

# SERVICING & STORMWATER MANAGEMENT REPORT 1 FINCH PRIVATE



Project No.: CCO-23-1408

City File No.: D07-XX-XX-XXXX

Prepared for:

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May 12<sup>th</sup>, 2023

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## 1.0 PROJECT DESCRIPTION

### 1.1 Purpose

McIntosh Perry (MP) has been retained by CSV Architects to prepare this Servicing and Stormwater Management Report in support of the Site Plan Control process for the proposed development located at 1 Finch Private 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-23-1408, C101 – Removals, Erosion & Sediment Control Plan
- CCO-23-1408, C101 – Lot Grading, Drainage & Servicing Plan
- CCO-23-1408, PRE – Pre-Development Drainage Plan (*Appendix E*)
- CCO-23-1408, POST – Post-Development Drainage Plan (*Appendix F*)

### 1.2 Site Description

Figure 1: Site Map



The subject property, herein referred to as the site, is located at 1 Finch Private the River Ward. The site covers approximately 0.25 ha and is located at the corner of Finch Private and Pinson Private. 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 the addition of a 6-storey 45-unit apartment building. Development is proposed within 0.17 ha of the site. Refer to *Site Plan* prepared by CSV Architects and included in *Appendix B* for further details.

### 1.4 Existing Conditions and Infrastructures

The site is currently developed containing a 6-unit townhouse block. The townhouse block will be removed as part of the development.

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

- ❖ Pinson Private
  - 150 mm diameter watermain, a
  - 200 mm diameter sanitary sewer, and a
  - 300 mm diameter concrete storm sewer, tributary to Sawmill Creek approximately 1.7km downstream.

### 1.5 Approvals

The proposed development is subject to the City of Ottawa site plan control approval 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 to be required since the proposed storm sewer system services one parcel of land and industrial use is not proposed.

## 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 (V22200) of the site was completed by Farley, Smith & Denis Surveying LTD. and dated December 4<sup>th</sup>, 2020.

The Site Plan (A100) was prepared by CSV Architects (*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-2018-04 City of Ottawa, March 2018. (*ISTB-2018-04*)
  - 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*)
  - Technical Bulletin ISTB-2021-03 City of Ottawa, August 2021. (*ISTB-2021-03*)

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 February 9<sup>th</sup>, 2023 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.
- The building shall provide roof storage to capture up to and including the 100-year event to the pre-existing 5-year storm release rate. The storm water in soft landscaped areas may be uncontrolled and shall be retained on site.

## 4.0 WATERMAIN

### 4.1 Existing Watermain

The site is located within the 2W2C pressure zone, as per the Water Distribution System mapping included in *Appendix C*. There are three privately owned fire hydrants available to service the proposed development, located along Finch Private and Pinson Private.

### 4.2 Proposed Watermain

It is proposed to service the new building with a 150 mm diameter water service connected to the proposed upgraded 200mm diameter water main within Pinson Private.

*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	0.17 ha
Residential	280 L/day/person
Residential Apartment – 1 Bedroom	1.4 person/unit
Residential Apartment – 2 Bedroom	2.1 person/unit
Residential Apartment – 3 Bedroom	3.1 person/unit
Max Day Peaking Factor - Residential	6.5 x avg. day
Peak Hour Peaking Factor - Residential	9.8 x avg. day

The OBC and Fire Underwriters Survey 2020 (FUS) methods were utilized to estimate the required fire flow for the proposed building. Fire flow requirements were calculated per City of Ottawa Technical Bulletin *ISTB-2018-02*. The following parameters were coordinated with the architect:

FUS:

- ❖ Type of construction – Non-Combustible Construction
- ❖ Occupancy Type – Limited Combustible
- ❖ Sprinkler Protection – Standard Sprinkler System

OBC:

- ❖ Type of construction – Non-Combustible Construction
- ❖ Occupancy Type: Group C
- ❖ Water Supply Coefficient (K): 10

The results of the FUS calculations yielded a maximum required fire flow of *10,000 L/min* (166.67 L/s), and the results of the OBC calculations yielded a maximum required fire flow of *9,000 L/min* (150.0 L/s). The detailed calculations for the FUS and OBC can be found in *Appendix C*.



Boundary conditions have been provided by the City of Ottawa for the current conditions and are available in Appendix 'C'. A water model was completed using Bentley's WaterCAD based on the boundary conditions. The results determined that the existing 150mm watermain cannot adequately service the proposed development and provide sufficient fire flow. As seen in *Table 2*, below, the maximum available fire flow at Junction 5 is *70.14 L/s @ 20psi*, while the required fire flow is *166.67 L/s*. Given the FUS fire demand of the existing townhouse blocks is estimated to be *7,000 – 8,000 L/min*, it is assumed that the existing development is underserviced with regards to fire flow. The results of the water model are available in *Appendix 'C'* of this report.

Table 2: Available Fire Flow at 20psi (Existing Conditions)

Junction	Required Fire flow (L/s)	Available Fire Flow @ 20psi (L/s)
J-5 (BLDG)	166.67	70.14

To improve the available fire flow, a second water model was completed which proposes extending a new 200 mm diameter watermain from the 305mm watermain within Uplands Drive. The new 200 mm diameter watermain will be extended along Finch Private and connect to the existing 150mm diameter watermain to form a loop. Refer to drawing *C103* and the water model figure included in *Appendix 'C'*. The results of the water model indicated that fire flows can be met with the new 200mm watermain connection to the existing 150 mm diameter watermain. The proposed building will require a service connection to the upgraded 200 mm diameter watermain, therefore a section of the existing 150 mm diameter watermain will need to be upsized as well. The results of the model are shown in *Table 3*, below.

Table 3: Available Fire Flow at 20psi (Proposed Loop)

Junction	Required Fire flow (L/s)	Available Fire Flow @ 20psi (L/s)
J-5 (BLDG)	166.67	181.02

To confirm the adequacy of fire flow to protect the proposed development, existing hydrants within 150 m of the proposed building were analysed per City of Ottawa *ISTB 2018-02* Appendix I Table 1. The results are summarized below.

Table 4: Fire Protection Confirmation

Building	Fire Flow Demand (L/min.)	Fire Hydrant(s) within 75m (5,700 L/min)	Fire Hydrant(s) within 150m (3,800 L/min)
1 Finch Private	9,000 (OBC) 10,000 (FUS)	1 Private	2 Private

Based on City guidelines (*ISTB-2018-02*), the existing hydrants provide adequate protection for the proposed development. A hydrant coverage figure can be found in *Appendix C*.

## 5.0 SANITARY DESIGN

### 5.1 Existing Sanitary Sewer

There is an existing 200 mm diameter sanitary sewer located within Pinson Private available to service the proposed development.

### 5.2 Proposed Sanitary Sewer

A new 150 mm diameter gravity sanitary service will be extended from the 200 mm diameter sanitary main within Pinson Private to service the proposed building, complete with a monitoring maintenance hole located just inside the property line.

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

Table 5: Sanitary Design Criteria

Design Parameter	Value
Site Area	0.17ha
Residential	280 L/person/day
1 Bedroom Apartment	1.4 persons/unit
2 Bedroom Apartment	2.7 persons/unit
3 Bedroom Apartment	3.1 persons/unit
Residential Peaking Factor	3.59
Extraneous Flow Allowance	0.33 L/s/ha
Estimated Population	109 persons

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	0.36
Total Estimated Peak Dry Weather Flow	1.28
Total Estimated Peak Wet Weather Flow	1.32

As noted above, the development is proposed to be serviced via a proposed 150 mm sanitary service connection to the 200 mm sanitary sewer within Pinson Private.

The full flowing capacity of a 150 mm diameter service at 1.0% slope is estimated to be 15.89 L/s. Per *Table 6*, a peak wet weather flow of 1.32 L/s will be conveyed within the 150 mm diameter service, therefore the proposed system is sufficiently sized for the development.

The full flowing capacity of the existing 200 mm diameter sanitary sewer at 0.96% slope is estimated to be 33.53 L/s. Per *Table 6*, the proposed development will only occupy 3.9% of the sewer capacity, therefore capacity issues are not anticipated. Due to the complexity of the downstream network the City will need to advise of any downstream constraints.

## 6.0 STORM SEWER DESIGN

### 6.1 Existing Storm Sewers

Stormwater runoff from the existing site flows overland towards Pinson Private and towards an existing swale east of the site. Runoff is conveyed via an existing private 300 mm diameter storm sewer to the existing 750mm storm sewer within Uplands Drive, where it travels approximately 1.7km before discharging to Sawmill Creek.

### 6.2 Proposed Storm Sewers

The proposed development will be serviced through a new 300 mm storm service connection to the existing 300 mm diameter storm sewer within Pinson Private.

Foundation drainage is proposed to be conveyed via the proposed 300 mm storm service, complete with a backwater valve.

Runoff collected on the roof of the proposed building will be stored and controlled internally using 7 roof drains. The roof drains will be used to limit the flow from the roof to the specified allowable release rate. Roof drainage will be directed to the proposed 300 mm diameter storm service, downstream of the backflow preventer. For calculation purposes a Watts Accutrol roof drain in the open position was used to estimate a reasonable roof flow. Other products may be specified at detailed building design provided release rates and storage volumes are respected.

See CCO-23-1408 - *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

As per *Section 6.2*, stormwater management for the proposed development will be provided by rooftop storage. The controlled stormwater flow will be directed to the existing 300 mm diameter storm sewer within Pinson Private. Stormwater management will account for the proposed development area of *0.17 ha*, and drainage considerations for the remainder of the site will be incorporated into the grading design.

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

#### Quality Control

- Quality controls are not anticipated to be required as the majority of runoff will be roof flow, which is considered clean.

#### Quantity Control

- Any storm events greater than the 5-year, up to 100-year, and including 100-year storm event must be detained on the roof.
- Post-development roof flow to be restricted to the 5-year storm event, based on a calculated time of concentration of at least 10 minutes and a combined maximum rational method coefficient of 0.50. Refer to *Section 7.2* for further details.

### 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 development area contains no stormwater management controls for flow attenuation. The estimated pre-development peak flows for the 5-, and 100-year events are summarized below in *Table 7*. See CCO-23-1408 - *PRE* in *Appendix E* and *Appendix G* for calculations.

Table 7: Pre-Development Runoff Summary

Drainage Area	Area (ha)	C 5 & 100- Year	Q (L/s)	
			5-Year	100-Year
A1	0.17	0.43 / 0.49	21.41	42.40
Total	0.17	-	21.41	42.40

### 7.4 Post-Development Drainage

To meet the stormwater objectives, the development will contain flow attenuation via rooftop storage. *Table 8*, below, summarizes the required restricted flow for the roof.

Table 8: Required Restricted Roof Flow

Drainage Area	Area (ha)	C (5-Year)	Q (L/s) 5-Year
A1	0.08	0.43	10.19

Based on the criteria listed in *Section 7.1*, 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 *10.19 L/s*. See *Appendix G* for calculations.

The proposed site drainage limits are demonstrated on the Post-Development Drainage Area Plan. See CCO-23-1408 - *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)	5-year Peak Flow (L/s)	100-year Peak Flow (L/s)	100-year Storage Required (m <sup>3</sup> )	100-year Storage Available (m <sup>3</sup> )
B1A	0.07	4.54	6.81	19.79	20.92
B1B	0.01	0.76	1.20	3.77	4.09
Roof Total	0.08	5.30	8.01	23.57	25.01
B2	0.09	10.37	20.65	-	-
Site Total	0.17	15.67	28.66	23.57	25.01

Runoff from areas B1A and B1B will be controlled and stored on the roof of the proposed building (B1) using 6 and 1 roof drains, respectively. The roof drains will be used to limit the flow from the roof to the specified allowable release rate.

For calculation purposes a Watts Accutrol roof drain in the open position was used to estimate a reasonable roof flow. Other products may be specified at detailed building design provided release rates and storage volumes are respected.

Runoff from area B2 is comprised of surface runoff from the walkways and landscaped areas and will be unrestricted and maintain existing drainage patterns.

As seen in *Table 10*, below, roof runoff will be restricted to a maximum release rate of 8.01 L/s, allowing for a proposed 25.01  $m^3$  of roof storage.

Table 10: Roof Drainage Summary

Drainage Area	Area (ha)	# of Roof Drains	Storage Depth (mm)		Total Flow Rate (L/s)	
			5-Year	100-Year	5-Year	100-Year
B1A	0.07	6	60	90	4.54	6.81
B1B	0.01	1	60	95	0.76	1.20
Total	0.08	7	-	-	5.30	8.01

## 7.5 Quality Control

As noted in *Section 7.1*, quality controls are not anticipated to be required for the development as the majority of runoff will be comprised of roof flow, which is considered clean.



## 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 new 6-storey  $823 m^2$  apartment building is proposed to be constructed at 1 Finch Private. The site covers  $0.25 ha$ , and development is proposed within  $0.17 ha$  of the site.
- It is proposed to service the new building through a new 150 mm diameter water service and 150 mm diameter sanitary service. A new 300 mm diameter storm service is proposed to convey foundation and roof drainage.
- It is proposed to service the development area via roof storage. The storm system will connect to the existing 300 mm diameter storm sewer within Pinson Private, which discharges to the existing 750 mm diameter storm sewer within Uplands Drive.
- Storage for the 5- through 100-year storm events will be provided on the roof.

## 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 1 Finch Private.

This report is respectfully being submitted for approval.

Regards,

*McIntosh Perry Consulting Engineers Ltd.*



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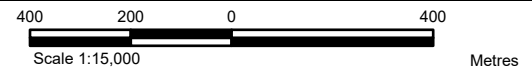
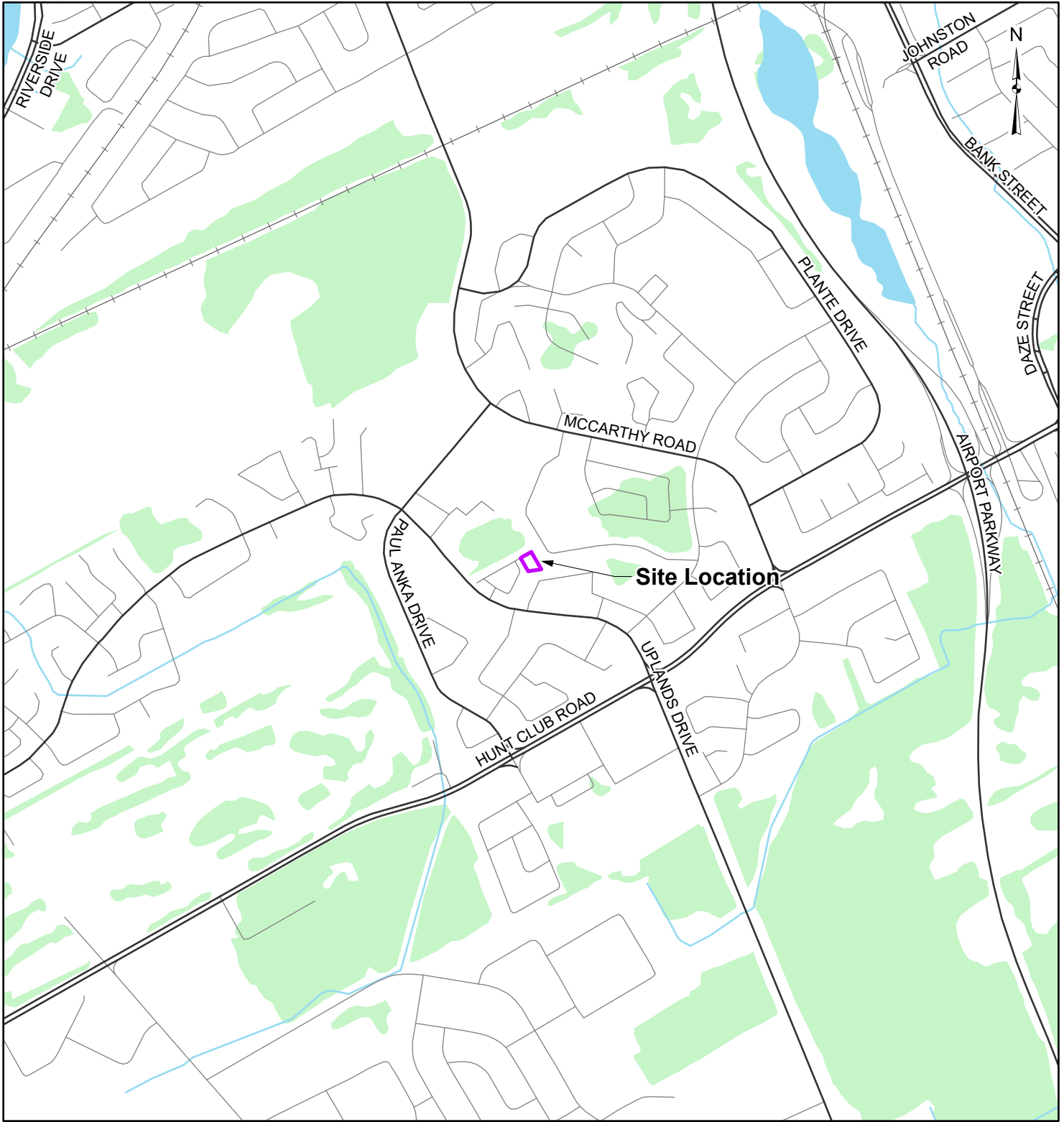
## 11.0 STATEMENT OF LIMITATIONS

This report was produced for the exclusive use of CSV Architects. 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



**LEGEND**

- Site Location
- Local Road
- Major Road
- Railroad
- ~ Watercourse
- Waterbody
- Wooded Area

**REFERENCE**

GIS data provided by the Ontario Ministry of Natural Resources and Forestry, 2023.

CLIENT:		<b>CSV ARCHITECTS</b>	
PROJECT:		<b>OCH RESIDENTIAL DEVELOPMENT</b>	
TITLE:		<b>SITE LOCATION</b>	
PROJECT NO: CCO-23-1408		FIGURE:	
Date	Apr., 26, 2023	<b>1</b>	
GIS	AH		
Checked By	FV		

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APPENDIX B  
BACKGROUND DOCUMENTS



# MEMO

Date:

To /  
Destinataire Craig Hamilton, Planner

From /  
Expéditeur Bruce Bramah, Project Manager, Infrastructure  
Approvals

**Pre-Application Consultation**  
**1 Finch Private,**  
*The proposed is a 45 unit, 6 storey  
affordable/market rental residential building that  
would be a part of the existing PUD. It is within  
the R5B H(18). The building will be accessed  
by the existing lanes. New parking will be  
provided along central green space for  
residents and visitors.*

File No. PC2023-0021

Please note the following information regarding the engineering design submission for the above noted site:

1. The Servicing Study Guidelines for Development Applications are available at the following address: <https://ottawa.ca/en/planning-development-and-construction/developing-property/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](mailto:InformationCentre@ottawa.ca) or by phone at (613) 580-2424 x.44455).
4. The Stormwater Management Criteria, for the subject site, is to be based on the following:
- i. The 5-yr storm event using the IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997.
  - ii. The pre-development runoff coefficient or a maximum equivalent 'C' of 0.5, whichever is less (§ 8.3.7.3).
  - iii. A calculated time of concentration (Cannot be less than 10 minutes).
  - iv. The building shall provide roof storage to capture up to and including the 100-year event to the pre-existing 5 year storm release rate. The storm water in soft landscaped areas may be uncontrolled and shall be retained on site.
  - v. On site quality control will be required (80% TSS removal).
  - vi. No surface ponding within parking areas during the 2-year event.
  - vii. The site outlets to the Sawmill Creek and there may be area specific SWM Criteria that may apply. Check for any related SWM &/or Sub-watershed studies that may have been completed.
  - viii. If existing services are to be used, a CCTV scan and recommendation memo by a qualified professional to will be required to verify the condition and identify any structural deficiencies.

5. Deep Services (Storm, Sanitary & Water Supply)
  - i. *Provide existing servicing information and the recommended location for the proposed connections. Services should ideally be grouped in a common trench to minimize the number of road cuts.*
  - ii. *Connections to trunk sewers and easement sewers are typically not permitted.*
  - iii. *Provide information on the monitoring manhole requirements – should be located in an accessible location on private property near the property line (ie. Not in a parking area).*
  - iv. *Review provision of a high-level sewer.*
  - v. *Provide information on the type of connection permitted*

Sewer connections to be made above the springline of the sewermain as per:

- a. *Std Dwg S11.1 for flexible main sewers – connections made using approved tee or wye fittings.*
  - b. *Std Dwg S11 (For rigid main sewers) – lateral must be less than 50% the diameter of the sewermain,*
  - c. *Std Dwg S11.2 (for rigid main sewers using bell end insert method) – for larger diameter laterals where manufactured inserts are not available; lateral must be less than 50% the diameter of the sewermain,*
  - d. *Connections to manholes permitted when the connection is to rigid main sewers where the lateral exceeds 50% the diameter of the sewermain. – Connect obvert to obvert with the outlet pipe unless pipes are a similar size.*
  - e. *No submerged outlet connections.*
6. Water Boundary condition requests must include the location of the service and the expected loads (net increase) required by the proposed development. The

hydraulic modelling submission shall include all existing demands on the private system. Please provide the following information for water boundary conditions:

- i. Location of service
  - ii. Type of development and the amount of fire flow required (as per FUS, 1999).
  - iii. Average daily demand: \_\_\_ l/s.
  - iv. Maximum daily demand: \_\_\_ l/s.
  - v. Maximum hourly daily demand: \_\_\_ l/s.
7. Developments with an average day demand over 50m<sup>3</sup>/day or 50units require two connections to the public watermain with an isolation valve in between to prevent any vulnerable service areas.
8. Phase 1 ESAs and Phase 2 ESAs must conform to clause 4.8.4 of the Official Plan that requires that development applications conform to Ontario Regulation 153/04.
9. ECA Requirements:

Note that an MOECC Environmental Compliance Approval (Private Sewage Works) may be required for the proposed development if the stormwater management plan for the site results in flows (major or minor) that cross any shared property line. ECA requirements can be further assessed once a formal application is received.

Should you have any questions or require additional information, please contact me directly at (613) 580-2424, ext. 29686 or by email at [Bruce.Bramah@ottawa.ca](mailto:Bruce.Bramah@ottawa.ca).

**– SITE PLAN APPLICATION – Municipal servicing**

Legend:

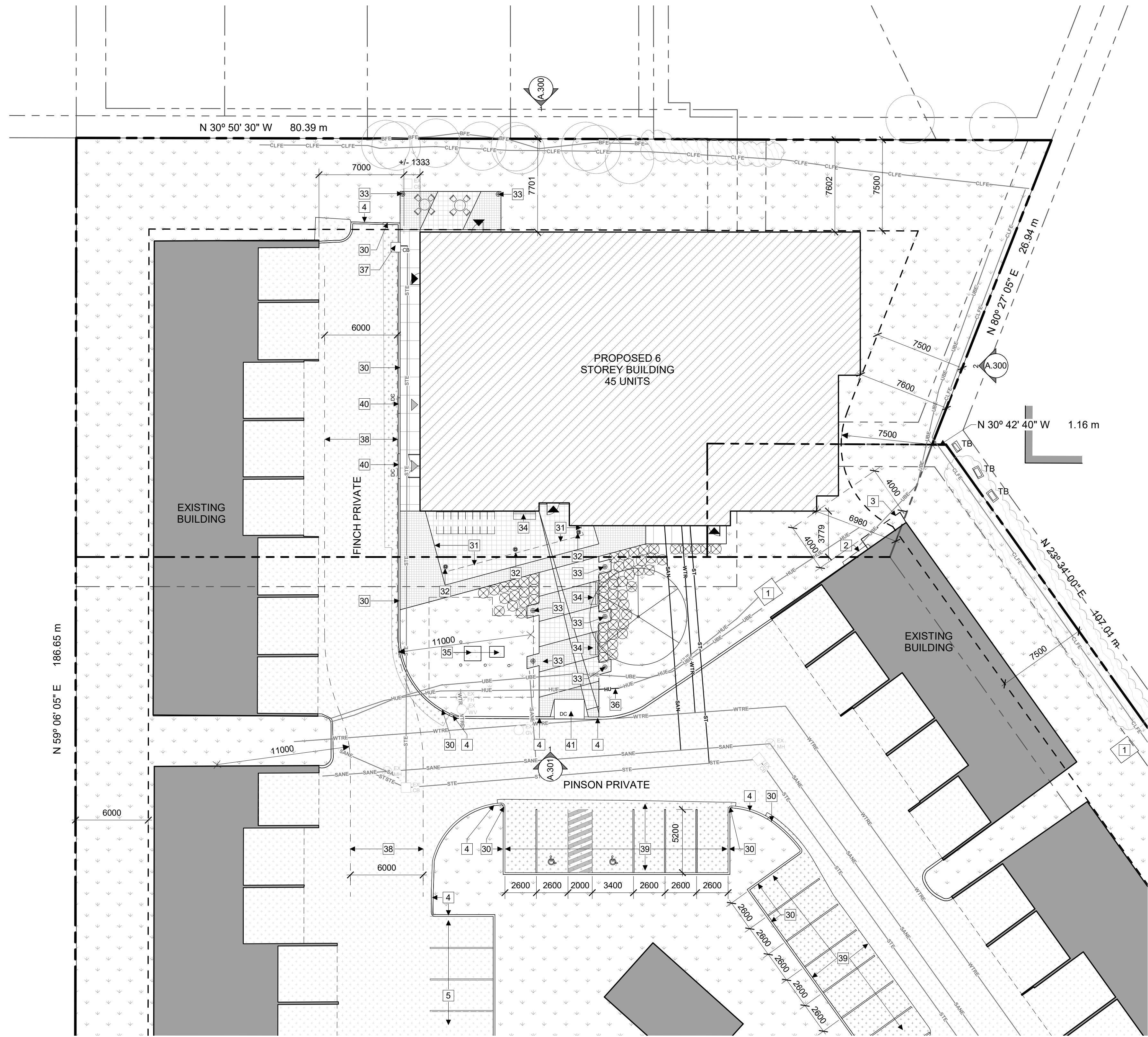
The letter **S** indicates that the study or plan is required with application submission.

The letter **M** indicates that the study or plan may be required with application submission.

For information on preparing required studies and plans refer to:

<http://ottawa.ca/en/development-application-review-process-0/guide-preparing-studies-and-plans>

S/A	Number of copies	ENGINEERING		S/A	Number of copies
<b>S</b>		1. Site Servicing Plan	2. Assessment of Adequacy of Public Services / Site Servicing Study / Brief	<b>S</b>	
<b>S</b>		3. Grade Control and Drainage Plan	4. Geotechnical Study / Slope Stability Study	<b>S</b>	
		5. Composite Utility Plan	6. Groundwater Impact Study		
		7. Servicing Options Report	8. Wellhead Protection Study		
		9. Community Transportation Study and/or Transportation Impact Study / Brief	10. Erosion and Sediment Control Plan / Brief	<b>S</b>	
<b>S</b>		11. Storm water Management Report / Brief	12. Hydro-geological and Terrain Analysis		
<b>M</b>		13. Water main Analysis	14. Noise / Vibration Study		
		15. Roadway Modification Design Plan	16. Confederation Line Proximity Study		



**1 PROPOSED SITE PLAN**  
A100 1:200

LEGAL DESCRIPTION	SITE AREA	16 946m <sup>2</sup> (TBC)	ZONING PROVISION	REQUIRED	PROVIDED	PARKING QUEING + LOADING	REQUIRED	PROVIDED
REFERENCE SURVEY	BUILDING AREA	825m <sup>2</sup>	MIN. LOT WIDTH	N/A	34.5m	RESIDENTIAL SPACES	54	54
MUNICIPAL ADDRESS	GROSS FLOOR AREA	4926m <sup>2</sup>	MIN. LOT AREA	1400m <sup>2</sup>	2541m <sup>2</sup>	VISITOR SPACES	9	9
	BUILDING HEIGHT	18m / 6 STOREYS	MIN. FRONT YARD SETBACK	3.0m	N/A	ACCESSIBLE PARKING		2
	ZONE	R5B (H18)	MIN. CORNER YARD SETBACK	N/A	N/A	BICYCLE PARKING	45	77
	SCHEDULE 1	AREA C	MIN. REAR YARD SETBACK	7.5m	7.6m			
	SCHEDULE 2	N / A	MIN. INTERIOR YARD SETBACK	7.5m	7.6m			
			MAX. HEIGHT	18m	18m	GARBAGE COLLECTION:		
			AMENITY AREA	270m <sup>2</sup> + TBD	79.3m <sup>2</sup> Interior 191m <sup>2</sup> Exterior	• GARBAGE 11yard: 3x4 Yd. bins • GMP 0.81 yds • FIBER 2.8 yds • COMPOST 1x240L Cart		
			LANDSCAPED AREA	762.3m <sup>2</sup>	1302m <sup>2</sup>			
			MINIMUM SETBACK OF WALL OF RESIDENTIAL BUILDING TO PRIVATE WAY	1.8m	1.8m			
			MINIMUM SEPARATION AREA BETWEEN BUILDINGS IN A PLANNED UNIT DEVELOPMENT	3.0m	4.0m			

**NEW SITE PLAN GENERAL NOTES:**

- ALL GENERAL SITE INFORMATION AND CONDITIONS COMPILED FROM EXISTING PLANS AND SURVEYS
- DO NOT SCALE THIS DRAWING
- REPORT ANY DISCREPANCIES PRIOR TO COMMENCING WORK. NO RESPONSIBILITY IS BORN BY THE CONSULTANT FOR UNKNOWN SUBSURFACE CONDITIONS
- CONTRACTOR TO CHECK AND VERIFY ALL DIMENSIONS ON SITE AND REPORT ANY ERRORS AND/OR OMISSIONS TO THE CONSULTANT
- REINSTATE ALL AREAS AND ITEMS DAMAGED AS A RESULT OF CONSTRUCTION ACTIVITIES TO THE SATISFACTION OF THE CONSULTANT
- CONTRACTOR TO LAYOUT PLANTING BEDS, PATHWAYS ETC. TO APPROVAL OF CONSULTANT PRIOR TO ANY JOB EXCAVATION
- THE ACCURACY OF THE POSITION OF UTILITIES IS NOT GUARANTEED - CONTRACTOR TO VERIFY PRIOR TO EXCAVATION
- INDIVIDUAL UTILITY COMPANY MUST BE CONTACTED FOR CONFIRMATION OF UTILITY EXISTENCE AND LOCATION PRIOR TO DIGGING
- ALL DISTURBED AREAS TO BE RESTORED TO ORIGINAL CONDITION OR BETTER UNLESS OTHERWISE NOTED
- PROVIDE TEMPORARY HOARDING AND FACING AROUND CONSTRUCTION SITE FOR PERIOD OF WORK
- PROTECT EXISTING TREES FROM DAMAGE FOR PERIOD OF WORK

**NEW SITE PLAN KEYNOTES:**

- EXISTING HYDRO KIOSK
  - EXISTING HYDRO METERS AT WOODEN BOX
  - EXISTING BUILDING ABOVE
  - EXISTING CURB TO REMAIN
  - EXISTING PARKING
- 
- NEW CURB
  - NEW CANOPY OVERHANG ABOVE (DASHED)
  - NEW COLUMN
  - NEW BOLLARD LIGHT PER LANDSCAPING
  - BENCH
  - NEW TRANSFORMER AND SWITCH PER ELECTRICAL
  - ADJUSTS UNDERGROUND HYDRO LINES PER ELECTRICAL AFTER HYDRO KIOSK REMOVAL PER ELECTRICAL
  - NEW CATCH BASING. ADJUST STORM WATER LINE AS REQUIRED
  - FIRE ROUTE
  - NEW PARKING
  - NEW DROPPED CURB AND SIDEWALK RAMP
  - NEW DROPPED CURB AND ACCESSIBLE SIDEWALK RAMP
  - NEW BIKE PACKING SPACES

**NEW SITE PLAN LEGEND:**

	EXISTING BUILDING
	PROPOSED BUILDING
	NEW ASPHALT PAVING
	EXISTING ASPHALT PAVING EXISTING
	NEW GRASS
	NEW CONCRETE SIDEWALK
	NEW CONCRETE PAD
	NEW PAVER TYPE 1
	NEW PAVER TYPE 2
	EXISTING CEDAR HEDGE

	EMERGENCY EXIT
	SERVICE DOORS
	BUILDING MAIN ENTRANCE
	PROPERTY LINE
	PARCEL MAIN BOUNDARY LINE
	PARCEL STANDARD BOUNDARY LINE
	SET BACK LINE
	NEW FENCE PER LANDSCAPE
	EXISTING CHAIN LINK FENCE
	EXISTING BOARD FENCE
	EXISTING WATER
	NEW WATER
	EXISTING SANITARY
	NEW SANITARY
	EXISTING STORM
	NEW STORM
	EXISTING ELECTRICAL SERVICE (BELOW GRADE)
	NEW ELECTRICAL SERVICE (BELOW GRADE)
	EXISTING BELL SERVICE (BELOW GRADE)
	EXISTING GAS
	NEW GAS

	CATCH BASIN
	CATCH BASIN EXISTING
	LIGHT STANDARD
	LIGHT STANDARD EXISTING
	FIRE HYDRANT
	FIRE HYDRANT EXISTING
	MANHOLE
	MANHOLE EXISTING
	UTILITY POLE
	UTILITY POLE EXISTING
	WATER VALVE CHAMBER EXISTING
	WATER VALVE EXISTING
	GAS VALVE EXISTING
	SIAMESE CONNECTION
	DROPPED CURB

	NEW TREE PER LANDSCAPING
	NEW SHRUB PER LANDSCAPING
	EXISTING TREE

STAMP

1	2023/05/11	ISSUED FOR COORDINATION
REV DATE	ISSUE	

NOTES

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- DO NOT SCALE DRAWINGS. CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY DIMENSIONS ON SITE.
- ALL WORK SHALL BE IN ACCORDANCE WITH THE ONTARIO BUILDING CODE AND ALL SUPPLEMENTS AND APPLICABLE MUNICIPAL REGULATIONS.

CLIENT

**OTTAWA COMMUNITY HOUSING**  
OTTAWA  
ONTARIO, CANADA

PROJECT

**OCH SHEARWATER APARTMENTS**

1 FINCH PRIVATE, OTTAWA, ON

TITLE

**PROPOSED SITE PLAN**

PROJECT NO: 2022-1430  
DRAWN: AL / LCB / IK  
APPROVED: JS  
SCALE: 1 : 200  
DATE PRINTED: 5/12/2023 9:46:48 AM

REV DRAWING NO.

1 A100



APPENDIX C  
WATERMAIN CALCULATIONS



# McINTOSH PERRY

## CCO-23-1408 - 1 Finch Private - Water Demands

Project:	1 Finch Private
Project No.:	CCO-23-1408
Designed By:	FV
Checked By:	AM
Date:	May 10, 2023
Site Area:	0.17 gross ha

Residential	NUMBER OF UNITS		UNIT RATE	
1 Bedroom Apartment	11 units		1.4	persons/unit
2 Bedroom Apartment	12 units		2.1	persons/unit
3 Bedroom Apartment	22 units		3.1	persons/unit
Total Population		109 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 <sup>2</sup> /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	0.35	L/s
	Commercial/Industrial /Institutional	0.00	L/s

### MAXIMUM DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS	
Residential	6.5	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	2.30	L/s
	Commercial/Industrial /Institutional	0.00	L/s

### MAXIMUM HOUR DEMAND

DEMAND TYPE	AMOUNT	UNITS	
Residential	9.8	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	3.46	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	0.35	L/s
MAXIMUM DAILY DEMAND	2.30	L/s
MAXIMUM HOUR DEMAND	3.46	L/s

# McINTOSH PERRY

## CCO-23-1408 - 1 Finch Private - OBC Fire Calculations

Project:	1 Finch Private
Project No.:	CCO-23-1408
Designed By:	FV
Checked By:	AM
Date:	May 10, 2023

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

*Water Supply for Fire-Fighting - Apartment Building*

Building is classified as Group : C - Residential (from table 3.2.2.55)  
 Building is of noncombustible construction with fire separations and fire-resistance ratings provided in accordance with subsections 3.2.2., including loadbearing walls, columns and arches

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

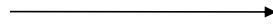
K = water supply coefficient from Table 1

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	10	(from Table 1 pg A-31) (Worst case occupancy {E / F2} 'K' value used)
V	14,978	(Total building volume in m <sup>3</sup> .)
Stot	2.0	(From figure 1 pg A-32)
Q =	299,559.60 L	



			From Figure 1 (A-32)
Snorth	28.36	m	0.0
Seast	7.67	m	0.2
Ssouth	5.32	m	0.5
Swest	2.58	m	0.5

\*approximate distances

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

9000 L/min if Q > 270,000 L  
 2378 gpm

# McINTOSH PERRY

## CCO-23-1408 - 1 Finch Private - Fire Underwriters Survey

Project: 1 Finch Private  
 Project No.: CCO-23-1408  
 Designed By: FV  
 Checked By: AM  
 Date: May 10, 2023

### 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 √A 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 Non-Combustible Construction

C 0.8 A 4,682.3 m<sup>2</sup>

Total Floor Area (per the 2020 FUS Page 20 - Total Effective Area) 3,121.7 m<sup>2</sup>

Calculated Fire Flow 9,833.5 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)

Standard Water Supply Sprinklered -40%

Reduction -3,400.0 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	10.1 to 20	Wood frame	39.2	3	117.6	15%
Exposure 2	10.1 to 20	Wood frame	22.67	2	45.3	12%
Exposure 3	10.1 to 20	Wood frame	31	3	93.0	14%
Exposure 4	3.1 to 10	Wood frame	10.81	3	32.4	16%
					% Increase*	57%

Increase\* 4,845.0 L/min

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

Fire Flow 9,945.0 L/min  
 Fire Flow Required\*\* 10,000.0 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-23-1408 - 1 Finch Private - Boundary Condition Unit Conversion

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Project: 1 Finch Private

Project No.: CCO-23-1408

Designed By: FV

Checked By: AM

Date: May 10, 2023

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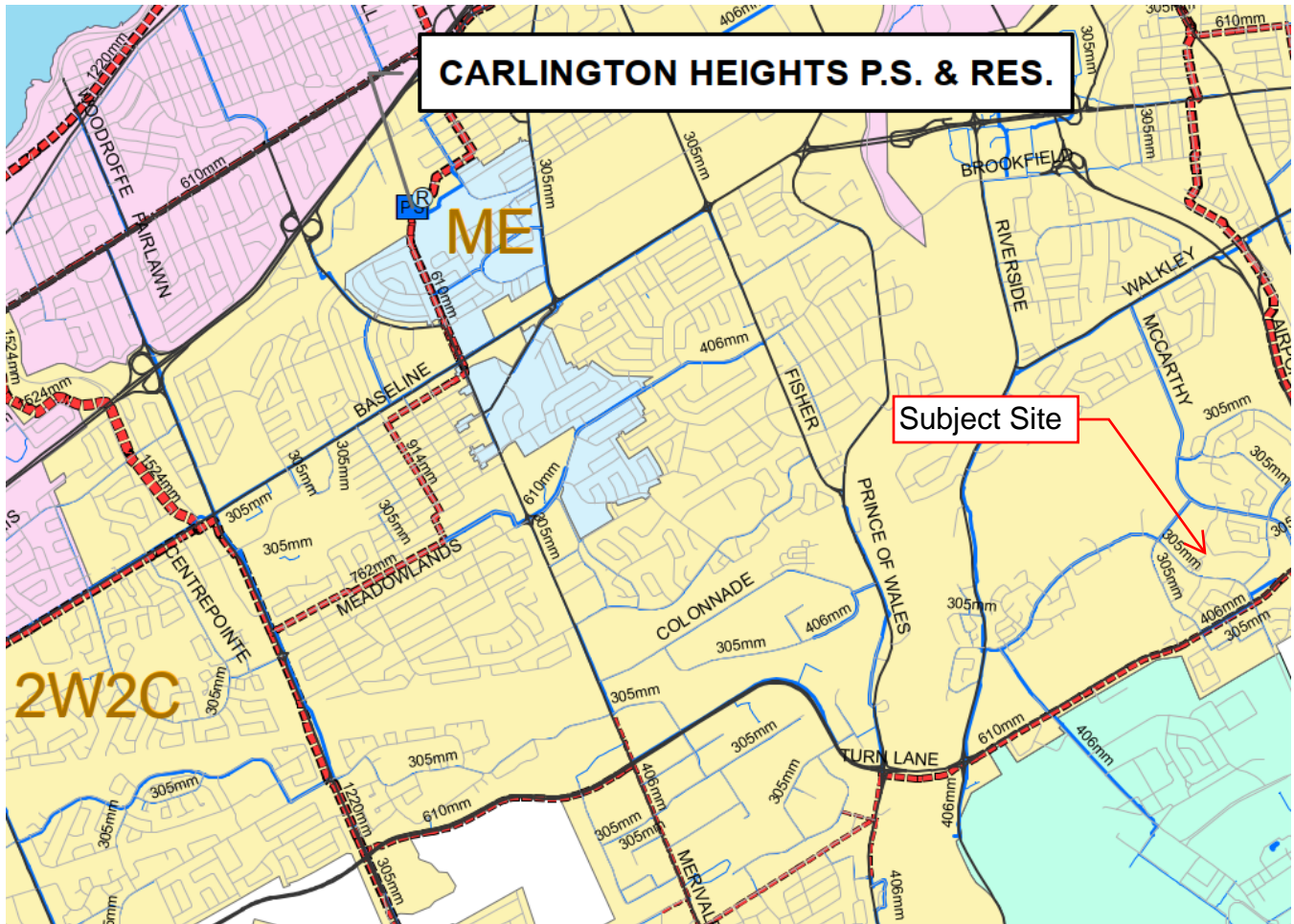
### Boundary Conditions Unit Conversion

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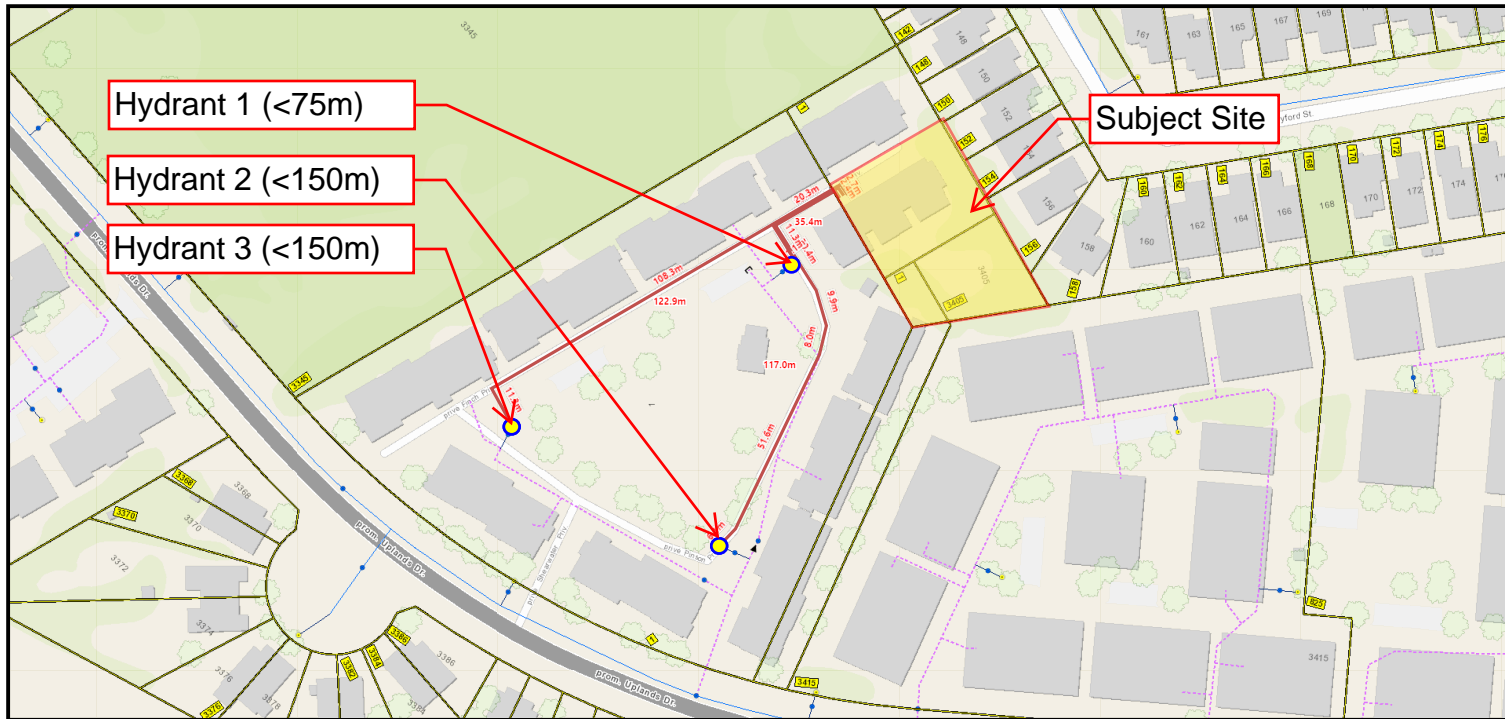
#### Uplands Drive

Scenario	Height (m)	Elevation (m)	m H <sub>2</sub> O	PSI	kPa
<b>Avg. DD</b>	131.9	95.9	36.0	51.2	352.8
<b>OBC Fire Flow (150 L/s or 9,000 L/min)</b>	126.2	95.9	30.3	43.1	296.9
<b>FUS Fire Flow (166.67 L/s or 10,000 L/min)</b>	125.8	95.9	29.9	42.5	292.9
<b>Peak Hour</b>	124.0	95.9	28.1	39.9	275.3

# 1 Finch Private Pressure Zone Figure



# 1 Finch Private Hydrant Coverage Figure



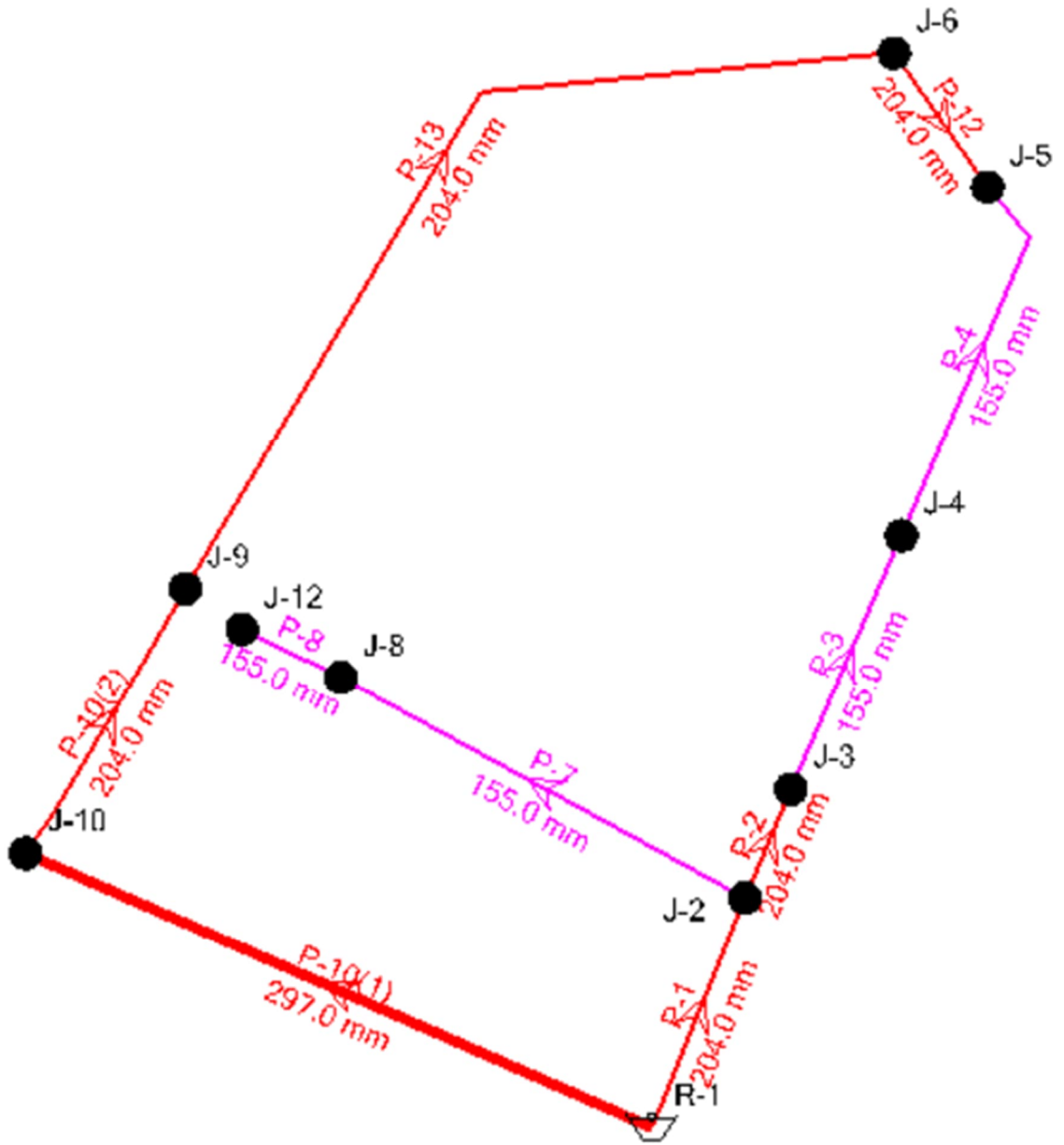


FIGURE: WATERCAD MODEL WITH NEW 200mm DIAMETER LOOP

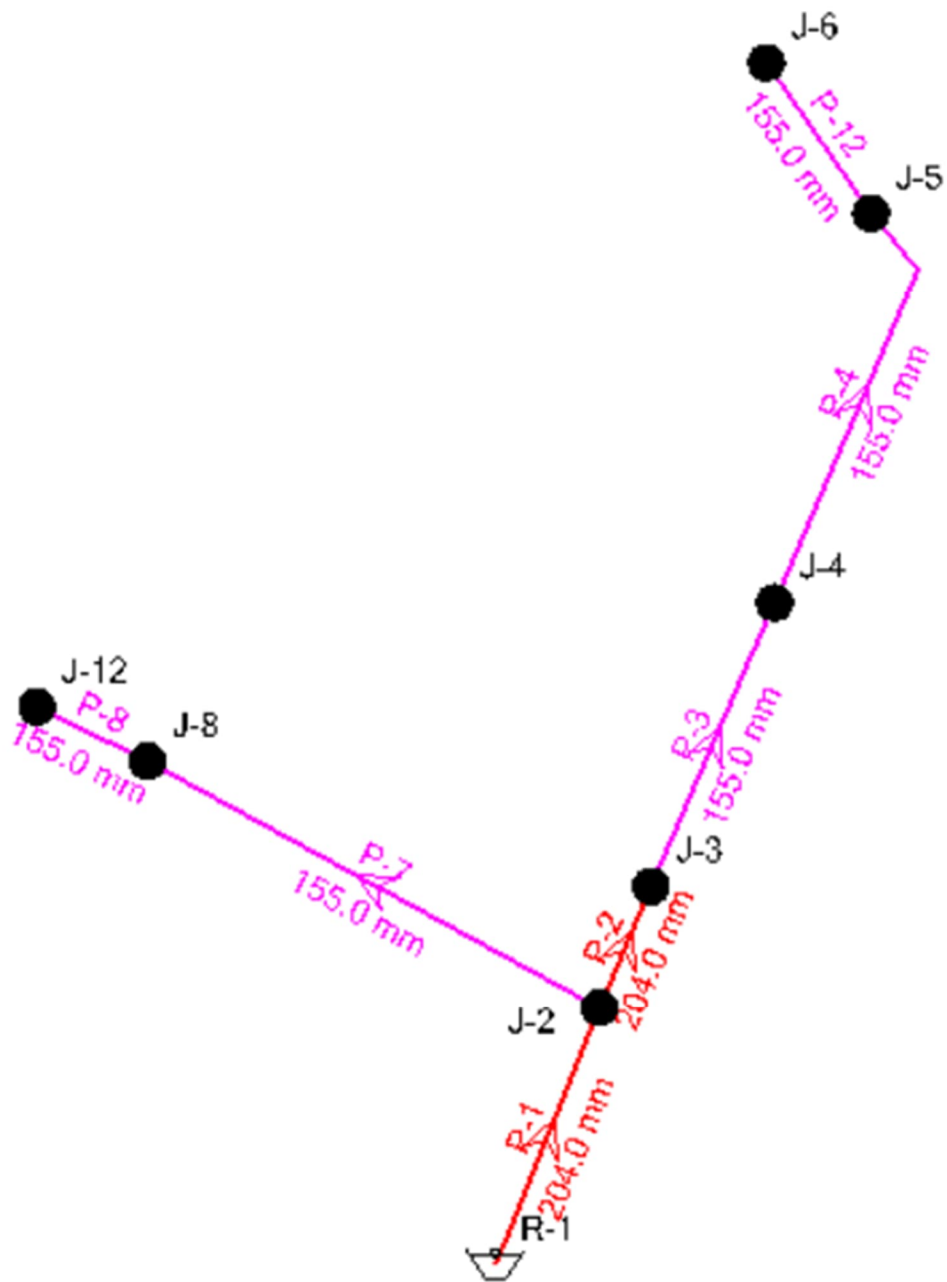


FIGURE: WATERCAD MODEL EXISTING CONDITIONS



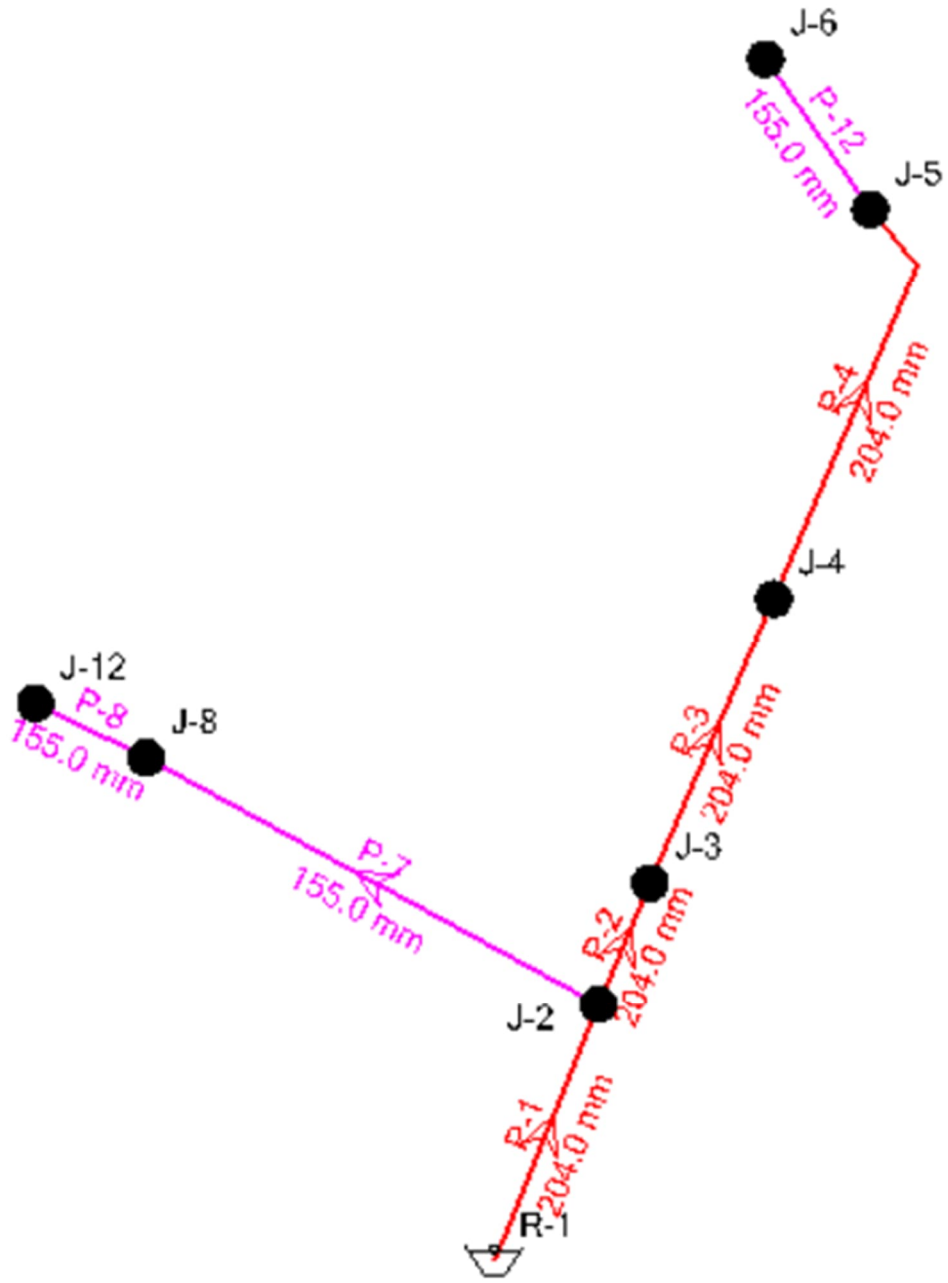


FIGURE: WATERCAD MODEL UPSIZED WATERMAIN (SINGLE FEED)

Shearwater Development - 3405 Uplands Drive  
Average Day Demands (Existing Conditions)  
Junction Table - Time: 0.00 hours

ID	Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (psi)
31	J-2	98.73	0.000	131.90	47
33	J-3	98.90	0.000	131.90	47
35	J-4	99.70	0.220	131.90	46
37	J-5	99.80	0.320	131.90	46
72	J-6	100.00	0.180	131.90	45
43	J-8	99.00	0.150	131.90	47
45	J-9	99.20	(N/A)	(N/A)	(N/A)
68	J-10	99.64	(N/A)	(N/A)	(N/A)
77	J-12	99.20	0.180	131.90	187

Pipe Table - Time: 0.00 hours

ID	Label	Length (Scaled) (m)	Start Node	Stop Node	Diameter (mm)	Material	Hazen-Williams C	Flow (L/s)	Velocity (m/s)
36	P-3	31	J-3	J-4	155.0	PVC	100.0	0.720	0.04
38	P-4	43	J-4	J-5	155.0	PVC	100.0	0.500	0.03
44	P-7	51	J-2	J-8	155.0	PVC	100.0	0.330	0.02
78	P-8	12	J-8	J-12	155.0	PVC	100.0	0.180	0.01
34	P-2	13	J-2	J-3	204.0	PVC	110.0	0.720	0.02
48	P-1	28	R-1	J-2	204.0	PVC	110.0	1.050	0.03
70	P-10(2)	34	J-10	J-9	204.0	PVC	110.0	(N/A)	(N/A)
73	P-12	18	J-5	J-6	155.0	PVC	100.0	0.180	0.01
74	P-13	110	J-6	J-9	204.0	PVC	110.0	(N/A)	(N/A)
69	P-10(1)	76	R-1	J-10	375.0	PVC	120.0	(N/A)	(N/A)

Reservoir Table - Time: 0.00 hours

ID	Label	Elevation (m)	Hydraulic Grade (m)
47	R-1	131.90	131.90

Shearwater Development - 3405 Uplands Drive  
 Peak Hour Demands (Existing Conditions)  
 Junction Table - Time: 0.00 hours

ID	Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (psi)
31	J-2	98.73	0.000	123.99	36
33	J-3	98.90	0.000	123.99	36
35	J-4	99.70	1.200	123.97	34
37	J-5	99.80	1.790	123.96	34
72	J-6	100.00	0.960	123.95	34
43	J-8	99.00	0.840	123.98	35
45	J-9	99.20	(N/A)	(N/A)	(N/A)
68	J-10	99.64	(N/A)	(N/A)	(N/A)
77	J-12	99.20	0.960	123.98	176

Pipe Table - Time: 0.00 hours

ID	Label	Length (Scaled) (m)	Start Node	Stop Node	Diameter (mm)	Material	Hazen-Williams C	Flow (L/s)	Velocity (m/s)
36	P-3	31	J-3	J-4	155.0	PVC	100.0	3.950	0.21
38	P-4	43	J-4	J-5	155.0	PVC	100.0	2.750	0.15
44	P-7	51	J-2	J-8	155.0	PVC	100.0	1.800	0.10
78	P-8	12	J-8	J-12	155.0	PVC	100.0	0.960	0.05
34	P-2	13	J-2	J-3	204.0	PVC	110.0	3.950	0.12
48	P-1	28	R-1	J-2	204.0	PVC	110.0	5.750	0.18
70	P-10(2)	34	J-10	J-9	204.0	PVC	110.0	(N/A)	(N/A)
73	P-12	18	J-5	J-6	155.0	PVC	100.0	0.960	0.05
74	P-13	110	J-6	J-9	204.0	PVC	110.0	(N/A)	(N/A)
69	P-10(1)	76	R-1	J-10	375.0	PVC	120.0	(N/A)	(N/A)

Reservoir Table - Time: 0.00 hours

ID	Label	Elevation (m)	Hydraulic Grade (m)
47	R-1	124.00	124.00

Shearwater Development - 3405 Uplands Drive  
 Peak Hour Demands (New 200mm Loop)  
 Junction Table - Time: 0.00 hours

ID	Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (psi)
31	J-2	98.73	0.000	124.00	36
33	J-3	98.90	0.000	124.00	36
35	J-4	99.70	1.200	123.99	34
37	J-5	99.80	1.790	123.99	34
72	J-6	100.00	0.960	123.99	34
43	J-8	99.00	0.840	123.99	35
45	J-9	99.20	0.960	124.00	35
68	J-10	99.64	0.000	124.00	35
77	J-12	99.20	0.960	123.99	176

Pipe Table - Time: 0.00 hours

ID	Label	Length (Scaled) (m)	Start Node	Stop Node	Diameter (mm)	Material	Hazen-Williams C	Flow (L/s)	Velocity (m/s)
36	P-3	31	J-3	J-4	155.0	PVC	100.0	1.775	0.09
38	P-4	43	J-4	J-5	155.0	PVC	100.0	0.575	0.03
44	P-7	51	J-2	J-8	155.0	PVC	100.0	1.800	0.10
78	P-8	12	J-8	J-12	155.0	PVC	100.0	0.960	0.05
34	P-2	13	J-2	J-3	204.0	PVC	110.0	1.775	0.05
48	P-1	28	R-1	J-2	204.0	PVC	110.0	3.575	0.11
70	P-10(2)	34	J-10	J-9	204.0	PVC	110.0	3.135	0.10
73	P-12	18	J-5	J-6	204.0	PVC	110.0	-1.215	0.04
74	P-13	110	J-6	J-9	204.0	PVC	110.0	-2.175	0.07
69	P-10(1)	76	R-1	J-10	375.0	PVC	120.0	3.135	0.03

Reservoir Table - Time: 0.00 hours

ID	Label	Elevation (m)	Hydraulic Grade (m)
47	R-1	124.00	124.00

Shearwater Development - 3405 Uplands Drive  
 Maximum Day + Fire Flow (Existing Conditions)  
 Junction Table - Time: 0.00 hours

ID	Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (psi)
31	J-2	98.73	0.000	125.80	38
33	J-3	98.90	0.000	125.80	38
35	J-4	99.70	0.550	125.79	37
37	J-5	99.80	0.810	125.79	37
72	J-6	100.00	0.440	125.79	37
43	J-8	99.00	0.380	125.80	38
45	J-9	99.20	(N/A)	(N/A)	(N/A)
68	J-10	99.64	(N/A)	(N/A)	(N/A)
77	J-12	99.20	0.440	125.80	38

Pipe Table - Time: 0.00 hours

ID	Label	Length (Scaled) (m)	Start Node	Stop Node	Diameter (mm)	Material	Hazen-Williams C	Flow (L/s)	Velocity (m/s)
36	P-3	31	J-3	J-4	155.0	PVC	100.0	1.800	0.10
38	P-4	43	J-4	J-5	155.0	PVC	100.0	1.250	0.07
44	P-7	51	J-2	J-8	155.0	PVC	100.0	0.820	0.04
78	P-8	12	J-8	J-12	155.0	PVC	100.0	0.440	0.02
34	P-2	13	J-2	J-3	204.0	PVC	110.0	1.800	0.06
48	P-1	28	R-1	J-2	204.0	PVC	110.0	2.620	0.08
70	P-10(2)	34	J-10	J-9	204.0	PVC	110.0	(N/A)	(N/A)
73	P-12	18	J-5	J-6	155.0	PVC	100.0	0.440	0.02
74	P-13	110	J-6	J-9	204.0	PVC	110.0	(N/A)	(N/A)
69	P-10(1)	76	R-1	J-10	297.0	PVC	120.0	(N/A)	(N/A)

Fire Flow Results Table - Time: 0.00 hours

Label	Fire Flow (Available) (L/s)	Pressure (Calculated Residual) (psi)	Junction w/ Minimum Pressure (Zone)	Pipe w/ Maximum Velocity	Velocity of Maximum Pipe (m/s)	Satisfies Fire Flow Constraints ?
J-2	226.176	28	J-6	P-1	7.00	True
J-3	226.176	23	J-6	P-1	7.00	True
J-4	104.902	20	J-6	P-3	5.65	False
J-5	70.142	20	J-6	P-3	3.81	False
J-8	89.904	20	J-12	P-7	4.81	False
J-9	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
J-10	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
J-6	63.093	20	J-5	P-3	3.44	False
J-12	80.985	20	J-8	P-7	4.34	False

Shearwater Development - 3405 Uplands Drive  
Maximum Day + Fire Flow (Existing Conditions)  
Reservoir Table - Time: 0.00 hours

ID	Label	Elevation (m)	Hydraulic Grade (m)
47	R-1	125.80	125.80

Shearwater Development - 3405 Uplands Drive  
 Maximum Day + Fire Flow (New 200mm Loop)  
 Junction Table - Time: 0.00 hours

ID	Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (psi)
31	J-2	98.73	0.000	125.80	38
33	J-3	98.90	0.000	125.80	38
35	J-4	99.70	0.550	125.80	37
37	J-5	99.80	0.810	125.80	37
72	J-6	100.00	0.440	125.80	37
43	J-8	99.00	0.380	125.80	38
45	J-9	99.20	0.440	125.80	38
68	J-10	99.64	0.000	125.80	37
77	J-12	99.20	0.440	125.80	38

Pipe Table - Time: 0.00 hours

ID	Label	Length (Scaled) (m)	Start Node	Stop Node	Diameter (mm)	Material	Hazen-Williams C	Flow (L/s)	Velocity (m/s)
36	P-3	31	J-3	J-4	155.0	PVC	100.0	0.827	0.04
38	P-4	43	J-4	J-5	155.0	PVC	100.0	0.277	0.01
44	P-7	51	J-2	J-8	155.0	PVC	100.0	0.820	0.04
78	P-8	12	J-8	J-12	155.0	PVC	100.0	0.440	0.02
34	P-2	13	J-2	J-3	204.0	PVC	110.0	0.827	0.03
48	P-1	28	R-1	J-2	204.0	PVC	110.0	1.647	0.05
70	P-10(2)	34	J-10	J-9	204.0	PVC	110.0	1.413	0.04
73	P-12	18	J-5	J-6	204.0	PVC	110.0	-0.533	0.02
74	P-13	110	J-6	J-9	204.0	PVC	110.0	-0.973	0.03
69	P-10(1)	76	R-1	J-10	297.0	PVC	120.0	1.413	0.02

Fire Flow Results Table - Time: 0.00 hours

Label	Fire Flow (Available) (L/s)	Pressure (Calculated Residual) (psi)	Junction w/ Minimum Pressure (Zone)	Pipe w/ Maximum Velocity	Velocity of Maximum Pipe (m/s)	Satisfies Fire Flow Constraints ?
J-2	250.000	30	J-12	P-1	6.40	True
J-3	250.000	26	J-4	P-1	6.14	True
J-4	180.543	20	J-5	P-3	5.74	True
J-5	181.015	20	J-6	P-3	3.85	True
J-8	91.579	20	J-12	P-7	4.90	False
J-9	250.000	25	J-6	P-10(2)	6.06	True
J-10	250.000	33	J-6	P-10(1)	3.25	True
J-6	184.286	20	J-5	P-3	3.72	True
J-12	82.236	20	J-8	P-7	4.40	False

Shearwater Development - 3405 Uplands Drive  
Maximum Day + Fire Flow (New 200mm Loop)  
Reservoir Table - Time: 0.00 hours

ID	Label	Elevation (m)	Hydraulic Grade (m)
47	R-1	125.80	125.80





APPENDIX D  
SANITARY CALCULATIONS

# McINTOSH PERRY

## CCO-23-1408 - 1 Finch Private - Sanitary Demands

Project:	1 Finch Private		
Project No.:	CCO-23-1408		
Designed By:	FV		
Checked By:	NV		
Date:	May-23		
Site Area	0.17	Gross ha	
1 Bedroom	11	1.40	Persons per unit
2 Bedroom	12	2.10	Persons per unit
3 Bedroom	22	3.10	Persons per unit
Total Population	109	Persons	
Amenity Space	m <sup>2</sup>		

### DESIGN PARAMETERS

Institutional/Commercial Peaking Factor	1.5	
Residential Peaking Factor	3.59	* 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	0.01
Wet	0.05
Total	0.06

### AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS	POPULATION / AREA	Flow (L/s)
Residential	280	L/c/d	109	0.35
Industrial - Light**	35,000	L/gross ha/d		0
Industrial - Heavy**	55,000	L/gross ha/d		0
Commercial / Amenity	2,800	L/(1000m <sup>2</sup> /d )	0.00	0.00
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 <sup>2</sup> /d		0
Tourist Commercial	28,000	L/gross ha/d		0
Other Commercial	28,000	L/gross ha/d		0

AVERAGE RESIDENTIAL FLOW	0.35	L/s
PEAK RESIDENTIAL FLOW	1.27	L/s
AVERAGE ICI FLOW	0.00	L/s
PEAK INSTITUTIONAL/COMMERCIAL FLOW	0.00	L/s
PEAK INDUSTRIAL FLOW	0.00	L/s
TOTAL PEAK ICI FLOW	0.00	L/s

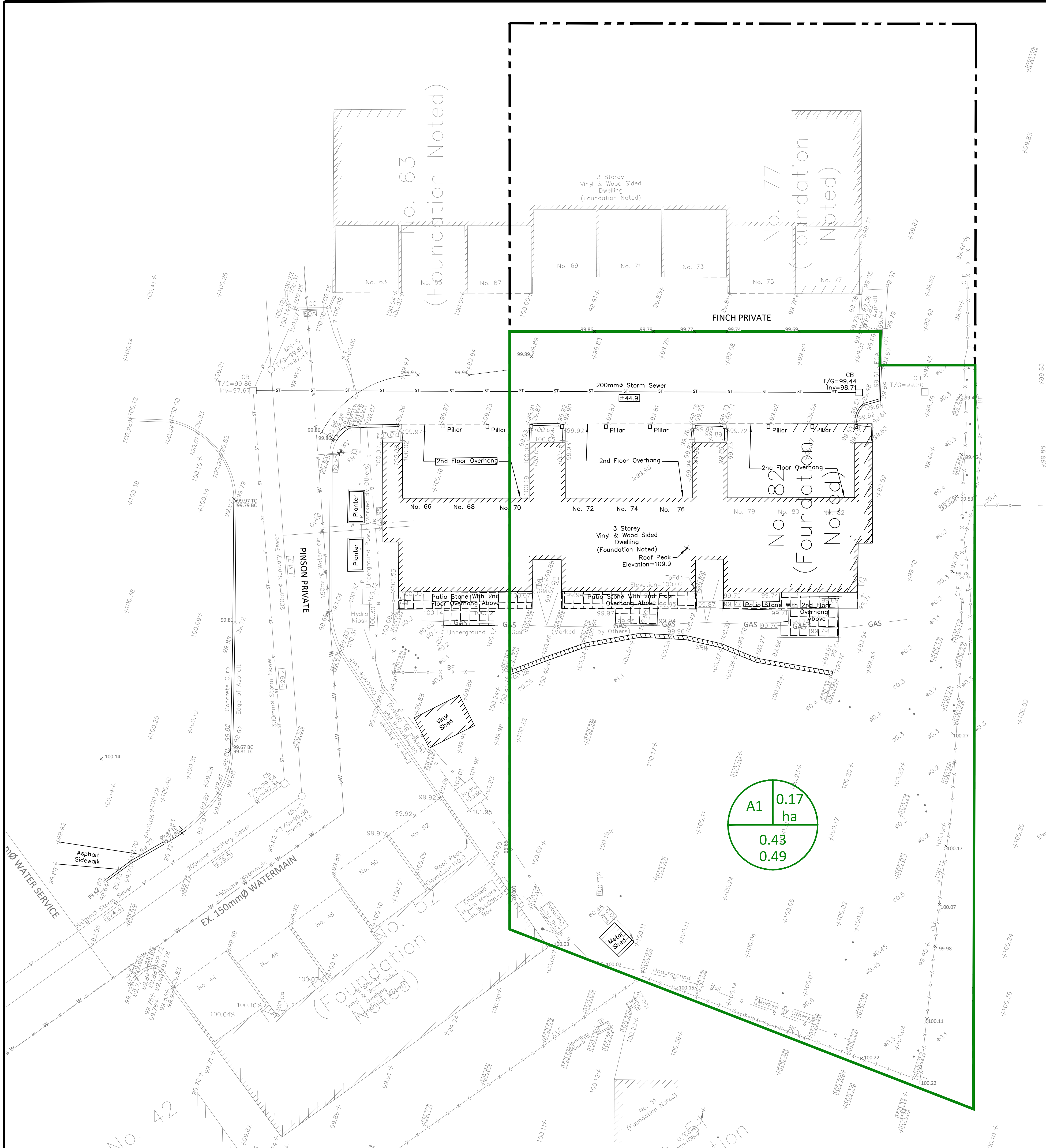
### TOTAL SANITARY DEMAND

TOTAL ESTIMATED AVERAGE DRY WEATHER FLOW	0.36	L/s
TOTAL ESTIMATED PEAK DRY WEATHER FLOW	1.28	L/s
TOTAL ESTIMATED PEAK WET WEATHER FLOW	1.32	L/s



APPENDIX E  
PRE-DEVELOPMENT DRAINAGE PLAN

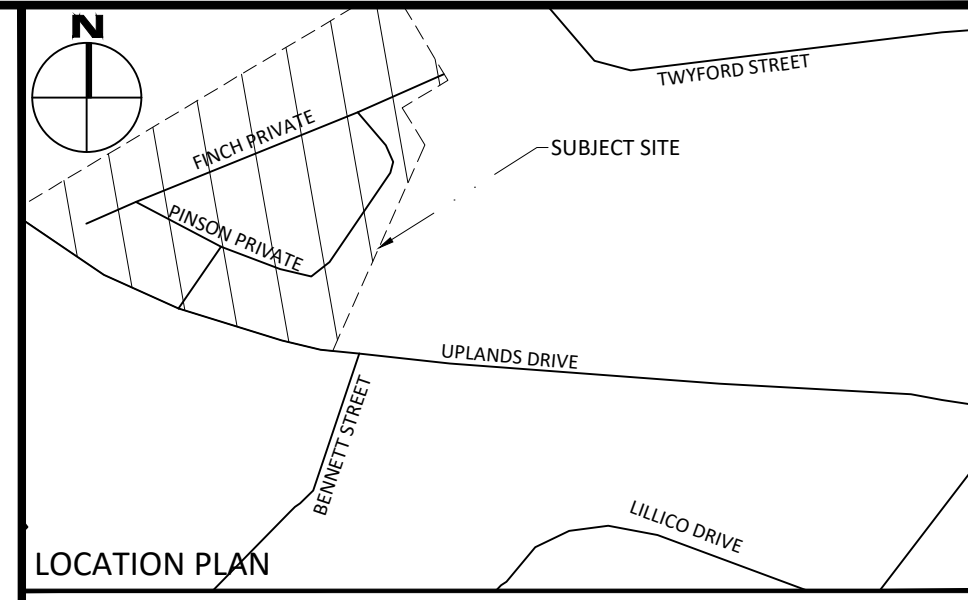
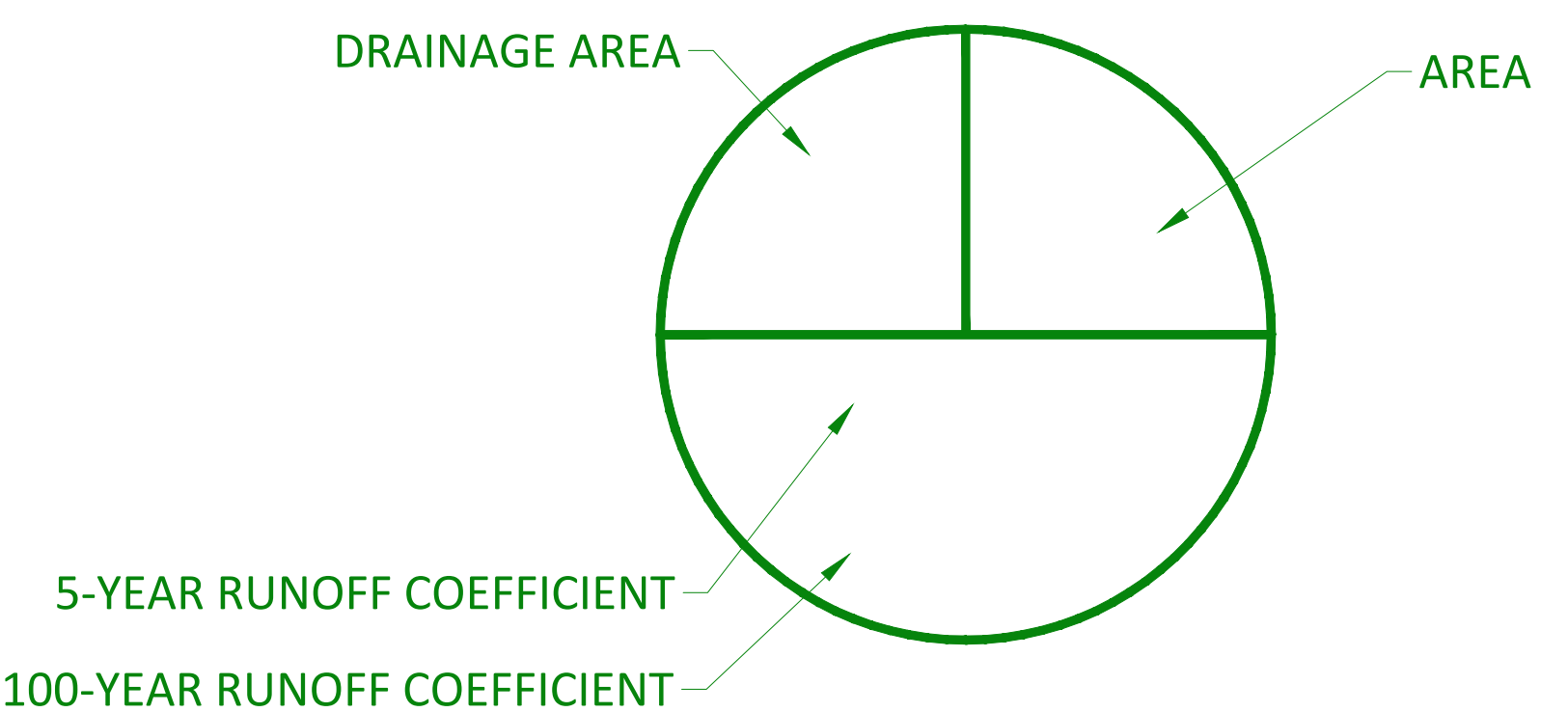
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 PLOTTED BY: J. B. [Name]



**GENERAL NOTES**

- THE ORIGINAL TOPOGRAPHY, GROUND ELEVATION AND SURVEY DATA SHOWN ARE SUPPLIED FOR INFORMATION PURPOSES ONLY, AND ARE NOT A GUARANTEE OF ACCURACY. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ALL INFORMATION SHOWN.
- 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) FARLEY, SMITH & DENIS SURVEYING LTD DRAWING #520-20 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.
- THE CONTRACTOR IS TO OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY BEFORE COMMENCING CONSTRUCTION.
- THE CONTRACTOR IS RESPONSIBLE FOR ALL LAYOUT.
- 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.
- 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.
- EXCAVATE AND DISPOSE OF ALL EXCESS EXCAVATED MATERIAL, SUCH AS ASPHALT, CURBING AND DEBRIS, OFF SITE AS DIRECTED BY THE ENGINEER AND THE CITY.
- TOPSOIL TO BE STRIPPED AND STOCKPILED FOR REHABILITATION. CLEAN FILL TO BE PLACED IN FILL AREAS AND COMPACTED TO 95% STANDARD PROCTOR DENSITY.
- ALL DISTURBED AREAS TO BE RESTORED TO ORIGINAL CONDITION OR BETTER UNLESS OTHERWISE SPECIFIED.
- 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.
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  - TELEVISION SERVICE - ROGERS.
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- ALL PROPOSED CURB TO BE CONCRETE BARRIER CURB UNLESS OTHERWISE SPECIFIED.
- THIS PLAN MUST BE READ IN CONJUNCTION WITH THE GEOTECHNICAL INVESTIGATION COMPLETED BY PATTERSON GROUP, DATED OCTOBER 19, 2020.

**LEGEND:**



**FOR REVIEW ONLY**  
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No.	Revisions	Date
1		

Check and verify all dimensions before proceeding with the work. Do not scale drawings.

SCALE 1:150

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

Stamp:

Client: **CSV ARCHITECTS**  
190 O'CONNOR STREET, SUITE 100  
OTTAWA, ON K2P 2R3

Project: **RESIDENTIAL DEVELOPMENT**  
1 FINCH PRIVATE

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

Scale: 1:150	Project Number: CCO-23-1408
Drawn By: FV	Checked By: AM
Designed By: NV	Drawing Number: PRE

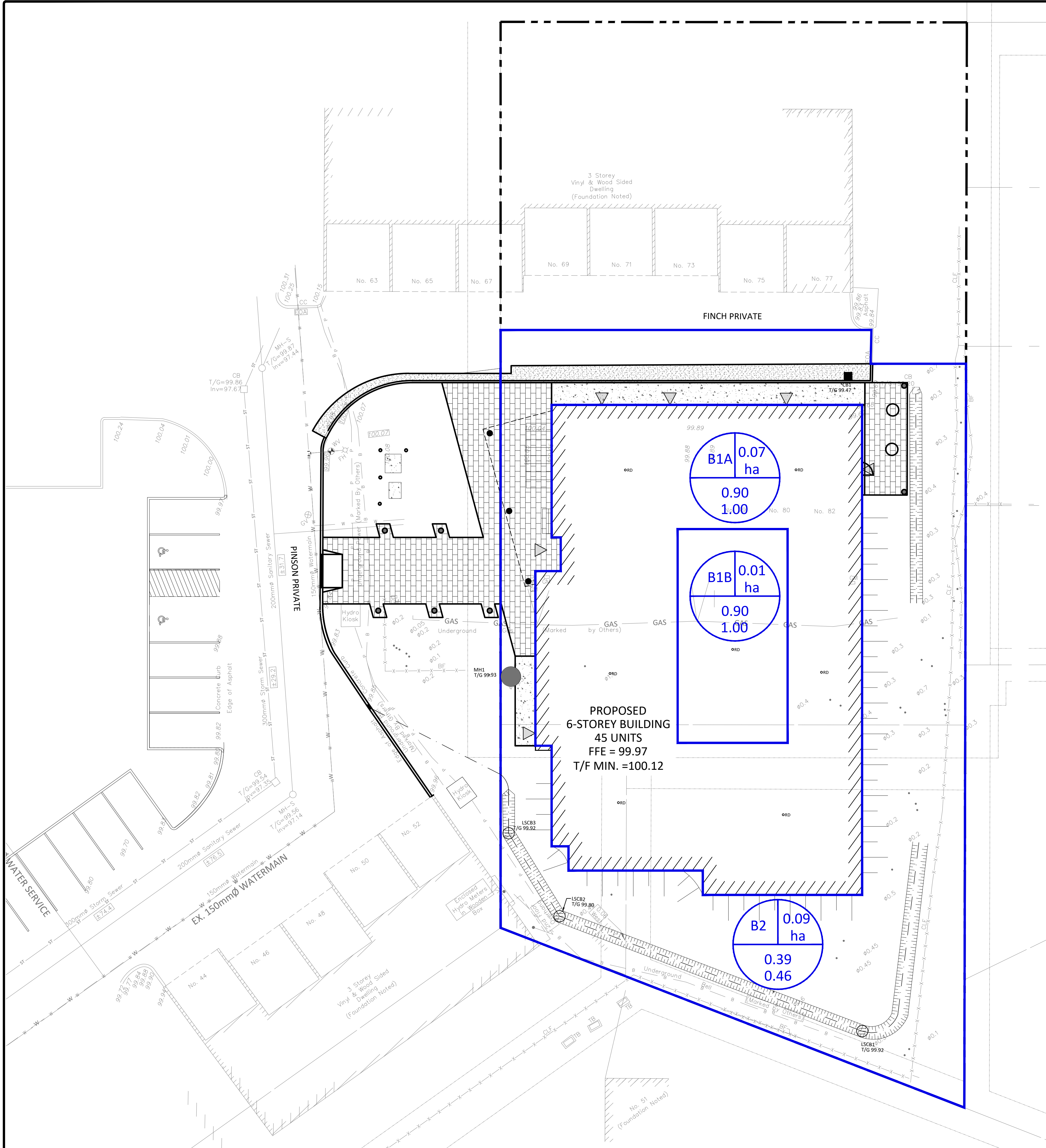
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APPENDIX F  
POST-DEVELOPMENT DRAINAGE PLAN



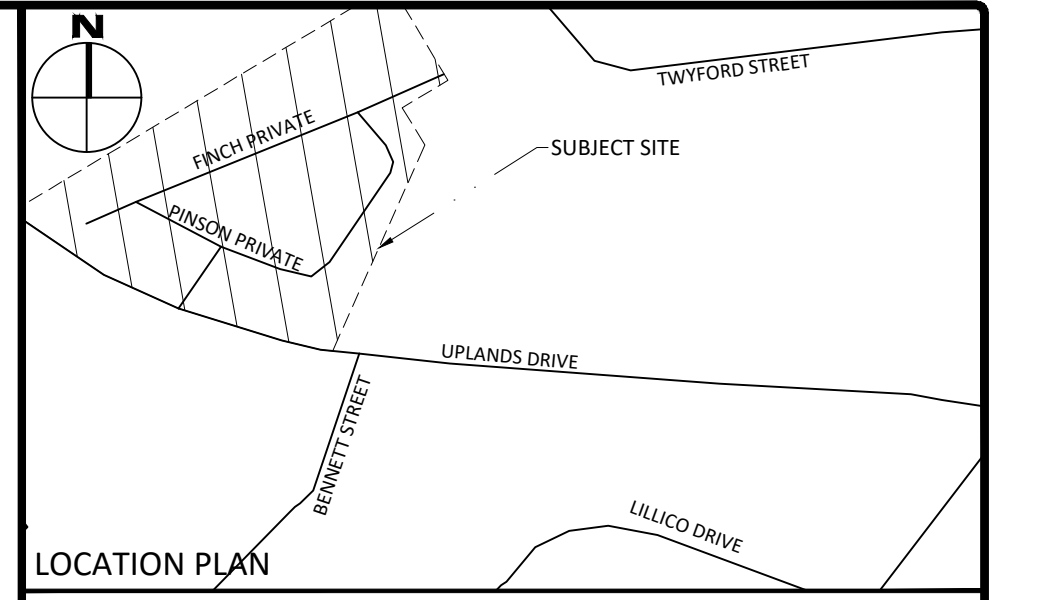
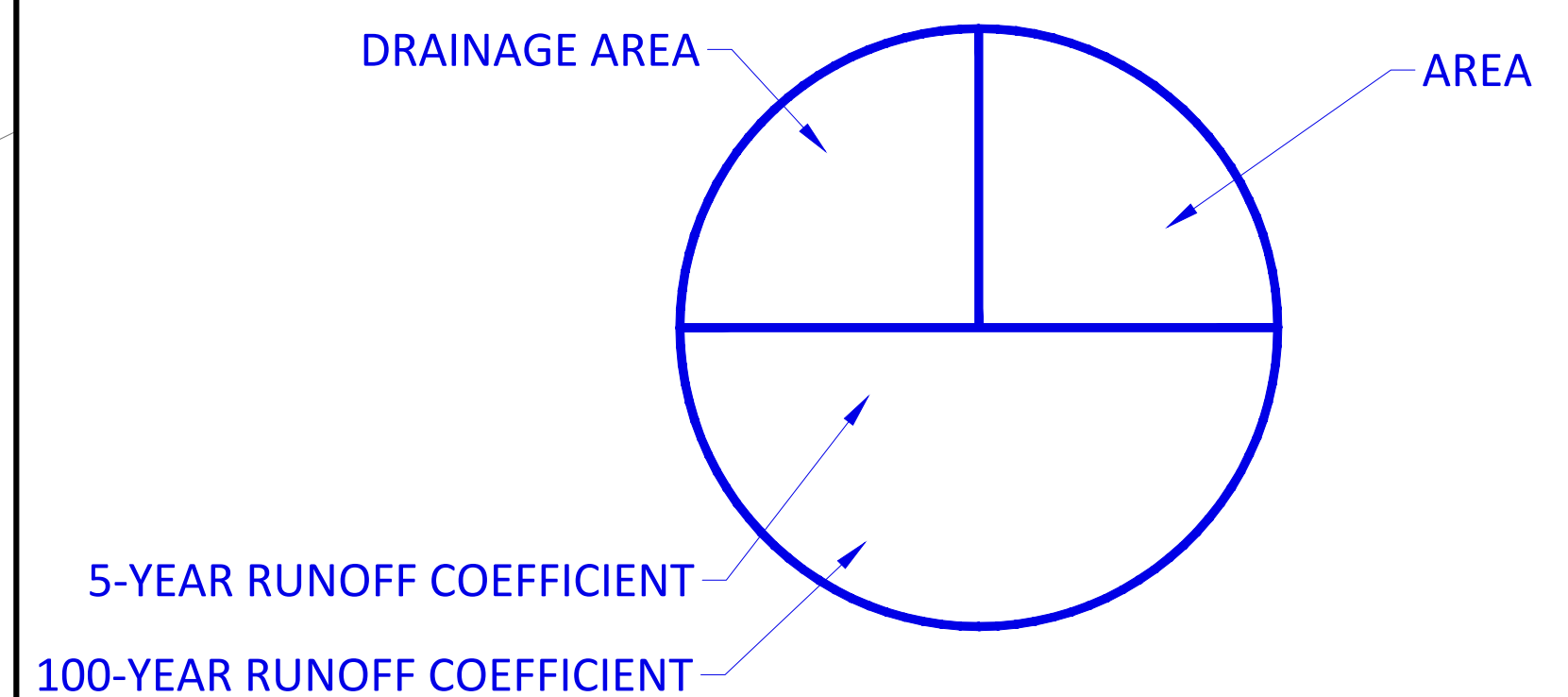
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17. CONTRACTOR TO ENSURE ALL APPLICABLE OPS SPECIFICATIONS ARE FOLLOWED DURING CONSTRUCTION.
18. ALL PROPOSED CURB TO BE CONCRETE BARRIER CURB UNLESS OTHERWISE SPECIFIED.
19. THIS PLAN MUST BE READ IN CONJUNCTION WITH THE GEOTECHNICAL INVESTIGATION COMPLETED BY PATERSON GROUP, DATED OCTOBER 19, 2020.

**LEGEND:**



**FOR REVIEW ONLY**  
**NOT FOR CONSTRUCTION**

No.	Revisions	Date
1		

Check and verify all dimensions before proceeding with the work. Do not scale drawings.

SCALE 1:150

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

Stamp:

Client: **CSV ARCHITECTS**  
190 O'CONNOR STREET, SUITE 100  
OTTAWA, ON K2P 2R3

Project: **RESIDENTIAL DEVELOPMENT**  
1 FINCH PRIVATE

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

Scale: 1:150	Project Number: CCO-23-1408
Drawn By: FV	
Checked By: AM	
Designed By: NV	

**POST**

D07-12-XX-XXXX

#XXXX



APPENDIX G  
STORMWATER MANAGEMENT CALCULATIONS

# McINTOSH PERRY

CCO-23-1408 - 1 Finch Private

1 of 5

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 <sup>2</sup> )	Gravel (m <sup>2</sup> )	Pervious Area (m <sup>2</sup> )	Average C (5-year)	Average C (100-year)
A1	560	0	1,176	0.43	0.49

## Pre-Development Runoff Calculations

Drainage Area	Area (ha)	C 5-Year	C 100-Year	Tc (min)	Q (L/s)	
					5-Year	100-Year
A1	0.17	0.43	0.49	10	21.41	42.40
Total	0.17				21.41	42.40

## Post-Development Runoff Coefficient

Drainage Area	Impervious Area (m <sup>2</sup> )	Gravel (m <sup>2</sup> )	Pervious Area (m <sup>2</sup> )	Average C (5-year)	Average C (100-year)	
B1A	697	0	0	0.90	1.00	<i>Proposed Bldg Roof</i>
B1B	129	0	0	0.90	1.00	<i>Proposed Mech. Roof</i>
B2	251	0	658	0.39	0.46	<i>Unrestricted</i>

## Post-Development Runoff Calculations

Drainage Area	Area (ha)	C 5-Year	C 100-Year	Tc (min)	Q (L/s)		
					5-Year	100-Year	
B1A	0.07	0.90	1.00	10	18.18	34.61	<i>Proposed Bldg Roof</i>
B1B	0.01	0.90	1.00	10	3.36	6.40	<i>Proposed Mech. Roof</i>
B2	0.09	0.39	0.46	10	10.37	20.65	<i>Unrestricted</i>
Total	0.17				31.91	61.67	

## Required Restricted Roof Flow

Drainage Area	Area (ha)	C 5-Year	Tc (min)	Q (L/s)	
				5-Year	
A1	0.08	0.43	10	10.19	Required restricted flow for areas B1A-B1B

## Post-Development Restricted Runoff Calculations

Drainage Area	Unrestricted Flow (L/S)		Restricted Flow (L/S)		Storage Required (m <sup>3</sup> )		Storage Provided (m <sup>3</sup> )	
	5-year	100-Year	5-Year	100-Year	5-Year	100-Year	5-Year	100-Year
B1A	18.18	34.61	4.54	6.81	9.27	19.79	10.46	20.92
B1B	3.36	6.40	0.76	1.20	1.81	3.77	1.94	4.09
Total (Roof)	21.54	41.02	5.30	8.01	11.08	23.57	12.40	25.01
B2	10.37	20.65	10.37	20.65				
Total (Site)	31.91	61.67	15.67	28.66	11.08	23.57	12.40	25.01

# McINTOSH PERRY

CCO-23-1408 - 1 Finch Private - Roof Storage - B1A

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## 5-Year Storm Event

Tc (min)	I (mm/hr)	B1A Runoff (L/s)	Allowable	Runoff to	Storage
			Outflow (L/s)	be Stored (L/s)	Required (m <sup>3</sup> )
10	104.2	18.18	4.54	13.64	8.18
20	70.3	12.27	4.54	7.72	9.27
30	53.9	9.40	4.54	4.86	8.75
40	44.2	7.71	4.54	3.17	7.61
50	37.7	6.58	4.54	2.04	6.11
60	32.9	5.74	4.54	1.20	4.31
70	29.4	5.13	4.54	0.59	2.47
80	26.6	4.64	4.54	0.10	0.47

Maximum Storage Required 5-Year (m <sup>3</sup> ) =	9.27
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## 100-Year Storm Event

Tc (min)	I (mm/hr)	B1A Runoff (L/s)	Allowable	Runoff to	Storage
			Outflow (L/s)	be Stored (L/s)	Required (m <sup>3</sup> )
10	178.6	34.61	6.81	27.80	16.68
20	120.0	23.25	6.81	16.44	19.73
30	91.9	17.81	6.81	11.00	19.79
40	75.1	14.57	6.81	7.75	18.61
50	64.0	12.40	6.81	5.58	16.75
60	55.9	10.84	6.81	4.02	14.48
70	49.8	9.65	6.81	2.84	11.92
80	45.0	8.72	6.81	1.91	9.16

Maximum Storage Required 100-Year (m <sup>3</sup> ) =	19.79
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Storage Parameters	
Roof Area (m <sup>2</sup> )	697.32
Usable Roof Area (%)	75%
Usable Roof Area (m <sup>2</sup> )	522.99

5-Year Storage Summary	
Max. Storage Available (m <sup>3</sup> )	10.46
Storage Required (m <sup>3</sup> )	9.27
Max. Ponding Depth (m)	0.06

100-Year Storage Summary	
Max. Storage Available (m <sup>3</sup> )	20.92
100-Year Storage Required (m <sup>3</sup> )	19.79
Max. Ponding Depth (m)	0.090

# McINTOSH PERRY

CCO-23-1408 - 1 Finch Private - Roof Storage - B1A

Roof Drain Flow (B1A)

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Roof Drains Summary		
Type of Control Device	Watts Drainage - Accutrol Weir	
Number of Roof Drains	6	
Roof Drain Position	Open	
	5-Year	100-Year
Rooftop Storage Available (m <sup>3</sup> )	10.46	20.92
Rooftop Storage Required (m <sup>3</sup> )	9.27	19.79
Storage Depth (m)	0.060	0.090
Flow (Per Roof Drain) (L/s)	0.76	1.14
Total Flow (L/s)	4.54	6.81

Flow Rate Vs. Build-Up (Individual Drain)	
Depth (mm)	Flow (L/s)
0	0.00
5	0.06
10	0.13
15	0.19
20	0.25
25	0.32
30	0.38
35	0.44
40	0.50
45	0.57
50	0.63
55	0.69
60	0.76
65	0.82
70	0.88
75	0.95
80	1.01
85	1.07
90	1.14
95	1.20
100	1.26
105	1.32
110	1.39
115	1.45
120	1.51
125	1.58
130	1.64
135	1.70
140	1.77
145	1.83
150	1.89

	Roof Drain Flow		
	Individual Flow (l/s)	Storage Depth (mm)	Cumulative Flow (l/s)
	0.00	0	0.00
	0.06	5	0.38
	0.13	10	0.76
	0.19	15	1.14
	0.25	20	1.51
	0.32	25	1.89
	0.38	30	2.27
	0.44	35	2.65
	0.50	40	3.03
	0.57	45	3.41
	0.63	50	3.79
	0.69	55	4.16
5-Year	0.76	60	4.54
	0.82	65	4.92
	0.88	70	5.30
	0.95	75	5.68
	1.01	80	6.06
	1.07	85	6.44
100-Year	1.14	90	6.81
	1.20	95	7.19
	1.26	100	7.57
	1.32	105	7.95
	1.39	110	8.33
	1.45	115	8.71
	1.51	120	9.08
	1.58	125	9.46
	1.64	130	9.84
	1.70	135	10.22
	1.77	140	10.60
	1.83	145	10.98
	1.89	150	11.36

\*Roof Drain model to be Accutrol Weirs, See attached sheets  
 \*Roof Drain Flow information taken from Watts Drainage website

**Note:** The flow leaving through a restricted roof drain is based on flow vs. head information

# McINTOSH PERRY

CCO-23-1408 - 1 Finch Private - Roof Storage - B1B

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## 5-Year Storm Event

Tc (min)	I (mm/hr)	B1B Runoff (L/s)	Allowable	Runoff to	Storage
			Outflow (L/s)	be Stored (L/s)	Required (m <sup>3</sup> )
10	104.2	3.36	0.76	2.61	1.56
20	70.3	2.27	0.76	1.51	1.81
30	53.9	1.74	0.76	0.98	1.77
40	44.2	1.43	0.76	0.67	1.61
50	37.7	1.22	0.76	0.46	1.38
60	32.9	1.06	0.76	0.30	1.10
70	29.4	0.95	0.76	0.19	0.81
80	26.6	0.86	0.76	0.10	0.49

Maximum Storage Required 5-Year (m <sup>3</sup> ) =	1.81
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## 100-Year Storm Event

Tc (min)	I (mm/hr)	B1B Runoff (L/s)	Allowable	Runoff to	Storage
			Outflow (L/s)	be Stored (L/s)	Required (m <sup>3</sup> )
10	178.6	6.40	1.20	5.21	3.12
20	120.0	4.30	1.20	3.10	3.72
30	91.9	3.30	1.20	2.10	3.77
40	75.1	2.70	1.20	1.50	3.59
50	64.0	2.29	1.20	1.10	3.29
60	55.9	2.00	1.20	0.81	2.90
70	49.8	1.79	1.20	0.59	2.47
80	45.0	1.61	1.20	0.42	1.99

Maximum Storage Required 100-Year (m <sup>3</sup> ) =	3.77
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Storage Parameters	
Roof Area (m <sup>2</sup> )	129.02
Usable Roof Area (%)	75%
Usable Roof Area (m <sup>2</sup> )	96.77

5-Year Storage Summary	
Max. Storage Available (m <sup>3</sup> )	1.94
Storage Required (m <sup>3</sup> )	1.81
Max. Ponding Depth (m)	0.06

100-Year Storage Summary	
Max. Storage Available (m <sup>3</sup> )	4.09
100-Year Storage Required (m <sup>3</sup> )	3.77
Max. Ponding Depth (m)	0.095

# McINTOSH PERRY

CCO-23-1408 - 1 Finch Private - Roof Storage - B1B

Roof Drain Flow (B1B)

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Roof Drains Summary		
Type of Control Device	Watts Drainage - Accutrol Weir	
Number of Roof Drains	1	
Roof Drain Position	Open	
	5-Year	100-Year
Rooftop Storage Available (m <sup>3</sup> )	1.94	4.09
Rooftop Storage Required (m <sup>3</sup> )	1.81	3.77
Storage Depth (m)	0.060	0.095
Flow (Per Roof Drain) (L/s)	0.76	1.20
Total Flow (L/s)	0.76	1.20

Flow Rate Vs. Build-Up (Individual Drain)	
Depth (mm)	Flow (L/s)
0	0.00
5	0.06
10	0.13
15	0.19
20	0.25
25	0.32
30	0.38
35	0.44
40	0.50
45	0.57
50	0.63
55	0.69
60	0.76
65	0.82
70	0.88
75	0.95
80	1.01
85	1.07
90	1.14
95	1.20
100	1.26
105	1.32
110	1.39
115	1.45
120	1.51
125	1.58
130	1.64
135	1.70
140	1.77
145	1.83
150	1.89

	Roof Drain Flow		
	Individual Flow (l/s)	Storage Depth (mm)	Cumulative Flow (l/s)
	0.00	0	0.00
	0.06	5	0.06
	0.13	10	0.13
	0.19	15	0.19
	0.25	20	0.25
	0.32	25	0.32
	0.38	30	0.38
	0.44	35	0.44
	0.50	40	0.50
	0.57	45	0.57
	0.63	50	0.63
	0.69	55	0.69
5-Year	0.76	60	0.76
	0.82	65	0.82
	0.88	70	0.88
	0.95	75	0.95
	1.01	80	1.01
	1.07	85	1.07
100-Year	1.14	90	1.14
	1.20	95	1.20
	1.26	100	1.26
	1.32	105	1.32
	1.39	110	1.39
	1.45	115	1.45
	1.51	120	1.51
	1.58	125	1.58
	1.64	130	1.64
	1.70	135	1.70
	1.77	140	1.77
	1.83	145	1.83
	1.89	150	1.89

\*Roof Drain model to be Accutrol Weirs, See attached sheets  
 \*Roof Drain Flow information taken from Watts Drainage website

**Note:** The flow leaving through a restricted roof drain is based on flow vs. head information





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"> <li>○ Metric scale</li> <li>○ North arrow (including construction North)</li> <li>○ Key plan</li> <li>○ Name and contact information of applicant and property owner</li> <li>○ Property limits including bearings and dimensions</li> <li>○ Existing and proposed structures and parking areas</li> <li>○ Easements, road widening and rights-of-way</li> <li>○ Adjacent street names</li> </ul>	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