Clifton Property Development Inc.

Site Servicing and Stormwater Management Report

316-332 Clifton Road

City of Ottawa, Ontario

CIMA+ file number: A001062
January 26, 2021

Clifton Property Development Inc.

Site Servicing and Stormwater Management Report

316-332 Clifton Road

City of Ottawa, Ontario

Prepared by:

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1. Introduction

CIMA+ was retained by Clifton Property Development Inc. to prepare a Site Servicing and Stormwater Management Report for the proposed construction of a multi-unit residential development comprised of six (6) townhouse blocks, with a total of twenty-nine (29) residential dwellings, at 316-332 Clifton Road in Ottawa, Ontario.

The purpose of this assessment is to confirm that the proposed development can be adequately serviced by the existing municipal infrastructure (water, sanitary, and storm) surrounding the site. This assessment shall be used in support of the application for Site Plan Control.

1.1 Site Description and Proposed Development

The site is located along the west side of Clifton Road, between Wilber Avenue and Scott Street (refer to **Figure 1** below). The subject site is currently comprised of five (5) private residential dwellings. The combined site area (316-332 Clifton Road) measures approximately 0.29 ha.

Generally, the site is bounded by a private residential dwelling (314 Clifton Road) to the north, Clifton Road to the east, Wilber Avenue to the south, and a mixed-use multi-storey residential/commercial building (319 McRae Avenue) to the west.

Figure 1: Site Location - Plan View.

The proposed development is a six (6) block townhouse development with 29 residential units, expected to include approximately 79 residents, with parking available in private garages at each unit. Refer to **Figure 2** for a conceptual site plan of the proposed development (prepared by Hobin Architecture Inc.).

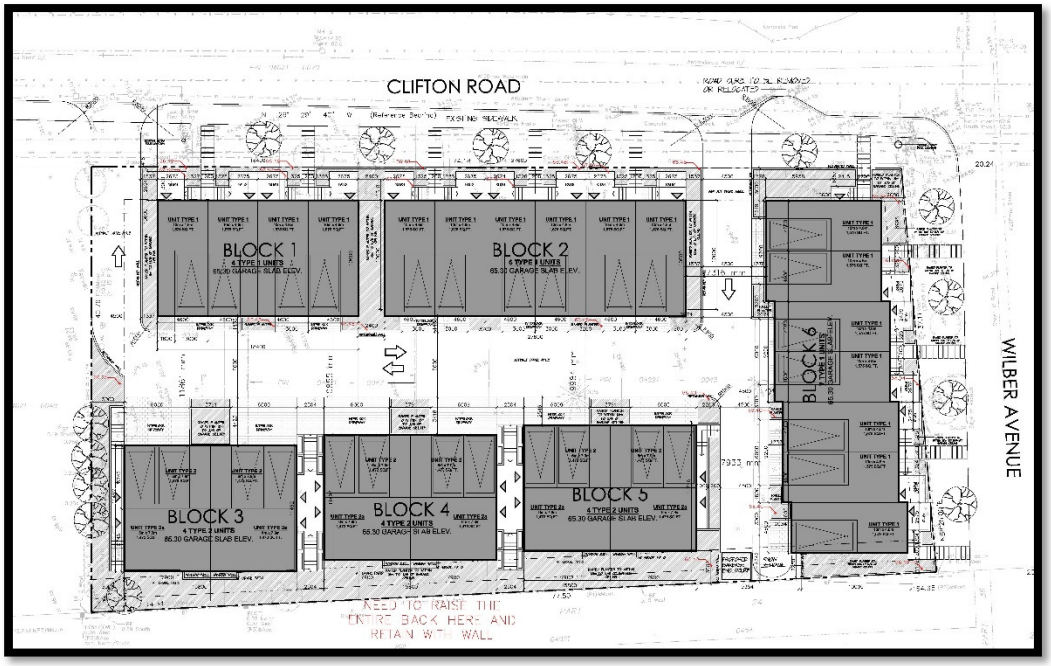

Figure 2: Conceptual Site Plan.

1.2 Review of Available Background Documentation

The following design guidelines have been used to estimate the theoretical servicing requirements for the proposed development; while geoOttawa, a detailed topographic survey prepared by Annis, O'Sullivan, Vollebekk Ltd. (**Appendix B**), and the available as-built drawings (**Appendix A**) provided by the City of Ottawa Information Centre have been used to determine the existing municipal services location, size, material and inverts fronting the site.

- Ottawa Sewer Design Guidelines (October 2012), as amended by all applicable Technical Bulletins;
- Ottawa Design Guidelines – Water Distribution (2010), as amended by all applicable Technical Bulletins;
- Ministry of the Environment Design Guidelines for Sewage Works (2008);
- Ministry of the Environment Stormwater Management Planning and Design Manual (2003);
- Ministry of the Environment Design Guidelines for Drinking-Water Systems (2008); and
- Fire Underwriters Survey (FUS) Water Supply for Public Fire Protection (1999).

1.3 Existing Infrastructure

As identified using the detailed topographic survey, geoOttawa and the available Utility Record Drawings provided by the City of Ottawa Information Centre, the following municipal infrastructure are available within the right-of-way fronting the proposed development site (refer to **Appendix B** for Existing Conditions Plan).

Clifton Road

- 152 mm diameter UCI watermain (**preferred water connection point**);
- 225 mm diameter Concrete sanitary sewer (**preferred sanitary connection point**);
- 450 mm diameter Concrete storm sewer (**preferred storm connection point**).

1.4 Consultation and Permits

In response to the pre-consultation requirements defined in the City's Development Servicing Study Checklist, the following agencies were consulted in support of the preparation of this report. The Development Servicing Study Checklist as well as all relevant correspondence with the consulted agencies can be found in **Appendix A**.

City of Ottawa

The City of Ottawa Information Centre was contacted to obtain any Reports, Studies, Engineering, and/or Utility Plans including sanitary sewer, storm sewer, watermain, gas, etc. within or adjacent to the site location. The available as-built plans were obtained, while no existing reports or studies were available. Given a detailed utility survey was previously completed by Annis, O'Sullivan, Vollebekk Ltd. for the project the UCC drawings were not obtained.

CIMA+ also contacted Shawn Wessel from the City of Ottawa's Planning, Infrastructure and Economic Development Department to obtain any site-specific servicing and stormwater management design criteria for the proposed development. The provided comments and criteria relevant to the Site Servicing and Stormwater Management Report are referenced within the appropriate sections of this report.

Rideau Valley Conservation Authority (RVCA)

The subject site falls under the jurisdiction of the Rideau Valley Conservation Authority (RVCA). CIMA+ contacted Jamie Batchelor from the RVCA to identify any Natural Heritage/Hazards features that may impact the development as well as any Storm Water Management Criteria for the site and required approvals/permits. These criteria are addressed in *Section 4.2* of this Report.

Ministry of the Environment, Conservation and Parks (MECP)

In regards to severance, the townhouses will be freehold ownership with a common condo corporation managing the shared private road, including services. Thus, CIMA+ expects that the proposed development will require an Environmental Compliance Approval (ECA) as the development does not meet the exemption requirements per O.Reg. 525/98, section 3(a), when considering the proposed sewage works and stormwater management facility will service multiple owners.

It is expected that the application can be submitted to the MECP through the City of Ottawa's Transfer of Review (ToR) Program. Correspondence has been provided to the City project manager (refer to **Appendix A**).

A Joint Use Maintenance and Liability Agreement (JUMLA) will also be obtained for the common areas and shared infrastructure.

2. Water Servicing

2.1 Water Supply Design Criteria

The design criteria for determining the water demand requirements for the proposed development follow the parameters outlined in the Ottawa Design Guidelines – Water Distribution (2010) and associated technical bulletins, as well as the MOE Design Guidelines for Drinking-Water Systems (2008). Namely, the following parameters have been used in determining the water demands:

Table 2-1: Water Supply Design Criteria

Design Criterion[1]	Residential Areas
Average Day Demand	350 L/capita/day
Maximum Daily Demand	7.6 × average daily demand[1]
Maximum (Peak) Hour Demand	11.5 × average daily demand[1]
Populations – 3 Bedroom Townhome	2.7 Persons Per Unit
Desired Operating Pressure under Normal Operating Conditions	50 to 70 psi
Minimum Operating Pressure under Normal Operating Conditions	40 psi
Maximum Operating Pressure under Normal Operating Conditions	80 psi
Minimum Operating Pressure under Maximum Daily Demand + Fire Flow	20 psi

In addition to those design criteria identified in **Table 2-1**, the following comments and criteria must be considered in the water supply servicing strategy in accordance with City Guidelines:

- The subject site is located within the 1W pressure zone;
- Residential buildings with a basic day demand greater than 50 m³/day (0.57 L/s) are required to be connected to a minimum of two (2) water services separated by an isolation valve to avoid a vulnerable service area;
- Fire flow demand requirements shall be based on the Fire Underwriters Survey (FUS) Water Supply for Public Fire Protection 1999 and Technical Bulletin ISTB-2018-02;
- Exposure separation distances shall be defined on a figure to support the FUS calculation and required fire flow (RFF);
- Hydrant capacity shall be assessed if relying on any public hydrants to provide fire protection, particularly if high design fire flows are being proposed, to demonstrate the Required Fire Flow (RFF) can be achieved. Identification of which hydrants are being considered to meet the RFF on a fire hydrant coverage figure is required as part of the boundary conditions request.

[1] Note that residential peaking factors were selected from **Table 3-3** of the MOE Design Guidelines for Drinking-Water Systems for 0 to 500 persons.

2.2 Proposed Water Supply Servicing and Calculations

Water Demands

The water supply demands for the proposed development are presented in **Table 2-2** below. The demands were developed utilizing the development statistics provided by Hobin Architects Inc. and those design criteria identified in *Section 2.1*. Refer to **Appendix D** for detailed calculations.

Table 2-2: Water Demands

Demand Type	Average Daily Demand (L/s)	Maximum Daily Demand (L/s)	Maximum (Peak) Hour Demand (L/s)
Residential	0.32	2.43	3.68
Total	**0.32**	**2.43**	**3.68**

Given the basic day demand is less than 50 m³/day (0.57 L/s), only one connection is required.

Proposed Water Supply Connection Point

A water service connection to Clifton Rd at the south access is proposed (Refer to **Appendix C**).

Required Fire Flow (RFF)

The required fire flow for the site was developed using the Fire Underwriters Survey (FUS) Water Supply for Public Fire Protection 1999 and Technical Bulletin ISTB-2018-02. It was determined that an RFF of **10,000 L/min (167 L/s)** would be required to provide adequate protection.

It was assumed that multiple municipal hydrants would be required to meet the fire flow requirements and a fire hydrant coverage figure was prepared is support of the boundary conditions request from the City.

Refer to **Appendix D** for detailed calculations, including supporting figures for exposure distances and hydrant coverage.

Municipal Boundary Conditions

Using the proposed demands, required fire flow and supporting figures the City provided boundary conditions for hydraulic analysis for current conditions, based on computer model simulation. The boundary conditions are as follows:

Table 2-3: Watermain Boundary Conditions

Hydraulic Condition (HGL = Hydraulic Grade Line)	Boundary Condition (Head) (m)
	Clifton Rd. 152 mm dia.
Minimum HGL	108.5
Maximum HGL	114.7

A Multi-Hydrant Analysis was performed by the City utilizing the two nearest available hydrants on Clifton Road as identified on the Hydrant Coverage Figure prepared by CIMA+ (refer to **Appendix D**). The total available flow from these hydrants was calculated as follows:

Table 2-4: Available Hydrant Flows

Hydrant Location	Available Flow (L/s)
South of Site	85
North of Site	70
Total	155

Hydraulic Analysis – Water Supply Adequacy

A hydraulic analysis was completed utilizing the boundary condition information provided by the City for the proposed development in order to confirm that there is adequate flow and pressure in the water distribution system to meet the required water demands. The following Table summarizes the available flow and pressure in the system under each demand scenario:

Table 2-5: Water Supply Adequacy - Hydraulic Analysis

Demand Type	Proposed Demand (L/s)	Available Flow/Pressure		Desired Flow/Pressure Objective	Flow/Pressure Objective Achieved?
		Design Operating Pressure (Relative Head) (m)	Design Operating Pressure (psi)		
Average Daily Demand	0.32	50.5	72	50 to 70 psi	Yes
Maximum Day Demand + Fire Flow	169.10	155 L/s @ 20 psi		≥ 20 psi	No
Maximum (Peak) Hour Demand	3.68	44.3	63	50 to 70 psi	Yes

NOTES:

1. Required fire flow demand was calculated as **10,000 L/min (167 L/s)**.
2. The minimum HGL elevation at Connection Points 1 and 2 is **108.5 m** and the maximum HGL elevation is **114.7 m**.
3. Boundary conditions for Connection 1 (North) to Clifton Road assumes a ground elevation of 64.20 m.
4. Boundary conditions for Connection 2 (South) to Clifton Road assumes a ground elevation of 64.40 m.

2.3 Water Supply Summary and Conclusions

The water supply design for the proposed development follows the parameters outlined in the Ottawa Design Guidelines – Water Distribution (2010) as amended by all applicable technical bulletins, as well as the MOE Design Guidelines for Drinking-Water Systems (2008).

Based on the boundary conditions provided by the City an additional private hydrant will be required on site to provide adequate fire flow (refer to **Appendix C** for proposed location). There is adequate flow and pressure in the water distribution system to meet the required potable water demands for the proposed development.

Where dead ends are proposed along the watermain a blowoff is to be installed per OPSD 1104.030.

Water Data Card for services greater than 19 mm is to be completed and submitted, once design has been finalized and in preparation for Commence Work Notification and Water Permit Application.

3. Sanitary Servicing

3.1 Sanitary Servicing Design Criteria

The design criteria for determining the sanitary peak flow rates for the proposed development follow the parameters outlined in the City of Ottawa Sewer Design Guidelines, 2012 as amended by all applicable Technical Bulletins. Namely, the following parameters have been used in determining the peak sanitary flow rates:

Table 3-1: Sanitary Peak Flow Determination Design Criteria

Design Criterion	Residential Areas
Base Flow	280 L/capita/day
Populations – 3 Bedroom Townhome	2.7 Persons Per Unit
Peaking Factor	Determined by Harmon Equation $P.F. = 1 + \left[\frac{1}{4 + \left(\frac{P}{1{,}000}\right)^{\frac{1}{2}}}\right] \times 0.8$ (P = population; P.F. = peaking factor) Maximum P.F. = 4.0 Minimum P.F. = 2.0
Dry Weather Infiltration Rate	0.05 L/s/effective gross hectare (for all areas)
Wet Weather Infiltration	0.28 L/s/effective gross hectare (for all areas)
Total Infiltration Allowance	0.33 L/s/effective gross hectare (for all areas)

3.2 Proposed Sanitary Servicing and Calculations

Proposed Sanitary Peak Flows

The estimated peak flows from the proposed development based on the design criteria listed in **Table 3-1** are outlined in the following Table.

Table 3-2: Peak Sanitary Flows

Flow Type	Total Flow Rate (L/s)
Total Estimated Average Dry Weather Flow Rate	0.26
Total Estimate Peak Dry Weather Flow Rate	0.93
Total Estimate Peak Wet Weather Flow Rate	1.02

Refer to **Appendix E** for detailed calculations.

Proposed Sanitary Service Connection Point

The proposed sanitary service will connect to the existing 225 mm diameter Concrete sanitary sewer within the right-of-way of Clifton Road. Wastewater flows to the West Nepean Trunk Collector sewer system. Refer to **Appendix C** for proposed connection points.

3.3 Sanitary Servicing Summary and Conclusions

The sanitary servicing design for the proposed development conforms to the requirements of the City of Ottawa Sewer Design Guidelines, 2012, as amended by all applicable Technical Bulletins.

Peak wastewater demands were provided to the City, who confirmed that there is adequate residual capacity in the city system to accommodate the proposed wastewater flow (refer to **Appendix A**).

Given the determined peak sanitary flows are quite low it is expected that self-cleansing velocity will not be achieved within the sanitary sewer system and thus a sewer maintenance and flushing program must be established.

4. Storm Servicing and Stormwater Management

4.1 Background

As previously mentioned, the subject site of 316-332 Clifton Road currently occupies five (5) residential dwellings. The site is approximately 67% pervious with no existing stormwater measures on site (i.e. catch basins, sewers, etc.) and it is thus assumed that there are no current stormwater management controls on site. Based on available recent survey information the site is relatively flat. As such storm runoff from the front yards of the existing properties generally flows to the storm system on Clifton Road, and the rear yards of the existing properties generally flow to Wilber Avenue, which connects into the storm system on Clifton Road.

Considering there are no current stormwater systems on site and that it is assumed that there are no flow attenuation controls the anticipated peak flows for the existing site are as follows (refer to **Appendix F**):

Table 4-1: Pre-Development Peak Release Flows – Existing Site

Storm Event	Release Flow (L/s)
5-year	38.4
100-year	81.9

Storm runoff from the site enters the municipal system along Clifton Road and ultimately discharges to the Ottawa River approximately 3.4 km downstream from the site. Refer to **Appendix F** for sketch demonstrating the flow path to the ultimate outlet.

4.2 Storm Servicing Strategy and Design Criteria

The design of the major and minor storm systems must ensure that the following criteria are upheld under post-development conditions, in keeping with the requirements of the City and the Rideau Valley Conservation Authority (refer to **Appendix A**).

- The allowable release rate for the site shall coincide with the 5-year storm event under pre-development conditions;
- The allowable release rate shall take into consideration any increase in uncontrolled runoff from increases in hard surface in the boulevard (concrete, interlocking paving stone, etc.);
- The pre-development runoff coefficient (C) shall be a maximum equivalent 'C' of 0.50, or the actual existing site runoff coefficient, whichever is less;
- The pre-development Time of Concentration (Tc) shall be calculated using an appropriate method and must not be less than 10 minutes;
- A Tc of 10 minutes shall be used for all post-development calculations;
- Storm runoff in excess of the allowable 5-year pre-development release rate, up to and including the 100-year storm event, must be detained on site;
- The hydraulic grade line within the municipal storm system is at the road surface (i.e. surcharges) during major storm events (100-year);
- Where an underground storage tank is proposed it will be equipped with backflow prevention as well as a pump to provide a consistent release rate from the site to ensure the proposed private storm sewer system will not be overwhelmed in the event the small (450 mm dia.) storm sewer main within Clifton Road become surcharged. The design of the pump is to be completed by the mechanical engineer;
- Gravity connections of foundations to the storm sewer are sufficient considering the proposed buildings will not have below grade basements;
- Foundation drains and roof drains will be independently connected to the sewer mains;
- The roof drain leaders will be utilizing a pressurized drainpipe type to provide additional protection in the event of surcharge in the system;
- Roof drain flow rate of 5 GPM per inch of water buildup above drain (refer to **Appendix G**);
- Overland flow will generally be directed to Clifton Road;
- Based on the distance of the site from the ultimate outlet at the Ottawa River being more that 2 km the RVCA would not insist on additional on-site water quality treatment.

4.3 Proposed Storm Servicing and Stormwater Management Design and Calculations

Proposed Storm Service Connection Point

Based on communications with the City, it is understood that the preferred and anticipated stormwater connection from the proposed development will discharge to the existing 450 mm concrete storm sewer on Clifton Road. Refer to **Appendix C** for proposed connection points.

Pre-development (Allowable) Release Rates

The pre-development release rates are summarized in the following Table:

Table 4-2: Pre-development (Allowable) Release Rate (2-year event)

Catchment ID	Area (ha)	Runoff Coefficient (C)	Time of Concentration (Tc) (minutes)	Rainfall Intensity (mm/hr)	Release Rate (L/s)
Subject Site	0.295	0.45	10	104.19	**38.4**

The storm runoff under post-development conditions for the site area must be controlled to the allowable 5-year pre-development release rate of **38.4 L/s**, up to and including the 100-year storm event.

Post Development Flow Rates and Stormwater Quantity Control

The anticipated post-development flow rates and required storage when controlled to the allowable pre-development release rate are summarized in the following Table.

Table 4-3: Post-development Flow Rate and Storage Summary

Control Area	100-year Release Rate (L/s)	100-year Storage Volume (m^3)
Roof Areas	11.2	40.2
Attenuated Areas (to tank)	5.7	17.4
Additional Storage (CB's/MH's/Sewers)	-	21.1
Unattenuated Areas	21.5	-
Total	38.4	78.7

The total post development release rate takes into consideration the increase in uncontrolled runoff from the boulevard (unattenuated areas) being converted to a hard surface (concrete, interlocking paving stone, etc.). Thus, the remaining allowable release rate for the attenuated site area is **16.9 L/s**.

As demonstrated in **Table 4-3** an anticipated storage volume of **17.4 m³** shall be required on-site via an underground storage tank, with **21.1 m³** within the storm sewer system (CB's/MH's/sewer pipes), and **40.2 m³** of storage proposed on the roofs and surface to restrict stormwater discharge to the allowable release rate of **38.4 L/s**. Refer to **Appendix F** for detailed stormwater storage calculations.

The storm water tank will be equipped with backflow prevention as well as a pump to meet the SWM design intent and ensure the proposed private storm sewer system will not be overwhelmed in the event the small (450 mm dia.) storm sewer main within Clifton Road becomes surcharged.

Below ground storage requirements have been determined using the full flow rate considering a pump will be provided at the storm tank outlet to provide a consistent release rate. A maintenance hole is provided for maintenance purposes at each end of the tank and the tank is also sloped towards the outlet to promote self-cleaning. The tank shall be constructed utilizing five (5) MC-3500 Storm Tech Chambers with 300 mm bedding by ADS or approved equivalent (refer to **Appendix G**).

Stormwater Quality Control

Through consultation with the Rideau Valley Conservation Authority (RVCA) (refer to **Appendix A**) it was confirmed that they would not require any onsite water quality control measures save and except best management practices.

4.4 Storm Servicing and Stormwater Management Summary and Conclusions

The storm servicing design for the proposed development conforms to the requirements of the City of Ottawa Sewer Design Guidelines, 2012, as amended by all applicable Technical Bulletins.

The allowable release rate for the site post-development was calculated to be **38.4 L/s**. It is expected that this can be achieved via roof retention and underground storage.

Roof Flow Control Declaration and Roof Plan will be provided upon completion of the Mechanical and Structural design.

5. Conclusion

The purpose of this assessment is to confirm that the proposed development can be adequately serviced using the existing municipal infrastructure (water, sanitary, and storm) surrounding the site. This assessment shall be used in support of a Site Plan Control Application to allow for the construction of six (6) townhouse blocks at 316-332 Clifton Road.

The important information and findings as a result of this assessment are as follows:

- The proposed development is expected to include six (6) townhouse blocks comprising 29 units, with a population of approximately 79 persons;
- The proposed development is expected to require an Environmental Compliance Approval (ECA) as per the Ontario Water Resources Act;
- The anticipated water demands for the proposed site are **0.32 L/s** (average day), **169.10 L/s** (max day + fire flow), and **3.68 L/s** (peak hour). Based on the boundary conditions provided by the City an additional private hydrant will be required on site to provide adequate fire flow.

There is adequate flow and pressure in the water distribution system to meet the required potable water demands for the proposed development.

- Water Data Card for services greater than 19 mm is to be completed and submitted, once design has been finalized and in preparation for Commence Work Notification and Water Permit Application;
- The estimated sanitary flow for the proposed development is **0.26 L/s** (average dry weather), **0.93 L/s** (peak dry weather), and **1.02 L/s** (peak wet weather). The City of Ottawa has indicated that the existing sanitary sewer network near the proposed site can accept the peak wet weather sanitary flow of the proposed development;
- Given the determined peak sanitary flows are quite low it is expected that self-cleansing velocity will not be achieved within the sanitary sewer system and thus a sewer maintenance and flushing program must be established;
- Storm runoff in excess of the allowable 5-year pre-development release rate, up to and including the 100-year storm event, will be detained on site via roof and underground retention prior to being discharged to the municipal storm sewer system;
- The allowable stormwater release rate for the proposed site is **38.4 L/s**. It is expected that this will be achieved via roof retention and an underground retention tank.
- The site is approximately 67% pervious with no existing stormwater measures on site (i.e. catch basins, sewers, etc.) and it is thus assumed that there are no current stormwater management controls on site. As such storm runoff from the front yards of the existing properties generally flows to the storm system on Clifton Road, and the rear yards of the existing properties generally flow to Wilber Avenue, which connects into the storm system on Clifton Road;
- The storm water tank will be equipped with backflow prevention as well as a pump to meet the SWM design intent and ensure the proposed private storm sewer system will not be overwhelmed in the event the small (450 mm dia.) storm sewer main within Clifton Road becomes surcharged.
- Quality control of stormwater is not required for the site given its distance from the receiving watercourse;
- Roof Flow Control Declaration and Roof Plan will be provided upon completion of the Mechanical and Structural design;
- As a result of the conclusions drawn by the previous points, it is expected that the proposed development can be serviced by the existing municipal services network surrounding the site.

We trust this Site Servicing and Stormwater Management Report is to your satisfaction. If you have any questions regarding this report, please do not hesitate to contact any of the signatories.

A

Appendix A
Pre-consultation Correspondence

Jaymeson Adams

From: Wessel, Shawn <shawn.wessel@ottawa.ca>
Sent: August 27, 2020 10:36 AM
To: Tim Kennedy; Deiaco, Simon
Cc: Christian Lavoie-Lebel; Jaymeson Adams
Subject: RE: 316 - 332 Clifton Road - City Servicing Requirements and Design Criteria

Good morning Mr. Kennedy.

Please find boundary conditions as requested:

******The following information may be passed on to the consultant, but do NOT forward this e-mail directly.******

The following are boundary conditions, HGL, for hydraulic analysis at 316-332 Clifton Road (zone 1W) assumed to be both connected to the 152mm on Clifton Road (see attached PDF for location).

Minimum HGL = 108.5m

Maximum HGL = 114.7m

Connection 1: Available Fire Flow @ 20 psi = 85 L/s

Connection 2: Available Fire Flow @ 20 psi = 70 L/s

These are for current conditions and are based on computer model simulation.

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.

If you require additional information or clarification, please do not hesitate to contact me anytime.

Thank you

Regards,

Shawn Wessel, A.Sc.T.,rcji
Project Manager - Infrastructure Approvals
Gestionnaire de projet – Approbation des demandes d'infrastructures

Development Review Central Branch | Direction de l'examen des projets d'aménagement, Centrale
Planning, Infrastructure and Economic Development Department | Direction générale de la planification de l'infrastructure et du développement économique
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(613) 580 2424 Ext. | Poste 33017
Int. Mail Code | Code de Courrier Interne 01-14
shawn.wessel@ottawa.ca

*****Please note that, while my work hours may be affected by the current situation, I still have access to email, video conferencing and telephone. Feel free to schedule video conferences and/or telephone calls, as necessary.*****

From: Tim Kennedy <Tim.Kennedy@cima.ca>
Sent: August 20, 2020 8:38 AM
To: Wessel, Shawn <shawn.wessel@ottawa.ca>; Deiaco, Simon <Simon.Deiaco@ottawa.ca>
Cc: Christian Lavoie-Lebel <Christian.Lavoie-Lebel@cima.ca>; Jaymeson Adams <Jaymeson.Adams@cima.ca>
Subject: 316 - 332 Clifton Road - City Servicing Requirements and Design Criteria

Hi Shawn and Simon,

I was given your contact information by a team member for this file who noted you would be the engineer and planner on file respectively. CIMA+ will be leading the civil design and I am hoping you have some availability this week to discuss the servicing requirements and design criteria for the above mentioned development. Would sometime on Friday between 9:30 and 1:30 work?

We have completed some preliminary analysis in regards to (1) Sanitary Demands and (2) Water/Fire Demands as follows:

1) **SANITARY DEMANDS:** Please find the proposed development information below and detailed calculations attached (I have also attached the Architectural Concept Plans for reference):
   A. **Type of Development and Units:** The proposed development involves the construction of six (6) townhouse blocks comprising thirty-one (31) residential units with private garages.
   B. **Site Address:** 316–322 Clifton Road.
   C. **Location of Services:** connection to existing 225 mm diameter concrete sanitary sewer on Clifton Road with new maintenance hole on sewer main anticipated.
   D. **Total Estimated Average Dry Weather Flow Rate:** 0.27 L/s
   E. **Total Estimated Peak Dry Weather Flow Rate:** 0.98 L/s
   F. **Total Estimated Peak Wet Weather Flow Rate:** 1.08 L/s

Could you please confirm if there is enough capacity in the City system to accommodate the proposed wastewater flow.

2) **WATER AND FIRE FLOW DEMANDS:** Please find the proposed development information below and detailed calculations and associated figures attached, including: (1) Water Demand Calculations, (2) Fire Flow Calculations, (3) Figure 1 – Proposed Water Service Connection Locations, (4) Figure 2 – Exposure Separation Distances, (5) Figure 3 – Fire Hydrant Coverage.

1. **Type of Development and Units:** The proposed development involves the construction of six (6) townhouse blocks comprising thirty-one (31) residential units with private garages.
2. **Site Address:** 316–322 Clifton Road.
3. **Location of Services:** Please see attached Figure 1.
4. **Plan showing Proposed Water Connections:** Please see attached Figure 1.
5. **Average Daily Demand:** 0.34 L/s
6. **Maximum Daily Demands:** 2.52 L/s
7. **Peak Hour Demand:** 3.81 L/s
8. **Required Fire Flow (RFF):** 10,000 L/min

Could you please provide the boundary conditions for the proposed development.

If you have any questions or require anything further, please do not hesitate to contact me on my cell (working from home these days).

Looking forward to collaborating on this one.

Regards,

TIM KENNEDY, P.Eng.
Project Manager / Infrastructure

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110–240 Catherine Street, Ottawa, ON K2P 2G8 CANADA

Notice to our customers on the COVID-19

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Jaymeson Adams

From: Wessel, Shawn <shawn.wessel@ottawa.ca>
Sent: August 24, 2020 1:41 PM
To: Tim Kennedy
Cc: Jaymeson Adams
Subject: RE: 316 - 322 Clifton Road - City Pre-consult

I apologize, we had provided you with the incorrect criteria for this site.

Please see the following:

The impact to the sanitary is negligible and as for storm they will can to do SWM on site since this appears to be a site plan. The storm system will need to be controlled to the 5-year using the lesser of C=0.5 or existing. Note that the storm pipe in the street is small (300 mm) and this is an uncontrolled system. I would highly discourage any gravity connection of foundations to the storm sewer and would instead ask that they use sump pumps.

We apologize for the inconvenience

If you require additional information or clarification, please do not hesitate to contact me anytime.

Thank you

Regards,

Shawn Wessel, A.Sc.T.,rcji
Project Manager - Infrastructure Approvals
Gestionnaire de projet – Approbation des demandes d'infrastructures

Development Review Central Branch | Direction de l'examen des projets d'aménagement, Centrale
Planning, Infrastructure and Economic Development Department | Direction générale de la planification de l'infrastructure et du développement économique
City of Ottawa | Ville d'Ottawa
110 Laurier Ave. W. | 110, avenue Laurier Ouest, Ottawa ON K1P 1J1
(613) 580 2424 Ext. | Poste 33017
Int. Mail Code | Code de Courrier Interne 01-14
shawn.wessel@ottawa.ca

*****Please note that, while my work hours may be affected by the current situation, I still have access to email, video conferencing and telephone. Feel free to schedule video conferences and/or telephone calls, as necessary.*****

From: Wessel, Shawn
Sent: August 24, 2020 11:19 AM
To: Tim Kennedy <Tim.Kennedy@cima.ca>
Cc: Jaymeson Adams <Jaymeson.Adams@cima.ca>
Subject: 316 - 322 Clifton Road - City Pre-consult

Good morning Mr. Kennedy.

Message from Water Resources Dept:

Storm should not be an issue since SWM will deal with any excess flows. We would ask that consultant provide us with the proposed sanitary flows and we can enter that in our model to see if there will be any impact.
Infrastructure is pre 1970, therefore Control to 2-year C=0.5

Please let me know if you want to discuss this further, or wait for Water Resources Dept. to review your sanitary flows and allow them to provide comments.

I have provided Jaymeson with some details regarding seperating sewer laters for foundation and roof drains, that being two storm and one sanitary and water service for each TH, if using flat roofs. Alternatively, sloped roofs with either a cistern in each unit, or downspouts are also permitted. DS must discharge 1.5 metres from property line as well as foundation walls and not allow for City SWs to become a hazzard in winter time, due to ice build up.

For flat roofs, a roof plan illustrating 5 and 100 year ponding, scuppers and roof drain locations is required as well as a table including, but not limited to, roof drain number, drain type (manufacturer, product name & number), weir opening etc.
In addtion to above, the apllicant must have their mechanical and structural engineer complete, stamp date and sign a Roof Flow Control Declaration Form.

2020 Roof Flow Control Declaration Fo

If you require additional information or clarification, please do not hesitate to contact me anytime.

Thank you

Regards,

Shawn Wessel, A.Sc.T.,rcji
Project Manager - Infrastructure Approvals

Gestionnaire de projet – Approbation des demandes d'infrastructures

Development Review Central Branch | Direction de l'examen des projets d'aménagement, Centrale
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*****Please note that, while my work hours may be affected by the current situation, I still have access to email, video conferencing and telephone. Feel free to schedule video conferences and/or telephone calls, as necessary.*****

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Jaymeson Adams

From: ISD Information Centre / Centre Information <informationcentre@ottawa.ca>
Sent: August 26, 2020 10:13 AM
To: Jaymeson Adams
Subject: 20-0892 - 316–332 Clifton Road - Servicing Capacity Assessment - Information Request
Attachments: 1246p&p1-ab.pdf; 8273-08.pdf; 20-0892.xlsx

Good morning Jaymeson,

Attached are the plans and work order for the locations requested.

The City of Ottawa's Financial Services Branch will send out an invoice at the end of the month. ***Please retain the attached work order for your records. A copy will not be included with the invoice sent at the end of the month****.*

If you have any concerns regarding this information, please refer to the contact information below.

I hope this helps.

Thank you.

Kind regards,

Brenda

For further information, please contact;

Geospatial Analytics Technology & Solutions Branch - Information Centre Unit

Phone: 613-580-2424 x 44455
Email: informationcentre@ottawa.ca

From: Jaymeson Adams <Jaymeson.Adams@cima.ca>
Sent: August 26, 2020 8:50 AM
To: ISD Information Centre / Centre Information <informationcentre@ottawa.ca>
Cc: Tim Kennedy <tim.kennedy@cima.ca>; Christian Lavoie-Lebel <Christian.Lavoie-Lebel@cima.ca>
Subject: RE: 20-0892 - 316–332 Clifton Road - Servicing Capacity Assessment - Information Request

Good morning Brenda,

Thank you for the information. In that case, please keep CIMA as the recipient in the header of the estimate.

Please proceed.

Thanks,

JAYMESON ADAMS, EIT
Engineering Trainee / Infrastructure
Ingénieur en formation / Infrastructures
T 613-860-2462 ext. 6659 **F** 613-860-1870
CIMA+

From: ISD Information Centre / Centre Information <informationcentre@ottawa.ca>
Sent: August 26, 2020 8:47 AM
To: Jaymeson Adams <Jaymeson.Adams@cima.ca>
Subject: RE: 20-0892 - 316–332 Clifton Road - Servicing Capacity Assessment - Information Request

Good morning Jaymeson,

Your previous email had asked if we could bill Clifton Property Developments.

We cannot not do third party billing.

.

Brenda

From: Jaymeson Adams <Jaymeson.Adams@cima.ca>
Sent: August 26, 2020 8:24 AM
To: ISD Information Centre / Centre Information <informationcentre@ottawa.ca>
Cc: Tim Kennedy <tim.kennedy@cima.ca>; Christian Lavoie-Lebel <Christian.Lavoie-Lebel@cima.ca>
Subject: 20-0892 - 316–332 Clifton Road - Servicing Capacity Assessment - Information Request

Good morning Brenda,

In a follow-up to below, are you able to proceed with providing the two (2) PDF plan & profile drawings while the estimate is being revised?

Thanks,

JAYMESON ADAMS, EIT
Engineering Trainee / Infrastructure
Ingénieur en formation / Infrastructures
T 613-860-2462 ext. 6659 **F** 613-860-1870
CIMA+

From: Jaymeson Adams
Sent: August 26, 2020 8:12 AM
To: ISD Information Centre / Centre Information <informationcentre@ottawa.ca>
Cc: Tim Kennedy <Tim.Kennedy@cima.ca>; Christian Lavoie-Lebel <Christian.Lavoie-Lebel@cima.ca>
Subject: RE: 20-0892 - 316–332 Clifton Road - Servicing Capacity Assessment - Information Request

Good morning Brenda,

Thank you for the updated estimate.

I require one more change to the header of the estimate before we can proceed. The cost should be billed to the following instead of CIMA+:

Clifton Property Development Inc.
100 Smirle Avenue
K1Y 0S3

Please revise accordingly.

Thanks,

JAYMESON ADAMS, EIT
Engineering Trainee / Infrastructure
Ingénieur en formation / Infrastructures
T 613-860-2462 ext. 6659 **F** 613-860-1870
CIMA+

From: ISD Information Centre / Centre Information <informationcentre@ottawa.ca>
Sent: August 25, 2020 7:14 PM
To: Jaymeson Adams <Jaymeson.Adams@cima.ca>
Subject: 20-0892 - 316–332 Clifton Road - Servicing Capacity Assessment - Information Request

Hi Jaymeson,

Attached is an updated estimate as per your request. Please advise if we can proceed.

Thank you.

Brenda

From: Jaymeson Adams <Jaymeson.Adams@cima.ca>
Sent: August 25, 2020 3:48 PM
To: ISD Information Centre / Centre Information <informationcentre@ottawa.ca>
Cc: Tim Kennedy <tim.kennedy@cima.ca>; Christian Lavoie-Lebel <Christian.Lavoie-Lebel@cima.ca>
Subject: 20-0892 - 316–332 Clifton Road - Servicing Capacity Assessment - Information Request

Hi Brenda,

Thank you very much. After discussion with my Project Managers, the UCC info will not be required in any format (PDF or CAD).

Please see below for my revised request:

COST ESTIMATE

Project: 316-332 Clifton Rd.: Scott St. to Richmond Rd.

Description	Quantity	Unit Price	Amount
Administration Fee	1	$78.00	$78.00
Engineering Plan - .pdf	2	$16.00	$32.00
~~UCC Central Registry Utility Plans - .pdf~~	~~2~~	~~$45.00~~	~~$90.00~~
		Sub-Total	~~$200.00~~ $110.00
		HST	~~$26.00~~ $14.30
		Total	~~$226.00~~ $124.30

Would you be able to provide me a revised cost estimate using the above table?

Thanks,

JAYMESON ADAMS, EIT
Engineering Trainee / Infrastructure
Ingénieur en formation / Infrastructures
T 613-860-2462 ext. 6659 **F** 613-860-1870
CIMA+

From: ISD Information Centre / Centre Information <informationcentre@ottawa.ca>
Sent: August 25, 2020 1:36 PM
To: Jaymeson Adams <Jaymeson.Adams@cima.ca>
Subject: 20-0892 - 316–332 Clifton Road - Servicing Capacity Assessment - Information Request

Hello Jaymeson,

Attached is an updated estimate. The cost for 2 UCC pdf files is shown in the estimate.

Looking forward to your reply on how you would like to proceed.

Thanks so much.

Brenda

From: Jaymeson Adams <Jaymeson.Adams@cima.ca>
Sent: August 21, 2020 1:09 PM
To: ISD Information Centre / Centre Information <informationcentre@ottawa.ca>
Cc: Tim Kennedy <tim.kennedy@cima.ca>
Subject: 20-0892 - 316–332 Clifton Road - Servicing Capacity Assessment - Information Request

Hi Brenda,

Thank you for the reply and update. Have a great weekend!

Best regards,

JAYMESON ADAMS, EIT
Engineering Trainee / Infrastructure
Ingénieur en formation / Infrastructures
T 613-860-2462 ext. 6659 **F** 613-860-1870
CIMA+

From: ISD Information Centre / Centre Information <informationcentre@ottawa.ca>
Sent: August 21, 2020 1:07 PM

To: Jaymeson Adams <Jaymeson.Adams@cima.ca>
Subject: 20-0892 - 316–332 Clifton Road - Servicing Capacity Assessment - Information Request

Good afternoon Jaymeson,

Thank you for your reply. I am awaiting confirmation on an updated estimate. Once I have this I can forward for your approval to proceed.

Apologies for the delay, I hope to hear back soon.

Kind regards,

Brenda

From: Jaymeson Adams <Jaymeson.Adams@cima.ca>
Sent: August 19, 2020 3:05 PM
To: ISD Information Centre / Centre Information <informationcentre@ottawa.ca>
Cc: Christian Lavoie-Lebel <Christian.Lavoie-Lebel@cima.ca>; Tim Kennedy <tim.kennedy@cima.ca>
Subject: 20-0892 - 316–332 Clifton Road - Servicing Capacity Assessment - Information Request

Hi Brenda,

Thanks for your patience in my response. **We would like to proceed with obtaining the two (2) PDF's but it is not necessary to obtain the CAD utility drawing.**

Therefore, we expect that the cost for the required information will be **$124.30 (including HST).**

The drawings can be invoiced to the following:

Clifton Property Development Inc.
100 Smirle Avenue
K1Y 0S3

Please prepare an updated Work Order with this information.

Thank you,

JAYMESON ADAMS, EIT
Engineering Trainee / Infrastructure
Ingénieur en formation / Infrastructures
T 613-860-2462 ext. 6659 **F** 613-860-1870
CIMA+

From: Jaymeson Adams
Sent: August 14, 2020 8:12 AM
To: ISD Information Centre / Centre Information <informationcentre@ottawa.ca>
Subject: RE: 20-0892 - 316–332 Clifton Road - Servicing Capacity Assessment - Information Request

Hi Brenda,

I will be discussing the cost estimate you provided with my Project Manager. I will let you know as soon as a decision is made.

Thanks,

JAYMESON ADAMS, EIT
Engineering Trainee / Infrastructure
Ingénieur en formation / Infrastructures
T 613-860-2462 ext. 6659 **F** 613-860-1870
CIMA+

From: ISD Information Centre / Centre Information <informationcentre@ottawa.ca>
Sent: August 12, 2020 2:32 PM
To: Jaymeson Adams <Jaymeson.Adams@cima.ca>
Cc: ISD Information Centre / Centre Information <informationcentre@ottawa.ca>
Subject: 20-0892 - 316–332 Clifton Road - Servicing Capacity Assessment - Information Request

Good afternoon Jaymeson,

Please note for the UCC portion of request UCC MH and Fronting in .dwg format would be the same cost – 0.5 x $143.00 = $71.50.

Plan and profiles are an additional fee as shown on the attached along with the administration fee.

Looking forward to your reply on how you would like to proceed.

Thank you.

Brenda

For further information, please contact;

Geospatial Analytics Technology & Solutions Branch - Information Centre Unit

Phone: 613-580-2424 x 44455
Email: informationcentre@ottawa.ca

From: Jaymeson Adams <Jaymeson.Adams@cima.ca>
Sent: August 12, 2020 11:29 AM
To: ISD Information Centre / Centre Information <informationcentre@ottawa.ca>
Cc: Christian Lavoie-Lebel <Christian.Lavoie-Lebel@cima.ca>; Hugues Bisson <Hugues.Bisson@cima.ca>; Tim Kennedy <tim.kennedy@cima.ca>; Greg Santyr <Greg.Santyr@cima.ca>
Subject: RE: 20-0892 - 316–332 Clifton Road - Servicing Capacity Assessment - Information Request

Hi Brenda,

We will only require UCC plans and plan & profiles.

Could you send us a cost estimate for (1) manhole to manhole and (2) fronting property?

Ideally any information you have on Clifton Avenue between Scott Street and Richmond Road would be perfect for the estimates.

Thanks,

JAYMESON ADAMS, EIT
Engineering Trainee / Infrastructure
Ingénieur en formation / Infrastructures
T 613-860-2462 ext. 6659 **F** 613-860-1870
CIMA+

From: ISD Information Centre / Centre Information <informationcentre@ottawa.ca>
Sent: August 12, 2020 11:07 AM
To: Jaymeson Adams <Jaymeson.Adams@cima.ca>
Cc: ISD Information Centre / Centre Information <informationcentre@ottawa.ca>
Subject: 20-0892 - 316–332 Clifton Road - Servicing Capacity Assessment - Information Request

Hello Jaymeson,

Will you only need UCC plans and plan and profiles?

With that information we can provide an estimate as per requested.

Looking forward to your reply.

Brenda

From: ISD Information Centre / Centre Information <informationcentre@ottawa.ca>
Sent: August 12, 2020 10:56 AM
To: ISD Information Centre / Centre Information <informationcentre@ottawa.ca>
Subject: 20-0892 - 316–332 Clifton Road - Servicing Capacity Assessment - Information Request

For UCC – fronting the site only. Mh to Mh, whole street segment? Please confirm for estimate [JA Comment: Please see above for clarification]

From: Jaymeson Adams <Jaymeson.Adams@cima.ca>
Sent: August 12, 2020 9:44 AM
To: ISD Information Centre / Centre Information <informationcentre@ottawa.ca>
Cc: Tim Kennedy <tim.kennedy@cima.ca>; Christian Lavoie-Lebel <Christian.Lavoie-Lebel@cima.ca>; Hugues Bisson <Hugues.Bisson@cima.ca>; Greg Santyr <Greg.Santyr@cima.ca>
Subject: 20-0892 - 316–332 Clifton Road - Servicing Capacity Assessment - Information Request

We are working with a client on a servicing capacity assessment for a zoning by-law amendment at 316–332 Clifton Road (refer to the attached Key Plan).

Our client is considering a servicing connection for the proposed development to Clifton Road. Could you please provide any available background information for the existing services and utilities that may be present at these locations, including but not limited to watermain, storm, and sanitary sewer, gas, hydro, streetlighting, Bell, Rogers, etc.? If you could provide a list of any available information you have on file and the associated fees for obtaining these, it would be much appreciated.

Also, CAD versions of utility plans would be preferable.

Thank you,

JAYMESON ADAMS, EIT
Engineering Trainee / Infrastructure
Ingénieur en formation / Infrastructures

T 613-860-2462 ext. 6659 **F** 613-860-1870
110–240 Catherine Street, Ottawa, ON K2P 2G8 CANADA

AVERTISSEMENT CONCERNANT LA CONFIDENTIALITÉ Ce message est confidentiel. S'il ne vous est pas destiné, veuillez en informer l'émetteur immédiatement et le détruire intégralement.

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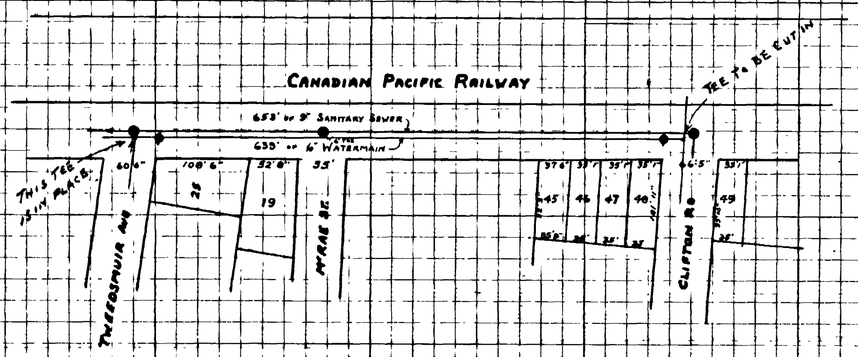
'

CLIFTON RD.
NOTES
1. REG'D PLAN No 369
2. B.M. N-3. N/W CORNER RICHMOND RD & CLIFTON RD. EAST WALL OF HSE. 193 3' FROM S/CORN.
3. ALL LOCATIONS AND DEPTHS OF UNDERGROUND UTILITIES ARE APPROXIMATE.
CONTRACTOR IS REQUESTED TO NOTIFY ALL UTILITIE COMPANIES BEFORE DIGGING.
PROP. 12" STORM
PROP. 18" STORM
EXIST. 9" CONC. PIPE SANITARY SEWER
INDEPENDANT COAL & LUMBER
ASPHALT PARKING AREA
RICHMOND RD.
WILBER AVE.
SCOTT ST.
CITY OF OTTAWA
ENGINEERING DEPARTMENT
SEWER BRANCH
CLIFTON RD.
RICHMOND RD. to SCOTT ST.
SENIOR DESIGN ENGINEER
ENGINEER I.C. SEWER BRANCH
T.H. Dobbin P. Eng.
CITY ENGINEER
DESIGNED BY
SCALE AS SHOWN
DRAWN BY P.A.T.H
DATE JULY 72
FIELD BOOK
CHECKED BY
- AS - BUILT - DRAWINGS -
Rock Elevations
PROP. 12" A.S.T.M. C-76 (Revised to date) CLASS IV REINFORCED CONC. PIPE STORM SEWER WITH APPROVED RUBBER GASKETS.
PROP. 18" A.S.T.M. C-76 (Revised to date) CLASS III REINF. CONC. PIPE STORM SEWER WITH APPROVED RUBBER GASKETS.
GRADE = 0.75%
EXIST. 9" CONC. PIPE SANITARY SEWER
GRADIENT = 1 IN 44.8 OR 2.2%
GRADIENT = 1 IN 131 OR .76%
REVISIONS
DATE DESCRIPTION DRW. BY APP'R BY
ROAD GRADE
SURFACE
INVERTS
ELEVATIONS
STATION
DESIGNED BY DATE
ROAD GRADE
STORM SEWER
SAN. SEWER
CITY OF OTTAWA
PLANNING AND WORKS DEPARTMENT
SEWERAGE AND DRAINAGE
CLIFTON RD.
RICHMOND RD. TO SCOTT ST.
SEWER DESIGN ENGINEER
ENG. I/C OF SEWERAGE & DRAINAGE
ENG. I/C OF ROADWAYS
F. E. AYERS P.Eng.
DIRECTOR OF PLANNING AND WORKS
DRAWN BY G.M.
CHECKED BY
DATE JAN. 16-63
SURVEY BK. 3177
SCALES HOR. 1"=40' VER. 1"=6'
PLAN No
TO LINEN
1246

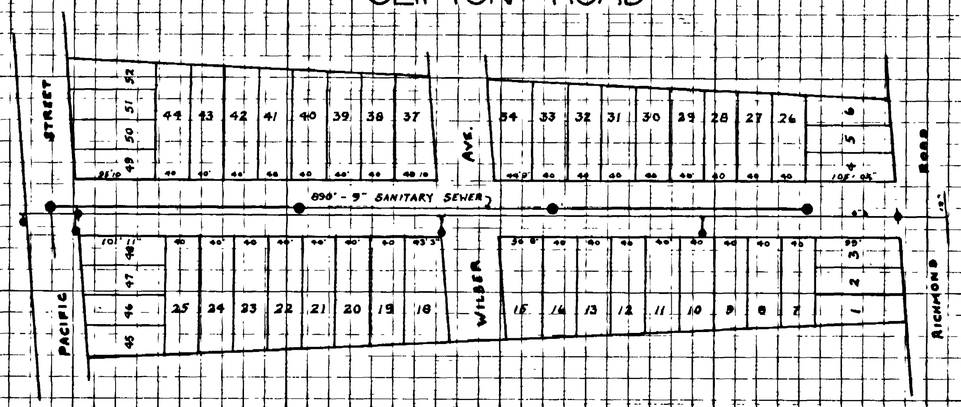
PACIFIC ST.



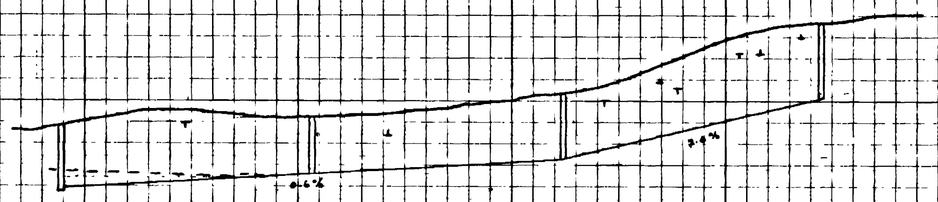
WATERMAIN IN SAME TRENCH AS SEWER, ON SOLID BENCH WITH 6' MINIMUM COVER, PIPES AT LEAST 18" APART.

653 FT. 9" SEWER PIPE
14 FT. MAN HOLE
2 MAN HOLE F.&C.
639 FT. 6" WATERMAIN
2 - 6"x6"x6" TEES
2 - 6" VALVES
2 - V. C. & F. & C.

CLIFTON ROAD



WATERMAIN IS IN PLACE ON THIS STREET LOCATED 25' FROM WEST ST. LINE.



890 FT. - 9" SEWER PIPE
22 AT - MAN HOLE
3 M.H. F&C

TOWNSHIP OF NEPEAN

PLAN AND PROFILE OF

~~PACIFIC~~ SCOTT ST. FROM TWEEDSMUIR AVENUE TO CLIFTON ROAD

CLIFTON RD. FROM PACIFIC STREET TO RICHMOND ROAD

SCALES HOR.- 100' = 1"
VERT.- 10' = 1"

T. B. MacKenzie
TWP. ENGINEER

OTTAWA AUG. 27 1946

BRITISH AVE

8273

Jaymeson Adams

From: Wessel, Shawn <shawn.wessel@ottawa.ca>
Sent: September 1, 2020 10:28 AM
To: Tim Kennedy
Cc: Jaymeson Adams
Subject: RE: 316 - 322 Clifton Road - City Pre-consult
Attachments: UPDATED_City of Ottawa_TOR 2_0 Additional Works Schedule A ver 20180309_Feb 2020.pdf; 2020 ECA Expanded Works Doc.docx

Good morning Mr. Kennedy.

Generally, a ToR MECP ECA application took anywhere from 2-6 months, depending on how busy the MECP were at the time.

During Covid19, it appears the MECP are taking longer to review applications and proponents are advised to check in with them, once submitted, on a regular basis to get status updates. The MECP appears to be understaffed and/or funded and are currently swamped with applications, even with the new ToR agreements with municipalities.

For ToR the following must be confirmed:

City can now be considered for approval of private works that will remain private as long as they meet conditions 1 and 2 of the attached schedule A.
If it does meet these conditions and you want to proceed under the ToR then the proposal needs approval from the MECP supervisor.

The test is if these works were considered public would they fall under the ToR.
If the only reason that they are going as direct submission is because of private ownership then we should be able to process under ToR

Each proposal needs to have approval from the MECP supervisor.

For the supervisors' approval process please provide the following:

The applicants name and address.
The site name and location.
Who will own the sewer works.
A brief description of the proposed sewage works.
Confirmation that outside of the fact the proposed sewage works will remain privately owned the works do meet all the requirements of items 1) and 2) of schedule A of the City's ToR agreement.
A request that the application be processed under the ToR for additional works not listed.

Further to above, please note this will need to be provided to MECP:

The applicants name and address:

- 123456 Ontario Inc. (c.o.b. as West East North South Developments)
- 1234 Somewhere Avenue, Ottawa, Ontario, K1A 4N9

The site name and location:

- Somewhere Phase I
- 1234 Somewhere Avenue, Ottawa, Ontario, K1A 4N9

Who will own the sewer works:

- Common elements condominium will own both the sanitary sewers and the storm sewers.

A brief description of the proposed sewage works:

- Storm sewers and small bore sanitary sewers to connect to the existing sewer networks within Phase 1A of the residential development.

Confirmation that outside of the fact the proposed sewage works will remain privately owned the works do meet all the requirements of items 1) and 2) of schedule A of the City's ToR agreement:

- The sanitary sewers and the storm sewers will remain privately owned.
- The sanitary sewers meet the requirements of Schedule A Item 1) Standard Works Allowed, as follows.
    - New private sanitary sewers
        i. Designed in accordance the Ministry document Design Guidelines for Sewage Works 2008 (section 5.15.4)
        ii. Not combined sewers
        iii. Do not discharge directly to a sewage treatment plant
- The storm sewers meet the requirements of Schedule A Item 1) Standard Works Allowed, as follows.
    - New private storm sewers
        i. Designed in accordance the Ministry document Design Guidelines for Sewage Works 2008
        ii. Designed primarily for the collection and transmission of stormwater
        iii. Discharge to existing storm sewers
        iv. Not drainage works under the Drainage Act
        v. Not combined sewers or superpipes and do not connect to a combined sewer
        vi. Not located on industrial land or designed to service industrial land
        vii. Do not collect, store or discharge stormwater containing substances or pollutants (other than TSS, or oil and grease) detrimental to the environment or human health. Note that there is an existing Vortech unit and dry pond downstream of the Phase 1A storm sewer system.
        viii. Do not require the establishment and monitoring of effluent quality criteria.

In addition to MECP application and supplemental information including, but not limited to, proof of identification or certificate of Incorporation, pipe data form, calc. sheets, drainage plans, approved civil plans, Site Servicing and SWM Report, Geotech Report, Correspondence with RVCA, MECP, Ministry of Natural Resources (if applicable) and City of Ottawa and Expanded Works (Draft ECA) which I have attached.

To summarize ToR info above, please complete your package, submit to me to review and once the City is satisfied with the package, we will contact the MECP to ensure ToR is permitted. Please use the Schedules and info above as a test as to whether ToR would be permitted by MECP.

If you require additional information or clarification, please do not hesitate to contact me anytime.

Thank you

Regards,

Shawn Wessel, A.Sc.T.,rcji
Project Manager - Infrastructure Approvals
Gestionnaire de projet – Approbation des demandes d'infrastructures

Development Review Central Branch | Direction de l'examen des projets d'aménagement, Centrale
Planning, Infrastructure and Economic Development Department | Direction générale de la planification de l'infrastructure et du développement économique
City of Ottawa | Ville d'Ottawa
110 Laurier Ave. W. | 110, avenue Laurier Ouest, Ottawa ON K1P 1J1
(613) 580 2424 Ext. | Poste 33017
Int. Mail Code | Code de Courrier Interne 01-14
shawn.wessel@ottawa.ca

Please note that I will be away from the office September 10-15 inclusive, returning on the 16th.

*****Please also note that, while my work hours may be affected by the current situation, I still have access to email, video conferencing and telephone. Feel free to schedule video conferences and/or telephone calls, as necessary.*****

From: Tim Kennedy <Tim.Kennedy@cima.ca>
Sent: September 01, 2020 6:50 AM
To: Wessel, Shawn <shawn.wessel@ottawa.ca>
Cc: Jaymeson Adams <Jaymeson.Adams@cima.ca>
Subject: RE: 316 - 322 Clifton Road - City Pre-consult

Good morning Shawn,

The RVCA has confirmed that quality control of stormwater will not be required on site given its distance from the outlet. This being the case can you confirm that the ECA process can be completed through the City's Transfer of Review program?

Also what is the expected timeline these days for ECA approval through Transfer of Review?

Thanks,

TIM KENNEDY, P.Eng.
Project Manager / Infrastructure
T 613 860-2462 ext. 6620 **M** 613 462-3627
CIMA+

From: Wessel, Shawn <shawn.wessel@ottawa.ca>
Sent: Wednesday, August 26, 2020 9:36 AM
To: Tim Kennedy <Tim.Kennedy@cima.ca>
Cc: Jaymeson Adams <Jaymeson.Adams@cima.ca>
Subject: RE: 316 - 322 Clifton Road - City Pre-consult

Good morning Mr. Kennedy

I sent a message to Water Distribution.

They are busy at the moment and will forward to you once we have obtained the conditions.

If you require additional information or clarification, please do not hesitate to contact me anytime.

Thank you

Regards,

Shawn Wessel, A.Sc.T.,rcji
Project Manager - Infrastructure Approvals
Gestionnaire de projet – Approbation des demandes d'infrastructures

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(613) 580 2424 Ext. | Poste 33017
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shawn.wessel@ottawa.ca

*****Please note that, while my work hours may be affected by the current situation, I still have access to email, video conferencing and telephone. Feel free to schedule video conferences and/or telephone calls, as necessary.*****

From: Tim Kennedy <Tim.Kennedy@cima.ca>
Sent: August 26, 2020 9:09 AM
To: Wessel, Shawn <shawn.wessel@ottawa.ca>
Cc: Jaymeson Adams <Jaymeson.Adams@cima.ca>
Subject: RE: 316 - 322 Clifton Road - City Pre-consult

Hi Shawn,

Just wanted to touch base and see if you had any idea on when the boundary conditions might be available?

Thanks,

TIM KENNEDY, P.Eng.
Project Manager / Infrastructure
T 613 860-2462 ext. 6620 **M** 613 462-3627
CIMA+

From: Wessel, Shawn <shawn.wessel@ottawa.ca>
Sent: Monday, August 24, 2020 1:41 PM
To: Tim Kennedy <Tim.Kennedy@cima.ca>
Cc: Jaymeson Adams <Jaymeson.Adams@cima.ca>
Subject: RE: 316 - 322 Clifton Road - City Pre-consult

I apologize, we had provided you with the incorrect criteria for this site.

Please see the following:

The impact to the sanitary is negligible and as for storm they will can to do SWM on site since this appears to be a site plan. The storm system will need to be controlled to the 5-year using the lesser of C=0.5 or existing. Note that the storm pipe in the street is small (300 mm) and this is an uncontrolled system. I would highly discourage any gravity connection of foundations to the storm sewer and would instead ask that they use sump pumps.

We apologize for the inconvenience

If you require additional information or clarification, please do not hesitate to contact me anytime.

Thank you

Regards,

Shawn Wessel, A.Sc.T.,rcji
Project Manager - Infrastructure Approvals
Gestionnaire de projet – Approbation des demandes d'infrastructures

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shawn.wessel@ottawa.ca

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From: Wessel, Shawn
Sent: August 24, 2020 11:19 AM
To: Tim Kennedy <Tim.Kennedy@cima.ca>
Cc: Jaymeson Adams <Jaymeson.Adams@cima.ca>
Subject: 316 - 322 Clifton Road - City Pre-consult

Good morning Mr. Kennedy.

Message from Water Resources Dept:

Storm should not be an issue since SWM will deal with any excess flows. We would ask that consultant provide us with the proposed sanitary flows and we can enter that in our model to see if there will be any impact.
Infrastructure is pre 1970, therefore Control to 2-year C=0.5

Please let me know if you want to discuss this further, or wait for Water Resources Dept. to review your sanitary flows and allow them to provide comments.

I have provided Jaymeson with some details regarding seperating sewer laters for foundation and roof drains, that being two storm and one sanitary and water service for each TH, if using flat roofs. Alternatively, sloped roofs with either a cistern in each unit, or downspouts are also permitted. DS must discharge 1.5 metres from

property line as well as foundation walls and not allow for City SWs to become a hazzard in winter time, due to ice build up.

For flat roofs, a roof plan illustrating 5 and 100 year ponding, scuppers and roof drain locations is required as well as a table including, but not limited to, roof drain number, drain type (manufacturer, product name & number), weir opening etc.
In addtion to above, the apllicant must have their mechanical and structural engineer complete, stamp date and sign a Roof Flow Control Declaration Form.

2020 Roof Flow Control Declaration Fo

If you require additional information or clarification, please do not hesitate to contact me anytime.

Thank you

Regards,

Shawn Wessel, A.Sc.T.,rcji
Project Manager - Infrastructure Approvals
Gestionnaire de projet – Approbation des demandes d'infrastructures

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shawn.wessel@ottawa.ca

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'

SCHEDULE A
SEWAGE WORKS ALLOWED UNDER THE TRANSFER OF REVIEW PROGRAM

Works allowed to be submitted under the TOR program by the Municipality are described in Sections 1 and 2 below. The works must also meet any requirements in the applicable section. Works that are not described in Section 1 or 2, do not meet any applicable requirements or to which Section 3 applies are not allowed to be submitted under the TOR program.

1. Standard Works Allowed

i) Allowed Sanitary Sewage Works

Unless specified in Section 3 of this Schedule, only ECA applications for the following sanitary sewage works are allowed to be submitted by the Municipality under the TOR Program:

a. New or modified, municipal or private sanitary sewers, forcemains or siphons that:

   i. are designed in accordance with the Ministry document *Design Guidelines for Sewage Works, 2008* (PIBS 6879) as amended from time to time;
   ii. are not combined sewers; and
   iii. do not discharge directly to a sewage treatment plant.

b. New or modified, municipal or private sanitary sewage pumping stations that:
   i. are designed in accordance with the Ministry document *Design Guidelines for Sewage Works, 2008* (PIBS 6879) as amended from time to time; and
   ii. do not discharge directly to a sewage treatment plant.

For greater clarity, any sanitary sewage works that provide any treatment of sanitary sewage are not allowed to be submitted under the TOR program.

ii) Allowed Stormwater Works

Unless specified in Section 3 of this Schedule, only ECA applications for the following stormwater works are allowed to be submitted by the Municipality under the TOR Program:

a. New or modified municipal or private storm sewers, ditches, culverts and grassed swales that:

   i. are designed in accordance with the Ministry document *Stormwater Management Planning and Design Manual, 2003* (PIBS 4329e) as amended from time to time;
   ii. are designed primarily for the collection and transmission of stormwater;
   iii. discharge to existing storm sewers, other existing stormwater conveyance works, an approved stormwater management facility, or a Municipal Drain;
   iv. for drainage works under the *Drainage Act,* approval of a petition for the modifications must be obtained under the *Drainage Act* prior to submitting an application for an ECA;
   v. are not combined sewers or superpipes and does not connect to a combined sewer;
   vi. are not located on industrial land or designed to service industrial land;
   vii. do not propose to collect, store or discharge stormwater containing substances or pollutants (other than Total Suspended Solids, or oil and grease) detrimental to the environment or human health; and
   viii. do not require the establishment and monitoring of effluent quality criteria.

b. New or modified, municipal or private oil/grit separators that:

i. are designed in accordance with the Ministry document *Stormwater Management Planning and Design Manual, 2003* (PIBS 4329e) as amended from time to time;
ii. discharge to existing storm sewers, other existing stormwater conveyance, an approved stormwater management facility, or a Municipal Drain;
iii. for drainage works under the *Drainage Act*, approval of a petition for the modifications must be obtained under the *Drainage Act* prior to submitting an application for an ECA;
iv. are not located on industrial land or designed to service industrial land;
v. do not propose to collect, store or discharge stormwater containing substances or pollutants (other than Total Suspended Solids, or oil and grease) detrimental to the environment or human health; and
vi. do not require the establishment and monitoring of effluent quality criteria.

2. Additional Works Allowed

The Municipality may submit ECA applications for sanitary and/or stormwater works other than those allowed in Section 1 as described below and in accordance with any listed requirements.

The Municipality's TOR Program is expanded to include:

a. Combined Sewers

- the rehabilitation of existing combined sewers where there is no increase in combined sewage overflow (CSO).

b. Stormwater Management Facilities (wet ponds, wetlands, hybrid ponds, dry ponds)

- altering, modifying, adding, optimizing or expanding the retention capacity for existing approved stormwater management facilities, including stormwater outfalls, provided that:
  - if the proposed works are required to provide quality control, the works are designed to achieve Enhanced Level water quality control and erosion protection (i.e. 80% TSS removal); and
  - any attenuation design requirements are satisfied;

- installing new stormwater management facilities, including stormwater outfalls, provided that:
  - if the proposed works are required to provide quality control, the works are designed to achieve Enhanced Level water quality control and erosion protection (i.e. 80% TSS removal); and
  - any attenuation design requirements are satisfied;

- stormwater pumping stations.

c. Lot Level and Conveyance Control (Low Impact Development) Measures

- altering, modifying, adding, optimizing or expanding the retention capacity for existing approved low impact development (LID) measures, including stormwater outfalls, provided that:

  - if the proposed works are required to provide quality control, the LID measures are designed to achieve Enhanced Level water quality control and erosion protection (i.e. 80% TSS removal); and
  - any attenuation design requirements are satisfied;

- installing new LID measures, including stormwater outfalls, provided that:
  - if the proposed works are required to provide quality control, the LID measures are designed to achieve Enhanced Level water quality control and erosion protection (i.e. 80% TSS removal);
  - any attenuation design requirements are satisfied; and
  - the design considers corrective and remediation measures in the event of lack of performance of the LID measures;

- rooftop, surface and underground storage with inlet control devices or orifices.

For Works listed in 2a through 2c the following requirements must be met:

- the Works must be designed in accordance with the Ministry documents *Design Guidelines for Sewage Works, 2008* (PIBS 6879) and *Stormwater Management Planning and Design Manual, 2003* (PIBS 4329e), as amended from time to time;

- the Works must receive drainage only from non-industrial lands, where industrial lands are defined by *Ontario Regulation 525/98*;

- any stormwater management pond listed in 2b above shall not be used as a snowmelt facility;

- for Works that are designed to partially infiltrate or exfiltrate into the surrounding soils during high flow conditions:
  - based on the type of works, the vertical separation distance between the highest groundwater table (i.e. spring runoff) and the lowest elevation of the works shall adhere to Table 4.1 of the Ministry document *Stormwater Management Planning and Design Manual, 2003* (PIBS 4329e); and
  - groundwater must not be utilized as a potable water resource anywhere drainage is captured by the stormwater management works;

- infiltration or exfiltration stormwater works include:
  - pervious pipes and catch-basins;
  - filtering systems, and infiltration trenches, such as, soak away pits attached to pervious catch-basins and sand filter beds;
  - infiltration basins;
  - pervious pipes and catch-basins with infiltration trench systems, rainwater and snow melt into the surrounding soils during high flow conditions; and
  - open channels, ditches, swale drainage systems, bio-swales, tree pits, and infiltration trenches on public roads, or right-of-ways, designed to exfiltrate part or all of the stormwater runoff from the adjacent road into the surrounding soils. These types of works are to include vegetative surfaces;

- for stormwater pumping stations, high level alarm systems, appropriate response time during emergency conditions, and redundancy in pumping arrangement must be provided;

- for the rehabilitation of existing combined sewers, the Works must conform to *Ministry Procedure F-5-5, Determination of Treatment Requirements for Municipal and Private Combined and Partially Separated Sewer Systems*, as amended from time to time;

- for drainage works under the *Drainage Act*, approval of a petition for the modifications must be obtained under the *Drainage Act* prior to submitting an application for an ECA;

- the description of the works for a new or replacement outfall will identify the receiving watercourse if it discharges into any of the provincially recognized critical receivers and/or their tributaries;

- the applicant has consulted with the local Conservation Authority and obtained necessary clearance as required, if the works discharge to a surface water body;

- as part of the Letter of Recommendation, the Municipality has clearly identified all of the works which fall under this Section of Schedule A;

- the Municipality has notified all applicants for works allowed in this Section that the ECA may contain conditions requiring the development of an operation and maintenance program, including a spill contingency plan for the works; the Municipality shall include in their Letter of Recommendation any other conditions related to operation and maintenance of the works if applicable; and

- the Municipality shall maintain a report with detailed records of all the stormwater management works constructed during the year.

The report and records noted above are to include, but not be limited to, the approval number, date of approval, location, description of the stormwater management works, information about what, how, when, why and who operates and maintains the works.

The report must also include a summary of the operation and maintenance program activities, any trouble shooting activities, reports of any flooding conditions and/or any complaints received from the public. The report must also include a statement concerning the potential for these stormwater management systems to impact groundwater quality, which will be based upon the available evidence from inspection and maintenance activities.

The Ministry may require the submission of this report upon request. Further instructions on where and to whom the report is to be submitted will be provided by the Ministry.

In most cases, private works included in this Section will be subject to the requirements under the Environmental Bill of Rights (EBR), which includes mandatory posting of the project proposal on the Environmental Registry for a minimum of forty-five (45) days prior to the issuance of the Environmental Compliance Approval. Ontario Regulation 681/94 under the EBR sets forth the types of ECAs that are classified as Class I or II proposals which require posting on the Environmental Registry. All private wastewater ECAs are subject to posting on the Environmental Registry unless they relate to a discharge point which is already subject to an ECA approval and the proposed ECA would not permit an increase in the discharge of any specific contaminant from the discharge point. In addition, as per section 30 of the EBR, a proposal may be exempt from EBR requirements if the proposal has been considered in a substantially equivalent process of public participation.

3. Works Not Allowed To Be Submitted

Under no circumstances are the following applications for Works identified in either Section 1 or 2 to be submitted under the TOR program:

a. applications that are identified by the local Ministry District Office as being proposed within the zone of influence of a landfill area;

b. applications for sanitary sewage works that provide any treatment of sanitary sewage;

c. applications for Regional Stormwater Control Facilities or Regional Flood Control Facilities consisting of storm water management ponds that are designed to provide quality control or contain floods **greater than** the 100 year flood event;

d. applications that are for airports or airparks;

e. applications that are for pumping stations that service combined sewer systems;

f. applications for projects that have received a Part II Order request, until the request has been decided;

g. applications for projects that have undertaken an individual Environmental Assessment; and

h. applications that are likely to trigger the Duty to Consult.

In addition, if the Municipality determines that the works listed in an application have been constructed or are being constructed before an Environmental Compliance Approval has been issued, the Municipality shall:

i. immediately notify the local Ministry District Office; and

ii. confirm with the Supervisor, Transfer of Review Program (Supervisor) that the application must be submitted directly to the Ministry for review. Once this confirmation is obtained, the municipality shall return the application and all associated documents and fees to the applicant and advise them that the application will not be reviewed under the TOR program. With written permission from the Supervisor, the municipality may be allowed to proceed with the review of the application.

4. 2020 Program Update: Proposed Consolidated Linear Infrastructure Approach

In view of the Ministry's plan to move to a consolidated permissions approach to linear infrastructure in the near future and subject to the written permission of the Supervisor, the municipality may be allowed in the interim to review additional works currently not listed in this schedule (including private works that may not be covered at the time of the application by an agreement pursuant to the Planning Act under section 1 of this Agreement).

Jaymeson Adams

From: Jamie Batchelor <jamie.batchelor@rvca.ca>
Sent: August 31, 2020 1:38 PM
To: Tim Kennedy
Cc: Christian Lavoie-Lebel; Jaymeson Adams
Subject: RE: 316 - 332 Clifton Road - RVCA Pre-Consultation - SWM Criteria

Good Afternoon Tim,

I also tracked the sewer network and came up with similar results. Based on the distance from the outlet being over 2km, the RVCA would not insist on additional on-site water quality treatment. However, if you are proposing water quality treatment via a mechanical separator, the RVCA would view this favorably, and an improvement for the site.

Jamie Batchelor, MCIP, RPP
Planner, ext. 1191
Jamie.batchelor@rvca.ca

Rideau Valley Conservation Authority
3889 Rideau Valley Drive
PO Box 599, Manotick ON K4M 1A5
T 613-692-3571 | 1-800-267-3504 F 613-692-0831 | www.rvca.ca

From: Tim Kennedy <Tim.Kennedy@cima.ca>
Sent: Monday, August 31, 2020 6:47 AM
To: Jamie Batchelor <jamie.batchelor@rvca.ca>
Cc: Christian Lavoie-Lebel <Christian.Lavoie-Lebel@cima.ca>; Jaymeson Adams <Jaymeson.Adams@cima.ca>
Subject: RE: 316 - 332 Clifton Road - RVCA Pre-Consultation - SWM Criteria

Good morning Jamie,

Just wanted to follow up on my email below.

Thanks,

TIM KENNEDY, P.Eng.
Project Manager / Infrastructure
T 613 860-2462 ext. 6620 **M** 613 462-3627
CIMA+

From: Tim Kennedy
Sent: Friday, August 21, 2020 6:47 AM

To: Jamie Batchelor <jamie.batchelor@rvca.ca>
Cc: Christian Lavoie-Lebel <Christian.Lavoie-Lebel@cima.ca>; Jaymeson Adams <Jaymeson.Adams@cima.ca>
Subject: 316 - 332 Clifton Road - RVCA Pre-Consultation - SWM Criteria

Good morning Jamie,

We are working on another file in the City of Ottawa and I wanted to get your input on Natural Heritage/Hazards features that may impact the development as well as any Storm Water Management Criteria for the site and required approvals/permits.

The proposed development involves the construction of six (6) townhouse blocks comprising thirty-one (31) residential units with private garages and a private access road through the site. It is anticipated that storm water will be stored in underground tanks and a mechanical separator will be used to achieve quality control requirements.

I have attached a key plan with the site location as well as the ultimate flow path for the storm sewer.

If you need anything further please let me know. Feel free to call me on my cell if you would like to discuss.

Best Regards,

TIM KENNEDY, P.Eng.
Project Manager / Infrastructure

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110–240 Catherine Street, Ottawa, ON K2P 2G8 CANADA

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Jaymeson Adams

From: Wessel, Shawn <shawn.wessel@ottawa.ca>
Sent: December 16, 2020 11:17 AM
To: Tim Kennedy
Cc: James Macmillan; Wagar, Barrett; Jaymeson Adams
Subject: RE: 316-332 Clifton Road Technical Circulation Comments

Follow Up Flag: Follow up
Flag Status: Completed

Good morning Mr. Kennedy.

The following comment is from Water Resource Dept.:

The 100 year HGL surcharges to roadway level due to downstream boundary conditions. Also, sewer rehab on this street is not in our 5 year forecast.

Regards,

Shawn Wessel, A.Sc.T.,rcji
Project Manager - Infrastructure Approvals
Gestionnaire de projet – Approbation des demandes d'infrastructures

Development Review Central Branch | Direction de l'examen des projets d'aménagement, Centrale
Planning, Infrastructure and Economic Development Department | Direction générale de la planification de l'infrastructure et du développement économique
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shawn.wessel@ottawa.ca

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From: Tim Kennedy
Sent: December 14, 2020 9:45 AM
To: Wessel, Shawn
Cc: James Macmillan ; Wagar, Barrett ; Jaymeson Adams
Subject: RE: 316-332 Clifton Road Technical Circulation Comments

Good morning Shawn,

As discussed, as part of the SWM solution for the site we will be looking at underground storage for storm water. We have calculated an allowable 5-year pre-development flow rate of 38.4 L/s for the site, which we will control the release rate to under post-development conditions up to and including the 100-year event. The connection will be to Clifton (refer to attached Assessment of Adequacy of Services Report for additional information).

Given the size of the existing storm sewer along Clifton and considering it is uncontrolled and therefore subject to surcharge could you please touch base with the Water Resources Unit and provide the HGL for the existing municipal system or any pertinent design information regarding the HGL? Could you also confirm whether or not the storm sewer is scheduled for renewal along this section in the near future?

Please let me know if you require any further information.

Regards,

TIM KENNEDY, P.Eng.
Project Manager / Infrastructure

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-----Original Appointment-----
From: Wessel, Shawn <shawn.wessel@ottawa.ca>
Sent: Friday, December 11, 2020 11:42 AM
To: Tim Kennedy
Subject: Accepted: 316-332 Clifton Road Technical Circulation Comments
When: Friday, December 11, 2020 1:30 PM-2:00 PM (UTC-05:00) Eastern Time (US & Canada).
Where:

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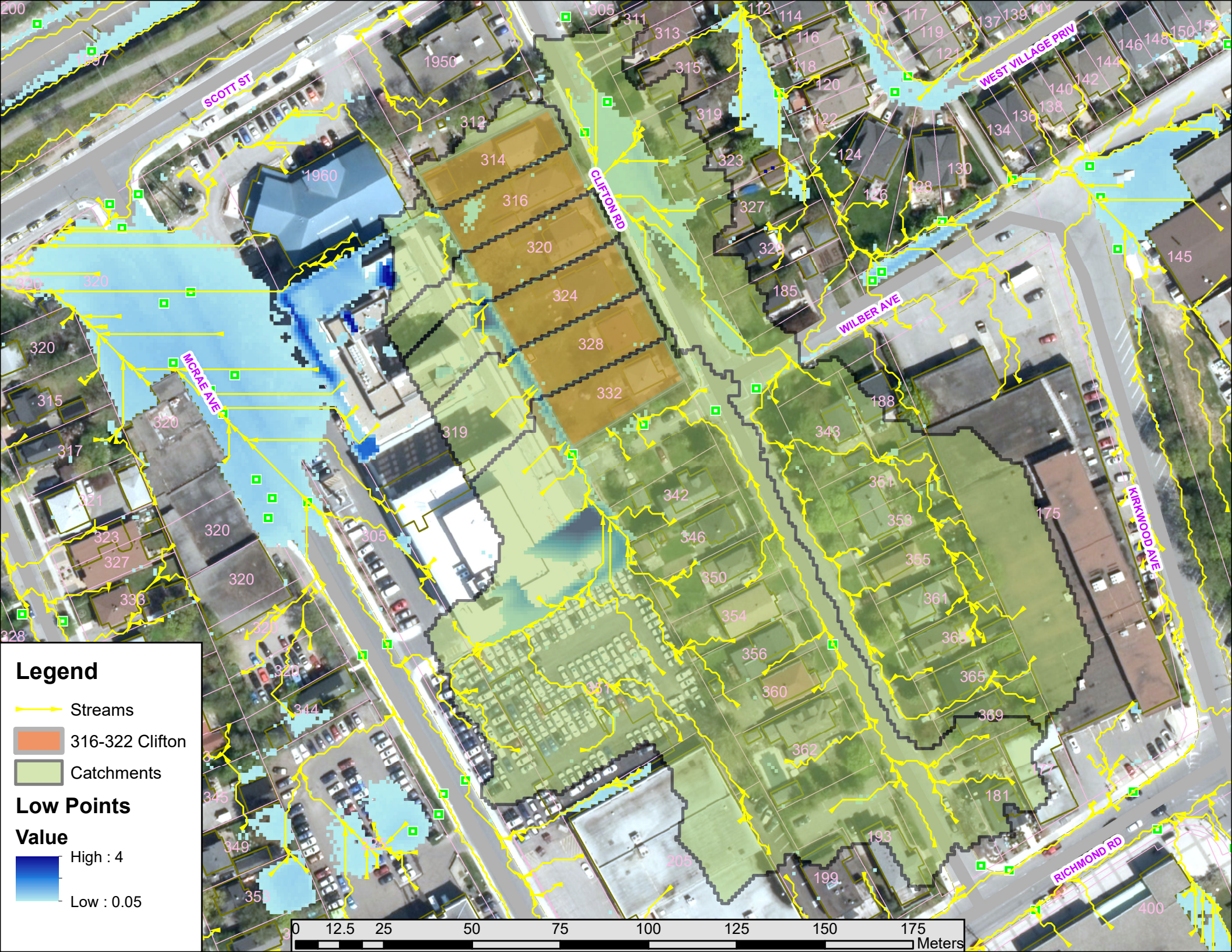
SCOTT ST
CLIFTON RD
WEST VILLAGE PRIV
WILBER AVE
MCRAE AVE
KIRKWOOD AVE
RICHMOND RD
Legend
Streams
316-322 Clifton
Catchments
Low Points
Value
High : 4
Low : 0.05
0 12.5 25 50 75 100 125 150 175
Meters

Servicing Study Guidelines for Development Applications

4. Development Servicing Study Checklist

4.1 General Content

	Required Content	Reference Location
☐	Executive Summary (for larger reports only).	N/A
☑	Date and revision number of the report.	Cover Sheet
☑	Location map and plan showing municipal address, boundary, and layout of proposed development.	Report Figures
☑	Plan showing the site and location of all existing services.	Appendix B
☑	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	Section 1.1
☑	Summary of Pre-consultation Meetings with City and other approval agencies.	Section 1.4
☑	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.	Section 1.2 & 1.4
☑	Statement of objectives and servicing criteria.	Section 1.0, 2.1, 3.1 & 4.2
☑	Identification of existing and proposed infrastructure available in the immediate area.	Section 1.3 & Appendix B
☐	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).	N/A
☐	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.	N/A
☐	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.	N/A
☐	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.	N/A

4.2 Development Servicing Report: Water

	Required Content	Reference Location
☐	Confirm consistency with Master Servicing Study, if available	N/A
☑	Availability of public infrastructure to service proposed development	Section 1.3 & Appendix B
☑	Identification of system constraints	Section 2.1 & 2.2
☑	Identify boundary conditions	Section 2.2
☑	Confirmation of adequate domestic supply and pressure	Section 2.2 & 2.3
☑	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.	Section 2.2 & 2.3
☐	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	Section 2.2 & Appendix C
☐	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	Table 2-5
☐	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.	Section 2.3
☐	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

Required Content		Reference Location
☑	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).	Section 3.1
☐	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 1.3, 3.2 & Appendix B
☑	Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)	Section 3.3
☑	Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	Section 3.2 & Appendix E
☑	Description of proposed sewer network including sewers, pumping stations, and forcemains.	Section 3.2
☐	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

Required Content		Reference Location
☑	Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)	Section 4.1
☑	Analysis of available capacity in existing public infrastructure.	Section 4.1
☑	A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	Appendix C & F
☑	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 4.2
☑	Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	Section 4.2
☑	Description of the stormwater management concept with facility locations and descriptions with references and supporting information.	Section 4.3, 4.4 & Appendix C
☐	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.	Appendix 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).	Section 4.3 & 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.	N/A
☑	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 4.1 & 4.3

☐	Any proposed diversion of drainage catchment areas from one outlet to another.	N/A
☐	Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	N/A
☐	If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100 year return period storm event.	N/A
☐	Identification of potential impacts to receiving watercourses	N/A
☐	Identification of municipal drains and related approval requirements.	N/A
☑	Descriptions of how the conveyance and storage capacity will be achieved for the development.	Section 4.3 and 4.4
☐	100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	N/A
☐	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.	N/A
☐	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

Required Content		Reference Location
☐	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

Required Content		Reference Location
☑	Clearly stated conclusions and recommendations	Section 5.0
☐	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 draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario	

B

Appendix B
Existing Conditions Plan

CIMA+

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
2078352

THIS PLAN IS NOT VALID UNLESS IT IS AN EMBOSSED ORIGINAL COPY ISSUED BY THE SURVEYOR In accordance with Regulation 1026, Section 29 (3).

ANNIS, O'SULLIVAN, VOLLEBEKK LTD. grants to Insight Properties INC. ("The Client"), their solicitors, mortgagees, and other related parties, permission to use original, signed, sealed copies of the Surveyor's Real Property Report in transactions involving The Client.

Scale 1 : 200

8.0 6.0 4.0 2.0 0 4 8 Metres

Metric

DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

SURVEYOR'S REAL PROPERTY REPORT

PART 1 Plan of LOTS 18,19, 20, 21, 22 & 23 REGISTERED PLAN 369 CITY OF OTTAWA

Surveyed by Annis, O'Sullivan, Vollebekk Ltd.

Surveyor's Certificate

I CERTIFY THAT :

1. This survey and plan are correct and in accordance with the Surveys Act, the Surveyors Act and the Land Titles Act and the regulations made under them.
2. The survey was completed on the 5th day of February, 2019.

Feb 7/19
Date

V. Andrew Shelp
Ontario Land Surveyor

PART 2
THIS PLAN MUST BE READ IN CONJUNCTION WITH SURVEY REPORT DATED: February 7, 2019

Notes & Legend

	Denotes	
—□—	"	Survey Monument Planted
—■—	"	Survey Monument Found
SIB	"	Standard Iron Bar
SSIB	"	Short Standard Iron Bar
IB	"	Iron Bar
CC	"	Cut Cross
(WIT)	"	Witness
Meas.	"	Measured
(AOG)	"	Annis, O'Sullivan, Vollebekk Ltd.
Acc.	"	Accepted
(P1)	"	Registered Plan 369
(P2)	"	(SG) Plan May 29, 2018
(P3)	"	(1319) Plan September 29, 1992
(P4)	"	(AOG) Plan June 10, 1985
(P5)	"	(857) Plan May 31, 1985
(P6)	"	(AOG) Plan May 8, 2015
(P7)	"	Plan 4R-8932
FH	"	Fire Hydrant
MH-ST	"	Maintenance Hole (Storm Sewer)
MH-S	"	Maintenance Hole (Sanitary)
MH	"	Maintenance Hole (Unidentified)
— ST —	"	Underground Storm Sewer
— S —	"	Underground Sanitary Sewer
— W —	"	Underground Water
— P —	"	Underground Power
— G —	"	Underground Gas
— T —	"	Underground Telecommunication
— B —	"	Bell Cable
— OHW —	"	Overhead Wires
CB	"	Catch Basin
GM	"	Gas Meter
HM	"	Hydro Meter
BF	"	Board Fence
WPF	"	Wood Picket Fence
UP	"	Utility Pole
AN	"	Anchor
AC	"	Air Conditioner
RW	"	Retaining Wall
Ø	"	Diameter
+ 65.00	"	Location of Elevations
+ 65.00*	"	Top of Concrete Curb / RW Elevation
C/L	"	Centreline
	"	Deciduous Tree
	"	Coniferous Tree
PO-W	"	Wood Pole
△ S	"	Sign
TB	"	Unidentified Terminal Box

Bearings are astronomic, and are referred to the westerly limit of Clifton Road as shown on Plan 4R-8932, having a bearing N 26°29'40"W

UTILITY NOTES

1. This drawing cannot be accepted as acknowledging all of the utilities and it will be the responsibility of the user to contact the respective utility authorities for confirmation.
2. Only visible surface utilities were located.
3. Underground utility data derived from City of Ottawa utility sheet reference E-05-02 & E-05-06
4. Sanitary and storm sewer grades and inverts were derived from City of Ottawa Planning and Works Department Sewer and Drainage Reference E-23-c
5. A field location of underground plant by the pertinent utility authority is mandatory before any work involving breaking ground, probing, excavating etc.

ELEVATION NOTES

1. Elevations shown are geodetic and are referred to the CGVD28 geodetic datum.
2. It is the responsibility of the user of this information to verify that the job benchmark has not been altered or disturbed and that it's relative elevation and description agrees with the information shown on this drawing.

Topographic data was collected under Winter Conditions. Snow cover and ice preclude determining location and elevation of some topographical data that is otherwise visible.

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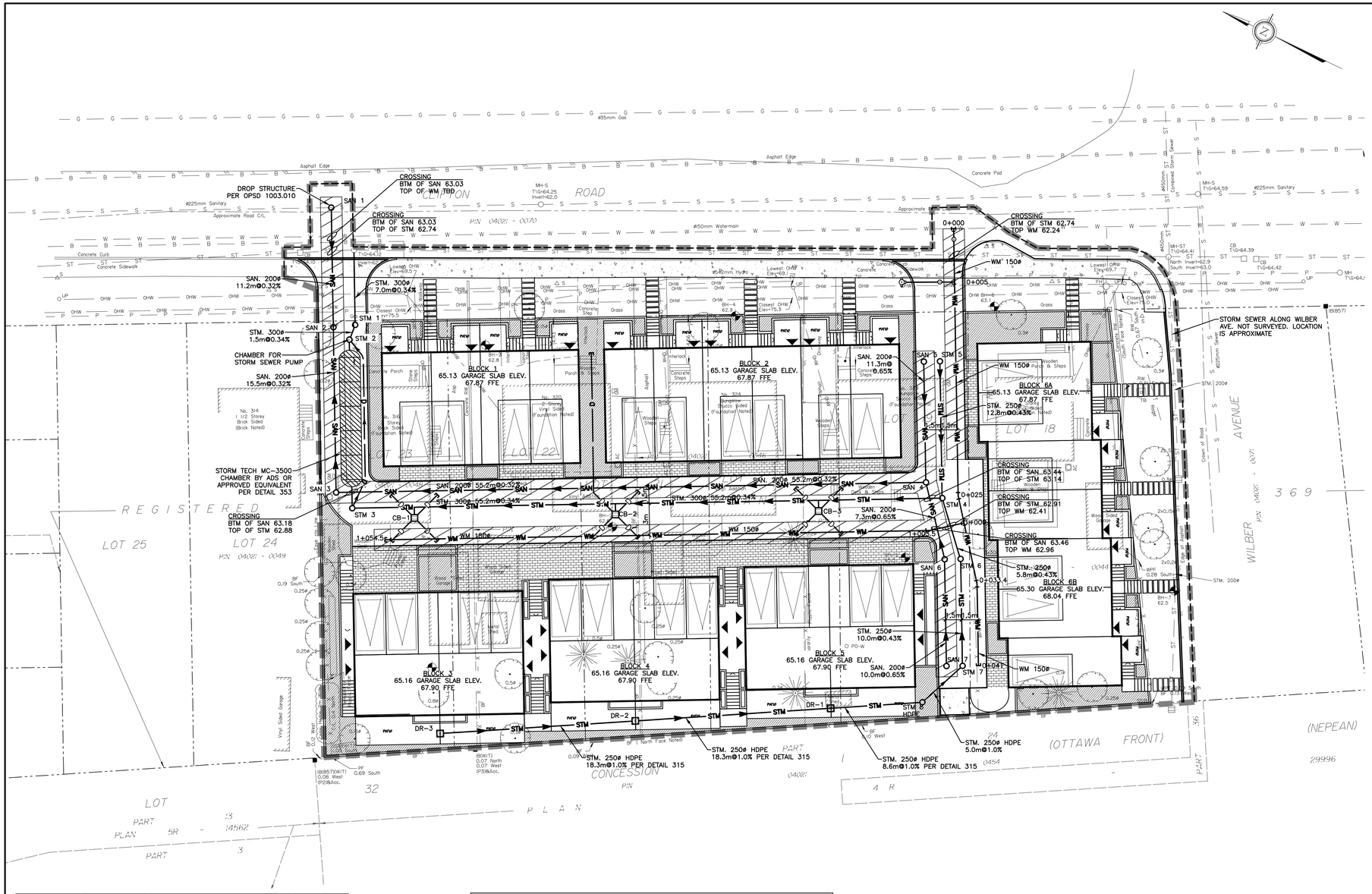
Ontario Land Surveyors

Job No. 18018-19 Lt 18 To 23 PL 369 T F | FS

C

Appendix C
Site Servicing Plan

CIMA+



EXISTING	LEGEND	PROPOSED
FH	FIRE HYDRANT	
MH-ST	MAINTENANCE HOLE (STORM SEWER)	○
MH-S	MAINTENANCE HOLE (SANITARY)	○
MH	MAINTENANCE HOLE (UNIDENTIFIED)	
ST	UNDERGROUND STORM SEWER	STM
S	UNDERGROUND SANITARY SEWER	SAN
W	UNDERGROUND WATER	WM
	PERFORATED SUBDRAIN	D
P	UNDERGROUND POWER	
GAS	UNDERGROUND GAS	
T	UNDERGROUND TELECOMMUNICATION	
B	BELL CABLE	
OHW	OVERHEAD WIRES	
CB	CATCH BASIN	◐ ◫ ☒
GM	GAS METER	
HM	HYDRO METER	
BF	BOARD FENCE	
WPF	WOOD PICKET FENCE	
UP	UTILITY POLE	
AN	ANCHOR	
AC	AIR CONDITIONER	
RW	RETAINING WALL	
Ø	DIAMETER	
+ 65.00	LOCATION OF ELEVATIONS	
+ 65.00*	TOP OF CONCRETE CURB / RW ELEVATION	
C/L	CENTRELINE	
	DECIDUOUS TREE	
	CONIFEROUS TREE	
PO-W	WOOD POLE	
S	SIGN	
TB	UNIDENTIFIED TERMINAL BOX	
	PROPERTY LINE	
	EASEMENT	
	WORK LIMIT	
	SEWER / WATERMAIN INSULATION	▨

STRUCTURE NUMBER	TOP	INVERTS				MH diam (mm)	TYPE
		NORTH	EAST	SOUTH	WEST		
STM-EXIST	64.12	62.30	-	62.30	62.45	1200	MH
STM-1	64.45	-	62.47	-	62.50	1200	MH
STM-2	64.45	-	62.51	-	62.54	1200	MH
STM-3	64.98	-	62.59	62.65	-	1200	MH
STM-4	65.21	62.84	62.90	-	62.90	1200	MH
STM-5	65.05	-	-	-	62.95	1200	MH
STM-6	65.24	-	62.93	-	62.95	1200	MH
STM-7	65.27	-	63.00	-	-	1200	MH
STM-8	66.10	63.56	63.54	-	-	900	MH
SAN-1	64.22	61.85	-	61.85	63.03	1200	MH
SAN-2	64.42	-	63.06	-	63.08	1200	MH
SAN-3	64.86	-	63.12	63.18	-	1200	MH
SAN-4	65.18	63.35	63.41	-	63.43	1200	MH
SAN-5	65.01	-	-	-	63.49	1200	MH
SAN-6	65.21	-	63.48	-	63.51	1200	MH
SAN-7	65.26	-	63.57	-	-	1200	MH
CB-1	64.98	-	63.58	-	-	600	CB
CB-2	64.99	-	63.59	-	-	600	CB
CB-3	65.30	-	63.63	-	-	600	CB
DR-1	65.76	63.64	-	63.64	-	300	DR
DR-2	65.76	63.83	-	63.83	-	300	DR
DR-3	65.76	-	-	64.01	-	300	DR

MH → MANHOLE
MHCB → MANHOLE CATCH BASIN
CB → CATCH BASIN
OGS → OIL AND GRIT SEPERATOR
DR → INLINE DRAIN

WATERMAIN TABLE			
CHAINAGE	ITEM	FINISHED GRADE	TOP OF WATERMAIN
0+00	CONNECTION TO MAIN	64.44	TBD
0+002.5	STORM SEWER CROSSIN	64.44	62.24
0+005	FIRE HYDRANT LEAD TEE	64.63	63.25
0+005	FIRE HYDRANT	64.56	63.25
0+025	ELBOW	65.25	62.85
0+033.4	ELBOW	65.27	62.87
0+041	END CAP	65.28	62.88
1+000	TEE	65.26	62.86
1+001.5	STORM SEWER CROSSING	65.22	62.41
1+003	SANITARY SEWER CROSSING	65.20	62.96
1003.5	ELBOW	65.19	63.99
1+054.5	END CAP	65.05	63.85

0 2 4 8 12 16 20

NOTE OF CAUTION

THE GEODETIC COORDINATES OF EVERY ITEM INCLUDED AS PART OF THIS DOCUMENT HAVE NO LEGAL VALUE. THE SITE LAYOUT MUST BE COMPLETED USING THE OFFICIAL BENCHMARKS OF AN ACCREDITED LAND SURVEYOR.

THE UNDERGROUND FEATURES AND INFORMATION THAT APPEAR ON THE DRAWINGS WERE OBTAINED FROM THE PUBLIC UTILITY COMPANIES AND/OR FROM THE CITY EACH RESPECTIVELY.

ALL INFORMATION UNDER THE LEGEND 'EXISTING' IS FOR INFORMATION ONLY. COMPLETE OR EXACT LOCATION AND ELEVATION OF UNDERGROUND SERVICES ARE NOT GUARANTEED.

CERTAIN UNDERGROUND FEATURES ON PRIVATE PROPERTY ARE NOT SHOWN ON THE CURRENT DRAWING.

ANYONE WHO PROCEEDS WITH EXCAVATION WORK SHALL VERIFY THE EXACT LOCATION OF ALL UNDERGROUND FEATURES, BY EXPLORATORY EXCAVATIONS, AND SHALL ASSUME FULL RESPONSIBILITY IF THERE IS ANY DAMAGE THAT OCCURS DURING WORK.

THE CONTRACTOR WILL HAVE THE RESPONSIBILITY AND THE OBLIGATION TO VALIDATE, BY EXPLORATORY EXCAVATION, THE SIZE OF THE PUBLIC UTILITIES UNDERGROUND SERVICES AND TO WARN THE ENGINEER OF ANY CONFLICT WITH THE PROJECTED WORK.

no.	date	revision
01	21/01/25	ISSUED FOR SITE PLAN CONTROL

It is the responsibility of the appropriate contractor to check and verify all dimensions on site and report all errors and/ or omissions to the architect.

All contractors must comply with all pertinent codes and by-laws.

Do not scale drawings.

This drawing may not be used for construction until signed.

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project title
CLIFTON TOWNS
316-332 CLIFTON ROAD
CLIFTON ROAD, OTTAWA, ONTARIO

drawing title
SITE SERVICING

drawn	date	scale
SCP	JAN/21	1:200

project
A001062

T. G. KENNEDY
100173201
January 25, 2021

drawing no.
C006

revision no.

D

Appendix D
Water Supply Design Calculations

CIMA+

PROJECT NAME:	316-332 Clifton Road Property Development
CIMA+ PROJECT NUMBER:	A001062
CLIENT:	Clifton Property Development Inc.
PROJECT STATUS:	Preliminary Design (Assessment of Adequacy of Public Services)

WATER CONSUMPTION CALCULATIONS

APPLICABLE DESIGN GUIDELINES:

1. Ottawa Design Guidelines - Water Distribution (2010)
2. City of Ottawa Technical Bulletin ISTB-2018-02, ISDTB-2014-02 and ISD-2010-02
3. MOE Design Guidelines for Drinking-Water Systems

RESIDENTIAL AND COMMERCIAL WATER DEMANDS:

RESIDENTIAL DESIGN CRITERIA:

Residential Average Day Demand:	350	L/c/day
Maximum Day Peaking Factor:	7.6	x Average Daily Demand
Maximum (Peak Hour) Peaking Factor:	11.5	x Average Daily Demand

EQUIVALENT POPULATION :

Unit Type	Number of Units	Persons Per Unit	Population
Block 1 Townhomes	4	2.7	11
Block 2 Townhomes	6	2.7	16
Block 3 Townhomes	4	2.7	11
Block 4 Townhomes	4	2.7	11
Block 5 Townhomes	4	2.7	11
Block 6 Townhomes	7	2.7	19
Total	**29**		**79**

Per Unit Populations:

Table 4.1 Per Unit Populations

Unit Type	Persons Per Unit
Single Family	3.4
Semi-detached	2.7
Duplex	2.3
Townhouse (row)	2.7
Apartments:	
Bachelor	1.4
1 Bedroom	1.4
2 Bedroom	2.1
3 Bedroom	3.1
Average Apt.	1.8

WATER DEMANDS:

Demand Type	Average Daily Demand (L/s)	Maximum Daily Demand (L/s)	Maximum (Peak) Hour Demand (L/s)
Residential	0.32	2.43	3.68
Total	**0.32**	**2.43**	**3.68**

NOTES:

1. Maximum Day and Maximum Hour residential peaking factors determined using Table 3-3 of the MOE Design Guidelines for Drinking-Water System for 0 to 500 persons.

2. Given basic day demand less than 50 m3/day (0.57 L/s), only one connection is required. However, the need for a second connection to the watermain on Clifton will be assessed at the detailed design stage in order to provide redundant supply, reduce hydraulic losses and avoid stagnant water associated with a dead end water main.

Prepared by: Jaymeson Adams, EIT Date: 2020-08-24

Verified by: Tim Kennedy, P.Eng. Date: 2020-08-24
PEO# 100173201

PROJECT NAME:	316-332 Clifton Road Property Development
CIMA+ PROJECT NUMBER:	A001062
CLIENT:	Clifton Property Development Inc.
PROJECT STATUS:	Preliminary Design (Assessment of Adequacy of Public Services)

FIRE FLOW ASSESSMENT

APPLICABLE DESIGN GUIDELINES:

1. Fire Underwriters Survey (FUS) Water Supply for Public Fire Protection, 1999
2. Ottawa Design Guidelines - Water Distribution (2010) including Appendix H per ISTB-2018-02
3. City of Ottawa Technical Bulletins ISTB-2018-02 and ISDTB-2014-02
4. MOE Design Guidelines for Drinking-Water Systems

STEP A - DETERMINE THE TYPE OF CONSTRUCTION

Type of Construction	Coefficient (C)	Value Selected (C)
Fire-resistive Construction (> 3 hours)	0.6	**1.5**
Non-combustible Construction	0.8	
Ordinary Construction	1	
Wood Frame Construction	**1.5**	

STEP B - DETERMINE THE FLOOR AREA

Block	Gross Floor Area (m^2)
Block 3	547
Block 4	547
Block 5	547
TOTAL FLOOR AREA (A):	**1,641**

STEP C - DETERMINE THE HEIGHT IN STOREYS

Floor/Level Per Block	Number of Storeys
Ground Level:	1
Level 2:	1
Level 3:	1
HEIGHT IN STOREYS:	**3**

STEP D - DETERMINE BASE FIRE FLOW (ROUND TO NEAREST 1,000 L/min)

$$F = 220C\sqrt{A}$$

Where:

F is the required fire flow in L/min

C is the coefficient related to the type of construction, and;

A is the total floor area of the building in m^2

Coefficient Related to Type of Construction (C) = **1.5**

Floor Area Considered (A) = **1,641** **m^2**

REQUIRED (BASE) FIRE FLOW (F) =	**13000** **L/min** (Rounded to Nearest 1,000 L/min)

PROJECT NAME:	316-332 Clifton Road Property Development
CIMA+ PROJECT NUMBER:	A001062
CLIENT:	Clifton Property Development Inc.
PROJECT STATUS:	Preliminary Design (Assessment of Adequacy of Public Services)

FIRE FLOW ASSESSMENT

STEP E - DETERMINE THE INCREASE OR DECREASE FOR OCCUPANCY AND APPLY TO STEP D (STEP D x STEP E, DO NOT ROUND)

Occupancy Class	Occupancy Factor	Value Selected (C)
Non-combustible	0.75	
Limited combustible	**0.85**	
Combustible	1.00	**0.85**
Free burning	1.15	
Rapid burning	1.25	

REQUIRED (BASE) FIRE FLOW (F) =	**11050**	**L/min** (Not rounded)

STEP F - DETERMINE THE DECREASE, IF ANY, FOR AUTOMATIC SPRINKLER PROTECTION AND APPLY TO VALUE IN STEP D ABOVE (DO NOT ROUND)

Sprinkler System Design	Sprinkler Design Charge	Value Selected (C)	Total Charge
Automatic sprinkler system conforming to NFPA standards	-30%	No	0%
Standard water supply	-10%	No	0%
Fully supervised system	-10%	No	0%
TOTAL CHARGE FOR SPRINKLER SYSTEM			**0%**

DECREASE FOR SPRINKLER PROTECTION =	**0**	**L/min** (Not rounded)

STEP G - DETERMINE THE TOTAL INCREASE FOR EXPOSURES AND APPLY TO VALUE IN STEP D ABOVE (DO NOT ROUND)

Façade	Separation Distance (m)	Length-height Factor of Exposed Wall (m-storeys)	Assumed Construction of Exposed Wall of Adjacent	Total Charge
North Façade	9.1	18	Wood Frame	17%
East Façade	10.1	210	Wood Frame	15%
South Façade	8.5	48	Wood Frame	18%
West Façade	9.5	472	Fire Resistive or Ordinary with Unprotected Openings	20%
TOTAL CHARGE FOR EXPOSURES				**70%**

INCREASE FOR EXPOSURES =	**9100**	**L/min** (Not rounded)

STEP H - DETERMINE FIRE FLOW INCLUDING ALL INCREASES AND REDUCTIONS ((STEP E + STEP F + STEP G, ROUND TO NEAREST 1,000 L/min)

TOTAL REQUIRED FIRE FLOW (RFF) =	**20000**	**L/min** (Rounded to Nearest 1,000 L/min)
	333	**L/s**
	5283	**USGPM**

MODIFICATIONS FOR APPLICATION IN THE CITY OF OTTAWA (per City of Ottawa Technical Bulletin ISTB-2018-02 and ISDTB-2014-02)

TOTAL REQUIRED FIRE FLOW (RFF) =	**10000**	**L/min**
	167	**L/s**
	2642	**USGPM**

PROJECT NAME:	316-332 Clifton Road Property Development
CIMA+ PROJECT NUMBER:	A001062
CLIENT:	Clifton Property Development Inc.
PROJECT STATUS:	Preliminary Design (Assessment of Adequacy of Public Services)

FIRE FLOW ASSESSMENT

NOTES/COMMENTS:

STEP A - DETERMINE THE TYPE OF CONSTRUCTION

1. The buildings do not qualify as ordinary construction as less than 2/3 of exterior walls are constructed from stone/masonry.

STEP B - DETERMINE THE FLOOR AREA

1.Blocks 3, 4 and 5 to the west of the proposed development are separated by less than 3 m, thus the fire area for the FUS calculation is the sum of the floor area of all three buildings.

STEP C - DETERMINE THE HEIGHT IN STOREYS

1. Garage/parking level located at least 50% below grade and thus not considered.

STEP D - DETERMINE BASE FIRE FLOW (ROUND TO NEAREST 1,000 L/min)

1. No notes or comments.

STEP E - DETERMINE THE INCREASE OR DECREASE FOR OCCUPANCY AND APPLY TO STEP D (STEP D x STEP E, DO NOT ROUND)

1. Residential buildings have a limited combustible occupancy.

STEP F - DETERMINE THE DECREASE, IF ANY, FOR AUTOMATIC SPRINKLER PROTECTION AND APPLY TO VALUE IN STEP D ABOVE (DO NOT ROUND)

1. No sprinklers.

STEP G - DETERMINE THE TOTAL INCREASE FOR EXPOSURES AND APPLY TO VALUE IN STEP D ABOVE (DO NOT ROUND)

1. The length height factor of the exposed walls to the east and west includes Blocks 3, 4 and 5 as they are separated by less than 3 m. The total exposure charge is below the maximum value of 75%..

STEP H - DETERMINE FIRE FLOW INCLUDING ALL INCREASES AND REDUCTIONS ((STEP E + STEP F + STEP G, ROUND TO NEAREST 1,000 L/min)

1. No notes or comments.

MODIFICATIONS FOR APPLICATION IN THE CITY OF OTTAWA (per City of Ottawa Technical Bulletin ISTB-2018-02 and ISDTB-2014-02)

1. The City of Ottawa cap of 10,000 L/min applies given town house blocks contain no more than 7 units, the total footprint of the fire area is less than 600 m^2 and town homes are not back to back.

Prepared by: Jaymeson Adams, EIT Date: 2020-08-24

Verified by: Tim Kennedy, P.Eng. Date: 2020-08-25
PEO# 100173201

CIMA+

T: 613-599-2488
110-340 Catherine Street, Ottawa, ON, K2P 2G9 CANADA

PROPOSED WATER SERVICE CONNECTION LOCATION(S)

DRAWN BY:	DESIGNED BY:	APPROVED BY:	SCALE:	DATE:	PROJECT No:	SHEET No:	FIGURE No:
J. Adams	----	T. Kennedy	NTS	2020/08/25	A001062	1 of 1	1

CIMA+

T: 613-888-3488
110-340 Catherine Street, Ottawa, ON, K2P 2G9 CANADA

EXPOSURE SEPARATION DISTANCES

DRAWN BY:	DESIGNED BY:	APPROVED BY:	SCALE:	DATE:	PROJECT No:	SHEET No:	FIGURE No:
J. Adams	----	T. Kennedy	NTS	2020/08/24	A001062	1 of 1	2

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110-340 Catherine Street, Ottawa, ON, K2P 2G9 CANADA

FIRE HYDRANT COVERAGE

DRAWN BY:	DESIGNED BY:	APPROVED BY:	SCALE:	DATE:	PROJECT No:	SHEET No:	FIGURE No:
J.Adams	----	T. Kennedy	NTS	2020/08/25	A001062	1 of 1	3

PROJECT NAME:	316-332 Clifton Road Property Development
CIMA+ PROJECT NUMBER:	A001062
CLIENT:	Clifton Property Development Inc.
PROJECT STATUS:	Preliminary Design (Assessment of Adequacy of Public Services)

HYDRAULIC ANALYSIS - WATER

APPLICABLE DESIGN GUIDELINES:

1. Ottawa Design Guidelines - Water Distribution (2010)
2. City of Ottawa Technical Bulletin ISDTB-2014-02 and ISD-2010-02
3. MOE Design Guidelines for Drinking-Water Systems

MUNICIPAL BOUNDARY CONDITIONS

HYDRAULIC BOUNDARY CONDITIONS (PROVIDED BY THE CITY OF OTTAWA):

Hydraulic Condition (HGL = Hydraulic Grade Line)	Boundary Condition (Head) (m)
	Clifton Rd. 152 mm dia.
Minimum HGL	108.5
Maximum HGL	114.7
Maximum Day + Fire Flow	N/A

AVAILABLE HYDRANT FLOWS - MULTI-HYDRANT ANALYSIS (PROVIDED BY THE CITY OF OTTAWA):

Hydrant ID	Available Flow (L/s)
North Hydrant	70
South Hydrant	85
Total	**155**

HYDRAULIC ANALYSIS - WATER SUPPLY ADEQUACY (FLOW AND PRESSURE)

DESIGN CRITERIA - WATERMAIN PRESSURE AND DEMAND OBJECTIVES:

Demand Type	Minimum Pressure (psi)	Desired Minimum Pressure (psi)	Desired Maximum Pressure (psi)	Maximum Pressure (psi)
Average Daily Demand	40.0	50.0	70.0	80.0
Maximum Daily Demand + Fire Flow	20.0			
Maximum (Peak) Hour Demand	40.0			

WATERMAIN PRESSURE AND DEMAND ANALYSIS SUMMARY - PROPOSED DEVELOPMENT:

Demand Type	Proposed Demand (L/s)	Available Flow/Pressure		Flow/Pressure Objective Achieved?
		Design Operating Pressure[1] (Relative Head) (m)	Design Operating Pressure (psi)	
Average Daily Demand	0.32	50.5	72	YES
Maximum Daily Demand + Fire Flow	169.10	155 L/s @ 20 psi		NO
Maximum (Peak) Hour Demand	3.68	44.3	63	YES

*See note 1.

1. Assumed ground elevation for northern connection (m) = 64.2

NOTES:

1. Based on the boundary conditions provided by the City and additional private hydrant will be required on site to provide adequate fire flow.

Prepared by: Jaymeson Adams, EIT Date: 2020-08-28

Verified by: Tim Kennedy, P.Eng. Date: 2020-08-31
PEO# 100173201

Jaymeson Adams

From: Wessel, Shawn <shawn.wessel@ottawa.ca>
Sent: August 27, 2020 10:36 AM
To: Tim Kennedy; Deiaco, Simon
Cc: Christian Lavoie-Lebel; Jaymeson Adams
Subject: RE: 316 - 332 Clifton Road - City Servicing Requirements and Design Criteria

Good morning Mr. Kennedy.

Please find boundary conditions as requested:

******The following information may be passed on to the consultant, but do NOT forward this e-mail directly.******

The following are boundary conditions, HGL, for hydraulic analysis at 316-332 Clifton Road (zone 1W) assumed to be both connected to the 152mm on Clifton Road (see attached PDF for location).

Minimum HGL = 108.5m

Maximum HGL = 114.7m

Connection 1: Available Fire Flow @ 20 psi = 85 L/s

Connection 2: Available Fire Flow @ 20 psi = 70 L/s

These are for current conditions and are based on computer model simulation.

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.

If you require additional information or clarification, please do not hesitate to contact me anytime.

Thank you

Regards,

Shawn Wessel, A.Sc.T.,rcji
Project Manager - Infrastructure Approvals
Gestionnaire de projet – Approbation des demandes d'infrastructures

Development Review Central Branch | Direction de l'examen des projets d'aménagement, Centrale
Planning, Infrastructure and Economic Development Department | Direction générale de la planification de l'infrastructure et du développement économique
City of Ottawa | Ville d'Ottawa

110 Laurier Ave. W. | 110, avenue Laurier Ouest, Ottawa ON K1P 1J1
(613) 580 2424 Ext. | Poste 33017
Int. Mail Code | Code de Courrier Interne 01-14
shawn.wessel@ottawa.ca

*****Please note that, while my work hours may be affected by the current situation, I still have access to email, video conferencing and telephone. Feel free to schedule video conferences and/or telephone calls, as necessary.*****

From: Tim Kennedy <Tim.Kennedy@cima.ca>
Sent: August 20, 2020 8:38 AM
To: Wessel, Shawn <shawn.wessel@ottawa.ca>; Deiaco, Simon <Simon.Deiaco@ottawa.ca>
Cc: Christian Lavoie-Lebel <Christian.Lavoie-Lebel@cima.ca>; Jaymeson Adams <Jaymeson.Adams@cima.ca>
Subject: 316 - 332 Clifton Road - City Servicing Requirements and Design Criteria

Hi Shawn and Simon,

I was given your contact information by a team member for this file who noted you would be the engineer and planner on file respectively. CIMA+ will be leading the civil design and I am hoping you have some availability this week to discuss the servicing requirements and design criteria for the above mentioned development. Would sometime on Friday between 9:30 and 1:30 work?

We have completed some preliminary analysis in regards to (1) Sanitary Demands and (2) Water/Fire Demands as follows:

1) **SANITARY DEMANDS:** Please find the proposed development information below and detailed calculations attached (I have also attached the Architectural Concept Plans for reference):
   A. **Type of Development and Units:** The proposed development involves the construction of six (6) townhouse blocks comprising thirty-one (31) residential units with private garages.
   B. **Site Address:** 316–322 Clifton Road.
   C. **Location of Services:** connection to existing 225 mm diameter concrete sanitary sewer on Clifton Road with new maintenance hole on sewer main anticipated.
   D. **Total Estimated Average Dry Weather Flow Rate:** 0.27 L/s
   E. **Total Estimated Peak Dry Weather Flow Rate:** 0.98 L/s
   F. **Total Estimated Peak Wet Weather Flow Rate:** 1.08 L/s

Could you please confirm if there is enough capacity in the City system to accommodate the proposed wastewater flow.

2) **WATER AND FIRE FLOW DEMANDS:** Please find the proposed development information below and detailed calculations and associated figures attached, including: (1) Water Demand Calculations, (2) Fire Flow Calculations, (3) Figure 1 – Proposed Water Service Connection Locations, (4) Figure 2 – Exposure Separation Distances, (5) Figure 3 – Fire Hydrant Coverage.

1. **Type of Development and Units:** The proposed development involves the construction of six (6) townhouse blocks comprising thirty-one (31) residential units with private garages.
2. **Site Address:** 316–322 Clifton Road.
3. **Location of Services:** Please see attached Figure 1.
4. **Plan showing Proposed Water Connections:** Please see attached Figure 1.
5. **Average Daily Demand:** 0.34 L/s
6. **Maximum Daily Demands:** 2.52 L/s
7. **Peak Hour Demand:** 3.81 L/s
8. **Required Fire Flow (RFF):** 10,000 L/min

Could you please provide the boundary conditions for the proposed development.

If you have any questions or require anything further, please do not hesitate to contact me on my cell (working from home these days).

Looking forward to collaborating on this one.

Regards,

TIM KENNEDY, P.Eng.
Project Manager / Infrastructure

T 613-860-2462 ext. 6620 **M** 613-462-3627 **F** 613-860-1870
110–240 Catherine Street, Ottawa, ON K2P 2G8 CANADA

Notice to our customers on the COVID-19

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Jaymeson Adams

From: Wessel, Shawn <shawn.wessel@ottawa.ca>
Sent: August 27, 2020 10:36 AM
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Cc: Christian Lavoie-Lebel; Jaymeson Adams
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Connection 1: Available Fire Flow @ 20 psi = 85 L/s

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Regards,

Shawn Wessel, A.Sc.T.,rcji
Project Manager - Infrastructure Approvals
Gestionnaire de projet – Approbation des demandes d'infrastructures

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City of Ottawa | Ville d'Ottawa

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Sent: August 20, 2020 8:38 AM
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Cc: Christian Lavoie-Lebel <Christian.Lavoie-Lebel@cima.ca>; Jaymeson Adams <Jaymeson.Adams@cima.ca>
Subject: 316 - 332 Clifton Road - City Servicing Requirements and Design Criteria

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Looking forward to collaborating on this one.

Regards,

TIM KENNEDY, P.Eng.
Project Manager / Infrastructure

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110–240 Catherine Street, Ottawa, ON K2P 2G8 CANADA

Notice to our customers on the COVID-19

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E

Appendix E
Sanitary Servicing Design Calculations

CIMA+

PROJECT NAME:	316-332 Clifton Road Property Development
CIMA+ PROJECT NUMBER:	A001062
CLIENT:	Clifton Property Development Inc.
PROJECT STATUS:	Preliminary Design (Assessment of Adequacy of Public Services)

WASTEWATER PEAK FLOW DETERMINATION

APPLICABLE DESIGN GUIDELINES:

1. City of Ottawa Sewer Design Guidelines, 2012

2. City of Ottawa Technical Bulletin ISTB-2018-01

DOMESTIC CONTRIBUTIONS:

RESIDENTIAL DESIGN CRITERIA:

Residential Average Flow: (1) 280 L/c/day

Residential Peak Factor (P.F.): Harmon Equation (Min 2.0 and Max 4.0)

$$P.F. = 1 + \left(\frac{14}{4 + \left(\frac{P}{1000} \right)^{\frac{1}{2}}} \right) * K$$

where:

P=Population

K=Correction Factor =0.8

Per Unit Populations:

Table 4.2 Per Unit Populations

Unit Type	Persons Per Unit
Single Family	3.4
Semi-detached	2.7
Duplex	2.3
Townhouse (row)	2.7
Apartments:	
Bachelor	1.4
1 Bedroom	1.4
2 Bedroom	2.1
3 Bedroom	3.1
Average Apt.	1.8

AVERAGE FLOW - DOMESTIC:

Unit Type	Number of Units	Persons Per Unit	Population	Average Flow (L/s)
Block 1 Townhomes	4	2.7	11	0.04
Block 2 Townhomes	6	2.7	16	0.05
Block 3 Townhomes	4	2.7	11	0.04
Block 4 Townhomes	4	2.7	11	0.04
Block 5 Townhomes	4	2.7	11	0.04
Block 6 Townhomes	7	2.7	19	0.06
Total	**29**		**79**	**0.26**

PEAK FLOW - DOMESTIC:

Population: (2)	79	persons
Average Dry Weather Flow: (3) = (1) x (2)	0.26	L/s
Peaking Factor (P.F.): (4)	3.62	
Peak Domestic Flow: (5) = (3) x (4)	**0.93**	L/s

EXTRANEOUS FLOW CONTRIBUTION - INFLOW AND INFILTRATION:

EXTRANEOUS DESIGN CRITERIA:

Dry Weather Infiltration:	0.05	L/s/effective gross ha (for all areas)
Wet Weather Infiltration:	0.28	L/s/effective gross ha (for all areas)

PEAK FLOW - EXTRANEOUS:

Effective Gross Area: (11)	0.2950	ha
Total Infiltration Allowance: (12)	0.33	L/s/effective gross ha (for all areas)
Peak Extraneous Flow: (13) = (11) x (12)	**0.10**	L/s

PROJECT NAME:	316-332 Clifton Road Property Development
CIMA+ PROJECT NUMBER:	A001062
CLIENT:	Clifton Property Development Inc.
PROJECT STATUS:	Preliminary Design (Assessment of Adequacy of Public Services)

WASTEWATER PEAK FLOW DETERMINATION

Total Estimated Avg. Dry Weather Flow Rate:	**0.26**	**L/s**
Total Estimated Peak Dry Weather Flow Rate:	**0.93**	**L/s**
Total Estimated Peak Wet Weather Flow Rate:	**1.02**	**L/s**

Prepared by: Jaymeson Adams, EIT Date: 2020-08-24

Verified by: Tim Kennedy, P.Eng. Date: 2020-08-25
PEO# 100173201

PROJECT NAME:	316-332 Clifton Road Property Development
CIMA+ PROJECT	A001062
CLIENT:	Clifton Property Development Inc.
PROJECT STATUS:	Detailed Design (Site Plan Control)

SIZING OF CIRCULAR PIPE

APPLICABLE DESIGN GUIDELINES:

1. City of Ottawa Sewer Design Guidelines, 2012

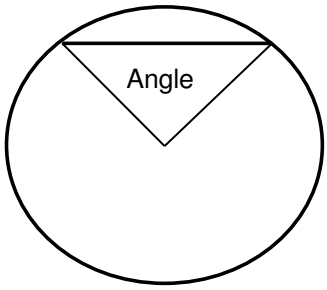
CIRCULAR PIPE SIZING CALCULATIONS:

DESIGN CRITERIA:

Manning's Coefficient (n):	0.013	
Maximum Permitted Velocity:	3.00	m/s
Minimum Permitted Velocity:	0.60	m/s

Pipe Diameter:	0.200 m
Slope:	0.32 %

Flow Angle:	265.9 °



FLOW		VELOCITY		HYDRAULIC PROPERTIES		
				Wetted Area	Wetted Perimeter	Hydraulic Radius
m^3/s	L/s	m/s	cm/s	m^2	m	m
0.0010	1.02	0.317	31.7	0.003	0.164	0.020

Percent Full	**10 %**

Prepared by: Jaymeson Adams, EIT Date: 2021-01-25

Verified by: Tim Kennedy, P.Eng. Date: 2021-01-25

PEO #100173201

F

Appendix F
Storm Servicing and Stormwater Management Calculations

PROJECT NAME:	316-332 Clifton Road Property Development
CIMA+ PROJECT NUMBER:	A001062
CLIENT:	Clifton Property Development Inc.
PROJECT STATUS:	Preliminary Design (Assessment of Adequacy of Public Services)

STORM RUNOFF COEFFICIENT DETERMINATION (PRE-DEVELOPMENT)

APPLICABLE DESIGN GUIDELINES:

1. City of Ottawa Sewer Design Guidelines, 2012

PRE-DEVELOPMENT RUNOFF COEFFICIENT DETERMINATION:

Area	Pervious Area m²	Pervious Area Runoff Coefficient	Impervious Area m²	Impervious Area Runoff Coefficient	Total Area m²	Weighted Runoff Coefficient (5-year)	Weighted Runoff Coefficient (100-year)
Attenuated Area	1893	0.20	1057	0.90	2950	**0.45**	**0.56**
Unattenuated Area - Clifton (NC1)	192	0.20	70	0.90	262	**0.39**	**0.48**
Unattenuated Area - Wilber (NC2)	166	0.20	2	0.90	168	**0.21**	**0.26**
TOTAL	**2251**	**0.20**	**1129**	**0.90**	**3380**	**0.43**	**0.54**

NOTES:

For 25 year storms add 10% to C value
For 50 year storms add 20% to C value
For 100 year storms add 25% to C value

Prepared by: Jaymeson Adams, EIT Date: 2020-08-25

Verified by: Tim Kennedy, P.Eng. Date: 2020-08-25
PEO# 100173201

PROJECT NAME:	316-332 Clifton Road Property Development
CIMA+ PROJECT NUMBER:	A001062
CLIENT:	Clifton Property Development Inc.
PROJECT STATUS:	Preliminary Design (Assessment of Adequacy of Public Services)

STORM PRE-DEVELOPMENT FLOW

APPLICABLE DESIGN GUIDELINES:

1. City of Ottawa Sewer Design Guidelines, 2012

PRE-DEVELOPMENT FLOW DETERMINATION:

DESIGN CRITERIA:

Design Storm (year):	5	
IDF Regression Constants: (a)	998.071	
(b)	6.053	
(c)	0.814	
IDF Curve Equation (mm/hr):	$I = a / (\text{Time in min} + b)^c$	
Rational Formula (L/s):	Q = 2.78C*I*A	where: Q = Flow (L/s) C = Runoff Coefficient I = Rainfall Intensity (mm/hr) A = Area (hectares)

ALLOWABLE RELEASE RATE - SUMMARY:

Catchment ID	Area (A) ha	Runoff Coefficient (C)	Time of Concentration (tc) min	Intensity (I) mm/hr	Allowable Release Rate (Q) L/s	Release Flow Per Unit Area (Q/ha) L/s/ha
A1	0.295	0.45	10	104.19	**38.4**	**130.2**
Total	**0.295**				**38.4**	**130.2**

NOTES:

1. Calculated Time of Concentration (tc) using Bransby Williams (C > 0.4) is 7 min. Minimum Tc of 10 min used per City Standard.
2. IDF Parameters per City of Ottawa Sewer Design Guidelines, 2012 (Macdonald-Cartier International Airport)

Prepared by: Jaymeson Adams, EIT Date: 2020-09-03

Verified by: Tim Kennedy, P.Eng. Date: 2020-09-03
PEO# 100173201

PROJECT NAME:	316-332 Clifton Road Property Development
CIMA+ PROJECT NUMBER:	A001062
CLIENT:	Clifton Property Development Inc.
PROJECT STATUS:	Preliminary Design (Assessment of Adequacy of Public Services)

STORM PRE-DEVELOPMENT FLOW - EXISTING SITE FLOWS

APPLICABLE DESIGN GUIDELINES:

1. City of Ottawa Sewer Design Guidelines, 2012

PRE-DEVELOPMENT FLOW DETERMINATION - 100-YEAR EVENT:

DESIGN CRITERIA:

Design Storm (year):	100	
IDF Regression Constants: (a)	1735.688	
(b)	6.014	
(c)	0.820	
IDF Curve Equation (mm/hr):	$I = a / (Time\ in\ min + b)^c$	
Rational Formula (L/s):	Q = 2.78C*I*A	where: Q = Flow (L/s) C = Runoff Coefficient I = Rainfall Intensity (mm/hr) A = Area (hectares)

ALLOWABLE RELEASE RATE - SUMMARY:

Catchment ID	Area (A) ha	Runoff Coefficient (C)	Time of Concentration (tc) min	Intensity (I) mm/hr	Release Rate (Q) L/s	Release Flow Per Unit Area (Q/ha) L/s/ha
A1	0.295	0.56	10	178.56	**81.9**	**277.8**
Total	**0.295**				**81.9**	**277.8**

NOTES:

1. Calculated Time of Concentration (tc) using Bransby Williams (C > 0.4) is 7 min. Minimum Tc of 10 min used per City Standard.
2. IDF Parameters per City of Ottawa Sewer Design Guidelines, 2012 (Macdonald-Cartier International Airport)

Prepared by: Jaymeson Adams, EIT Date: 2020-09-03

Verified by: Tim Kennedy, P.Eng. Date: 2020-09-03
PEO# 100173201


DIRECTION OF STORM FLOW IS UNCLEAR IN THIS AREA GIVEN AVAILABLE STORM SEWER INFORMATION ON GEOOTTAWA HOWEVER THERE ARE TWO POSSIBLE ALIGNMENTS EACH WITH SIMILAR ULTIMATE OUTLET LOCATION
SITE LOCATION
316–332 CLIFTON RD
JAYMESON ADAMS, EIT
A001062
2020-08-20
Bayview
prom. Sir John A. Macdonald Pky.
av. Gladstone Ave.
prom. Island Park Dr.

CIMA+

T: 613-839-3182
110-340 Catherine Street, Ottawa, ON K2P 2G9 CANADA

PRE-DEVELOPMENT DRAINAGE AREAS

DRAWN BY:	DESIGNED BY:	APPROVED BY:	SCALE:	DATE:	PROJECT No:	SHEET No:	FIGURE No:
J. Adams	----	T. Kennedy	NTS	2020/08/21	A001062	1 of 1	EXIST - 2

PROJECT NAME:	316-332 Clifton Road Property Development
CIMA+ PROJECT NUMBER:	A001062
CLIENT:	Clifton Property Development Inc.
PROJECT STATUS:	Detailed Design (Site Plan Control)

STORM RUNOFF COEFFICIENT DETERMINATION (POST-DEVELOPMENT)

APPLICABLE DESIGN GUIDELINES:

1. City of Ottawa Sewer Design Guidelines, 2012

POST-DEVELOPMENT RUNOFF COEFFICIENT DETERMINATION:

Area	Pervious Area m²	Pervious Area Runoff Coefficient	Impervious Area m²	Impervious Area Runoff Coefficient	Total Area m²	Weighted Runoff Coefficient (5-year)	Weighted Runoff Coefficient (100-year)
Block 1 (A1)	0	0.20	195	0.90	195	**0.90**	**0.95**
Block 2 (A2)	0	0.20	293	0.90	293	**0.90**	**0.95**
Block 3 (A3)	0	0.20	182	0.90	182	**0.90**	**0.95**
Block 4 (A4)	0	0.20	182	0.90	182	**0.90**	**0.95**
Block 5 (A5)	0	0.20	182	0.90	182	**0.90**	**0.95**
Block 6 (A6)	0	0.20	341	0.90	341	**0.90**	**0.95**
Area to CB1 (A7.1)	41	0.20	163	0.90	204	**0.76**	**0.95**
Area to CB2 (A7.2)	48	0.20	195	0.90	243	**0.76**	**0.95**
Area to CB3 (A7.3)	68	0.20	349	0.90	417	**0.79**	**0.95**
Remaining Site Area (A7.4)	19	0.20	213	0.90	232	**0.84**	**0.95**
Unattenuated Area - Clifton (NC1)	338	0.20	345	0.90	683	**0.55**	**0.69**
Unattenuated Area - Wilber (NC2)	138	0.20	88	0.90	226	**0.47**	**0.59**
TOTAL	**652**	**0.20**	**2728**	**0.90**	**3380**	**0.76**	**0.95**

NOTES:

For 25 year storms add 10% to C value
For 50 year storms add 20% to C value
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Prepared by: Jaymeson Adams, EIT Date: 2021-01-22

Verified by: Tim Kennedy, P.Eng. Date: 2021-01-22
PEO# 100173201

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PROJECT STATUS:	Detailed Design (Site Plan Control)

STORM PRE- VS POST DEVELOPMENT FLOW - UNATTENUATED AREA NC1 (100-YEAR)

APPLICABLE DESIGN GUIDELINES:

1. City of Ottawa Sewer Design Guidelines, 2012

PRE- vs POST-DEVELOPMENT FLOW DETERMINATION FOR UNATTENUATED AREAS:

DESIGN CRITERIA:

Design Storm (year):	100	
IDF Regression Constants: (a)	1735.688	
(b)	6.014	
(c)	0.820	
IDF Curve Equation (mm/hr):	$I = a / (Time\ in\ min + b)^c$	
Rational Formula (L/s):	Q = 2.78C*I*A	where: Q = Flow (L/s) C = Runoff Coefficient I = Rainfall Intensity (mm/hr) A = Area (hectares)

RELEASE RATE SUMMARY - UNATTENUATED AREAS - PRE- vs POST-DEVELOPMENT (100-year):

Design Event	Area (A) ha	Runoff Coefficient (C)	Time of Concentration (tc) min	Intensity (I) mm/hr	Allowable Release Rate (Q) L/s	Release Flow Per Unit Area (Q/ha) L/s/ha
Pre-development (Clifton)	0.0262	0.48	10	178.56	**6.2**	**238.08**
Post-development (Clifton)	0.0683	0.69	10	178.56	**23.4**	**342.24**
Variance (Post minus Pre)					**17.1**	

NOTES:

1. Calculated Time of Concentration (tc) using Bransby Williams (C > 0.4) is 7 min. Minimum Tc of 10 min used per City Standard.
2. IDF Parameters per City of Ottawa Sewer Design Guidelines, 2012 (Macdonald-Cartier International Airport)

Prepared by: Jaymeson Adams, EIT Date: 2021-01-22

Verified by: Tim Kennedy, P.Eng. Date: 2021-01-22
PEO# 100173201

PROJECT NAME:	316-332 Clifton Road Property Development
CIMA+ PROJECT NUMBER:	A001062
CLIENT:	Clifton Property Development Inc.
PROJECT STATUS:	Detailed Design (Site Plan Control)

STORM PRE- VS POST DEVELOPMENT FLOW - UNATTENUATED AREA NC2 (100-YEAR)

APPLICABLE DESIGN GUIDELINES:

1. City of Ottawa Sewer Design Guidelines, 2012

PRE- vs POST-DEVELOPMENT FLOW DETERMINATION FOR UNATTENUATED AREAS:

DESIGN CRITERIA:

Design Storm (year):	100	
IDF Regression Constants: (a) **(b)** **(c)**	1735.688 6.014 0.820	
IDF Curve Equation (mm/hr):	$I = a / (\text{Time in min} + b)^c$	
Rational Formula (L/s):	Q = 2.78C*I*A	where: Q = Flow (L/s) C = Runoff Coefficient I = Rainfall Intensity (mm/hr) A = Area (hectares)

RELEASE RATE SUMMARY - UNATTENUATED AREAS - PRE- vs POST-DEVELOPMENT (100-year):

Design Event	Area (A) ha	Runoff Coefficient (C)	Time of Concentration (tc) min	Intensity (I) mm/hr	Allowable Release Rate (Q) L/s	Release Flow Per Unit Area (Q/ha) L/s/ha
Pre-development (Wilber)	0.0168	0.26	10	178.56	**2.2**	**128.96**
Post-development (Wilber)	0.0226	0.59	10	178.56	**6.6**	**292.64**
Variance (Post minus Pre)					**4.4**	

NOTES:

1. Calculated Time of Concentration (tc) using Bransby Williams (C > 0.4) is 7 min. Minimum Tc of 10 min used per City Standard.
2. IDF Parameters per City of Ottawa Sewer Design Guidelines, 2012 (Macdonald-Cartier International Airport)

Prepared by: Jaymeson Adams, EIT Date: 2021-01-22

Verified by: Tim Kennedy, P.Eng. Date: 2021-01-22
PEO# 100173201

PROJECT NAME: 316-332 Clifton Road Property Development
CIMA+ PROJECT NUMBER: A001062
CLIENT: Clifton Property Development Inc.
PROJECT STATUS: Detailed Design (Site Plan Control)

STORMWATER MANAGEMENT – RETENTION CALCULATIONS

APPLICABLE DESIGN GUIDELINES:

1. City of Ottawa Sewer Design Guidelines, 2012

STORMWATER MANAGEMENT SUMMARY - STORAGE AND DRAWDOWN:

DESIGN CRITERIA:

Rainfall event	100.0	years
Roof Flows	11.2	L/s
Attenuated Flow (100 year)	5.7	L/s
Unattenuated Flow (100 year)	21.5	L/s
Allowable Release Rate	38.4	L/s

Sub-Area	Total Area (m^2)	Available Storage Area (m^2)	Catchbasin/ Roof Drain Elevation (m)	Maximum Ponding Elevation (m)	Y_{max} (m)	V_{max} (m^3)	V_{rain} (m^3)	V_{acc} (m^3)	Y_{rain} (m)	$Elev_{rain}$ (m)	A_{rain} (m^2)	Q (L/s)	Drawdown Time (min)	Comments
A1	195	195	100.00	100.15	0.15	9.8	5.6	5.6	0.11	100.11	148	1.6	59	Block 1
A2	293	293	100.00	100.15	0.15	14.7	10.1	10.1	0.12	100.12	243	1.6	105	Block 2
A3	182	182	100.00	100.15	0.15	9.1	5.1	5.1	0.11	100.11	136	1.6	53	Block 3
A4	182	182	100.00	100.15	0.15	9.1	5.1	5.1	0.11	100.11	136	1.6	53	Block 4
A5	182	182	100.00	100.15	0.15	9.1	5.1	5.1	0.11	100.11	136	1.6	53	Block 5
A6	341	341	100.00	100.15	0.15	17.1	9.2	9.2	0.11	100.11	251	3.2	48	Block 6
A7.1	204	-	64.98	65.04	0.06	40.0	7.2	38.5	-	-	-	1.1	605	Area to CB1
A7.2	243	-	64.99	65.08	0.09		8.5		-	-	-	1.3	0	Area to CB2
A7.3	417	-	65.03	65.12	0.09		14.7		-	-	-	2.2	0	Area to CB3
A7.4	232	-	65.76	65.80	0.04		8.2		-	-	-	1.2	0	Rear of Blocks 3-5
NC1	683	0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	17.1	0.00	to Clifton
NC2	226	0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	4.4	0.00	to Wilber
Total to Tank	**1096**					**40.0**	**38.5**	**38.5**				**5.7**		
Total	**3380**	**1375**				108.8	78.7	78.7				38.4		

DEFINITIONS OF ABBREVIATIONS USED IN CALCULATION TABLE:

NC = Area is not controlled (unattenuated)
Available Area = Area of water accumulated in sub-area at Max. Elev.
Catchbasin Elev. = Elevation of catchbasin inlet (top of grate).
Max. Elev. = Maximum elevation of water that may be accumulated within sub-area.
Y_{max} = Maximum depth of water that may be accumulated within the sub-area.
V_{max} = Maximum volume of water (capacity) that may be accumulated within the sub-area.
V_{rain} = Volume of water generated by rainfall.
V_{acc} = Total volume of water accumulated within the sub-area in the event of a specific rainfall.
Y_{rain} = Depth of water generated by rainfall.
$Elev_{rain}$ = Elevation of water generated by rainfall.
A_{rain} = Area of water generated by rainfall.
Q = Release flow rate.
Tank Release Rate = Release rate from the underground storage tank equal to 1/2 the allowable release rate.
Drawdown Time = Time required for the total volume of water accumulated within sub-area to subside.

Prepared by: Jaymeson Adams, EIT Date: 2021-01-25

Verified by: Tim Kennedy, P.Eng. Date: 2021-01-25
PEO# 100173201

PROJECT NAME:	316-332 Clifton Road Property Development
CIMA+ PROJECT NUMBER:	A001062
CLIENT:	Clifton Property Development Inc.
PROJECT STATUS:	Detailed Design (Site Plan Control)

RETENTION CALCULATIONS FOR FOR SUB-CATCHMENT AREA A1 (BLOCK 1)

APPLICABLE DESIGN GUIDELINES:

1. City of Ottawa Sewer Design Guidelines, 2012

REQUIRED STORAGE VOLUME DETERMINATION:

DESIGN CRITERIA:

Rainfall Station:	City of Ottawa Sewer Design Guidelines, 2012 (Macdonald-Cartier Airport)
Release Rate Per Unit Area (Q/ha):	82.05 L/s/ha
Area (A):	0.0195 ha
Runoff Coefficient (C):	0.95
Rainfall Event:	100 year
Release Rate (Q):	0.0016 m³/s
Discharge Factor (K):	1

Regression Constants	2 year	5 year	10 year	25 year	50 year	100 year
A	732.951	998.071	1174.184	1402.844	1569.58	1735.688
B	6.199	6.053	6.014	6.018	6.014	6.014
C	0.810	0.814	0.816	0.819	0.82	0.82

Required Retention Volume: **5.6 m³**

Rainfall Duration (min) *T* (1)	Rainfall Intensity (mm/h) *I* (2)	Runoff Volume (m³) *CIAT* (3)	Output Volume (m³) *kQT* (4)	Retention Volume (m³) *(3)-(4)* (5)
5.0	242.7	3.7	0.5	3.3
10.0	178.6	5.5	1.0	4.6
15.0	142.9	6.6	1.4	5.2
20.0	120.0	7.4	1.9	5.5
25.0	103.8	8.0	2.4	5.6
30.0	**91.9**	**8.5**	**2.9**	**5.6**
35.0	82.6	8.9	3.4	5.6
40.0	75.1	9.3	3.8	5.4
45.0	69.1	9.6	4.3	5.3
50.0	64.0	9.9	4.8	5.1
55.0	59.6	10.1	5.3	4.8
60.0	55.9	10.4	5.8	4.6
65.0	52.6	10.6	6.2	4.3
70.0	49.8	10.8	6.7	4.0
75.0	47.3	10.9	7.2	3.7
80.0	45.0	11.1	7.7	3.4
85.0	43.0	11.3	8.2	3.1
90.0	41.1	11.4	8.6	2.8
95.0	39.4	11.6	9.1	2.4
100.0	37.9	11.7	9.6	2.1
105.0	36.5	11.8	10.1	1.8
110.0	35.2	12.0	10.6	1.4
115.0	34.0	12.1	11.0	1.0
120.0	32.9	12.2	11.5	0.7
125.0	31.9	12.3	12.0	0.3
130.0	30.9	12.4	12.5	-0.1
Design Volume:				**5.6**

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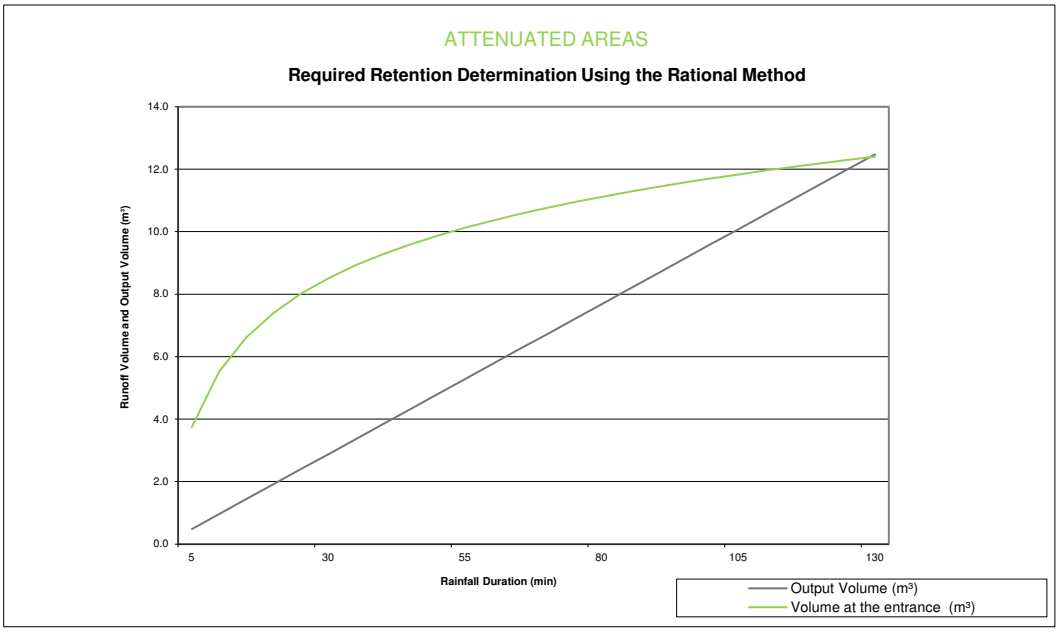
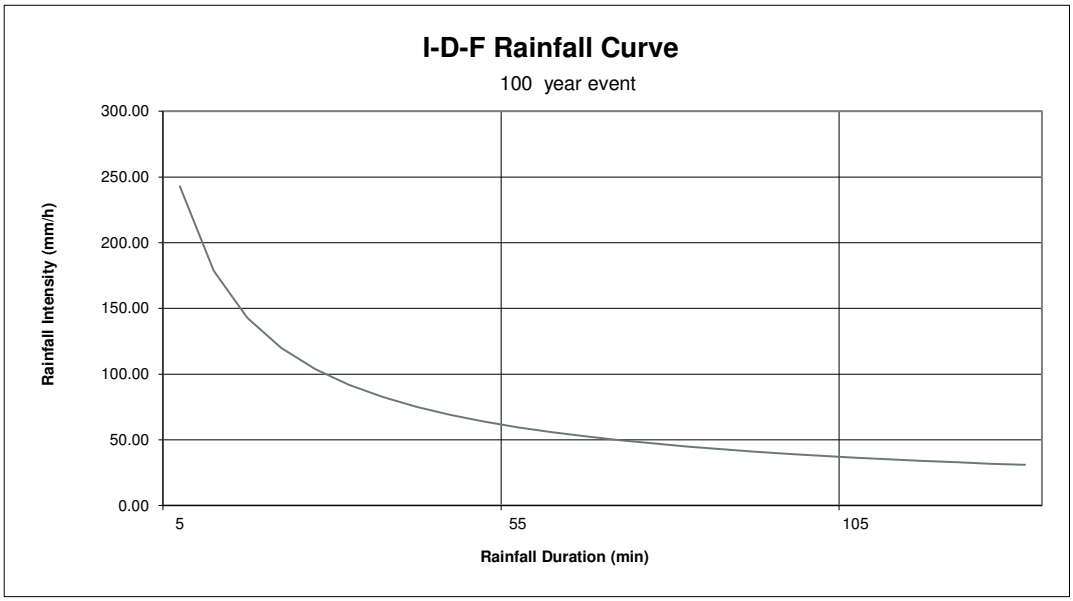




Prepared by: Jaymeson Adams, EIT Date: 2021-01-25

Verified by: Tim Kennedy, P.Eng. Date: 2021-01-25
PEO# 100173201

Init._____

PROJECT NAME:	316-332 Clifton Road Property Development
CIMA+ PROJECT NUMBER:	A001062
CLIENT:	Clifton Property Development Inc.
PROJECT STATUS:	Detailed Design (Site Plan Control)

RETENTION CALCULATIONS FOR FOR SUB-CATCHMENT AREA A2 (BLOCK 2)

APPLICABLE DESIGN GUIDELINES:

1. City of Ottawa Sewer Design Guidelines, 2012

REQUIRED STORAGE VOLUME DETERMINATION:

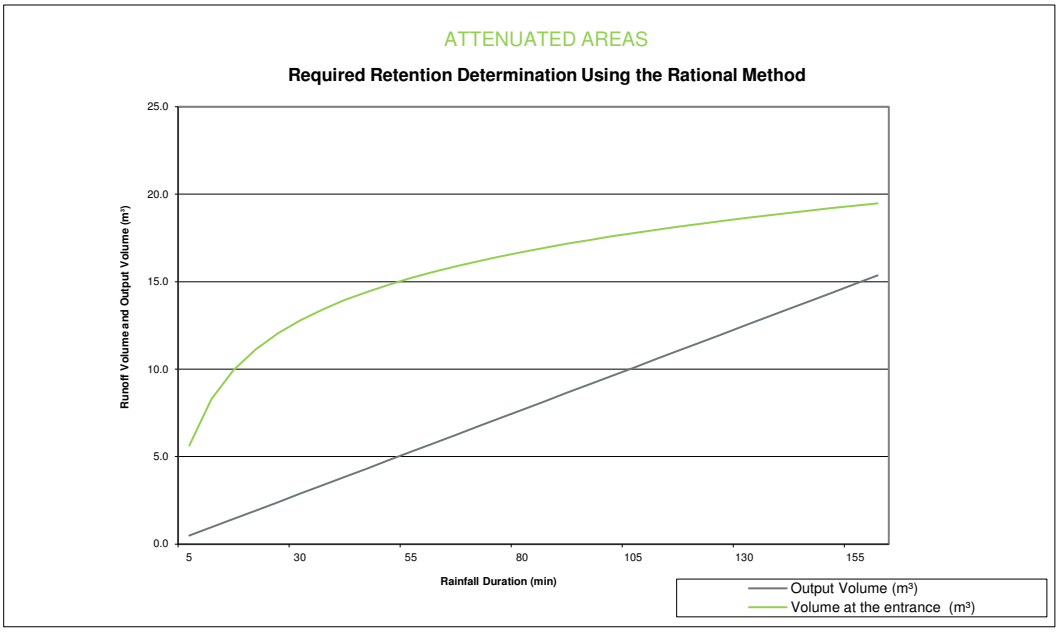
DESIGN CRITERIA:

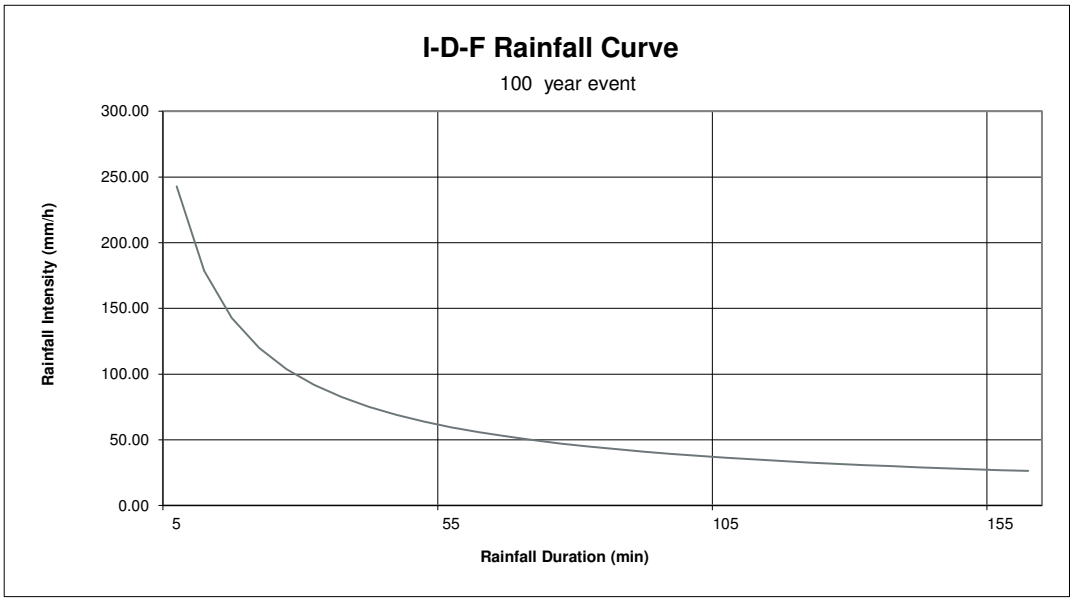
Rainfall Station:	City of Ottawa Sewer Design Guidelines, 2012 (Macdonald-Cartier Airport)
Release Rate Per Unit Area (Q/ha):	54.61 L/s/ha
Area (A):	0.0293 ha
Runoff Coefficient (C):	0.95
Rainfall Event:	100 year
Release Rate (Q):	0.0016 m³/s
Discharge Factor (K):	1

Regression Constants	2 year	5 year	10 year	25 year	50 year	100 year
A	732.951	998.071	1174.184	1402.844	1569.58	1735.688
B	6.199	6.053	6.014	6.018	6.014	6.014
C	0.810	0.814	0.816	0.819	0.82	0.82

Required Retention Volume: 10.1 m³

Rainfall Duration (min) *T* (1)	**Rainfall Intensity** (mm/h) *I* (2)	**Runoff Volume** (m³) *CIAT* (3)	**Output Volume** (m³) *kQT* (4)	**Retention Volume** (m³) *(3)-(4)* (5)
5.0	242.7	5.6	0.5	5.1
10.0	178.6	8.3	1.0	7.3
15.0	142.9	9.9	1.4	8.5
20.0	120.0	11.1	1.9	9.2
25.0	103.8	12.0	2.4	9.6
30.0	91.9	12.8	2.9	9.9
35.0	82.6	13.4	3.4	10.0
40.0	**75.1**	**13.9**	**3.8**	**10.1**
45.0	69.1	14.4	4.3	10.1
50.0	64.0	14.8	4.8	10.0
55.0	59.6	15.2	5.3	9.9
60.0	55.9	15.6	5.8	9.8
65.0	52.6	15.9	6.2	9.6
70.0	49.8	16.2	6.7	9.4
75.0	47.3	16.4	7.2	9.2
80.0	45.0	16.7	7.7	9.0
85.0	43.0	16.9	8.2	8.8
90.0	41.1	17.2	8.6	8.5
95.0	39.4	17.4	9.1	8.3
100.0	37.9	17.6	9.6	8.0
105.0	36.5	17.8	10.1	7.7
110.0	35.2	18.0	10.6	7.4
115.0	34.0	18.1	11.0	7.1
120.0	32.9	18.3	11.5	6.8
125.0	31.9	18.5	12.0	6.5
130.0	30.9	18.6	12.5	6.2
135.0	30.0	18.8	13.0	5.8
140.0	29.2	18.9	13.4	5.5
145.0	28.4	19.1	13.9	5.2
150.0	27.6	19.2	14.4	4.8
155.0	26.9	19.3	14.9	4.5
160.0	26.2	19.5	15.4	4.1
Design Volume:				**10.1**





Prepared by: Jaymeson Adams, EIT Date: 2021-01-25

Verified by: Tim Kennedy, P.Eng. Date: 2021-01-25
PEO# 100173201

Init._____

PROJECT NAME:	316-332 Clifton Road Property Development
CIMA+ PROJECT NUMBER:	A001062
CLIENT:	Clifton Property Development Inc.
PROJECT STATUS:	Detailed Design (Site Plan Control)

RETENTION CALCULATIONS FOR FOR SUB-CATCHMENT AREA A3 (BLOCK 3)

APPLICABLE DESIGN GUIDELINES:

1. City of Ottawa Sewer Design Guidelines, 2012

REQUIRED STORAGE VOLUME DETERMINATION:

DESIGN CRITERIA:

Rainfall Station:	City of Ottawa Sewer Design Guidelines, 2012 (Macdonald-Cartier Airport)
Release Rate Per Unit Area (Q/ha):	87.91 L/s/ha
Area (A):	0.0182 ha
Runoff Coefficient (C):	0.95
Rainfall Event:	100 year
Release Rate (Q):	0.0016 m³/s
Discharge Factor (K):	1

Regression Constants	2 year	5 year	10 year	25 year	50 year	100 year
A	732.951	998.071	1174.184	1402.844	1569.58	1735.688
B	6.199	6.053	6.014	6.018	6.014	6.014
C	0.810	0.814	0.816	0.819	0.82	0.82

Required Retention Volume:	**5.1 m³**

Rainfall Duration (min) *T* (1)	Rainfall Intensity (mm/h) *I* (2)	Runoff Volume (m³) *CIAT* (3)	Output Volume (m³) *kQT* (4)	Retention Volume (m³) *(3)-(4)* (5)
5.0	242.7	3.5	0.5	3.0
10.0	178.6	5.1	1.0	4.2
15.0	142.9	6.2	1.4	4.7
20.0	120.0	6.9	1.9	5.0
25.0	**103.8**	**7.5**	**2.4**	**5.1**
30.0	91.9	7.9	2.9	5.1
35.0	82.6	8.3	3.4	5.0
40.0	75.1	8.7	3.8	4.8
45.0	69.1	9.0	4.3	4.6
50.0	64.0	9.2	4.8	4.4
55.0	59.6	9.4	5.3	4.2
60.0	55.9	9.7	5.8	3.9
65.0	52.6	9.9	6.2	3.6
70.0	49.8	10.0	6.7	3.3
75.0	47.3	10.2	7.2	3.0
80.0	45.0	10.4	7.7	2.7
85.0	43.0	10.5	8.2	2.4
90.0	41.1	10.7	8.6	2.0
95.0	39.4	10.8	9.1	1.7
100.0	37.9	10.9	9.6	1.3
105.0	36.5	11.0	10.1	1.0
110.0	35.2	11.2	10.6	0.6
115.0	34.0	11.3	11.0	0.2
120.0	32.9	11.4	11.5	-0.1
125.0	31.9	11.5	12.0	-0.5
130.0	30.9	11.6	12.5	-0.9
135.0	30.0	11.7	13.0	-1.3
140.0	29.2	11.8	13.4	-1.7
145.0	28.4	11.8	13.9	-2.1
150.0	27.6	11.9	14.4	-2.5
Design Volume:				**5.1**

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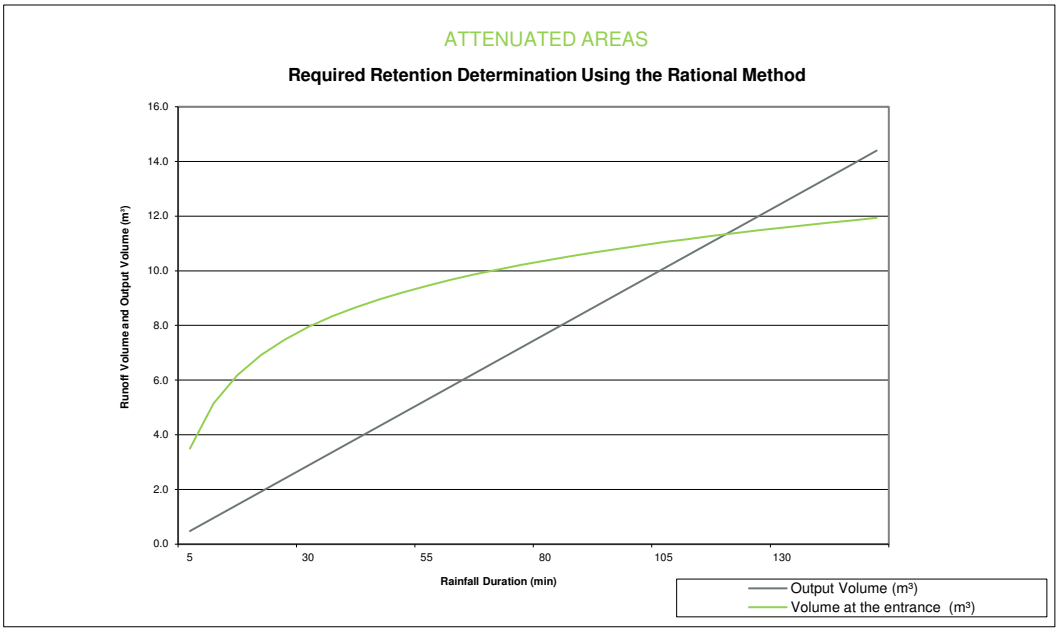
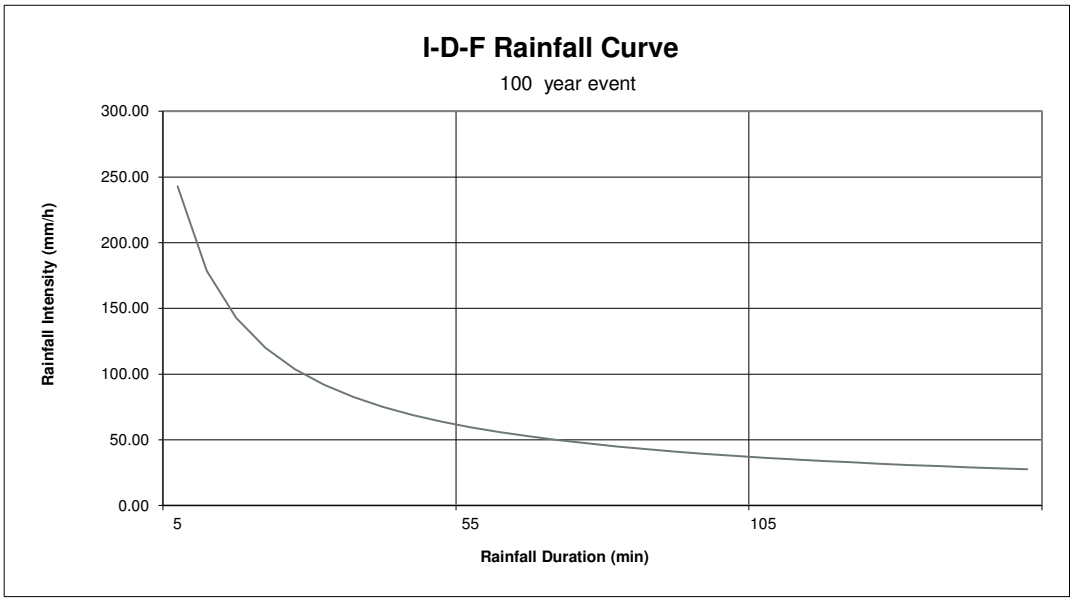




Prepared by: Jaymeson Adams, EIT Date: 2021-01-25

Verified by: Tim Kennedy, P.Eng. Date: 2021-01-25
PEO# 100173201

Init._____

PROJECT NAME:	316-332 Clifton Road Property Development
CIMA+ PROJECT NUMBER:	A001062
CLIENT:	Clifton Property Development Inc.
PROJECT STATUS:	Detailed Design (Site Plan Control)

RETENTION CALCULATIONS FOR FOR SUB-CATCHMENT AREA A4 (BLOCK 4)

APPLICABLE DESIGN GUIDELINES:

1. City of Ottawa Sewer Design Guidelines, 2012

REQUIRED STORAGE VOLUME DETERMINATION:

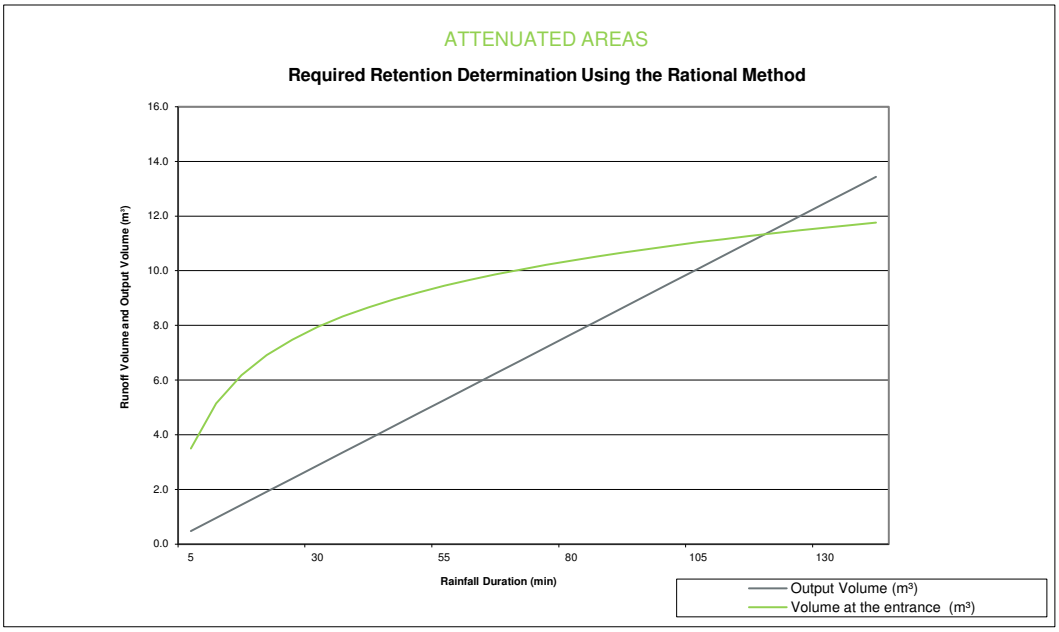
DESIGN CRITERIA:

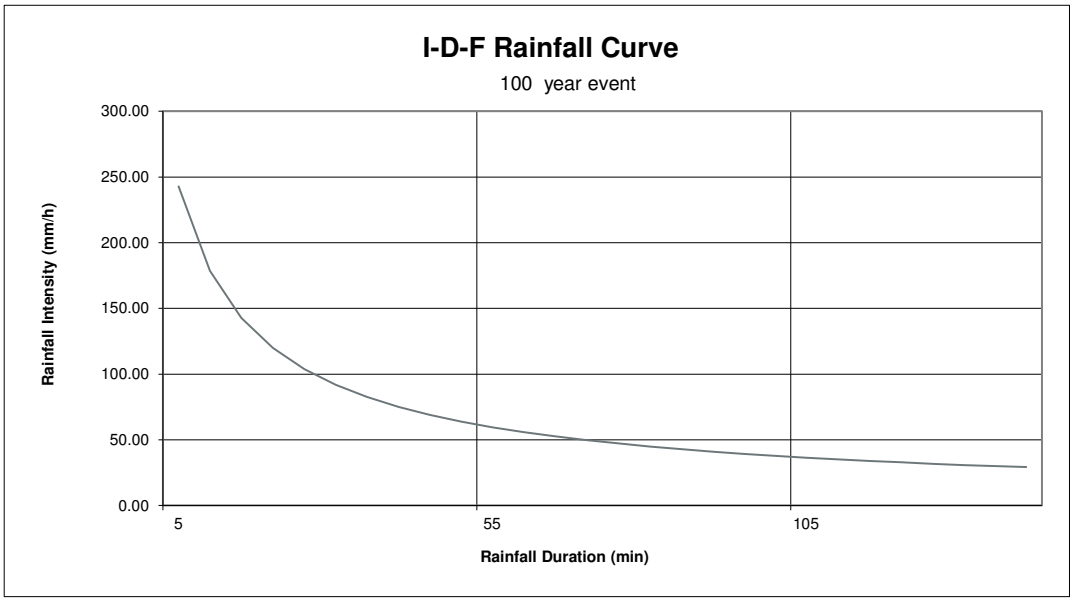
Rainfall Station:	City of Ottawa Sewer Design Guidelines, 2012 (Macdonald-Cartier Airport)
Release Rate Per Unit Area (Q/ha):	87.91 L/s/ha
Area (A):	0.0182 ha
Runoff Coefficient (C):	0.95
Rainfall Event:	100 year
Release Rate (Q):	0.0016 m³/s
Discharge Factor (K):	1

Regression Constants	2 year	5 year	10 year	25 year	50 year	100 year
A	732.951	998.071	1174.184	1402.844	1569.58	1735.688
B	6.199	6.053	6.014	6.018	6.014	6.014
C	0.810	0.814	0.816	0.819	0.82	0.82

Required Retention Volume:	**5.1 m³**

Rainfall Duration (min) *T* (1)	Rainfall Intensity (mm/h) *I* (2)	Runoff Volume (m³) *CIAT* (3)	Output Volume (m³) *kQT* (4)	Retention Volume (m³) *(3)-(4)* (5)
5.0	242.7	3.5	0.5	3.0
10.0	178.6	5.1	1.0	4.2
15.0	142.9	6.2	1.4	4.7
20.0	120.0	6.9	1.9	5.0
25.0	**103.8**	**7.5**	**2.4**	**5.1**
30.0	91.9	7.9	2.9	5.1
35.0	82.6	8.3	3.4	5.0
40.0	75.1	8.7	3.8	4.8
45.0	69.1	9.0	4.3	4.6
50.0	64.0	9.2	4.8	4.4
55.0	59.6	9.4	5.3	4.2
60.0	55.9	9.7	5.8	3.9
65.0	52.6	9.9	6.2	3.6
70.0	49.8	10.0	6.7	3.3
75.0	47.3	10.2	7.2	3.0
80.0	45.0	10.4	7.7	2.7
85.0	43.0	10.5	8.2	2.4
90.0	41.1	10.7	8.6	2.0
95.0	39.4	10.8	9.1	1.7
100.0	37.9	10.9	9.6	1.3
105.0	36.5	11.0	10.1	1.0
110.0	35.2	11.2	10.6	0.6
115.0	34.0	11.3	11.0	0.2
120.0	32.9	11.4	11.5	-0.1
125.0	31.9	11.5	12.0	-0.5
130.0	30.9	11.6	12.5	-0.9
135.0	30.0	11.7	13.0	-1.3
140.0	29.2	11.8	13.4	-1.7
Design Volume:				**5.1**





Prepared by: Jaymeson Adams, EIT Date: 2021-01-25

Verified by: Tim Kennedy, P.Eng. Date: 2021-01-25
PEO# 100173201

Init._____

PROJECT NAME:	316-332 Clifton Road Property Development
CIMA+ PROJECT NUMBER:	A001062
CLIENT:	Clifton Property Development Inc.
PROJECT STATUS:	Detailed Design (Site Plan Control)

RETENTION CALCULATIONS FOR FOR SUB-CATCHMENT AREA A5 (BLOCK 5)

APPLICABLE DESIGN GUIDELINES:

1. City of Ottawa Sewer Design Guidelines, 2012

REQUIRED STORAGE VOLUME DETERMINATION:

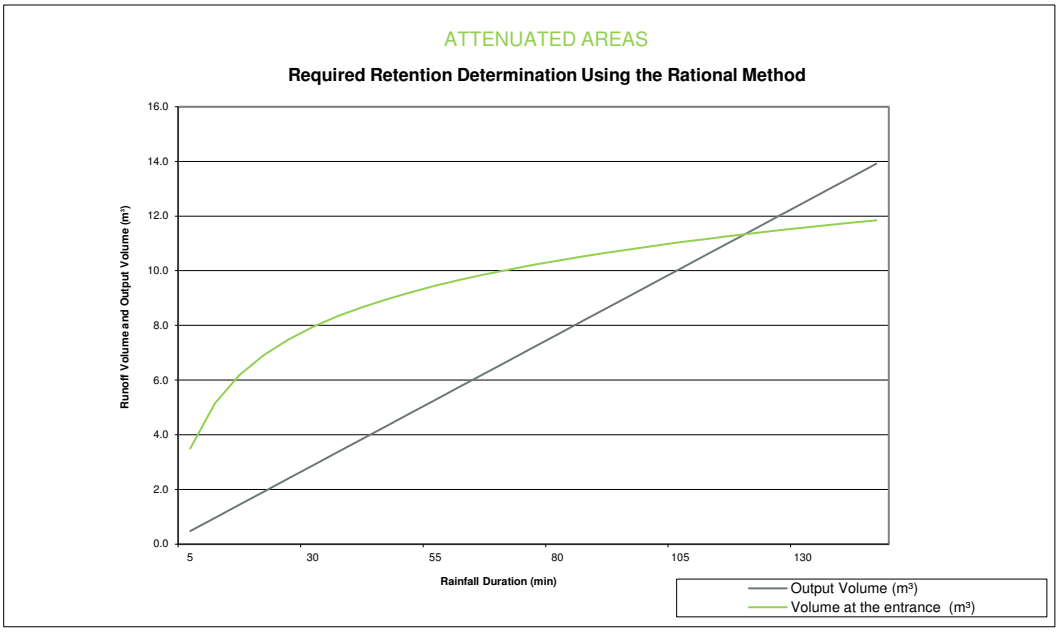
DESIGN CRITERIA:

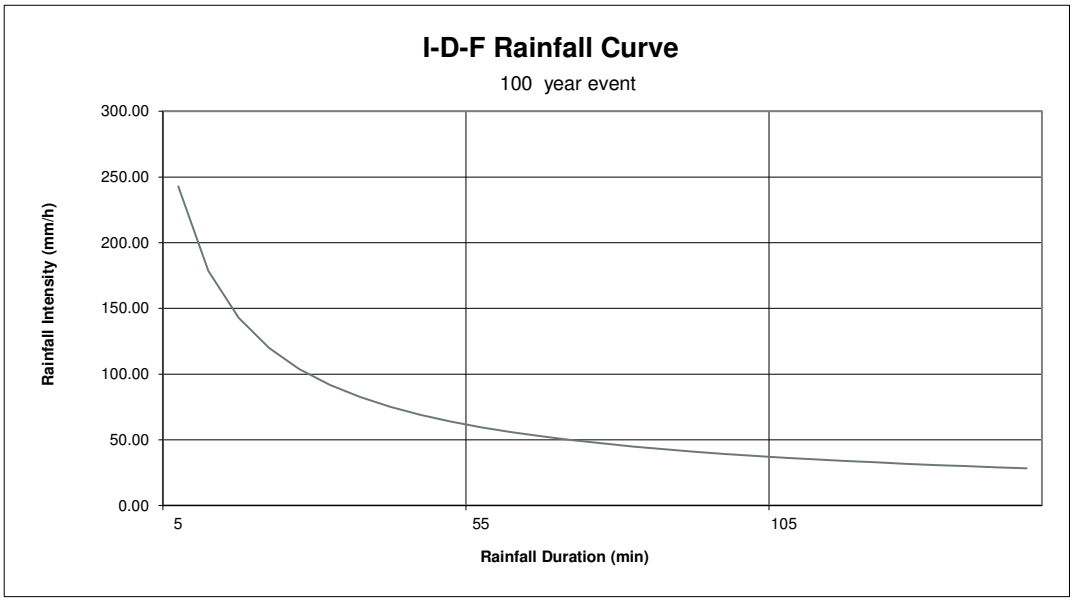
Rainfall Station:	City of Ottawa Sewer Design Guidelines, 2012 (Macdonald-Cartier Airport)
Release Rate Per Unit Area (Q/ha):	87.91 L/s/ha
Area (A):	0.0182 ha
Runoff Coefficient (C):	0.95
Rainfall Event:	100 year
Release Rate (Q):	0.0016 m^3/s
Discharge Factor (K):	1

Regression Constants	2 year	5 year	10 year	25 year	50 year	100 year
A	732.951	998.071	1174.184	1402.844	1569.58	1735.688
B	6.199	6.053	6.014	6.018	6.014	6.014
C	0.810	0.814	0.816	0.819	0.82	0.82

Required Retention Volume: **5.1 m^3**

Rainfall Duration (min) *T* (1)	Rainfall Intensity (mm/h) *I* (2)	Runoff Volume (m^3) *CIAT* (3)	Output Volume (m^3) *kQT* (4)	Retention Volume (m^3) *(3)-(4)* (5)
5.0	242.7	3.5	0.5	3.0
10.0	178.6	5.1	1.0	4.2
15.0	142.9	6.2	1.4	4.7
20.0	120.0	6.9	1.9	5.0
25.0	**103.8**	**7.5**	**2.4**	**5.1**
30.0	91.9	7.9	2.9	5.1
35.0	82.6	8.3	3.4	5.0
40.0	75.1	8.7	3.8	4.8
45.0	69.1	9.0	4.3	4.6
50.0	64.0	9.2	4.8	4.4
55.0	59.6	9.4	5.3	4.2
60.0	55.9	9.7	5.8	3.9
65.0	52.6	9.9	6.2	3.6
70.0	49.8	10.0	6.7	3.3
75.0	47.3	10.2	7.2	3.0
80.0	45.0	10.4	7.7	2.7
85.0	43.0	10.5	8.2	2.4
90.0	41.1	10.7	8.6	2.0
95.0	39.4	10.8	9.1	1.7
100.0	37.9	10.9	9.6	1.3
105.0	36.5	11.0	10.1	1.0
110.0	35.2	11.2	10.6	0.6
115.0	34.0	11.3	11.0	0.2
120.0	32.9	11.4	11.5	-0.1
125.0	31.9	11.5	12.0	-0.5
130.0	30.9	11.6	12.5	-0.9
135.0	30.0	11.7	13.0	-1.3
140.0	29.2	11.8	13.4	-1.7
145.0	28.4	11.8	13.9	-2.1
Design Volume:				**5.1**





Prepared by: Jaymeson Adams, EIT Date: 2021-01-25

Verified by: Tim Kennedy, P.Eng. Date: 2021-01-25
PEO# 100173201

Init._____

PROJECT NAME:	316-332 Clifton Road Property Development
CIMA+ PROJECT NUMBER:	A001062
CLIENT:	Clifton Property Development Inc.
PROJECT STATUS:	Detailed Design (Site Plan Control)

RETENTION CALCULATIONS FOR FOR SUB-CATCHMENT AREA A6 (BLOCK 6)

APPLICABLE DESIGN GUIDELINES:

1. City of Ottawa Sewer Design Guidelines, 2012

REQUIRED STORAGE VOLUME DETERMINATION:

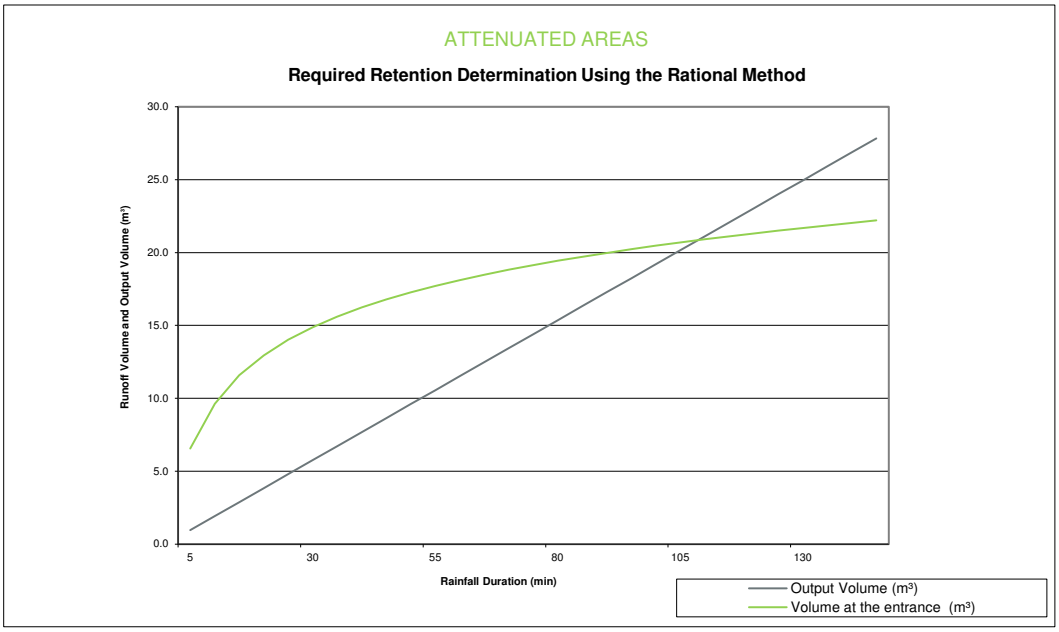
DESIGN CRITERIA:

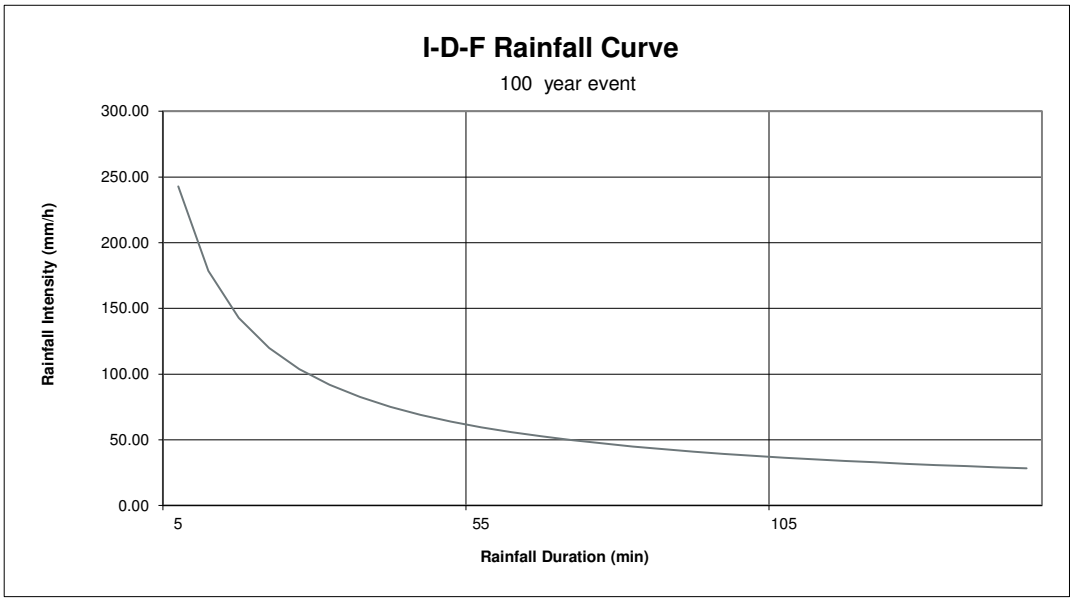
Rainfall Station:	City of Ottawa Sewer Design Guidelines, 2012 (Macdonald-Cartier Airport)
Release Rate Per Unit Area (Q/ha):	93.84 L/s/ha
Area (A):	0.0341 ha
Runoff Coefficient (C):	0.95
Rainfall Event:	100 year
Release Rate (Q):	0.0032 m^3/s
Discharge Factor (K):	1

Regression Constants	2 year	5 year	10 year	25 year	50 year	100 year
A	732.951	998.071	1174.184	1402.844	1569.58	1735.688
B	6.199	6.053	6.014	6.018	6.014	6.014
C	0.810	0.814	0.816	0.819	0.82	0.82

Required Retention Volume: 9.2 m^3

Rainfall Duration (min) *T* (1)	Rainfall Intensity (mm/h) *I* (2)	Runoff Volume (m^3) *CIAT* (3)	Output Volume (m^3) *kQT* (4)	Retention Volume (m^3) *(3)-(4)* (5)
5.0	242.7	6.6	1.0	5.6
10.0	178.6	9.6	1.9	7.7
15.0	142.9	11.6	2.9	8.7
20.0	120.0	13.0	3.8	9.1
25.0	**103.8**	**14.0**	**4.8**	**9.2**
30.0	91.9	14.9	5.8	9.1
35.0	82.6	15.6	6.7	8.9
40.0	75.1	16.2	7.7	8.5
45.0	69.1	16.8	8.6	8.1
50.0	64.0	17.3	9.6	7.7
55.0	59.6	17.7	10.6	7.1
60.0	55.9	18.1	11.5	6.6
65.0	52.6	18.5	12.5	6.0
70.0	49.8	18.8	13.4	5.4
75.0	47.3	19.1	14.4	4.7
80.0	45.0	19.4	15.4	4.1
85.0	43.0	19.7	16.3	3.4
90.0	41.1	20.0	17.3	2.7
95.0	39.4	20.2	18.2	2.0
100.0	37.9	20.5	19.2	1.3
105.0	36.5	20.7	20.2	0.5
110.0	35.2	20.9	21.1	-0.2
115.0	34.0	21.1	22.1	-1.0
120.0	32.9	21.3	23.0	-1.7
125.0	31.9	21.5	24.0	-2.5
130.0	30.9	21.7	25.0	-3.3
135.0	30.0	21.9	25.9	-4.1
140.0	29.2	22.0	26.9	-4.8
145.0	28.4	22.2	27.8	-5.6
Design Volume:				**9.2**





Prepared by: Jaymeson Adams, EIT Date: 2021-01-25

Verified by: Tim Kennedy, P.Eng. Date: 2021-01-25
PEO# 100173201

Init._____

PROJECT NAME:	316-332 Clifton Road Property Development
CIMA+ PROJECT NUMBER:	A001062
CLIENT:	Clifton Property Development Inc.
PROJECT STATUS:	Detailed Design (Site Plan Control)

RETENTION CALCULATIONS FOR FOR SUB-CATCHMENT AREA A7.1 (GROUND LEVEL)

APPLICABLE DESIGN GUIDELINES:

1. City of Ottawa Sewer Design Guidelines, 2012

REQUIRED STORAGE VOLUME DETERMINATION:

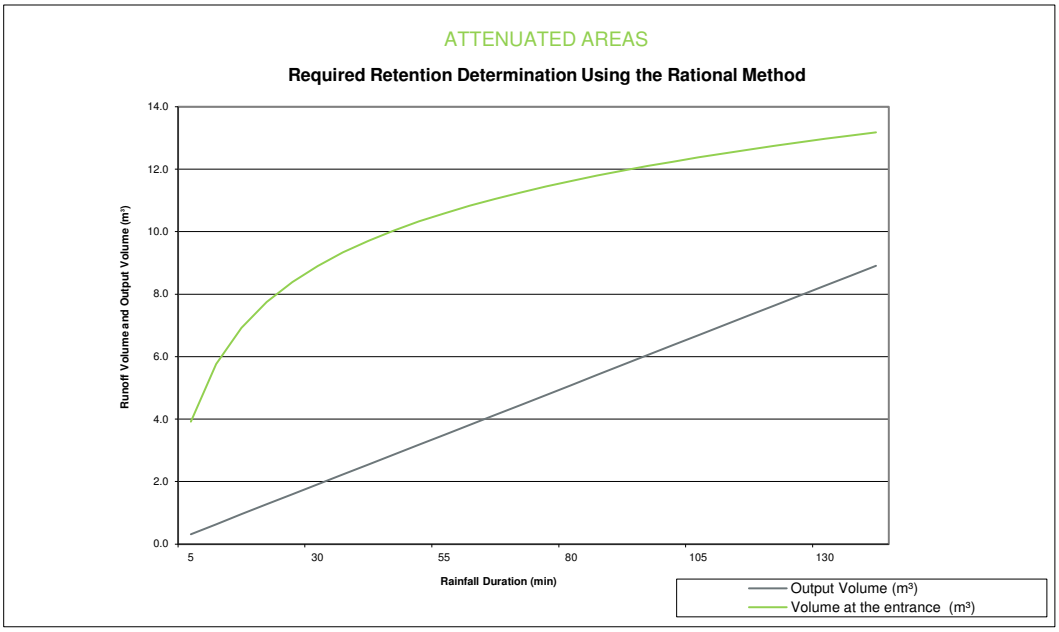
DESIGN CRITERIA:

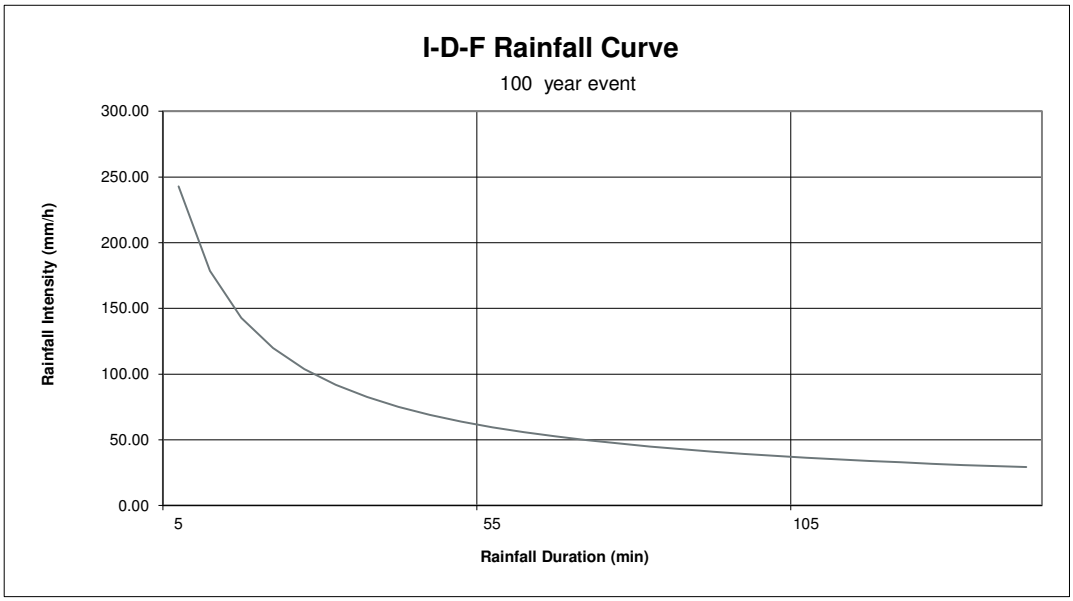
Rainfall Station:	City of Ottawa Sewer Design Guidelines, 2012 (Macdonald-Cartier Airport)
Release Rate Per Unit Area (Q/ha):	52.01 L/s/ha
Area (A):	0.0204 ha
Runoff Coefficient (C):	0.95
Rainfall Event:	100 year
Release Rate (Q):	0.0011 m³/s
Discharge Factor (K):	1

Regression Constants	2 year	5 year	10 year	25 year	50 year	100 year
A	732.951	998.071	1174.184	1402.844	1569.58	1735.688
B	6.199	6.053	6.014	6.018	6.014	6.014
C	0.810	0.814	0.816	0.819	0.82	0.82

Required Retention Volume:	**7.2 m³**

Rainfall Duration (min) *T* (1)	Rainfall Intensity (mm/h) *I* (2)	Runoff Volume (m³) *CIAT* (3)	Output Volume (m³) *kQT* (4)	Retention Volume (m³) *(3)-(4)* (5)
5.0	242.7	3.9	0.3	3.6
10.0	178.6	5.8	0.6	5.1
15.0	142.9	6.9	1.0	6.0
20.0	120.0	7.7	1.3	6.5
25.0	103.8	8.4	1.6	6.8
30.0	91.9	8.9	1.9	7.0
35.0	82.6	9.3	2.2	7.1
40.0	75.1	9.7	2.5	7.2
45.0	**69.1**	**10.0**	**2.9**	**7.2**
50.0	64.0	10.3	3.2	7.1
55.0	59.6	10.6	3.5	7.1
60.0	55.9	10.8	3.8	7.0
65.0	52.6	11.1	4.1	6.9
70.0	49.8	11.3	4.5	6.8
75.0	47.3	11.4	4.8	6.7
80.0	45.0	11.6	5.1	6.5
85.0	43.0	11.8	5.4	6.4
90.0	41.1	12.0	5.7	6.2
95.0	39.4	12.1	6.0	6.1
100.0	37.9	12.2	6.4	5.9
105.0	36.5	12.4	6.7	5.7
110.0	35.2	12.5	7.0	5.5
115.0	34.0	12.6	7.3	5.3
120.0	32.9	12.8	7.6	5.1
125.0	31.9	12.9	8.0	4.9
130.0	30.9	13.0	8.3	4.7
135.0	30.0	13.1	8.6	4.5
140.0	29.2	13.2	8.9	4.3
Design Volume:				**7.2**





Prepared by: Jaymeson Adams, EIT Date: 2021-01-25

Verified by: Tim Kennedy, P.Eng. Date: 2021-01-25
PEO# 100173201

Init._____

PROJECT NAME:	316-332 Clifton Road Property Development
CIMA+ PROJECT NUMBER:	A001062
CLIENT:	Clifton Property Development Inc.
PROJECT STATUS:	Detailed Design (Site Plan Control)

RETENTION CALCULATIONS FOR FOR SUB-CATCHMENT AREA A7.2 (GROUND LEVEL)

APPLICABLE DESIGN GUIDELINES:

1. City of Ottawa Sewer Design Guidelines, 2012

REQUIRED STORAGE VOLUME DETERMINATION:

DESIGN CRITERIA:

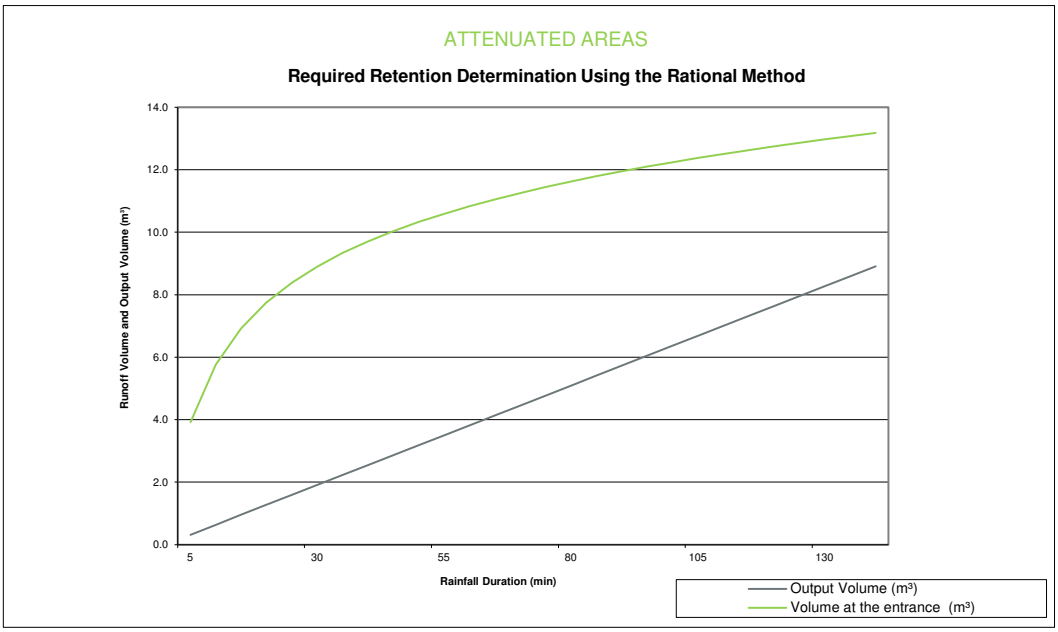
Rainfall Station:	City of Ottawa Sewer Design Guidelines, 2012 (Macdonald-Cartier Airport)
Release Rate Per Unit Area (Q/ha):	52.01 L/s/ha
Area (A):	0.0243 ha
Runoff Coefficient (C):	0.95
Rainfall Event:	100 year
Release Rate (Q):	0.0013 m³/s
Discharge Factor (K):	1

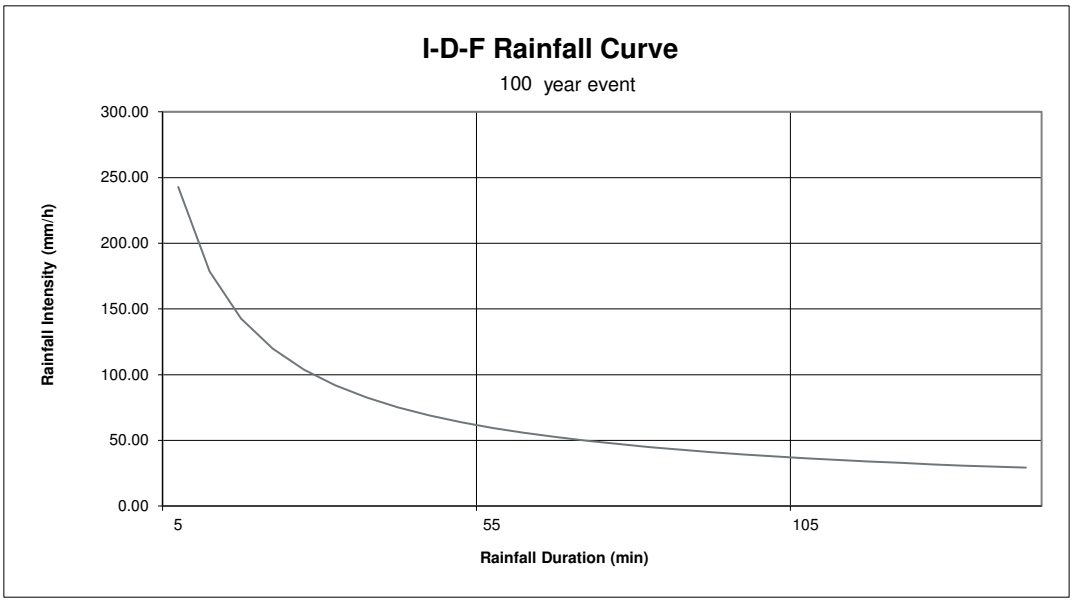
Regression Constants	2 year	5 year	10 year	25 year	50 year	100 year
A	732.951	998.071	1174.184	1402.844	1569.58	1735.688
B	6.199	6.053	6.014	6.018	6.014	6.014
C	0.810	0.814	0.816	0.819	0.82	0.82

Required Retention Volume: 8.5 m³

Rainfall Duration (min) *T* (1)	**Rainfall Intensity** (mm/h) *I* (2)	**Runoff Volume** (m³) *CIAT* (3)	**Output Volume** (m³) *kQT* (4)	**Retention Volume** (m³) *(3)-(4)* (5)
5.0	242.7	4.7	0.4	4.3
10.0	178.6	6.9	0.8	6.1
15.0	142.9	8.2	1.1	7.1
20.0	120.0	9.2	1.5	7.7
25.0	103.8	10.0	1.9	8.1
30.0	91.9	10.6	2.3	8.3
35.0	82.6	11.1	2.7	8.5
40.0	75.1	11.6	3.0	8.5
45.0	**69.1**	**12.0**	**3.4**	**8.5**
50.0	64.0	12.3	3.8	8.5
55.0	59.6	12.6	4.2	8.4
60.0	55.9	12.9	4.5	8.4
65.0	52.6	13.2	4.9	8.2
70.0	49.8	13.4	5.3	8.1
75.0	47.3	13.6	5.7	7.9
80.0	45.0	13.8	6.1	7.8
85.0	43.0	14.0	6.4	7.6
90.0	41.1	14.2	6.8	7.4
95.0	39.4	14.4	7.2	7.2
100.0	37.9	14.6	7.6	7.0
105.0	36.5	14.7	8.0	6.8
110.0	35.2	14.9	8.3	6.6
115.0	34.0	15.0	8.7	6.3
120.0	32.9	15.2	9.1	6.1
125.0	31.9	15.3	9.5	5.8
130.0	30.9	15.5	9.9	5.6
135.0	30.0	15.6	10.2	5.3
140.0	29.2	15.7	10.6	5.1
Design Volume:				**8.5**

ATTENUATED AREAS





Prepared by: Jaymeson Adams, EIT Date: 2021-01-25

Verified by: Tim Kennedy, P.Eng. Date: 2021-01-25
PEO# 100173201

Init._____

PROJECT NAME:	316-332 Clifton Road Property Development
CIMA+ PROJECT NUMBER:	A001062
CLIENT:	Clifton Property Development Inc.
PROJECT STATUS:	Detailed Design (Site Plan Control)

RETENTION CALCULATIONS FOR FOR SUB-CATCHMENT AREA A7.3 (GROUND LEVEL)

APPLICABLE DESIGN GUIDELINES:

1. City of Ottawa Sewer Design Guidelines, 2012

REQUIRED STORAGE VOLUME DETERMINATION:

DESIGN CRITERIA:

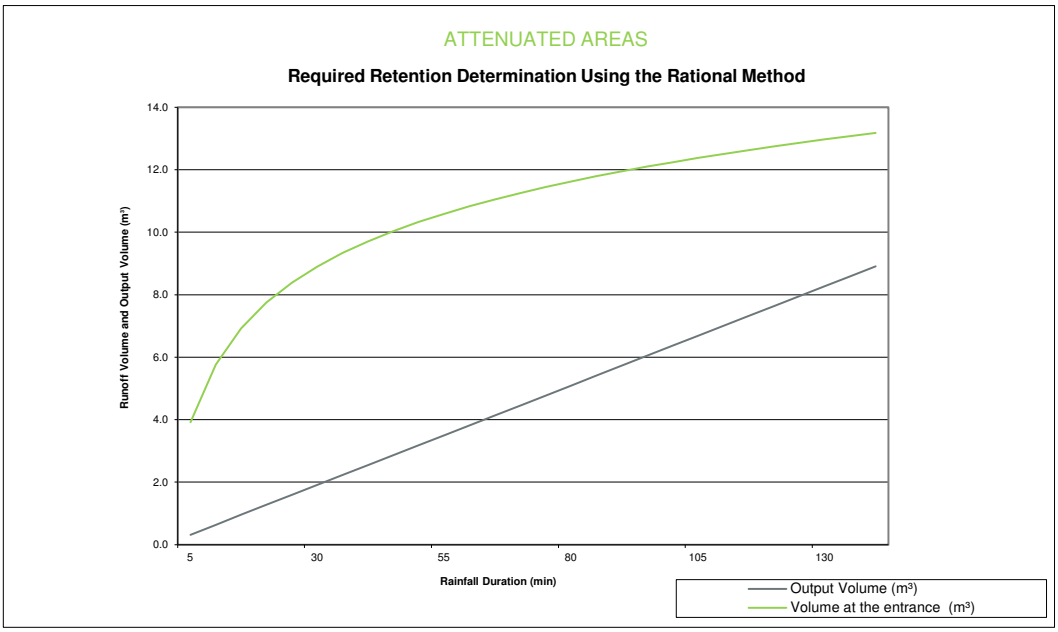
Rainfall Station:	City of Ottawa Sewer Design Guidelines, 2012 (Macdonald-Cartier Airport)
Release Rate Per Unit Area (Q/ha):	52.01 L/s/ha
Area (A):	0.0417 ha
Runoff Coefficient (C):	0.95
Rainfall Event:	100 year
Release Rate (Q):	0.0022 m³/s
Discharge Factor (K):	1

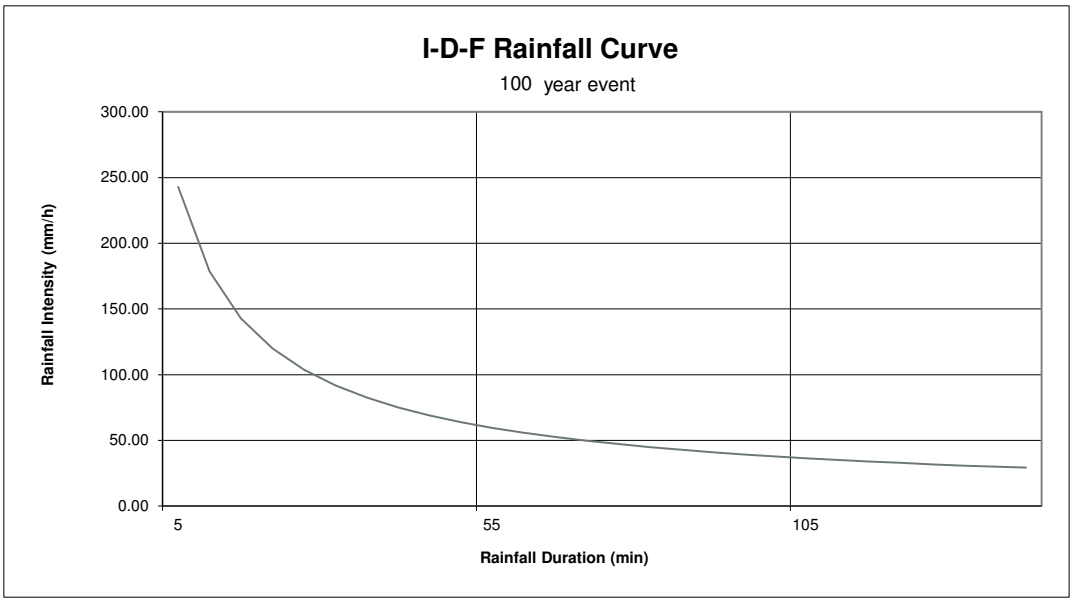
Regression Constants	2 year	5 year	10 year	25 year	50 year	100 year
A	732.951	998.071	1174.184	1402.844	1569.58	1735.688
B	6.199	6.053	6.014	6.018	6.014	6.014
C	0.810	0.814	0.816	0.819	0.82	0.82

Required Retention Volume: 14.7 m³

Rainfall Duration (min) *T* (1)	**Rainfall Intensity** (mm/h) *I* (2)	**Runoff Volume** (m³) *CIAT* (3)	**Output Volume** (m³) *kQT* (4)	**Retention Volume** (m³) *(3)-(4)* (5)
5.0	242.7	8.0	0.7	7.4
10.0	178.6	11.8	1.3	10.5
15.0	142.9	14.2	2.0	12.2
20.0	120.0	15.8	2.6	13.2
25.0	103.8	17.1	3.3	13.9
30.0	91.9	18.2	3.9	14.3
35.0	82.6	19.1	4.6	14.5
40.0	75.1	19.8	5.2	14.6
45.0	**69.1**	**20.5**	**5.9**	**14.7**
50.0	64.0	21.1	6.5	14.6
55.0	59.6	21.7	7.2	14.5
60.0	55.9	22.1	7.8	14.3
65.0	52.6	22.6	8.5	14.1
70.0	49.8	23.0	9.1	13.9
75.0	47.3	23.4	9.8	13.6
80.0	45.0	23.8	10.4	13.4
85.0	43.0	24.1	11.1	13.0
90.0	41.1	24.4	11.7	12.7
95.0	39.4	24.7	12.4	12.4
100.0	37.9	25.0	13.0	12.0
105.0	36.5	25.3	13.7	11.6
110.0	35.2	25.6	14.3	11.3
115.0	34.0	25.8	15.0	10.9
120.0	32.9	26.1	15.6	10.4
125.0	31.9	26.3	16.3	10.0
130.0	30.9	26.5	16.9	9.6
135.0	30.0	26.7	17.6	9.2
140.0	29.2	26.9	18.2	8.7
Design Volume:				**14.7**

ATTENUATED AREAS





Prepared by: Jaymeson Adams, EIT Date: 2021-01-25

Verified by: Tim Kennedy, P.Eng. Date: 2021-01-25
PEO# 100173201

Init._____

PROJECT NAME:	316-332 Clifton Road Property Development
CIMA+ PROJECT NUMBER:	A001062
CLIENT:	Clifton Property Development Inc.
PROJECT STATUS:	Detailed Design (Site Plan Control)

RETENTION CALCULATIONS FOR FOR SUB-CATCHMENT AREA A7.4 (GROUND LEVEL)

APPLICABLE DESIGN GUIDELINES:

1. City of Ottawa Sewer Design Guidelines, 2012

REQUIRED STORAGE VOLUME DETERMINATION:

DESIGN CRITERIA:

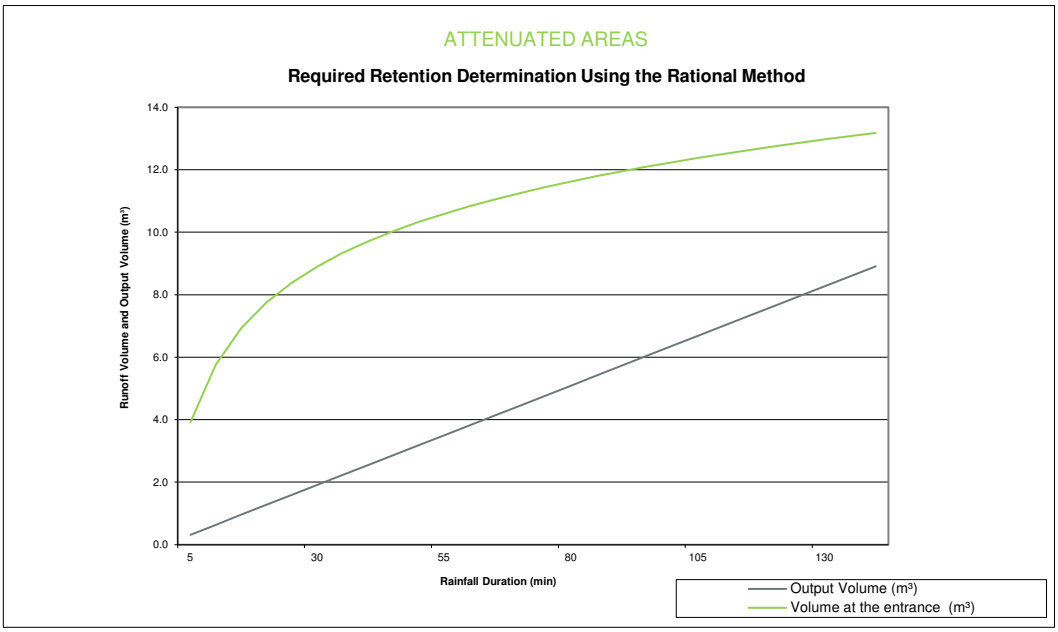
Rainfall Station:	City of Ottawa Sewer Design Guidelines, 2012 (Macdonald-Cartier Airport)
Release Rate Per Unit Area (Q/ha):	52.01 L/s/ha
Area (A):	0.0232 ha
Runoff Coefficient (C):	0.95
Rainfall Event:	100 year
Release Rate (Q):	0.0012 m³/s
Discharge Factor (K):	1

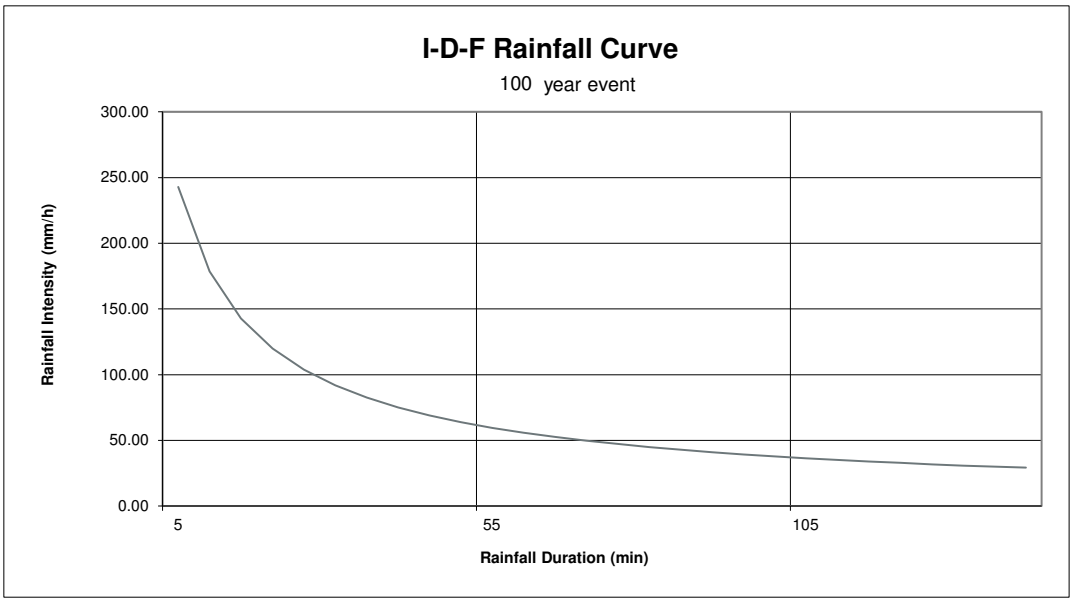
Regression Constants	2 year	5 year	10 year	25 year	50 year	100 year
A	732.951	998.071	1174.184	1402.844	1569.58	1735.688
B	6.199	6.053	6.014	6.018	6.014	6.014
C	0.810	0.814	0.816	0.819	0.82	0.82

Required Retention Volume: 8.2 m³

Rainfall Duration (min) *T* (1)	**Rainfall Intensity** (mm/h) *I* (2)	**Runoff Volume** (m³) *CIAT* (3)	**Output Volume** (m³) *kQT* (4)	**Retention Volume** (m³) *(3)-(4)* (5)
5.0	242.7	4.5	0.4	4.1
10.0	178.6	6.6	0.7	5.8
15.0	142.9	7.9	1.1	6.8
20.0	120.0	8.8	1.4	7.4
25.0	103.8	9.5	1.8	7.7
30.0	91.9	10.1	2.2	8.0
35.0	82.6	10.6	2.5	8.1
40.0	75.1	11.0	2.9	8.1
45.0	**69.1**	**11.4**	**3.3**	**8.2**
50.0	64.0	11.7	3.6	8.1
55.0	59.6	12.0	4.0	8.1
60.0	55.9	12.3	4.3	8.0
65.0	52.6	12.6	4.7	7.9
70.0	49.8	12.8	5.1	7.7
75.0	47.3	13.0	5.4	7.6
80.0	45.0	13.2	5.8	7.4
85.0	43.0	13.4	6.2	7.3
90.0	41.1	13.6	6.5	7.1
95.0	39.4	13.8	6.9	6.9
100.0	37.9	13.9	7.2	6.7
105.0	36.5	14.1	7.6	6.5
110.0	35.2	14.2	8.0	6.3
115.0	34.0	14.4	8.3	6.0
120.0	32.9	14.5	8.7	5.8
125.0	31.9	14.6	9.0	5.6
130.0	30.9	14.8	9.4	5.3
135.0	30.0	14.9	9.8	5.1
140.0	29.2	15.0	10.1	4.9
Design Volume:				**8.2**

ATTENUATED AREAS





Prepared by: Jaymeson Adams, EIT Date: 2021-01-25

Verified by: Tim Kennedy, P.Eng. Date: 2021-01-25
PEO# 100173201

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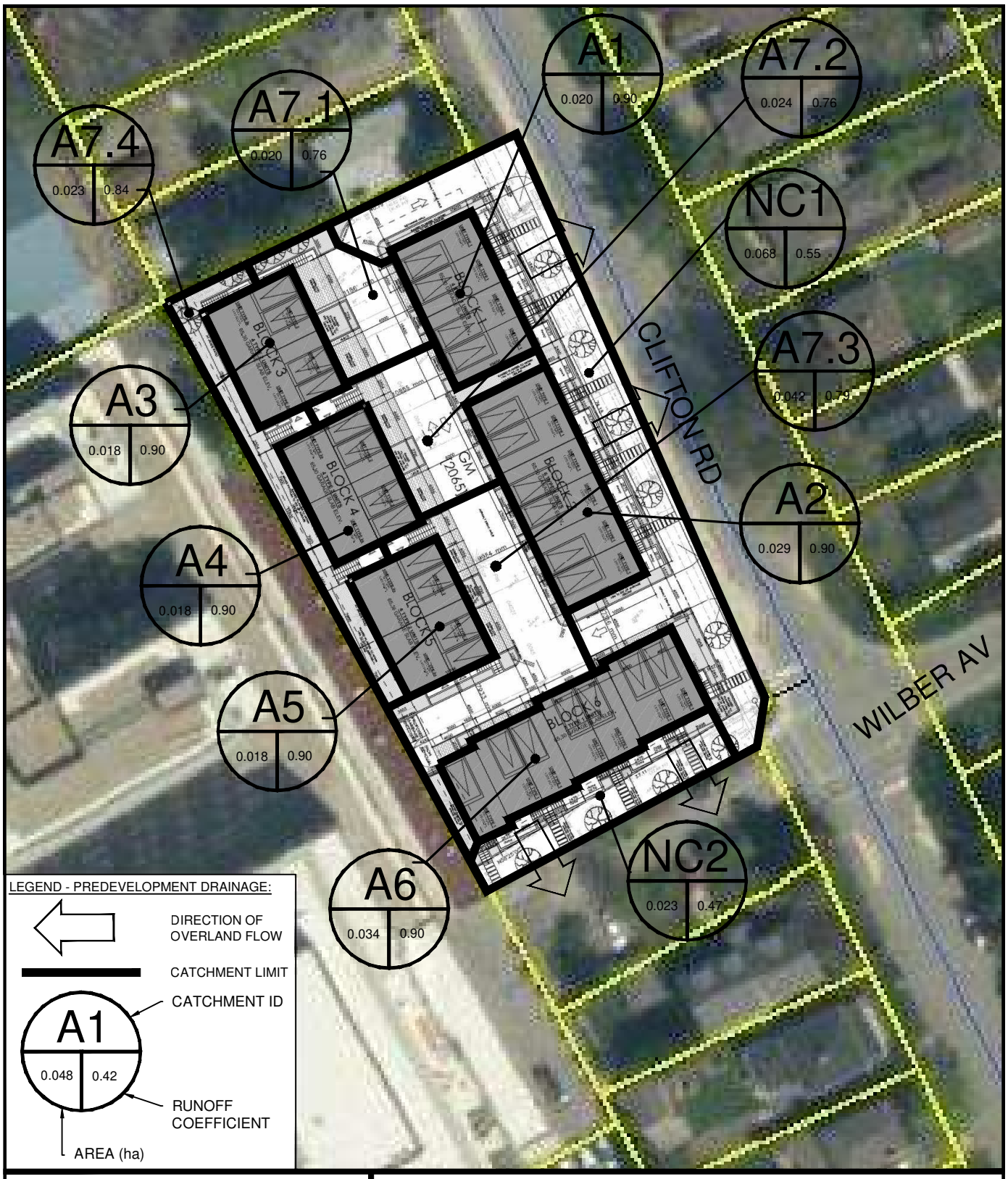


LEGEND - PREDEVELOPMENT DRAINAGE:

DIRECTION OF OVERLAND FLOW

CATCHMENT LIMIT

CATCHMENT ID

A1
0.048
0.42

RUNOFF COEFFICIENT

AREA (ha)

CIMA+
T: 613-580-2424
110-340 Catherine Street, Ottawa, ON K2P 2G9 CANADA

POST-DEVELOPMENT DRAINAGE AREAS

DRAWN BY:	DESIGNED BY:	APPROVED BY:	SCALE:	DATE:	PROJECT No:	SHEET No:	FIGURE No:
J. Adams	----	T. Kennedy	NTS	2021/01/25	A001062	1 of 1	PROP - 2

PROJECT NAME: 316-332 Clifton Road Property Development
CIMA+ PROJECT NUMBER: A001062
CLIENT: Clifton Property Development Inc.
PROJECT STATUS: Detailed Design (Site Plan Control)

STORM SEWER HYDRAULIC DESIGN SHEET (SSDS) – RATIONAL METHOD

APPLICABLE DESIGN GUIDELINES:
1. City of Ottawa Sewer Design Guidelines, 2012

STORM SEWER DESIGN CALCULATIONS:
DESIGN CRITERIA:

Rainfall Station:	City of Ottawa Sewer Design Guidelines, 2012 (Macdonald-Cartier Airport)	
Manning's Coefficient (n):	0.013	
Maximum Permitted Velocity:	3.00	m/s
Minimum Permitted Velocity:	0.80	m/s

IDF PARAMETERS AND RATIONAL FORMULA:

Design Storm (year):	5	
IDF Regression Constants: (a)	998.071	
(b)	6.053	
(c)	0.814	
IDF Curve Equation (mm/hr):	$I = a / (Time\ in\ min + b)^c$	
Rational Formula (L/s):	$Q = 2.78*C*I*A$	where: Q = Flow (L/s); C = Runoff Coefficient; I = Rainfall Intensity (mm/hr); A = Area (hectares)

OTHER FORMULAS USED IN CALCULATION TABLE:

Time of Concentration (minutes):	$Tc = Ti + Tf$	where: Tc = time of concentration (min); Ti = inlet time before pipe (min); Tf = time of flow in pipe (min) = L/(60*V); L = pipe length (m); V = actual velocity (m/s)
Manning's Equation (L/s):	$Q_{cap} = (1/n)*A*R^{2/3}*S^{1/2}$	where: Q_{cap} = flow rate at capacity (L/s); n = Manning's roughness coefficient; A = area of flow (m^2); R = hydraulic radius (m)*; S = slope of pipe (%). * Hydraulic radius is defined as the area of flow (m^2) divided by wetted perimeter (m)

LOCATION			AREA			FLOW					SEWER DATA						
Street/Catchment Name	From MH/CB	To MH/CB	C = Varies (ha)	C = Varies (ha)	C = Varies (ha)	Section 2.78*AC (ha)	Accum 2.78*AC (ha)	Time of Conc (min)	Rainfall Intensity (mm/hr)	Peak Flow (L/s)	Diameter (mm)	Material Type	Slope (%)	Length (m)	Capacity (full) (L/s)	Velocity (full) (m/s)	Ratio (%)
A7.4	Rear Yard Drain	STM-7	-	-	0.023	0.054	0.054	10.00	104.193	5.64	250	HDPE	1.00%	-	59.47	1.21	9%
Block 6 (West)	Block 6	STM-6	-	-	-	-	-	-	-	1.60	150	PVC	1.00%	-	15.23	0.86	11%
Access Road (dead end)	STM-7	STM-6	-	-	-	-	-	-	-	7.24	250	PVC	0.43%	10.00	39.00	0.80	19%
Access Road (dead end)	STM-6	STM-4	-	-	-	-	-	-	-	7.24	250	PVC	0.43%	6.00	39.00	0.80	19%
Block 6 (East)	Block 6	STM-5	-	-	-	-	-	-	-	1.60	150	PVC	1.00%	-	15.23	0.86	11%
Access Loop	STM-5	STM-4	-	-	-	-	-	-	-	1.60	250	PVC	0.43%	15.50	39.00	0.80	4%
Blocks 1-5	Blocks 1-5	STM-3	-	-	-	-	-	-	-	8.00	150	PVC	1.00%	-	15.23	0.86	53%
A7.3	CB-3	STM-3	-	-	0.042	0.092	0.092	10.00	104.193	9.54	200	PVC	1.00%	-	32.80	1.04	29%
A7.2	CB-2	STM-3	-	-	0.024	0.051	0.051	10.00	104.193	5.35	200	PVC	1.00%	-	32.80	1.04	16%
A7.1	CB-1	STM-3	-	-	0.020	0.043	0.043	10.00	104.193	4.49	200	PVC	1.00%	-	32.80	1.04	14%
Access Loop	STM-4	STM-3	-	-	-	-	-	-	-	36.23	300	PVC	0.34%	54.80	56.39	0.80	64%
Access Loop	STM-3	STM-2	-	-	-	-	-	-	-	36.23		Tank		-	-	-	-
Access Loop	STM-2	STM-1	-	-	-	-	-	-	-	16.90	300	PVC	0.34%	1.80	56.39	0.80	30%
Access Loop	STM-1	MH-ST (exist)	-	-	-	-	-	-	-	16.90	300	PVC	0.34%	7.20	56.39	0.80	30%

Prepared by: Jaymeson Adams, EIT Date: 2021-01-25

Verified by: Tim Kennedy, P.Eng. Date: 2021-01-25
PEO #100173201

G

Appendix G
Technical References

CIMA+

STORMTECH MC-3500 CHAMBER

Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots, thus maximizing land usage for private (commercial) and public applications. StormTech chambers can also be used in conjunction with Green Infrastructure, thus enhancing the performance and extending the service life of these practices.

STORMTECH MC-3500 CHAMBER
(not to scale)

Nominal Chamber Specifications

Size (L x W x H)
90" x 77" x 45"
2,286 mm x 1,956 mm x 1,143 mm

Chamber Storage
109.9 ft³ (3.11 m³)

Min. Installed Storage*
175.0 ft³ (4.96 m³)

Weight
134 lbs (60.8 kg)

Shipping
15 chambers/pallet
7 end caps/pallet
7 pallets/truck

*Assumes a minimum of 12" (300 mm) of stone above, 9" (230 mm) of stone below chambers, 6" (150 mm) of stone between chambers/end caps and 40% stone porosity.

STORMTECH MC-3500 END CAP
(not to scale)

Nominal End Cap Specifications

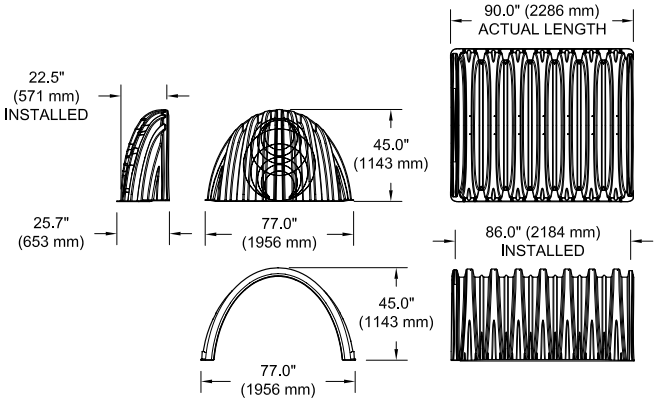
Size (L x W x H)
26.5" x 71" x 45.1"
673 mm x 1,803 mm x 1,145 mm

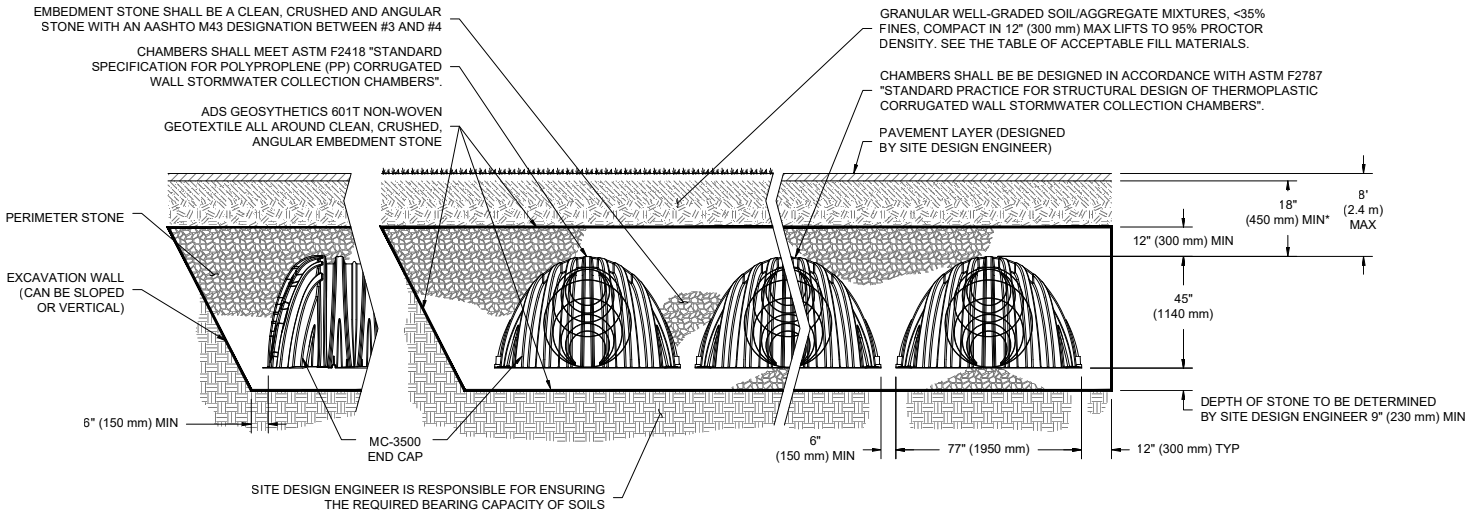
End Cap Storage
14.9 ft³ (0.42 m³)

Min. Installed Storage*
45.1ft³ (1.28 m³)

Weight
49 lbs (22.2 kg)

*Assumes a minimum of 12" (300 mm) of stone above, 9" (230 mm) of stone below, 6" (150 mm) of stone perimeter, 6" (150 mm) of stone between chambers/end caps and 40% stone porosity.





*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 24" (600 mm).

MC-3500 CHAMBER SPECIFICATION

STORAGE VOLUME PER CHAMBER FT³ (M³)

	Bare Chamber Storage ft³ (m³)	Chamber and Stone Foundation Depth in. (mm)			
		9" (230 mm)	12" (300 mm)	15" (375 mm)	18" (450 mm)
MC-3500 Chamber	109.9 (3.11)	175.0 (4.96)	179.9 (5.09)	184.9 (5.24)	189.9 (5.38)
MC-3500 End Cap	14.9 (.42)	45.1 (1.28)	46.6 (1.32)	48.3 (1.37)	49.9 (1.41)

Note: Assumes 6" (150 mm) row spacing, 40% stone porosity, 12" (300 mm) stone above and includes the bare chamber/end cap volume.

AMOUNT OF STONE PER CHAMBER

ENGLISH TONS (yds³)	Stone Foundation Depth			
	9"	12"	15"	18"
MC-3500 Chamber	8.5 (6.0)	9.1 (6.5)	9.7 (6.9)	10.4 (7.4)
MC-3500 End Cap	3.9 (2.8)	4.1 (2.9)	4.3 (3.1)	4.5 (3.2)
METRIC KILOGRAMS (m³)	**230 mm**	**300 mm**	**375 mm**	**450 mm**
MC-3500 Chamber	7711 (4.6)	8255 (5.0)	8800 (5.3)	9435 (5.7)
MC-3500 End Cap	3538 (2.1)	3719 (2.2)	3901 (2.4)	4082 (2.5)

Note: Assumes 12" (300 mm) of stone above and 6" (150 mm) row spacing and 6" (150 mm) of perimeter stone in front of end caps.

VOLUME EXCAVATION PER CHAMBER YD³ (M³)

	Stone Foundation Depth			
	9" (230 mm)	12" (300 mm)	15" (375mm)	18" (450 mm)
MC-3500 Chamber	11.9 (9.1)	12.4 (9.5)	12.8(9.8)	13.3 (10.2)
MC-3500 End Cap	4.0 (3.1)	4.1 (3.2)	4.3 (3.3)	4.4 (3.4)

Note: Assumes 6" (150 mm) of separation between chamber rows and 24" (600 mm) of cover. The volume of excavation will vary as depth of cover increases.

Working on a project?
Visit us at www.stormtech.com
and utilize the StormTech Design Tool

For more information on the StormTech MC-3500 Chamber and other ADS products, please contact our Customer Service Representatives at 1-800-821-6710

*THE MOST **ADVANCED** NAME IN WATER MANAGEMENT SOLUTIONS®*

Advanced Drainage Systems, Inc.
4640 Trueman Blvd., Hilliard, OH 43026
1-800-821-6710 www.ads-pipe.com

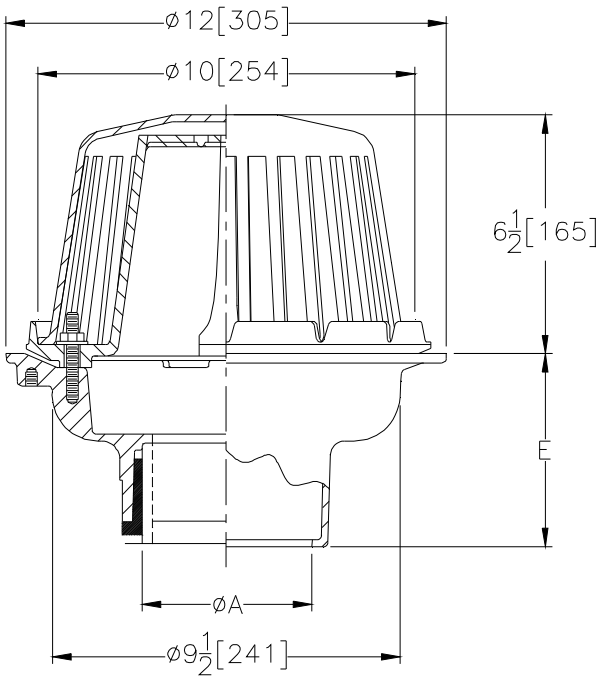
ZCF121

Ø12 [305] CONTROL-FLO ROOF DRAIN

SPECIFICATION SHEET

TAG _____

Dimensional Data (inches and [mm]) are Subject to Manufacturing Tolerances and Change Without Notice



A Pipe Size In. [mm]	Approx. Wt. Lb. [kg]	Dome Open Area Sq. In. [cm²]
2,3,4 [51,76,102]	22 [10]	78 [503]
6 [152]		

ENGINEERING SPECIFICATION: ZURN ZCF121
12" [305mm] diameter "Control-Flo" roof drain for dead-level roof construction, Dura-Coated cast iron body. Combination membrane flashing clamp/gravel guard, aluminum "Control-Flo" weir, and Poly-Dome. "Control-Flo" weir shall be linear functioning with flow rate of 5 GPM [23 LPM] per inch of water buildup above drain. All data shall be verified proportional to flow rates.

OPTIONS (Check/specify appropriate options)

PIPE SIZE	(Specify size/type) OUTLET		E BODY HT. DIM.
2,3,4,6 [51,76,102,152]	_____ IC	Inside Caulk	5-1/4 [133]
2,3,4,6 [51,76,102,152]	_____ IP	Threaded	3-3/4 [95]
2,3,4,6 [51,76,102,152]	_____ NH	No-Hub	5-1/4 [133]
2,3,4 [51,76,102]	_____ NL	Neo-Loc	4-5/8 [117]

PREFIXES

_____ Z D.C.C.I. Body with Poly-Dome*
_____ ZA D.C.C.I. Body with Aluminum Dome

SUFFIXES

_____ -A Waterproof Flange
_____ -AR Acid Resistant Epoxy Coated Finish
_____ -C Underdeck Clamp
_____ -DP Top Set® Roof Deck Plate (Replaces both the -C and -R)
_____ -DR Adjustable Drain Riser Extension Assembly 3-5/8 [92] to 7-1/4 [184]
_____ -E Static Extension 1 [25] thru 4 [102] (Specify Ht.)
_____ -EB Elevating Body Plate
_____ -G Galvanized Cast Iron
_____ -R Roof Sump Receiver
_____ -SC Secondary Clamp Collar
_____ -TC Neo-LocTest CapGasket (2,3,4 [51,76,102] NL Bottom Outlet Only)
_____ -VP Vandal Proof Secured Top
_____ -90 90º Threaded Side Outlet Body (2,3,4 [51,76,102])

* Regularly furnished unless otherwise specified.

Zurn Industries, LLC | **Specification Drainage Operation**
1801 Pittsburgh Avenue, Erie, PA U.S.A. 16502 · Ph. 855-663-9876, Fax 814-454-7929
In Canada | **Zurn Industries Limited**
3544 Nashua Drive, Mississauga, Ontario L4V 1L2 · Ph. 905-405-8272, Fax 905-405-1292
www.zurn.com

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Date: 09/21/2017
C.N. No. 137768
Prod. | Dwg. No. ZCF121