

SERVICING & STORMWATER MANAGEMENT REPORT

476 WILBROD STREET, OTTAWA



Building Perspective Prepared by Arca-Verde Architecture Inc.

Project No.: CCO-22-3130

City File No.: D07-12-22-0051

Prepared for:

Sleepwell Property Management
423 Bronson Avenue
Ottawa, Ontario
K1R 6J5

Prepared by:

McIntosh Perry Consulting Engineers Ltd.
115 Walgreen Road
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April 27th, 2022

Revised September 12th, 2022

McINTOSH PERRY

TABLE OF CONTENTS

1.0	PROJECT DESCRIPTION	1
1.1	<i>Purpose</i>	1
1.2	<i>Site Description</i>	1
1.3	<i>Proposed Development and Statistics</i>	2
1.4	<i>Existing Conditions and Infrastructures</i>	2
1.5	<i>Approvals</i>	2
2.0	BACKGROUND STUDIES, STANDARDS, AND REFERENCES.....	3
2.1	<i>Background Reports / Reference Information</i>	3
2.2	<i>Applicable Guidelines and Standards</i>	3
3.0	PRE-CONSULTATION SUMMARY	4
4.0	WATERMAIN	5
4.1	<i>Existing Watermain</i>	5
4.2	<i>Proposed Watermain</i>	5
5.0	DESIGN	7
5.1	<i>Existing Sanitary Sewer</i>	7
5.2	<i>Proposed Sanitary Sewer</i>	7
6.0	STORM SEWER DESIGN	9
6.1	<i>Existing Storm Sewers</i>	9
6.2	<i>Proposed Storm Sewers</i>	9
7.0	PROPOSED STORMWATER MANAGEMENT	10
7.1	<i>Design Criteria and Methodology</i>	10
7.2	<i>Runoff Calculations</i>	10
7.3	<i>Pre-Development Drainage</i>	10
7.4	<i>Post-Development Drainage</i>	11
8.0	EROSION AND SEDIMENT CONTROL.....	12
8.1	<i>Temporary Measures</i>	12
8.2	<i>Permanent Measures</i>	12
9.0	SUMMARY	13

10.0 RECOMMENDATION.....	14
11.0 STATEMENT OF LIMITATIONS.....	15

LIST OF TABLES

Table 1: Water Supply Design Criteria	5
Table 2: Summary of Estimated Water Demand	5
Table 3: Boundary Conditions Results	6
Table 4: Fire Protection Confirmation.....	6
Table 5: Sanitary Design Criteria.....	7
Table 6: Summary of Estimated Sanitary Flow	7
Table 7: Pre-Development Runoff Summary.....	11
Table 8: Required Restricted Flow	11
Table 9: Post-Development Runoff Summary	11

APPENDICES

Appendix A: Site Location Plan

Appendix B: Background Documents

Appendix C: Watermain Calculations

Appendix D: Sanitary Calculations

Appendix E: Pre-Development Drainage Plan

Appendix F: Post-Development Drainage Plan

Appendix G: Stormwater Management Calculations

Appendix H: City of Ottawa Design Checklist

1.0 PROJECT DESCRIPTION

1.1 Purpose

McIntosh Perry (MP) has been retained by Sleepwell Property Management to prepare this Servicing and Stormwater Management Report in support of the Site Plan Control for the proposed development located at 476 Wilbrod Street within the City of Ottawa.

The main purpose of this report is to present a servicing and stormwater management design for the development in accordance with the recommendations and guidelines provided by the City of Ottawa (City), the Rideau Valley Conservation Authority (RVCA), and the Ministry of the Environment, Conservation and Parks (MECP). This report will address the water, sanitary, and storm sewer servicing for the development, ensuring that existing and available services will adequately service the proposed development.

This report should be read in conjunction with the following drawings:

- CCO-22-3130, C101 – Grading, Drainage, Erosion, Sediment Control, and Servicing Plan
- CCO-22-3130, PRE – Pre-Development Drainage Area Plan (*Appendix E*)
- CCO-22-3130, POST – Post-Development Drainage Area Plan (*Appendix F*)

1.2 Site Description



Figure 1: Site Map

The subject property, herein referred to as the site, is located at 476 Wilbrod Street within the Rideau-Vanier Ward. The site covers approximately 0.09 ha and is located along Wilbrod Street between Cobourg Street and Charlotte Street. The site is zoned for Residential Fifth Density (R5B H (18)). See Site Location Plan in Appendix A for more details.

1.3 Proposed Development and Statistics

The proposed development consists of a 3-storey residential building addition to the existing residential building. Additionally, the development proposes a second and third storey addition to the existing 1-storey addition in the rear. The proposed development will contain 20 residential units. Refer to *Site Plan* prepared by Arca-Verde Architecture Inc in *Appendix B* for further details.

1.4 Existing Conditions and Infrastructures

The site currently contains a 2^{1/2}-storey detached building with a 1-storey rear addition.

Sewer and watermain mapping collected from the City of Ottawa indicate that the following services exist across the property frontages within the adjacent municipal rights-of-way(s):

- ❖ Wilbrod Street
 - 305 mm diameter DI watermain,
 - 250 mm diameter PVC sanitary sewer, and
 - A 900 mm diameter Concrete storm sewer tributary to the Rideau River approximately 0.27 km downstream.

1.5 Approvals

The proposed development is subject to the City of Ottawa site plan control process. Site plan control requires the City to review, provided concurrence and approve the engineering design package. Permits to construct can be requested once the City has issued a site plan agreement.

An Environmental Compliance Approval (ECA) through the Ministry of Environment, Conservation and Parks (MECP) is not anticipated for the development since the site is located on one parcel of land, does not propose industrial usage, and is not located within a combined sewershed. As a result, the stormwater management system meets the exemption requirements under O.Reg 525/90.

2.0 BACKGROUND STUDIES, STANDARDS, AND REFERENCES

2.1 Background Reports / Reference Information

As-built drawings of existing services, provided by the City of Ottawa Information centre, within the vicinity of the proposed site were reviewed in order to identify infrastructure available to service the proposed development.

A topographic survey (22-3223) of the site was completed by McIntosh Perry Surveying Inc. and dated March 1st, 2022.

The Site Plan (A000) was prepared by Arca-Verde Architecture Inc. and dated February 10th, 2022 (*Site Plan*).

2.2 Applicable Guidelines and Standards

City of Ottawa:

- ◆ Ottawa Sewer Design Guidelines, City of Ottawa, SDG002, October 2012. (*Ottawa Sewer Guidelines*)
 - Technical Bulletin ISTB-2014-01 City of Ottawa, February 2014. (*ISTB-2014-01*)
 - Technical Bulletin PIEDTB-2016-01 City of Ottawa, September 2016. (*PIEDTB-2016-01*)
 - Technical Bulletin ISTB-2018-01 City of Ottawa, January 2018. (*ISTB-2018-01*)
 - Technical Bulletin ISTB-2018-03 City of Ottawa, March 2018. (*ISTB-2018-03*)
 - Technical Bulletin ISTB-2019-01 City of Ottawa, January 2019. (*ISTB-2019-01*)
 - Technical Bulletin ISTB-2019-02 City of Ottawa, February 2019. (*ISTB-2019-02*)
- ◆ Ottawa Design Guidelines – Water Distribution City of Ottawa, July 2010. (*Ottawa Water Guidelines*)
 - Technical Bulletin ISD-2010-2 City of Ottawa, December 15, 2010. (*ISD-2010-2*)
 - Technical Bulletin ISDTB-2014-02 City of Ottawa, May 2014. (*ISDTB-2014-02*)
 - Technical Bulletin ISTB-2018-02 City of Ottawa, March 2018. (*ISTB-2018-02*)

Ministry of Environment, Conservation and Parks:

- ◆ Stormwater Planning and Design Manual, Ministry of the Environment, March 2003. (*MECP Stormwater Design Manual*)
- ◆ Design Guidelines for Sewage Works, Ministry of the Environment, 2008. (*MECP Sewer Design Guidelines*)

Other:

- ◆ Water Supply for Public Fire Protection, Fire Underwriters Survey, 2020. (*FUS Guidelines*)

3.0 PRE-CONSULTATION SUMMARY

A pre-consultation meeting was held with City staff on December 21st, 2021, regarding the proposed site servicing. Specific design parameters to be incorporated within this design include the following:

- Pre-development and post-development flows shall be calculated using a time of concentration (T_c) no less than 10 minutes.
- Control 5 through 100-year post-development flows to the 5-year pre-development flows with a combined C value to a maximum of 0.50.

4.0 WATERMAIN

4.1 Existing Watermain

There is an existing 305 mm diameter DI watermain within Wilbrod Street. The site is located within the 1W pressure zone, as per the Water Distribution System mapping included in *Appendix C*. There are two municipal hydrants on Wilbrod Street and two municipal hydrants on Charlotte Street available to service the proposed development. For hydrant locations, see the Hydrant Coverage Figure included in *Appendix C*.

4.2 Proposed Watermain

It is proposed to service the proposed building addition through the existing building. A mechanical consultant will need to review and confirm whether upgrades to the existing building are required to accommodate the addition.

Table 1, below, summarizes the water supply design criteria obtained from the *Ottawa Water Guidelines* and utilized for the water analysis.

Table 1: Water Supply Design Criteria

Site Area	0.09 ha
Residential	280 L/day/person
Residential Apartment – 1 Bedroom	1.4 person/unit
Max Day Peaking Factor - Residential	9.5 x avg. day
Peak Hour Peaking Factor - Residential	14.3 x avg. day

The water analysis results have been summarized in *Table 2*, below. The fire flow demand accounted for both the existing floor area and the proposed area.

Table 2: Summary of Estimated Water Demand

Design Parameter	Total Flow (L/s) Proposed
Average Daily Demand	0.09
Max Day Demand	0.86
Max Day Demand + FUS (200 L/s)	200.86
Peak Hour Demand	1.30

The Fire Underwriters Survey 2020 (FUS) method was utilized to estimate the required fire flow for the site. Fire flow requirements were calculated per City of Ottawa Technical Bulletin *ISTB-2018-02*. The following parameters were assumed:

- ❖ Type of construction – Wood Frame Construction
- ❖ Occupancy Type – Limited Combustible
- ❖ Sprinkler Protection – Non-Sprinklered System

The results of the calculations yielded a required fire flow of 12,000 L/min. The detailed calculations for the FUS can be found in *Appendix C*.

The City provided the estimated water pressures at both for the average day scenario, peak hour scenario and the max day plus fire flow scenario for the demands indicated by the correspondence in *Appendix C*. The resulting pressures for the boundary conditions results are shown in *Table 3*, below.

Table 3: Boundary Conditions Results

Scenario	Proposed Demands (L/S)	Connection 1 HGL (m H ₂ O)* /kPa
Average Day Demand	0.09	47.2 / 463.0
Maximum Daily + Fire Flow Demand	200.86	38.2 / 374.7
Peak Hourly Demand	1.30	37.9 / 371.8

**Adjusted for an estimated ground elevation of 58.75m above the connection point for connection.*

The normal operating pressure range is anticipated to be 372 kPa to 463 kPa and will not be less than 275 kPa (40 psi) or exceed 689 kPa (100 psi). The proposed watermains will meet the minimum required 20 psi (140 kPa) from the *Ottawa Water Guidelines* at the ground level under maximum day demand and fire flow conditions.

To confirm the adequacy of fire flow to protect the proposed development, public fire hydrants within 150 m of the proposed building were analysed per City of Ottawa *ISTB 2018-02* Appendix I Table 1. Based on City guidelines (*ISTB-2018-02*), the existing hydrants can provide adequate fire protection to the proposed development. The results are summarized in *Table 4*, below.

Table 4: Fire Protection Confirmation

Building	Fire Flow Demand (L/min.)	Fire Hydrant(s) within 75m	Fire Hydrant(s) within 150m	Combined Fire Flow (L/min.)
476 Wilbrod Street	12,000 (FUS)	0	4 public	15,200

5.0 SANITARY DESIGN

5.1 Existing Sanitary Sewer

There is an existing 250 mm diameter sanitary sewer within Wilbrod Avenue, fronting the subject site. The subject site currently contributes wastewater to the Wilbrod Avenue sewer system.

The existing building is serviced via a 100-125mm diameter ABS/Transite/PVC service. CCTV inspection of the existing sanitary service was completed by Drain-All on August 25, 2022. The footage revealed fine roots at two joints.

5.2 Proposed Sanitary Sewer

It is proposed to service the proposed building addition through the existing building. A mechanical consultant will need to review and confirm whether upgrades to the existing building are required to accommodate the addition.

Table 5, below, summarizes the wastewater design criteria identified by the *Ottawa Sewer Guidelines*.

Table 5: Sanitary Design Criteria

Design Parameter	Value
Site Area	0.09 ha
Residential	280 L/person/day
1 Bedroom Apartment	1.4 persons/unit
Residential Peaking Factor	3.69
Extraneous Flow Allowance	0.33 L/s/ha

Table 6, below, summarizes the estimated wastewater flow from the proposed development. Refer to *Appendix D* for detailed calculations.

Table 6: Summary of Estimated Sanitary Flow

Design Parameter	Total Flow (L/s)
Total Estimated Average Dry Weather Flow	0.10
Total Estimated Peak Dry Weather Flow	0.35

Total Estimated Peak Wet Weather Flow	0.37
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The full flowing capacity of a 100 mm diameter sanitary service at an assumed slope of 1.0% is estimated to be 5.39 L/s. Based on *Table 6*, above, the existing sanitary service is adequately sized for the proposed development.

6.0 STORM SEWER DESIGN

6.1 Existing Storm Sewers

Stormwater runoff from the site is currently tributary to the Rideau River within the Lower Rideau River sub-watershed. There is an existing 900 mm diameter storm sewer within Wilbrod Street that is available to service the site. The existing sewer is tributary to the Rideau River approximately 0.27 km downstream (outlet ID OUT04451).

6.2 Proposed Storm Sewers

A new 250 mm diameter storm service is proposed to be extended from the 900 mm storm sewer within Wilbrod Street to the rear of the site. Refer to drawing *C101* for a detailed servicing layout.

Runoff from the parking area and rear yard will be collected and conveyed to a catch basin in the parking area. An ICD will then be used to limit the flow to the specified allowable release rate. Flows in excess of the allowable release rate will be directed to a storage system in the rear yard. For calculation purposes a Tempest LMF55 was used to estimate a reasonable ICD flow. Other products maybe specified at detailed design so long as release rates and storage volumes are respected.

Foundation drainage is proposed to be conveyed without flow attenuation through the existing building.

See CCO-22-3130 - *POST* include in *Appendix F* of this report for more details. The Stormwater Management design for the subject property will be outlined in *Section 7.0* of this report.

7.0 PROPOSED STORMWATER MANAGEMENT

7.1 Design Criteria and Methodology

The following design criteria have been employed in developing the stormwater management design for the site as directed by the City and the RVCA:

Quality Control

- Quality controls are not required for the site based on correspondence with the RVCA included in *Appendix B*.

Quantity Control

- Any storm events greater than 5-year, up to 100-year, and including the 100-year storm event must be detained on site.

7.2 Runoff Calculations

Runoff calculations presented in this report are derived using the Rational Method, given as:

$$Q = 2.78CIA \text{ (L/s)}$$

Where:	C	= Runoff coefficient
	I	= Rainfall intensity in mm/hr (City of Ottawa IDF curves)
	A	= Drainage area in hectares

It is recognized that the Rational Method tends to overestimate runoff rates. As a result, the conservative calculation of runoff ensures that any SWM facility sized using this method is expected to function as intended. The following coefficients were used to develop an average C for each area:

Roofs/Concrete/Asphalt	0.90
Undeveloped and Grass	0.20

As per the *City of Ottawa - Sewer Design Guidelines*, the 5-year balanced 'C' value must be increased by 25% for a 100-year storm event to a maximum of 1.0.

7.3 Pre-Development Drainage

It has been assumed that the site contains no stormwater management controls for flow attenuation. Runoff from the existing roof is directed towards the side yard. Surface runoff flows overland towards Wilbrod Street and Charlotte Street. The estimated pre-development peak flows for the 5 and 100-year events within the development area are summarized below in *Table 7*. See CCO-22-3130 - PRE in *Appendix E* and *Appendix G* for calculations.

Table 7: Pre-Development Runoff Summary

Drainage Area	Area (ha)	C (5-Year)	C (100-Year)	Q (L/s)	
				5-Year	100-Year
A1	0.04	0.58	0.66	7.14	13.85

7.4 Post-Development Drainage

To meet the stormwater objectives the development will contain underground storage.

Based on the criteria listed in *Section 7.2.1*, the development will be required to restrict flow to the 5-year storm event. It is estimated that the target release rate during the 100-year event will be 6.15 L/s based on the development area of 0.0424 ha. Please see summary in *Table 8*, below.

Table 8: Required Restricted Flow

Drainage Area	Area (ha)	C (5-Year)	Q (L/s) 5-Year
A1	0.0424	0.5	6.15

The proposed site drainage limits are demonstrated on the Post-Development Drainage Area Plan. See CCO-22-3130 - *POST* in *Appendix F* of this report for more details. A summary of the post-development runoff calculations can be found below.

Table 9: Post-Development Runoff Summary

Drainage Area	Area (ha)	Unrestricted Flow (L/s)		Restricted Flow (L/s)		100-year Storage Required (m ³)	100-year Storage Available (m ³)
		5-Year	100-Year	5-Year	100-Year		
B1	0.04	6.75	13.02	2.30	2.60	7.39	16.00
B2	0.01	1.66	3.16	1.66	3.16		
Total	0.04	8.41	16.19	3.96	5.76	7.39	16.00

Runoff from area B1 will be collected by a catchbasin and a rear yard landscaping catchbasin. Flow from area B1 will be restricted using an ICD within CB1, with excess flow being diverted to the underground storage system. Area B1 will have a maximum release rate of 3.16 L/s and will provide up to 16 m³ of storage.

Runoff from area B2 will be unrestricted and maintain existing drainage patterns.

Foundation drainage is proposed to be connected to the existing building drainage systems. The internal servicing layout is to be reviewed by the mechanical engineer.

8.0 EROSION AND SEDIMENT CONTROL

8.1 Temporary Measures

Before construction begins, temporary silt fence, straw bale or rock flow check dams will be installed at all-natural runoff outlets from the property. It is crucial that these controls be maintained throughout construction and inspection of sediment and erosion control will be facilitated by the Contractor or Contract Administration staff throughout the construction period.

Silt fences will be installed where shown on the final engineering plans, specifically along the downstream property limits. The Contractor, at their discretion or at the instruction of the City, Conservation Authority or the Contract Administrator shall increase the quantity of sediment and erosion controls on-site to ensure that the site is operating as intended and no additional sediment finds its way off site. The rock flow, straw bale & silt fence check dams and barriers shall be inspected weekly and after rainfall events. Care shall be taken to properly remove sediment from the fences and check dams as required. Fibre roll barriers are to be installed at all existing curb inlet catch basins and filter fabric is to be placed under the grates of all existing catch basins and manholes along the frontage of the site and any new structures immediately upon installation. The measures for the existing/proposed structures are to be removed only after all areas have been paved. Care shall be taken at the removal stage to ensure that any silt that has accumulated is properly handled and disposed of. Removal of silt fences without prior removal of the sediments shall not be permitted.

Although not anticipated, work through winter months shall be closely monitored for erosion along sloped areas. Should erosion be noted, the Contractor shall be alerted and shall take all necessary steps to rectify the situation. Should the Contractor's efforts fail at remediating the eroded areas, the Contractor shall contact the City and/or Conservation Authority to review the site conditions and determine the appropriate course of action. As the ground begins to thaw, the Contractor shall place silt fencing at all required locations as soon as ground conditions warrant. Please see the *Site Grading, Drainage and Sediment & Erosion Control Plan* for additional details regarding the temporary measures to be installed and their appropriate OPSD references.

8.2 Permanent Measures

It is expected that the Contractor will promptly ensure that all disturbed areas receive topsoil and seed/sod and that grass be established as soon as possible. Any areas of excess fill shall be removed or levelled as soon as possible and must be located a sufficient distance from any watercourse to ensure that no sediment is washed out into the watercourse. As the vegetation growth within the site provides a key component to the control of sediment for the site, it must be properly maintained once established. Once the construction is complete, it will be up to the landowner to maintain the vegetation and ensure that the vegetation is not overgrown or impeded by foreign objects.

9.0 SUMMARY

- A 2nd and 3rd-storey addition to the existing building and 3-storey building addition is proposed to be constructed at 476 Wilbrod Street. The *Site Plan* proposes a total of 20 residential units, with street access from Charlotte Street.
- The FUS method estimated fire flow indicated that *12,000 L/min* is required for the proposed development.
- The development is estimated to have a peak wet weather flow of *0.37 L/s*.
- Based on City of Ottawa guidelines and a development area of 0.04 ha, the development will be required to attenuate post-development 5 and 100-year flows to the 5-year release rate of *6.15 L/s*.
- To meet the stormwater objectives the development will contain *16 m³* of underground storage for flow attenuation; and
- Quality controls are not required for the development based on correspondence with the RVCA.

10.0 RECOMMENDATION

Based on the information presented in this report, we recommend that City of Ottawa approve this Servicing and Stormwater Management report in support of the proposed development at 476 Wilbrod Street.

This report is respectfully being submitted for approval.

Regards,

McIntosh Perry Consulting Engineers Ltd.



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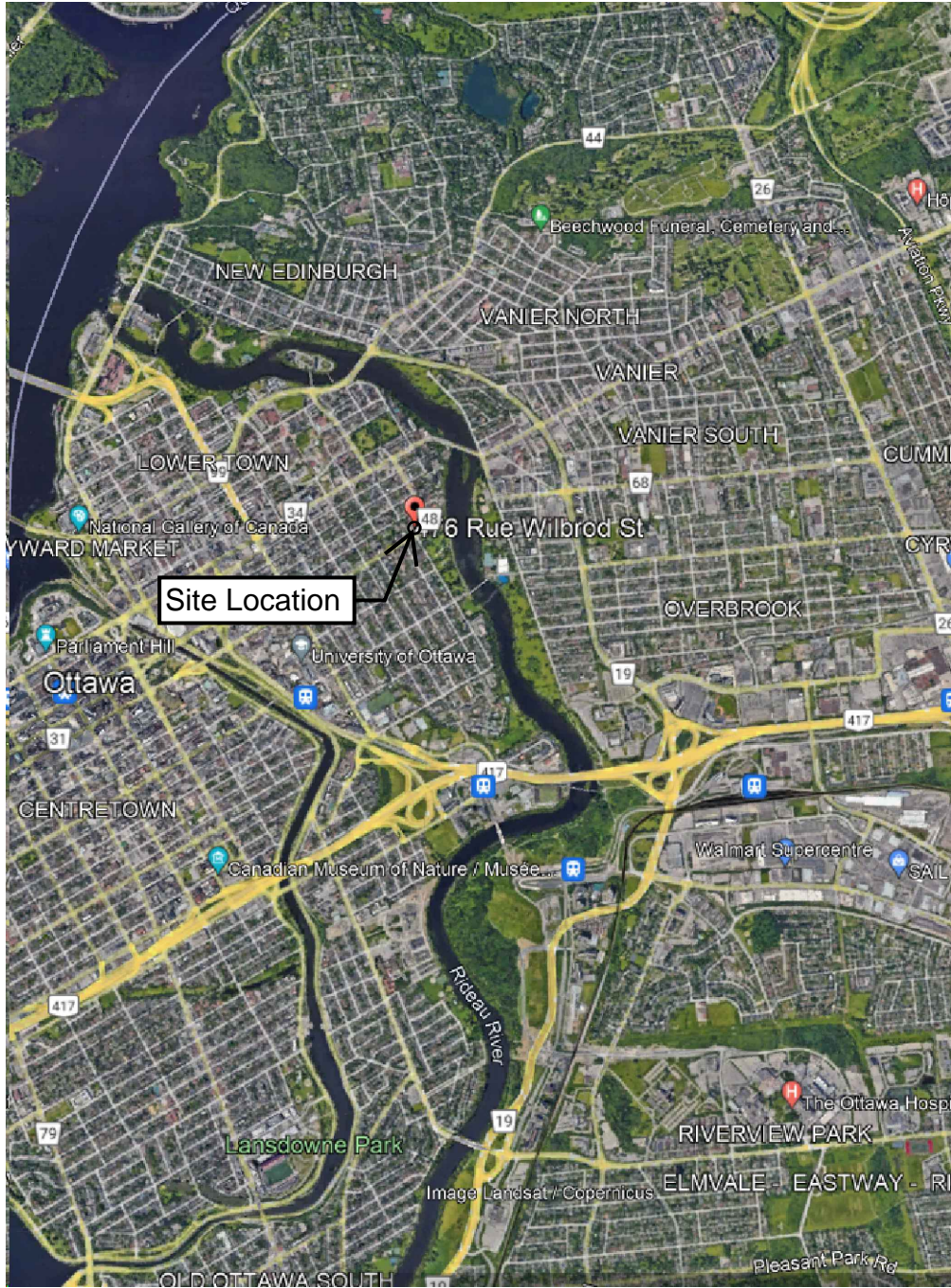
11.0 STATEMENT OF LIMITATIONS

This report was produced for the exclusive use of Sleepwell Property Management. The purpose of the report is to assess the existing stormwater management system and provide recommendations and designs for the post-construction scenario that are in compliance with the guidelines and standards from the Ministry of the Environment, Parks and Climate Change, City of Ottawa and local approval agencies. McIntosh Perry reviewed the site information and background documents listed in Section 2.0 of this report. While the previous data was reviewed by McIntosh Perry and site visits were performed, no field verification/measures of any information were conducted.

Any use of this review by a third party, or any reliance on decisions made based on it, without a reliance report is the responsibility of such third parties. McIntosh Perry accepts no responsibility for damages, if any, suffered by any third party as a result of decisions or actions made based on this review.

The findings, conclusions and/or recommendations of this report are only valid as of the date of this report. No assurance is made regarding any changes in conditions subsequent to this date. If additional information is discovered or becomes available at a future date, McIntosh Perry should be requested to re-evaluate the conclusions presented in this report, and provide amendments, if required.

APPENDIX A
KEY PLAN



CLIENT: SLEEPWELL PROPERTY MANAGEMENT		
PROJECT: 476 WILBROD STREET		
TITLE: SITE LOCATION		
McINTOSH PERRY 115 Walgreen Road, RR3, Carp, ON K0A 1L0 Tel: 613-836-2184 Fax: 613-836-3742 www.mcintoshperry.com	PROJECT: CCO-22-3130	FIGURE: 1
	DATE: APR. 27, 2022	SCALE: N.T.S

APPENDIX B
BACKGROUND DOCUMENTS

Pre-Application Consultation Meeting Notes

Property Address: 476 Wilbroad Avenue
December 21, 2021

Attendees:

City of Ottawa:

Jessica Button (File Lead), Christopher Moise (Urban Design), Adrian van Wyk (Heritage), Mohamed Fawzi (Engineering), Craig Hamilton (Committee of Adjustment), Wally Dubyk (Transportation)

Applicant Team: Collin Hopkins (Sleepwell), Michael Pexito

Community: John Verbaas (Action Sandi Hill)

Meeting notes:

Opening & attendee introduction

- Introduction of meeting attendees
- Overview of proposal:
 - Proposal would be subject to a Zoning By-law Amendment (Minor) / Minor Variance, Site Plan Control, Complex Process.
 - Additional 8 1-bedroom rental units to be located in a rear addition. The existing rooming house is proposed to be renovated into 12 1-bedroom apartments. 20 units total. 5 new parking spaces are also planned.

Preliminary comments and questions from staff and agencies, including follow-up actions:

Planning (Jessica Button)

- Application required
 - Zoning By-law Amendment / Minor Variance
 - Site Plan Control – Complex (Manager Approval, Public Consultation)
 - Property is designated as Low Profile Residential. See the Sandy Hill Secondary Plan for additional policy direction.
 - Review and appropriately address the policies in the City's new Official Plan which may be in force and effect at the time of application. Note that the Secondary Plan Polices are included in the Sandy Hill Character Area of the Central and East Secondary Plan. The property is designated Local Neighbourhood with a maximum height of 4 storeys.
 - The following City policies or guidelines are applicable to the site:
 - [Tree Protection By-law](#)
 - [Waste Management Guidelines](#)
 - The site includes the following zones:

- R5B H(18)
- Mature Neighbourhood Overlay (N/A in R5)
- Heritage Overlay
- After 20m from the front lot line, a 6.0m interior side yard setback is required. Consider tree protection, width of pathway access, amenity space, and addition permissions in the rear yard minimum setback.
- Refer to amenity area requirements of the ZBL and demonstrate compliance.
- Refer to section 111 - Bicycle Parking and demonstrate compliance. Staff strongly encourage 1 space per unit of sheltered or interior bicycle parking.
- Review provisions of Section 65, Permitted Encroachments into yards, and consider the location of the deck, setback, design and usability of space. Also consider tree protection in this location.
- Refer to Section 60 - Heritage Overlay and demonstrate compliance
- Floor plans will be required
- Provide a zoning table and demonstrate compliance or highlight relief requested
- Provide building height of existing and proposed building.
- Garbage storage and loading shall be interior to the building, located away from existing residential uses.
- Confirm easement / access for parking
- Dimension concrete walkway. This appears narrow especially adjacent to parking
- A tree protection plan will be required
- Cash in lieu of parkland dedication will be required

Urban Design (Christopher Moise)

- This proposal does not run along one of the City's Design Priority Areas and does not need to attend the City's UDRP for design review. Staff will be responsible for evaluating the proposal and providing design direction;
- We thank the applicant for providing detailed plans and rendering images at the pre-consultation which greatly assist in our understanding of the project and review of the proposal. We generally appreciate the intent to keep the scale and material choices in line with the existing building and believe a reasonable approach has been taken in locating additional massing on the site;
- We do however, recommend clarity be provided on the site plan drawing in two areas:
 - How is the rear yard amenity space being changed/improved?
Please illustrate what is existing and what is new;
 - How are cars intended to access the five indicated parking spaces?
Please illustrate how vehicles are intended to reach the parking;
- Bike storage: We recommend a suitable ratio of protected bike parking be provided on the site, either in the building or in the rear yard in a suitable location;

- Garbage storage: We recommend protected garbage storage be provided on the site, either in the building or in the rear yard in a suitable location;
- Landscaping: We recommend providing a landscaping plan that illustrates landscaping approach on the site;
- Trees: We recommend opportunities for new trees be illustrated on the landscape plan;
- We recommend accessibility standards be checked as providing suitable access will change the design presented;
- A scoped Design Brief is a required submittal (and separate from any UDRP submission) for all Site Plan/Re-zoning applications and can be combined with the Planning Rationale. Please see the Design Brief Terms of Reference provided (note the renderings provided at the pre-consultation meeting are sufficient).

- This is an exciting project in an area full of potential. We look forward to helping you achieve its goals with the highest level of design resolution. We are happy to assist and answer any questions regarding the above. Good luck.

Engineering (Mohamed Fawzi)

Water Boundary Conditions:

Will be provided at request of consultant. Requests must include the location of the service and the expected loads required by the proposed development. Please provide the following and submit Fire Flow Calculation Sheet per FUS method with the request:

- Location of service
- Type of development and amount of required fire flow (per FUS method – include FUS calculation sheet with request)
- Average Daily Demand (l/s)
- Maximum Hourly Demand (l/s)
- Maximum Daily Demand (l/s)
- Water Supply Redundancy – Fire Flow:
Applicant to ensure that a second service with an inline valve chamber be provided where the average daily demand exceeds 50 m³ / day (0.5787 l/s per day)

Water services larger than 19 mm require a Water Data Card. Please complete card and submit.

Stormwater Management:

Coefficient (C) of runoff determined **as per existing conditions** but in no case more than 0.5.

- TC = To be calculated, minimum 10 minutes

- Any storm events greater than 5 year, up to 100 year, and including 100-year storm event must be detained on site.
- Foundation drains are to be independently connected to sewer main unless being pumped with appropriate back up power, sufficient sized pump and back flow prevention.
- Roof drains are to be connected downstream of any incorporated ICD within the SWM system.

Stormwater Management Criteria (Quality Control)

Include a section in the SWM report concerning quality control requirements. It is the consultant's responsibility to check with the relevant Conservation Authority for quality control issues and include this information in the SWM report.

Noise and Vibration Study:

Noise Study required due to Major Collector Road (Charlotte Street).

Phase I and Phase II ESA:

- Phase I ESA is required; Phase II ESA may be required depending on the results of the Phase I ESA. Phase I ESA must include an EcoLog ERIS Report.
- Phase I ESA and Phase II ESAs must conform to clause 4.8.4 of the Official Plan that requires that development applications conform to Ontario Regulation 153/04.

Required Studies

- Stormwater Management Report
- Servicing Brief
- Geotechnical Study
- Phase I ESA
- Phase II ESA (depends on outcome of Phase I)
- Noise Study

Required Plans

- Site Servicing Plan
- Grade Control and Drainage Plan
- Erosion and Sediment Control Plan (Can be combined with grading plan)

1. The Servicing Study Guidelines for Development Applications are available at the following address: <https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans#servicing-study-guidelines-development-applications>
2. Servicing and site works shall be in accordance with the following documents:
 - ⇒ Ottawa Sewer Design Guidelines (October 2012)

- ⇒ Ottawa Design Guidelines – Water Distribution (2010)
 - ⇒ Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)
 - ⇒ City of Ottawa Slope Stability Guidelines for Development Applications (revised 2012)
 - ⇒ City of Ottawa Environmental Noise Control Guidelines (January, 2016)
 - ⇒ City of Ottawa Park and Pathway Development Manual (2012)
 - ⇒ City of Ottawa Accessibility Design Standards (2012)
 - ⇒ Ottawa Standard Tender Documents (latest version)
 - ⇒ Ontario Provincial Standards for Roads & Public Works (2013)
3. Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at InformationCentre@ottawa.ca or by phone at (613) 580-2424 x.44455).
 4. Any proposed work in utility easements requires written consent of easement owner.
 5. If the existing services are proposed to be reused a CCTV Report confirming that the existing services are in adequate condition will be required.

Transportation (Wally Dubyk)

- Wilbrod Street is classified as a local road. There are no additional protected ROW limits identified in the OP.
- The development site proposes 8 bedroom units & 12 bedroom apartments and 5 parking spaces. This development would not generate sufficient traffic to warrant a TIA report. Submission of TDM checklists is encouraged even if a TIA study report is not considered to be required.
- The purchaser, tenant or sub-lessee acknowledges the unit being rented/sold is not provided with any on-site parking and should a tenant/purchaser have a vehicle for which they wish to have parking that alternative and lawful arrangements will need to be made to accommodate their parking need at an alternative location. The Purchaser/Tenant also acknowledges that the availability and regulations governing on-street parking vary; that access to on-street parking, including through residential on-street parking permits issued by the City cannot be guaranteed now or in the future; and that a purchaser, tenant or sub-lessee intending to rely on on-street parking for their vehicle or vehicles does so at their own risk.
- Please keep in mind that on street parking is not a viable option for tenants. Ensure that potential tenants are aware that there is no provision for parking.

- Permanent structures such as curbing, stairs, retaining walls, and underground parking foundation also bicycle parking racks are not to extend into the City's right-of-way limits.
- The Owner shall be required to enter into maintenance and liability agreement for all pavers, plant and landscaping material placed in the City right-of-way and the Owner shall assume all maintenance and replacement responsibilities in perpetuity.
- Bicycle parking spaces are required as per Section 111 of the Ottawa Comprehensive Zoning By-law. Bicycle parking spaces should be located in safe

Heritage (Adrian van Wyk)

- This property is listed on the City's Heritage Register. A Heritage Permit is not required to make alterations to the property; however, should the applicant wish to demolish the existing building, the City must be provided with at least 60 days' written notice of the applicant's intention to demolish.
- The property is categorized as a Category 3 property within the Sandy Hill Cultural Heritage Character Area. Section 5.2.11 of the Sandy Hill Cultural Heritage Character Area Guidelines should be consulted as it relates to additions to Category 3 properties:
 - "5.2.11 Additions
 - "1. Additions to historic buildings should be sympathetic to the existing building, subordinate to, and distinguishable from the original. Falsifying a past architectural style in a new addition is strongly discouraged.
 - "2. Additions should generally be located in the rear yard.
 - "3. Where not located in the rear yard, additions should be consistent with the streetscape with respect to setback, height, scale, and massing.
 - "4. New additions should respect the existing wall to window ratio and proportion of the existing building."
- The Heritage Planning Branch has no concerns with the proposal at this time.

Forestry (Mark Richardson)

TCR requirements:

1. a Tree Conservation Report (TCR) must be supplied for review along with the suite of other plans/reports required by the City
 - a. an approved TCR is a requirement of Site Plan approval.
 - b. The TCR may be combined with the LP provided all information is supplied
2. As of January 1 2021, any removal of privately-owned trees 10cm or larger in diameter, or publicly (City) owned trees of any diameter requires a tree permit issued under the Tree Protection Bylaw (Bylaw 2020 – 340); the permit will be based on an approved TCR and made available at or near plan approval.
3. The Planning Forester from Planning and Growth Management as well as foresters from Forestry Services will review the submitted TCR
 - a. If tree removal is required, both municipal and privately-owned trees will be addressed in a single permit issued through the Planning Forester
 - b. Compensation may be required for city owned trees – if so, it will need to be paid prior to the release of the tree permit
4. the TCR must list all trees on site, as well as off-site trees if the CRZ extends into the developed area, by species, diameter and health condition
5. please identify trees by ownership – private onsite, private on adjoining site, city owned, co-owned (trees on a property line)
6. the TCR must list all trees on adjacent sites if they have a critical root zone that extends onto the development site
7. If trees are to be removed, the TCR must clearly show where they are, and document the reason they cannot be retained
8. All retained trees must be shown and all retained trees within the area impacted by the development process must be protected as per City guidelines available at [Tree Protection Specification](#) or by searching Ottawa.ca
 - a. the location of tree protection fencing must be shown on a plan
 - b. show the critical root zone of the retained trees
 - c. if excavation will occur within the critical root zone, please show the limits of excavation
9. the City encourages the retention of healthy trees; if possible, please seek opportunities for retention of trees that will contribute to the design/function of the site.
10. For more information on the process or help with tree retention options, contact Mark Richardson mark.richardson@ottawa.ca or on [City of Ottawa](#)

LP tree planting requirements:

For additional information on the following please contact tracy.smith@Ottawa.ca

Minimum Setbacks

- Maintain 1.5m from sidewalk or MUP/cycle track.
- Maintain 2.5m from curb
- Coniferous species require a minimum 4.5m setback from curb, sidewalk or MUP/cycle track/pathway.
- Maintain 7.5m between large growing trees, and 4m between small growing trees. Park or open space planting should consider 10m spacing.
- Adhere to Ottawa Hydro's planting guidelines (species and setbacks) when planting around overhead primary conductors.

Tree specifications

- Minimum stock size: 50mm tree caliper for deciduous, 200cm height for coniferous.
- Maximize the use of large deciduous species wherever possible to maximize future canopy coverage
- Tree planting on city property shall be in accordance with the City of Ottawa's Tree Planting Specification; and include watering and warranty as described in the specification (can be provided by Forestry Services).
- Plant native trees whenever possible
- No root barriers, dead-man anchor systems, or planters are permitted.
- No tree stakes unless necessary (and only 1 on the prevailing winds side of the tree)

Hard surface planting

- Curb style planter is highly recommended
- No grates are to be used and if guards are required, City of Ottawa standard (which can be provided) shall be used.
- Trees are to be planted at grade

Soil Volume

- Please ensure adequate soil volumes are met:

Tree Type/Size	Single Tree Soil Volume (m3)	Multiple Tree Soil Volume (m3/tree)
Ornamental	15	9
Columnar	15	9
Small	20	12
Medium	25	15

Large	30	18
Conifer	25	15

Please note that these soil volumes are not applicable in cases with Sensitive Marine Clay.

Sensitive Marine Clay

- Please follow the City’s 2017 Tree Planting in Sensitive Marine Clay guidelines

Committee of Adjustment (Craig Hamilton)

- Variances have been accurately identified and Staff do not have particular concerns at this time
- Please contact Committee of Adjustment Coordinators directly for process, fees and timelines relating to the Minor Variance at CofA@ottawa.ca
- Please do not hesitate to contact me at Craig.hamilton@ottawa.ca should you wish to review submission form correctness and plans prior to formally applying for minor variance.

City Surveyor

- The determination of property boundaries, minimum setbacks and other regulatory constraints are a critical component of development. An Ontario Land Surveyor (O.L.S.) needs to be consulted at the outset of a project to ensure properties are properly defined and can be used as the geospatial framework for the development.
- Topographic details may also be required for a project and should be either carried out by the O.L.S. that has provided the Legal Survey or done in consultation with the O.L.S. to ensure that the project is integrated to the appropriate control network.

Questions regarding the above requirements can be directed to the City’s Surveyor, Bill Harper, at Bill.Harper@ottawa.ca

Community Association (John Verbaas)

- Bicycle parking should be provided for each unit. Secure bicycle parking should be provided.
- Garbage needs to be planned for and accommodated property.

Next steps

- City Staff encourage applicant to discuss the proposal with Councillor, community groups and neighbours

- City staff to send follow-up email confirming submission requirements

Francis Valenti

From: Eric Lalande <eric.lalande@rvca.ca>
Sent: April 27, 2022 3:29 PM
To: Francis Valenti
Subject: RE: 22-3130 - 476 Wilbrod Street - Quality Control Requirement

Hi Francis,

After reviewing the Site Plan, the RVCA confirms no additional on-site water quality protection is required based on plan proposed.

Thank you,

Eric Lalande, MCIP, RPP
Planner, RVCA
613-692-3571 x1137

From: Francis Valenti <F.Valenti@McIntoshPerry.com>
Sent: Wednesday, April 27, 2022 11:22 AM
To: Eric Lalande <eric.lalande@rvca.ca>
Subject: RE: 22-3130 - 476 Wilbrod Street - Quality Control Requirement

Hi Eric,

Please find attached the site plan for your review.

Regards,

Francis Valenti, EIT
Engineering Intern, Land Development
T. 613.714.6895 | C. 613.808.2123
F.Valenti@McIntoshPerry.com | www.mcintoshperry.com

McINTOSH PERRY

Turning Possibilities Into Reality

From: Eric Lalande <eric.lalande@rvca.ca>
Sent: April 27, 2022 11:14 AM
To: Francis Valenti <F.Valenti@McIntoshPerry.com>
Subject: RE: 22-3130 - 476 Wilbrod Street - Quality Control Requirement

Hi Francis,

Do you have a site plan available?

Thanks,

Eric Lalande, MCIP, RPP
Planner, RVCA

613-692-3571 x1137

From: Francis Valenti <F.Valenti@McIntoshPerry.com>
Sent: Wednesday, April 27, 2022 9:39 AM
To: Eric Lalande <eric.lalande@rvca.ca>
Cc: Robert Freel <r.freel@mcintoshperry.com>
Subject: 22-3130 - 476 Wilbrod Street - Quality Control Requirement

Good Morning,

We wanted to touch base with you regarding the proposed development at 476 Wilbrod Street.

The property covers approximately 0.09 ha, and currently contains a 2 ½-storey residential building with a 1-storey rear addition. The proposed development includes a 3-storey rear addition. Five asphalt parking spots are proposed, however three of the five spots will be replacing existing asphalt. Additional asphalt removals in the existing rear parking area will result in a net reduction of 65.9 m² of drive aisle/parking asphalt within the property. Surface runoff from the parking area will be collected and conveyed to a catch basin with a sump. Surface runoff from the roof and rear yard amenity area will be directed towards a grass swale to promote infiltration. Runoff collected on site will be directed to the 900mm concrete storm sewer within Wilbrod street, where, as seen in the above figure, it will travel approximately 0.27km downstream to Outlet#04451 at the Rideau River.

Due to the overall reduction in asphalt drive aisle and parking areas, it is requested that specific quality controls not be required for the development. Can you please review and confirm?

Thanks,

Francis Valenti, EIT

Engineering Intern, Land Development

T. 613.714.6895 | C. 613.808.2123

F.Valenti@McIntoshPerry.com | www.mcintoshperry.com

McINTOSH PERRY

Turning Possibilities Into Reality

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Platinum
member

Francis Valenti

From: Norm Emond <nemond@cwscanada.com>
Sent: August 2, 2022 11:23 AM
To: Alison Gosling; Paul Leroux
Subject: RE: Maximum Lengths for Cleaning CB Leads

Follow Up Flag: Follow up
Flag Status: Flagged

Good Morning Alison,

We can flush a CB line up to 100m in a straight line 4" and up. Pumping the CB, we can go approximately 60m. If you have any questions, please call me.

Thanks,

Norm Emond

Project Manager



Clean Water Works Inc.

www.cwscanada.com



Direct : 613-745-9536

Toll Free : 1-866-695-0155 Ext. 249

Cell. : 613-913-9412

Ottawa (Head Office)

1800, Bantree Street
Ottawa (Ontario) K1B 5L6
Tel. : 613-745-2444
Fax : 613-745-9994

Montréal

2700, Sabourin Street
Montréal (Québec) H4S 1M2
Tel. : 514-738-2666
Fax : 514-738-9762

From: Alison Gosling <a.gosling@mcintoshperry.com>
Sent: August 2, 2022 10:09 AM
To: Paul Leroux <paull@cwscanada.com>; Norm Emond <nemond@cwscanada.com>
Subject: Maximum Lengths for Cleaning CB Leads

Good morning Paul and Norm,

I hope you had a great long weekend.

We are hoping you could help us out with a question regarding catchbasin cleaning. What is the maximum a CB lead can be for CWW to be able to clean the service?

Let me know if you have any questions.

Thanks in advance,

Alison Gosling, P.Eng.

Project Engineer, Land Development

T. 613.714.4629

a.gosling@mcintoshperry.com | www.mcintoshperry.com

McINTOSH PERRY

Turning Possibilities Into Reality

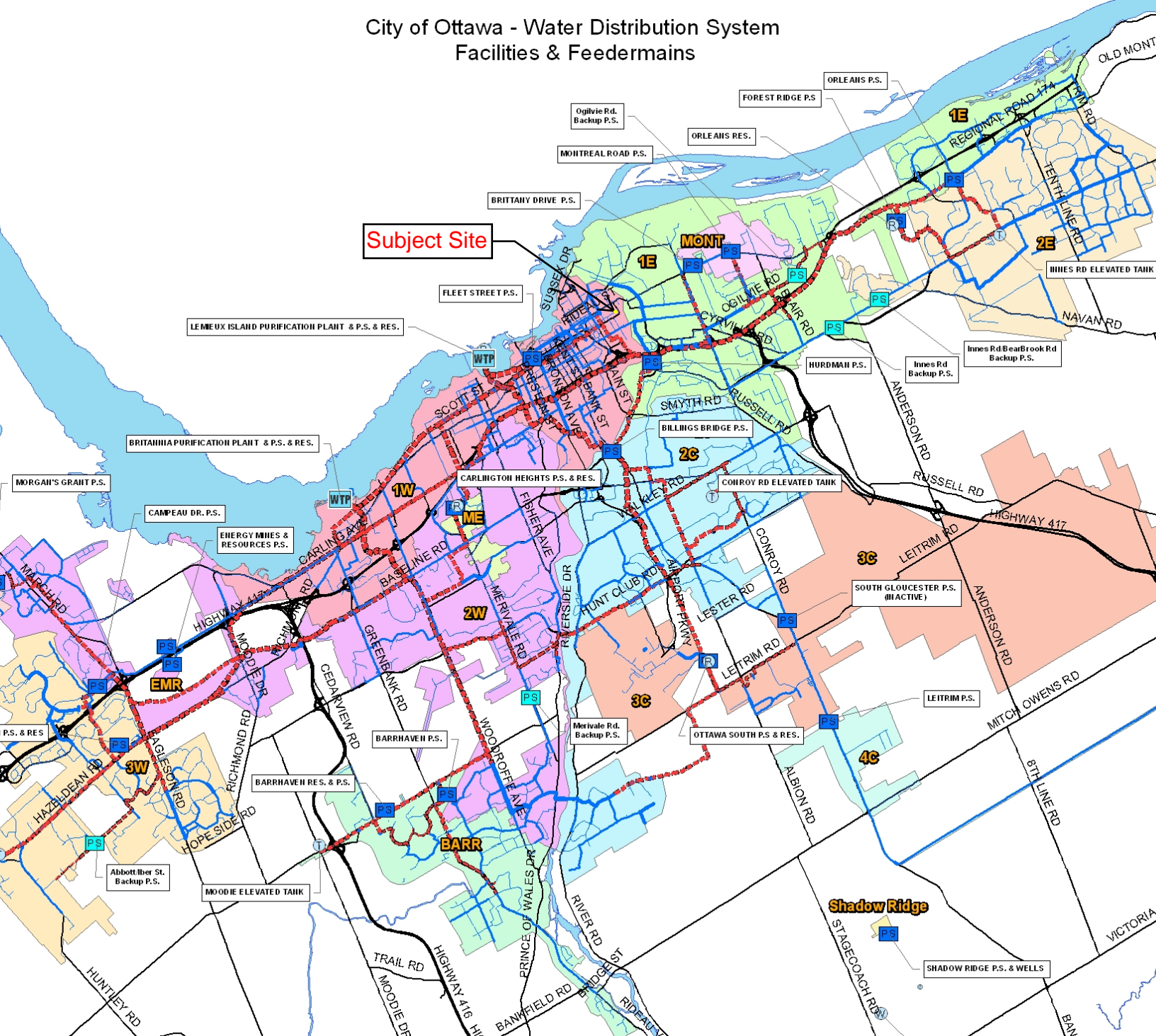
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Platinum
member

APPENDIX C
WATERMAIN CALCULATIONS

476 Wilbrod Pressure Map Figure



McINTOSH PERRY

CCO-22-3130 - 476 Wilbrod - Water Demands

Project:	476 Wilbrod
Project No.:	CCO-22-3130
Designed By:	FV
Checked By:	AG
Date:	August 23, 2022
Site Area:	0.09 gross ha

Residential	NUMBER OF UNITS	UNIT RATE	
1 Bedroom Apartment	20 units	1.4	persons/unit
Total Population	28 persons		

AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS	
Residential	280	L/c/d	
Industrial - Light	35,000	L/gross ha/d	
Industrial - Heavy	55,000	L/gross ha/d	
Shopping Centres	2,500	L/(1000m ² /d)	
Hospital	900	L/(bed/day)	
Schools	70	L/(Student/d)	
Trailer Park with no Hook-Ups	340	L/(space/d)	
Trailer Park with Hook-Ups	800	L/(space/d)	
Campgrounds	225	L/(campsite/d)	
Mobile Home Parks	1,000	L/(Space/d)	
Motels	150	L/(bed-space/d)	
Hotels	225	L/(bed-space/d)	
Tourist Commercial	28,000	L/gross ha/d	
Other Commercial	28,000	L/gross ha/d	
AVERAGE DAILY DEMAND	Residential	0.09	L/s
	Commercial/Industrial/Institutional	0.00	L/s

MAXIMUM DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS	
Residential	9.5	x avg. day	
Industrial	1.5	x avg. day	
Commercial	1.5	x avg. day	
Institutional	1.5	x avg. day	
MAXIMUM DAILY DEMAND	Residential	0.86	L/s
	Commercial/Industrial/Institutional	0.00	L/s

MAXIMUM HOUR DEMAND

DEMAND TYPE	AMOUNT	UNITS	
Residential	14.3	x avg. day	
Industrial	1.8	x max. day	
Commercial	1.8	x max. day	
Institutional	1.8	x max. day	
MAXIMUM HOUR DEMAND	Residential	1.30	L/s
	Commercial/Industrial/Institutional	0.00	L/s

WATER DEMAND DESIGN FLOWS PER UNIT COUNT
CITY OF OTTAWA - WATER DISTRIBUTION GUIDELINES, JULY 2010

AVERAGE DAILY DEMAND	0.09	L/s
MAXIMUM DAILY DEMAND	0.86	L/s
MAXIMUM HOUR DEMAND	1.30	L/s

McINTOSH PERRY

CCO-22-3130 - 476 Wilbrod - OBC Fire Calculations

Project:	476 Wilbrod
Project No.:	CCO-22-3130
Designed By:	FV
Checked By:	AG
Date:	August 23, 2022

Ontario 2006 Building Code Compendium (Div. B - Part 3)

Water Supply for Fire-Fighting - Apartment Building

Building is classified as Group : **C - Residential Occupancies** (from table 3.2.2.55)

Building is of noncombustible construction or of heavy timber construction conforming to Article 3.1.4.6. Floor assemblies are fire separations but with no fire-resistance rating. Roof assemblies, mezzanines, loadbearing walls, columns and arches do not have a

From Div. B A-3.2.5.7. of the Ontario Building Code - 3. Building On-Site Water Supply:

(a) $Q = K \times V \times Stot$

where:

Q = minimum supply of water in litres

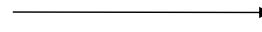
K = water supply coefficient from Table 1

V = total building volume in cubic metres

Stot = total of spatial coefficient values from the property line exposures on all sides as obtained from the formula:

$Stot = 1.0 + [S_{side1} + S_{side2} + S_{side3} + \dots \text{etc.}]$

K	16	(from Table 1 pg A-31) (Worst case occupancy {E / F2} 'K' value used)
V	2,916	(Total building volume in m ³ .)
Stot	2.0	(From figure 1 pg A-32)
Q =	93,325.12 L	



			From Figure 1 (A-32)
Snorth	9.24	m	0.1
Seast	3.07	m	0.5
Ssouth	11.68	m	0.0
Swest	1.92	m	0.5

*approximate distances

From Table 2: Required Minimum Water Supply Flow Rate (L/s)

2700 L/min if $Q < 108,000 L$
713 gpm

McINTOSH PERRY

CCO-22-3130 - 476 Wilbrod - Fire Underwriters Survey

Project: 476 Wilbrod
 Project No.: CCO-22-3130
 Designed By: FV
 Checked By: AG
 Date: August 23, 2022

From the Fire Underwriters Survey (2020)

From Part II – Guide for Determination of Required Fire Flow Copyright I.S.O.:
 City of Ottawa Technical Bulletin ISTB-2018-02 Applied Where Applicable

A. BASE REQUIREMENT (Rounded to the nearest 1000 L/min)

F = 220 x C x VA Where:

F = Required fire flow in liters per minute

C = Coefficient related to the type of construction.

A = The total floor area in square meters (including all storey's, but excluding basements at least 50 percent below grade) in the building being considered.

Construction Type Wood Frame

C 1.5 A 978.2 m²
 Total Floor Area (per the 2020 FUS Page 20 - Total Effective Area) 978.2 m²

Calculated Fire Flow 10,321.2 L/min
 10,000.0 L/min

B. REDUCTION FOR OCCUPANCY TYPE (No Rounding)

From Page 24 of the Fire Underwriters Survey:
 Limited Combustible -15%

Fire Flow 8,500.0 L/min

C. REDUCTION FOR SPRINKLER TYPE (No Rounding)

Non-Sprinklered 0%

Reduction 0.0 L/min

D. INCREASE FOR EXPOSURE (No Rounding)

	Separation Distance (m)	Cons.of Exposed Wall	Length Exposed Adjacent Wall (m)	Height (Stories)	Length-Height Factor	
Exposure 1	Over 30 m	Wood frame	N/A	N/A	N/A	0%
Exposure 2	3.1 to 10	Wood frame	17	1	17.0	15%
Exposure 3	10.1 to 20	Wood frame	6.5	1	6.5	10%
Exposure 4	0 to 3	Fire Resistive - Non Combustible (Unprotected Openings)	15.9	9	143.1	15%
% Increase*						40%

Increase* 3,400.0 L/min

E. Total Fire Flow (Rounded to the Nearest 1000 L/min)

Fire Flow 11,900.0 L/min
 Fire Flow Required** 12,000.0 L/min

*In accordance with Part II, Section 4, the Increase for separation distance is not to exceed 75%

**In accordance with Section 4 the Fire flow is not to exceed 45,000 L/min or be less than 2,000 L/min

McINTOSH PERRY

CCO-22-3130 - 476 Wilbrod - Boundary Condition Unit Conversion

Project: 476 Wilbrod

Project No.: CCO-22-3130

Designed By: FV

Checked By: AG

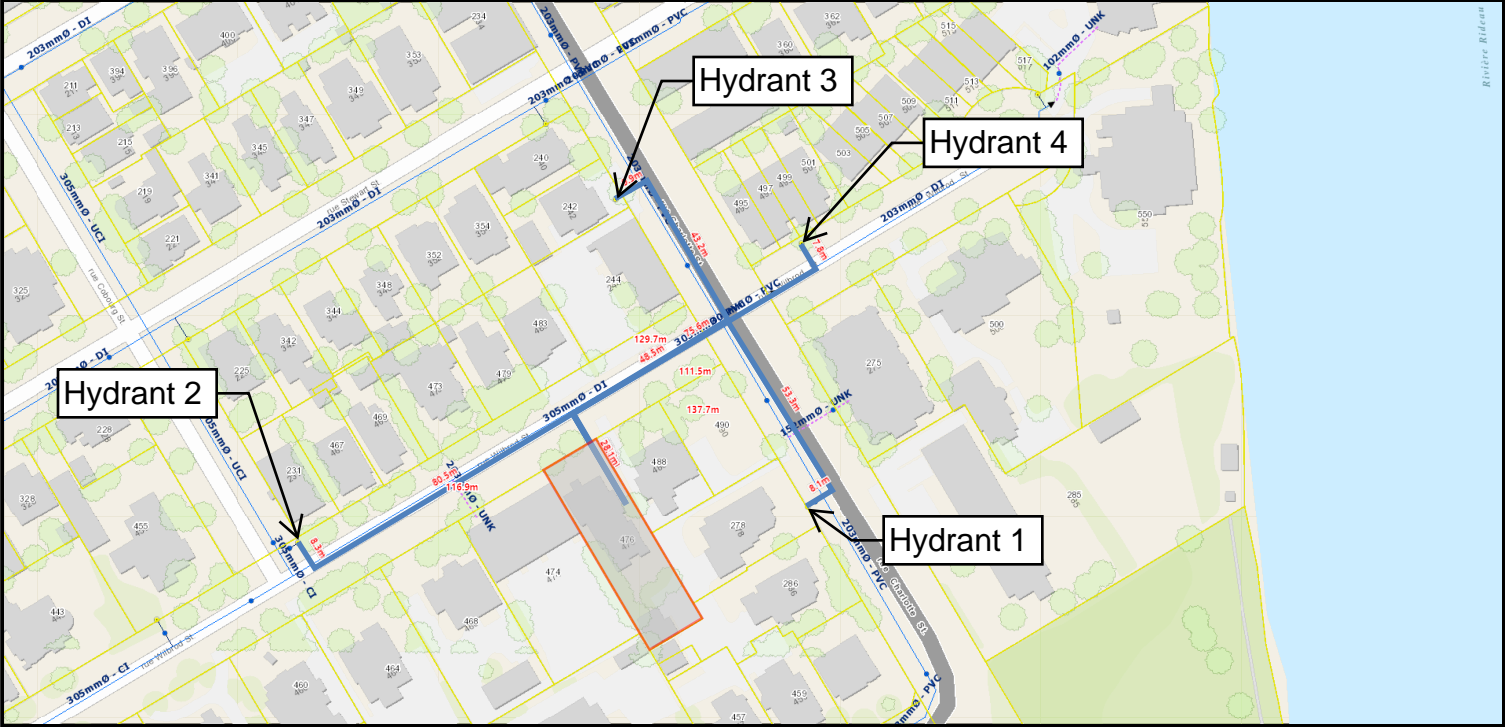
Date: August 23, 2022

Boundary Conditions Unit Conversion

WILBROD STREET

Scenario	Height (m)	Elevation (m)	m H ₂ O	PSI	kPa
Avg. DD	115.4	68.2	47.2	67.2	463.0
Fire Flow (45 L/s or 2,700 L/min)	109.1	68.2	40.9	58.2	401.2
Fire Flow (200 L/s or 12,000 L/min)	106.4	68.2	38.2	54.4	374.7
Peak Hour	106.1	68.2	37.9	53.9	371.8

476 Wilbrod Hydrant Coverage Figure



APPENDIX D
SANITARY CALCULATIONS

McINTOSH PERRY

CCO-22-3130 - 476 Wilbrod - Sanitary Demands

Project:	476 Wilbrod
Project No.:	CCO-22-3130
Designed By:	FV
Checked By:	RF
Date:	Aug-22

Site Area	0.09	Gross ha		
1 Bedroom Apartment	20		1.40	Persons per unit
Total Population	28	Persons		
Amenity Space	137.00	m ²		

DESIGN PARAMETERS

Institutional/Commercial Peaking	1.5	
Residential Peaking Factor	3.69	* Using Harmon Formula = $1+(14/(4+P^{0.5}))^{0.8}$ where P = population in thousands, Harmon's Correction Factor = 0.8
Mannings coefficient (n)	0.013	
Demand (per capita)	280	L/day
Infiltration allowance	0.33	L/s/Ha

EXTRANEOUS FLOW ALLOWANCES

Infiltration / Inflow	Flow (L/s)
Dry	0.00
Wet	0.03
Total	0.03

AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS	POPULATION / AREA	Flow (L/s)
Residential	280	L/c/d	28	0.09
Industrial - Light**	35,000	L/gross ha/d		0
Industrial - Heavy**	55,000	L/gross ha/d		0
Commercial / Amenity	2,800	L/(1000m ² /d)	137.00	0.004
Hospital	900	L/(bed/day)		0
Schools	70	L/(Student/d)		0
Trailer Parks no Hook-Ups	340	L/(space/d)		0
Trailer Park with Hook-Ups	800	L/(space/d)		0
Campgrounds	225	L/(campsite/d)		0
Mobile Home Parks	1,000	L/(Space/d)		0
Motels	150	L/(bed-space/d)		0
Hotels	225	L/(bed-space/d)		0
Office	75	L/7.0m ² /d		0
Tourist Commercial	28,000	L/gross ha/d		0
Other Commercial	28,000	L/gross ha/d		0

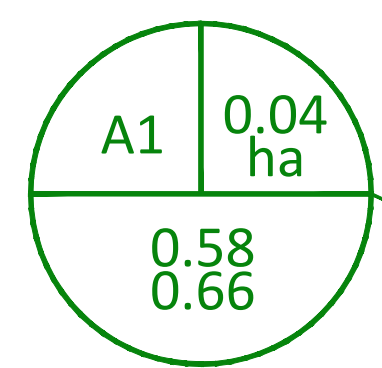
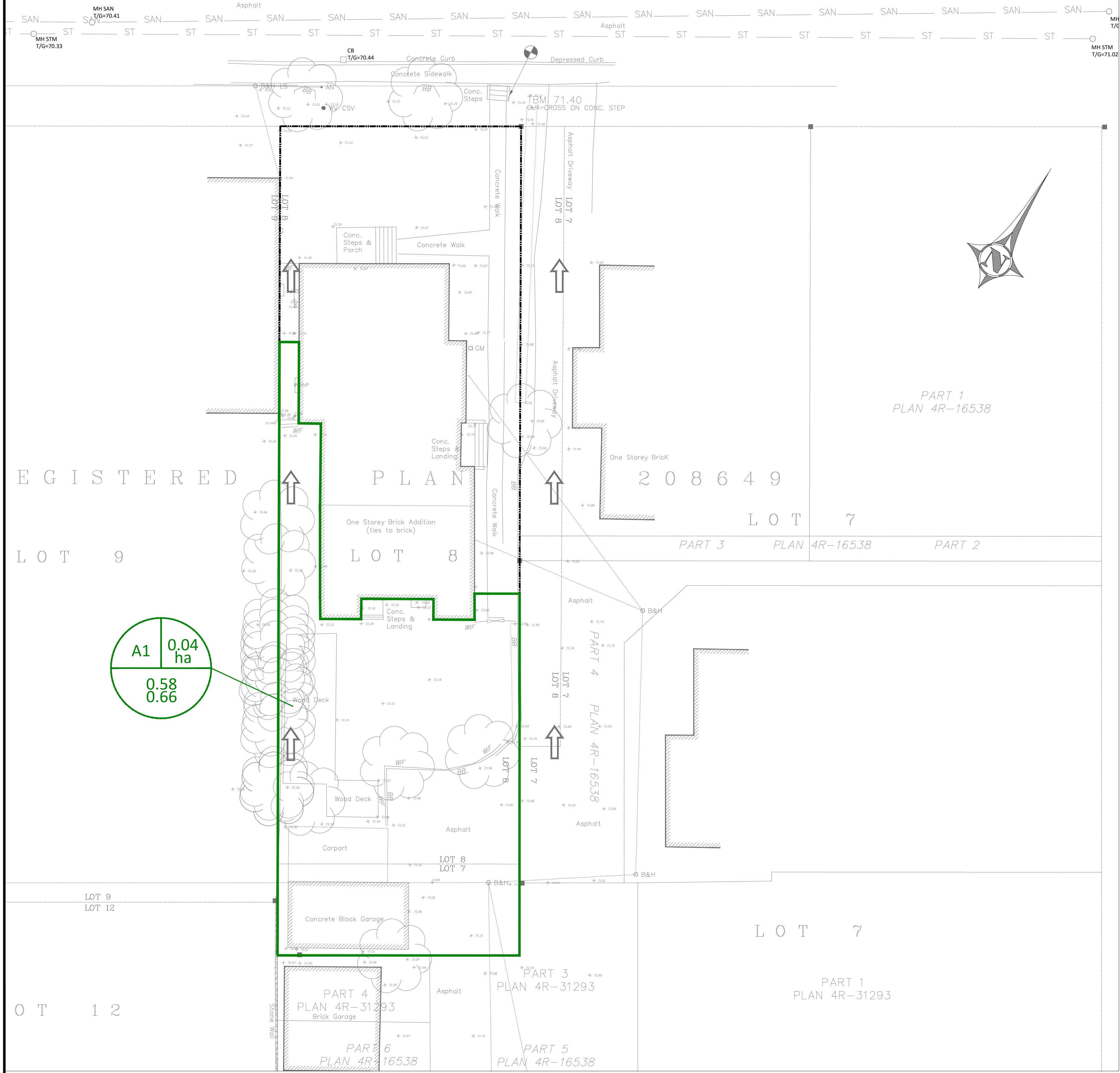
AVERAGE RESIDENTIAL FLOW	0.09	L/s
PEAK RESIDENTIAL FLOW	0.33	L/s
AVERAGE ICI FLOW	0.00	L/s
PEAK INSTITUTIONAL/COMMERCIAL FLOW	0.01	L/s
PEAK INDUSTRIAL FLOW	0.00	L/s
TOTAL PEAK ICI FLOW	0.01	L/s

TOTAL SANITARY DEMAND

TOTAL ESTIMATED AVERAGE DRY WEATHER FLOW	0.10	L/s
TOTAL ESTIMATED PEAK DRY WEATHER FLOW	0.35	L/s
TOTAL ESTIMATED PEAK WET WEATHER FLOW	0.37	L/s

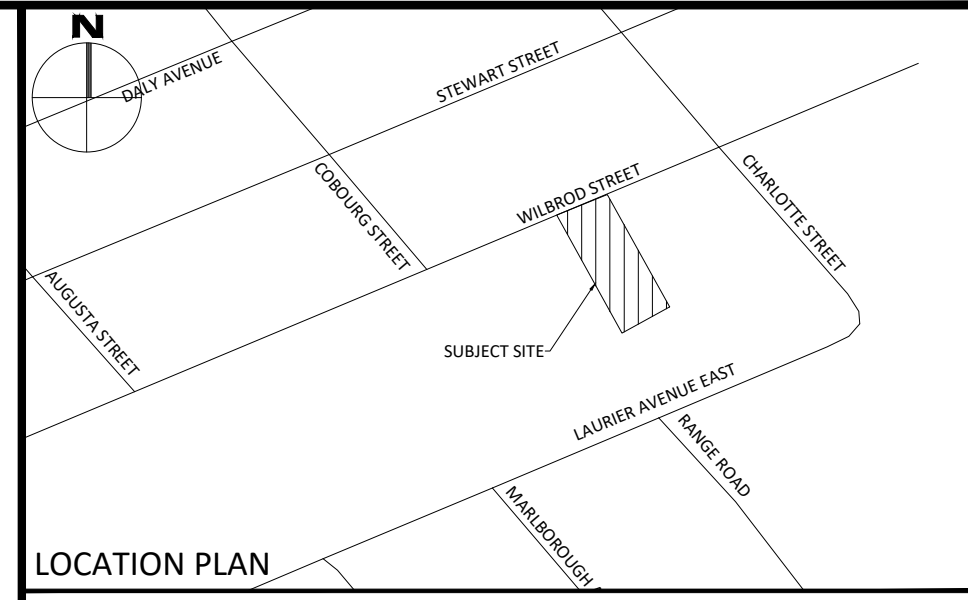
APPENDIX E
PRE-DEVELOPMENT DRAINAGE PLAN

WILBROD STREET
REGISTERED PLAN 6



GENERAL NOTES

1. THE ORIGINAL TOPOGRAPHY, GROUND ELEVATION AND SURVEY DATA SHOWN ARE SUPPLIED FOR INFORMATION PURPOSES ONLY, AND IMPLY NO GUARANTEE OF ACCURACY. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ALL INFORMATION SHOWN.
2. THIS PLAN IS NOT A CADASTRAL SURVEY SHOWING LEGAL PROPERTY BOUNDARIES AND EASEMENTS. THE PROPERTY BOUNDARIES SHOWN HEREON HAVE BEEN DERIVED FROM INFORMATION SUPPLIED BY (OR SHOWN ON) MCINTOSH PERRY SURVEYING INC. DRAWING #22-3223-476, DATED MARCH 1, 2022, AND CANNOT BE RELIED UPON TO BE ACCURATE OR COMPLETE. THE PRECISE LOCATION OF THE CURRENT PROPERTY BOUNDARIES AND EASEMENTS CAN ONLY BE DETERMINED BY AN UP-TO-DATE LAND TITLES SEARCH AND A SUBSEQUENT CADASTRAL SURVEY PERFORMED AND CERTIFIED BY AN ONTARIO LAND SURVEYOR.
3. THE CONTRACTOR IS TO OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY BEFORE COMMENCING CONSTRUCTION.
4. THE CONTRACTOR IS RESPONSIBLE FOR ALL LAYOUT.
5. THE CONTRACTOR IS TO DETERMINE THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION. PROTECT AND ASSUME ALL RESPONSIBILITY FOR EXISTING UTILITIES WHETHER OR NOT SHOWN ON THESE DRAWINGS. IF THERE IS ANY DISCREPANCY THE CONTRACTOR IS TO NOTIFY THE ENGINEER PROMPTLY.
6. RESTORE ALL TRENCHES AND SURFACES OF PUBLIC ROAD ALLOWANCES TO CONDITION EQUAL OR BETTER THAN ORIGINAL CONDITION AND TO THE SATISFACTION OF THE CITY AUTHORITIES.
7. EXCAVATE AND DISPOSE OF ALL EXCESS EXCAVATED MATERIAL, SUCH AS ASPHALT, CURBING AND DEBRIS, OFF SITE AS DIRECTED BY THE ENGINEER AND THE CITY.
8. TOPSOIL TO BE STRIPPED AND STOCKPILED FOR REHABILITATION. CLEAN FILL TO BE PLACED IN FILL AREAS AND COMPACTED TO 95% STANDARD PROCTOR DENSITY.
9. ALL DISTURBED AREAS TO BE RESTORED TO ORIGINAL CONDITION OR BETTER UNLESS OTHERWISE SPECIFIED.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TRAFFIC CONTROL AND SAFETY MEASURES DURING THE CONSTRUCTION PERIOD, INCLUDING THE SUPPLY, INSTALLATION, AND REMOVAL OF ALL NECESSARY SIGNAGE, DELINEATORS, MARKERS AND BARRIERS.
11. DO NOT ALTER GRADING OF THE SITE WITHOUT PRIOR APPROVAL OF THE ENGINEER/CITY.
12. ALL ROADWAY, PARKING LOT, AND GRADING WORKS TO BE UNDERTAKEN IN ACCORDANCE WITH CITY STANDARDS AND SPECIFICATIONS. THE CONTRACTOR IS TO PROVIDE POSITIVE DRAINAGE AWAY FROM THE BUILDING.
13. CONTACT THE CITY FOR INSPECTION OF ROUGH GRADING OF PARKING LOTS, ROADWAYS AND LANDSCAPED AREAS PRIOR TO PLACEMENT OF ANY ASPHALT, TOPSOIL, SEED & MULCH AND/OR SOD.
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17. CONTRACTOR TO ENSURE ALL APPLICABLE OPS SPECIFICATIONS ARE FOLLOWED DURING CONSTRUCTION
18. ALL PROPOSED CURB TO BE CONCRETE BARRIER CURB UNLESS OTHERWISE SPECIFIED.



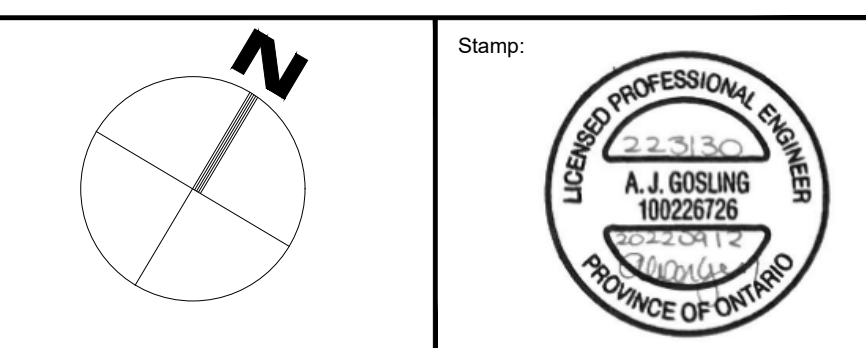
LEGEND

SUBJECT TO APPROVAL

No.	Revisions	Date
2	REVISED PER CITY COMMENTS	AUG. 02, 2022
1	ISSUED FOR REVIEW	APR. 26, 2022

Check and verify all dimensions before proceeding with the work. Do not scale drawings.
SCALE 1:150
0 5 10 15 Metres

McINTOSH PERRY
115 Walgreen Road, RR3, Carp, ON K0A 1L0
Tel: 613-836-2184 Fax: 613-836-3742
www.mcintoshperry.com



Client: **SLEEPWELL PROPERTY MANAGEMENT**
423 BRONSON AVENUE
OTTAWA, ON K1R 6J5

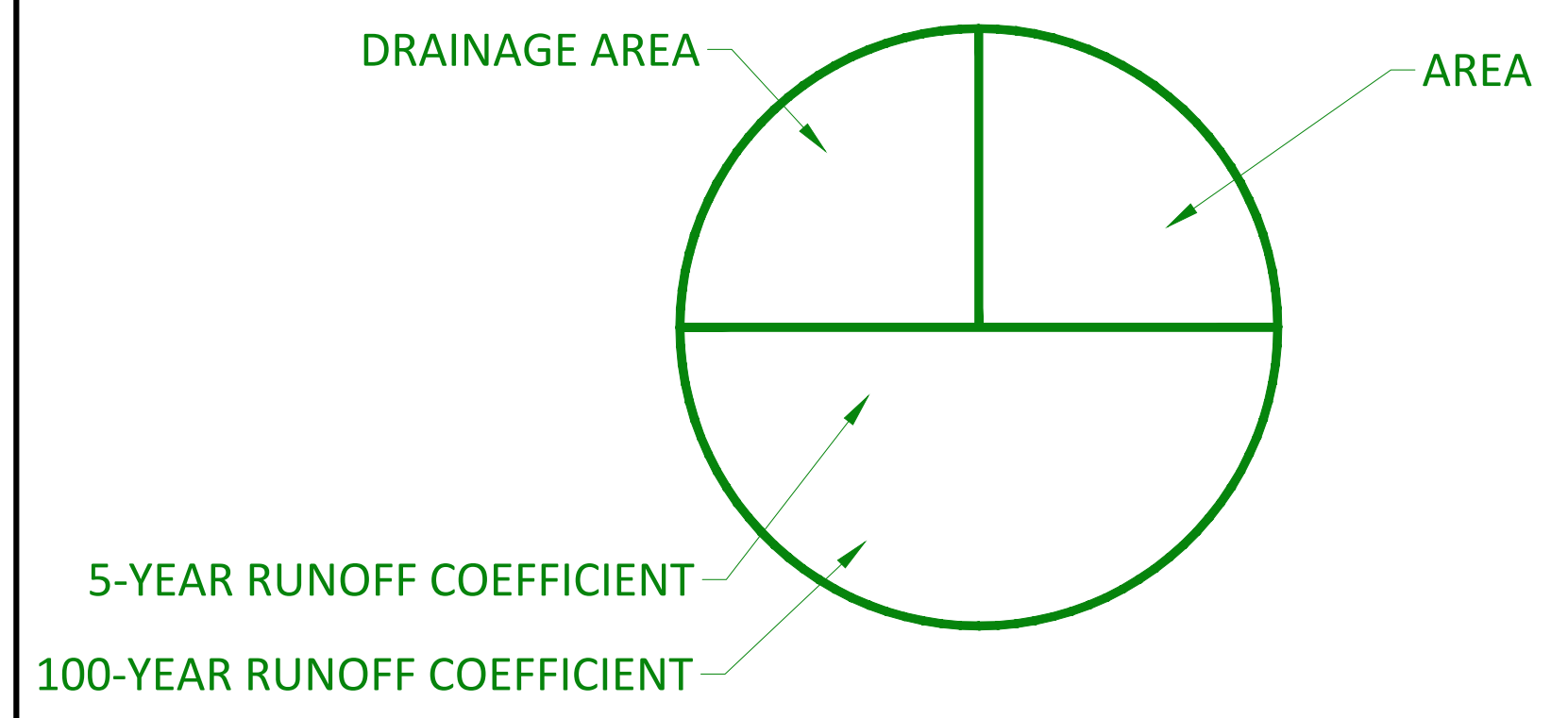
Project: **APARTMENT BUILDING ADDITION**
476 WILBROD STREET

Drawing Title: **PRE-DEVELOPMENT DRAINAGE PLAN**

Scale: 1:150	Project Number: CCO-22-3130
Drawn By: FV	
Checked By: RF	
Designed By: FV	

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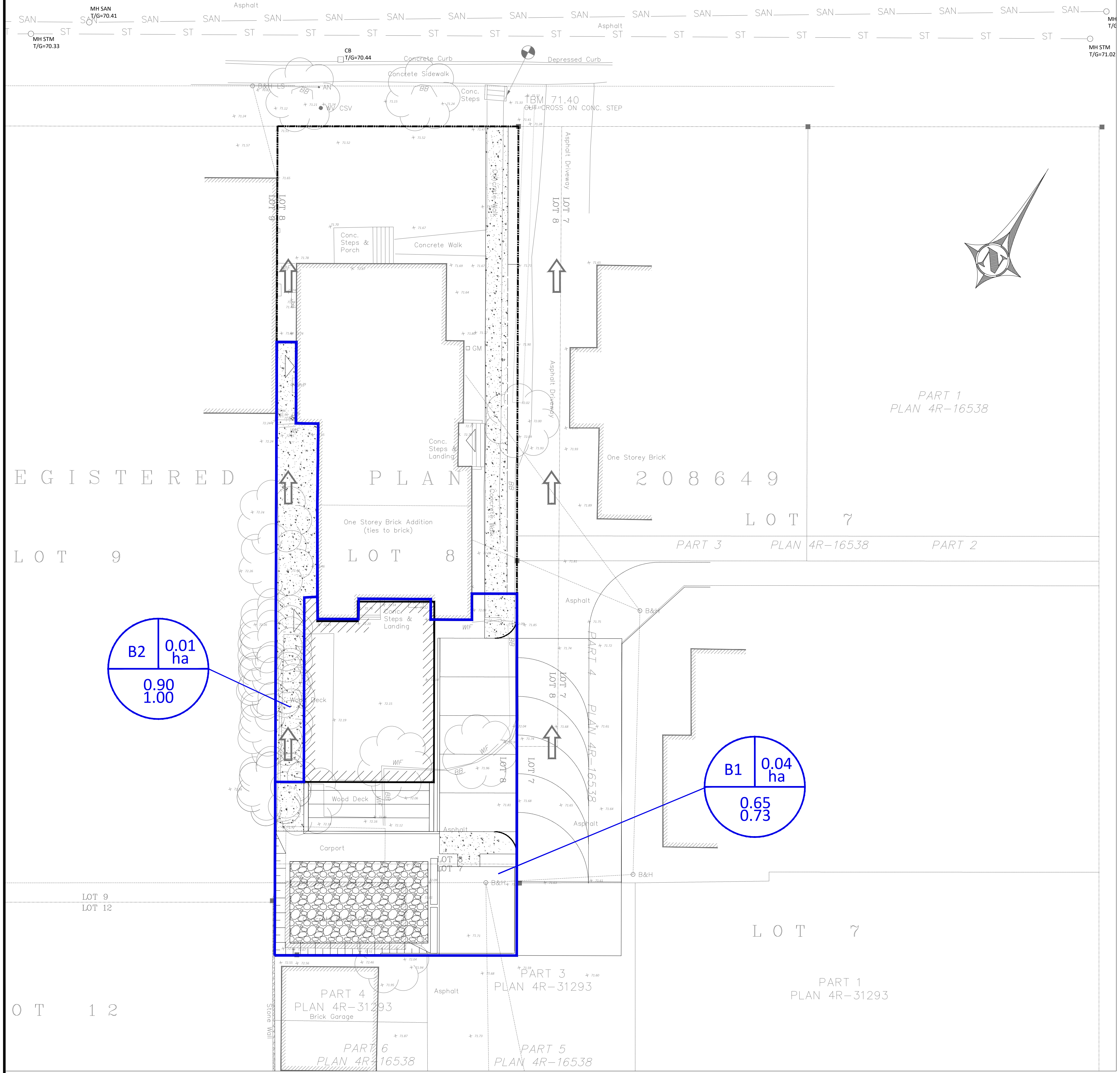


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DATE PLOTTED: Tuesday, August 02, 2022 1:51:54 PM
PLOTTER: Tundra, August 02, 2022 1:51:54 PM

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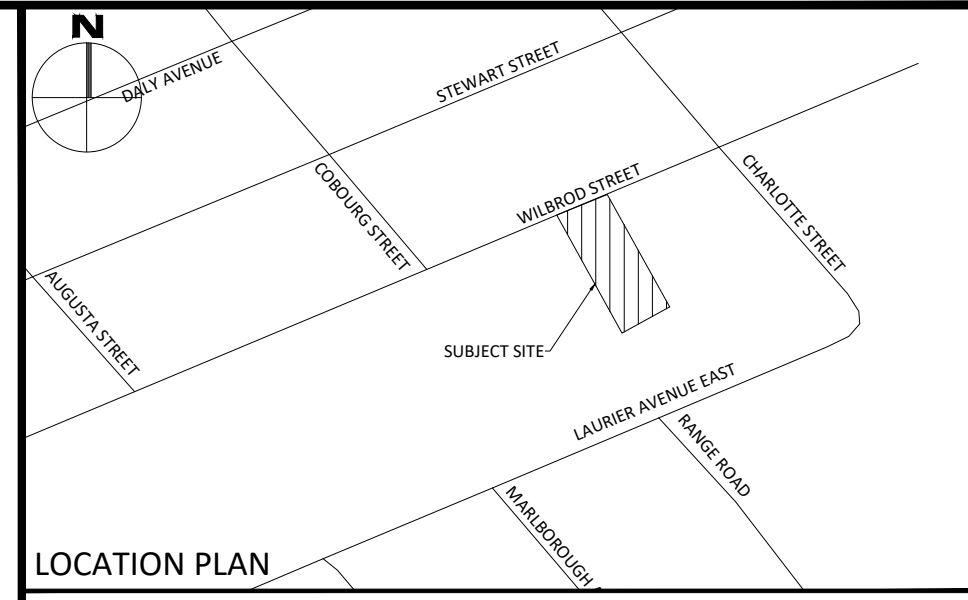
APPENDIX F
POST-DEVELOPMENT DRAINAGE PLAN

WILBROD STREET
REGISTERED PLAN 6



GENERAL NOTES

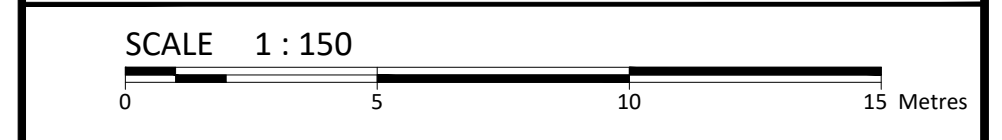
1. THE ORIGINAL TOPOGRAPHY, GROUND ELEVATION AND SURVEY DATA SHOWN ARE SUPPLIED FOR INFORMATION PURPOSES ONLY, AND IMPLY NO GUARANTEE OF ACCURACY. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ALL INFORMATION SHOWN.
2. THIS PLAN IS NOT A CADASTRAL SURVEY SHOWING LEGAL PROPERTY BOUNDARIES AND EASEMENTS. THE PROPERTY BOUNDARIES SHOWN HEREON HAVE BEEN DERIVED INFORMATION SUPPLIED BY (OR SHOWN ON) MCINTOSH PERRY SURVEYING INC. DRAWING #22-3223-476, DATED MARCH 1, 2022, AND CANNOT BE RELIED UPON TO BE ACCURATE OR COMPLETE. THE PRECISE LOCATION OF THE CURRENT PROPERTY BOUNDARIES AND EASEMENTS CAN ONLY BE DETERMINED BY AN UP-TO-DATE LAND TITLES SEARCH AND A SUBSEQUENT CADASTRAL SURVEY PERFORMED AND CERTIFIED BY AN ONTARIO LAND SURVEYOR.
3. THE CONTRACTOR IS TO OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY BEFORE COMMENCING CONSTRUCTION.
4. THE CONTRACTOR IS RESPONSIBLE FOR ALL LAYOUT.
5. THE CONTRACTOR IS TO DETERMINE THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION. PROTECT AND ASSUME ALL RESPONSIBILITY FOR EXISTING UTILITIES WHETHER OR NOT SHOWN ON THESE DRAWINGS. IF THERE IS ANY DISCREPANCY THE CONTRACTOR IS TO NOTIFY THE ENGINEER PROMPTLY.
6. RESTORE ALL TRENCHES AND SURFACES OF PUBLIC ROAD ALLOWANCES TO CONDITION EQUAL OR BETTER THAN ORIGINAL CONDITION AND TO THE SATISFACTION OF THE CITY AUTHORITIES.
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LEGEND

SUBJECT TO APPROVAL

REVISIONS	DATE
1 ISSUED FOR REVIEW	APR. 26, 2022
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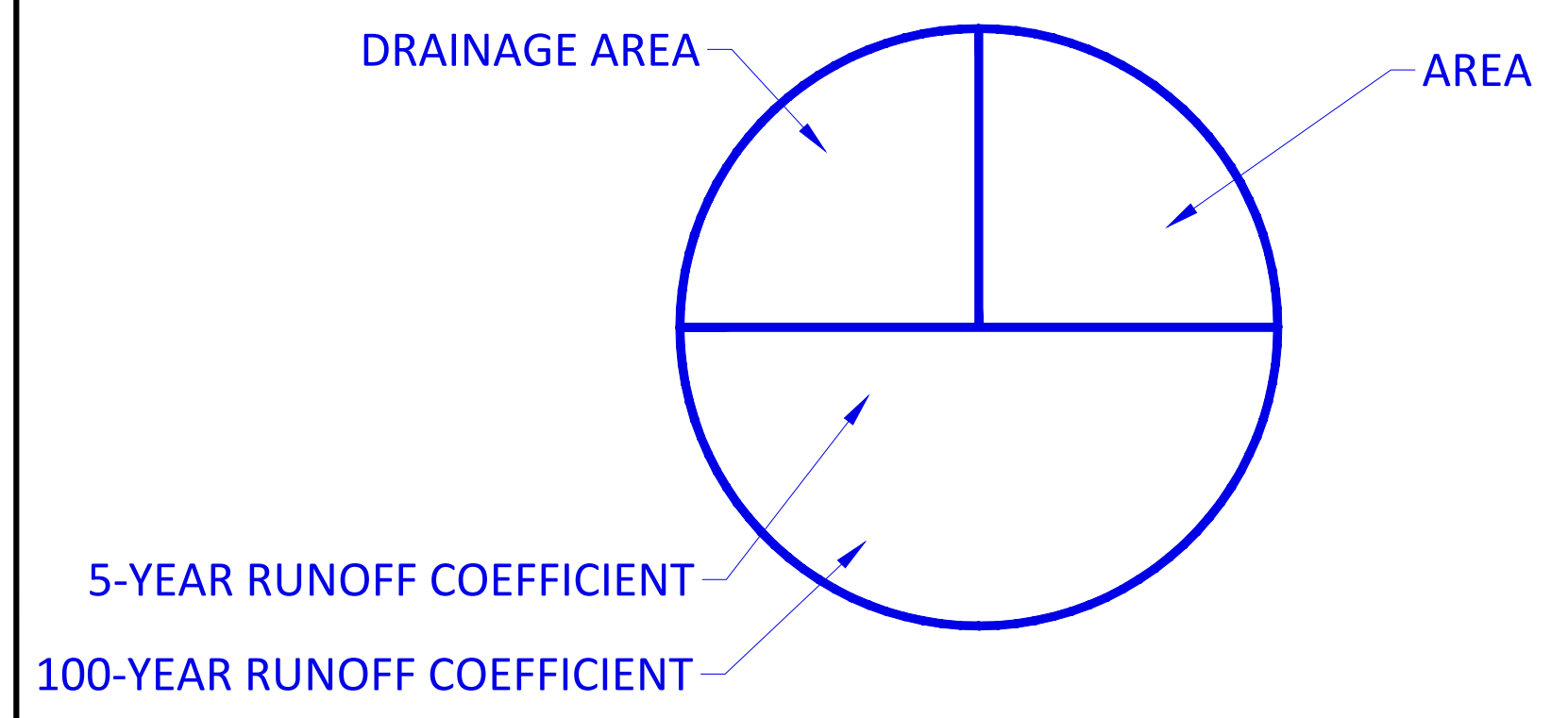
Client: **SLEEPWELL PROPERTY MANAGEMENT**
423 BRONSON AVENUE
OTTAWA, ON K1R 6J5

Project: **APARTMENT BUILDING ADDITION**
476 WILBROD STREET

Drawing Title: **POST-DEVELOPMENT DRAINAGE PLAN**

Scale:	1:150	Project Number:	CCO-22-3130
Drawn By:	FV	Checked By:	RF
Designed By:	FV	Drawing Number:	POST

LEGEND:



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 PLOT DEVICE: Tundra, August 02, 2022 1:58:54 PM

D07-12-22-0051

APPENDIX G
STORMWATER MANAGEMENT CALCULATIONS

McINTOSH PERRY

CCO-22-3130 - 476 Wilbrod

1 of 3

Tc (min)	Intensity (mm/hr)	
	5-Year	100-Year
20	70.3	120.0
10	104.2	178.6

C-Values	
Impervious	0.90
Gravel	0.60
Pervious	0.20

Pre-Development Runoff Coefficient

Drainage Area	Impervious Area (m ²)	Gravel (m ²)	Pervious Area (m ²)	Average C (5-year)	Average C (100-year)
A1	231	0	193.73	0.58	0.66

Pre-Development Runoff Calculations

Drainage Area	Area (ha)	C 5-Year	C 100-Year	Tc (min)	Q (L/s)	
					5-Year	100-Year
A1	0.0424	0.58	0.66	10	7.14	13.85
Total	0.0424				7.14	13.85

Post-Development Runoff Coefficient

Drainage Area	Impervious Area (m ²)	Gravel (m ²)	Pervious Area (m ²)	Average C (5-year)	Average C (100-year)
B1	230	0	131.07	0.65	0.73
B2	64	0	0	0.90	1.00

Post-Development Runoff Calculations

Drainage Area	Area (ha)	C 5-Year	C 100-Year	Tc (min)	Q (L/s)	
					5-Year	100-Year
B1	0.0361	0.65	0.73	10	6.75	13.02
B2	0.0064	0.90	1.00	10	1.66	3.16
Total	0.0424				8.41	16.19

Unrestricted

Required Restricted Flow

Drainage Area	Area (ha)	C 5-Year	Tc (min)	Q (L/s)
				5-Year
A1	0.0424	0.50	10	6.15

Post-Development Restricted Runoff Calculations

Drainage Area	Unrestricted Flow (L/S)		Restricted Flow (L/S)		Storage Required (m ³)		Storage Provided (m ³)	
	5-year	100-Year	5-Year	100-Year	5-Year	100-Year	5-Year	100-Year
B1	6.75	13.02	2.30	2.60	2.70	7.39	16.00	16.00
B2	1.66	3.16	1.66	3.16				
Total	8.41	16.19	3.96	5.76	2.70	7.39	16.00	16.00

McINTOSH PERRY

CCO-22-3130 - 476 Wilbrod

2 of 3

Storage Requirements for Area B1

5-Year Storm Event

Tc (min)	I (mm/hr)	Runoff (L/s) B1	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m ³)
10	104.2	6.75	2.30	4.45	2.67
20	70.3	4.55	2.30	2.25	2.70
30	53.9	3.49	2.30	1.19	2.14
40	44.2	2.86	2.30	0.56	1.35
50	37.7	2.44	2.30	0.14	0.42

Maximum Storage Required 5-year = 3 m³

100-Year Storm Event

Tc (min)	I (mm/hr)	Runoff (L/s) B1	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m ³)
10	178.6	13.03	2.60	10.43	6.26
20	120.0	8.75	2.60	6.15	7.38
30	91.9	6.70	2.60	4.10	7.39
40	75.1	5.48	2.60	2.88	6.91
50	64.0	4.67	2.60	2.07	6.21
60	55.9	4.08	2.60	1.48	5.32
70	49.8	3.63	2.60	1.03	4.34
80	45.0	3.28	2.60	0.68	3.28
90	41.1	3.00	2.60	0.40	2.15
100	37.9	2.76	2.60	0.16	0.99

Maximum Storage Required 100-year = 7 m³

5-Year Storm Event Storage Summary

		Water Elev. (m) = 71.01			
Location	T/G	INV. (out)	Depth (m)	Head (m)	Volume (m ³)
LSCB1	71.87	70.88	0.13	1.10	2.7

Storage Available (m³) = 16.0 *
Storage Required (m³) = 2.7

100-Year Storm Event Storage Summary

		Water Elev. (m) = 71.25			
Location	T/G	INV. (out)	Depth (m)	Head (m)	Volume (m ³)
LSCB1	71.87	70.88	0.37	1.34	7.4

Storage Available (m³) = 16.0 *
Storage Required (m³) = 7.4

McINTOSH PERRY

CCO-22-3130 - 476 Wilbrod

3 of 3

Time of Concentration Pre-Development

Drainage Area ID	Sheet Flow Distance (m)	Slope of Land (%)	Tc (min) (5-Year)	Tc (min) (100-Year)
A1	58	1.79	7	5

Therefore, a Tc of 10 can be used

$$T_c = (3.26(1.1-c)L^{0.5}/S^{0.33})$$

c = Balanced Runoff Coefficient

L = Length of drainage area

S = Average slope of watershed

APPENDIX H
CITY OF OTTAWA DESIGN CHECKLIST

City of Ottawa

4. Development Servicing Study Checklist

The following section describes the checklist of the required content of servicing studies. It is expected that the proponent will address each one of the following items for the study to be deemed complete and ready for review by City of Ottawa Infrastructure Approvals staff.

The level of required detail in the Servicing Study will increase depending on the type of application. For example, for Official Plan amendments and re-zoning applications, the main issues will be to determine the capacity requirements for the proposed change in land use and confirm this against the existing capacity constraint, and to define the solutions, phasing of works and the financing of works to address the capacity constraint. For subdivisions and site plans, the above will be required with additional detailed information supporting the servicing within the development boundary.

4.1 General Content

Criteria	Location (if applicable)
<input type="checkbox"/> Executive Summary (for larger reports only).	N/A
<input type="checkbox"/> Date and revision number of the report.	On Cover
<input type="checkbox"/> Location map and plan showing municipal address, boundary, and layout of proposed development.	Appendix A
<input type="checkbox"/> Plan showing the site and location of all existing services.	Site Servicing Plan (C102)
<input type="checkbox"/> Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	1.1 Purpose 1.2 Site Description 6.0 Stormwater Management
<input type="checkbox"/> Summary of pre-consultation meetings with City and other approval agencies.	Appendix B
<input type="checkbox"/> Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defensible design criteria.	1.1 Purpose 1.2 Site Description 6.0 Stormwater Management
<input type="checkbox"/> Statement of objectives and servicing criteria.	3.0 Pre-Consultation Summary

<input type="checkbox"/> Identification of existing and proposed infrastructure available in the immediate area.	N/A
<input type="checkbox"/> Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).	Site Grading Plan (C101)
<input type="checkbox"/> Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	Site Grading Plan (C101)
<input type="checkbox"/> Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.	N/A
<input type="checkbox"/> Proposed phasing of the development, if applicable.	N/A
<input type="checkbox"/> Reference to geotechnical studies and recommendations concerning servicing.	Section 2.0 Background Studies, Standards and References
<input type="checkbox"/> All preliminary and formal site plan submissions should have the following information: <ul style="list-style-type: none"> ○ Metric scale ○ North arrow (including construction North) ○ Key plan ○ Name and contact information of applicant and property owner ○ Property limits including bearings and dimensions ○ Existing and proposed structures and parking areas ○ Easements, road widening and rights-of-way ○ Adjacent street names 	Site Grading Plan (C101)

4.2 Development Servicing Report: Water

Criteria	Location (if applicable)
<input type="checkbox"/> Confirm consistency with Master Servicing Study, if available	N/A
<input type="checkbox"/> Availability of public infrastructure to service proposed development	N/A
<input type="checkbox"/> Identification of system constraints	N/A
<input type="checkbox"/> Identify boundary conditions	Appendix C
<input type="checkbox"/> Confirmation of adequate domestic supply and pressure	N/A
<input type="checkbox"/> Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.	Appendix C
<input type="checkbox"/> Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.	N/A
<input type="checkbox"/> Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design	N/A
<input type="checkbox"/> Address reliability requirements such as appropriate location of shut-off valves	N/A
<input type="checkbox"/> Check on the necessity of a pressure zone boundary modification.	N/A
<input type="checkbox"/> Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range	Appendix C, Section 4.2

<input type="checkbox"/> Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.	Site Servicing Plan (C101)
<input type="checkbox"/> Description of off-site required feeder mains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.	N/A
<input type="checkbox"/> Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Appendix C
<input type="checkbox"/> Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	N/A

4.3 Development Servicing Report: Wastewater

Criteria	Location (if applicable)
<input type="checkbox"/> Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).	N/A
<input type="checkbox"/> Confirm consistency with Master Servicing Study and/or justifications for deviations.	N/A
<input type="checkbox"/> Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.	N/A
<input type="checkbox"/> Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Section 5.2 Proposed Sanitary Sewer

<input type="checkbox"/> Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)	Section 5.3 Proposed Sanitary Design
<input type="checkbox"/> Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	N/A
<input type="checkbox"/> Description of proposed sewer network including sewers, pumping stations, and forcemains.	Section 5.2 Proposed Sanitary Sewer
<input type="checkbox"/> Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).	N/A
<input type="checkbox"/> Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	N/A
<input type="checkbox"/> Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	N/A
<input type="checkbox"/> Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.	N/A
<input type="checkbox"/> Special considerations such as contamination, corrosive environment etc.	N/A

4.4 Development Servicing Report: Stormwater Checklist

Criteria	Location (if applicable)
<input type="checkbox"/> Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)	Section 6.0 Stormwater Sewer Design & Section 7.0 Proposed Stormwater Management
<input type="checkbox"/> Analysis of available capacity in existing public infrastructure.	N/A
<input type="checkbox"/> A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	Pre & Post-Development Plans
<input type="checkbox"/> Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5-year event (dependent on the receiving sewer design) to 100-year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.	Section 6.0 Stormwater Sewer Design & Section 7.0 Proposed Stormwater Management
<input type="checkbox"/> Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	Section 6.0 Stormwater Sewer Design & Section 7.0 Proposed Stormwater Management
<input type="checkbox"/> Description of the stormwater management concept with facility locations and descriptions with references and supporting information.	Section 6.0 Stormwater Sewer Design & Section 7.0 Proposed Stormwater Management
<input type="checkbox"/> Set-back from private sewage disposal systems.	N/A
<input type="checkbox"/> Watercourse and hazard lands setbacks.	N/A
<input type="checkbox"/> Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	N/A
<input type="checkbox"/> Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	N/A
<input type="checkbox"/> Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5-year return period) and major events (1:100-year return period).	Appendix G

<input type="checkbox"/> Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	Site Grading Plan
<input type="checkbox"/> Calculate pre-and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.	Section 7.0 Proposed Stormwater Management Appendix G
<input type="checkbox"/> Any proposed diversion of drainage catchment areas from one outlet to another.	Section 6.0 Stormwater Sewer Design & Section 7.0 Proposed Stormwater Management
<input type="checkbox"/> Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	Section 6.0 Stormwater Sewer Design & Section 7.0 Proposed Stormwater Management
<input type="checkbox"/> If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.	N/A
<input type="checkbox"/> Identification of potential impacts to receiving watercourses	N/A
<input type="checkbox"/> Identification of municipal drains and related approval requirements.	N/A
<input type="checkbox"/> Descriptions of how the conveyance and storage capacity will be achieved for the development.	Section 6.0 Stormwater Sewer Design & Section 7.0 Proposed Stormwater Management
<input type="checkbox"/> 100-year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	Site Grading Plan (C101)
<input type="checkbox"/> Inclusion of hydraulic analysis including hydraulic grade line elevations.	N/A

<input type="checkbox"/> Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Section 8.0 Sediment & Erosion Control
<input type="checkbox"/> Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	N/A
<input type="checkbox"/> Identification of fill constraints related to floodplain and geotechnical investigation.	N/A

4.5 Approval and Permit Requirements: Checklist

The Servicing Study shall provide a list of applicable permits and regulatory approvals necessary for the proposed development as well as the relevant issues affecting each approval. The approval and permitting shall include but not be limited to the following:

Criteria	Location (if applicable)
<input type="checkbox"/> Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.	N/A
<input type="checkbox"/> Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.	N/A
<input type="checkbox"/> Changes to Municipal Drains.	N/A
<input type="checkbox"/> Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	N/A

4.6 Conclusion Checklist

Criteria	Location (if applicable)
<input type="checkbox"/> Clearly stated conclusions and recommendations	Section 9.0 Summary Section 10.0 Recommendations
<input type="checkbox"/> Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.	All are stamped
<input type="checkbox"/> All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario	All are stamped