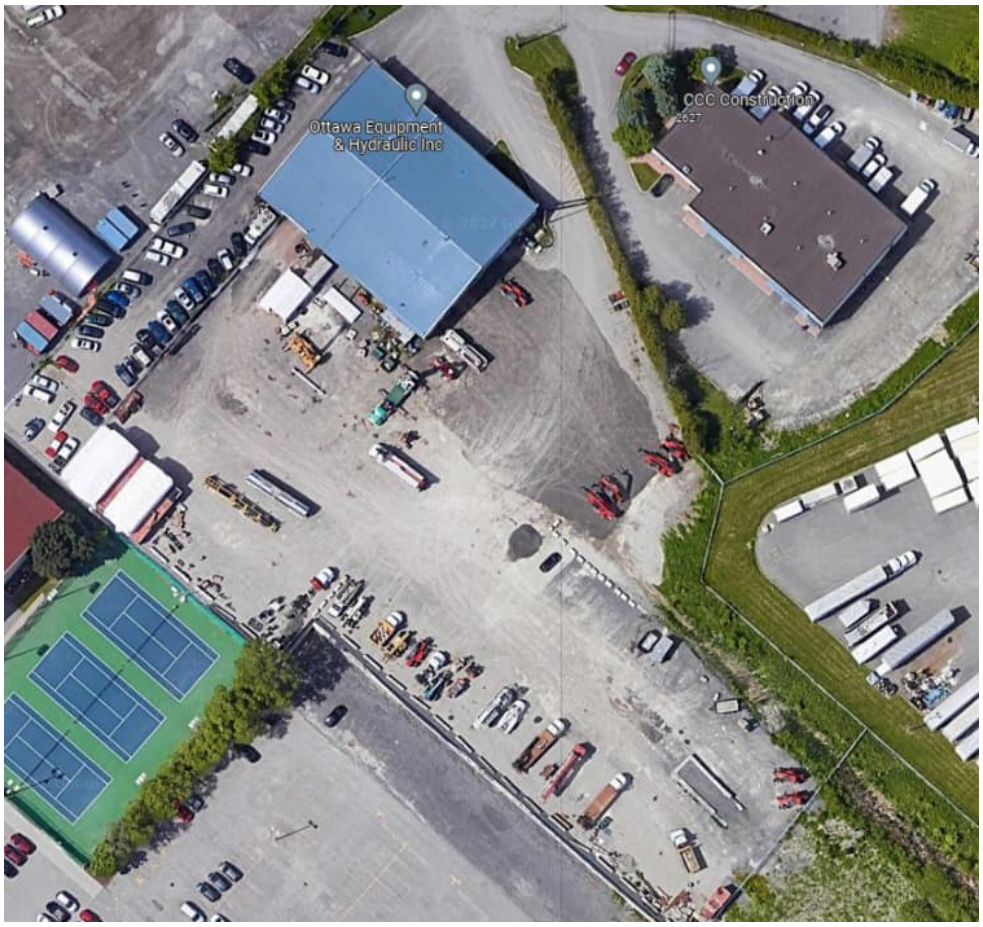
SERVICING & STORMWATER MANAGEMENT REPORT
2628 EDINBURGH PLACE



Project No.: CCO-22-2058

City File No.: D07-12-22-0184

Prepared for:

BBS Construction Ltd
1805 Woodward Drive
Ottawa, ON
K2C 0P9

Prepared by:

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December 5th, 2022

Rev02: April 28th, 2023

McINTOSH PERRY

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1.0 PROJECT DESCRIPTION

1.1 Purpose

McIntosh Perry (MP) has been retained by BBS Construction LTD to prepare this Servicing and Stormwater Management Report in support of the Site Plan Control process for the proposed development located at 2628 Edinburgh Place within the City of Ottawa.

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

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

- CCO-22-2058, C101 –Erosion, Sediment Control, Grading and Drainage Plan
- CCO-22-2058, C102 – Site Servicing Plan
- CCO-22-2058, PRE – Pre-Development Drainage Area Plan (*Appendix E*)
- CCO-22-2058, POST – Post-Development Drainage Area Plan (*Appendix F*)

1.2 Site Description

Figure 1: Site Map

The subject property, herein referred to as the site, is located at 2628 Edinburgh Place within the Alta Vista ward. The site covers approximately *1.34 ha* and is located at the end of Edinburgh Place. The site is zoned for Heavy Industrial Use (IH) and Light Industrial use (IL). See Site Location Plan in *Appendix 'A'* for more details.

1.3 Proposed Development and Statistics

The proposed development consists of a *1003 m²* addition to the existing building. The proposed addition will contain a sales area, service bays, storage areas, and a staff amenity area. Parking and drive aisles will be reconfigured as part of the development. Development is proposed within *1.33 ha* of the site. Refer to *Site Plan* (SP1) prepared by GJA Inc. and included in *Appendix B* for further details.

1.4 Existing Conditions and Infrastructures

The site is currently developed containing an existing 1-storey commercial/industrial building with asphalt and gravel parking areas, and gravel storage areas in the rear yard. The existing building is serviced via a 150 mm sanitary service connected to the 250 mm diameter concrete sanitary sewer located within Edinburgh Place. Water servicing is assumed to be connected to the 305 mm diameter watermain within Edinburgh Place.

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

- Edinburgh Place
  - 305 mm diameter DI watermain, and
  - 450 mm diameter concrete storm sewer tributary to Green's Creek, and
  - 250 mm diameter concrete sanitary sewer, tributary to the Innes Road trunk sewer.

1.5 Approvals

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

An Environmental Compliance Approval (*ECA*) through the Ministry of Environment, Conservation and Parks (*MECP*) is not anticipated to be required since the proposed storm sewer system services one parcel of land and is not tributary to a combined sewershed. ECA requirements to be further discussed with City staff due to the heavy industrial zoning.

2.0 BACKROUND STUDIES, STANDARDS, AND REFERENCES

2.1 Background Reports / Reference Information

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

A topographic survey (22676-22) of the site was completed by Annis, O'Sullivan, Vollebekk Ltd. and dated March 9th, 2022.

The Site Plan (SP1) was prepared by GJA Inc. and dated April 28th, 2023 (*Site Plan*).

A geotechnical report was completed by Paterson Group and dated August 17th, 2022.

2.2 Applicable Guidelines and Standards

City of Ottawa:

- Ottawa Sewer Design Guidelines, City of Ottawa, SDG002, October 2012. (*Ottawa Sewer Guidelines*)
  - Technical Bulletin ISTB-2014-01 City of Ottawa, February 2014. *(ISTB-2014-01)*
  - Technical Bulletin PIEDTB-2016-01 City of Ottawa, September 2016. *(PIEDTB-2016-01)*
  - Technical Bulletin ISTB-2018-01 City of Ottawa, January 2018. *(ISTB-2018-01)*
  - Technical Bulletin ISTB-2018-04 City of Ottawa, March 2018. *(ISTB-2018-04)*
  - Technical Bulletin ISTB-2019-02 City of Ottawa, February 2019. *(ISTB-2019-02)*
- Ottawa Design Guidelines – Water Distribution City of Ottawa, July 2010. (*Ottawa Water Guidelines*)
  - Technical Bulletin ISD-2010-2 City of Ottawa, December 15, 2010. *(ISD-2010-2)*
  - Technical Bulletin ISDTB-2014-02 City of Ottawa, May 2014. (ISDTB-2014-02)
  - Technical Bulletin ISTB-2018-02 City of Ottawa, March 2018. *(ISTB-2018-02)*
  - Technical Bulletin ISTB-2021-03 City of Ottawa, August 2021. *(ISTB-2021-03)*

Ministry of Environment, Conservation and Parks:

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

Other:

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

3.0 PRE-CONSULTATION SUMMARY

A pre-consultation meeting was held with City staff on September 15th, 2021, regarding the proposed site servicing. Specific design parameters to be incorporated within this design include the following:

- Pre-development and post-development flows shall be calculated using a time of concentration (Tc) no less than 10 minutes.
- Control 5 through 100-year post-development flows to the 5-year pre-development flows with a combined C value to a maximum of 0.50.
- Quality control requirements to be provided by the Rideau Valley Conservation Authority (RVCA).

4.0 WATERMAIN

4.1 Existing Watermain

The site is located within the 1E pressure zone, as per the Water Distribution System mapping included in *Appendix C*. There are two public fire hydrants along Edinburgh Place available to service the development.

4.2 Proposed Watermain

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

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

Table 1: Water Supply Design Criteria

Site Area	1.34 ha
Commercial Area	28,000 L/gross ha/day
Max Day Peaking Factor	1.5 x avg. day
Peak Hour Peaking Factor	1.8 x max. day

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

- Type of construction – Non-Combustible Construction
- Occupancy Type – Combustible
- Sprinkler Protection – No Sprinkler System

The results of the calculations yielded a required fire flow of *9,000 L/min* (150 L/s). The detailed calculations for the FUS can be found in *Appendix C*.

The city provided the estimated water pressures at both the average day scenario, peak hour scenario, and the max day plus fire flow scenario for the demands indicated by the correspondence in *Appendix C*. The resulting pressures for the boundary conditions results are shown in *Table 2*, below.

Table 2: Summary of Estimated Water Demand

Scenario	Proposed Demands (L/S)	Connection 1 HGL (m H_2O)*/kPa
Average Day Demand	0.44	51.8 / 507.7
Maximum Daily + Fire Flow Demand (FUS)	150.65	32.3 / 316.4
Maximum Daily + Fire Flow Demand (OBC)	150.65	32.3 / 316.4
Peak Hourly Demand	1.17	43.8 / 429.2
**Adjusted for an estimated ground elevation of 68.48m above the connection point.*		

The normal operating pressure range is anticipated to be 429.2 kPa to 507.7 kPa and will not be less than 275 kPa (40 psi) or exceed 689 kPa (100 psi). The proposed watermains will meet the minimum required 20 psi (140 kPa) from the *Ottawa Water Guidelines* at the ground level under maximum day demand and fire flow conditions.

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

Table 3: Fire Protection Confirmation

Building	Fire Flow Demand (L/min.)	Fire Hydrant(s) within 75m (5,700 L/min)	Fire Hydrant(s) within 150m (3,800 L/min)	Combined Fire Flow (L/min.)
2628 Edinburgh Place	9,000	1 Public	1 Public	9,500

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

5.0 SANITARY DESIGN

5.1 Existing Sanitary Sewer

There is an existing 150 mm diameter service connection to the 250mm diameter concrete sanitary sewer located within Edinburgh Place, which is tributary to the Innes Road trunk sewer. No changes are proposed to the existing sanitary sewer system.

5.2 Proposed Sanitary Sewer

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

Table 4, below, summarizes the wastewater design criteria identified by the *Ottawa Sewer Guidelines*.

Table 4: Sanitary Design Criteria

Design Parameter	Value
Site Area	1.34 ha
Commercial Area	2211 m^2
Commercial Peaking Factor	1.5
Extraneous Flow Allowance	0.33 L/s/ha

Table 5 below, summarizes the estimated wastewater flow from the proposed development. Refer to *Appendix D* for detailed calculations.

Table 5: Summary of Estimated Sanitary Flow

Design Parameter	Total Flow (L/s)
Total Estimated Average Dry Weather Flow	0.14
Total Estimated Peak Dry Weather Flow	0.17
Total Estimated Peak Wet Weather Flow	0.55

As noted above, the development is proposed to be serviced via the existing 150 mm sanitary service connection to the 250 mm concrete sanitary sewer within Edinburgh Place. Due to the complexity of the downstream network the City will need to advise of any downstream constraints.

The full flowing capacity of a 150 mm diameter service at a 1.0% slope is estimated to be *15.89 L/s*. Per *Table 5*, a peak wet weather flow of *0.55 L/s* will be conveyed within the 150 mm diameter service, therefore the existing sanitary service is sufficiently sized for the development.

6.0 STORM SEWER DESIGN

6.1 Existing Storm Sewers

There is an existing 450 mm diameter storm sewer within Edinburgh Place that is available to service the site. The existing sewer is tributary to Green's Creek approximately 1.6 km downstream.

6.2 Proposed Storm Sewers

The proposed development will be serviced through an on-site storm sewer network connected to the existing 450 mm diameter storm sewer within Edinburgh Place.

Runoff from the proposed roof, parking, storage, and landscaped areas will be directed towards catch basins and catch basins maintenance holes. The storm flow will be treated for quality, stored, and controlled. Storm flows will be controlled by an inlet control device (ICD) to limit the flow to the specified allowable release rate.

See CCO-22-2058 - *POST* include in *Appendix F* of this report for more details. The Stormwater Management design for the subject property will be outlined in *Section 7.0* of this report.

7.0 PROPOSED STORMWATER MANAGEMENT

7.1 Design Criteria and Methodology

As per *Section 6.2*, stormwater management for the proposed development will be provided by catch basin flow attenuation and surface storage. The controlled stormwater flow will be directed to the existing 450 mm diameter storm sewer within Edinburgh Place.

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

Quality Control

- Based on coordination with the RVCA, quality controls, up to an enhanced level of treatment, are required for the development.

Quantity Control

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

7.2 Runoff Calculations

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

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

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

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

Roofs/Concrete/Asphalt	0.90
Undeveloped and Grass	0.20

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

7.3 Pre-Development Drainage

It has been assumed that the development area contains no stormwater management controls for flow attenuation. The estimated pre-development peak flows for the 5- and 100-year events are summarized below in *Table 6*. See CCO-22-2058 - *PRE* in *Appendix E* and *Appendix G* for calculations.

Table 6: Pre-Development Runoff Summary

Drainage Area	Area (ha)	C		Q (L/s)	
		5-Year	100-Year	5-Year	100-Year
A1	1.33	0.70	0.83	269.41	547.83

Table 7, below, summarizes the required restricted flow.

Table 7: Required Restricted Flow

Drainage Area	Area (ha)	C (5-Year)	Q (L/s) 5-Year
A1	1.33	0.50	192.47

7.4 Post-Development Drainage

To meet the stormwater objectives, the development will contain flow attenuation via surface storage.

Based on the criteria listed in *Section 7.1*, the development will be required to restrict flow to the 5-year storm event. It is estimated that the target release rate during the 100-year event will be *192.47 L/s*. See *Appendix G* for calculations.

The proposed site drainage limits are demonstrated on the Post-Development Drainage Area Plan. See CCO-22-2058 - *POST* in *Appendix F* of this report for more details. A summary of the post-development runoff calculations can be found below.

Table 8: Post-Development Runoff Summary

Drainage Area	Area (ha)	5-year Peak Flow (L/s)	100-year Peak Flow (L/s)	100-year Storage Required (m^3)	100-year Storage Available (m^3)
B1	1.25	167.65	173.85	187.8	188.0
B2	0.08	7.17	15.36	-	-
Total	1.33	175.45	189.81	187.48	187.97

The flow from Area B2 will be discharged without restriction and will be compensated for in areas with attenuation.

Runoff for area B2 will flow overland towards the proposed catch basin systems. Stormwater will be restricted by a 264 mm ICD to a maximum release rate of *173.85 L/s*. The ICD will be located at the outlet of CBMH1 at an invert elevation of 67.07. The catch basin system will provide *188.0 m^3* of surface storage.

7.5 Quality Control

As noted in *Section 7.1*, quality controls are required for the development. Per drawing *C102*, a Hydro International FD-4HC (or approved equivalent) is proposed to be installed at the downstream end of the proposed storm servicing. The oil & grit separator structure will provide an enhanced level of treatment (80% TSS removal) for the parking lot, roof, and landscaped areas. Refer to *Appendix G* for OGS sizing and TSS removal calculations.

Storm runoff from area B2 will consist of runoff from landscaped areas and will maintain existing drainage patterns.

8.0 EROSION AND SEDIMENT CONTROL

8.1 Temporary Measures

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

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

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

8.2 Permanent Measures

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

9.0 SUMMARY

- A new *1003 m^2* building addition is proposed to be constructed at 2628 Edinburgh Place. The development is proposed within *1.33 ha* of the site.
- It is proposed to service the new building through the existing service connection for water and sanitary. A new storm service is proposed to collect and control drainage within the development area.
- It is proposed to service the development area via surface storage with a series of catch basins. The storm system will connect to the existing 450 mm diameter concrete storm sewer located south of the site.
- Storage for the 5- through 100-year storm events will be provided by surface storage.
- Quality controls will be provided up to an enhanced level of treatment via an Oil and Grit separator.

10.0 RECOMMENDATION

Based on the information presented in this report, we recommend that City of Ottawa approve this Servicing and Stormwater Management report in support of the proposed development at 2628 Edinburgh Place.

This report is respectfully being submitted for approval.

Regards,

McIntosh Perry Consulting Engineers Ltd.

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11.0 STATEMENT OF LIMITATIONS

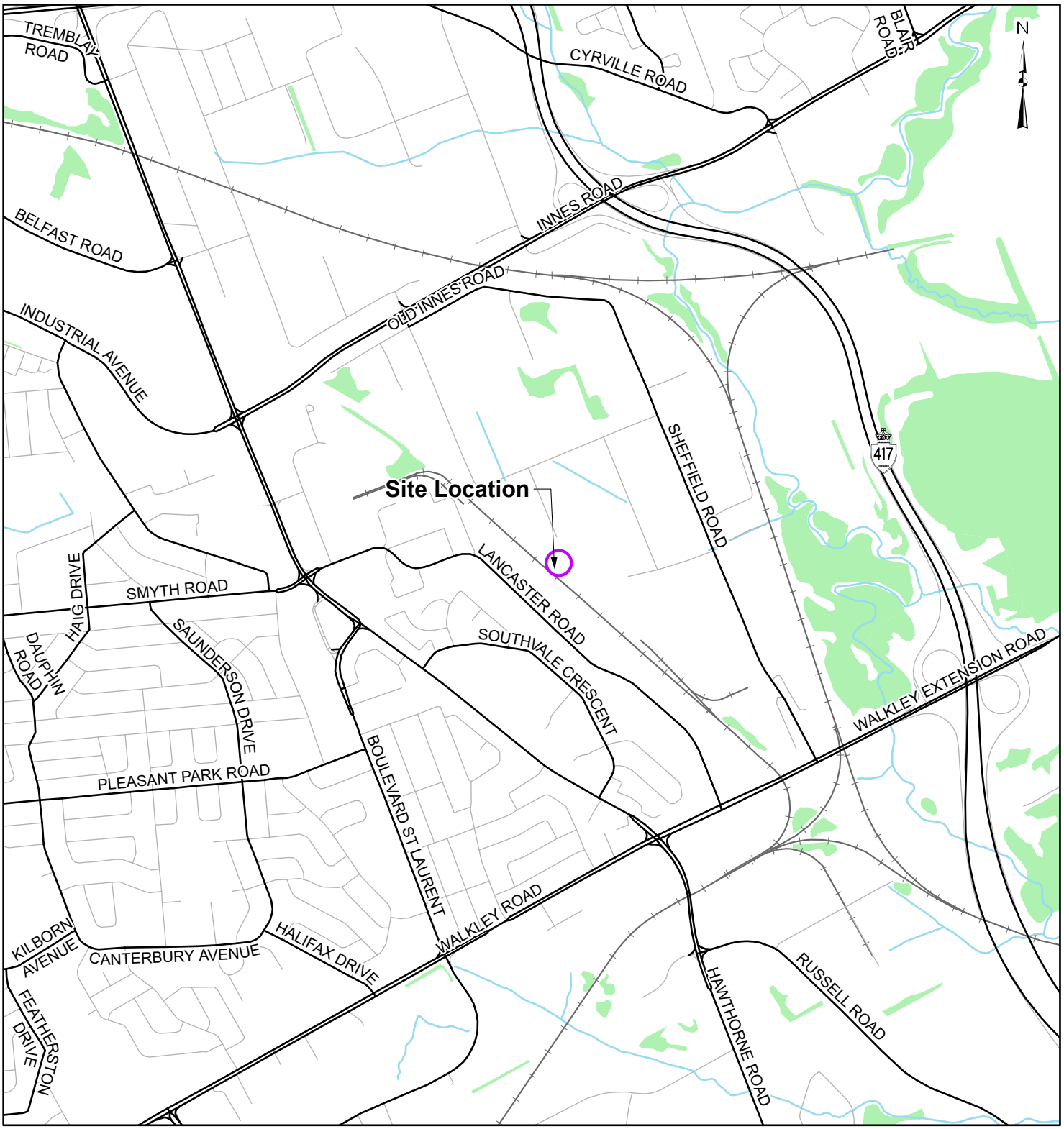
This report was produced for the exclusive use of BBS Construction LTD. The purpose of the report is to assess the existing stormwater management system and provide recommendations and designs for the post-construction scenario that are in compliance with the guidelines and standards from the Ministry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

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

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

APPENDIX A
KEY PLAN

McINTOSH PERRY



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Scale 1:20,000 Metres

LEGEND

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

REFERENCE

GIS data provided by the Ontario Ministry of Northern Development, Mines, Natural Resources and Forestry, 2022.

CLIENT: BBS CONSTRUCTION LTD.

PROJECT: 2628 EDINBURGH PLACE

TITLE: SITE LOCATION

McINTOSH PERRY
115 Walgreen Road, RR3, Carp, ON K0A1L0
Tel: 613-836-2184 Fax: 613-836-3742
www.mcintoshperry.com

PROJECT NO: CCO-22-2058	
Date	Jul., 11, 2022
GIS	MG
Checked By	FV

FIGURE: 1

C:\Users\M.Grunstra\McIntosh Perry\GIS - Documents\Projects\2022\CCO\CCO-22-2058 Gloucester 2616 and 2628 Edinburgh Place\aprx\Environmental\CCO-22-2058 Site Location.aprx

APPENDIX B
BACKGROUND DOCUMENTS

McINTOSH PERRY

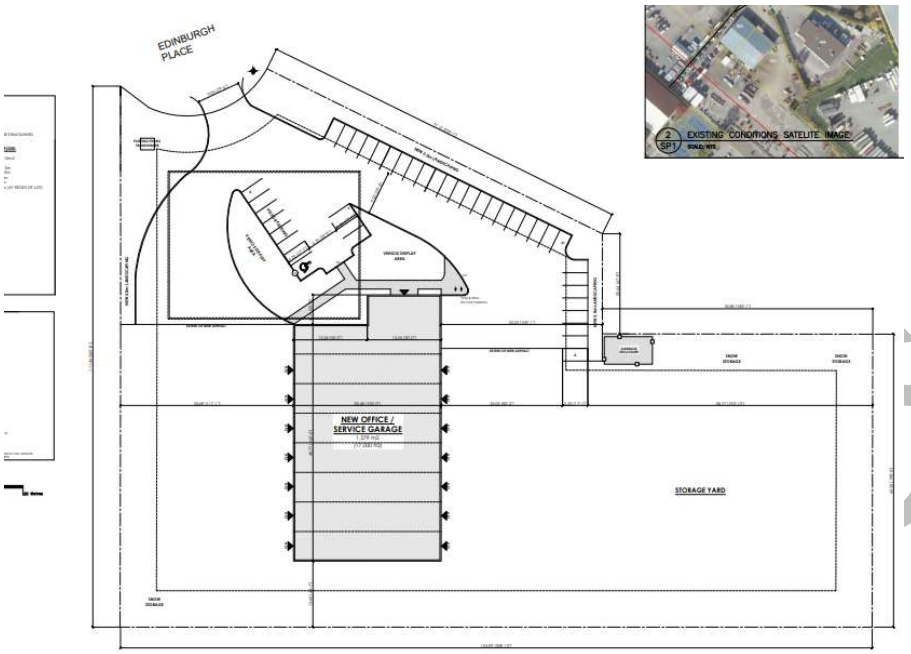
2628 Edinburgh Place
Meeting Summary Notes
Sept 15, 2021. Online Teams Meeting

Attendees:
- Michel Pouliot, Co-Owner, Ottawa Equipment & Hydraulics Inc.
- Mark Kauhanen, Applicant, BBS Construction (Ontario) Ltd.
- Matthew – co owner
- Scott Bosman, BBS Construction
- Bridgette Alchawa, McIntosh Perry
- Curtis Melanson, McIntosh Perry

- Tyler Cassidy, Kelsey Charie (Project Manager/EIT, City of Ottawa)
- Adrian vanWyk (Urban Designer, Architect, City of Ottawa)
- Katie Morphet (File Lead, Planner, City of Ottawa)
- Matthew Hayley (Environmental Planner)
- Jeannette Krabicka (Parks Planner)
- Penelope Horn (Planning Student)
- Tracey Scaramozzino (Planner, City of Ottawa)

Not in Attendance:
- Mark Richardson (City Forester)
- Wally Dubyk (Transportation Project Manager, City of Ottawa)
- Jamie Batchelor (RVCA)

Issue of Discussion:
- Site Plan Control for a new 1-storey 17,000 ft2 service garage/office bldg. and future demolition of existing 13,000 ft2 bldg
- New service connection for water, sani and storm to Edinburgh Place



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1. **Official Plan**
    a. Designated “Urban Employment Lands”.

2. **Zoning Information**
    a. Split Zoning: Heavy Industrial (IH) and Light Industrial (IL)

    b. IL Section 203 (5):

        3. *Except in the case of the storage of motor vehicles associated with an automobile dealership and automobile rental establishment, outdoor storage is prohibited. (By-law 2017-302)*

    c. The uses (heavy equipment and vehicles sales, servicing, rental; office; parking lot) are permitted, except that as per section 203 (5), accessory outdoor storage of the heavy equipment is NOT permitted for this use in the IL zone

3. **Infrastructure/Servicing (Tyler Cassidy)**

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

a. The Servicing Study Guidelines for Development Applications are available at the following address:

https://ottawa.ca/en/city-hall/planning-and-development/how-develop-property/development-application-review-process-2/guide-preparing-studies-and-plans

b. Servicing and site works shall be in accordance with the following documents:
   - Ottawa Sewer Design Guidelines (October 2012) and all the Technical Bulletins including, Technical Bulletin PIEDTB-2016-01 and ISTB-2018-01
   - Ottawa Design Guidelines – Water Distribution (2010) and Technical Bulletins ISD-2010-2, ISDTB-2014-02 and ISTB-2018-02
   - Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)
   - City of Ottawa Slope Stability Guidelines for Development Applications (revised 2012)
   - City of Ottawa Environmental Noise Control Guidelines (January, 2016)
   - City of Ottawa Park and Pathway Development Manual (2012)
   - City of Ottawa Accessibility Design Standards (2012)
   - Ottawa Standard Tender Documents (latest version)
   - Ontario Provincial Standards for Roads & Public Works (2013)

c. Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at InformationCentre@ottawa.ca or by phone at (613) 580-2424 x 44455

d. The Stormwater Management Criteria, for the subject site, is to be based on the following (as established in the Citigate Centre Site Servicing Report):
   - The pre-development runoff coefficient or a maximum equivalent 'C' of 0.5, whichever is less (§ 8.3.7.3).
   - Flows to the storm sewer in excess of the 5-year storm release rate, up to and including the 100-year storm event, must be detained on site (based on sewer age, 1989)
   - Ensure no overland flow for all storms up to and including the 100-year event.
   - The 2-yr storm or 5-yr storm event using the IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997.
   - **A calculated time of concentration (Cannot be less than 10 minutes).**
   - Quality control requirements to be provided by Rideau Valley Conservation Authority (RVCA)

- This property is located within the Green's Creek subwatershed. Please verify any subwatershed specific SWM criteria with the RVCA.

e. Deep Services:

i. *A plan view of the approximate services may be seen above. Services should ideally be grouped in a common trench to minimize the number of road cuts. The sizing of available future services is:*

a. Connections (Edinburgh Place):

i. Existing 450 mm dia. STM (Conc.)
ii. Existing 305 mm dia. Watermain (DI)
iii. Existing 250 mm dia. SAN (Conc.)

ii. Provide existing servicing information and the recommended location for the proposed connections. Services should ideally be grouped in a common trench to minimize the number of road cuts.

iii. Provide information on the monitoring manhole requirements – should be located in an accessible location on private property near the property line (ie. Not in a parking area).

iv. Provide information on the type of connection permitted

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

a. Std Dwg S11.1 for flexible main sewers – *connections made using approved tee or wye fittings.*

b. Std Dwg S11 (For rigid main sewers) – *lateral must be less that 50% the diameter of the sewermain,*

c. Std Dwg S11.2 (for rigid main sewers using bell end insert method) – *for larger diameter laterals where manufactured inserts are not available; lateral must be less that 50% the diameter of the sewermain,*

d. Connections to manholes permitted when the connection is to rigid main sewers where the lateral exceeds 50% the diameter of the sewermain. – Connect obvert to obvert with the outlet pipe unless pipes are a similar size.

e. No submerged outlet connections.

f. Civil consultant must request boundary conditions from the City's assigned Project Manager prior to first submission. Water Boundary condition requests must include the location of the service and the expected loads required by the proposed development. Please provide the following information:

i. Location of service(s)

ii. Type of development and the amount of fire flow required (as per FUS, 1999).

iii. Average daily demand: ___ l/s.

iv. Maximum daily demand: ___l/s.

v. Maximum hourly daily demand: ___ l/s.

vi. Hydrant location and spacing to meet City's Water Design guidelines.

vii. Water supply redundancy will be required for more than 50 m3/day water demand.

g. Phase 1 ESAs and Phase 2 ESAs must conform to clause 4.8.4 of the Official Plan that requires that development applications conform to Ontario Regulation 153/04.

h. If applicable, MECP ECA Requirements –

All development applications should be considered for an Environmental Compliance Approval (ECA) by the Ministry of the Environment, Conservation, and Parks (MECP);

a. Consultant determines if an approval for sewage works under Section 53 of OWRA is required. Consultant then determines what type of application is required and the City's project manager confirms. (If the consultant is not clear if an ECA is required, they will work with the City to determine what is required. If the consultant it is still unclear or there is a difference of opinion only then will the City PM approach the MECP.

b. The project will be either transfer of review (standard), transfer of review (additional), direct submission, or exempt as per O. Reg. 525/98.

c. Standard Works ToR Draft ECA's are sent to the local MECP office (moeccottawasewage@ontario.ca) for information only

d. Additional ToR draft ECAs require a project summary/design brief and require a response from the local MECP (10 business day window)

e. Site plan Approval, or Draft Approval, is required before an application is sent to the MECP

4. Initial Planning Comments (Katie Morphet)

a. IL permits "Heavy Equipment and vehicle sales, rental and servicing"

We have been able to confirm with Zoning Interpretation that the proposed accessory outdoor storage is not permitted in the IL zone (as per section 203 (5)) and must be contained and kept to the side of the lot that is zoned Heavy Industrial. Alternatively a Zoning By-law Amendment could be sought to permit the use on the entire property.

b. Please submit a survey plan to help clarify property boundary.

c. Please update the zoning table on the Site Plan to show the correct zones and zoning information. Please include all relevant zoning information such as parking spaces, bicycle parking and loading.

5. Urban Design Comments (Adrian van Wyk)

a. Please see the attached Design Brief Submission Requirements. A scoped Design Brief will be required, which may be combined with a Planning Rationale.

b. Landscaping

- It is recommended that hard surfaces be kept to a minimum, except where required for parking, storage, or vehicle circulation.
- A soft landscaped buffer is recommended along the rear and side lot lines.
- It is recommended that new softscape and shrubs/trees be introduced where possible.

c. Pedestrian and bicycle circulation

- It is recommended that pedestrian circulation be carefully considered, and options explored to provide a connection between the proposed building and Edinburgh Place.

d. Sustainability

- It is recommended that the applicant consider introducing sustainable design features, such as light coloured materials, swales, etc.

6. Parks (Jeanette Krabicka)

1. Parkland Dedication:

a. The amount of parkland dedication that is required is to be calculated as per the City of Ottawa Parkland Dedication By-law No 2009-95. Parkland requirement for commercial uses is calculated as 2% of the gross land area of the site being developed.

b. Section 14 (2) (b) of the By-law states that no conveyance of land or payment of money in-lieu is required for a change of use from commercial or industrial to another commercial or industrial use, or for the alteration of an existing

building resulting in a change of use from commercial or industrial to another commercial or industrial use.

c. The 'front' property parcel (located to the north-east) which contains the existing building is currently developed with a commercial/industrial use. The proposed development is also for a commercial/industrial use. Therefore, no additional parkland dedication is required for the front property parcel.

d. The 'rear' property parcel has not been developed to date and is therefore subject to parkland dedication for the proposed development.

e. The approximate gross land area of the rear property parcel is 9,378 sq.m. The approximate parkland dedication requirement is calculated as:
    - 9,378 m2 x 2% = 188 sq.m.

f. Please provide the City with a surveyor's area certificate/memo which specifies the exact gross land area of the rear property parcel of 2628 Edinburgh Place.

g. If parkland dedication for the rear parcel has been satisfied previously, please provide Parks & Facilities Planning with the supporting documentation.

h. Please note that the park comments are preliminary and will be finalized (and subject to change) upon receipt of the development application and the requested supporting documentation.

Additionally, if the proposed commercial product or land use changes, then the parkland dedication
requirement be re-evaluated accordingly.

2. Form of Parkland Dedication:

a. Parks & Facilities Planning will be requesting Cash-in-Lieu of Parkland for this Site Plan proposal.

7. Trees (Mark Richardson)

a. No comments as there are no trees on site.

8. Environment (Matthew Hayley)

a. Bird Safe Design

Given the proposal will need to review and incorporate bird safe design elements. Some of the risk factors include glass and related design traps such as corner glass and fly-through conditions, ventilation grates and open pipes, landscaping, light pollution. More guidance and solutions are available in the guidelines which can be found here: https://ottawa.ca/en/planning-

development-and-construction/developing-property/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans .

b. Site Plan Applications: medium to large scale commercial / industrial / institutional:
   - Bird-safe glass or integrated protection measures may be required through conditions of site plan approval for projects involving large expanses of glazing. However, it is important that the Bird-Safe Design Guidelines do not have a significant impact on the affordability or timelines of the respective project. The City recognize that corporate standards or other design requirements may limit or preclude use of bird-safe glass or integrated protection measures in cases of small-scale commercial buildings (e.g. restaurant, retail pads).

9. Conservation Authority (RVCA)

a. Comments not received yet.

10. Transportation (Wally Dubyk)

a. The development site proposes an additional 4,000 ft2 service garage with 40 parking spaces. This development would not generate sufficient traffic to warrant a TIA report.

b. Edinburgh Place is classified as a Local road. There are no additional protected ROW limits identified in the OP.

c. The proponent shall comply with the Private Approach By-Law 2003-447

d. No private approach intended for two-way vehicular traffic shall exceed 9.0 metres in width at the roadway edge, and in no case shall the width exceed 50% of the frontage on which the approach or approaches are located.

e. The closure of an existing private approach shall reinstate the sidewalk, shoulder, curb and boulevard to City standards.

f. No private approach shall be constructed within 0.3 metres of any adjacent property measured at the highway line, and at the curb line or roadway edge.

g. The Tactile Walking Surface Indicator (TWSI) should be provided at pedestrian crossings. Under the Integrated Accessibility Standards of the Accessibility for Ontarians with Disabilities Act, 2005, and the City of Ottawa Accessibility Design Standards, TWSI's are required for new construction and the redevelopment of elements in public spaces, such as for exterior paths of travel (e.g. sidewalks and at the top of stairs).

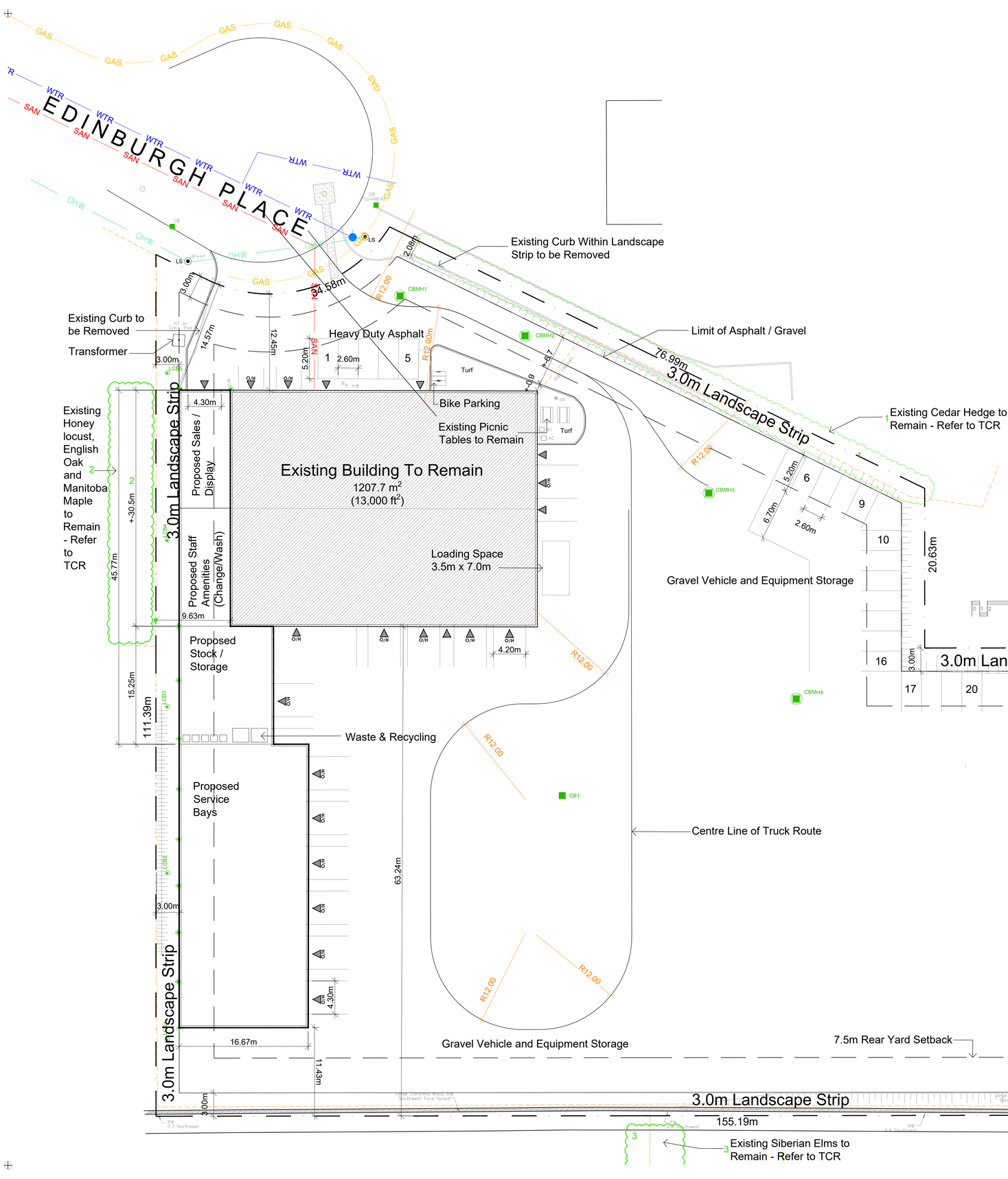
h. Bicycle parking spaces are required as per Section 111 of the Ottawa Comprehensive Zoning By-law. Bicycle parking spaces should be located in safe, secure places near main entrances and preferably protected from the weather.

11. Waste Collection

This facility will not be on City Collection.

12. General Information

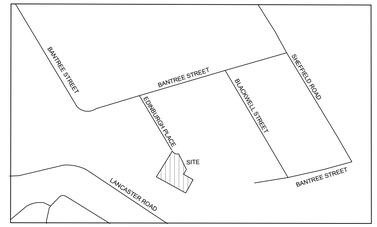
a. Ensure that all plans and studies are prepared as per City guidelines – as available online…
   https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans



LEGAL DESCRIPTION:

PART OF LOT 25 AND 26
CONCESSION 3 (OTTAWA FRONT)
GEOGRAPHIC TOWNSHIP OF GLOUCESTER, CITY OF OTTAWA

AS SURVEYED BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
MARCH 9, 2022



Zoning Provisions

Zone: Heavy Industrial (IH)
Building Uses: Heavy Equipment & Vehicle Sales, Rental and Servicing

Existing Building Area = 1455 m^2 (15,660 ft^2)
New Addition GFA = 1103 m^2 (11,870 ft^2)
New GFA = 2558 m^2 (27,530 ft^2)

Regulation	Required	Provided Proposed/Existing	Compliance
Minimum Lot Area	4000m^2	13,426m^2	Yes
Minimum Front Yard Setback	7.5m	12.45m	Yes
Minimum Rear Yard Setback	7.5m	11.43m	Yes
Minimum Interior Side Yard Setback	7.5m	3.0m	No
Maximum Floor Space Index	2.0	0.19	Yes
Maximum Building Height	22m	9.0m	Yes
Minimum Width of Landscape Area	3.0m	3.0m	Yes
Minimum Required Parking Spaces Heavy Equipment Servicing, N41, Area C 0.75 spaces per 100m^2 GFA	20	20	Yes
Minimum Required Loading Spaces Other Non-Residential, 2000-4999 m^2	1	1	Yes
Minimum Required Bicycle Parking Heavy Equipment Servicing 1 per 1000m^2 GFA	3	3	Yes

#	Revision	Date
0	REVIEW/COORDINATION	OCTOBER 2022
1	FIRST SUBMISSION SPC	DECEMBER 19 2022
2	SECOND SUBMISSION SPC	APRIL 28 2023

SITE PLAN LEGEND

- Existing Building(s)
- Proposed Building(s)
- Property Lines
- Setback Lines
- Fence
- Proposed Concrete Curb
- Slope at 3:1 Unless Specified
- Existing Exterior Door ('O/H' indicates Overhead Door)
- Proposed Exterior Door ('O/H' indicates Overhead Door)
- Retaining Wall
- Fire Hydrant
- Light Standard Base
- Roofwater Downspout
- Catch Basin Man Hole
- Catch Basin
- Landscape Catch Basin
- Bike Rack Anchor to Concrete

BELOW GRADE SERVICES REFER TO CIVIL /CUP

- WTR — U/G Water Service
- SAN — U/G Sanitary Service
- GAS — U/G Gas Service
- OHW — O/H Hydro Service

BUILDING A REPUTATION ON EXCELLENCE

BBS CONSTRUCTION (ONTARIO) LTD.
1805 WOODWARD DRIVE,
OTTAWA, ON K2C 0P9 CANADA
TEL.613-226-8830 FAX:613-226-7709

Design Builder

Annis O'Sullivan Vollebekk Ltd.
14 Concourse Gate # 500 Nepean K2E 7S6
Surveyor 613 727 0850

McIntosh Perry Consulting
115 Walgreen Rd, Carp, ON K0A 1L0
Civil Engineer 613 836 2184

McIntosh Perry Consulting
115 Walgreen Rd, Carp, ON K0A 1L0
Planner 613 836 2184

ONTARIO ASSOCIATION OF LANDSCAPE ARCHITECTS — GINO J. AIELLO — OALA MEMBER

1120952 Ontario Inc.
2628 Edinburgh Place Ottawa K1B 5M1
Property Owner 613 748 9000

Gino J. Aiello | landscape architect GJALA.com
GJA Inc. Gino@GJALA.com (613) 286 5130
110 Didsbury Road Unit # 9 | Ottawa Ontario | K2T 0C2

OEH Service Garage Expansion
2628 EDINBURGH PLACE
Project

SITE PLAN

Scale: 1:250

SP1

D07-12-22-0184

APPENDIX C
WATERMAIN CALCULATIONS

McINTOSH PERRY

McINTOSH PERRY

CCO-22-2058 - 2628 Edinburgh Place - Water Demands

Project:	2628 Edinburgh Place
Project No.:	CCO-22-2058
Designed By:	FV
Checked By:	AG
Date:	November 23, 2022
Site Area:	1.34 gross ha

Commercial Area	13425.00	m2	28,000	L/gross ha/d

AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS
Residential	280	L/c/d
Industrial - Light	35,000	L/gross ha/d
Industrial - Heavy	55,000	L/gross ha/d
Shopping Centres	2,500	L/(1000m² /d
Hospital	900	L/(bed/day)
Schools	70	L/(Student/d)
Trailer Park with no Hook-Ups	340	L/(space/d)
Trailer Park with Hook-Ups	800	L/(space/d)
Campgrounds	225	L/(campsite/d)
Mobile Home Parks	1,000	L/(Space/d)
Motels	150	L/(bed-space/d)
Hotels	225	L/(bed-space/d)
Tourist Commercial	28,000	L/gross ha/d
Other Commercial	28,000	L/gross ha/d

AVERAGE DAILY DEMAND	Residential	0.00	L/s
	Commercial/Industrial /Institutional	0.44	L/s

MAXIMUM DAILY DEMAND

DEMAND TYPE	AMOUNT		UNITS
Residential	9.5	x avg. day	L/c/d
Industrial	1.5	x avg. day	L/gross ha/d
Commercial	1.5	x avg. day	L/gross ha/d
Institutional	1.5	x avg. day	L/gross ha/d

MAXIMUM DAILY DEMAND	Residential	0.00	L/s
	Commercial/Industrial /Institutional	0.65	L/s

MAXIMUM HOUR DEMAND

DEMAND TYPE	AMOUNT		UNITS
Residential	14.3	x avg. day	L/c/d
Industrial	1.8	x max. day	L/gross ha/d
Commercial	1.8	x max. day	L/gross ha/d
Institutional	1.8	x max. day	L/gross ha/d

MAXIMUM HOUR DEMAND	Residential	0.00	L/s
	Commercial/Industrial /Institutional	1.17	L/s

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

AVERAGE DAILY DEMAND	0.44	L/s
MAXIMUM DAILY DEMAND	0.65	L/s
MAXIMUM HOUR DEMAND	1.17	L/s

115 Walgreen Road, R.R.3. Carp, ON K0A 1L0 | T. 613-836-2184 | F. 613-836-3742
info@mcintoshperry.com | www.mcintoshperry.com

McINTOSH PERRY

CCO-22-2058 - 2628 Edinburgh Place - OBC Fire Calculations

Project:	2628 Edinburgh Place
Project No.:	CCO-22-2058
Designed By:	FV
Checked By:	AG
Date:	November 23, 2022

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

Water Supply for Fire-Fighting - Store/Office & Warehouse Building

Building is classified as Group : D, E, and F2 up to 2 Storeys (from table 3.2.2.55)

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

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

(a) Q = K x V x Stot

where:

Q = minimum supply of water in litres

K = water supply coefficient from Table 1

V = total building volume in cubic metres

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

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

K	17	(from Table 1 pg A-31) (Worst case occupancy {E / F2} 'K' value used)
V	16,012	(Total building volume in m³.)
Stot	1.5	(From figure 1 pg A-32)
Q =	408,298.36 L	

From Figure 1 (A-32)

Snorth	12.49	m	0.0
Seast	24.24	m	0.0
Ssouth	11.44	m	0.0
Swest	3	m	0.5

*approximate distances

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

9000 L/min if Q > 270,000 L

2378 gpm

McINTOSH PERRY

CCO-22-2058 - 2628 Edinburgh Place - Fire Underwriters Survey

Project:	2628 Edinburgh Place
Project No.:	CCO-22-2058
Designed By:	FV
Checked By:	AG
Date:	November 23, 2022

From the Fire Underwriters Survey (2020)

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

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

F = 220 x C x √A Where:

F = Required fire flow in liters per minute
C = Coefficient related to the type of construction.
A = The total floor area in square meters (including all storey's, but excluding basements at least 50 percent below grade) in the building being considered.

Construction Type: Non-Combustible Construction

C = 0.8

A = 2,211.0 m^2

Total Floor Area (per the 2020 FUS Page 20 - Total Effective Area) = 2,211.0 m^2 **Unprotected Vertical Openings*

Calculated Fire Flow	8,275.7 L/min
	8,000.0 L/min

B. REDUCTION FOR OCCUPANCY TYPE (No Rounding)

From Page 24 of the Fire Underwriters Survey:

Combustible 0%

Fire Flow	8,000.0 L/min

C. REDUCTION FOR SPRINKLER TYPE (No Rounding)

Non-Sprinklered 0%

Reduction	0.0 L/min

D. INCREASE FOR EXPOSURE (No Rounding)

	Separation Distance (m)	Cons.of Exposed Wall	Length Exposed Adjacent Wall (m)	Height (Stories)	Length-Height Factor	
Exposure 1	Over 30 m	Wood frame	N/A	N/A	N/A	0%
Exposure 2	20.1 to 30	Wood frame	43.6	2	87.2	8%
Exposure 3	Over 30 m	Wood frame	N/A	N/A	N/A	0%
Exposure 4	Over 30 m	Wood frame	N/A	N/A	N/A	0%
					% Increase*	8%

Increase*	640.0 L/min

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

Fire Flow	8,640.0 L/min
Fire Flow Required**	9,000.0 L/min

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

CCO-22-2058 - 2628 Edinburgh Place - Boundary Condition Unit Conversion

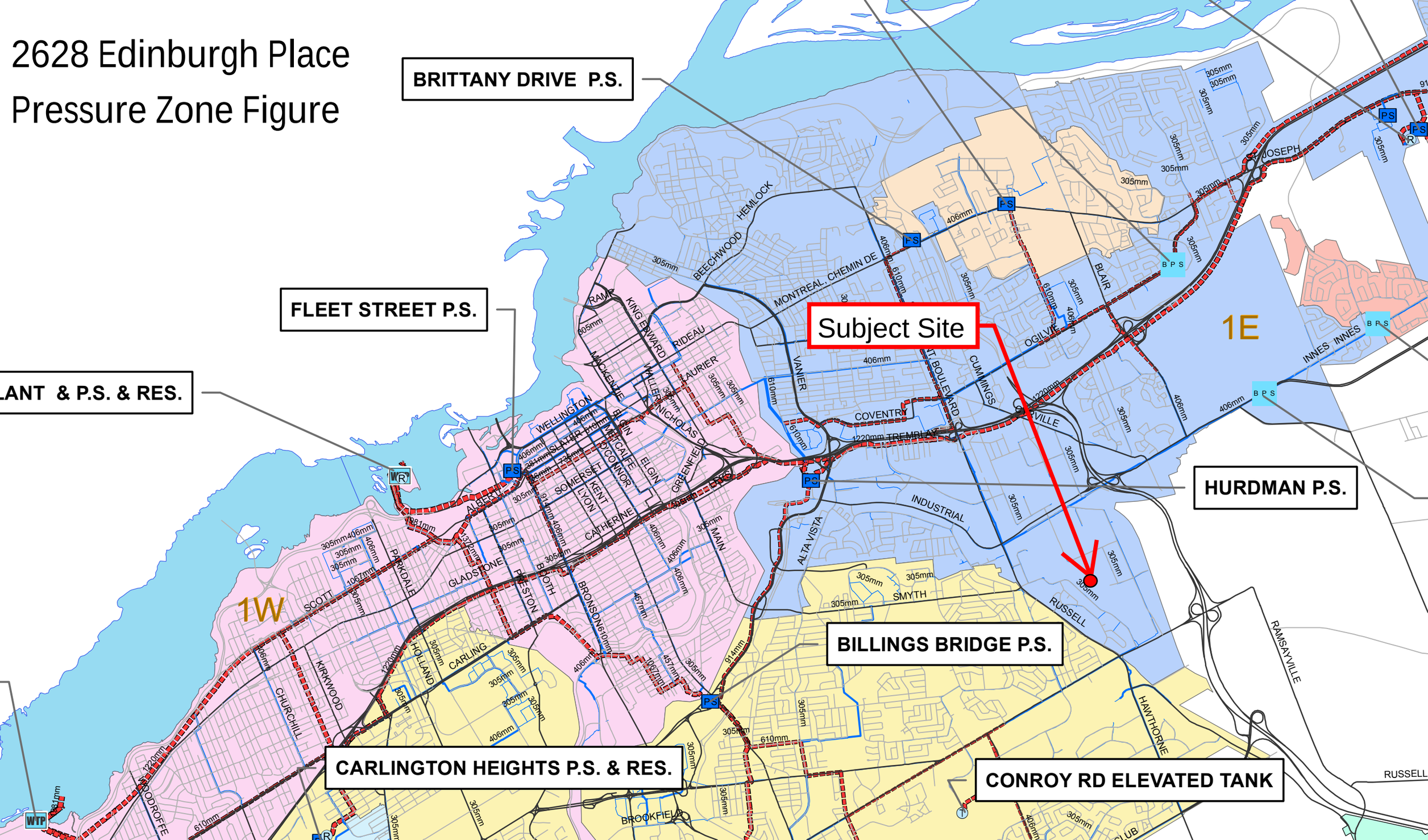
Project:	2628 Edinburgh Place
Project No.:	CCO-22-2058
Designed By:	FV
Checked By:	AG
Date:	November 23, 2022

Boundary Conditions Unit Conversion

Edinburgh Place

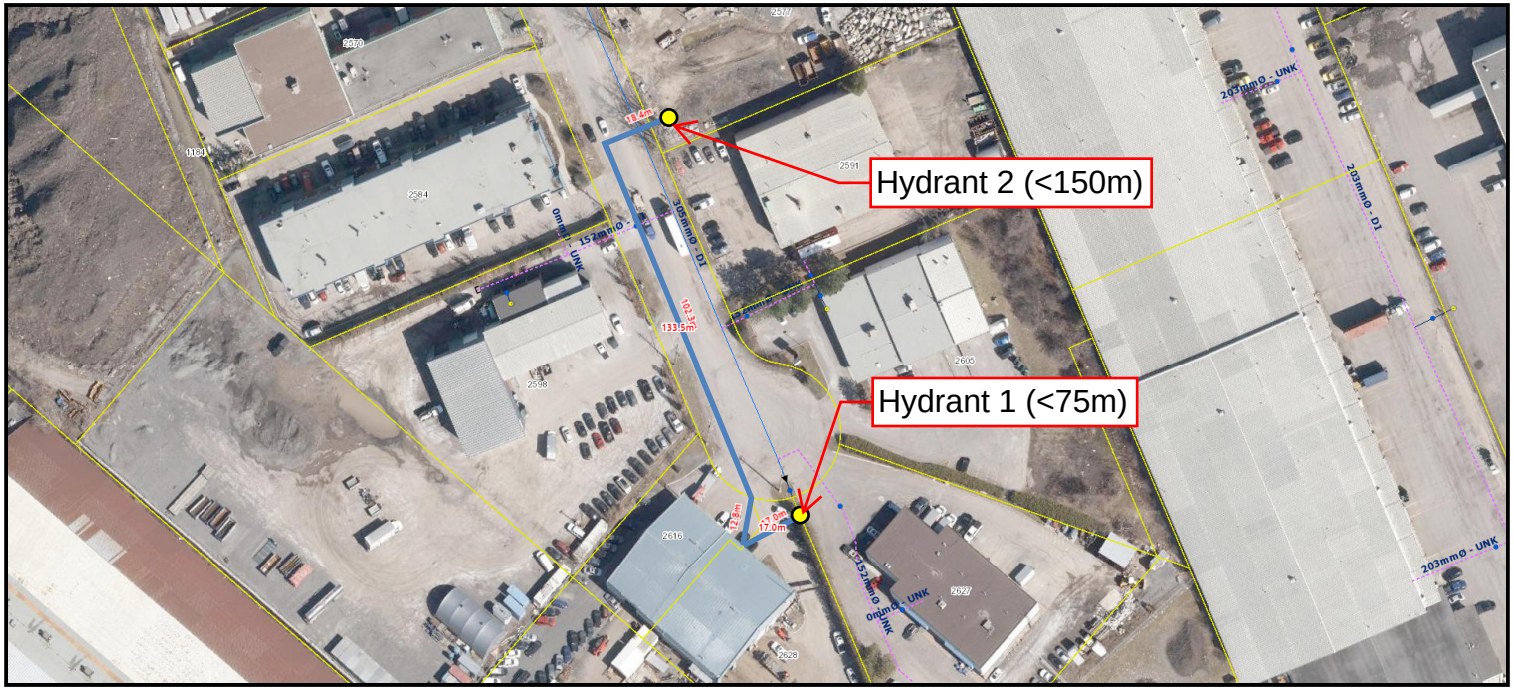
Scenario	Height (m)	Elevation (m)	m H_2O	PSI	kPa
Avg. DD	117.9	66.2	51.8	73.6	507.7
Max Day + Fire Flow (150.0 L/s)	98.4	66.2	32.3	45.9	316.4
Peak Hour	109.9	66.2	43.8	62.2	429.2

2628 Edinburgh Place
Pressure Zone Figure



2628 Edinburgh Place

Hydrant Coverage Figure



Francis Valenti

From: Charie, Kelsey <kelsey.charie@ottawa.ca>
Sent: August 11, 2022 11:58 AM
To: Cassidy, Tyler; Francis Valenti
Cc: Alison Gosling
Subject: RE: 22-2058 - Boundary Condition Request - 2628 Edinburgh Place
Attachments: 2628 Edinburgh Place August 2022.pdf

Hi Francis,

Here is the water boundary conditions from our water resources department:

The following are boundary conditions, HGL, for hydraulic analysis at 2628 Edinburgh Place (zone 1E) assumed to be connected to the 305 mm watermain on Edinburgh Place (see attached PDF for location).

Minimum HGL: 109.9 m

Maximum HGL: 117.9 m

Max Day + FF (150.0 L/s): 98.4 m

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.

Please let me know if there is anything you wish to discuss further,

Kelsey Charie, EIT
Engineering Intern
Planning, Real Estate and Economic Development Department - Direction générale de la planification, des biens immobiliers et du développement économique
Development Review - South Branch
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste 22551, kelsey.charie@ottawa.ca

From: Cassidy, Tyler <tyler.cassidy@ottawa.ca>
Sent: August 02, 2022 2:28 PM
To: Francis Valenti <F.Valenti@McIntoshPerry.com>; Charie, Kelsey <kelsey.charie@ottawa.ca>
Cc: Alison Gosling <a.gosling@mcintoshperry.com>
Subject: RE: 22-2058 - Boundary Condition Request - 2628 Edinburgh Place

Hi Francis,

I've sent the request to our Water Resources group. Please allow for up to 10 business days for them to provide boundary conditions.

Please reach out to Kelsey Charie if you do not receive them before then.

Thank you,

Please note that I am anticipated to be Out of Office for 5 weeks starting August 8th, 2022. For any inquiries please contact Kelsey Charie at Kelsey.Charie@Ottawa.ca .

Tyler Cassidy, P.Eng
Infrastructure Project Manager,
Planning, Real Estate and Economic Development Department / Direction générale de la planification, des biens immobiliers et du développement économique - South Branch
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste 12977, Tyler.Cassidy@ottawa.ca

From: Francis Valenti <F.Valenti@McIntoshPerry.com>
Sent: August 02, 2022 11:32 AM
To: Cassidy, Tyler <tyler.cassidy@ottawa.ca>; Charie, Kelsey <kelsey.charie@ottawa.ca>
Cc: Alison Gosling <a.gosling@mcintoshperry.com>
Subject: RE: 22-2058 - Boundary Condition Request - 2628 Edinburgh Place

Hi Tyler,

The water demand calculations have been revised to consider the entire lot area as commercial. The revised demands are listed below:

- The estimated fire flow is 9,000 L/min based on the OBC method
- The estimated fire flow is 9,000 L/min based on the FUS method
- Average Daily Demand (combined): 0.44 L/s
- Maximum Daily Demand (combined): 0.65 L/s
- Maximum hourly daily demand (combined): 1.17 L/s

Please find attached calculations prepared for the demands listed above.

Regards,

From: Cassidy, Tyler <tyler.cassidy@ottawa.ca>
Sent: August 2, 2022 9:09 AM
To: Francis Valenti <F.Valenti@McIntoshPerry.com>; Charie, Kelsey <kelsey.charie@ottawa.ca>
Cc: Alison Gosling <a.gosling@mcintoshperry.com>
Subject: RE: 22-2058 - Boundary Condition Request - 2628 Edinburgh Place

Hi Francis,

I'm reviewing the water demand calculations from your email below and they look a little low. Can you please double check the calculations and confirm what your Average Daily Demand, Max Daily Demand, and Max Hourly Daily Demand rates are? Note that Average Daily Demand is calculated with the site's gross area (1.34 gross ha x 28,000 L/gross ha/day) and reduced down to L/s.

Thank you,

Please note that I am anticipated to be Out of Office for 5 weeks starting August 8th, 2022. For any inquiries please contact Kelsey Charie at Kelsey.Charie@Ottawa.ca .

Tyler Cassidy, P.Eng
Infrastructure Project Manager,
Planning, Real Estate and Economic Development Department / Direction générale de la planification, des biens immobiliers et du développement économique - South Branch
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste 12977, Tyler.Cassidy@ottawa.ca

From: Francis Valenti <F.Valenti@McIntoshPerry.com>
Sent: July 28, 2022 4:24 PM
To: Cassidy, Tyler <tyler.cassidy@ottawa.ca>; Charie, Kelsey <kelsey.charie@ottawa.ca>
Cc: Alison Gosling <a.gosling@mcintoshperry.com>
Subject: 22-2058 - Boundary Condition Request - 2628 Edinburgh Place

Good afternoon,

We would like to request boundary conditions for the proposed development at 2628 Edinburgh Place. The proposed development includes a 1-storey rear addition with gravel vehicle & equipment storage areas. The proposed connection (single) will be to the existing 305 mm dia. watermain located within Edinburgh Place.

- The estimated fire flow is 9,000 L/min based on the OBC method
- The estimated fire flow is 9,000 L/min based on the FUS method
- Average Daily Demand (combined): 0.07 L/s
- Maximum Daily Demand (combined): 0.11 L/s
- Maximum hourly daily demand (combined): 0.19 L/s

Please find attached a map showing the proposed connection location and calculations prepared for the demands listed above.

Regards,

Francis Valenti, EIT
Engineering Intern, Land Development

T. 613.714.6895 | **C.** 613.808.2123
F.Valenti@McIntoshPerry.com | www.mcintoshperry.com

McINTOSH PERRY

Turning Possibilities Into Reality

'

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APPENDIX D
SANITARY CALCULATIONS

McINTOSH PERRY

McINTOSH PERRY

CCO-22-2058 - 2628 Edinburgh Pl - Existing Sanitary Demands

Project:	2628 Edinburgh Pl
Project No.:	CCO-22-2058
Designed By:	FV
Checked By:	AG
Date:	Jun-22

Site Area	1.34	Gross ha
Commercial Area	1207.70	m^2

DESIGN PARAMETERS

Institutional/Commercial Peaking Facto	1.5	
Mannings coefficient (n)	0.013	
Demand (per capita)	280	L/day
Infiltration allowance	0.33	L/s/Ha

EXTRANEOUS FLOW ALLOWANCES

Infiltration / Inflow	Flow (L/s)
Dry	0.07
Wet	0.38
Total	0.44

AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS	POPULATION / AREA	Flow (L/s)
Residential	280	L/c/d	0	0.00
Industrial - Light**	35,000	L/gross ha/d		0
Industrial - Heavy**	55,000	L/gross ha/d		0
Commercial / Amenity	2,800	L/(1000m² /d)	1207.70	0.04
Hospital	900	L/(bed/day)		0
Schools	70	L/(Student/d)		0
Trailer Parks no Hook-Ups	340	L/(space/d)		0
Trailer Park with Hook-Ups	800	L/(space/d)		0
Campgrounds	225	L/(campsite/d)		0
Mobile Home Parks	1,000	L/(Space/d)		0
Motels	150	L/(bed-space/d)		0
Hotels	225	L/(bed-space/d)		0
Office	75	L/7.0m^2/d		0
Tourist Commercial	28,000	L/gross ha/d		0
Other Commercial	28,000	L/gross ha/d		0

AVERAGE RESIDENTIAL FLOW	0.00	L/s
PEAK RESIDENTIAL FLOW	0.00	L/s
AVERAGE ICI FLOW	0.04	L/s
PEAK INSTITUTIONAL/COMMERCIAL FLOW	0.06	L/s
PEAK INDUSTRIAL FLOW	0.00	L/s
TOTAL PEAK ICI FLOW	0.06	L/s

TOTAL SANITARY DEMAND

TOTAL ESTIMATED AVERAGE DRY WEATHER FLOW	0.11	L/s
TOTAL ESTIMATED PEAK DRY WEATHER FLOW	0.13	L/s
TOTAL ESTIMATED PEAK WET WEATHER FLOW	0.50	L/s

McINTOSH PERRY

CCO-22-2058 - 2628 Edinburgh Pl - Proposed Sanitary Demands

Project:	2628 Edinburgh Pl
Project No.:	CCO-22-2058
Designed By:	FV
Checked By:	AG
Date:	Jun-22

Site Area	1.34	Gross ha
Commercial Area	2210.76	m^2

DESIGN PARAMETERS

Institutional/Commercial Peaking Factor	1.5	
Mannings coefficient (n)	0.013	
Demand (per capita)	280	L/day
Infiltration allowance	0.33	L/s/Ha

EXTRANEOUS FLOW ALLOWANCES

Infiltration / Inflow	Flow (L/s)
Dry	0.07
Wet	0.38
Total	0.44

AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS	POPULATION / AREA	Flow (L/s)
Residential	280	L/c/d	0	0.00
Industrial - Light**	35,000	L/gross ha/d		0
Industrial - Heavy**	55,000	L/gross ha/d		0
Commercial / Amenity	2,800	L/(1000m^2 /d)	2210.76	0.07
Hospital	900	L/(bed/day)		0
Schools	70	L/(Student/d)		0
Trailer Parks no Hook-Ups	340	L/(space/d)		0
Trailer Park with Hook-Ups	800	L/(space/d)		0
Campgrounds	225	L/(campsite/d)		0
Mobile Home Parks	1,000	L/(Space/d)		0
Motels	150	L/(bed-space/d)		0
Hotels	225	L/(bed-space/d)		0
Office	75	L/7.0m^2/d		0
Tourist Commercial	28,000	L/gross ha/d		0
Other Commercial	28,000	L/gross ha/d		0

AVERAGE RESIDENTIAL FLOW	0.00	L/s
PEAK RESIDENTIAL FLOW	0.00	L/s
AVERAGE ICI FLOW	0.07	L/s
PEAK INSTITUTIONAL/COMMERCIAL FLOW	0.11	L/s
PEAK INDUSTRIAL FLOW	0.00	L/s
TOTAL PEAK ICI FLOW	0.11	L/s

TOTAL SANITARY DEMAND

TOTAL ESTIMATED AVERAGE DRY WEATHER FLOW	0.14	L/s
TOTAL ESTIMATED PEAK DRY WEATHER FLOW	0.17	L/s
TOTAL ESTIMATED PEAK WET WEATHER FLOW	0.55	L/s

SANITARY SEWER DESIGN SHEET

PROJECT: CCO-22-2058
LOCATION: 2628 Edinburgh Place
CLIENT: BBS Construction LTD

McINTOSH PERRY

LOCATION				RESIDENTIAL									ICI AREAS							INFILTRATION ALLOWANCE			FLOW	SEWER DATA						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
STREET	AREA ID	FROM MH	TO MH	UNIT TYPES				AREA	POPULATION		PEAK FACTOR	PEAK FLOW (L/s)	AREA (ha)						PEAK FLOW (L/s)	AREA (ha)		FLOW (L/s)	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	DIA (mm)	SLOPE (%)	VELOCITY (full) (m/s)	AVAILABLE CAPACITY	
				SF	SD	TH	APT	(ha)	IND	CUM			INSTITUTIONAL		COMMERCIAL		INDUSTRIAL			IND	CUM								L/s	(%)
													IND	CUM	IND	CUM	IND	CUM											
Edinburgh Place		Ex. Bldg	Ex. Main												0.22	0.22			0.11	1.34	1.34	0.44	0.55	15.89	29.60	150	1.00	0.871	15.34	96.54

Design Parameters:

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

Notes:

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

Designed: FV

Checked: AG

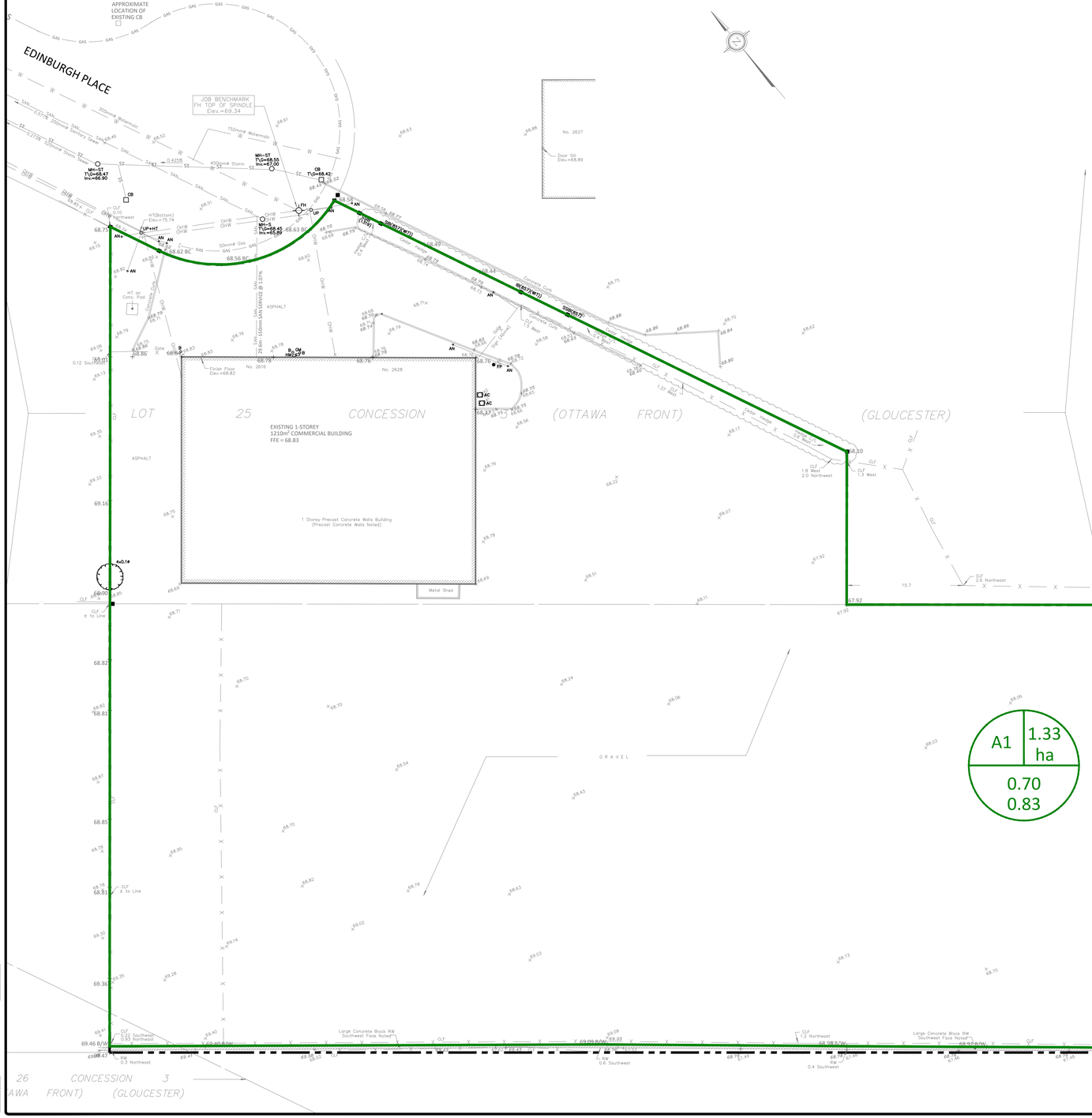
Project No.: CCO-22-2058

No.	Revision	Date
1.		

Sheet No: 1 of 1

APPENDIX E
PRE-DEVELOPMENT DRAINAGE PLAN

McINTOSH PERRY



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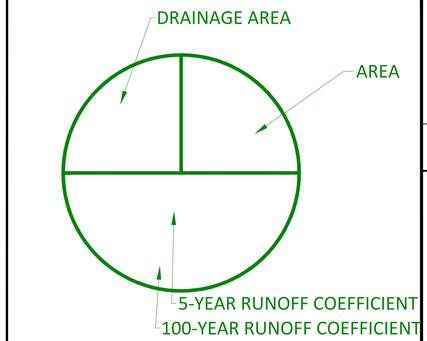

GENERAL NOTES

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8. TOPSOIL TO BE STRIPPED AND STOCKPILED FOR REHABILITATION. CLEAN FILL TO BE PLACED IN FILL AREAS AND COMPACTED TO 95% STANDARD PROCTOR DENSITY.
9. ALL DISTURBED AREAS TO BE RESTORED TO ORIGINAL CONDITION OR BETTER UNLESS OTHERWISE SPECIFIED.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TRAFFIC CONTROL AND SAFETY MEASURES DURING THE CONSTRUCTION PERIOD, INCLUDING THE SUPPLY, INSTALLATION, AND REMOVAL OF ALL NECESSARY SIGNAGE, DELINEATORS, MARKERS AND BARRIERS.
11. DO NOT ALTER GRADING OF THE SITE WITHOUT PRIOR APPROVAL OF THE ENGINEER/CITY.
12. ALL ROADWAY, PARKING LOT, AND GRADING WORKS TO BE UNDERTAKEN IN ACCORDANCE WITH CITY STANDARDS AND SPECIFICATIONS. THE CONTRACTOR IS TO PROVIDE POSITIVE DRAINAGE AWAY FROM THE BUILDING.
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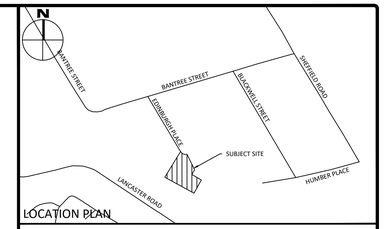
18. ALL PROPOSED CURB TO BE CONCRETE BARRIER CURB UNLESS OTHERWISE SPECIFIED.
19. THIS PLAN MUST BE READ IN CONJUNCTION WITH THE GEOTECHNICAL INVESTIGATION COMPLETED BY QUALITAS OUTAOUAIS, DATED JANUARY 2007.



LOCATION PLAN

LEGEND

	CONCRETE BARRIER CURB		LIMIT OF CONSTRUCTION
	CONCRETE WALKWAY		DRAINAGE SWALE
	PROPOSED ASPHALT		DRAINAGE DITCH
SCB#	LANDSCAPING CATCHBASIN		SLOPING AT 3:1 UNLESS SPECIFIED
CBMH# T/G	CATCHBASIN MANHOLE	95.50	SURFACE ELEVATION
CB# T/G	CATCHBASIN	95.50 (S)	SWALE ELEVATION
MH#A T/G	SANITARY SEWER MANHOLE	T/W 95.50 B/W 94.25	TOP OF WALL ELEVATION BOTTOM OF WALL ELEVATION
HYD B/F	FIRE HYDRANT		OVERLAND FLOW ROUTE
	WATER VALVE		SILT FENCE BARRIER
M	WATER METER		STRAW BALE CHECK DAM
RM	REMOTE WATER METER		MUD MAT

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No.	Revisions	Date
11		

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

SCALE 1 : 300
0 5 10 15 20 25 30 Metres

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

Stamp:

Client:
BBS CONSTRUCTION LTD.
1805 WOODWARD DRIVE
OTTAWA, ON K2C 0P9

Project:
PROPOSED BUILDING ADDITION
2628 EDINBURGH PLACE

Drawing Title:
PRE-DEVELOPMENT DRAINAGE PLAN

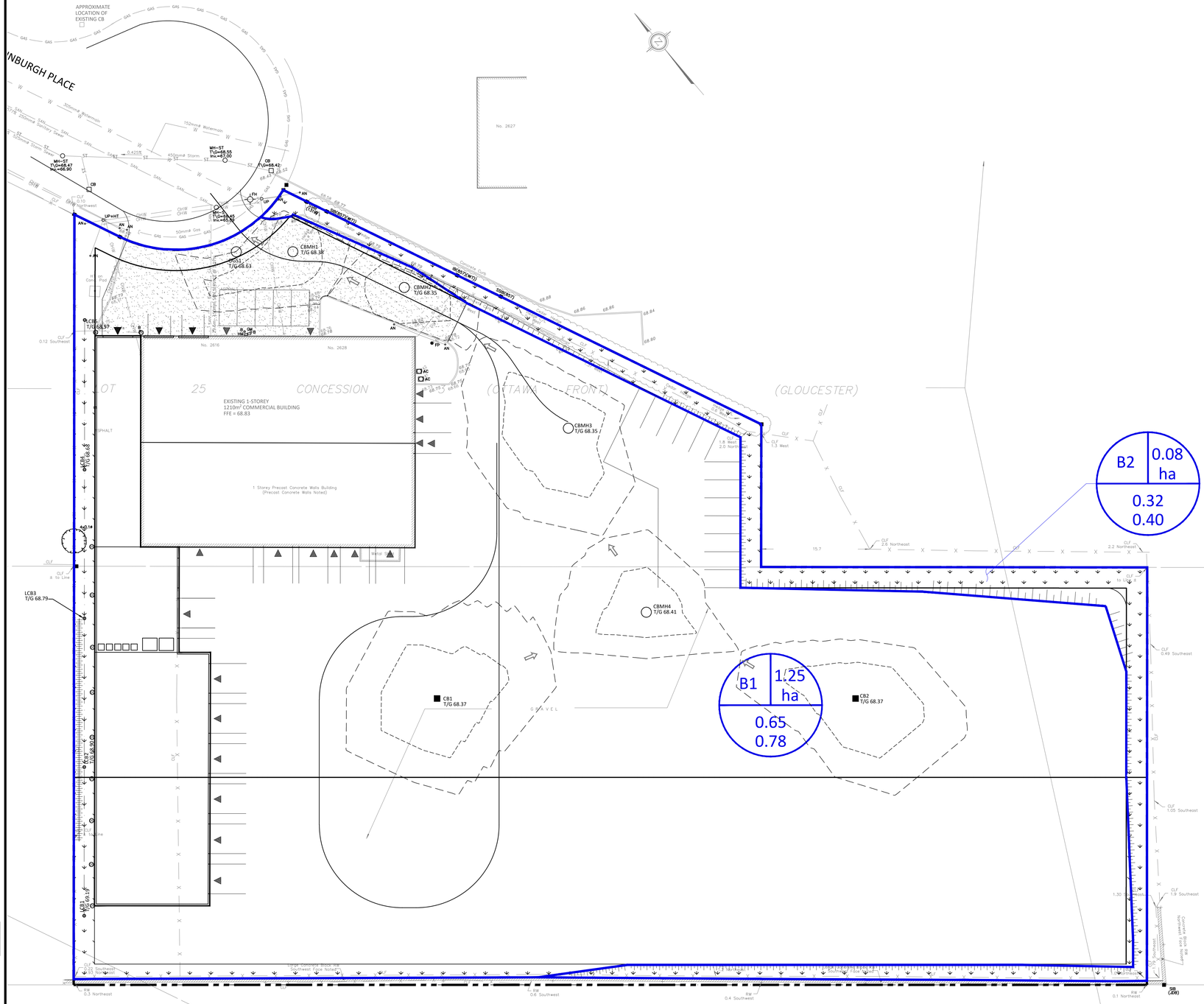
Scale:	1:300	Project Number:	CCO-22-2058
Drawn By:	FV		
Checked By:	CJM	Drawing Number:	PRE
Designed By:	FV		

D07-12-XX-XXXX
#XXXXX

FILENAME: I:\Ottawa\01 Project - Proposal\2022 Jobs\CCO\CCO-22-2058 BBS_QEH Building_2628 Edinburgh Place\Civil\12 - Drawings\CCO-22-2058_Presentation.dwg
LAST SAVED: Wednesday, August 31, 2022 LAST SAVED BY: F Valenti
LAST PLOTTED: Wednesday, August 31, 2022 CTB FILE USED:

APPENDIX F
POST-DEVELOPMENT DRAINAGE PLAN

McINTOSH PERRY



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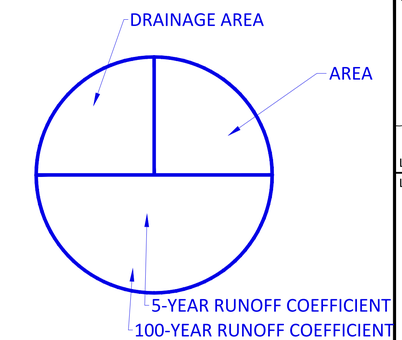

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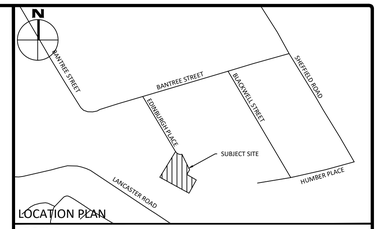
19. THIS PLAN MUST BE READ IN CONJUNCTION WITH THE GEOTECHNICAL INVESTIGATION COMPLETED BY PATERSON GROUP, DATED AUGUST 17, 2022.



LOCATION PLAN

LEGEND

- CONCRETE BARRIER CURB
- CONCRETE WALKWAY
- PROPOSED ASPHALT
- SCB# LANDSCAPING CATCHBASIN
- CBMH# T/G CATCHBASIN MANHOLE
- CB# T/G CATCHBASIN
- MH#A T/G SANITARY SEWER MANHOLE
- HYD B/F FIRE HYDRANT
- WATER VALVE
- WM WATER METER
- RM REMOTE WATER METER
- DS DOWNSPOUT LOCATION
- LIMIT OF CONSTRUCTION
- DRAINAGE SWALE
- DRAINAGE DITCH
- SLOPING AT 3:1 UNLESS SPECIFIED
- 95.50 SURFACE ELEVATION
- 95.50 (S) SWALE ELEVATION
- T/W 95.50 B/W 94.25 TOP OF WALL ELEVATION BOTTOM OF WALL ELEVATION
- OVERLAND FLOW ROUTE
- SILT FENCE BARRIER
- STRAW BALE CHECK DAM
- MUD MAT
- 5-YEAR PONDING
- 100-YEAR PONDING

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No.	Revisions	Date
1	ISSUED FOR MUNICIPAL REVIEW	APR. 21, 2023

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

SCALE 1 : 300
0 5 10 15 20 25 30 Metres

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

Stamp:

Client:
BBS CONSTRUCTION LTD.
1805 WOODWARD DRIVE
OTTAWA, ON K2C 0P9

Project:
PROPOSED BUILDING ADDITION
2628 EDINBURGH PLACE

Drawing Title:
POST-DEVELOPMENT DRAINAGE PLAN

Scale: 1:300	Project Number: CCO-22-2058
Drawn By: FV	
Checked By: CH	Drawing Number: POST
Designed By: FV	

D07-12-22-0184
#XXXXX

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LAST SAVED: Friday, April 21, 2023 LAST SAVED BY: F.Valent
LAST PLOTTED: Friday, April 21, 2023 1:36 PM FILE USED:

APPENDIX G
STORMWATER MANAGEMENT CALCULATIONS

McINTOSH PERRY

Tc (min)	Intensity (mm/hr)	
	5-Year	100-Year
20	70.3	120.0
13	90.6	155.1
10	104.2	178.6

C-Values	
Impervious	0.90
Gravel	0.60
Pervious	0.20

Pre-Development Runoff Coefficient

Drainage Area	Impervious Area (m^2)	Gravel (m^2)	Pervious Area (m^2)	Average C (5-year)	Average C (100-year)
A1	4,722	8,344	223	0.70	0.83

Pre-Development Runoff Calculations

Drainage Area	Area (ha)	C 5-Year	C 100-Year	Tc (min)	Q (L/s)	
					5-Year	100-Year
A1	1.33	0.70	0.83	10	269.41	547.83
Total	1.33				269.41	547.83

Post-Development Runoff Coefficient

Drainage Area	Impervious Area (m^2)	Gravel (m^2)	Pervious Area (m^2)	Average C (5-year)	Average C (100-year)	
B1	2,589	9,468	467	0.65	0.78	*Restricted*
B2	0	236	529	0.32	0.40	*Unrestricted*

Post-Development Runoff Calculations

Drainage Area	Area (ha)	C 5-Year	C 100-Year	Tc (min)	Q (L/s)		
					5-Year	100-Year	
B1	1.25	0.65	0.78	10	234.75	486.81	*Restricted*
B2	0.08	0.32	0.40	10	7.17	15.36	*Unrestricted*
Total	1.33				241.92	502.17	

Required Restricted Flow

Drainage Area	Area (ha)	C 5-Year	Tc (min)	Q (L/s)
				5-Year
A1	1.33	0.50	10	192.47

Post-Development Restricted Runoff Calculations

Drainage Area	Unrestricted Flow (L/S)		Restricted Flow (L/S)		Storage Required (m^3)		Storage Provided (m^3)	
	5-year	100-Year	5-Year	100-Year	5-Year	100-Year	5-Year	100-Year
B1	234.75	486.81	167.65	173.85	40.3	187.8	42.7	188.0
B2	7.17	15.36	7.17	15.36				
Total	241.92	502.17	174.82	189.21	40.3	187.8	42.7	188.0

Storage Requirements for Area B1

5-Year Storm Event

Tc (min)	I (mm/hr)	Runoff (L/s) B1	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
10	104.2	234.77	167.65	67.12	40.27
20	70.3	158.39	167.65	-9.26	-11.11

Maximum Storage Required 5-year =	40	m^3

100-Year Storm Event

Tc (min)	I (mm/hr)	Runoff (L/s) B1	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
10	178.6	486.92	173.85	313.07	187.84
20	120.0	327.16	173.85	153.31	183.97

Maximum Storage Required 100-year =	188	m^3

5-Year Storm Event Storage Summary

		Water Elev. (m) =		68.53	
Location	T/G	INV. (out)	Depth (m)	Head (m)	Volume (m^3)
CBMH1	68.38	67.07	0.15	1.33	42.7

Storage Available (m^3) =	42.7	*
Storage Required (m^3) =	40.3	

100-Year Storm Event Storage Summary

		Water Elev. (m) =		68.63	
Location	T/G	INV. (out)	Depth (m)	Head (m)	Volume (m^3)
CBMH1	68.38	67.07	0.25	1.43	188.0

Storage Available (m^3) =	188.0	*
Storage Required (m^3) =	187.8	

*Available Storage calculated from AutoCAD

For Orifice Flow, C= 0.60
For Weir Flow, C= 1.84

	Orifice 1	Orifice 2	Weir 1	Weir 2
invert elevation	67.07			
center of crest elevation	67.20			
orifice width / weir length	264 mm			
weir height				
orifice area (m^2)	0.055			

Elevation Discharge Table - Storm Routing

Elevation	Orifice 1		Orifice 2		Weir 1		Weir 2		Total	
	H [m]	Q [m^3/s]	H [m]	Q [m^3/s]	H [m]	Q [m^3/s]	H [m]	Q [m^3/s]	Q [L/s]	
68.35	1.15	0.16							155.87	
68.36	1.16	0.16							156.55	
68.37	1.17	0.16							157.22	
68.38	1.18	0.16							157.90	
68.39	1.19	0.16							158.57	
68.40	1.20	0.16							159.23	
68.41	1.21	0.16							159.89	
68.42	1.22	0.16							160.55	
68.43	1.23	0.16							161.21	
68.44	1.24	0.16							161.87	
68.45	1.25	0.16							162.52	
68.46	1.26	0.16							163.17	
68.47	1.27	0.16							163.82	
68.48	1.28	0.16							164.46	
68.49	1.29	0.17							165.10	
68.50	1.30	0.17							165.74	
68.51	1.31	0.17							166.38	
68.52	1.32	0.17							167.02	
68.53	1.33	0.17							167.65	5-Year
68.54	1.34	0.17							168.28	
68.55	1.35	0.17							168.91	
68.56	1.36	0.17							169.53	
68.57	1.37	0.17							170.15	
68.58	1.38	0.17							170.77	
68.59	1.39	0.17							171.39	
68.60	1.40	0.17							172.01	
68.61	1.41	0.17							172.62	
68.62	1.42	0.17							173.24	
68.63	1.43	0.17							173.85	100-Year

Notes:
1. For Orifice Flow, User is to Input an Elevation Higher than Crown of Orifice.
2. Orifice Equation: $Q = cA(2gh)^{1/2}$
3. Weir Equation: $Q = CLH^{3/2}$
4. These Computations Do Not Account for Submergence Effects Within the Pond Riser.
5. H for orifice equations is depth of water above the centroide of the orifice.
6. H for weir equations is depth of water above the weir crest.

2-Year Storm Event

Tc (min)	I (mm/hr)	Runoff (L/s) B1	Allowable Outflow* (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
10	76.8	173.04	155.87	17.17	10.30
12	69.9	157.47	155.87	1.60	1.15
	Maximum Storage Required 2-year =			10.30	m^3

*Outflow based on flow rate of proposed 264mm Orifice at lowest T/G Elevation (68.35)

Storage within Pipes:

Pipe (Start - End)	Inner Diameter (m)	Cross-Sectional Area (m2)	Pipe Length (m)	**Volume (m3)**
CB1-CBMH4	0.375	0.11	32.71	3.61
CB2-CBMH4	0.375	0.11	32.74	3.62
CBMH4-CBMH3	0.450	0.16	28.90	4.60
CBMH3-CBMH2	0.525	0.22	31.25	6.76
CBMH2-CBMH1	0.525	0.22	16.93	3.66
Total	-	-	-	22.25

Storage Required within Storm System (m3):	10.30
Storage Available within Storm System (m3):	22.25

Based on the calculations above, the proposed storm system has sufficient capacity to contain excess flow during the 2-year event.

STORM SEWER DESIGN SHEET

PROJECT: CCO-22-2058
LOCATION: 2628 Edinburgh Place
CLIENT: BBS Construction

McINTOSH PE

LOCATION				CONTRIBUTING AREA (ha)				RATIONAL DESIGN FLOW								SEWER DATA						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	19	20	21	22	25	26	27	28
STREET	AREA ID	FROM MH	TO MH	C-VALUE	AREA	INDIV AC	CUMUL AC	INLET (min)	TIME IN PIPE	TOTAL (min)	i (5) (mm/hr)	i (10) (mm/hr)	i (100) (mm/hr)	5yr PEAK FLOW (L/s)	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	PIPE SIZE (mm DIA	SLOPE (%)	VELOCITY (m/s)	AVAIL CAP (5yr) (L/s)	AVAIL CAP (5yr) (%)
	B1	LCB1	LCB2	0.65	0.15	0.09	0.09	10.00	0.41	10.41	104.19	122.14	178.56	27.45	27.45	43.87	21.50	250	0.50	0.866	16.42	37.42%
		LCB2	LCB3				0.09	10.41	0.41	10.83	102.06	119.62	174.86	26.89	26.89	43.87	21.50	250	0.50	0.866	16.98	38.71%
		LCB3	LCB4				0.09	10.83	0.41	11.24	100.01	117.22	171.33	26.35	26.35	43.87	21.50	250	0.50	0.866	17.52	39.93%
		LCB4	LCB5				0.09	11.24	0.42	11.66	98.06	114.92	167.95	25.84	25.84	43.87	21.64	250	0.50	0.866	18.03	41.11%
		LCB5	CBMH1				0.09	11.66	0.31	11.97	96.18	112.71	164.70	25.34	25.34	87.30	32.42	250	1.98	1.723	61.96	70.97%
	B1	CB1	CBMH4	0.65	0.43	0.28	0.28	10.00	0.68	10.68	104.19	122.14	178.56	80.99	80.99	91.46	32.71	375	0.25	0.802	10.46	11.44%
	B1	CB2	CBMH4	0.65	0.36	0.24	0.24	10.00	0.68	10.68	104.19	122.14	178.56	68.32	68.32	91.46	32.74	375	0.25	0.802	23.13	25.29%
	B1	CBMH4	CBMH3	0.65	0.08	0.05	0.57	10.68	0.45	11.13	100.73	118.07	172.57	159.68	159.68	175.96	28.90	450	0.35	1.072	16.28	9.25%
	B1	CBMH3	CBMH2	0.65	0.11	0.07	0.64	11.13	0.60	11.72	98.58	115.53	168.85	175.01	175.01	195.57	31.25	525	0.19	0.875	20.55	10.51%
	B1	CBMH2	CBMH1	0.65	0.04	0.03	0.67	11.72	0.32	12.05	95.89	112.36	164.19	177.82	177.82	195.57	16.93	525	0.19	0.875	17.75	9.08%
	B1	CBMH1	OGS	0.65	0.09	0.06	0.82	11.72	0.13	11.85	95.89	112.36	164.19	218.16	218.16	237.41	8.17	525	0.28	1.062	19.25	8.11%
		OGS	EX. MH			0.00	0.82	11.72	0.21	11.93	95.89	112.36	164.19	218.16	218.16	237.41	13.34	525	0.28	1.062	19.25	8.11%

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

Notes:
1. Mannings coefficient (n) = 0.013

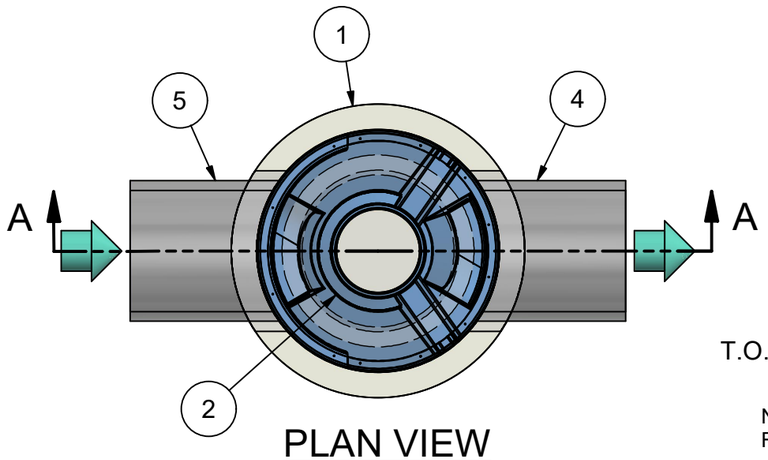
Designed:
FV

Checked:
Checked:

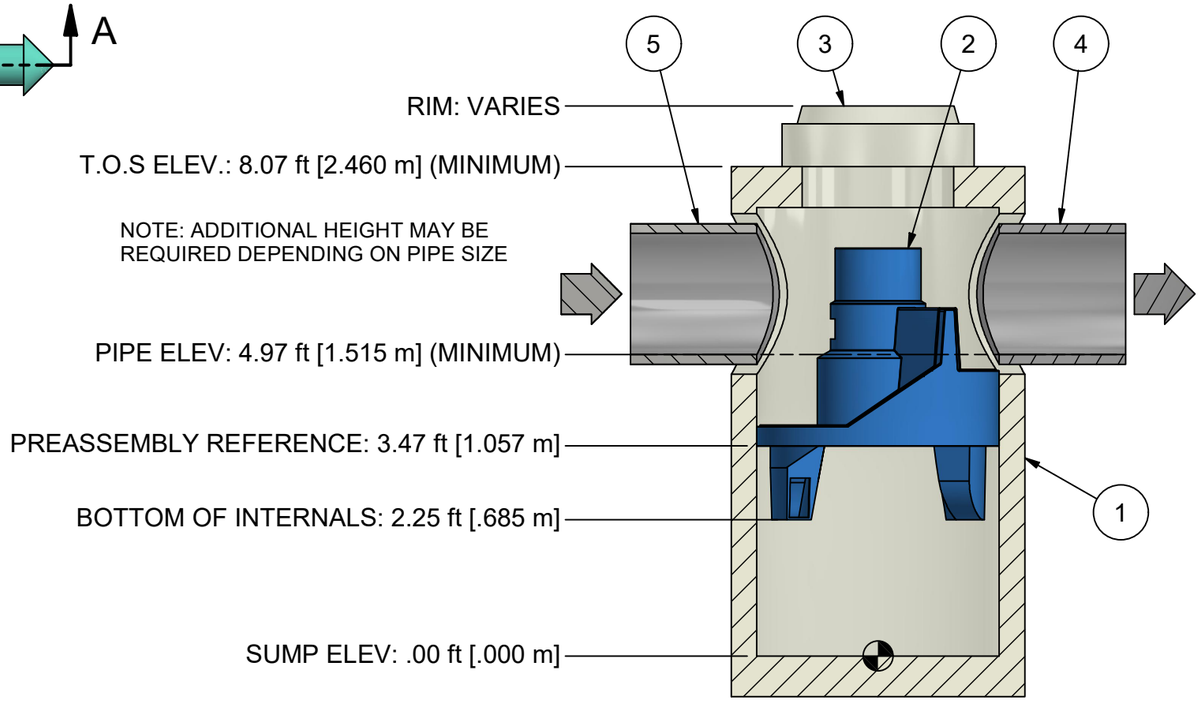
Project No.:
CCO-22-2058

No.	Revision	Date
1.	Revision 1	2023.04.12

Date: 2015-05-21
Sheet No: 1 of 1



PLAN VIEW



SECTION A-A

HYDRO FRAME AND COVER (INCLUDED)

GRADE RINGS BY OTHERS AS REQUIRED

1. MANHOLE WALL AND SLAB THICKNESSES ARE NOT TO SCALE.

2. CONTACT HYDRO INTERNATIONAL FOR A BOTTOM OF STRUCTURE ELEVATION PRIOR TO SETTING FIRST DEFENSE MANHOLE.

3. CONTRACTOR TO CONFIRM RIM, PIPE INVERTS, PIPE DIA. AND PIPE ORIENTATION PRIOR TO RELEASE OF UNIT TO FABRICATION.

PRODUCT SPECIFICATION:

1. Peak Hydraulic Flow: 18.0 cfs (510 l/s)
2. Min Sediment Storage Capacity: 0.7 cu. yd. (0.5 cu. m.)
3. Maximum Inlet/Outlet Pipe Diameters: 24 in. (600 mm)
4. The Treatment System Shall Use An Induced Vortex To Separate Pollutants From Stormwater Runoff.
5. For More Product Information Including Regulatory Acceptances, Please Visit https://hydro-int.com/en/products/first-defense

GENERAL NOTES:
1. General Arrangement drawings only. Contact Hydro International for site specific drawings.
2. The diameter of the inlet and outlet pipes may be no more than 24".
3. Multiple inlet pipes possible (refer to project plan).
4. Inlet/outlet pipe angle can vary to align with drainage network (refer to project plans).
5. Peak flow rate and minimum height limited by available cover and pipe diameter.
6. Larger sediment storage capacity may be provided with a deeper sump depth.

PARTS LIST

ITEM	QTY	SIZE (in)	SIZE (mm)	DESCRIPTION
1	1	48	1200	I.D. PRECAST MANHOLE
2	1			INTERNAL COMPONENTS (PRE-INSTALLED)
3	1	30	750	FRAME AND COVER (ROUND)
4	1	24 (MAX)	600 (MAX)	OUTLET PIPE (BY OTHERS)
5	1	24 (MAX)	600 (MAX)	INLET PIPE (BY OTHERS)

PROJECTION

IF IN DOUBT ASK

DATE:	SCALE:
11/2/2021	1:30

DRAWN BY:	CHECKED BY:	APPROVED BY
ER	MRJ	

Title
4-ft DIAMETER
FIRST DEFENSE

GENERAL ARRANGEMENT

Hydro International®
hydro-int.com
HYDRO INTERNATIONAL

WEIGHT:	MATERIAL:

STOCK NUMBER:

DRAWING NO.: FD GA-4

SHEET SIZE:	SHEET:	Rev:
B	1 OF 1	-

Hydro First Defense® - HC

Rev. 12.6

Project Name:	**22-2058**	*Report Date:*	**4/18/2023** Paste
Street:	**2628 Edinburgh Place**	*City:*	**Ottawa**
Province:	**Ontario**	*Country:*	**Canada**
Designer:	**Francis Valenti**	*email:*	**F.Valenti@McIntoshPerry.c**

Treatment Parameters:

Structure ID:		
TSS Goal:	80	% Removal
TSS Particle Size:	Fine	
Area:	1.25	ha
Percent Impervious:	65%	
Rational C value:	0.69	Calc. Cn
Rainfall Station:	Ottawa, ONT	MAP
Peak Storm Flow:	486.81	L/s

RESULTS SUMMARY

Model	TSS	Volume
FD-3HC	71.0%	>90%
FD-4HC	**84.0%**	**>90%**
FD-5HC	89.0%	>90%
FD-6HC	91.0%	>90%
FD-8HC	95.0%	>90%
FD-10HC	97.0%	>90%

Model Specification:

Model:	**FD-4HC**	
Diameter:	1200	mm
Peak Flow Capacity:	510.00	L/s
Sediment Storage:	0.54	m^3
Oil Storage:	723.00	L

Installation Configuration:

Placement:	Online		
Outlet Pipe Size:	525	mm	*OK*
Inlet Pipe 1 Size:	525	mm	*OK*
Inlet Pipe 2 Size:		mm	*OK*
Inlet Pipe 3 Size:		mm	*OK*
Rim Level:	68.630	m	Calc Invs.
Outlet Pipe Invert:	67.047	m	*OK*
Invert Pipe 1:	67.047	m	*OK*
Invert Pipe 2:		m	
Invert Pipe 3:		m	

Designer Notes:

Net Annual Removal Model: FD-4HC

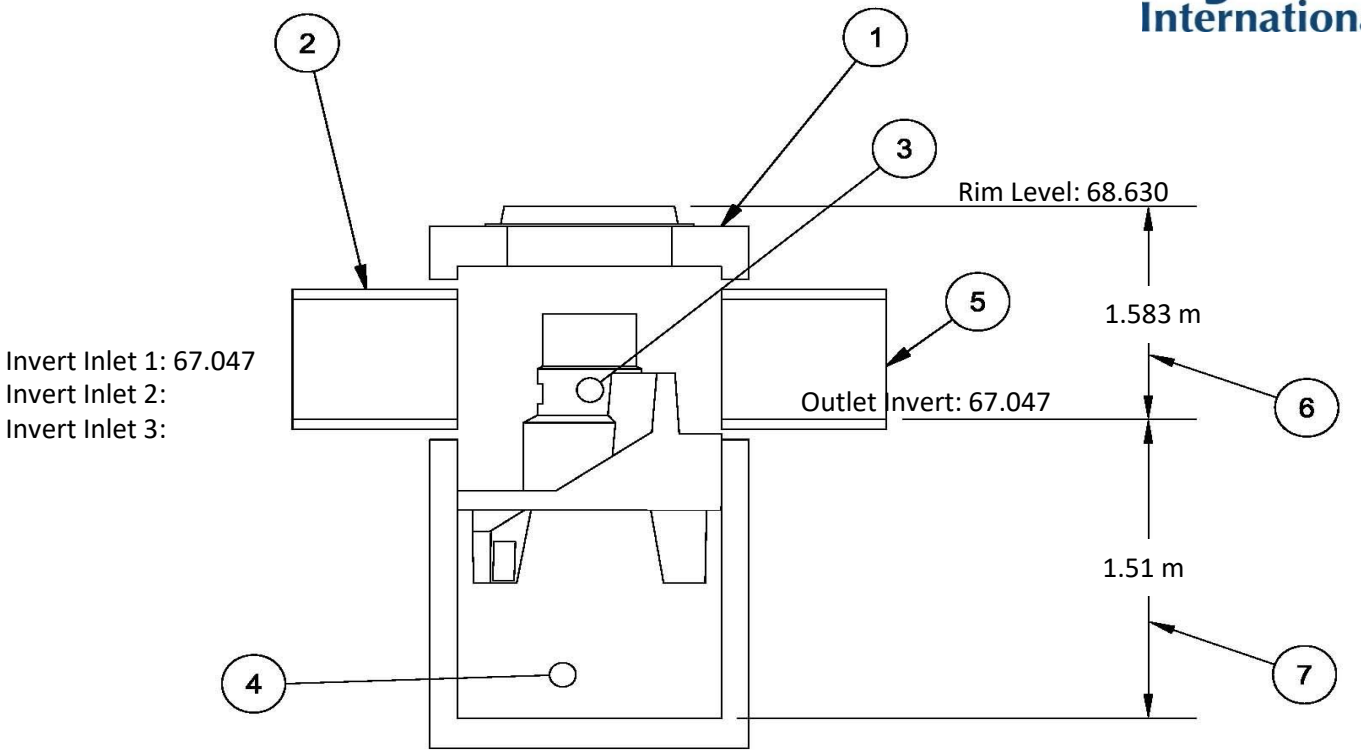
Intensity[1]	Fraction of Rainfall[1]	FD-4HC Removal Efficiency[2]	Weighted Net Annual Efficiency
(mm/hr)	(%)	(%)	(%)
0.50	0.1%	100.0%	0.1%
1.00	14.1%	95.9%	13.5%
1.50	14.2%	92.3%	13.1%
2.00	14.1%	89.9%	12.7%
2.50	4.2%	88.0%	3.7%
3.00	1.5%	86.6%	1.3%
3.50	8.5%	85.3%	7.3%
4.00	5.4%	84.3%	4.6%
4.50	1.2%	83.4%	1.0%
5.00	5.5%	82.5%	4.6%
6.00	4.3%	81.2%	3.5%
7.00	4.5%	80.0%	3.6%
8.00	3.1%	79.0%	2.4%
9.00	2.3%	78.2%	1.8%
10.00	2.6%	77.4%	2.0%
20.00	9.2%	72.6%	6.7%
30.00	2.6%	69.9%	1.8%
40.00	1.2%	68.0%	0.8%
Total Net Annual Removal Efficiency:			**84.0%**
Total Annual Runoff Volume Treated:			**>90%**

1. Rainfall Data: 1960:2007, HLY03, Ottawa, ONT, 6105976 & 6105978.

2. Based on third party verified data and appoximating the removal of a PSD similar to the STC Fine distribution

3. Rainfall adjusted to 5 min peak intensity based on hourly average.

Hydro First Defense® - HC



All drawing elevations are metres.

FD-4HC Specification

1	Vortex Chamber Diameter	1200	mm
2	Inlet Pipe Diameter	525	mm
3	Oil Storage Capacity	723.00	L
4	Min. Provided Sediment Storage Capacity	0.54	m^3
5	Outlet Pipe Diameter	525	mm
6	Height(Final Grade to Outlet Invert)	1583	mm
7	Sump Depth(Outlet Invert to Sump)	1510	mm
	Total Depth	**3093**	**mm**

Notes:

First Defense® High Capacity

A Simple Solution for your Trickiest Sites

Product Profile

The First Defense® High Capacity is an enhanced vortex separator that combines an effective stormwater treatment chamber with an integral peak flow bypass. It efficiently removes sediment total suspended solids (TSS), trash and hydrocarbons from stormwater runoff without washing out previously captured pollutants. The First Defense® High Capacity is available in several model configurations to accommodate a wide range of pipe sizes, peak flows and depth constraints (**Table 1**, next page).

Applications

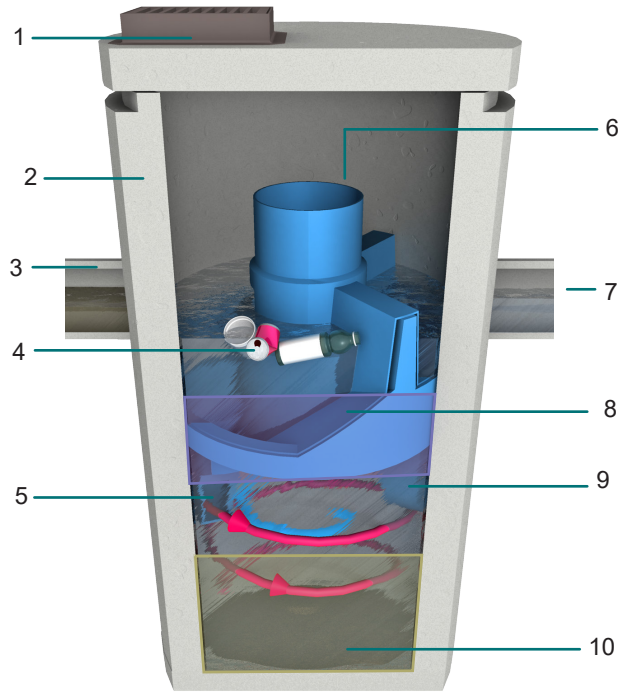
- Stormwater treatment at the point of entry into the drainage line
- Sites constrained by space, topography or drainage profiles with limited slope and depth of cover
- Retrofit installations where stormwater treatment is placed on or tied into an existing storm drain line
- Pretreatment for filters, infiltration and storage

Advantages

- Inlet options include surface grate or multiple inlet pipes
- Integral high capacity bypass conveys large peak flows without the need for "offline" arrangements using separate junction manholes
- Proven to prevent pollutant washout at up to 450% of its treatment flow
- Long flow path through the device ensures a long residence time within the treatment chamber, enhancing pollutant settling
- Delivered to site pre-assembled and ready for installation

Verified by NJCAT and NJDEP

Fig.1 The First Defense® High Capacity has internal components designed to efficiently capture pollutants and prevent washout at peak flows.



Components

1. Inlet Grate (optional)
2. Precast chamber
3. Inlet Pipe (optional)
4. Floatables Draw Off Slot (not pictured)
5. Inlet Chute
6. Internal Bypass
7. Outlet pipe
8. Oil and Floatables Storage
9. Outlet chute
10. Sediment Storage Sump

How it Works

The First Defense® High Capacity has internal components designed to remove and retain gross debris, total suspended solids (TSS) and hydrocarbons (**Fig.1**).

Contaminated stormwater runoff enters the inlet chute from a surface grate and/or inlet pipe. The inlet chute introduces flow into the chamber tangentially to create a low energy vortex flow regime (magenta arrow) that directs sediment into the sump while oils, floating trash and debris rise to the surface.

Treated stormwater exits through a submerged outlet chute located opposite to the direction of the rotating flow (blue arrow). Enhanced vortex separation is provided by forcing the rotating flow within the vessel to follow the longest path possible rather than directly from inlet to outlet.

Higher flows bypass the treatment chamber to prevent turbulence and washout of captured pollutants. An internal bypass conveys infrequent peak flows directly to the outlet eliminating the need for, and expense of, external bypass control structures. A floatables draw off slot functions to convey floatables into the treatment chamber prior to bypass.

Hydro International, 94 Hutchins Drive, Portland, ME 04102
Tel: (207) 756-6200 Fax: (207) 756-6212
Email: stormwaterinquiry@hydro-int.com Web: www.hydro-int.com

First Defense® High Capacity

Sizing & Design

This adaptable online treatment system works easily with large pipes, multiple inlet pipes, inlet grates and now, contains a high capacity bypass for the conveyance of large peak flows. Designed with site flexibility in mind, the First Defense® High Capacity allows engineers to maximize available site space without compromising treatment level.

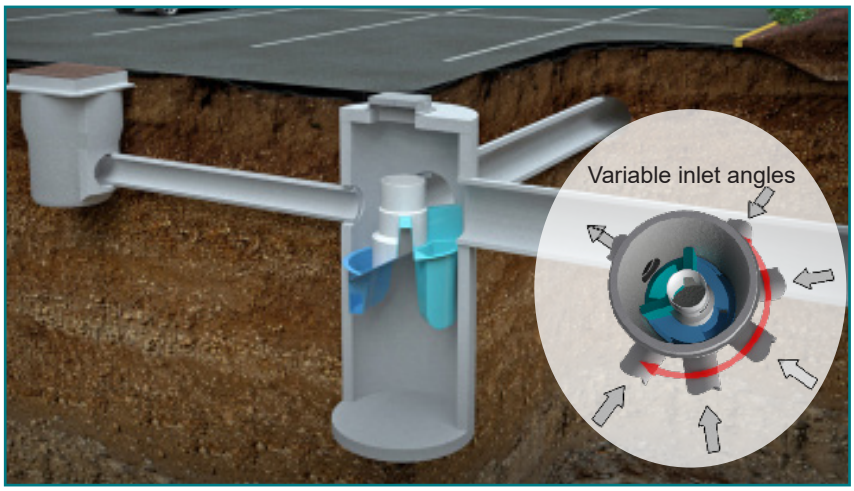


Fig 2. Works with multiple inlet pipes and grates

Inspection and Maintenance

Nobody maintains our systems better than we do. To ensure optimal, ongoing device performance, be sure to recommend Hydro International as a preferred service and maintenance provider to your clients.

Call **1 (800) 848-2706** to schedule an inspection and cleanout or learn more at **hydro-int.com/service**

Sizing Calculator for Engineers

This simple online tool will recommend the best separatror, model size and online/offline arrangement based on site-specific data entered by the user.

Go to hydro-int.com/sizing to access the tool.

Fig 3. Maintenance is done with a vactor truck

Table 1. First Defense® High Capacity Design Criteria.

First Defense® High Capacity Model Number	Diameter	Typical TSS Treatment Flow Rates		Peak Online Flow Rate	Maximum Pipe Diameter[1]	Oil Storage Capacity	Typical Sediment Storage Capacity[2]	Minimum Distance from Outlet Invert to Top of Rim[3]	Standard Distance from Outlet Invert to Sump Floor
		NJDEP Certified	110µm						
	(ft / m)	(cfs / L/s)	(cfs / L/s)	(cfs / L/s)	(in / mm)	(gal / L)	(yd^3 / m^3)	(ft / m)	(ft / m)
FD-3HC	3 / 0.9	0.84 / 23.7	1.06 / 30.0	15 / 424	18 / 457	125 / 473	0.4 / 0.3	2.0 - 3.5 / 0.6 - 1.0	3.71 / 1.13
FD-4HC	4 / 1.2	1.50 / 42.4	1.88 / 53.2	18 / 510	24 / 600	191 / 723	0.7 / 0.5	2.3 - 3.9 / 0.7 - 1.2	4.97 / 1.5
FD-5HC*	5 / 1.5	2.34 / 66.2	2.94 / 83.2	20 / 566	24 / 600	300 / 1135	1.1 / .84	2.5 - 4.5 / 0.7 - 1.3	5.19 / 1.5
FD-6HC	6 / 1.8	3.38 / 95.7	4.23 / 119.8	32 / 906	30 / 750	496 / 1,878	1.6 / 1.2	3.0 - 5.1 / 0.9 - 1.6	5.97 / 1.8
FD-8HC	8 / 2.4	6.00 / 169.9	7.52 / 212.9	50 / 1,415	48 / 1219	1120 / 4239	2.8 / 2.1	3.0 - 6.0 / 0.9 -1.8	7.40 / 2.2

***Coming soon**
[1]Contact Hydro International when larger pipe sizes are required.
[2]Contact Hydro International when custom sediment storage capacity is required.
[3]Minimum distance for models depends on pipe diameter.

Hydro International, 94 Hutchins Drive, Portland, ME 04102
Tel: (207) 756-6200 Fax: (207) 756-6212
Email: stormwaterinquiry@hydro-int.com Web: www.hydro-int.com

Stormwater Solutions
hydro-int.com/firstdefensehc

APPENDIX H
CITY OF OTTAWA DESIGN CHECKLIST

McINTOSH PERRY

City of Ottawa

4. Development Servicing Study Checklist

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

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

4.1 General Content

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

☐ Identification of existing and proposed infrastructure available in the immediate area.	N/A
☐ Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).	Site Grading Plan (C101)
☐ Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	Site Grading Plan (C101)
☐ Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.	N/A
☐ Proposed phasing of the development, if applicable.	N/A
☐ Reference to geotechnical studies and recommendations concerning servicing.	Section 2.0 Background Studies, Standards and References
☐ All preliminary and formal site plan submissions should have the following information: o Metric scale o North arrow (including construction North) o Key plan o Name and contact information of applicant and property owner o Property limits including bearings and dimensions o Existing and proposed structures and parking areas o Easements, road widening and rights-of-way o Adjacent street names	Site Grading Plan (C101)

4.2 Development Servicing Report: Water

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

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

4.3 Development Servicing Report: Wastewater

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

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

4.4 Development Servicing Report: Stormwater Checklist

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

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

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

4.5 Approval and Permit Requirements: Checklist

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

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

4.6 Conclusion Checklist

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