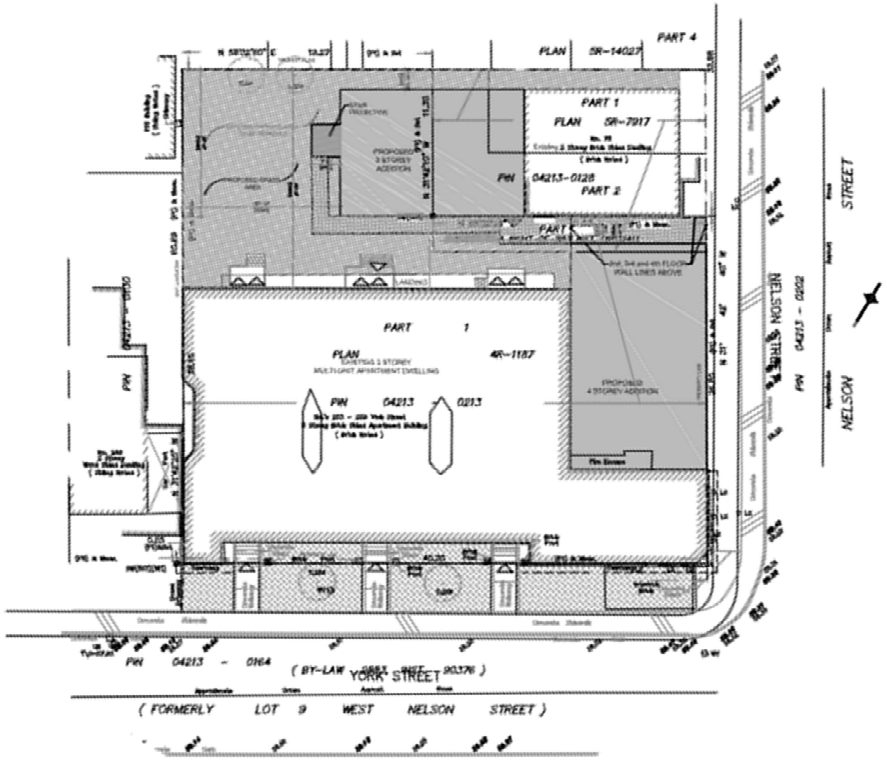
SERVICING & STORMWATER MANAGEMENT REPORT
253 YORK STREET AND 78 & 80 NELSON STREET



Project No.: CCO-22-0938

City File No.: D07-12-XX-XXXX

Prepared for:

Smart Living Properties
226 Argyle Avenue
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2021-08-24

McINTOSH PERRY

TABLE OF CONTENTS

LIST OF TABLES

APPENDICES

1.0 PROJECT OVERVIEW

1.1 Purpose

McIntosh Perry (MP) has been retained by Smart Living Properties to prepare this Servicing and Stormwater Management Report in support of the Site Plan Control (SPC) application process for the proposed development at 253 York Street, 78 Nelson Street, and 80 Nelson 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 infrastructure available will adequately service the proposed development.

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

- CCO-22-0938, C101 – Grading, Drainage & Sediment and Erosion Control Plan
- CCO-22-0938, C102 – Site Servicing Plan
- CCO-22-0938, C103 – Existing Conditions Plan
- CCO-22-0938, PRE – Pre Development Drainage Area Plan (***Appendix 'E'***)
- CCO-22-0938, 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 253 York Street, 78 Nelson Street, 80 Nelson Street within the Rideau-Vanier Ward in the City of Ottawa. The site covers approximately ***0.15 ha*** and is located north west of the York Street and Nelson Street intersection, as shown by ***Figure 1*** above. The site is zoned for Residential Use (R4UD). Additional details are included on the Site Location Plan included in ***Appendix 'A'***.

1.3 Proposed Development and Statistics

The proposed development incorporates a building addition to the existing building within 253 York Street (***B2***) and a building addition to the existing building within 78 & 80 Nelson Street (***B1***). The ***Site Plan*** proposes an additional 26 units to the existing 12 units within ***B1***, with street access from Nelson Street. 20 additional residential units to the existing 31 units are proposed within ***B2***, with street access from Nelson Street and York Street. The development is proposed within ***0.071 ha*** of the site.

1.4 Existing Conditions and Infrastructure

The property is located within the City of Ottawa's Central Sub-Watershed, tributary to the Ottawa River. Two residential buildings exist within the site and are proposed to be retained. The existing building within 253 York Street is serviced via the City's infrastructure within York Street, as designed by Kollaard Associates (Project No. 190502) in January 2020. The existing building within 78 & 80 Nelson Street is serviced via the City's infrastructure within Nelson Street, as designed by W. Elias & Associates (Project No. 2020-42) in September 2020.

Sewer and watermain mapping collected from the City of Ottawa indicate that the following services exist across the property frontages within the adjacent municipal right-of-ways:

- **York Street**
  - 152 mm diameter ductile iron watermain;
  - 600 mm diameter concrete sanitary sewer, tributary to the King Edward Avenue Trunk; and
  - 600 mm diameter concrete storm sewer, tributary to the Ottawa River approximately 1.5 km downstream.
- **Nelson Street**
  - 203 mm diameter ductile iron watermain (within 312 Murray Street);
  - 300 mm diameter concrete sanitary sewer, tributary to the King Edward Avenue Trunk; and
  - 300 mm diameter concrete storm Sewer, tributary to the Ottawa River approximately 1.5 km 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 for the development since the three parcels of land will be amalgamated into a single parcel. As a result, the stormwater management system meets the exemption requirements under O.Reg 525/90.

2.0 BACKROUND 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 site were reviewed in order to identify infrastructure available to service the proposed development.

A topographic survey (20112-19) of the site was completed by Annis, O'Sullivan, Vollebekk Ltd. dated October 21, 2019.

The Site Plan, SPD-1 was prepared by Ottawa Carleton Construction dated May 2021 (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-2018-03 City of Ottawa, March 2018. ***(ISTB-2018-03)***

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***)

3.0 PRE-CONSULTATION SUMMARY

A pre-consultation meeting was conducted on July 31st, 2021 regarding the proposed development at 253 York St, 78 Nelson St, and 80 Nelson St. Specific design parameters to be incorporated within this design are noted by the City of Ottawa pre-consultation found in ***Appendix 'B'***.

4.0 WATERMAIN

4.1 Existing Watermain

The subject site is located within the 1W pressure zone, as shown by the Water Distribution figure located in ***Appendix 'C'***. The following subsections outline the water infrastructure that exists within York Street and Nelson Street.

4.1.1 *York Street*

There is an existing 152 mm diameter watermain, that runs the entire length of the property along York Street. There is one public hydrant located approximately 25 m west of the site. Based on the Site Servicing Plan for 253 York Street, prepared by Kollaard Associates and dated January 2020, the existing building is currently serviced by a 102 mm diameter water service connected to the infrastructure within the right-of-way.

4.1.2 *Nelson Street*

There is an existing 203 mm diameter watermain that runs the entire length of the property, within 312 Murray Street. There is one public hydrant located at the north east corner of York Street and Nelson Street, approximately 36 m east of the site. Based on the Site Servicing Plan for 78 & 80 Nelson Street, prepared by W. Elias & Associates and dated September 2020, the existing building is currently serviced by a 25 mm diameter water service connected to the infrastructure within the right-of-way.

4.2 Proposed Watermain

A 150 mm diameter PVC water lateral to the existing 203 mm watermain within 312 Murray Street is proposed to service ***B1***. The lateral is designed to have a minimum of 2.4 m cover. ***B2*** is proposed to be serviced through the existing building at 253 York Street. The building additions will be serviced via 100 mm diameter services. Refer to drawing ***C102*** for a detailed servicing layout.

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	0.154 ha
Residential	280 L/day/person
Residential Bachelor/1 Bedroom	1.4 person/unit
Max Day Peaking Factor	4.9 x avg. day (B1) 9.5 x avg. day (B2)
Peak Hour Peaking Factor	7.4 x avg. day (B1) 14.3 x avg. day (B2)

The water analysis results for ***B2*** have been summarized in ***Table 2***, below. The fire flow demand accounted for both the existing above-ground floor area and the proposed area within ***B2***.

Table 2: Summary of Estimated Water Demand – York Street

Design Parameter	Total Flow (L/s) Existing	Total Flow (L/s) Proposed	Total Flow (L/s) Total
Average Daily Demand	0.4*	0.09	0.49
Max Day Demand	1.0*	0.86	1.86
Max Day + Fire Flow Demand (366 L/s)	-	367.5	-
Peak Hour Demand	2.2*	1.30	2.50

Per Kollaard Associates Engineers (File No. 190502) Servicing Brief for 253, 255, 257, 259 York Street and dated January 31, 2020 (Rev 1). Based on a peaking factor of 2.5 x avg day and 2.2 x max day for the max day and peak hour demands. Refer to **Appendix 'C' for relevant excerpt.*

The water analysis results for ***B1*** have been summarized in ***Table 3***, below. The fire flow demand accounted for both the existing above-ground floor area and the proposed area within ***B1***.

Table 3: Summary of Estimated Water Demand – Nelson Street

Design Parameter	Total Flow (L/s)
Average Daily Demand	0.12
Max Day Demand	0.58
Max Day + Fire Flow Demand (183 L/s)	183.9
Peak Hour Demand	0.93

The Fire Underwriters Survey 1999 (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-2018-03***.

The following parameters were coordinated with the architect:

- Type of construction – Wood Frame Construction
- Occupancy type – Combustible
- Sprinkler Protection – Standard Sprinkler System

The results of the calculations yielded a required fire flow of ***366 L/s*** (22,000 L/min) for ***B2*** and ***183 L/s*** (11,000 L/min) for ***B1***. The detailed calculations for the FUS can be found in ***Appendix 'C'***.

Boundary Conditions have been requested from the City, however, were not available at the time of submission. Once boundary conditions are provided by the City, the minimum and maximum water pressures will be compared to those proposed to ensure they fall within the required range identified by in the City of Ottawa Water Supply Guidelines and to confirm the system has adequate capacity for the proposed development.

To confirm the adequacy of fire flow to protect the proposed development, public fire hydrants within 150 m of the proposed building were accounted for per ***ISTB 2018-03*** *Appendix I*. As demonstrated by ***Table 4***, below.

Table 4: Fire Protection Confirmation

Fire Flow Demand (L/min.)	Fire Hydrant(s) within 75m	Fire Hydrant(s) within 150m	Combined Fire Flow (L/min)
11,000 L/min – B1 22,000 L/min – B2	3 public	2 public	24,300 (405 L/s)

Based on City guidelines the existing hydrants located in the vicinity can provide adequate fire protection to ***B1*** and ***B2***.

5.0 SANITARY DESIGN

5.1 Existing Sanitary Sewer

The subject site lies within the King Edward Collector sewer collection area. There is an existing 600 mm diameter sanitary sewer located within York Street tributary to the King Edward Collector sewer approximately 150 m downstream. In addition, there is an existing 300 mm diameter sanitary sewer within Nelson Street tributary to the King Edward Collector sewer approximately 200 m downstream.

5.2 Proposed Sanitary Sewer

The new building additions are proposed to be serviced through the existing buildings. ***B1*** is proposed to be serviced by the existing 200 mm diameter sanitary lateral, tributary to the 300 mm diameter sanitary sewer within Nelson Street. ***B2*** is proposed to be serviced by the existing 150 mm diameter sanitary lateral, tributary to the 600 mm diameter sanitary sewer within York Street. Refer to drawing ***C102*** for the proposed servicing layout.

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

Table 5: Sanitary Design Criteria

Design Parameter	Value
Residential 1 Bedroom / Studio Apartment	1.4 persons/unit
Average Daily Demand	280 L/day/person
Extraneous Flow Allowance	0.33 L/s/ha

Table 6 and ***Table 7*** below, summarizes the estimated wastewater flow from the proposed development. Refer to ***Appendix 'D'*** for detailed calculations.

Table 6: Summary of Estimated Sanitary Flow – York Street

Design Parameter	Total Flow (L/s) Existing	Total Flow (L/s) Proposed	Total Flow (L/s) Total
Total Estimated Average Dry Weather Flow	0.28*	0.10	0.38
Total Estimated Peak Dry Weather Flow	1.01*	0.35	1.36
Total Estimated Peak Wet Weather Flow	1.05*	0.38	1.43
Per Kollaard Associates Engineers (File No. 190502) Servicing Brief for 253, 255, 257, 259 York Street and dated January 31, 2020 (Rev 1). Based on a peaking factor of 3.61. Refer to **Appendix 'D' for relevant excerpt.*			

Capacity of the Nelson Street and York Street sanitary sewers were reviewed to demonstrate that the receiving system could accommodate development. Per the wastewater analysis included in ***Appendix 'D'***, the constraining leg between the subject site and the King Edward Collector sewer (MH1 to MH2) is estimated to be at 1% capacity and can accommodate an additional ***495.46 L/s*** of wastewater drainage. Therefore, the proposed ***0.38 L/s*** can be collected by the local sewer within York Street.

As noted above, ***B2*** is proposed to be serviced by the existing 150 mm diameter sanitary lateral servicing the building at 253 York Street. The full flowing capacity of a 150 mm diameter service at a 1% slope is estimated to be ***15.2 L/s***. Per ***Table 4***, a combined flow of ***1.43 L/s*** is proposed to be directed towards the York Street sewer and therefore is sufficient sized. The internal servicing layout is to be reviewed by the mechanical engineer.

Table 7: Summary of Estimated Sanitary Flow – Nelson Street

Design Parameter	Total Flow (L/s) Existing	Total Flow (L/s) Proposed	Total Flow (L/s) Total
Total Estimated Average Dry Weather Flow	0.06	0.12	0.18
Total Estimated Peak Dry Weather Flow	0.21	0.44	0.65
Total Estimated Peak Wet Weather Flow	0.21	0.46	0.67

Capacity of the Nelson Street and Clarence Street sanitary sewers were reviewed to demonstrate that the receiving system could accommodate development. Per the wastewater analysis included in ***Appendix 'D'***, the constraining leg between the subject site and the King Edward Collector sewer (MH6 to MH7) is estimated to be at 6.76% capacity and can accommodate an additional ***28.22 L/s*** of wastewater drainage. Therefore, the proposed ***0.46 L/s*** can be collected by the local sewer within Nelson Street.

As noted above, ***B1*** is proposed to be serviced by the existing 200 mm diameter sanitary lateral servicing the building at 78 & 80 Nelson Street. The full flowing capacity of a 200 mm diameter service at a 28% slope is estimated to be ***173.6 L/s***. Per ***Table 5***, a combined flow of ***0.67 L/s*** is proposed to be directed towards the Nelson Street sewer and therefore is sufficient sized. The internal servicing layout is to be reviewed by the mechanical engineer.

6.0 STORM SEWER & STORMWATER MANAGEMENT DESIGN

6.1 Existing Storm Sewers

Stormwater runoff from the site is currently tributary to the Ottawa River within the Ottawa Central sub-watershed. There is an existing 600 mm diameter storm sewer within York Street and an existing 300 mm diameter storm sewer within Nelson Street, both tributary to the Ottawa River approximately 1.5 km downstream.

The existing building at 78 & 80 Nelson Street are currently serviced by the Nelson Street storm sewer via a 150 mm diameter service lateral. Refer to W. Elias & Associates Services Plan included in ***Appendix 'B'*** for further details.

The existing building at 253 York Street are currently serviced by the York Street storm sewer via a 200 mm diameter service lateral. Refer to Kollaard Associates Proposed Servicing Plan included in ***Appendix 'B'*** for further details.

6.2 Proposed Storm Sewers

A new 250 mm diameter storm service will be extended from the existing 300 mm diameter storm sewer within Nelson Street to provide flow attenuation for the building additions and at-grade common areas within the site.

Foundation drainage is proposed to be connected to the existing building drainage systems, recently designed by W. Elias Associates and Kollaard Associates. The internal servicing layout is to be reviewed by the mechanical engineer.

Runoff collected on the roof of the proposed buildings ***B1*** and ***B2*** will be stored and controlled internally using two and three roof drains, respectively. 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 was used estimate a reasonable roof flow. Other products maybe specified at detailed building design so long as release rates and storage volumes are respected.

Runoff from the at-grade common areas within the site will be directed to two outlets. The first, along the North edge of the property, will convey stormwater overland to Nelson Street via a swale. The second, central in the site, will convey stormwater via a subdrain system to the 300 mm diameter storm sewer within Nelson Street. The subdrain system will provide quantity control and storage to meet the City requirements for the site, in accordance with the pre-consultation notes included in ***Appendix 'B'***. Storm flows from this will be controlled by an inlet control device (ICD) to limit the flow to the specified allowable release rate.

See CCO-22-0938 - *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 STORMWATER MANAGEMENT

7.1 Design Criteria and Methodology

Stormwater management for the proposed site will be maintained through two methods. The first will store and control runoff collected on the roof of the proposed buildings. It is estimated that five Watts Accutrol Weirs will be used to control the release rate of the stormwater. The second will control stormwater via a subdrain system and will collect runoff from the at-grade common areas within the site. The flow will be directed to the existing 300 mm storm sewer located within Nelson Street.

The following design criteria will need to be employed to develop the stormwater management design for the site, as directed by the City:

Quality Control

- Quality controls are not anticipated for the development due to the distance to the outlet. In addition, the quality of runoff on-site will be improved due to the increased roof and landscaped areas. The RVCA will need to confirm quality controls however, a formal response was not received prior to submission.

Quantity Control

- Any storm events greater than 2 year, up to 100 year, and including 100-year storm event must be detained on site.
- Post-development to be restricted to the 5-year storm event, based on a calculated time of concentration greater than 10 minutes and a rational method coefficient of 0.50. Refer to *Section 7.2* for further details.

7.2 Quality Control

7.2.1 *Runoff Calculations*

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

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

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

The time of concentration (Tc) used for pre-development shall be calculated and no less than 10 minutes and post-development flows shall be calculated and no less than 10 minutes.

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 ***10.31 L/s*** based on the construction limit of ***0.071 ha***.

7.3 Pre-Development Drainage

It has been assumed that the existing development contained no stormwater management controls for flow attenuation. The estimated pre-development peak flows for the 2, 5, and 100-year events are summarized below in ***Table 8***. See CCO-22-0938 - *PRE* in ***Appendix 'E'*** and ***Appendix 'G'*** for calculations.

Table 8: Pre-Development Runoff Summary

Drainage Area	Area (ha)	Q (L/s)	
		5-Year	100-Year
A1	0.071	17.16	32.76

7.4 Post-Development Drainage

To meet the stormwater objectives the development will contain a combination of flow attenuation with rooftop controls and subsurface 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 ***10.31 L/s*** based on the construction limit of ***0.071 ha***. See ***Appendix 'G'*** for calculations.

The proposed site drainage limits are demonstrated on the Post-Development Drainage Area Plan. See CCO-22-0938 - *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^3)	100-year Storage Available (m^3)
B1	0.014	0.64	1.14	4.60	4.89
B2	0.018	0.96	1.89	6.45	6.87
B3	0.019	2.69	3.16	1.47	1.65
B4	0.019	2.00	4.01	-	-
Total	**0.071**	**6.29**	**10.20**	**12.53**	**13.41**

Runoff for area B1 will be stored on the roof of the proposed building addition (***B1***) and restricted using two Watts Accutrol roof drains (or equivalent product) to a maximum release rate of ***1.14 L/s*** and will provide up to ***4.89 m^3*** of storage.

Runoff for area B2 will be stored on the roof of the proposed building addition (***B2***) and restricted using three Watts Accutrol roof drains (or equivalent product) to a maximum release rate of ***1.89 L/s*** and will provide up to ***6.87 m^3*** of storage.

Runoff for area B3 will be restricted before discharging to the existing storm system within Nelson Street. The flow will be controlled within a catch basin (CB4) installed with a 75 mm plug style ICD. Drainage from Area B3 will be controlled to a maximum release rate of ***3.16 L/s***.

The flow from Area B4 directed to the City's right of ways without restriction and will be compensated or in areas with attenuation.

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 is 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

- The proposed development incorporates a building addition to the existing building within 253 York Street (***B2***) and a building addition to the existing building within 78 & 80 Nelson Street (***B1***). The ***Site Plan*** proposes an additional 26 units to the existing 12 units within ***B1***, with street access from Nelson Street. 20 additional residential units to the existing 31 units are proposed within ***B2***, with street access from Nelson Street and York Street. The development is proposed within ***0.071 ha*** of the site.
- The FUS method estimated fire flow indicated that ***14,000 L/min*** for ***B1*** and 29,000 L/min for ***B2*** is required for the proposed development;
- The development is estimated to have a peak wet weather flow of ***0.46 L/s*** for ***B1*** and ***0.38 L/s*** for ***B2***. Based on the sanitary analysis, the receiving sewer system can accommodate the increased wastewater flow from the site;
- Based on City of Ottawa guidelines, the development will be required to attenuate post-development 5 and 100-year flows to the 5-year release rate of ***10.31 L/s***. This flow rate is based on the limit of work area of ***0.071 ha***;
- To meet the stormwater objectives the development will contain a combination of flow attenuation with rooftop controls and subsurface storage. ***13.41 m^3*** of onsite storage will be required to attenuate flow to the established release rate; and
- Quality controls are not anticipated for the development due to the distance to the outlet. In addition, the quality of runoff on-site will be improved due to the increased roof and landscaped areas. The RVCA will need to confirm quality controls however, a formal response was not received prior to submission.

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 253 York Street, 78 Nelson Street, and 80 Nelson Street.

This report is respectfully being submitted for approval.

Regards,

McIntosh Perry Consulting Engineers Ltd.

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11.0 STATEMENT OF LIMITATIONS

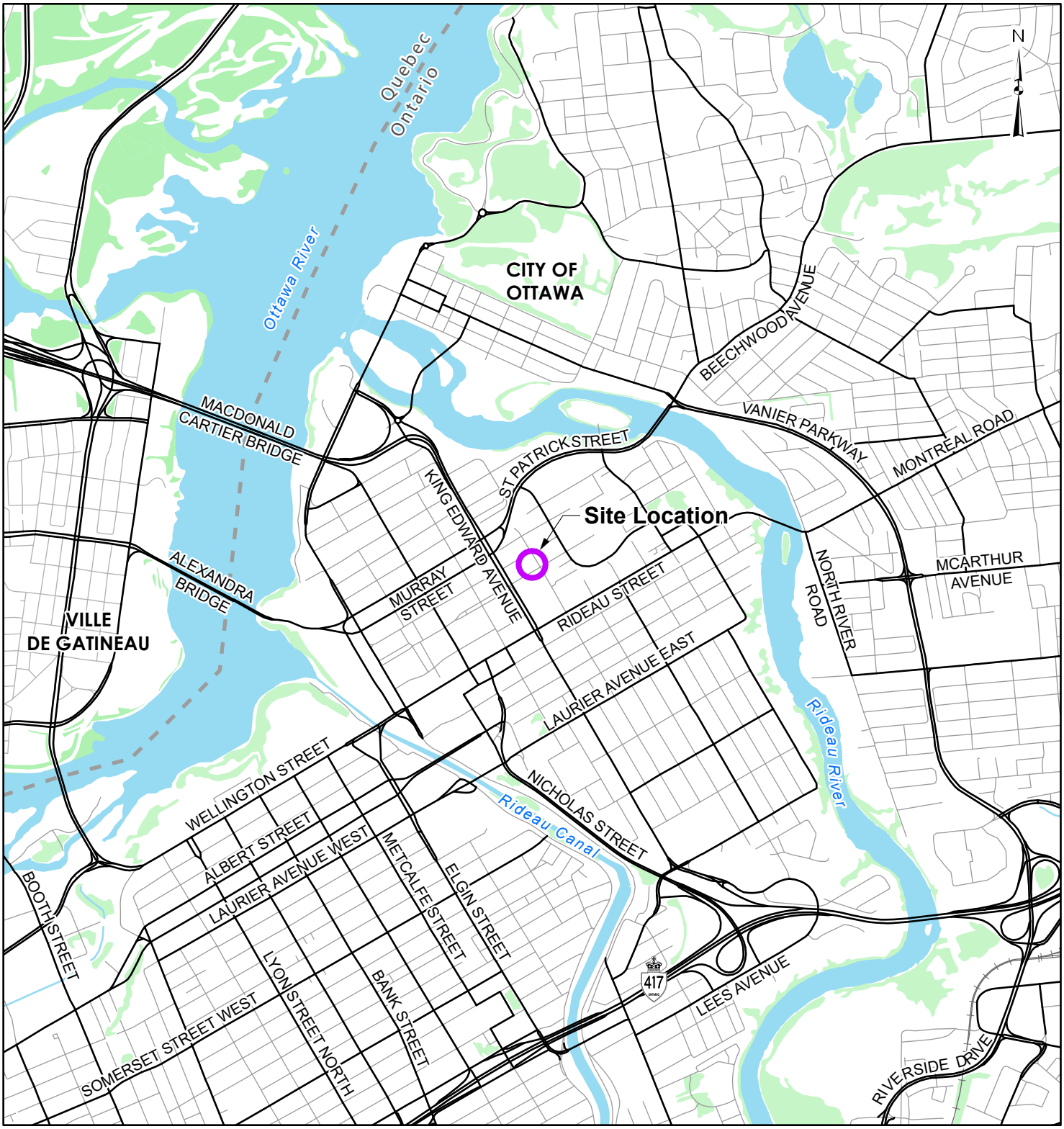
This report was produced for the exclusive use of Osgoode Properties. The purpose of the report is to assess the existing stormwater management system and provide recommendations and designs for the post-construction scenario that are in compliance with the guidelines and standards from the Ministry 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

McINTOSH PERRY



LEGEND

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

600 300 0 600

Scale 1:25,000 Metres

REFERENCE

GIS data provided by the Ontario Ministry of Natural Resources and Forestry, 2021.

CLIENT: SMART LIVING PROPERTIES

PROJECT: 253 YORK STREET, 78 NELSON STREET, 80 NELSON STREET
SERVICING AND STORMWATER MANAGEMENT REPORT

TITLE: SITE LOCATION PLAN

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PROJECT NO:	CCO-22-0938
Date	Aug., 20, 2021
GIS	EU
Checked By	AG

FIGURE: 1

C:\Users\e.ungun\McIntosh Perry\GIS - Documents\Projects\2022\CCO\CCO-22-0938 Smart Living - Civil - 253 York Street\aprx\Key Maps\LandDevelopment\CCO-22-0938_01_SiteLocationPlan.aprx

APPENDIX B
BACKGROUND DOCUMENTS

McINTOSH PERRY

Alison Gosling

From: Fraser, Mark <Mark.Fraser@ottawa.ca>
Sent: July 31, 2020 9:08 AM
To: Deiaco, Simon
Subject: PC2020-0162_253 York Street
Attachments: 253-255-257 York site plan.pdf; ServicingGuidelines_ final_Dec2009.pdf; Servicing Report Template Final Version.pdf

Hi Simon,

Please forward the below engineering notes to the applicant regarding a development proposal at **253 York Street**. Note that the information is considered preliminary and the assigned DR Project Manager may modify and/or add additional requirements/conditions upon review of an application or if additional information becomes available.

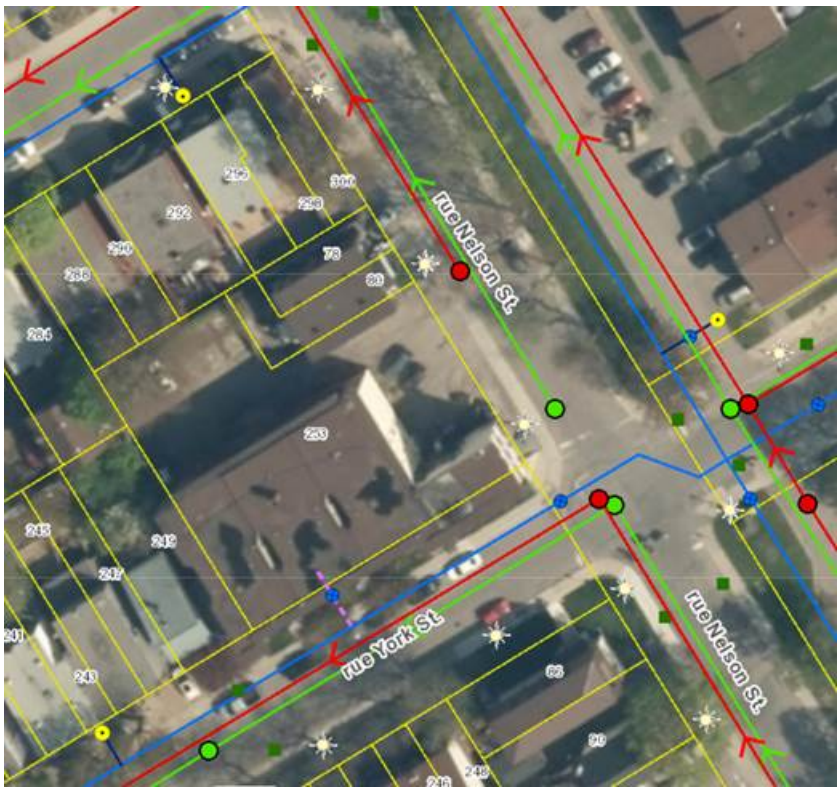
Comments:

- A deep excavation and dewatering operations have the potential to cause damages to the neighboring adjacent buildings/City infrastructure. Document that construction activities (excavation, dewatering, vibrations associated with construction, etc.) will not have an impact on any adjacent buildings and infrastructure.
- A **Record of Site Condition (RSC)** in accordance with O.Reg. 153/04 will be required to be **filed and acknowledged by the Ministry prior to issuance of a building permit** due to a change to a more sensitive property use. O.Reg 153/04 permits the issuance of a building permit for excavation and shoring of excavation but not a construction permit until RSC is acknowledged by the MECP.

  Changes of use, s. 168.3.1 (1) (b) of the Act
  14. *A person shall not change the use of property for the purposes of clause 168.3.1 (1) (b) of the Act in any of the following manners:*
  6. If the property is used for a commercial use as well as any other type or types of property use, a change in the use of part or all of the property used for commercial use to any or all of the following types of property uses:
    - *Agricultural or other use.*
    - *Institutional use.*
    - *Parkland use.*
    - *Residential use.*
- A singular (1) storm and (1) sanitary service connection to the sewer networks and two (2) water services are permitted for this development if the site is intended to operate under one ownership and remain as single parcel post-development. The additions shall not be serviced independent from the existing building as the City does not want to maintain multiple connections for a single property.
- The sidewalk on Nelson St. fronting the property has a depressed sidewalk for an existing parking lot. This depressed sidewalk shall be removed as part of the site works.
- The condition of the existing services must be verified for reuse to ensure absence of any structural deficiencies and ensure minimum size and materiality requirements are being met. **A CCTV scan and accompanying report must be submitted to the City for review to determine if they are acceptable**. A comment concerning the CCTV scan and lateral condition must also be included in the servicing report, stating that the existing service laterals for the subject property are absent of any structural defects and are of size and material that adheres to City of Ottawa Guidelines. Located existing services are to be placed on site servicing plan.
- Incorporate permeable pavers into the SWM design to further reduce stormwater runoff however no credit in terms of stormwater management (to be considered and impervious for design purposes).

General:

- It is the consultant /designer's responsibility to verify all the information related to the infrastructures by using as built drawings or field visit and inspection as required.
- It is the sole responsibility of the consultant to investigate the location of existing underground utilities in the proposed servicing area to avoid any conflict with utilities. The location of existing utilities and services shall be documented on an **Existing Conditions Plan**. Verify all the information related to the infrastructures by using as built drawings or field visit and inspection as required. **Include a note on the Servicing and Grading Plan stating the existing utilities in the proposed servicing area have been investigated.**
- All underground and above ground building footprints and permanent walls need to be shown on the plans to confirm that any permanent structure does not extend either above or below into the existing property lines and sight triangles and/or future road widening protection limits.
- Please note that the proposed servicing design and site works shall be in accordance with the following documents:
    - Ottawa Sewer Design Guidelines (October 2012)
    - Technical Bulletin PIEDTB-2016-01
    - Technical Bulletins ISTB-2018-01, ISTB-2018-02 and ISTB-2018-03.
    - Ottawa Design Guidelines - Water Distribution (2010)
    - Design Guidelines for Sewage Works, MECP, 2008
    - Stormwater Planning and Design Manual, MECP, March 2003
    - 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 Accessibility Design Standards (November 2015) (City recommends development be in accordance with these standards on private property)
    - Ottawa Standard Tender Documents (latest version)
    - Ontario Provincial Standards for Roads & Public Works (2013)
    - 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) 580-424 x.44455. **Include copies in the Appendix of the report as supporting documentation.**
- Any proposed work within utility/infrastructure easements requires written consent of the easement owner.



Disclaimer:

The City of Ottawa does not guarantee the accuracy or completeness of the data and information contained on the above image(s) and does not assume any responsibility or liability with respect to any damage or loss arising from the use or interpretation of the image(s) provided. This image is for schematic purposes only.

Stormwater Management Criteria (Quantity and Quality Control) and Servicing Information:

SWM Criteria: Discharging into a Separated Sewer System

- **Water Quantity Control:** Control post-development runoff (for the entire site), up to and including the 100-year storm event, to a **5-year pre-development level**. The pre-development runoff coefficient will need to be determined **using the smaller of a runoff coefficient of C=0.5 or the actual existing site runoff coefficient**. The time of concentration used to determine the pre-development condition will be the larger of 10min. or the calculated time of concentration. [*Tc should not be less than 10 min. since IDF curves become unrealistic at less than 10 min; T_c of 10 minutes shall be used for all post-development calculations*].
    - Total allowable release rate will be **5-year pre-development rate**.
    - C Coefficient of runoff will need to be determined **as per existing conditions but in no case more than 0.5**
    - TC =20 minutes or can be calculated,
    - TC should not be less than 10 minutes, since the IDF curves become unrealistic less than 10min.
    - Any uncontrolled runoff (100-year) is required to be subtracted from the allowable release rate.
- The impact from the receiving system HGL will need to be assessed and considered if proposing underground storage The SWM solution will need to be designed accordingly. The storm connection will need to be above the receiving sewer HGL.
- Any storm events greater than the calculated **5-year allowable release rate**, up to and including the 100-year storm event, shall be detained on-site by appropriate SWM measures to avoid impact on the downstream sewer system.
- **Water Quality:** Please consult with the local conservation authority (RVCA) regarding water quality criteria and onsite requirements prior to submission of an application as the site is located less than 2km from the outlet. It is consultant's responsibility to check with the RVCA regarding water quality control and include this information and discussion within the SWM report. Contact the RVCA for further information regarding requirements for water quality for this project.

- Compare pre-development flows to post-developments flows in the SWM report to document improvement.
- If **rooftop control and storage** is considered as part of the SWM solution for this project sufficient details (Cl. 8.3.8.4) shall be discussed and documented in the report and on the engineering plans. A **roof drainage plan and detailed roof drain summary table** with supporting drain manufacturer information will be required. Any note indicating *to be designed by others* will not be sufficient for approval. The roof drainage plan will need to document roof drain type, flow rates, emergency scupper locations and spill over elevations and ponding areas. Roof drains are to be connected downstream of any incorporated ICDs within the SWM system and not to the foundation drain system. Provide a **Roof Drain Plan** as part of the engineering submission package.
- Emergency rooftop scuppers and rooftop flow control drains must be shown on the plan if providing roof top storage for stormwater management.
- Provide a memorandum if Rooftop Flow Control drains are used confirming the new roof will be designed to meet the Stormwater Management objectives with flow control drains and roof spill scuppers in accordance with the requirements of clause 7.4.10.4 of the 2012 Ontario Building code.
- **Underground Storage: Underground storage volumes are to be based on 50% peak flow rates or use dynamic computer model.** The Modified Rational Method for storage computation in the Sewer Design Guidelines was originally intended to be used for above ground storage (i.e. parking lot) where the change in head over the orifice varied from 1.5 m to 1.2 m (assuming a 1.2 m deep CB and a max ponding depth of 0.3 m). This change in head was small and hence the release rate fluctuated little, therefore there was no need to use an average release rate.
  When underground storage is used, the release rate fluctuates from a maximum peak flow based on maximum head down to a release rate of zero. This difference is large and has a significant impact on storage requirements. **We therefore require that an average release rate equal to 50% of the peak allowable rate shall be applied to estimate the required volume. Alternatively, the consultant may choose to use a submersible pump in the design to ensure a constant release rate.**
  In the event that there is a disagreement from the designer regarding the required storage, The City will require that the designer demonstrate their rationale utilizing dynamic modelling, that will then be reviewed by City modellers in the Water Resources Group.
  Note that the above will added to upcoming revised Sewer Design Guidelines to account for underground storage, which is now widely used.
- If an underground storage tank considered as part of the SWM solution for this project sufficient details and system information will need to be provided in the report and on the plans. A detailed cross-section of such SWM system with sufficient details and information (HWLs, release rate, volume, location, size (dimensions), control device, emergency flow outlet and backflow protection, etc.) will need to be provided. An appropriate emergency overflow location will need to be determined and documented. Backup power supply necessary if pump controlled. Details regarding the proposed on-site stormwater management system are to be provided for review.
- The minimum orifice dia. for a plug style ICD is 83mm and the minimum flow rate from a vortex ICD is 6 L/s in order to reduce the likelihood of plugging otherwise choose to pump the SWM system.
- Please include a Pre-Development Drainage Area Plan to define the pre-development drainage areas/patterns. Runoff shall not be directed toward any adjacent properties. Post-development site grading shall match existing property line grades in order to minimize disruption to the adjacent properties.
- Provide a stormwater management summary table within the body of the SWM report to summarize the SWM design for this site.
- Foundation drains are to be independently connected to sewermain (separated or combined) unless being pumped with appropriate back up power, sufficient sized pump and back flow prevention.

Implementation Considerations:

- Accounting for external overland drainage.
- Use of standard ICDs
- Requirement for ICD/roof drain information on the plans
- Requirement for plans showing 100-year ponding limits
- Provide a foundation drain backwater valve installed as per Std Dwg S14.

Storm Sewer:

- Available Storm Sewers: A 600mm dia. Conc. storm sewer is available within York Street and a 300mm dia. Conc. storm sewer is available within Nelson Street. Stormwater drains to the King Edward collector sewer system and discharged to the Ottawa River.
  For concrete sewer pipe, maintenance manholes shall be installed when the service is greater than 50% of the diameter of the mainline concrete pipe.
- Only one storm connection to the sewer is permitted for this development. Investigate servicing the additions internally through the existing building utilizing the existing sewer lateral if determined to be suitable for reuse. Any new connection is to be discussed with the City. The additions shall not be serviced independent from the existing building.
- A storm sewer monitoring maintenance hole is required to be installed at the property line (on the private side of the property) as per City of Ottawa Sewer-Use By-Law 2003-514 (14) *Monitoring Devices*.
- As-built drawings of the existing services within the vicinity of the site are available and to be reviewed in order to determine proper servicing and SWM plan for the subject site(s).
- Foundation drainage system details are to be discussed in the report and document how the system will be integrated into the servicing design. Please note that foundation drain is to be independently connected to sewermain unless being pumped with appropriate back up power, sufficient sized pump and back flow prevention.
- A backwater valve is required on all service laterals for protection.
- Identify if there is an existing storm lateral that drains the foundation weeping tile, if currently installed. If weeping tile is connected to the sanitary lateral, it must be disconnected and drained via separate lateral to the storm sewer system.

Sanitary Sewer:

- Available Sanitary Sewers: A 600mm dia. Conc. sanitary sewer is located within York Street and 300mm dia. Conc. sanitary sewer within Nelson Street. Wastewater flows to the King Edward Trunk Collector sewer system. For concrete sewer pipe, maintenance manholes shall be installed when the service is greater than 50% of the diameter of the mainline concrete pipe.
- Only one sanitary connection to the sewer is permitted for this development. Investigate servicing the additions internally through the existing building utilizing the existing sewer lateral if determined to be suitable for reuse. Any new connection is to be discussed with the City. The additions shall not be serviced independent from the existing building.
- An analysis and demonstration that there is sufficient/adequate residual capacity to accommodate any increase in wastewater flows in the receiving and downstream wastewater system is required to be provided. It is suggested to **calculate the total peak wastewater demand for the proposed development and send it to the City as soon as possible in advance of a submission of an application, as an initial step to determine whether or not there is enough capacity in the city system to accommodate the proposed wastewater flow.** Please note that it takes approx. 10 business days to get a response back from the internal circulation.
- Existing and proposed increases in sanitary flow are to be calculated using the methods established in City of Ottawa Sewer Design Guidelines (SDG) 2012, as amended. Refer to Section 4, Appendix 4-A, and **Technical Bulletin ISTB-2018-01** for guidance.
- A sanitary sewer monitoring maintenance hole is required to be installed at the property line (on the private side of the property) as per City of Ottawa Sewer-Use By-Law 2003-514 (14) *Monitoring Devices*.
- A backwater valve is required on the sanitary service for protection (mandatory now anyways).
- If the site requires to discharge of remediated groundwater, it will require discharge into the sanitary sewer not into city storm sewer per the Sewer Use By-law and subject to a sewer use agreement. Review the ESA reports.

Watermain:

- Available Watermains: A 152mm dia. DI watermain is located within York Street and a 203mm dia. DI watermain is located within Nelson Street. Any connection to the watermain in Nelson Street will be subject to consent from the Owners of 312 Murray St. as the watermain is situated on private property.

- **Analyze and demonstrate there is adequate fire protection** for the buildings per *Technical Bulletin ISTB-2018-02*. Multiple municipal hydrants will be required for fire protection. Adequacy of fire flow must be demonstrated.
- Demonstrate that the pressure requirements, per Section 4.2.2.1, 4.2.2.2, and 4.2.2.3 of the WDG, are met for this building.
- **Water Supply Redundancy:** Residential buildings with a basic day demand greater than 50m^3/day (0.57 L/s) are required to be connected to a minimum of two water services separated by an isolation valve to avoid a vulnerable service area as per the *Ottawa Design Guidelines - Water Distribution, WDG001, July 2010 Clause 4.3.1 Configuration.* This proposed development **will require two (2) separate water service connections** if the basic day demand for this site exceeds 50m^3/day. There shall be a primary water service and a secondary connection. This is a corner lot so we will not support the installation of a new isolation valve on the City watermain to satisfy this requirement.
- Include a **hydrant coverage figure** and **demonstrate there is adequate fire protection** for the building per *Technical Bulletin ISTB-2018-02* . Multiple municipal hydrants will be required for fire protection.
- **Boundary conditions**, HGL, shall be requested and a hydraulic analysis completed to confirm that the require fire flows can be achieved as well as availability of domestic water pressure. **Use Table 3-3 of the MOE Design Guidelines for Drinking-Water System to determine Maximum Day and Maximum Hour peaking factors for 0 to 500 persons and Table 4.2 of the ODG-Water Distribution for 501 to 3,000 persons.** Provide the following information to the City of Ottawa via email to request water distribution network boundary conditions for the subject site. Please note that once this information has been provided to the City of Ottawa it takes approximately 5-10 business days to receive boundary conditions.
    - Type of Development and Units
    - Site Address (Street Number and Name)
    - Location of service(s).
    - A plan showing the proposed water service connection locations.
    - **Average Daily Demand** (L/s)
    - **Maximum Daily Demand** (L/s)
    - **Peak Hour Demand** (L/s)
    - **Required Fire Flow** (L/min) **FUS calculations are to be provided with request for boundary conditions.**
      [*Fire flow demand requirements shall be based on Fire Underwriters Survey (FUS) Water Supply for Public Fire Protection*
      1999 and Technical Bulletin ISTB-2018-02]
      Exposure separation distances shall be defined on a figure to support the FUS calculation and required fore flow (RFF).
      Fire flow demands will be inputted as point loads at each connection separately unless otherwise noted. A multi-hydrant analysis can be requested if necessary.
    - If fire protection is provided by existing municipal hydrants, hydrant capacity shall be assessed to demonstrate the RFF can be achieved. Identify which hydrants are being considered to meet the RFF on a **fire hydrant coverage figure** as part of the boundary conditions request.
- Include a figure showing the location of applicable fire hydrants supplying adequate fire flow. If fire protection is provided by existing municipal hydrants, hydrant capacity shall be assessed to demonstrate the RFF can be achieved. Identify which hydrants are being considered to meet the RFF on a **fire hydrant coverage figure** as part of the boundary conditions request.
- Hydrant capacity shall be assessed if relying on any public hydrants to provide fire protection particularly if high design fire flows are being proposed to demonstrate the RFF can be achieved. ***Refer to Table 1: Maximum flow to be considered from a given hydrant in Appendix I of Technical Bulletin ISTB-2018-02***.Appropriate fire protection mitigation measures shall be investigated/proposed to lower the RFF for the site to an appropriate level.
- The subject site is located within the 1W Pressure Zone.

Snow Storage:

- Any portion of the subject property which is intended to be used for permanent or temporary snow storage shall be as shown on the approved site plan and grading plan. Snow storage shall not interfere with approved grading and drainage patters or servicing. Snow storage areas shall be setback from the property lines, foundations, fencing or landscaping a minimum of 1.5m. Snow storage areas shall not occupy driveways, aisles, required parking spaces or any portion of a road allowance. If snow is to be removed from the site please indicate this on the plan(s).

Permits and Approvals:

- The consultant shall determine if this project will be subject to an Environmental Compliance Approval (ECA). It shall be determined if the exemptions set out in Ontario Regulation 525/98: *Approval Exemptions* are satisfied. All regulatory approvals shall be documented and discussed in the report. This project will be subject to an ECA application if stormwater works are servicing more than one parcel of land (i.e. 78/80 Nelson Street), regardless of ownership.

Capital Woks:

- No capital works are currently planned in this area.

Sight Triangle and Any Road widening Requirement (By Transportation Project Manager Wally Dubyk)

- The Official Plan does not identify York Street or Nelson Street as a protected road corridor. To be confirmed by the Transportation Project Manager assigned to this project.

Required Engineering Plans and Studies in Support of SPC application:

PLANS:

Design drawings are to be provided at a specified **scale (1:200, 1L250, 1:300, 1:400, or 1:500)**

- Existing Conditions and Removals Plan
- Site Servicing Plan
- Grade Control and Drainage Plan
- Erosion and Sediment Control Plan
- Pre-Development Drainage Area Plan
- Post-Development Drainage Area Plan
- Roof Drainage Plan w/ Roof Drain Summary Table (if rooftop SWM storage is being considered)
- Stormwater Storage System Detail (Internal Cistern Details from the Mechanical Engineer if being considered)
- Foundation Drainage System Details
- Legal Survey Plan
- Site Lighting Plan, Photometric Plan and Site Lighting Certification Letter

REPORTS:

- Site Servicing and Stormwater Management Report
- Geotechnical Study
- Phase 2 Detailed Noise Study (Transportation Noise Assessment and Stationary Noise Assessment) [due to proximity (within 100m) of King Edward Ave. (Arterial Road Classification)] Stationary noise to be discussed in report as per City NCG and NPC 300 Guidelines]
- Phase I ESA (in accordance with Ontario Regulation 153/04)
- Phase II ESA (depending on results and recommendation of the Phase I-ESA)
- Record of Site Condition (RSC) is anticipated to be required for this property due to change to a more sensitive property use.

Servicing Report Template and Guidelines:

Please find attached the Servicing Report Template & Study Guidelines" and prepare the servicing study accordingly. For capacity issue, please see section 3.2.1 page 3-3 and follow this section. A completed checklist with corresponding references from the servicing study is mandatory for the completeness of the study. Please add a completed checklist in the report. Please ensure you are using current guidelines, by-laws and standards.

- Include development statistics (unit type breakdown), building construction type, site area, building GFA from the Architect,
- Include description of lot topography, surface drainage patterns, and ground cover (grass, hard landscaping, asphalt, etc.)
- Include description of the existing sewer laterals servicing the building, including size and material type, and street location of connection to the City main.
- Reports must be prepared and stamped by a Professional Engineer licensed in the Province of Ontario.

Please refer to the **City of Ottawa Guide to Preparing Studies and Plans [Engineering]:**
https://ottawa.ca/en/planning-development-and-construction/developing-property/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans

Phase One Environmental Site Assessment (Official Plan Section 4.8.4):

- A **Phase I ESA** is required to be completed in accordance with Ontario Regulation 153/04 (not per CSA standards) in support of this development proposal to determine the potential for site contamination. A **Phase II ESA** may be required depending on the results and recommendations of the Phase I-ESA. In accordance with O.Reg. 153/04 TOC requirements.
- The Phase I ESA shall include an RSC statement discussing any requirement to file a RSC with the Ministry. A **Record of Site Condition (RSC)** in accordance with O.Reg. 153/04 is anticipated to be filed and acknowledged by the Ministry prior to issuance of a building permit due to the change in property use. As per the Official Plan (4.8.4) we do not consider an RSC acknowledged by the Ministry until either it's has been confirmed that it will not be audited or it has passed the Ministry audit.
- Please also note that in the event soil and/or groundwater contamination is identified on this site and the proposal is for a more sensitive land use, the MECP will require approximately 1-1.5 years to review the RSC. PIED will apply appropriate conditions, based on Environmental Protection Act (Section 168.3.1 (1)) and O.Reg. 153/04 (Parts IV and V) regarding requirements for RSC prior to building permit issuance. Dependent on the levels/types of contamination, timelines for building permit issuance may be longer than expected and we recommend applicant speak to Building Code Services, at the earliest convenience, so as to discuss these timelines in more detail, if deemed applicable.
- **Environmental Risk Information Services (ERIS) report** is required to be included as part of the Phase I ESA to support the findings and recommendations.
  https://www.ontario.ca/page/guide-completing-phase-one-environmental-site-assessments-under-ontario-regulation-15304
  https://www.ontario.ca/laws/regulation/040153#BK43

Geotechnical Investigation (Official Plan Section 4.8.3):

- A **Geotechnical Study/Investigation** shall be prepared in support of this development proposal.
- Investigate the effect of short-term and long-term lowering of the groundwater level and the impact on the adjacent lands and existing neighboring structures. The impact of groundwater lowering on adjacent properties needs to be discussed and investigated to ensure there will be no short term and long term damages associated with lowering the groundwater in this area.
- A deep excavation and dewatering operations have the potential to cause damages to the neighboring adjacent buildings. Document that construction activities (deep excavation, dewatering, vibrations associated with construction, etc.) will not have an negative impact on any adjacent buildings and infrastructure in proximity to the site.
- Dewatering during construction may be subject to volume restrictions, therefore coordinate with the City of Ottawa Sewer Use Program to discuss discharge details.
- Geotechnical Study shall be consistent with the **Geotechnical Investigation and Reporting Guidelines for Development Applications.**
  https://documents.ottawa.ca/sites/default/files/documents/cap137602.pdf

Detailed Noise Study:

- A **Transportation Noise Assessment** is required as the subject development is located in proximity (within 100m) of King Edward Ave. (Arterial Road Classification)]
- A **Stationary Noise Assessment** is required in order to assess the noise impact of the proposed sources of stationary noise (mechanical HVAC system/equipment) of the development onto the surrounding residential area to ensure the noise levels do not exceed allowable limits specified in the City Environmental Noise Control Guidelines.
- Noise Study shall be consistent with the City's **Environmental Noise Control Guidelines**. https://documents.ottawa.ca/sites/default/files/documents/enviro_noise_guide_en.pdf

Exterior Site Lighting:

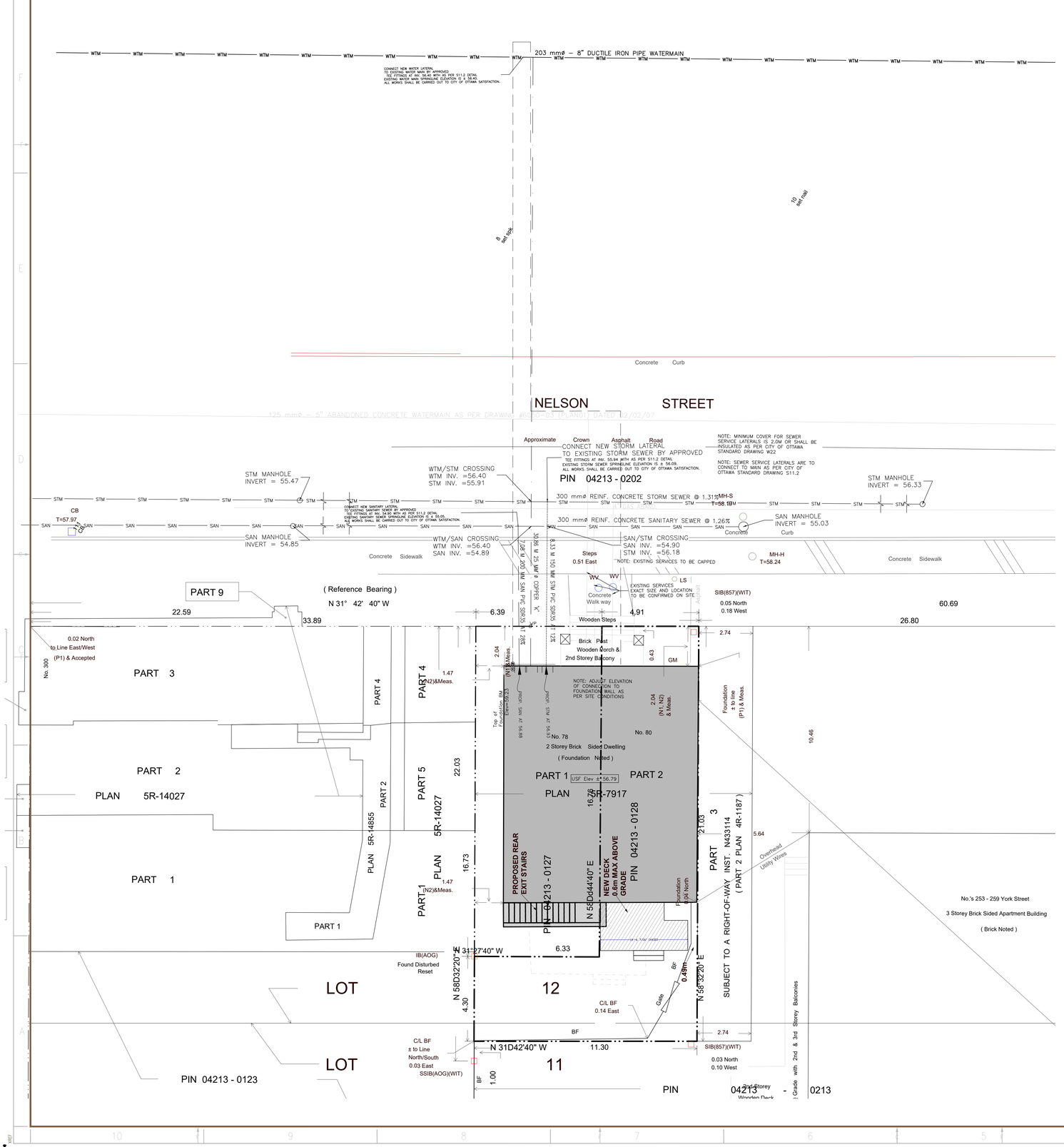
- Any proposed light fixtures (both pole-mounted and wall mounted) must be part of the approved Site Plan. All external light fixtures must meet the criteria for Full Cut-off Classification as recognized by the Illuminating Engineering Society of North America (IESNA or IES), and must result in minimal light spillage onto adjacent properties (as a guideline, 0.5 fc is normally the maximum allowable spillage). In order to satisfy these criteria, the please provide the City with a **Site Lighting Plan, Photometric Plan and Certification (Statement) Letter** from an acceptable professional engineer stating that the design is compliant.

Please note that these comments are considered preliminary based on the information available to date and therefore maybe amended as additional details become available and presented to the City. The above pre-consultation comments are to be considered valid for one year. It is the responsibility of the applicant and their representatives/consultants to verify information provided by the City. The applicant may contact me for any follow-up questions related to engineering/infrastructure prior to submission of an application if necessary.

If you have any questions or require any clarification please let me know.

Regards,

Mark Fraser, P. Eng.
Project Manager, Planning Services
Development Review Central Branch
City of Ottawa | Ville d'Ottawa
Planning, Infrastructure and Economic Development Department
110 Laurier Avenue West. 4th Floor, Ottawa ON, K1P 1J1
Tel:613.580.2424 ext. 27791
Fax: 613-580-2576
Mail: Code 01-14
Email: Mark.Fraser@ottawa.ca



LEGEND

- 381mmø SAN — EXISTING SANITARY SEWER
- 609.6mmø STM — EXISTING STORM SEWER
- 150mmø WM — EXISTING WATERMAIN
- EX.SANMH — EXISTING SANITARY MANHOLE
- EX.STMMH — EXISTING STORM MANHOLE
- EX.CB — EXISTING CATCHBASIN
- V&VC — EXISTING VALVE AND VALVE CHAMBER
- V&VB — EXISTING VALVE AND VALVE BOX
- EX.FH — EXISTING FIRE HYDRANT
- EXISTING OVERHEAD BELL
- EXISTING OVERHEAD HYDRO
- EXISTING UNDERGROUND HYDRO
- EXISTING GAS MAIN
- 135mmø SAN — PROPOSED SANITARY SEWER
- 100mmø STM — PROPOSED STORM SEWER
- 25mmø WM — PROPOSED WATERMAIN
- SANMH — PROPOSED SANITARY MANHOLE
- CBMH — PROPOSED CATCHBASIN MANHOLE
- LMH — LANDSCAPE MANHOLE
- CB1 — PROPOSED CATCHBASIN
- V&VB — PROPOSED VALVE AND VALVE BOX
- FH — PROPOSED FIRE HYDRANT
- WRM — PROPOSED WATER REMOTE METER
- PROPOSED WATER METER
- PROPOSED CURB STOP
- STREET ASPHALT OVERLAY
- WP — WATER POST

GENERAL NOTES FOR SERVCING

1. ALL SERVICES, MATERIALS, CONSTRUCTION METHODS AND INSTALLATIONS SHALL BE IN ACCORDANCE WITH THE LATEST STANDARDS AND REGULATIONS OF THE CITY OF OTTAWA STANDARD SPECIFICATIONS AND DRAWINGS, ONTARIO PROVINCIAL SPECIFICATION STANDARD SPECIFICATION (OPSS) AND ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD), UNLESS OTHERWISE SPECIFIED, TO THE SATISFACTION OF THE CITY AND THE CONSULTANT.
2. THE POSITION OF EXISTING PUBLIC LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UTILITIES AND STRUCTURES SHOWN ON THE DRAWINGS ARE APPROXIMATE ONLY AND WHERE NECESSARILY SHOWN ON THE CONTRACT DRAWING, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL SATISFY HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM DURING THE COURSE OF CONSTRUCTION. ANY RELOCATION OF EXISTING UTILITIES REQUIRED BY THE DEVELOPMENT OF SUBJECT LANDS IS TO BE UNDERTAKEN AT CONTRACTOR'S EXPENSE.
3. THE CONTRACTOR MUST NOTIFY ALL EXISTING UTILITY COMPANY OFFICIALS FIVE (5) BUSINESS DAYS PRIOR TO START OF CONSTRUCTION AND HAVE ALL EXISTING UTILITIES AND SERVICES LOCATED IN THE FIELD OR EXPOSED PRIOR TO THE START OF CONSTRUCTION, INCLUDING BUT NOT LIMITED TO HYDRO, BELL, CABLE TV, AND CONSUMERS GAS LINES.
4. ALL TRENCHING AND EXCAVATIONS TO BE IN ACCORDANCE WITH THE LATEST REVISIONS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS.
5. REFER TO ARCHITECTS PLANS FOR BUILDING DIMENSIONS LAYOUT AND REMOVALS. REFER TO LANDSCAPE PLAN FOR LANDSCAPED DETAILS AND OTHER RELEVANT INFORMATION. AU. INFORMATION SHALL BE CONFIRMED PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. THE LOCATION OF UNDERGROUND SERVICES ARE BASED ON THE SURVEY PROVIDED WITH THE INFORMATION FROM THE CITY OF OTTAWA DRAWING PART TWELON STREET – RIDEAU ST TO YORK ST". HOWEVER, CONTRACTOR MUST ENSURE THAT THIS INFORMATION IS VERIFIED PRIOR TO CONSTRUCTION AND NOTIFY ENGINEER IMMEDIATELY OF ANY DISCREPANCIES.
7. ALL ELEVATIONS ARE GEODETIC AND UTILIZE METRIC UNITS.
8. JOB BENCH MARK TO BE USED FROM TO OF FOUNDATION AS INDICATED ON THE DRAWINGS. THIS ELEVATION IS BASED OFF THE DRAWING BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD. DATED OCTOBER 21, 2019.
9. ALL GROUND SURFACES SHALL BE EVENLY GRADED WITHOUT PONDING AREAS AND WITHOUT LOW POINTS EXCEPT WHERE APPROVED SWALE OR CATCH BASIN OUTLETS ARE PROVIDED.
10. ALL EDGES OF DISTURBED PAVEMENT SHALL BE SAW CUT TO FORM A NEAT AND STRAIGHT LINE PRIOR TO PLACING NEW PAVEMENT. PAVEMENT REINSTATEMENT SHALL BE WITH STEP JOINTS OF 500mm WIDTH MINIMUM
11. ALL DISTURBED AREAS OUTSIDE PROPOSED GRADING LIMITS TO BE RESTORED TO ORIGINAL ELEVATIONS AND CONDITIONS UNLESS OTHERWISE SPECIFIED. ALL RESTORATION SHALL BE COMPLETED WITH THE GEOTECHNICAL REQUIREMENTS FOR BACKFILL AND COMPACTION.
12. ALL MATERIAL SUPPLIED AND PLACED FOR PARKING LOT AND ACCESS ROAD CONSTRUCTION SHALL BE TO OPSS STANDARDS AND SPECIFICATIONS UNLESS OTHERWISE NOTED. CONSTRUCTION TO OPSS 206, 310 & 314. MATERIALS TO OPSS 1001, 1003 & 1010.
13. CONTRACTOR SHALL OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND APPROVALS FROM THE MUNICIPAL AUTHORITIES PRIOR TO COMMENCING CONSTRUCTION.
14. MINIMIZE DISTURBANCE TO EXISTING VEGETATION DURING THE EXECUTION OF ALL WORKS.
15. REMOVE FROM SITE ALL EXCESS EXCAVATED MATERIAL UNLESS OTHERWISE DIRECTED FROM THE ENGINEER. EXCAVATE AND REMOVE ALL ORGANIC MATERIAL AND DEBRIS LOCATED WITHIN THE PROPOSED BUILDING, PARKING AND ROADWAY LOCATIONS.
16. AT PROPOSED UTILITIES CONNECTION POINTS AND CROSSINGS (I.E. STORM SEWER, SANITARY SEWER, WATER, ETC.) THE CONTRACTOR SHALL DETERMINE THE PRECISE LOCATION AND DEPTH OF EXISTING UTILITIES AND REPORT ANY DISCREPANCIES OR CONFLICTS TO THE ENGINEER BEFORE COMMENCING WORK.
17. SERVICE TRENCHES ON MUNICIPAL RIGHT OF WAY TO BE REINSTATED AS PER CITY OF OTTAWA DETAIL #10.
18. PRIOR TO CONSTRUCTION, A GEOTECHNICAL ENGINEER REGISTERED IN THE PROVINCE OF ONTARIO IS TO INSPECT ALL SUB-SURFACES FOR FOOTINGS, SERVICES AND PAVEMENT STRUCTURES.

NOTES: WATERMAIN

24. ALL WATERMAIN AND WATERMAIN APPURTENANCES, MATERIALS, CONSTRUCTION AND TESTING METHODS SHALL CONFORM TO THE CURRENT CITY OF OTTAWA AND MINISTRY OF ENVIRONMENT STANDARDS AND SPECIFICATIONS.
25. ALL WATERMAIN 300mm DIAMETER AND SMALLER TO BE POLY VINYL CHLORIDE (PVC) CLASS 150 OR 18 MEETING AWWA SPECIFICATION C900. STANDARD LATERAL MATERIAL SERVICES UP TO 50MM IS COPPER TYPE 'K'.
26. ALL WATER MAIN TO BE INSTALLED AT MINIMUM COVER OF 2.4m BELOW FINISHED GRADE. WHERE WATERMAINS CROSS OVER OTHER UTILITIES, A MINIMUM 0.30m CLEARANCE FROM UTILITIES OBVERT SHALL BE MAINTAINED; WHERE WATERMAINS CROSS UNDER OTHER UTILITIES, A MINIMUM 0.50m CLEARANCE SHALL BE MAINTAINED. WHERE THE MINIMUM SEPARATION CANNOT BE ACHIEVED: THE WATERMAIN SHALL BE INSTALLED AS PER CITY OF OTTAWA STANDARDS W25 AND W25.2. WHERE 2.4m MINIMUM DEPTH CANNOT BE ACHIEVED, THERMAL INSULATION SHALL BE PROVIDED AS PER CITY OF OTTAWA STANDARD W22.
27. WATER MAIN BEDDING TO BE AS PER CITY OF OTTAWA STANDARD W17.
28. VALVE AND VALVE BOX TO BE AS PER CITY OF OTAWA STANDARD W24.
29. CONCRETE THRUST BLOCKS AND MECHANICAL RESTRAINTS ARE TO BE INSTALLED AT ALL TEES, BENDS, HYDRANTS, REDUCERS, ENDS OF MAINS AND CONNECTIONS 100mm AND LARGER, IN ACCORDANCE WITH CITY OF OTTAWA STANDARDS W30.3 & W25.4.
30. CATHODIC PROTECTION REQUIRED FOR ALL IRON FITTINGS AS PER CITY OF OTTAWA STANDARD W40 & W42.
31. FIRE HYDRANTS TO BE AS PER CITY OF OTTAWA STANDARD W19. (NOT REQUIRED)
32. IF WATER MAIN MUST BE DEFLECTED TO MEET ALIGNMENT, ENSURE THAT THE AMOUNT OF DEFLECTION USED IS LESS THAN HALF THAT RECOMMENDED BY THE MANUFACTURER.

"TYPICAL WATER SERVICE LINE AS PER W26(FOR 19MM & 25MM DIA. WATER SERVICES). AND TO BE INSTALLED AT 1 M FROM THE FOUNDATION WALLS

NOTES: SANITARY SEWER AND MANHOLES

34. ALL SANITARY SEWER, SANITARY SEWER APPURTENANCE AND CONSTRUCTION METHODS SHALL CONFORM TO THE CURRENT CITY OF OTTAWA STANDARDS AND SPECIFICATIONS.
36. SEWER BEDDING AS PER CITY OF OTTAWA DETAIL S6.
37. ALL WORK SHALL BE PERFORMED, AS APPLICABLE IN ACCORDANCE WITH OPSS 407, AND 410.
38. ALL SANITARY MANHOLES 1200mm IN DIAMETER TO BE AS PER OPSD 701.01. FRAME AND COVER TO BE AS PER CITY OF OTAWA STANDARD S25 AND S24. (NOT APPLICABLE)
39. SANITARY BACKWATER VALVES TO BE PROVIDED FOR EACH BUILDING CLOSE TO THE FOUNDATION WALL NEAR SERVICES ENTRY AS PER CITY OF OTTAWA STD S14.1 OR S14.2
40. STORM BACKWATER VALVES TO BE PROVIDED FOR EACH BUILDING CLOSE TO THE FOUNDATION WALL NEAR SERVICES ENTRY AS PER CITY OF OTTAWA STD S14
41. PROPOSED SEWER SERVICE LATERALS ARE TO HAVE A MINIMUM OF 2.0 M OF COVER OF SHALL BE INSULATED AS PER City of Ottawa Standard DRAWING W22.
42. SEWER LATERALS ARE TO CONNECT AS PER S11.2.
43. SHOULD INVERT OF EXISTING SERVICES BE LESS THAN 300MM BELOW THE USF, SLEEVED SERVICES ARE REQUIRED.

NOTES: STORM SEWERS AND STRUCTURES

44. ALL STORM SEWER MATERIALS AND CONSTRUCTION METHODS SHALL CONFORM TO THE CURRENT CITY OF OTTAWA STANDARDS AND SPECIFICATIONS.

W. Elias & Associates
CONSULTING ENGINEERS
204 BOREALIS CR.
OTTAWA, ON K1K 4V1
TEL 613-762-7800
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CIVIL
STRUCTURE
ELECTRICAL
MECHANICAL

CONSULTANT:

SEAL:

LICENSED PROFESSIONAL ENGINEER
W. ELIAS
100155011
PROVINCE OF ONTARIO

Sept 24, 2020

CLIENT:

OTTAWA ONTARIO

PROJECT:

PROPOSED REDEVELOPMENT
78–80 NELSON
OTTAWA, ON K1R 7P8

KEY PLAN:

ISSUED FOR – REVISION:

IS	RE	DATE	DESCRIPTION
4		2020-09-23	FOR REVIEW AS PER STAFF COMMENTS
3		2020-09-22	FOR REVIEW AS PER STAFF COMMENTS
2		2020-07-16	FOR REVIEW AS PER STAFF COMMENTS
1		2020-06-22	ISSUED FOR COORDINATION

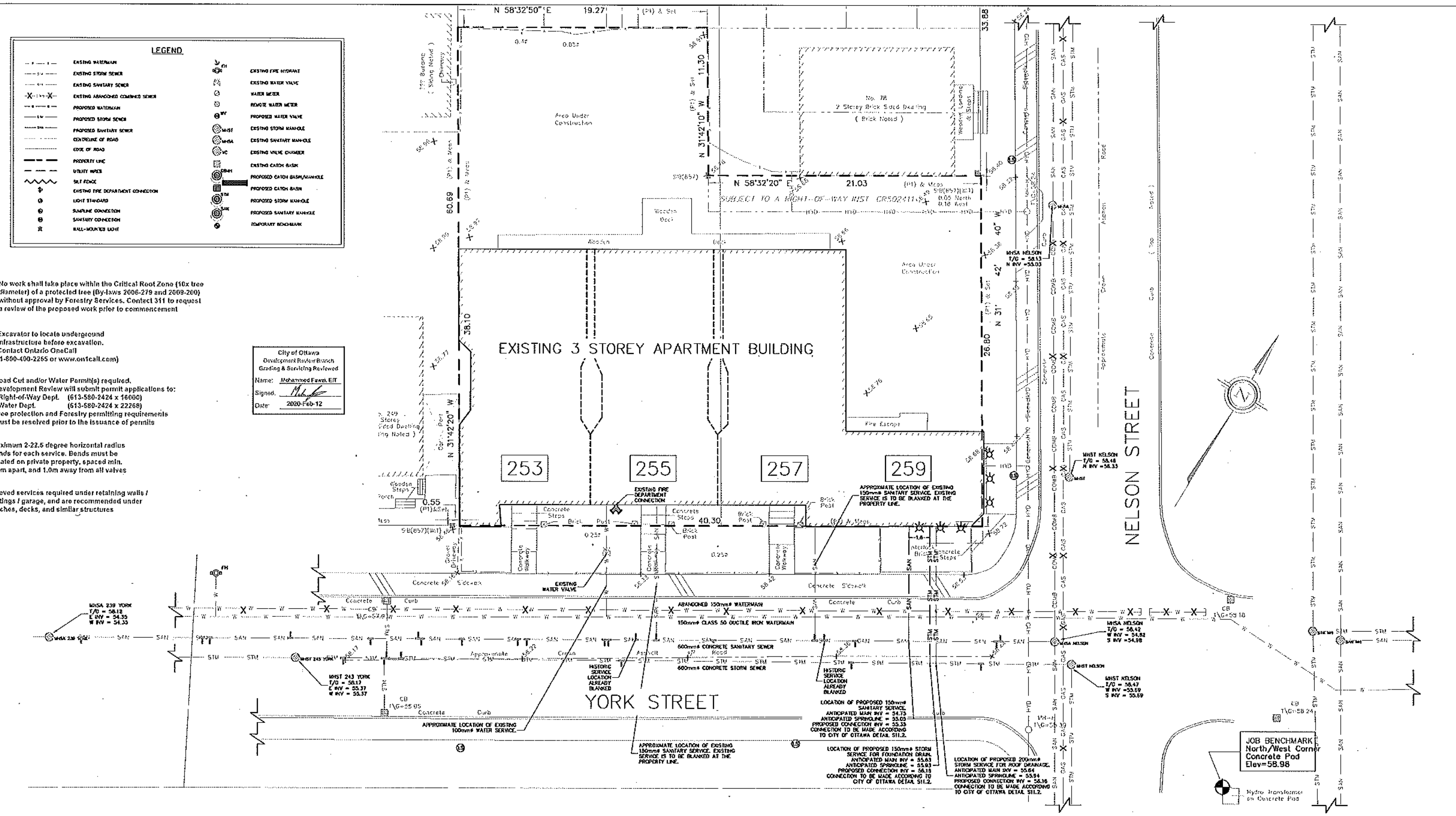
PROJECT NO: 2020-42
DATE: 2020-03-20
ORIGINAL SCALE: 1:100
DESIGNED BY: R.E
DRAWN BY: R.E
CHECKED BY: W.E
IF THIS BAR IS NOT 1" LONG, ADJUST YOUR PLOTING SCALE: 1"
DISCIPLINE:

TITLE:
SERVICES PLAN

SHEET NUMBER: S–1
SHEET #: OF

ISSUE: ISSUED FOR REVIEW
DATE OF: 2020-06-20
REV #: –

SCALE BAR 1:100
5 10 15 20



No work shall take place within the Critical Root Zone (10x tree diameter) of a protected tree (By-laws 2006-279 and 2009-200) without approval by Forestry Services. Contact 311 to request a review of the proposed work prior to commencement

Excavator to locate underground infrastructure before excavation.
Contact Ontario OneCall
(1-800-400-2265 or www.on1call.com)

Road Cut and/or Water Permit(s) required.
Development Review will submit permit applications to:
- Right-of-Way Dept. (613-580-2424 x 16000)
- Water Dept. (613-580-2424 x 22268)

Tree protection and Forestry permitting requirements must be resolved prior to the issuance of permits

Maximum 2-22.5 degree horizontal radius bends for each service. Bends must be located on private property, spaced min. 1.0m apart, and 1.0m away from all valves

Sleeved services required under retaining walls / footings / garage, and are recommended under porches, decks, and similar structures

PROPOSED SERVICING PLAN

SCALE = 1:150

WATERMAIN NOTES:

1. CITY TO SUPPLY, INSTALL & DISINFECT THE WATER SERVICE; CONTRACTOR TO EXCAVATE, BACKFILL AND REINSTATE THE ROADWAY AS PER STD DWG R10.
2. SPECIFICATIONS:

ITEM	SPEC. No.	City Std.Dwg.No.	REFERENCE
WATERMAIN BEDDING AND BACKFILL OPSD	802.010/802.031	W17 (trench detail)	
CATHODIC PROTECTION OPSD	1109.010	W40	
PRESSURE TESTING AWWA	C-600-5		
CHLORINATION AWWA	C-651-05		
WATERMAIN MATERIAL	PVC DR18	(CLASS 150)	

3. WATERMAIN SHALL BE MINIMUM 2.4m DEPTH BELOW GRADE UNLESS OTHERWISE INDICATED. WHERE LESS THAN 2.4m COVER, THERMAL INSULATION IS TO BE PROVIDED AS PER CITY STD DWG W22 (to shallow trenches), W23 (At open structures).
4. A MINIMUM OF 0.5m VERTICAL CLEARANCE IS REQUIRED BETWEEN THE WATERMAINS AND ALL UTILITIES AND SEWERS. IN LOCATIONS WHERE THIS IS NOT ACHIEVABLE, MUST FOLLOW PROCEDURE F-6-1 SEC. 5.2 OF THE ONTARIO DRINKING WATER RESOURCES ACT.
5. METALLIC WARNING TAPE SHALL BE USED OVER ALL WATERMAINS.
6. INSTALL AND TEST TRACER WIRE FOR ALL PROPOSED WATERMAIN IN ACCORDANCE WITH THE CITY OF OTTAWA DESIGN STANDARDS AS SPECIFIED IN SECTION 4.28.
7. EXISTING WATERMAIN INFORMATION SHOWN ON YORK STREET IS BASED ON BEST CURRENT INFORMATION. CONTRACTOR TO VERIFY EXACT LOCATION OF WATERMAIN AND REPORT ANY DISCREPANCIES TO KOLLAARD ASSOCIATES INC.
8. WATER SHUTOFF VALVE AND VALVE BOX TO BE WITHIN THE ROAD ALLOWANCE AND LOCATED A MINIMUM OF 1.0 METRES FROM THE BUILDING FOUNDATION. TYPICAL PRIVATE SERVICE AS PER STD. DWG. W50 (with the exception that the valve are to be located 1.0 m minimum from the foundation wall); VALVE BOX ASSEMBLY AS PER STD. DWG. W24.
9. CONNECTIONS AT ELBOWS AND TEES IN WATER MAINS SHOULD BE MADE WITH THE USE OF JOINT RESTRAINERS DESIGNED FOR WATERMAIN APPLICATION. JOINT AND PIPE RESTRAINERS SHOULD MEET THE REQUIREMENTS OF AWWA C900, C905 AND C907 AND ASTM F1674-11. JOINT RESTRAINERS SHOULD BE INSTALLED AS PER MANUFACTURERS RECOMMENDATIONS.
10. ALL CONNECTORS, RODS AND VALVE BOLTS SHALL BE STAINLESS STEEL.
11. VALVES ARE TO BE OPERATED BY CITY OF OTTAWA STAFF ONLY.
12. NO CONNECTION TO EXISTING WATER NETWORK SHALL BE COMPLETED UNTIL A WATER PERMIT IS OBTAINED FROM THE CITY OF OTTAWA AND CITY OF OTTAWA FORCES ARE ON HAND TO MAKE THE CONNECTION.

SEWER NOTES:

1. ONTARIO ONE CALL AT 1-800-400-2255.
2. ALL NOTES ARE AS PER CURRENT CITY/PROVINCIAL STANDARDS, GUIDELINES, BY-LAWS AND DETAIL DRAWINGS.
3. SUPPLY AND CONSTRUCT ALL SEWERS AND APPURTENANCES IN ACCORDANCE WITH THE CITY OF OTTAWA STANDARDS AND SPECIFICATIONS AND ONTARIO PROVINCIAL STANDARDS FOR ROADS AND PUBLIC WORKS.
4. SPECIFICATIONS:

ITEM	CITY OF OTTAWA STD DWG NO.
CATCH BASIN	S1-S4.1, S19-S25 & S28-S31
STORM/SANITARY MANHOLE	S12-S13.4, S24-S25, & S33
REAR YARD CBs	S29 & S30
BACKWATER VALVES	S14-S14.2 & S18
WASTE WATER SAMPLING/INSPECTION CHAMBER	S18.1
SEWER SERVICE CONNECTION	S11 & S11.1
STORM MANHOLE FRAME & COVER	S24.1 & S25
CATCH BASIN FRAME & COVER	S19, S22 & S23
SEWER TRENCH	S6 & S7

SERVICE LATERALS:

SANITARY – PVC SDR 28 @ 1.0% (MIN)
STORM – PVC SDR 28 @ 1.0% (MIN), HDPE (ROOF DRAINS)
WATER – (IF BEING REPLACED) PEX SDR 9 MUNICIPAL WATER SERVICE TUBING (SUCH AS BlueS04+ OR APPROVED EQUIVALENT)

TRENCH BACKFILL AS PER GEOTECHNICAL ENGINEER RECOMMENDATIONS REFERENCE GEOTECHNICAL REPORT PREPARED BY KOLLAARD ASSOCIATES DATED JANUARY 29, 2019.

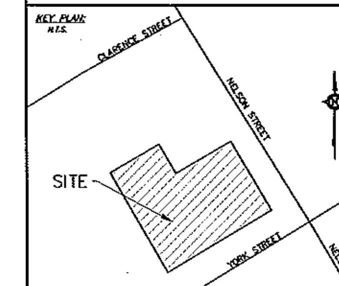
5. INSULATE ALL STORM PIPES THAT HAVE LESS THAN 2m COVER AND ALL SANITARY PIPES THAT HAVE LESS THAN 2m COVER WITH THERMAL INSULATION. PROVIDE 150mm CLEARANCE BETWEEN PIPE AND INSULATION.
6. PIPE BEDDING, COVER AND BACKFILL ARE TO BE COMPACTED TO AT LEAST 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY.
7.
8. SERVICE LATERALS ARE TO BE SLEEVED THROUGH THE FOUNDATION WALL.
9. FLEXIBLE CONNECTIONS ARE REQUIRED FOR CONNECTION PIPES TO MANHOLES (FOR EXAMPLE KOR-N-SEAL, PSX: POSITIVE SEAL AND DURASEAL). SANITARY RUBBER GASKET TYPE JOINTS SHALL CONFORM TO CSA (B-182.2,3,4).
10. THE OWNER SHALL REQUIRE THAT THE SITE SERVICING CONTRACTOR PERFORM FIELD TESTS FOR QUALITY CONTROL OF ALL SANITARY SEWERS. LEAKAGE TESTING SHALL BE COMPLETED IN ACCORDANCE WITH OPSS 410.07.16, 410.07.16.04 AND 407.07.24. DYE TESTING IS TO BE COMPLETED ON ALL SANITARY SERVICES TO CONFIRM PROPER CONNECTION TO THE SANITARY SEWER MAIN. THE FIELD TESTS SHALL BE PERFORMED IN THE PRESENCE OF A CERTIFIED PROFESSIONAL ENGINEER WHO SHALL SUBMIT A CERTIFIED COPY OF THE TEST RESULTS.
11. STORM MANHOLES AND CBMHS ARE TO HAVE 300mm SUMPS (AS PER SUMP DETAIL ON OPSD 701.010), UNLESS OTHERWISE INDICATED.
12. BUILDING CONTRACTOR TO PROVIDE TEMPORARY ADDITIONAL GRANULAR BACKFILL ABOVE SHALLOW CULVERTS AND STORM SEWERS TO SUPPORT HEAVY CONSTRUCTION EQUIPMENT.
13. CONTRACTOR TO TELEVISE (CCTV) ALL PROPOSED SEWERS, 200mmØ OR GREATER PRIOR TO BASE COURSE ASPHALT. UPON COMPLETION OF CONTRACT, THE CONTRACTOR IS RESPONSIBLE TO FLUSH AND CLEAN ALL SEWERS & APPURTENANCES TO CITY SATISFACTION.
14. WHERE THE SANITARY SEWER CROSSES ABOVE THE WATERMAIN, THE CONTRACTOR IS TO PROVIDE A MINIMUM OF 0.50m VERTICAL SEPARATION, ADEQUATE STRUCTURAL SUPPORT OF THE SEWER TO PREVENT SETTLING AND EXCESSIVE JOINT DEFLECTION AND ENSURE THAT THE LENGTH OF THE WATER PIPE BE CENTERED AT THE POINT OF CROSSING SO THAT THE JOINTS ARE EQUIDISTANT AND AS FAR AS POSSIBLE FROM THE SEWER.

SERVICING NOTES:

1. A 0.5-METRE CLEARANCE BETWEEN WATERMAIN AND THE SANITARY AND STORM LATERALS IS TO BE PROVIDED.
2. ALL SERVICES ARE TO BE INSTALLED AT CURRENT CITY OF OTTAWA STANDARDS.
3. EXISTING LOCATION OF WATERMAIN, SANITARY SEWER AND STORM SEWER ARE APPROXIMATE. ELEVATIONS AND STATUS OF EXISTING LATERALS ARE UNKNOWN. IF RE-USE OF BUILDING LATERALS IS DESIRED, IT IS RECOMMENDED THAT THEY BE EXCAVATED AND INSPECTED PRIOR TO BUILDING RENOVATION. IF NOT BEING RE-USED, EXISTING ARE TO BE BLANKED AS PER CITY OF OTTAWA STANDARDS.
4. SERVICE LATERALS ARE TO HAVE A MINIMUM CLEARANCE OF 3 METRES FROM EXISTING UTILITIES POLES.
5. ALL BENDS IN THE SERVICE LATERALS ARE TO BE A MAXIMUM OF 2 @ 22° BENDS AND WITHIN THE PROPERTY.
6. EXISTING SANITARY SERVICE TO BE CAPPED AT PROPERTY LINE. WATER SERVICE TO BE BLANKED AT MAIN TO THE SATISFACTION OF CITY FORCES.
7. SEWER SERVICE CONNECTIONS WITH LESS THAT 2.0m COVER TO BE INSULATED PER OPSD 1109.030.

DRAWING NUMBER: 190502-SER

KEY PLAN: N.T.S.



SCALE: 0 1 2 3 4 5 10
SCALE 1:150 METRES

GENERAL NOTES:

1. All dimensions are in metres; all elevations are in metres and are geodetic. TBM = North/West corner of hydro transformer concrete pad. Elevation= 58.98
2. This is not a legal survey. Boundary information was derived from draft Surveyor's Property Report by Annis O'Sullivan Vollebekk Ltd. on April 11rd, 2019. Registered plan 43586
3. Contractor is responsible for location and protection of utilities.
4. All dimensions to be verified on site by contractor prior to construction.
5. Any changes made to this plan must be verified and approved by Kollaard Associates Inc.
6. Client is responsible for acquiring all necessary permits. This drawing is not for construction until a building permit has been granted.
7. The owner agrees to prepare and implement an erosion and sediment control plan to the satisfaction of the City of Ottawa, appropriate to the site conditions, prior to undertaking any site alterations (filling, grading, removal of vegetation, etc.) and during all phases of site preparation and construction in accordance with the current Best Management Practices for Erosion and Sediment Control such as, and not limited to installing filter cloths across manhole/catchbasin lids to prevent sediments from entering structures and install and maintain a light duty silt fence barrier as required.
8. All materials and construction to be in accordance with City of Ottawa standards and Ontario Provincial Standards and Specifications; sewer and watermain material types; disinfection, provide minimum 2.4 metres of cover for water services, cathodic protection, City of Ottawa insulation specifications for watermain, pipe bedding, reinstatement of disturbed areas and leakage testing.
9. Reference to Kollaard File No. 190502 for Servicing brief.

No.	REVISION	DATE	BY
1	RESPONSE TO REVIEW COMMENTS	01/31/2020	AVB
0	SERVICING BRIEF SUBMISSION	10/07/2019	AVB
#	REVISION ITEM / DESCRIPTION	REV. DATE	INT.

Kollaard Associates
Engineers
(613) 860-0923
info@kollaard.ca
P.O. BOX 189, 210 PRESCOTT ST.
KEMPTVILLE, ONTARIO
K0G 1J0 FAX (613) 258-0475
http://www.kollaard.ca

CLIENT: SMART LIVING RESIDENCES

PROJECT: PROPOSED RESIDENTIAL RENOVATION

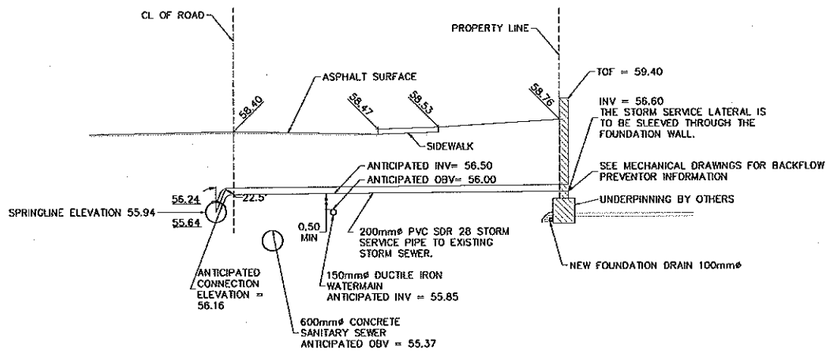
LOCATION: 253, 255, 257 YORK STREET, OTTAWA, ONTARIO

LICENSED PROFESSIONAL ENGINEER — JAN. 31, 2020 — S.E. deWit — 100079612 — PROVINCE OF ONTARIO

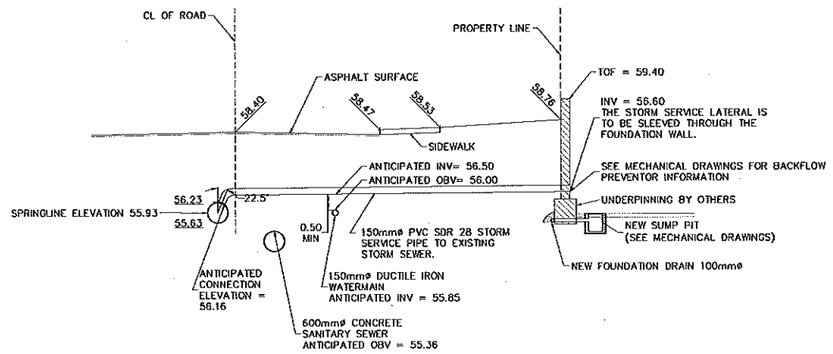
DESIGNED BY: AVB	CHECKED BY: WK
DRAWN BY: AVB	APPROVED BY: WK
DATE: JULY 10, 2019	
KOLLAARD FILE NUMBER: 190502	

DRAWING NUMBER: 1 OF 2

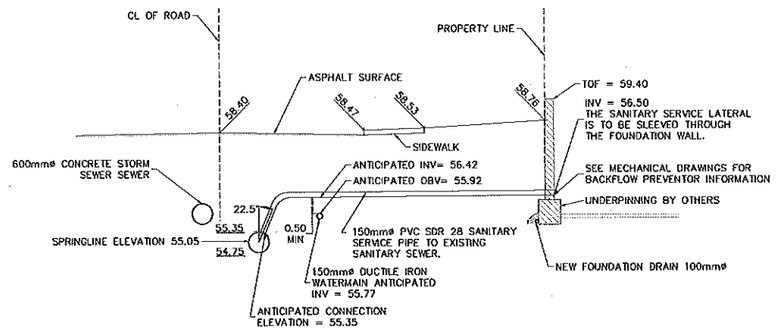
DRAWING NAME: PROPOSED SERVICING PLAN



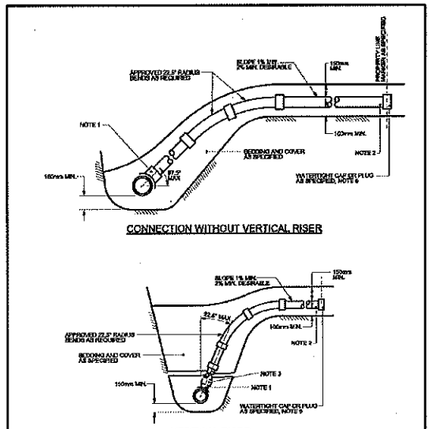
STORM CONNECTION DETAIL
(ROOF DRAINAGE)
(NOT TO SCALE)



STORM CONNECTION DETAIL
(FOUNDATION DRAIN)
(NOT TO SCALE)



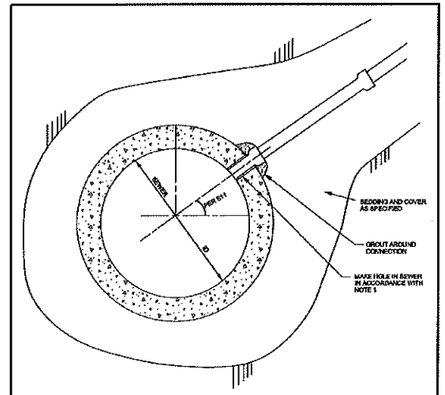
SANITARY CONNECTION DETAIL
(NOT TO SCALE)



NOTES:
1. ALL DIAMETERS OF SERVICE CONNECTIONS THAT HAVE NOMINAL DIAMETERS NO GREATER THAN 50% OF THE NOMINAL DIAMETER OF THE MAIN OR SEWER BARREL SHALL BE MADE USING A BELL AND SPIGOT AS PER S11.2 OR AN APPROVED IN-SEWER GASKETED INSERT, WHETHER INSPECTED OR NOT.
2. SANITARY SERVICES TO BE 150mm AND STORM SERVICES TO BE 150mm FOR DETACHED AND SEMI-DETACHED DWELLINGS, SERVICE PIPE AND FITTINGS SHALL TO BE APPROVED SDR 41/35 JOINTS PRODUCTS UNLESS SPECIFIED OTHERWISE.
3. APPROVED CONTROLLED SETTLEMENT JOINTS OPTIONAL FOR SERVICE CONNECTIONS TO MAIN SEWERS UP TO 6.4m DEEP. WHERE APPROVED CONNECTORS TO SEWERS CONSIST OF CEMENT MORTAR, APPROVED CONTROLLED SETTLEMENT JOINTS.
4. VERTICAL RISER SHALL BE SAME AS SERVICE PIPE UNLESS OTHERWISE SPECIFIED.
5. CAP OR PLUG AT THE PROPERTY LINE SHALL BE ABSOLUTELY BRACED TO WITHSTAND TESTING PRESSURE.
6. FOR NEW CONSTRUCTION, SHEETS MUST BE INSTALLED ON THE MAIN LINE BEFORE THEY PIPE IS LAID. FOR SERVICES/MUNICIPAL STORM SEWER, UNLESS, APPROVED "SCREW TYPE" MAY BE USED.
7. APPROVED CUT-IN TOOL MUST BE USED FOR FIELD MADE CONNECTIONS.
8. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.

N.T.S.

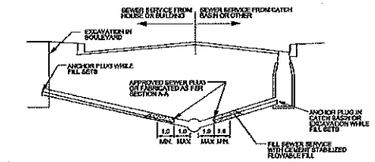
Ottawa	SEWER SERVICE CONNECTIONS FOR RIGID MAIN SEWER PIPE (MODIFIED OPSD-1006.010)	DATE:	MARCH 2008
		REV. DATE:	MARCH 2015
		DWG No.:	S11



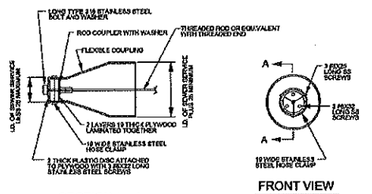
NOTES:
1. OPENINGS IN PIPE SHALL BE A ROUND MACHINE CUT HOLE.
2. INSERT TO CONSIST OF THE BELL END OF AN APPROVED SERVICE PIPE, LENGTH TO BE LIMITED SUCH THAT NO PART OF THE INSERT PROTRUDES INTO THE OPENING OF THE PIPE.
3. WRAP APPROVED WATER-TIGHT SEALANT AROUND THE SPIGOT PORTION OF THE BELL END PRIOR TO INSERTING. USE SPIGOT SEALANT TO ENSURE A TIGHT WATER-TIGHT CONNECTION THAT WILL HOLD THE BELL IN POSITION
4. GROUT AROUND THE BELL END TO PROTECT THE SEALANT AND SUPPORT THE BELL.
5. ALL OTHER NOTES OF S11 APPLY.
6. SEE MS-23.15 FOR APPROVED SEALANT PRODUCTS.

N.T.S.

Ottawa	SEWER SERVICE CONNECTIONS FOR RIGID MAIN SEWER PIPE USING BELL END INSERT METHOD	DATE:	MARCH 2015
		REV. DATE:	
		DWG. No.:	S11.2



SEWER SERVICE ABANDONMENT BENEATH PAVEMENT



SECTION A - A
FABRICATED SEWER PLUG

FRONT VIEW

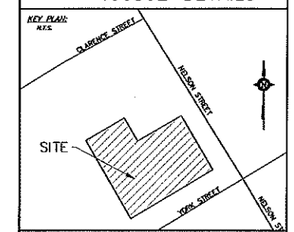
NOTES:
1. ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE SHOWN.

N.T.S.

Ottawa	SEWER SERVICE ABANDONMENT BENEATH PAVEMENT	DATE:	MARCH 2015
		REV. DATE:	
		DWG No.:	S15.4

DRAWING NUMBER:
190502-DETAILS

KEY PLAN:
N.T.S.



SCALE:

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5. Any changes made to this plan must be verified and approved by Kollaard Associates Inc.
6. Client is responsible for acquiring all necessary permits. This drawing is not for construction until a building permit has been granted.
7. The owner agrees to prepare and implement an erosion and sediment control plan to the satisfaction of the City of Ottawa, appropriate to the site conditions, prior to undertaking any site alterations (filling, grading, removal of vegetation, etc.) and during all phases of site preparation and construction in accordance with the current Best Management Practices for Erosion and Sediment Control such as, and not limited to installing filter cloths across manhole/catchbasin lids to prevent sediments from entering structures and install and maintain a tight duty silt fence barrier as required.
8. All materials and construction to be in accordance with City of Ottawa standards and Ontario Provincial Standards and Specifications; sewer and watermain material types; disinfection, provide minimum 2.4 metres of cover for water services, cathodic protection, City of Ottawa insulation specifications for watermain, pipe bedding, reinstatement of disturbed areas and leakage testing.
9. Reference to Kollaard File No. 190502 for Servicing brief.

No.	REVISION	DATE	BY
1	RESPONSE TO REVIEW COMMENTS	01/31/2020	AVB
0	SERVICING BRIEF SUBMISSION	10/07/2019	AVB
#	REVISION ITEM / DESCRIPTION	REV. DATE	INIT.

Kollaard Associates
Engineers
(613) 860-0923
info@kollaard.ca
P.O. BOX 189, 210 PRESCOTT ST.
KEMPTVILLE, ONTARIO
K0G 1J0 FAX (613) 258-0475
http://www.kollaard.ca

CLIENT:
SMART LIVING RESIDENCES

PROJECT:
PROPOSED RESIDENTIAL RENOVATION

LOCATION:
253, 255, 257 YORK STREET
OTTAWA, ONTARIO

LICENCED PROFESSIONAL ENGINEER — JULY 31, 2019 — S.E. deWit — 100079612 — PROVINCE OF ONTARIO

DESIGNED BY	CHECKED BY
AVB	WK
DRAWN BY	APPROVED BY
AVB	WK
DATE	
JULY 10, 2019	
KOLLAARD FILE NUMBER	
190502	

DRAWING NUMBER:
2 OF 2

DRAWING NAME:
PROPOSED DETAILS PLAN

ARCH D

APPENDIX C
WATERMAIN CALCULATIONS

McINTOSH PERRY

4 WATERMAIN DESIGN

When underpinning was completed on the building, part of the existing water lateral was uncovered. The construction manager on site commented that the pipe was of ductile iron material and was in sufficient condition. Correspondence is included in the appendix. The existing 100mm diameter water lateral is to remain.

Fire flow protection requirements were calculated as per the Fire Underwriter's Survey (FUS) Calculations of the fire flow required for the building are provided in Appendix B.

From Appendix B, the maximum fire flow requirement is 14875 L/min or 248 L/sec.

4.1 Water Demand

The water demand for the proposed development was calculated based on the City of Ottawa Water Distribution Design Guidelines (as amended) as follows:

Residential

Total domestic pop:		
One Bedroom units	*(14) x 1.4 ppu:*	*19.6*
Two Bedroom units	*(14) x 2.1 ppu:*	*29.4*
Three Bedroom	*(1) x 3.1 ppu*	*3.1*
Four Bedroom	*(8) x 4.2 ppu*	*33.6*
Total:		85.7

$Q_{Domestic}$ = 86 x 350 L/person/day x (1/86,400 sec/day) = 0.35 L/sec

- Average daily demand 0.35 L/s
- Maximum daily demand (factor of 2.5) is 0.35 L/s x 2.5 = 0.87 L/s
- Peak hourly demand (factor of 2.2) = 0.87 L/s x 2.2= 1.92 L/s

4.2 Boundary Conditions

The water demand due to occupancy together with the fire flow requirements were provided to the City of Ottawa in 2019 as follows:

- Average daily water demand 0.4 L/s
- Maximum daily water demand 1.0 L/s
- Peak hourly water demand 2.2 L/s

- Fire Flow required 273 L/s

It is assumed that the water services will be connected to the 150 mm diameter ductile iron (DI) water main along York Street.

The following are the boundary conditions, HGL, for hydraulic analysis that were provided in 2019 for the above indicated peak hourly demand and fire flow demand.

Minimum HGL = 106.5m
Maximum HGL = 115.0m

The actual water demand and sanitary was modified from what was submitted for boundary conditions, as the unit count and floor areas were verified. The average daily water demand decreased by 0.06 L/s. It is expected that this minor decrease will have negligible impact on the minimum HGL.

The City of Ottawa Design Guidelines – Water Distribution as amended by technical bulletin ISDTB-2014-02 indicates that if possible water distribution systems are to be designed to provide residual pressures of 345 to 552 kPa in all occupied areas outside of the public right-of-way.

In accordance with MOE Guidelines, the distribution system shall be sized so that under maximum hourly demand conditions the pressures are no less than 276 kPa (40 psi.)

The pressure loss to the third floor of the proposed building was calculated using Bernoulli's Equation in Combination with the Darcy – Weisbach Equation and the Colebrook Equation. The equations are shown below.

$$H_P + Z_1 - Z_2 + \frac{P_1 - P_2}{S} + \frac{V_1^2 - V_2^2}{2g} = h_f + h_m \quad \text{where:}$$

$$h_m = K_m \frac{V^2}{2g} \qquad \mathrm{Re} = \frac{VD}{\nu} \qquad Q = VA \qquad A = \frac{\pi}{4} D^2$$

Darcy – Weisbach Equation: $h_f = f \frac{L}{D} \frac{V^2}{2g}$ where:

If laminar flow $\left(\mathrm{Re} < 4000 \text{ and any } \frac{e}{D}\right)$, $f = \frac{64}{\mathrm{Re}}$

If turbulent flow $\left(4000 \le \mathrm{Re} \le 10^8 \text{ and } 0 \le \frac{e}{D} < 0.05\right)$, then

Colebrook Equation: $\frac{1}{\sqrt{f}} = -2.0 \log\left(\frac{e/D}{3.7} + \frac{2.51}{\mathrm{Re}\sqrt{f}}\right)$

McINTOSH PERRY

CO-22-0938 - 78 & 80 Nelson Street Addition (B1) - Water Demands

Project:	78 & 80 Nelson Street Addition (B1)		
Project No.:	CO-22-0938		
Designed By:	AJG		
Checked By:	RDF		
Date:	August 23, 2021		
Site Area:	0.154 gross ha		
Residential	26 Bachelor	1.4 Persons per unit	
Population	36		

AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS	DEMANDS
Residential	280	L/c/d	0.12
Industrial - Light	35,000	L/gross ha/d	0
Industrial - Heavy	55,000	L/gross ha/d	0
Shopping Centres	2,500	L/(1000m² /d	0
Motels	150	L/(bed-space/d)	0
Hotels	225	L/(bed-space/d)	0
Tourist Commercial	28,000	L/gross ha/d	0
Othe Commercial	28,000	L/gross ha/d	0
AVERAGE DAILY DEMAND	**0.12**	**L/s**	
	7.08	**L/min**	

MAXIMUM DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS	DEMANDS
Residential	4.9 x avg. day	L/c/d	0.58
Industrial	1.5 x avg. day	L/gross ha/d	
Commercial	1.5 x avg. day	L/gross ha/d	
Institutional	1.5 x avg. day	L/gross ha/d	
MAXIMUM DAILY DEMAND	**0.58**	**L/s**	
	34.68	**L/min**	

MAXIMUM HOUR DEMAND

DEMAND TYPE	AMOUNT	UNITS	DEMANDS
Residential	7.4 x avg. day	L/c/d	0.93
Industrial	1.8 x max. day	L/gross ha/d	
Commercial	1.8 x max. day	L/gross ha/d	
Institutional	1.8 x max. day	L/gross ha/d	
MAXIMUM HOUR DEMAND	**0.93**	**L/s**	
	55.91	**L/min**	

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

McINTOSH PERRY

CO-22-0938 - 253 York Street Addition (B2) - Water Demands

Project:	253 York Street Addition (B2)		
Project No.:	CO-22-0938		
Designed By:	AJG		
Checked By:	RDF		
Date:	August 23, 2021		
Site Area:	0.154 gross ha		
Residential	20 Bachelor/1 Bedroom	1.4 Persons per unit	
Population	28		

AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS	DEMANDS
Residential	280	L/c/d	0.09
Industrial - Light	35,000	L/gross ha/d	0
Industrial - Heavy	55,000	L/gross ha/d	0
Shopping Centres	2,500	L/(1000m² /d	0
Motels	150	L/(bed-space/d)	0
Hotels	225	L/(bed-space/d)	0
Tourist Commercial	28,000	L/gross ha/d	0
Othe Commercial	28,000	L/gross ha/d	0
AVERAGE DAILY DEMAND	**0.09**	**L/s**	
	5.44	**L/min**	

MAXIMUM DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS	DEMANDS
Residential	9.5 x avg. day	L/c/d	0.86
Industrial	1.5 x avg. day	L/gross ha/d	
Commercial	1.5 x avg. day	L/gross ha/d	
Institutional	1.5 x avg. day	L/gross ha/d	
MAXIMUM DAILY DEMAND	**0.86**	**L/s**	
	51.72	**L/min**	

MAXIMUM HOUR DEMAND

DEMAND TYPE	AMOUNT	UNITS	DEMANDS
Residential	14.3 x avg. day	L/c/d	1.30
Industrial	1.8 x max. day	L/gross ha/d	
Commercial	1.8 x max. day	L/gross ha/d	
Institutional	1.8 x max. day	L/gross ha/d	
MAXIMUM HOUR DEMAND	**1.30**	**L/s**	
	77.86	**L/min**	

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

McINTOSH PERRY

CCO-22-0938 - 78 & 80 Nelson Addition - Fire Underwriters Survey (FUS) Fire Calculations

Project:	78 & 80 Nelson (B1)
Project No.:	CO-22-0938
Designed By:	AJG
Checked By:	RDF
Date:	August 23, 2021

From the Fire Underwriters Survey (1999)

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

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 Wood Frame

C 1.5 **A** **672.9** m^2

**Note: Area is the proposed addition + the existing building.*

Caluclated Fire Flow	**8560.3 L/min**
	9000.0 L/min

B. REDUCTION FOR OCCUPANCY TYPE (No Rounding)

From note 2, Page 18 of the Fire Underwriter Survey:

Combustible 0%

Fire Flow	**9000.0 L/min**

C. REDUCTION FOR SPRINKLER TYPE (No Rounding)

Standard Water Supply Sprinklered -40%

Reduction	**-3600 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	3.1 to 10	Ordinary (Unprotected)	5	2	10	18%
Exposure 2	<45	Ordinary (Unprotected)	30	2	60	18%
Exposure 3	0 to 3	Wood frame	10	4	40	10%
Exposure 4	10.1 to 20	Wood frame	8	2	16	14%
					% Increase*	**60%**

Increase*	**5400.0 L/min**

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

Fire Flow	**10800.0 L/min**
Fire Flow Required**	**11000.0 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-22-0938 - 253 York Street Addition (B2) - Fire Underwriters Survey (FUS) Fire Calculations

Project:	253 York Street Addition (B2)
Project No.:	CO-22-0938
Designed By:	AJG
Checked By:	RDF
Date:	August 23, 2021

From the Fire Underwriters Survey (1999)

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

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 Wood Frame

C 1.5 **A** **2,824.7** m^2

**Note: Area is the proposed addition + the existing building.*

Caluclated Fire Flow	**17538.8 L/min**
	18000.0 L/min

B. REDUCTION FOR OCCUPANCY TYPE (No Rounding)

From note 2, Page 18 of the Fire Underwriter Survey:

Combustible 0%

Fire Flow	**18000.0 L/min**

C. REDUCTION FOR SPRINKLER TYPE (No Rounding)

Standard Water Supply Sprinklered -40%

Reduction	**-7200 L/min**

D. INCREASE FOR EXPOSURE (No Rounding)

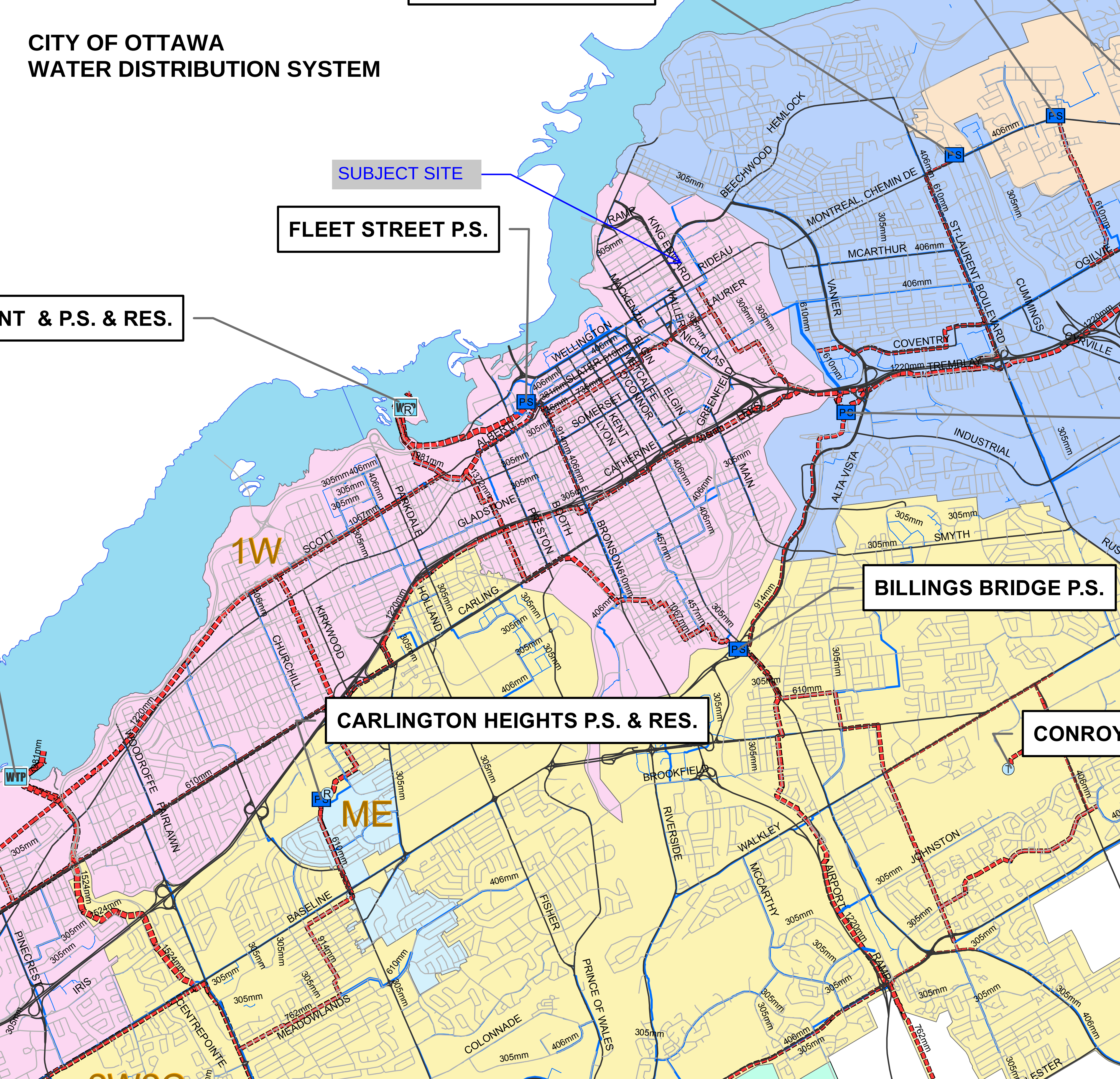
	Separation Distance (m)	Cons.of Exposed Wall	Length Exposed Adjacent Wall (m)	Height (Stories)	Length-Height Factor	
Exposure 1	0 to 3	Wood frame	28	3	85	18%
Exposure 2	30.1 to 45	Wood frame	12	2	24	18%
Exposure 3	10.1 to 20	Ordinary (Unprotected)	17	3	51	10%
Exposure 4	0 to 3	Wood frame	8	2	16	14%
					% Increase*	**60%**

Increase*	**10800.0 L/min**

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

Fire Flow	**21600.0 L/min**
Fire Flow Required**	**22000.0 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


CITY OF OTTAWA
WATER DISTRIBUTION SYSTEM
SUBJECT SITE
FLEET STREET P.S.
NT & P.S. & RES.
BILLINGS BRIDGE P.S.
CARLINGTON HEIGHTS P.S. & RES.
CONROY
1W
ME
WTP
PS
BEECHWOOD
HEMLOCK
MONTREAL, CHEMIN DE
MCARTHUR
RIDEAU
LAURIER
KING EDWARD
WALLER
NICHOLAS
VANIER
ST-LAURENT BOULEVARD
CUMMINGS
OGILVIE
COVENTRY
TREMBLAY
INDUSTRIAL
ALTA VISTA
MAIN
WELLINGTON
SLATER
ALBERT
SOMERSET
LYON
KENT
O'CONNOR
METCALFE
ELGIN
GREENFIELD
CATHERINE
GLADSTONE
PRESTON
BOOTH
BRONSON
PARKDALE
SCOTT
KIRKWOOD
CHURCHILL
HOLLAND
CARLING
SMYTH
WOODROFFE
FAIRLAWN
PINECREST
IRIS
CENTREPOINTE
MEADOWLANDS
BASELINE
COLONNADE
FISHER
PRINCE OF WALES
RIVERSIDE
BROOKFIELD
WALKLEY
MCCARTHY
AIRPORT
JOHNSTON
RAMP
MACKENZIE

APPENDIX D
SANITARY CALCULATIONS

McINTOSH PERRY

2 SANITARY SEWER DESIGN

The sanitary service laterals from the proposed development will be connected to the existing 600 mm diameter sanitary sewer along York Street.

Sewage discharges will be domestic in type and in compliance with the City of Ottawa Sewer Use By-law. The anticipated peak sanitary flow will be a total of approximately 1.05 L/s.

The sanitary sewage flow for the building was calculated based on the City of Ottawa Sewer Design Guidelines (Section 4.4.1.2).

2.1 Design Flows

The existing building is for residential use with domestic flows. The design flows are calculated based on the population density shown in the Ottawa Water Distribution Guidelines Section 4.2.8.

The peak sanitary design flows are calculated using the Ottawa Sewer Guidelines – Technical Bulletin ISTB-2018-01.

Residential

Total domestic pop:		
One Bedroom units	*(14) x 1.4 ppu:*	*19.6*
Two Bedroom units	*(14) x 2.1 ppu:*	*29.4*
Three Bedroom	*(1) x 3.1 ppu*	*3.1*
Four Bedroom	*(8) x 4.2 ppu*	*33.6*
Total:		*85.7*

$Q_{Domestic}$ = 86x 280 L/person/day x (1/86,400 sec/day) = 0.28 L/sec

Peaking Factor = $1 + \left(\frac{14}{4+\left(\frac{P}{1000}\right)}\right) * 0.8$ = 3.61 (4 maximum)

$Q_{Peak\ Domestic}$ = 0.28 L/sec x 3.61 = 1.01 L/sec

Infiltration

$Q_{Infiltration}$ = 0.33 L/ha/sec x 0.13ha = 0.04L/sec

Total Peak Sanitary Flow = 1.01 + 0.04 = 1.05 L/sec

McINTOSH PERRY

CO-22-0938 - Ex. Building at 78 & 80 Nelson St - Sanitary Demands

Project:	Ex. Building at 78 & 80 Nelson St
Project No.:	CO-22-0938
Designed By:	A.J.G.
Checked By:	R.D.F.
Date:	11/12/2021

Site Area	0.024	Gross ha		
Bachelor	12		1.40	Persons per unit
Total Population	17	Persons		

DESIGN PARAMETERS

Residential Peaking Factor	3.71	** 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	0.001
Wet	0.007
Total	**0.008**

AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS	POPULATION / AREA	Flow (L/s)
Residential	***280***	***L/c/d***	***17***	***0.06***
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)		0
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	**0.06**	**L/s**
PEAK RESIDENTIAL FLOW	**0.20**	**L/s**

TOTAL SANITARY DEMAND

TOTAL ESTIMATED AVERAGE DRY WEATHER FLOW	**0.06**	**L/s**
TOTAL ESTIMATED PEAK DRY WEATHER FLOW	**0.21**	**L/s**
TOTAL ESTIMATED PEAK WET WEATHER FLOW	**0.21**	**L/s**

McINTOSH PERRY

CO-22-0938 - 78 & 80 Nelson Addition - Sanitary Demands

Project:	78 & 80 Nelson Addition
Project No.:	CO-22-0938
Designed By:	A.J.G.
Checked By:	R.D.F.
Date:	11/12/2021

Site Area	0.064	Gross ha		
Bachelor	26		1.40	Persons per unit
Total Population	37	Persons		

DESIGN PARAMETERS

Residential Peaking Factor	3.67	** 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	0.02
Total	**0.02**

AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS	POPULATION / AREA	Flow (L/s)
Residential	***280***	***L/c/d***	***37***	***0.12***
Industrial - Light**	35,000	L/gross ha/d		0
Industrial - Heavy**	55,000	L/gross ha/d		0
Commercial / Amenity	2,800	L/(1000m² /d)		0
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	**0.12**	**L/s**
PEAK RESIDENTIAL FLOW	**0.44**	**L/s**

TOTAL SANITARY DEMAND

TOTAL ESTIMATED AVERAGE DRY WEATHER FLOW	**0.12**	**L/s**
TOTAL ESTIMATED PEAK DRY WEATHER FLOW	**0.44**	**L/s**
TOTAL ESTIMATED PEAK WET WEATHER FLOW	**0.46**	**L/s**

McINTOSH PERRY

CO-22-0938 - 253 York St Addition - Sanitary Demands

Project:	253 York St Addition
Project No.:	CO-22-0938
Designed By:	A.J.G.
Checked By:	R.D.F.
Date:	11/12/2021

Site Area	0.089	Gross ha		
Bachelor	17		1.40	Persons per unit
1 Bedroom	3		1.40	Persons per unit
Total Population	29	Persons		

DESIGN PARAMETERS

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***	***29***	***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/(1000m² /d)		0
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	**0.35**	**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	**0.38**	**L/s**

SANITARY SEWER DESIGN SHEET

PROJECT: 253 York, 80 Nelson, 78 Nelson
LOCATION:
CLIENT: Smart Living Properties

McINTOSH PERRY

LOCATION				RESIDENTIAL									ICI AREAS							INFILTRATION ALLOWANCE			FLOW	SEWER DATA						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
STREET	AREA ID	FROM MH	TO MH	UNIT TYPES				AREA (ha)	POPULATION		PEAK FACTOR	PEAK FLOW (L/s)	AREA (ha)						PEAK FLOW (L/s)	AREA (ha)		FLOW (L/s)	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	DIA (mm)	SLOPE (%)	VELOCITY (full) (m/s)	AVAILABLE CAPACITY	
				SF	SD	TH	APT		IND	CUM			INSTITUTIONAL		COMMERCIAL		INDUSTRIAL			IND	CUM								L/s	(%)
													IND	CUM	IND	CUM	IND	CUM											
Nelson Avenue	A-1	MH1	MH2	2	8	5	148	1.39	382.3	382.3	3.43	4.24		0.00	0.16	0.16		0.00	0.08	1.55	1.55	0.51	4.84	500.29	78.00	600	0.61	1.714	495.46	99.03
York Street	A-2	MH2	MH3					0.00	0.0	382.3	3.43	4.24	0.37	0.37		0.16		0.00	0.26	0.37	1.93	0.64	5.14	597.47	60.00	600	0.87	2.047	592.33	99.14
Nelson Avenue	B-1	MH4	MH5				12	0.02	27.6	27.6	3.69	0.33		0.00		0.00		0.00	0.00	0.02	0.02	0.01	0.34	113.24	50.00	300	1.26	1.552	112.90	99.70
Clarence Street	B-2	MH5	MH6	1	8	7	10	0.44	66.9	94.5	3.60	1.10		0.00		0.00		0.00	0.00	0.44	0.47	0.15	1.26	78.79	66.00	300	0.61	1.080	77.53	98.40
Clarence Street	B-3	MH6	MH7	1	4		19	0.41	57.9	152.4	3.55	1.75		0.00		0.00		0.00	0.00	0.41	0.88	0.29	2.04	30.26	70.00	300	0.09	0.415	28.22	93.24

Design Parameters:

Residential			ICI Areas			
						Peak Factor
SF	3.4	p/p/u				
TH/SD	2.7	p/p/u	INST	28,000	L/Ha/day	1.5
APT	2.3	p/p/u	COM	28,000	L/Ha/day	1.5
Other	60	p/p/Ha	IND	35,000	L/Ha/day	MOE Chart

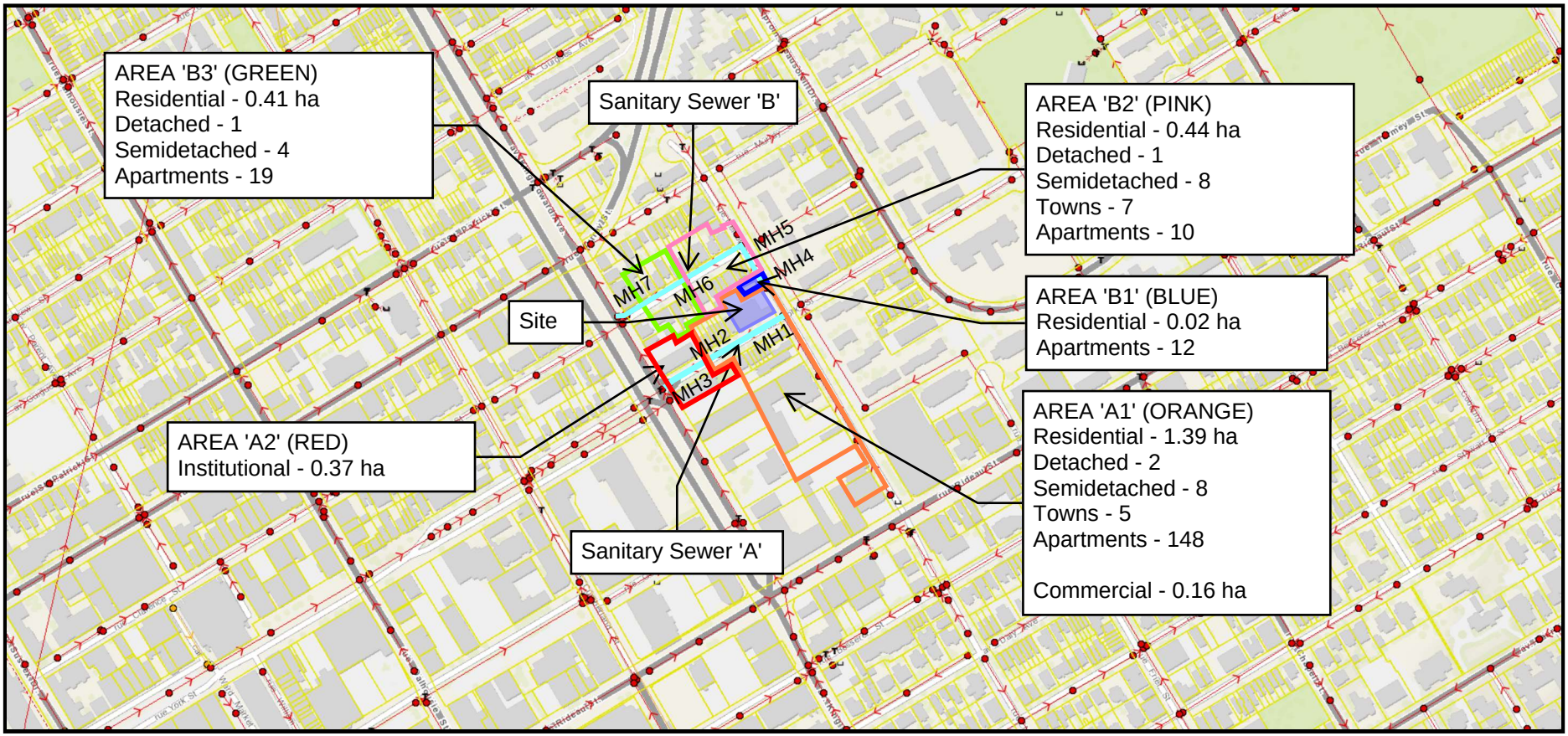
Notes:
1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 280 L/day
3. Infiltration allowance: 0.33 L/s/Ha
4. Residential Peaking Factor:
Harmon Formula = 1+(14/(4+P^0.5)*0.8)
where P = population in thousands

Designed: AJG
Checked: RDF
Project No.: C0-22-0938

No.	Revision	Date
1.	City of Ottawa Submission 1	2021-08-23

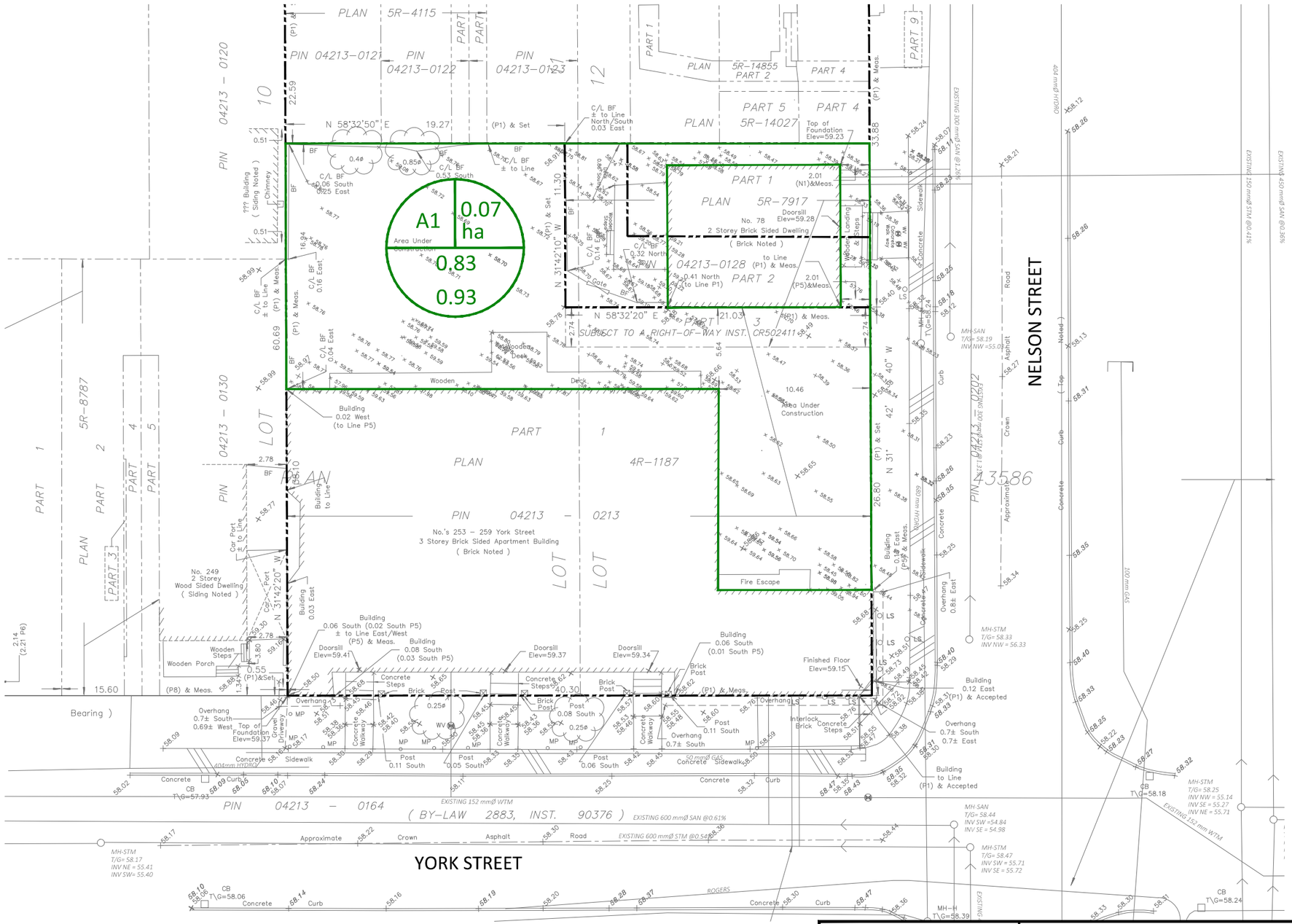
Sheet No: 1 of 1

Sanitary Drainage Figure - Existing Conditions



APPENDIX E
PRE-DEVELOPMENT DRAINAGE PLAN

McINTOSH PERRY



SCALE 1 : 300

0 5 10 15 20 25 30 Metres

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

Client: SMART LIVING PROPERTIES
226 ARGYLE AVE OTTAWA, ON K2P 1B9

Project: BUILDING ADDITIONS
253-257 YORK ST & 78-80 NELSON ST

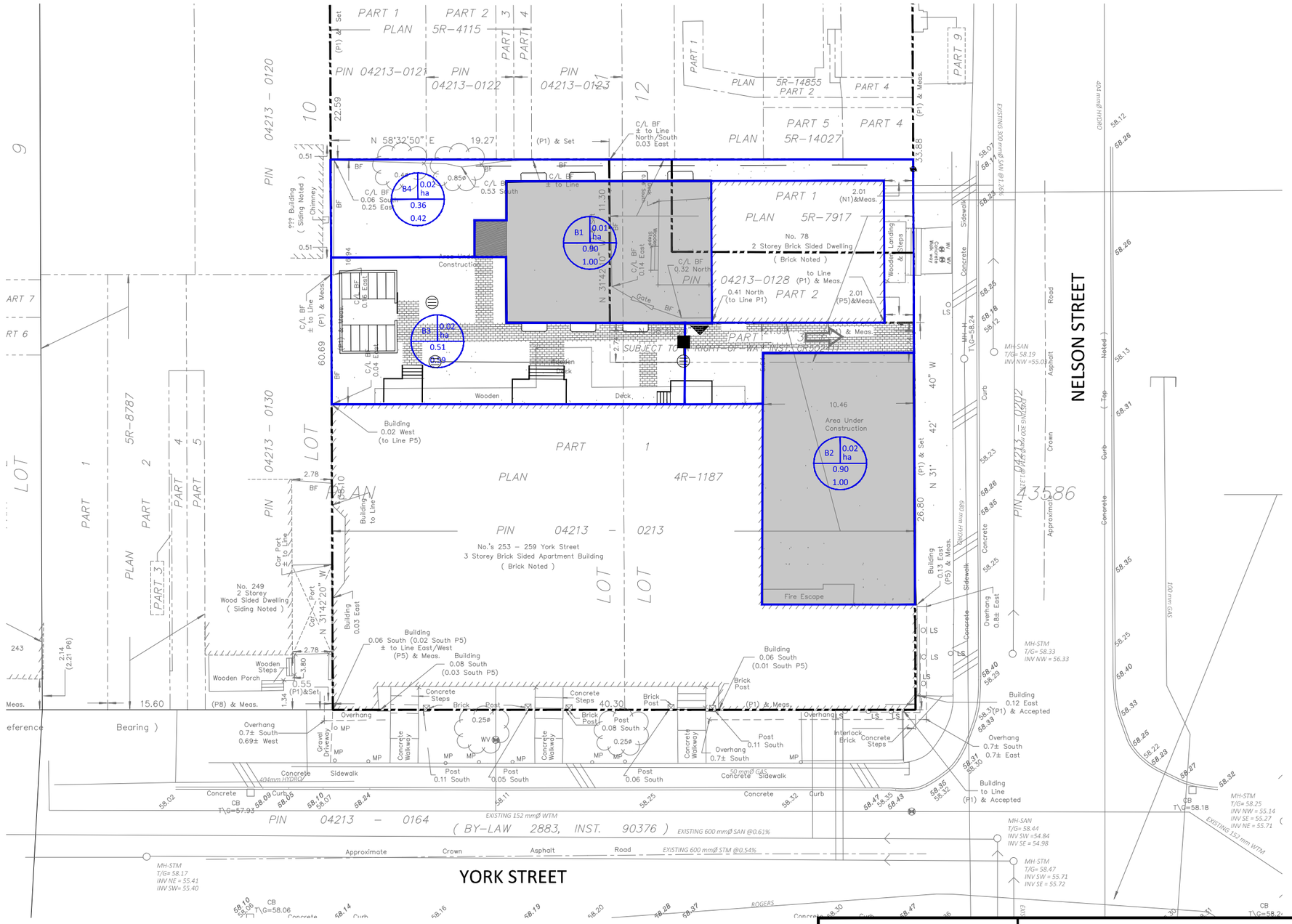
Drawing Title: PRE-DEVELOPMENT DRAWING AREA PLAN

Drawn by:	Checked By:				Drawing Number:
R.R.R.	A.J.G.				PRE
Scale: 1:300	Project Number: CCO-22-0938	1	ISSUED FOR REVIEW	AUG 24, 2021	
		No.	Revisions	Date	

FILENAME:U:\Ottawa\01 Project - Proposals\2022 Jobs\CCO\CCO-22-0938 Smart Living Properties_BLDG Additions_253 York Street\12 - Drawings\CCO-22-0938_Presentation.dwg
LAST SAVED: Tuesday, August 24, 2021 LAST SAVED BY: rabchieai
LAST PLOTTED: Tuesday, August 24, 2021 7:09 PM EST

APPENDIX F
POST-DEVELOPMENT DRAINAGE PLAN

McINTOSH PERRY



Legend:

DRAINAGE AREA — B3 — AREA 0.07 ha

5-YEAR RUNOFF COEFFICIENT 0.79

100-YEAR RUNOFF COEFFICIENT 0.88

SCALE 1 : 300

0 5 10 15 20 25 30 Metres

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Client: SMART LIVING PROPERTIES
226 ARGYLE AVE OTTAWA, ON K2P 1B9

Project: BUILDING ADDITIONS
253-257 YORK ST & 78-80 NELSON ST

Drawing Title: POST-DEVELOPMENT DRAINAGE AREA PLAN

Drawn by:	Checked By:			
R.R.R.	A.J.G.			Drawing Number: POST
Scale: 1:300	Project Number: CCO-22-0938	1	ISSUED FOR REVIEW	
		No.	Revisions	Date

FILENAME:U:\Ottawa\01 Project - Proposals\2022 Jobs\CCO\CCO-22-0938 Smart Living Properties_BLDG Additions_253 York Street\12 - Drawings\CCO-22-0938_Presentation.dwg
LAST SAVED: Tuesday, August 24, 2021 LAST SAVED BY: r.robitheau
LAST PLOTTED: Tuesday, August 24, 2021 7:07:41 PM EDT

APPENDIX G
STORMWATER MANAGEMENT CALCULATIONS

McINTOSH PERRY

Pre Development
Rational Method Coefficient Figure

Site Area = 1,536 m2
Development Area = 710.9 m2
Landscaped Area = 69 m2
Impervious Area = 642.3 m2
RM Coefficient = 0.83

2021-08-19

58 m2

5 m2

6 m2

Longest Path =42.2 m

Post Development
Rational Method Coefficient Figure

Site Area = 1,536 m2
Development Area = 710.9 m2
Proposed Landscaped Area = 250.2 m2
Proposed Impervious Area = 460.7 m2
RM Coefficient = 0.65

2021-08-19

163.5 m2

Excluded Area

3.8 m2

6 m2

PROPOSED 3 STOREY ADDITION

29.9 m2

22.2 m2

24.8 m2

PROPOSED 4 STOREY ADDITION

Excluded Area

PIN 04213-0123

PART 1 PLAN 5R-14855 PART 2

PART 4

PART 5 PLAN 5R-14027

PART 1 PLAN 5R-7917

PART 2 PLAN 4R-1187

PIN 04213-0128 (P1)

PIN 04213-0213

No. 78 2 Storey Brick Sided Dwelling (Brick Noted)

No.'s 253 - 259 York Street 3 Storey Brick Sided Apartment Building (Brick Noted)

No. 249 2 Storey ... Siding Noted)

Doorsill Elev=59.28

Top of Foundation Elev=59.23

Finished Floor Elev=59.15

Fire Escape

Area Under Construction

Wooden Steps & Landing

Concrete Walk way

Gravel Driveway

Asphalt

Concrete Curb

Sidewalk

Overhang 0.7± South 0.69± West

Overhang 0.8± East

Overhang 0.7± South 0.7± East

Building 0.12 East (P1) & Accepted

Building to Line

Interlock Brick

Concrete Steps

Brick Post

Post 0.11 South

Post 0.05 South

Post 0.06 South

Post 0.08 South

Post 0.11 South

Wooden Steps

Wooden Deck

Concrete Steps

Concrete Walkway

Building 0.02 West (to Line P5)

Building 0.06 South (0.02 South P5) ± to Line East/West (P5) & Meas.

Building 0.08 South (0.03 South P5)

Building 0.06 South (0.01 South P5)

Building 0.16 East (P5) & Meas.

Car Port ± to Line

Car Port N 31°42'20" W

Building 0.03 East

Building to Line

MH-SAN T/G= 58.19 INV NW =55.03

MH-STM T/G= 58.33 INV NW = 56.33

404mm HYDRO

50 mm GAS

100 mm GAS

EXISTING 300 mm STM @1.31%

680 mm HYDRO

SIB(857)(WIT)

SIB(857)(M)

LS

MP

WV

0.25ø

0.4ø

0.85ø

STREET

NELSON

CCO-22-0938 - 253 York Street - Runoff Calculations

Pre-Development Runoff Coefficient

Drainage Area	Area (ha)	Impervious Area (m^2)	C	Gravel Area (m^2)	C	Pervious Area (m^2)	C	C_{AVG} 5-Year	C_{AVG} 100-Year
A1	0.071	642.73	0.90	0.00	0.60	69.00	0.20	0.83	0.93

Pre-Development Runoff Calculations

Drainage Area	Area (ha)	C 5-Year	C 100-Year	Tc (min)	I (mm/hr)		Q (L/s)	
					5-Year	100-Year	5-Year	100-Year
A1	0.071	0.83	0.93	10	104.2	178.6	17.16	32.76
Total	0.071						17.16	32.76

Post-Development Runoff Coefficient

Drainage Area	Area (ha)	Impervious Area (m^2)	C	Gravel Area (m^2)	C	Pervious Area (m^2)	C	C_{AVG} 5-Year	C_{AVG} 100-Year	
B1	0.014	144.80	0.90	0.00	0.60	0.00	0.20	0.90	1.00	Restricted 3 Storey Roof
B2	0.018	183.24	0.90	0.00	0.60	0.00	0.20	0.90	1.00	Restricted 4 Storey Roof
B3	0.019	86.58	0.90	0.00	0.60	106.37	0.20	0.51	0.59	Restricted Area
B4	0.019	44.06	0.90	0.00	0.60	146.69	0.20	0.36	0.42	Unrestricted Area

Post-Development Runoff Calculations

Drainage Area	Area (ha)	C 5-Year	C 100-Year	Tc (min)	I (mm/hr)		Q (L/s)		
					5-Year	100-Year	5-Year	100-Year	
B1	0.014	0.90	1.00	10	104.2	178.6	3.77	7.19	Restricted 3 Storey Roof
B2	0.018	0.90	1.00	10	104.2	178.6	4.78	9.10	Restricted 4 Storey Roof
B3	0.019	0.51	0.59	10	104.2	178.6	2.87	5.62	Restricted Area
B4	0.019	0.36	0.42	10	104.2	178.6	2.00	4.01	Unrestricted Area
Total	0.071						13.42	25.91	

Required Restricted Flow

Drainage Area	Area (ha)	C 5-Year	Tc (min)	I (mm/hr)	Q (L/s)
				5-Year	5-Year
A1	0.071	0.50	10	104.2	10.31

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	3.77	7.19	0.64	1.14	2.36	4.60	2.72	4.89	Restricted
B2	4.78	9.10	0.96	1.89	3.33	6.45	3.44	6.87	Restricted
B3	2.87	5.62	2.69	3.16	0.11	1.47	1.65	1.65	Restricted
B4	2.00	4.01	2.00	4.01					
Total	11.42	21.90	6.29	10.20	5.80	12.53	7.80	13.41	

Storage Requirements for Area B1

5-Year Storm Event

Tc (min)	I (mm/hr)	B1 Runoff (L/s)	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
10	104.2	3.77	0.64	3.13	1.88
20	70.3	2.55	0.64	1.91	2.29
30	53.9	1.95	0.64	1.31	2.36
40	44.2	1.60	0.64	0.96	2.31
50	37.7	1.36	0.64	0.72	2.17
60	32.9	1.19	0.64	0.55	1.99
70	29.4	1.06	0.64	0.42	1.78
80	26.6	0.96	0.64	0.32	1.55
90	24.3	0.88	0.64	0.24	1.30
100	22.4	0.81	0.64	0.17	1.03

Maximum Storage Required 5-Year (m^3) =	2.36

100-Year Storm Event

Tc (min)	I (mm/hr)	B1 Runoff (L/s)	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
10	178.6	7.19	1.14	6.05	3.63
20	120.0	4.83	1.14	3.69	4.43
30	91.9	3.70	1.14	2.56	4.60
40	75.1	3.02	1.14	1.88	4.52
50	64.0	2.57	1.14	1.43	4.30
60	55.9	2.25	1.14	1.11	4.00
70	49.8	2.00	1.14	0.86	3.63
80	45.0	1.81	1.14	0.67	3.22

Maximum Storage Required 100-Year (m^3) =	4.60

Storage Occupied In Area B1

5-Year Storm Event

Roof Storage			
Location	Area*	Depth	Volume (m^3)
Roof	108.60	0.025	2.72
		Total	2.72

Storage Available (m^3) =	2.72
Storage Required (m^3) =	2.36

100-Year Storm Event

Roof Storage			
Location	Area*	Depth	Volume (m^3)
Roof	108.60	0.045	4.89
		Total	4.89

Storage Available (m^3) =	4.89
Storage Required (m^3) =	4.60

*Storage area is 75% of the total roof area

Roof Drain Flow (B1)

Roof Drains Summary		
Type of Control Device	Watts Drianage - Accutrol Weir	
Number of Roof Drians	2	
	5-Year	100-Year
Rooftop Storage (m^3)	2.72	4.89
Storage Depth (m)	0.025	0.045
Flow (Per Roof Drain) (L/s)	0.32	0.57
Total Flow (L/s)	0.64	1.14

Flow Rate Vs. Build-Up (One Weir)	
Depth (mm)	Flow (L/s)
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

*Roof Drain model to be Accutrol Weirs, See attached sheets

*Roof Drain Flow information taken from Watts Drainage website

CALCULATING ROOF FLOW EXAMPLES

2 roof drains during a 5 year storm
elevation of water = 30mm
Flow leaving 2 roof drains = (2 x 0.36 L/s) = 0.72 L/s

2 roof drains during a 100 year storm
elevation of water = 45mm
Flow leaving 2 roof drains = (2 x 0.54 L/s) = 1.08 L/s

	Roof Drain Flow		
	Flow (l/s)	Storage Depth (mm)	Drains Flow (l/s)
	0.19	15	0.38
	0.25	20	0.50
5-Year	0.32	25	0.64
	0.38	30	0.76
	0.44	35	0.88
	0.50	40	1.00
100-Year	0.57	45	1.14
	0.63	50	1.26
	0.69	55	1.38
	0.76	60	1.52
	0.82	65	1.64
	0.88	70	1.76
	0.95	75	1.90
	1.01	80	2.02
	1.07	85	2.14
	1.13	90	2.26
	1.20	95	2.40
	1.26	100	2.52
	1.32	105	2.64
	1.39	110	2.78
	1.45	115	2.90
	1.51	120	3.02
	1.58	125	3.16
	1.64	130	3.28
	1.70	135	3.40
	1.76	140	3.52
	1.83	145	3.66
	1.89	150	3.78

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

Storage Requirements for Area B2

5-Year Storm Event

Tc (min)	I (mm/hr)	B1 Runoff (L/s)	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
10	104.2	4.78	0.64	4.14	2.48
20	70.3	3.22	0.64	2.58	3.10
30	53.9	2.47	0.64	1.83	3.30
40	44.2	2.03	0.64	1.39	3.33
50	37.7	1.73	0.64	1.09	3.26
60	32.9	1.51	0.64	0.87	3.13
70	29.4	1.35	0.64	0.71	2.97
80	26.6	1.22	0.64	0.58	2.77
90	24.3	1.11	0.64	0.47	2.56
100	22.4	1.03	0.64	0.39	2.32

Maximum Storage Required 5-Year (m^3) =	3.33

100-Year Storm Event

Tc (min)	I (mm/hr)	B1 Runoff (L/s)	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
10	178.6	9.10	1.14	7.96	4.77
20	120.0	6.11	1.14	4.97	5.96
30	91.9	4.68	1.14	3.54	6.37
40	75.1	3.83	1.14	2.69	6.45
50	64.0	3.26	1.14	2.12	6.35
60	55.9	2.85	1.14	1.71	6.15
70	49.8	2.54	1.14	1.40	5.86
80	45.0	2.29	1.14	1.15	5.53

Maximum Storage Required 100-Year (m^3) =	6.45

Storage Occupied In Area B2

5-Year Storm Event

Roof Storage			
Location	Area*	Depth	Volume (m^3)
Roof	137.43	0.025	3.44
		Total	3.44

Storage Available (m^3) =	3.44
Storage Required (m^3) =	3.33

100-Year Storm Event

Roof Storage			
Location	Area*	Depth	Volume (m^3)
Roof	137.43	0.050	6.87
		Total	6.87

Storage Available (m^3) =	6.87
Storage Required (m^3) =	6.45

*Storage area is 75% of the total roof area

Roof Drain Flow (B1)

Roof Drains Summary		
Type of Control Device	Watts Drianage - Accutrol Weir	
Number of Roof Drians	3	
	5-Year	100-Year
Rooftop Storage (m^3)	2.72	4.89
Storage Depth (m)	0.025	0.050
Flow (Per Roof Drain) (L/s)	0.32	0.63
Total Flow (L/s)	0.96	1.89

Flow Rate Vs. Build-Up (One Weir)	
Depth (mm)	Flow (L/s)
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

*Roof Drain model to be Accutrol Weirs, See attached sheets

*Roof Drain Flow information taken from Watts Drainage website

CALCULATING ROOF FLOW EXAMPLES

3 roof drains during a 5 year storm
elevation of water = 25mm
Flow leaving 3 roof drains = (3 x 0.32 L/s) = 0.96L/s

3 roof drains during a 100 year storm
elevation of water = 50mm
Flow leaving 3 roof drains = (3 x 0.54 L/s) = 1.89L/s

	Roof Drain Flow		
	Flow (l/s)	Storage Depth (mm)	Drains Flow (l/s)
	0.19	15	0.57
	0.25	20	0.75
5-Year	0.32	25	0.96
	0.38	30	1.14
	0.44	35	1.32
	0.50	40	1.50
	0.57	45	1.71
100-Year	0.63	50	1.89
	0.69	55	2.07
	0.76	60	2.28
	0.82	65	2.46
	0.88	70	2.64
	0.95	75	2.85
	1.01	80	3.03
	1.07	85	3.21
	1.13	90	3.39
	1.20	95	3.60
	1.26	100	3.78
	1.32	105	3.96
	1.39	110	4.17
	1.45	115	4.35
	1.51	120	4.53
	1.58	125	4.74
	1.64	130	4.92
	1.70	135	5.10
	1.76	140	5.28
	1.83	145	5.49
	1.89	150	5.67

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

Storage Requirements for Area B3

5-Year Storm Event

Tc (min)	I (mm/hr)	B1 Runoff (L/s)	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
10	104.2	2.87	2.69	0.18	0.11
12	94.7	2.61	2.69	-0.08	-0.06
14	86.9	2.40	2.69	-0.29	-0.25
16	80.5	2.22	2.69	-0.47	-0.45
18	75.0	2.07	2.69	-0.62	-0.67
20	70.3	1.94	2.69	-0.75	-0.90
22	66.1	1.82	2.69	-0.87	-1.14

Maximum Storage Required 5-Year (m^3) =	0.11

100-Year Storm Event

Tc (min)	I (mm/hr)	B1 Runoff (L/s)	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
10	178.6	5.62	3.16	2.46	1.47
12	162.1	5.10	3.16	1.94	1.40
14	148.7	4.68	3.16	1.52	1.28
16	137.5	4.33	3.16	1.17	1.12
18	128.1	4.03	3.16	0.87	0.94
20	120.0	3.77	3.16	0.61	0.74
22	112.9	3.55	3.16	0.39	0.52

Maximum Storage Required 100-Year (m^3) =	1.47

Storage Available CB4

Length (m)	Width (m)	Depth (m)	Storage Available (m^3)
0.60	0.60	1.50	0.54

Storage Available in Subdrain

Pipe Length (m)	Diameter (mm)	Storage Available (m^3)
22.64	250.00	1.11

5 Year Storage Summary

Storage Available (m^3) =	1.7
Storage Required (m^3) =	0.1

100 Year Storage Summary

Storage Available (m^3) =	1.7
Storage Required (m^3) =	1.5

For Orifice Flow, C= 0.6
For Weir Flow, C= 3.33

	Orifice 1	Orifice 2	Weir 1	Weir 2
invert elevation	56.36			
center of crest elevation	56.40			
orifice width / weir length	75 mm			
orifice height				
orifice area (m^2)	0.004	0.000		

Elevation Discharge Table - Storm Routing

Elevation (m)	Orifice 1		Orifice 2		Weir 1		Weir 2		Total
	H [m]	Q [m^3]	H [m]	Q [m^3]	H [m]	Q [m^3]	H [m]	Q [m^3]	Q [l/s]
56.36	x	x							0.00
56.41	0.01	0.001							1.31
56.42	0.02	0.002							1.76
56.43	0.03	0.002							2.12
56.44	0.04	0.002							2.42
56.45	0.05	0.003							2.69
56.46	0.06	0.003							2.94
56.47	0.07	0.003							3.16
56.48	0.08	0.003							3.37
56.49	0.09	0.004							3.57
56.50	0.10	0.004							3.76
56.51	0.11	0.004							3.94
56.52	0.12	0.004							4.11
56.53	0.13	0.004							4.27
56.54	0.14	0.004							4.43
56.55	0.15	0.005							4.59
56.56	0.16	0.005							4.73
56.57	0.17	0.005							4.88
56.58	0.18	0.005							5.02
56.59	0.19	0.005							5.15
56.60	0.20	0.005							5.28
56.61	0.21	0.005							5.41
56.62	0.22	0.006							5.54
56.63	0.23	0.006							5.66
56.64	0.24	0.006							5.78
56.65	0.25	0.006							5.90
56.66	0.26	0.006							6.02
56.67	0.27	0.006							6.13
56.68	0.28	0.006							6.24
56.69	0.29	0.006							6.35
56.70	0.30	0.006							6.46
56.71	0.31	0.007							6.56
56.72	0.32	0.007							6.67
56.73	0.33	0.007							6.77
56.74	0.34	0.007							6.87
56.75	0.35	0.007							6.97
56.76	0.36	0.007							7.07
56.77	0.37	0.007							7.17
56.78	0.38	0.007							7.26
56.79	0.39	0.007							7.36
56.80	0.40	0.007							7.45
56.81	0.41	0.008							7.54
56.82	0.42	0.008							7.63
56.83	0.43	0.008							7.72
56.84	0.44	0.008							7.81
56.85	0.45	0.008							7.90
56.86	0.46	0.008							7.98
56.87	0.47	0.008							8.07
56.88	0.48	0.008							8.16
56.89	0.49	0.008							8.24
56.90	0.50	0.008							8.32
56.91	0.51	0.008							8.41
56.92	0.52	0.008							8.49
56.93	0.53	0.009							8.57
56.94	0.54	0.009							8.65
56.95	0.55	0.009							8.73
56.96	0.56	0.009							8.81
56.97	0.57	0.009							8.88
56.98	0.58	0.009							8.96
56.99	0.59	0.009							9.04

Notes: 1. For Orifice Flow, User is to Input an Elevation Higher than Crown of Orifice.
2. Orifice Equation: $Q = cA(2gh)^{1/2}$
3. Weir flow calculated in Bentley's FlowMaster - Trapezoidal Channel at 0.1%, 3:1 side slopes, roughness coeff. Of 0.035
4. These Computations Do Not Account for Submergence Effects Within the Pond Riser.
5. H for orifice equations is depth of water above the centroide of the orifice.
6. H for weir equations is depth of water above the weir crest.

Time of Concentration Pre-Development

Drainage Area ID	Sheet Flow Distance (m)	Slope of Land (%)	Tc (min) (5-Year)	Tc (min) (100-Year)
A1	39	0.76	6	4

*Therefore, a Tc of 10 can be used

Tc= (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

McINTOSH PERRY

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)
☐ Executive Summary (for larger reports only).	N/A
☐ Date and revision number of the report.	On Cover
☐ Location map and plan showing municipal address, boundary, and layout of proposed development.	Appendix A
☐ Plan showing the site and location of all existing services.	Site Servicing Plan (C101)
☐ 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
☐ Summary of pre-consultation meetings with City and other approval agencies.	Appendix B
☐ 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 defendable design criteria.	1.1 Purpose 1.2 Site Description 6.0 Stormwater Management
☐ Statement of objectives and servicing criteria.	3.0 Pre-Consultation Summary

☐ Identification of existing and proposed infrastructure available in the immediate area.	N/A
☐ 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, Drainage, Sediment & Erosion Control Plan (C101)
☐ 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, Drainage, Sediment & Erosion Control Plan (C101)
☐ 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
☐ Proposed phasing of the development, if applicable.	N/A
☐ Reference to geotechnical studies and recommendations concerning servicing.	Section 2.0 Background Studies, Standards and References
☐ All preliminary and formal site plan submissions should have the following information: ○ 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, Drainage, Sediment & Erosion Control Plan (C101)

4.2 Development Servicing Report: Water

Criteria	Location (if applicable)
☐ Confirm consistency with Master Servicing Study, if available	N/A
☐ Availability of public infrastructure to service proposed development	N/A
☐ Identification of system constraints	N/A
☐ Identify boundary conditions	Unavailable at time of submission
☐ Confirmation of adequate domestic supply and pressure	N/A
☐ 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
☐ 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
☐ Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design	N/A
☐ Address reliability requirements such as appropriate location of shut-off valves	N/A
☐ Check on the necessity of a pressure zone boundary modification.	N/A
☐ 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

☐ 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)
☐ Description of off-site required feedermains, 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
☐ Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Appendix C
☐ 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)
☐ 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
☐ Confirm consistency with Master Servicing Study and/or justifications for deviations.	N/A
☐ 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
☐ Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Section 5.1

☐ 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 5.2 Proposed Sanitary Design
☐ Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	Appendix C
☐ Description of proposed sewer network including sewers, pumping stations, and forcemains.	Section 5.2 Proposed Sanitary Sewer
☐ 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
☐ Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	N/A
☐ Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	N/A
☐ 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
☐ Special considerations such as contamination, corrosive environment etc.	N/A

4.4 Development Servicing Report: Stormwater Checklist

Criteria	Location (if applicable)
☐ 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
☐ Analysis of available capacity in existing public infrastructure.	N/A
☐ A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	Pre & Post-Development Plans
☐ 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
☐ 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
☐ 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
☐ Set-back from private sewage disposal systems.	N/A
☐ Watercourse and hazard lands setbacks.	N/A
☐ Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	N/A
☐ Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	N/A
☐ 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

☐ 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, Drainage, Sediment & Erosion Control Plan
☐ 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
☐ Any proposed diversion of drainage catchment areas from one outlet to another.	Section 6.0 Stormwater Sewer Design & Section 7.0 Proposed Stormwater Management
☐ 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
☐ 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
☐ Identification of potential impacts to receiving watercourses	N/A
☐ Identification of municipal drains and related approval requirements.	N/A
☐ 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
☐ 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, Drainage, Sediment & Erosion Control Plan (C101)
☐ Inclusion of hydraulic analysis including hydraulic grade line elevations.	N/A

☐ 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
☐ 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
☐ Identification of fill constraints related to floodplain and geotechnical investigation.	N/A

4.5 Conclusion Checklist

Criteria	Location (if applicable)
☐ Clearly stated conclusions and recommendations	Section 9.0 Summary Section 10.0 Recommendations
☐ 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
☐ All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario	All are stamped