CEPEO Elementary School Louise-Arbour 45 Oak Street - Servicing and Stormwater Management Report

Stantec

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Limitations: Design analysis, drawings, and reports for municipal and private water distribution systems, gravity storm and sanitary sewers, stormwater management, roadways, grading and erosion control.
Association of Professional Engineers of Ontario

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1 Background

Stantec Consulting Ltd. has been commissioned by the City of Ottawa to prepare the following Servicing and Stormwater Management Report for a proposed school to be located on the north side of Oak Street (45 Oak Street) within the 1010 Somerset Street complex. The current application is for a 4-storey school with 467 students, 88 daycares, and 100 staff but due to anticipated future upgrades a 6-storey school with 847 students, 88 daycares, and 100 staff has been considered in this analysis. The overall subject property comprised of the school, access road, and landscaped areas is approximately 0.32 ha with approximately 0.16 ha proposed for the new school. Surrounding areas of the 1010 Somerset Street complex will also be developed to support the function of the new school. An existing parking lot is currently established on the subject property. The site limits are indicated in **Figure 1** below.

The intent of this report is to provide a servicing scenario for the site that is free of conflicts, provides on-site servicing in accordance with City of Ottawa design guidelines, and utilizes the existing local infrastructure in accordance with the guidelines outlined per consultation with City of Ottawa staff. The location of the site is provided in **Figure 1** below.

Figure 1: Key Map of Site

2 References

Supporting documents referenced in support of this report include:

- *City of Ottawa Sewer Design Guidelines* (SDG), City of Ottawa, October 2012, including all subsequent technical bulletins
- *City of Ottawa Design Guidelines – Water Distribution*, City of Ottawa, July 2010, including all subsequent technical bulletins
- *Design Guidelines for Drinking Water Systems*, Ministry of the Environment, Conservation, and Parks (MECP), 2008
- *Fire Protection Water Supply Guideline* for Part 3 in the Ontario Building Code, Office of the Fire Marshal (OFM), October 2020
- *Water Supply for Public Fire Protection*, Fire Underwriters Survey (FUS), 2020
- *Fire Code*, National Fire Protection Agency, 2012
- *1010 Somerset Street - Adequacy of Services*, Stantec Consulting Ltd., 160402067, June 2025
- *Geotechnical Investigation – Proposed School Development 1010 Somerset Street West*, Paterson Group, PG7468-1, March 2025
- *Gladstone Village, 933 Gladstone Avenue – Stormwater Management and Servicing Report*, Stantec Consulting Ltd., December 2022

- Details of the existing infrastructure located within the adjacent public roads are obtained from available City of Ottawa as-built records and GeoOttawa.

3 Potable Water Servicing

The proposed development comprises of a 4-storey school (with anticipated future upgrades to a 6-storey school), complete with associated landscaped areas and access roads. The proposed development is located within Pressure Zone '1W' of the City of Ottawa's water distribution system. A 150 mm diameter PVC watermain exists south of the site within Oak Street as shown on **Drawing SSP-1**. The site will be serviced through two 150mm building service connection to the existing 150mm diameter watermain within the Oak Street ROW at the southern boundary of the site. The location of any existing water service laterals shall be confirmed prior to construction and blanked at the main as part of the servicing works.

3.1.1 Boundary Conditions

The assessed domestic water and fire flow demands are used to confirm the level of servicing available to the proposed development from the adjacent municipal watermain and hydrants. Average proposed ground elevations of the site are approximately 59.5 m. The associated hydraulic grade line (HGL) elevation boundary conditions provided by the City of Ottawa (see **Appendix A.1** for correspondence) are summarized in **Table 3.1**.

Table 3.1: Boundary Conditions

HGL Condition	Elevation (m)
Minimum HGL	107.3
Maximum HGL	114.9
Max. Day + Fire Flow (83.3 L/s) HGL	106.3

3.2 Water Demands

3.2.1 Domestic Water Demands

Water demands for the proposed development were estimated using the Ministry of Environment's Design Guidelines for Drinking Water Systems (2008) and the City of Ottawa Design Guidelines – Water Distribution (2010). A conservative daily demand rate of 90 L/person/day was applied for the population of the proposed site as per Appendix 4A of the City of Ottawa Sewer Design Guidelines. Population counts have been provided by Hobin Architecture (refer to **Appendix A.4** for confirmations from the architect). It has been assumed that the proposed school will house 847 students, 88 daycares, and 100 staff in the ultimate condition. The school construction is to be broken out into two phases, with 4-storeys being constructed in Phase 1 which will house 467 students, 88 daycares, and 100 staff. The remaining 380 students will be included in a 2-storey addition in Phase 2. See **Appendix A.2** for detailed domestic water demand estimates.

The ultimate average day demand (AVDY) for the site was determined to be 1.1 L/s. The maximum day demand rate (MXDY) is 1.5 times the AVDY for institutional areas, which results in 1.6 L/s. The peak hour demand rate (PKHR) is 1.8 times the MXDY which was determined to be 2.9 L/s. Since the average day demand exceeds 50 m^3/day (0.58 L/s), a dual water service connection is required as per the City of Ottawa Design Guidelines for Water Distribution.

3.2.2 Fire Flow and Hydrant Capacity

Fire Underwriters Survey (FUS) methodology was used to determine the fire flow required for the proposed building. The building was considered to be of non-combustible construction with a sprinkler system. Vertical openings are assumed to be protected, and the occupancy and contents factor has been considered for limited combustible materials. Refer to **Appendix A.4** for the confirmation from the architect regarding the assumptions made. Based on calculations per the FUS guidelines (see **Appendix A.3),** the minimum required fire flows for this development are 83.3 L/s (5,000L/min).

Fire hydrant capacity is assessed based on Table 18.5.4.3 of the National Fire Protection Agency (NFPA) Fire Code document. A hydrant situated less than 76 m away from a building can supply a maximum capacity of 5,678 L/min, and a hydrant 76 to less than 152 m away can supply a maximum capacity of 3,785 L/min.

The closest hydrant is located on Oak Street at the southern boundary of the subject property and is within 90m of the proposed building as per City of Ottawa Guidelines for Water Distribution. The building is to be sprinklered and a Siamese (fire department) connection provided. The fire department connection is within 45m of the existing fire hydrant as indicated on **Drawing SSP-1** so adequate fire hydrant capacity (5,678 L/min as per on Table 18.5.4.3 of the NFPA Fire Code document) is available to service the proposed building.

3.3 Proposed Servicing

Domestic water supply pressures are required to range within the guidelines of 50-80 psi and no less than 275 kPa (40 psi) at the ground elevation on the streets (i.e., at hydrant level) specified in the City of Ottawa Design Guidelines for Water Distribution. Maximum day demand rates in addition to fire flow demands must result in a residual pressure at the main above the required minimum 140 kPa (20 psi).

Based on boundary conditions provided by the City of Ottawa and an approximate elevation of 59.5m, adequate domestic water supply is available for the subject site with pressures ranging from 47.8 m (68.1 psi) to 55.4 m (78.8 psi). This pressure value is within the guidelines of 50-80 psi specified in the City of Ottawa Design Guidelines for Water Distribution.

Since the proposed building is 6-storeys in height, an additional 34 kPa (5 psi) for every additional storey (above 2 storeys) is required to account for the change in elevation head and additional head loss when determining available pressure at upper building floors. Given that the available pressure is expected to be 469.5 kPa (68.1 psi) at ground level, the resultant equivalent pressure at the 6th floor will be approximately 331.6 kPa (48.1 psi), within the City’s minimum objective pressure value. As a result, building booster pump(s) are not anticipated to be required to maintain an acceptable level of service on the higher floors.

The boundary conditions provided for the proposed development under maximum day demands and fire flow conditions demonstrate that a fire flow rate of 83.3 L/s is available while maintaining a residual pressure above the required minimum 20 psi. The residual pressure in the system while providing maximum day demand plus a fire flow of 83.3 L/s is anticipated to be 46.8 m (66.5 psi). This demonstrates that sufficient fire flow is available for the proposed development for the fire flow requirement of 83.3 L/s.

The mechanical engineering consultant is responsible to confirm the service sizes required, the requirement for booster pumps, and that the water pressure within the building is adequate to meet building code requirements. This confirmation is to occur during subsequent stages of the development application process.

3.4 Summary of Findings

The proposed development is in an area of the City's water distribution system that has sufficient capacity to provide both the required domestic and emergency fire flows. Based on boundary conditions provided by City of Ottawa staff shown in **Appendix A.1**, it is anticipated that there is sufficient supply and pressure in the proposed water distribution system to meet the demands expected from the new development.

4 Wastewater Servicing

4.1 Existing Conditions

An existing 250 mm diameter PVC sanitary and 375 mm diameter PVC combined sewer runs from west to east on Oak Street, immediately south of the subject site. A proposed 250 mm diameter service lateral connection is to be made via new maintenance hole installed within the existing 250 mm diameter sewer line along Oak Street to service the proposed site (see **Drawing SSP-1**). The location of any existing sanitary service laterals shall be confirmed prior to construction and be abandoned as part of the servicing works.

4.2 Design Criteria

As outlined in the City's Sewer Design Guidelines and the MECP Design Guidelines for Sewage Works, the following criteria were used to calculate estimated wastewater flow rates and to preliminarily size on-site sanitary sewers:

- Minimum full flow velocity – 0.6 m/s
- Maximum full flow velocity – 3.0 m/s
- Manning's roughness coefficient for all smooth walled pipes – 0.013
- Minimum size – 250mm dia. for non-residential areas
- Peaking factor if ICI in contributing area is > 20% – 1.5
- Peaking factor if ICI in contributing area is < 20% – 1.0
- Extraneous flow allowance – 0.33 L/s/ha
- Harmon Correction Factor – 0.8
- Maintenance hole spacing – 120 m
- Minimum cover – 2.5 m

4.3 Proposed Servicing

The proposed site will be serviced by gravity sewers which will direct the wastewater flows (approx. 1.7 L/s with allowance for infiltration) to the existing 250 mm diameter PVC sanitary sewer on Oak Street. A sanitary sewer design sheet for the proposed service lateral is included in **Appendix B**. Full port backwater valves are to be installed on all sanitary services within the site to prevent any surcharge from the downstream sewer main from impacting the proposed property. A sump pump is also required in the proposed building to discharge internal sewage into the proposed sanitary sewer

The anticipated peak wastewater flows for the proposed development were provided to the City of Ottawa staff to evaluate the adequacy of the receiving municipal sanitary sewer system in the vicinity of the site and downstream network. Refer to **Appendix B.2** for City correspondence confirming available capacity in the downstream sewer in Oak Street.

The mechanical engineering consultant is responsible to confirm the service sizes required and that the appropriate backwater valve and sump pump requirements are satisfied. This confirmation is to occur during subsequent stages of the development application process.

5 Stormwater Management

5.1 Objectives

The objective of this stormwater management plan is to determine the measures necessary to control the quantity and quality of stormwater released from the proposed development to criteria established during the pre-consultation process, and to provide sufficient detail for approval and construction.

5.2 SWM Criteria and Constraints

Criteria were established by combining current design practices outlined by the City of Ottawa Design Guidelines (2012), and through consultation with City of Ottawa staff. The following summarizes the criteria, with the source of each criterion indicated in brackets:

General

- Wherever feasible and practical, site-level measures should be used to reduce and control the volume and rate of runoff. (City of Ottawa).
- Use of the dual drainage principle (City of Ottawa).
- Assess impact of 100-year event outlined in the City of Ottawa Sewer Design Guidelines on major & minor drainage system (City of Ottawa)
- Water Quality Control: provide enhanced levels of protection of 80% for total suspended solids removal.

Storm Sewer & Inlet Controls

- Proposed site to discharge the existing 375 mm diameter storm sewer on Oak Street south of the subject site.
- Proposed access road to discharge to the existing 300 mm diameter storm sewer on Oak Street south of the subject site. Peak flow to be restricted to the full flow capacity of the Oak Street sewers.
- Any storm events greater than the established 2-year allowable release rate, up to and including the 100-year storm event, shall be detained on-site. For events greater than 100 years, spillage must be directed to a public ROW and not to neighboring private property.
- The pre-development runoff coefficient to be determined as per existing conditions but in no case more than 0.5.
- Minor system inflow to be sized to convey the 2-year storm event, under free-flow conditions using City of Ottawa I-D-F parameters (City of Ottawa).

- The time of concentration (Tc) used to determine the pre-development condition should be calculated. Tc should not be less than 10 min.
- Tc of 10 minutes shall be used for all post-development calculations.

Surface Storage & Overland Flow

- Building openings to be a minimum of 0.30 m above the 100-year water level (City of Ottawa).
- Provide adequate emergency overflow conveyance off-site (City of Ottawa).
- There shall be no surface ponding on private parking areas during the 2-year storm rainfall event.

5.3 Existing Conditions

The site area currently consists of existing open space and parking areas. The majority of the runoff from the site currently drains to the Plouffe Park stormwater relief area and an existing ditch inlet catch basin north of the proposed site with a small area draining uncontrolled to Oak Street. There is no external drainage area draining into this property. There is also an existing network of catch basins that collect drainage from the adjacent 1010 Somerset Street and Plant Recreation Centre properties and ultimately discharge to the existing Preston Street storm sewers. The location, size, and elevation of the existing catch basin network should be confirmed by the contractor prior to construction. The current pre-development drainage pattern is illustrated on **Drawing EXSD-1**.

The overall existing condition rational method runoff coefficient of the drainage area to be captured in the proposed storm sewer network is assessed at C = 0.55.

5.4 Stormwater Management Design

In the interim condition for the 1010 Somerset Street Complex, the existing Plant Recreation Center parking lot will be retained and a temporary access road to service the school will be connected to Somerset Street. The existing drainage patterns to the network of catch basins in these areas are to be retained in the interim condition. During the full buildout of the 1010 Somerset Street Complex the drainage areas and catch basin network will be modified as required to suit the proposed works (to be determined as part of a separate application by others).

The SWM strategy for the proposed site is to provide roof storage and underground stormwater storage to attenuate peak flows to the downstream system to the allowable release rate. The proposed building will retain stormwater on the rooftop by installing restricted flow roof drains. Additionally, controlled drainage areas for surface drainage components within the rear yard and access road will allocate stormwater flows to underground storage pipes. The underground storage pipes will be controlled through the use of inlet control devices (ICD's) and outlet via gravity to the downstream storm sewers. Due to grading constraints and to ensure the existing adjacent catch basin network capacity is not exceeded, drainage from the northern access road and southern park block has been accounted for as part of this analysis.

The release rate from the proposed access road to the existing Oak Street storm sewers is to be restricted to the full flow capacity of the downstream sewers on Oak Street to minimize the extent of sewer upsizing required.

The intent of the stormwater management plan presented herein is to mitigate any negative impact that the proposed development will have on the existing storm sewer infrastructure, while providing adequate capacity to service the proposed buildings, parking and access areas. The proposed stormwater management plan is designed to detain runoff on site and within subsurface storage to ensure that peak flows after construction will not exceed the allowable site release rate detailed below.

The proposed site plan, drainage areas, runoff coefficients, and proposed storm sewer infrastructure are shown on **Drawing SD-1**.

5.4.1 Quality Control

Enhanced level of quality control equivalent to 80% total suspended solids (TSS) removal will be provided to treat runoff from the proposed access road and school yard through oil/grit separators or approved equivalent. The proposed Stormceptor EFO4 has been sized to provide 94% and 96% TSS removal respectively from the contributing areas. For further details regarding the sizing and specifications of the Stormceptor EFO4 see **Appendix C.4**.

5.4.2 Allowable Release Rate

The Modified Rational Method was employed to assess the rate of runoff generated during pre-development conditions. Based on consultation with City of Ottawa staff, the peak post-development discharge from the subject site to be controlled to the 2-year predevelopment release rate, to a maximum runoff coefficient C of 0.5. The predevelopment release rate for the area has been determined using the rational method based on the criteria above. A time of concentration for the predevelopment area (10 minutes) was assigned based on the relatively small site and its proximity to the existing drainage outlet for the site. Peak flow rates have been calculated using the rational method as follows:

$$\boldsymbol{Q} = \mathbf{2.78}\ (\boldsymbol{C})(\boldsymbol{I})(\boldsymbol{A})$$

Where:
$\boldsymbol{Q} = peak\ flow\ rate, L/s$
$\boldsymbol{C} = site\ runoff\ coefficient$
$\boldsymbol{I} = rainfall\ intensity, mm/hr\ (per\ City\ of\ Ottawa\ 5-year\ IDF\ curves)$
$\boldsymbol{A} = drainage\ area, ha$

The target release rate for the site is summarized in **Table 2** below. The release rate from the proposed access road to the existing Oak Street storm sewers has been restricted to the capacity of the existing storm sewer to limit the length of sewer to be upsized. The existing peak flows to the Oak Street storm sewers (75.9 L/s) have been obtained from the Gladstone Village, 933 Gladstone Avenue – Stormwater Management and Servicing Report prepared by Stantec Consulting, dated December 13, 2022. As-built information used to calculate the full flow capacity of the Oak Street storm sewers (95.3 L/s) has been obtained from drawings PP-1 and PP-4 from the Gladstone Village 933 Gladstone Avenue development prepared by Stantec Consulting, dated January 25, 2024. Based on these values, the remaining residual capacity of the existing storm sewer on Oak Street is 19.4 L/s. This has been subtracted from the total allowable release rate from the site to determine the target flow rate for the school and rear yard amenity area.

Table 2: Target Stormwater Release Rate

Design Storm	Target Flow Rate (L/s)
Access Road Outlet to Oak Street 2 and 100-year storm (restricted to the existing storm sewer capacity)	19.4
School and Yard 2 and 100-year storm	39.3
Total Site 2 and 100-year storm	58.7

5.4.3 Storage Requirements

The site requires quantity control measures to meet the restrictive stormwater release criteria. The use of controlled rooftop storage in addition to underground storage pipes with ICD's are proposed to reduce site peak outflow to the allowable target release rates.

5.4.3.1 Rooftop Storage

It is proposed to detain stormwater within the rooftop area by installing restricted flow roof drains. Roof flows will be directed to the proposed building storm service and discharge downstream of all ICD's. The following calculations assume that roofs will be equipped with Watts Model Adjustable Accutrol Roof Drains open at 50%.

Watts Drainage "Accutrol" roof drain weir data has been used to calculate a practical roof release rate and detention storage volume for the rooftops. It should be noted that the "Accutrol" weir has been used as an example only, and that other products may be specified for use, provided that the total roof drain release rate is restricted to match the maximum rate of release indicated in **Table 3**, and that sufficient roof storage is provided to meet (or exceed) the resulting volume of detained stormwater. Storage volume and controlled release rate are summarized in **Table 3**:

Table 3: Summary of Rooftop Storage (2 & 100-Year Events)

Storm Return Period	Area ID	Ponding Depth (mm)	Discharge (L/s)	$V_{required}$ (m^3)	$V_{available}$ (m^3)
2-year	R111A	99	5.7	18.7	64.0
100-year	R111A	149	7.5	62.8	64.0

5.4.3.2 Subsurface Storage

It is proposed to detain stormwater within underground storage pipes within the rear yard amenity area and the access road. The Modified Rational Method was used to determine the peak volume requirement for the underground storage pipes. The majority of the site was captured and directed to the underground storage pipes where it will be temporarily stored then released via gravity to the downstream storm sewers.

Table 5 summarizes the flow rates and volume of stormwater in the two underground storage pipes in the 2-year and 100-year storm events.

Table 5: Peak Controlled (Tributary) 2- and 100-Year Release Rates

Storm Return Period	Area ID	Area (ha)	Runoff 'C'	$Q_{release}$ (L/s)	V_{stored} (m^3)	$V_{available}$ (m^3)
2-year	L102A	0.17	0.77	14.5	8.1	33.8
100-year	L102A	0.17	0.96	30.5	30.5	33.8
2-year	L107A, L107B, L107C	0.22	0.82	9.6	19.7	79.4
100-year	L107A, L107B, L107C	0.22	1.00	19.2	66.6	79.4

Coordination with the architect and the landscape architect will be required to determine the ideal location for the rear yard amenity area underground storage pipe to ensure that no conflicts exist, and any constraints are adequately managed.

5.4.4 Interim External Area

In the interim condition for the 1010 Somerset Street Complex, the existing Plant Recreation Center parking lot will be retained and a temporary access road to service the school will be connected to the existing access road to the north and ultimately connect to Somerset Street. The existing drainage patterns to the network of catch basins in these areas are to be retained in the interim condition. An AxC comparison of the pre-development to post-development drainage has been included in **Appendix C.3,** is illustrated on drawings **EXSD-1** and **SD-1** and summarized in **Table 5-4** below.

This comparison demonstrates an overall reduction in drainage being directed to the existing storm sewer networks to remain in the adjacent external areas.

Table 5-4: Pre-development to Pose-development Interim External Area Comparison

Outlet	Pre-development AxC	Post-development AxC	Pre to Post AxC Difference (%)
Preston Street	0.498	0.480	-3.6
Somerset Street (uncontrolled)	0.030	0.030	0.0
Champagne Avenue	0.697	0.426	-38.9
Plouffe Park	0.034	0.000	-100.0

5.4.5 Results

Table 5-5 demonstrates that the proposed stormwater management plan provides adequate attenuation storage to meet the target peak outflow for the site while also not exceeding the full flow capacity of the existing upstream sewers within Oak Street to limit the required extent of sewer upsizing. A portion of the existing 375 mm diameter storm sewer on Oak Street downstream of the rear yard amenity area connection is required to be upsized to accommodate the total peak flows from the proposed site as shown on **Drawing SD-1.**

Table 5-5: Estimated Post-Development Discharge (2-Year, and 100-Year)

	2-Year Peak Discharge (L/s)	100-Year Peak Discharge (L/s)
Controlled Access Road Underground Storage Discharge To Oak Street	9.6	19.2
Upstream Oak Street Target	**19.4**	
Controlled Roof Discharge	5.7	7.5
Controlled Rear Yard Amenity Underground Storage Discharge	14.5	30.5
Uncontrolled Sheet Flow	0.0	0.0
Total	**29.7**	**57.2**
Total Target	**58.7**	

5.5 Proposed Stormwater Servicing

The proposed 0.32 ha development area is to contain a 4-storey school (with anticipated future upgrades to a 6-storey school). The site will be serviced by the existing 375 mm diameter concrete storm sewer southwest of the subject site and the existing 300 mm diameter storm sewer on Oak Street south of the subject site. A portion of the existing 375 mm diameter storm sewer on Oak Street is required to be upsized to accommodate the peak flows from the proposed site. Stormwater detention infrastructure through the use of an underground stormwater storage pipes will be provided onsite and discharged from the proposed development at a controlled flow rate. Due to the depth of the basement level, storm sump pumps will be required to discharge the foundation drains. Full port backwater valves are to be installed on all storm services within the site to prevent any surcharge from the downstream storm sewer main from impacting the proposed property. See **Drawings SSP-1** and **SD-1** for the proposed locations of the stormwater infrastructure.

The mechanical engineering consultant is responsible to confirm sizing of the sump pumps and services to the building, that the appropriate backwater valve requirements are satisfied, and that any roof drainage systems and pumping systems are adequate for accommodating the 100-year design storm conditions. This confirmation is to occur during subsequent stages of the development application process

6 Grading and Drainage

The proposed development measures approximately 0.32 ha in area and the majority of the runoff from the site currently drains to the Plouffe Park stormwater relief area and an existing ditch inlet catch basin north of the proposed site with a small area draining uncontrolled to Oak Street. A detailed grading plan (see **Drawing GP-1**) has been provided to satisfy the stormwater management requirements and provide for minimum cover requirements for storm and sanitary sewers where possible. Site grading has been established to provide emergency overland flow routes required for stormwater management in accordance with City of Ottawa requirements.

In the interim condition for the 1010 Somerset Street Complex, the existing Plant Recreation Center parking lot will be retained and a temporary access road to service the school will be connected to the existing access road to the north and ultimately connect to Somerset Street. During the full buildout of the 1010 Somerset Street Complex the grading in these areas will be modified as required to suit the proposed works (to be determined as part of a separate application by others).

Grading design has been based on the existing topography and the requirement to route overland flows from the proposed development to the adjacent ROW's. Given the current topography, site grading has been designed to match the existing boundaries of the site as well as the existing Plant Recreation Centre building. Major system flows from the development will be directed to Somerset Street and Oak Street and ultimately the Plouffe Park storm relief area as per existing conditions.

Building footing elevations are to be confirmed by the structural consultant to ensure proper interaction with anticipated groundwater levels and service laterals.

7 Utilities

Hydro, gas, and cable servicing are anticipated to be readily available for the development, as the site lies within a mature residential and institutional area and the existing buildings within the 1010 Somerset Street complex are presumed to be currently serviced by all utilities listed. The exact size, location, and routing of utilities, including determining whether off-site works are required to extend any additional utility services to the property, shall be finalized after design circulation and coordinated by the Electrical Consultant.

Several overhead hydro wires servicing the site may need to be removed, relocated, or buried as part of the site servicing works.

8 Approvals

An Environmental Compliance Approval (ECA) from the Ontario Ministry of Environment, Conservation, and Parks (MECP) is anticipated be required for the proposed servicing works as all they do not meet the exemption criteria of servicing a single property parcel since drainage is collected from the surrounding City lands. It is expected that the proposed shared SWM works will require an ECA which is anticipated to be under transfer of review. The municipal sewer upsizing within Oak Street is anticipated to be governed by the Consolidated Linear Infrastructure Environmental Compliance Approval (CLI ECA) process.

Requirement for a MECP Permit to Take Water (PTTW) for pumping during construction of the underground parking area will be confirmed by the geotechnical consultant.

9 Erosion Control During Construction

Erosion and sediment control measures must be implemented during construction. The following recommendations will be included in the contract documents.

1. Implement best management practices to provide appropriate protection of the existing and proposed drainage system and the receiving water course(s).
2. Limit the extent of the exposed soils at any given time.
3. Re-vegetate exposed areas as soon as possible.
4. Minimize the area to be cleared and grubbed.
5. Protect exposed slopes with geotextiles, geogrid, or synthetic mulches.
6. Provide sediment traps and basins during dewatering works.
7. Install sediment traps (such as SiltSack® by Terrafix) between catch basins and frames.
8. Schedule the construction works at times which avoid flooding due to seasonal rains.

The Contractor will also be required to complete inspections and guarantee the proper performance of their erosion and sediment control measures at least after every rainfall. The inspections are to include:

- Verification that water is not flowing under silt barriers.
- Cleaning and changing the sediment traps placed on catch basins.

Refer to **Drawing EC-1** for details of the proposed erosion control measures.

10 Geotechnical Investigation

A geotechnical investigation was completed for the subject site by Paterson Group on March 21, 2025. The report summarizes the existing soil conditions within the subject area and provides construction recommendations. For details which are not summarized below, please see the original geotechnical report.

Subsurface soil conditions within the subject site were determined from 3 boreholes which were completed in March 2025. Previous field investigations undertaken by others within the subject site boundary in 2021 and 2024 were also considered. Generally, the subsurface profile consists of a layer of topsoil or asphalt underlain by fill, further underlain by a deposit of silty clay. A deposit of glacial till followed by bedrock was noted below the silty clay layer.

In general, the fill material consists of silty sand or silty clay with variable amounts of organics, gravel, cobbles, boulders, and construction debris. The fill layer was noted to extend to approximate depths between 1.5 to 2.6 m below the ground surface. The silty clay deposit consists of a hard to very stiff brown silty clay underlain by a layer of very stiff to stiff grey silty clay which extended to approximate depths between 4.2 and 5.3 m below the ground surface. The glacial till deposit generally consists of a layer of stiff to firm grey silty clay over a layer of loose to very dense grey silty sand with variable amounts of silt, clay, gravel, cobbles, and boulders extending to approximate depths between 6.9 and 8.6 m below the ground surface. Based on available geological mapping bedrock consists of limestone with interbedded shale of the Lindsay Formation.

Groundwater levels were found to range from 4.2 m to 6.6 m below the ground surface and are subject to seasonal fluctuations. A grade raise restriction of 2 m has been recommended for the subject site.

Recommended pavement structures are provided in **Table 6** and **Table 7** below.

Table 6: Recommended Pavement Structure – Light Vehicle Parking and Playground Areas

Thickness (mm)	Material Description
50	Superpave 12.5 Asphaltic Concrete or hot mix asphalt concrete (HL-3)
150	OPSS Granular A base
300	OPSS Granular B Type II Subbase

Table 7: Recommended Pavement Structure – Local Roadways and Bus Lanes, Access Lanes, and Heavy Vehicle Parking

Thickness (mm)	Material Description
40	Superpave 12.5 Asphaltic Concrete or hot mix asphalt concrete (HL-3)
50	Superpave 19.0 Asphaltic Concrete or hot mix asphalt concrete (HL-8)
150	OPSS Granular A base
400	OPSS Granular B Type II Subbase

11 Conclusions

11.1 Potable Water Servicing

Based on the supplied boundary conditions from the City for existing watermains and estimated domestic and fire flow demands for the subject site, it is anticipated that the proposed servicing in this development will provide sufficient capacity to sustain both the required domestic demands and emergency fire flow demands of the proposed site. Booster pumps are not anticipated to be required to achieve adequate pressures on higher levels. Sizing of the water service laterals and booster pump requirements are to be confirmed by the mechanical engineering consultant.

11.2 Wastewater Servicing

The proposed sanitary sewer network is sufficiently sized to provide gravity drainage of the site. The proposed site will be serviced by a gravity sewer service lateral which will direct wastewater flows to the existing 250 mm diameter sanitary sewer within the Oak Street ROW, directly south of the property. Sizing of the service lateral and the appropriate backwater valve requirements are to be confirmed by the mechanical consultant.

11.3 Stormwater Management

The proposed stormwater management plan is in compliance with the goals specified through consultation with the City of Ottawa. Rooftop storage with controlled roof release and subsurface storage via underground storage pipes with ICD's have been proposed to limit peak storm sewer inflows to downstream storm sewers to predevelopment levels as determined by City of Ottawa staff. No surface ponding is anticipated for events up to and including the 100-year storm. Minor system flows from the site will be controlled to the 2-year storm event. A portion of the existing 375 mm diameter storm sewer within Oak Street is required to be upsized to accommodate peak flows from the proposed site. Sizing of the storm sewer laterals, design of the roof drains, sump pumps, and the appropriate backwater valve requirements are to be confirmed by the mechanical engineering consultant.

11.4 Grading

Grading for the site has been designed to provide an emergency overland flow route as per City requirements and reflects the recommendations in the Geotechnical Review prepared by Paterson Group. Erosion and sediment control measures will be implemented during construction to reduce the impact on existing facilities.

11.5 Approvals/Permits

An MECP Environmental Compliance Approval may be required for the subject site. Requirements for a Permit to Take Water (PTTW) are not anticipated. Need for a PTTW for sewer construction dewatering and building footing excavation will be confirmed by the geotechnical consultant. No other approval requirements from other regulatory agencies are anticipated.

Appendix

Appendix A Potable Water Servicing

A.1 Boundary Conditions

From:	Duquette, Vincent
To:	Moroz, Peter
Cc:	Abdulkarim, Yasser; Rheal Labelle; Johnson, Warren; Melanie Lamontagne; Mottalib, Abdul; Tam, Edith
Subject:	RE: 45 Oak Street School - Watermain Boundary Conditions
Date:	Monday, April 14, 2025 10:10:06 AM
Attachments:	image001.png 45 Oak Street April 2025.pdf

Hi Peter,

The following are boundary conditions, HGL, for hydraulic analysis at 45 Oak Street (zone 1W) assumed to be connected via dual connection to the 152mm watermain on Oak Street (see attached PDF for location).

Minimum HGL = 107.3 m
Maximum HGL = 114.9 m
Max Day + Fire Flow (83.3 L/s) = 106.3 m

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

Disclaimer: The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation. 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.

Best Regards,

Vincent Duquette, E.I.T
Project Manager, Infrastructure Approvals | Gestionnaire de projet, Projets d'infrastructure
Development Review – All Ward | Direction de l'examen des projets d'aménagement - Tous les quartiers
Planning, Development and Building Services Department (PDBS)| Direction générale des services de la planification, de l'aménagement et du bâtiment (DGSPAB)
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Ottawa, ON K1P 1J1
613.580.2424 ext./poste 14048, vincent.duquette@ottawa.ca

From: Moroz, Peter <peter.moroz@stantec.com>
Sent: April 11, 2025 1:04 PM
To: Duquette, Vincent <Vincent.Duquette@ottawa.ca>; Tam, Edith <Edith.Tam@ottawa.ca>
Cc: Abdulkarim, Yasser <yasser.abdulkarim@ottawa.ca>; Rheal Labelle <rlabelle@hobinarc.com>; Johnson, Warren <Warren.Johnson@stantec.com>; Melanie Lamontagne <melaniel@hobinarc.com>; Mottalib, Abdul <Abdul.Mottalib@ottawa.ca>
Subject: RE: 45 Oak Street School - Watermain Boundary Conditions

Vincent, any updates on the boundary conditions? My understanding is that CEPEO wants to make a submission as soon as possible, and we need this information to finalize the civil package.

thx

Peter

Peter Moroz P.Eng., MBA
Business Center Practice Lead - Community Development (Atlantic & Ontario East)
Stantec
300 - 1331 Clyde Avenue Ottawa ON K2C 3G4
Cell: (613) 294-2851

peter.moroz@stantec.com

From: Duquette, Vincent <Vincent.Duquette@ottawa.ca>
Sent: Wednesday, April 2, 2025 6:34 PM
To: Moroz, Peter <peter.moroz@stantec.com>; Tam, Edith <Edith.Tam@ottawa.ca>
Cc: Abdulkarim, Yasser <yasser.abdulkarim@ottawa.ca>; Rheal Labelle <rlabelle@hobinarc.com>; Johnson, Warren <Warren.Johnson@stantec.com>; Melanie Lamontagne <melaniel@hobinarc.com>; Mottalib, Abdul <Abdul.Mottalib@ottawa.ca>
Subject: RE: 45 Oak Street School - Watermain Boundary Conditions

Hi Peter,

Thanks for the info about the phases. I will let you know when I receive the boundary conditions.

@Tam, Edith the ownership structure for this site and the entire 1010 Somerset parcel has not been communicated to us and will impact how we review the servicing. If you could share any information you have regarding this subject that would be greatly appreciated.

Best Regards,

Vincent Duquette, E.I.T
Project Manager, Infrastructure Approvals | Gestionnaire de projet, Projets d'infrastructure
Development Review – All Ward | Direction de l'examen des projets d'aménagement - Tous les quartiers
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613.580.2424 ext./poste 14048, vincent.duquette@ottawa.ca

Classified as City of Ottawa - Internal / Ville d'Ottawa - classé interne

From: Moroz, Peter <peter.moroz@stantec.com>
Sent: April 02, 2025 9:20 AM
To: Duquette, Vincent <Vincent.Duquette@ottawa.ca>
Cc: Abdulkarim, Yasser <yasser.abdulkarim@ottawa.ca>; Rheal Labelle <rlabelle@hobinarc.com>; Johnson, Warren <Warren.Johnson@stantec.com>; Melanie Lamontagne <melaniel@hobinarc.com>; Tam, Edith <Edith.Tam@ottawa.ca>
Subject: RE: 45 Oak Street School - Watermain Boundary Conditions

Vincent, my understanding is that we are going with 4 storey building, but there are plans to add 2 more storeys in the future subject to funding. The timing of that is unknown. At this stage we want to make sure we check for both conditions in case there are some service upgrades that can be done at this stage that will accommodate future addition of the 2 storeys or highlight any potential issues.

The ROW agreements will be discussed on Thursday between Robin, Edith and CEPEO, and they can provide you with more information on this topic.

Peter

Peter Moroz P.Eng., MBA
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peter.moroz@stantec.com

From: Duquette, Vincent <Vincent.Duquette@ottawa.ca>
Sent: Tuesday, April 1, 2025 8:20 PM
To: Johnson, Warren <Warren.Johnson@stantec.com>; Moroz, Peter <peter.moroz@stantec.com>
Cc: Abdulkarim, Yasser <yasser.abdulkarim@ottawa.ca>; Rheal Labelle <rlabelle@hobinarc.com>; Melanie Lamontagne <melaniel@hobinarc.com>; Tam, Edith <Edith.Tam@ottawa.ca>
Subject: RE: 45 Oak Street School - Watermain Boundary Conditions

Hi Warren,

I am ok using the 70 L/day per student demand.
However I need to know more about the building phasing plan before I can comment on the phased water servicing approach. Will the upcoming SPC application be for both phases or only phase 1? How long will it be in between each phase being built?

I will request boundary conditions based on the 90 L/day per student demand with two connections on Oak St. Domestic demands will most likely not govern, it should be fireflow. If the boundary conditions come back too low, we can revise the domestic demand numbers accordingly to see if they work with 70 L/day per student.

Please attached the marked up servicing cross section with my comments and questions. Can you also please confirm if the proposed bus laneway will be privately owned or become city ROW? Please note that any non-standard ROW cross-sections must go through the deviation process.

Best Regards,

Vincent Duquette, E.I.T
Project Manager, Infrastructure Approvals | Gestionnaire de projet, Projets d'infrastructure
Development Review – All Ward | Direction de l'examen des projets d'aménagement - Tous les quartiers
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613.580.2424 ext./poste 14048, vincent.duquette@ottawa.ca

From: Johnson, Warren <Warren.Johnson@stantec.com>
Sent: March 18, 2025 2:31 PM
To: Moroz, Peter <peter.moroz@stantec.com>; Duquette, Vincent <Vincent.Duquette@ottawa.ca>

Cc: Abdulkarim, Yasser <yasser.abdulkarim@ottawa.ca>; Rheal Labelle <rlabelle@hobinarc.com>; Melanie Lamontagne <melaniel@hobinarc.com>; Tam, Edith <Edith.Tam@ottawa.ca>
Subject: RE: 45 Oak Street School - Watermain Boundary Conditions

Hi Vincent,

We confirmed with the architect that there will be no showers in the school so a lower demand rate could be used (see attached 70Lpd demand calculations). The intent is to phase the building (4 storeys in Phase 1 and the remaining 2 storeys in Phase 2). In Phase 1 the demand is less than the 50m3/day threshold for dual services so a phased approach to the water servicing could be utilized. However, in Phase 2 the 50m3/day threshold is exceeded so the dual service would be needed at that stage.

Since the dual services will be required in the ultimate condition regardless, it would likely be best to install them both off Oak Street during Phase 1 to avoid having multiple water meters in the building. See attached conceptual section for the 6m access lane showing how the dual watermains could fit (a superelevated lane with one CB would be required). If this is acceptable to the City we would like to proceed with the previously submitted 90 L/person/day demands (attached) for the boundary conditions for conservatism.

If you would like to discuss let me know.

Thanks,

Warren Johnson C.E.T.
Civil Engineering Technologist

Direct: 613 784-2272
Warren.Johnson@stantec.com

Stantec

From: Moroz, Peter peter.moroz@stantec.com
Sent: Tuesday, March 18, 2025 12:06 PM
To: Duquette, Vincent Vincent.Duquette@ottawa.ca
Cc: Abdulkarim, Yasser yasser.abdulkarim@ottawa.ca; Rheal Labelle rlabelle@hobinarc.com; Johnson, Warren <Warren.Johnson@stantec.com>; Melanie Lamontagne <melaniel@hobinarc.com>; Tam, Edith <Edith.Tam@ottawa.ca>
Subject: RE: 45 Oak Street School - Watermain Boundary Conditions

Hi Vincent, the double watermain in 6m easement will be difficult to accomplish. We will have to confirm whether we can fit all these service pipes in this narrow corridor. With regards to storm, unfortunately, the existing 300mm dia and 375mm dia. storm pipes on Oak which were installed by OCH subdivision do not have sufficient capacity for the school. If the City and School want to connect to Oak with storm, we will need to provide a secondary storm pipe along the north boulevard of Oak street as per my sketch, or upgrade the already installed pipe which will further escalate costs given that these would be remove and replace costs. The other alternative to Oak connection for storm would be to construct the ultimate storm connection as highlighted in green, or part of the ultimate storm with temporary connection through the field per clip below, however, I am under the impression the City is not prepared to run any services through the main complex at this time. We will need direction on this from the City/School as it changes the storm design significantly.
thx

Peter

Peter Moroz P.Eng., MBA
Business Center Practice Lead - Community Development (Atlantic & Ontario East)
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300 - 1331 Clyde Avenue Ottawa ON K2C 3G4
Cell: (613) 294-2851

peter.moroz@stantec.com

From: Duquette, Vincent <Vincent.Duquette@ottawa.ca>
Sent: Tuesday, March 18, 2025 11:46 AM
To: Johnson, Warren <Warren.Johnson@stantec.com>
Cc: Moroz, Peter <peter.moroz@stantec.com>; Abdulkarim, Yasser <yasser.abdulkarim@ottawa.ca>
Subject: RE: 45 Oak Street School - Watermain Boundary Conditions

Hi Warren,

Thanks for clarifying the distance between buildings is more than 30m. FUS calculations are ok.
Option 1 does not meet the independent redundant servicing criteria. Option 2 would meet that criteria. Would you like me to request boundary conditions for Option 2?

I also wanted to ask what is the planned outlet for the storm flows generated from the site? There is limited capacity within the segments of the storm sewer on Oak St.

Best Regards,

Vincent Duquette, E.I.T
Project Manager, Infrastructure Approvals | Gestionnaire de projet, Projets d'infrastructure
Development Review – All Ward | Direction de l'examen des projets d'aménagement - Tous les quartiers
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From: Johnson, Warren <Warren.Johnson@stantec.com>
Sent: March 18, 2025 11:02 AM
To: Duquette, Vincent <Vincent.Duquette@ottawa.ca>
Cc: Moroz, Peter <peter.moroz@stantec.com>; Abdulkarim, Yasser <yasser.abdulkarim@ottawa.ca>
Subject: RE: 45 Oak Street School - Watermain Boundary Conditions

Hi Vincent,

The scale of 1:350 noted on the architects site plan is incorrect and should read 1:500. There is roughly 34m from the school to the future townhomes to the south.

See attached conceptual sketches showing where the dual water services may be located. Option 1 is preferable as the access lane is only 6m wide and will not allow for storm, sanitary, dual watermains, and catch basins. If this is unacceptable, option 2 may require the building to be shifted to allow for a wider access lane. Both options would be serviced from the existing 150mm diameter watermain on Oak Street so it should not impact the boundary condition request. Let me know your thoughts.

Thanks,

Warren Johnson C.E.T.
Civil Engineering Technologist

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Warren.Johnson@stantec.com

Stantec

From: Duquette, Vincent <Vincent.Duquette@ottawa.ca>
Sent: Tuesday, March 18, 2025 10:21 AM
To: Johnson, Warren <Warren.Johnson@stantec.com>
Cc: Moroz, Peter <peter.moroz@stantec.com>; Abdulkarim, Yasser <yasser.abdulkarim@ottawa.ca>
Subject: RE: 45 Oak Street School - Watermain Boundary Conditions

Hi Warren,

Domestic demands look good. For the FUS calculations, shouldn't there be an exposure increase to south? Looks like the proposed townhomes are less than 30m away.
I also wanted to point out that the average day demand exceeds 0.58 L/s (50 m^3/day) which triggers the need for dual service. Please update to the sketch to show the second connection location.

Best Regards,

Vincent Duquette, E.I.T
Project Manager, Infrastructure Approvals | Gestionnaire de projet, Projets d'infrastructure
Development Review – All Ward | Direction de l'examen des projets d'aménagement - Tous les quartiers
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613.580.2424 ext./poste 14048, vincent.duquette@ottawa.ca

From: Johnson, Warren <Warren.Johnson@stantec.com>
Sent: March 18, 2025 8:40 AM
To: Duquette, Vincent <Vincent.Duquette@ottawa.ca>
Cc: Moroz, Peter <peter.moroz@stantec.com>
Subject: 45 Oak Street School - Watermain Boundary Conditions

Hi Vincent,

We would like to request boundary conditions for the development on 45 Oak Street. The proposed development consists of a 6-storey school and associated access road. The school is anticipated to house 847 students, 88 daycares, and 100 staff as confirmed by the architect.

The proposed site is expected to be serviced via a connection to the existing 150 mm diameter watermain in Oak Street as shown on the attached watermain location sketch.

Estimated domestic demands based on the City of Ottawa guidelines and fire flow requirements for the site are as follows:

- Total domestic demands:
  - Average Day Demand: 1.1 L/s (64.7 L/min)
  - Maximum Day Demand: 1.6 L/s (97.0 L/min)
  - Peak Hour Demand: 2.9 L/s (174.7 L/min)
- Maximum Fire Flow Demand per FUS methodology: 83.3 L/s (5,000 L/min)
- Please also provide the maximum available fire flow in the main at 20 psi

Attached is a watermain location sketch, site plan, water demand, and fire flow calculations. Please let me know if you have any questions or need additional information.

I will follow up with a separate email for the sanitary capacity request.

Thanks,

Warren Johnson C.E.T.
Civil Engineering Technologist
Direct: 613 784-2272

Warren.Johnson@stantec.com

Stantec

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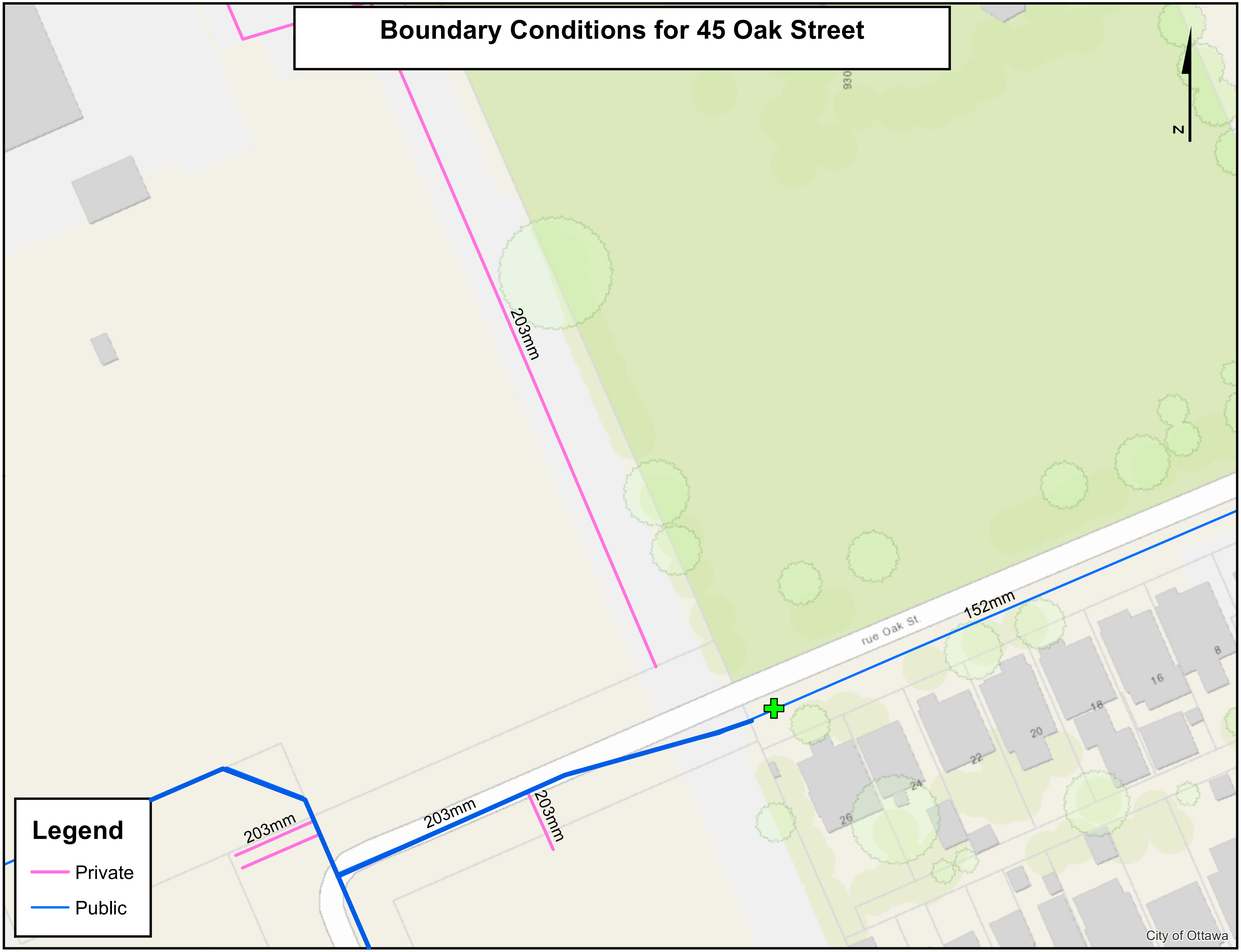

Boundary Conditions for 45 Oak Street
N
203mm
152mm
rue Oak St.
203mm
203mm
203mm
930
8
16
18
20
22
24
26
Legend
Private
Public
City of Ottawa

A.2 Domestic Water Demand Calculations

45 Oak Street School - Domestic Water Demand Estimates

Based on Site Plan provided by Hobin (2025-07-02)

Project No. 160401837 Designed by: WAJ

Date: 7/4/2025 Checked by: JB

Revision: 02

Population densities per Appendix 4A of the City of Ottawa Sewer Design Guidelines:		
Day School with cafeteria, gym, and showers	90.0	l/person/day

Building ID	Area (ha)	No. of Units	Population	Avg Day Demand		Max Day Demand [1]		Peak Hour Demand [1]	
				(L/min)	(L/s)	(L/min)	(L/s)	(L/min)	(L/s)
School	0.28								
Students			847	52.9	0.9	79.4	1.3	142.9	2.4
Day Care			88	5.5	0.1	8.3	0.1	14.9	0.2
Staff			100	6.3	0.1	9.4	0.2	16.9	0.3
Total Site :	**0.28**	**0**	**1035**	**64.7**	**1.1**	**97.0**	**1.6**	**174.7**	**2.9**

1 Water demand criteria used to estimate peak demand rates for commercial and institutional areas are as follows:

maximum daily demand rate = 1.5 x average day demand rate

peak hour demand rate = 1.8 x maximum day demand rate (as per Technical Bulletin ISD-2010-02)

A.3 FUS Calculation Sheets

FUS Fire Flow Calculation Sheet - 2020 FUS Guidelines

Stantec Project #: 160401837
Project Name: 45 Oak Street School
Date: 6/30/2025
Fire Flow Calculation #: 1
Description: 6-Storey School
Notes: Future Recreation and Cultural Facility to the north assumed to be 3-Storey, Type II - Noncombustible, and sprinklered. Future townhomes to the south assumed to be 3-Storey, Type V - Woodframe, and not sprinklered.

Step	Task	Notes							Value Used	Req'd Fire Flow (L/min)
1	Determine Type of Construction	Type II - Noncombustible Construction / Type IV-A - Mass Timber Construction							0.8	-
2	Determine Effective Floor Area	Sum of Largest Floor + 25% of Two Additional Floors					Vertical Openings Protected?		YES	-
		1591	1565	1189					2279.5	-
3	Determine Required Fire Flow	(F = 220 x C x $A^{1/2}$). Round to nearest 1000 L/min							-	8000
4	Determine Occupancy Charge	Limited Combustible							-15%	6800
5	Determine Sprinkler Reduction	Conforms to NFPA 13							-30%	-2040
		Non-Standard Water Supply or N/A							0%	
		Not Fully Supervised or N/A							0%	
		% Coverage of Sprinkler System							100%	
6	Determine Increase for Exposures (Max. 75%)	Direction	Exposure Distance (m)	Exposed Length (m)	Exposed Height (Stories)	Length-Height Factor (m x stories)	Construction of Adjacent Wall	Firewall / Sprinklered ?	-	-
		North	10.1 to 20	50.8	3	> 100	Type I-II - Protected Openings	YES	0%	0
		East	> 30	46.8	3	> 100	Type V	NO	0%	
		South	> 30	23.1	3	61-80	Type V	NO	0%	
		West	> 30	46.8	3	> 100	Type V	NO	0%	
7	Determine Final Required Fire Flow	Total Required Fire Flow in L/min, Rounded to Nearest 1000L/min								5000
		Total Required Fire Flow in L/s								83.3
		Required Duration of Fire Flow (hrs)								1.75
		Required Volume of Fire Flow (m^3)								525

A.4 Architectural Confirmations

From:	Moroz, Peter
To:	Melanie Lamontagne; Rheal Labelle
Cc:	junxiang.guan@smithandanderson.com; Madelyn Byrtus; Johnson, Warren; Reinhard Vogel
Subject:	RE: 2457 - 45 Oak St Site Plan
Date:	Monday, March 17, 2025 4:57:25 PM
Attachments:	image001.png image002.png image003.png

Hi Melanie, ok, we will go with 6 storey, protected openings, and limited combustible.

thx

Peter

Peter Moroz P.Eng., MBA
Business Center Practice Lead - Community Development (Atlantic & Ontario East)
Stantec
300 - 1331 Clyde Avenue Ottawa ON K2C 3G4
Cell: (613) 294-2851

peter.moroz@stantec.com

From: Melanie Lamontagne <melaniel@hobinarc.com>
Sent: Monday, March 17, 2025 3:46 PM
To: Moroz, Peter <peter.moroz@stantec.com>; Rheal Labelle <rlabelle@hobinarc.com>
Cc: junxiang.guan@smithandanderson.com; Madelyn Byrtus <mbyrtus@hobinarc.com>; Johnson, Warren <Warren.Johnson@stantec.com>; Reinhard Vogel <reinhard@hobinarc.com>
Subject: RE: 2457 - 45 Oak St Site Plan

Hi Peter,

I am away on holidays starting tomorrow and returning in the office March 27th, 2025. During my absence, please send your questions to Rheal and Reinhard (I have added him to the email chain) and c.c. me. They should be able to help you with any outstanding questions you might have to move along the project. See my answers in red below.

From: Moroz, Peter <peter.moroz@stantec.com>
Sent: March 17, 2025 3:10 PM
To: Melanie Lamontagne <melaniel@hobinarc.com>; Rheal Labelle <rlabelle@hobinarc.com>
Cc: junxiang.guan@smithandanderson.com; Madelyn Byrtus <mbyrtus@hobinarc.com>; Johnson, Warren <Warren.Johnson@stantec.com>
Subject: RE: 2457 - 45 Oak St Site Plan

Hi Melanie, we have couple of follow up questions before we can forward the request to the city for boundary conditions:

- The site plan notes the entire building as 4-storey, but Rheal's email noted that there is a 2-storey addition. Are we designing for the 6 storey building or 4 storey? The site plan notes 4-storey as that is what we will build to when the school opens on day 1; however, we need to assume the additional 2-storeys that will be added in the future. The occupancy numbers I gave you in my original comments account for the 2-storey addition.
- Can you confirm if vertical openings will be protected per FUS criteria. Usually we assume vertical openings to be protected. This is referring to openings through horizontal separations (e.g., elevator shafts, stairwells, etc.). Our elevator shaft and stairwells and any duct shaft will be protected by a fire rating that meets OBC.

2) For a building classified with a Construction Coefficient below 1.0:
   a) if any vertical openings in the building (ex. interconnected floor spaces, atria, elevators, escalators, etc.) are unprotected, consider the two largest adjoining floor areas plus 50% of all floors immediately above them up to a maximum of eight; or
   b) if all vertical openings and exterior vertical communications are properly protected in accordance with the National Building Code, consider only the single largest Floor Area plus 25% of each of the two immediately adjoining floors.

Protection requirements:

The protection requirements for vertical openings are only applicable in buildings with a Construction Coefficient below 1.0. The type of protection for vertical openings shall be based on the construction of the enclosure walls and the type of opening or other device used for the protection of openings in the enclosure. See also NBC Division B, Section 3.5. Vertical Transportation.

Protected openings:

i. Enclosures shall have walls of masonry or other limited or noncombustible construction with a fire resistance rating of not less than one hour.
ii. Openings including doors shall be provided with automatic closing devices
iii. Elevator doors shall be of metal or metal-covered construction, so arranged that the doors must normally be closed for operation of the elevator.

Unprotected openings:

i. Any opening through horizontal separations that are unprotected or otherwise have closures that do not meet the minimum requirements for protected openings, above.

- Please confirm occupancy charge is assumed as Limited Combustible. From the description noted below, I believe it's Limited Combustible. Can you confirm what you typically see for other school projects you might have worked on?

Occupancy and Contents Adjustment Factor

The required fire flow may be reduced by as much as -25% for occupancies having contents with a very low fire hazard or may be increased by up to 25% for occupancies having contents with a high fire hazard. The Occupancy and Contents Adjustment Factor should not be made at greater than 25% or less than -25%.

- *Noncombustible Contents* *-25%*
  - Includes merchandise or materials, including stock, or equipment, which in permissible quantities does not in themselves constitute an active fuel for the spread of fire.
  - May include limited or controlled amounts of combustible material, not exceeding 5% of the Total Effective Area of the occupancy. Combustible components of construction (ex. interior walls, finishes, etc.) should be included in the limit on combustible materials.
- *Limited Combustible Contents* *-15%*
  - Includes merchandise or materials, including furniture, stock, or equipment, of low combustibility, with limited concentrations of combustible materials.
- Combustible Contents 0% no adjustment
  - Includes merchandise or materials, including furniture, stock, or equipment, of moderate combustibility.
- *Free Burning Contents* *+15%*
  - Includes merchandise or materials, including furniture, stock, or equipment, which burn freely, constituting an active fuel.
- *Rapid Burning Contents* *+25%*
  - Includes merchandise or materials, including furniture, stock, or equipment, which either
    - Burn with great intensity
    - spontaneously ignite and are difficult to extinguish
    - give off flammable or explosive vapors at ordinary temperatures
    - as a result of an industrial processing, produce large quantities of dust or other finely divided debris subject to flash fire or explosion

Peter

Peter Moroz P.Eng., MBA

Business Center Practice Lead - Community Development (Atlantic & Ontario East)
Stantec
300 - 1331 Clyde Avenue Ottawa ON K2C 3G4
Cell: (613) 294-2851

peter.moroz@stantec.com

From: Melanie Lamontagne <melaniel@hobinarc.com>
Sent: Friday, March 14, 2025 12:41 PM
To: Moroz, Peter <peter.moroz@stantec.com>; Rheal Labelle <rlabelle@hobinarc.com>
Cc: junxiang.guan@smithandanderson.com; Madelyn Byrtus <mbyrtus@hobinarc.com>; Johnson, Warren <Warren.Johnson@stantec.com>
Subject: RE: 2457 - 45 Oak St Site Plan

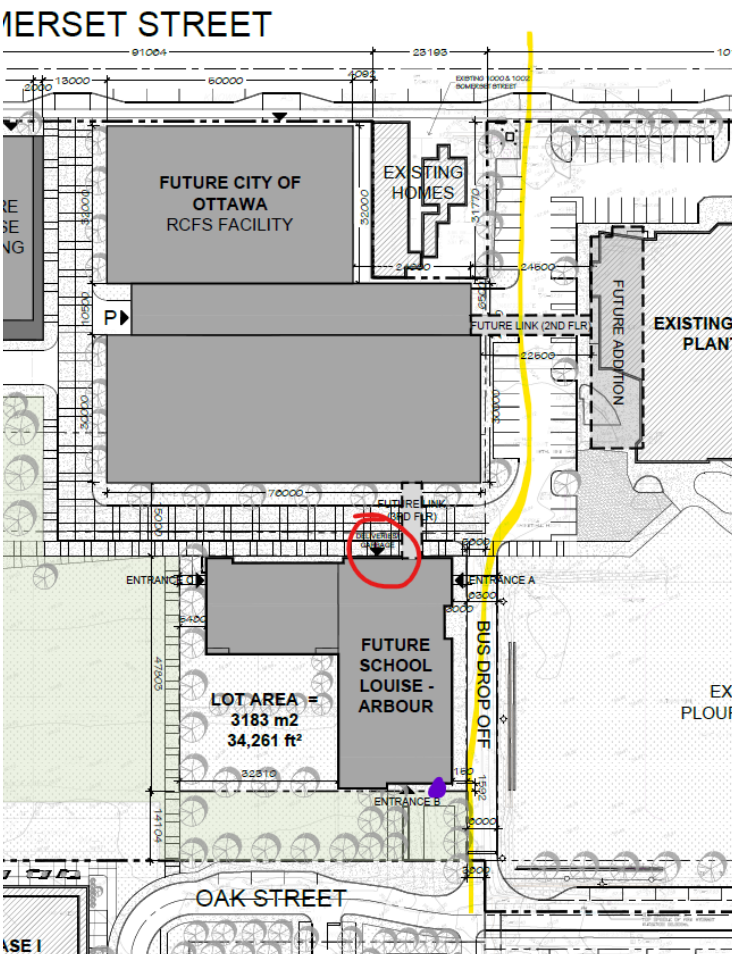
Hello Peter,

Please see below some answers to your questions noted in red.

From: Moroz, Peter <peter.moroz@stantec.com>
Sent: March 14, 2025 9:36 AM
To: Rheal Labelle <rlabelle@hobinarc.com>
Cc: junxiang.guan@smithandanderson.com; Madelyn Byrtus <mbyrtus@hobinarc.com>; Johnson, Warren <Warren.Johnson@stantec.com>; Melanie Lamontagne <melaniel@hobinarc.com>
Subject: RE: 2457 - 45 Oak St Site Plan

Hi Rheal, thank you for the site plan. Below you will find our questions which we need answered to progress with our design and request boundary conditions:

- Extent of the school block scope (will the access be constructed to Somerset? Will the sidewalks/landscaped areas around the school be constructed?). Please provide limits of Site Plan. Yes, we will need a connection to Sommerset to allow for buses to enter the site. See snipit below of what has to stay highlighted in yellow. We Will need to maintain service access that is shown in a red circle in snipit. We'll need to review this with traffic.



- Fire department connection location. Please identify Siamese connection. Noted in snipit above with a purple circle.
- Please confirm grade relationships for the building
  - Is the finished floor stepped at any location or flush through the whole school (a stepped FF could help with the grade change from front to back)? Ground FFE must be level
  - Is the building slab on grade or is there a basement? There is a basement. With services being relocated it will be near Stair B (see attached revised basement location plan) We are working on basement and will be max. 200 sq.m. to meet code for access with 1 stair only.
  - Do all entrances have to be accessible or can any of them have ramps/risers whether internal or external? Yes all barrier free

For the FUS calcs we will need the following information:

- Type of construction (Type III ordinary, Type II non-combustible, etc.) Noncombustible construction; we are doing steel structure
- Floor areas (or I can measure this off the CAD if it is unavailable) I will send you a matrix with all floor areas.
- Will the building be sprinklered? yes
- Are firewalls proposed anywhere? No; this is 1 single building
- If the building is Type I (fire resistive), II (non-combustible) or IV (mass timber) construction will the vertical openings be protected as per FUS criteria (architects do not usually have this answer at this stage so we often assume they will be protected as it is a typical practice).Type II; non-combustible as steel structure (not mass timber)

For the water demand and sanitary flow:

- Confirm mechanical room location. Water entry room will be in basement; room can be located to accommodate incoming services; I'm assuming along bus route; behind Stair B.
- We are assuming sanitary and water services will be connected to Oak Street. Correct? Correct
- Please provide the anticipated number of students and staff (70L/student/day) We need to assume capacity for

the full 4-storey building + the 2-storey addition. The 4-storey building is sized for 467 students + 88 kid daycares + +/-380 kids in 2-storey addition. Staff is above that (I'm assuming 75-100 staff). We have not had a chance to fully calculate so I propose to assume extra for now.

- Mechanical to confirm service size and locations for the services. Junxiang can provide

For storm:

- Required response to my previous email regarding storm (refer to attached email)
- Mechanical to confirm service size and location for the service.
- Roof area available for stormwater storage. Please confirm roof can be utilized for storm water retention. This is typical for site and minimized the size of the underground storage tanks required to manage the storm water. I'm unsure if CEPEO is ok with stormwater storage on roof. We would also need to review with Cunliffe. We will need to review this as a team, and we can review with client for the roof option.
- Roof drain and scupper locations. Mechanical provide roof layout for the drains.

Peter

Peter Moroz P.Eng., MBA
Business Center Practice Lead - Community Development (Atlantic & Ontario East)
Stantec
300 - 1331 Clyde Avenue Ottawa ON K2C 3G4
Cell: (613) 294-2851

peter.moroz@stantec.com

From: Madelyn Byrtus <mbyrtus@hobinarc.com>
Sent: Wednesday, March 12, 2025 3:43 PM
To: Moroz, Peter <peter.moroz@stantec.com>
Cc: junxiang.guan@smithandanderson.com; Johnson, Warren <Warren.Johnson@stantec.com>; Rheal Labelle <rlabelle@hobinarc.com>; Melanie Lamontagne <melaniel@hobinarc.com>
Subject: 2457 - 45 Oak St Site Plan

Good Afternoon Peter,

Please see our Site Plan CAD file attached.

Thank you
Madelyn Byrtus
Intern Architect

Hobin Architecture Incorporated

63 Pamilla Street
Ottawa, Ontario
Canada K1S 3K7

t 613-238-7200 x135
f 613-235-2005
e mbyrtus@hobinarc.com

hobinarc.com

Appendix B Wastewater Servicing

B.1 Sanitary Sewer Design Sheet

Stantec

SUBDIVISION:

CEPEO Elementary School Louise-Arbour - 45 Oak Street

DATE: 6/30/2025
REVISION: 2
DESIGNED BY: WAJ
CHECKED BY: JB

SANITARY SEWER DESIGN SHEET
(City of Ottawa)

FILE NUMBER: 160401837

DESIGN PARAMETERS

MAX PEAK FACTOR (RES.)=	4.0	AVG. DAILY FLOW / PERSON	280 l/p/day	MINIMUM VELOCITY	0.60 m/s
MIN PEAK FACTOR (RES.)=	2.0	COMMERCIAL	28,000 l/ha/day	MAXIMUM VELOCITY	3.00 m/s
PEAKING FACTOR (INDUSTRIAL):	2.4	INDUSTRIAL (HEAVY)	55,000 l/ha/day	MANNINGS n	0.013
PEAKING FACTOR (ICI >20%):	1.5	INDUSTRIAL (LIGHT)	35,000 l/ha/day	BEDDING CLASS	B
SCHOOL	90.0 l/person/day	INSTITUTIONAL	28,000 l/ha/day	MINIMUM COVER	2.50 m
		INFILTRATION	0.33 l/s/Ha	HARMON CORRECTION FACTOR	0.8

LOCATION			SCHOOL AREA AND POPULATION							COMMERCIAL		INDUSTRIAL (L)		INDUSTRIAL (H)	
AREA ID NUMBER	FROM M.H.	TO M.H.	AREA (ha)	STUDENTS	UNITS DAYCARE	STAFF	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)
I3A	3	2	0.28	847	88	100	1035	0.28	1035	0.00	0.00	0.00	0.00	0.00	0.00
G2A	2	1	0.00	0	0	0	0	0.28	1035	0.00	0.00	0.00	0.00	0.00	0.00

LOCATION	INSTITUTIONAL		GREEN / UNUSED		C+I+I	INFILTRATION			TOTAL	PIPE								
AREA ID NUMBER	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	FLOW (l/s)	LENGTH (m)	DIA (mm)	MATERIAL	CLASS	SLOPE (%)	CAP. (FULL) (l/s)	CAP. V PEAK FLOW (%)	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
I3A	0.00	0.00	0.00	0.00	1.62	0.28	0.28	0.1	1.709	4.3	250	PVC	SDR 35	1.00	60.6	**2.82%**	1.22	0.44
G2A	0.00	0.00	0.12	0.12	1.62	0.12	0.40	0.1	1.749	33.3	250	PVC	SDR 35	1.00	60.6	**2.88%**	1.22	0.44
											250							

B.2 City Correspondence

From:	Duquette, Vincent
To:	Johnson, Warren
Cc:	Moroz, Peter; Mottalib, Abdul; Abdulkarim, Yasser
Subject:	RE: 45 Oak Street School - Sanitary Capacity
Date:	Tuesday, March 18, 2025 9:22:18 AM

Hi Warren,

There is no capacity concerns with sending 1.7L/s of sanitary flows to either of the 250mm sanitary sewer or the 375mm combined sewer segments on Oak St.

Best Regards,

Vincent Duquette, E.I.T
Project Manager, Infrastructure Approvals | Gestionnaire de projet, Projets d'infrastructure
Development Review – All Ward | Direction de l'examen des projets d'aménagement - Tous les quartiers
Planning, Development and Building Services Department (PDBS)| Direction générale des services de la planification, de l'aménagement et du bâtiment (DGSPAB)
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West | 110 avenue Laurier Ouest
Ottawa, ON K1P 1J1
613.580.2424 ext./poste 14048, vincent.duquette@ottawa.ca

From: Johnson, Warren <Warren.Johnson@stantec.com>
Sent: March 18, 2025 8:51 AM
To: Duquette, Vincent <Vincent.Duquette@ottawa.ca>
Cc: Moroz, Peter <peter.moroz@stantec.com>
Subject: 45 Oak Street School - Sanitary Capacity

Hi Vincent,

We would like to confirm the sanitary sewer capacity for the development on 45 Oak Street. The proposed development consists of a 6-storey school and associated access road. The school is anticipated to house 847 students, 88 daycares, and 100 staff as confirmed by the architect.

The proposed site is expected to be serviced via a connection to the existing 375 mm diameter combined sewer in Oak Street as shown on the attached sewer location sketch. The total estimated peak flow for the site is 1.7 L/s (see detailed breakdown in the attached sewer design sheet).

Please let me know if you have any questions or need additional information.

Thanks,

Warren Johnson C.E.T.
Civil Engineering Technologist

Direct: 613 784-2272
Warren.Johnson@stantec.com

Stantec

Appendix C Stormwater Management

C.1 Storm Sewer Design Sheet

Stantec	CEPEO Elementary School Louise-Arbour - 45 Oak Street		STORM SEWER DESIGN SHEET (City of Ottawa)
	DATE:	2025-06-30	
	REVISION:	2	
	DESIGNED BY:	WAJ	FILE NUMBER: 160401837
	CHECKED BY:	JB	

DESIGN PARAMETERS

$I = a / (t+b)^c$ (As per City of Ottawa Guidelines, 2012)

	1:2 yr	1:5 yr	1:10 yr	1:100 yr					
a =	732.951	998.071	1174.184	1735.688	MANNING'S n =	0.013		BEDDING CLASS =	B
b =	6.199	6.053	6.014	6.014	MINIMUM COVER:	2.00	m		
c =	0.810	0.814	0.816	0.820	TIME OF ENTRY	10	min		

LOCATION / DRAINAGE AREA

AREA ID NUMBER	FROM M.H.	TO M.H.	AREA (2-YEAR) (ha)	AREA (5-YEAR) (ha)	AREA (10-YEAR) (ha)	AREA (100-YEAR) (ha)	AREA (ROOF) (ha)	C (2-YEAR) (-)	C (5-YEAR) (-)	C (10-YEAR) (-)	C (100-YEAR) (-)	A x C (2-YEAR) (ha)	ACCUM AxC (2YR) (ha)	A x C (5-YEAR) (ha)	ACCUM. AxC (5YR) (ha)	A x C (10-YEAR) (ha)	ACCUM. AxC (10YR) (ha)	A x C (100-YEAR) (ha)	ACCUM. AxC (100YR) (ha)
R111A	111	110	0.00	0.00	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	110	101A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
L102A	102A	102	0.00	0.00	0.00	0.00	0.17	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	102	101A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	101A	101	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
L107A, L107B, L107C	107	106	0.00	0.00	0.00	0.00	0.22	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	106	105	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	105	EX 109	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Ex. Oak Street	EX 109	EX 108	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Ex. Oak Street	EX 108	101	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	101	EX 100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

DRAINAGE AREA (continued) / PIPE SELECTION

FROM M.H.	TO M.H.	T of C (min)	I_{2-YEAR} (mm/h)	I_{5-YEAR} (mm/h)	$I_{10-YEAR}$ (mm/h)	$I_{100-YEAR}$ (mm/h)	$Q_{CONTROL}$ (L/s)	ACCUM. $Q_{CONTROL}$ (L/s)	Q_{ACT} (CIA/360) (L/s)	LENGTH (m)	PIPE WIDTH OR DIAMETEI (mm)	PIPE HEIGHT (mm)	PIPE SHAPE (-)	MATERIAL (-)	CLASS (-)	SLOPE %	Q_{CAP} (FULL) (L/s)	% FULL (-)	VEL. (FULL) (m/s)	VEL. (ACT) (m/s)	TIME OF FLOW (min)
111	110	10.00	76.81	104.19	122.14	178.56	7.5	7.5	7.5	18.3	200	200	CIRCULAR	PVC	100-D	1.00	33.3	**22.52%**	1.05	0.70	0.43
110	101A	10.43	75.18	101.95	119.50	174.68	0.0	7.5	7.5	24.8	300	300	CIRCULAR	PVC	SDR 35	0.50	68.0	**11.03%**	0.97	0.53	0.78
		11.22																			
102A	102	10.00	76.81	104.19	122.14	178.56	30.5	30.5	30.5	2.3	300	300	CIRCULAR	PVC	100-D	1.00	96.2	**31.72%**	1.37	1.01	0.04
102	101A	10.04	76.66	103.99	121.91	178.21	0.0	30.5	30.5	2.9	300	300	CIRCULAR	PVC	SDR 35	0.40	60.8	**50.15%**	0.86	0.74	0.07
		10.10																			
101A	101	11.22	72.42	98.17	115.05	168.14	0.0	0.0	0.0	32.2	300	300	CIRCULAR	PVC	SDR 35	0.40	60.8	**0.00%**	0.86	0.00	0.00
		11.22																			
107	106	10.00	76.81	104.19	122.14	178.56	19.2	19.2	19.2	60.0	1200	1200	CIRCULAR	CONCRETE	100-D	0.10	1286.2	**1.49%**	1.10	0.34	2.95
106	105	12.95	67.08	90.83	106.41	155.46	0.0	19.2	19.2	4.2	300	300	CIRCULAR	PVC	SDR 35	0.50	68.0	**28.24%**	0.97	0.70	0.10
105	EX 109	13.05	66.80	90.45	105.96	154.79	0.0	19.2	19.2	9.0	300	300	CIRCULAR	PVC	SDR 35	0.50	68.0	**28.24%**	0.97	0.70	0.22
EX 109	EX 108	13.26	66.20	89.63	104.99	153.37	0.0	19.2	28.0	27.1	300	300	CIRCULAR	PVC	SDR 35	0.44	63.8	**43.90%**	0.91	0.74	0.61
EX 108	101	13.87	64.57	87.40	102.37	149.53	0.0	19.2	95.1	29.2	375	375	CIRCULAR	PVC	SDR 35	0.33	95.1	**100.00%**	0.90	0.95	0.51
		14.38																			
101	EX 100	14.38	63.26	85.61	100.26	146.43	0.0	19.2	95.1	12.2	450	450	CIRCULAR	CONCRETE	100-D	0.33	170.9	**55.66%**	1.04	0.92	0.22
		14.60									1650	1650									

C.2 Modified Rational Method Calculations

Stormwater Management Calculations

File No: **160401837**
Project: **CEPEO Elementary School Louise-Arbour - 45 Oak Street**
Date: **30-Jun-25**

SWM Approach:
Post-development to Pre-development flows

Post-Development Site Conditions:

Overall Runoff Coefficient for Site and Sub-Catchment Areas

Runoff Coefficient Table								
Catchment Type	**Sub-catchment Area ID / Description**		**Area (ha) "A"**		**Runoff Coefficient "C"**	**"A x C"**		**Overall Runoff Coefficient**
Roof	R111A	Hard	0.160		0.9	0.144		
		Soft	0.000		0.2	0.000		
	Subtotal			0.16			0.144	0.90
Controlled - Tributary	L107A, L107B, L107C	Hard	0.193		0.9	0.174		
		Soft	0.027		0.2	0.005		
	Subtotal			0.22			0.1794	0.82
Controlled - Tributary	L102A	Hard	0.138		0.9	0.125		
		Soft	0.032		0.2	0.006		
	Subtotal			0.17			0.1309	0.77
Total				**0.550**			**0.454**	
Overall Runoff Coefficient= C:								**0.83**

Total Roof Areas	**0.160 ha**
Total Tributary Surface Areas (Controlled and Uncontrolled)	**0.390 ha**
Total Tributary Area to Outlet	**0.550 ha**
Total Uncontrolled Areas (Non-Tributary)	**0.000 ha**
Total Site	**0.550 ha**

Project #160401837, CEPEO Elementary School Louise-Arbour - 45 Oak Street
Roof Drain Design Sheet, Area R111A
Standard Watts Model R1100 Accutrol Roof Drain

Rating Curve				Volume Estimation				Water Depth
Elevation (m)	Discharge Rate (cu.m/s)	Outlet Discharge (cu.m/s)	Storage (cu. m)	Elevation (m)	Area (sq. m)	Volume (cu. m) Increment	Volume (cu. m) Accumulated	(m)
0.000	0.0000	0.0000	0	0.000	0	0	0	0.000
0.025	0.0003	0.0019	0	0.025	36	0	0	0.025
0.050	0.0006	0.0038	2	0.050	142	2	2	0.050
0.075	0.0008	0.0047	8	0.075	320	6	8	0.075
0.100	0.0009	0.0057	19	0.100	569	11	19	0.100
0.125	0.0011	0.0066	37	0.125	889	18	37	0.125
0.150	0.0013	0.0076	64	0.150	1280	27	64	0.150

Drawdown Estimate

Total Volume (cu.m)	Total Time (sec)	Vol (cu.m)	Detention Time (hr)
0.0	0.0	0.0	0
2.1	547.9	2.1	0.1522
7.7	1189.8	5.6	0.48268
18.7	1930.7	11.0	1.019
36.7	2728.4	18.1	1.77688
63.7	3561.4	27.0	2.76617

Rooftop Storage Summary

Total Building Area (sq.m)		1600
Assume Available Roof Area (sq.	80%	1280
Roof Imperviousness		0.99
Roof Drain Requirement (sq.m/Notch)		232
Number of Roof Notches*		6
Max. Allowable Depth of Roof Ponding (m)		0.15
Max. Allowable Storage (cu.m)		64
Estimated 100 Year Drawdown Time (h)		2.7

* As per Ontario Building Code section OBC 7.4.1(1.196

* Note: Number of drains can be reduced if multiple-notch drain used.

From Watts Drain Catalogue

Head (m)	L/s Open	75%	50%	25%	Closed
0.025	0.3155	0.31545	**0.31545**	0.31545	0.31545
0.050	0.6309	0.6309	**0.6309**	0.6309	0.6309
0.075	0.9464	0.86749	**0.78863**	0.70976	0.6309
0.100	1.2618	1.10408	**0.94635**	0.78863	0.6309
0.125	1.5773	1.34067	**1.10408**	0.86749	0.6309
0.150	1.8927	1.57726	**1.2618**	0.94635	0.6309

Calculation Results

	2yr	100yr	Available
Qresult (cu.m/s)	0.006	0.008	-
Depth (m)	0.099	0.149	0.150
Volume (cu.m)	18.7	62.8	64.0
Draintime (hrs)	1.0	2.7	

Stormwater Management Calculations

Project #160401837, CEPEO Elementary School Louise-Arbour - 45 Oak Street
Modified Rational Method Calculations for Storage

2 yr Intensity
City of Ottawa

I = a/(t + b)^c

		t (min)	I (mm/hr)
a =	732.951	10	76.81
b =	6.199	20	52.03
c =	0.81	30	40.04
		40	32.86
		50	28.04
		60	24.56
		70	21.91
		80	19.83
		90	18.14
		100	16.75
		110	15.57
		120	14.56

2 YEAR Predevelopment Target Release from Portion of Site

Subdrainage Area: Predevelopment Tributary Area to Outlet
Area (ha): 0.5500
C: 0.50

Typical Time of Concentration

tc (min)	I (2 yr) (mm/hr)	Qtarget (L/s)
10	76.81	**58.72**

2 YEAR Modified Rational Method for Entire Site

Subdrainage Area: R111A — Roof
Area (ha): 0.16 — Maximum Storage Depth: 150 mm
C: 0.90

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)	Depth (mm)	
10	76.81	30.75	5.36	25.39	15.23	91.5	0.00
20	52.03	20.83	5.62	15.21	18.25	98.4	0.00
30	40.04	16.03	5.65	10.38	**18.68**	99.4	0.00
40	32.86	13.16	5.61	7.55	18.12	98.1	0.00
50	28.04	11.23	5.52	5.71	17.12	95.8	0.00
60	24.56	9.83	5.41	4.42	15.90	93.0	0.00
70	21.91	8.77	5.30	3.47	14.58	90.0	0.00
80	19.83	7.94	5.18	2.76	13.23	86.9	0.00
90	18.14	7.26	5.07	2.20	11.87	83.8	0.00
100	16.75	6.70	4.95	1.75	10.52	80.8	0.00
110	15.57	6.23	4.84	1.40	9.21	77.8	0.00
120	14.56	5.83	4.72	1.11	7.96	74.8	0.00

Storage: Roof Storage

	Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check
2-year Water Level	99.35	0.10	5.65	18.68	64.00	0.00

Subdrainage Area: L107A, L107B, L107C — Controlled - Tributary
Area (ha): 0.22
C: 0.82

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.81	38.31	9.01	29.29	17.58
20	52.03	25.95	9.57	16.38	**19.65**
30	40.04	19.97	9.40	10.57	19.02
40	32.86	16.39	9.03	7.36	17.66
50	28.04	13.98	8.61	5.38	16.13
60	24.56	12.25	8.18	4.07	14.64
70	21.91	10.93	7.77	3.16	13.26
80	19.83	9.89	7.39	2.50	12.01
90	18.14	9.05	7.03	2.02	10.91
100	16.75	8.35	6.70	1.65	9.92
110	15.57	7.76	6.39	1.37	9.05
120	14.56	7.26	6.11	1.15	8.28

Storage: Underground Storage

Orifice Equation: Q = CdA(2gh)^0.5 — Where C = 0.61
Orifice Diameter: 92.00 mm
Invert Elevation 56.66 m
Obvert Elevation: 56.96 m
Max Storage Depth 0.28 m
Downstream W/L 56.55 m

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
2-year Water Level	56.94	0.28	9.57	19.65	79.41	OK

Subdrainage Area: L102A — Controlled - Tributary
Area (ha): 0.17
C: 0.77

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.81	27.95	14.47	13.48	**8.09**
20	52.03	18.93	13.24	5.70	6.84
30	40.04	14.57	11.62	2.95	5.31
40	32.86	11.96	10.23	1.72	4.14
50	28.04	10.20	9.11	1.10	3.29
60	24.56	8.94	8.20	0.74	2.67
70	21.91	7.97	7.45	0.52	2.20
80	19.83	7.22	6.83	0.39	1.85
90	18.14	6.60	6.31	0.29	1.58
100	16.75	6.09	5.87	0.23	1.37
110	15.57	5.67	5.48	0.18	1.20
120	14.56	5.30	5.15	0.15	1.06

Storage: Underground Storage

Orifice Equation: Q = CdA(2gh)^0.5 — Where C = 0.61
Orifice Diameter: 126.00 mm
Invert Elevation 56.55 m
Obvert Elevation: 56.85 m
Max Storage Depth 0.18 m
Downstream W/L 56.53 m

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
2-year Water Level	56.73	0.18	14.47	8.09	33.78	OK

Project #160401837, CEPEO Elementary School Louise-Arbour - 45 Oak Street
Modified Rational Method Calculations for Storage

100 yr Intensity
City of Ottawa

I = a/(t + b)^c

		t (min)	I (mm/hr)
a =	1735.688	10	178.56
b =	6.014	20	119.95
c =	0.820	30	91.87
		40	75.15
		50	63.95
		60	55.89
		70	49.79
		80	44.99
		90	41.11
		100	37.90
		110	35.20
		120	32.89

100 YEAR Predevelopment Target Release from Portion of Site

100 YEAR Modified Rational Method for Entire Site

Subdrainage Area: R111A — Roof
Area (ha): 0.16 — Maximum Storage Depth: 150 mm
C: 1.00

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)	Depth (mm)	
10	178.56	79.42	6.85	72.57	43.54	131.0	0.00
20	119.95	53.35	7.27	46.09	55.31	141.9	0.00
30	91.87	40.86	7.44	33.43	60.17	146.4	0.00
40	75.15	33.42	7.51	25.92	62.20	148.3	0.00
50	63.95	28.45	7.53	20.92	**62.76**	148.8	0.00
60	55.89	24.86	7.52	17.35	62.44	148.6	0.00
70	49.79	22.15	7.49	14.66	61.58	147.8	0.00
80	44.99	20.01	7.44	12.57	60.33	146.6	0.00
90	41.11	18.29	7.39	10.90	58.84	145.2	0.00
100	37.90	16.86	7.33	9.53	57.17	143.7	0.00
110	35.20	15.66	7.27	8.39	55.37	142.0	0.00
120	32.89	14.63	7.20	7.43	53.49	140.3	0.00

Storage: Roof Storage

	Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check
100-year Water Level	148.85	0.15	7.53	62.76	64.00	0.00

Subdrainage Area: L107A, L107B, L107C — Controlled - Tributary
Area (ha): 0.22
C: 1.00

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	109.21	17.14	92.07	55.24
20	119.95	73.36	18.88	54.48	65.37
30	91.87	56.19	19.18	37.00	**66.61**
40	75.15	45.96	18.83	27.13	65.11
50	63.95	39.11	18.31	20.81	62.42
60	55.89	34.19	17.75	16.43	59.16
70	49.79	30.45	17.20	13.25	55.65
80	44.99	27.52	16.66	10.85	52.09
90	41.11	25.14	16.14	9.00	48.59
100	37.90	23.18	15.64	7.54	45.22
110	35.20	21.53	15.17	6.36	42.01
120	32.89	20.12	14.71	5.41	38.98

Storage: Underground Storage

Orifice Equation: Q = CdA(2gh)^0.5 — Where C = 0.61
Orifice Diameter: 92.00 mm — Max Volume in STM 106, 107 and CB 107A, 107B, 107C at max storage depth: 11.55
Invert Elevation 56.66 m
Obvert Elevation: 56.96 m
Max Storage Depth 1.14 m — Capacity of Oak Street Sewer = 95.3 L/s
Downstream W/L 56.55 m — Existing Flow to Oak Street Sewer = 75.9 L/s
Available capacity in Oak Street Sewer = 19.4 L/s

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Level	57.80	1.14	19.18	66.61	79.41	OK
					12.80	

Subdrainage Area: L102A — Controlled - Tributary
Area (ha): 0.17
C: 0.96

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	81.22	30.45	50.77	**30.46**
20	119.95	54.56	29.89	24.68	29.61
30	91.87	41.79	27.60	14.19	25.54
40	75.15	34.18	25.36	8.82	21.17
50	63.95	29.09	23.33	5.76	17.29
60	55.89	25.43	21.21	4.22	15.19
70	49.79	22.65	19.43	3.22	13.52
80	44.99	20.47	17.98	2.49	11.94
90	41.11	18.70	16.74	1.96	10.57
100	37.90	17.24	15.68	1.56	9.39
110	35.20	16.01	14.74	1.27	8.38
120	32.89	14.96	13.92	1.04	7.52

Storage: Underground Storage

Orifice Equation: Q = CdA(2gh)^0.5 — Where C = 0.61
Orifice Diameter: 126.00 mm
Invert Elevation 56.55 m — Max Volume in STM 102A and 102B at max storage: 1.85
Obvert Elevation: 56.85 m
Max Storage Depth 0.82 m
Downstream W/L 56.53 m

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Level	57.37	0.82	30.45	30.46	33.78	OK
					3.32	

Stormwater Management Calculations

Project #160401837, CEPEO Elementary School Louise-Arbour - 45 Oak Street
Modified Rational Method Calculations for Storage

SUMMARY TO OUTLET

			Vrequired	Vavailable*		
Tributary Area	0.550	ha				
Total 2yr Flow to Sewer	29.7	L/s	46	177	m^3	Ok
Non-Tributary Area	0.000	ha				
Total 2yr Flow Uncontrolled	0.0	L/s				
Total Area	0.550	ha				
Total 2yr Flow	29.7	L/s				
Target	58.7	L/s				

Project #160401837, CEPEO Elementary School Louise-Arbour - 45 Oak Street
Modified Rational Method Calculations for Storage

SUMMARY TO OUTLET

			Vrequired	Vavailable*		
Tributary Area	0.550	ha				
Total 100yr Flow to Sewer	57.2	L/s	160	177	m^3	Ok
Non-Tributary Area	0.000	ha				
Total 100yr Flow Uncontrolled	0.0	L/s				
Total Area	0.550	ha				
Total 100yr Flow	57.2	L/s				
Target	58.7	L/s				

C.3 External Area Post-development to Pre-development Comparison

Pre-development to Post-development External Area Comparison									
		Pre-development			Post-development			Difference	
Outlet	**Area ID**	**Area**	**C**	**AxC**	**Area**	**C**	**AxC**	**AxC**	**Percentage**
Preston St	CB-1	0.03	0.61	0.018	0.03	0.61	0.018	0.000	0.0%
	CB-2	0.03	0.90	0.027	0.03	0.90	0.027	0.000	0.0%
	CB-3	0.06	0.90	0.054	0.06	0.90	0.054	0.000	0.0%
	CB-4	0.02	0.20	0.004	0.02	0.20	0.004	0.000	0.0%
	DICB-5	0.02	0.27	0.005	0.02	0.27	0.005	0.000	0.0%
	CB-6	0.15	0.67	0.101	0.15	0.67	0.101	0.000	0.0%
	CB-7	0.02	0.78	0.016	0.02	0.78	0.016	0.000	0.0%
	CB-8	0.08	0.89	0.071	0.08	0.89	0.071	0.000	0.0%
	CB-9	0.17	0.53	0.090	0.12	0.62	0.074	-0.016	-17.4%
	CB-10	0.11	0.66	0.073	0.11	0.64	0.070	-0.002	-3.0%
	CB-11	0.07	0.56	0.039	0.07	0.56	0.039	0.000	0.0%
	Subtotal	**0.760**		**0.498**	**0.710**		**0.480**	**-0.018**	**-3.6%**
Somerset St	UNC-1	0.05	0.59	0.030	0.05	0.59	0.030	0.000	0.0%
Champagne Ave	DICB-12	0.85	0.82	0.697	0.56	0.76	0.426	-0.271	-38.9%
Plouffe Park	PLOUFFE	0.17	0.20	0.034	0.00	0.00	0.000	-0.034	-100.0%
	Total	**1.830**		**1.258**	**1.320**		**0.935**	**-0.323**	**-25.7%**

C.4 Stormceptor Sizing Reports and Specifications

Stormceptor® Rinker MATERIALS™

Stormceptor® EF Sizing Report

Imbrium® Systems
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

06/30/2025

Province:	Ontario
City:	Ottawa
Nearest Rainfall Station:	OTTAWA CDA RCS
Climate Station Id:	6105978
Years of Rainfall Data:	20

Site Name:	L102A

Drainage Area (ha):	0.17
Runoff Coefficient 'c':	0.77

Project Name:	CEPEO Elementary School Louise-Arbour - 45 Oak Street
Project Number:	160401837
Designer Name:	Warren Johnson
Designer Company:	Stantec
Designer Email:	warren.johnson@stantec.com
Designer Phone:	613-784-2272
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0
Required Water Quality Runoff Volume Capture (%):	
Estimated Water Quality Flow Rate (L/s):	4.22
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	Yes
Upstream Orifice Control Flow Rate to Stormceptor (L/s):	30.50
Peak Conveyance (maximum) Flow Rate (L/s):	
Influent TSS Concentration (mg/L):	
Estimated Average Annual Sediment Volume (L/yr):	141

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	96
EFO5	98
EFO6	99
EFO8	100
EFO10	100
EFO12	100

Recommended Stormceptor EFO Model:	**EFO4**
Estimated Net Annual Sediment (TSS) Load Reduction (%):	**96**
Water Quality Runoff Volume Capture (%):	**> 90**

imbrium

THIRD-PARTY TESTING AND VERIFICATION

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

PERFORMANCE

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

PARTICLE SIZE DISTRIBUTION (PSD)

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

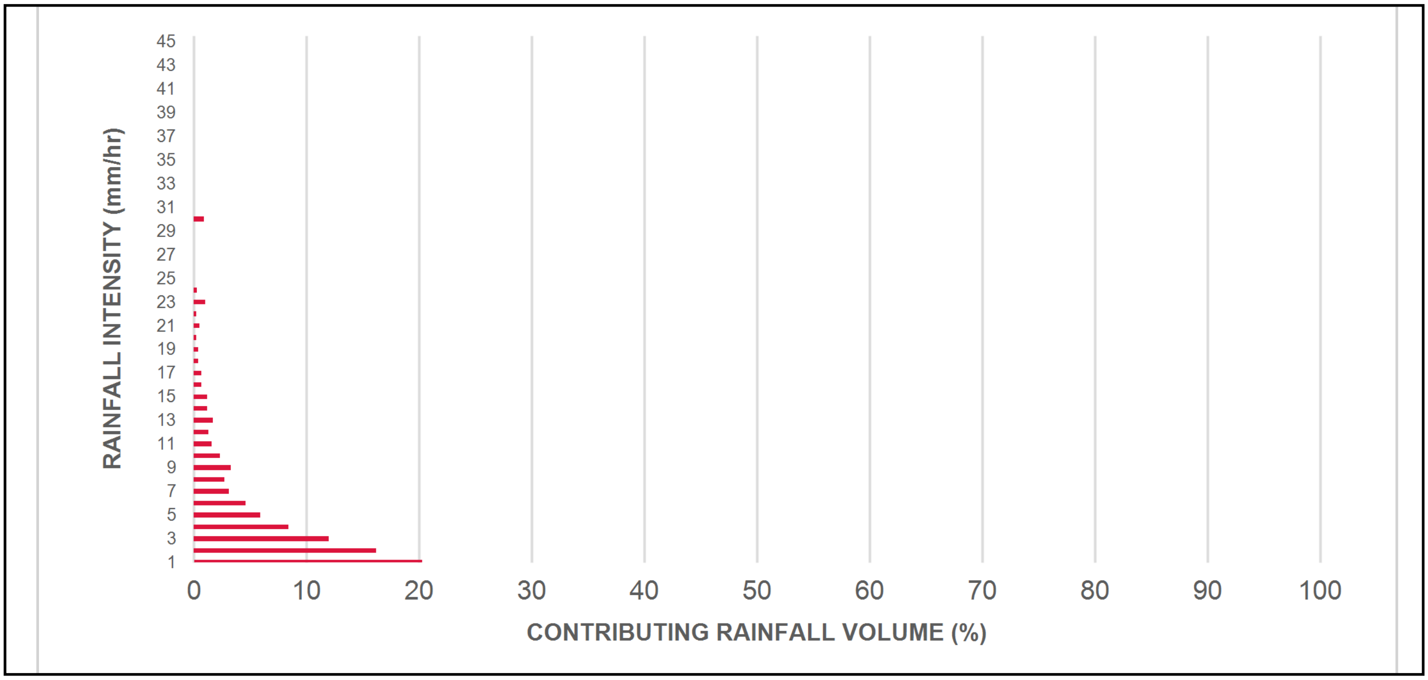
Particle Size (μm)	Percent Less Than	Particle Size Fraction (μm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

Upstream Flow Controlled Results

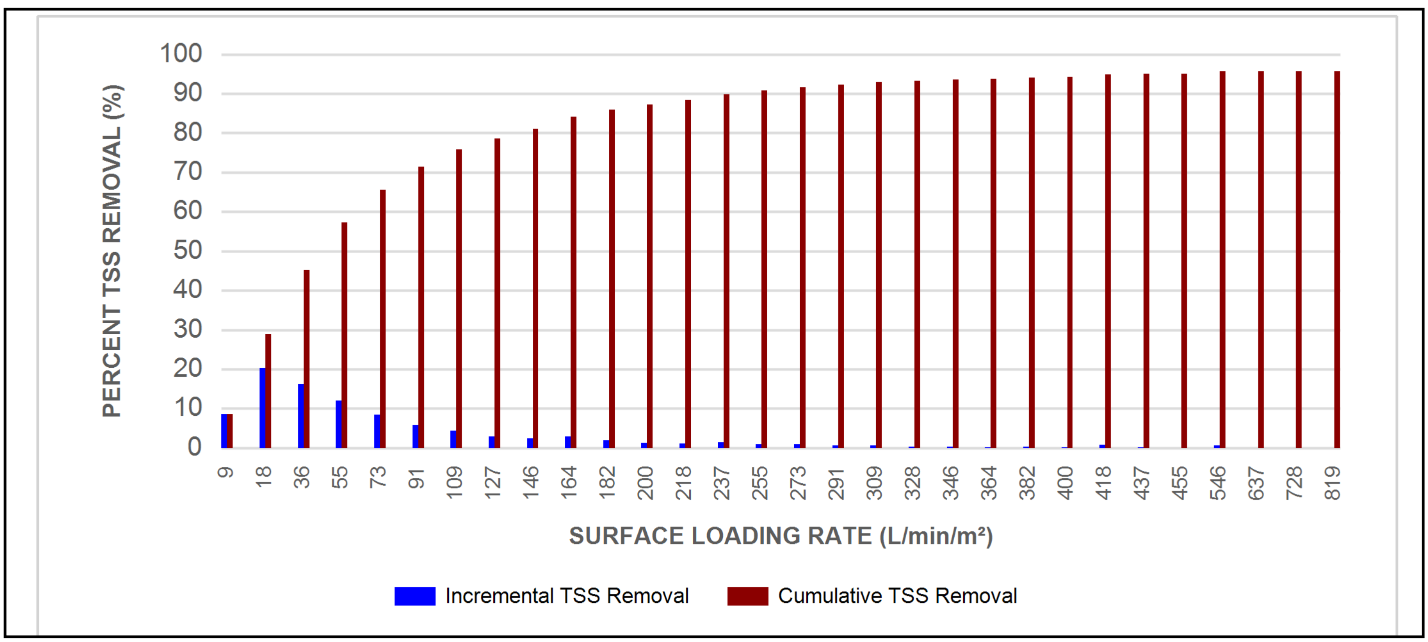
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.50	8.6	8.6	0.18	11.0	9.0	100	8.6	8.6
1.00	20.3	29.0	0.36	22.0	18.0	100	20.3	29.0
2.00	16.2	45.2	0.73	44.0	36.0	100	16.2	45.2
3.00	12.0	57.2	1.09	66.0	55.0	100	12.0	57.2
4.00	8.4	65.6	1.46	87.0	73.0	100	8.4	65.6
5.00	5.9	71.6	1.82	109.0	91.0	97	5.8	71.4
6.00	4.6	76.2	2.18	131.0	109.0	95	4.4	75.8
7.00	3.1	79.3	2.55	153.0	127.0	93	2.9	78.6
8.00	2.7	82.0	2.91	175.0	146.0	91	2.5	81.1
9.00	3.3	85.3	3.28	197.0	164.0	88	2.9	84.1
10.00	2.3	87.6	3.64	218.0	182.0	86	2.0	86.0
11.00	1.6	89.2	4.00	240.0	200.0	83	1.3	87.3
12.00	1.3	90.5	4.37	262.0	218.0	83	1.1	88.4
13.00	1.7	92.2	4.73	284.0	237.0	82	1.4	89.8
14.00	1.2	93.5	5.09	306.0	255.0	81	1.0	90.8
15.00	1.2	94.6	5.46	328.0	273.0	80	0.9	91.7
16.00	0.7	95.3	5.82	349.0	291.0	79	0.6	92.3
17.00	0.7	96.1	6.19	371.0	309.0	78	0.6	92.9
18.00	0.4	96.5	6.55	393.0	328.0	78	0.3	93.2
19.00	0.4	96.9	6.91	415.0	346.0	77	0.3	93.5
20.00	0.2	97.1	7.28	437.0	364.0	76	0.2	93.7
21.00	0.5	97.5	7.64	459.0	382.0	75	0.3	94.0
22.00	0.2	97.8	8.01	480.0	400.0	74	0.2	94.2
23.00	1.0	98.8	8.37	502.0	418.0	73	0.7	94.9
24.00	0.3	99.1	8.73	524.0	437.0	72	0.2	95.1
25.00	0.9	100.0	9.10	546.0	455.0	72	0.7	95.8
30.00	0.9	100.9	10.92	655.0	546.0	67	0.6	96.4
35.00	-0.9	100.0	12.74	764.0	637.0	64	N/A	95.8
40.00	0.0	100.0	14.56	873.0	728.0	64	0.0	95.8
45.00	0.0	100.0	16.38	983.0	819.0	63	0.0	95.8
Estimated Net Annual Sediment (TSS) Load Reduction =								**96 %**

Climate Station ID: 6105978 *Years of Rainfall Data*: 20

RAINFALL DATA FROM OTTAWA CDA RCS RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



Maximum Pipe Diameter / Peak Conveyance

Stormceptor EF / EFO	Model Diameter		Min Angle Inlet / Outlet Pipes	Max Inlet Pipe Diameter		Max Outlet Pipe Diameter		Peak Conveyance Flow Rate	
	(m)	(ft)		(mm)	(in)	(mm)	(in)	(L/s)	(cfs)
EF4 / EFO4	1.2	4	90	609	24	609	24	425	15
EF5 / EFO5	1.5	5	90	762	30	762	30	710	25
EF6 / EFO6	1.8	6	90	914	36	914	36	990	35
EF8 / EFO8	2.4	8	90	1219	48	1219	48	1700	60
EF10 / EFO10	3.0	10	90	1828	72	1828	72	2830	100
EF12 / EFO12	3.6	12	90	1828	72	1828	72	2830	100

SCOUR PREVENTION AND ONLINE CONFIGURATION

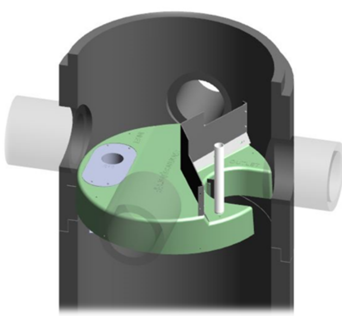
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test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

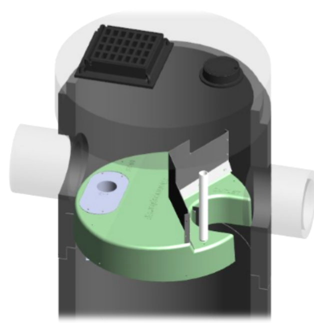
DESIGN FLEXIBILITY

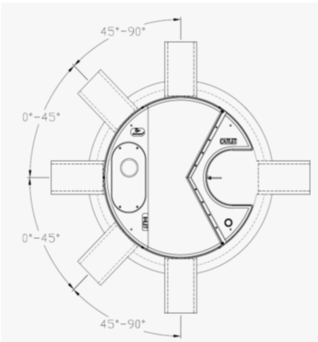
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend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

OIL CAPTURE AND RETENTION

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







INLET-TO-OUTLET DROP

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

HEAD LOSS

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

Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft³)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF5 / EFO5	1.5	5	1.62	5.3	420	111	305	10	2124	75	2612	5758
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

*Increased sump depth may be added to increase sediment storage capacity
** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft³)

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

STANDARD STORMCEPTOR EF/EFO DRAWINGS

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

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

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

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

PART 1 – GENERAL

1.1 WORK INCLUDED

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

1.2 REFERENCE STANDARDS & PROCEDURES

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

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

1.3 SUBMITTALS

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

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

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

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

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

2.1.1	4 ft (1219 mm) Diameter OGS Units:	1.19 m^3 sediment / 265 L oil
	5 ft (1524 mm) Diameter OGS Units:	1.95 m^3 sediment / 420 L oil
	6 ft (1829 mm) Diameter OGS Units:	3.48 m^3 sediment / 609 L oil
	8 ft (2438 mm) Diameter OGS Units:	8.78 m^3 sediment / 1,071 L oil
	10 ft (3048 mm) Diameter OGS Units:	17.78 m^3 sediment / 1,673 L oil
	12 ft (3657 mm) Diameter OGS Units:	31.23 m^3 sediment / 2,476 L oil

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

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

3.2 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in the sizing report for the specified device. Sizing of the OGS shall be determined by use of a minimum ten (10) years of local historical rainfall data provided by Environment Canada. Sizing shall also be determined by use of the sediment removal performance data derived from the ISO 14034 ETV third-party verified laboratory testing data from testing conducted in accordance with the Canadian ETV protocol Procedure for Laboratory Testing of Oil-Grit Separators, as follows:

3.2.1 Sediment removal efficiency for a given surface loading rate and its associated flow rate shall be based on sediment removal efficiency demonstrated at the seven (7) tested surface loading rates specified in the protocol, ranging 40 L/min/m^2 to 1400 L/min/m^2, and as stated in the ISO 14034 ETV Verification Statement for the OGS device.

3.2.2 Sediment removal efficiency for surface loading rates between 40 L/min/m^2 and 1400 L/min/m^2 shall be based on linear interpolation of data between consecutive tested surface loading rates.

3.2.3 Sediment removal efficiency for surface loading rates less than the lowest tested surface loading rate of 40 L/min/m^2 shall be assumed to be identical to the sediment removal efficiency at 40 L/min/m^2. No extrapolation shall be allowed that results in a sediment removal efficiency that is greater than that demonstrated at 40 L/min/m^2.

3.2.4 Sediment removal efficiency for surface loading rates greater than the highest tested surface loading rate of 1400 L/min/m^2 shall assume zero sediment removal for the portion of flow that exceeds 1400 L/min/m^2, and shall be calculated using a simple proportioning formula, with 1400 L/min/m^2 in the numerator and the higher surface loading rate in the denominator, and multiplying the resulting fraction times the sediment removal efficiency at 1400 L/min/m^2.

The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 2.1.

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

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

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

3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid

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

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m^2 to 2600 L/min/m^2) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.** However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.

Stormceptor® EF Sizing Report

Imbrium® Systems
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION
04/23/2025

Province:	Ontario
City:	Ottawa
Nearest Rainfall Station:	OTTAWA CDA RCS
Climate Station Id:	6105978
Years of Rainfall Data:	20
Site Name:	L107A, L107B, L107C
Drainage Area (ha):	0.22
Runoff Coefficient 'c':	0.82
Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0
Required Water Quality Runoff Volume Capture (%):	
Estimated Water Quality Flow Rate (L/s):	5.82
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	Yes
Upstream Orifice Control Flow Rate to Stormceptor (L/s):	19.20
Peak Conveyance (maximum) Flow Rate (L/s):	
Influent TSS Concentration (mg/L):	
Estimated Average Annual Sediment Volume (L/yr):	198

Project Name:	CEPEO Elementary School Louise-Arbour - 45 Oak Street
Project Number:	160401837
Designer Name:	Warren Johnson
Designer Company:	Stantec
Designer Email:	warren.johnson@stantec.com
Designer Phone:	613-784-2272
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	94
EFO5	96
EFO6	98
EFO8	100
EFO10	100
EFO12	100

Recommended Stormceptor EFO Model: **EFO4**

Estimated Net Annual Sediment (TSS) Load Reduction (%): **94**

Water Quality Runoff Volume Capture (%): **> 90**

THIRD-PARTY TESTING AND VERIFICATION

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

PERFORMANCE

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

PARTICLE SIZE DISTRIBUTION (PSD)

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

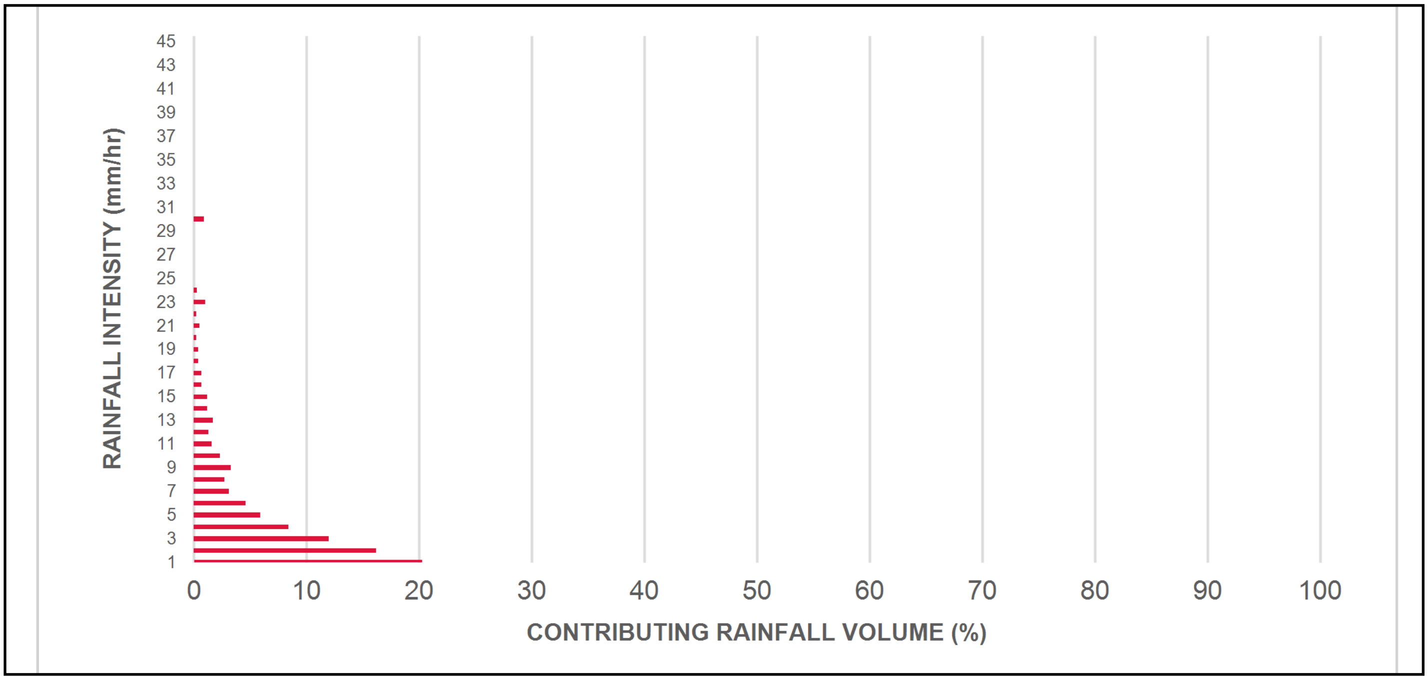
Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

Upstream Flow Controlled Results

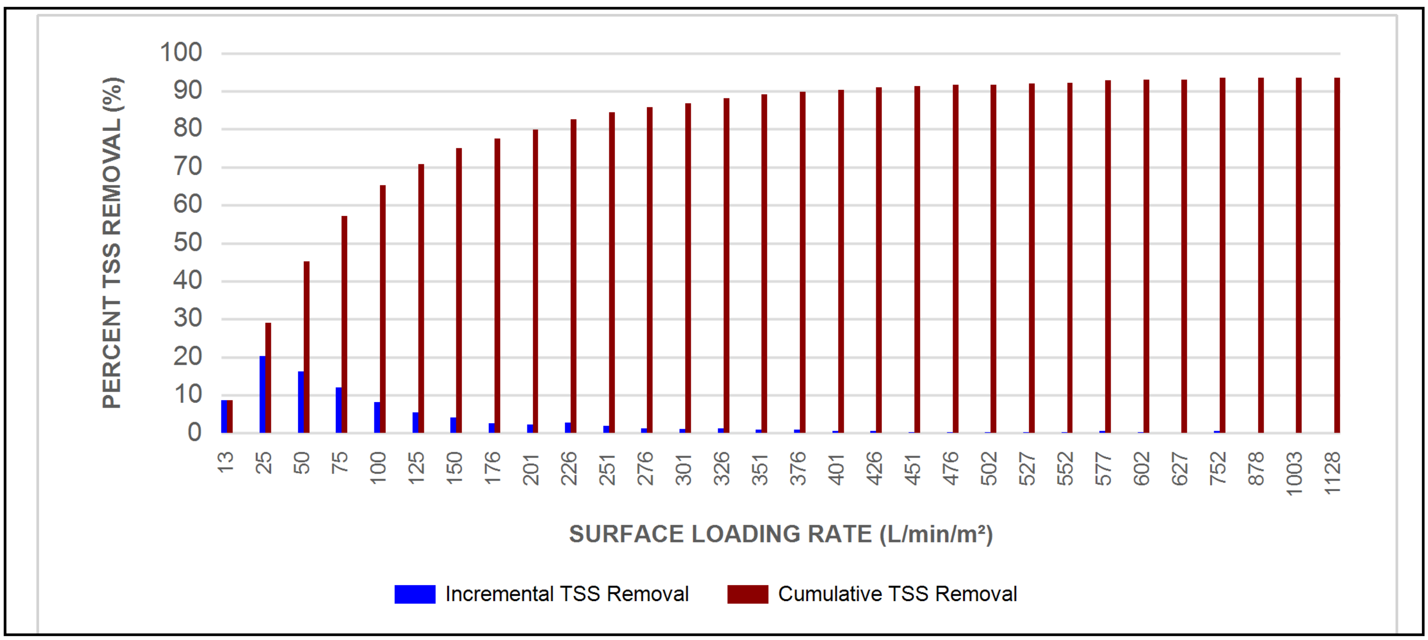
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.50	8.6	8.6	0.25	15.0	13.0	100	8.6	8.6
1.00	20.3	29.0	0.50	30.0	25.0	100	20.3	29.0
2.00	16.2	45.2	1.00	60.0	50.0	100	16.2	45.2
3.00	12.0	57.2	1.50	90.0	75.0	100	12.0	57.2
4.00	8.4	65.6	2.01	120.0	100.0	96	8.1	65.3
5.00	5.9	71.6	2.51	150.0	125.0	93	5.6	70.8
6.00	4.6	76.2	3.01	181.0	150.0	89	4.1	75.0
7.00	3.1	79.3	3.51	211.0	176.0	87	2.7	77.6
8.00	2.7	82.0	4.01	241.0	201.0	83	2.3	79.9
9.00	3.3	85.3	4.51	271.0	226.0	82	2.7	82.6
10.00	2.3	87.6	5.02	301.0	251.0	81	1.9	84.5
11.00	1.6	89.2	5.52	331.0	276.0	80	1.2	85.8
12.00	1.3	90.5	6.02	361.0	301.0	78	1.0	86.8
13.00	1.7	92.2	6.52	391.0	326.0	78	1.3	88.1
14.00	1.2	93.5	7.02	421.0	351.0	76	0.9	89.1
15.00	1.2	94.6	7.52	451.0	376.0	75	0.9	89.9
16.00	0.7	95.3	8.02	481.0	401.0	74	0.5	90.4
17.00	0.7	96.1	8.53	512.0	426.0	73	0.5	91.0
18.00	0.4	96.5	9.03	542.0	451.0	72	0.3	91.3
19.00	0.4	96.9	9.53	572.0	476.0	71	0.3	91.6
20.00	0.2	97.1	10.03	602.0	502.0	69	0.2	91.7
21.00	0.5	97.5	10.53	632.0	527.0	68	0.3	92.0
22.00	0.2	97.8	11.03	662.0	552.0	67	0.2	92.2
23.00	1.0	98.8	11.53	692.0	577.0	66	0.7	92.8
24.00	0.3	99.1	12.04	722.0	602.0	65	0.2	93.0
25.00	0.9	100.0	12.54	752.0	627.0	64	0.6	93.6
30.00	0.9	100.9	15.05	903.0	752.0	63	0.6	94.2
35.00	-0.9	100.0	17.55	1053.0	878.0	63	N/A	93.6
40.00	0.0	100.0	19.00	1140.0	950.0	62	0.0	93.6
45.00	0.0	100.0	19.00	1140.0	950.0	62	0.0	93.6
Estimated Net Annual Sediment (TSS) Load Reduction =								**94 %**

Climate Station ID: 6105978 *Years of Rainfall Data*: 20

RAINFALL DATA FROM OTTAWA CDA RCS RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



Maximum Pipe Diameter / Peak Conveyance									
Stormceptor EF / EFO	Model Diameter		Min Angle Inlet / Outlet Pipes	Max Inlet Pipe Diameter		Max Outlet Pipe Diameter		Peak Conveyance Flow Rate	
	(m)	(ft)		(mm)	(in)	(mm)	(in)	(L/s)	(cfs)
EF4 / EFO4	1.2	4	90	609	24	609	24	425	15
EF5 / EFO5	1.5	5	90	762	30	762	30	710	25
EF6 / EFO6	1.8	6	90	914	36	914	36	990	35
EF8 / EFO8	2.4	8	90	1219	48	1219	48	1700	60
EF10 / EFO10	3.0	10	90	1828	72	1828	72	2830	100
EF12 / EFO12	3.6	12	90	1828	72	1828	72	2830	100

SCOUR PREVENTION AND ONLINE CONFIGURATION

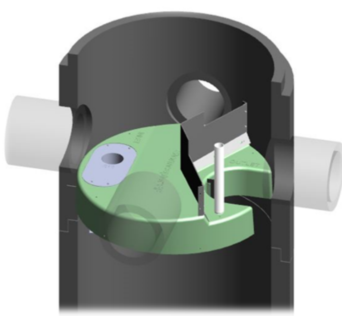
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test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

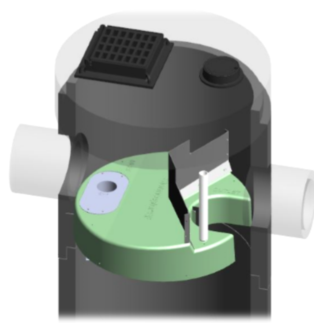
DESIGN FLEXIBILITY

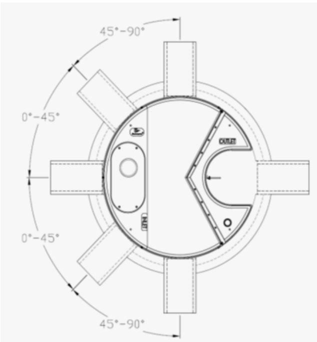
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend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

OIL CAPTURE AND RETENTION

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







INLET-TO-OUTLET DROP

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.

0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.

45° - 90° : The inlet pipe is 2-inches (50mm) higher than the outlet pipe.

HEAD LOSS

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

Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft³)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF5 / EFO5	1.5	5	1.62	5.3	420	111	305	10	2124	75	2612	5758
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EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
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EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

*Increased sump depth may be added to increase sediment storage capacity

** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft³)

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

STANDARD STORMCEPTOR EF/EFO DRAWINGS

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

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

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

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

PART 1 – GENERAL

1.1 WORK INCLUDED

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

1.2 REFERENCE STANDARDS & PROCEDURES

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

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

1.3 SUBMITTALS

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

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

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

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

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

2.1.1	4 ft (1219 mm) Diameter OGS Units:	1.19 m^3 sediment / 265 L oil
	5 ft (1524 mm) Diameter OGS Units:	1.95 m^3 sediment / 420 L oil
	6 ft (1829 mm) Diameter OGS Units:	3.48 m^3 sediment / 609 L oil
	8 ft (2438 mm) Diameter OGS Units:	8.78 m^3 sediment / 1,071 L oil
	10 ft (3048 mm) Diameter OGS Units:	17.78 m^3 sediment / 1,673 L oil
	12 ft (3657 mm) Diameter OGS Units:	31.23 m^3 sediment / 2,476 L oil

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

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

3.2 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in the sizing report for the specified device. Sizing of the OGS shall be determined by use of a minimum ten (10) years of local historical rainfall data provided by Environment Canada. Sizing shall also be determined by use of the sediment removal performance data derived from the ISO 14034 ETV third-party verified laboratory testing data from testing conducted in accordance with the Canadian ETV protocol Procedure for Laboratory Testing of Oil-Grit Separators, as follows:

3.2.1 Sediment removal efficiency for a given surface loading rate and its associated flow rate shall be based on sediment removal efficiency demonstrated at the seven (7) tested surface loading rates specified in the protocol, ranging 40 L/min/m^2 to 1400 L/min/m^2, and as stated in the ISO 14034 ETV Verification Statement for the OGS device.

3.2.2 Sediment removal efficiency for surface loading rates between 40 L/min/m^2 and 1400 L/min/m^2 shall be based on linear interpolation of data between consecutive tested surface loading rates.

3.2.3 Sediment removal efficiency for surface loading rates less than the lowest tested surface loading rate of 40 L/min/m^2 shall be assumed to be identical to the sediment removal efficiency at 40 L/min/m^2. No extrapolation shall be allowed that results in a sediment removal efficiency that is greater than that demonstrated at 40 L/min/m^2.

3.2.4 Sediment removal efficiency for surface loading rates greater than the highest tested surface loading rate of 1400 L/min/m^2 shall assume zero sediment removal for the portion of flow that exceeds 1400 L/min/m^2, and shall be calculated using a simple proportioning formula, with 1400 L/min/m^2 in the numerator and the higher surface loading rate in the denominator, and multiplying the resulting fraction times the sediment removal efficiency at 1400 L/min/m^2.

The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 2.1.

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

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

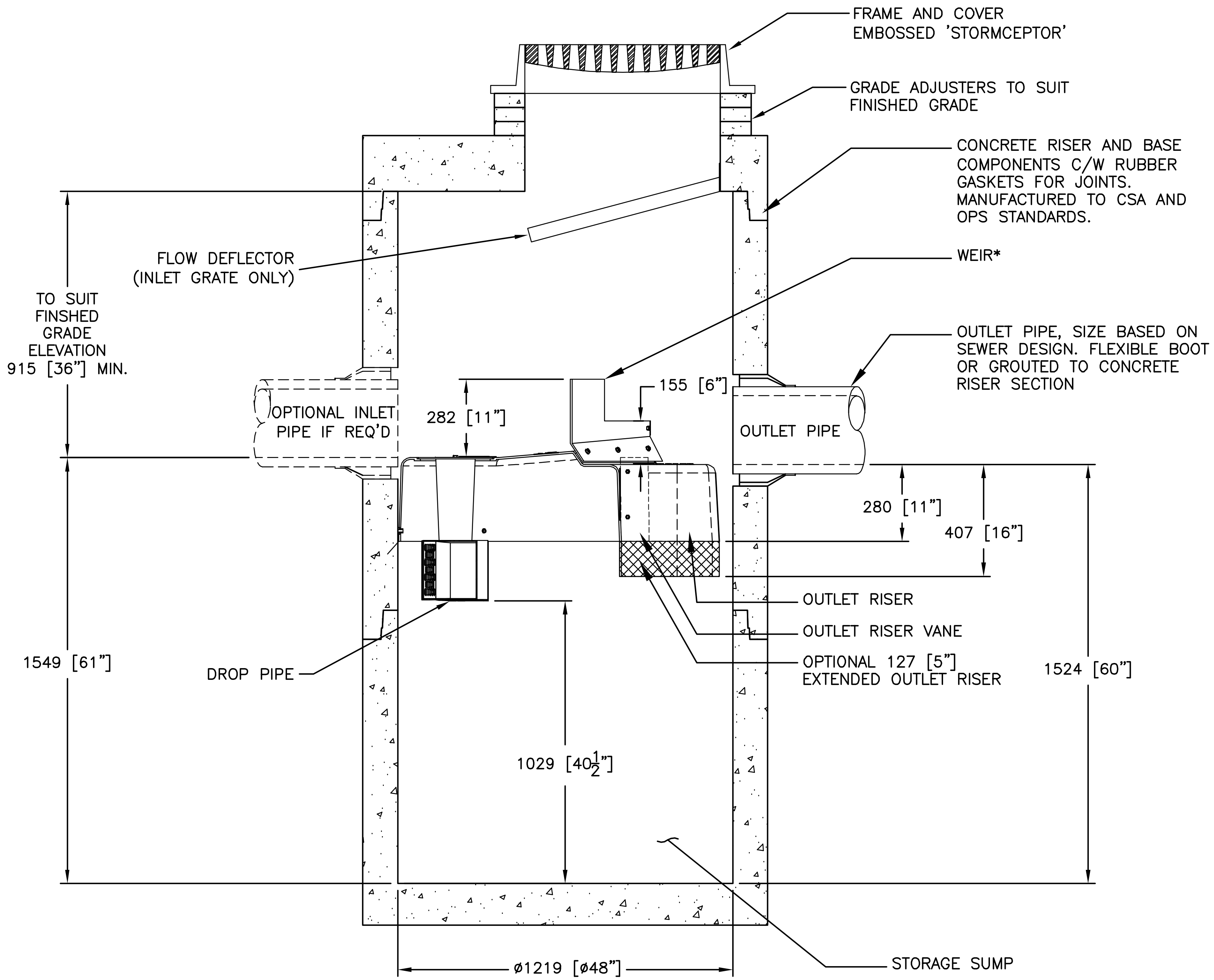
3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m^2.

3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

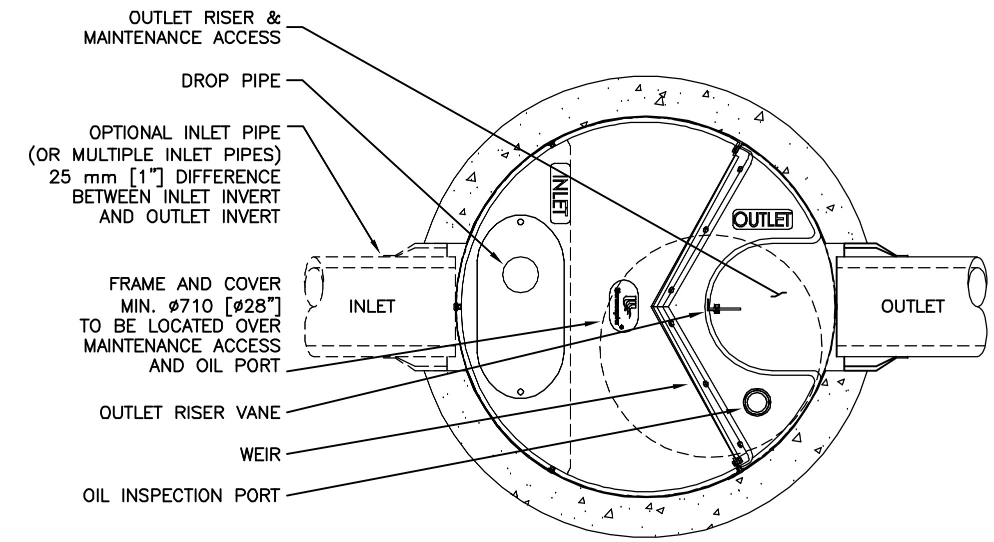
The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid

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

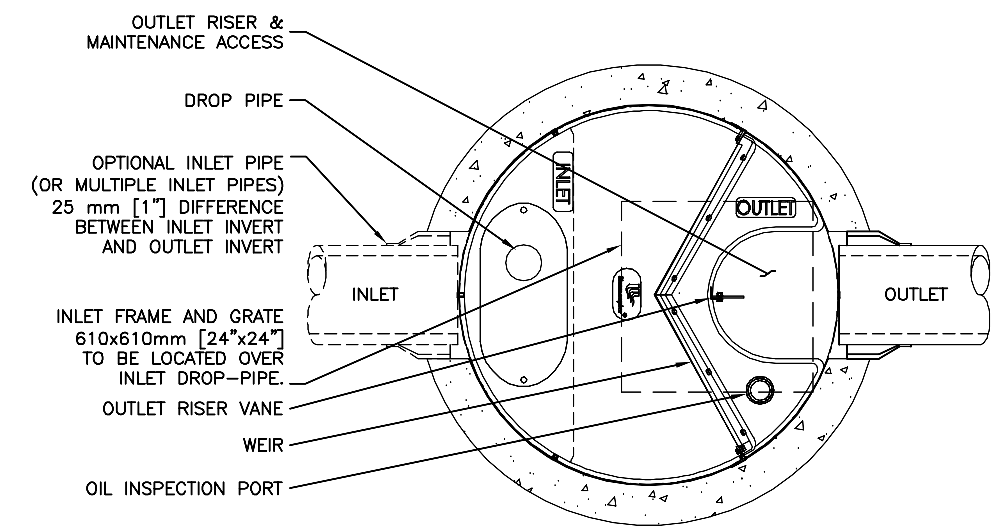
3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m^2 to 2600 L/min/m^2) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.** However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.



SECTION VIEW



PLAN VIEW (STANDARD)



PLAN VIEW (INLET TOP)

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

GENERAL NOTES:

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

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

INSTALLATION NOTES

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

STANDARD DETAIL
NOT FOR CONSTRUCTION

SITE SPECIFIC DATA REQUIREMENTS

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

* PER ENGINEER OF RECORD

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

Stormceptor® EF

imbrium

SCALE = NTS

DATE: 10/13/2017
DESIGNED: JSK | DRAWN: JSK
CHECKED: BSF | APPROVED: SP
PROJECT No.: EFO4 | SEQUENCE No.: *
SHEET: 1 OF 1

Stormceptor® EF

Stormceptor® EF Overview

imbrium®

About Imbrium® Systems

Imbrium® Systems is dedicated to protecting Canada's waterways. Based on our knowledge and experience in the Canadian stormwater industry, we have the ability to provide the most effective stormwater treatment technologies that capture and retain harmful pollutants from urban runoff before it enters our streams, rivers, lakes, and oceans.

Imbrium's engineered treatment solutions have been third-party tested and verified in accordance with the ISO 14034 Environmental Technology Verification (ETV) protocol to ensure performance in real-world conditions as designed. Our team of highly skilled engineers and partners provide the highest level of service from design to installation and long-term maintenance.

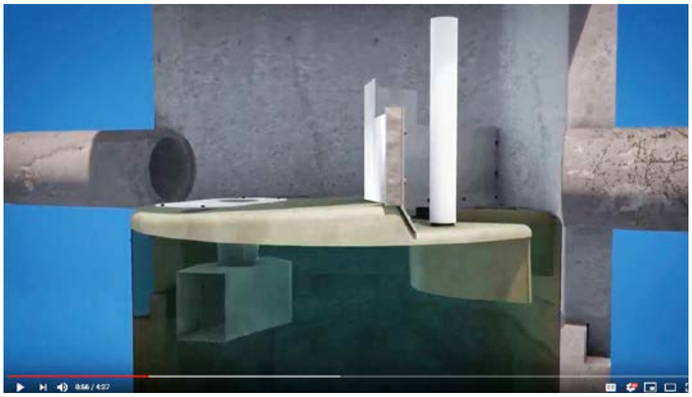
By working with Imbrium and our partners, you can expect superior treatment technology, unparalleled customer service, compliance with local stormwater regulations, and cleaner water. To find your local representative, please visit **www.imbriumsystems.com/localrep**.

Learn About the Stormceptor® EF

Go online and watch our animation to learn how the Stormceptor EF works. The animation highlights important features of the Stormceptor EF including:

- Functionality
- Applications
- Inspection and Maintenance

To view the Stormceptor EF animation, visit **www.imbriumsystems.com/stormceptoref**



Stormceptor® EF

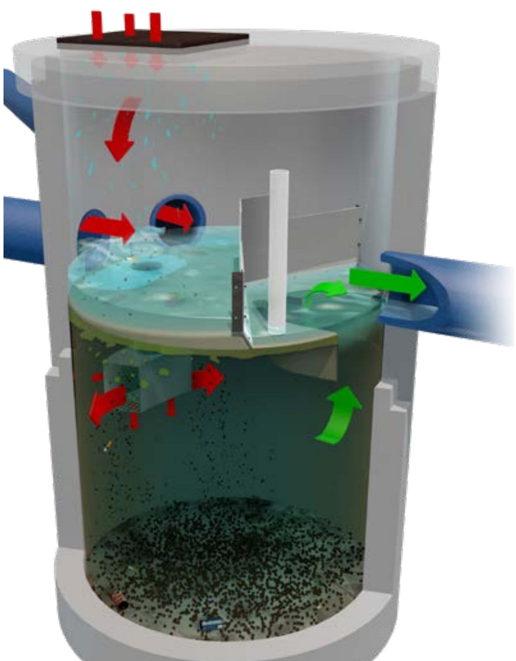
A CONTINUATION AND EVOLUTION OF THE MOST GLOBALLY RECOGNIZED OIL GRIT SEPARATOR (OGS) STORMWATER TREATMENT TECHNOLOGY

Stormceptor EF effectively targets sediment (TSS), free oils, gross pollutants and other pollutants that attach to particles, such as nutrients and metals. Stormceptor EF's independently tested and verified, patent- pending treatment and scour prevention platform ensures pollutants are captured and contained during all rainfall events.

Stormceptor EF also offers design flexibility in one platform, accepting flow from a single inlet pipe, multiple inlet pipes, and from the surface through an inlet grate. Stormceptor EF can also accommodate a 90-degree inlet to outlet bend angle, and tailwater conditions.

Ideal Uses

- Sediment (TSS) removal
- Hydrocarbon control and hotspots (Stormceptor EF)
- Debris and small floatables capture
- Pretreatment for filtration, detention/retention systems, ponds, wetlands, and bioretention
- Retrofit and redevelopment projects

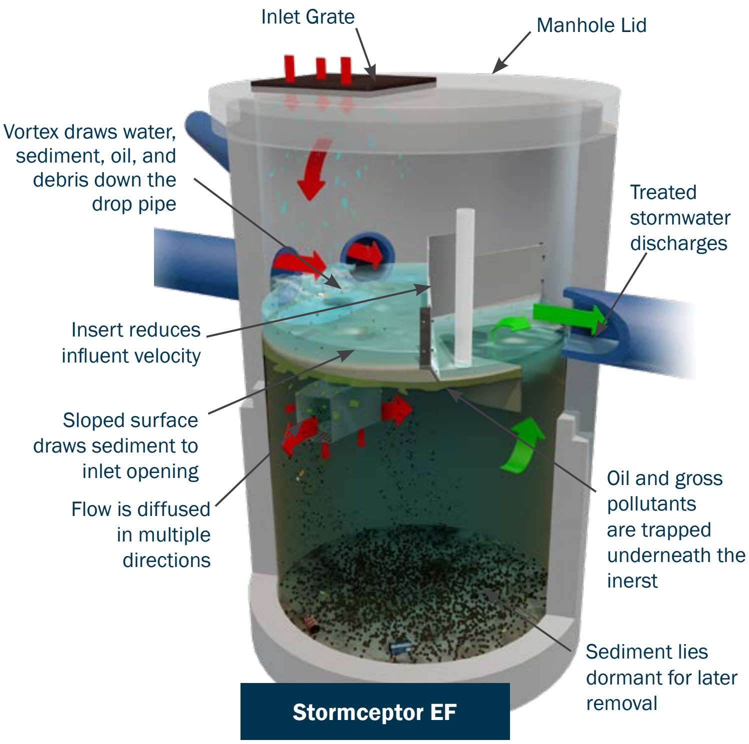


Stormceptor EF

Stormceptor EF and Stormceptor EFO have been verified in accordance with ISO 14034 Environment Management - Environmental Technology Verification (ETV) protocol.

How the Stormceptor® EF Works

- Flow enters the Stormceptor through one or more inlet pipes or an inlet grate.
- A specially designed insert reduces influent velocity by creating a pond upstream of the weir, allowing sediments to begin settling.
- Swirling flow sweeps water and pollutants across the sloped insert surface to the drop pipe, where a strong vortex draws water, sediment, oil, and debris down the drop pipe cone and into the lower chamber.
- Flow exits the drop pipe through two large rectangular openings, while also diffusing through perforations in multiple directions. This reduces stream velocities and increases pollutant removal efficiency while preventing resuspension and washout of previously captured pollutants.
- Floatables, such as oil and gross pollutants, rise up and are trapped beneath the insert.
- Sediment settles to the sump.
- Treated stormwater discharges to the top side of the insert downstream of the weir, where it exits through the outlet pipe.
- During intense storm events excess influent passes over the weir and exits through the outlet pipe. The pond continues to separate sediment from all incoming flows, while full treatment in the lower chamber continues at the maximum flow rate, without scour of previously captured pollutants.

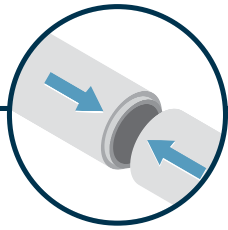


* Fiberglass system is an option

Stormceptor® EF Features & Benefits

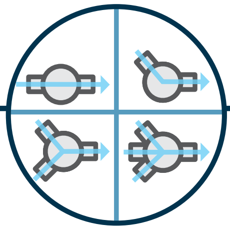
EASY TO INSTALL

Small footprint saves time and money with limited disruption to your site.



SEAMLESS

Minimal drop between inlet and outlet pipes makes Stormceptor ideal for retrofits and new development projects.

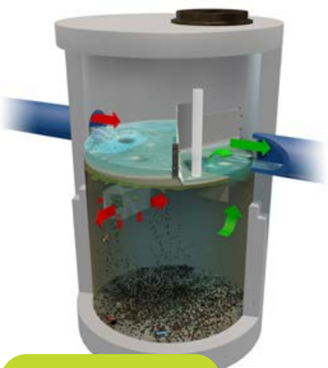


FLEXIBLE

Multiple inlets can connect to a single unit. Can be used as a bend structure.

FEATURES	BENEFITS
Patent-pending enhanced flow treatment and scour prevention technology	Superior, third-party verified performance
Third-party verified light liquid capture and retention (EFO version)	Proven performance for fuel/oil hotspot locations
Functions as bend, junction or inlet structure	Cost savings and design flexibility
Minimal drop between inlet and outlet	Site installation ease
Large diameter outlet riser for inspection and maintenance	Easy maintenance access from grade

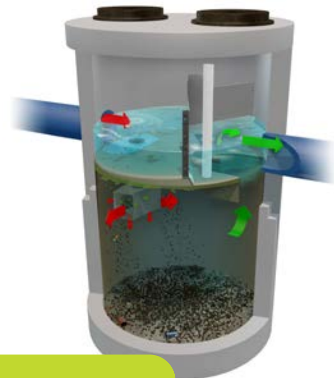
Stormceptor® EF Standard Configurations



Single Inlet Pipe

Multiple Inlet Pipes

Grate Inlet



High Tailwater

OPTIONS & ACCESSORIES

The following options and accessories are available for specific functions and site conditions:

- **Tailwater/Submerged Site** – For sites with standing water during dry weather periods, weir modifications can be implemented to ensure optimal performance.
- **Additional Sediment Storage Volume** – For sites with high pollutant loads or remote sites, additional sediment storage volume can easily be added.
- **Oil Alarm** – To mitigate spill liability, a monitoring system can be employed to trigger a visual and audible alarm when an oil or fuel spill occurs.
- **Additional Oil Capture** – A draw-off tank can be incorporated to increase spill storage capacity.
- **High Load** – Standard design loading is CHBDC or AASHTO H-20. Specialized loading can be designed to withstand very high loadings typical of airports and port facilities.
- **Lightweight** – Sites that required lightweight or above ground units are available as complete fiberglass systems.

Optional Oil Alarm

For any of these options or accessories, please contact your Stormceptor representative for design assistance.

Stormceptor® EFO

Accidents and spills happen, whether it is a fueling station, port, ndustrial site, or general hot spot with daily vehicle traffic. Protect the environment and your site from potentially costly clean-up, remediation, litigation and fines with the Stormceptor EFO configuration.

The Stormceptor EFO has been third-party tested to ensure oil capture, and retention during high flow events. The hydraulics of the Stormceptor EFO have been optimized to enhance oil and hydrocarbon capture.

STORMCEPTOR EFO – HYDROCARBON SPILL PROTECTION

- Stormceptor EFO configuration has been third-party performance tested for safe oil capture and retention.
- Patent-pending technology ensures captured oil and sediment are retained even during the largest rain events, for secure storage, environmental protection and easy removal.
- Stormceptor EFO provides double wall containment for captured hydrocarbons.
- Stormceptor EFO is ideal for gas stations, fuel depots, ports, garages, loading docks, industrial sites, fast food locations, high-collision intersections and other hotspots with spill-prone areas.
- Stormceptor EFO can accommodate an optional oil alarm and additional storage to increase spill storage capacity.

Stormceptor® Inspection & Maintenance

Conducted at grade, the Stormceptor EF design makes inspection and maintenance an easy and inexpensive process. Once maintained, the Stormceptor EF is functionally restored as designed, with full pollutant capture capacity.

Stormceptor maintenance is performed at grade with a standard vacuum truck

MAINTENANCE RECOMMENDATIONS:

- Inspect every six months for the first year to determine the pollutant accumulation rate.
- In subsequent years, inspections can be based on observations or local requirements.
- Inspect the unit immediately after an oil, fuel or chemical spill. A licensed waste management company should remove oil and sediment, and dispose responsibly.

ADDITIONAL SOLUTIONS

FILTERRA® BIORETENTION

The Filterra® Bioretention System is an engineered biofiltration device with components that make it similar to bioretention in pollutant removal and application, but has been optimized for high volume/flow treatment in a compact system.

JELLYFISH® FILTER

The Jellyfish® Filter is a stormwater treatment technology featuring pretreatment and membrane filtration in a compact stand-alone treatment system that removes a high level and a wide variety of stormwater pollutants.

LEARN MORE

- Access project profiles, photos, videos, and more online at **www.imbriumsystems.com/stormceptoref.**

REQUEST DESIGN ASSISTANCE

- Call us at (888) 279-8826 or 301-279-8827 to talk to one of our engineers for technical support or design assistance.

START A PROJECT

- Submit your system requirements on our product Design Worksheet at **www.imbriumsystems.com/pdw.**

FIND A LOCAL REPRESENTATIVE

- Visit **www.imbrumsystems.com/localrep** for contact information for your local Imbrium representative.

imbrium®

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www.imbriumsystems.com

Imbrium® Systems is an engineered stormwater treatment company that designs and manufactures stormwater treatment solutions that protect water resources from harmful pollutants. By developing technologies to address the long-term impact of urban runoff, Imbrium ensures our clients' projects are compliant with government water quality regulations. For information, visit www.imbriumsystems.com or call +1 416-960-9900.

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MADE IN CANADA
By Canadians, for Canadians.

IB-Stormceptor EF Bro 4/21 PDF

With every community, we redefine what's possible.

Stantec is a global leader in sustainable engineering, architecture, and environmental consulting. The diverse perspectives of our partners and interested parties drive us to think beyond what's previously been done on critical issues like climate change, digital transformation, and future-proofing our cities and infrastructure. We innovate at the intersection of community, creativity, and client relationships to advance communities everywhere, so that together we can redefine what's possible.

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