model and does not account for other future developments.

Any questions on the above let me know.

Thanks
Bobby

Bobby Pettigrew, M.Eng., P.Eng.
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Appendix D
Stormwater Drainage

5.0 STORM DRAINAGE

The following sections describe the conceptual stormwater management (SWM) plan for the Mill Valley Estates Development the context of the governing criteria.

5.1 EXISTING CONDITIONS

The site is currently undeveloped consisting mainly of agricultural lands areas that sheet flow east towards an existing ditch that crosses the site at the eastern corner and ultimately discharges into the Mississippi River. **Figure 2** shows existing site conditions and the location of the existing ditch.

Appleton Side Road has a rural cross section and as such, runoff from external drainage areas upstream of the site is conveyed through a network of grassed swales and road side ditches to an existing 1100 mm diameter CSP that crosses Appleton Side Road and discharges into the exiting ditch crossing the site, which will serve as a storm outlet for the majority of the site.

Figure 2: Existing Site Conditions

A hydrologic analysis of the existing condition drainage patterns across the site and external areas tributary to the proposed storm outlet has been done using PCSWMM to estimate the existing peak flows from the site and external areas to the proposed outlet location. Input parameter calculations and a PCSWMM input file example have been included in **Appendix C.2**. The following summarizes the parameters used and assumptions made in the existing conditions model.

- The SCS Dimensionless Unit Hydrograph method was used to generate a runoff response from the undeveloped site and external areas tributary to the proposed outlet location.
- Existing soils were assumed to be hydrologic soil group C to represent stiff brown silty clay to clayey silt and/or glacial till as per the Geotechnical Investigation (Paterson Group, December 2020).
- A weighted CN of 78 was calculated for the overall catchment based on soil type and land use.
- Flow length and slope were calculated based on available LIDAR and existing drainage patterns.

The PCSWMM model was run using the 24-hour and 12-hour SCS Type II distributions for the 5, and 100-year return periods using City of Ottawa IDF parameters. **Table 5.1** summarizes the existing condition peak flows tributary to the proposed outlet.

Table 5.1: Existing Condition Peak Flows

Existing Condition Peak Flow (L/s)	Storm event			
	5yr - 12hr SCS	100yr - 12hr SCS	5yr - 24hr SCS	100yr - 24hr SCS
Site and External Area Tributary to Storm Outlet	545.7	1,673.8	516.0	1,322.1

5.2 PROPOSED STORM DRAINAGE CONDITIONS

The proposed development encompasses 33.4 ha of land at 53% imperviousness and will consist of a mix of townhomes, single family homes, apartments, a future industrial block (Houchaimi Business Park), a community park block, a pump station, a SWM wet pond, and associated transportation and servicing infrastructure. Storm sewers from the site will outlet to a proposed SWM wet pond that will provide quality control and mitigate post development peak flows to pre-development levels up to the 100-year storm. On-site controls (i.e., on-site storage and quality control) will be required within the future Houchaimi Business Park prior to discharging into the Appleton Side Road side ditch.

The site storm sewer infrastructure and proposed SWM wet pond have been sized to service the future Mill Valley Retirement Community, which encompasses 3.9 ha of land, with an assumed 71% imperviousness.

Inlet control devices at road low points will be used to restrict inflow rates to the sewer to the 5-year runoff. Major system peak flows from the majority of the site, with the exception of the Houchaimi Business Park, will be directed south towards the SWM wet pond a shown on **Drawing OSD-1**.

5.2.1 Proposed Ditch Realignment

The existing ditch that crosses the eastern corner of the site conveys runoff from the southern Appleton Side Road side ditch, as well as runoff from an existing 1100 mm diameter CSP crossing Appleton Side Road. The existing ditch runs in a south-western direction for approximately 1.1 km and ultimately discharges into the Mississippi River.

Figure 3 shows the overall drainage plan which includes proposed site and external areas tributary to the SWM wet pond, the future Houchaimi Business Park block which will provide on-site controls prior to discharging to the Appleton Side Road side ditch, as well as external upstream areas tributary to the proposed ditch realignment.

As part of the proposed development, it is proposed to realign a section of the existing ditch that crosses the site as shown on the conceptual grading plan **Drawing GP-1**.

5.2.2 Future Houchaimi Business Park Block

Stormwater management for the future business park block will be provided on-site to provide 'Enhanced' water quality control and to control post development peak flows to pre-development levels up to the 100-year storm prior to discharging into the Appleton Side Road side ditch.

As a result, the industrial block (Area IND-1) has been modeled as an undeveloped catchment, which results in 5-year and 100-year post development target peak outflows of 196 L/s and 638 L/s respectively.

5.3 SWM CRITERIA

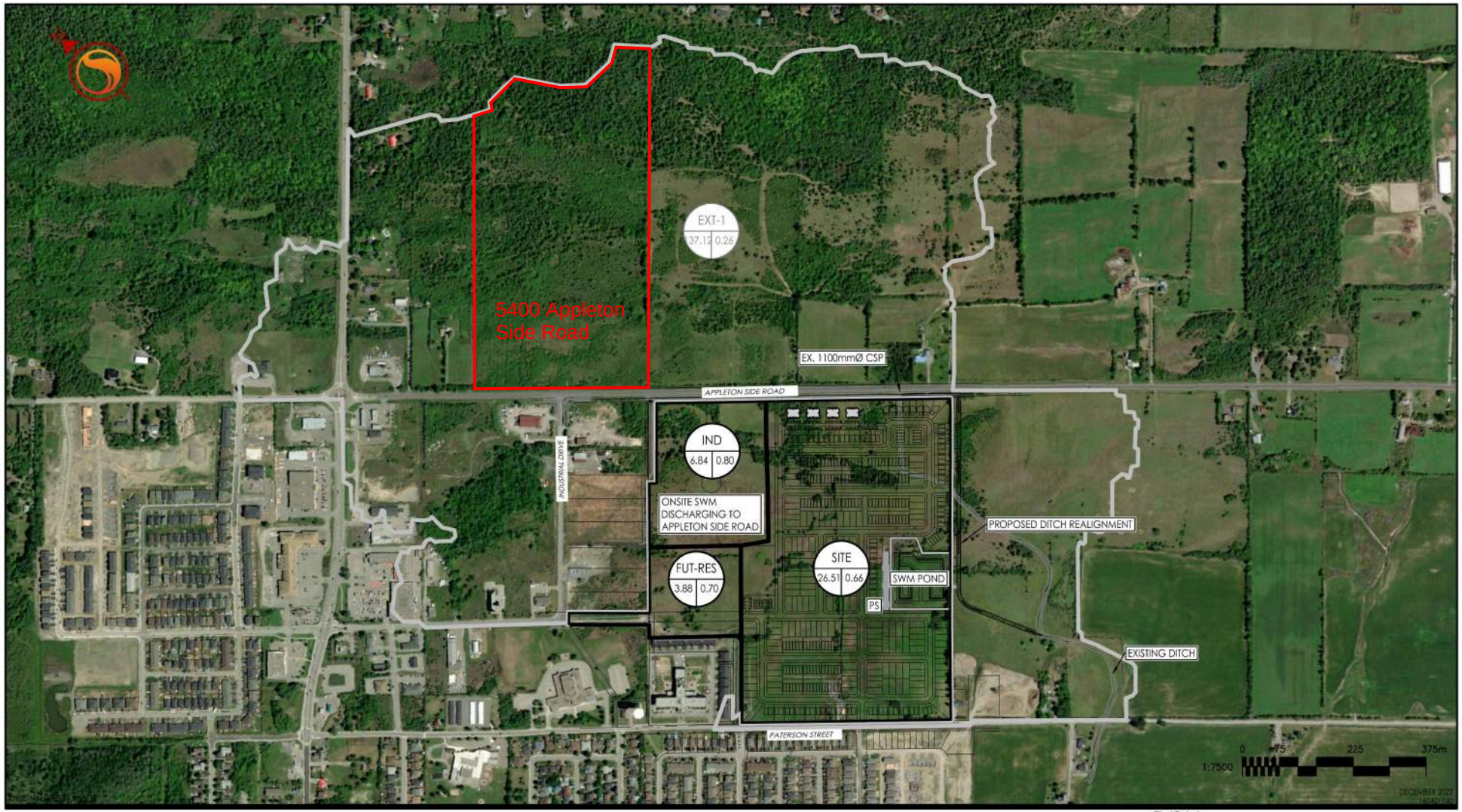
The following summarizes the SWM criteria for the proposed development.

- SWM facility to be designed to provide 'Enhanced' level of treatment as per MECP recommendations which represents an equivalent 80% TSS removal.
- Post development peak flows up to the 100-year storm event to be restricted to pre-development levels.
- Provide adequate conveyance of emergency flows off site.
- Provide best management practices to prevent disturbances to the receiving environment.
- Size storm sewers for the 5-year event under free flow conditions.

5.4 CONCEPTUAL DESIGN METHODOLOGY

The conceptual design methodology for the SWM component of the development is as follows:

- Provide a conceptual pond configuration that meets Ministry of the Environment, Conservation and Parks (MECP) requirements for quality control for the proposed site and external areas.
- Restrict inflows to the sewer to the 5-year rate in all areas.
- Produce a preliminary PCSWMM model that generates major and minor system hydrographs and that routes the hydrographs through a hydraulic model.
- Incorporate the conceptual SWM pond and outlet structure into the model and optimize the proposed SWM pond stage-storage-discharge relationship while assessing the effects of the pond water levels on the hydraulic grade line (HGL) across the site.
- Assess the resulting 100-year hydraulic grade line to provide the lowest underside of footing (USF) allowed for the proposed units to be used during detailed design in order to maintain a minimum clearance of 0.3 m between USF and 100-year HGL.
- Estimate external drainage peak flows tributary the existing 1100 CSP and the proposed ditch realignment and assess hydraulic performance of the proposed ditch.



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2022/12/01 8:50 AM By: Johnson, Warren

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Legend

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AREA ID
RUNOFF COEFFICIENT
STORM DRAINAGE AREA ha.
STORM DRAINAGE BOUNDARY
EXISTING STORM DRAINAGE BOUNDARY

Notes

Client/Project
HOUXHIAMI HOLDINGS INC.
MILL VALLEY ESTATES

Figure No.
3.0

Title
OVERALL STORM DRAINAGE PLAN

The site will be designed using the "dual drainage" principle, whereby the minor (pipe) system is designed to convey the peak rate of runoff from the 5-year design storm and runoff from larger events is conveyed by both minor (pipe) and major (overland) channels, such as roadways and walkways, safely off site without impacting proposed or existing downstream properties.

Drawing OSD-1 outlines the conceptual storm sewer alignment, conceptual pond configuration and water levels, and drainage divides and labels.

5.5 MODELLING RATIONALE

A hydrologic modeling exercise was completed with PCSWMM, accounting for the estimated major and minor systems to evaluate the storm sewer infrastructure, assess the proposed SWM pond hydraulic performance and assess the hydraulic conveyance capacity of the realigned ditch. The use of PCSWMM for modeling of the site hydrology and hydraulics allowed for an analysis of the systems response during various storm events. The following assumptions were applied to the conceptual model:

- Used the 5-year and 100-year, 3-hour Chicago Storm distribution for sewer sizing and HGL analysis, and the 100-year, 12-hour and 24-hour SCS Type II distribution for HGL analysis and pond and ditch realignment hydraulic performance assessment.
- Percent imperviousness estimated based on proposed land use.
- Subcatchment areas are preliminary lumped areas.
- The width parameter was measured as twice the road/rear yard swale for two-sided catchments and equal to the length of the road/rear yard swale for one-sided catchments. The width parameter for urban external drainage areas and future Mill Valley Living block was defined as 225 m/ha as per the City of Ottawa Sewer Design Guidelines.
- Minor system inflow from each subcatchment was restricted with outlet curves as necessary to maintain 5-year inflow target rates at the assumed catchbasin grate elevation and increased by 10% for a total flow depth of 40 cm.
- No surface ponding has been assumed for conservatism. However, in order to account for surface routing, the major system has been created such that the total street length at 0.5% within each subcatchment is represented in the model.
- Major system conduits defined to represent the proposed right of way (ROW) cross-section.

5.5.1 SWMM Dual Drainage Methodology

The proposed development is modeled in one modeling program as a dual conduit system (see **Figure 4**), with: 1) circular conduits representing the sewers & junction nodes representing manholes; 2) irregular conduits using street-shaped cross-sections to represent the approximate overland road network and storage nodes representing catchbasins. The dual drainage systems are connected via outlet link objects