SERVICING & STORMWATER MANAGEMENT REPORT
MIXED USE DEVELOPMENT
1518-1526 STITTSVILLE MAIN STREET

Project No.: CP-19-0608

City File No.: D07-12-20-0167

Prepared for:

Inverness Homes (c/o Krumac Holdings Inc.)
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Ottawa, Ontario K2E 8A5

Prepared by:

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November 13, 2020

Revised: April 22, 2021

McINTOSH PERRY

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1.0 PROJECT DESCRIPTION

1.1 Purpose

McIntosh Perry (MP) has been retained by Krumac Holding Inc. to prepare this Servicing and Stormwater Management Report in support of the Site Plan Control process for the proposed Mixed Use Development, located at 1518 Stittsville Main Street within the City of Ottawa (City File No.).

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

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

- CP-19-0608, C101 – Site Removals, Grading and Drainage Plan, and
- CP-19-0608, C102 – Site Servicing, Erosion & Sediment Control Plan.

1.2 Site Description

The property is located at 1518-1526 Stittsville Main Street within ward 6 Stittsville/ Glen Gower. It is described as Plan 4R-11524, Part of Lot 23, Concession 10, Geographic Township of Stittsville, City of Ottawa. The land in question covers approximately 0.48 ha. The development area for the proposed works is approximately 0.48ha.

See Site Location Plan in Appendix 'A' for more details.

The existing site is currently developed as a residential property and is made up of gravel parking areas. The existing site has no sanitary, storm or water services, however there are sanitary, storm, and water mains within Stittsville Main Street.

The proposed development consists of a 785 m^2, four storey Apartment and attached 450m^2 restaurant/ office. Parking and drive aisles will be provided throughout the site along with landscaping. There will be one site accesses for the development; a new entrance along Stittsville Main Street.

2.0 BACKROUND STUDIES

Background studies that have been completed for the proposed site include City of Ottawa as-built drawings, a topographical survey, a geotechnical report and a Phase I Environmental Site Assessment (ESA).

As-built drawings of existing services within the vicinity of the proposed site were reviewed in order to determine accurate servicing and stormwater management schemes for the site.

The following is a list of report available but not included in this submission:

- Topographical Survey (Completed by Fairhall Moffatt & Woodland)
- Geotechnical Report (Completed by Paterson Group Inc.)
- Phase 1 Environmental Assessment (Completed by Paterson Group Inc.)

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3.0 PRE-CONSULTATION SUMMARY

A pre-consultation meeting was conducted on November 25, 2019 regarding the proposed site. Specific design parameters to be incorporated within this design include the following:

- Pre-development and post-development flows shall be calculated using a time of concentration (Tc) of 10 minutes, respectively.
- Control 5 through 100-year post-development flows to the 5-year pre-development flows with a combined C value to a maximum of 0.50.
- Quality control is required to be provided for this site (80% TSS Removal) as per MVCA requirements.

The notes from the City of Ottawa can be found in Appendix ‘B’.

4.0 WATERMAIN

4.1 Existing Watermain

There is an existing 400mm diameter PVC watermain within Stittsville Main Street. The watermain services the adjacent properties as well as the fire hydrants along Stittsville Main Street.

4.2 Proposed Watermain

A new 150mm diameter PVC watermain is proposed to service the site complete with a water valve located at the property line and will be connected to the existing 400 mm diameter watermain within Stittsville Main. The watermain is designed to have a minimum of 2.4m cover.

The Fire Underwriters Survey 1999 (FUS) method was utilized to determine the required fire flow for the site. The 'C' factor (type of construction) for the FUS calculation was determined to be 1.0 (ordinary type construction). The total floor area ('A' value) for the FUS calculation was determined to be 4,040 m^2. The results of the calculations yielded a required fire flow of 16,000 L/min. A fire flow of 6,300 L/min was calculated using the Ontario Building Code (OBC) requirements. The detailed calculations for the FUS and OBC can be found in Appendix 'C'.

The water demands for the proposed building have been calculated to adhere to the *Ottawa Design Guidelines – Water Distribution* manual and can be found in Appendix 'C'. The results have been summarized below:

Table 1: Water Demands

Site Area	0.48 ha
Residential, Commercial	350 L/c/Day & 28,000 L/ha/day
Average Day Demand (L/s)	0.40
Maximum Daily Demand (L/s)	0.84
Peak Hourly Demand (L/s)	1.76
OBC Fire Flow Requirement (L/s)	105.00
FUS Fire Flow Requirement (L/s)	267.00

Boundary conditions have been provided by the City of Ottawa for the current conditions and are available in Appendix 'C'. The subject site is located in pressure zone 3W. A water model was completed using Bentley's WaterCAD based on the boundary conditions. The results determined that the proposed 150mm watermain can adequately service the proposed development and provide sufficient fire flow since Hydrant H-2 produced available fire flows of 18,210 L/min. Refer to drawing for more details. The results are available in Appendix 'C' of this report.

The normal operating pressure range is anticipated to be 308 kPa to 396 kPa and will not be less than 275 kPa (40 psi) or exceed 689 kPa (100 psi). The proposed watermain will meet the minimum required 20 psi (140 kPa) at the ground level under maximum day demand and fire flow conditions.

Table 2: Water Pressure at Junctions per Scenario

Junction	Average Day (psi)	Peak Hourly (psi)	Max. Day + Fire Flow (psi)
J-1	57.45	51.76	45.09
J-2 (Res.)	57.16	51.48	44.81
J-3 (Com.)	57.23	51.54	44.88

To confirm the adequacy of fire flow to protect the proposed development, public fire hydrants within 150 m of the proposed building were analysed per City of Ottawa ISTB 2018-02 Appendix I Table 1. The results are demonstrated below, and a fire hydrant coverage figure has been provided in Appendix "C" which shows the Hydrants included in the analysis.

Table 3: Fire Protection Confirmation

Building	**Fire Flow Demand (L/min.)**	**Fire Hydrant(s) within 75m**	**Fire Hydrant(s) within 150m**	**Combined Fire Flow (L/min.)**
1518 Stittsville Main Street	16,000	2	2	19,000

5.0 SANITARY DESIGN

5.1 Existing Sanitary Sewer

There is an existing 250mm diameter concrete sanitary sewer within Stittsville Main Street.

5.2 Proposed Sanitary Sewer

A new 150 mm diameter gravity sanitary service will be connected to the existing 250 mm diameter sanitary sewer within Stittsville Main Street. The sanitary service will be complete with a maintenance manhole (MH2A) which will be installed just inside the property line as per the *City of Ottawa – Sewer Design Guidelines*, October 2012, Clause 4.4.4.7 and City of Ottawa Sewer-Use By-Law 2003-514 (14).

The subject site is a proposed apartment with attached restaurant/ office. The total area of the building is 1,235 m^2. The peak design flows for the proposed building were calculated using criteria from the *City of Ottawa – Sewer Design Guidelines, October 2012*. The proposed site development area (0.48ha) will generate a flow of 0.47 L/s.

The proposed 150 mm diameter gravity sanitary sewers will be installed throughout the subject property with a minimum full flow target velocity (cleansing velocity) of 0.6 m/s and a full flow velocity of not more than 3.0 m/s. Design parameters for the site include an infiltration rate of 0.28 l/s/ha.

The proposed service for the site will be connected to existing 250 mm diameter sanitary sewer within Stittsville Main Street and although the sanitary flow is slightly higher for the proposed development, it is anticipated that there will be no issues with capacity constraints within the proposed lateral or within the existing sanitary main within Stittsville Main Street.

See *Sanitary Sewer Design Sheet* and *Sanitary Capacity Analysis* in Appendix 'D' of this report for more details.

6.0 STORM SEWER DESIGN

6.1 Existing Storm Sewers

There is an existing 750 mm diameter concrete storm sewer within Stittsville Main Street.

6.2 Proposed Storm Sewers

A new sewer system will be extended from the existing 750 mm diameter storm sewer within Stittsville Main Street. The new pipe network will collect storm flows and restrict runoff prior to leaving the site. The storm services from the proposed building will be connected to the proposed on site storm system downstream of the restriction device.

Runoff from the proposed site will be collected and directed towards the existing 750 mm storm main within Stittsville Main Street. The flow will be restricted in CBMH2 and the required storage for the subject property will be provided over CBMH2 in the parking area. From CBMH2 the flow is conveyed to an OGS unit which will provide treatment to the running before it enters the existing 750mm diameter storm sewer within Stittsville Main Street. The storm sewers will 300 mm in diameter throughout the subject property.

The minor storm sewers will be sized for the 5-year flow without any restriction. A storm sewer design sheet was created using the rational method and City of Ottawa 5-year storm event. Storm flows will be controlled by an inlet control device (ICD) to limit flows to the specified allowable release rate.

The storm design sheet calculates the proper sizing of the storm pipes within the development. Drainage area information, along with respective pipe slopes and other necessary information was utilized to evaluate the performance of the storm sewer network. The time of concentration calculated for the storm sewer system is based on a 10 minute inlet time at the uppermost sewer run. Within the design sheet, pipe capacities and associated full flow velocities have been calculated. The design flow (peak flow) was checked against the theoretical capacity to ensure that each storm sewer pipe can convey the 5-year unrestricted flow.

See CP-19-0608 - *POST* and *Storm Sewer Design Sheet* in Appendix 'F' of this report for more details. The Stormwater Management design for the subject property will be outlined in Section 6.0.

7.0 PROPOSED STORMWATER MANAGEMENT

7.1 Design Criteria and Methodology

Stormwater management for the proposed site will be maintained through positive drainage away from the proposed building and into a new underground storm sewer system. The storm system will capture the parking lot runoff and direct the flow to CBMH2 where it will be restricted. Roof runoff will be captured and restricte creating ponding on the flat roof. The restricted flow will then release into a proposed storm sewer network that connects to the existing 750 mm storm sewer located within Stittsville Main Street. The emergency overland flow route for the proposed site will be directed east towards Stittsville Mains Street. The quantitative and qualitative properties of the storm runoff for both the pre & post development flows are further detailed below. Stormwater Best Management Practices (SWM BMP's) will be implemented at the "Lot level", "Conveyance" and "End of Pipe" locations. These concepts will be explained further in Section 7.6.

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

Quality Control

- The site has been designed to achieve an 80% total suspended solids removal (***enhanced*** level) using a proposed oil/grit separator.

Quantity Control

- Post-development flow 5/100-year is be restricted to match the 5-year pre-development flow with a maximum C value of 0.50.

7.2 Runoff Calculations

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

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

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

It is recognized that the Rational Method tends to overestimate runoff rates. As a result, the conservative calculation of runoff ensures that any SWM facility sized using this method is expected to function as intended.

The following coefficients were used to develop an average C for each area:

Roofs/Concrete/Asphalt	0.90
Gravel	0.60
Undeveloped and Grass	0.20

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

As per the pre-consultation meeting with the City of Ottawa the time of concentration (Tc) used for pre-development shall be calculated using a Tc of 10 minutes and post-development flows shall be calculated using a Tc of 10 minutes.

7.3 Pre-Development Drainage

The existing site drainage limits are demonstrated on the Pre-Development Drainage Area Plan. Area A0 represents the portion of the existing site that drains to the Trans Canada Trail while area A1 is the remainder of the site. A summary of the Pre-Development runoff calculations can be found below.

Table 4: Pre-Development Runoff Summary

Drainage Area	Area (ha)	Runoff Coefficient (2/5-Year)	Runoff Coefficient (100-Year)	2-year Peak Flow (L/s)	5-year Peak Flow (L/s)	100-year Peak Flow (L/s)
A0	0.13	0.60	0.74	16.40	22.25	46.96
A1	0.35	0.35	0.43	26.05	35.33	74.23
Total	**0.48**			**42.45**	**57.59**	**121.19**

See CP-19-0608 - *PRE* in Appendix 'E' and Appendix 'G' for calculations.

7.4 Post-Development Drainage

The proposed site drainage limits are demonstrated on the Post-Development Drainage Area Plan. See CP-19-0608 - *POST* in Appendix 'F' of this report for more details. A summary of the Post-Development Runoff Calculations can be found below.

Table 5: Post-Development Runoff Summary

Drainage Area	Area (ha)	Runoff Coefficient (2/5-Year)	Runoff Coefficient (100-Year)	2-year Peak Flow (L/s)	5-year Peak Flow (L/s)	100-year Peak Flow (L/s)
B0	0.089	0.64	0.73	12.30	16.68	32.21
B1	0.065	0.40	0.47	5.63	7.63	15.17
B2A	0.027	0.90	1.00	5.15	6.99	13.30
B2B	0.020	0.90	1.00	3.79	5.14	9.78
B3	0.275	0.79	0.88	46.24	62.73	120.06
Total	**0.48**			**73.10**	**99.17**	**190.53**

See Appendix 'G' for calculations.

Area B0 represents the post-development runoff going to the Trans Canada Trail and it is noted that the post-development flows do not exceed the pre-development flows to this location. Area B1 is the remainder of the site's unrestricted runoff. Runoff for areas B2 and B3 will be restricted before outletting to the existing storm system within Stittsville Main Street. The flow will be controlled within roof drains for area B2. Runoff for area B3 will be restricted and the required storage will be provided within the parking area. The flow will be controlled by an inlet control device located within CBMH2. The restriction device will account for the unrestricted flow (Area B1) leaving the site. This quantity and quality control will be further detailed in Sections 7.5 and 7.6.

7.5 Quantity Control

After discussing the stormwater management criteria for the site with City staff, the total post-development runoff for this site has been restricted to match the 5-year pre-development flow rate with a combined C value of 0.50. (See Appendix 'B' for pre-consultation notes). These values create the following allowable release rate and storage volumes for the development site.

Table 6: Allowable Release Rate Summary

Drainage Area	Area (ha)	5 - Year Runoff Coefficient	Required Restricted Flow *5-Year* (L/s)
A0 + A1	0.48	0.42	57.91

See Appendix 'G' for calculations.

Reducing site flows will be achieved using flow restrictions and will create the need for onsite storage. Runoff from areas B2 and B3 will be restricted as shown in the table below.

Table 7: Post-Development Restricted Runoff Summary

Drainage Area	Post Development Unrestricted Flow (L/s)			Post Development Restricted Flow (L/s)			
	2-Year	5-Year	100-Year	2- Year	5-Year	100-Year	
B0	12.30	16.68	32.21	12.30	16.68	32.21	Unrestricted to Trans Canada Trail
B1	5.63	7.63	15.17	5.63	7.63	15.17	Unrestricted
B2A	5.15	6.99	13.30	0.38	0.50	0.95	Restricted - Roof Drains
B2B	3.79	5.14	9.78	0.32	0.44	0.76	
B3	46.24	62.73	120.06	5.70	5.75	6.00	Restricted – CBMH2
Total	**73.10**	**99.17**	**190.53**	**24.32**	**31.00**	**55.09**	

See Appendix 'G' for calculations.

Area B2 will be restricted through two (2) roof drains (B2A and B2B) before discharging to the new storm sewer downstream of CBMH2. The total flow leaving the roof will be 0.70 L/s, 0.94 L/s and 1.71 L/s for the 2, 5 and 100-year storm events, respectively. Area B2A will have ponding depths of 30, 40 and 75 mm for the 2, 5 and 100-year storm events, respectively. Area B2B will have ponding depths of 25, 35 and 60 mm for the 2, 5 and 100-year storm events, respectively. All of the storage required for area B2 will be located on the proposed roof, and emergency roof scuppers will be installed to ensure ponding does not exceed the proposed ponding limits.

Runoff from Area B3 will be restricted at CBMH2 through an IPEX 66 mm Tempest LMF ICD or an approved equivalent (design head of 2.49 m). This orifice plug will restrict area B3 to 5.70 L/s, 5.75 L/s and 6.00 L/s for the 2, 5 and 100-year storm events, respectively. The restriction creates a water surface elevation (WSEL) of 121.75 m for the 5-year storm event and 121.84 m for the 100-year storm event. The storage for the 2-year storm event will be provided in the pipes and structures upstream of the ICD. See below table for details of the required and provided storage volumes.

Table 8: Storage Summary

Drainage Area	Depth of Ponding (m)	Storage Required (m^3)	Storage Available (m^3)	Depth of Ponding (m)	Storage Required (m^3)	Storage Available (m^3)	Depth of Ponding (m)	Storage Required (m^3)	Storage Available (m^3)
	2-Year			5- Year			100- Year		
B2A	0.030	4.58	4.64	0.040	6.17	6.18	0.075	11.59	11.59
B2B	0.025	3.21	3.45	0.035	4.26	4.83	0.060	8.28	8.28
B3	0.000	33.81	34.39	0.25	50.81	52.67	0.34	116.94	122.01
Total		**41.59**	**42.48**		**61.24**	**63.68**		**136.81**	**141.88**

See Appendix 'G' for calculations.

In the event that there is a rainfall above the 100 year storm event, or a blockage within the storm sewer system, an emergency overland flow route has been provided so that the storm water runoff will be conveyed towards the east entrance at Stittsville Main Street.

7.6 Quality Control

The development of this lot will employ Best Management Practices (BMP's) wherever possible. The intent of implementing stormwater BMP's is to ensure that water quality and quantity concerns are addressed at all stages of development. Lot level BMP's typically include temporary retention of the parking lot runoff, minimizing ground slopes and maximizing landscaped areas. Some of these BMP's cannot be provided for this site due to site constraints and development requirements.

As per the discussions with the MVCA, the existing storm sewers within Stittsville Main Street ties into the Poole Creek cool water system. A quality treatment unit has been sized to provide a TSS removal rate of 80% as per MVCA requirements. The OGS Unit will provide a water quality of at least 80% TSS. The OGS Unit shall

be placed downstream of the restriction unit in order to provide the required water quality treatment for the site runoff before discharging to the storm sewer within Stittsville Main Street. Detailed sizing information for the OGS Unit has been provided in Appendix 'G' of this report.

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 catchbasins and filter fabric is to be placed under the grates of all existing catchbasins and manholes along the frontage of the site and any new structures immediately upon installation. Mud mats are to be provided at the site access. 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

- A new 1,235m^2 apartment with attached restaurant and office will be constructed at 1518-1526 Stittsville Main Street.
- A new 150 mm watermain will be installed to service the site, connecting to the 400 mm watermain within Stittsville Main Street.
- A new 150mm sanitary sewer will be installed to service the proposed development and will connect to the existing 250 mm sanitary sewer within Stittsville Main Street.
- The proposed 300 mm storm sewers will be installed throughout the site and drain to the existing 750 mm storm sewer within Stittsville Main Street.
- Storage for the 2- through 100-year storm events will be provided within the parking lot areas above the proposed storm structures and on the proposed flat roof. However, in the parking area the 2-year storm event will be contained within the proposed structures and pipes.
- An OGS unit has been proposed to provide 80% TSS removal as per MVCA requirements.

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 mixed use development.

This report is respectfully being submitted for approval.

Regards,

McIntosh Perry Consulting Engineers Ltd.

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11.0 STATEMENT OF LIMITATIONS

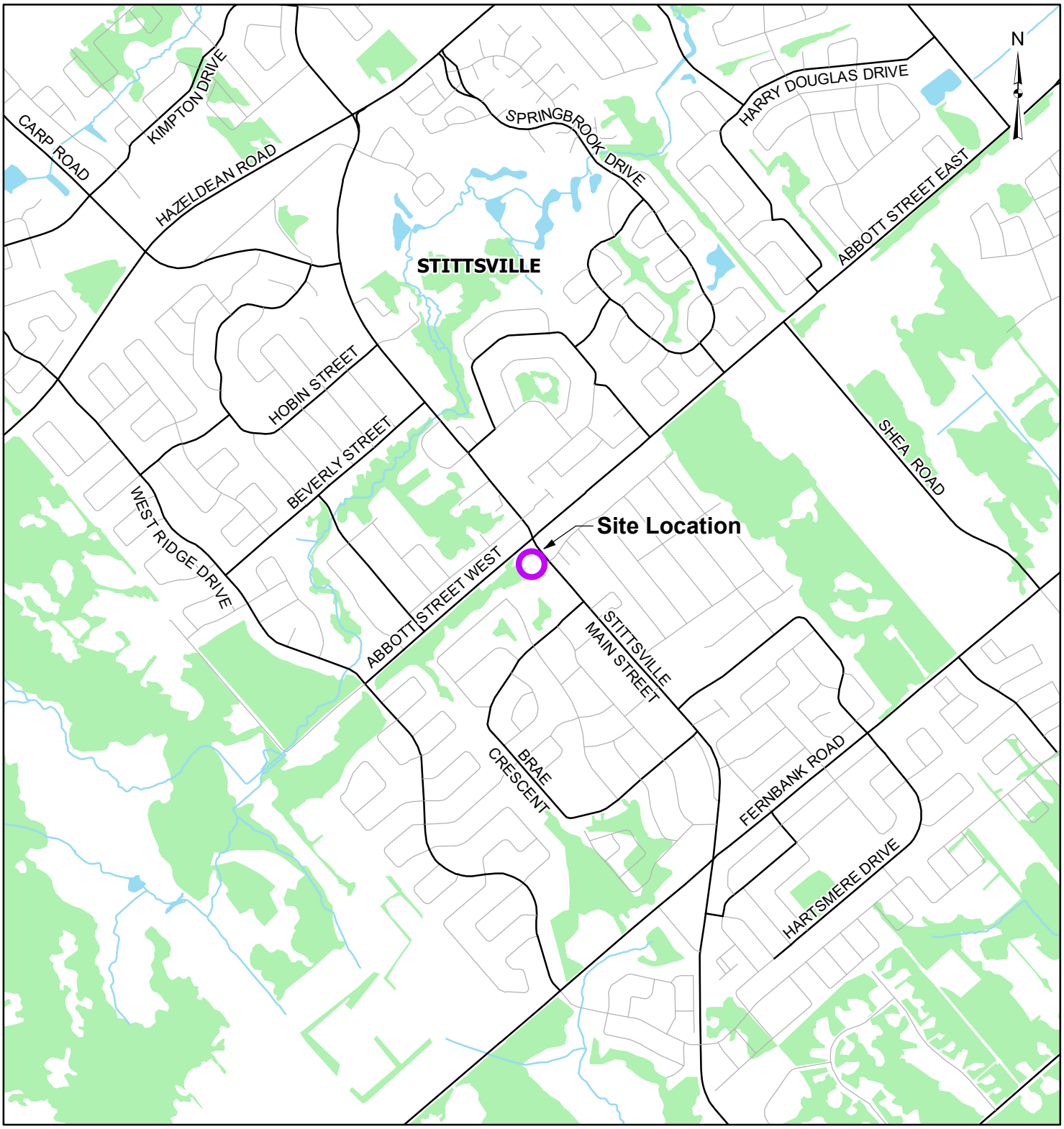
This report was produced for the exclusive use of Inverness Homes (c/o Krumac Holdings Inc.). The purpose of the report is to assess the existing stormwater management system and provide recommendations and designs for the post-construction scenario that are in compliance with the guidelines and standards from the Ministry of the Environment, Conservation and Parks, 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



600 300 0 600

Scale 1:20,000 Metres

LEGEND

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

REFERENCE

GIS data provided by the Ontario Ministry of Natural Resources and Forestry, 2020.

CLIENT: KRUMAC HOLDINGS INC.

PROJECT: MIXED USE BUILDING
1518 STITTSVILLE MAIN STREET

TITLE: KEY PLAN

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PROJECT NO:	CP-19-0608
Date	Oct., 22, 2020
GIS	EU
Checked By	NV

FIGURE: 1

APPENDIX B
BACKGROUND DOCUMENTS

McINTOSH PERRY

1518 - 1526 Stittsville Main Street
Pre-Consultation Meeting Minutes

Location: Room 4102E, City Hall
Date: November 25, 3:00pm to 4:00pm

Attendee	Role	Organization
Mark Young	Planner	City of Ottawa
Ahmed Elsayed	Project Manager (Infrastructure)	
Neeti Paudel	Project Manager (Transportation)	
David Maloney	Planner (Heritage)	
Justyna Garbos	Planner (Parks)	
Melanie Knight	Planner (Urban Design)	
Representative	Owner	Krumac Holdings
Kyle MacHutchon	Potential Owner	Inverness Homes
Ben Clare	Applicant	McIntosh Perry
Sarah Butt	Applicant	McIntosh Perry

Comments from Applicant

1. The proposed development involves a four-storey building and one (1) two-storey building. Thirty-two (32) parking spaces, along with three (3) accessible parking spaces are proposed.
2. A combined access is proposed at the southern end of the site.
3. It is undecided if the four-storey building will contain retail at grade.
4. The proposal is Zoning By-law conformant as designed.
5. Patio to take advantage of adjacency to trailhead.

Urban Design Comments

1. Melanie Knight provided a brief overview of the Trailhead feature and the success of incorporating items related to Rail history in developments within this location. If the applicant wishes to source authentic railway materials as part of their development, staff at the Railway Museum of Eastern Ontario were very helpful with the trailhead project. Graeme Roy can be contacted at info@rmeo.org
2. No concerns related to the overall site layout/concept as it reflects the intent of the Secondary Plan, CDP and Zoning By-law.
3. The proposal will be subject to a formal review with the Urban Design Review Panel. An informal pre-consultation meeting with the panel is optional prior to the submission of a complete application. The next meetings are scheduled for:
    - January 10th (Dec 27th submission deadline)

- More details available on the UDRP webpage. For questions, email UDRP coordinator David Maloney: David.Maloney@ottawa.ca

Planning Comments:

1. The concept is a positive addition to the community and meets the requirements of the Secondary Plan, CDP and Zoning.
2. Additional non-residential uses are not required in the proposed four-storey building.
3. The location of the proposed access should be considered as it relates to the location of the Orville Street intersection. (Issues have been raised related to turning issues at this intersection).
4. Please design for/ensure that the road widening is protected.
5. A 0-metre front yard setback is possible to the newly established front property line post widening. Patio space could be considered within the widened right-of-way.
6. The proposed relationship to the trans-Canada trail and trailhead is positive but this space could be designed as the access lane/public/private realm between the corridor and the proposal if necessary. The treatment could allow for pedestrian use and create a positive addition to the public realm.
7. Planning staff noted that the trans-Canada trail is located on a city owned rail corridor (Carleton Place Rail Corridor) and there may be a request from Corporate Real Estate Office to implement the 2013 FCM guidelines for new development in proximity to railway operations. The applicant was advised that this would be looked into following the meeting.
8. The current Official Plan Review will include a review of rail corridors within the City, including the subject Carleton Place Rail Corridor. The scope of this review is currently being developed. Until such time as this scope and associated review is completed, we are unable to advise as to the ultimate status and/or alternative protection measures for this corridor beyond the current CREO requirements. Planning staff recommend you contact Robin van de Lande Robin.vandeLande@ottawa.ca for additional information related to the protection of rail corridors as part of the current Official Plan review.
9. Please be advised that a grade separation triangle at the intersection of Stittsville Main and the rail corridor may also be required. The size of this triangle is to be determined in consultation with your transportation consultant and city transportation staff.

Corporate Real Estate Office (CREO) Comments:

The subject site is located adjacent to the city owned Carleton Place Rail Corridor. CREO has adopted the Guidelines for New Development in Proximity to Rail Operations, created by the Railway Association of Canada and the Federation of Canadian Municipalities, see:
http://www.proximityissues.ca/asset/image/reference/guidelines/2013_05_29_Guidelines_NewDevelopment_E.pdf

    - The main objective is to mitigate railway-oriented impacts such as noise, vibration, and safety hazards, to ensure that the quality of life of a building's occupants and users are not negatively affected and to the maintain the long-term integrity and viability of the corridor.
- The guidelines are intended to be applied primarily to new residential development but are applicable to other sensitive/occupied dwellings.
- According the guidelines, a 30-metre setback from the property line to the face of the building is recommended combined with an earthen berm 2 meters above grade (2.5:1) (see page 27 & 38). It is also recommended that a noise and vibration study should be conducted according to page 28 of the guidelines.
- Appropriate uses within the 30-metre setback area include public and private roads; landscaping, parking spaces/structures; and storage sheds.
- Consideration to reducing the stated set-back is possible subject to engineered mitigation measures. (such as a crash wall, larger berm etc.)
- In addition, the guidelines recommended that the future potential and the existence of the rail corridor be registered on title. The following clause should be inserted in all developments, offers to purchase, and agreements of Purchase and Sale or Lease for all developments within 300 meters of the railway right-of-way:
    - Warning: The City of Ottawa or its assigns or successors in interest has or have a rights-of-way within 300 metres from the land subject hereof. There may be alteration to or expansions of the railway facilities on such rights-of-way in the future including the possibility that the railway or its assigns or successors as aforesaid may expand its operations, which expansion may affect the environment of the occupants in the vicinity, notwithstanding the inclusion of any noise and vibration attenuating measures in the design of the development and individual dwellings. The City of Ottawa will not be responsible for any complaints or claims arising from use of such facilities and/or operations on, over or under the aforesaid rights-of-way.

Heritage Comments:

1. The previous building on site was designated under Part IV of the Ontario Heritage Act but after the fire and its subsequent demolition, the By-law designating the property was repealed.
2. The Green's Hotel at 1510 Stittsville Main is located about 23m from the subject site, on the north side of the trail. As per Official Plan policy 4.6.1(3), a Cultural Heritage Impacts Statement (CHIS) will be required. Please see the guide below.
3. The CHIS will assess the impacts of the proposed development on the nearby Green's Hotel, and help guide the design toward heritage compatibility within this streetscape.
4. It is recommended that the applicant look to the demolished Bradley's Grocer building, as well as the heritage designated Green's Hotel for architectural inspiration in order to better reflect the existing and historic character. Other properties on Stittsville Main Street that are listed on the Heritage Register are: 1495, 1501, 1521, 1528, 1538, and 1543.

A guide to preparing cultural heritage impact statements is attached.

Parks Planning:

Parks will take cash-in-lieu of parkland at an amount equivalent to 10% of the value of the land area of the site being developed. The exact amount will be identified as a condition of site plan approval. In addition, the applicant will be charged a land appraisal fee of $565 (HST included).

Engineering Comments

General

- Please note that servicing and site works shall be in accordance with the following documents:
  - Ottawa Sewer Design Guidelines (October 2012)
  - Ottawa Design Guidelines-Water Distribution (July 2010)
  - Stormwater Management Planning and Design Manual, Ministry of the Environment, March 2003
  - Technical Bulletin PIEDTB-2016-01
  - Technical Bulletins ISTB-2018-01, ISTB-2018-02 and ISTB-2018-03.
  - Ottawa Design Guidelines – Water Distribution (2010)
  - Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)
  - City of Ottawa Accessibility Design Standards (2012)
  - Ottawa Standard Tender Documents (latest version)
  - Ontario Provincial Standards for Roads & Public Works (2013)

Stormwater Management Criteria:

- In the absence of SWM criteria, controlling the 100-year post development flows to the 2-year pre development flow rate applies to ICI sites (refer to section 8.3.6.1 of the Ottawa Sewer Design guidelines for additional information). For residential applications, controlling the 2 to 100-year post to pre development flow rates is required. A runoff coefficient of 0.5 is typically used for pre-development conditions.
- When using the modified rational method to calculate the storage requirements for the site any underground storage (pipe storage etc.) should not be included in the overall available storage. The modified rational method assumes that the restricted flow rate is constant throughout the storm which underestimates the storage requirement prior to the 1:100 year head elevation being reached. Please note that if you wish to utilize any underground storage as available storage, the $Q_{(release)}$ must be modified to compensate for the lack of

head on the orifice. An assumed average release rate equal to 50% of the peak allowable rate shall be applied. Otherwise, disregard the underground storage as available storage or provide modeling to support SWM strategy.

- Please note that 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.
- Please provide a **Pre-Development Drainage Area Plan** as part of the engineering drawing set to define the pre-development drainage area(s)/patterns.
- A stress-test (100-year plus 20%) of the stormwater management system shall be performed as per Section 8.3.12 of the City's sewer design guidelines. Drainage systems shall be stress tested using design storms calculated on the basis of a 20% increase in the City's IDF curves rainfall values.
- A stormwater summary table shall be provided in the report.

Sanitary:

- Analysis and demonstration that there is sufficient/adequate residual capacity to accommodate any increase in wastewater flows in the receiving and downstream wastewater systems are required to be provided.
- Please review the wastewater design flow parameters *in Technical Bulletin PIEDTB-2018-01.*

Water:

- Service areas with a basic day demand greater than 50 m^3/day (about 50 homes) shall be connected with a minimum of two watermains, separated by an isolation valve, to avoid the creation of a vulnerable service area.
- The maximum fire flow capacity of a fire hydrant shall be reviewed and documented to ensure a sufficient number of fire hydrants are available to service the proposed development. Please review Technical Bulletin ISTB-2018-
  0. A **fire hydrant coverage plan** shall be provided.
- Please 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
    - Site Address
    - A plan showing the proposed water service connection location(s).
    - **Average Daily Demand** (L/s)
    - **Maximum Daily Demand** (L/s)

- **Peak Hour Demand** (L/s)
- **Fire Flow** (L/min)

  [*Fire flow demand requirements shall be based on Fire Underwriters Survey (FUS) Water Supply for Public Fire Protection 1999*]

- **FUS Fire Flow**

Calculations

Geotechnical Investigation:

- A Geotechnical Study shall be prepared in support of this development proposal.
- Report needs to show effect on ground water and effect on surrounding existing buildings.

Topographic information:

- Topographic information and design grades to be tied to proper geodetic benchmark along with proper description of the Geodetic Benchmark used.

Please note that these comments are considered preliminary based on the conceptual information provided to date and therefore maybe amended as additional details become available and presented to the City.

Transportation Planning:

1. Follow Traffic Impact Assessment Guidelines
   - Screening form to start, full Traffic Impact Assessment if any of the triggers on the screening form are satisfied. / Traffic Impact Assessment will be required.
   - Start this process as soon as possible.
   - Applicant advised that their application will not be deemed complete until the submission of the draft step 1-4, including the functional draft RMA package (if applicable) and/or monitoring report (if applicable).
   - Request base mapping asap if RMA is required. Contact Engineering Services (https://ottawa.ca/en/city-hall/planning-and-development/engineering-services)
2. ROW protection on Stittsville Main Street between Carp and Etta is 23m even (Ensure this is shown on the site plan).
3. Ensure the AODA requirements are met (See attached checklist).
4. Noise Impact Studies required for the following:
   - Road
   - Rail (Noise and Vibration)
   - Stationary (if there will be any exposed mechanical equipment due to the proximity to neighbouring noise sensitive land uses)

5. Minimum corner clearance from the access to the intersection is
    - 70 m from Abbott Street
    - 15m from Orville Street
6. On site plan:
    - Show all details of the roads abutting the site up to and including the opposite curb; include such items as pavement markings, accesses and/or sidewalks.
    - Turning templates will be required for all accesses showing the largest vehicle to access the site; required for internal movements and at all access (entering and exiting and going in both directions).
    - Show all curb radii measurements; ensure that all curb radii are reduced as much as possible
    - Show lane/aisle widths.
    - Sidewalk is to be continuous across access as per City Specification 7.1.

The AODA checklist is attached.

Planning Forester:

1. A Tree Conservation Report (TCR) must be supplied for review along with the suite of other plans/reports required by the City;
2. Tree removal
    a. any removal of privately-owned trees 10cm or larger in diameter requires a tree permit issued under the Urban Tree Conservation Bylaw; the permit is based on the approved TCR
    b. any removal of City-owned trees will require the permission of Forestry Services who will also review the submitted TCR
3. The TCR must list all trees on site by species, diameter and health condition – separate stands of trees may be combined using averages
4. The TCR must clearly show where tree removal will occur.
5. Tree permits for geotechnical work are possible, but tree removal must be limited to areas required for machinery access and drilling; please provide a plan supported by the TCR showing travel routes and landings
6. All retained trees must be shown and all retained trees within the area impacted by the development process must be protected as per City guidelines listed on Ottawa.ca
7. For more information on the process or help with tree retention options, contact Mark Richardson mark.richardson@ottawa.ca

Environment:

1. An EIS/TCR is required to address species at risk on the site in the old structures (e.g., barn swallows, bats and chimney swifts) and possible butternut trees.
2. They will also need to address the Protocol for Wildlife protection during Construction which is available at www.ottawa.ca

Requested Plans and Studies

1. A list of required plans and studies required for a complete Site Plan Control application have been attached.

Process

1. This is a pre-consultation for a Site Plan Control application at 1518 – 1526 Stittsville Main Street and the associated requirements for a complete application.

2. This proposal will trigger a New Site Plan Control application, Manager Approval, subject to Public Consultation. The proposal would fall under the 'complex' category as per the Site Plan Control Subtype Thresholds. The application form, timeline and fees can be found here.

Please refer to the links to "Guide to preparing studies and plans" and fees for general information. Additional information is available related to building permits, development charges, and the Accessibility Design Standards. Be aware that other fees and permits may be required, outside of the development review process. You may obtain background drawings by contacting informationcentre@ottawa.ca.

These pre-con comments are valid for one year. If you submit a development application(s) after this time, you may be required to meet for another pre-consultation meeting and/or the submission requirements may change. You are as well encouraged to contact us for a follow-up meeting if the plan/concept will be further refined.

Please contact me at Mark.Young@ottawa.ca or at 613-580-2424 extension 41396 if you have any questions.

Sincerely,

Mark Young MCIP RPP
Planner III
Development Review - West

APPLICANT'S STUDY AND PLAN IDENTIFICATION LIST

Legend: **S** indicates that the study or plan is required with application submission.
A indicates that the study or plan may be required to satisfy a condition of approval/draft approval.

For information and guidance on preparing required studies and plans refer here:

S/A	Number of copies	ENGINEERING		S/A	Number of copies
S	15	1. Site Servicing Plan	2. Site Servicing Study	S	3
S	15	3. Grade Control and Drainage Plan	4. Geotechnical Study / Slope Stability Study	S	3
	2	5. Composite Utility Plan	6. Groundwater Impact Study		3
	3	7. Servicing Options Report	8. Wellhead Protection Study		3
S	9	9. Transportation Impact Assessment (TIA)	10.Erosion and Sediment Control Plan / Brief		3
S	3	11.Storm water Management Report / Brief	12.Hydro geological and Terrain Analysis		3
	3	13.Hydraulic Water main Analysis	14.Noise / Vibration Study	S	3
	PDF only	15.Roadway Modification Functional Design	16.Confederation Line Proximity Study		3

S/A	Number of copies	PLANNING / DESIGN / SURVEY		S/A	Number of copies
	15	17.Draft Plan of Subdivision	18.Plan Showing Layout of Parking Garage	S	2
	5	19.Draft Plan of Condominium	20.Planning Rationale	S	3
S	15	21.Site Plan	22.Minimum Distance Separation (MDS)		3
	15	23.Concept Plan Showing Proposed Land Uses and Landscaping	24.Agrology and Soil Capability Study		3
	3	25.Concept Plan Showing Ultimate Use of Land	26.Cultural Heritage Impact Statement	S	3
S	15	27.Landscape Plan	28.Archaeological Resource Assessment Requirements: **S** (site plan) **A** (subdivision, condo)		3
S	2	29.Survey Plan	30.Shadow Analysis		3
S	3	31.Architectural Building Elevation Drawings (dimensioned)	32.Design Brief (includes the Design Review Panel Submission Requirements)	S	Available online
	3	33.Wind Analysis			

S/A	Number of copies	ENVIRONMENTAL		S/A	Number of copies
S	3	34.Phase 1 Environmental Site Assessment	35.Impact Assessment of Adjacent Waste Disposal/Former Landfill Site		3
TBD	3	36.Phase 2 Environmental Site Assessment (depends on the outcome of Phase 1)	37.Assessment of Landform Features		3
TBD	3	38.Record of Site Condition	39.Mineral Resource Impact Assessment		3
S	3	40.Tree Conservation Report	41.Environmental Impact Statement / Impact Assessment of Endangered Species	S	3
	3	42.Mine Hazard Study / Abandoned Pit or Quarry Study	43.Integrated Environmental Review (Draft, as part of Planning Rationale)		3

S/A	Number of copies	ADDITIONAL REQUIREMENTS		S/A	Number of copies
S	1	44. Applicant's Public Consultation Strategy (may be provided as part of the Planning Rationale)	45.		

Meeting Date: November 25, 2019 Application Type: *Site Plan Control – Manager Approval*

File Lead (Assigned Planner): Mark Young Infrastructure Approvals Project Manager: Ahmed Elsayed

Site Address (Municipal Address): 1518 – 1526 Stittsville Main Street

*Preliminary Assessment: 1☐ 2☐ 3☒ 4☐ 5

*One (1) indicates that considerable major revisions are required before a planning application is submitted, while five (5) suggests that proposal appears to meet the City's key land use policies and guidelines. **This assessment is purely advisory and does not consider technical aspects of the proposal or in any way guarantee application approval.**

It is important to note that the need for additional studies and plans may result during application review. If following the submission of your application, it is determined that material that is not identified in this checklist is required to achieve complete application status, in accordance with the Planning Act and Official Plan requirements, the* Planning, Infrastructure and Economic Development Department *will notify you of outstanding material required within the required 30 day period. Mandatory pre-application consultation will not shorten the City's standard processing timelines, or guarantee that an application will be approved. It is intended to help educate and inform the applicant about submission requirements as well as municipal processes, policies, and key issues in advance of submitting a formal development application. This list is valid for one year following the meeting date. If the application is not submitted within this timeframe the applicant must again pre-consult with the Planning, Infrastructure and Economic Development Department.

Tyler Ferguson

From:	Tyler Ferguson
Sent:	October 21, 2020 12:17 PM
To:	Erica Ogden
Cc:	Nicholas Vachon
Subject:	RE: 1518-1526 Stittsville Main Street - MVCA Requirements
Attachments:	_ags_290f1cee2c3045579d3f3e23b0a43299.pdf

Hi Erica,

Thanks for the timely response. We will be discharging/connecting to the sewers on Stittsville Main Street, so we will provide an enhanced level of protection. See attached for reference. Thanks.

Tyler Ferguson, P.Eng.
Project Engineer
T. 613.903.4426 | **F.** 613.836.3742 | **C.** 613.298.2921
McINTOSH PERRY

From: Erica Ogden <eogden@mvc.on.ca>
Sent: October 20, 2020 4:39 PM
To: Tyler Ferguson <t.ferguson@mcintoshperry.com>
Cc: Nicholas Vachon <n.vachon@mcintoshperry.com>
Subject: RE: 1518-1526 Stittsville Main Street - MVCA Requirements

Hello Tyler,

Is the site discharging north along Stittsville Main Street to Poole Creek?

Is so, Poole Creek is a cool water system and an enhanced level of protection (80% TSS removal) is required for water quality control.

If you have any questions, please feel free to contact me.

Thank you,

Erica C. Ogden, MCIP, RPP | Environmental Planner | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, ON K7C 3P1
www.mvc.on.ca | c. 613 451 0463 | o. 613 253 0006 ext. 229| eogden@mvc.on.ca

From: Tyler Ferguson <t.ferguson@mcintoshperry.com>
Sent: October 20, 2020 11:46 AM
To: Erica Ogden <eogden@mvc.on.ca>
Cc: Nicholas Vachon <n.vachon@mcintoshperry.com>
Subject: 1518-1526 Stittsville Main Street - MVCA Requirements

Hi Erica,

Hope all is well, we have a development moving forward at 1518-1526 Stittsville Main Street. The development will be mixed use, a 4 storey residential building and a 2 storey commercial building (office/restaurant) and parking lot as per the attached draft site plan.

We had the pre-consultation with the City. Can you confirm the quality control requirement for the site?

If you could please review and let me know. Any questions don't hesitate to contact me.

Thank you for your time,
Tyler

Tyler Ferguson, P.Eng.

Project Engineer
115 Walgreen Road, R.R. 3, Carp, ON K0A 1L0
T. 613.903.4426 | **F.** 613.836.3742 | **C.** 613.298.2921
t.ferguson@mcintoshperry.com | www.mcintoshperry.com

McINTOSH PERRY

Nicholas Vachon

From: Elsayed, Ahmed <ahmed.elsayed@ottawa.ca>
Sent: March 16, 2021 11:45 AM
To: Tyler Ferguson
Cc: Nicholas Vachon
Subject: RE: D07-12-20-0167 - 1518, 1524 and 1526 Stittsville Main Street

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Tyler,

Yes, you can design the site for 5-years pre-development release rates.

Thanks,
Ahmed

From: Tyler Ferguson <t.ferguson@mcintoshperry.com>
Sent: Monday, March 15, 2021 1:37 PM
To: Elsayed, Ahmed <ahmed.elsayed@ottawa.ca>
Cc: Nicholas Vachon <n.vachon@mcintoshperry.com>
Subject: RE: D07-12-20-0167 - 1518, 1524 and 1526 Stittsville Main Street

Hi Ahmed,

Have you had a chance to look into the below? We are hoping to finalize our resubmission package soon. Thanks.

From: Tyler Ferguson <t.ferguson@mcintoshperry.com>
Sent: February 26, 2021 1:13 PM
To: Elsayed, Ahmed <ahmed.elsayed@ottawa.ca>
Cc: Nicholas Vachon <n.vachon@mcintoshperry.com>
Subject: RE: D07-12-20-0167 - 1518, 1524 and 1526 Stittsville Main Street

Hi Ahmed,

Just following up on the below. Did you have a chance to look into the restriction requirements? Thanks.

Tyler Ferguson, P.Eng.
Project Engineer
T. 613.903.4426 | **F.** 613.836.3742 | **C.** 613.298.2921
McINTOSH PERRY

From: Tyler Ferguson <t.ferguson@mcintoshperry.com>
Sent: February 11, 2021 4:53 PM
To: Elsayed, Ahmed <ahmed.elsayed@ottawa.ca>
Cc: Nicholas Vachon n.vachon@mcintoshperry.comHi a
Subject: RE: D07-12-20-0167 - 1518, 1524 and 1526 Stittsville Main Street

Hi Ahmed,

Thanks for your response. Just want to confirm why the site is being held to the 2-year restriction rater then the 5-year. I've included a portion of section 8.3.6.1 below. The storm sewer as-built drawing we have from the City (attached for reference) was done in 1993 which suggest the sewers would have been designed to accommodate the 5-year storm. Can you confirm?

- In areas draining to a storm sewer system, the 100 year post development runoff must be controlled to either the 2 year or the 5-year pre-development flow depending on the return period used when sizing the receiving storm sewer system. The level of control must be selected so that there are no downstream impacts for all storms up to and including the 100 year return period. All flow depth must be controlled on-site. For events greater than 100 years, spillage must be directed to a public ROW and not to neighbouring private property.

Thanks,
Tyler

Tyler Ferguson, P.Eng.
Project Engineer
T. 613.903.4426 | **F.** 613.836.3742 | **C.** 613.298.2921
McINTOSH PERRY

From: Elsayed, Ahmed <ahmed.elsayed@ottawa.ca>
Sent: February 8, 2021 12:37 PM
To: Tyler Ferguson <t.ferguson@mcintoshperry.com>
Cc: Nicholas Vachon <n.vachon@mcintoshperry.com>
Subject: RE: D07-12-20-0167 - 1518, 1524 and 1526 Stittsville Main Street

Hi Tyler,

Please find below my response.

Thanks,
Ahmed

From: Tyler Ferguson <t.ferguson@mcintoshperry.com>
Sent: February 3, 2021 2:48 PM
To: Elsayed, Ahmed <ahmed.elsayed@ottawa.ca>
Cc: Nicholas Vachon <n.vachon@mcintoshperry.com>
Subject: D07-12-20-0167 - 1518, 1524 and 1526 Stittsville Main Street

ATTENTION : Ce courriel provient d'un expéditeur externe. Ne cliquez sur aucun lien et n'ouvrez pas de pièce jointe, excepté si vous connaissez l'expéditeur.

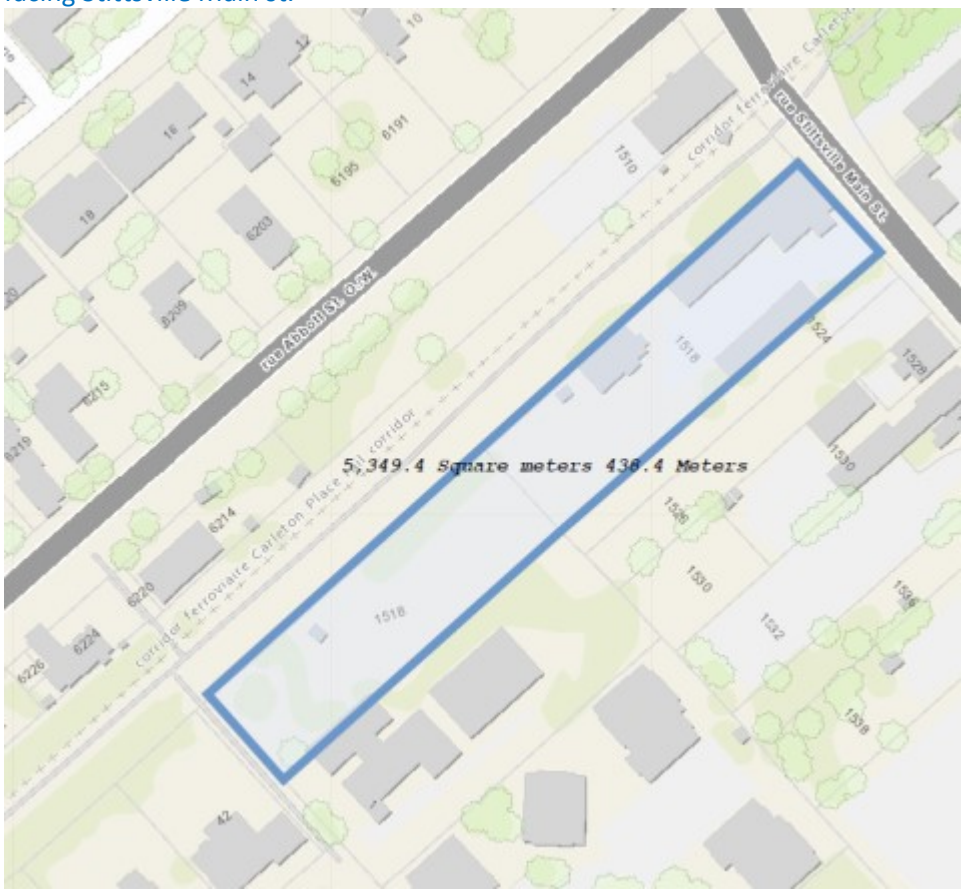
Hi Ahmed,

Thank for your comments on our project on Stittsville Main Street, I have a few follow up questions/comments, please see below.

57. Please discuss what is proposed for the rest of 1518 Stittsville Main St. extending west beside 1 Henry Goulburn Way.

Can you clarify what you are looking for in this comment response? Are you just looking for us to describe the grading at the back of the site?

Ahmed Response: as shown in the below sketch 1518 Stittsville extends west, right now the site is only showing the part facing Stittsville Main st.



63. Please address comment in pre-consultation notes under sanitary about analyzing sufficient capacity in downstream sanitary sewers to accommodate more flows.

Can you confirm the sanitary area we are required to analyze? From my notes of the pre-consultation, you mentioned two downstream pipe runs. If you could mark up the attached plan with the sanitary sewers you would like us to review that would be appreciated.

Similar to the below comment, this didn't apply to the property across the street (D07-12-19-0005 – 1531 Stittsville Main), can you confirm why we are required to analyze the downstream capacity?

Ahmed's response: This was an IPU requirement, I highlighted on the attached sketch.

64. For SWM, As per pre-consultation notes, flows needs to be controlled to 2-years pre-development as per guide lines item 8.3.6.1.

The development across the street (D07-12-19-0005 – 1531 Stittsville Main) currently under construction has a SWM requirement of 100-year post-development flow to 100-year pre-development flow and 5-year post-development flow to 5-year pre-development flow. Both our site and the site across the street connect to the same storm sewer, can you confirm why there is different SWM criteria for the two developments?

Ahmed's response: As per the city guidelines this is the criteria for ICI sites, the site is commercial due to the 2 buildings facing Stittsville main.

Thanks,
Tyler

Tyler Ferguson, P.Eng.
Project Engineer
115 Walgreen Road, R.R. 3, Carp, ON K0A 1L0
T. 613.903.4426 | **F.** 613.836.3742 | **C.** 613.298.2921
t.ferguson@mcintoshperry.com | www.mcintoshperry.com
McINTOSH PERRY

APPENDIX C
WATERMAIN CALCULATIONS

McINTOSH PERRY

McINTOSH PERRY

CP-19-0608 - 1518 Stittsville Main - Water Demands

Project:	1518 Stittsville Main	
Project No.:	CP-19-0608	
Designed By:	NBV	
Checked By:	TDF	
Date:	April 14, 2021	
Site Area:	0.48	gross ha
Units	1 Bedroom	10 Units
	2 Bedroom	22 Units
Persons:	60.20	People

AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS
Residential	*350*	*L/c/d*
Industrial - Light	35,000	L/gross ha/d
Industrial - Heavy	55,000	L/gross ha/d
Campgrounds	225	L/(campsite/d)
Mobile Home Parks	1,000	L/(Space/d)
Motels	150	L/(bed-space/d)
Hotels	225	L/(bed-space/d)
Tourist Commercial	28,000	L/gross ha/d
Other Commercial	*28,000*	*L/gross ha/d*

Commercial Demand	*0.16*	L/s
Residential Demand	*0.24*	L/s
AVERAGE DAILY DEMAND	0.40	L/s

MAXIMUM DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS
Residential	*2.5 x avg. day*	*L/c/d*
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

Commercial Demand	*0.23*	L/s
Residential Demand	*0.61*	L/s
MAXIMUM DAILY DEMAND	0.84	L/s

MAXIMUM HOUR DEMAND

DEMAND TYPE	AMOUNT	UNITS
Residential	*2.2 x max. day*	*L/c/d*
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
Commercial Demand	*0.42*	L/s
Residential Demand	*1.34*	L/s
MAXIMUM HOUR DEMAND	1.76	L/s

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

McINTOSH PERRY

CP-19-0608 - 1518 Stittsville Main - OBC Fire Calculations

Project:	1518 Stittsville Main
Project No.:	CP-19-0608
Designed By:	NBV
Checked By:	TDF
Date:	April 14, 2021

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

***Water Supply for Fire-Fighting* - Restaurant/Office & Residential**

Building is classified as Group : A-2, C & D (from table 3.2.2.55)

Building is of noncombustible construction with fire separations and fire-resistance ratings provided in accordance with subsections 3.2.2., including loadbearing walls, columns and arches

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

(a) Q = K x V x Stot

where:

Q = minimum supply of water in litres

K = water supply coefficient from Table 1

V = total building volume in cubic metres

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

Stot = 1.0 + [Sside1+Sside2+Sside3+…etc.]

K	**10**	(from Table 1 pg A-31) (Worst case occupancy {E / F2} 'K' value used)
V	**13,228**	(Total building volume in m^3.)
Stot	**1.7**	(From figure 1 pg A-32)
Q =	**224,877.36 L**	

→

			From Figure 1 (A-32)
Snorth	7.7	m	0.2
Seast	4.7	m	0.5
Ssouth	15	m	0.0
Swest	10	m	0.0

*approximate distances

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

6300 L/min (if Q >190,000 and Q<270,000 L)
1664 gpm

McINTOSH PERRY

CP-19-0608 - 1518 Stittsville Main - Fire Underwriters Survey (FUS) Fire Calculations

Project:	1518 Stittsville Main Street
Project No.:	CP-19-0608
Designed By:	NBV
Checked By:	TDF
Date:	April 7, 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** **4,409.4** m^2 872.84 m^2 (Residential x 4 Storey)
459.00 m^2 (Office/ Restaurant x 2 Storey)

Caluclated Fire Flow	**21,913.0 L/min**
	22,000.0 L/min

B. REDUCTION FOR OCCUPANCY TYPE (No Rounding)

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

Limited Combustible -15%

Fire Flow	**18,700.0 L/min**

C. REDUCTION FOR SPRINKLER TYPE (No Rounding)

Standard Water Supply Sprinklered -40%

Reduction	**-7,480.0 L/min**

D. INCREASE FOR EXPOSURE (No Rounding)

	Separation Distance (m)	Cons.of Exposed Wall	Length Exposed Adjacent Wall (m)	Height (Stories)	Length-Height Factor	
Exposure 1	30.1 to 45	Wood frame	84	2	N/A	5%
Exposure 2	20.1 to 30	Wood frame	24.7	2	49	8%
Exposure 3	10.1 to 20	Wood frame	84	2	168	15%
Exposure 4	>45	Wood frame	12	2	N/A	0%
					% Increase*	**28%**

Increase*	**5,236.0 L/min**

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

Fire Flow	**16,456.0 L/min**
Fire Flow Required**	**16,000.0 L/min**

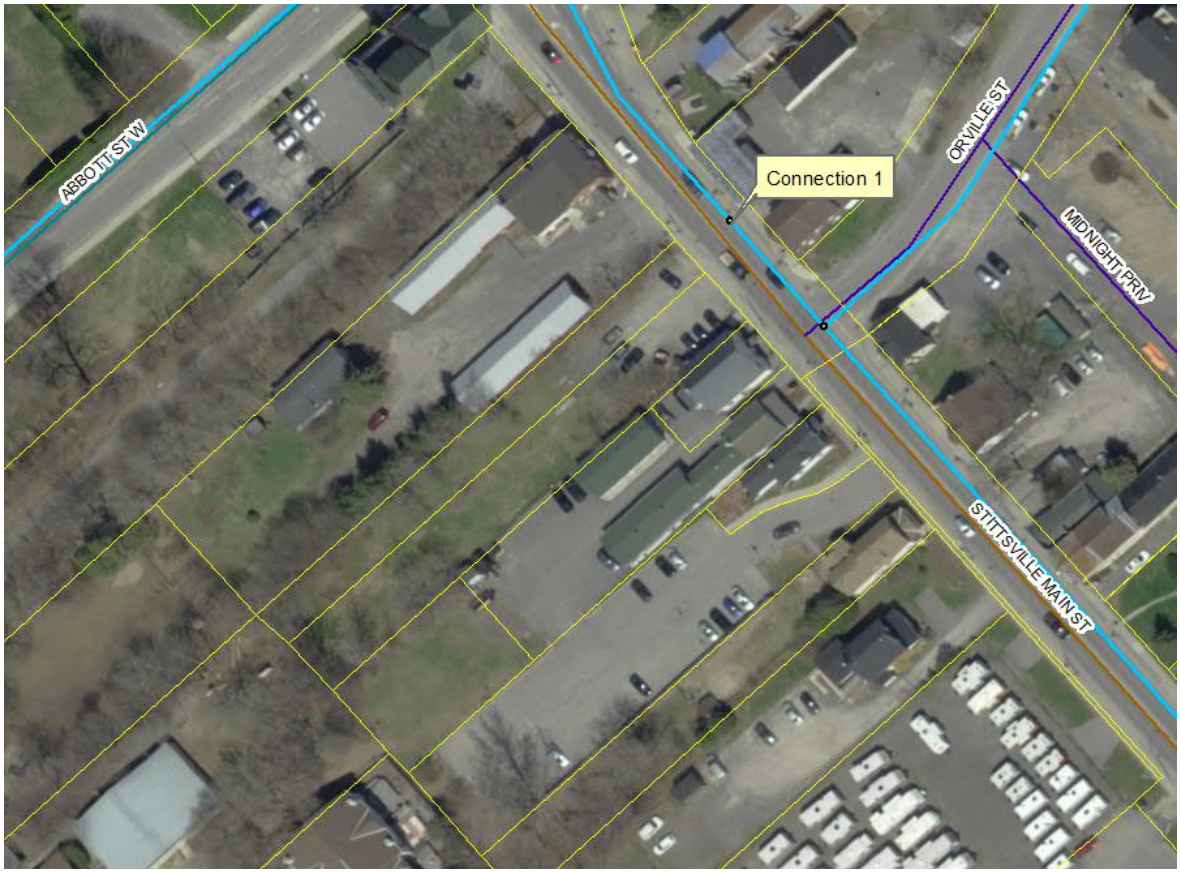
*In accordance with Part II, Section 4, the Increase for separation distance is not to exceed 75%
**In accordance with Section 4 the Fire flow is not to exceed 45,000 L/min or be less than 2,000 L/min

Boundary Conditions
1518-1526 Stittsville Main Street

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	24	0.40
Maximum Daily Demand	50	0.84
Peak Hour	106	1.76
Fire Flow Demand #1	15,000	250.00

Location



Results

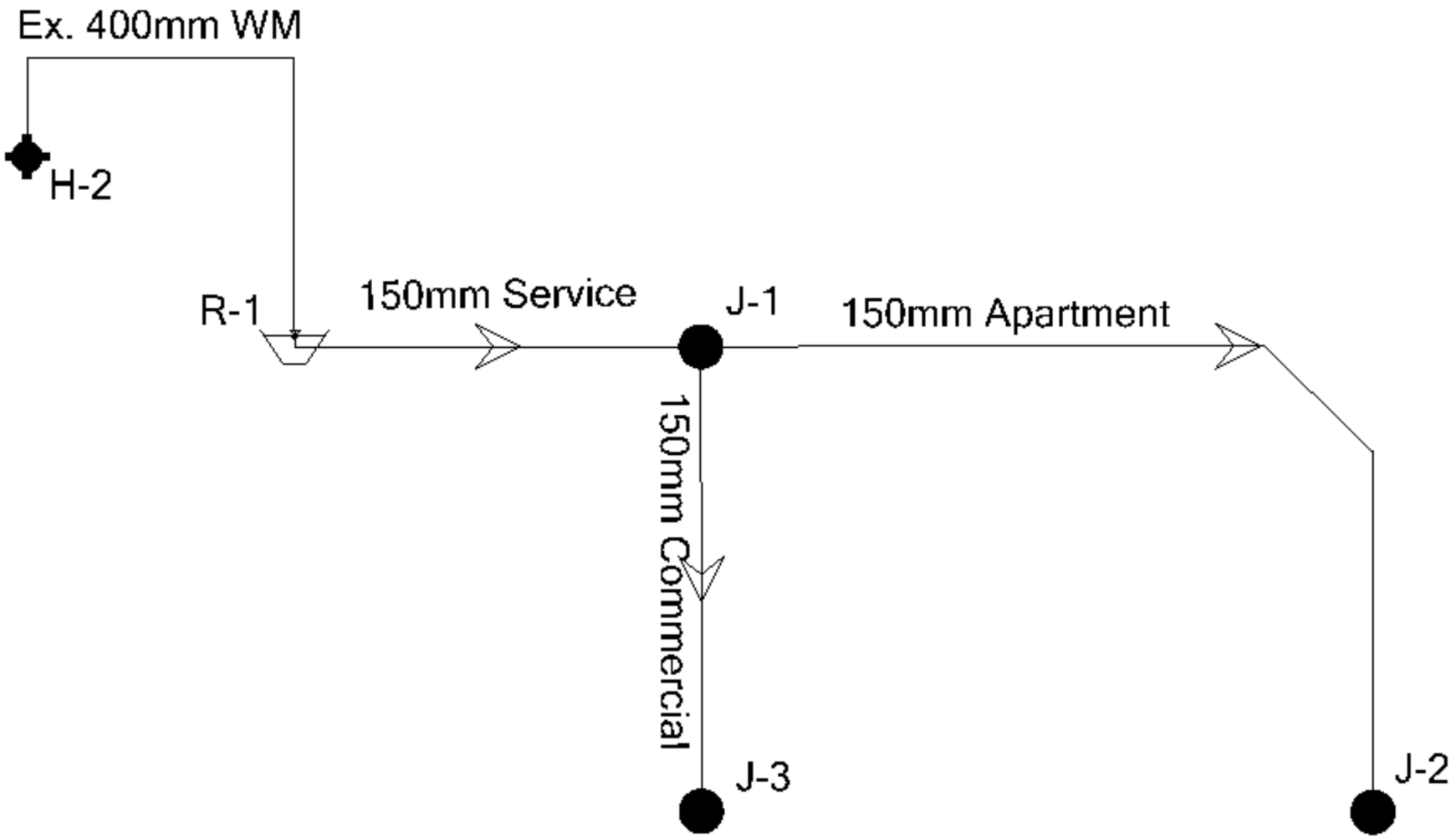
Connection 1 – Stittsville Main Street

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	159.9	54.0
Peak Hour	155.9	48.4
Max Day plus Fire 1	151.2	41.6

[1] Ground Elevation = 121.9 m

Disclaimer

The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.


Ex. 400mm WM
H-2
R-1
150mm Service
J-1
150mm Apartment
150mm Commercial
J-3
J-2

Active Scenario: Average Day - Existing Conditions

Label	Elevation (m)	Demand (L/min)	Pressure (psi)	Hydraulic Grade (m)
J-1	119.43	0.00	57.45	159.90
J-3	119.63	9.60	57.16	159.90
J-2	119.58	14.40	57.23	159.90

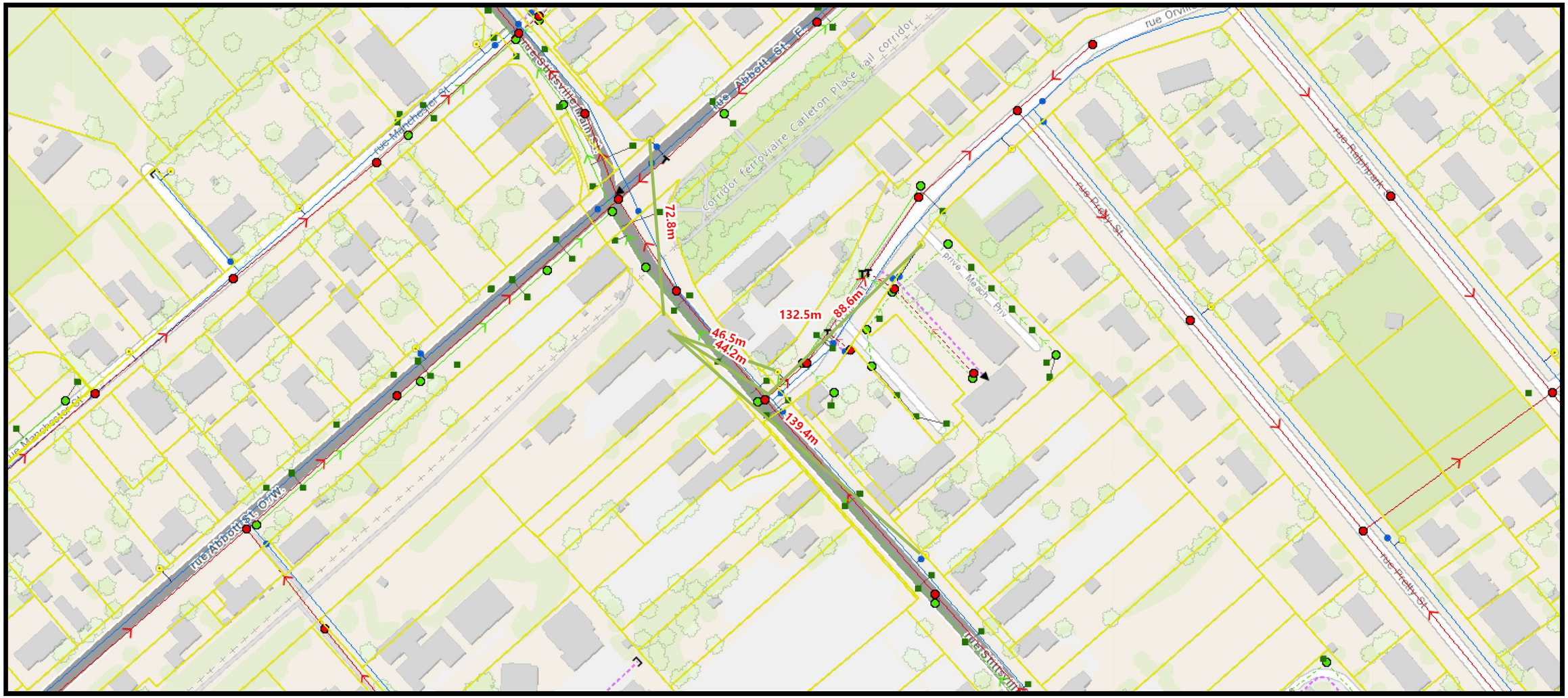
Active Scenario: Peak Hourly - Existing Conditions

Label	Elevation (m)	Demand (L/min)	Pressure (psi)	Hydraulic Grade (m)
J-1	119.43	0.00	51.76	155.89
J-3	119.63	25.20	51.48	155.89
J-2	119.58	80.40	51.54	155.89

Active Scenario: Max Day + Fire Flow - Existing Conditions

Label	Is Fire Flow Run Balanced?	Satisfies Fire Flow Constraints?	Fire Flow (Needed) (L/min)	Fire Flow (Available) (L/min)	Pressure (psi)	Elevation (m)	Demand (L/min)	Pressure (Residual Lower Limit) (psi)
H-2	True	True	16,000.00	18,210.44	43.27	120.72	0.00	20.00
J-1	False	False	16,000.00	(N/A)	45.09	119.43	0.00	20.00
J-3	False	False	16,000.00	(N/A)	44.81	119.63	13.80	20.00
J-2	False	False	16,000.00	(N/A)	44.88	119.58	36.60	20.00

Hydrant Cover Table



APPENDIX D
SANITARY CALCULATIONS

McINTOSH PERRY

McINTOSH PERRY

Project:	CP-19-0608 – Mixed Use Development
Designed By:	NBV
Checked By:	TFD
Date:	October 23, 2020

Re: Sanitary Flow Calculations

1. Building Occupancy

The maximum number of bedroom units will be 22 – 2 bedroom units and 10 – 1 bedroom units as per the floors plans and the attached unit break down from the Architect. The restaurant will have 100 seats and the office space will have an occupant load of 19 people.

2. Daily Volume in Litres

As per the extract of the City of Ottawa Sewer Design Guidelines, Appendix 4-A; Daily Sewage Flow for Dwellings;

- Each Dwelling unit of 1bedroom
  = 275 Liters/Dwelling/Day
- Each Dwelling unit of 2 bedrooms
  = 1100 Liters/Dwelling/Day
- Each Seat of Ordinary Restaurant
  = 125 Liters/Seat/Day
- Office Space
  = 75 Liters/Person/Day

3. Peak Flow (Q/p)

- $Q_{1\text{-BED}}(p) = F_{1\text{-BED}} \times P_{1\text{-BED}}$

  Where:
  $F_{1\text{-BED}}$ = 275 Litres/Dwelling/Day (as per City of Ottawa Sewer Design Guidelines)
  $P_{1\text{-BED}}$ = 10 Units (as per Site Plan)
- Therefore, $Q_{1\text{-BED}}(p)$ = (275) x (10) = <u>2,750 L/Day (0.032 L/sec)</u>

- $Q_{2\text{-BED}}(p) = F_{2\text{-BED}} \times P_{2\text{-BED}}$

  Where:
  $F_{2\text{-BED}}$ = 1100 Litres/Dwelling/Day (as per City of Ottawa Sewer Design Guidelines)
  $P_{2\text{-BED}}$ = 22 Units (as per Site Plan)

- $Q_{REST}(p) = F_{REST} \times P_{REST}$ Where:
  F_{REST} = 125 Litres/Seat/Day (as per City of Ottawa Sewer Design Guidelines)
  P_{REST} = 100 Seats (as per Site Plan)
- Therefore, $Q_{REST}(p)$ = (125) x (100) = 12,500 L/Day (0.145 L/sec)

- $Q_{OFF}(p) = F_{OFF} \times P_{OFF}$ Where:
  F_{OFF} = 75 Litres/Seat/Day (as per City of Ottawa Sewer Design Guidelines)
  P_{OFF} = 19 Seats (as per Site Plan)
- Therefore, $Q_{OFF}(p)$ = (75) x (25) = 1,425 L/Day (0.016 L/sec)

- $Q_{TOTAL}(p) = Q_{1\text{-}BED} + Q_{2\text{-}BED} + Q_{REST} + Q_{OFF}$
  Where:
  $Q_{1\text{-}BED}$ = 2,750 L/Day
  $Q_{2\text{-}BED}$ = 24,200 L/Day
  Q_{REST} = 12,500 L/Day
  Q_{OFF} = 1,425 L/Day
- Therefore, $Q_{TOTAL}(p)$ = (2,750) + (24,200) + (9,375) + (1,875) = **40,875 L/Day (0.473 L/sec)**

The proposed site will have peak flows that are negligibly small in comparison to the capacity of the existing 250mm Sanitary main (37.22L/s). Therefore, it is anticipated that the existing 250mm diameter PVC sanitary main within Stittsville Main has the capacity to accommodate the new flows.

SANITARY SEWER DESIGN SHEET

PROJECT: Mixed Use Development
LOCATION: 1518-1526 Stittsville Main Street
CLIENT: Inverness Homes (c/o Krumac Holdings Inc.)

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-1BD	APT-2BD	(ha)	IND	CUM			INSTITUTIONAL		COMMERCIAL		INDUSTRIAL			IND	CUM								L/s	(%)
													IND	CUM	IND	CUM	IND	CUM											
		BLDG	MH2A					0.00	0.0	0.0	4.00	0.00		0.00		0.48		0.00	0.23	0.00	0.00	0.00	0.23	11.23	6.10	150	0.50	0.616	11.00	97.92
		BLDG	MH1A			10	22	0.48	60.2	60.2	4.00	0.98		0.00		0.00		0.00	0.00	0.48	0.48	0.16	1.13	11.23	9.35	150	0.50	0.616	10.10	89.91
		MH1A	MH2A					0.00	0.0	60.2	4.00	0.98		0.00		0.00		0.00	0.00	0.00	0.48	0.16	1.13	11.23	8.71	150	0.50	0.616	10.10	89.91
		MH2A	Ex 250mm					0.00	0.0	60.2	4.00	0.98		0.00		0.48		0.00	0.23	0.00	0.48	0.16	1.37	11.23	28.50	150	0.50	0.616	9.87	87.83

Design Parameters:

Residential			ICI Areas			
SF	3.4	p/p/u				Peak Factor
TH/SD	2.7	p/p/u	INST	28,000	L/Ha/day	1.5
APT-1BD	1.4	p/p/u	COM	28,000	L/Ha/day	1.5
APT-2BD	2.1	p/p/u	IND	35,000	L/Ha/day	MOE Chart
Other	60	p/p/Ha				

Notes:
1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 350 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: NBV

Checked: TDF

Project No.: CP-19-0608

No.	Revision	Date
1.	Issued for Review	2020-10-23
2	Issued for Review	2020-11-05

Sheet No: 1 of 1

WEST

2021 Wastewater Collection System

Department of Planning, Infrastructure and Economic Development

This map was compiled from existing & collected engineering Information from the City of Ottawa Geographic Information System and is protected by copyright. The location of Infrastructure is approximate and should not be used for construction purposes.

Scale 1:2500

Ottawa

Legend

- Storm Inlet
- Storm Outlet
- Storm Manhole
- Sanitary Manhole
- Combined Manhole
- Combined Pipe
- Sanitary Pipe
- Storm Pipe
- Pipe Cap
- Combined Trunk Sewer
- Sanitary Trunk Sewer
- Storm Trunk Sewer
- Regulator
- Storm Pumping Station
- Storm Water Management Pond
- Sanitary Pumping Station
- Treatment Plant

Pipe Equivalents

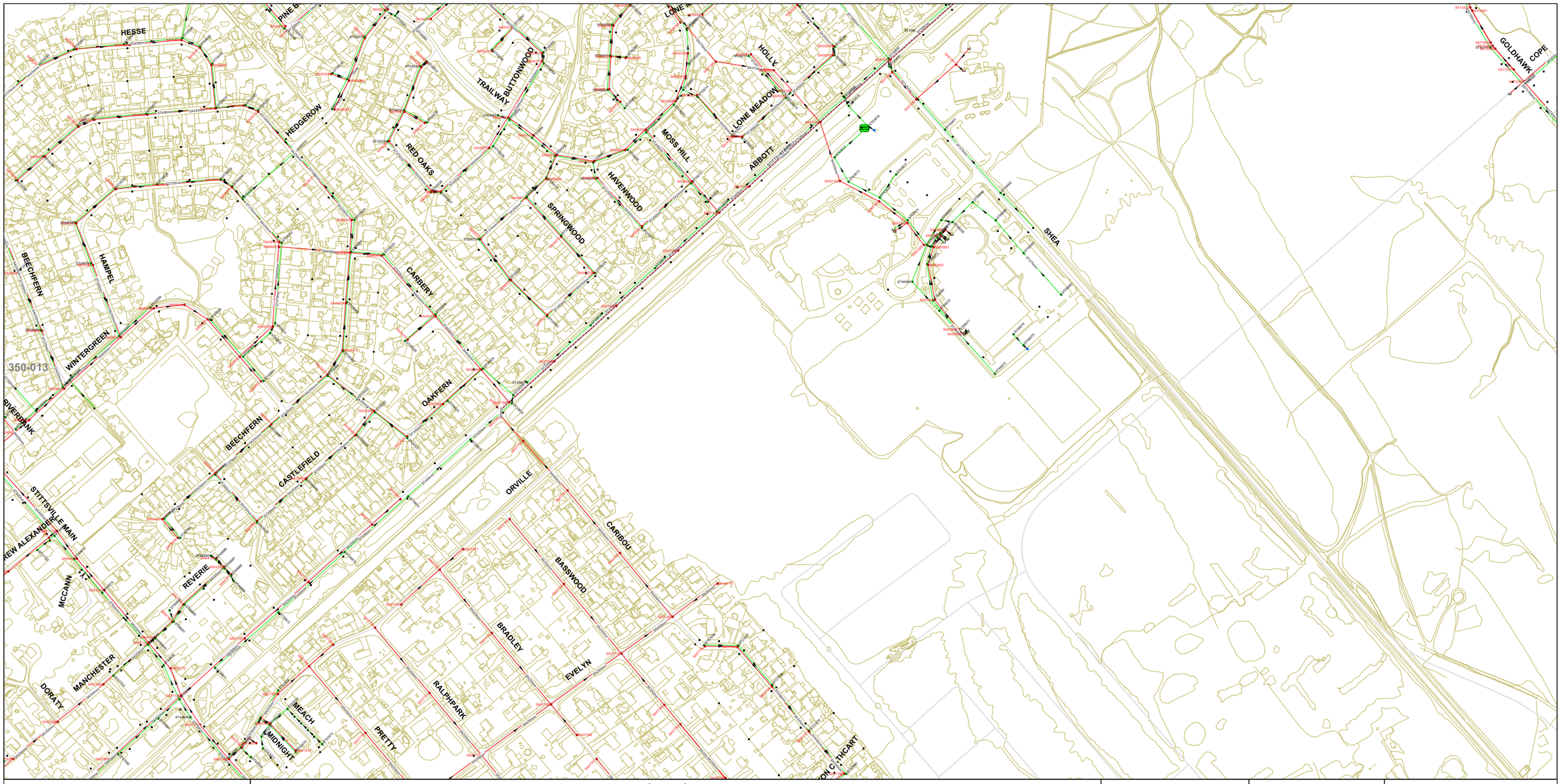
nominal (mm)	actual (inches)	nominal (mm)	actual (inches)	nominal (mm)	actual (inches)
100	4	675	27	1800	72
150	6	750	30	1950	78
200	8	825	33	2025	80
250	10	900	36	2100	84
300	12	975	39	2250	90
375	15	1050	42	2400	96
400	16	1200	48	2550	102
450	18	1350	54	2700	108
525	21	1500	60	2850	114
600	24	1650	66	3000	120

Pipe Materials

A - ASBESTOS
CI - CAST IRON
CO - COPPER
CO0 - AWWA C300
CO1 - AWWA C301
CO2 - AWWA C302
CO3 - AWWA C303
DI - DUCTILE IRON
PE - POLYETHYLENE (DR11 TO DR21)
PVC - POLYVINYL CHLORIDE
STC - CONCRETE LINED STEEL PIPE
UCI - UNLINED CAST IRON
UNK - UNKNOWN MATERIAL

350-012

WEST



2021 Wastewater Collection System

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150	6	750	30	1950	78
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CO1 - AWWA C301
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CO3 - AWWA C303
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PE - POLYETHYLENE (DR11 TO DR21)
PVC - POLYVINYL CHLORIDE
STC - CONCRETE LINED STEEL PIPE
UCI - UNLINED CAST IRON
UNK - UNKNOWN MATERIAL

350-013


130,206.6sq m
2,343.5m
100.0m
234.8m
161.6m
158.0m
101.5m
64.3m

SANITARY SEWER CAPACITY ANALYSIS DESIGN SHEET

McINTOSH PERRY

PROJECT: CP-19-0608
LOCATION: 1518 Stittsville Main Street
CLIENT: Inverness Homes

LOCATION				RESIDENTIAL								ICI AREAS							INFILTRATION ALLOWANCE			ROW INFILTRATION ALLOWANCE			FLOW	SEWER DATA						
1	2	3	4	5	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	32	35	36
STREET	AREA ID (Street Address)	FROM MH	TO MH	RESIDENTIAL TYPES				POPULATION		PEAK FACTOR	PEAK FLOW (L/s)	CALCULATED FLOW (L/s)						PEAK FLOW (L/s)	AREA (ha)		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	
				Single Family	Townhouse	1 Bed	2 Bed	IND.	CUM.			INSTITUTIONAL		COMMERCIAL		INDUSTRIAL			IND.	CUM.		IND.	CUM.								L/s	(%)
												IND.	CUM.	IND.	CUM.	IND.	CUM.	(L/s)													
Stittsville Main Street	1518	SA07171	SA07169			10.0	22.00	60.2	60.2	3.64	0.89		0.00		0.00		0.00	0.00	0.48	0.48	0.16	0.08	0.08	0.03	1.07	37.22	59.37	250	0.36	0.735	36.15	97.12
	1519							0.0	60.2	3.64	0.89		0.00	0.15	0.15		0.00	0.07	0.15	0.63	0.21		0.08	0.03	1.20	37.22	59.37	250	0.36	0.735	36.03	96.79
	1521							0.0	60.2	3.64	0.89		0.00	0.18	0.33		0.00	0.16	0.18	0.81	0.27		0.08	0.03	1.34	37.22	59.37	250	0.36	0.735	35.88	96.39
	1528							0.0	60.2	3.64	0.89		0.00	0.03	0.36		0.00	0.17	0.03	0.83	0.28		0.08	0.03	1.36	37.22	59.37	250	0.36	0.735	35.86	96.33
	1648	SA43440	SA07169					0.0	0.0	3.80	0.00		0.00	0.07	0.07		0.00	0.04	0.07	0.07	0.02		0.00	0.00	0.06	0.00						
	1644							0.0	0.0	3.80	0.00		0.00	0.07	0.14		0.00	0.07	0.07	0.14	0.05		0.00	0.00	0.12	0.00						
	1643							0.0	0.0	3.80	0.00	0.95	0.95		0.14		0.00	0.53	0.95	1.09	0.36		0.00	0.00	0.89	0.00						
	1637							0.0	0.0	3.80	0.00	0.14	1.09		0.14		0.00	0.60	0.14	1.23	0.41		0.00	0.00	1.01	0.00						
	1634							0.0	0.0	3.80	0.00		1.09		0.14	0.58	0.58	0.95	0.58	1.82	0.60		0.00	0.00	1.55	0.00						
	1631							0.0	0.0	3.80	0.00	0.18	1.27		0.14		0.58	1.04	0.18	2.00	0.66		0.00	0.00	1.70	0.00						
	1626							0.0	0.0	3.80	0.00		1.27		0.14	0.79	1.38	1.52	0.79	2.79	0.92		0.00	0.00	2.44	0.00						
	1619							0.0	0.0	3.80	0.00	0.43	1.70		0.14		1.38	1.73	0.43	3.22	1.06		0.00	0.00	2.80	0.00						
	1615							0.0	0.0	3.80	0.00	0.09	1.80		0.14		1.38	1.78	0.09	3.32	1.10		0.00	0.00	2.88	0.00						
	1610							0.0	0.0	3.80	0.00		1.80	0.15	0.29		1.38	1.85	0.15	3.47	1.14		0.00	0.00	3.00	0.00						
	1609							0.0	0.0	3.80	0.00		1.80	0.38	0.67		1.38	2.04	0.38	3.85	1.27		0.00	0.00	3.31	0.00						
	1606							0.0	0.0	3.80	0.00		1.80	0.22	0.89		1.38	2.14	0.22	4.06	1.34		0.00	0.00	3.48	0.00						
	1601			1				3.4	3.4	3.76	0.05		1.80		0.89		1.38	2.14	0.12	4.19	1.38		0.00	0.00	3.57	0.00						
	1600							0.0	3.4	3.76	0.05	0.27	2.07		0.89		1.38	2.27	0.27	4.46	1.47		0.00	0.00	3.79	0.00						
	1594							0.0	3.4	3.76	0.05	0.11	2.18		0.89		1.38	2.33	0.11	4.56	1.51		0.00	0.00	3.88	0.00						
	1591							0.0	3.4	3.76	0.05		2.18		0.89		1.38	2.33	0.25	4.81	1.59		0.00	0.00	3.97	0.00						
	1589				6			16.2	19.6	3.71	0.29		2.18	0.09	0.98		1.38	2.37	0.09	4.90	1.62		0.00	0.00	4.28	0.00						
	1587				7			18.9	38.5	3.67	0.57		2.18		0.98		1.38	2.37	0.20	5.10	1.68		0.00	0.00	4.62	0.00						
	1586			1				3.4	41.9	3.66	0.62		2.18		0.98		1.38	2.37	0.16	5.26	1.73		0.00	0.00	4.73	0.00						
	1582							0.0	41.9	3.66	0.62		2.18	0.12	1.09		1.38	2.42	0.12	5.37	1.77		0.00	0.00	4.82	0.00						
	1580							0.0	41.9	3.66	0.62		2.18		1.09		1.38	2.42	0.10	5.47	1.81		0.00	0.00	4.85	0.00						
	1577				35			94.5	136.4	3.56	1.97		2.18		1.09		1.38	2.42	0.46	5.93	1.96		0.00	0.00	6.35	0.00						
	1573							0.0	136.4	3.56	1.97		2.18	0.20	1.29		1.38	2.52	0.20	6.13	2.02		0.00	0.00	6.51	0.00						
	1572							0.0	136.4	3.56	1.97		2.18	0.17	1.46		1.38	2.60	0.17	6.30	2.08		0.00	0.00	6.65	0.00						
	1567							0.0	136.4	3.56	1.97		2.18	0.20	1.66		1.38	2.70	0.20	6.50	2.14		0.00	0.00	6.81	0.00						
	1564							0.0	136.4	3.56	1.97		2.18	0.07	1.73		1.38	2.74	0.07	6.57	2.17		0.00	0.00	6.87	0.00						
	1563							0.0	136.4	3.56	1.97		2.18	0.26	2.00		1.38	2.86	0.26	6.84	2.26		0.00	0.00	7.09	0.00						
	1560							0.0	136.4	3.56	1.97		2.18	0.51	2.51		1.38	3.11	0.51	7.34	2.42		0.00	0.00	7.50	0.00						
	1557							0.0	136.4	3.56	1.97		2.18	0.20	2.71		1.38	3.21	0.20	7.54	2.49		0.00	0.00	7.67	0.00						
	1553							0.0	136.4	3.56	1.97		2.18	0.19	2.90		1.38	3.30	0.19	7.73	2.55		0.00	0.00	7.82	0.00						
	1552							0.0	136.4	3.56	1.97		2.18	0.23	3.12		1.38	3.41	0.23	7.96	2.63		0.00	0.00	8.01	0.00						
	1549							0.0	136.4	3.56	1.97		2.18	0.20	3.10		1.38	3.40	0.20	7.94	2.62		0.00	0.00	7.99	0.00						
	1547							0.0	136.4	3.56	1.97		2.18	0.14	3.24		1.38	3.47	0.14	8.08	2.67		0.00	0.00	8.11	0.00						
	1543			1				1.0	137.4	3.56	1.98		2.18		3.24		1.38	3.47	0.17	8.25	2.72		0.00	0.00	8.18	0.00						
	1542							0.0	136.4	3.56	1.97		2.18	0.40	3.64		1.38	3.66	0.40	8.48	2.80		0.00	0.00	8.43	0.00						
	1539					43.0		75.0	211.4	3.51	3.01		2.18	0.21	3.85		1.38	3.76	0.21	8.69	2.87		0.00	0.00	9.64	0.00						
	1538							0.0	211.4	3.51	3.01		2.18	0.20	4.05		1.38	3.86	0.20	8.89	2.93		0.00	0.00	9.80	0.00						
	1536							0.0	211.4	3.51	3.01		2.18	0.11	4.15		1.38	3.91	0.11	8.99	2.97		0.00	0.00	9.89	0.00						
	1532			1				1.0	212.4	3.51	3.02		2.18	0.17	4.33		1.38	4.00	0.17	9.16	3.02		0.00	0.00	10.04	0.00						
	1530							0.0	212.4	3.51	3.02		2.18	0.12	4.44		1.38	4.05	0.12	9.28	3.06	1.73	1.73	0.57	10.71	35.09	106.80	250	0.32	0.693	24.39	69.49
Orville Steet	2	SA07169	SA07787					0.0	272.6	3.48	3.84		2.18		4.80		1.38	4.23	0.12	10.23	3.38	0.00	1.82	0.60	12.04	39.24	22.40	250	0.40	0.774	27.20	69.31
	20				18.00			48.6	321.2	3.45	4.49		2.18		4.80		1.38	4.23	0.34	10.57	3.49	0.70	2.52	0.83	13.04	35.64	80.90	250	0.33	0.703	22.60	63.41

Design Parameters:

Residential		
Single	3.4	Persons
Semi	2.7	Persons
Avg. Apt.	1.8	Persons
1 Bed	1.4	Persons
2 Bed	2.1	Persons

ICI Areas			
			Peak Factor
INST	28,000	L/Ha/day	1.5
COM	28,000	L/Ha/day	1.5
IND	35,000	L/Ha/day	1.5

Notes:
1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 350 L/day
3. Infiltration allowance: 0.33 L/s/Ha
4. Residential Peaking Factor:
   Harmon Formula = 1+((14/(4+P^0.5))x0.8)
   where P = population in thousands
* = High density values are the determined population calculated by the flow determination spreadsheet

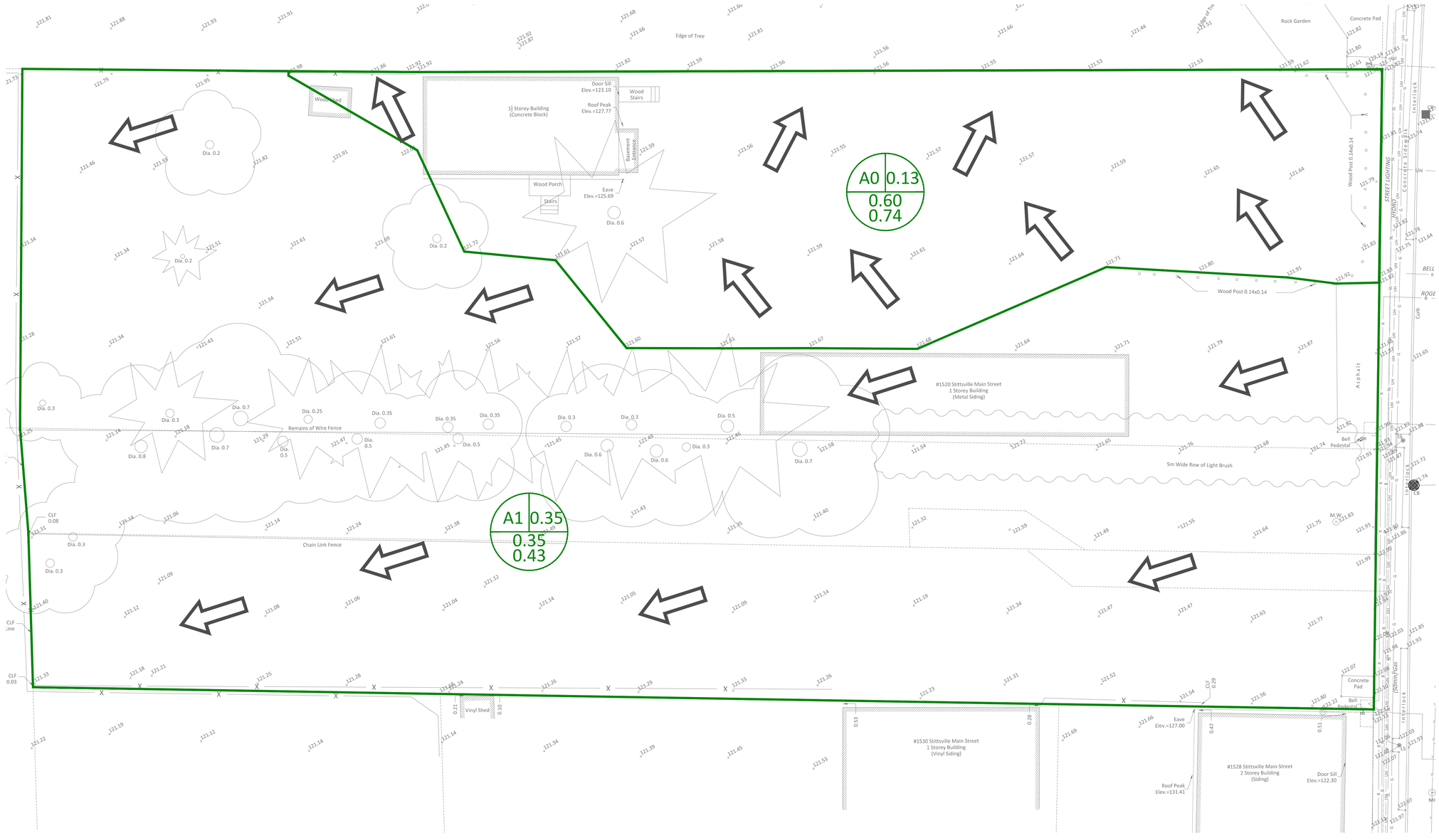
Designed: NBV
Checked: TDF
Project No.: CP-19-0608

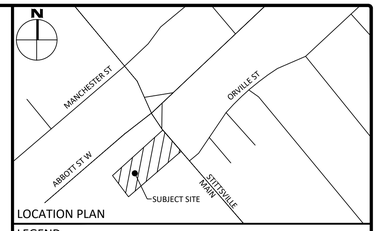
No.	Revision	Date
1.	ISSUED FOR REVIEW	2021-04-16

Sheet No: 1 of 1

APPENDIX E
PRE-DEVELOPMENT DRAINAGE PLAN

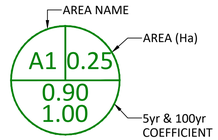
McINTOSH PERRY





LOCATION PLAN

LEGEND



FOR REVIEW ONLY
NOT FOR CONSTRUCTION

No.	Revisions	Date
2	REVISED PER CITY COMMENTS	APR. 14, 2021
1	ISSUED FOR REVIEW	NOV. 13, 2020

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

SCALE 1 : 150

0 5 10 15 Metres

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Stamp:

Client:
INVERNESS HOMES
38 AURIGA DRIVE, SUITE 200
OTTAWA, ON K2E8A5

Project:
MIXED USE DEVELOPMENT
1518-1526 STITTSVILLE MAIN STREET

Drawing Title:
PRE-DEVELOPMENT DRAINAGE PLAN

Scale: 1:250	Project Number: CP-19-0608
Drawn By: N.B.V.	
Checked By: T.D.F.	Drawing Number: PRE
Designed By: N.B.V.	

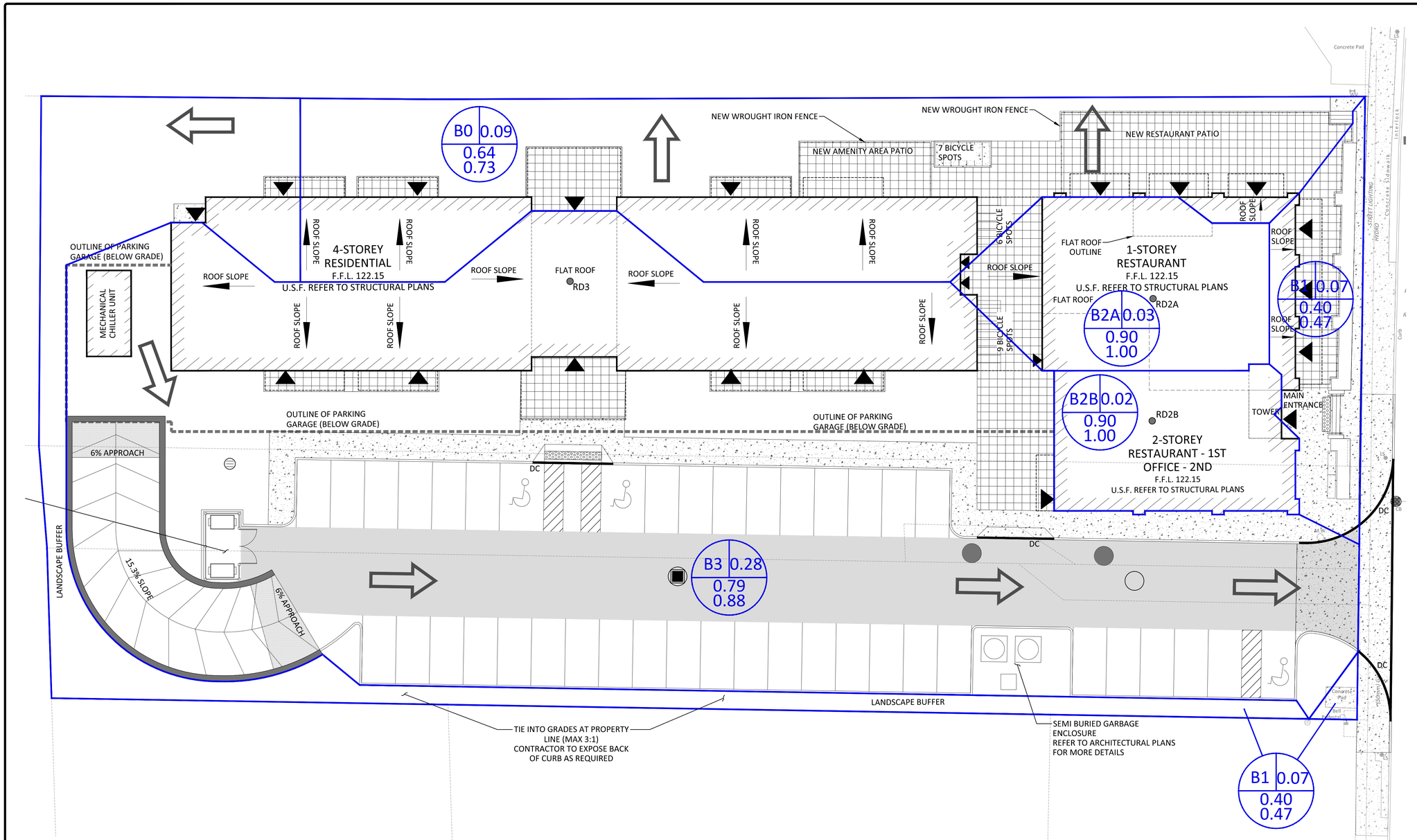
D07-12-20-0167

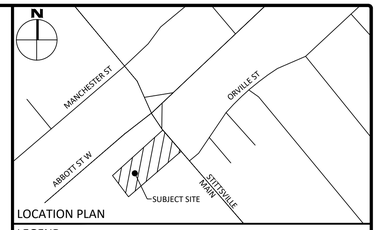
#18309

FILENAME: U:\Ottawa\01 Project - Proposal\2019 Jobs\CP\CP Projects\CP-19-0608 Inverness Homes_The Station_1518 Stittsville Main Street\Civil\12 - Drawings\CP-19-0608 PRESENTATION.dwg
LAST SAVED: Friday, April 09, 2021 LAST SAVED BY: n.vachon
LAST PLOTTED: Friday, April 09, 2021 CTB FILE USED: ----

APPENDIX F
POST-DEVELOPMENT DRAINAGE PLAN

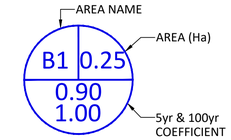
McINTOSH PERRY





LOCATION PLAN

LEGEND



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No.	Revisions	Date
2	REVISED PER CITY COMMENTS	APR. 14, 2021
1	ISSUED FOR REVIEW	NOV. 13, 2020

Check and verify all dimensions before proceeding with the work

Do not scale drawings

SCALE 1 : 150

0 5 10 15 Metres

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Stamp:

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INVERNESS HOMES
38 AURIGA DRIVE, SUITE 200
OTTAWA, ON K2E8A5

Project:

MIXED USE DEVELOPMENT
1518-1526 STITTSVILLE MAIN STREET

Drawing Title:

POST-DEVELOPMENT DRAINAGE PLAN

Scale: 1:250	Project Number: CP-19-0608
Drawn By: N.B.V.	
Checked By: T.D.F.	Drawing Number: POST
Designed By: N.B.V.	

D07-12-20-0167

#18309

FILENAME: \\Ottawa\01 Project - Projects\2019 jobs\CP\CP-Projects\CP-19-0608 Inverness Homes_The Station_1518 Stittsville Main Street\Cad\13 - Drawing\CP-19-0608 PRESENTATION.dwg
LAST SAVED: Friday, April 09, 2021 LAST SAVED BY: n.vachon
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APPENDIX G
STORMWATER MANAGEMENT CALCULATIONS

McINTOSH PERRY

CP-19-0608 - 1518-1526 Stittsville Main - 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	
A0	0.13	115.00	0.90	1,083.00	0.60	75.00	0.20	0.60	0.74	Unrestricted to Trail
A1	0.35	235.00	0.90	895.00	0.60	2,356.80	0.20	0.35	0.43	

Pre-Development Runoff Calculations

Drainage Area	Area (ha)	C 2/5-Year	C 100-Year	Tc (min)	I (mm/hr)			Q (L/s)			
					2-Year	5-Year	100-Year	2-Year	5-Year	100-Year	
A0	0.13	0.60	0.74	10	76.8	104.2	178.6	16.40	22.25	46.96	Unrestricted to Trail
A1	0.35	0.35	0.43	10	76.8	104.2	178.6	26.05	35.33	74.23	
Total	**0.48**							**42.45**	**57.59**	**121.19**	

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} 2/5-Year	C_{AVG} 100-Year
B0	0.089	567.00	0.90	0.00	0.60	327.70	0.20	0.64	0.73
B1	0.065	190.30	0.90	0.00	0.60	461.20	0.20	0.40	0.47
B2A	0.027	268.00	0.90	0.00	0.60	0.00	0.20	0.90	1.00
B2B	0.020	197.00	0.90	0.00	0.60	0.00	0.20	0.90	1.00
B3	0.275	2,308.56	0.90	0.00	0.60	440.44	0.20	0.79	0.88

Post-Development Runoff Calculations

Drainage Area	Area (ha)	C 2/5-Year	C 100-Year	Tc (min)	I (mm/hr)			Q (L/s)			
					2-Year	5-Year	100-Year	2-Year	5-Year	100-Year	
B0	0.089	0.64	0.73	10	76.8	104.2	178.6	12.30	16.68	32.21	Unrestricted to Trail
B1	0.065	0.40	0.47	10	76.8	104.2	178.6	5.63	7.63	15.17	
B2A	0.027	0.90	1.00	10	76.8	104.2	178.6	5.15	6.99	13.30	
B2B	0.020	0.90	1.00	10	76.8	104.2	178.6	3.79	5.14	9.78	
B3	0.275	0.79	0.88	10	76.8	104.2	178.6	46.24	62.73	120.06	
Total	**0.48**							**73.10**	**99.17**	**190.53**	

Required Restricted Flow

Drainage Area	Area (ha)	C 5-Year	Tc (min)	I (mm/hr)	Q (L/s)
				5-Year	5-Year
A0 +A1	0.48	0.42	10	104.2	57.91
Total	**0.48**				**57.91**

Post-Development Restricted Runoff Calculations

Drainage Area	Unrestricted Flow (L/s)			Restricted Flow (L/s)			Storage Required (m^3)			Storage Provided (m^3)		
	2-Year	5-Year	100-Year	2-Year	5-Year	100-Year	2-Year	5-Year	100-Year	2-Year	5-Year	100-Year
B0	12.30	16.68	32.21	12.30	16.68	32.21	x	x	x	x	x	x
B1	5.63	7.63	15.17	5.63	7.63	15.17	x	x	x	x	x	x
B2A	5.15	6.99	13.30	0.38	0.50	0.95	4.58	6.17	11.59	4.64	6.18	11.59
B2B	3.79	5.14	9.78	0.32	0.44	0.76	3.21	4.26	8.28	3.45	4.83	8.28
B3	46.24	62.73	120.06	5.70	5.75	6.00	33.81	50.81	116.94	34.39	52.67	122.01
Total	**73.10**	**99.17**	**190.53**	**24.32**	**31.00**	**55.09**	**41.59**	**61.24**	**136.81**	**42.48**	**63.68**	**141.88**

Storage Requirements for Area B2A

2-Year Storm Event

Tc (min)	I (mm/hr)	B2A Runoff (L/s)	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
35	36.1	2.42	0.38	2.04	4.28
40	32.9	2.20	0.38	1.82	4.38
45	30.2	2.03	0.38	1.65	4.45
50	28.0	1.88	0.38	1.50	4.50
55	26.2	1.75	0.38	1.37	4.54
60	24.6	1.65	0.38	1.27	4.56
65	23.2	1.55	0.38	1.17	4.57
70	21.9	1.47	0.38	1.09	4.58
75	20.8	1.40	0.38	1.02	4.57
80	19.8	1.33	0.38	0.95	4.56

Maximum Storage Required 2-Year (m^3) =	4.58

5-Year Storm Event

Tc (min)	I (mm/hr)	B2A Runoff (L/s)	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
40	44.2	2.96	0.50	2.46	5.91
45	40.6	2.72	0.50	2.22	6.01
50	37.7	2.52	0.50	2.02	6.07
55	35.1	2.36	0.50	1.86	6.12
60	32.9	2.21	0.50	1.71	6.15
65	31.0	2.08	0.50	1.58	6.17
70	29.4	1.97	0.50	1.47	6.17
75	27.9	1.87	0.50	1.37	6.17
80	26.6	1.78	0.50	1.28	6.15
85	25.4	1.70	0.50	1.20	6.13

Maximum Storage Required 5-Year (m^3) =	6.17

100-Year Storm Event

Tc (min)	I (mm/hr)	B2A Runoff (L/s)	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
40	75.1	5.60	0.95	4.65	11.16
45	69.1	5.14	0.95	4.19	11.33
50	64.0	4.76	0.95	3.81	11.44
55	59.6	4.44	0.95	3.49	11.52
60	55.9	4.16	0.95	3.21	11.57
65	52.6	3.92	0.95	2.97	11.59
70	49.8	3.71	0.95	2.76	11.59
75	47.3	3.52	0.95	2.57	11.57
80	45.0	3.35	0.95	2.40	11.53
85	43.0	3.20	0.95	2.25	11.48

Maximum Storage Required 100-Year (m^3) =	11.59

Storage Occupied In Area B2A

2-Year Storm Event

Roof Storage			
Location	**Area***	**Depth**	**Volume (m^3)**
Roof	154.58	0.030	4.64
		Total	4.64

Storage Available (m^3) =	**4.64**
Storage Required (m^3) =	**4.58**

5-Year Storm Event

Roof Storage			
Location	**Area***	**Depth**	**Volume (m^3)**
Roof	154.58	0.040	6.18
		Total	6.18

Storage Available (m^3) =	**6.18**
Storage Required (m^3) =	**6.17**

100-Year Storm Event

Roof Storage			
Location	**Area***	**Depth**	**Volume (m^3)**
Roof	154.58	0.075	11.59
		Total	11.59

Storage Available (m^3) =	**11.59**
Storage Required (m^3) =	**11.59**

*Area is 75% of the total roof area

Roof Drain Flow (B2)

Roof Drains Summary			
Type of Control Device	Watts Drianage - Accutrol Weir		
Number of Roof Drians	1		
	2-Year	5-Year	100-Year
Rooftop Storage (m^3)	4.64	6.18	11.59
Storage Depth (m)	0.030	0.040	0.075
Flow (Per Roof Drain) (L/s)	0.38	0.50	0.95
Total Flow (L/s)	0.38	0.50	0.95

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 Adjustable Accutrol Weirs, Fully Exposed

*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	0.19
	0.25	20	0.25
	0.32	25	0.32
2-Year	**0.38**	**30**	**0.38**
	0.44	35	0.44
5-Year	**0.50**	**40**	**0.50**
	0.57	45	0.57
	0.63	50	0.63
	0.69	55	0.69
	0.76	60	0.76
	0.82	65	0.82
	0.88	70	0.88
100-Year	**0.95**	**75**	**0.95**
	1.01	80	1.01
	1.07	85	1.07
	1.13	90	1.13
	1.20	95	1.20
	1.26	100	1.26
	1.32	105	1.32
	1.39	110	1.39
	1.45	115	1.45
	1.51	120	1.51
	1.58	125	1.58
	1.64	130	1.64
	1.70	135	1.70
	1.76	140	1.76
	1.83	145	1.83
	1.89	150	1.89

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

Storage Requirements for Area B2B

2-Year Storm Event

Tc (min)	I (mm/hr)	B2B Runoff (L/s)	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
20	52.0	2.56	0.32	2.24	2.69
25	45.2	2.23	0.32	1.91	2.86
30	40.0	1.97	0.32	1.65	2.98
35	36.1	1.78	0.32	1.46	3.06
40	32.9	1.62	0.32	1.30	3.12
45	30.2	1.49	0.32	1.17	3.16
50	28.0	1.38	0.32	1.06	3.19
55	26.2	1.29	0.32	0.97	3.20
60	24.6	1.21	0.32	0.89	3.21
65	23.2	1.14	0.32	0.82	3.20

Maximum Storage Required 2-Year (m^3) =	3.21

5-Year Storm Event

Tc (min)	I (mm/hr)	B2B Runoff (L/s)	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
20	70.3	3.46	0.44	3.02	3.63
25	60.9	3.00	0.44	2.56	3.84
30	53.9	2.66	0.44	2.22	3.99
35	48.5	2.39	0.44	1.95	4.10
40	44.2	2.18	0.44	1.74	4.17
45	40.6	2.00	0.44	1.56	4.22
50	37.7	1.86	0.44	1.42	4.25
55	35.1	1.73	0.44	1.29	4.26
60	32.9	1.62	0.44	1.18	4.26
65	31.0	1.53	0.44	1.09	4.25

Maximum Storage Required 5-Year (m^3) =	4.26

100-Year Storm Event

Tc (min)	I (mm/hr)	B2B Runoff (L/s)	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
40	75.1	4.12	0.76	3.36	8.05
45	69.1	3.78	0.76	3.02	8.16
50	64.0	3.50	0.76	2.74	8.23
55	59.6	3.27	0.76	2.51	8.27
60	55.9	3.06	0.76	2.30	8.28
65	52.6	2.88	0.76	2.12	8.28
70	49.8	2.73	0.76	1.97	8.26
75	47.3	2.59	0.76	1.83	8.23
80	45.0	2.46	0.76	1.70	8.18
85	43.0	2.35	0.76	1.59	8.12

Maximum Storage Required 100-Year (m^3) =	8.28

Storage Occupied In Area B2B

2-Year Storm Event

Roof Storage			
Location	**Area***	**Depth**	**Volume (m^3)**
Roof	138.00	0.025	3.45
		Total	3.45

Storage Available (m^3) =	**3.45**
Storage Required (m^3) =	**3.21**

5-Year Storm Event

Roof Storage			
Location	**Area***	**Depth**	**Volume (m^3)**
Roof	138.00	0.035	4.83
		Total	4.83

Storage Available (m^3) =	**4.83**
Storage Required (m^3) =	**4.26**

100-Year Storm Event

Roof Storage			
Location	**Area***	**Depth**	**Volume (m^3)**
Roof	138.00	0.060	8.28
		Total	8.28

Storage Available (m^3) =	**8.28**
Storage Required (m^3) =	**8.28**

*Area is 75% of the total roof area

Roof Drain Flow (B2)

Roof Drains Summary			
Type of Control Device	Watts Drianage - Accutrol Weir		
Number of Roof Drians	1		
	2-Year	5-Year	100-Year
Rooftop Storage (m^3)	3.45	4.83	8.28
Storage Depth (m)	0.025	0.035	0.060
Flow (Per Roof Drain) (L/s)	0.32	0.44	0.76
Total Flow (L/s)	0.32	0.44	0.76

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 Adjustable Accutrol Weirs, Fully Exposed

*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	0.19
	0.25	20	0.25
2-Year	**0.32**	**25**	**0.32**
	0.38	30	0.38
5-Year	**0.44**	**35**	**0.44**
	0.50	40	0.50
	0.57	45	0.57
	0.63	50	0.63
	0.69	55	0.69
100-Year	**0.76**	**60**	**0.76**
	0.82	65	0.82
	0.88	70	0.88
	0.95	75	0.95
	1.01	80	1.01
	1.07	85	1.07
	1.13	90	1.13
	1.20	95	1.20
	1.26	100	1.26
	1.32	105	1.32
	1.39	110	1.39
	1.45	115	1.45
	1.51	120	1.51
	1.58	125	1.58
	1.64	130	1.64
	1.70	135	1.70
	1.76	140	1.76
	1.83	145	1.83
	1.89	150	1.89

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

Storage Requirements for Area B3

2-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)
20	52.0	31.33	5.70	25.63	30.75
25	45.2	27.19	5.70	21.49	32.24
30	40.0	24.11	5.70	18.41	33.14
35	36.1	21.71	5.70	16.01	33.62
40	32.9	19.79	5.70	14.09	33.81
45	30.2	18.21	5.70	12.51	33.77
50	28.0	16.88	5.70	11.18	33.55

Maximum Storage Required 2-Year (m^3) =	33.81

5-Year Storm Event

Tc (min)	I (mm/hr)	B3 Runoff (L/s)	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
30	53.9	32.47	5.75	26.72	48.09
35	48.5	29.21	5.75	23.46	49.27
40	44.2	26.60	5.75	20.85	50.05
45	40.6	24.46	5.75	18.71	50.52
50	37.7	22.67	5.75	16.92	50.76
55	35.1	21.15	5.75	15.40	50.81
60	32.9	19.83	5.75	14.08	50.71

Maximum Storage Required 5-Year (m^3) =	50.81

100-Year Storm Event

Tc (min)	I (mm/hr)	B3 Runoff (L/s)	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
80	45.0	30.25	6.00	24.25	116.41
85	43.0	28.88	6.00	22.88	116.70
90	41.1	27.64	6.00	21.64	116.87
95	39.4	26.52	6.00	20.52	116.94
100	37.9	25.49	6.00	19.49	116.91
105	36.5	24.54	6.00	18.54	116.81
110	35.2	23.67	6.00	17.67	116.62

Maximum Storage Required 100-Year (m^3) =	116.94

Storage Occupied In Area B3

2-Year Storm Event

Structure/Pipe	Size (mm)	Depth/ Length (m)	Area (m^2)	Volume (m^3)
LSCB1	600x600	2.660	0.372	0.990
LSCB1-CBMH2	525	35.480	0.866	30.716
CBMH2	1200	2.300	1.167	2.684

Storage Available (m^3) =	**34.4**
Storage Required (m^3) =	**33.8**

5-Year Storm Event Storage Summary

Water Elev. (m) =		121.75		
T/G	INV. (out)	Head (m)	Depth (m)	Volume (m^3)
121.50	119.20	2.40	0.25	52.7

Storage Available (m^3) =	**52.7**
Storage Required (m^3) =	**50.8**

*Storage Calculated in AutoCAD

100-Year Storm Event Storage Sumamry

Water Elev. (m) =		121.84		
T/G	INV. (out)	Head (m)	Depth (m)	Volume (m^3)
121.50	119.20	2.49	0.34	122.0

Storage Available (m^3) =	**122.0**
Storage Required (m^3) =	**116.9**

*Storage Calculated in AutoCAD

Time of Concentration Pre-Development

Drainage Area ID	Sheet Flow Distance (m)	Slope of Land (%)	Tc (min) (5-Year)	Tc (min) (100-Year)
A1	**66**	**1.50**	8	6

Therefore, a Tc of 10 can be used

Tc= (3.26(1.1-c)L^0.5/S^0.33)

c= Blanced Runoff Coefficient

L= Length of drainage area

S= Average slope of watershed

TEMPEST Product Submittal Package

Date: November 4, 2020

Customer: McIntosh Perry

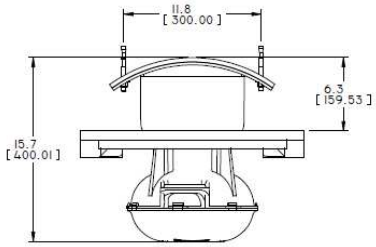
Contact: Nicholas Vachon

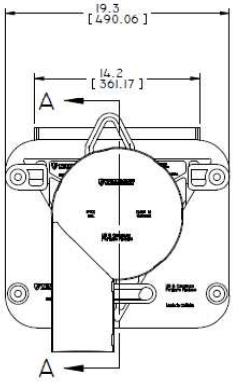
Location: Ottawa

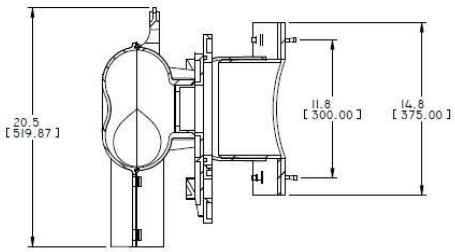
Project Name: Stittsville Main St

IPEX

Tempest LMF ICD Rd Shop Drawing







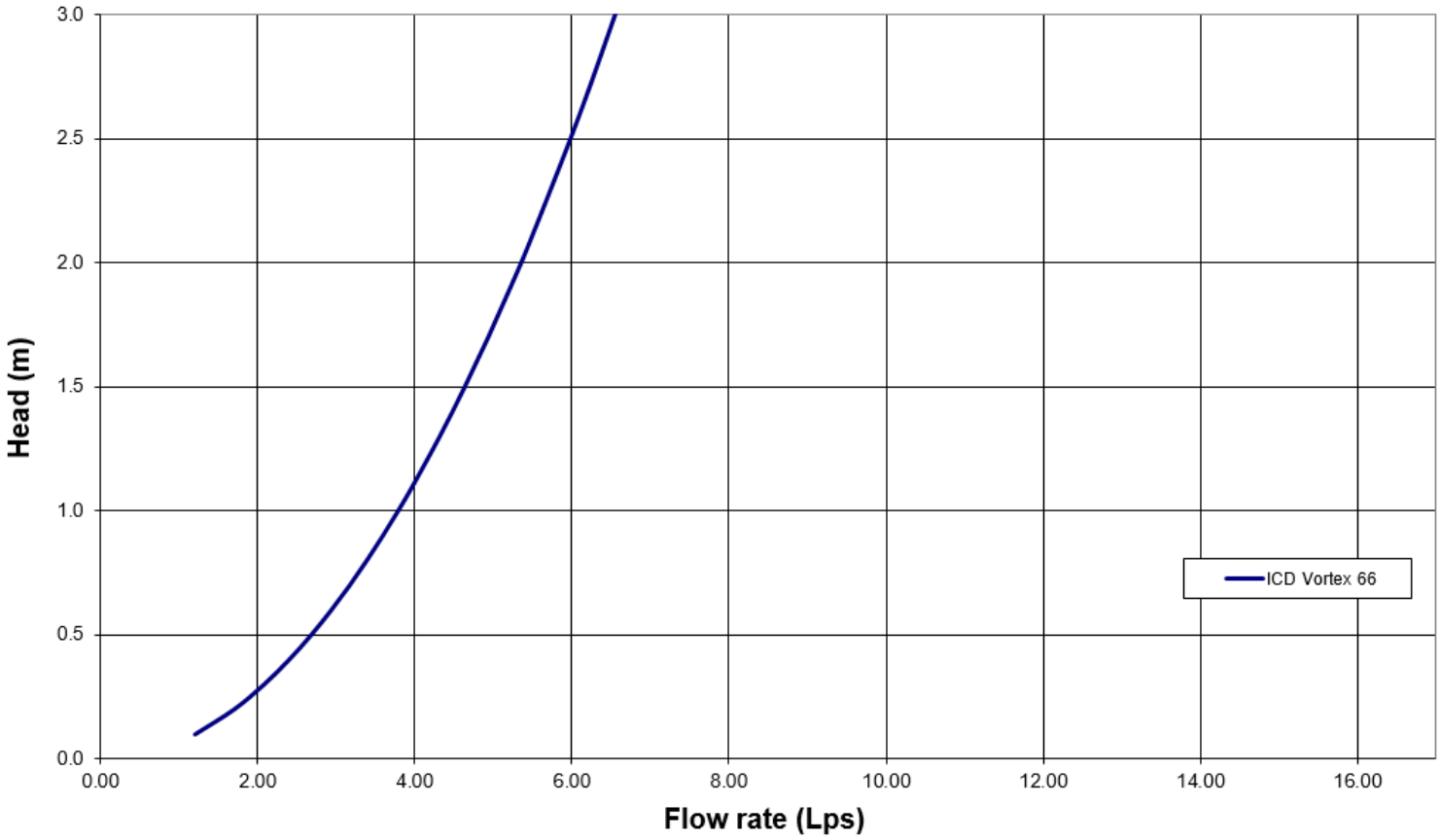
SECTION A-A

IPEX TECHNOLOGIES INC.			
PROJECTION	UNITS: in (mm)	TITLE: LMF ROUND CB ASSEMBLY	
DRAWN BY: H. M-MARTIN	DATE: 2011-07-26	SIZE: B	SCALE(S): 1/8
VERIFIED BY:	DATE: 2011-07-26	DRAWING NUMBER: SGM74_FA002R03	REV: 3

IPEX

Tempest LMF ICD Flow Curve

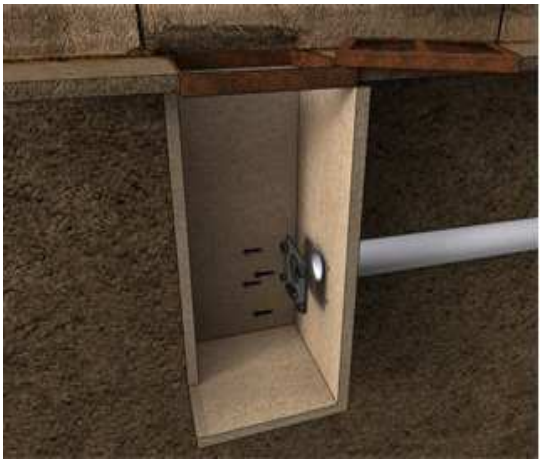
Flow: 6 L/s
Head: 2.49 m

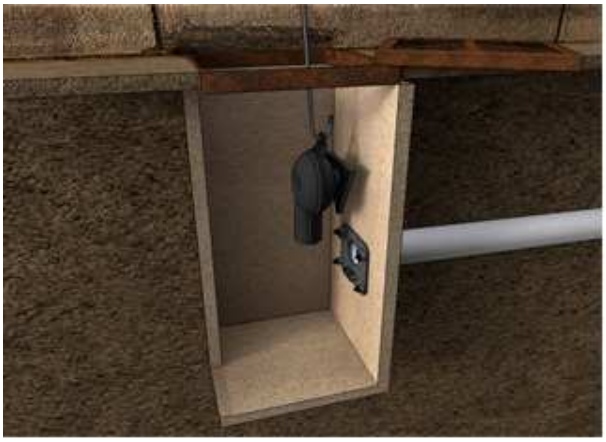


IPEX

Square CB Installation Notes:

1. Materials and tooling verification:
   - Tooling: impact drill, 3/8'' concrete bit, torque wrench for 9/16''nut, hand hammer, level, and marker.
   - Material: (4) concrete anchor 3/8x3-1/2, (4) washers, (4) nuts
2. Use the mounting wall plate to locate and mark the hole (4) pattern on the catch basin wall. You should use a level to ensure that the plate is at the horizontal.
3. Use an impact drill with a 3/8'' concrete bit to make the four holes at a minimum of 1-1/2'' depth up to 2-1/2''. Clean the concrete dust from the holes.
4. Install the anchors (4) in the holes by using a hammer. Put the nuts on the top of the anchors to protect the threads when you will hit the anchors with the hammer. Remove the nuts on the ends of the anchors
5. Install the wall mounting plate on the anchors and screw the nut in place with a maximum torque of 40 N.m (30 lbf-ft). There should be no gap between the wall mounting plate and the catch basin wall.
6. From ground above using a reach bar, lower the device by hooking the end of the reach bar to the handle of the LMF device. Align the triangular plate portion into the mounting wall plate. Push down the device to be sure it has centered in to the wall mounting plate and has created a seal.



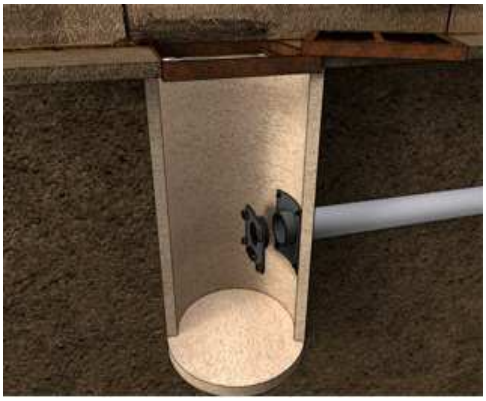


IPEX

Round CB Installation Notes: (Refer to square install notes above for steps 1 , 3, & 4)

2. Use spigot catch basin wall plate to locate and mark the hole (4) pattern on the catch basin wall. You should use a level to ensure that the plate is at the horizontal.
5. Install the CB spigot wall plate on the anchors and screw the 4 nuts in place with a maximum torque of 40 N.m (30 lb-ft). There should be no gap between the CB spigot wall plate and the catch basin wall.
6. Apply solvent cement on the hub of the universal mounting plate and the spigot of the spigot CB wall plate. Slide the hub over the spigot. Make sure the universal mounting plate is at the horizontal and its hub is completely inserted onto the spigot. Normally, the corners of the universal mounting plate hub adapter should touch the catch basin wall.
7. From ground above using a reach bar, lower the ICD device by hooking the end of the reach bar to the handle of the ICD device. Align the triangular plate portion into the mounting wall plate. Push down the device to be sure it has centered into the mounting plate and has created a seal.






CAUTION/WARNING/DISCLAIM:

- Verify that the inlet(s) pipe(s) is not protruding into the catch basin. If it is, cut it back so that the inlet pipe is flush with the catch basin wall.
- Any required cement in the installation must be approved for PVC.
- The solvent cement should not be used below 0°C (32°F) or in a high humidity environment. Please refer to the IPEX solvent cement guide to confirm required curing times or attend the IPEX **Online Solvent Cement Training Course**.
- Call your IPEX representative for more information or if you have any questions about our products.

IPEX

IPEX TEMPEST Inlet Control Devices Technical Specification

General

Inlet control devices (ICD's) are designed to provide flow control at a specified rate for a given water head level and also provide odour and floatable control where specified. All ICD's will be IPEX Tempest or approved equal.

All devices shall be removable from a universal mounting plate. An operator from street level using only a T-bar with a hook will be able to retrieve the device while leaving the universal mounting plate secured to the catch basin wall face. The removal of the TEMPEST devices listed above must not require any unbolting or special manipulation or any special tools.

High Flow (HF) Sump devices will consist of a removable threaded cap which can be accessible from street level with out entry into the catchbasin (CB). The removal of the threaded cap shall not require any special tools other than the operator's hand.

ICD's must have no moving parts.

Materials

ICD's are to be manufactured from Polyvinyl Chloride (PVC) or Polyurethane material, designed to be durable enough to withstand multiple freeze-thaw cycles and exposure to harsh elements.

The inner ring seal will be manufactured using a Buna or Nitrile material with hardness between Duro 50 and Duro 70.

The wall seal is to be comprised of a 3/8" thick Neoprene Closed Cell Sponge gasket which is attached to the back of the wall plate.

All hardware will be made from 304 stainless steel.

Dimensioning

The Low Medium Flow (LMF), High Flow (HF) and the High Flow (HF) Sump shall allow for a minimum outlet pipe diameter of 200mm with a 600mm deep Catch Basin sump.

Installation

Contractor shall be responsible for securing, supporting and connecting the ICD's to the existing influent pipe and catchbasin/manhole structure as specified and designed by the Engineer.

STORM SEWER DESIGN SHEET

PROJECT: Mixed Used Development
LOCATION: 1518 Stittsville Main
CLIENT: Krumac Holdings Inc.

McINTOSH PERRY

LOCATION				CONTRIBUTING AREA (ha)				RATIONAL DESIGN 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
STREET	AREA ID	FROM MH	TO MH	C-VALUE	AREA (ha)	INDIV AC	CUMUL AC	INLET (min)	TIME IN PIPE	TOTAL (min)	i (5) (mm/hr)	i (10) (mm/hr)	i (100) (mm/hr)	5yr PEAK FLOW (L/s)	10yr PEAK FLOW (L/s)	100yr PEAK FLOW (L/s)	FIXED FLOW (L/s)	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	PIPE SIZE (mm)			SLOPE (%)	VELOCITY (m/s)	AVAIL CAP (5yr)	
																					DIA	W	H			(L/s)	(%)
	B2	Roof Drain	Tee	0.90	0.04												1.76	1.76	15.89	35.10	150			1.00	0.871	14.13	88.92%
	B3	LSCB1	CBMH2	0.79	0.27	0.21	0.21	10.00	0.42	10.42	104.19			0.00				0.00	317.25	35.48	525			0.50	1.420	317.25	100.00%
		CBMH2	OGS			0.00	0.21	10.42	0.60	11.01	102.04			60.73			1.76	62.49	71.33	35.10	300			0.50	0.978	8.84	12.39%
		OGS	Ex. 750mm			0.00	0.21	11.01	0.38	11.39	99.12			58.99			1.76	60.75	71.33	22.12	300			0.50	0.978	10.58	14.83%

Definitions:
Q = 2.78CiA, where:
Q = Peak Flow in Litres per Second (L/s)
A = Area in Hectares (ha)
i = Rainfall intensity in millimeters per hour (mm/hr)
[i = 998.071 / (TC+6.053)^0.814] 5 YEAR
[i = 1174.184 / (TC+6.014)^0.816] 10 YEAR
[i = 1735.688 / (TC+6.014)^0.820] 100 YEAR

Notes:
1. Mannings coefficient (n) = 0.013

Designed: N.B.V.
Checked: T.D.F.
Project No.: CP-19-0608

No.	Revision	Date
1.	ISSUED FOR REVIEW	2020-11-13
2	REVISED PER CITY COMMENTS	2020-04-14

Sheet No: 1 of 1

Stormceptor®

FORTERRA

Stormceptor® EF Sizing Report

STORMCEPTOR®
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

11/04/2020

Province:	Ontario
City:	Ottawa
Nearest Rainfall Station:	OTTAWA MACDONALD-CARTIER INT'L AP
NCDC Rainfall Station Id:	6000
Years of Rainfall Data:	37

Site Name:	1518-1526 Stittsville Main St.

Drainage Area (ha):	0.48
Runoff Coefficient 'c':	0.80

Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0
Required Water Quality Runoff Volume Capture (%):	90.0

Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	Yes
Upstream Orifice Control Flow Rate to Stormceptor (L/s):	7.76
Peak Conveyance (maximum) Flow Rate (L/s):	7.76

Project Name:	1518-1526 Stittsville Main St.
Project Number:	-
Designer Name:	Brandon O'Leary
Designer Company:	Forterra
Designer Email:	brandon.oleary@forterrabp.com
Designer Phone:	905-630-0359
EOR Name:	Nicholas Vachon
EOR Company:	McIntosh Perry
EOR Email:	
EOR Phone:	

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	81
EFO6	89
EFO8	92
EFO10	93
EFO12	93

Recommended Stormceptor EFO Model: EFO4

Estimated Net Annual Sediment (TSS) Load Reduction (%): 81

Water Quality Runoff Volume Capture (%): > 90

imbrium

THIRD-PARTY TESTING AND VERIFICATION

►**Stormceptor® EF and Stormceptor® EFO** are the latest evolutions in the Stormceptor® oil-grit separator (OGS) technology series, and are designed to remove a wide variety of pollutants from stormwater and snowmelt runoff. These technologies have been third-party tested in accordance with the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators** and performance has been third-party verified in accordance with the **ISO 14034 Environmental Technology Verification (ETV)** protocol.

PERFORMANCE

►**Stormceptor® EF and EFO** remove stormwater pollutants through gravity separation and floatation, and feature a patent-pending design that generates positive removal of total suspended solids (TSS) throughout each storm event, including high-intensity storms. Captured pollutants include sediment, free oils, and sediment-bound pollutants such as nutrients, heavy metals, and petroleum hydrocarbons. Stormceptor is sized to remove a high level of TSS from the frequent rainfall events that contribute the vast majority of annual runoff volume and pollutant load. The technology incorporates an internal bypass to convey excessive stormwater flows from high-intensity storms through the device without resuspension and washout (scour) of previously captured pollutants. Proper routine maintenance ensures high pollutant removal performance and protection of downstream waterways.

PARTICLE SIZE DISTRIBUTION (PSD)

►The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV ***Procedure for Laboratory Testing of Oil-Grit Separators*** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a wide range of particle sizes in the sand and silt fractions, and is considered reasonably representative of the particle size fractions found in typical urban stormwater runoff.

Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

imbrium

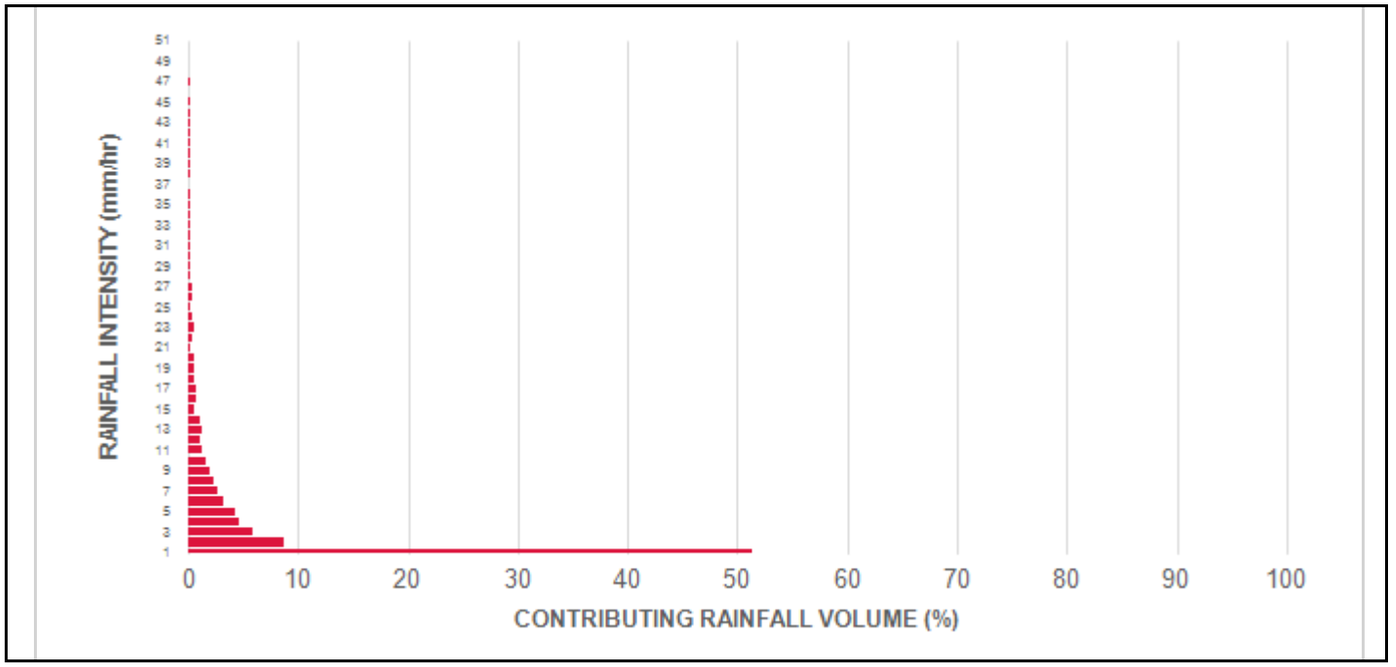
Upstream Flow Controlled Results

Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
1	51.3	51.3	1.07	64.0	53.0	92	47.2	47.2
2	8.7	60.0	2.14	128.0	107.0	87	7.6	54.8
3	5.8	65.8	3.20	192.0	160.0	80	4.7	59.4
4	4.6	70.4	4.27	256.0	214.0	75	3.5	62.9
5	4.2	74.6	5.34	320.0	267.0	71	3.0	65.8
6	3.2	77.8	6.41	384.0	320.0	65	2.1	67.9
7	22.2	100.0	7.47	448.0	374.0	61	13.5	81.4
8	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4
9	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4
10	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4
11	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4
12	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4
13	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4
14	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4
15	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4
16	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4
17	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4
18	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4
19	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4
20	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4
21	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4
22	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4
23	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4
24	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4
25	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4

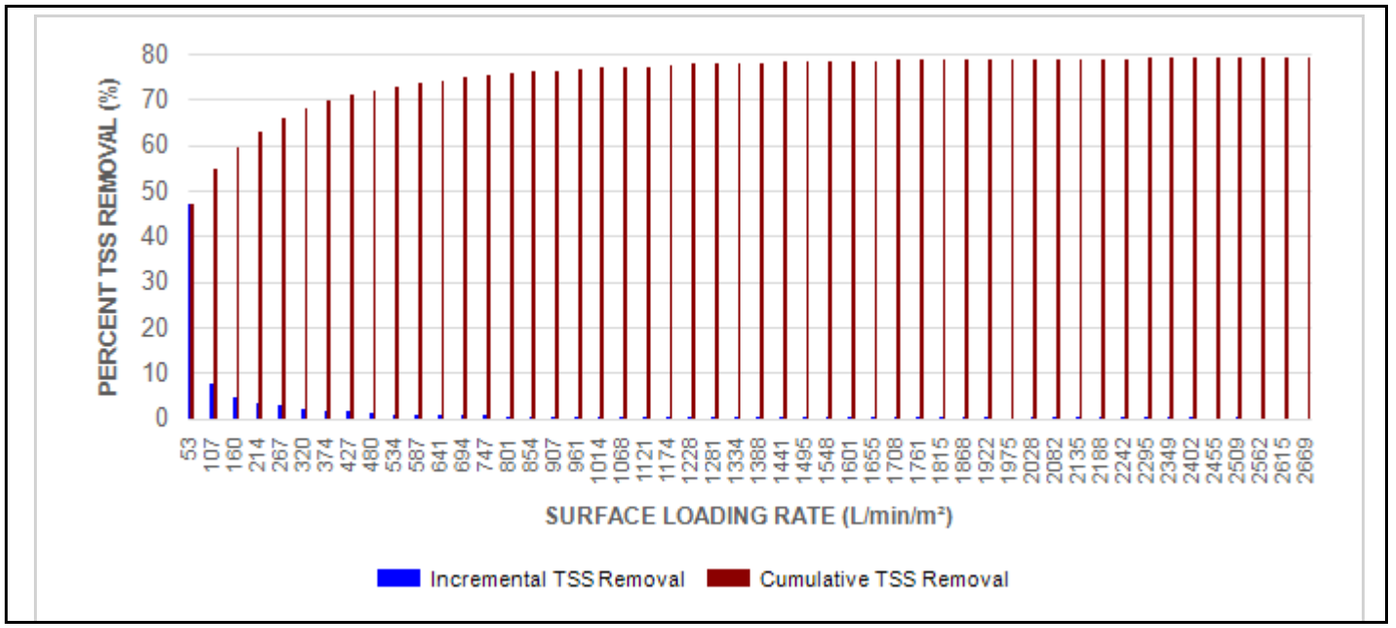
Stormceptor® EF Sizing Report

Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
26	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4
27	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4
28	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4
29	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4
30	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4
31	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4
32	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4
33	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4
34	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4
35	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4
36	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4
37	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4
38	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4
39	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4
40	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4
41	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4
42	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4
43	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4
44	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4
45	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4
46	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4
47	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4
48	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4
49	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4
50	0.0	100.0	8.00	480.0	400.0	58	0.0	81.4
Estimated Net Annual Sediment (TSS) Load Reduction =								**81 %**

RAINFALL DATA FROM OTTAWA MACDONALD-CARTIER INT'L AP RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



Maximum Pipe Diameter / Peak Conveyance

Stormceptor EF / EFO	Model Diameter		Min Angle Inlet / Outlet Pipes	Max Inlet Pipe Diameter		Max Outlet Pipe Diameter		Peak Conveyance Flow Rate	
	(m)	(ft)		(mm)	(in)	(mm)	(in)	(L/s)	(cfs)
EF4 / EFO4	1.2	4	90	609	24	609	24	425	15
EF6 / EFO6	1.8	6	90	914	36	914	36	990	35
EF8 / EFO8	2.4	8	90	1219	48	1219	48	1700	60
EF10 / EFO10	3.0	10	90	1828	72	1828	72	2830	100
EF12 / EFO12	3.6	12	90	1828	72	1828	72	2830	100

SCOUR PREVENTION AND ONLINE CONFIGURATION

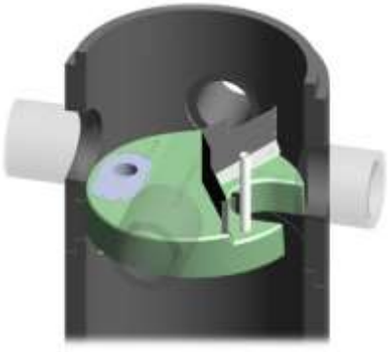
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test performance has been third-party verified in accordance with the ISO 14034 ETV protocol. As a result, Stormceptor EF and EFO are approved for online installation, eliminating the need for costly additional bypass structures, piping, and installation expense.

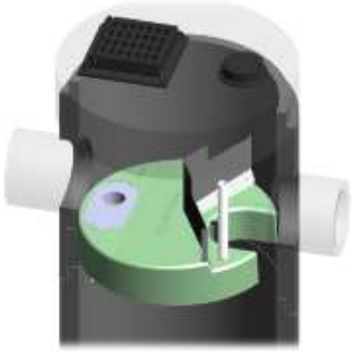
DESIGN FLEXIBILITY

►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend angle, and can be modified to ensure performance in submerged conditions.

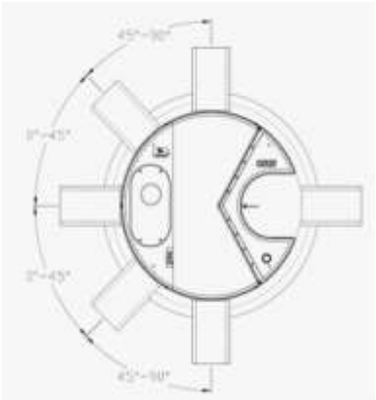
OIL CAPTURE AND RETENTION

►While Stormceptor® EF will capture and retain oil from dry weather spills and low intensity runoff, **Stormceptor® EFO** has demonstrated superior oil capture and greater than 99% oil retention in third-party testing according to the light liquid re-entrainment testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**. Stormceptor EFO is recommended for sites where oil capture and retention is a requirement.





imbrium



INLET-TO-OUTLET DROP

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.
0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.
45° - 90° : The inlet pipe is 2-inches (50mm) higher than the outlet pipe.

HEAD LOSS

The head loss through Stormceptor EF is similar to that of a 60-degree bend structure. The applicable K value for calculating minor losses through the unit is 1.1. For submerged conditions the applicable K value is 3.0.

Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft^3)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

*Increased sump depth may be added to increase sediment storage capacity
** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft^3)

Feature	Benefit	Feature Appeals To
Patent-pending enhanced flow treatment and scour prevention technology	Superior, verified third-party performance	Regulator, Specifying & Design Engineer
Third-party verified light liquid capture and retention for EFO version	Proven performance for fuel/oil hotspot locations	Regulator, Specifying & Design Engineer, Site Owner
Functions as bend, junction or inlet structure	Design flexibility	Specifying & Design Engineer
Minimal drop between inlet and outlet	Site installation ease	Contractor
Large diameter outlet riser for inspection and maintenance	Easy maintenance access from grade	Maintenance Contractor & Site Owner

STANDARD STORMCEPTOR EF/EFO DRAWINGS

For standard details, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

For specifications, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD PERFORMANCE SPECIFICATION FOR "OIL GRIT SEPARATOR" (OGS) STORMWATER QUALITY TREATMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, and designing an underground Oil Grit Separator (OGS) device for stormwater quality treatment, with third-party testing results and a Statement of Verification in accordance with ISO 14034 Environmental Management – Environmental Technology Verification (ETV).

1.2 REFERENCE STANDARDS & PROCEDURES

ISO 14034:2016 Environmental management – Environmental technology verification (ETV)

Canadian Environmental Technology Verification (ETV) Program's **Procedure for Laboratory Testing of Oil-Grit** S**eparators**

1.3 SUBMITTALS

1.3.1 All submittals, including sizing reports & shop drawings, shall be submitted upon request with each order to the contractor then forwarded to the Engineer of Record for review and acceptance. Shop drawings shall detail all OGS components, elevations, and sequence of construction.

1.3.2 Alternative devices shall have features identical to or greater than the specified device, including: treatment chamber diameter, treatment chamber wet volume, sediment storage volume, and oil storage volume.

1.3.3 Unless directed otherwise by the Engineer of Record, OGS stormwater quality treatment product substitutions or alternatives submitted within ten days prior to project bid shall not be accepted. All alternatives or substitutions submitted shall be signed and sealed by a local registered Professional Engineer, based on the exact same criteria detailed in Section 3, in entirety, subject to review and approval by the Engineer of Record.

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

The OGS device shall include a sump for sediment storage, and a protected volume for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants. The minimum sediment & petroleum hydrocarbon storage capacity shall be as follows:

2.1.1	4 ft (1219 mm) Diameter OGS Units:	1.19 m^3 sediment / 265 L oil
	6 ft (1829 mm) Diameter OGS Units:	3.48 m^3 sediment / 609 L oil
	8 ft (2438 mm) Diameter OGS Units:	8.78 m^3 sediment / 1,071 L oil
	10 ft (3048 mm) Diameter OGS Units:	17.78 m^3 sediment / 1,673 L oil
	12 ft (3657 mm) Diameter OGS Units:	31.23 m^3 sediment / 2,476 L oil

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality treatment device shall remove oil, sediment and gross pollutants from stormwater runoff during frequent wet weather events, and retain these pollutants during less frequent high flow wet weather events below the insert within the OGS for later removal during maintenance. The Manufacturer shall have at least ten (10) years of local experience, history and success in engineering design, manufacturing and production and supply of OGS stormwater quality treatment device systems, acceptable to the Engineer of Record.

3.2 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in the sizing report for the specified device. Sizing shall be determined using historical rainfall data and a sediment removal performance curve derived from the actual third-party verified laboratory testing data. The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 2.1.

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of third-party scour testing conducted in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.**

3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m^2.

3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators,** with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to assess whether light liquids captured after a spill are effectively retained at high flow rates.

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m2 to 2600 L/min/m2) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.**However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.

STANDARD PERFORMANCE SPECIFICATION FOR "OIL GRIT SEPARATOR" (OGS) STORMWATER QUALITY TREAMENT DEVICE

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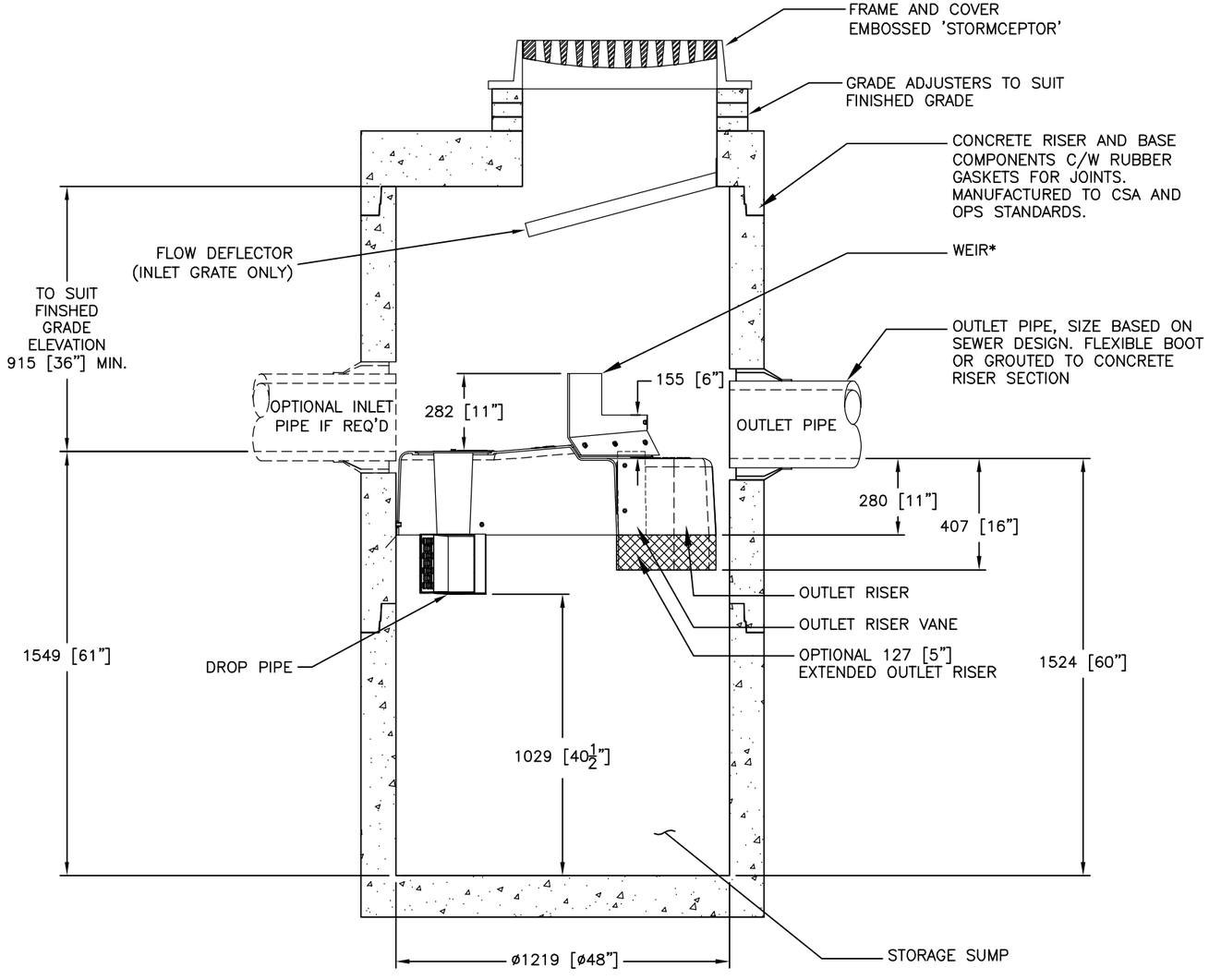
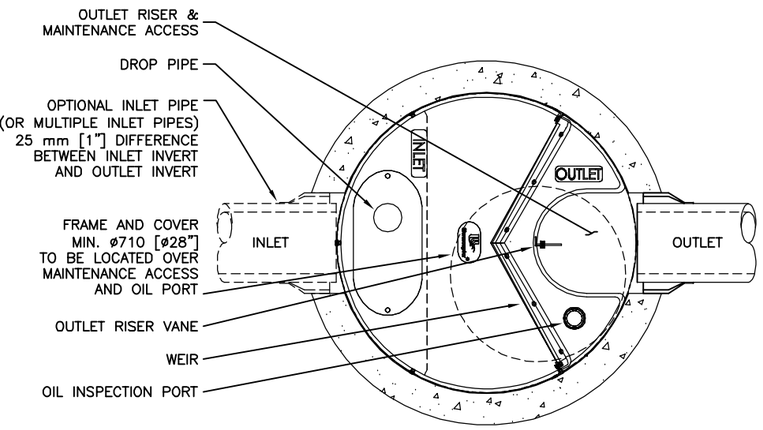
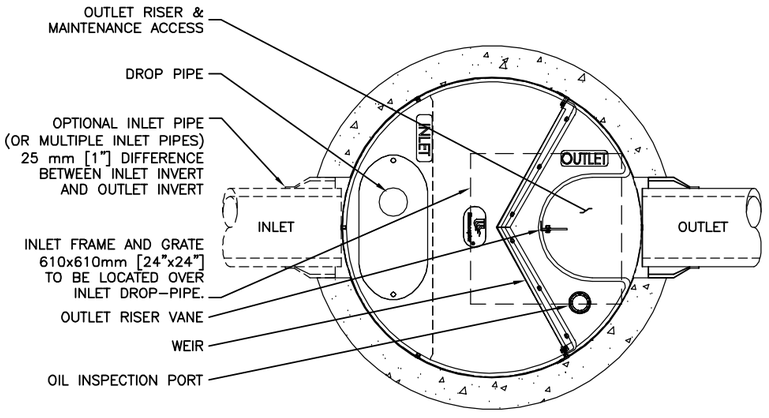


SECTION VIEW



PLAN VIEW (STANDARD)



PLAN VIEW (INLET TOP)

FOR SITE SPECIFIC DRAWINGS PLEASE CONTACT YOUR LOCAL STORMCEPTOR REPRESENTATIVE. SITE SPECIFIC DRAWINGS ARE BASED ON THE BEST AVAILABLE INFORMATION AT THE TIME. SOME FIELD REVISIONS TO THE SYSTEM LOCATION OR CONNECTION PIPING MAY BE NECESSARY BASED ON AVAILABLE SPACE OR SITE CONFIGURATION REVISIONS. ELEVATIONS SHOULD BE MAINTAINED EXCEPT WHERE NOTED ON BYPASS STRUCTURE (IF REQUIRED).

GENERAL NOTES:

* MAXIMUM SURFACE LOADING RATE (SLR) INTO LOWER CHAMBER THROUGH DROP PIPE IS 1135 L/min/m^2 (27.9 gpm/ft^2) FOR STORMCEPTOR EF4 AND 535 L/min/m^2 (13.1 gpm/ft^2) FOR STORMCEPTOR EFO4 (OIL CAPTURE CONFIGURATION). WEIR HEIGHT IS 150 mm (6 INCH) FOR EF04.

1. ALL DIMENSIONS INDICATED ARE IN MILLIMETERS (INCHES) UNLESS OTHERWISE SPECIFIED.
2. STORMCEPTOR STRUCTURE INLET AND OUTLET PIPE SIZE AND ORIENTATION SHOWN FOR INFORMATIONAL PURPOSES ONLY.
3. UNLESS OTHERWISE NOTED, BYPASS INFRASTRUCTURE, SUCH AS ALL UPSTREAM DIVERSION STRUCTURES, CONNECTING STRUCTURES, OR PIPE CONDUITS CONNECTING TO COMPLETE THE STORMCEPTOR SYSTEM SHALL BE PROVIDED AND ADDRESSED SEPARATELY.
4. DRAWING FOR INFORMATION PURPOSES ONLY. REFER TO ENGINEER'S SITE/UTILITY PLAN FOR STRUCTURE ORIENTATION.
5. NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS SUBMITTED 10 DAYS PRIOR TO PROJECT BID DATE, OR AS DIRECTED BY THE ENGINEER OF RECORD.

INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE (LIFTING CLUTCHES PROVIDED)
C. CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT)
D. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT THE DEVICE FROM CONSTRUCTION-RELATED EROSION RUNOFF.
E. DEVICE ACTIVATION, BY CONTRACTOR, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE STORMCEPTOR UNIT IS CLEAN AND FREE OF DEBRIS.

STANDARD DETAIL
NOT FOR CONSTRUCTION

SITE SPECIFIC DATA REQUIREMENTS

STORMCEPTOR MODEL	EFO4				
STRUCTURE ID					*
HYDROCARBON STORAGE REQ'D (L)					*
WATER QUALITY FLOW RATE (L/s)					*
PEAK FLOW RATE (L/s)					*
RETURN PERIOD OF PEAK FLOW (yrs)					*
DRAINAGE AREA (HA)					*
DRAINAGE AREA IMPERVIOUSNESS (%)					*
PIPE DATA:	I.E.	MAT'L	DIA	SLOPE %	HGL
INLET #1	*	*	*	*	*
INLET #2	*	*	*	*	*
OUTLET	*	*	*	*	*

* PER ENGINEER OF RECORD

MARK	DATE	REVISION DESCRIPTION	BY
####	####	####	####
####	####	####	####
1	6/8/18	UPDATES	JSK
0	5/26/17	INITIAL RELEASE	JSK

Stormceptor® EF

SCALE = NTS

imbrium®
7007 RIDGE ROAD, SUITE 550, HANOVER, MD 21076
USA: 888-279-9828 CA: 800-386-4801 INTL: +1-416-960-9900

DATE: 10/13/2017

DESIGNED:	DRAWN:
JSK	JSK
CHECKED:	APPROVED:
BSF	SP
PROJECT No.:	SEQUENCE No.:
EFO4	*

SHEET: 1 OF 1

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 E
☐ Plan showing the site and location of all existing services.	Site Servicing Plan (C102)
☐ 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 A
☐ 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 Backround Studies
☐ 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	N/A
☐ 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 B
☐ 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	N/A

☐ 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.	N/A
☐ 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 B
☐ 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 5.2 Sanitary Sewer

☐ 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)	N/A
☐ Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	N/A
☐ Description of proposed sewer network including sewers, pumping stations, and forcemains.	Section 5.2 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 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 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 Management
☐ Description of the stormwater management concept with facility locations and descriptions with references and supporting information.	Section 6.0 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 F

☐ 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 6.0 Stormwater Management Appendix F
☐ Any proposed diversion of drainage catchment areas from one outlet to another.	Section 6.0 Stormwater Management
☐ Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	Section 6.0 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.	Appendix 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 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 7.0 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 Approval and Permit Requirements: Checklist

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

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

4.6 Conclusion Checklist

Criteria	Location (if applicable)
☐ Clearly stated conclusions and recommendations	Section 8.0 Summary Section 9.0 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