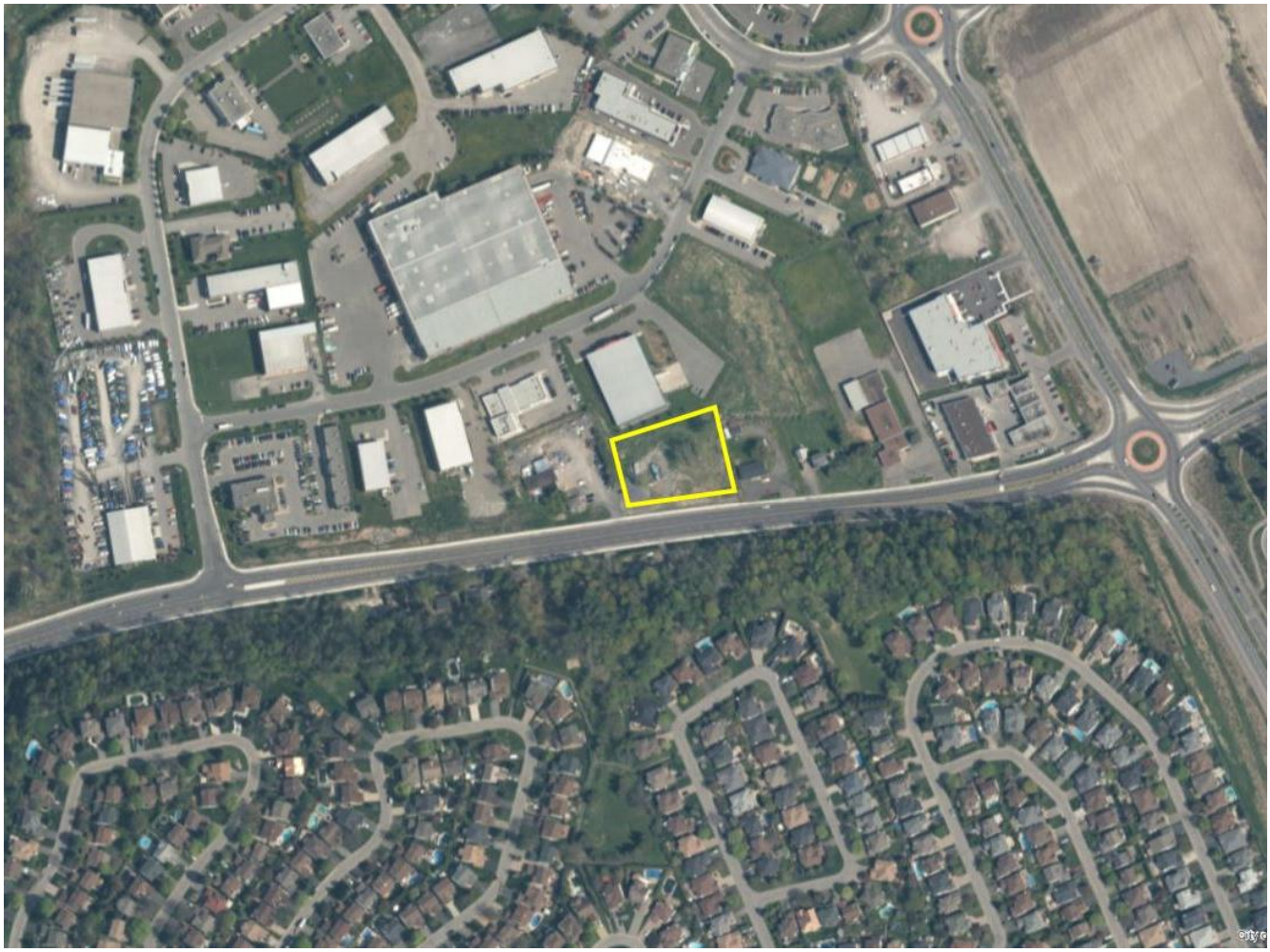
SERVICING AND STORMWATER MANAGEMENT REPORT



Project No.: 0CP-18-0054
Project Name.: 3735 St. Joseph Boulevard – Mixed Use Commercial Building

Prepared for:

BluePrint Builds Inc.
17 – 1010 Polytek Street
Ottawa, ON
K1J 9J1

Prepared by:

McIntosh Perry
115 Walgreen Road
Carp, ON
K0A 1L0

October 5, 2018

McINTOSH PERRY

Executive Summary

Developing a site within the City of Ottawa requires meeting a predefined set of requirements outlined in the City of Ottawa Sewer Design Guidelines (SDG) - 2012 along with meeting the local conservation authority requirements (Rideau Valley Conservation Authority - RVCA) and provincial requirements (Ministry of Environmental and Climate Change – MOECC). Site specific requirements are discussed and outlined in the pre-consultation meeting with the City of Ottawa before the detailed design process is initiated.

This report describes an innovative and cost-efficient design solution for the site servicing (water, sanitary, and storm) and stormwater management (SWM) requirements in order to develop this site.

Evaluation of the proposed site in addition to a review of the site grading was completed. Our review identified that underground storage below the rear parking area is the optimal design solution to meet the SWM requirements. The flows from the storm network will be discharged into the infrastructure within the northeastern easement on-site.

The evaluation of the proposed development, existing site characteristics and surrounding municipal infrastructure suggests that the SWM design elements consisting of parking area underground storage, quantity restriction and quality control by a CDS unit will be a sufficient solution to the site constraints. The proposed sanitary and water services will utilize the existing infrastructure surrounding the site to service the development. Therefore, it is our professional opinion that this site located at 3735 St. Joseph Boulevard is able to be developed and fully serviced to support the proposed two-storey mixed-use building.

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1.0 PROJECT DESCRIPTION

1.1 Purpose

McIntosh Perry (MP) has been retained by BluePrint Construction Services Ltd. to prepare this Servicing and Stormwater Managment Report in support of the Site Plan Control process for the proposed mixed-use commercial building at 3735 St. Joseph Boulevard within the City of Ottawa.

The main purpose of this report is to present a servicing design for the development in accordance with the recommendations and guidelines provided by the City of Ottawa (City), the 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:

- CP-18-0054, C101 - Lot Grading, Drainage, Sediment and Erosion Control Plan
- CP-18-0054, C102 – Site Servicing Plan

1.2 Site Description

The property is located at 3735 St. Joseph Boulevard in the City of Ottawa and covers approximately 0.51 ha. The legal description of the land is Part of Lot 31, Concession 1 (Old Survey).

The existing site is currently undeveloped and consists largely of grass cover. The existing site also has several servicing and grading easements located around the perimeter of the site. A stormwater and a sanitary sewer are located within the easement in the northeast corner of the site and will provide servicing to the proposed development. There is also another storm pipe located in the easement within the northwest corner of the site. A grading and Hydro easement is located along the frontage of the site.

The site is bounded by St. Joseph Boulevard to the south, Lacolle Way to the north and Trim Road to the east. The adjacent lands to east, west and north are currently fully developed. For a location map, please refer to Appendix 'A' of this report.

The proposed development consists of a 610m² mixed use commercial building complete with one entrance from St. Joseph Boulevard, associated parking lot and landscaped areas. The buildings will be two-storeys and centrally located within the site. Parking will be situated around three sides of the building with basement walkouts along the south side of the property. Landscaping will be located around the perimeter of the site. The new private approach will conform to the City of Ottawa Private Approach By-Law (No. 2003-447).

2.0 BACKGROUND STUDIES

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

report, an Environmental Impact Study (EIS), a Traffic Impact Study (TIS), a Tree Conservation Report, and the roadway modification plans for St. Joseph Boulevard.

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

The Guidelines for On-Site Detention Design for the Taylor Creek Business Park dated April 1989, by McNeely Engineering were reviewed to ensure the Stormwater management aspects were maintained. This report, found under separate cover, specifies a maximum release rate of 26.4 L/s/ha for each lot in the Business Park.

A topographic survey of the site was completed by Annis, O'Sullivan, Vollebekk Ltd. dated April 28th, 2014, and can be found under separate cover.

The Phase I ESA was completed by Paterson Group dated May 6th, 2014. The report outlined that subject site and adjacent properties were used for agricultural purposes prior to development, and that results from previous assessments eliminates the fill as an environmental concern to the property. The report did not deem a Phase II ESA as a requirement. The entire report can be found under separate cover.

The geotechnical report was also completed by Paterson Group Dated May 11th, 2014; revised August 10, 2018. The investigation found that a thin topsoil layer was underlain by silty sand to silty clay mixed with construction debris at the majority of the test holes completed on site. Groundwater was noted at 2.5 m to 3.0 m below the ground surface. A grade raise restriction of 1.5 m above existing ground surface was identified. The entire report can be found under separate cover.

The EIS was completed by McIntosh Perry dated May 2014. The report noted that in terms of species at risk, no butternut trees nor sensitive habitats for Milksnakes were observed on site. The loss of woody vegetation will be mitigated by native landscape plantings. The report further states that there will be no residual negative impacts to significant natural features or ecological functions, the entire report can be found under a separate cover.

The TIS was completed by McIntosh Perry dated June 18 2014. After the proposed development is in operation, the adjacent road network will continue to operate at an acceptable level of service during the weekday a.m. and p.m. peak hours to the horizon year of 2019. The complete report can be found under a separate cover.

The Tree Conservation Report was completed by McIntosh Perry dated September 2014 and can be found under a separate cover. The report stated that none of the existing vegetation growing *on* the property will be conserved; however, a combination of deciduous and coniferous vegetation will be used in order to provide a visual screen of the proposed parking area and property lines and to provide seasonal interest for the site.

The roadway modification plans were completed by Robinson Consultants dated Issued for Construction September 21, 2012 and can be found under a separate cover.

3.0 PRE-CONSULTATION SUMMARY

City of Ottawa Staff has been pre-consulted regarding this proposed development via email on March 17, 2014. Specific design parameters to be incorporated within this design include the following:

- On site stormwater management shall be designed per the "Guidelines for On-Site Detention Design in the Taylor Creek Business Park Township of Cumberland".
- The 5-Year and 100-Year Storm events must be controlled on-site to a 5-Year maximum release rate of 26.4 l/s/ha which creates a release rate of 13.4 L/s for this development.
    - If the street elevations are lower than the site elevations, then runoff control and on-site detention is only required for the 5-year storm; overland flows from the larger storms are to be conveyed to the streets.
    - The site elevations for this project are higher than the road elevations within Taylor Creek Drive, therefore storage and restriction is required for only the 5-year storm event.
- Pre-development flows are to be calculated with a Tc (time of concentration) of 20 minutes, whereas post-development flows will be calculated with a Tc of 10 minutes.
- Quality Control will be required at an enhanced level of 80% Total Suspended Solids (TSS) removal.

Correspondence with the City can be found in Appendix 'B'.

4.0 EXISTING SERVICES

The northeast corner of the site contains an existing 250 mm sanitary sewer and 1050 mm diameter storm sewer. Both of these mains are located within an existing sewer easement.

In addition to the northeast corner of the site, there is also an existing 900 mm storm sewer that runs north-south along the west property line within an easement. This main is also available as a stormwater outlet for the development.

An existing 406 mm diameter watermain is located along the north portion of St. Joseph Boulevard as well as a 610 mm diameter watermain within the south portion of St. Joseph Boulevard. A 675 mm diameter storm sewer is also present within the south side of St. Joseph boulevard.

Hydro, gas, cable and bell are available to service the site from St. Joseph Boulevard.

5.0 SERVICING PLAN

5.1 Proposed Servicing Overview

The proposed site will be serviced with a new water lateral constructed from the existing watermain within St. Joseph Boulevard. A new sanitary lateral will be constructed from the existing sanitary sewer manhole located within the northeast corner of the site. Storm runoff will be managed on site and will outlet from the site

through the existing storm sewer manhole located within the northeast corner of the site. Calculated flows for both the water and sanitary services are provided in Sections 5.2 and 5.3 below. The storm sewer will be further detailed in Section 6.0.

Hydro, Bell, and Cable will be provided via an underground trench, while gas will be provided via a separate trench. All utilities will be provided from St. Joseph Boulevard with the final design being completed by the relevant utility companies. All servicing requirements shall be approved by the City of Ottawa or the relevant utilities as applicable.

5.2 Proposed Water Design

A new 150 mm diameter PVC water lateral will be extended from the 406 mm water main located within St. Joseph Boulevard to service the proposed building. This new service will be complete with a water valve that will be installed at the property line. The proposed buildings will not be equipped with a sprinkler system for fire protection. The existing fire hydrants along St. Joseph Boulevard are located within 45m from the building therefore a private hydrant is not required.

The water demands for the new buildings are as follows: the average daily and maximum demands are 0.17 L/s and 0.25 L/s respectively. The maximum hourly demand was calculated as 0.45 L/s (Refer to Appendix 'C' for flow details). The boundary conditions for the site have been requested from City staff and can be found in Appendix 'C' once made available.

5.3 Proposed Sanitary Design

A new sanitary lateral shall be constructed from the existing sanitary sewer manhole located within the easement in the northeast corner of the site to the proposed buildings. The 135 mm diameter lateral has been sized to sufficiently convey the peak design flow of the buildings which is 0.59 L/s (See Appendix 'D' for calculation). A 135 mm diameter pipe at a slope of 1.00% percent slope has a capacity of 12.00 L/s, therefore the proposed 135 mm diameter lateral has sufficient capacity to convey the flows (See Appendix 'C' for detailed calculations). It is anticipated that there will be no issues with capacity constraints within the proposed lateral or within the existing sanitary main as the amount of flow leaving the site is minimal.

5.4 Proposed Storm Design (Conveyance and Management)

Stormwater runoff will be conveyed by way of overland sheet flow into the proposed storm network which will discharge into the existing infrastructure within the northeastern easement. An IPEX Tempest inlet control device within CBMH1 will restrict the flow to conform to City requirements.

From discussions with the City of Ottawa and the Rideau Valley Conservation Authority (RVCA), quantity control will be provided. Quality control will be achieved by a CDS PMSU20_15_4m that will treat the water and discharge into the existing storm manhole within the northeastern easement. Further details and calculations pertaining to the quantity and quality of the stormwater management system are provided in Section 6.0.

5.5 Site Utilities

All relevant utility companies (telephone/cable – Bell/Rogers, gas – Enbridge and hydro – Hydro Ottawa) will be contacted prior to construction in order to confirm adequate utility servicing for the site. Existing utilities are present along St. Joseph Boulevard. Utility services are anticipated to be fed from the existing utilities currently within the St. Joseph Boulevard right-of-way.

5.6 Service Locations

The proposed water service will be placed under the grassed and asphalt area in the southern portion of the property. The storm and sanitary services will be placed under the parking and undeveloped areas in the northeastern portion of the site. Hydro, cable, telephone and gas will be primarily placed in a common utility trench connecting to existing infrastructure along St. Joseph Boulevard.

Separation distances between the storm, water and sanitary services will be maintained as per the Ministry of the Environment requirements.

6.0 PROPOSED STORMWATER MANAGEMENT

6.1 Design Criteria and Methodology

Stormwater management for this site will be maintained through positive drainage away from the proposed building and into a new underground storm sewer system within the site. The storm runoff will enter the pipe system through a catch basin manhole (CBMH) located within the site. The storm network will be restricted prior to outletting to the existing storm sewer manhole located in the northeast corner of the site. Overflow from the site will be directed towards the drainage easement within the northwest corner. The quantitative and qualitative properties of the storm runoff for both the pre and post development flows are further detailed below. An enhanced level of total suspended solid removal will be provided on this site by the employment of an CDS PMSU unit.

Stormwater Best Management Practices (SWM BMP's) will be implemented at the "Lot level", "Conveyance" and "End of Pipe" locations.

6.2 Runoff Calculations

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

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

Where C = Runoff coefficient

I = Rainfall intensity in mm/hr (City of Ottawa IDF curves)

A = Drainage area in hectares

It is recognized that the rational method tends to overestimate runoff rates. As a by-product of using extremely conservative prediction method, any facilities that are sized using these results are expected to function as intended in real world conditions.

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

Table 1: Average Runoff Coefficients (C)

Surface	Avg. C
Roofs/Concrete/Asphalt	0.90
Gravel	0.60
Undeveloped and Grass	0.20

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

As per correspondence with City of Ottawa Staff the time of concentration (Tc) used for pre-development and post-development flows shall be 20 and 10 minutes, respectively.

6.2.1 Pre-Development Drainage

The existing site has been demonstrated as drainage area A1. Drawing CP-18-0054 PRE (Appendix 'E') indicates the limits of the drainage area. Drainage area A1 is 0.51 ha and includes the entire site. The area is covered with grass and trees. The site drains to the north via overland sheet flow to adjacent properties. A runoff coefficient ('C') value of 0.20 was calculated for the 5-year storm event and this value was increased to 0.25 for the 100-year storm event. Estimates of maximum runoff rates for typical 5 and 100-year rainfall events are 19.85 L/s and 42.37 L/s, respectively.

Table 2: Pre-Development Runoff Summary

Area ID	Drainage Area (ha)	Balanced Runoff Coefficient (C) 5-yr	Balanced Runoff Coefficient (C) 100-yr	5-Year Flow Rate (l/s)	100-Year Flow Rate (l/s)
A1	0.51	0.20	0.25	19.85	42.37
Total	0.51			19.85	42.37

(See Appendix 'G' for Calculations)

6.2.2 Post-Development Drainage

The post-development drainage plan was designed to retain runoff generated by a 5-year event onsite. Stormwater exceeding this amount is directed to the northwest corner of the property. The proposed drainage and overland flow directions are indicated on drawing CP-18-0054 POST (Appendix 'F'). Table 3, on the following page, displays the post-development runoff generated by the proposed site.

Table 3: Post-Development Runoff Summary

Area ID	Drainage Area (ha)	Balanced Runoff Coefficient (C) 5-yr	Balanced Runoff Coefficient (C) 100-yr	5-year Flow Rate (L/s)	100-year Flow Rate (L/s)
B1	0.02	0.24	0.29	1.13	2.42
B2	0.28	0.84	0.94	68.57	130.90
B3	0.21	0.90*	1.00*	53.93	102.68
Total	0.51			123.63	236.00

(See Appendix 'G' for Calculations)
* B3 Assumed to be comprised of all impervious surfaces to anticipate worst case storage volume for future development.

Runoff from area B2 will be restricted before outletting to the existing storm system within the northeastern easement. The total flow generated from area B2 will be controlled by a Tempest LMF inlet control device (ICD) located within CBMH1. The restriction device will restrict the 5-yr runoff to the rate determined by the area of the limit of development multiplied by the allowable outflow value (26.4 L/s) from the *Guidelines for On-Site Detention Design: In the Taylor Creek Business Park* by McNeely Engineering Limited (1989). The unrestricted flow generated from drainage are B1 are accounted for within the proposed restriction. See Appendix 'G' for calculations. This restriction will be further detailed in Section 6.3.

6.3 Quantity Control

After discussing the stormwater management criteria for the site with City of Ottawa staff, the 5-year post-development runoff for this site has been restricted to match the allowable runoff per area (ha) as outlined in the *Guidelines for On-Site Detention Design: In the Taylor Creek Business Park* by McNeely Engineering Limited (1989). From reviewing of the aforementioned report by McNeely Engineering the allowable release rate for the limit of development was determined by multiplying the allowable release rate of 26.4 L/s/ha by the area of the limit of development (0.30 ha). The resulting allowable flow is 7.96 L/s, which requires restriction of the stormwater runoff that in turn generates a requirement for on-site storage for the development. The allowable release rate for the entirety of the site is 13.42 L/s.

Table 4: Allowable Release Rate (Entirety of Site)

Area	Drainage Area (ha)	Max Allowable Release Rate (L/s)	5-Year Flow Rate (L/s)
A1	0.51	26.40	13.42

(See Appendix 'G' for Calculations)

Table 5: Allowable Release Rate (B1-B3)

Area	Drainage Area (ha)	Max Allowable Release Rate (L/s)	5-Year Flow Rate (L/s)
B1-B3	0.30	26.40	7.96

(See Appendix 'G' for Calculations)

Reducing site flows will be achieved using flow restrictions and will create the need for onsite storage. Runoff from area B2 will be restricted as detailed in the Table 5 below.

Table 6: Post-Development Restricted Runoff Calculations

Area ID	Post-Development Unrestricted (l/s)	Post-Development (Restricted) (l/s)	
	5-yr	5-yr	
B1	1.13	1.13	UNRESTRICTED
B2	68.57	6.79	RESTRICTED
B3	53.93	5.50*	UNDEVELOPED
Total	123.63	13.42	

(See Appendix 'G' for Calculations)

* Restriction shown for B3 is to represent the required restriction in future development. No restriction is proposed currently.

Runoff from Area B2 will be restricted at CBMH1 through a Tempest LMF ICD (Design Head of 2.20m). This ICD will restrict area B2 and B3 to 6.79 L/s for the 5-year storm event. The restriction creates a storage requirement on-site. Table 7 details the required storage before discharge into the infrastructure within the northeastern easement located on-site.

Table 7: Site Storage Requirements

Area	Depth of ponding (m) for 5-yr storm	5-year required storage (m^3)	5-yr available storage (m^3)
B2	0.30	54.0	54.0
B3	-	42.0	0.0*

(See Appendix 'G' for Calculations)

**No storage provided at this time, 42m^3 represents the absolute maximum required storage for future development.*

6.4 Quality Control

The development of this lot will employ Best Management Practices (BMP's) wherever possible. The intent of implementing stormwater BMP's is to ensure that water quality and quantity concerns are addressed at all stages of development. BMP's at this site will be implemented at the lot level.

Lot level BMP's typically include temporary retention of the parking lot runoff, minimizing ground slopes and maximizing landscaped areas. There is a limited opportunity to employ these techniques at this re-development site.

One IPEX LMF ICD will restrict flows from the site, causing temporary ponding. There will be an opportunity for particle settlement during this process, but the full benefits of a larger scale end-of-pipe facility will not be fully realized at this site.

A quality treatment unit has been sized to provide a total suspended solids (TSS) removal rate of 80%. The PMSU20_15_4m CDS Unit will provide a water quality of 85.0% TSS (See Appendix 'G' for calculation sheets). This treatment unit has a sediment capacity of 1.02 m^3, total holding capacity of 1.77 m^3, an oil storage capacity of 232 L and a treatment flow rate of 20 L/s. The CDS Unit shall be placed east of CBMH1 in order to provide the required water quality treatment for the site runoff before entering the existing storm main within service easement. See Appendix 'G' for quality control treatment unit design and calculations.

7.0 SEDIMENT EROSION CONTROL

The site-grading contractor is responsible for ensuring sediment control structures are installed in accordance with the Site Grading and Drainage Plan as indicated. Silt fences shall be installed on site before construction or earth-moving operations begin.

Geosock is to be installed under the grates of all existing structures along the frontage of the site and any new structures immediately upon installation. The Geosock is to be removed only after all areas have been paved and vegetation has been established. 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.

At the discretion of the project manager, municipal staff or conservation authority, additional silt control devices shall be installed at designated locations.

8.0 SUMMARY

- A new 610 m^2 area two-storey mixed-use commercial will be constructed centrally on the site located at 3735 St. Joseph Boulevard.
- A new 135 mm diameter sanitary service will be installed and connected to the existing infrastructure within the northeastern easement within the site.
- A new 150 mm diameter water lateral will be extended from the existing 406 mm diameter main within St. Joseph Boulevard.
- A new storm network will be installed onsite and will connect to the existing infrastructure within the northeastern easement within the site.
- As discussed with City of Ottawa staff, the stormwater management design will ensure that the post-development flow rates are restricted to the allowable outflow as described by the *Guidelines for On-Site Detention Design: In the Taylor Creek Business Park* by McNeely Engineering Limited (1989).
- Storage for the 5-year storm event will be provided above the southern parking area.

9.0 RECOMMENDATIONS

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 BluePrint Construction Services Ltd. development located at 3735 St. Joseph Boulevard.

The sediment and erosion control plan outlined in Section 7.0 and detailed in the Grading and Drainage Plan notes are to be implemented by the contractor.

This report is respectfully being submitted for approval.

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Practice Area Lead, Land Development
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10.0 STATEMENT OF LIMITATIONS

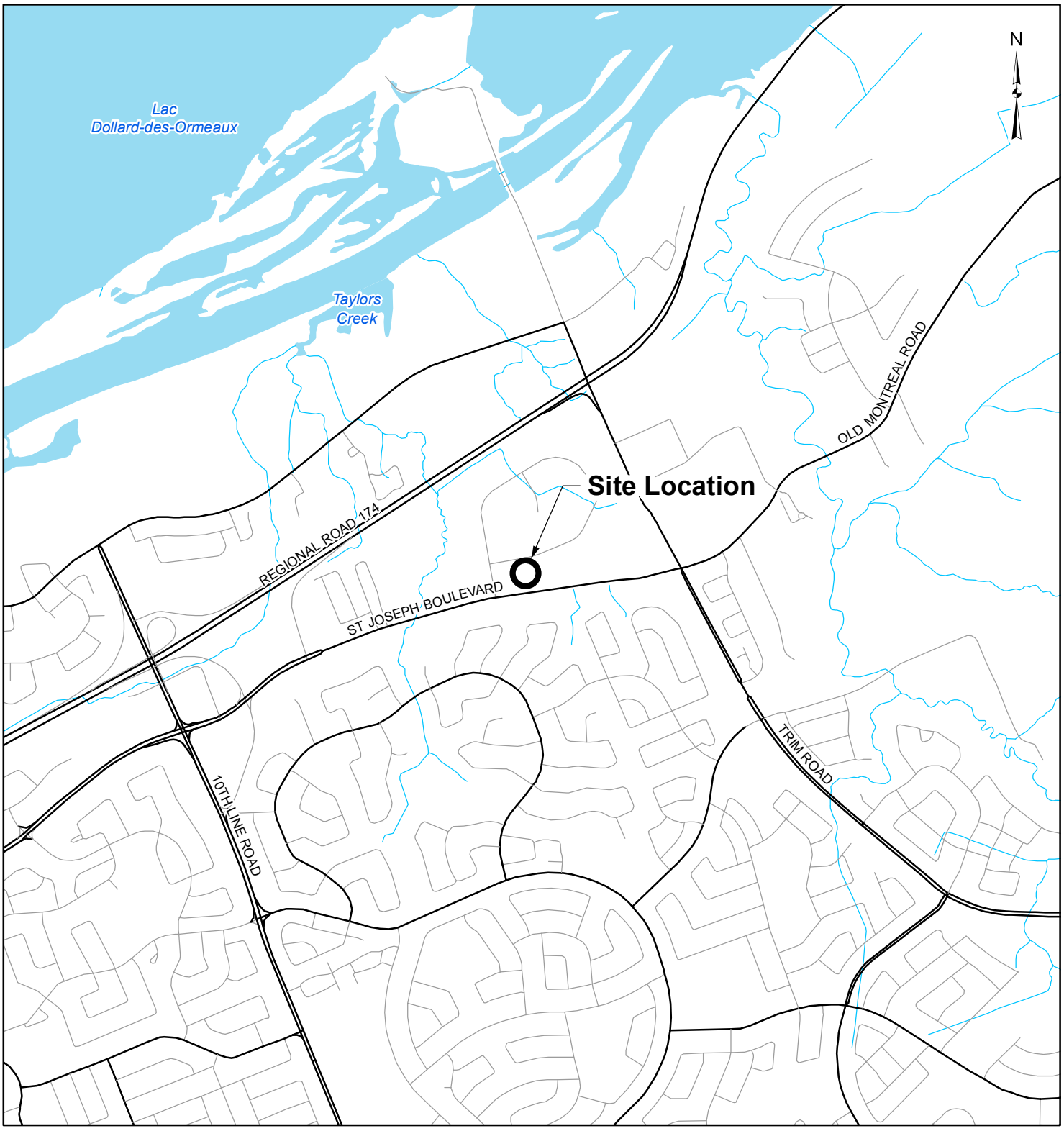
This report was produced for the exclusive use of BluePrint Construction Services Ltd. The purpose of the report is to assess the existing stormwater management system and provide recommendations and designs for the post-construction scenario that are in compliance with the guidelines and standards from the Ministry of the Environment 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
SITE LOCATION MAP

McINTOSH PERRY



LEGEND

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

REFERENCE

GIS data provided by the Ontario Ministry of Natural Resources and Forestry, 2018.

CLIENT:
BLUEPRINT CONSTRUCTION SERVICES LTD.

PROJECT:
MIXED-USE DEVELOPMENT
3735 ST. JOSEPH BOULEVARD

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:	CP-18-0056
Date	Sep., 18, 2018
GIS	SK
Checked By	SL

FIGURE: 1

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APPENDIX B
CITY OF OTTAWA PRE-CONSULTATION NOTES

McINTOSH PERRY

From: Murshid, Shoma <Shoma.Murshid@ottawa.ca>
Sent: February 22, 2018 10:06 AM
To: 'Phil Lalonde'
Cc: Wong, Isaac; Young, Mark; Richardson, Mark; Yousfani, Asad; Curtis Melanson
Subject: 3735 St. Joseph Boulevard - Follow-Up to Pre-consultation
Attachments: Pre-application Consultation - 3735 St Joseph - Servicing Memo.docx

Hello Phil,

Thank you for meeting with us this past February 20, 2018 to discuss a one-storey building with 4 units.

Please note that a tree permit will be required for the removal of trees on-site. It is recommended you retain the existing cedar or landscaping along the western perimeter. Please review if street trees (shade trees preferable) can be planted along St. Joseph Boulevard.

Explore if the building can be placed as close as possible to St. Joseph Boulevard with the proposed parking lot to the north of the site, as this is the City's preferable option as development intensifies in Orleans. If not possible at this time, we will understand as well.

This proposal triggers Site Plan Control's Application for New Development – Manager Approval, Public Consultation with a planning fee of $21,508.66 + Initial Engineering Design Review and Inspection Fee (based on the value of infrastructure and landscaping – between $1k to $10K – see application form) + the Initial Conservation Authority Fee of $975.00.

The required plans and reports, at time of submission shall be the following:

Site Plan – 15 copies + PDF
Landscape Plan/TCR – 15 copies + PDF
Grade Control and Drainage Plan – 15 copies + PDF
Site Servicing Plan – 15 copies + PDF
Survey Plan – 2 copies + PDF
Topographical Plan – 2 copies + PDF
Site Servicing Study – 6 copies + PDF
Stormwater Management Report – 6 copies + PDF
Geotechnical Study/Slope Stability Report – 4 copies + PDF
Amendment to Geotechnical/Slope Report – 4 copies + PDF
Erosion and Sediment Control Plan – 8 copies + PDF
Transportation Noise Study (for office component) – 3 copies + PDF
Planning Rationale, including Design Component – 4 copies + PDF]
Architectural Elevations – 3 copies + PDF
Floor Plans – 3 copies + PDF
Street Level visualization of the proposed development (rendering) in JPEG or PDF format only – 1 PDF or JPEG document
Phase 1 Environmental Site Assessment – 5 copies + PDF (previous report submission is acceptable).

'Here are the TCR requirements for 3735:

1. a Tree Conservation Report (TCR) must be supplied for review along with the suite of other plans/reports required by the City; an approved TCR is a requirement of Site Plan Approval
2. any removal of privately-owned trees 10cm or larger in diameter require a tree permit issued under the Urban Tree Conservation Bylaw; the permit is based on the approved TCR
3. in this case, the TCR may be combined with the Landscape Plan,
4. the TCR must list all trees on s
5. ite by species, diameter and health condition. Note that the TCR must address all trees on adjoining properties with a critical root zone that extends into the developable area.
6. If trees are to be removed, the TCR must clearly show where they are and document the reason they can not be retained
7. All retained trees must be shown and all retained trees within the area impacted by the development process must be protected as per the City guidelines listed on Ottawa.ca
8. Trees with a trunk that crosses/touches a property line are considered co-owned by both property owners; permission from the adjoining property owner must be obtained prior to the removal of co-owned trees
9. the City does encourage the retention of healthy trees wherever possible; please ask your design/planning team to find opportunities for retention wherever possible if the trees are healthy and will contribute to the design/function of the site. Trees along the western property edge should be retained in this case unless they are in poor form, health, or conflict directly with the planed development
10. For more information on the process or help with tree retention options, contact Mark Richardson mark.richardson@ottawa.ca
11. the removal of City-owned trees will require the permission of Forestry Services who will also review the submitted TCR; note that Forestry Services may ask for compensation for any City-owned tree that has to be removed.

All plans must be submitted on A1 size sheets.

Attached, you will find additional engineering requirements and information.

Should you have any further questions or concerns, please do not hesitate to contact me.

Sincerely,

Shoma Murshid, MCIP, RPP
File Lead, Planner II
Responsable de dossier, urbaniste II

City of Ottawa/ Ville d'Ottawa
Development Review (Suburban Services, East)/ Examen des projets d'aménagement (Services suburbains Est)
Planning, Infrastructure, and Economic Development Department/ Service de la planification, de l'infrastructure et du développement économique
110 Laurier Avenue West, 4th Floor, Ottawa ON K1P 1J1/ 110, avenue Laurier Ouest, 4e étage, Ottawa (Ontario) K1P 1J1
Mail Code/ Code de courrier : 01-14
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Fax/ Téléc. : (613) 580-4751
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www.ottawa.ca

MEMO

Date: February 21, 2018

To / Destinataire	Shoma Murshid, Planner
From / Expéditeur	Isaac Wong, Project Manager, Infrastructure Approvals
Subject / Objet	**Pre-Application Consultation** File No. PC2018-0046 **3735 St. Joseph Blvd, Ward 1 - Orleans,** *1 storey light industrial building*

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

1. The Servicing Study Guidelines for Development Applications are available at the following address: http://ottawa.ca/en/development-application-review-process-0/servicing-study-guidelines-development-applications

2. The following Engineering plans and reports are requested for submission:

   a. Site Servicing Plan

   b. Site Servicing Report

   c. Grade Control and Drainage Plan

   d. Geotechnical Study (amendment if prior study was completed)

   e. Erosion and Sediment Control Plan

   f. Stormwater Management Report

3. Servicing and site works shall be in accordance with the following documents:

   ð Ottawa Sewer Design Guidelines (October 2012)

   ð Ottawa Design Guidelines – Water Distribution (2010)

   ð Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)

- ð City of Ottawa Slope Stability Guidelines for Development Applications (revised 2012)
- ð City of Ottawa Environmental Noise Control Guidelines (January, 2016)
- ð City of Ottawa Park and Pathway Development Manual (2012)
- ð City of Ottawa Accessibility Design Standards (2012)
- ð Ottawa Standard Tender Documents (latest version)
- ð Ontario Provincial Standards for Roads & Public Works (2013)

4. 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).

5. The Stormwater Management Criteria, for the subject site, is to be based on the following:

   i. The 5-yr storm event using the IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997.

   ii. For separated sewer system built pre-1970 the design of the storm sewers are based on a 2 year storm.

   iii. The pre-development runoff coefficient or a maximum equivalent 'C' of 0.5, whichever is less (§ 8.3.7.3).

   iv. A calculated time of concentration (Cannot be less than 10 minutes).

   v. 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.

   vi. For a combined sewer system the maximum C= 0.4 or the pre-development C value, whichever is less. In the absence of other information the allowable release rate shall be based on a 2 year storm event.

   Note: There may be area specific SWM Criteria that may apply. Check for any related SWM &/or Sub-watershed studies that may have been completed.

6. Deep Services (Storm, Sanitary & Water Supply)

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

   ii. *Connections to trunk sewers and easement sewers are typically not permitted.*

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

   iv. *Review provision of a high-level sewer.*

   v. *Provide information on the type of connection permitted*

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

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

   b. Std Dwg S11 (For rigid main sewers) – *lateral must be less 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.*

7. 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

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.

8. MOECC ECA Requirements – The applicant shall consult with the local office of the MOECC to determine which ECA, if any, are required. **NOTE: Site Plan Approval, or Draft Approval, is required before any Ministry of the Environment and Climate Change application is sent to the MOECC.**

For residential applications: Charlie Primeau

(613) 521-3450, ext. 251

Charlie.Primeau@ontario.ca

For I/C/I applications: Emily Diamond

(613) 521-3450, ext. 238

Emily.Diamond@ontario.ca

9. 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.

Should you have any questions or require additional information, please contact me directly at (613) 580-2424, x 24169 or by email at Isaac.Wong@ottawa.ca.

APPENDIX C
WATERMAIN FLOW & FIRE CALCULATIONS

McINTOSH PERRY

McINTOSH PERRY

CP-18-0054 - 3735 ST. JOSEPH BOULEVARD - Water Demands

Project:	3735 ST. JOSEPH BOULEVARD
Project No.:	CP-18-0054
Designed By:	S.V.L.
Checked By:	R.P.K.
Date:	08/16/2018
Site Area:	0.51 gross ha

AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS
Residential	350	L/c/d
Industrial - Light	35,000	L/gross ha/d
Industrial - Heavy	55,000	L/gross ha/d
Shopping Centres	2,500	L/(1000m² /d
Hospital	900	L/(bed/day)
Schools	70	L/(Student/d)
Trailer Parks 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	**0.17**	**L/s**

MAXIMUM DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS
Residential	2.5 x avg. day	L/c/d
Industrial	1.5 x avg. day	L/gross ha/d
Commercial	***1.5 x avg. day***	***L/gross ha/d***
Institutional	1.5 x avg. day	L/gross ha/d
MAXIMUM DAILY DEMAND	**0.25**	**L/s**

MAXIMUM HOUR DEMAND

DEMAND TYPE	AMOUNT	UNITS
Residential	2.2 x max. day	L/c/d
Industrial	1.8 x max. day	L/gross ha/d
Commercial	***1.8 x max. day***	***L/gross ha/d***
Institutional	1.8 x max. day	L/gross ha/d
MAXIMUM HOUR DEMAND	**0.45**	**L/s**

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

McINTOSH PERRY

CP-18-0054 - 3735 ST. JOSEPH BOULEVARD - OBC Fire Calculations

Project:	3735 ST. JOSEPH BOULEVARD
Project No.:	CP-18-0054
Designed By:	S.V.L.
Checked By:	R.P.K.
Date:	08/16/2018

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

***Water Supply for Fire-Fighting* - Store/Office & Warhouse Building**

Building is classified as Group : A-2 and D (from table 3.2.2.55)

Building is of combustible construction with fire separations and fire resistance ratings provided in accordance with Subsection 3.2.2., including loadbearing walls, columns and arches. Noncombustible construction may be used in lieu of fire-resistance rating where permitted in Subsection 3.2.2.

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	**18**	(from Table 1 pg A-31) (Worst case occupancy {E / F2} 'K' value used)
V	**4,366**	(Total building volume in m³.)
Stot	**1.0**	(From figure 1 pg A-32)
Q =	**78,591.77 L**	

→

			From Figure 1 (A-32)
Snorth	14.588	m	0.0
Seast	32.298	m	0.0
Ssouth	42.312	m	0.0
Swest	15.998	m	0.0

*approximate distances

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

2700 L/min (if Q ≤108,000 L)

713 gpm

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info@mcintoshperry.com | www.mcintoshperry.com

McINTOSH PERRY

CP-18-0054 - 3735 ST. JOSEPH BOULEVARD - Fire Underwriters Survey (FUS) Fire Calculations

Project:	3735 ST. JOSEPH BOULEVARD
Project No.:	CP-18-0054
Designed By:	S.V.L.
Checked By:	R.P.K.
Date:	08/16/2018

From the Fire Underwriters Survey (1999)

From Part II – Guide for Determination of Required Fire Flow Copyright I.S.O.:

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.

A. Determine The Coefficient Related To The Type Of Construction

The building is considered to be of ordinary construction type. Therefore,

C = 1.50

B. Determine Ground Floor Area

As provided by the Architect:

Floor Area (One Floor) = 597.85 m²

A = 1,195.70 m²

This floor area represents the final build-out of the development; as outlined on the Site Plan drawing.

C. Determine Height in Storeys

From Architectural Drawings:

Number of Storeys = 2.00

D. Calculate Required Fire Flow

F = 220 x C x √A

F = 220.00 X 1.50 X √ 1195.70

F = 11,411.04 L/min.

F = 11,000.00 L/min.

E. Determine Increase or Decrease Based on Occupancy

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

Limited Combustibility

-15%

Occupancy Decrease = 1,650.00 L/min.

F = 9,350.00 L/min.

CP-18-0054 - 3735 ST. JOSEPH BOULEVARD - Fire Underwriters Survey (FUS) Fire Calculations

F. Determine the Decrease, if any for Sprinkler Protection

From note 3, Page 18 of the Fire Underwriter Survey:

- The flow requirement may be reduced by up to 50% for complete automatic sprinkler protection depending upon adequacy of the system.
- The credit for the system will be a maximum of 30% for an adequately designed system conforming to NFPA 13 and other NFPA sprinkler standards.
- Additional credit of 10% if water supply is standard for both the system and fire department hose lines
- If sprinkler system is fully supervised system, an additional 10% credit is granted
- The entire building will not sprinklered.
- Therefore the value obtained in Step E is not reduced.

Reduction = 9,350.00 L/min. X 0%

Reduction = 0.00 L/min.

G. Determine the Total Increase for Exposures

From note 4, Page 18 of the Fire Underwriter Survey:

- Exposure distance to the existing buildings to the north & east of the proposed building is approximately 21m & 43m respectfully.
- There are no existing buildings surrounding the remainder of the site that are within 45m.
- Therefore the charge for exposure is 14% of the value obtained in Step E.

Increase = 9,350.00 L/min. X 14%

Increase = 1,309.00 L/min.

H. Determine the Total Fire Demand

- To the answer obtained in E, substract the value obtained in F and add the value obtained in G
- Fire flow should be no less than 2,000L/min. and the maximum value shoul not exceed 45,000L/min.

F = 9,350.00 L/min. - 0.00 L/min. + 1,309.00 L/min.
F = 10,659.00 L/min.

Therefore, after rounding to the nearest 1,000 L/min, the total required fire flow for the development is 11000 L/min (2906 GPM).

Table 1					
WATER SUPPLY COEFFICIENT - K					
TYPE OF CONSTRUCTION	Classification by Group or Division in Accordance with Table 3.1.2.1. of the Building Code				
	A-2 B-1 B-2 B-3 C D	A-4 F-3	A-1 A-3	E F-2	F-1
Building is of noncombustible construction with fire separations and fire-resistance ratings provided in accordance with Subsection 3.2.2., including loadbearing walls, columns and arches.	10	12	14	17	23
Building is of noncombustible construction or of heavy timber construction conforming to Article 3.1.4.6. Floor assemblies are fire separations but with no fire-resistance rating. Roof assemblies, mezzanines, loadbearing walls, columns and arches do not have a fire-resistance rating.	16	19	22	27	37
Building is of combustible construction with fire separations and fire-resistance ratings provided in accordance with Subsection 3.2.2., including loadbearing walls, columns and arches. Noncombustible construction may be used in lieu of fire-resistance rating where permitted in Subsection 3.2.2.	18	22	25	31	41
Building is of combustible construction. Floor assemblies are fire separations but with no fire-resistance rating. Roof assemblies, mezzanines, loadbearing walls, columns and arches do not have a fire-resistance rating.	23	28	32	39	53
Column 1	2	3	4	5	6

Table 3.2.2.55.
Maximum Building Area, Group D, up to 2 Storeys
Forming Part of Sentence 3.2.2.55.(1)

No. of *Storeys*	Maximum Area, m^2		
	Facing 1 *Street*	Facing 2 *Streets*	Facing 3 *Streets*
1 2	1 000 800	1 250 1 000	1 500 1 200
Column 1	2	3	4

Table 2	
OBC Part 3 Buildings	Required Minimum Water Supply Flow Rate (L/min)
One-storey building with building area not exceeding 600 m²	1800
All other buildings	2700 (if Q ≤ 108,000 L)(1) 3600 (if Q > 108,000 L and ≤ 135,000 L)(1) 4500 (if Q > 135,000 L and ≤ 162,000 L)(1) 5400 (if Q > 162,000 L and ≤ 190,000 L)(1) 6300 (if Q > 190,000 L and ≤ 270,000 L)(1) 9000 (if Q > 270,000 L)(1)

Note to Table 2:
(1) $Q = KVS_{Tot}$ as referenced in Paragraph 3(a)

BOUNDARY CONDITIONS

Boundary Conditions For: 3735 St. Joseph Blvd

Date of Boundary Conditions: 2018-Aug-22

Provided Information:

Scenario	Demand	
	L/min	L/s
Average Daily Demand	10.2	0.2
Maximum Daily Demand	15	0.3
Peak Hour	27	0.5
Fire Flow #1 Demand	11,000	183.3

Number Of Connections: 1

Location:

BOUNDARY CONDITIONS

Results:

Connection #: 1

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	113.2	72.4
Peak Hour	108.4	65.6
Max Day Plus Fire (11,000) L/min	102.1	56.7

[1]Elevation: **62.250 m**

Notes:

1) As per the Ontario Building Code in areas that may be occupied, the static pressure at any fixture shall not exceed 552 kPa (80 psi.) Pressure control measures to be considered are as follows, in order of preference:

a) If possible, systems to be designed to residual pressures of 345 to 552 kPa (50 to 80 psi) in all occupied areas outside of the public right-of-way without special pressure control equipment.
b) Pressure reducing valves to be installed immediately downstream of the isolation valve in the home/ building, located downstream of the meter so it is owner maintained.

2) Click or tap here to enter text.

3) Click or tap here to enter text.

Disclaimer

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

Average Day

Label	Elevation (m)	Demand (L/min)	Pressure (psi)	Hydraulic Grade (m)
J-19	61.40	0.00	73.53	113.20
BLDG	61.50	10.20	73.39	113.20

Max. Day + Fire Flow

Label	Is Fire Flow Run Balanced?	Satisfies Fire Flow Constraints?	Fire Flow (Needed) (L/min)	Fire Flow (Available) (L/min)	Pressure (psi)	Elevation (m)
H-7	True	True	11,000.00	22,000.00	57.09	61.88
J-19	False	False	11,000.00	(N/A)	57.77	61.40
BLDG	False	False	11,000.00	(N/A)	57.63	61.50

Peak Hourly

Label	Elevation (m)	Demand (L/min)	Pressure (psi)	Hydraulic Grade (m)
J-19	61.40	0.00	66.71	108.40
BLDG	61.50	27.00	66.57	108.40

APPENDIX D
SANITARY SEWER CALCULATIONS

McINTOSH PERRY

SANITARY SEWER DESIGN SHEET

PROJECT: ST. JOSEPH BOULEVARD
LOCATION: OTTAWA
CLIENT: BLUEPRINT CONSTRUCTION SERVICES 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	30	31
STREET	AREA ID	FROM MH	TO MH	UNIT TYPES				AREA (ha)	POPULATION		PEAK FACTOR	PEAK FLOW (L/s)	AREA (ha)						PEAK FLOW (L/s)	AREA (ha)		FLOW (L/s)	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	DIA (mm)	SLOPE (%)	VELOCITY (full) (m/s)	FLOW DEPTH (mm)	VELOCITY (actual) (m/s)	AVAILABLE CAPACITY	
				SF	SD	TH	APT		IND	CUM			INSTITUTIONAL		COMMERCIAL		INDUSTRIAL			IND	CUM										L/s	(%)
													IND	CUM	IND	CUM	IND	CUM													
	A-1	BLDG	MH1A					0.00	0.0	0.0	4.00	0.00		0.00	0.51	0.51		0.00	0.44	0.51	0.51	0.14	0.59	12.00	13.73	135	1.00	0.812	21.6	0.425	11.41	95.12
		MH1A	EX.SANMH					0.00	0.0	0.0	4.00	0.00		0.00	0.00	0.51		0.00	0.44	0.00	0.51	0.14	0.59	12.00	27.82	135	1.00	0.812	21.6	0.425	11.41	95.12

Design Parameters:

Residential			ICI Areas			
						Peak Factor
SF	3.4	p/p/u				
TH/SD	2.7	p/p/u	INST	50,000	L/Ha/day	1.5
APT	2.3	p/p/u	COM	50,000	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): 350 L/day
3. Infiltration allowance: 0.28 L/s/Ha
4. Residential Peaking Factor:
Harmon Formula = 1+(14/(4+P^0.5))
where P = population in thousands

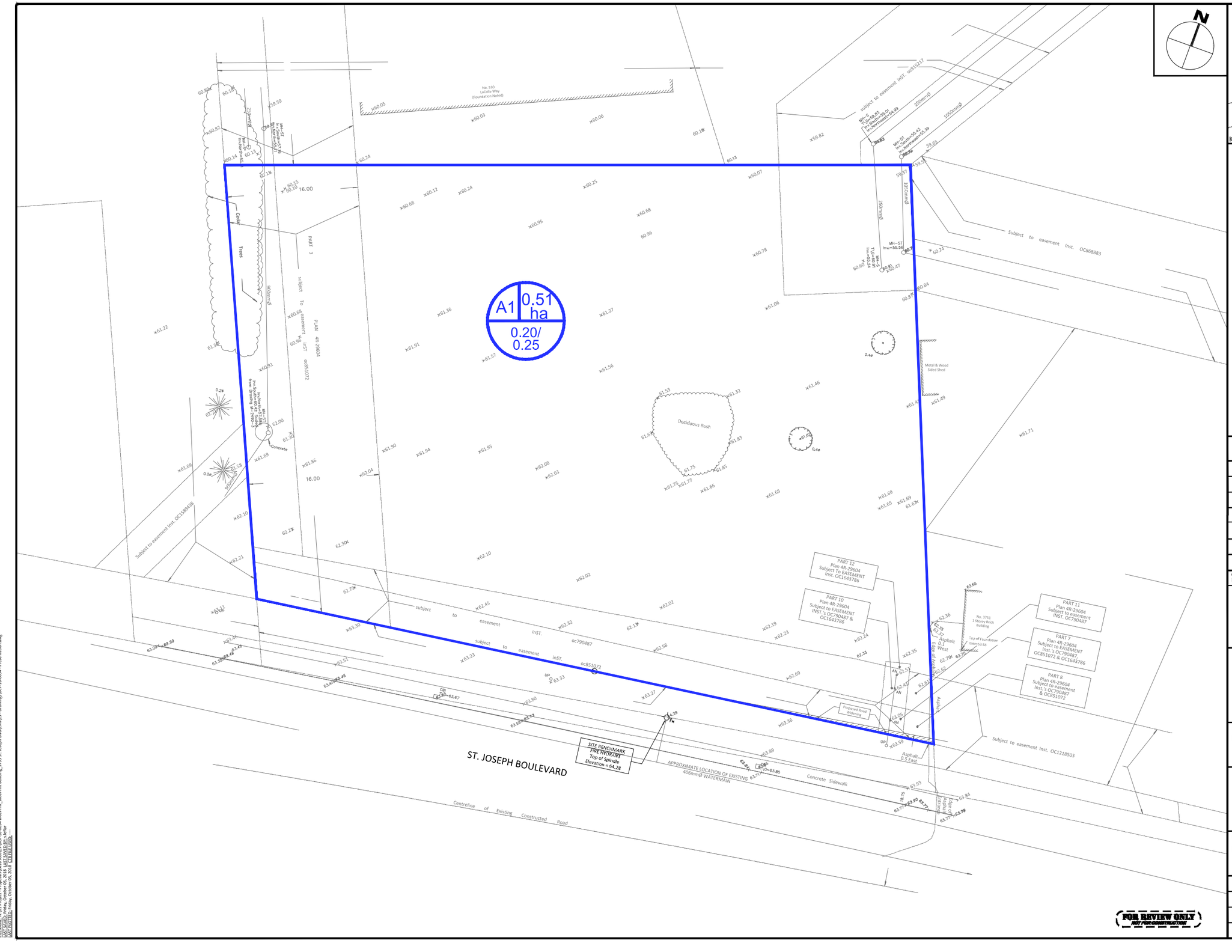
Designed: S.V.L.
Checked: R.P.K.
Project No.: CP-18-0054

No.	Revision	Date
1.	ISSUED FOR SITE PLAN CONTROL	2018-09-27

Date: 2018-09-27
Sheet No: 1 of 1

APPENDIX E
PRE-DEVELOPMENT PLAN

McINTOSH PERRY



No.	Revision/Issue	Date
01	ISSUED FOR SITE PLAN CONTROL	OCT. 05, 2018

Check and verify all dimensions before proceeding with the work

Do not scale drawings

McINTOSH PERRY
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www.mcintoshperry.com

Stamp:

Client:
BLUEPRINT CONSTRUCTION SERVICES LTD.
17-1010 POLYTEK STREET, OTTAWA, ON K1J 9J1

Project:
3735 ST. JOSEPH BOULEVARD
MIXED-USE COMMERCIAL DEVELOPMENT
OTTAWA ONTARIO

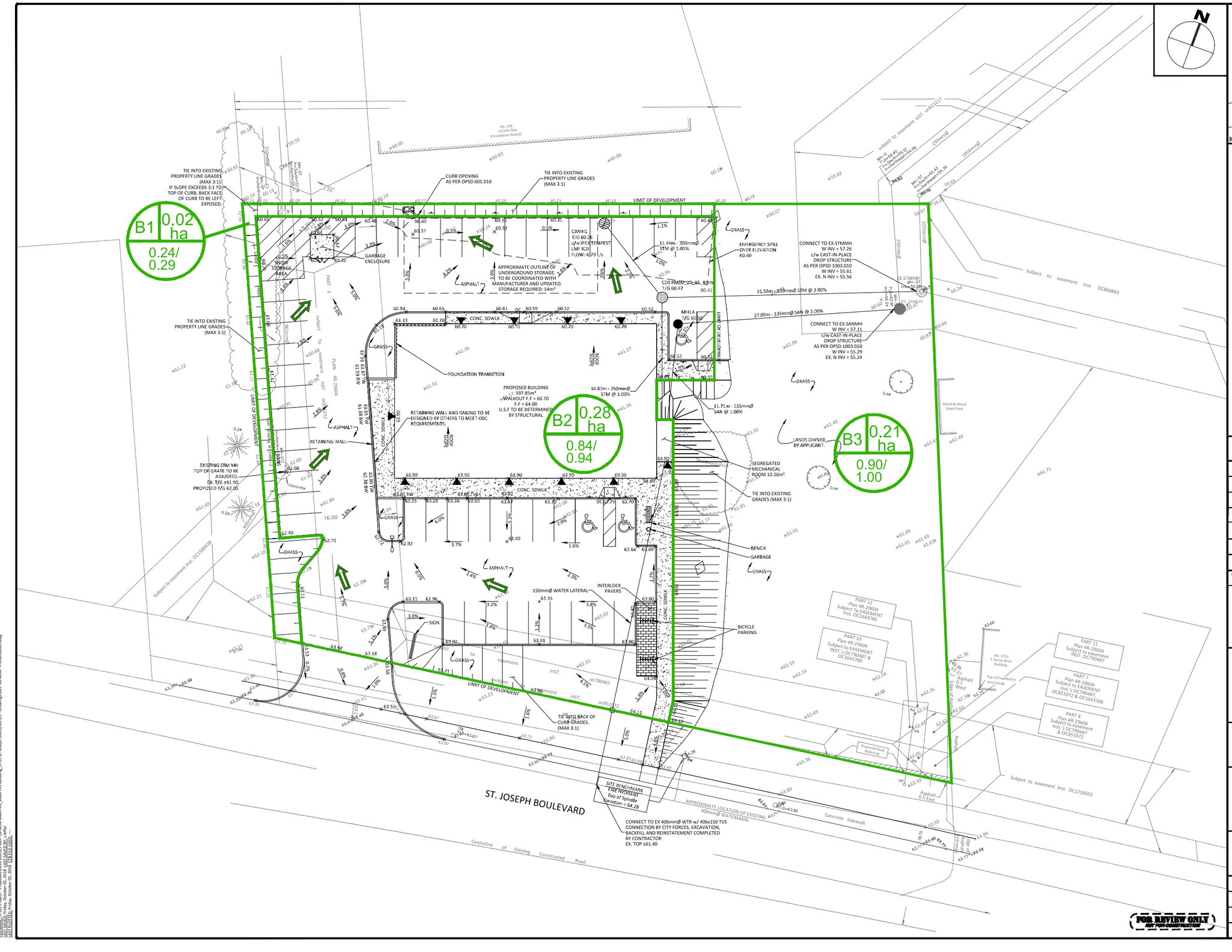
Drawing Title:
PRE-DEVELOPMENT DRAINAGE PLAN

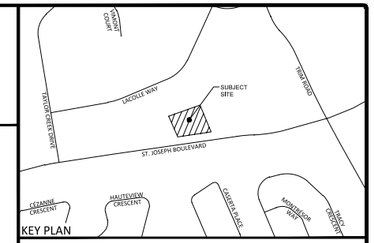
Scale: N.T.S.	Project Number: CP-18-0054
Drawn by: S.V.L.	
Checked By: R.P.K.	Drawing Number: PRE
Designed By: S.V.L.	

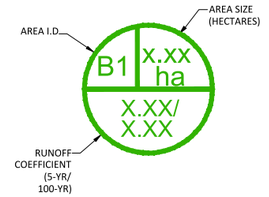
FILENAME: H:\01 Project - Proposals\2018 Jobs\CP\0CP-18-0054 Blueprint_BluePrint Building_3735 St. Joseph Blvd\Civil\15 - Drawings\0CP-18-0054 - Presentation.dwg
LAST SAVED: Friday, October 05, 2018 | LAST SAVED BY: S.Lefler
LAST PLOTTED: Friday, October 05, 2018 | PLOTTED BY: —

APPENDIX F
POST-DEVELOPMENT PLAN

McINTOSH PERRY







No.	Revision/Issue	Date
01	ISSUED FOR SITE PLAN CONTROL	OCT. 05, 2018

Check and verify all dimensions before proceeding with the work

Do not scale drawings

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Stamp:

Client:
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Project:
3735 ST. JOSEPH BOULEVARD
MIXED-USE COMMERCIAL DEVELOPMENT
OTTAWA ONTARIO

Drawing Title:
POST-DEVELOPMENT DRAINAGE PLAN

Scale:	N.T.S.
Drawn by:	S.V.L.
Checked By:	R.P.K.
Designed By:	S.V.L.

Project Number: CP-18-0054

Drawing Number: POST

FOR REVIEW ONLY NOT FOR CONSTRUCTION

APPENDIX G
STORMWATER MANAGEMENT CALCULATIONS

McINTOSH PERRY

CP-18-0054 - 3735 ST.JOSEPH BOULEVARD - RUNOFF CALCULATIONS

Pre-Development Runoff Coefficient

Drainage Area	Area (ha)	Impervious Area (m^2)	C	Gravel Area (m^2)	C	Pervious Area (m^2)	C	Average C (5-Year)	Average C (100-Year)
A1	0.51	0.00	0.90	0.00	0.60	5082.18	0.20	0.20	0.25

Pre-Development Runoff Calculations

Drainage Area	Area (ha)	C (5-Year)	C (100-Year)	Tc (min)	I (mm/hr)		Q (L/s)	
					5-Year	100-Year	5-Year	100-Year
A1	0.51	0.20	0.25	20	70.3	120.0	19.85	42.37
Total	0.51						19.85	42.37

Post-Development Runoff Coefficient

Drainage Area	Area (ha)	Impervious Area (m^2)	Runoff Coefficient	Gravel Area (m^2)	Runoff Coefficient	Pervious Area (m^2)	Runoff Coefficient	Average C (5-Year)	Average C (100-Year)	
B1	0.02	0.00	0.90	0.00	0.60	194.93	0.20	0.20	0.25	
B2	0.28	2576.50	0.90	0.00	0.60	242.29	0.20	0.84	0.94	
B3	0.21	2068.553	0.90	0.00	0.60	0.00	0.20	0.90	1.00	*

* B3 Assumed to be comprised of all impervious surfaces to anticipate worst case storage volumes for future development

Post-Development Runoff Calculations

Drainage Area	Area (ha)	C (5-Year)	C (100-Year)	Tc (min)	I (mm/hr)		Q (L/s)	
					5-Year	100-Year	5-Year	100-Year
B1	0.02	0.20	0.25	10	104.2	178.6	1.13	2.42
B2	0.28	0.84	0.94	10	104.2	178.6	68.57	130.90
B3	0.21	0.90	1.00	10	104.2	178.6	53.93	102.68
Total	0.51						123.63	236.00

Required Restricted Flow 26.4 L/s/ha Full Site

Drainage Area	Area (ha)	Max Allowable Release Rate (L/s/ha)	5-Year Flow Rate (L/s)
A1	0.51	26.40	13.42

Required Restricted Flow 26.4 L/s/ha (B1-B3)

Drainage Area	Area (ha)	Max Allowable Release Rate (L/s/ha)	5-Year Flow Rate (L/s)
B1-B3	0.30	26.40	7.96

Post-Development Restricted Runoff Calculations

Drainage Area	Unrestricted Flow 5-Year	Restricted Flow 5-Year	Storage Required 5-Year	Storage Provided 5-Year	
B1	1.13	1.13	-	-	*UNRESTRICTED*
B2	68.57	6.79	54.0	54.0	*RESTRICTED*
B3	53.93	5.50	42.0	0.0**	*UNDEVELOPED*
Total	123.63	13.42	95.9	54.0	

** No storage provided at this time, 42 cu.m represents the absolute maximimum required storage for future development.

CP-18-0054 - 3735 ST.JOSEPH BOULEVARD - STORAGE REQUIREMENTS

Storage Requirements for Area B3

5-Year Storm Event

Tc (min)	I (mm/hr)	B2 Runoff (L/s)	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
45	40.6	26.74	6.79	19.95	53.86
46	40.0	26.32	6.79	19.53	53.90
47	39.4	25.91	6.79	19.12	53.93
48	38.8	25.52	6.79	18.73	53.95
49	38.2	25.15	6.79	18.36	53.96
50	37.7	24.78	6.79	17.99	53.97
51	37.1	24.43	6.79	17.64	53.96

Maximum Storage Required 5-Year (m^3) =	53.97

STORM SEWER DESIGN SHEET

PROJECT: 3735 ST.JOSEPH BOULEVARD
LOCATION: OTTAWA, ON
CLIENT: BLUEPRINT CONSTRUCTION SERVICES LTD.

McINTOSH PERRY

LOCATION				CONTRIBUTING AREA (ha)								RATIONAL DESIGN FLOW											SEWER DATA								
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
STREET	AREA ID	FROM MH	TO MH	C-VALUE						INDIV AC	CUMUL AC	INLET (min)	TIME IN PIPE	TOTAL (min)	i (5) (mm/hr)	i (10) (mm/hr)	i (100) (mm/hr)	5yr PEAK FLOW (L/s)	10yr PEAK FLOW (L/s)	100yr PEAK FLOW (L/s)	FIXED FLOW (L/s)	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	PIPE SIZE (mm)			SLOPE (%)	VELOCITY (m/s)	AVAIL CAP (5yr)	
				0.20	0.50	0.60	0.70	0.80	0.90																DIA	W	H			(L/s)	(%)
	B2	CBMH1	CDS_PMSU	0.02		0.00			0.26	0.24	0.24	10.00	0.12	10.12	104.19	122.14	178.56	68.57				68.57	100.88	10.03	300			1.00	1.383	32.31	32.03%
		CDS_PMSU	*EX.STMMH*	0.00		0.00			0.00	0.00	0.24	10.12	0.27	10.39	103.56	121.39	177.46	68.15				68.15	142.67	31.59	300			2.00	1.955	74.52	52.23%

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: S.V.L.
Checked: R.P.K.
Project No.: CP-18-0118

No.	Revision	Date
1.	ISSUED FOR SITE PLAN CONTROL	2018-10-05

Date: 2018-10-05
Sheet No: 3 of 3

head office: (905)948-0000
fax: (905)948-0577
www.echelonenvironmental.ca

From: Jonathan Jonker [mailto:j.jonker@mcintoshperry.com]
Sent: May-12-14 7:47 AM
To: Georges Gebare (georges@echelonenvironmental.ca)
Subject: 3735 St. Joseph Boulevard, Ottawa - Quality Treatment Unit Sizing

Good Morning George,

We have a site located at 3735 St. Joseph Boulevard in the City of Ottawa that is being developed into a mixed-use commercial development. The City has stipulated 80% TSS removal, there is limited room on the site for treatment using natural features therefore we will need a Quality treatment unit. Please find below site parameters for the sizing and structure costs.

Site Parameters:
Location: 3735 St. Joseph Boulevard
Area: 0.51 ha
% Impervious: 82% Impervious
Need 80% TSS

Site Flows:
Flow (100yr Stm) = 10.4 L/s
Flow (5yr Stm) =10.4 L/s
*Please note that the Quality treatment unit will be downstream of the site restriction, and the flows provided include the restricted flows that will be leaving the site through the unit.
C Value for 5yr = 0.76
C Value for 100yr = 0.85

We will require:

- The units Treatment flow rate
- Oil Capacity
- Sediment Capacity
- Total Holding Capacity
- Structure cost

If you need any other information please don't hesitate to call or email

Thank you very much,

Jonathan Jonker, C.Tech.
Junior Designer / Inspector - Site Development
115 Walgreen Road, R R 3, Carp, ON K0A 1LO
T. 613.836.2184 (2252) | **F.** 613.836.3742 | **C.** 613.223.8513

ECHELON ENVIRONMENTAL
505 Hood Road Unit 26 Markham ON L3R 5V6
Tel: (905) 948-0000 Fax: (905) 948-0577
E-mail: info@echelonenvironmental.ca

May 12, 2014

McIntosh Perry Consulting Engineers Ltd.
115 Walgreen Road, R.R. #3
Carp, ON. K0A 1L0
Tel: 613-836-2184
Fax: 613-836-3742

Attention: Mr. J. Jonker

RE: CDS Oil/Grit 3735 Saint Joseph Blvd, Ontario

Mr. Jonker,

Echelon Environmental is pleased to offer the following information to confirm suitability of the proposed Continuous Deflective Separation (CDS) Stormwater Treatment Units for the, 3735 Saint Joseph Blvd, Ottawa Ontario project.

We currently have over 1600 CDS units installed throughout Ontario with single units treating drainage areas ranging from 0.1 ha to 50 ha. The CDS is an approved product in the Province of Ontario and has received approval for installation in all cities/municipalities and counties it has submitted to. The Ottawa area is a location where several of our units have been placed. A small sample of ongoing or completed projects in this area is:

The most recent projects with McIntosh Perry are;

- Fire Station, route 300 Embrun (2013)
- Heritage Funeral Homes, Taylor Creek Drive, Ottawa (2013)

Recent city of Ottawa approvals are:

- Heritage Funeral homes, listed above
- 4419 Inns Rd, Veterinary hospital (2012)
- 3545 Saint Joseph, Public Storage (2012)

The unit has received City of Ottawa approval for all applications submitted. It carries NDJEP certification as well as Ministry of Ontario Approval (MOE certificated attached). It has also received approval (Job specific) by the Rideau Valley Conservation Authority.

Approval of the CDS Technology for TSS Removal

Ministry of Environment - The Ministry of Environment (MOE) has reviewed our system and has provided Certificate of Approval for many sites using CDS units to achieve Level 1 (80% TSS Removal) treatment. Our MOE certificate has been attached in Appendix A.

Ontario Provincial Standards – Ontario Provincial Standards (OPS) formed a special review committee for the approval of oil-grit separators in municipal roadway applications. This committee was formed to provide a standardized review process for all municipalities. CDS has been reviewed and approved by OPS.

Conservation Authorities – We have been approved throughout Ontario by Conservation Authorities including Central Lake Ontario Conservation Authority (CLOCA).

Testing of CDS Stormwater Treatment Systems

CDS systems have undergone comprehensive performance testing and are approved under multiple certification protocols including the Washington Department of Ecology (WASHDOE), TAPE Water Quality Control Test Protocol and NJCAT Technology Acceptance and Reciprocity Partnership (TARP) Tier I and II Protocols.

Testing on CDS units has included an evaluation of TSS removal efficiency through discrete particle ranges (by sieve gradation). This level of detailed testing allows the performance of the CDS unit to be predicted with any defined particle gradation.

The TSS calculations provided for the 3735 Saint Joseph Blvd, Ottawa, Ontario project were completed using a fine particle size distribution. Please find the attached, TSS calculations for your reference.

System Overview

Conventional oil-grit separators rely solely on gravity for grit separation. As such, the energy in the storm flow must be dispersed to achieve gravity settling, therefore requiring a very large tank volume. By contrast, CDS units utilize multiple hydraulic techniques to allow large flows to be processed in a compact footprint. These processes include gravity, swirl concentration and a patented inertial based screening process. In a CDS system, the energy in the storm flow is used to enhance separation, thereby allowing for a much more compact treatment chamber.

For the 3735 Saint Joseph Blvd project, the system sizing was based upon the rational method, using 40 years of rain data for the community of Ottawa Ontario. We followed the MOE requirement of treating 90% of the average yearly rainfall and targeted the desired 80% TSS removal (Level I). As outlined above a fine PSD was selected. Please see the attached validation.

Structural Integrity of CDS Stormwater Treatment Units
CDS units are manufactured to meet the Canadian Highway Bridge Design Code (CHBDC) which meets the requirements specified in the tender documents. Please see Appendix C for our OPS Certified Plant Manufacturer's compliance letter.

Floatables Containment
The CDS system incorporates a riser tube on top of the treatment chamber that extends beyond the high water condition to maintain the capture of buoyant material and oil during peak events and temporary backwater conditions.

In addition, the CDS system is the only hydrodynamic separator in North America that utilizes a non-blocking screening system. This system removes 100% of the buoyant and neutrally buoyant material larger than 2.4mm in addition to the 60% total suspended solids specified.

Hydrocarbon Capture

CDS units are capable of capturing and retaining hydrocarbons with its integral oil baffle design. CDS units were tested and demonstrated to be greater than 99% effective in controlling dry-weather accidental oil spills.

Internal High Flow By-Pass Capability

CDS units have an internal by-pass weir and are capable of by-passing peak design storm events. CDS units are custom designed for each site based on the specific hydraulic requirements.

Sump is Separate from the Treatment Chamber

CDS units have the sump chamber separate from the treatment chamber. With this design feature, the geometry of the treatment chamber is not impacted by accumulated grit, and the independent sump chamber volume can be optimized to capture the estimated accumulated grit in between maintenance cycles.

Inspection and Maintenance

Echelon Environmental provides a full Operations and Maintenance Manual with as-built drawings included for all CDS units. Echelon Environmental also offers a comprehensive Inspection and Maintenance Program for our clients to take advantage of.

Summary

The CDS system has undergone extensive testing and has demonstrated that is can meet the Enhanced Treatment Criteria as defined in the MOE Stormwater Management Guidelines. The compact design of the CDS system provides significant maintenance cost savings for the owner as compared to conventional gravity based separators.

Echelon Environmental would be pleased to provide any additional supporting information that you may require. We appreciate your consideration of the enclosed material and we look forward to working with you on this project. If you have any questions or require clarification of any information provided above, please contact our office at your convenience.

80% TSS removal
90% average yearly rainfall treated

Best regards,
Echelon Environmental Inc.

George Gebara, B.Eng
Project Manager

Attached:
1) MOE NETE Approval
2) CDS TSS Calculations
3) Cut Sheet for sized unit
4) Estimated Sediment volume/suggested cleaning cycle

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION
BASED ON THE RATIONAL RAINFALL METHOD
BASED ON A FINE PARTICLE SIZE DISTRIBUTION

Project Name: 3735 Saint Joseph Blvd.
Location: Ottawa, ON.
OGS #: -

Engineer: McIntosh Perry
Contact: Mr. Jonathon Jonker
Report Date: 5-Dec-14

Area	0.51	ha	**Rainfall Station #**	215	
Weighted C	0.85	(assumed)	(select from Rainfall Data column D)		
Tc	10	minutes (assumed)	**Particle Size Distribution**	FINE	
CDS Model	2015-4	(select from pulldown)	**CDS Treatment Capacity**	20	l/s

Rainfall Intensity[1] (mm/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (l/s)	Treated Flowrate (l/s)	Operating Rate (%)	Removal Efficiency (%)	Incremental Removal (%)
0.5	9.2%	9.2%	0.6	0.6	3.0	98.0	9.0
1.0	10.6%	19.8%	1.2	1.2	6.1	97.1	10.3
1.5	9.9%	29.7%	1.8	1.8	9.1	96.2	9.5
2.0	8.4%	38.1%	2.4	2.4	12.2	95.4	8.0
2.5	7.7%	45.8%	3.0	3.0	15.2	94.5	7.3
3.0	5.9%	51.7%	3.6	3.6	18.2	93.6	5.6
3.5	4.4%	56.1%	4.2	4.2	21.3	92.8	4.0
4.0	4.7%	60.7%	4.8	4.8	24.3	91.9	4.3
4.5	3.3%	64.0%	5.4	5.4	27.4	91.0	3.0
5.0	3.0%	67.1%	6.0	6.0	30.4	90.1	2.7
6.0	5.4%	72.4%	7.2	7.2	36.5	88.4	4.8
7.0	4.4%	76.8%	8.4	8.4	42.6	86.7	3.8
8.0	3.5%	80.3%	9.6	9.6	48.6	84.9	3.0
9.0	2.8%	83.2%	10.8	10.8	54.7	83.2	2.3
10.0	2.2%	85.3%	12.1	12.1	60.8	81.4	1.8
15.0	7.0%	92.3%	18.1	18.1	91.2	72.7	5.1
20.0	4.5%	96.9%	24.1	19.8	100.0	57.7	2.6
25.0	1.4%	98.3%	30.1	19.8	100.0	46.2	0.7
30.0	0.7%	99.0%	36.2	19.8	100.0	38.5	0.3
35.0	0.5%	99.5%	42.2	19.8	100.0	33.0	0.2
40.0	0.5%	100.0%	48.2	19.8	100.0	28.9	0.2
45.0	0.0%	100.0%	54.2	19.8	100.0	25.7	0.0
50.0	0.0%	100.0%	60.3	19.8	100.0	23.1	0.0
							88.3

Removal Efficiency Adjustment[2] = 6.5%

Predicted Net Annual Load Removal Efficiency = 81.8%

Predicted % Annual Rainfall Treated = 97.4%

1 - Based on 42 years of hourly rainfall data from Canadian Station 6105976, Ottawa ON
2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

CDS Stormwater Treatment Unit Performance

Table 1. Fine Particle Size Distribution (PSD)

Particle Size (µm)	% of Particle Mass
< 20	20
20 – 40	10
40 – 60	10
60 – 130	20
130 – 400	20
400 – 2000	20

Removal Efficiencies – CDS Unit Testing Under Various Flow Rates

The following performance curves are based on controlled tests using a full scale CDS Model PMSU20_20 (2400 micron screen), 1.1-cfs (494-gpm) capacity treatment unit.

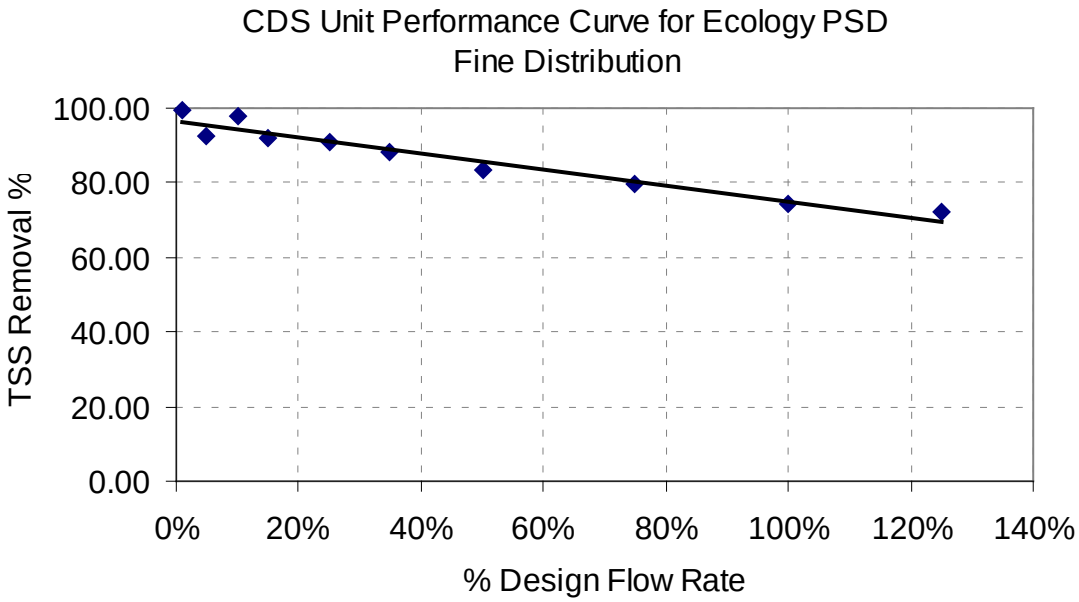


Figure 1. CDS Unit Performance for Fine PSD

Tests were conducted using two types of sand – U.S. Silica OK-110 and UF sediment (a mixture of U.S. Silica sands). Particle size gradations for the two types of sand are illustrated in Figure 2.

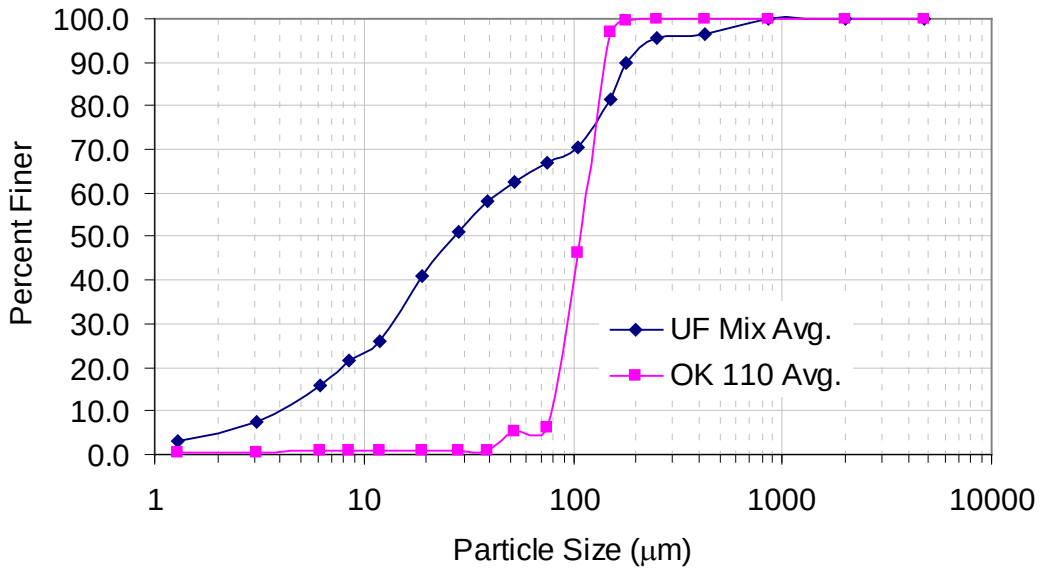


Figure 2. Test material particle size gradations - CDS Model PMSU20_20 test
(Analytical results provided by MACTEC Engineering and Consulting Inc. FL
ASTM D-422 with Hydrometer method)

The influent concentration (mg/L) for the test was set at 200-mg/L and verified from slurry feeding. Effluent samples were taken at fixed time intervals during each test run at various flow rates. The composite effluent samples were sent to Test American Analytical Testing Lab, OR for TSS analysis (ASTM D3977-97).

TSS removal rates for the specified PSD (d_{50} of 90 μm) under various flow rates were calculated from Figure 2 shows the removal efficiency as a function of operating flow rate. This removal efficiency curve as a function of percent flow rate can be applied to all CDS unit models.

ECHELON ENVIRONMENTAL

Phone: 905-948-0000
Fax: 905-948-0577
info@echelonenvironmental.ca
www.echelonenvironmental.ca

Estimate of Annual Grit Collection

Engineer:	**McIntosh Perry**	**Project:**	3735 Saint Joseph Blvd.
Contact:	Mr. J. Jonker	**CDS Model:**	20_15_4
Report Date:	12-May-14	**OGS Location:**	

Area :	0.51	ha
Imperviousness :	92	%
Runoff Coefficient :	0.85	

*based on C of 0.85 for 100 year storm

Assumptions:

1. Annual Rainfall	700	mm	
2. Typical Grit Concentration	250	mg/l	
3. Apparent Grit Density	1.4	kg/l	(estimated)
4. Grit Capture Efficiency	80%		

Runoff Volume = Area x Rainfall Depth x Runoff Coefficient = 3,035 cu.m

Grit Collected = Grit Concentration x Runoff Volume x Grit Capture Efficiency = 607 kg

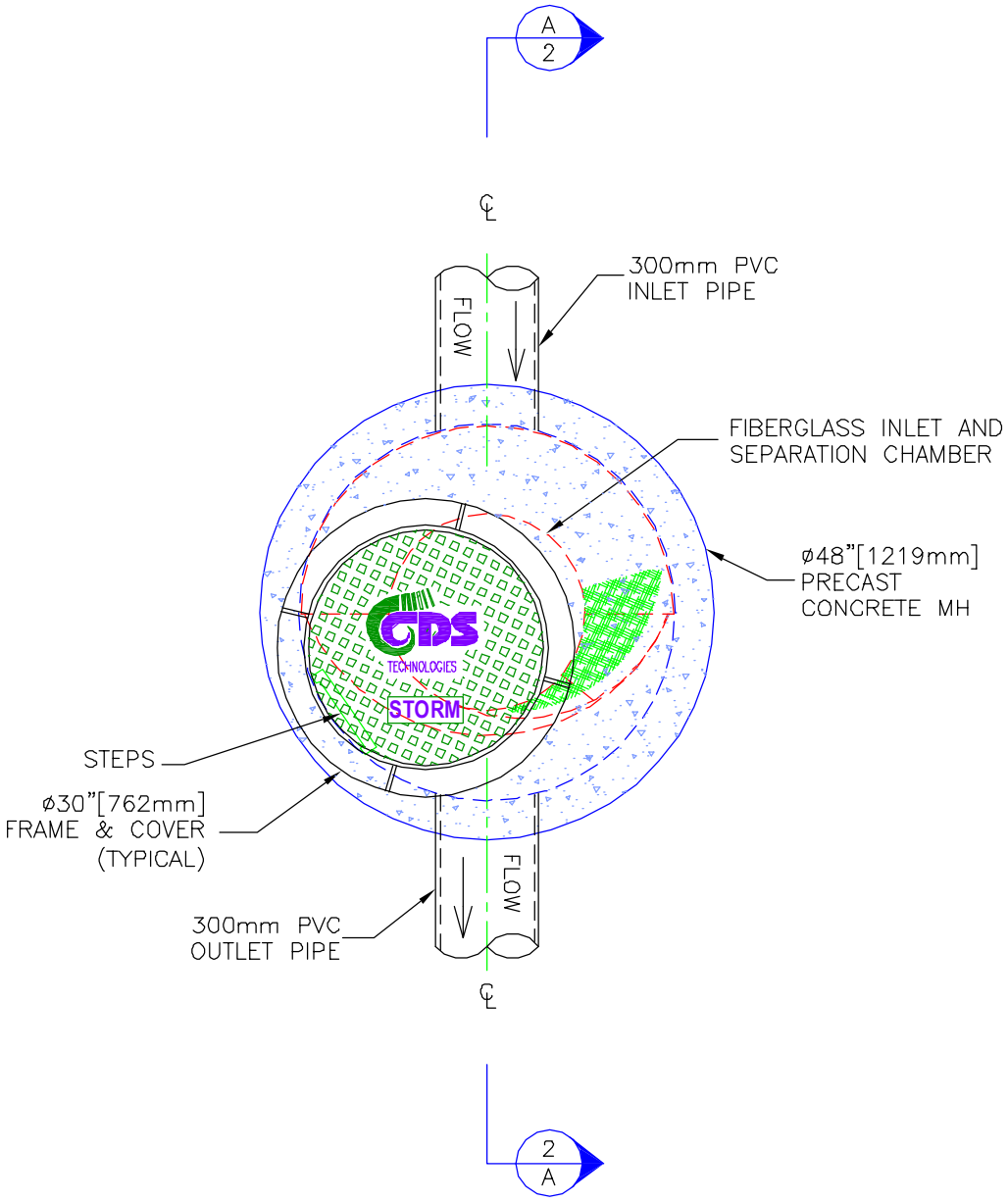
Grit Volume = Mass / Apparent Density = 434 litres or 0.434 cu.m

Therefore it can be expected that this site will generate approximately 0.434cu.m of grit annually.

Sump Capacity of CDS unit = 0.838 cu.m

Therefore the design sump capacity will accommodate a cleaning frequency of one time per 16 to 18 months.

PLAN VIEW

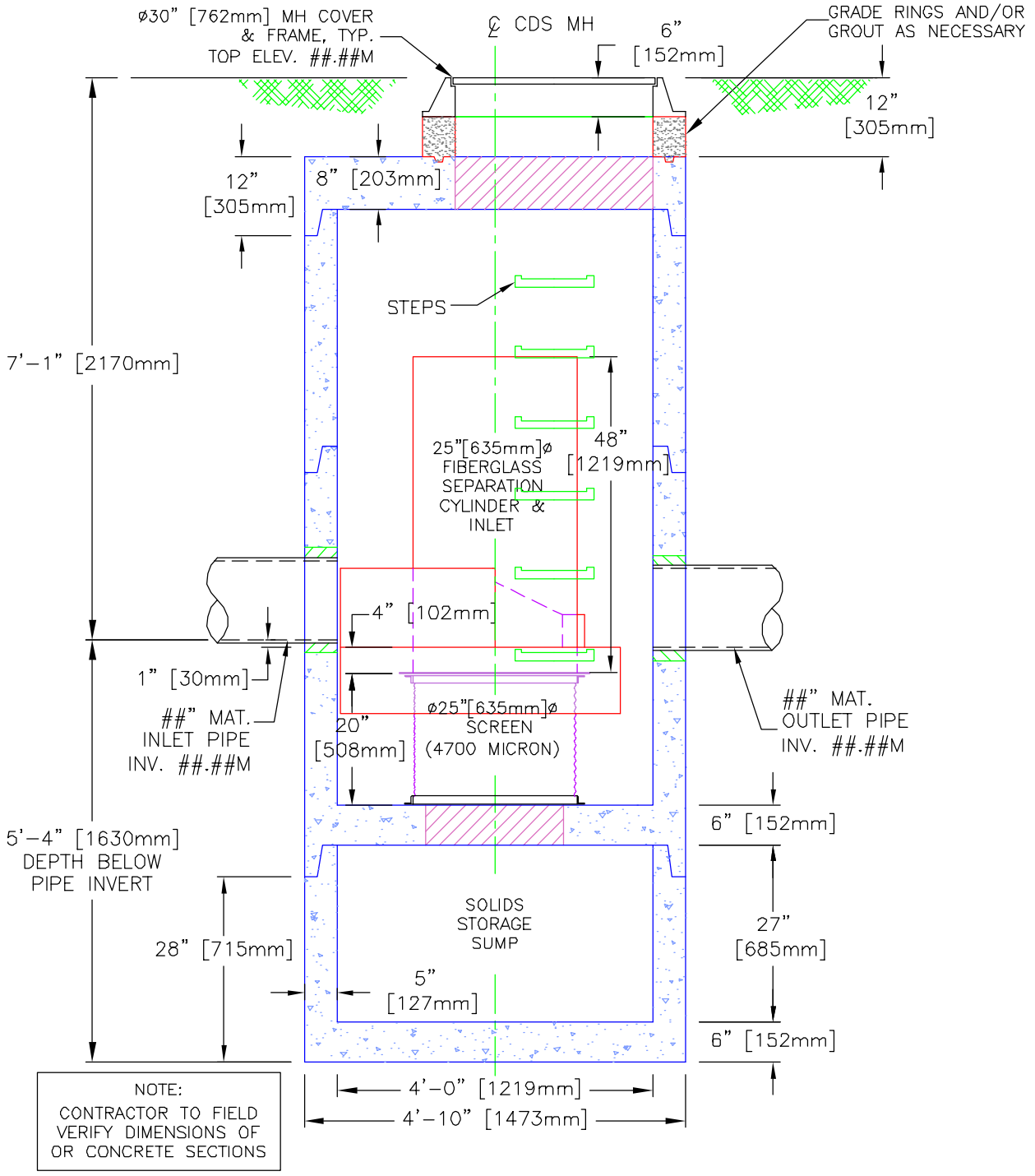


CDS MODEL PMSU20_15_4m
STORMWATER TREATMENT UNIT

CONTECH STORMWATER SOLUTIONS	PROJECT NAME CITY, STATE	JOB# XX-##-###	SCALE 1" = 2'
		DATE ##/##/##	SHEET 1
		DRAWN INITIALS	
		APPROV.	

Echelon Environmental 505 Hood Road, Unit 26, Markham, Ontario L3R 5V6 Tel: (905) 948-0000 Fax: (905) 948-0577
CONTECH Stormwater Solutions Inc. 930 Woodcock Road, Suite 101, Orlando, Florida 32803 Tel: (800) 848-9955

SECTION A–A
ELEVATION VIEW



NOTE:
CONTRACTOR TO FIELD VERIFY DIMENSIONS OF OR CONCRETE SECTIONS

CDS MODEL PMSU20_15_4m
STORMWATER TREATMENT UNIT

CONTECH STORMWATER SOLUTIONS	PROJECT NAME CITY, STATE	JOB#	XX–##–###	SCALE 1" = 2'
		DATE	##/##/##	SHEET 2
		DRAWN	INITIALS	
		APPROV.		

Echelon Environmental 505 Hood Road, Unit 26, Markham, Ontario L3R 5V6 Tel: (905) 948-0000 Fax: (905) 948-0577
CONTECH Stormwater Solutions Inc. 930 Woodcock Road, Suite 101, Orlando, Florida 32803 Tel: (800) 848-9955

TECHNOLOGY ASSESSMENT • TECHNOLOGY ASSESSMENT

CERTIFICATE

OF TECHNOLOGY ASSESSMENT

CDS™ Technologies

The Ontario Ministry of the Environment has reviewed the solid/liquid separation system developed by ***CDS™ Technologies****. Based on the review of the documentation submitted by the company (see the Notable Aspects section and Appendix), and data from pilot-scale testing and full-scale operations conducted by various agencies, the Ministry concludes that the continuous deflection separation (CDS™) system can provide useful removal of solids and floatables as part of a stormwater management system.*

The CDS™ Technologies may be able to provide "basic to enhanced" level of protection when used alone, maintained for effective operation, and when appropriately designed for the development area to be serviced. CDS™ units may also be used for pretreatment in combination with other non-proprietary technologies such as man-made wetlands, treatment ponds and infiltration basins.

John Mayes, (A) Director
Standards Development Branch
Ministry of the Environment
(September 2006)

New Environmental Technology Evaluation Program

Promoting the development and application of new environmental technologies

Ontario

TECHNOLOGY ASSESSMENT • TECHNOLOGY ASSESSMENT

150 - 07 - 2000

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION
BASED ON THE RATIONAL RAINFALL METHOD
BASED ON A FINE PARTICLE SIZE DISTRIBUTION

Project Name:	3735 Saint Joseph Blvd.	**Engineer:**	**McIntosh Perry**
Location:	Ottawa, ON.	**Contact:**	Mr. Jonathon Jonker
OGS #:	-	**Report Date:**	5-Dec-14

Area	0.51	ha	**Rainfall Station #**	215	
Weighted C	0.78	(assumed)	(select from Rainfall Data column D)		
Tc	10	minutes (assumed)	**Particle Size Distribution**	FINE	
CDS Model	2015-4	(select from pulldown)	**CDS Treatment Capacity**	20	l/s

Rainfall Intensity[1] (mm/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (l/s)	Treated Flowrate (l/s)	Operating Rate (%)	Removal Efficiency (%)	Incremental Removal (%)
0.5	9.2%	9.2%	0.6	0.6	2.8	98.1	9.0
1.0	10.6%	19.8%	1.1	1.1	5.6	97.3	10.3
1.5	9.9%	29.7%	1.7	1.7	8.4	96.5	9.6
2.0	8.4%	38.1%	2.2	2.2	11.2	95.7	8.0
2.5	7.7%	45.8%	2.8	2.8	13.9	94.9	7.3
3.0	5.9%	51.7%	3.3	3.3	16.7	94.1	5.6
3.5	4.4%	56.1%	3.9	3.9	19.5	93.3	4.1
4.0	4.7%	60.7%	4.4	4.4	22.3	92.5	4.3
4.5	3.3%	64.0%	5.0	5.0	25.1	91.7	3.0
5.0	3.0%	67.1%	5.5	5.5	27.9	90.9	2.7
6.0	5.4%	72.4%	6.6	6.6	33.5	89.3	4.8
7.0	4.4%	76.8%	7.7	7.7	39.0	87.7	3.8
8.0	3.5%	80.3%	8.8	8.8	44.6	86.1	3.0
9.0	2.8%	83.2%	10.0	10.0	50.2	84.5	2.4
10.0	2.2%	85.3%	11.1	11.1	55.8	82.9	1.8
15.0	7.0%	92.3%	16.6	16.6	83.7	74.9	5.2
20.0	4.5%	96.9%	22.1	19.8	100.0	62.9	2.9
25.0	1.4%	98.3%	27.6	19.8	100.0	50.3	0.7
30.0	0.7%	99.0%	33.2	19.8	100.0	41.9	0.3
35.0	0.5%	99.5%	38.7	19.8	100.0	36.0	0.2
40.0	0.5%	100.0%	44.2	19.8	100.0	31.5	0.2
45.0	0.0%	100.0%	49.8	19.8	100.0	28.0	0.0
50.0	0.0%	100.0%	55.3	19.8	100.0	25.2	0.0
							89.2

Removal Efficiency Adjustment[2] = 6.5%

Predicted Net Annual Load Removal Efficiency = 82.7%

Predicted % Annual Rainfall Treated = 97.8%

1 - Based on 42 years of hourly rainfall data from Canadian Station 6105976, Ottawa ON

2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

STORMWATER TREATMENT UNIT
OPERATION & MAINTENANCE MANUAL

PROJECT NAME
CITY, ON
CDS JOB #

ECHELON ENVIRONMENTAL

505 Hood Road, Unit 26
Markham, ON L3R 5V6
Tel: (905) 948-0000 Fax: (905) 948-0577
Email: info@echelonenvironmental.ca
Website: www.echelonenvironmental.ca

OPERATIONS AND MAINTENANCE GUIDELINES FOR CDS® UNIT MODEL PMSU

(Continuous Deflective Separation Unit)

PROJECT NAME

1. INTRODUCTION

The CDS® unit is an important and effective component of your stormwater management program and proper operation and maintenance of the unit are essential to demonstrate your compliance with local, provincial and federal water pollution control requirements.

Your CDS® system utilizes patented "continuous deflective separation" (CDS®) technology to separate and trap debris, sediment and oil and grease from stormwater runoff. The indirect screening capability of the system allows for 100% removal of floatables and neutrally buoyant material that is larger than the screen aperture.

2. OPERATION OVERVIEW

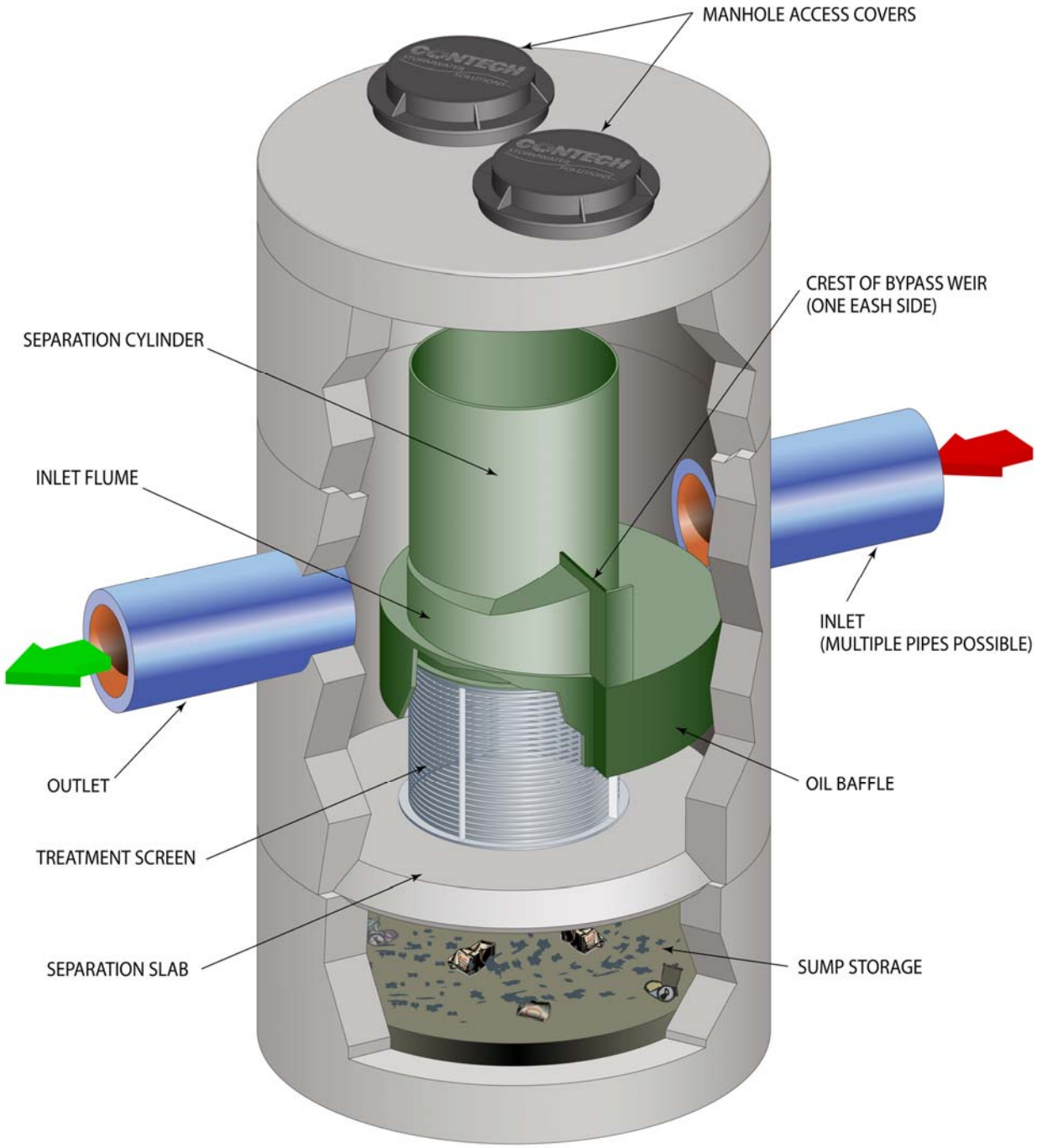
The CDS® unit is a non-mechanical hydraulically driven technology that will function any time there is flow in the storm drainage system. Stormwater enters the CDS® System (Figure 1) where the bypass weir guides the flow into the unit's separation chamber and pollutants are removed from the flow. All flows up to the system's treatment design capacity enter the separation chamber and are treated. Flows in excess of the treatment capacity spill over the bypass weir and exit the system through the outlet pipe.

Stormwater entering the CDS® System circulates in a torriodial flow path. This flow pattern helps to maintain the non-blocking attributes of the treatment screen as well as creating a hydraulic condition at the screen surface that effects pollutant separation. Treated stormwater passes through the screen into the outer volute area where it moves toward the outlet pipe and out of the system.

The separation chamber is shrouded by an integral oil baffle that traps free oil and grease that floats to the water surface during treatment.

During normal operation captured grit will fall by gravity into the lower storage sump located beneath the treatment chamber. Floatables will be captured at the water surface inside the separation chamber and oil, if present, will be located at the water surface underneath the integral oil baffle.

Figure One: In-Line CDS® Systems



3. INSPECTION OVERVIEW

The frequency of cleaning for the CDS® unit will depend upon the generation of trash and debris and sediments in each application. Cleanout and preventive maintenance schedules will be determined based on operating experience unless precise pollutant loadings have been determined. The unit should be periodically inspected to determine the amount of accumulated pollutants and to ensure that the cleanout frequency is adequate to handle the predicted pollutant load being processed by the CDS® unit. The recommended cleanout of solids within the CDS® unit's sump should occur at 85% of the sump capacity. Note that the sump may be completely full with no impact on the CDS® unit's performance.

Access to the CDS® unit is typically achieved through two manhole access covers – one allows inspection and cleanout of the separation chamber (screen/cylinder) & sump and another allows inspection and cleanout of sediment captured and retained behind the screen. The PSW & PSWC off-line models have an additional access cover over the weir of the diversion vault. Inspections of the internal components and cleanout maintenance can, in most cases, be accomplished from the ground surface without requiring entry into the unit.

IMPORTANT - CONFINED SPACE

The CDS® unit is a confined space environment and only properly trained personnel possessing the necessary safety equipment should enter the unit to perform maintenance and/or inspection. Personnel inspecting the system or performing maintenance must have proper training certification in Fall Protection and Confined Space entry as a minimum.

4. MAINTENANCE

Contech Engineered Solutions recommends the following:

NEW INSTALLATIONS – Check the condition of the unit after every runoff event for the first 30 days. The visual inspection should ascertain that the unit is functioning properly (no blockages or obstructions to inlet and/or separation screen), and should measure the amount of solid materials that have accumulated in the sump, the amount of fine sediment accumulated behind the screen, and determining the amount of floating trash and debris in the separation chamber. This can be done with a calibrated "dip stick" so that the depth of deposition can be tracked. Refer to the "Inspection Schematic" **(Appendix C)** for allowable deposition depths and critical distances. Schedules for inspections and cleanout should be based on storm events and pollutant accumulation.

ONGOING OPERATION – Once the site is established, the inspection frequency should be based on historical pollutant loading. In general, CDS sumps are sized for a cleanout frequency in the order of 12 to 24 months. If floatables accumulate more rapidly than the settleable solids, the floatables should be removed using a vactor truck or dip net before the layer thickness exceeds one to two feet.

Cleanout of the CDS® unit at the end of a rainfall season is recommended because of the nature of pollutants collected and the potential for odor generation from the decomposition of material collected and retained. This end of season cleanout will assist in preventing the discharge of pore water from the CDS® unit during summer months.

It is recommended to pump down the CDS® unit and remove pollutants at least one time per year. (This may be extended for fully developed sites that generate small pollutant loadings.) During cleanout, the internal components normally below the water line should be inspected. If any parts appear to be damage please contact Contech Engineered Solutions or Echelon Environmental to make arrangements to have the damaged items repaired or replaced:

CONTECH ENGINEERED SOLUTIONS
200 Enterprise Drive
Scarborough, ME 04074
Phone: 877-907-8676
www.conteches.com

ECHELON ENVIRONMENTAL
505 Hood Road, Unit #26
Markham, ON L3R 5V6
Phone: 905-948-0000
Email: info@echelonenvironmental.ca

CLEANOUT AND DISPOSAL

A vactor truck is recommended for cleanout of the CDS® unit and can be easily accomplished in less than 30-40 minutes for most installations. Cleanout should be conducted by a licensed waste management company. Disposal of material from the CDS® unit should be in accordance with the local municipality's requirements. During cleanout the vactor truck will evacuate all stormwater and pollutants from the CDS® unit. (Local waste receiving stations may require the solids to have minimal water content. If decanting of stormwater from the vactor truck is required then the local permitting and regulatory authority should be contacted to determine if this is permissible.) Vactor trucks are typically equipped with a power wash system that may be used to wash the screen if required.

If oil is present in the CDS® unit it should be removed separately by a licensed liquid waste hauler. The CDS® unit should be cleaned immediately if a hydrocarbon spill has occurred. CDS® Technologies only recommends the addition of sorbents to the separation chamber if there are specific land use activities in the catchment watershed that could produce exceptionally large concentrations of hydrocarbons. Alternatively, the local regulator may allow the use of sorbents to capture and remove hydrocarbons from the CDS® system. Disposal of sorbents may be less costly and disposing of an oily-water mixture creating by vacuum removal.

5. OPTIONAL FEATURES

USE OF SORBENTS FOR ENHANCED OIL CAPTURE

It should be emphasized that the addition of sorbents is not a requirement for CDS® units to effectively capture oil and grease from storm water runoff. The CDS® unit separation chamber effectively captures free oil and grease and CDS® units are also equipped with a conventional oil baffle for the capture of gross quantities. However, the addition of sorbents is a unique capability of CDS® units that enables enhanced oil and grease capture efficiencies beyond that obtainable by conventional oil baffle systems as well as permanent retention of captured oil and grease in solid form that prevents emulsification and conveyance.

Under normal operations, CDS® units will provide effluent concentrations of oil and grease that are less than 15 parts per million (ppm) for all dry weather spills where the volume is less than or equal to the spill capture volume of the CDS® unit. During wet weather flows, the oil baffle system can be expected to remove between 40 and 70% of the free oil and grease from the storm water runoff.

Contech Engineered Solutions only recommends the addition of sorbents to the separation chamber if there are specific land use activities in the catchment watershed that could produce exceptionally large concentrations of oil and grease in the runoff, or for large amounts that may be subjected to extended periods of inattention. If site evaluations merit an increased control of free oil and grease then oil sorbents can be added to the CDS® unit to thoroughly address these particular pollutants of concern.

Recommended Oil Sorbents - Rubberizer® Particulate 8-4 mesh or OARS™ Particulate for Filtration, HPT4100, or equal, available from Haz-Mat Response Technologies, Inc. 4626 Santa Fe Street, San Diego, CA 92109 (800) 542-3036. OARS™ is supplied by AbTech Industries, 4110 N. Scottsdale Road, Suite 235, Scottsdale, AZ 85251 (800) 545-8999.

The amount of sorbent to be added to the CDS® separation chamber can be determined if sufficient information is known about the concentration of oil and grease in the runoff. Frequently the actual concentrations of oil and grease are too variable and the amount to be added and frequency of cleaning will be determined by periodic observation of the sorbent. As an initial application, CDS® recommends that approximately 4 to 8 pounds of sorbent material be added to the separation chamber of the CDS® units per acre of parking lot or road surface per year. Typically this amount of sorbent results in a ½ inch to one (1") inch depth of sorbent material on the liquid surface of the separation chamber. The oil and grease loading of the sorbent material should be observed after major storm events. Oil Sorbent material may also be furnished in pillow or boom configurations.

The sorbent material should be replaced when it is fully discolored by skimming the sorbent from the surface. The sorbent may require disposal as a special or hazardous waste, but will depend on local and state regulatory requirements.

VECTOR CONTROL

Most CDS® units do not readily facilitate vector infestation. However, for CDS® units that may experience extended periods of non-operation (stagnant flow conditions for more than approximately one week) there may be the potential for vector infestation. In the event that these conditions exist, the CDS® unit may be designed to minimize potential vector habitation through the use of physical barriers (such as seals, plugs and/or netting) to seal out potential vectors. The CDS® unit may also be configured to allow drain-down under favorable soil conditions where infiltration of storm water runoff is permissible. For standard CDS® units that show evidence of mosquito infestation, the application of larvicide is one control strategy that is recommended. Typical larvicide applications are as follows:

SOLID B.t.i. LARVICIDE: ½ to 1 briquet (typically treats 50-100 sq. ft.) one time per month (30-days) or as directed by manufacturer.

SOLID METHOPRENE LARVICIDE (not recommended for some locations): ½ to 1 briquet (typically treats 50-100 sq. ft.) one time per month (30-days) to once every 4-½ to 5-months (150-days) or as directed by manufacturer.

6. RECORDS OF OPERATION AND MAINTENANCE

Contech Engineered Solutions recommends that the owner maintain annual records of the operation and maintenance of the CDS® unit to document the effective maintenance of this important component of your storm water management program. The attached **Annual Record of Operations and Maintenance** form (see **Appendix A**) is suggested and should be retained for a minimum period of three years.

APPENDIX A

CDS® UNIT RECORD OF

OPERATIONS & MAINTENANCE

CDS® UNIT RECORD OF OPERATION & MAINTENANCE

OWNER _____

ADDRESS _____

OWNER REPRESENTATIVE _____ **PHONE** _____

CDS® INSTALLATION:

MODEL DESIGNATION _____ DATE _____
SITE LOCATION _____
DEPTH FROM COVER TO BOTTOM OF SUMP (SUMP INVERT) _____
VOLUME OF SUMP _____ CUBIC METERS

INSPECTIONS:

DATE/INSPECTOR	SCREEN/INLET INTEGRITY	FLOATABLES DEPTH	DEPTH TO SEDIMENT (meters)	SEDIMENT VOLUME* (cubic meters)	SORBENT DISCOLORATION

***Calculate Sediment Volume = (Depth to Sump Invert – Depth to Sediment)*(Volume/meter)**

OBSERVATIONS OF FUNCTION: _____

_____

_____

_____

CLEANOUT:

DATE	VOLUME FLOATABLES	VOLUME SEDIMENTS	METHOD OF DISPOSAL OF FLOATABLES, SEDIMENTS, DECANT AND SORBENTS

SCREEN MAINTENANCE:
Note is Power Washing Performed: _____

CERTIFICATION: _____ **TITLE:** _____

DATE: _____

APPENDIX B

CDS® UNIT

INSPECTION CHECKLIST

Date: _____

INSPECTION CHECKLIST

1. During initial rainfall season, inspect and check condition of unit once every 30 days (as needed, thereafter) ☐

2. Ascertain that unit is functioning properly (no blockages or obstructions to inlet and/or separation screen) ☐

3. Measure amount of solid materials that have accumulated in sump ☐

4. Measure amount of fine sediment accumulated behind screen ☐

5. Measure amount of floating trash and debris in separation chamber ☐

MAINTENANCE CHECKLIST

1. Cleanout unit at beginning and end of rainfall season ☐

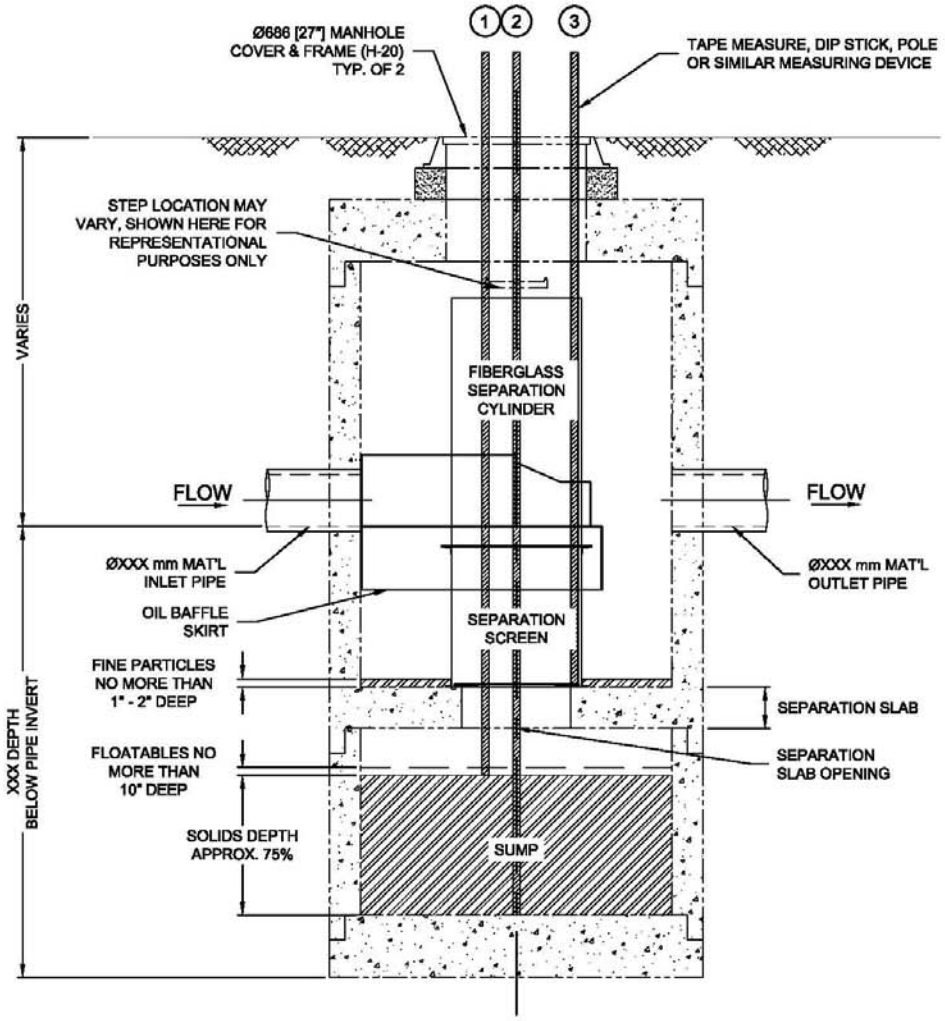
2. Pump down unit (at least once a year) and thoroughly inspect separation chamber, separation screen and oil baffle ☐

3. No visible signs of damage to internal components observed ☐

APPENDIX C

INSPECTION SCHEMATIC

ELEVATION VIEW



CDS MODEL
STORM WATER TREATMENT UNIT
INSPECTION SCHEMATIC

ALL UNITS IN mm UNLESS NOTED OTHERWISE.

CONTECH ENGINEERED SOLUTIONS LLC
www.contechES.com
200 Enterprise Drive, Scarborough, ME 04074
877-907-8676 207-885-9830 207-885-9825 FAX

PROJECT NAME
CITY, PROVINCE
SITE DESIGNATION: OGS ID

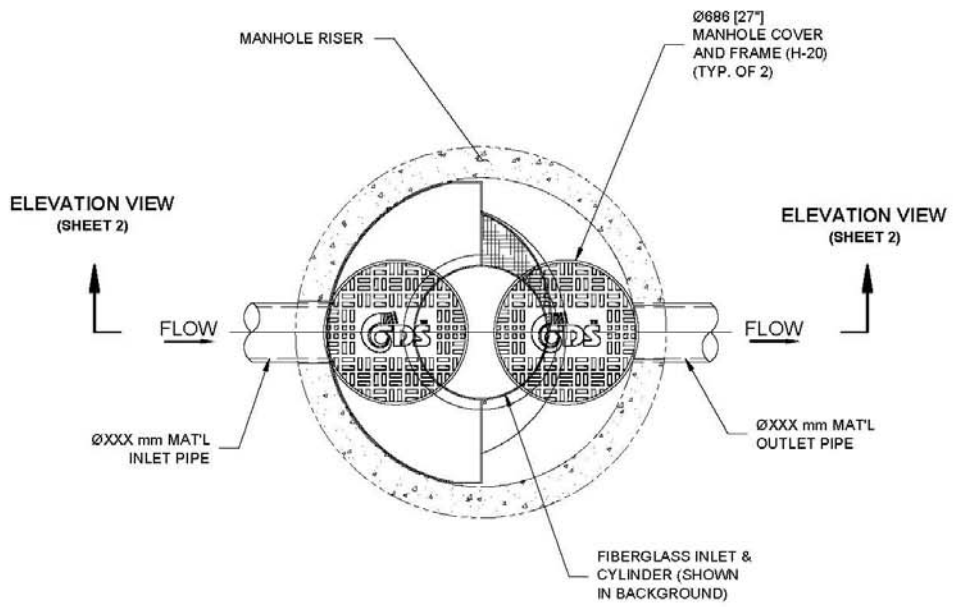
JOB No.: ###-#####-###	SCALE: 1:30
DATE: XX/XX/XXXX	SHEET: 1
DRAWN: —	
APPROV.:	

Echelon Environmental, 505 Hood Road, Unit 26, Markham, Ontario L3R 5V6 Tel: (905) 948-0000 Fax: (905) 948-0577

APPENDIX D

CLEANOUT SCHEMATIC

PLAN VIEW



CDS MODEL
STORM WATER TREATMENT UNIT
CLEANOUT SCHEMATIC

ALL UNITS IN mm UNLESS NOTED OTHERWISE.

CONTECH ENGINEERED SOLUTIONS LLC
www.contechES.com
200 Enterprise Drive, Scarborough, ME 04074
877-907-8676 207-885-9830 207-885-9825 FAX

PROJECT NAME
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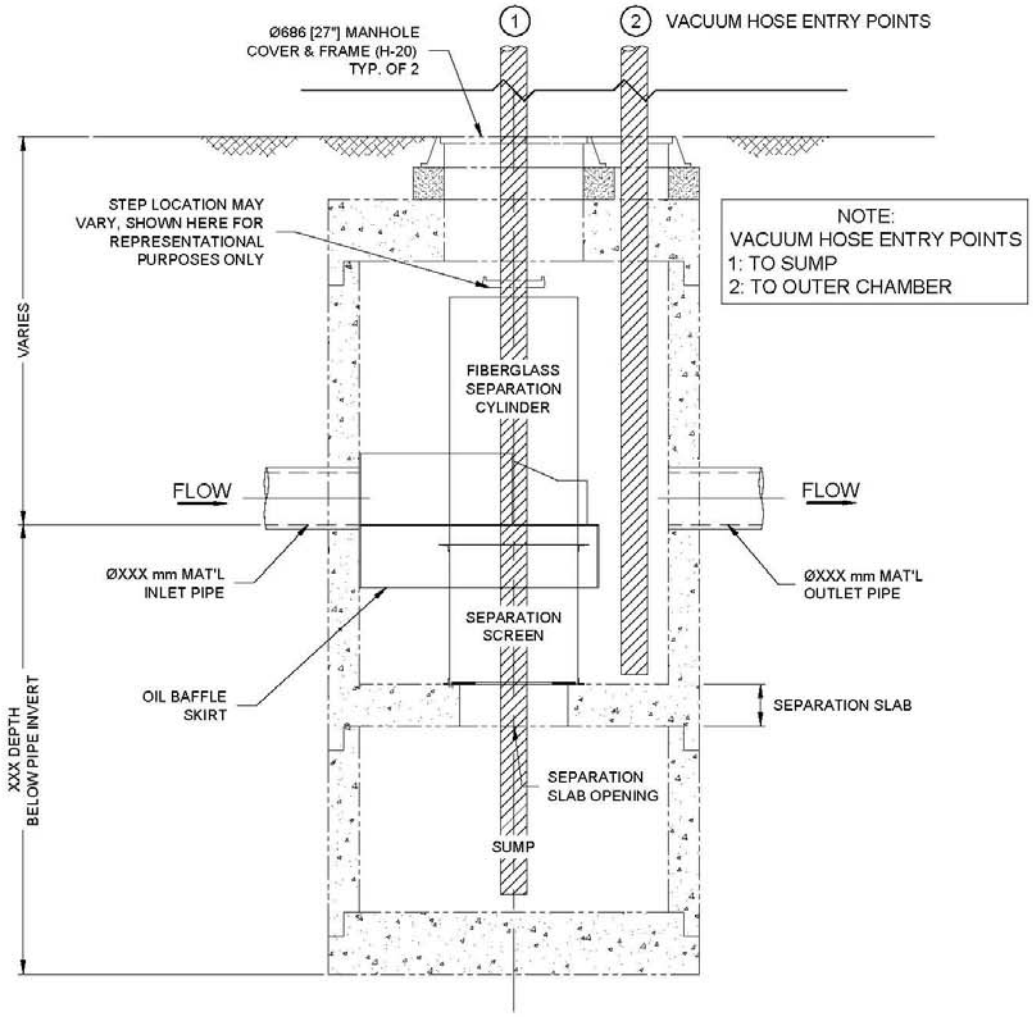
SITE DESIGNATION: OGS ID

JOB No. : ###-####-###	SCALE : 1:30
DATE : XX/XX/XXXX	SHEET : 1
DRAWN : ---	
APPROV. :	

Echelon Environmental, 505 Hood Road, Unit 26, Markham, Ontario L3R 5V6 Tel: (905) 948-0000 Fax: (905) 948-0577

ELEVATION VIEW



CDS MODEL
STORM WATER TREATMENT UNIT
CLEANOUT SCHEMATIC

ALL UNITS IN mm UNLESS NOTED OTHERWISE.

CONTECH ENGINEERED SOLUTIONS LLC
www.contechES.com
200 Enterprise Drive, Scarborough, ME 04074
877-907-8676 207-885-9830 207-885-9825 FAX

PROJECT NAME
CITY, PROVINCE
SITE DESIGNATION: OGS ID

JOB No.: ###-####-###	SCALE: 1:30
DATE: XX/XX/XXXX	SHEET: 2
DRAWN: ---	
APPROV.:	

Echelon Environmental, 505 Hood Road, Unit 26, Markham, Ontario L3R 5V6 Tel: (905) 948-0000 Fax: (905) 948-0577

APPENDIX E

AS-BUILT CDS® UNIT

PLAN & PROFILE

DRAWINGS

TEMPEST Product Submittal Package

Date: September 28, 2018

Customer: McIntosh Perry

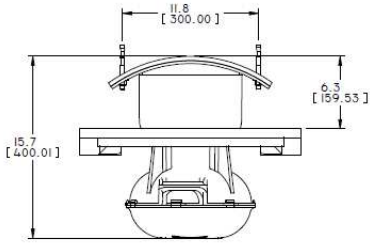
Contact: Sean Leflar

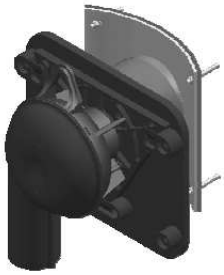
Location: Ottawa

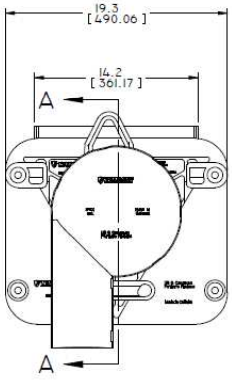
Project Name: 3735 St Joseph Boulevard

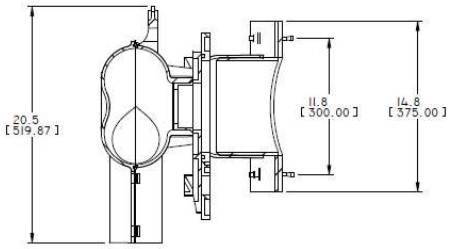
IPEX

Tempest LMF ICD Rd Shop Drawing









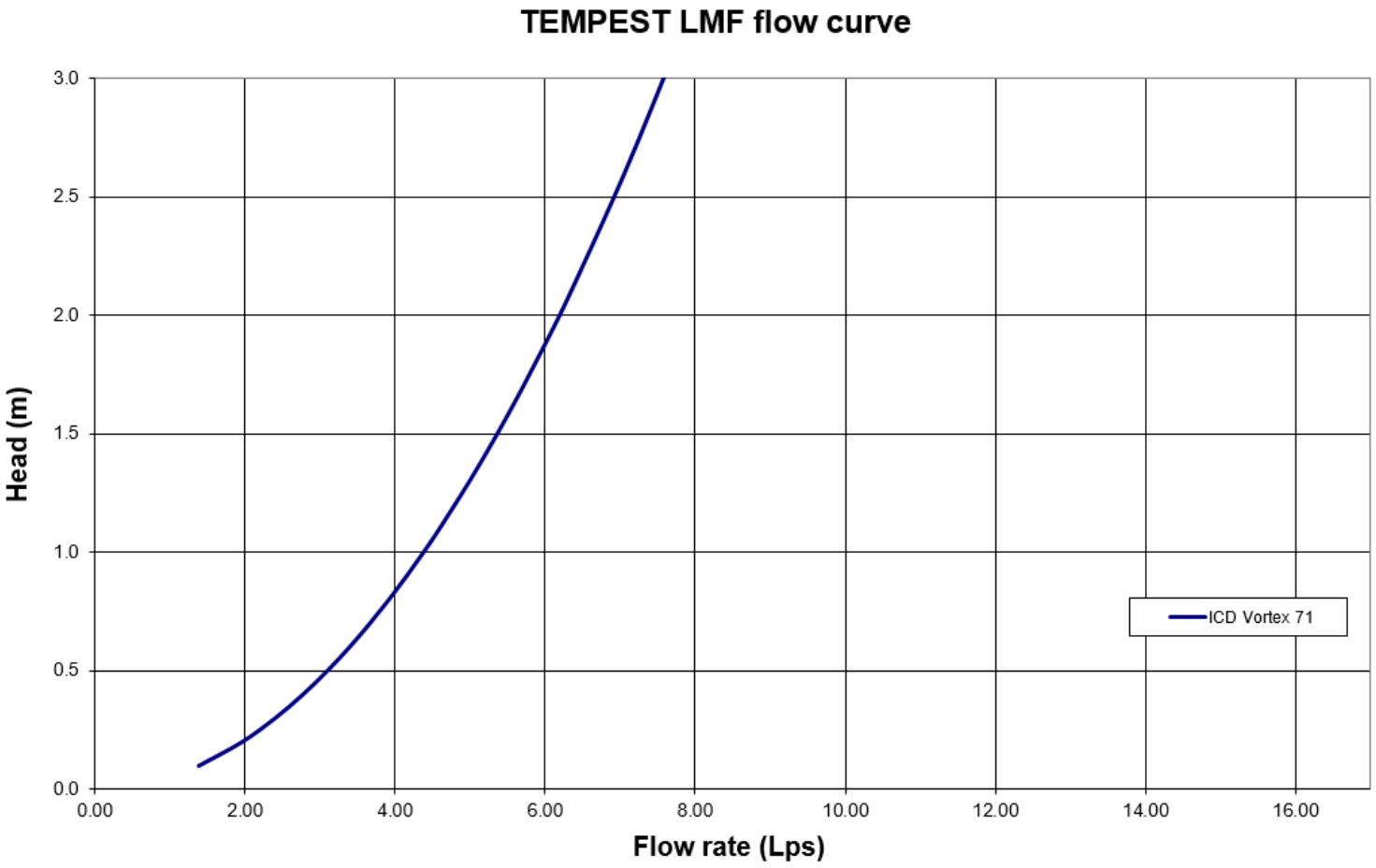
SECTION A-A

IPEX TECHNOLOGIES INC.					
PROJECTION	UNITS	TITLE	LMF ROUND CB ASSEMBLY		
	in (mm)				
DRAWN BY	DATE	SIZE	SCALE(S)	SHEET	
H. M-MARTIN	2011-07-26	B	1/6	1 OF 1	
VERIFIED BY	DATE	DRAWING NUMBER		REV	
	2011-07-26	09174-FA0002R03		3	

IPEX

LMF ICD Flow Curve

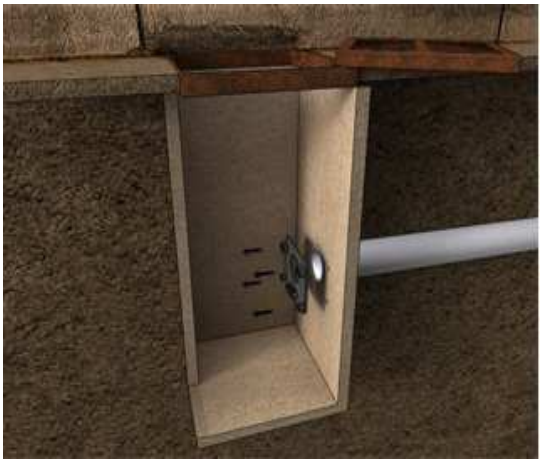
Flow: **6.51 L/s**
Head: **2.20 m**

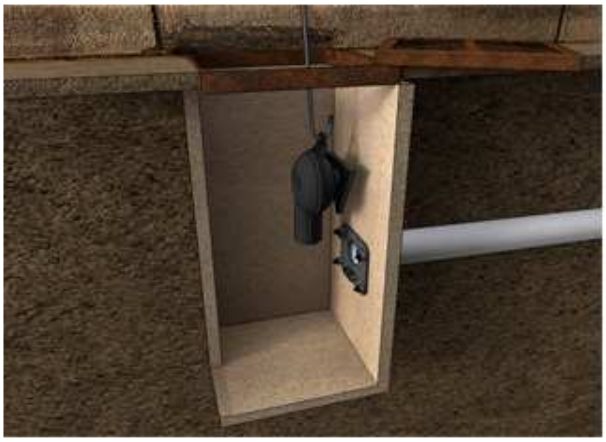


IPEX

Square CB Installation Notes:

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



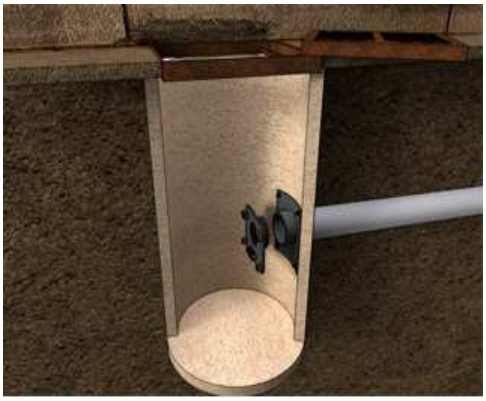


IPEX

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

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






CAUTION/WARNING/DISCLAIM:

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

IPEX

IPEX TEMPEST Inlet Control Devices Technical Specification

General

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

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

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

ICD's must have no moving parts.

Materials

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

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

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

All hardware will be made from 304 stainless steel.

Dimensioning

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

Installation

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

APPENDIX H
CITY OF OTTAWA DESIGN CHECKLIST

McINTOSH PERRY

City of Ottawa

4. Development Servicing Study Checklist

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

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

4.1 General Content

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

• Identification of existing and proposed infrastructure available in the immediate area.	N/A
• Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).	Site Grading, Drainage, Sediment & Erosion Control Plan (C101)
• Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	Site Grading, Drainage, Sediment & Erosion Control Plan (C101)
• Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.	N/A
• Proposed phasing of the development, if applicable.	N/A
• Reference to geotechnical studies and recommendations concerning servicing.	Section 2.0 Backround Studies
• All preliminary and formal site plan submissions should have the following information: 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, Drainage, Sediment & Erosion Control Plan (C101)

4.2 Development Servicing Report: Water

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

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

4.3 Development Servicing Report: Wastewater

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

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

4.4 Development Servicing Report: Stormwater Checklist

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

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

• Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Section 7.0 Sediment & Erosion Control
• Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	N/A
• Identification of fill constraints related to floodplain and geotechnical investigation.	N/A

4.5 Approval and Permit Requirements: Checklist

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

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

4.6 Conclusion Checklist

Criteria	Location (if applicable)
• Clearly stated conclusions and recommendations	Section 8.0 Summary Section 9.0 Recommendations
• Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.	All are stamped
• All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario	All are stamped