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FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT

FOURTH SUBMISSION – JUNE 2026

12100 Creditview Road, Town of Caledon
Proposed Commercial Development

KWA PROJECT: 24045

Report Prepared for:
12100 Creditview Developments Limited
5400 Yonge St, 1st floor
Toronto, ON M2N 5R5

Report Prepared by:
KWA Site Development Consulting Inc.
2453 Auckland Drive
Burlington, Ontario
L7L 7A9

This report reflects best engineering judgment based on the material available at the time of its preparation. KWA Site Development Consulting Inc. accepts no responsibility for any damages to a third party that may arise as a result of decisions made or actions taken based on this report.

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1.0 INTRODUCTION

KWA Site Development Consulting Inc. (KWA) has been retained by 12100 Creditview Developments Limited to prepare a detailed Functional Servicing and Stormwater Management Report along with a corresponding grading and servicing design in support of the Site Plan Amendment (SPA) for the proposed development. The subject property is located at the northwest corner of Mayfield Road and Creditview Road at municipal addresses 12100 Creditview Road in the Town of Caledon, Refer to **Figure 1.1** below.

This report will:

- Provide background information regarding the subject property;
- Summarize the existing site conditions;
- Provide information regarding the proposed development conditions;
- Outline the proposed grading for the development; and
- Outline the existing and proposed municipal servicing.

The recommended servicing has been developed in accordance with the applicable design criteria and requirements of the Town of Caledon (the Town), the Region of Peel (the Region) and the Credit Valley Conservation Authority (CVC).

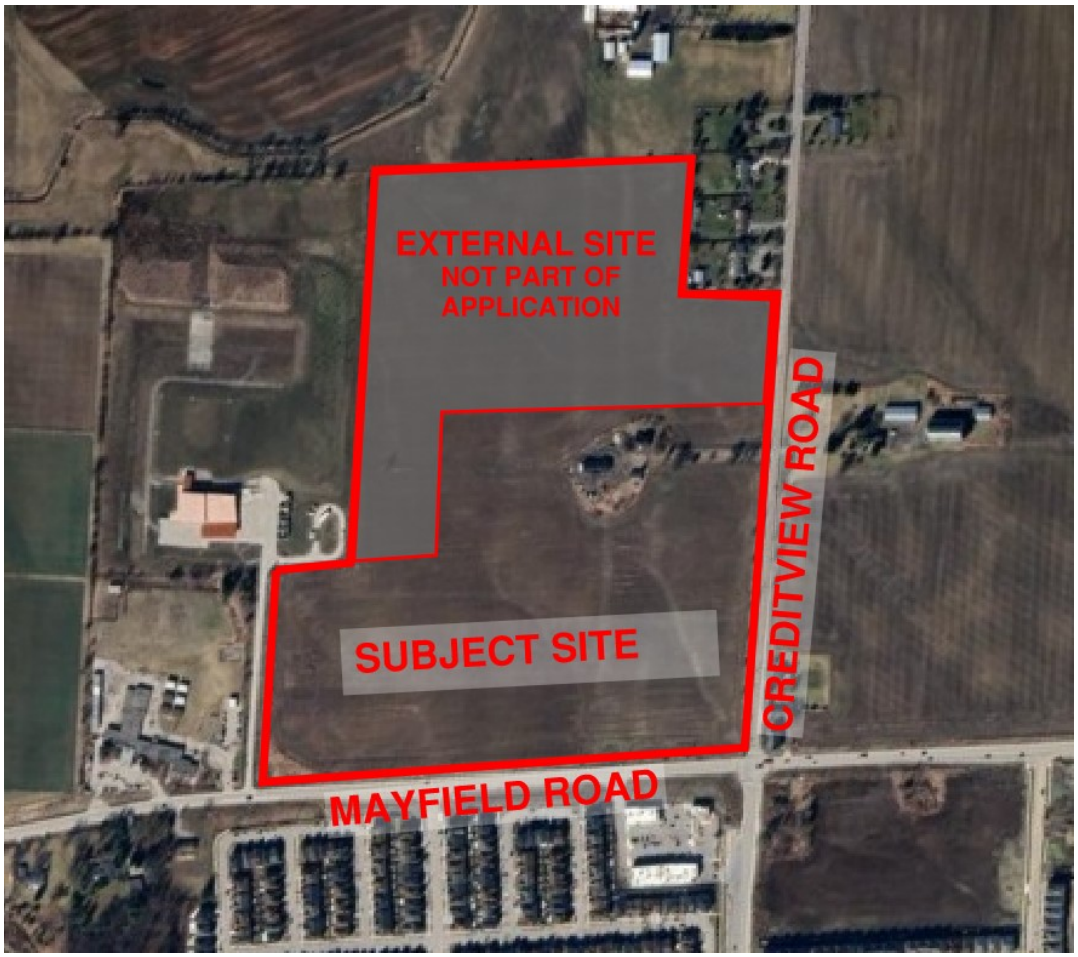


Figure 1-1: Location Plan

1.1 PROJECT BACKGROUND

The total property is approximately 14.69ha in area at municipal address 12100 Creditview Road in the Town of Caledon and is currently vacant and agricultural land. The proposed commercial development (the subject site) is within the southeastern portion of the site and is approximately 12.64ha in area. The remaining lands that are not part of this application and its ultimate land uses are expected to be determined through a future Secondary Plan planning process.

The subject site is bound by Creditview Road to the northeast, Mayfield Road to the southeast, and existing vacant and agricultural land to the northwest and southwest. The site is currently occupied by an existing dwelling and farm in the north corner of the site.

The existing topography of the site has a gentle slope from west to east, towards the ditch located at Creditview and Mayfield Road with elevation differences of approximately 5.0-6.0m across the length of the site.

1.2 PROPOSED DEVELOPMENT

The proposed development of the site includes the construction of ten retail buildings with a total footprint of 28,202m^2. The largest retail building will be an anchor tenant (identified as Retail A) which has additional tenant specific requirements which includes additional parking and will be accommodated by two at-grade parking lots located south and west of the building. The development will also have a proposed gas station located to the southeast of Retail A. Refer to **Figure 1-2** for the proposed development plan.

1.3 SITE ACCESS

The site's main vehicular accesses will be through two entrances along Creditview Road, one off Mayfield Road, and one off future road named Street G in this application (design to be completed by TYLin). The proposed vehicular access to the site will require driveway culverts underneath the roadway entrances in order to maintain existing ditch flows while providing site vehicular access. These culverts have been designed by the subdivision engineer (TYLin) and incorporated with the design to the subject site.

1.4 UTILITIES

As the proposed development is located within a developing area of Caledon, all utilities including telephone, cable, electricity and gas are readily available to service the subject property.

1.5 ALLOA PHASE 1 SECONDARY AND TERTIARY PLANS

The subject development is identified as the two commercial blocks located in the southwest corner within the Alloa Phase 1 Secondary Plan (refer to Appendix D for the Alloa Secondary Plan Tertiary Plan – Phase 1 mapping by GSAI). The secondary plan also envisions a public street, referred to as Street G between the two commercial blocks. This Street G ultimately continues northwards into the future Alloa Phase 2 lands, and connects into an east-west ROW called Street A.

At the time of this report and development, there is no planning application for the residential development to the north of the commercial blocks, therefore the subject development proposes a temporary cul-de-sac bulb for Street G until when the north residential development is to proceed.

Design requirements set out for the subject development can be found in the Alloa Phase 1 Secondary and Tertiary Plans and has been summarized in the respective sections in this report. Figure excerpts from these plans can also be found in Appendix D for context.

The design of Street G is completed by an external consultant, TYLin and follows the recommendations set out in these plans which has been coordinated with the subject development.

2.0 STORMWATER MANAGEMENT

2.1 EXISTING DRAINAGE CONDITIONS

The existing topography of the site has a gentle slope from west to east, with low points along the site perimeter at Creditview and Mayfield along the roadway ditches. Under existing conditions, it appears that some drainage external to the proposed development site enters the site from the north. Refer to **Figure 2-1** for the Existing Drainage Area Plan.

2.2 PRESCRIBED DRAINAGE – ALLOA SECONDARY PLAN

As per the Alloa Secondary and Tertiary plans, the storm drainage design for the subject development is prescribed to the storm outlet to Creditview Road for Block A + B, and the storm outlet to Robert Parkinson Drive for Block C + Street G. The design of these storm outlets have been completed by TYLin and is submitted as supplemental information for this application.

The Alloa Tertiary Plan identifies the subject site as within the Fletcher's Creek (F2) subwatershed. Table 3-5 of the study provides the quantity control criteria and unit flow rates prescribed to all areas within the respective subwatershed, and is summarized specifically for the site below in Table 1. This criterion has been reviewed and confirmed with Urbantech.

Table 2-1 – Quantity Control Requirements – Subject Site

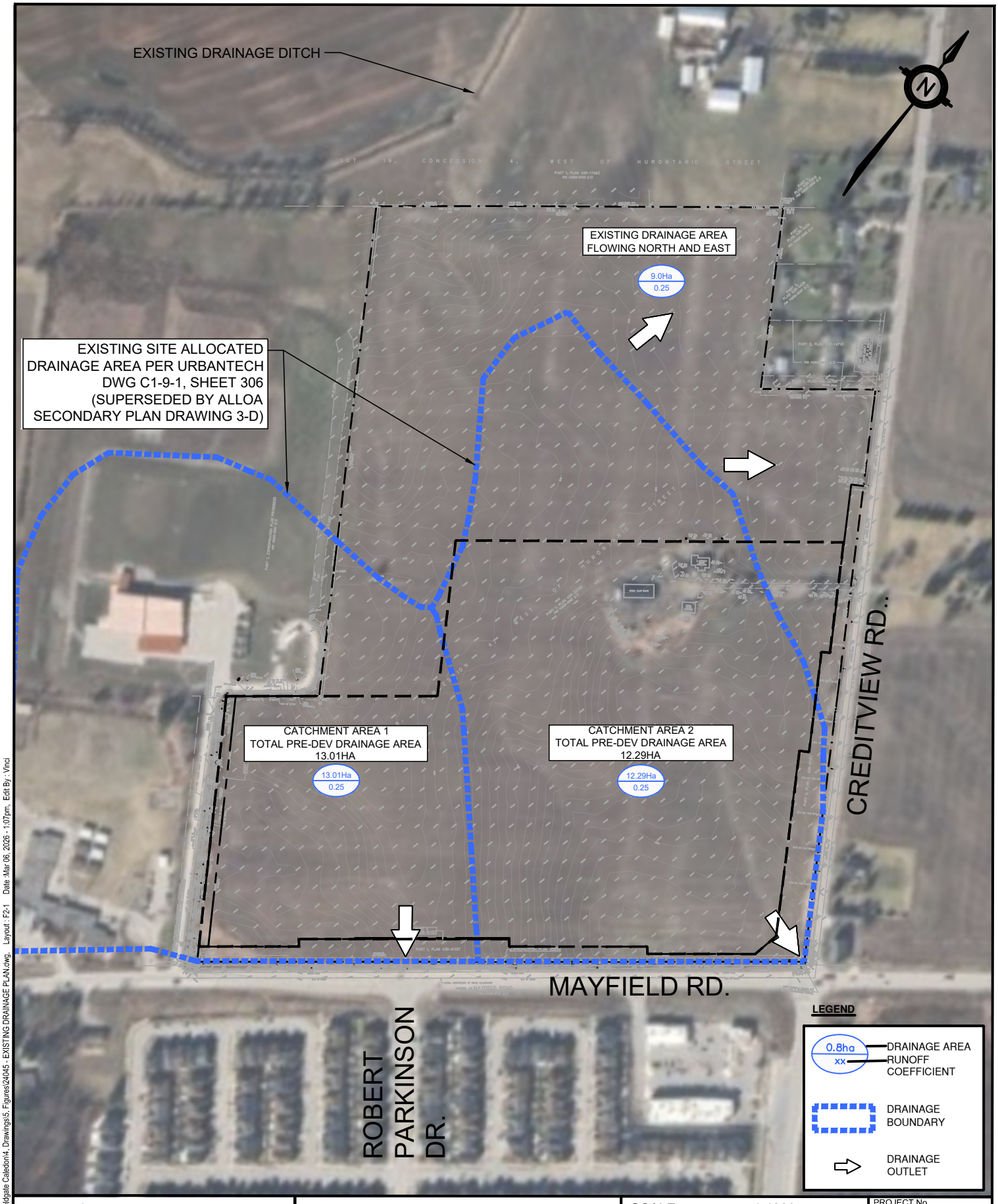
		Flow Rate (L/s)			
Storm Event	**Unit Flow Rates (m3/s/ha)***	**Block A (7.25 ha)**	**Block B (2.58 ha)**	**Block C (2.81 ha)**	**Total**
25-year	0.0083	60.1	21.4	23.3	**104.9**
100 year	0.0250	181.2	64.5	70.3	**315.9**

*as per Table 3-5 of Alloa Phase 1 Tertiary Plan by Urbantech Consulting, dated March 2026. Site is located within Fletcher's Creek subwatershed, i.e. Flow Node F2

Furthermore, as per the hierarchy of evaluation found in the scoped servicing study, the flow rate shall be the lesser of those unit flow rates and the downstream pipe capacity. As per the TYLin design, Block A+B will drain into a 750mm storm sewer at 0.50% slope with a full flow capacity of 787L/s, and Block C will drain into a 450mm storm sewer at 0.40% slope with a full flow capacity of 180L/s.

Accordingly, the flow rates calculated in Table 1 are the allowable release rates for each respective development block as it conforms to the requirements of the Alloa Secondary Plan and is the lesser amount compared to the downstream pipe capacity and therefore will be used for the quantity control design for the development.

For specific excerpts from the Alloa Scoped Servicing Study, please refer to **Appendix D**.



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KWA SITE DEVELOPMENT CONSULTING INC. 2453 AUCKLAND DRIVE BURLINGTON, ON L7L 7A9

PRE-DEVELOPMENT DRAINAGE AREA PLAN

SCALE:	1:4000
DATE:	JULY 2024
DESIGNED BY:	TF/TG
CHECKED BY:	TF/RA

PROJECT No. 24045

FIGURE No. F2-1

2.3 STORMWATER MANAGEMENT DESIGN CRITERIA

The proposed stormwater management design is based on the MOE 2003 Stormwater Management Planning & Design (SWMPD), The Town of Caledon Development Standards Manual (2019), The Credit Valley Conservation Authority "Stormwater Management Guideline" (July 2022), the Alloa Secondary Plan Scoped Servicing Study (July 2024), the Alloa Phase 1 Tertiary Plan FSR (September 2024), and the Local Subwatershed Study for the Alloa Secondary Plan Area (August 2025).

- **Stormwater Outlet:** Stormwater drainage systems shall discharge to the outlets as prescribed in the Alloa Secondary Plan and Alloa Phase 1 Tertiary Plans and designed by TYLin. For Block A and B, this is to the 900mm concrete storm pipe on Creditview Road, with a 750mm storm stub provided to the site. For Block C, this is to the 900mm storm sewer located on Robert Parkinson Drive, where storm sewers are extended northwards into Street G and a 450mm storm stub provided to Block C.
- **Quantity Control:** Quantity controls are to be provided for the development blocks for 25-year and 100-year storm events at predefined unit flow rates, consistent with the Alloa Secondary Plan. Refer to Section 2.2 in this report.
- **Water Balance:** The hydrogeological report by Gemtec indicates a minimum required retention volume equivalent to a 5mm rainfall event for the site, which equates to a rainfall retention of 12.3mm/event based on retention of rooftops only.
- **Quality Control:** Stormwater quality control measures will be provided to achieve, as a minimum, the Enhanced level of protection (i.e. 80% TSS removal) as described in the MOE SWMPD manual, consistent with the Alloa Secondary Plan.
- **Erosion Control:** Erosion controls are to be provided for the development blocks based on the criteria for the Fletcher's Creek subwatershed which is to achieve a unitary flow rate and unitary volume of 0.00041m^3/s/ha and 250m^3/impervious ha, respectively. This is equivalent to the detention of the 25mm rainfall event at a drawdown period of 169 hours.
- **Construction Erosion and Sediment Control:** All applicants must include an Erosion and Sediment Control plan demonstrating that fish habitat and water quality are not affected by sediment from the property during or following site construction.

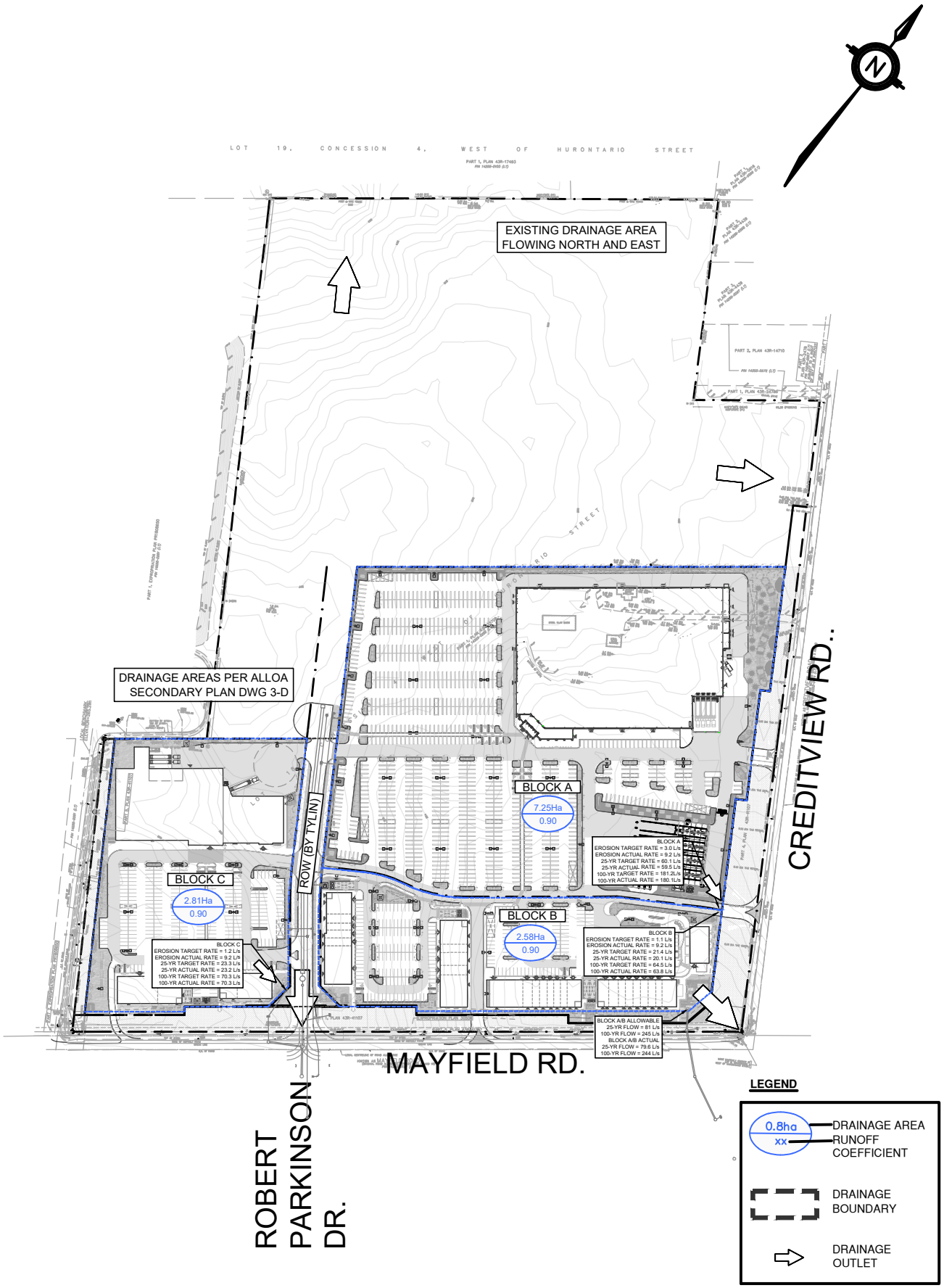
2.4 PROPOSED STORMWATER OUTFALL

There will be two proposed storm connections; one outlet will be for drainage area Block A and Block B and the other for drainage area Block C, which are provided as stubs to the respective sites and designed by the subdivision engineer, TYLin. The storm connection for drainage area Block A and Block B will be made to a future 750mm concrete storm sewer that runs perpendicular to Mayfield Road, at the southeast corner of Block B, which ultimate connects to the existing storm sewer on Creditview Road.

The storm connection for drainage area Block C will be made to a future 450mm PVC storm sewer at the southeast corner of Block C, which crosses Mayfield Road and ultimately connects into the storm sewer on Robert Parkinson Drive.

As per the Alloa Secondary and Tertiary plans, drainage into these two outfalls from the subject site are subject to the lesser flow of downstream pipe capacity and the unitary flow rates for the 25-year and 100-year quantity controls, as calculated in Section 2.2 in this report. The latter was assumed for this design as the unitary flow rates yield more restrictive flow rates than the downstream pipe capacity.

The proposed sewer infrastructure is shown on the Servicing Plan (S1). Refer to **Appendix D** for more information regarding this existing storm design allocation plan from the Alloa Secondary Plan. Refer to **Figure 2-2** below for the Proposed Drainage Plan.



KWA SITE DEVELOPMENT CONSULTING

KWA SITE DEVELOPMENT CONSULTING INC. 2453 AUCKLAND DRIVE BURLINGTON, ON L7L 7A9

POST-DEVELOPMENT DRAINAGE AREA PLAN

SCALE:	1:4000
DATE:	JULY 2024
DESIGNED BY:	TF/TG
CHECKED BY:	TF/RA

PROJECT No. 24045

FIGURE No. F2-2

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2.5 PROPOSED STORMWATER MANAGEMENT DESIGN STRATEGY

The proposed stormwater management system will include the capture and conveyance of the entire commercial block development (14.15ha) by a series of catchbasins spread out across the site. The storm sewers will be sized to convey 100-year flow rates downstream into stormwater storage elements to achieve the site storage requirements prior to release into its respective outfalls. An orifice will be designed at the outlet of each chamber to provide the necessary attenuation to maximize the storage volume and ultimately allow the site to release post-development flows from the site to allowable levels. Total suspended solids treatment will be achieved primarily using Stormceptor OGS units.

2.6 STORMWATER QUANTITY CONTROL

The proposed quantity controls are based on the Alloa Secondary Plan and as summarized in Section 2.2. Based on the unitary flow rates provided for Fletcher's Creek (node F2), the development is subject to 25-year and 100-year storm controls to the two outfalls for the site.

Block A & B (East Site) – Outfall to 750mm concrete storm sewer (Creditview Road)

The maximum allowable release rate to the 750mm storm sewer outlet at the corner of Mayfield and Creditview is calculated to **81.5 L/s** and **245.7 L/s** for the 25-year and 100-year storm events, respectively from a combination of Block A and Block B flows, calculated based on the unitary flow rates prescribed to areas within the Fletcher's Creek subwatershed as summarized in Section 2.2.

It is assumed that all retail buildings will have rooftop controls, except for Retail A within Block A which has specific tenant requirements for no rooftop controls. With a post-development runoff coefficient of 0.90, it was calculated that the drainage area for Block A would require a total site storage volume of **4140.6m³** to control the post-development release rate to **180.1 L/s** for the 100-year storm event. Quantity controls will be achieved primarily using underground chambers within the parking lots, with supplementary storage provided through the controlled rooftops. Block A will be provided with an EZStorm chamber sized to **4202m³** to meet the total storage requirement. Immediately downstream of the chamber will be a 155mm orifice plate affixed to a weir wall with a 0.95m width rectangular notch to handle both the 25-year and 100-year controls, respectively.

Block B would require a total site storage volume of **1473.6m³** to control the post-development release rate to **64.1 L/s** for the 100-year storm event. Block B will be provided with an EZStorm chamber sized to **1500m³** to meet the total storage requirement. Immediately downstream of the chamber will be a 165mm orifice plate affixed to a weir wall with a 1.0m width rectangular notch to handle both the 25-year and 100-year controls, respectively. A 75mm orifice is also equipped to handle erosion control criteria, which is further discussed in Section 2.9.

With the combination of both Block A and Block B quantity controls, a total of **5619.9m³**, the outfall to the Creditview Road storm sewer will see a maximum release rate of **244.0 L/s** during the 100-year storm event, which is consistent to the allowable release rate prescribed to the site in Section 2.2.

Block C (West Site) – Outfall to 450mm storm sewer (Robert Parkinson Drive)

The maximum allowable release rate to the 750mm storm sewer outlet at the corner of Mayfield and Creditview is calculated to **23.3 L/s** and **70.3 L/s** for the 25-year and 100-year storm events, respectively from Block C, calculated based on the unitary flow rates prescribed to areas within the Fletcher's Creek subwatershed as summarized in Section 2.2.

Proposed drainage area Block C would require a total site storage volume of **1603.8m³** to control the post-development release rate to **70.3 L/s** for the 100-year storm event. Block C will be provided with an EZStorm chamber sized to **1605m³** to meet the total storage requirement. Immediately downstream of the chamber will be a 95mm orifice plate affixed to a weir wall with a 0.95m width rectangular notch to handle both the 25-year and 100-year controls, respectively. A 75mm orifice is also equipped to handle erosion control criteria, which is further discussed in Section 2.9.

The ROW (Street G) between Block C and Block A & B is not included as part of this design and will be completed by consultant TYLin. It is understood that the design of Street G by TYLin, along with its associated servicing follows the recommendations set in the Alloa Secondary and Tertiary Plans.

For detailed quantity control calculations, please refer to **Appendix A**.

2.7 WATER BALANCE

2.7.1 SITE CONSTRAINTS

A hydrogeological investigation completed by Gemtec (dated November 4, 2025) estimates an annual infiltration deficit of 15,668m^3/year of infiltration. The total potential annual roof runoff volume available for capture from rainfall events greater than 5 mm is estimated at 21,715m^3/year, based on a contributing rooftop area of 28,020m^2.

To offset the identified infiltration deficit, approximately 72% of the captured annual roof runoff must be retained and infiltrated. Assuming approximately 45 rainfall events per year exceeding 5 mm, this required annual retention volume corresponds to a minimum retention depth of approximately 12.3mm/event across the contributing rooftop area.

Although this approach meets the water balance requirements through overcompensation of rooftops, the basis of the infiltration deficit is based on the 5 mm rainfall event, therefore the site is designed such that the first 5 mm of all rainfall events for the entire site is captured and conveyed to an infiltration system prior to its release to downstream sewers, as opposed to 12.3 mm of the rooftops only.

It should be noted that the subject site is also observed to have high groundwater levels throughout the course of the water level monitoring period between April 2024 and June 2024, which provides further constraint on siting infiltration galleries as a reasonable buffer from the high groundwater level to the bottom of the infiltration practice is required (typically and ideally 1.0m).

Due to the grading constraints associated with the subject lands, achieving a vertical separation of 1.0m is not feasible without introducing broader site servicing impacts. The proposed grading design is governed by the requirement to match existing elevations along the northwest, northeast, and southwest property limits, as well as the proposed roadway widening along the southeast property line (Mayfield Road). As a result, site grading is highly constrained and sensitive to elevation adjustments.

The current design has already been optimized to the practical limits with respect to minimum pipe cover and cover above the infiltration chambers. Any further grade raise would necessitate raising the overall site elevation, which would adversely impact tie-in conditions along all surrounding property boundaries and municipal infrastructure interfaces.

Accordingly, while the proposed vertical separation of 0.50m between the groundwater table and the bottom of the infiltration system is less than the typically preferred criterion, it represents the maximum achievable separation under the existing site constraints. From a functional perspective, this separation should be considered acceptable, particularly given that the design objective is to maximize on-site infiltration and reduce reliance on conventional stormwater conveyance.

2.7.1 WATER BALANCE COMPENSATION FOR STREET G

A water balance assessment completed by TYLin for Street G identified that the proposed road design cannot independently satisfy the required water balance targets within the municipal right-of-way. The assessment determined that post-development conditions result in an annual infiltration deficit of approximately 420 m^3/year relative to existing conditions. To address this deficit, an additional 24 m^3 of infiltration storage will be provided within the infiltration chamber of Block C. This additional storage volume will compensate for the reduction in infiltration associated with the Street G works as indicated by TYLin.

Block C has a developable area of approximately 2.82 ha and requires 141 m^3 of infiltration storage to meet the 5mm retention requirement. With the inclusion of the additional 24 m^3 required for Street G compensation, the total infiltration storage volume to be provided within Block C is 165 m^3.

2.7.2 INFILTRATION STRATEGY

For Block A, the developable area is 7.24ha. A volume of 362m^3 would be required to meet the 5mm retention requirement. Block B, with a developable area of 2.58ha would require a volume of 129m^3 for infiltration. As mentioned in the previous section Block C requires 165m^3 for infiltration with the addition of the 24m3 required for Street G. This totals 656m^3 for the total site.

As per the Hydrogeological Investigation Report completed by Gemtec, the infiltration rate for the Clayey Silt/Silty Clay Till on site is 32mm/hr. With a safety correction factor of 2.5, the design infiltration rate is taken as 12.8 mm/hr.

As discussed previously in this report, there is high groundwater elevations surrounding the site, which constrains and limits the locations and areas available for suitable infiltration of stormwater. To achieve the total water balance volume objective of 656m^3 for the entire site, each Block will be provided with its own infiltration chamber and strategically placed in locations where reasonable buffer between the infiltration bottom and high groundwater levels can be met.

Block A will be served by three infiltration chambers (Chamber 1A, 1B, and 2), combining for a total infiltration volume of 366.7m^3. Block B will be served by two infiltration chambers (Chamber 3.1, 3.2, and 4), combining for a total infiltration volume of 134.8m^3. Block C will be served by a single infiltration chamber (Chamber 5) for a total infiltration volume of 166.75m^3. The infiltration chambers will be EZStorm units with a total system depth of 500mm (inclusive of the stone bedding and backfill depths).

In order to ensure that the adequate volumes are retained, a weir wall installed at the downstream manhole of each infiltration chamber is installed with a weir elevation set to the top of stone elevation of the EZStorm chambers. This ensures that only rainfall events beyond the 5 mm event will bypass the infiltration chambers while keeping the 5 mm volume retained. Furthermore, infiltration calculations were completed to verify that the water retained within the depth in the system can be cleared within the recommended maximum allowable drawdown time of 72 hours. Based on a design infiltration rate of 12.8mm/hr, and the depth of the entire chamber system (the weir wall is set such that all water in the tank will be infiltrated), the calculated drawdown time for all systems is 39.1hrs, which meets the maximum drawdown requirement.

As noted in Section 2.7.1., the infiltration deficit for the site is calculated to be 15,668m^3/year. Of the total 12.64ha site area, approximately 4.84ha of drainage area is being retained in the infiltration chambers. Assuming there is approximately 45 rainfall events that are above 5 mm of rainfall in a year, the estimated annual rainfall retention of the captured area is 7.2mm, which also represents a runoff reduction of approximately 59% of total average annual rainfall depth based on the City of Toronto's Wet Weather Management Flow Guidelines (Figure 1a). Therefore, the minimum rainfall retention of 5 mm is met and the post-development infiltration deficit is mitigated by the current proposed infiltration design.

In total, between all three proposed Chambers, a total of 653m^3 of infiltration is provided across the subject site. For Chamber sizing, water balance and drawdown times, please refer to **Appendix A**.

2.8 STORMWATER QUALITY CONTROL

The quality control objective is to provide an enhanced protection level, which corresponds to the removal of minimum 80% TSS. Although runoff from the rooftops and landscaped areas can be considered clean, all runoff on site, including rooftops, parking lots, and drive aisles, will be pretreated by a treatment row within the EZStorm chamber. While this treatment row is recognized and intended to provide inherent treatment and thus quality control benefit, this technology does not hold Environmental Technology Verification (ETV) and therefore will not be considered in the calculations of the treatment train approach.

Additionally, quality control is provided via infiltration. As per the requirements in Table 3.2 of the MOE SWMPD Manual (2003), a site with an overall 85% imperviousness must infiltrate a minimum of 40 m^3/ha in order to achieve an enhanced level of water quality treatment through infiltration practices. This results in a required infiltration volume of 290.8 m^3 for the developed areas of Block A (7.27 ha), 102 m^3 for the developed areas of Block B (2.55 ha), and 112.8 m^3 for the developed areas of Block C (2.82 ha). This amounts to a total of 505.6 m^3 of required infiltration across the entire developed site.

As stated in Section 2.8, an infiltration volume 642.8 m^3 is provided within the Infiltration Chambers, exceeding the required volume for infiltration to achieve **Level 1 Enhanced TSS Removal of 80%.**

Based on the requirements of the MOE, stormwater quality is required to achieve an average of 80% long-term removal of total suspended solids based on an annual loading basis from all runoff leaving the site.

Much of the site is rooftop or parking lot asphalt. Runoff from rooftop areas is generally considered clean water. The rest of the site, which primarily consists of pavement, has the potential to generate contaminated runoff and would require further quality treatment to achieve the 80% long-term TSS removal. An analysis was completed using the New Jersey Department of Environmental Protection (NJDEP) to determine the total TSS removal rate.

Additional stormwater quality controls will be provided through a treatment train approach using technologies holding Environmental Technology Verification (ETV). ISO 14034:2016 specifies principles, procedures and requirements for environmental technology verification (ETV) and was developed and published by the International Organization for Standardization (ISO). The objective of ETV is to provide credible, reliable and independent verification of the performance of environmental technologies. An environmental technology is a technology that results in an environmental added value of measures parameters that indicate environmental impact. Such technologies have an increasingly important role in addressing environmental challenges and achieving sustainable development.

The EZStorm chambers have been proposed which contain a treatment row for initial pretreatment and TSS removal prior to entering the main component of the chambers. This ensures that sediment loading takes place in the first row which can be easily flushed and maintained without having to clear the entire system.

Additionally, a Stormceptor EFO (OGS) unit will be provided for quality control of each block before it releases to the downstream storm sewers. For Block A, OGS units are proposed upstream of infiltration chambers and quantity control tanks to provide TSS removal prior to entering the immediately downstream EZStorm chamber to improve operations and maintenance of the tanks. For Block B and C, a single OGS is proposed to deal with the respective block areas prior to its release to downstream storm sewers. All OGS units have been sized to a Fine particle size distribution for the contributing drainage area and to a TSS removal of at least 80%, with devices all holding Environmental Technology Verification (ETV). Refer to **Appendix A** for Stormceptor OGS unit sizing calculations.

With the use of Stormceptor OGS units, the total TSS removal for the subject site is over 80%. This, in combination with the infiltration galleries and inherent TSS removal from the EZStorm treatment rows, would meet and surpass the MOE requirement of 80% TSS removal.

2.9 EROSION CONTROL

As per Table 3.2 of the Alloa Phase 1 Tertiary Plan report, the erosion control criteria for areas within the Fletcher's Creek subwatershed (of which the subject site is part of), is based on the unitary flow rate and unitary volume of 0.00041 m3/s/ha and 250 m3/impervious ha, respectively. The table below summarizes the calculated flow rates and volumes for each Block within the subject development. It is understood based on these unitary flow rates that the erosion control criterion is intended to achieve extended detention of the 25mm rainfall event with a 169 hour drawdown period.

Table 2-2 Erosion Control Criteria

	Block A	Block B	Block C
Area (ha)	7.25	2.58	2.81
Imperviousness	100%	100%	100%
Allowable Release Rate (L/s) *(0.00041 $m^3/s/ha$)*	3.0	1.1	1.2
Volume Requirement (m^3) *(250 m^3/imp.ha)*	1812	645	703

In correspondence with Urbantech's stormwater management group, who established the erosion control criteria for the site, it is acknowledged that site constraints may not permit full adherence to the prescribed allowable release rates and erosion control volume requirements. With a minimum practical orifice plate diameter of 75 mm, the maximum acting head required to achieve the specified release rates would be approximately 0.07 m, 0.01 m, and 0.01 m for Block A, Block B, and Block C, respectively. When combined with the corresponding erosion control storage volume requirements, this would necessitate tank footprints that exceed the available site area. As such, strict compliance with both the erosion control volume and flow targets is not feasible. Urbantech has therefore recommended that a best-efforts approach be applied, whereby a combination of a 75 mm orifice and 5 mm event retention is implemented to satisfy the intent of the criteria as closely as site conditions allow. Refer to **Appendix D** for email correspondence from Urbantech confirming this approach, which is also summarized below.

1. The respective **erosion volume** requirements are met for each Block;
2. Provide **on-site retention** of the 5 mm rainfall event;
3. Best efforts for **erosion flow** control.

Accordingly, a 75mm orifice has been designed for each outlet structure of each Block to control the erosion volume to the minimum flow rate as functionally possible for the current chamber layouts (as defined by the quantity control criteria). This ensures that the erosion volume is detained and released at the resultant flow rate of a 75mm orifice across the footprint of the detention chambers. Based on the stage-storage sheets for each Block, the drawdown times of the erosion volume detention have been calculated and summarized in the table below.

Table 2-3 Drawdown Times

	Block A	Block B	Block C
Area (ha)	7.25	2.58	2.81
Volume Requirement (m^3)	1812	645	703
Flow Rate (L/s) *(stage-flow @ erosion volume)*	9.2	9.2	9.2
Drawdown Time (hrs)	55	20	21

Consequently, the increased flow rate relative to the required erosion flow target results in a shorter drawdown period of the detention volume than the drawdown period assumed in the Alloa Tertiary Plan of 169 hours.

Furthermore, as discussed in Section 2.7, on-site retention of the 5 mm rainfall event is proposed and achieved through infiltration galleries located on the site. On-site retention of 5 mm is recognized as the minimum erosion control criteria for sites without a stormwater management pond by both the Toronto Region Conservation Authority (TRCA) and Credit Valley Conservation (CVC) of which the subject site is located. This further supplement the erosion control measures proposed.

Therefore, despite not adhering to the required erosion flow controls set in the Alloa Tertiary Plan, the combination of both on-site retention of the 5 mm rainfall event and detention of the erosion volume requirements per the Alloa Tertiary Plan exceeds the minimum erosion control criterion set in the guidelines of the conservation authority and demonstrates a best-efforts approach.

2.10 THERMAL MITIGATION

The underground stormwater chamber will provide the primary form of thermal reduction on this site. All stormflows will be capture and directed to the underground chamber. The exact rate of thermal loss through the chamber can vary on a site by site basis based on several factors including soil type and water saturation in the soils. Generally speaking, soils that are denser (such as silty clay) tend to have a higher heat capacity and thermal conductivity. Saturated soils also have a much higher heat capacity. As these are the existing conditions at this site one would expect to see a higher rate of temperature reduction in storm flows then would be measured on another more typical site.

The performance of thermal reduction of stormwater in underground stormwater detention chambers was tested by the department of Civil Engineering at the University of Toronto in collaboration with the TRCA. The results of the analysis determined a maximum temperature reduction of 5 degrees Celsius from inlet to outlet, and outlet temperatures remained within the thermal regime for Coldwater fish habitat throughout the evaluation period (which lasted 6 months). The nominal outlet temperature ranged from 10C in the spring to a high of 13C by the end of the summer. This finding was published in the journal *Water*, 21 January 2016, an excerpt of the journal article is included in **Appendix A**.

Based on these results and the existing high thermal capacity of the subsurface soils, it is expected that the underground chamber would provide a similar order of magnitude thermal benefit to the stormwater.

2.11 CONSTRUCTION EROSION AND SEDIMENT CONTROL

Best practices are implemented to control erosion and sedimentation during construction and prior to build-out of stormwater quantity and quality control measures. All measures will be designed in accordance with the TRCA "Erosion and Sediment Control Guideline for Urban Construction" 2019, and Town of Caledon's design criteria.

Erosion and sediment control measures during the topsoil stripping and pregrading stages of the site have been designed by TYLin (dated August 2024). As per the TYLin ESC design, the following ESC features will be established during these stages under the site alteration permit:

- Silt fencing installed around the site perimeter.
- A construction access (mud mat) is provided at the entrance off Creditview Road.
- Filling of existing headwater drainage features within the site
- A secured topsoil stockpile from the topsoil stripping is located at the west end of the site, complete with double silt fence.
- Cutoff swales to convey construction site drainage to a temporary ESC pond.
- The ESC pond is sized with a perforated vertical riser (hickenbottom) and orifice that will control the active pool to the existing 500mm CSP culvert located at the northwest corner of Creditview and Mayfield.

Following topsoil stripping and pregrading works, ESC measures during the site servicing and building construction stages will include the maintenance of all above ESC measures and as per the requirements outlined by TYLin. During servicing construction, catchbasins and other drainage structures that are capable of receiving runoff in and adjacent to the site will be equipped with a Terrafix 240R non-woven geotextile to filter out silt-laden runoff, as they are being constructed. These ESC measures should be regularly inspected and maintained to ensure they are operating as designed. The ESC drawings and report by TYLin can be found in **Appendix D**.

2.12 STORMWATER MANAGEMENT SUMMARY

In summary the subject development will achieve or exceed all required Town, Region, and MOE requirements (outlined in Section 2.3). Refer to Table 2-1: Stormwater Management Summary below for a summary.

Table 2-4 Stormwater Management Summary

Existing Drainage Area ID	**Catchment Area 2**	**Catchment Area 1**	
Prop Drainage Area ID	Block C	Block A	Block B
Outfall	900mm CWP @ Robert Parkinson/Mayfield	750mm CWP @ Mayfield/Creditview Road	
Allowable Release Rates			
25-year (L/s)	**23.3**	(60.1 + 21.4) = **81.5**	
100-year (L/s)	**70.3**	(181.2 + 64.5) = **245.7**	
Orifice Dia. (mm) (Erosion)	75mm plate	75mm plate	75mm plate
Orifice Dia. (mm) (25-year)	100mm plate	165mm plate	100mm plate
Weir Width (mm) (100-year)	950mm notch	950mm notch	1000mm notch
Release Rates Achieved			
25-year (L/s)	**23.2**	(59.5 + 20.1) = **79.6**	
100-year (L/s)	**70.3**	(180.1 + 63.8) = **244.0**	
Total Storage Required (m^3)	1604.8	4146.3	1473.6
Total Storage Provided (m^3)	1605	4202	1500
Erosion Control Volume Required/Provided (m^3)	1812	645	703
Erosion Flow Rate Required (L/s)	3.0	1.1	1.2
Erosion Flow Rate Provided (L/s)	9.2	9.2	9.3
TSS Removal Required/Achieved	80%+	80%+	80%+
Water Balance Volume Required (m^3)	362	129	141
Water Balance Volume Provided (m^3)	366.74	134.84	141.18

3.0 SANITARY SERVICING

3.1 EXISTING SANITARY SERVICING

The existing site servicing details obtained from The Region of Peel engineering plan and profiles and a topographical survey completed of the area indicate that there is sanitary sewer infrastructure in the vicinity of the site. The following sanitary infrastructure is adjacent to the subject site;

- A 250mm sanitary sewer located within the Robert Parkinson Drive right-of-way that flows southeast.

As the existing site is greenfield, the site area is anticipated to only generate extraneous flows to nearby sanitary sewers. Based on the infiltration allowance of 0.0002m^3/s/ha by the Region of Peel, this amounts to an existing flow of 1.94L/s and 0.56L/s for the east (Site A+B) and west (Site C) sites, respectively.

As per Drawing 5.1 (**Appendix D**) from the Alloa Phase 1 Tertiary Plan Functional Servicing Report by Urbantech, dated September 2024 and the Alloa Scoped Servicing Study by Urbantech, dated July 2024, the subject property could be serviced either on an interim or permanent basis (subject to Peel Region review) through an extension of the 250mm sanitary sewer on Robert Parkinson Drive. The design of the sanitary sewer within Street G has been completed by TYLin and follows the recommendations set out in the Alloa Phase 1 Tertiary and Secondary Plans.

Refer to the Servicing Drawing (S1) for the existing sanitary sewer infrastructure and proposed sanitary service design.

3.2 PROPOSED SANITARY SERVICING

A comparative analysis was undertaken to determine peak flows under the existing conditions in comparison with projected peak flows based on the proposed re-development of the site. Design flows for the proposed development has been calculated using the Region of Peel Public Works Design, Specifications & Procedures Manual.

The total peak sanitary flow for the proposed development has been calculated as 3.46L/s for the east site (Site A+B) and 1.13L/s for the west site (Site C), inclusive of the infiltration allowance. This is an estimated peak increase of 1.52L/s and 0.57L/s for the east and west sites, from the existing sanitary flow rate of 1.94L/s and 0.56L/s for the east and west sites, respectively. Refer to **Appendix B** for details of the calculations.

Sanitary servicing for the proposed development will consist of a 200 mm diameter connection at a 0.5% slope. The connection will be made to a future sanitary sewer in Street G (by TYLin and not part of this application) which is to be extended from the 250mm sanitary sewer within the upstream end of the Robert Parkinson Drive right-of-way.

3.3 DOWNSTREAM SANITARY ANALYSIS

Based on the available sanitary drainage area plan for the Paradise Homes development to the south (Block 51-1 – Phase 2), the subject site was not allocated sanitary drainage to the Robert Parkinson sewer. A review of the available, as-constructed sanitary sewer design sheets however, suggest that the addition of the proposed 4.56L/s flows from the subject development would increase the most upstream sanitary sewer leg (MH52A) from 17% to 23%, and last sanitary sewer leg of the Paradise Homes development (MH59A) from 23% to 26%, which is still within an acceptable limit. Therefore, no downstream sanitary sewer impacts are anticipated from the addition of the proposed sanitary flows of the subject site, based on the currently available information.

For the sanitary drainage area plan and design sheets for the Paradise Homes development, please refer to **Appendix D**.

4.0 WATER SERVICING

4.1 EXISTING WATER SERVICING

The existing site servicing details obtained from The Region of Peel engineering plan and profiles and a topographical survey completed of the area, indicate that there is watermain infrastructure in the vicinity of the site. The following watermain infrastructure is adjacent to the subject site;

- A 600mm diameter watermain on the southeast side of Mayfield Road,
- A 1050mm diameter watermain on the southeast side of Mayfield Road,
- Two existing fire hydrant one at on the southeast side of Mayfield Road and one on the southwest of Mayfield road located southeast of the site.

As per Drawing 6.1 (**Appendix D**) from the Alloa Phase 1 Tertiary Plan Functional Servicing Report by Urbantech, dated September 2024 and the Alloa Scoped Servicing Study by Urbantech, dated July 2024, a proposed 300mm diameter watermain is planned through Street G, connecting from Mayfield Road and Robert Parkinson Drive. This watermain will continue northwards along Street G and into the Alloa Phase 2 lands, and eastwards along future Street A before it loops back into the future planned 400mm watermain on Creditview Road (2026). The design of the watermain within Street G has been completed by TYLin and follows the recommendations set out in the Alloa Phase 1 Tertiary and Secondary Plans.

Refer to the Servicing Drawing (S1) for the location of the existing watermain infrastructure.

4.2 PROPOSED WATER SERVICING

The proposed water service connection for the two blocks will be made to a future watermain extended from the 600mm watermain located within the Mayfield Road right-of-way and into Street G, completed by TYLin and as per the recommendations set out in the Alloa Phase 1 Secondary and Tertiary Plans. The connection will consist of a proposed 250mm main connection with 100mm domestic watermain branched at the property line and will be installed with a detector check valve in chamber at the property line and water meters to be installed within the mechanical rooms of each retail building as per Region of Peel standard drawing 1-8-5A.

Fire protection for the proposed development will be achieved through the existing and proposed hydrants surrounding the site and through internal sprinkler systems. The internal onsite water supply and distribution system will be design and specified to comply with the current standards and specifications of the Region of Peel and the Ontario Building Code and NFPA 13.

Under proposed conditions the development is anticipated to have a fire flow demand of 167L/s for the east site and 100L/s for the west site (based on the Fire Underwriters Survey). The anticipated maximum day and peak hour domestic demands for the development under proposed conditions has been calculated as 0.52L/s and 1.11L/s for the east site and 0.19L/s and 0.42L/s for the west site. It is expected that the 600 mm diameter watermain supply within Mayfield Road will adequately provide the required flow demands for the commercial block development.

A fire hydrant flow test was completed November 15, 2021 by Bruce Fire Engineering; see Appendix C for the complete report. Based on the results from the fire hydrant test, residual pressure within the watermain system will remain above the minimum pressure required of 20.3psi, both at the public main and up to the point of delivery to each of the blocks. A watermain of 300mm from the 600mm main will be extended into the 12100 Creditview property along Street G (designed by others), with a fire and domestic water branched service to each commercial block property of 250mm and 100mm, respectively.

The water demand calculations are shown in Appendix C and the proposed and existing watermain infrastructure are shown on the Servicing Drawing (S1).

4.3 FIRE HYDRANT COVERAGE

There are fire hydrants located along Mayfield Road which provides fire hydrant coverage to the site along Mayfield. It is currently unknown if Creditview has existing or future planned watermains and fire hydrants, as engineering drawings and mapping were not available from the Town of Caledon or Region of Peel at the time of this report.

Watermains and hydrants are also proposed as part of the Street G design by TYLin, as per the Alloa Secondary and Tertiary Plans and have been terminated at the Street G cul-de-sac bulb which is to be extended northwards into the Alloa Phase 2 lands and eastwards along future Street A. These extensions are per the Secondary and Tertiary Plans and are not subject to this application.

Hydrant coverage for the proposed buildings within Block A, B, and C are available through private hydrants, which are located within 45m of fire department connections or within 90m of the access route length from a hydrant to a pumper vehicle plus the unobstructed travel path for a firefighter from the vehicle to the building.

5.0 CONCLUSION

The proposed development will see the construction of a twelve-building commercial development at 12100 Creditview Road in the Town of Caledon. The proposed development can be serviced utilizing the existing and proposed infrastructure outlined in the Servicing Drawing (S1). Our conclusions and recommendations for servicing of the proposed development is summarized as follows:

Stormwater Management Servicing:

- The proposed development will provide 25-year and 100-year quantity controls as prescribed for the site by the Alloa Secondary Plan, using orifice plates, weir walls, and quantity control storage chambers.
- The proposed development site stormwater drainage will have no adverse impact to the downstream sewer infrastructure
- Stormwater quality will be achieved by a treatment train approach, primarily through OGS units, infiltration chambers, and inherent TSS removal from the chamber treatment rows.
- Sediment and erosion control measures to be taken during construction have been presented in this report.
- Under post-development conditions it is expected that stormwater runoff will have had an improvement in quality and quantity as compared to predevelopment condition with the adherence to the requirements set out in the Alloa Secondary Plan.

Sanitary Servicing:

- The anticipated peak sanitary peak flow for the proposed development is 3.46L/s for the east site and 1.13L/s for the west site.
- The downstream sewer infrastructure designed by Urbantech did not account for the subject site, however the sewer design sheets suggest there is sufficient capacity to service the development.
- The sanitary sewer on Robert Parkinson Drive is proposed to be extended into the private driveway within the 12100 Creditview property, with a 200mm sanitary service provided to the subject site

Water Servicing:

- The calculated maximum day and peak hour demands were calculated as 0.52L/s and 1.11L/s for the east site and 0.19L/s and 0.42L/s for the west site.
- The fire flow was determined based on the largest building on each site and using the Fire Underwriters Survey, calculated as 167L/s for the east site and 100L/s for the west site.
- The watermain on Mayfield Road will be branched off and extended into Street G within the 12100 Creditview property, with a 250mm fire and 100mm domestic branch provided to the subject site.
- Under fire flow demand loading condition, water pressure will remain above the 20.3psi and 40psi minimum requirements during the max day+fire and peak hour scenarios. These residuals are maintained both at the source (i.e. at the public main on Mayfield Road) and to the point of delivery (i.e. to the building)
- Additional confirmation of the fire and domestic branch sizing and fire flow requirements should be provided by the Mechanical Consultant at the Building Permit stage of approval.

5.1 RECOMMENDATIONS:

The following recommendations are presented:

- The contractor shall locate and verify all dimensions, levels, inverts, and datums onsite and report any discrepancies or omissions to the engineer prior to construction.

In summary, the site can be adequately serviced in respect to water supply, sanitary drainage, stormwater drainage, and stormwater management. The stormwater quantity and quality controls can be implemented in accordance to The Credit Valley Conservation Authority "Stormwater Management Guidelines" (July 2022).

Accordingly, we hereby recommend the adoption of this report as it relates to the provision of servicing works, and for the purposes of site plan application, and building permit application approvals. We trust that this Functional Servicing and Stormwater Management Report is sufficient for your purposes. If you have any questions or comments, please do not hesitate to contact the undersigned.

Yours very truly,

KWA Site Development Consulting Inc.

Ted Fair, P.Eng.
ted.fair@kwasitedev.com

Luan Phan, P.Eng.
luan.phan@kwasitedev.com

LICENSED PROFESSIONAL ENGINEER
T. FAIR
100176144
JUNE 25, 2026
PROVINCE OF ONTARIO

APPENDIX A

STORMWATER CALCULATIONS

Allowable Release Rates*

Storm Event	Unit Flow Rates (m3/s/ha)	Flow Rate (L/s) Block A (7.25 ha)	Block B (2.58 ha)	Block C (2.81 ha)	Total
Erosion**	0.0004	3.0	1.1	1.2	**5.2**
25-year	0.0083	60.1	21.4	23.3	**104.9**
100 year	0.0250	181.2	64.5	70.3	**315.9**

Erosion Unit Volume (m3/imp. ha)**	250	250	250	
Erosion Volume (m3)	1812	645	703	3159
Drawdown Time (hours)	169	169	169	

*as per Table 3-5 of Alloa Secondary Plan Scoped Servicing Study by Urbantech Consulting, dated August 2025. Site is located within Fletcher's Creek subwatershed, i.e. Flow Node F2

**as per Erosion Control Criteria from Alloa Tertiary Plan by Urbantech Consulting, dated March 2026

MODIFIED RATIONAL METHOD - BLOCK A

Site (Vault)

25-Year

	Area	Runoff C
Controlled	7.25	0.90
Orifice Control Flow (L/s) =	59.50	

Storm Duration t_d (min)	Rainfall Intensity i (mm/h)	Inflow $Q_{in} + Q_{in,roof}$ (L/s)	Controlled Flow $Q_{out,con}$ (L/s)	Storage Required V (m^3)
10	156.5	2836.8	59.50	1666.36
15	132.0	2392.8	59.50	2099.97
20	114.3	2072.1	59.50	2415.13
25	100.9	1829.3	59.50	2654.65
30	90.4	1638.8	59.50	2842.74
40	75.0	1358.9	59.50	3118.43
60	56.1	1017.3	59.50	3447.91
70	49.9	905.1	59.50	3551.43
80	45.0	815.8	59.50	3630.33
90	41.0	743.1	59.50	3691.17
100	37.6	682.6	59.50	3738.32
120	32.4	587.7	59.50	3802.80
140	28.5	516.6	59.50	3839.32
160	25.4	461.2	59.50	3856.63
180	23.0	416.9	59.50	3860.09
200	21.0	380.6	59.50	3853.15
240	17.9	324.6	59.50	3816.80
280	15.6	283.3	59.50	3759.49
320	13.9	251.6	59.50	3687.79
360	12.5	226.4	59.50	3605.68

$V = (Q_{in} - Q_{out,con}) * t_d$

Max Storage (m^3) = 3860.09
Total Outflow (L/s) = 59.50
Target Release Rate (L/s) = 60.14

Site (Vault)

100-Year

	Area	Runoff C
Controlled	7.25	0.90
Orifice Control Flow (L/s) =	180.11	

Storm Duration t_d (min)	Rainfall Intensity i (mm/h)	Storm Runoff Q_{in} (L/s)	Controlled Flow $Q_{out,con}$ (L/s)	Storage Required V (m^3)
10	196.5	3563.1	180.11	2029.81
15	166.9	3025.7	180.11	2560.99
20	145.1	2631.1	180.11	2941.20
25	128.5	2329.0	180.11	3223.27
30	115.3	2090.0	180.11	3437.83
40	95.7	1735.9	180.11	3733.87
60	71.7	1299.6	180.11	4030.25
70	63.7	1155.5	180.11	4096.78
80	57.4	1040.7	180.11	4130.62
90	52.2	946.9	180.11	4140.58
100	47.9	868.9	180.11	4132.55
120	41.2	746.4	180.11	4077.59
140	36.1	654.7	180.11	3986.56
160	32.2	583.3	180.11	3871.07
180	29.0	526.2	180.11	3738.18
200	26.4	479.5	180.11	3592.40
240	22.5	407.4	180.11	3273.46
280	19.6	354.5	180.11	2929.47
320	17.3	313.9	180.11	2568.68
360	15.5	281.8	180.11	2196.00

$V = (Q_{in} - Q_{out,con}) * t_d$

Max Storage (m^3) = 4140.58
Total Outflow (L/s) = 180.11
Target Release Rate (L/s) = 181.15

STAGE-STORAGE - BLOCK A

	Orifice 1 $Q = (C)(A)\sqrt{2g\Delta h}$		Orifice 2		Weir $Q = (C)(L)(H)^{\frac{3}{2}}$	
Invert	261.07	Invert	261.69	Invert	262.44	
Size (mm)	75	Size (mm)	165	Width	0.95	
Area (m2)	0.0044	Area (m2)	0.0214			
Type	Plate	Type	Plate			
Cd	0.62	Cd	0.62	Cd	1.81	

Elevation (m)	BASIN-1 (m3)	Stage (m)	Orifice 1 Discharge	Orifice 2 Discharge	Weir Discharge	TOTAL DISCHARGE	
262.65	4201.75	1.62	15.07	55.01	165.47	235.55	
262.63	4176.39	1.60	14.97	54.38	142.41	211.75	
262.61	4151.03	1.58	14.87	53.74	120.52	189.14	
262.60	4138.36	1.57	14.82	53.42	110.05	178.29	100-Year
262.59	4125.68	1.56	14.77	53.09	99.89	167.76	
262.57	4100.32	1.54	14.67	52.44	80.60	147.71	
262.55	4074.96	1.52	14.57	51.78	62.73	129.08	
262.53	4049.60	1.50	14.47	51.11	46.43	112.01	
262.51	4024.24	1.48	14.37	50.43	31.85	96.64	
262.49	3998.88	1.46	14.27	49.74	19.22	83.23	
262.47	3973.52	1.44	14.16	49.04	8.93	72.14	
262.45	3948.16	1.42	14.06	48.33	1.72	64.11	
262.43	3922.80	1.40	13.95	47.62	0.00	61.57	
262.41	3897.44	1.38	13.85	46.89	0.00	60.73	
262.39	3872.08	1.36	13.74	46.14	0.00	59.88	
262.38	3859.40	1.35	13.69	45.77	0.00	59.46	25-Year
262.37	3846.72	1.34	13.63	45.39	0.00	59.02	
262.35	3821.36	1.32	13.52	44.62	0.00	58.15	
262.33	3757.67	1.30	13.41	43.85	0.00	57.26	
262.31	3693.98	1.28	13.30	43.05	0.00	56.36	
262.29	3630.29	1.26	13.19	42.24	0.00	55.44	
262.27	3575.70	1.24	13.08	41.42	0.00	54.50	
262.25	3521.11	1.22	12.97	40.58	0.00	53.55	
262.23	3466.52	1.20	12.85	39.72	0.00	52.57	
262.21	3407.38	1.18	12.74	38.84	0.00	51.58	
262.19	3343.69	1.16	12.62	37.94	0.00	50.57	
262.17	3280.00	1.14	12.51	37.02	0.00	49.53	
262.15	3220.86	1.12	12.39	36.08	0.00	48.47	
262.13	3166.27	1.10	12.27	35.11	0.00	47.38	
262.11	3111.68	1.08	12.15	34.11	0.00	46.26	
262.09	3057.09	1.06	12.03	33.09	0.00	45.11	
262.07	2993.40	1.04	11.90	32.03	0.00	43.93	
262.05	2929.71	1.02	11.78	30.93	0.00	42.71	
262.03	2866.02	1.00	11.65	29.80	0.00	41.45	
262.01	2802.33	0.98	11.53	28.62	0.00	40.14	
261.99	2738.64	0.96	11.40	27.39	0.00	38.78	
261.97	2674.95	0.94	11.27	26.10	0.00	37.36	
261.95	2620.36	0.92	11.14	24.74	0.00	35.88	
261.93	2565.77	0.90	11.00	23.30	0.00	34.31	
261.91	2511.18	0.88	10.87	21.77	0.00	32.64	
261.89	2452.04	0.86	10.73	20.13	0.00	30.86	
261.87	2388.35	0.84	10.59	18.34	0.00	28.93	
261.85	2324.66	0.82	10.45	16.35	0.00	26.80	
261.83	2265.52	0.80	10.31	14.08	0.00	24.39	
261.81	2210.93	0.78	10.17	11.37	0.00	21.54	
261.79	2156.34	0.76	10.02	7.77	0.00	17.79	
261.77	2101.75	0.74	9.88	0.00	0.00	9.88	
261.75	2038.06	0.72	9.73	0.00	0.00	9.73	
261.73	1974.37	0.70	9.57	0.00	0.00	9.57	
261.71	1910.68	0.68	9.42	0.00	0.00	9.42	
261.69	1846.99	0.66	9.26	0.00	0.00	9.26	
261.68	1815.15	0.65	9.18	0.00	0.00	9.18	Erosion
261.67	1783.30	0.64	9.10	0.00	0.00	9.10	
261.65	1719.61	0.62	8.94	0.00	0.00	8.94	
261.63	1665.02	0.60	8.77	0.00	0.00	8.77	
261.61	1610.43	0.58	8.60	0.00	0.00	8.60	
261.59	1555.84	0.56	8.43	0.00	0.00	8.43	
261.57	1496.70	0.54	8.25	0.00	0.00	8.25	
261.55	1433.01	0.52	8.07	0.00	0.00	8.07	
261.53	1369.32	0.50	7.89	0.00	0.00	7.89	
261.51	1310.18	0.48	7.70	0.00	0.00	7.70	
261.49	1255.59	0.46	7.50	0.00	0.00	7.50	
261.47	1201.00	0.44	7.30	0.00	0.00	7.30	
261.45	1146.41	0.42	7.10	0.00	0.00	7.10	
261.43	1082.72	0.40	6.89	0.00	0.00	6.89	
261.41	1019.03	0.38	6.67	0.00	0.00	6.67	
261.39	955.34	0.36	6.45	0.00	0.00	6.45	
261.37	891.65	0.34	6.22	0.00	0.00	6.22	
261.35	827.96	0.32	5.97	0.00	0.00	5.97	
261.33	764.27	0.30	5.72	0.00	0.00	5.72	
261.31	709.68	0.28	5.46	0.00	0.00	5.46	
261.29	655.09	0.26	5.18	0.00	0.00	5.18	
261.27	600.50	0.24	4.89	0.00	0.00	4.89	
261.25	541.36	0.22	4.58	0.00	0.00	4.58	
261.23	477.67	0.20	4.25	0.00	0.00	4.25	
261.21	413.98	0.18	3.88	0.00	0.00	3.88	
261.19	354.84	0.16	3.48	0.00	0.00	3.48	
261.17	300.25	0.14	3.03	0.00	0.00	3.03	
261.15	245.66	0.12	2.50	0.00	0.00	2.50	
261.13	191.07	0.10	1.82	0.00	0.00	1.82	
261.11	127.38	0.08	0.61	0.00	0.00	0.61	
261.09	63.69	0.06	0.00	0.00	0.00	0.00	
261.07	0.00	0.04	0.00	0.00	0.00	0.00	INVERT
261.05	0.00	0.02	0.00	0.00	0.00	0.00	
261.03	0.00	0.00	0.00	0.00	0.00	0.00	

MODIFIED RATIONAL METHOD - BLOCK B

Site (Vault)

25-Year

	Area	Runoff C
Controlled	2.58	0.90
Orifice Control Flow (L/s) =	20.06	

Storm Duration t_d (min)	Rainfall Intensity i (mm/h)	Inflow $Q_{in} + Q_{in,roof}$ (L/s)	Controlled Flow $Q_{out,con}$ (L/s)	Storage Required V (m^3)
10	156.5	1009.6	20.06	593.74
15	132.0	851.6	20.06	748.40
20	114.3	737.5	20.06	860.90
25	100.9	651.0	20.06	946.48
30	90.4	583.3	20.06	1013.76
40	75.0	483.6	20.06	1112.55
60	56.1	362.0	20.06	1231.15
70	49.9	322.1	20.06	1268.67
80	45.0	290.4	20.06	1297.42
90	41.0	264.5	20.06	1319.74
100	37.6	242.9	20.06	1337.19
120	32.4	209.2	20.06	1361.48
140	28.5	183.8	20.06	1375.82
160	25.4	164.2	20.06	1383.33
180	23.0	148.4	20.06	1385.90
200	21.0	135.5	20.06	1384.77
240	17.9	115.5	20.06	1374.51
280	15.6	100.8	20.06	1356.80
320	13.9	89.5	20.06	1333.96
360	12.5	80.6	20.06	1307.42

$V = (Q_{in} - Q_{out,con}) * t_d$

Max Storage (m^3) = 1385.90
Total Outflow (L/s) = 20.06
Target Release Rate (L/s) = 1.06

Site (Vault)

100-Year

	Area	Runoff C
Controlled	2.58	0.90
Orifice Control Flow (L/s) =	63.84	

Storm Duration t_d (min)	Rainfall Intensity i (mm/h)	Storm Runoff Q_{in} (L/s)	Controlled Flow $Q_{out,con}$ (L/s)	Storage Required V (m^3)
10	196.5	1268.1	63.84	722.58
15	166.9	1076.9	63.84	911.71
20	145.1	936.4	63.84	1047.11
25	128.5	828.9	63.84	1147.58
30	115.3	743.8	63.84	1224.02
40	95.7	617.8	63.84	1329.54
60	71.7	462.5	63.84	1435.35
70	63.7	411.3	63.84	1459.18
80	57.4	370.4	63.84	1471.39
90	52.2	337.0	63.84	1475.09
100	47.9	309.2	63.84	1472.39
120	41.2	265.7	63.84	1453.15
140	36.1	233.0	63.84	1421.07
160	32.2	207.6	63.84	1380.29
180	29.0	187.3	63.84	1333.31
200	26.4	170.6	63.84	1281.74
240	22.5	145.0	63.84	1168.87
280	19.6	126.2	63.84	1047.07
320	17.3	111.7	63.84	919.31
360	15.5	100.3	63.84	787.30

$V = (Q_{in} - Q_{out,con}) * t_d$

Max Storage (m^3) = 1475.09
Total Outflow (L/s) = 63.84
Target Release Rate (L/s) = 21.40

STAGE-STORAGE - BLOCK B

Orifice 1 $Q = (C)(A)\sqrt{2g\Delta h}$		Orifice 2		Weir $Q = (C)(L)(H)^{\frac{3}{2}}$	
Invert	260.8	Invert	262.00	Invert	262.25
Size (mm)	75	Size (mm)	100	Width	1.00
Area (m2)	0.0044	Area (m2)	0.0079		
Type	Plate	Type	Plate		
Cd	0.62	Cd	0.62	Cd	1.81

Elevation (m)	EZStorm (m3)	Stage (m)	Orifice 1 Discharge	Orifice 2 Discharge	Weir Discharge	TOTAL DISCHARGE	
262.38	1500.39	1.62	15.07	12.39	84.84	112.30	
262.36	1491.08	1.60	14.97	12.01	66.03	93.01	
262.34	1481.78	1.58	14.87	11.62	48.87	75.36	
262.33	1477.13	1.57	14.82	11.41	40.96	67.19	100-Year
262.32	1472.47	1.56	14.77	11.21	33.52	59.50	
262.30	1463.17	1.54	14.67	10.78	20.24	45.69	
262.28	1453.86	1.52	14.57	10.34	9.41	34.32	
262.26	1444.55	1.50	14.47	9.88	1.81	26.16	
262.24	1435.25	1.48	14.37	9.40	0.00	23.77	
262.22	1425.94	1.46	14.27	8.89	0.00	23.16	
262.20	1416.64	1.44	14.16	8.35	0.00	22.52	
262.18	1407.33	1.42	14.06	7.78	0.00	21.83	
262.16	1398.02	1.40	13.95	7.15	0.00	21.11	
262.14	1388.72	1.38	13.85	6.47	0.00	20.32	
262.13	1384.06	1.37	13.79	6.10	0.00	19.89	25-Year
262.12	1379.41	1.36	13.74	5.71	0.00	19.45	
262.10	1370.11	1.34	13.63	4.82	0.00	18.46	
262.08	1360.80	1.32	13.52	3.74	0.00	17.26	
262.06	1338.12	1.30	13.41	2.16	0.00	15.57	
262.04	1315.44	1.28	13.30	0.00	0.00	13.30	
262.02	1292.76	1.26	13.19	0.00	0.00	13.19	
262.00	1273.32	1.24	13.08	0.00	0.00	13.08	
261.98	1253.88	1.22	12.97	0.00	0.00	12.97	
261.96	1234.44	1.20	12.85	0.00	0.00	12.85	
261.94	1213.38	1.18	12.74	0.00	0.00	12.74	
261.92	1190.70	1.16	12.62	0.00	0.00	12.62	
261.90	1168.02	1.14	12.51	0.00	0.00	12.51	
261.88	1146.96	1.12	12.39	0.00	0.00	12.39	
261.86	1127.52	1.10	12.27	0.00	0.00	12.27	
261.84	1108.08	1.08	12.15	0.00	0.00	12.15	
261.82	1088.64	1.06	12.03	0.00	0.00	12.03	
261.80	1065.96	1.04	11.90	0.00	0.00	11.90	
261.78	1043.28	1.02	11.78	0.00	0.00	11.78	
261.76	1020.60	1.00	11.65	0.00	0.00	11.65	
261.74	997.92	0.98	11.53	0.00	0.00	11.53	
261.72	975.24	0.96	11.40	0.00	0.00	11.40	
261.70	952.56	0.94	11.27	0.00	0.00	11.27	
261.68	933.12	0.92	11.14	0.00	0.00	11.14	
261.66	913.68	0.90	11.00	0.00	0.00	11.00	
261.64	894.24	0.88	10.87	0.00	0.00	10.87	
261.62	873.18	0.86	10.73	0.00	0.00	10.73	
261.60	850.50	0.84	10.59	0.00	0.00	10.59	
261.58	827.82	0.82	10.45	0.00	0.00	10.45	
261.56	806.76	0.80	10.31	0.00	0.00	10.31	
261.54	787.32	0.78	10.17	0.00	0.00	10.17	
261.52	767.88	0.76	10.02	0.00	0.00	10.02	
261.50	748.44	0.74	9.88	0.00	0.00	9.88	
261.48	725.76	0.72	9.73	0.00	0.00	9.73	
261.46	703.08	0.70	9.57	0.00	0.00	9.57	
261.44	680.40	0.68	9.42	0.00	0.00	9.42	
261.42	657.72	0.66	9.26	0.00	0.00	9.26	
261.41	646.38	0.65	9.18	0.00	0.00	9.18	Erosion
261.40	635.04	0.64	9.10	0.00	0.00	9.10	
261.38	612.36	0.62	8.94	0.00	0.00	8.94	
261.36	592.92	0.60	8.77	0.00	0.00	8.77	
261.34	573.48	0.58	8.60	0.00	0.00	8.60	
261.32	554.04	0.56	8.43	0.00	0.00	8.43	
261.30	532.98	0.54	8.25	0.00	0.00	8.25	
261.28	510.30	0.52	8.07	0.00	0.00	8.07	
261.26	487.62	0.50	7.89	0.00	0.00	7.89	
261.24	466.56	0.48	7.70	0.00	0.00	7.70	
261.22	447.12	0.46	7.50	0.00	0.00	7.50	
261.20	427.68	0.44	7.30	0.00	0.00	7.30	
261.18	408.24	0.42	7.10	0.00	0.00	7.10	
261.16	385.56	0.40	6.89	0.00	0.00	6.89	
261.14	362.88	0.38	6.67	0.00	0.00	6.67	
261.12	340.20	0.36	6.45	0.00	0.00	6.45	
261.10	317.52	0.34	6.22	0.00	0.00	6.22	
261.08	294.84	0.32	5.97	0.00	0.00	5.97	
261.06	272.16	0.30	5.72	0.00	0.00	5.72	
261.04	252.72	0.28	5.46	0.00	0.00	5.46	
261.02	233.28	0.26	5.18	0.00	0.00	5.18	
261.00	213.84	0.24	4.89	0.00	0.00	4.89	
260.98	192.78	0.22	4.58	0.00	0.00	4.58	
260.96	170.10	0.20	4.25	0.00	0.00	4.25	
260.94	147.42	0.18	3.88	0.00	0.00	3.88	
260.92	126.36	0.16	3.48	0.00	0.00	3.48	
260.90	106.92	0.14	3.03	0.00	0.00	3.03	
260.88	87.48	0.12	2.50	0.00	0.00	2.50	
260.86	68.04	0.10	1.82	0.00	0.00	1.82	
260.84	45.36	0.08	0.61	0.00	0.00	0.61	
260.82	22.68	0.06	0.00	0.00	0.00	0.00	
260.80	0.00	0.04	0.00	0.00	0.00	0.00	
260.78	0.00	0.02	0.00	0.00	0.00	0.00	
260.76	0.00	0.00	0.00	0.00	0.00	0.00	

MODIFIED RATIONAL METHOD - BLOCK C

Site (Vault)

25-Year

	Area	Runoff C
Controlled	2.81	0.90
Orifice Control Flow (L/s) =	23.22	

Storm Duration t_d (min)	Rainfall Intensity i (mm/h)	Inflow $Q_{in} + Q_{in,roof}$ (L/s)	Controlled Flow $Q_{out,con}$ (L/s)	Storage Required V (m^3)
10	156.5	1100.3	23.22	646.23
15	132.0	928.1	23.22	814.38
20	114.3	803.7	23.22	936.57
25	100.9	709.5	23.22	1029.43
30	90.4	635.6	23.22	1102.34
40	75.0	527.0	23.22	1209.19
60	56.1	394.6	23.22	1336.81
70	49.9	351.0	23.22	1376.87
80	45.0	316.4	23.22	1407.39
90	41.0	288.2	23.22	1430.90
100	37.6	264.7	23.22	1449.10
120	32.4	227.9	23.22	1473.94
140	28.5	200.4	23.22	1487.93
160	25.4	178.9	23.22	1494.48
180	23.0	161.7	23.22	1495.65
200	21.0	147.6	23.22	1492.78
240	17.9	125.9	23.22	1478.34
280	15.6	109.9	23.22	1455.77
320	13.9	97.6	23.22	1427.62
360	12.5	87.8	23.22	1395.43

$V = (Q_{in} - Q_{out,con}) * t_d$

Max Storage (m^3) = 1495.65
Total Outflow (L/s) = 23.22
Target Release Rate (L/s) = 1.15

Site (Vault)

100-Year

	Area	Runoff C
Controlled	2.81	0.90
Orifice Control Flow (L/s) =	70.26	

Storm Duration t_d (min)	Rainfall Intensity i (mm/h)	Storm Runoff Q_{in} (L/s)	Controlled Flow $Q_{out,con}$ (L/s)	Storage Required V (m^3)
10	196.5	1382.0	70.26	787.05
15	166.9	1173.5	70.26	992.96
20	145.1	1020.5	70.26	1140.31
25	128.5	903.3	70.26	1249.59
30	115.3	810.6	70.26	1332.69
40	95.7	673.3	70.26	1447.27
60	71.7	504.1	70.26	1561.75
70	63.7	448.2	70.26	1587.31
80	57.4	403.6	70.26	1600.20
90	52.2	367.3	70.26	1603.82
100	47.9	337.0	70.26	1600.47
120	41.2	289.5	70.26	1578.67
140	36.1	253.9	70.26	1542.88
160	32.2	226.3	70.26	1497.61
180	29.0	204.1	70.26	1445.58
200	26.4	186.0	70.26	1388.56
240	22.5	158.0	70.26	1263.89
280	19.6	137.5	70.26	1129.51
320	17.3	121.7	70.26	988.62
360	15.5	109.3	70.26	843.11

$V = (Q_{in} - Q_{out,con}) * t_d$

Max Storage (m^3) = 1603.82
Total Outflow (L/s) = 70.26
Target Release Rate (L/s) = 23.33

STAGE-STORAGE - BLOCK C

Orifice 1 $Q = (C)(A)\sqrt{2g\Delta h}$		Orifice 2		Weir $Q = (C)(L)(H)^{\frac{3}{2}}$	
Invert	261.73	Invert	262.85	Invert	263.22
Size (mm)	75	Size (mm)	100	Width	0.95
Area (m2)	0.0044	Area (m2)	0.0079		
Type	Plate	Type	Plate		
Cd	0.62	Cd	0.62	Cd	1.81

Elevation (m)	EZStorm (m3)	Stage (m)	Orifice 1 Discharge	Orifice 2 Discharge	Weir Discharge	TOTAL DISCHARGE	
263.31	1605.10	1.62	15.07	13.81	43.37	72.25	100-Year
263.29	1595.37	1.60	14.97	13.47	29.16	57.60	
263.27	1585.65	1.58	14.87	13.12	16.96	44.96	
263.25	1575.92	1.56	14.77	12.76	7.21	34.74	
263.23	1566.20	1.54	14.67	12.39	0.80	27.86	
263.21	1556.47	1.52	14.57	12.01	0.00	26.58	
263.19	1546.74	1.50	14.47	11.62	0.00	26.09	
263.17	1537.02	1.48	14.37	11.21	0.00	25.58	
263.15	1527.29	1.46	14.27	10.78	0.00	25.05	
263.13	1517.57	1.44	14.16	10.34	0.00	24.51	
263.11	1507.84	1.42	14.06	9.88	0.00	23.94	
263.09	1498.11	1.40	13.95	9.40	0.00	23.35	25-Year
263.07	1488.39	1.38	13.85	8.89	0.00	22.74	
263.05	1478.66	1.36	13.74	8.35	0.00	22.09	
263.03	1468.94	1.34	13.63	7.78	0.00	21.41	
263.01	1459.21	1.32	13.52	7.15	0.00	20.68	
262.99	1434.89	1.30	13.41	6.47	0.00	19.89	
262.97	1410.57	1.28	13.30	5.71	0.00	19.01	
262.95	1386.25	1.26	13.19	4.82	0.00	18.02	
262.93	1365.40	1.24	13.08	3.74	0.00	16.82	
262.91	1344.56	1.22	12.97	2.16	0.00	15.13	
262.89	1323.71	1.20	12.85	0.00	0.00	12.85	
262.87	1301.13	1.18	12.74	0.00	0.00	12.74	
262.85	1276.81	1.16	12.62	0.00	0.00	12.62	
262.83	1252.49	1.14	12.51	0.00	0.00	12.51	
262.81	1229.91	1.12	12.39	0.00	0.00	12.39	
262.79	1209.06	1.10	12.27	0.00	0.00	12.27	
262.77	1188.22	1.08	12.15	0.00	0.00	12.15	
262.75	1167.37	1.06	12.03	0.00	0.00	12.03	
262.73	1143.05	1.04	11.90	0.00	0.00	11.90	
262.71	1118.73	1.02	11.78	0.00	0.00	11.78	
262.69	1094.41	1.00	11.65	0.00	0.00	11.65	
262.67	1070.09	0.98	11.53	0.00	0.00	11.53	
262.65	1045.77	0.96	11.40	0.00	0.00	11.40	
262.63	1021.45	0.94	11.27	0.00	0.00	11.27	
262.61	1000.60	0.92	11.14	0.00	0.00	11.14	
262.59	979.76	0.90	11.00	0.00	0.00	11.00	
262.57	958.91	0.88	10.87	0.00	0.00	10.87	
262.55	936.33	0.86	10.73	0.00	0.00	10.73	
262.53	912.01	0.84	10.59	0.00	0.00	10.59	
262.51	887.69	0.82	10.45	0.00	0.00	10.45	
262.49	865.11	0.80	10.31	0.00	0.00	10.31	
262.47	844.26	0.78	10.17	0.00	0.00	10.17	
262.45	823.42	0.76	10.02	0.00	0.00	10.02	
262.43	802.57	0.74	9.88	0.00	0.00	9.88	
262.41	778.25	0.72	9.73	0.00	0.00	9.73	
262.39	753.93	0.70	9.57	0.00	0.00	9.57	
262.37	729.61	0.68	9.42	0.00	0.00	9.42	
262.35	705.29	0.66	9.26	0.00	0.00	9.26	Erosion
262.33	680.97	0.64	9.10	0.00	0.00	9.10	
262.31	656.65	0.62	8.94	0.00	0.00	8.94	
262.29	635.80	0.60	8.77	0.00	0.00	8.77	
262.27	614.95	0.58	8.60	0.00	0.00	8.60	
262.25	594.10	0.56	8.43	0.00	0.00	8.43	
262.23	571.52	0.54	8.25	0.00	0.00	8.25	
262.21	547.20	0.52	8.07	0.00	0.00	8.07	
262.19	522.88	0.50	7.89	0.00	0.00	7.89	
262.17	500.30	0.48	7.70	0.00	0.00	7.70	
262.15	479.45	0.46	7.50	0.00	0.00	7.50	
262.13	458.61	0.44	7.30	0.00	0.00	7.30	
262.11	437.76	0.42	7.10	0.00	0.00	7.10	
262.09	413.44	0.40	6.89	0.00	0.00	6.89	
262.07	389.12	0.38	6.67	0.00	0.00	6.67	
262.05	364.80	0.36	6.45	0.00	0.00	6.45	
262.03	340.48	0.34	6.22	0.00	0.00	6.22	
262.01	316.16	0.32	5.97	0.00	0.00	5.97	
261.99	291.84	0.30	5.72	0.00	0.00	5.72	
261.97	270.99	0.28	5.46	0.00	0.00	5.46	
261.95	250.15	0.26	5.18	0.00	0.00	5.18	
261.93	229.30	0.24	4.89	0.00	0.00	4.89	
261.91	206.72	0.22	4.58	0.00	0.00	4.58	
261.89	182.40	0.20	4.25	0.00	0.00	4.25	
261.87	158.08	0.18	3.88	0.00	0.00	3.88	
261.85	135.50	0.16	3.48	0.00	0.00	3.48	
261.83	114.65	0.14	3.03	0.00	0.00	3.03	
261.81	93.81	0.12	2.50	0.00	0.00	2.50	
261.79	72.96	0.10	1.82	0.00	0.00	1.82	
261.77	48.64	0.08	0.61	0.00	0.00	0.61	
261.75	24.32	0.06	0.00	0.00	0.00	0.00	
261.73	0.00	0.04	0.00	0.00	0.00	0.00	INVERT
261.71	0.00	0.02	0.00	0.00	0.00	0.00	
261.69	0.00	0.00	0.00	0.00	0.00	0.00	

Project:	**Fieldgate Caledon**
Project #:	24045
Designed By:	T.G
Checked By:	T.F
Date:	4-Jun-2026

Infiltration Gallery - Infiltration Rate & Drawdown Time (Block A)

Infiltration Rate

Based on in-suti testing completed using a Guelph Permeameter, the mesaured field saturated hydraulic condutivity is approx 2.5x10^-7 (Clayey Silt to Silty Clay)
From Gemtec Hydrogeological Investigation Report (dated June 19th) --> infiltration rate = 32 mm/hr
Design infiltration Rate has been used with a safety correction factor of 2.5
Design Infiltration Rate = 12.8 mm/hr

Infiltration Storage Required

Drainage Area	**7.24** ha
Rainfall Depth (mm)	**5.00** mm
Total Target Water Balance Volume	**362.00** m^3

	Vol of Infiltration (m^3)	Infiltration Rate (m/hr)	Area of Infiltration (m^2)	Infiltration Vol. Rate (m^3/hr)	Drawdown Time (hrs)*	Effective Depth of Water (m)**	Weir Elevation (masl)***
Infiltration Gallery 1 (1A+1B)	274.53	0.0128	738.32	9.45	36.7	0.47	263.93
Infiltration Gallery 2	92.21	0.0128	242.76	3.11	39.1	0.50	263.66
Total	**366.74**						

*Max allowable drawdown time = 72 hours (3 days)
**depth at which infiltration volume is achieved (EZStorm Stage Storage)
***elevation at which infiltration volume is achieved (EZStorm Stage Storage)

Project:	**Fieldgate Caledon**
Project #:	24045
Designed By:	T.G
Checked By:	T.F
Date:	4-Jun-2026

Infiltration Gallery - Infiltration Rate & Drawdown Time (Block B)

Infiltration Rate

Based on in-suti testing completed using a Guelph Permeameter, the mesaured field saturated hydraulic condutivity is approx $2.5x10^{\wedge-7}$ (Clayey Silt to Silty Clay)

From Gemtec Hydrogeological Investigation Report (dated June 19th) --> infiltration rate = 32 mm/hr

Design infiltration Rate has been used with a safety correction factor of 2.5

Design Infiltration Rate = 12.8 mm/hr

Infiltration Storage Required

Drainage Area	**2.58**	ha
Rainfall Depth (mm)	**5.00**	mm
Total Target Water Balance Volume	**129.00**	m^3

	Vol of Infiltration (m^3)	Infiltration Rate (m/hr)	Area of Infiltration (m^2)	Infiltration Vol. Rate (m^3/hr)	Drawdown Time (hrs)*	Effective Depth of Water (m)**	Weir Elevation (masl)***
Infiltration Gallery 3.1	41.19	0.0128	110.60	1.42	39.1	0.50	262.81
Infiltration Gallery 3.2	40.02	0.0128	107.88	1.38	39.1	0.50	262.54
Infiltration Gallery 4	53.64	0.0128	142.76	1.83	39.1	0.50	263.31
Total	**134.84**						

*Max allowable drawdown time = 72 hours (3 days)

**depth at which infiltration volume is achieved (EZStorm Stage Storage)

***elevation at which infiltration volume is achieved (EZStorm Stage Storage)

Project:	**Fieldgate Caledon**
Project #:	24045
Designed By:	T.G
Checked By:	T.F
Date:	4-Jun-2026

Infiltration Gallery - Infiltration Rate & Drawdown Time (Block C)

Infiltration Rate

Based on in-suti testing completed using a Guelph Permeameter, the mesaured field saturated hydraulic condutivity is approx $2.5x10^{\wedge-7}$ (Clayey Silt to Silty Clay)

From Gemtec Hydrogeological Investigation Report (dated June 19th) --> infiltration rate = 32 mm/hr

Design infiltration Rate has been used with a safety correction factor of 2.5

Design Infiltration Rate = 12.8 mm/hr

Infiltration Storage Required

Drainage Area **2.82** ha

Rainfall Depth (mm) **5.00** mm

Total Target Water Balance Volume **141.00** m^3

	Vol of Infiltration (m^3)	Infiltration Rate (m/hr)	Area of Infiltration (m^2)	Infiltration Vol. Rate (m^3/hr)	Drawdown Time (hrs)*	Effective Depth of Water (m)**	Weir Elevation (masl)***
Infiltration Gallery 5	166.75	0.0128	438.60	5.61	39.1	0.50	264.35
Total	**166.75**						

*Max allowable drawdown time = 72 hours (3 days)

**depth at which infiltration volume is achieved (EZStorm Stage Storage)

***elevation at which infiltration volume is achieved (EZStorm Stage Storage)

Project:	**Fieldgate Caledon**
Project #:	24045
Designed By:	L.P.
Checked By:	T.F
Date:	4-Jun-2026

Summary and % of Annual Rainfall Retaind

	Total Area (ha)	Captured Area (ha)	Area Shortfall (ha)	Retained Volume (m3)	Required Retention Depth (mm)
Block A	7.24	2.55	4.69	366.74	5
Block B	2.58	1.70	0.88	134.84	5
Block C	2.82	0.5924	2.23	166.75	5
Total	**12.64**	**4.84**	**7.80**	**668.33**	**5**

Infiltration deficit =	15668	m^3/year	*per Hydrogeological report*
Total site area captured =	48358	m2	
Depth of rainfall required to offset deficit =	324	mm/year	
# of <5mm rainfall events per year =	45		*per Hydrogeological report*
Annual rainfall retention of captured area achieved =	**7.2**	**mm**	
% of total average annual rainfall depth =	**59%**		*per City of Toronto WWFMG Figure 1a*

CODE DE L'ARTICLE	DESCRIPTION	B1-Inf	B1	B2-Inf	B3	B3.1-Inf	B3.2-Inf	B4-Inf	B5-Inf	B4	Total
EZ-SHD	EZStorm - half block 2 units/block (units)	1082	19168	348	6672	152	147	200	531	7296	35596
FL-EZSHD	EZSTORM Sidewall grid (units)	0	856	0	804	0	0	0	0	400	2060
FL-EZSHD 1/2	EZSTORM Sidewall grid for half block (units)	188	0	82	0	54	56	60	136	0	576
PR-EZSHD	EZSTORM Cover plate	1082	0	348	0	152	147	200	531	0	2460
CONNECTEUR EZS-1	EZSTORM Single layer-connector (units)	4200	0	800	0	400	400	500	1200	0	7500
CONNECTEUR EZS-2	EZSTORM Multi layer-connector (units)	0	10600	0	3700	0	0	0	0	4300	18600
R-P	EZSTORM Pre-treatment row (0.8m / unit)	50	101	24	51	19	21	0	118	76	460
EZSTORM adapters											
FC-150mm-PVC	EZSTORM Adapter 150 mm PVC (units)	0	0	0	0			0	0	0	0
FC-200mm-PVC	EZSTORM Adapter 200 mm PVC (units)	0	0	0	0	0	0	0	0	0	0
FC-250mm-PVC	EZSTORM Adapter 250 mm PVC (units)	0	0	0	0	0	0	0	4	0	4
FC-300mm-PVC	EZSTORM Adapter 300 mm PVC (units)	22	0	1	0	4	4	10	0	0	41
FC-375mm-PVC	EZSTORM Adapter 375 mm PVC (units)	0	0	0	0	0	0	0	0	0	0
FC-450mm-PVC	EZSTORM Adapter 450 mm PVC (units)	0	0	0	0	0	0	0	0	0	0
FC-450mm-TBA	EZSTORM Adapter 450 mm PCP (units)	0	1	0	2	0	0	0	0	0	3
FC-525mm-PVC	EZSTORM Adapter 525 mm PVC (units)	0	0	0	2	0	0	0	0	0	2
FC-600mm-PEHD	EZSTORM Adapter 600 mm HDPE (units)	0	7	0	2	0	0	0	0	6	15
Inspection Chimney											
EZSTORM-ACCES	EZSTORM half-elements with opening (units)	0	20	0	16	0	0	0	0	8	44
PP-EZSTORM	EZSTORM half-elements with positioning plate (units)	0	10	0	8	0	0	0	0	4	22
PP-EZSTORM 1/2	EZSTORM Cover plate with positioning plate (units)	3	0	0	0	1	1	4	2	0	11
REHAUSSE-PEHD-600	EZSTORM Extension Pipe - Chimney (units) - Ø 600mm - 1.5 m /unit	3	10	0	8	1	1	4	2	4	33
Dalle-répartition	EZSTORM Support concrete ring (units)	3	10	0	8	1	1	4	2	4	33
OPSD401.01ST	Cast iron frame and cover (unit)	3	10	0	8	1	1	4	2	3	32
OPSD400.02	Catch basin Frame and grates (unités)	0	0	0	0	0	0	0	0	1	1
Rectangulare concrete inspection manhole 1200mm x 1200mm											
R1212	EZSTORM rectangular inspection concrete manhole	0	0	0	0	0	0	0	0	0	0
EZ-226	EZSTORM Protection geotextile (226g/m2) - Rolls of 6 m x 100 m	7	15	2	6	1	1	1	3	6	42
EZ-450	EZSTORM Protection geotextile (450g/m2) -Rolls of 6 m x 50 m	0	31	0	14	0	0	0	0	12	57
EZ-LLDPE30	LLDPE 30 mils liner - Rolls of 4m x 50m	0	21	0	10	0	0	0	0	9	40
Clear Stone (by others)											0
	Quantity of 20 mm (3/4 in) clear stone required (m3) (by others)	105	1083	43	472	21	21	27	67	427	2265

LEGEND

- **ACCESSORIES not included in all projects**
- **Drawings for guidance only. For more details please refer to the DETAILS project plans**

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B	ISSUED FOR APPROVAL	16/09/2025	S.M.
A	ISSUED FOR APPROVAL	30/07/2025	S.M.

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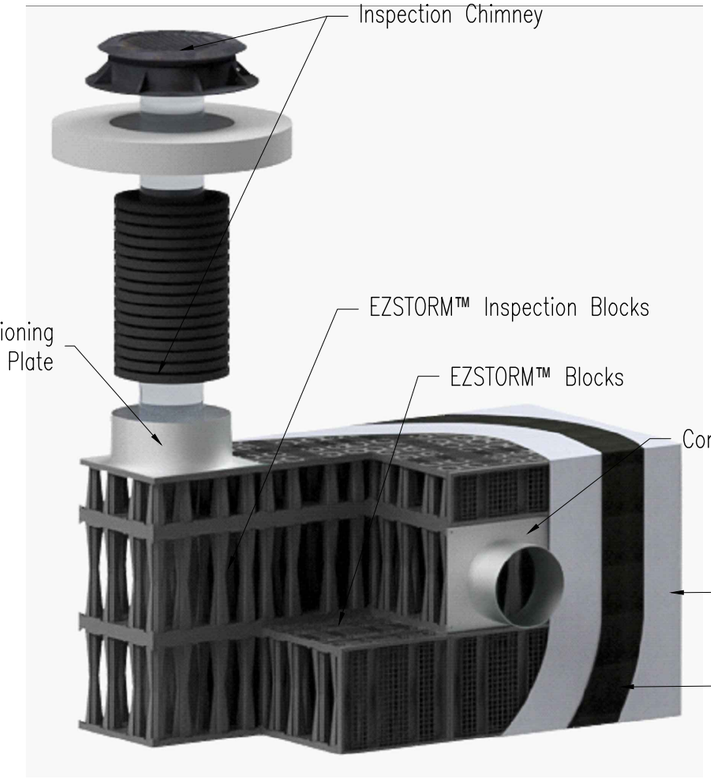
LIST OF MATERIALS

BASIN-EZSTORM™

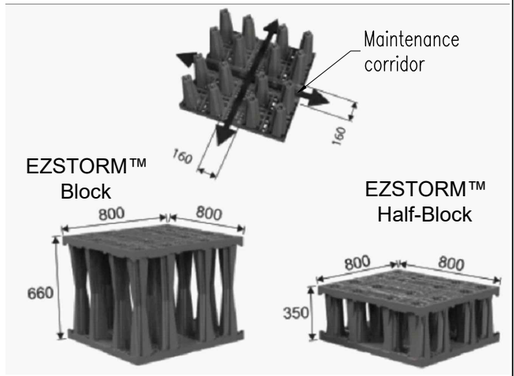
PROJECT NAME:
12100 CREDITVIEW DEVELOPMENT, CALEDON, ON

PROJECT N°:	DATE:
250724-08	18/12/2025
DRAWN BY: S.M.	CHECKED BY: S.K.
SCALE: SCALE	SHEET N°: 29/30

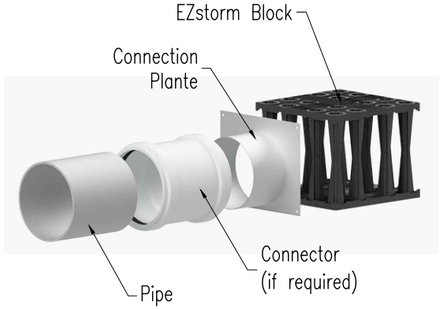
NEXT
1625, Boulevard Monseigneur-Langlois
Salaberry-de-Valleyfield
J6S 1C2, Québec



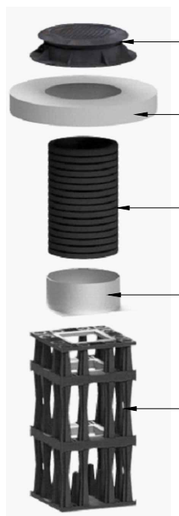
1. EZSTORM™ Components and Accessories (According on each project)



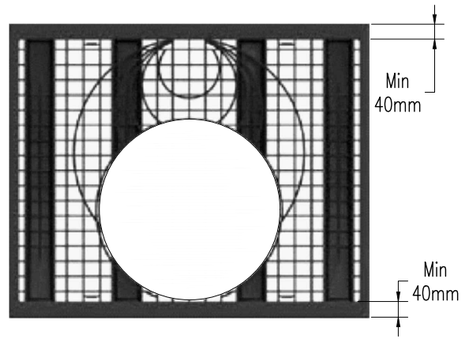
2. EZSTORM™ Block Standard Dimensions



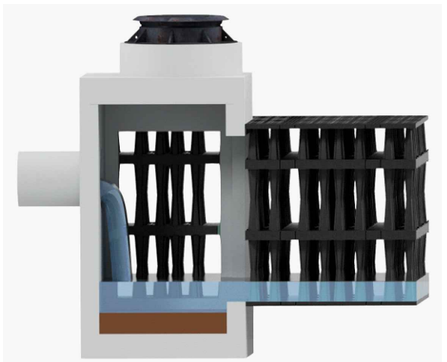
3.Connection Accessories Configuration



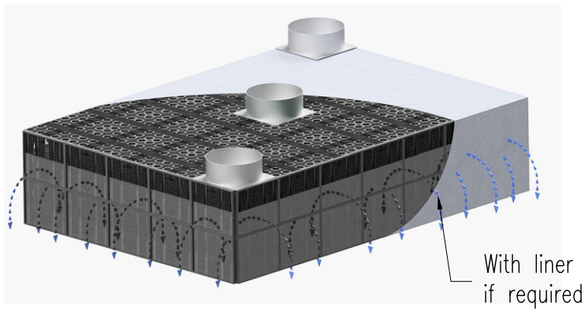
4. EZSTORM™ Block and Inspection Chimney



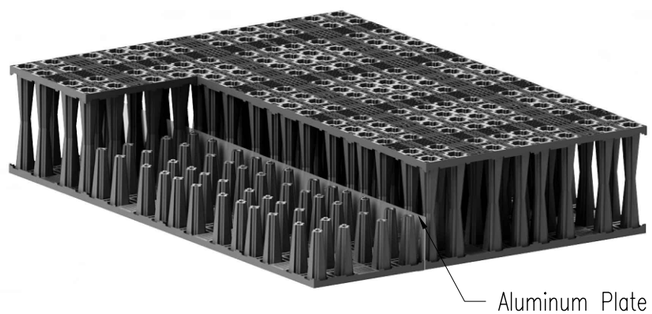
5. sidewall Grid with Connection Opening



6. Concrete Manhole for Access and Connection (if required)



7. Infiltration Basin Typical 3D Section View



8. Pretreatment Row (if required)

LEGEND

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- **Drawings for guidance only. For more details please refer to the DETAILS project plans**

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ACCESSORIES

BASIN-EZSTORM™

PROJECT NAME:
12100 CREDITVIEW DEVELOPMENT, CALEDON, ON

PROJECT N°:	DATE:
250724-08	18/12/2025
DRAWN BY: S.M.	CHECKED BY: S.K.
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NEXT
1625, Boulevard Monseigneur-Langlois
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J6S 1C2, Québec

12100 CREDITVIEW DEVELOPMENT, CALEDON, ON

1/01 IMPLANTATION

SCALE 1:2000

INDEX

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SYSTEM LAYOUT & VOL SHEETS B3	..... 11 of 30
SYSTEM LAYOUT & VOL SHEETS B3.1 inf	..... 14 of 30
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CONTACTS			
SITE CONTACT	PARTH PUSHKARNA	647 278-7339	ppushkarna@brunet.cc
SALES REPRESENTATIVE	PARTH PUSHKARNA	647 278-7339	ppushkarna@brunet.cc
TECNICAL SUPPORT	NEXTSTORM	450 322-6260	info@nextstorm.ca

NOTE :

- These drawings may contain components, including but not limited to manholes, catch basins, storm pipes, fittings, manifolds, castings or other necessary appurtenances that may not be supplied by Nextstorm.
- It is the responsibility of the contractor to confirm all the material required is provided before installation.
- This drawing was prepared to support the project engineer of record for the proposed system. It is the ultimate responsibility of the project engineer of record to ensure that the EZSTORM™ System's design is in full compliance with all applicable laws and regulations. It is the contractor of record's responsibility to ensure that the Nextstorm products are designed in accordance with Nexstorm's minimum requirements. Nextstorm does not approve plans, sizings or systems designs.
- All measurements are in meters unless otherwise indicated.

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COVER

BASIN-EZSTORM™

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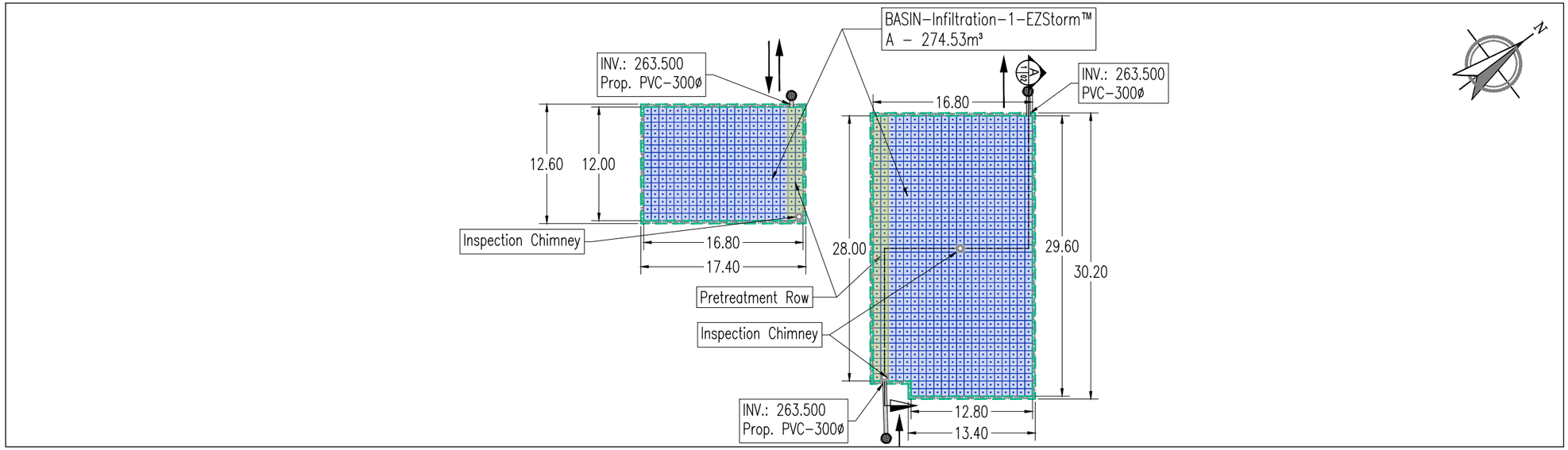
DRAWN BY: S.M.	CHECKED BY: S.K.
SCALE: SCALE	SHEET N°: 1/30

NEXT

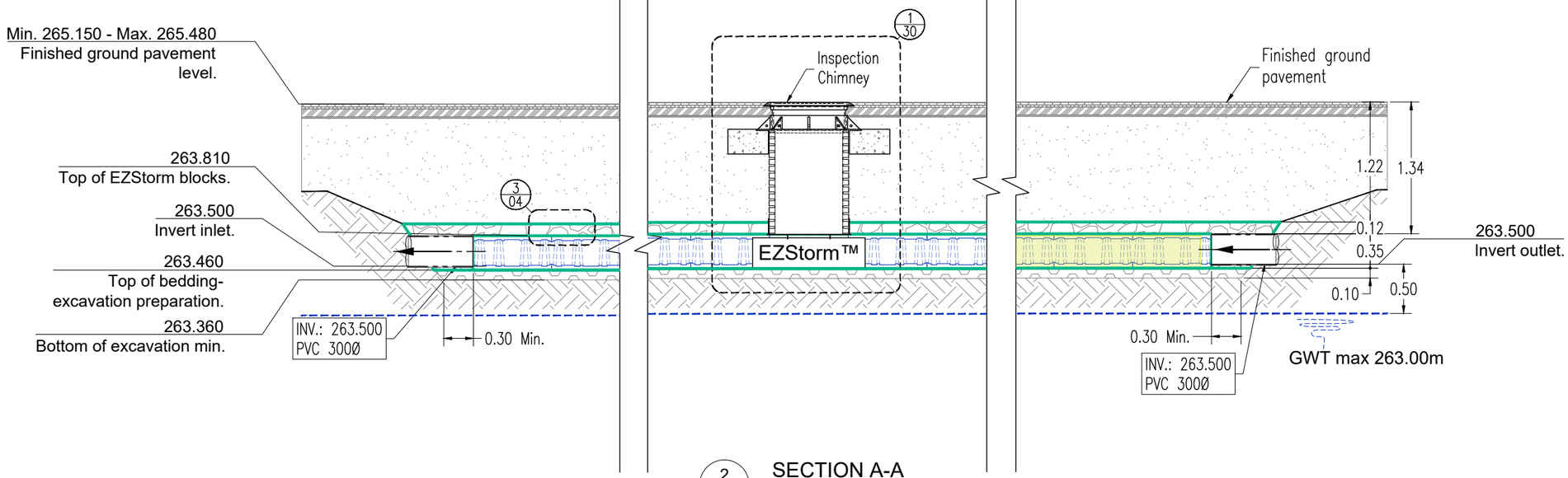
1625, Boulevard Monseigneur-Langlois
Salaberry-de-Valleyfield
J6S 1C2, Québec



1/02 — 1/2 LAYER PLAN VIEW

SCALE 1:500

EZSTORM™ SYSTEM	
Total volume storage capacity	274.53m³
EZSTORM™ Storage Volume	232.67m³
clear Stone Storage Volume	41.86m³
System Area	738.32m²
Number of blocks length	42
Number of blocks width	37
System's height	0.35m



2/02 — SECTION A-A

SCALE 1:50

LEGEND

- Inspection Chimney
- Catch basin
- Connection–access concrete manhole
- Manhole
- A. Geotextile EZ–226.
- B. Geomembrane EZ–LLDPE–30
- Drain HDPE 150Ø (By others)
- Clean Stone with maximum grain size of 20mm at 40% void ratio
- A / B — Thickness of this layer may vary according to project requirements
- C — Paving bed

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BASIN'S PLAN AND SECTION VIEW

BASIN-EZSTORM™-B1inf-274.53M³

PROJECT NAME:
12100 CREDITVIEW DEVELOPMENT, CALEDON, ON

PROJECT N°:	DATE:
250724-08	18/12/2025
DRAWN BY: S.M.	CHECKED BY: S.K.
SCALE: SCALE	SHEET N°: 2/30

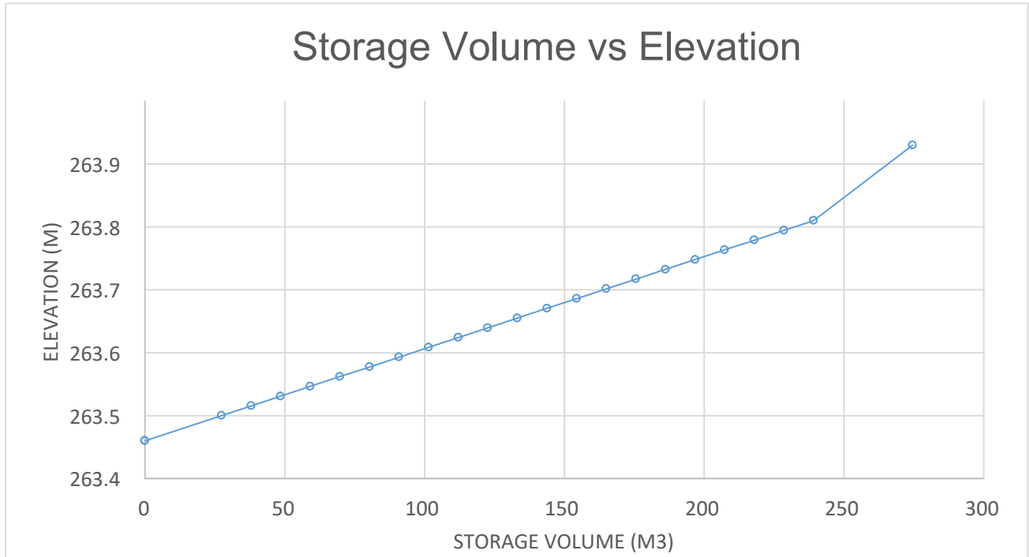
NEXT
1625, Boulevard Monseigneur-Langlois
Salaberry-de-Valleyfield
J6S 1C2, Québec

SYSTEM CHARACTERISTICS			
Model	EZSTORM™ system B1-Inf		
	Number of blocks (unit)	Dimensions / blocks (m)	Dimensions EZStorm (m)
Height	0.5	0.66	0.35
Length	42	0.80	33.60
Width	37	0.80	29.60

EZSTORM area (m2)	692.5
EZSTORM + Clear stone area (m2)	738.3
Total storage volume (m3)	274.5
Invert (m)	263.50
Min finished ground level (m)	264.55

EZSTORM volume (m3)	232.7	Clear stone volume (m3)	41.9
Void in EZSTORM (%)	96%	Void in Clear stone (%)	40%

System height (m)	Storage volume (m3)	Elevation (m)	Notes
0.47	274.53	263.930	Top clear stone
0.35	239.09	263.810	Top EZSTORM
0.33	228.50	263.795	
0.32	217.91	263.779	
0.30	207.33	263.764	
0.29	196.74	263.748	
0.27	186.15	263.733	
0.26	175.56	263.717	
0.24	164.97	263.702	
0.23	154.38	263.686	
0.21	143.80	263.671	
0.20	133.21	263.655	
0.18	122.62	263.640	
0.16	112.03	263.624	
0.15	101.44	263.609	
0.13	90.85	263.593	
0.12	80.27	263.578	
0.10	69.68	263.562	
0.09	59.09	263.547	
0.07	48.50	263.531	
0.06	37.91	263.516	
0.04	27.32	263.500	Invert
0.00	0.00	263.460	Bottom EZSTORM



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E	ISSUED FOR APPROVAL	04/03/2026	S.M.
D	ISSUED FOR APPROVAL	04/03/2026	S.M.

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VOLUME CALCULATION

BASIN-EZSTORM™-B1inf-274.53M³

PROJECT NAME:
12100 CREDITVIEW DEVELOPMENT, CALEDON, ON

PROJECT N°:	DATE:
250724-08	18/12/2025
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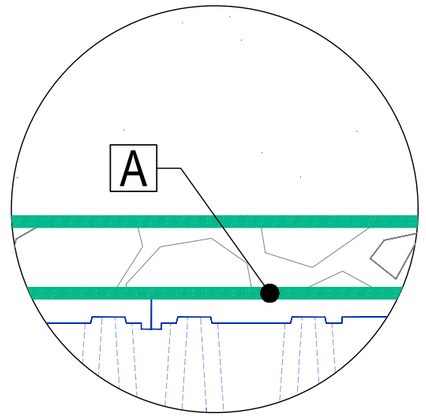
SCALE: SCALE	SHEET N°: 3/30

NEXT
1625, Boulevard Monseigneur-Langlois
Salaberry-de-Valleyfield
J6S 1C2, Québec

Acceptable backfill materials for this project

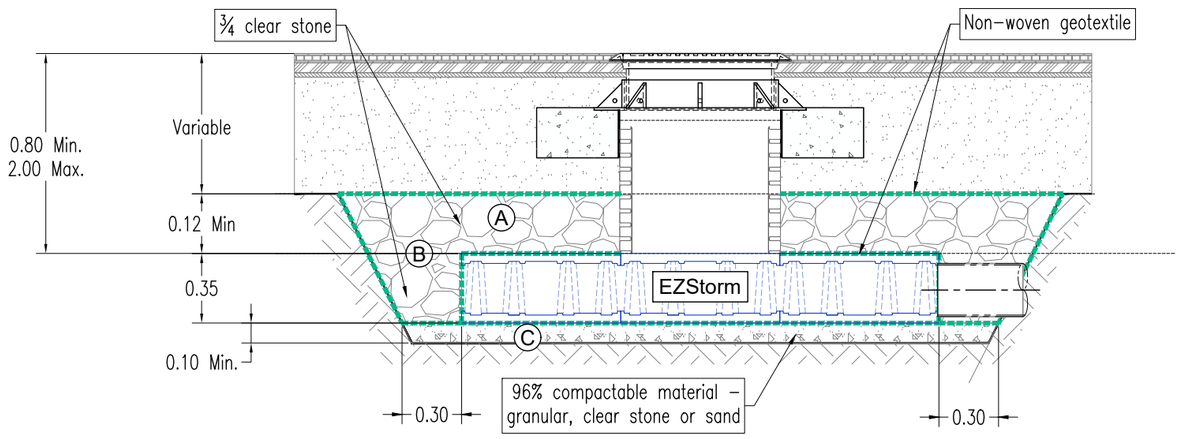
Live Load: CL-625 / HS-25 (CSA-S6: 19)

	Layer location	Backfill material	Density requirements
(A)	Top embakment: Embakment located directly above the EZStorm chambers abd below the road structure.	3/4" Clear stone at a 40% void ratio	No compaction needed.
(B)	Lateral backfill: Located between the lateral faces of the EZStorms and the limits of the excavated volume.	3/4" Clear stone at a 40% void ratio	No compaction needed.
(C)	Laying bed: located under the EZStorm blocks, between the foundation floor and the base of the blocks.	Subgrade granular material 100 mm Min. 3/4 (20mm) granular material, clean stone or sand to 96% M.P.	Compact to 90% M.P. using a vibrating plate or roller compactor. Place the system on a flat, solid, horizontal and stable surface.



3/04 DETAIL

SCALE NOT AT SCALE



1/04 TYPICAL SECTION

SCALE 1:30

LEGEND

- Inspection Chimney
- Catch basin
- Connection–access concrete manhole
- Manhole
- A. Geotextile EZ-226.
- B. Geomembrane EZ-LLDPE-30
- Drain HDPE 150Ø (By others)
- Clean Stone with maximum grain size of 20mm at 40% void ratio
- A / B — Thickness of this layer may vary according to project requirements
- C — Paving bed

N°.	REVISION	DATE	BY
J	ISSUED FOR APPROVAL	03/06/2026	S.M.
I	ISSUED FOR APPROVAL	11/05/2026	S.M.
H	ISSUED FOR APPROVAL	01/05/2026	S.M.
G	ISSUED FOR APPROVAL	30/03/2026	S.M.
F	ISSUED FOR APPROVAL	06/03/2026	S.M.
E	ISSUED FOR APPROVAL	04/03/2026	S.M.
D	ISSUED FOR APPROVAL	04/03/2026	S.M.

ISSUED FOR APPROVAL
NOT FOR PRODUCTION

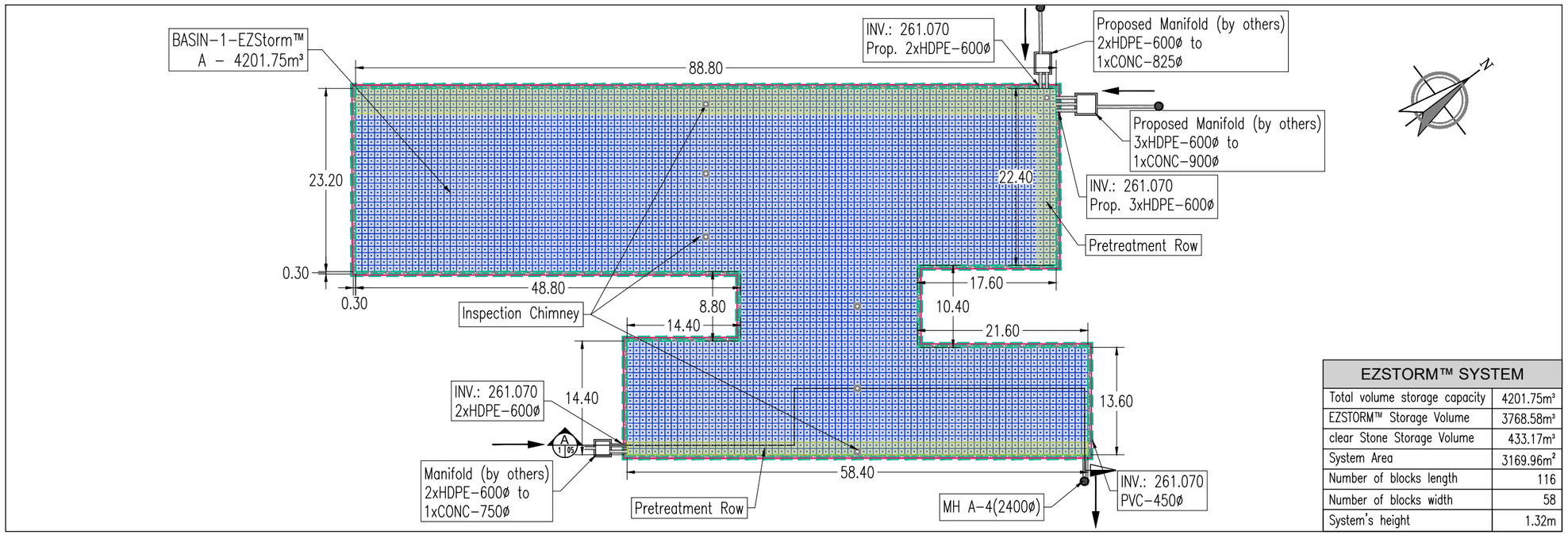
STANDARD BACKFILL REQUIREMENTS

BASIN-EZSTORM™-B1inf-274.53M³

PROJECT NAME:
12100 CREDITVIEW DEVELOPMENT, CALEDON, ON

PROJECT N°:	DATE:
250724-08	18/12/2025
DRAWN BY: S.M.	CHECKED BY: S.K.
SCALE: SCALE	SHEET N°: 4/30

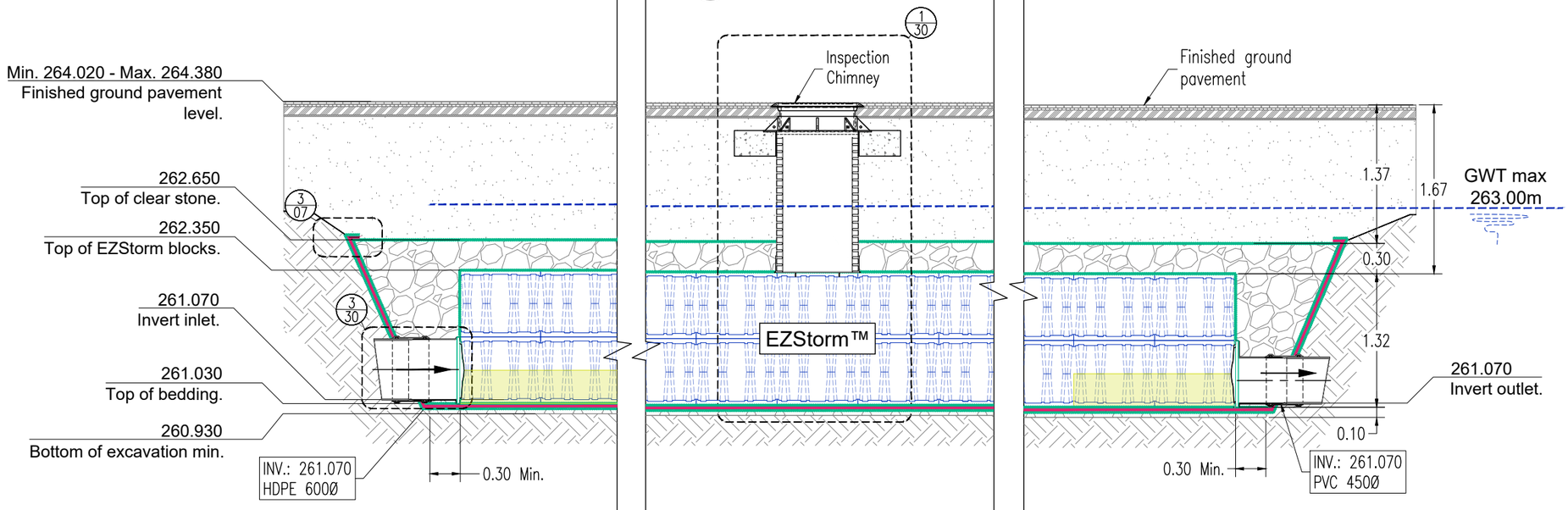
NEXT
1625, Boulevard Monseigneur-Langlois
Salaberry-de-Valleyfield
J6S 1C2, Québec



1/05 2 LAYER PLAN VIEW

SCALE 1:600

EZSTORM™ SYSTEM	
Total volume storage capacity	4201.75m³
EZSTORM™ Storage Volume	3768.58m³
clear Stone Storage Volume	433.17m³
System Area	3169.96m²
Number of blocks length	116
Number of blocks width	58
System's height	1.32m



*GWT BASED ON SERVICING PLAN BY KWA CONSULTING INC. PROJECT 24045. SEPT. 17TH, 2025

2/05 SECTION A-A

SCALE 1:50

LEGEND

- Inspection Chimney
- Catch basin
- Connection-access concrete manhole
- Manhole
- A. Geotextile EZ-226.
- B. Geomembrane EZ-LLDPE-30
- Drain HDPE 150ø (By others)
- Clean Stone with maximum grain size of 20mm at 40% void ratio
- A / B — Thickness of this layer may vary according to project requirements
- C — Paving bed

N°.	REVISION	DATE	BY
J	ISSUED FOR APPROVAL	03/06/2026	S.M.
I	ISSUED FOR APPROVAL	11/05/2026	S.M.
H	ISSUED FOR APPROVAL	01/05/2026	S.M.
G	ISSUED FOR APPROVAL	30/03/2026	S.M.
F	ISSUED FOR APPROVAL	06/03/2026	S.M.
E	ISSUED FOR APPROVAL	04/03/2026	S.M.
D	ISSUED FOR APPROVAL	04/03/2026	S.M.

ISSUED FOR APPROVAL
NOT FOR PRODUCTION

BASIN'S PLAN AND SECTION VIEW

BASIN-EZSTORM™-B1-4201.75M³

PROJECT NAME:
12100 CREDITVIEW DEVELOPMENT, CALEDON, ON

PROJECT N°:	DATE:
250724-08	18/12/2025
DRAWN BY: S.M.	CHECKED BY: S.K.
SCALE: SCALE	SHEET N°: 5/30

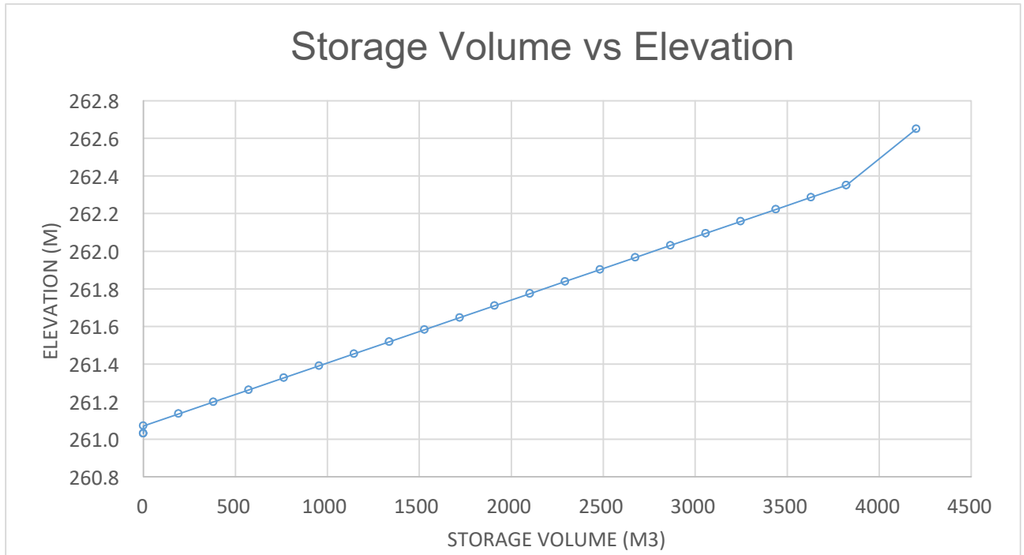
NEXT
1625, Boulevard Monseigneur-Langlois
Salaberry-de-Valleyfield
J6S 1C2, Québec

SYSTEM CHARACTERISTICS			
Model	EZSTORM™ system B1		
	Number of blocks (unit)	Dimensions / blocks (m)	Dimensions EZStorm (m)
Height	2.0	0.66	1.32
Length	116	0.80	92.80
Width	58	0.80	46.40

EZSTORM area (m2)	3066.9
EZSTORM + Clear stone area (m2)	3170.0
Total storage volume (m3)	4201.8
Invert (m)	261.07
Min finished ground level (m)	264.02

EZSTORM volume (m3)	3768.6	Clear stone volume (m3)	433.2
Void in EZSTORM (%)	96%	Void in Clear stone (%)	40%

System height (m)	Storage volume (m3)	Elevation (m)	Notes
1.62	4201.75	262.650	Top clear stone
1.32	3821.36	262.350	Top EZSTORM
1.26	3630.29	262.286	
1.19	3439.22	262.222	
1.13	3248.16	262.158	
1.06	3057.09	262.094	
1.00	2866.02	262.030	
0.94	2674.95	261.966	
0.87	2483.88	261.902	
0.81	2292.82	261.838	
0.74	2101.75	261.774	
0.68	1910.68	261.710	
0.62	1719.61	261.646	
0.55	1528.54	261.582	
0.49	1337.48	261.518	
0.42	1146.41	261.454	
0.36	955.34	261.390	
0.30	764.27	261.326	
0.23	573.20	261.262	
0.17	382.14	261.198	
0.10	191.07	261.134	
0.04	0.00	261.070	Invert
0.00	0.00	261.030	Bottom EZSTORM



N°	REVISION	DATE	BY
J	ISSUED FOR APPROVAL	03/06/2026	S.M.
I	ISSUED FOR APPROVAL	11/05/2026	S.M.
H	ISSUED FOR APPROVAL	01/05/2026	S.M.
G	ISSUED FOR APPROVAL	30/03/2026	S.M.
F	ISSUED FOR APPROVAL	06/03/2026	S.M.
E	ISSUED FOR APPROVAL	04/03/2026	S.M.
D	ISSUED FOR APPROVAL	04/03/2026	S.M.

ISSUED FOR APPROVAL
NOT FOR PRODUCTION

VOLUME CALCULATION

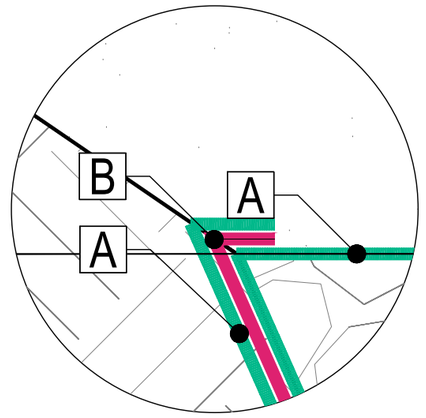
BASIN-EZSTORM™-B1-4201.75M³

PROJECT NAME:
12100 CREDITVIEW DEVELOPMENT, CALEDON, ON

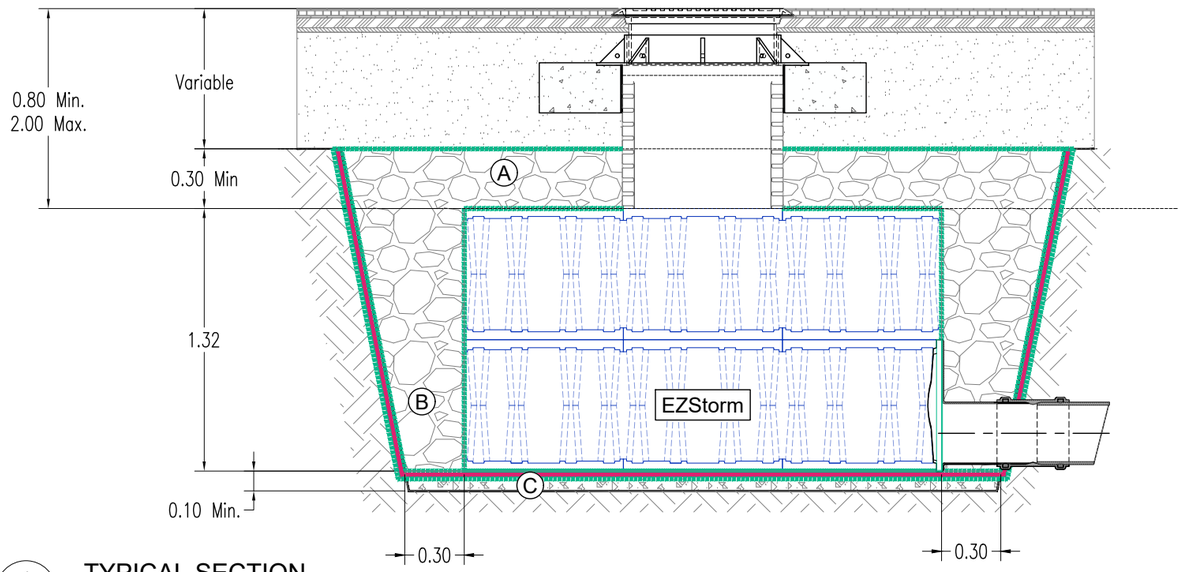
PROJECT N°:	DATE:
250724-08	18/12/2025
DRAWN BY: S.M.	CHECKED BY: S.K.
SCALE: SCALE	SHEET N°: 6/30

NEXT
1625, Boulevard Monseigneur-Langlois
Salaberry-de-Valleyfield
J6S 1C2, Québec

Acceptable backfill materials for this project			
Live Load: CL-625 / HS-25 (CSA-S6: 19)			
	Layer location	Backfill material	Density requirements
Ⓐ	Top embakment: Embakment located directly above the EZStorm chambers abd below the road structure.	3/4" Clear stone at a 40% void ratio	No compaction needed.
Ⓑ	Lateral backfill: Located between the lateral faces of the EZStorms and the limits of the excavated volume.	3/4" Clear stone at a 40% void ratio	No compaction needed.
Ⓒ	Laying bed: located under the EZStorm blocks, between the foundation floor and the base of the blocks.	Subgrade granular material 100 mm Min. 3/4 (20mm) granular material, clean stone or sand to 96% M.P.	Compact to 90% M.P. using a vibrating plate or roller compactor. Place the system on a flat, solid, horizontal and stable surface.



3/07 DETAIL
SCALE NOT AT SCALE



1/07 TYPICAL SECTION
SCALE 1:30

LEGEND

- Inspection Chimney
- Catch basin
- Connection–access concrete manhole
- Manhole
- A. Geotextile EZ-226.
- B. Geomembrane EZ-LLDPE-30
- Drain HDPE 150Ø (By others)
- Clean Stone with maximum grain size of 20mm at 40% void ratio
- A / B: Thickness of this layer may vary according to project requirements
- C: Paving bed

N°.	REVISION	DATE	BY
J	ISSUED FOR APPROVAL	03/06/2026	S.M.
I	ISSUED FOR APPROVAL	11/05/2026	S.M.
H	ISSUED FOR APPROVAL	01/05/2026	S.M.
G	ISSUED FOR APPROVAL	30/03/2026	S.M.
F	ISSUED FOR APPROVAL	06/03/2026	S.M.
E	ISSUED FOR APPROVAL	04/03/2026	S.M.
D	ISSUED FOR APPROVAL	04/03/2026	S.M.

ISSUED FOR APPROVAL
NOT FOR PRODUCTION

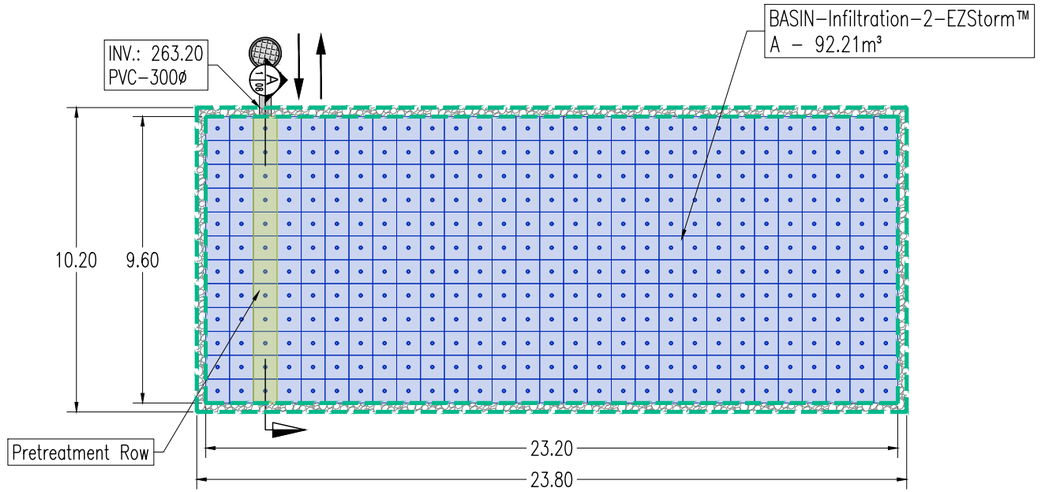
STANDARD BACKFILL REQUIREMENTS

BASIN-EZSTORM™-B1-4201.75M³

PROJECT NAME:
12100 CREDITVIEW DEVELOPMENT, CALEDON, ON

PROJECT N°:	DATE:
250724-08	18/12/2025
DRAWN BY: S.M.	CHECKED BY: S.K.
SCALE: SCALE	SHEET N°: 7/30

NEXT
1625, Boulevard Monseigneur-Langlois
Salaberry-de-Valleyfield
J6S 1C2, Québec

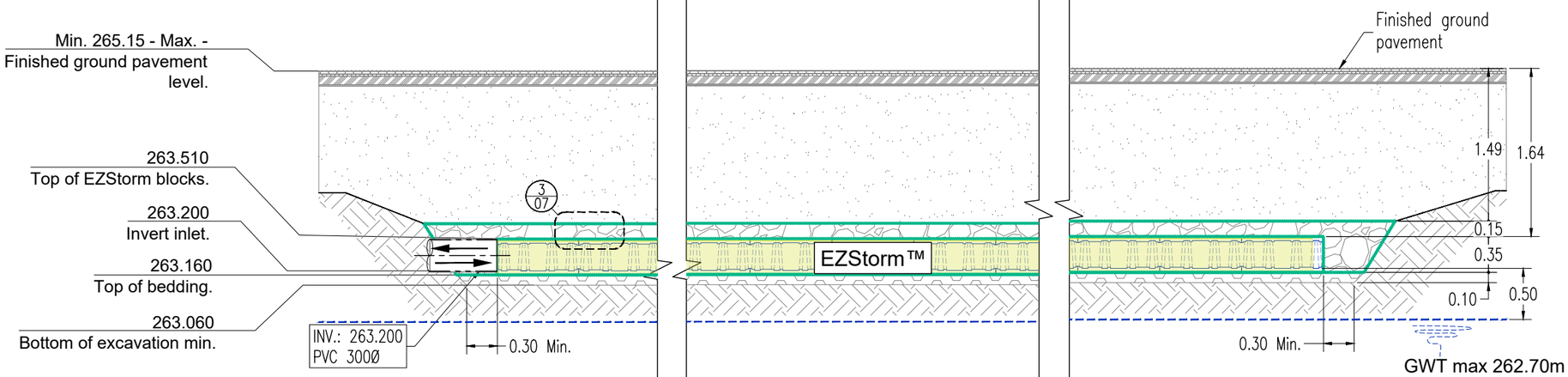


1/2 LAYER PLAN VIEW

1 / 08

SCALE 1:200

EZSTORM™ SYSTEM	
Total volume storage capacity	92.21m³
EZSTORM™ Storage Volume	74.83m³
clear Stone Storage Volume	17.37m³
System Area	242.76m²
Number of blocks length	29
Number of blocks width	12
System's height	0.35m



SECTION A-A

2 / 08

SCALE 1:50

LEGEND

- Inspection Chimney
- Catch basin
- Connection-access concrete manhole
- Manhole
- A. Geotextile EZ-226.
- B. Geomembrane EZ-LLDPE-30
- Drain HDPE 150Ø (By others)
- Clean Stone with maximum grain size of 20mm at 40% void ratio
- A / B — Thickness of this layer may vary according to project requirements
- C — Paving bed

N°.	REVISION	DATE	BY
J	ISSUED FOR APPROVAL	03/06/2026	S.M.
I	ISSUED FOR APPROVAL	11/05/2026	S.M.
H	ISSUED FOR APPROVAL	01/05/2026	S.M.
G	ISSUED FOR APPROVAL	30/03/2026	S.M.
F	ISSUED FOR APPROVAL	06/03/2026	S.M.
E	ISSUED FOR APPROVAL	04/03/2026	S.M.
D	ISSUED FOR APPROVAL	04/03/2026	S.M.

ISSUED FOR APPROVAL
NOT FOR PRODUCTION

BASIN'S PLAN AND SECTION VIEW

BASIN-EZSTORM™-B2inf-92.21M³

PROJECT NAME:
12100 CREDITVIEW DEVELOPMENT, CALEDON, ON

PROJECT N°:	DATE:
250724-08	18/12/2025
DRAWN BY: S.M.	CHECKED BY: S.K.
SCALE: SCALE	SHEET N°: 8/30

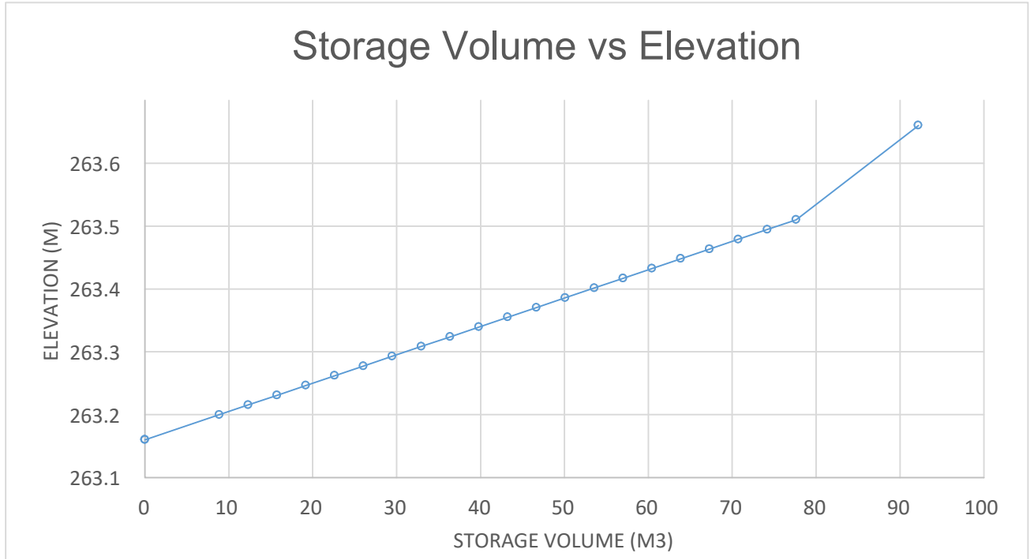
NEXT
1625, Boulevard Monseigneur-Langlois
Salaberry-de-Valleyfield
J6S 1C2, Québec

SYSTEM CHARACTERISTICS			
Model	EZSTORM™ system B2-Inf		
	Number of blocks (unit)	Dimensions / blocks (m)	Dimensions EZStorm (m)
Height	0.5	0.66	0.35
Length	29	0.80	23.20
Width	12	0.80	9.60

EZSTORM area (m2)	222.7
EZSTORM + Clear stone area (m2)	242.8
Total storage volume (m3)	92.2
Invert (m)	263.20
Min finished ground level (m)	265.15

EZSTORM volume (m3)	74.8	Clear stone volume (m3)	17.4
Void in EZSTORM (%)	96%	Void in Clear stone (%)	40%

System height (m)	Storage volume (m3)	Elevation (m)	Notes
0.50	92.21	263.660	Top clear stone
0.35	77.64	263.510	Top EZSTORM
0.33	74.20	263.495	
0.32	70.76	263.479	
0.30	67.32	263.464	
0.29	63.89	263.448	
0.27	60.45	263.433	
0.26	57.01	263.417	
0.24	53.57	263.402	
0.23	50.13	263.386	
0.21	46.69	263.371	
0.20	43.26	263.355	
0.18	39.82	263.340	
0.16	36.38	263.324	
0.15	32.94	263.309	
0.13	29.50	263.293	
0.12	26.06	263.278	
0.10	22.63	263.262	
0.09	19.19	263.247	
0.07	15.75	263.231	
0.06	12.31	263.216	
0.04	8.87	263.200	Invert
0.00	0.00	263.160	Bottom EZSTORM



N°	REVISION	DATE	BY
J	ISSUED FOR APPROVAL	03/06/2026	S.M.
I	ISSUED FOR APPROVAL	11/05/2026	S.M.
H	ISSUED FOR APPROVAL	01/05/2026	S.M.
G	ISSUED FOR APPROVAL	30/03/2026	S.M.
F	ISSUED FOR APPROVAL	06/03/2026	S.M.
E	ISSUED FOR APPROVAL	04/03/2026	S.M.
D	ISSUED FOR APPROVAL	04/03/2026	S.M.

ISSUED FOR APPROVAL
NOT FOR PRODUCTION

VOLUME CALCULATION

BASIN-EZSTORM™-B2inf-92.21M³

PROJECT NAME:
12100 CREDITVIEW DEVELOPMENT, CALEDON, ON

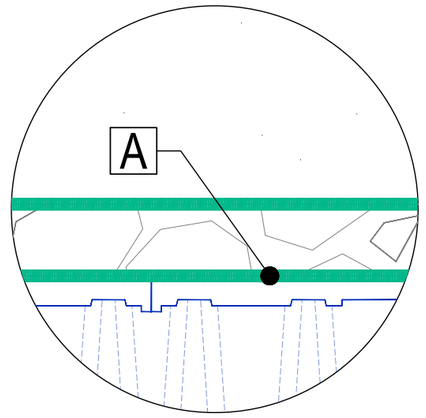
PROJECT N°:	DATE:
250724-08	18/12/2025
DRAWN BY: S.M.	CHECKED BY: S.K.
SCALE: SCALE	SHEET N°: 9/30

NEXT
1625, Boulevard Monseigneur-Langlois
Salaberry-de-Valleyfield
J6S 1C2, Québec

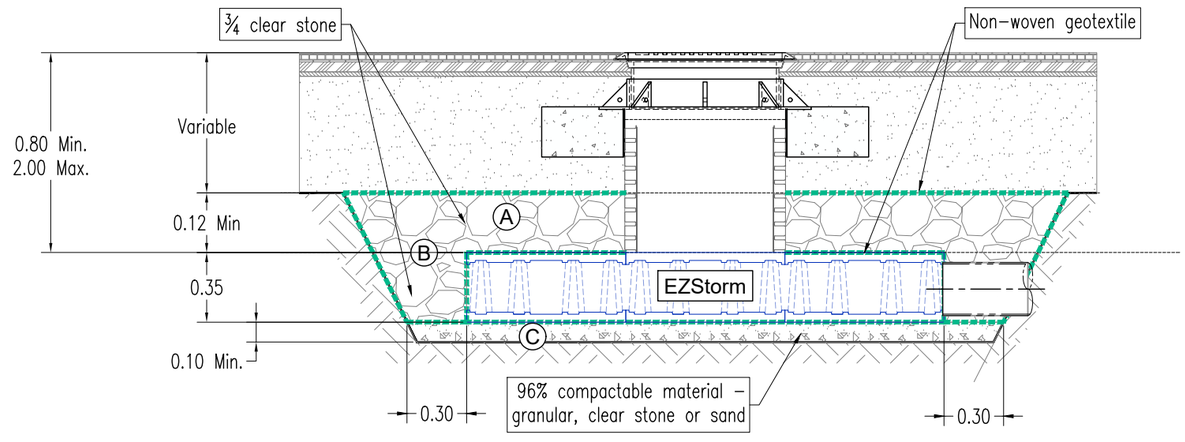
Acceptable backfill materials for this project

Live Load: CL-625 / HS-25 (CSA-S6: 19)

	Layer location	Backfill material	Density requirements
(A)	Top embakment: Embakment located directly above the EZStorm chambers abd below the road structure.	3/4" Clear stone at a 40% void ratio	No compaction needed.
(B)	Lateral backfill: Located between the lateral faces of the EZStorms and the limits of the excavated volume.	3/4" Clear stone at a 40% void ratio	No compaction needed.
(C)	Laying bed: located under the EZStorm blocks, between the foundation floor and the base of the blocks.	Subgrade granular material 100 mm Min. 3/4 (20mm) granular material, clean stone or sand to 96% M.P.	Compact to 90% M.P. using a vibrating plate or roller compactor. Place the system on a flat, solid, horizontal and stable surface.



3/10 DETAIL
SCALE NOT AT SCALE



1/10 TYPICAL SECTION
SCALE 1:30

LEGEND

- Inspection Chimney
- Catch basin
- Connection-access concrete manhole
- Manhole
- A. Geotextile EZ-226.
- B. Geomembrane EZ-LLDPE-30
- Drain HDPE 150Ø (By others)
- Clean Stone with maximum grain size of 20mm at 40% void ratio
- A / B: Thickness of this layer may vary according to project requirements
- C: Paving bed

N°.	REVISION	DATE	BY
J	ISSUED FOR APPROVAL	03/06/2026	S.M.
I	ISSUED FOR APPROVAL	11/05/2026	S.M.
H	ISSUED FOR APPROVAL	01/05/2026	S.M.
G	ISSUED FOR APPROVAL	30/03/2026	S.M.
F	ISSUED FOR APPROVAL	06/03/2026	S.M.
E	ISSUED FOR APPROVAL	04/03/2026	S.M.
D	ISSUED FOR APPROVAL	04/03/2026	S.M.

ISSUED FOR APPROVAL
NOT FOR PRODUCTION

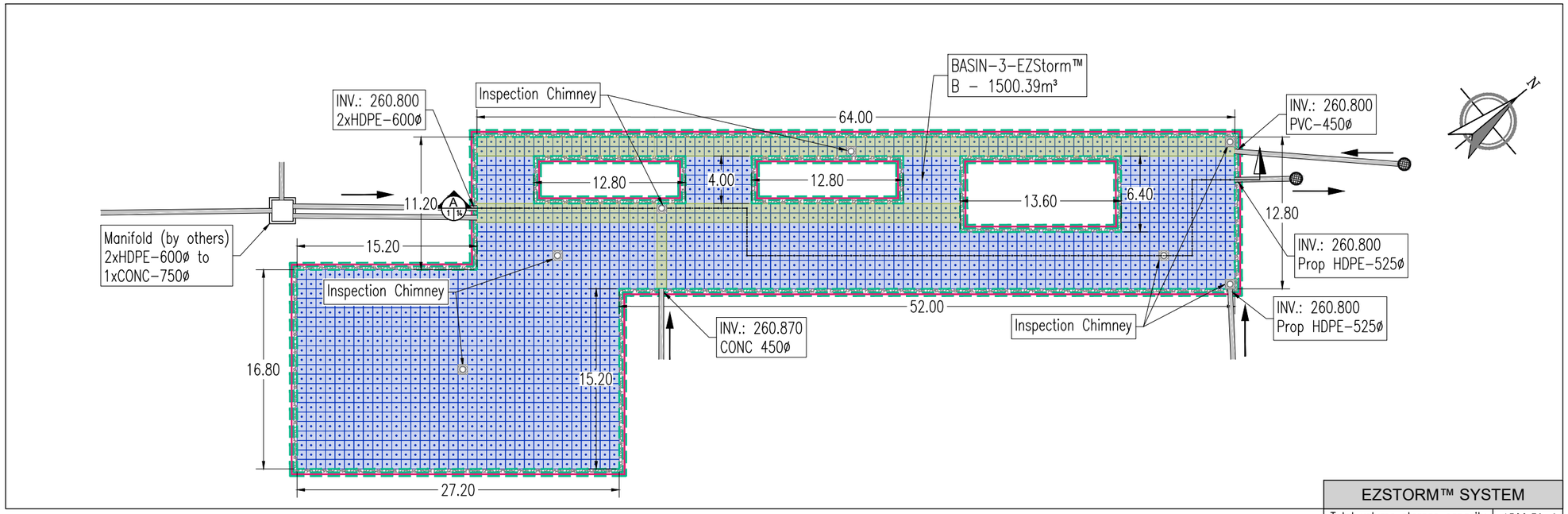
STANDARD BACKFILL REQUIREMENTS

BASIN-EZSTORM™-B2inf-92.21M³

PROJECT NAME:
12100 CREDITVIEW DEVELOPMENT, CALEDON, ON

PROJECT N°:	DATE:
250724-08	18/12/2025
DRAWN BY: S.M.	CHECKED BY: S.K.
SCALE: SCALE	SHEET N°: 10/30

NEXT
1625, Boulevard Monseigneur-Langlois
Salaberry-de-Valleyfield
J6S 1C2, Québec



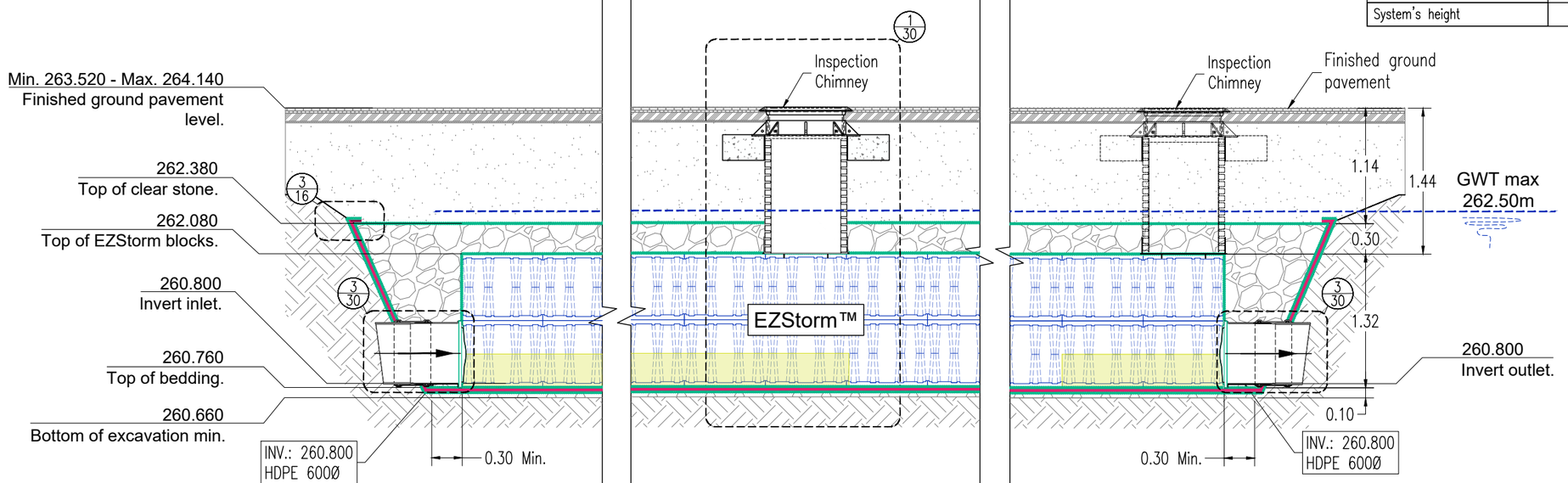
1/11 2 LAYER PLAN VIEW

SCALE 1:400

LEGEND

- Inspection Chimney
- Catch basin
- Connection-access concrete manhole
- Manhole
- A. Geotextile EZ-226.
- B. Geomembrane EZ-LLDPE-30
- Drain HDPE 150Ø (By others)
- Clean Stone with maximum grain size of 20mm at 40% void ratio
- A / B — Thickness of this layer may vary according to project requirements
- C — Paving bed

EZSTORM™ SYSTEM	
Total volume storage capacity	1500.39m³
EZSTORM™ Storage Volume	1311.77m³
clear Stone Storage Volume	188.62m³
System Area	1163.28m²
Number of blocks length	99
Number of blocks width	35
System's height	1.32m



*GWT BASED ON SERVICING PLAN BY KWA CONSULTING INC. PROJECT 24045. SEPT. 17TH, 2025

2/11 SECTION A-A

SCALE 1:50

N°.	REVISION	DATE	BY
J	ISSUED FOR APPROVAL	03/06/2026	S.M.
I	ISSUED FOR APPROVAL	11/05/2026	S.M.
H	ISSUED FOR APPROVAL	01/05/2026	S.M.
G	ISSUED FOR APPROVAL	30/03/2026	S.M.
F	ISSUED FOR APPROVAL	06/03/2026	S.M.
E	ISSUED FOR APPROVAL	04/03/2026	S.M.
D	ISSUED FOR APPROVAL	04/03/2026	S.M.

ISSUED FOR APPROVAL
NOT FOR PRODUCTION

BASIN'S PLAN AND SECTION VIEW

BASIN-EZSTORM™-B3-1500.39M³

PROJECT NAME:
12100 CREDITVIEW DEVELOPMENT, CALEDON, ON

PROJECT N°:	DATE:
250724-08	18/12/2025
DRAWN BY: S.M.	CHECKED BY: S.K.
SCALE: SCALE	SHEET N°: 11/30

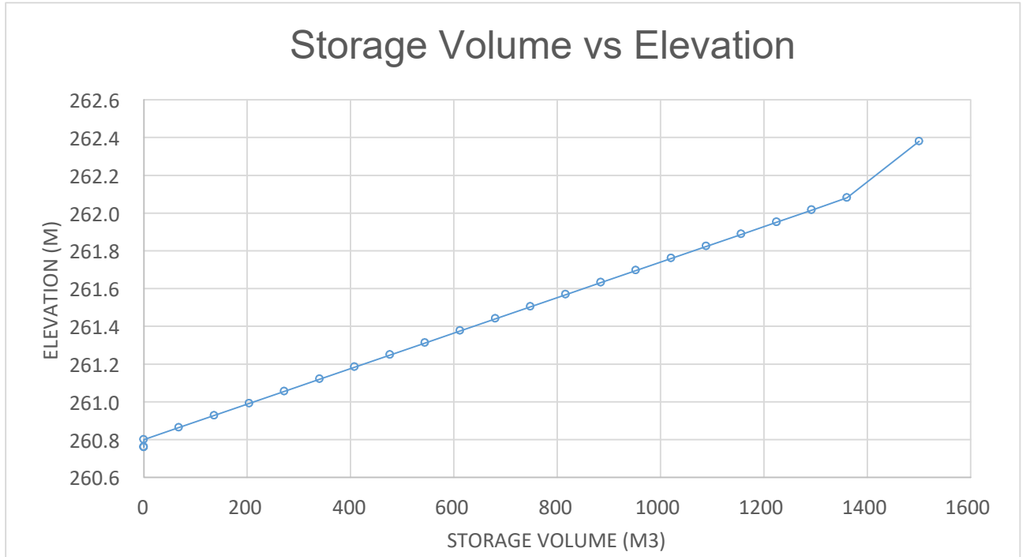
NEXT
1625, Boulevard Monseigneur-Langlois
Salaberry-de-Valleyfield
J6S 1C2, Québec

SYSTEM CHARACTERISTICS			
Model	EZSTORM™ system B3		
	Number of blocks (unit)	Dimensions / blocks (m)	Dimensions EZStorm (m)
Height	2.0	0.66	1.32
Length	99	0.80	79.20
Width	35	0.80	28.00

EZSTORM area (m2)	1067.5
EZSTORM + Clear stone area (m2)	1163.3
Total storage volume (m3)	1500.4
Invert (m)	260.80
Min finished ground level (m)	263.52

EZSTORM volume (m3)	1311.8	Clear stone volume (m3)	188.6
Void in EZSTORM (%)	96%	Void in Clear stone (%)	40%

System height (m)	Storage volume (m3)	Elevation (m)	Notes
1.62	1500.39	262.380	Top clear stone
1.32	1360.80	262.080	Top EZSTORM
1.26	1292.76	262.016	
1.19	1224.72	261.952	
1.13	1156.68	261.888	
1.06	1088.64	261.824	
1.00	1020.60	261.760	
0.94	952.56	261.696	
0.87	884.52	261.632	
0.81	816.48	261.568	
0.74	748.44	261.504	
0.68	680.40	261.440	
0.62	612.36	261.376	
0.55	544.32	261.312	
0.49	476.28	261.248	
0.42	408.24	261.184	
0.36	340.20	261.120	
0.30	272.16	261.056	
0.23	204.12	260.992	
0.17	136.08	260.928	
0.10	68.04	260.864	
0.04	0.00	260.800	Invert
0.00	0.00	260.760	Bottom EZSTORM



N°	REVISION	DATE	BY
J	ISSUED FOR APPROVAL	03/06/2026	S.M.
I	ISSUED FOR APPROVAL	11/05/2026	S.M.
H	ISSUED FOR APPROVAL	01/05/2026	S.M.
G	ISSUED FOR APPROVAL	30/03/2026	S.M.
F	ISSUED FOR APPROVAL	06/03/2026	S.M.
E	ISSUED FOR APPROVAL	04/03/2026	S.M.
D	ISSUED FOR APPROVAL	04/03/2026	S.M.

ISSUED FOR APPROVAL
NOT FOR PRODUCTION

VOLUME CALCULATION

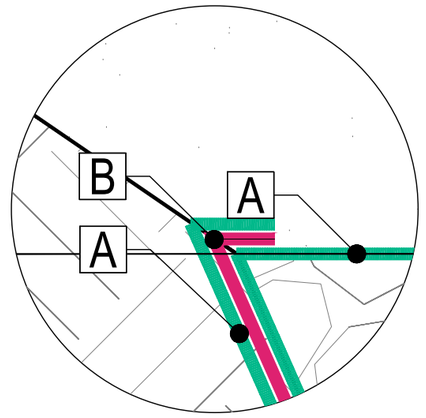
BASIN-EZSTORM™-B3-1500.39M³

PROJECT NAME:
12100 CREDITVIEW DEVELOPMENT, CALEDON, ON

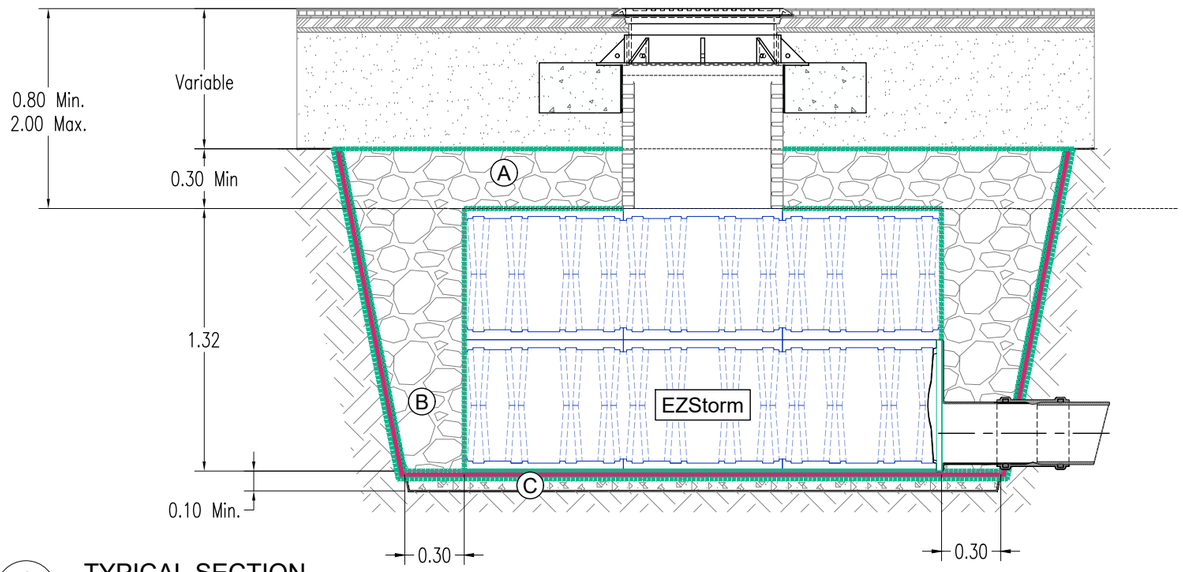
PROJECT N°:	DATE:
250724-08	18/12/2025
DRAWN BY: S.M.	CHECKED BY: S.K.
SCALE: SCALE	SHEET N°: 15/30

NEXT
1625, Boulevard Monseigneur-Langlois
Salaberry-de-Valleyfield
J6S 1C2, Québec

Acceptable backfill materials for this project			
Live Load: CL-625 / HS-25 (CSA-S6: 19)			
	Layer location	Backfill material	Density requirements
Ⓐ	Top embakment: Embakment located directly above the EZStorm chambers abd below the road structure.	3/4" Clear stone at a 40% void ratio	No compaction needed.
Ⓑ	Lateral backfill: Located between the lateral faces of the EZStorms and the limits of the excavated volume.	3/4" Clear stone at a 40% void ratio	No compaction needed.
Ⓒ	Laying bed: located under the EZStorm blocks, between the foundation floor and the base of the blocks.	Subgrade granular material 100 mm Min. 3/4 (20mm) granular material, clean stone or sand to 96% M.P.	Compact to 90% M.P. using a vibrating plate or roller compactor. Place the system on a flat, solid, horizontal and stable surface.



3/13 DETAIL
SCALE NOT AT SCALE



1/13 TYPICAL SECTION
SCALE 1:30

LEGEND

- Inspection Chimney
- Catch basin
- Connection–access concrete manhole
- Manhole
- A. Geotextile EZ-226.
- B. Geomembrane EZ-LLDPE-30
- Drain HDPE 150Ø (By others)
- Clean Stone with maximum grain size of 20mm at 40% void ratio
- A / B: Thickness of this layer may vary according to project requirements
- C: Paving bed

N°.	REVISION	DATE	BY
J	ISSUED FOR APPROVAL	03/06/2026	S.M.
I	ISSUED FOR APPROVAL	11/05/2026	S.M.
H	ISSUED FOR APPROVAL	01/05/2026	S.M.
G	ISSUED FOR APPROVAL	30/03/2026	S.M.
F	ISSUED FOR APPROVAL	06/03/2026	S.M.
E	ISSUED FOR APPROVAL	04/03/2026	S.M.
D	ISSUED FOR APPROVAL	04/03/2026	S.M.

ISSUED FOR APPROVAL
NOT FOR PRODUCTION

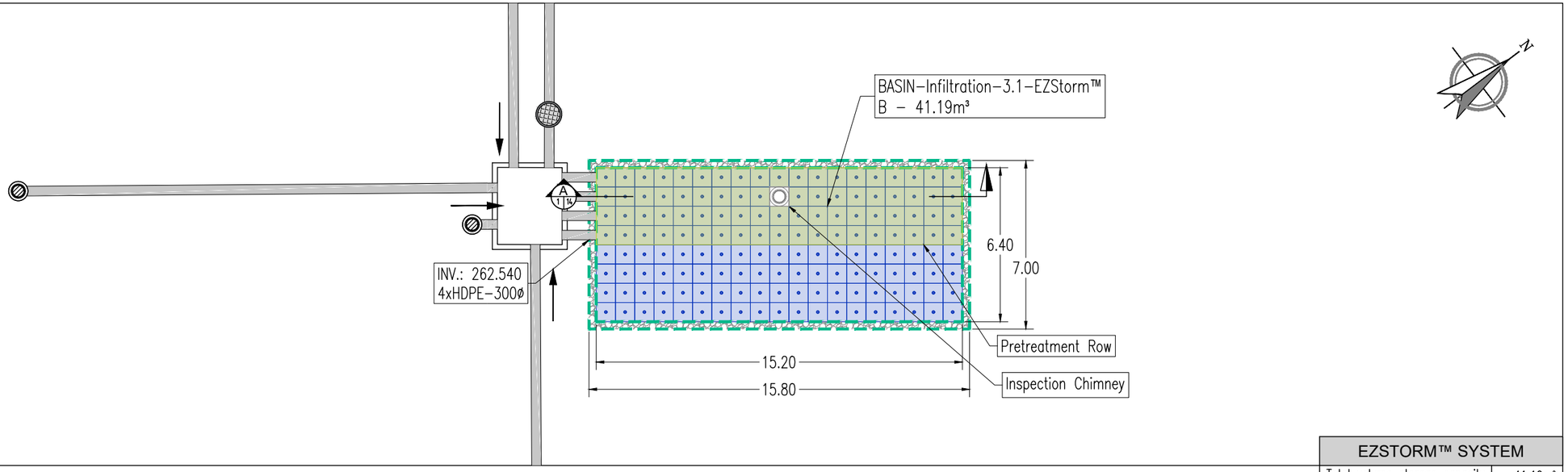
STANDARD BACKFILL REQUIREMENTS

BASIN-EZSTORM™-B3-1500.39M³

PROJECT NAME:
12100 CREDITVIEW DEVELOPMENT, CALEDON, ON

PROJECT N°:	DATE:
250724-08	18/12/2025
DRAWN BY: S.M.	CHECKED BY: S.K.
SCALE: SCALE	SHEET N°: 13/30

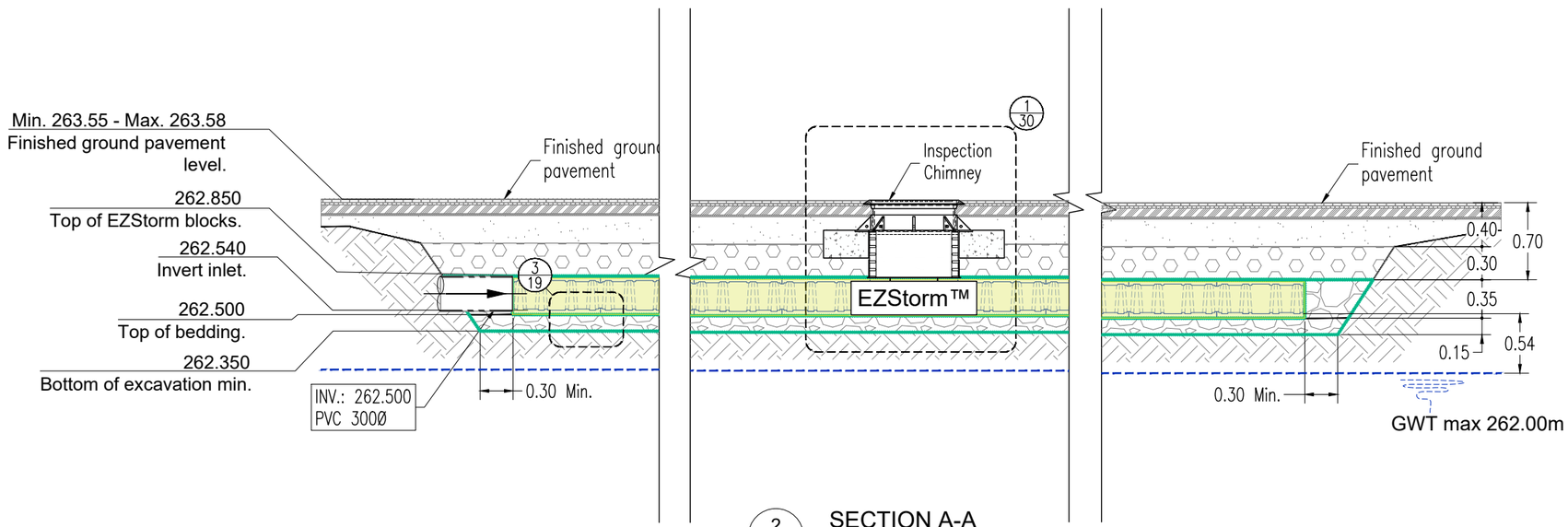
NEXT
1625, Boulevard Monseigneur-Langlois
Salaberry-de-Valleyfield
J6S 1C2, Québec



1/14 — 1/2 LAYER PLAN VIEW

SCALE 1:200

EZSTORM™ SYSTEM	
Total volume storage capacity	41.19m³
EZSTORM™ Storage Volume	32.69m³
clear Stone Storage Volume	8.50m³
System Area	110.60m²
Number of blocks length	19
Number of blocks width	8
System's height	0.35m



2/14 — SECTION A-A

SCALE 1:50

LEGEND

- Inspection Chimney
- Catch basin
- Connection–access concrete manhole
- Manhole
- A. Geotextile EZ–226.
- B. Geomembrane EZ–LLDPE–30
- Drain HDPE 150Ø (By others)
- Clean Stone with maximum grain size of 20mm at 40% void ratio
- A / B — Thickness of this layer may vary according to project requirements
- C — Paving bed

N°.	REVISION	DATE	BY
J	ISSUED FOR APPROVAL	03/06/2026	S.M.
I	ISSUED FOR APPROVAL	11/05/2026	S.M.
H	ISSUED FOR APPROVAL	01/05/2026	S.M.
G	ISSUED FOR APPROVAL	30/03/2026	S.M.
F	ISSUED FOR APPROVAL	06/03/2026	S.M.
E	ISSUED FOR APPROVAL	04/03/2026	S.M.
D	ISSUED FOR APPROVAL	04/03/2026	S.M.

ISSUED FOR APPROVAL
NOT FOR PRODUCTION

BASIN'S PLAN AND SECTION VIEW

BASIN-EZSTORM™-B3.1Inf-41.19M³

PROJECT NAME:
12100 CREDITVIEW DEVELOPMENT, CALEDON, ON

PROJECT N°:	DATE:
250724-08	18/12/2025
DRAWN BY: S.M.	CHECKED BY: S.K.
SCALE: SCALE	SHEET N°: 14/30

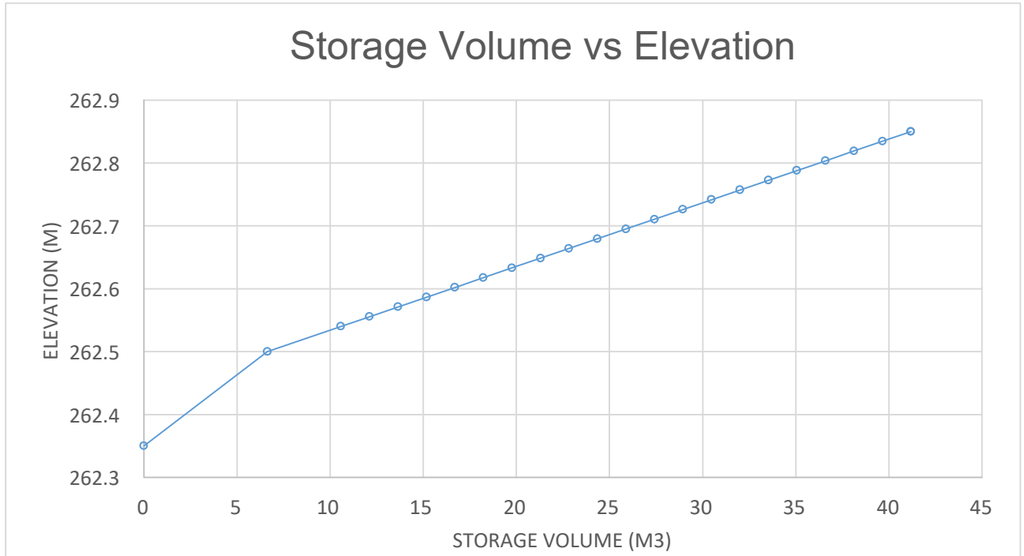
NEXT
1625, Boulevard Monseigneur-Langlois
Salaberry-de-Valleyfield
J6S 1C2, Québec

SYSTEM CHARACTERISTICS			
Model	EZSTORM™ system B3.1-Inf		
	Number of blocks (unit)	Dimensions / blocks (m)	Dimensions EZStorm (m)
Height	0.5	0.66	0.35
Length	19	0.80	15.20
Width	8	0.80	6.40

EZSTORM area (m2)	97.3
EZSTORM + Clear stone area (m2)	110.6
Total storage volume (m3)	41.2
Invert (m)	262.54
Min finished ground level (m)	263.55

EZSTORM volume (m3)	32.7	Clear stone volume (m3)	8.5
Void in EZSTORM (%)	96%	Void in Clear stone (%)	40%

System height (m)	Storage volume (m3)	Elevation (m)	Notes
0.50	41.19	262.850	Top EZSTORM
0.48	39.66	262.835	
0.47	38.13	262.819	
0.45	36.60	262.804	
0.44	35.07	262.788	
0.42	33.54	262.773	
0.41	32.01	262.757	
0.39	30.48	262.742	
0.38	28.95	262.726	
0.36	27.42	262.711	
0.35	25.89	262.695	
0.33	24.36	262.680	
0.31	22.83	262.664	
0.30	21.30	262.649	
0.28	19.77	262.633	
0.27	18.24	262.618	
0.25	16.71	262.602	
0.24	15.18	262.587	
0.22	13.64	262.571	
0.21	12.11	262.556	
0.19	10.58	262.540	Invert
0.15	6.64	262.500	Bottom EZSTORM
0.00	0.00	262.350	Bottom clear stone



N°	REVISION	DATE	BY
J	ISSUED FOR APPROVAL	03/06/2026	S.M.
I	ISSUED FOR APPROVAL	11/05/2026	S.M.
H	ISSUED FOR APPROVAL	01/05/2026	S.M.
G	ISSUED FOR APPROVAL	30/03/2026	S.M.
F	ISSUED FOR APPROVAL	06/03/2026	S.M.
E	ISSUED FOR APPROVAL	04/03/2026	S.M.
D	ISSUED FOR APPROVAL	04/03/2026	S.M.

ISSUED FOR APPROVAL
NOT FOR PRODUCTION

VOLUME CALCULATION

BASIN-EZSTORM™-B3.1Inf-41.19M³

PROJECT NAME:
12100 CREDITVIEW DEVELOPMENT, CALEDON, ON

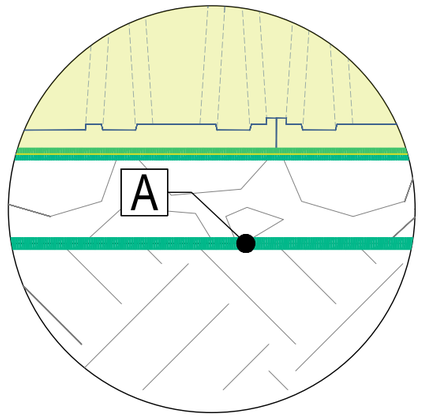
PROJECT N°:	DATE:
250724-08	18/12/2025
DRAWN BY: S.M.	CHECKED BY: S.K.
SCALE: SCALE	SHEET N°: 15/30

NEXT
1625, Boulevard Monseigneur-Langlois
Salaberry-de-Valleyfield
J6S 1C2, Québec

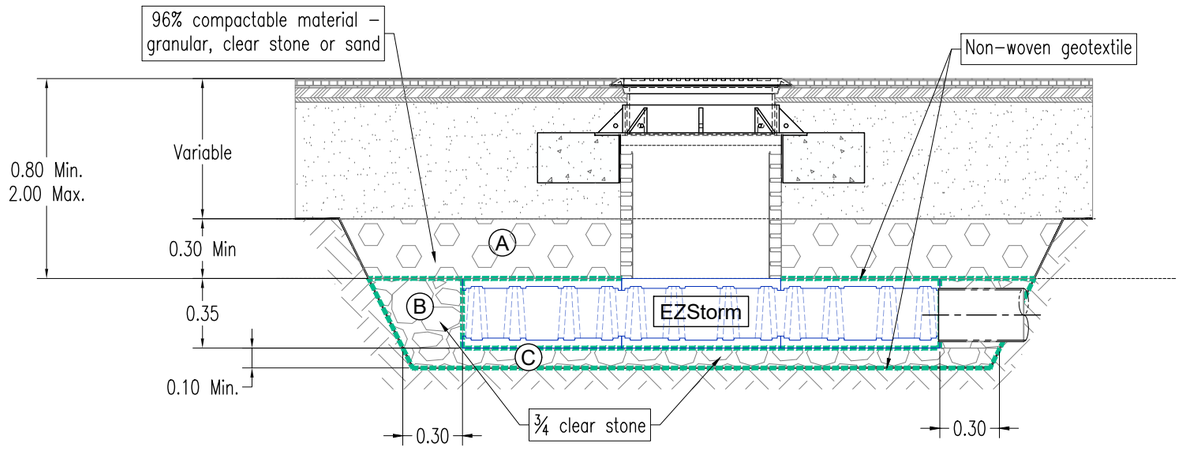
Acceptable backfill materials for this project

Live Load: CL-625 / HS-25 (CSA-S6: 19)

	Layer location	Backfill material	Density requirements
(A)	Top embakment: Embakment located directly above the EZStorm chambers abd below the road structure.	Backfill with a 20 mm Max. granular material compacted at a rate > 95 % S.P.D. (3/4 (20mm) granular material, clean stone or sand)	Without driving over the structure, place a first layer of 450mm thick on top then compact to 90% M.P. using light equipment not exceeding 5.000 kg and always driving in the same direction. Then add layers up to 300 mm thick using the same equipment and always in the same direction. Normal traffic is only permitted once the final backfill height has been reached.
(B)	Lateral backfill: Located between the lateral faces of the EZStorms and the limits of the excavated volume.	3/4" Clear stone at a 40% void ratio	No compaction needed.
(C)	Laying bed: located under the EZStorm blocks, between the foundation floor and the base of the blocks.	3/4" Clear stone at a 40% void ratio	No compaction needed.



3/16 DETAIL
SCALE NOT AT SCALE



1/16 TYPICAL SECTION
SCALE 1:30

LEGEND

- Inspection Chimney
- Catch basin
- Connection–access concrete manhole
- Manhole
- A. Geotextile EZ-226.
- B. Geomembrane EZ-LLDPE-30
- Drain HDPE 150Ø (By others)
- Clean Stone with maximum grain size of 20mm at 40% void ratio
- A, B: Thickness of this layer may vary according to project requirements
- C: Paving bed

N°.	REVISION	DATE	BY
J	ISSUED FOR APPROVAL	03/06/2026	S.M.
I	ISSUED FOR APPROVAL	11/05/2026	S.M.
H	ISSUED FOR APPROVAL	01/05/2026	S.M.
G	ISSUED FOR APPROVAL	30/03/2026	S.M.
F	ISSUED FOR APPROVAL	06/03/2026	S.M.
E	ISSUED FOR APPROVAL	04/03/2026	S.M.
D	ISSUED FOR APPROVAL	04/03/2026	S.M.

ISSUED FOR APPROVAL
NOT FOR PRODUCTION

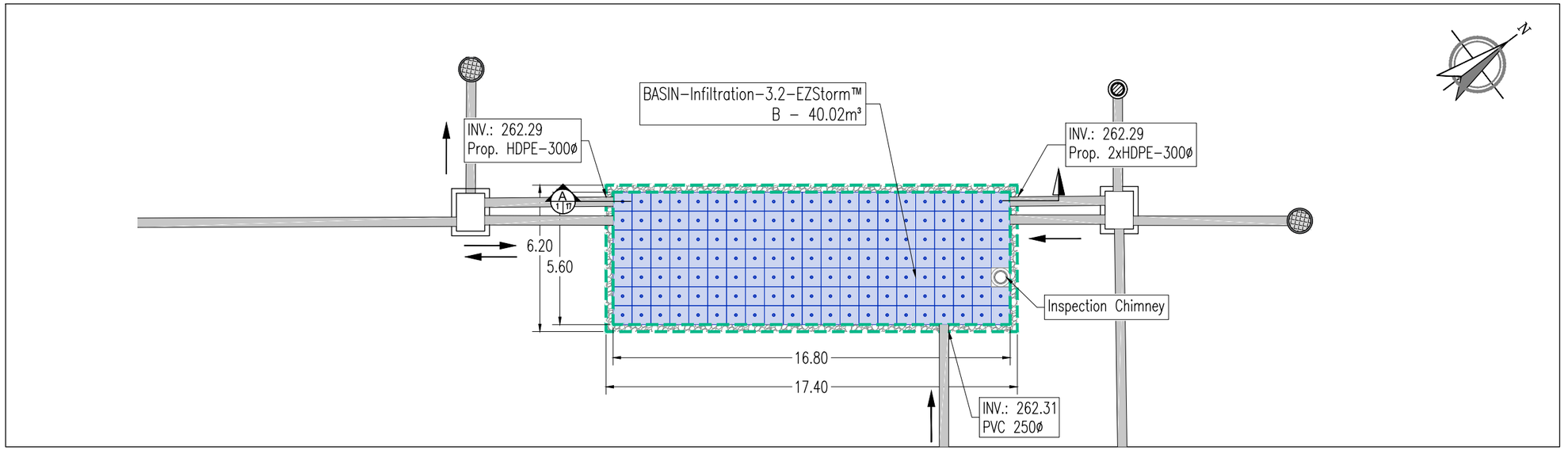
STANDARD BACKFILL REQUIREMENTS

BASIN-EZSTORM™-B3.1Inf-41.19M³

PROJECT NAME:
12100 CREDITVIEW DEVELOPMENT, CALEDON, ON

PROJECT N°:	DATE:
250724-08	18/12/2025
DRAWN BY: S.M.	CHECKED BY: S.K.
SCALE: SCALE	SHEET N°: 16/30

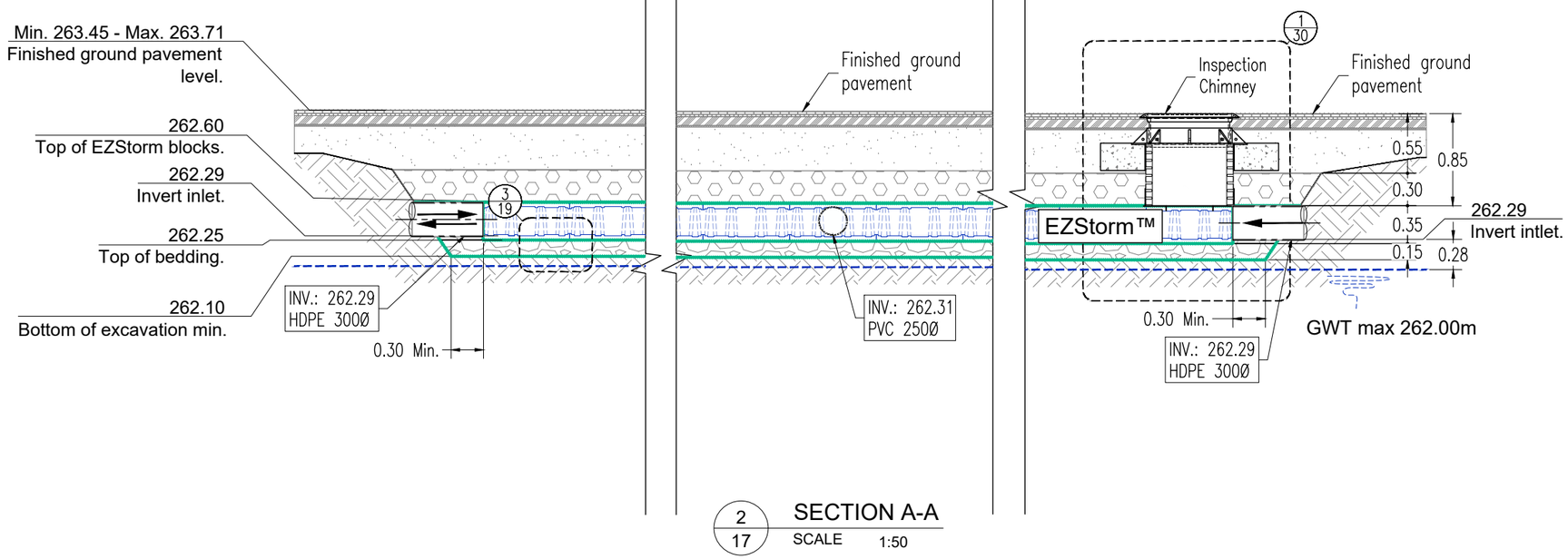
NEXT
1625, Boulevard Monseigneur-Langlois
Salaberry-de-Valleyfield
J6S 1C2, Québec



1/17 1/2 LAYER PLAN VIEW

SCALE 1:200

EZSTORM™ SYSTEM	
Total volume storage capacity	40.02m³
EZSTORM™ Storage Volume	31.61m³
clear Stone Storage Volume	8.40m³
System Area	107.88m²
Number of blocks length	21
Number of blocks width	7
System's height	0.35m



2/17 SECTION A-A

SCALE 1:50

LEGEND

- Inspection Chimney
- Catch basin
- Connection–access concrete manhole
- Manhole
- A. Geotextile EZ–226.
- B. Geomembrane EZ–LLDPE–30
- Drain HDPE 150ø (By others)
- Clean Stone with maximum grain size of 20mm at 40% void ratio
- A / B — Thickness of this layer may vary according to project requirements
- C — Paving bed

N°.	REVISION	DATE	BY
J	ISSUED FOR APPROVAL	03/06/2026	S.M.
I	ISSUED FOR APPROVAL	11/05/2026	S.M.
H	ISSUED FOR APPROVAL	01/05/2026	S.M.
G	ISSUED FOR APPROVAL	30/03/2026	S.M.
F	ISSUED FOR APPROVAL	06/03/2026	S.M.
E	ISSUED FOR APPROVAL	04/03/2026	S.M.
D	ISSUED FOR APPROVAL	04/03/2026	S.M.

ISSUED FOR APPROVAL
NOT FOR PRODUCTION

BASIN'S PLAN AND SECTION VIEW

BASIN-EZSTORM™-B3.1Inf-40.02M³

PROJECT NAME:
12100 CREDITVIEW DEVELOPMENT, CALEDON, ON

PROJECT N°:	DATE:
250724-08	18/12/2025
DRAWN BY: S.M.	CHECKED BY: S.K.
SCALE: SCALE	SHEET N°: 17/30

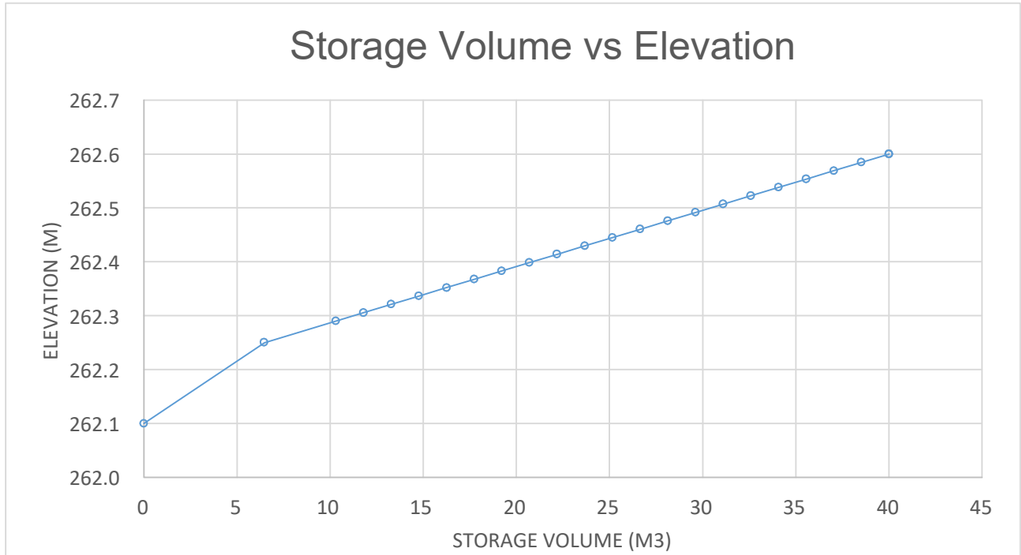
NEXT
1625, Boulevard Monseigneur-Langlois
Salaberry-de-Valleyfield
J6S 1C2, Québec

SYSTEM CHARACTERISTICS			
Model	EZSTORM™ system B3.2-Inf		
	Number of blocks (unit)	Dimensions / blocks (m)	Dimensions EZStorm (m)
Height	0.5	0.66	0.35
Length	21	0.80	16.80
Width	7	0.80	5.60

EZSTORM area (m2)	94.1
EZSTORM + Clear stone area (m2)	107.9
Total storage volume (m3)	40.0
Invert (m)	262.29
Min finished ground level (m)	263.45

EZSTORM volume (m3)	31.6	Clear stone volume (m3)	8.4
Void in EZSTORM (%)	96%	Void in Clear stone (%)	40%

System height (m)	Storage volume (m3)	Elevation (m)	Notes
0.50	40.02	262.600	Top EZSTORM
0.48	38.53	262.585	
0.47	37.04	262.569	
0.45	35.56	262.554	
0.44	34.07	262.538	
0.42	32.59	262.523	
0.41	31.10	262.507	
0.39	29.62	262.492	
0.38	28.13	262.476	
0.36	26.65	262.461	
0.35	25.16	262.445	
0.33	23.68	262.430	
0.31	22.19	262.414	
0.30	20.70	262.399	
0.28	19.22	262.383	
0.27	17.73	262.368	
0.25	16.25	262.352	
0.24	14.76	262.337	
0.22	13.28	262.321	
0.21	11.79	262.306	
0.19	10.31	262.290	Invert
0.15	6.47	262.250	Bottom EZSTORM
0.00	0.00	262.100	Bottom clear stone



N°	REVISION	DATE	BY
J	ISSUED FOR APPROVAL	03/06/2026	S.M.
I	ISSUED FOR APPROVAL	11/05/2026	S.M.
H	ISSUED FOR APPROVAL	01/05/2026	S.M.
G	ISSUED FOR APPROVAL	30/03/2026	S.M.
F	ISSUED FOR APPROVAL	06/03/2026	S.M.
E	ISSUED FOR APPROVAL	04/03/2026	S.M.
D	ISSUED FOR APPROVAL	04/03/2026	S.M.

ISSUED FOR APPROVAL
NOT FOR PRODUCTION

VOLUME CALCULATION

BASIN-EZSTORM™-B3.1Inf-40.02M³

PROJECT NAME:
12100 CREDITVIEW DEVELOPMENT, CALEDON, ON

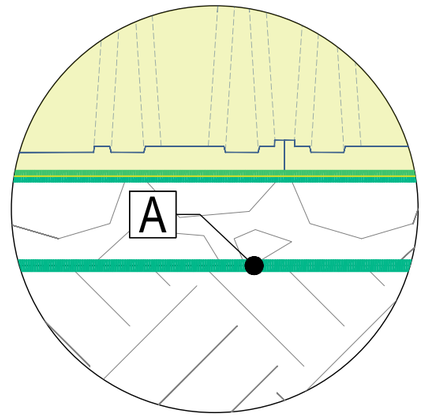
PROJECT N°:	DATE:
250724-08	18/12/2025
DRAWN BY: S.M.	CHECKED BY: S.K.
SCALE: SCALE	SHEET N°: 18/30

NEXT
1625, Boulevard Monseigneur-Langlois
Salaberry-de-Valleyfield
J6S 1C2, Québec

Acceptable backfill materials for this project

Live Load: CL-625 / HS-25 (CSA-S6: 19)

	Layer location	Backfill material	Density requirements
(A)	Top embakment: Embakment located directly above the EZStorm chambers abd below the road structure.	Backfill with a 20 mm Max. granular material compacted at a rate > 95 % S.P.D. (3/4 (20mm) granular material, clean stone or sand)	Without driving over the structure, place a first layer of 450mm thick on top then compact to 90% M.P. using light equipment not exceeding 5.000 kg and always driving in the same direction. Then add layers up to 300 mm thick using the same equipment and always in the same direction. Normal traffic is only permitted once the final backfill height has been reached.
(B)	Lateral backfill: Located between the lateral faces of the EZStorms and the limits of the excavated volume.	3/4" Clear stone at a 40% void ratio	No compaction needed.
(C)	Laying bed: located under the EZStorm blocks, between the foundation floor and the base of the blocks.	3/4" Clear stone at a 40% void ratio	No compaction needed.



3/19 DETAIL
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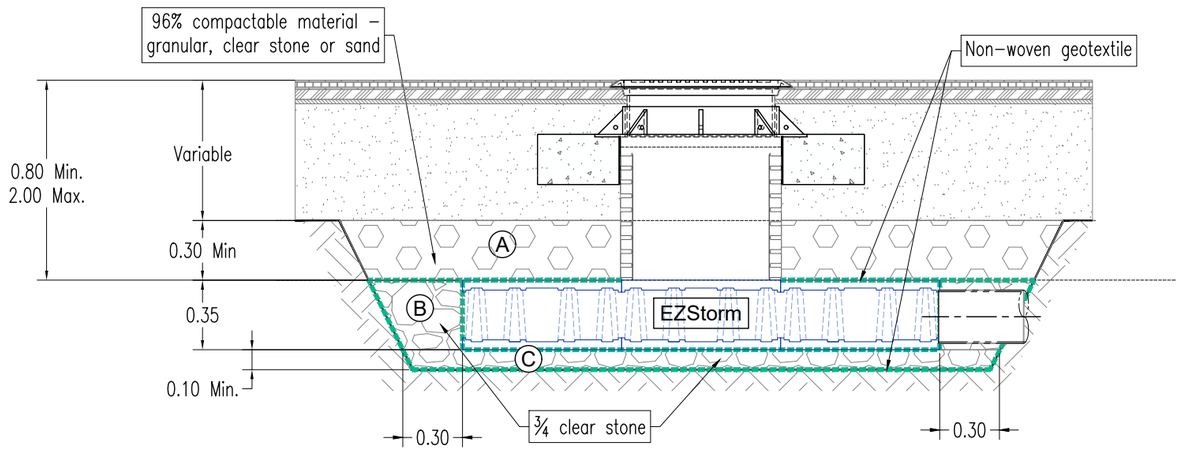


1/19 TYPICAL SECTION
SCALE 1:30

LEGEND

- Inspection Chimney
- Catch basin
- Connection–access concrete manhole
- Manhole
- A. Geotextile EZ-226.
- B. Geomembrane EZ-LLDPE-30
- Drain HDPE 150Ø (By others)
- Clean Stone with maximum grain size of 20mm at 40% void ratio
- A, B: Thickness of this layer may vary according to project requirements
- C: Paving bed

N°	REVISION	DATE	BY
J	ISSUED FOR APPROVAL	03/06/2026	S.M.
I	ISSUED FOR APPROVAL	11/05/2026	S.M.
H	ISSUED FOR APPROVAL	01/05/2026	S.M.
G	ISSUED FOR APPROVAL	30/03/2026	S.M.
F	ISSUED FOR APPROVAL	06/03/2026	S.M.
E	ISSUED FOR APPROVAL	04/03/2026	S.M.
D	ISSUED FOR APPROVAL	04/03/2026	S.M.

ISSUED FOR APPROVAL
NOT FOR PRODUCTION

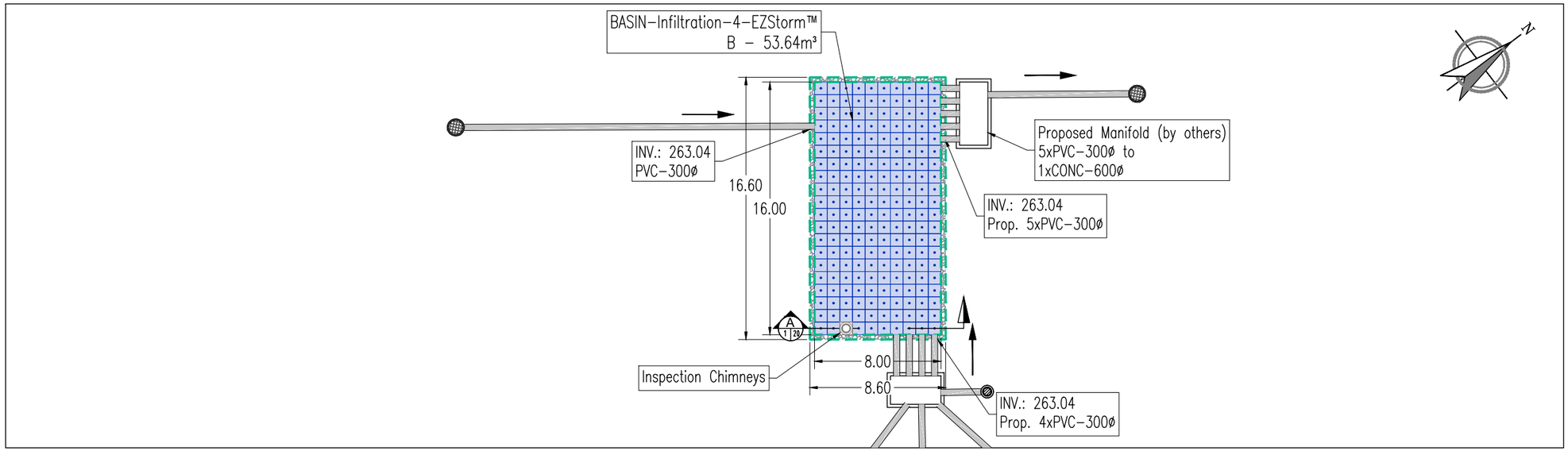
STANDARD BACKFILL REQUIREMENTS

BASIN-EZSTORM™-B3.1Inf-40.02M³

PROJECT NAME:
12100 CREDITVIEW DEVELOPMENT, CALEDON, ON

PROJECT N°:	DATE:
250724-08	18/12/2025
DRAWN BY: S.M.	CHECKED BY: S.K.
SCALE: SCALE	SHEET N°: 19/30

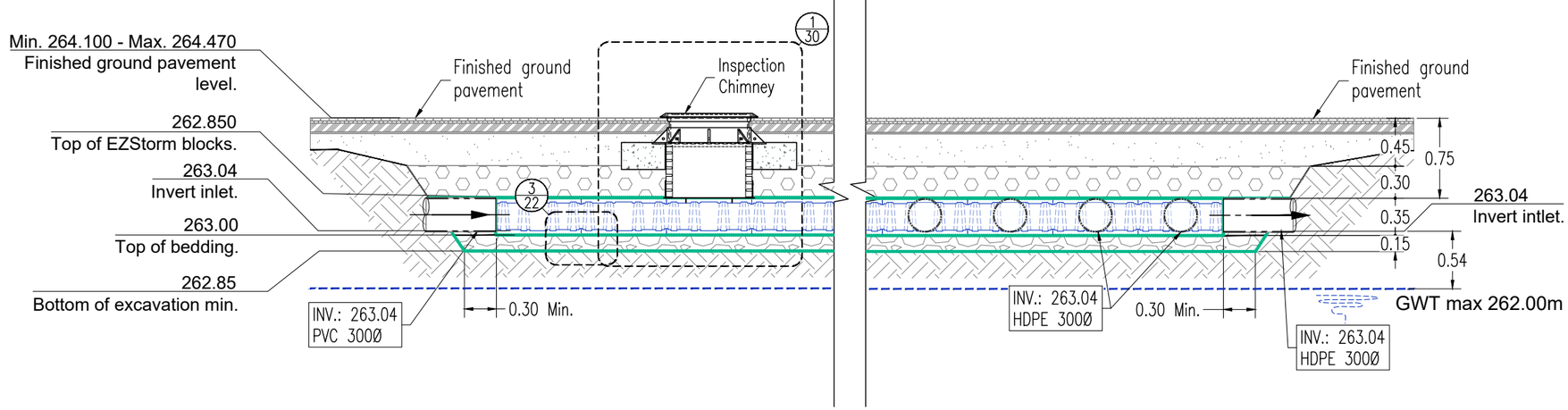
NEXT
1625, Boulevard Monseigneur-Langlois
Salaberry-de-Valleyfield
J6S 1C2, Québec



1/20 — 1/2 LAYER PLAN VIEW

SCALE 1:300

EZSTORM™ SYSTEM	
Total volume storage capacity	53.64m³
EZSTORM™ Storage Volume	43.01m³
clear Stone Storage Volume	10.63m³
System Area	142.76m²
Number of blocks length	20
Number of blocks width	10
System's height	0.35m



2/20 — SECTION A-A

SCALE 1:50

LEGEND

- Inspection Chimney
- Catch basin
- Connection–access concrete manhole
- Manhole
- A. Geotextile EZ–226.
- B. Geomembrane EZ–LLDPE–30
- Drain HDPE 150Ø (By others)
- Clean Stone with maximum grain size of 20mm at 40% void ratio
- A / B — Thickness of this layer may vary according to project requirements
- C — Paving bed

N°.	REVISION	DATE	BY
J	ISSUED FOR APPROVAL	03/06/2026	S.M.
I	ISSUED FOR APPROVAL	11/05/2026	S.M.
H	ISSUED FOR APPROVAL	01/05/2026	S.M.
G	ISSUED FOR APPROVAL	30/03/2026	S.M.
F	ISSUED FOR APPROVAL	06/03/2026	S.M.
E	ISSUED FOR APPROVAL	04/03/2026	S.M.
D	ISSUED FOR APPROVAL	04/03/2026	S.M.

ISSUED FOR APPROVAL
NOT FOR PRODUCTION

BASIN'S PLAN AND SECTION VIEW

BASIN-EZSTORM™-B4inf-53.64M³

PROJECT NAME:
12100 CREDITVIEW DEVELOPMENT, CALEDON, ON

PROJECT N°:	DATE:
250724-08	18/12/2025
DRAWN BY: S.M.	CHECKED BY: S.K.
SCALE: SCALE	SHEET N°: 20/30

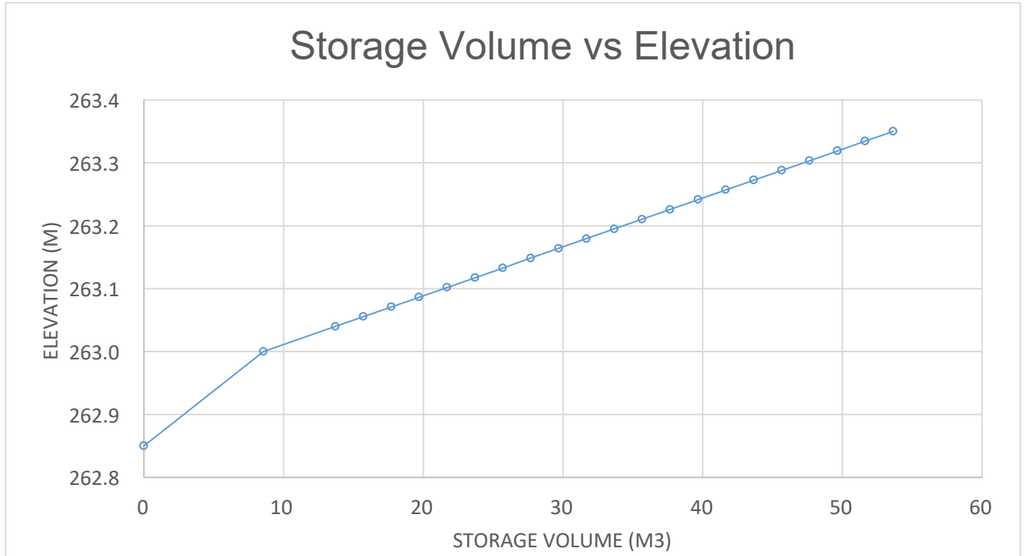
NEXT
1625, Boulevard Monseigneur-Langlois
Salaberry-de-Valleyfield
J6S 1C2, Québec

SYSTEM CHARACTERISTICS			
Model	EZSTORM™ system B4-Inf		
	Number of blocks (unit)	Dimensions / blocks (m)	Dimensions EZStorm (m)
Height	0.5	0.66	0.35
Length	20	0.80	16.00
Width	10	0.80	8.00

EZSTORM area (m2)	128.0
EZSTORM + Clear stone area (m2)	142.8
Total storage volume (m3)	53.6
Invert (m)	263.04
Min finished ground level (m)	264.10

EZSTORM volume (m3)	43.0	Clear stone volume (m3)	10.6
Void in EZSTORM (%)	96%	Void in Clear stone (%)	40%

System height (m)	Storage volume (m3)	Elevation (m)	Notes
0.50	53.64	263.350	Top EZSTORM
0.48	51.64	263.335	
0.47	49.65	263.319	
0.45	47.65	263.304	
0.44	45.66	263.288	
0.42	43.66	263.273	
0.41	41.66	263.257	
0.39	39.67	263.242	
0.38	37.67	263.226	
0.36	35.67	263.211	
0.35	33.68	263.195	
0.33	31.68	263.180	
0.31	29.69	263.164	
0.30	27.69	263.149	
0.28	25.69	263.133	
0.27	23.70	263.118	
0.25	21.70	263.102	
0.24	19.71	263.087	
0.22	17.71	263.071	
0.21	15.71	263.056	
0.19	13.72	263.040	Invert
0.15	8.57	263.000	Bottom EZSTORM
0.00	0.00	262.850	Bottom clear stone



N°	REVISION	DATE	BY
J	ISSUED FOR APPROVAL	03/06/2026	S.M.
I	ISSUED FOR APPROVAL	11/05/2026	S.M.
H	ISSUED FOR APPROVAL	01/05/2026	S.M.
G	ISSUED FOR APPROVAL	30/03/2026	S.M.
F	ISSUED FOR APPROVAL	06/03/2026	S.M.
E	ISSUED FOR APPROVAL	04/03/2026	S.M.
D	ISSUED FOR APPROVAL	04/03/2026	S.M.

ISSUED FOR APPROVAL
NOT FOR PRODUCTION

VOLUME CALCULATION

BASIN-EZSTORM™-B4inf-53.64M³

PROJECT NAME:
12100 CREDITVIEW DEVELOPMENT, CALEDON, ON

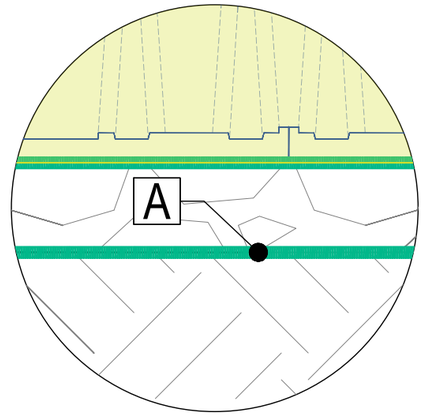
PROJECT N°:	DATE:
250724-08	18/12/2025
DRAWN BY: S.M.	CHECKED BY: S.K.
SCALE: SCALE	SHEET N°: 21/30

NEXT
1625, Boulevard Monseigneur-Langlois
Salaberry-de-Valleyfield
J6S 1C2, Québec

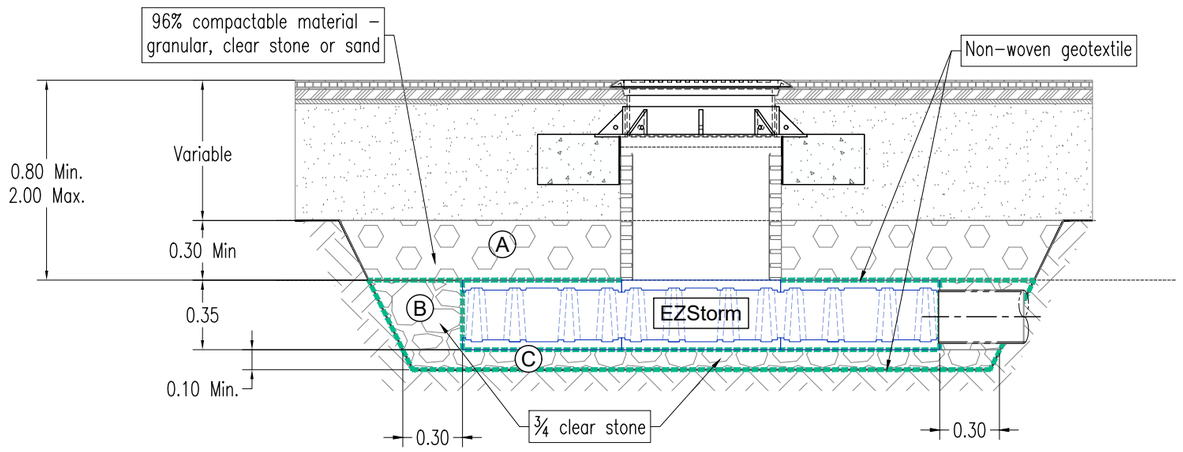
Acceptable backfill materials for this project

Live Load: CL-625 / HS-25 (CSA-S6: 19)

	Layer location	Backfill material	Density requirements
(A)	Top embakment: Embakment located directly above the EZStorm chambers abd below the road structure.	Backfill with a 20 mm Max. granular material compacted at a rate > 95 % S.P.D. (3/4 (20mm) granular material, clean stone or sand)	Without driving over the structure, place a first layer of 450mm thick on top then compact to 90% M.P. using light equipment not exceeding 5.000 kg and always driving in the same direction. Then add layers up to 300 mm thick using the same equipment and always in the same direction. Normal traffic is only permitted once the final backfill height has been reached.
(B)	Lateral backfill: Located between the lateral faces of the EZStorms and the limits of the excavated volume.	3/4" Clear stone at a 40% void ratio	No compaction needed.
(C)	Laying bed: located under the EZStorm blocks, between the foundation floor and the base of the blocks.	3/4" Clear stone at a 40% void ratio	No compaction needed.



3/22 DETAIL
SCALE NOT AT SCALE



1/22 TYPICAL SECTION
SCALE 1:30

LEGEND

- Inspection Chimney
- Catch basin
- Connection–access concrete manhole
- Manhole
- A. Geotextile EZ-226.
- B. Geomembrane EZ-LLDPE-30
- Drain HDPE 150Ø (By others)
- Clean Stone with maximum grain size of 20mm at 40% void ratio
- A, B: Thickness of this layer may vary according to project requirements
- C: Paving bed

N°.	REVISION	DATE	BY
J	ISSUED FOR APPROVAL	03/06/2026	S.M.
I	ISSUED FOR APPROVAL	11/05/2026	S.M.
H	ISSUED FOR APPROVAL	01/05/2026	S.M.
G	ISSUED FOR APPROVAL	30/03/2026	S.M.
F	ISSUED FOR APPROVAL	06/03/2026	S.M.
E	ISSUED FOR APPROVAL	04/03/2026	S.M.
D	ISSUED FOR APPROVAL	04/03/2026	S.M.

ISSUED FOR APPROVAL
NOT FOR PRODUCTION

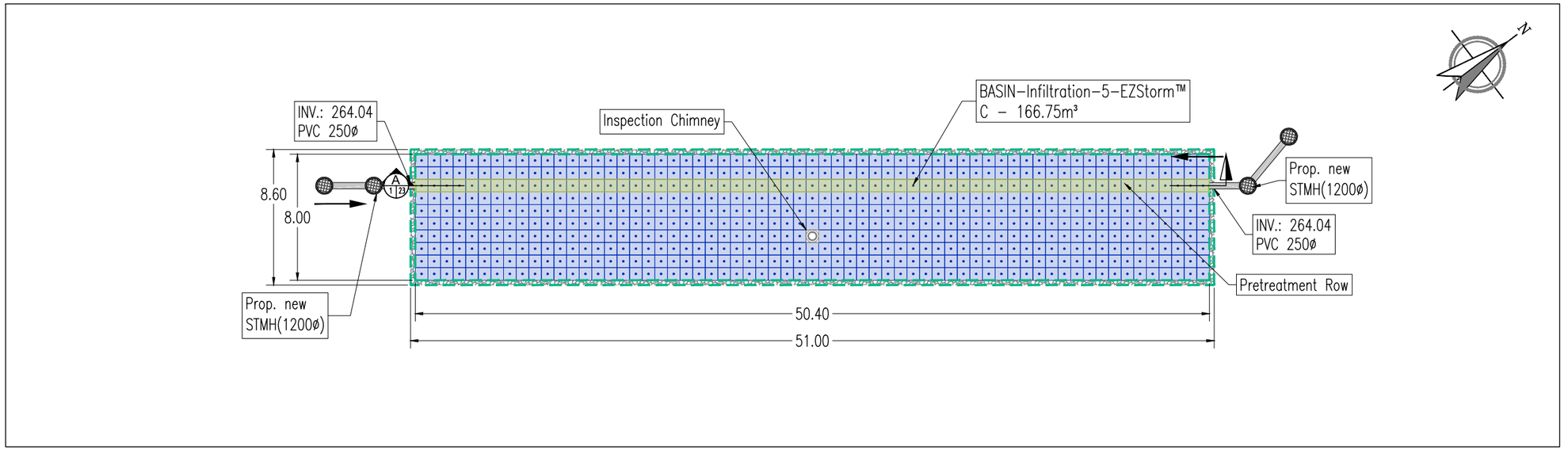
STANDARD BACKFILL REQUIREMENTS

BASIN-EZSTORM™-B4inf-53.64M³

PROJECT NAME:
12100 CREDITVIEW DEVELOPMENT, CALEDON, ON

PROJECT N°:	DATE:
250724-08	18/12/2025
DRAWN BY: S.M.	CHECKED BY: S.K.
SCALE: SCALE	SHEET N°: 22/30

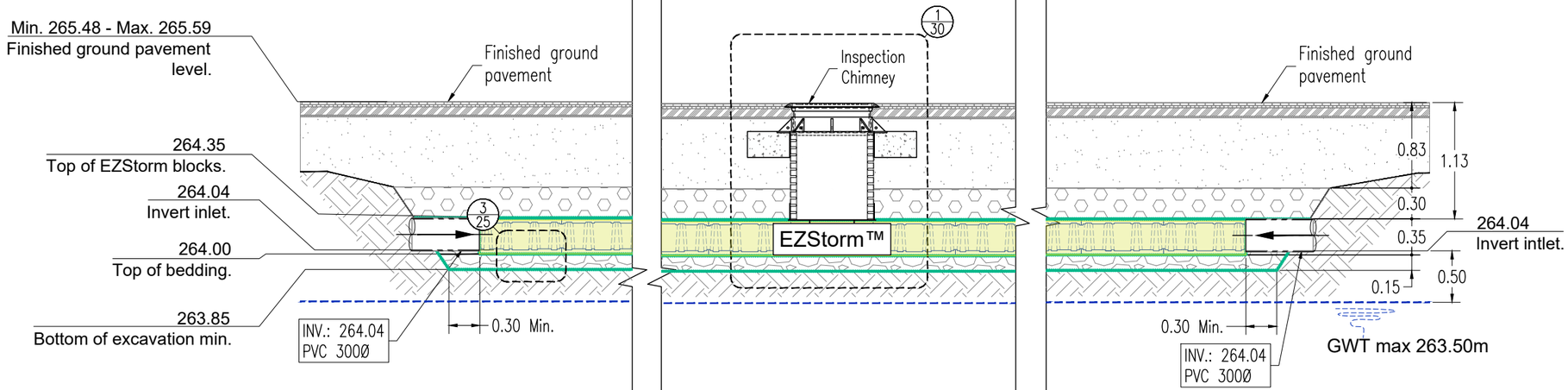
NEXT
1625, Boulevard Monseigneur-Langlois
Salaberry-de-Valleyfield
J6S 1C2, Québec



1/23 — 1/2 LAYER PLAN VIEW

SCALE 1:300

EZSTORM™ SYSTEM	
Total volume storage capacity	166.75m³
EZSTORM™ Storage Volume	135.48m³
clear Stone Storage Volume	31.27m³
System Area	438.60m²
Number of blocks length	63
Number of blocks width	10
System's height	0.35m



2/02 — SECTION A-A

SCALE 1:50

LEGEND

- Inspection Chimney
- Catch basin
- Connection–access concrete manhole
- Manhole
- A. Geotextile EZ–226.
- B. Geomembrane EZ–LLDPE–30
- Drain HDPE 150Ø (By others)
- Clean Stone with maximum grain size of 20mm at 40% void ratio
- A / B — Thickness of this layer may vary according to project requirements
- C — Paving bed

N°.	REVISION	DATE	BY
J	ISSUED FOR APPROVAL	03/06/2026	S.M.
I	ISSUED FOR APPROVAL	11/05/2026	S.M.
H	ISSUED FOR APPROVAL	01/05/2026	S.M.
G	ISSUED FOR APPROVAL	30/03/2026	S.M.
F	ISSUED FOR APPROVAL	06/03/2026	S.M.
E	ISSUED FOR APPROVAL	04/03/2026	S.M.
D	ISSUED FOR APPROVAL	04/03/2026	S.M.

ISSUED FOR APPROVAL
NOT FOR PRODUCTION

BASIN'S PLAN AND SECTION VIEW

BASIN-EZSTORM™-B5inf-166.75M³

PROJECT NAME:
12100 CREDITVIEW DEVELOPMENT, CALEDON, ON

PROJECT N°:	DATE:
250724-08	18/12/2025
DRAWN BY: S.M.	CHECKED BY: S.K.
SCALE: SCALE	SHEET N°: 23/30

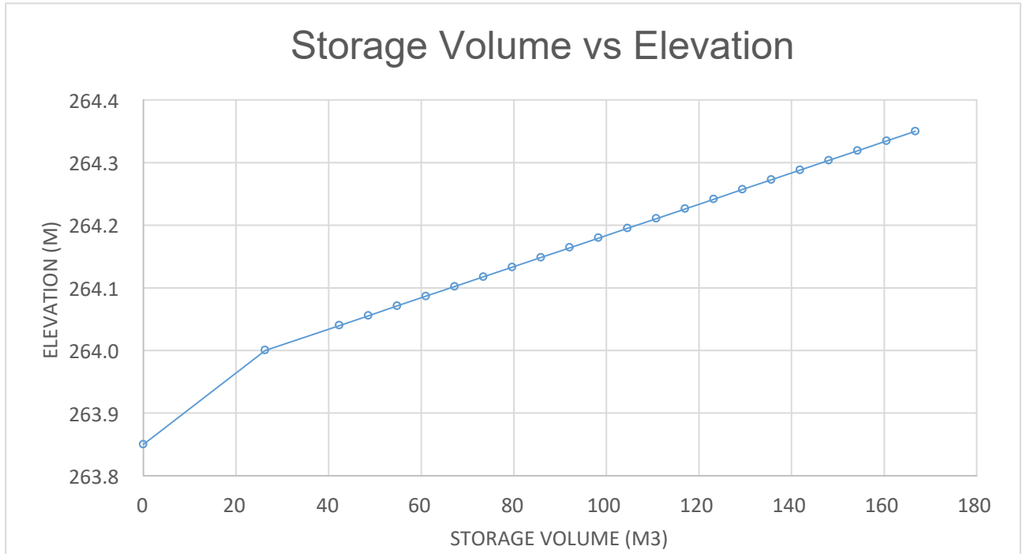
NEXT
1625, Boulevard Monseigneur-Langlois
Salaberry-de-Valleyfield
J6S 1C2, Québec

SYSTEM CHARACTERISTICS			
Model	EZSTORM™ system B5-Inf		
	Number of blocks (unit)	Dimensions / blocks (m)	Dimensions EZStorm (m)
Height	0.5	0.66	0.35
Length	63	0.80	50.40
Width	10	0.80	8.00

EZSTORM area (m2)	403.2
EZSTORM + Clear stone area (m2)	438.6
Total storage volume (m3)	166.7
Invert (m)	264.04
Min finished ground level (m)	265.48

EZSTORM volume (m3)	135.5	Clear stone volume (m3)	31.3
Void in EZSTORM (%)	96%	Void in Clear stone (%)	40%

System height (m)	Storage volume (m3)	Elevation (m)	Notes
0.50	166.75	264.350	Top EZSTORM
0.48	160.53	264.335	
0.47	154.31	264.319	
0.45	148.09	264.304	
0.44	141.87	264.288	
0.42	135.65	264.273	
0.41	129.43	264.257	
0.39	123.21	264.242	
0.38	116.99	264.226	
0.36	110.78	264.211	
0.35	104.56	264.195	
0.33	98.34	264.180	
0.31	92.12	264.164	
0.30	85.90	264.149	
0.28	79.68	264.133	
0.27	73.46	264.118	
0.25	67.24	264.102	
0.24	61.02	264.087	
0.22	54.80	264.071	
0.21	48.58	264.056	
0.19	42.37	264.040	Invert
0.15	26.32	264.000	Bottom EZSTORM
0.00	0.00	263.850	Bottom clear stone



N°	REVISION	DATE	BY
J	ISSUED FOR APPROVAL	03/06/2026	S.M.
I	ISSUED FOR APPROVAL	11/05/2026	S.M.
H	ISSUED FOR APPROVAL	01/05/2026	S.M.
G	ISSUED FOR APPROVAL	30/03/2026	S.M.
F	ISSUED FOR APPROVAL	06/03/2026	S.M.
E	ISSUED FOR APPROVAL	04/03/2026	S.M.
D	ISSUED FOR APPROVAL	04/03/2026	S.M.

ISSUED FOR APPROVAL
NOT FOR PRODUCTION

VOLUME CALCULATION

BASIN-EZSTORM™-B5inf-166.75M³

PROJECT NAME:
12100 CREDITVIEW DEVELOPMENT, CALEDON, ON

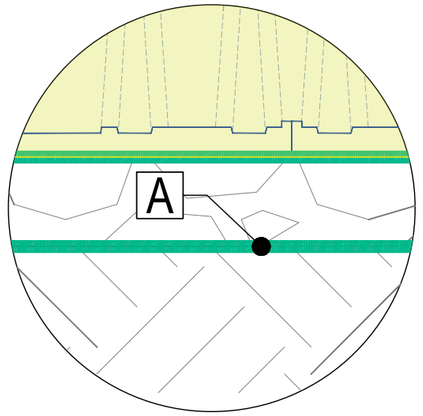
PROJECT N°:	DATE:
250724-08	18/12/2025
DRAWN BY: S.M.	CHECKED BY: S.K.
SCALE: SCALE	SHEET N°: 24/30

NEXT
1625, Boulevard Monseigneur-Langlois
Salaberry-de-Valleyfield
J6S 1C2, Québec

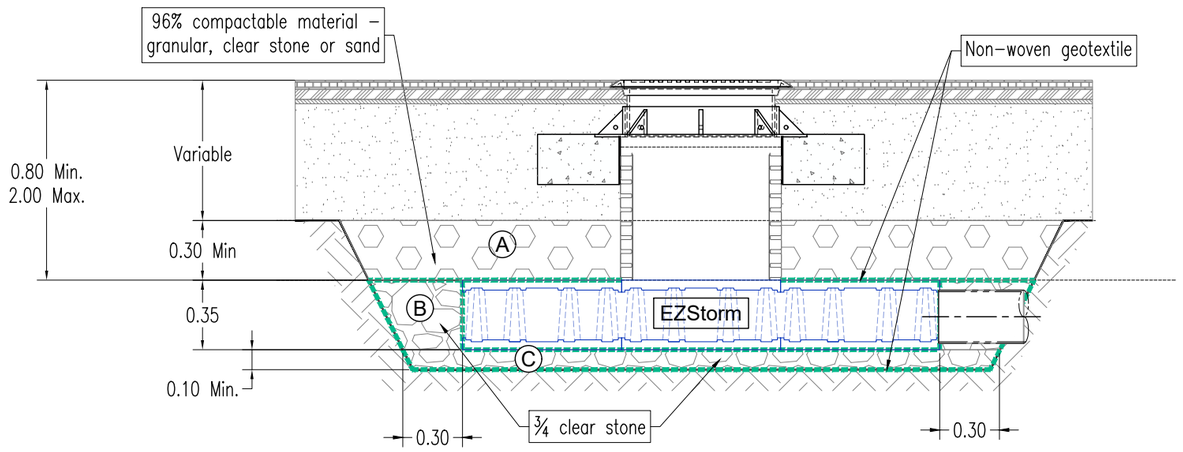
Acceptable backfill materials for this project

Live Load: CL-625 / HS-25 (CSA-S6: 19)

	Layer location	Backfill material	Density requirements
(A)	Top embakment: Embakment located directly above the EZStorm chambers abd below the road structure.	Backfill with a 20 mm Max. granular material compacted at a rate > 95 % S.P.D. (3/4 (20mm) granular material, clean stone or sand)	Without driving over the structure, place a first layer of 450mm thick on top then compact to 90% M.P. using light equipment not exceeding 5.000 kg and always driving in the same direction. Then add layers up to 300 mm thick using the same equipment and always in the same direction. Normal traffic is only permitted once the final backfill height has been reached.
(B)	Lateral backfill: Located between the lateral faces of the EZStorms and the limits of the excavated volume.	3/4" Clear stone at a 40% void ratio	No compaction needed.
(C)	Laying bed: located under the EZStorm blocks, between the foundation floor and the base of the blocks.	3/4" Clear stone at a 40% void ratio	No compaction needed.



3/25 DETAIL
SCALE NOT AT SCALE



1/25 TYPICAL SECTION
SCALE 1:30

LEGEND

- Inspection Chimney
- Catch basin
- Connection–access concrete manhole
- Manhole
- A. Geotextile EZ-226.
- B. Geomembrane EZ-LLDPE-30
- Drain HDPE 150Ø (By others)
- Clean Stone with maximum grain size of 20mm at 40% void ratio
- A, B: Thickness of this layer may vary according to project requirements
- C: Paving bed

N°.	REVISION	DATE	BY
J	ISSUED FOR APPROVAL	03/06/2026	S.M.
I	ISSUED FOR APPROVAL	11/05/2026	S.M.
H	ISSUED FOR APPROVAL	01/05/2026	S.M.
G	ISSUED FOR APPROVAL	30/03/2026	S.M.
F	ISSUED FOR APPROVAL	06/03/2026	S.M.
E	ISSUED FOR APPROVAL	04/03/2026	S.M.
D	ISSUED FOR APPROVAL	04/03/2026	S.M.

ISSUED FOR APPROVAL
NOT FOR PRODUCTION

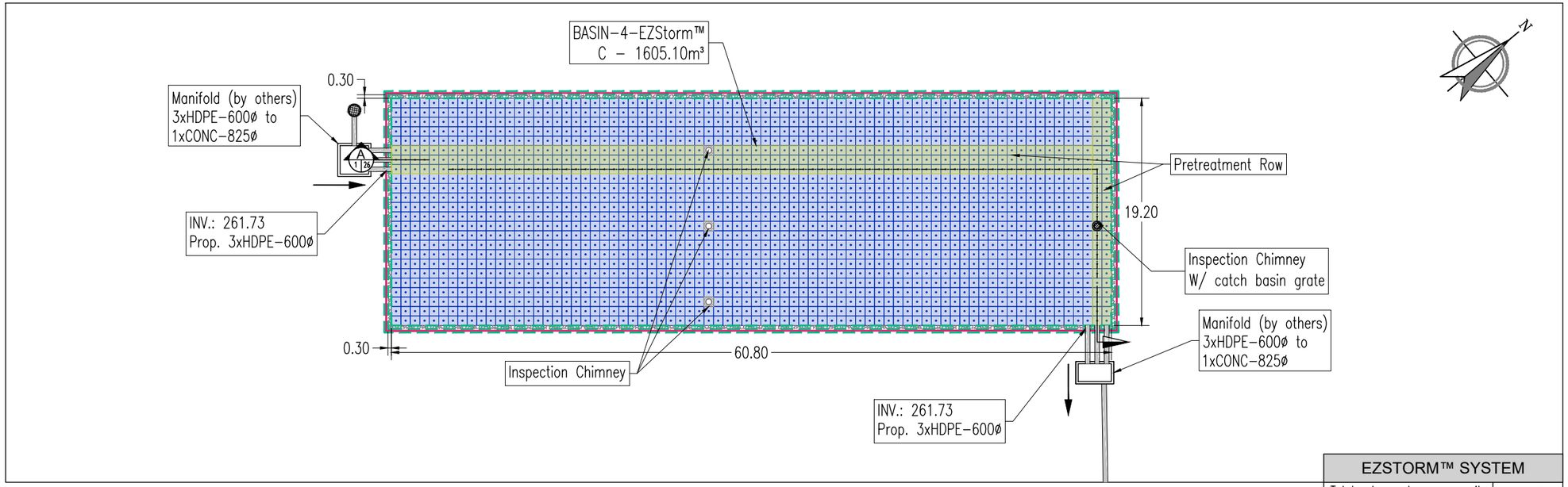
STANDARD BACKFILL REQUIREMENTS

BASIN-EZSTORM™-B5inf-166.75M³

PROJECT NAME:
12100 CREDITVIEW DEVELOPMENT, CALEDON, ON

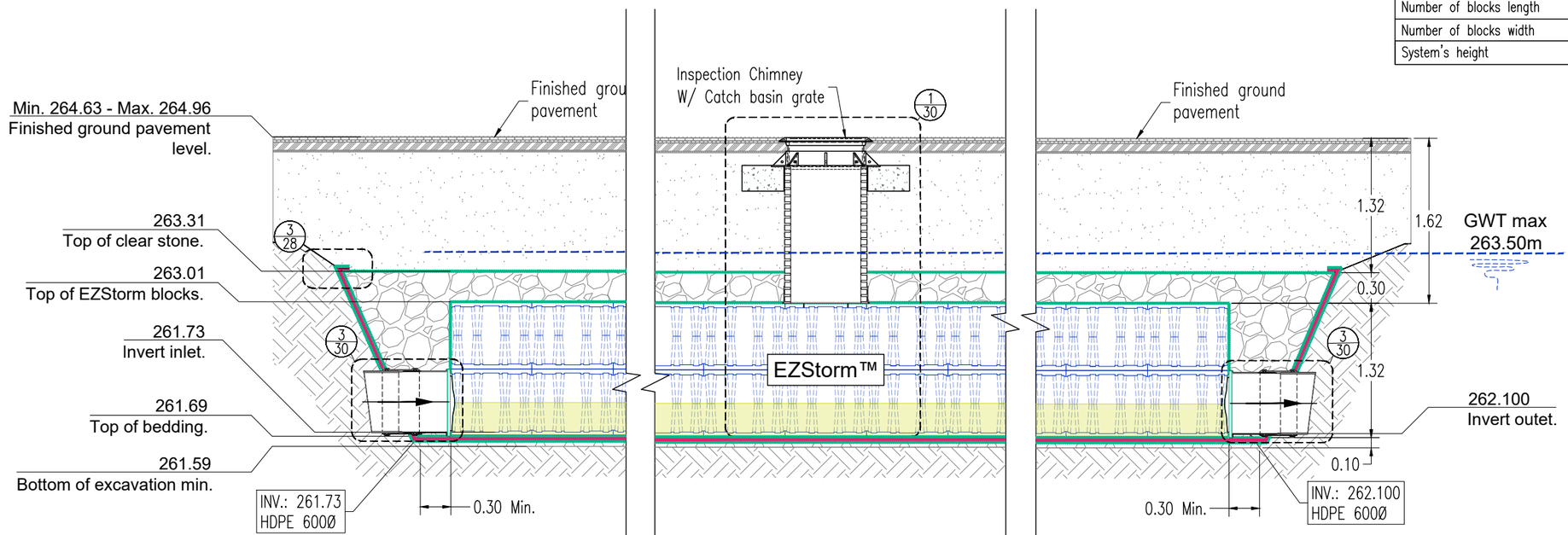
PROJECT N°:	DATE:
250724-08	18/12/2025
DRAWN BY: S.M.	CHECKED BY: S.K.
SCALE: SCALE	SHEET N°: 25/30

NEXT
1625, Boulevard Monseigneur-Langlois
Salaberry-de-Valleyfield
J6S 1C2, Québec



1 / 26 — 2 LAYER PLAN VIEW
SCALE 1:400

EZSTORM™ SYSTEM	
Total volume storage capacity	1605.10m³
EZSTORM™ Storage Volume	1434.45m³
clear Stone Storage Volume	170.65m³
System Area	1215.72m²
Number of blocks length	76
Number of blocks width	24
System's height	1.32m



*GWT BASED ON SERVICING PLAN BY KWA CONSULTING INC. PROJECT 24045. SEPT. 17TH, 2025

2 / 02 — SECTION A-A
SCALE 1:50

LEGEND

- Inspection Chimney
- Catch basin
- Connection–access concrete manhole
- Manhole
- A. Geotextile EZ–226.
- B. Geomembrane EZ–LLDPE–30
- Drain HDPE 150Ø (By others)
- Clean Stone with maximum grain size of 20mm at 40% void ratio
- A / B — Thickness of this layer may vary according to project requirements
- C — Paving bed

N°.	REVISION	DATE	BY
J	ISSUED FOR APPROVAL	03/06/2026	S.M.
I	ISSUED FOR APPROVAL	11/05/2026	S.M.
H	ISSUED FOR APPROVAL	01/05/2026	S.M.
G	ISSUED FOR APPROVAL	30/03/2026	S.M.
F	ISSUED FOR APPROVAL	06/03/2026	S.M.
E	ISSUED FOR APPROVAL	04/03/2026	S.M.
D	ISSUED FOR APPROVAL	04/03/2026	S.M.

ISSUED FOR APPROVAL
NOT FOR PRODUCTION

BASIN'S PLAN AND SECTION VIEW

BASIN-EZSTORM™-B4-1605.10M³

PROJECT NAME:
12100 CREDITVIEW DEVELOPMENT, CALEDON, ON

PROJECT N°:	DATE:
250724-08	18/12/2025
DRAWN BY: S.M.	CHECKED BY: S.K.
SCALE: SCALE	SHEET N°: 26/30

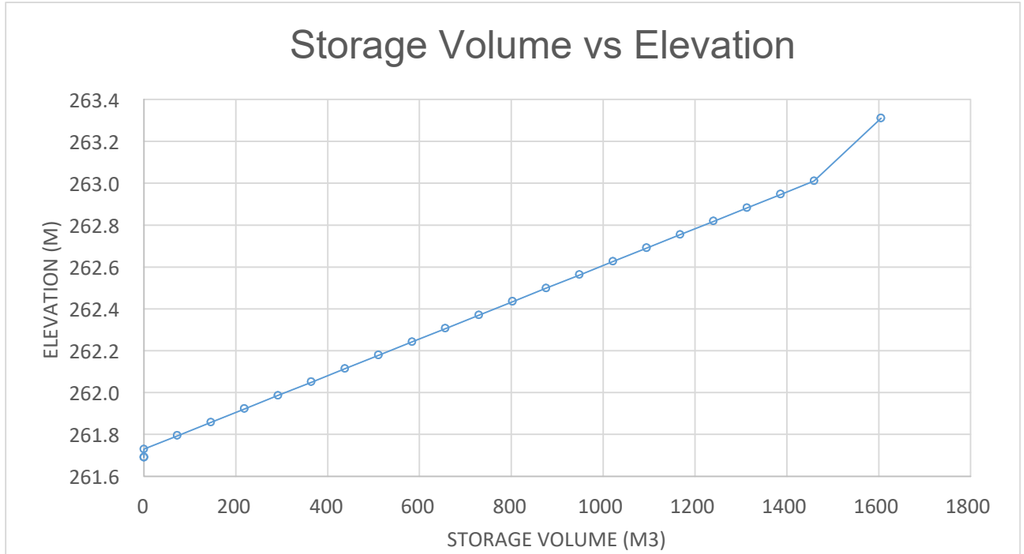
NEXT
1625, Boulevard Monseigneur-Langlois
Salaberry-de-Valleyfield
J6S 1C2, Québec

SYSTEM CHARACTERISTICS			
Model	EZSTORM™ system B4		
	Number of blocks (unit)	Dimensions / blocks (m)	Dimensions EZStorm (m)
Height	2.0	0.66	1.32
Length	76	0.80	60.80
Width	24	0.80	19.20

EZSTORM area (m2)	1167.4
EZSTORM + Clear stone area (m2)	1215.7
Total storage volume (m3)	1605.1
Invert (m)	261.73
Min finished ground level (m)	264.63

EZSTORM volume (m3)	1434.5	Clear stone volume (m3)	170.6
Void in EZSTORM (%)	96%	Void in Clear stone (%)	40%

System height (m)	Storage volume (m3)	Elevation (m)	Notes
1.62	1605.10	263.310	Top clear stone
1.32	1459.21	263.010	Top EZSTORM
1.26	1386.25	262.946	
1.19	1313.29	262.882	
1.13	1240.33	262.818	
1.06	1167.37	262.754	
1.00	1094.41	262.690	
0.94	1021.45	262.626	
0.87	948.49	262.562	
0.81	875.53	262.498	
0.74	802.57	262.434	
0.68	729.61	262.370	
0.62	656.65	262.306	
0.55	583.68	262.242	
0.49	510.72	262.178	
0.42	437.76	262.114	
0.36	364.80	262.050	
0.30	291.84	261.986	
0.23	218.88	261.922	
0.17	145.92	261.858	
0.10	72.96	261.794	
0.04	0.00	261.730	Invert
0.00	0.00	261.690	Bottom EZSTORM



N°	REVISION	DATE	BY
J	ISSUED FOR APPROVAL	03/06/2026	S.M.
I	ISSUED FOR APPROVAL	11/05/2026	S.M.
H	ISSUED FOR APPROVAL	01/05/2026	S.M.
G	ISSUED FOR APPROVAL	30/03/2026	S.M.
F	ISSUED FOR APPROVAL	06/03/2026	S.M.
E	ISSUED FOR APPROVAL	04/03/2026	S.M.
D	ISSUED FOR APPROVAL	04/03/2026	S.M.

ISSUED FOR APPROVAL
NOT FOR PRODUCTION

VOLUME CALCULATION

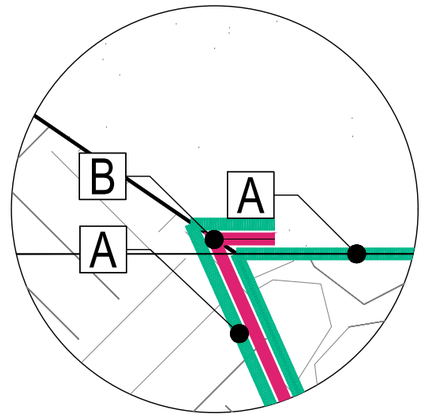
BASIN-EZSTORM™-B4-1605.10M³

PROJECT NAME:
12100 CREDITVIEW DEVELOPMENT, CALEDON, ON

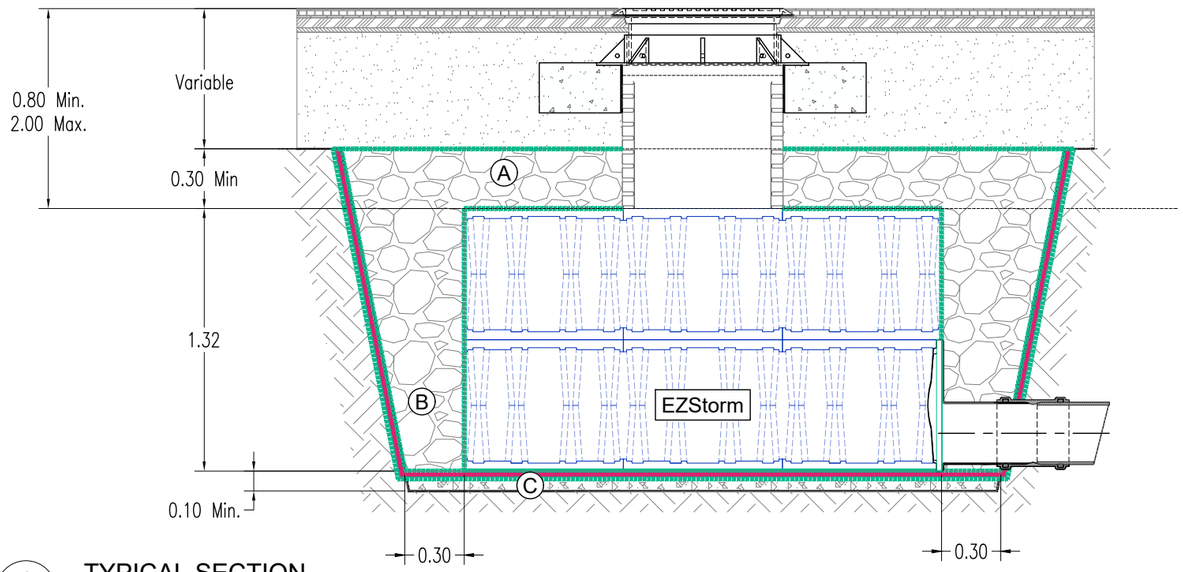
PROJECT N°:	DATE:
250724-08	18/12/2025
DRAWN BY: S.M.	CHECKED BY: S.K.
SCALE: SCALE	SHEET N°: 27/30

NEXT
1625, Boulevard Monseigneur-Langlois
Salaberry-de-Valleyfield
J6S 1C2, Québec

Acceptable backfill materials for this project			
Live Load: CL-625 / HS-25 (CSA-S6: 19)			
	Layer location	Backfill material	Density requirements
Ⓐ	Top embakment: Embakment located directly above the EZStorm chambers abd below the road structure.	3/4" Clear stone at a 40% void ratio	No compaction needed.
Ⓑ	Lateral backfill: Located between the lateral faces of the EZStorms and the limits of the excavated volume.	3/4" Clear stone at a 40% void ratio	No compaction needed.
Ⓒ	Laying bed: located under the EZStorm blocks, between the foundation floor and the base of the blocks.	Subgrade granular material 100 mm Min. 3/4 (20mm) granular material, clean stone or sand to 96% M.P.	Compact to 90% M.P. using a vibrating plate or roller compactor. Place the system on a flat, solid, horizontal and stable surface.



3/28 DETAIL
SCALE NOT AT SCALE



1/28 TYPICAL SECTION
SCALE 1:30

LEGEND

- Inspection Chimney
- Catch basin
- Connection–access concrete manhole
- Manhole
- A. Geotextile EZ-226.
- B. Geomembrane EZ-LLDPE-30
- Drain HDPE 150Ø (By others)
- Clean Stone with maximum grain size of 20mm at 40% void ratio
- A, B: Thickness of this layer may vary according to project requirements
- C: Paving bed

N°.	REVISION	DATE	BY
J	ISSUED FOR APPROVAL	03/06/2026	S.M.
I	ISSUED FOR APPROVAL	11/05/2026	S.M.
H	ISSUED FOR APPROVAL	01/05/2026	S.M.
G	ISSUED FOR APPROVAL	30/03/2026	S.M.
F	ISSUED FOR APPROVAL	06/03/2026	S.M.
E	ISSUED FOR APPROVAL	04/03/2026	S.M.
D	ISSUED FOR APPROVAL	04/03/2026	S.M.

ISSUED FOR APPROVAL
NOT FOR PRODUCTION

STANDARD BACKFILL REQUIREMENTS

BASIN-EZSTORM™-B4-1605.10M³

PROJECT NAME:
12100 CREDITVIEW DEVELOPMENT, CALEDON, ON

PROJECT N°:	DATE:
250724-08	18/12/2025
DRAWN BY: S.M.	CHECKED BY: S.K.
SCALE: SCALE	SHEET N°: 28/30

NEXT
1625, Boulevard Monseigneur-Langlois
Salaberry-de-Valleyfield
J6S 1C2, Québec

CODE DE L'ARTICLE	DESCRIPTION	B1-Inf	B1	B2-Inf	B3	B3.1-Inf	B3.2-Inf	B4-Inf	B5-Inf	B4	Total
EZ-SHD	EZStorm - half block 2 units/block (units)	1082	19168	348	6672	152	147	200	630	7296	35695
FL-EZSHD	EZSTORM Sidewall grid (units)	0	856	0	804	0	0	0	0	400	2060
FL-EZSHD 1/2	EZSTORM Sidewall grid for half block (units)	188	0	82	0	54	56	60	146	0	586
PR-EZSHD	EZSTORM Cover plate	1082	0	348	0	152	147	200	630	0	2559
CONNECTEUR EZS-1	EZSTORM Single layer-connector (units)	4200	0	800	0	400	400	500	1500	0	7800
CONNECTEUR EZS-2	EZSTORM Multi layer-connector (units)	0	10600	0	3700	0	0	0	0	4300	18600
R-P	EZSTORM Pre-treatment row (0.8m / unit)	50	101	24	114	19	0	0	126	76	510
EZSTORM adapters											
FC-150mm-PVC	EZSTORM Adapter 150 mm PVC (units)	0	0	0	0	0	0	0	0	0	0
FC-200mm-PVC	EZSTORM Adapter 200 mm PVC (units)	0	0	0	0	0	0	0	0	0	0
FC-250mm-PVC	EZSTORM Adapter 250 mm PVC (units)	0	0	0	0	0	1	0	2	0	3
FC-300mm-PVC	EZSTORM Adapter 300 mm PVC (units)	3	0	1	0	4	4	10	0	0	22
FC-375mm-PVC	EZSTORM Adapter 375 mm PVC (units)	0	0	0	0	0	0	0	0	0	0
FC-450mm-PVC	EZSTORM Adapter 450 mm PVC (units)	0	0	0	1	0	0	0	0	0	1
FC-450mm-TBA	EZSTORM Adapter 450 mm PCP (units)	0	1	0	1	0	0	0	0	0	2
FC-525mm-PVC	EZSTORM Adapter 525 mm PVC (units)	0	0	0	2	0	0	0	0	0	2
FC-600mm-PEHD	EZSTORM Adapter 600 mm HDPE (units)	0	7	0	2	0	0	0	0	6	15
Inspection Chimney											
EZSTORM-ACCES	EZSTORM half-elements with opening (units)	0	20	0	16	0	0	0	0	8	44
PP-EZSTORM	EZSTORM half-elements with positioning plate (units)	0	10	0	8	0	0	0	0	4	22
PP-EZSTORM 1/2	EZSTORM Cover plate with positioning plate (units)	3	0	0	0	1	1	1	1	0	7
REHAUSSE-PEHD-600	EZSTORM Extension Pipe - Chimney (units) - Ø 600mm - 1.5 m /unit	3	10	0	8	1	1	1	1	4	29
Dalle-répartition	EZSTORM Support concrete ring (units)	3	10	0	8	1	1	1	1	4	29
OPSD401.01ST	Cast iron frame and cover (unit)	3	10	0	8	1	1	1	1	3	28
OPSD400.02	Catch basin Frame and grates (unités)	0	0	0	0	0	0	0	0	1	1
Rectangulare concrete inspection manhole 1200mm x 1200mm											
R1212	EZSTORM rectangular inspection concrete manhole	0	0	0	0	0	0	0	0	0	0
EZ-226	EZSTORM Protection geotextile (226g/m2) - Rolls of 6 m x 100 m	7	15	2	6	1	1	1	3	6	42
EZ-450	EZSTORM Protection geotextile (450g/m2) -Rolls of 6 m x 50 m	0	31	0	14	0	0	0	0	12	57
EZ-LLDPE30	LLDPE 30 mils liner - Rolls of 4m x 50m	0	21	0	10	0	0	0	0	9	40
Clear Stone (by others)											
	Quantity of 20 mm (3/4 in) clear stone required (m3) (by others)	105	1083	43	472	21	21	27	78	427	2276

LEGEND

- **ACCESSORIES not included in all projects**
- **Drawings for guidance only. For more details please refer to the DETAILS project plans**

N°.	REVISION	DATE	BY
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E	ISSUED FOR APPROVAL	04/03/2026	S.M.
D	ISSUED FOR APPROVAL	04/03/2026	S.M.

ISSUED FOR APPROVAL
NOT FOR PRODUCTION

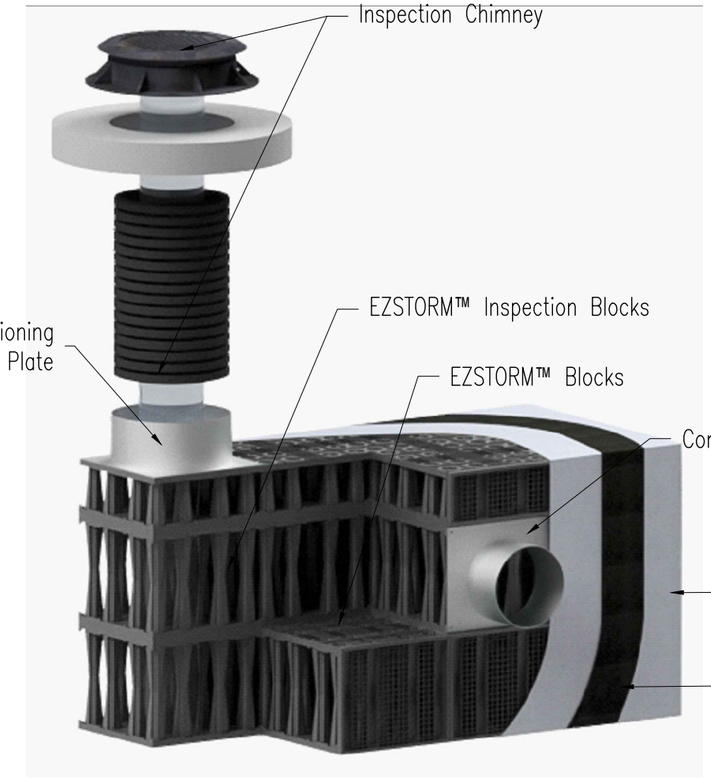
LIST OF MATERIALS

BASIN-EZSTORM™

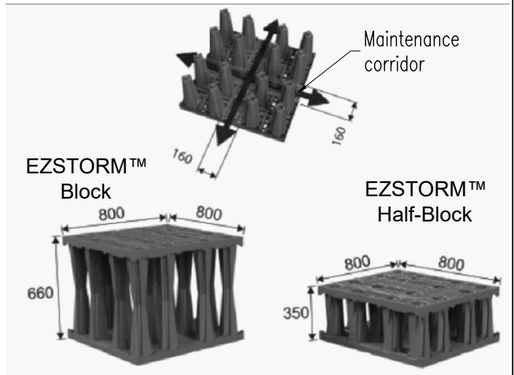
PROJECT NAME:
12100 CREDITVIEW DEVELOPMENT, CALEDON, ON

PROJECT N°:	DATE:
250724-08	18/12/2025
DRAWN BY: S.M.	CHECKED BY: S.K.
SCALE: SCALE	SHEET N°: 29/30

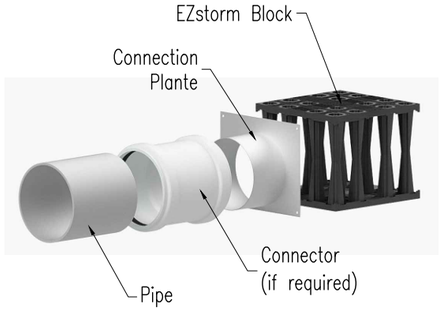
NEXT
1625, Boulevard Monseigneur-Langlois
Salaberry-de-Valleyfield
J6S 1C2, Québec



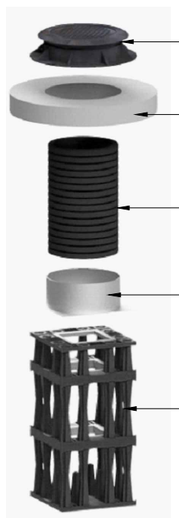
1. EZSTORM™ Components and Accessories (According on each project)



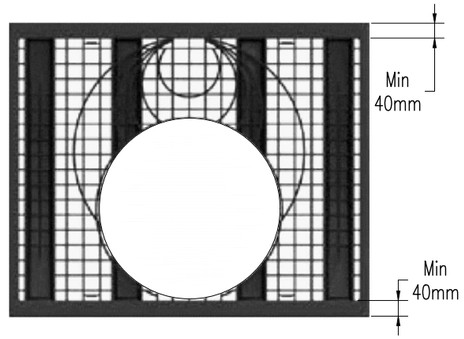
2. EZSTORM™ Block Standard Dimensions



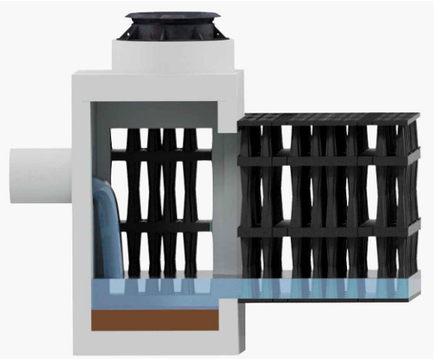
3.Connection Accessories Configuration



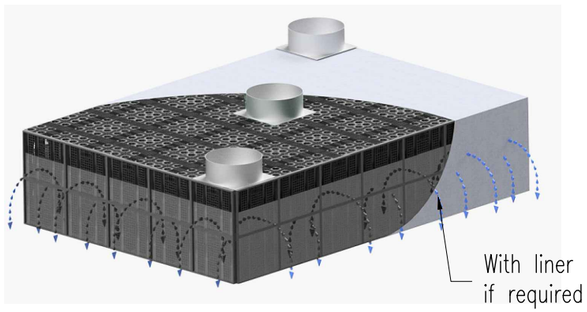
4. EZSTORM™ Block and Inspection Chimney



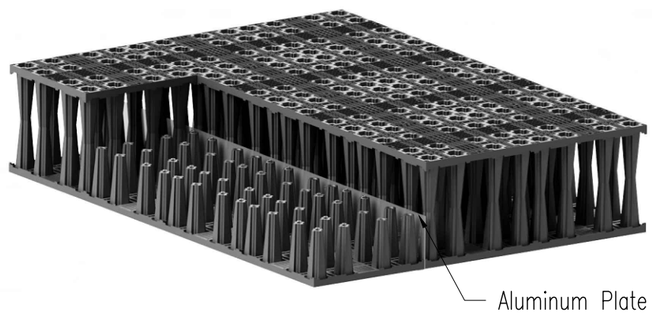
5. sidewall Grid with Connection Opening



6. Concrete Manhole for Access and Connection (if required)



7. Infiltration Basin Typical 3D Section View



8. Pretreatment Row (if required)

LEGEND

- **ACCESSORIES not included in all projects**
- **Drawings for guidance only. For more details please refer to the DETAILS project plans**

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D	ISSUED FOR APPROVAL	04/03/2026	S.M.

ISSUED FOR APPROVAL
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ACCESSORIES

BASIN-EZSTORM™

PROJECT NAME:
12100 CREDITVIEW DEVELOPMENT, CALEDON, ON

PROJECT N°:	DATE:
250724-08	18/12/2025
DRAWN BY: S.M.	CHECKED BY: S.K.
SCALE: SCALE	SHEET N°: 30/30

NEXT
1625, Boulevard Monseigneur-Langlois
Salaberry-de-Valleyfield
J6S 1C2, Québec

water

MDPI

Article

Performance of an Underground Stormwater Detention Chamber and Comparison with Stormwater Management Ponds

Jennifer Drake [1,*], Dean Young [2] and Nicholas McIntosh [1]

[1] Department of Civil Engineering, University of Toronto, 35 St George St., Toronto, ON M5S 1A4, Canada; nicholas.mcintosh@mail.utoronto.ca

[2] Toronto and Region Conservation Authority, 9520 Pine Valley Drive, Vaughan, ON L4L 1A6, Canada; dyoung@trca.on.ca

* Correspondence: jenn.drake@utoronto.ca; Tel.: +1-416-978-8248

Academic Editors: Kelly T. Morgan and Monica Ozores-Hampton
Received: 21 January 2016; Accepted: 11 May 2016; Published: 20 May 2016

Abstract: The transportation of pollutants from impervious surfaces during runoff events to receiving water bodies is a serious environmental problem. Summer runoff is also heated by impervious surfaces, causing thermal enrichment in receiving water body systems and degradation of coldwater aquatic ecosystems. End-of-pipe stormwater management facilities that are open to the environment can result in further elevated temperatures due to exposure to solar radiation. Receiving water systems that provide coldwater habitat require cool water temperatures to sustain healthy conditions for cold water flora and fauna (e.g., trout, dace). Underground Stormwater Detention Chambers (USDC) are a technology for the detention and treatment of stormwater runoff that can potentially solve the thermal issues associated with sun-exposed detention facilities while still providing an equivalent level of treatment services for stormwater pollutants. A field study of an USDC located in Southern Ontario was undertaken to characterize its treatment performance and effect on water temperature. The results were: the USDC was found to provide similar levels of stormwater treatment as wet detention ponds. On average, outlet maximum temperatures were 5 °C cooler than inlet maximum temperatures, and outlet water temperatures remained within the thermal regime for coldwater fish habitat throughout the evaluation period. There was little to no stratification of temperature, nor dissolved solids, but stratification of dissolved oxygen was observed mid-winter and into the spring.

Keywords: stormwater detention; end-of-pipe; underground detention chambers; ponds; water quality; temperature

1. Introduction

Stormwater management is a key issue in the design of urban infrastructure. Sustained increases in urbanization have resulted in large-scale replacement of pervious land by impervious surfaces, which reduces infiltration rates and available surface storage [1]. Due to these changes, a larger proportion of urban precipitation becomes runoff. Runoff from urban areas causes non-point source pollution by transporting pollutants-which are deposited on impervious surfaces through human activities and atmospheric deposition-to receiving water bodies [2,3].

Stormwater management (SWM) ponds have been the most widely employed management practice in urban drainage for over 40 years [4]. SWM ponds have been widely documented to improve stormwater quality reducing concentrations of suspended sediments [5], metals [5], nutrients [5,6] and bacteria [7]. Ponds are often assumed to provide high removal efficiency for total suspended solids

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

03/04/2026

Province:	Ontario
City:	Caledon
Nearest Rainfall Station:	TORONTO CITY
Climate Station Id:	6158355
Years of Rainfall Data:	20

Site Name:	Block A - OGS A-1

Drainage Area (ha):	2.41
Runoff Coefficient 'c':	0.90

Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0

Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	70.08
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	No
Peak Conveyance (maximum) Flow Rate (L/s):	
Influent TSS Concentration (mg/L):	200
Estimated Average Annual Sediment Load (kg/yr):	2540
Estimated Average Annual Sediment Volume (L/yr):	2065

Project Name:	12100 Creditview
Project Number:	24045
Designer Name:	Vinci Patrick
Designer Company:	KWA
Designer Email:	vinci.patrick@kwasitedev.com
Designer Phone:	647-518-0453
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	57
EFO5	65
EFO6	72
EFO8	82
EFO10	87
EFO12	91

Recommended Stormceptor EFO Model: EFO8

Estimated Net Annual Sediment (TSS) Load Reduction (%): 82

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 waterwavs.

PARTICLE SIZE DISTRIBUTION (PSD)

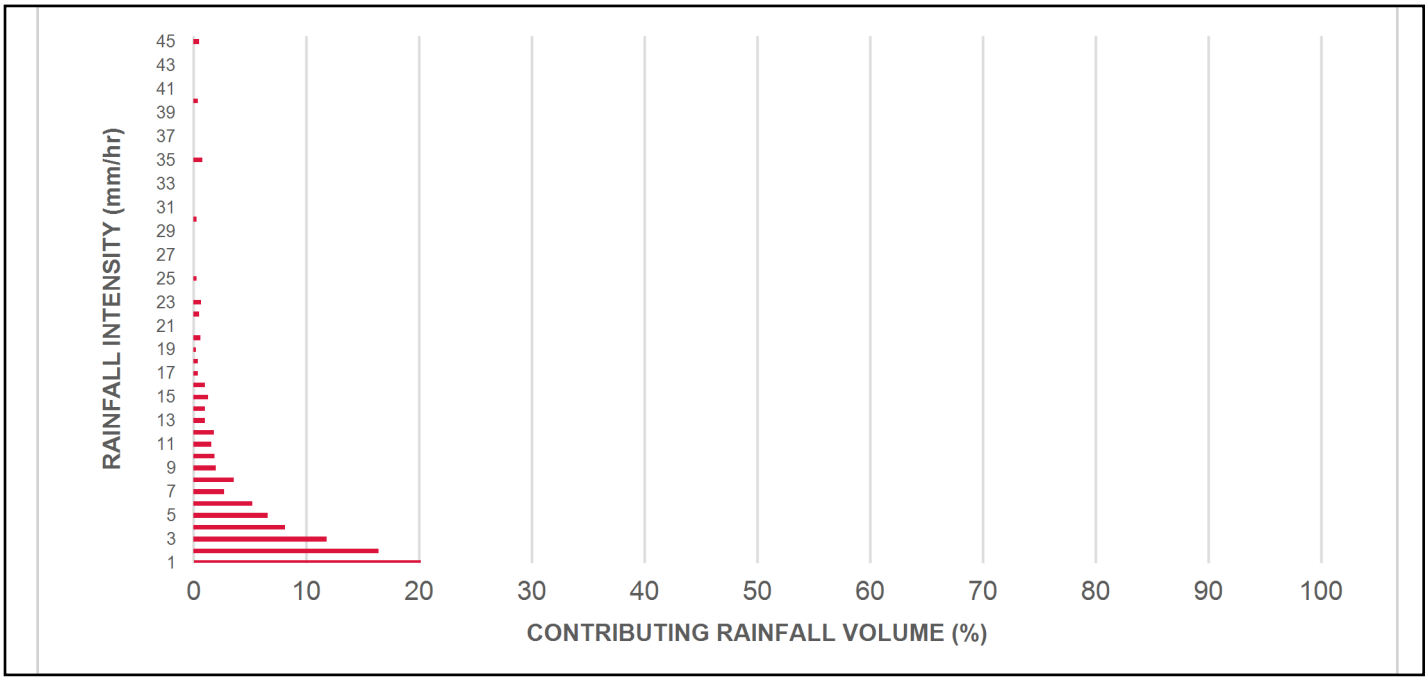
►The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV ***Procedure for Laboratory Testing of Oil-Grit Separators*** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a 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

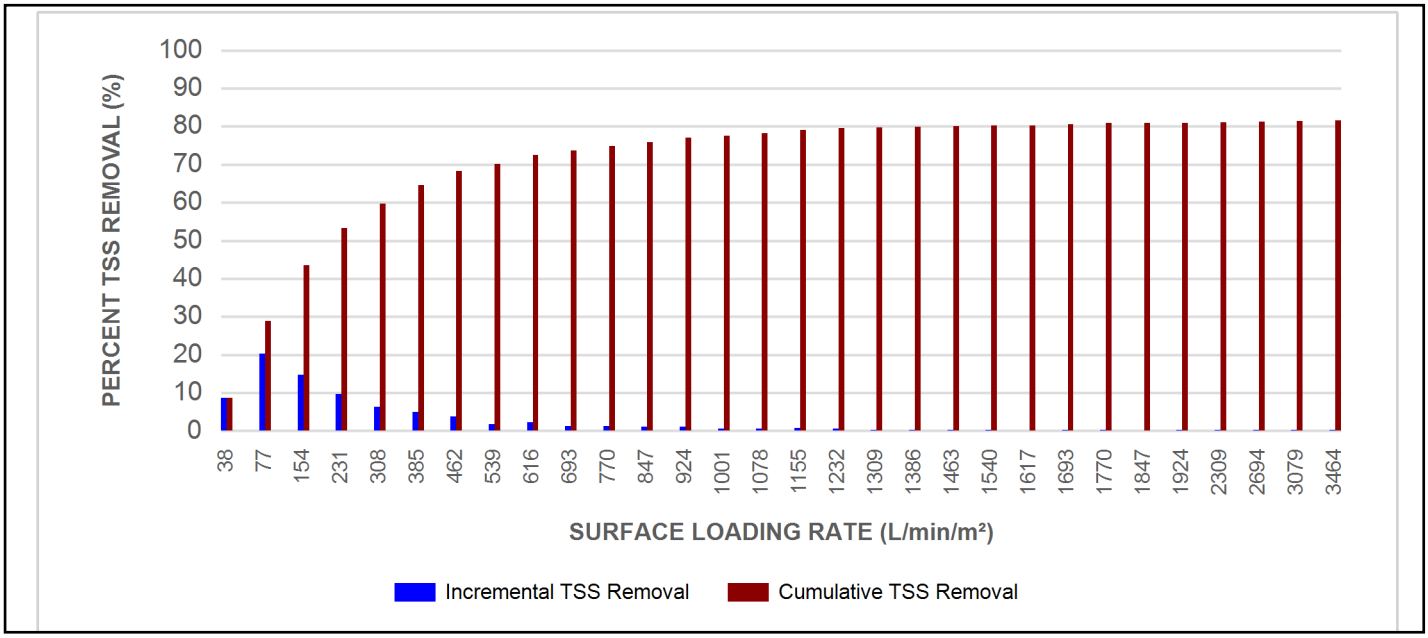
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.50	8.7	8.7	3.01	181.0	38.0	100	8.7	8.7
1.00	20.2	28.9	6.03	362.0	77.0	100	20.2	28.9
2.00	16.4	45.3	12.06	724.0	154.0	89	14.7	43.6
3.00	11.8	57.1	18.09	1085.0	231.0	82	9.6	53.2
4.00	8.1	65.2	24.12	1447.0	308.0	78	6.4	59.6
5.00	6.6	71.9	30.15	1809.0	385.0	75	5.0	64.6
6.00	5.2	77.1	36.18	2171.0	462.0	71	3.7	68.3
7.00	2.7	79.8	42.21	2533.0	539.0	68	1.8	70.1
8.00	3.6	83.4	48.24	2894.0	616.0	65	2.3	72.4
9.00	2.0	85.4	54.27	3256.0	693.0	64	1.3	73.7
10.00	1.9	87.3	60.30	3618.0	770.0	63	1.2	74.9
11.00	1.6	88.9	66.33	3980.0	847.0	63	1.0	75.9
12.00	1.8	90.7	72.36	4341.0	924.0	62	1.1	77.0
13.00	1.0	91.6	78.39	4703.0	1001.0	62	0.6	77.6
14.00	1.0	92.7	84.42	5065.0	1078.0	60	0.6	78.2
15.00	1.3	93.9	90.45	5427.0	1155.0	58	0.7	79.0
16.00	1.0	95.0	96.48	5789.0	1232.0	56	0.6	79.6
17.00	0.4	95.3	102.51	6150.0	1309.0	55	0.2	79.7
18.00	0.4	95.7	108.54	6512.0	1386.0	53	0.2	79.9
19.00	0.2	95.9	114.57	6874.0	1463.0	50	0.1	80.0
20.00	0.6	96.5	120.60	7236.0	1540.0	48	0.3	80.3
21.00	0.0	96.5	126.63	7598.0	1617.0	45	0.0	80.3
22.00	0.5	97.0	132.66	7959.0	1693.0	43	0.2	80.5
23.00	0.7	97.7	138.69	8321.0	1770.0	41	0.3	80.9
24.00	0.0	97.7	144.72	8683.0	1847.0	40	0.0	80.9
25.00	0.3	98.0	150.75	9045.0	1924.0	38	0.1	80.9
30.00	0.3	98.3	180.89	10854.0	2309.0	32	0.1	81.0
35.00	0.8	99.1	211.04	12663.0	2694.0	28	0.2	81.3
40.00	0.4	99.5	241.19	14472.0	3079.0	24	0.1	81.4
45.00	0.5	100.0	271.34	16281.0	3464.0	22	0.1	81.5
Estimated Net Annual Sediment (TSS) Load Reduction =								**81 %**

Climate Station ID: 6158355 *Years of Rainfall Data*: 20

RAINFALL DATA FROM TORONTO CITY RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



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

03/04/2026

Province:	Ontario
City:	Caledon
Nearest Rainfall Station:	TORONTO CITY
Climate Station Id:	6158355
Years of Rainfall Data:	20

Site Name:	Block A OGS A-2

Drainage Area (ha):	2.36
Runoff Coefficient 'c':	0.90

Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0

Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	68.62
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	No
Peak Conveyance (maximum) Flow Rate (L/s):	
Influent TSS Concentration (mg/L):	200
Estimated Average Annual Sediment Load (kg/yr):	2487
Estimated Average Annual Sediment Volume (L/yr):	2022

Project Name:	12100 Creditview
Project Number:	24045
Designer Name:	Vinci Patrick
Designer Company:	KWA
Designer Email:	vinci.patrick@kwasitedev.com
Designer Phone:	647-518-0453
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	57
EFO5	65
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EFO8	82
EFO10	87
EFO12	91

Recommended Stormceptor EFO Model: EFO8

Estimated Net Annual Sediment (TSS) Load Reduction (%): 82

Water Quality Runoff Volume Capture (%): > 90

imbrium

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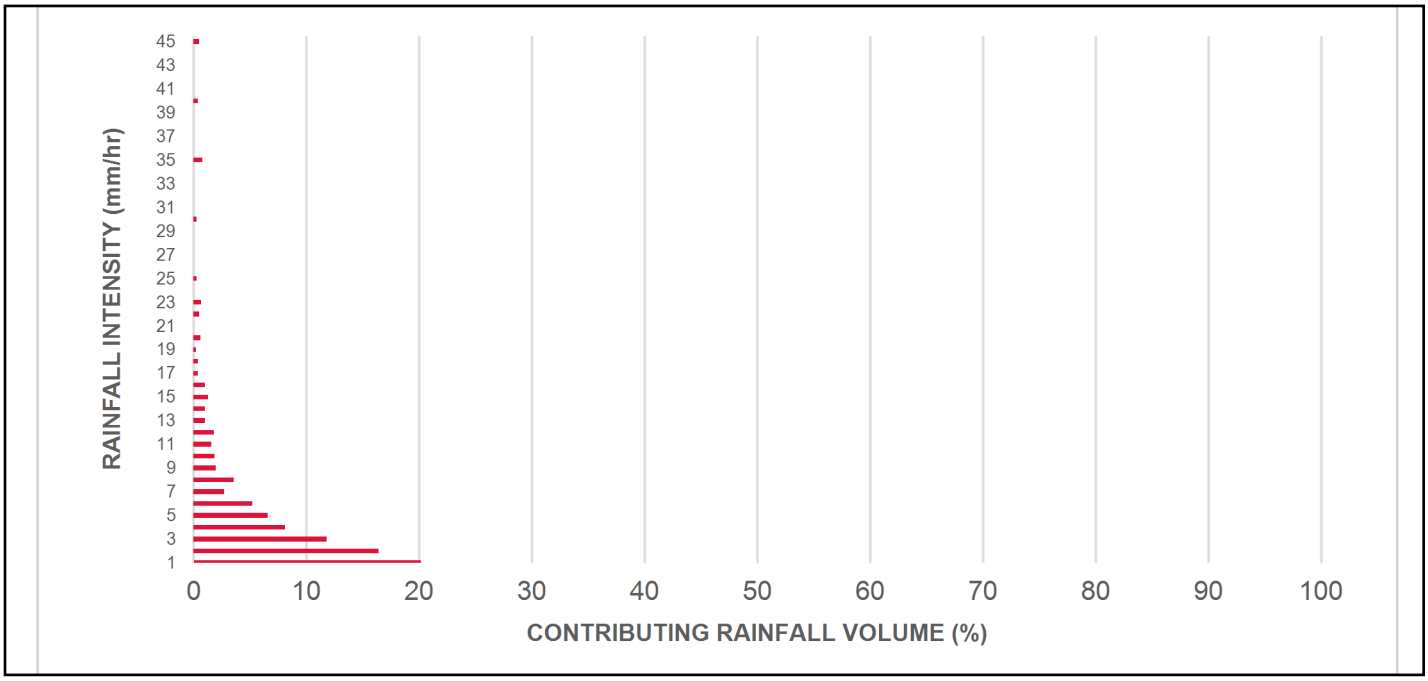
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

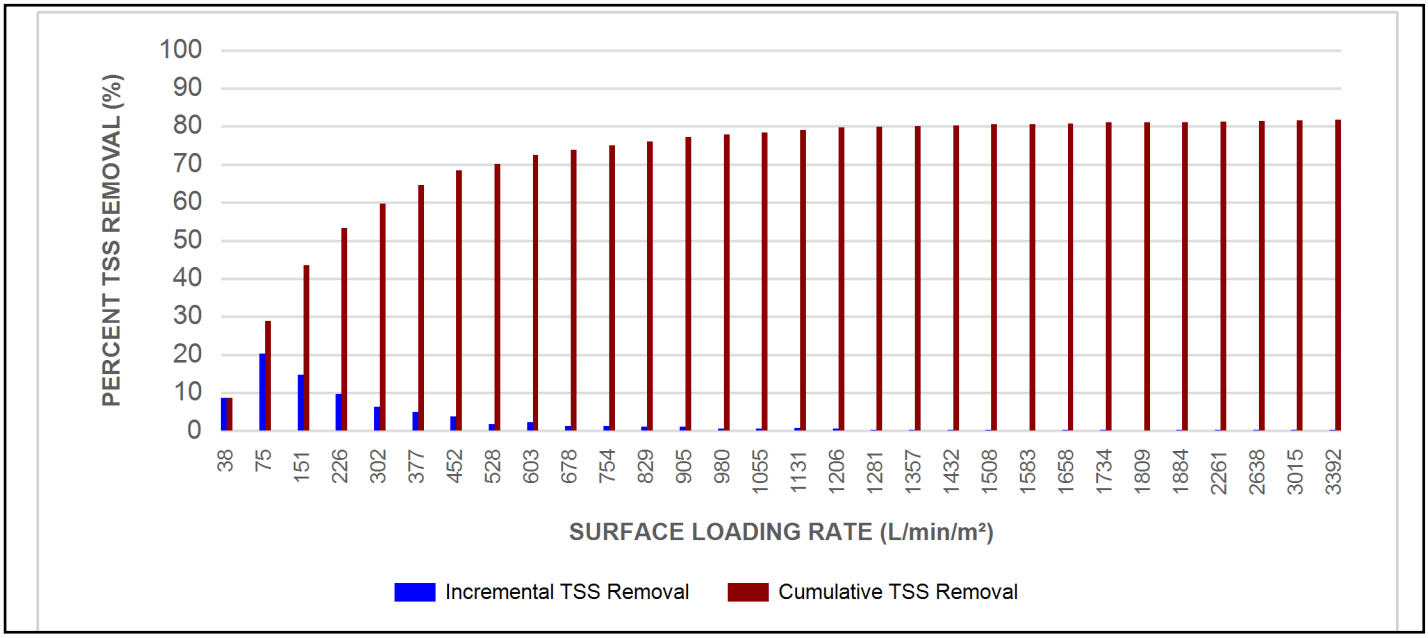
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.50	8.7	8.7	2.95	177.0	38.0	100	8.7	8.7
1.00	20.2	28.9	5.90	354.0	75.0	100	20.2	28.9
2.00	16.4	45.3	11.81	709.0	151.0	89	14.7	43.6
3.00	11.8	57.1	17.71	1063.0	226.0	82	9.7	53.3
4.00	8.1	65.2	23.62	1417.0	302.0	78	6.4	59.7
5.00	6.6	71.9	29.52	1771.0	377.0	75	5.0	64.6
6.00	5.2	77.1	35.43	2126.0	452.0	72	3.7	68.4
7.00	2.7	79.8	41.33	2480.0	528.0	68	1.8	70.2
8.00	3.6	83.4	47.24	2834.0	603.0	65	2.3	72.5
9.00	2.0	85.4	53.14	3189.0	678.0	64	1.3	73.8
10.00	1.9	87.3	59.05	3543.0	754.0	63	1.2	75.0
11.00	1.6	88.9	64.95	3897.0	829.0	63	1.0	76.0
12.00	1.8	90.7	70.86	4251.0	905.0	62	1.1	77.2
13.00	1.0	91.6	76.76	4606.0	980.0	62	0.6	77.8
14.00	1.0	92.7	82.67	4960.0	1055.0	60	0.6	78.4
15.00	1.3	93.9	88.57	5314.0	1131.0	59	0.7	79.1
16.00	1.0	95.0	94.48	5669.0	1206.0	57	0.6	79.7
17.00	0.4	95.3	100.38	6023.0	1281.0	55	0.2	79.9
18.00	0.4	95.7	106.28	6377.0	1357.0	53	0.2	80.1
19.00	0.2	95.9	112.19	6731.0	1432.0	51	0.1	80.2
20.00	0.6	96.5	118.09	7086.0	1508.0	49	0.3	80.5
21.00	0.0	96.5	124.00	7440.0	1583.0	46	0.0	80.5
22.00	0.5	97.0	129.90	7794.0	1658.0	44	0.2	80.7
23.00	0.7	97.7	135.81	8149.0	1734.0	42	0.3	81.0
24.00	0.0	97.7	141.71	8503.0	1809.0	40	0.0	81.0
25.00	0.3	98.0	147.62	8857.0	1884.0	39	0.1	81.1
30.00	0.3	98.3	177.14	10628.0	2261.0	32	0.1	81.2
35.00	0.8	99.1	206.67	12400.0	2638.0	28	0.2	81.4
40.00	0.4	99.5	236.19	14171.0	3015.0	24	0.1	81.5
45.00	0.5	100.0	265.71	15943.0	3392.0	22	0.1	81.7
Estimated Net Annual Sediment (TSS) Load Reduction =								**82 %**

Climate Station ID: 6158355 *Years of Rainfall Data*: 20

RAINFALL DATA FROM TORONTO CITY RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



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

03/04/2026

Province:	Ontario
City:	Caledon
Nearest Rainfall Station:	TORONTO CITY
Climate Station Id:	6158355
Years of Rainfall Data:	20

Site Name:	Block A OGS A-3

Drainage Area (ha):	1.9
Runoff Coefficient 'c':	0.90

Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0

Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	55.25
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	No
Peak Conveyance (maximum) Flow Rate (L/s):	
Influent TSS Concentration (mg/L):	200
Estimated Average Annual Sediment Load (kg/yr):	2051
Estimated Average Annual Sediment Volume (L/yr):	1668

Project Name:	12100 Creditview
Project Number:	24045
Designer Name:	Vinci Patrick
Designer Company:	KWA
Designer Email:	vinci.patrick@kwasitedev.com
Designer Phone:	647-518-0453
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	62
EFO5	70
EFO6	76
EFO8	84
EFO10	90
EFO12	93

Recommended Stormceptor EFO Model: EFO8

Estimated Net Annual Sediment (TSS) Load Reduction (%): 84

Water Quality Runoff Volume Capture (%): > 90

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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 waterwavs.

PARTICLE SIZE DISTRIBUTION (PSD)

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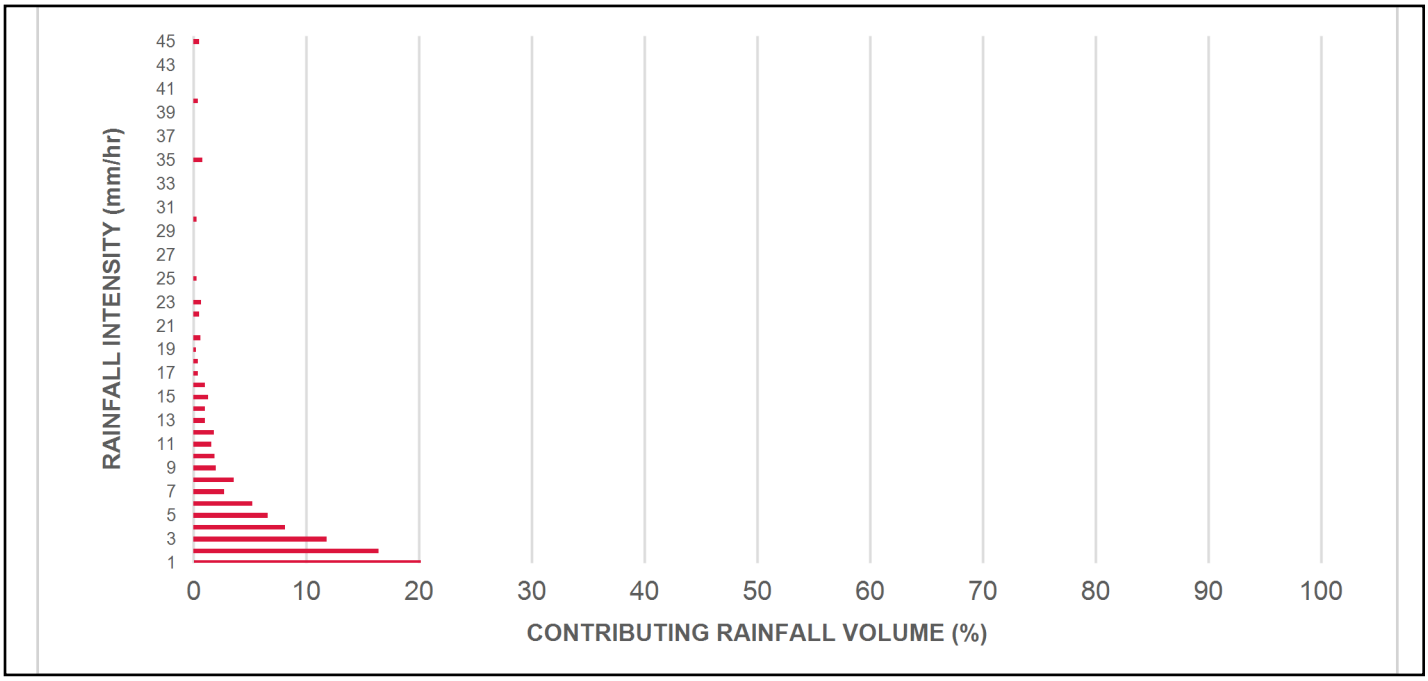
Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

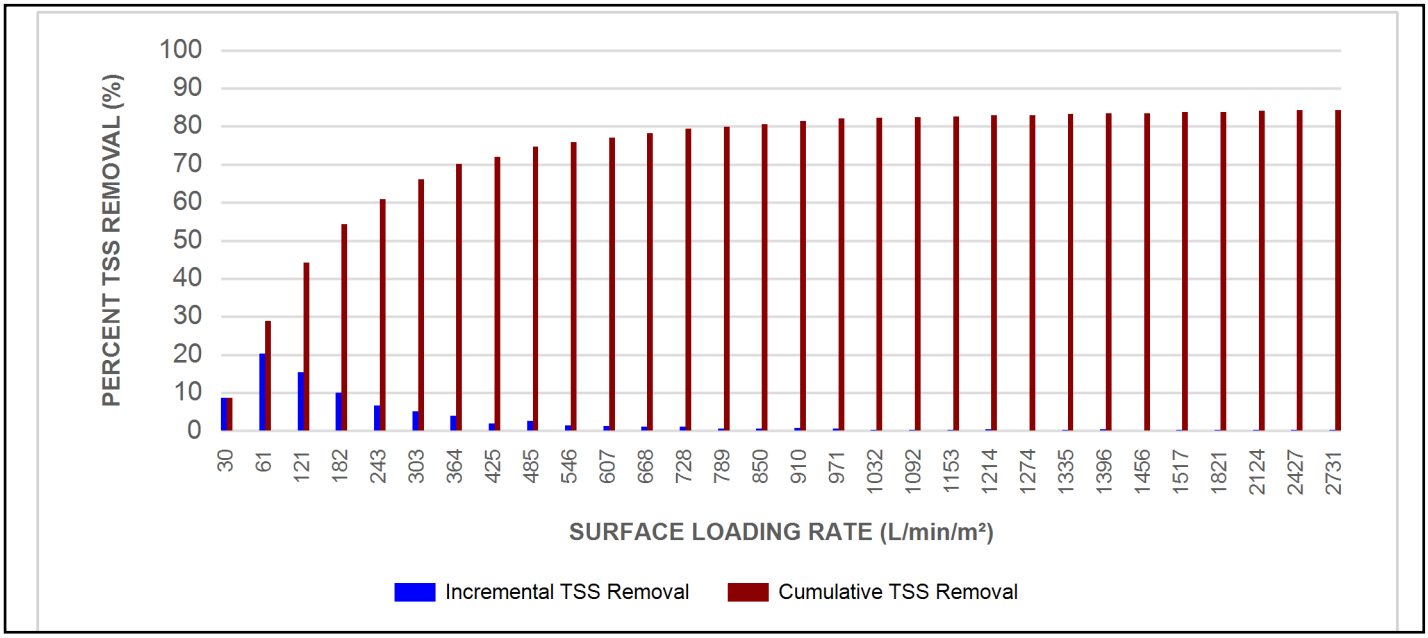
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.50	8.7	8.7	2.38	143.0	30.0	100	8.7	8.7
1.00	20.2	28.9	4.75	285.0	61.0	100	20.2	28.9
2.00	16.4	45.3	9.51	570.0	121.0	93	15.3	44.2
3.00	11.8	57.1	14.26	856.0	182.0	86	10.1	54.3
4.00	8.1	65.2	19.02	1141.0	243.0	81	6.6	60.9
5.00	6.6	71.9	23.77	1426.0	303.0	78	5.2	66.1
6.00	5.2	77.1	28.52	1711.0	364.0	76	4.0	70.1
7.00	2.7	79.8	33.28	1997.0	425.0	73	1.9	72.0
8.00	3.6	83.4	38.03	2282.0	485.0	70	2.5	74.6
9.00	2.0	85.4	42.78	2567.0	546.0	67	1.3	75.9
10.00	1.9	87.3	47.54	2852.0	607.0	65	1.2	77.1
11.00	1.6	88.9	52.29	3138.0	668.0	64	1.0	78.2
12.00	1.8	90.7	57.05	3423.0	728.0	64	1.1	79.3
13.00	1.0	91.6	61.80	3708.0	789.0	63	0.6	79.9
14.00	1.0	92.7	66.55	3993.0	850.0	63	0.6	80.6
15.00	1.3	93.9	71.31	4278.0	910.0	62	0.8	81.4
16.00	1.0	95.0	76.06	4564.0	971.0	62	0.6	82.0
17.00	0.4	95.3	80.81	4849.0	1032.0	61	0.2	82.2
18.00	0.4	95.7	85.57	5134.0	1092.0	59	0.2	82.4
19.00	0.2	95.9	90.32	5419.0	1153.0	58	0.1	82.6
20.00	0.6	96.5	95.08	5705.0	1214.0	57	0.4	82.9
21.00	0.0	96.5	99.83	5990.0	1274.0	55	0.0	82.9
22.00	0.5	97.0	104.58	6275.0	1335.0	54	0.3	83.2
23.00	0.7	97.7	109.34	6560.0	1396.0	53	0.4	83.5
24.00	0.0	97.7	114.09	6845.0	1456.0	51	0.0	83.5
25.00	0.3	98.0	118.85	7131.0	1517.0	48	0.1	83.7
30.00	0.3	98.3	142.61	8557.0	1821.0	40	0.1	83.8
35.00	0.8	99.1	166.38	9983.0	2124.0	35	0.3	84.1
40.00	0.4	99.5	190.15	11409.0	2427.0	30	0.1	84.2
45.00	0.5	100.0	213.92	12835.0	2731.0	27	0.1	84.3
Estimated Net Annual Sediment (TSS) Load Reduction =								**84 %**

Climate Station ID: 6158355 *Years of Rainfall Data*: 20

RAINFALL DATA FROM TORONTO CITY RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



Stormceptor®

Stormceptor® EF Sizing Report

Rinker MATERIALS™

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

03/05/2026

Province:	Ontario
City:	Caledon
Nearest Rainfall Station:	TORONTO CITY
Climate Station Id:	6158355
Years of Rainfall Data:	20

Site Name:	Block A OGS A-4

Drainage Area (ha):	1.1
Runoff Coefficient 'c':	0.90

Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0

Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	31.99
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	No
Peak Conveyance (maximum) Flow Rate (L/s):	
Influent TSS Concentration (mg/L):	200
Estimated Average Annual Sediment Load (kg/yr):	1188
Estimated Average Annual Sediment Volume (L/yr):	965

Project Name:	12100 Creditview
Project Number:	24045
Designer Name:	Vinci Patrick
Designer Company:	KWA
Designer Email:	vinci.patrick@kwasitedev.com
Designer Phone:	647-532-3752
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	###-###-####

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	72
EFO5	79
EFO6	84
EFO8	91
EFO10	94
EFO12	97

Recommended Stormceptor EFO Model: EFO6

Estimated Net Annual Sediment (TSS) Load Reduction (%): 84

Water Quality Runoff Volume Capture (%): > 90

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THIRD-PARTY TESTING AND VERIFICATION

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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 waterwavs.

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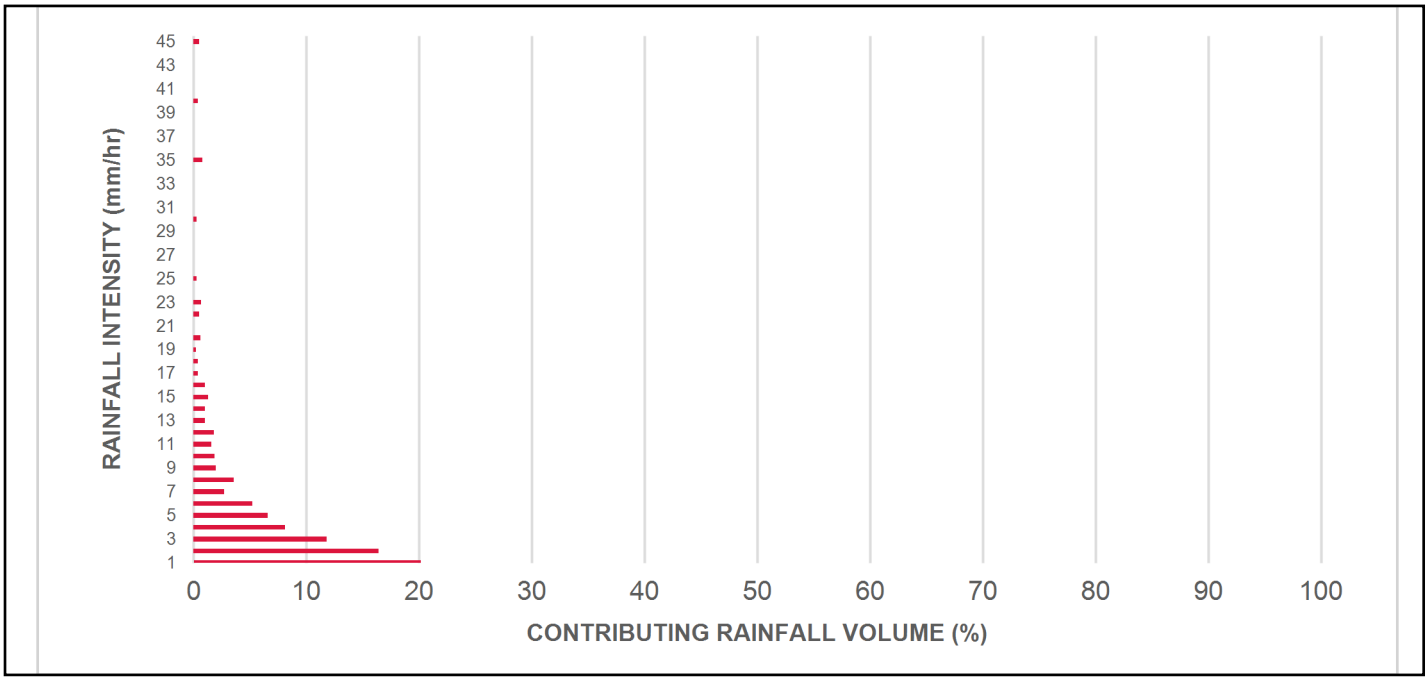
Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

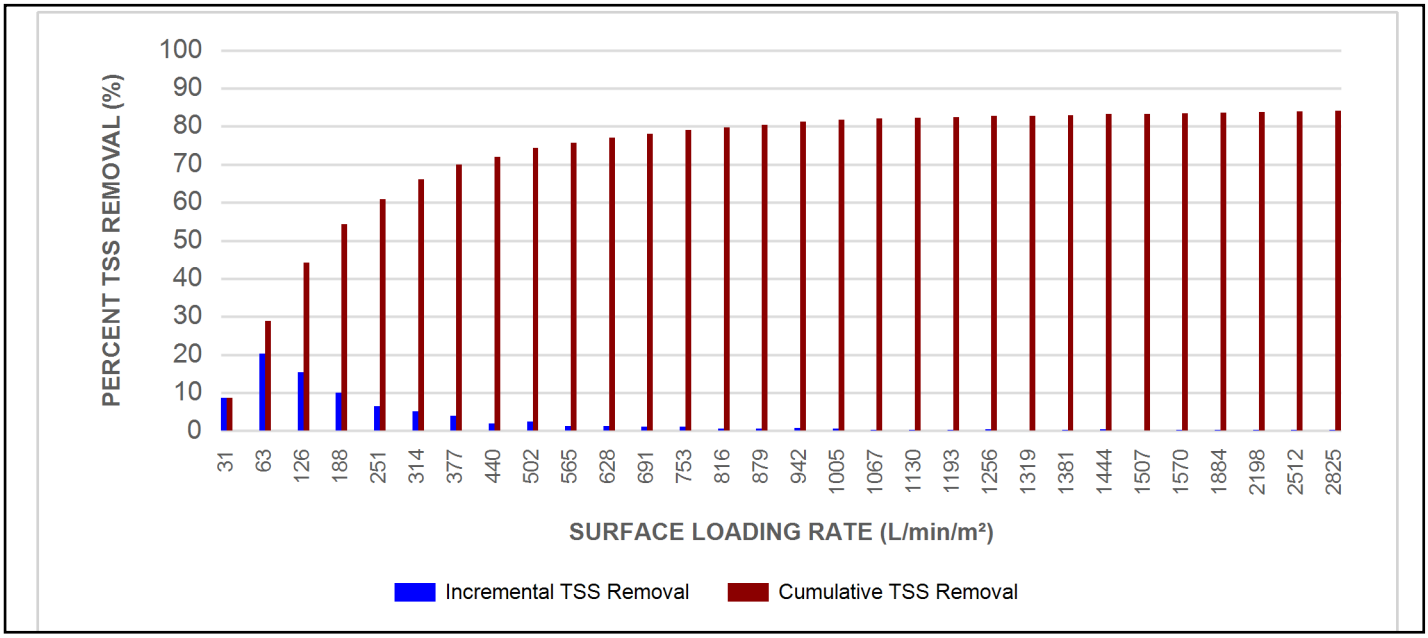
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.50	8.7	8.7	1.38	83.0	31.0	100	8.7	8.7
1.00	20.2	28.9	2.75	165.0	63.0	100	20.2	28.9
2.00	16.4	45.3	5.50	330.0	126.0	93	15.3	44.2
3.00	11.8	57.1	8.26	495.0	188.0	86	10.1	54.3
4.00	8.1	65.2	11.01	661.0	251.0	81	6.6	60.9
5.00	6.6	71.9	13.76	826.0	314.0	78	5.2	66.1
6.00	5.2	77.1	16.51	991.0	377.0	75	3.9	70.0
7.00	2.7	79.8	19.27	1156.0	440.0	72	1.9	71.9
8.00	3.6	83.4	22.02	1321.0	502.0	69	2.5	74.4
9.00	2.0	85.4	24.77	1486.0	565.0	66	1.3	75.7
10.00	1.9	87.3	27.52	1651.0	628.0	64	1.2	77.0
11.00	1.6	88.9	30.27	1816.0	691.0	64	1.0	78.0
12.00	1.8	90.7	33.03	1982.0	753.0	63	1.1	79.1
13.00	1.0	91.6	35.78	2147.0	816.0	63	0.6	79.7
14.00	1.0	92.7	38.53	2312.0	879.0	62	0.6	80.4
15.00	1.3	93.9	41.28	2477.0	942.0	62	0.8	81.2
16.00	1.0	95.0	44.04	2642.0	1005.0	62	0.6	81.8
17.00	0.4	95.3	46.79	2807.0	1067.0	60	0.2	82.0
18.00	0.4	95.7	49.54	2972.0	1130.0	59	0.2	82.2
19.00	0.2	95.9	52.29	3138.0	1193.0	57	0.1	82.4
20.00	0.6	96.5	55.04	3303.0	1256.0	56	0.4	82.7
21.00	0.0	96.5	57.80	3468.0	1319.0	54	0.0	82.7
22.00	0.5	97.0	60.55	3633.0	1381.0	53	0.2	83.0
23.00	0.7	97.7	63.30	3798.0	1444.0	51	0.4	83.3
24.00	0.0	97.7	66.05	3963.0	1507.0	49	0.0	83.3
25.00	0.3	98.0	68.81	4128.0	1570.0	47	0.1	83.4
30.00	0.3	98.3	82.57	4954.0	1884.0	39	0.1	83.6
35.00	0.8	99.1	96.33	5780.0	2198.0	33	0.3	83.8
40.00	0.4	99.5	110.09	6605.0	2512.0	29	0.1	83.9
45.00	0.5	100.0	123.85	7431.0	2825.0	26	0.1	84.1
Estimated Net Annual Sediment (TSS) Load Reduction =								**84 %**

Climate Station ID: 6158355 *Years of Rainfall Data*: 20

RAINFALL DATA FROM TORONTO CITY RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



Stormceptor®

Stormceptor® EF Sizing Report

Rinker MATERIALS™

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

03/04/2026

Province:	Ontario
City:	Caledon
Nearest Rainfall Station:	TORONTO CITY
Climate Station Id:	6158355
Years of Rainfall Data:	20

Project Name:	12100 Creditview
Project Number:	24045
Designer Name:	Vinci Patrick
Designer Company:	KWA
Designer Email:	vinci.patrick@kwasitedev.com
Designer Phone:	647-518-0453
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Site Name:	BLOCK B OGS B-1

Drainage Area (ha):	2.55
Runoff Coefficient 'c':	0.90

Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0

Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	74.15
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	No
Peak Conveyance (maximum) Flow Rate (L/s):	
Influent TSS Concentration (mg/L):	200
Estimated Average Annual Sediment Load (kg/yr):	2655
Estimated Average Annual Sediment Volume (L/yr):	2158

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	56
EFO5	64
EFO6	71
EFO8	81
EFO10	86
EFO12	90

Recommended Stormceptor EFO Model: EFO8

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

Water Quality Runoff Volume Capture (%): > 90

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THIRD-PARTY TESTING AND VERIFICATION

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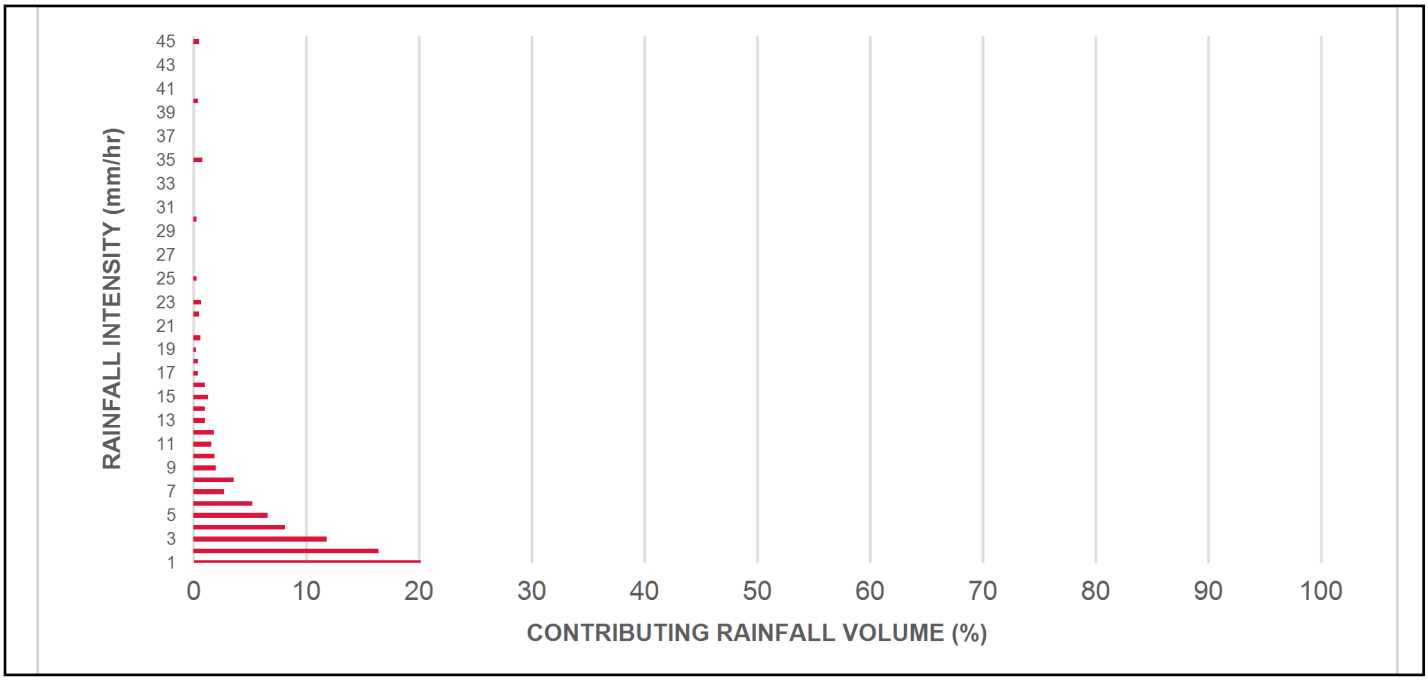
Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

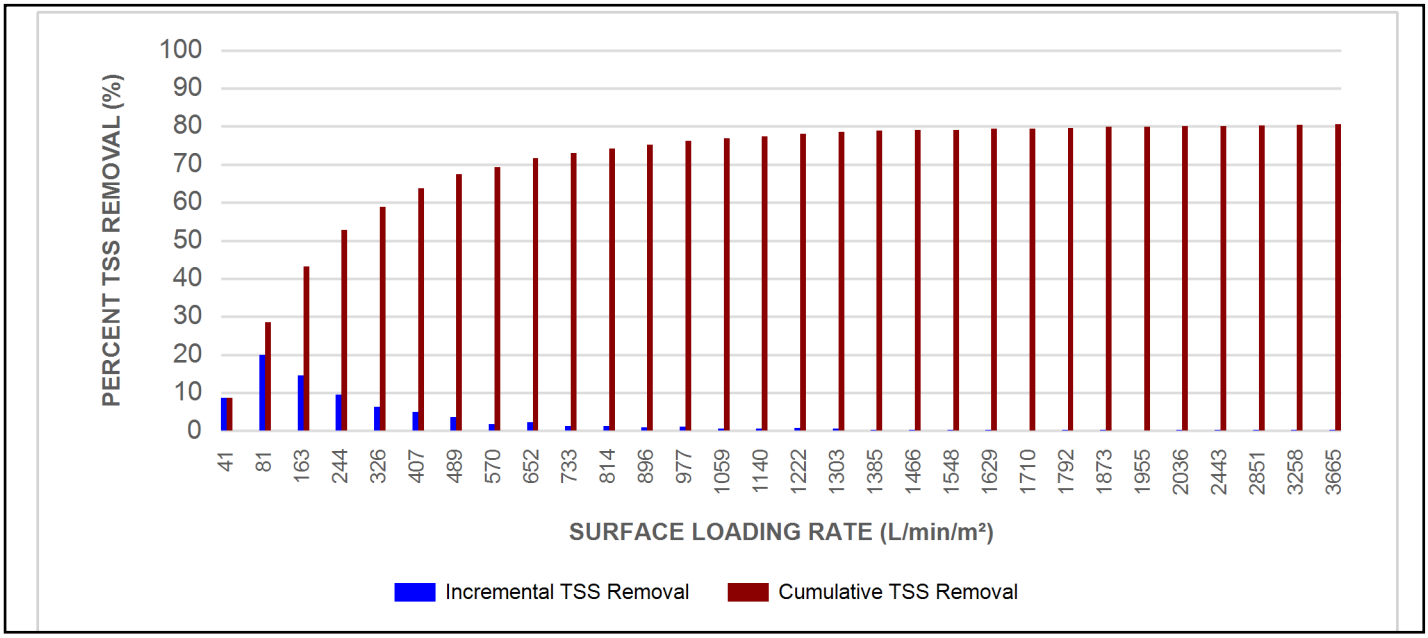
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.50	8.7	8.7	3.19	191.0	41.0	100	8.7	8.7
1.00	20.2	28.9	6.38	383.0	81.0	98	19.9	28.6
2.00	16.4	45.3	12.76	766.0	163.0	88	14.5	43.1
3.00	11.8	57.1	19.14	1148.0	244.0	81	9.6	52.7
4.00	8.1	65.2	25.52	1531.0	326.0	78	6.3	58.9
5.00	6.6	71.9	31.90	1914.0	407.0	74	4.9	63.8
6.00	5.2	77.1	38.28	2297.0	489.0	70	3.7	67.5
7.00	2.7	79.8	44.66	2680.0	570.0	66	1.8	69.3
8.00	3.6	83.4	51.04	3062.0	652.0	64	2.3	71.6
9.00	2.0	85.4	57.42	3445.0	733.0	64	1.3	72.9
10.00	1.9	87.3	63.80	3828.0	814.0	63	1.2	74.1
11.00	1.6	88.9	70.18	4211.0	896.0	62	1.0	75.1
12.00	1.8	90.7	76.56	4594.0	977.0	62	1.1	76.2
13.00	1.0	91.6	82.94	4976.0	1059.0	60	0.6	76.8
14.00	1.0	92.7	89.32	5359.0	1140.0	58	0.6	77.4
15.00	1.3	93.9	95.70	5742.0	1222.0	56	0.7	78.1
16.00	1.0	95.0	102.08	6125.0	1303.0	55	0.6	78.6
17.00	0.4	95.3	108.46	6508.0	1385.0	53	0.2	78.8
18.00	0.4	95.7	114.84	6891.0	1466.0	50	0.2	79.0
19.00	0.2	95.9	121.22	7273.0	1548.0	48	0.1	79.1
20.00	0.6	96.5	127.60	7656.0	1629.0	45	0.3	79.4
21.00	0.0	96.5	133.98	8039.0	1710.0	43	0.0	79.4
22.00	0.5	97.0	140.36	8422.0	1792.0	41	0.2	79.6
23.00	0.7	97.7	146.74	8805.0	1873.0	39	0.3	79.9
24.00	0.0	97.7	153.12	9187.0	1955.0	38	0.0	79.9
25.00	0.3	98.0	159.50	9570.0	2036.0	36	0.1	80.0
30.00	0.3	98.3	191.40	11484.0	2443.0	30	0.1	80.1
35.00	0.8	99.1	223.30	13398.0	2851.0	26	0.2	80.3
40.00	0.4	99.5	255.20	15312.0	3258.0	23	0.1	80.4
45.00	0.5	100.0	287.10	17226.0	3665.0	20	0.1	80.5
Estimated Net Annual Sediment (TSS) Load Reduction =								**80 %**

Climate Station ID: 6158355 *Years of Rainfall Data*: 20

RAINFALL DATA FROM TORONTO CITY RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



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

03/04/2026

Province:	Ontario
City:	Caledon
Nearest Rainfall Station:	TORONTO CITY
Climate Station Id:	6158355
Years of Rainfall Data:	20

Site Name:	Block C OGS C-1

Drainage Area (ha):	2.7
Runoff Coefficient 'c':	0.90

Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0

Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	78.51
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	No
Peak Conveyance (maximum) Flow Rate (L/s):	
Influent TSS Concentration (mg/L):	200
Estimated Average Annual Sediment Load (kg/yr):	2776
Estimated Average Annual Sediment Volume (L/yr):	2257

Project Name:	12100 Creditview
Project Number:	24045
Designer Name:	Vinci Patrick
Designer Company:	KWA
Designer Email:	vinci.patrick@kwasitedev.com
Designer Phone:	647-518-0453
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	55
EFO5	63
EFO6	70
EFO8	80
EFO10	86
EFO12	90

Recommended Stormceptor EFO Model: EFO8

Estimated Net Annual Sediment (TSS) Load Reduction (%): 80

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 waterwavs.

PARTICLE SIZE DISTRIBUTION (PSD)

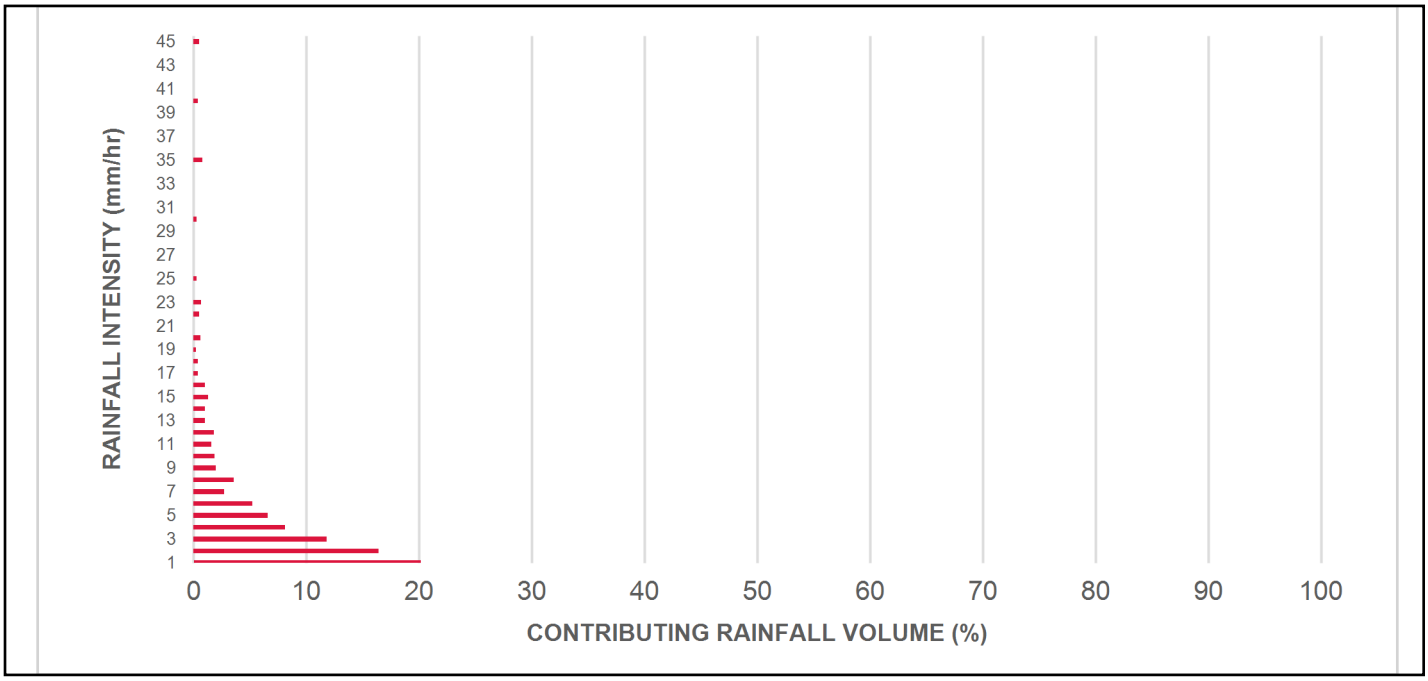
►The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV ***Procedure for Laboratory Testing of Oil-Grit Separators*** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a 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

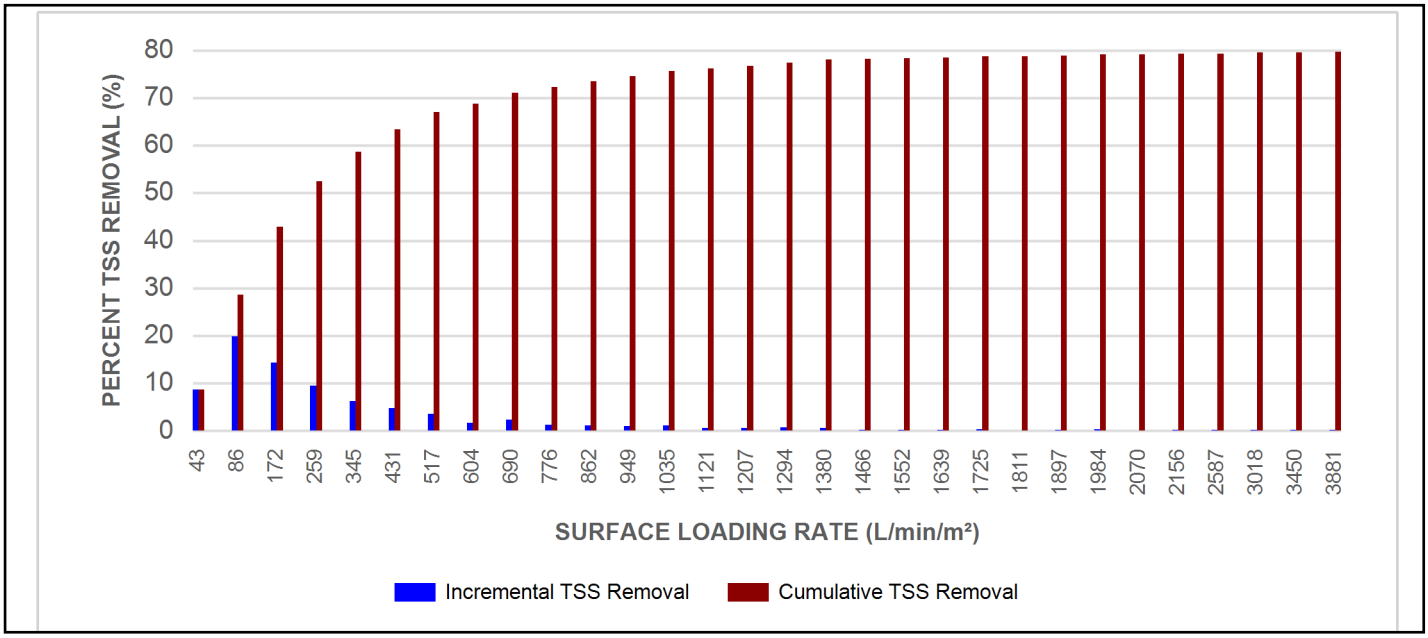
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.50	8.7	8.7	3.38	203.0	43.0	100	8.7	8.7
1.00	20.2	28.9	6.76	405.0	86.0	98	19.9	28.6
2.00	16.4	45.3	13.51	811.0	172.0	87	14.3	42.9
3.00	11.8	57.1	20.27	1216.0	259.0	81	9.5	52.4
4.00	8.1	65.2	27.02	1621.0	345.0	77	6.2	58.6
5.00	6.6	71.9	33.78	2027.0	431.0	72	4.8	63.4
6.00	5.2	77.1	40.53	2432.0	517.0	69	3.6	67.0
7.00	2.7	79.8	47.29	2837.0	604.0	65	1.7	68.7
8.00	3.6	83.4	54.04	3243.0	690.0	64	2.3	71.0
9.00	2.0	85.4	60.80	3648.0	776.0	63	1.3	72.3
10.00	1.9	87.3	67.55	4053.0	862.0	63	1.2	73.5
11.00	1.6	88.9	74.31	4459.0	949.0	62	1.0	74.5
12.00	1.8	90.7	81.06	4864.0	1035.0	61	1.1	75.6
13.00	1.0	91.6	87.82	5269.0	1121.0	59	0.6	76.2
14.00	1.0	92.7	94.58	5675.0	1207.0	57	0.6	76.7
15.00	1.3	93.9	101.33	6080.0	1294.0	55	0.7	77.4
16.00	1.0	95.0	108.09	6485.0	1380.0	53	0.5	78.0
17.00	0.4	95.3	114.84	6891.0	1466.0	50	0.2	78.2
18.00	0.4	95.7	121.60	7296.0	1552.0	47	0.2	78.3
19.00	0.2	95.9	128.35	7701.0	1639.0	45	0.1	78.4
20.00	0.6	96.5	135.11	8106.0	1725.0	43	0.3	78.7
21.00	0.0	96.5	141.86	8512.0	1811.0	40	0.0	78.7
22.00	0.5	97.0	148.62	8917.0	1897.0	39	0.2	78.9
23.00	0.7	97.7	155.37	9322.0	1984.0	37	0.3	79.1
24.00	0.0	97.7	162.13	9728.0	2070.0	35	0.0	79.1
25.00	0.3	98.0	168.89	10133.0	2156.0	34	0.1	79.2
30.00	0.3	98.3	202.66	12160.0	2587.0	28	0.1	79.3
35.00	0.8	99.1	236.44	14186.0	3018.0	24	0.2	79.5
40.00	0.4	99.5	270.22	16213.0	3450.0	22	0.1	79.6
45.00	0.5	100.0	303.99	18240.0	3881.0	19	0.1	79.7
Estimated Net Annual Sediment (TSS) Load Reduction =								**80 %**

Climate Station ID: 6158355 *Years of Rainfall Data*: 20

RAINFALL DATA FROM TORONTO CITY 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

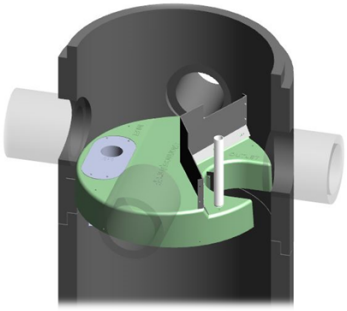
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test 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.

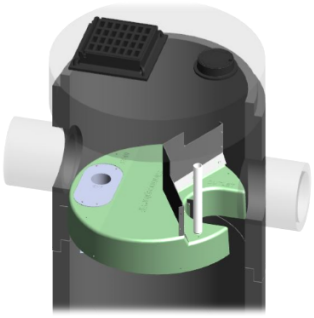
DESIGN FLEXIBILITY

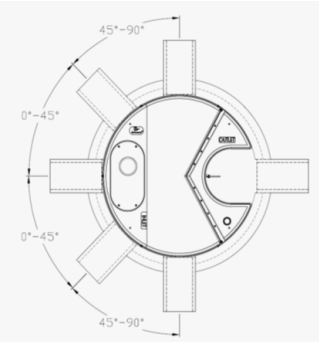
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend 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)	(ft^3)	(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/ft^3)

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

STANDARD STORMCEPTOR EF/EFO DRAWINGS

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

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

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

STANDARD PERFORMANCE SPECIFICATION FOR "OIL GRIT SEPARATOR" (OGS) STORMWATER QUALITY 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 Separators**

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.

CALCULATION NOTES

Prepared by:

NA

Project:

12100 Creditview Development
Caledon, ON

Title:

Preliminary buoyancy calculations

April 02, 2026

Data

Notes:
Detention System B1

Number of layers: 2

Basin Height: 1,320 m

Maximum top elevation: 264,380
Basin bed's elevation: 261,030

Minimum top elevation: 264,020
Groundwater table elevation: 263,000

Saturated soil unit weight: 21 kN/m³

Lateral earth pressure coefficient (Ka): 0,35

Water unit weight: 9,81 kN/m³

Allowable vertical pressure: 190 kPa

Allowable lateral pressure: 50 kPa

Traffic load above basin → CL-625 / HS-25

Load Factors
- -Load factor for overload: 1,7
- -Load factor for dead loads: 1,25

Verification of Allowable Pressures

* Pressures are calculated using the gratest backfill height (most critical case)

Vertical pressure on top of the basin (at 2,030m depth):
- -Weighted dead load = 53,3 kPa
- -Weighted overload = 17,5 kPa
- -Total weighted load = 70,8 kPa OK! (Weighted Pressure < Allowable pressure)

Lateral pressure at the bottom of the basin (at 3,350m depth):
- -Weighted dead load = 46,5 kPa
- -Weighted overload = 2,9 kPa
- -Total weighted load = 49,4 kPa OK! (Weighted Pressure < Allowable pressure)

Buoyancy (Archimedes' Force) Verification

* Buoyancy is verified using the smallest backfill height (Umost critical case)
Calculations are performed for a $1m^2$ section

Effective (submerged) soil unit weight = 21,00 kN/m³ - 9,81 kN/m³ = 11,19 kN/m³
Dry soil unit weight = 17,97 kN/m³ → Calculated from saturated unit weight and particle density of 2,65

The groundwater table is above the basin.

Downward Force Calculation
Height of dry soil above the basin = 1.020 m
Height of submerged soil above the basin = 0,650 m
Downward force = 1,020 m · 1 m² · 17,97 kN/m³ + 0,650 m · 1 m² · 11,19 kN/m³ = 25,6 kN

Upward Force Calculation
Displaced water volume = 1,320 m · 1 m² = 1,320 m³
Upward force = 1,320 m³ · 9,81 kN/m³ = 12,9 kN

Safety Factor
F.S. = Downward Force / Upward Force = 25,6 / 12,9 = 1,98 OK! (F.S. > 1,20)

Data

Notes:
Detention System B3

Number of layers: 2

Basin Height: 1,320 m

Maximum top elevation: 264,140
Minimum top elevation: 263,520
Basin bed's elevation: 260,760
Groundwater table elevation: 262,500

Saturated soil unit weight: 21 kN/m³

Lateral earth pressure coefficient (Ka): 0,35

Water unit weight: 9,81 kN/m³

Allowable vertical pressure: 190 kPa

Allowable lateral pressure: 50 kPa

Traffic load above basin → CL-625 / HS-25

Load Factors
- -Load factor for overload: 1,7
- -Load factor for dead loads: 1,25

Verification of Allowable Pressures

* Pressures are calculated using the gratest backfill height (most critical case)

Vertical pressure on top of the basin (at 2,060m depth):
- -Weighted dead load = 54,1 kPa
- -Weighted overload = 17,1 kPa
- -Total weighted load = 71,2 kPa OK! (Weighted Pressure < Allowable pressure)

Lateral pressure at the bottom of the basin (at 3,380m depth):
- -Weighted dead load = 44,9 kPa
- -Weighted overload = 2,9 kPa
- -Total weighted load = 47,8 kPa OK! (Weighted Pressure < Allowable pressure)

Buoyancy (Archimedes' Force) Verification

* Buoyancy is verified using the smallest backfill height (Umost critical case)
Calculations are performed for a $1m^2$ section

Effective (submerged) soil unit weight = 21,00 kN/m³ - 9,81 kN/m³ = 11,19 kN/m³
Dry soil unit weight = 17,97 kN/m³ → Calculated from saturated unit weight and particle density of 2,65

The groundwater table is above the basin.

Downward Force Calculation
Height of dry soil above the basin = 1.020 m
Height of submerged soil above the basin = 0,420 m
Downward force = 1,020 m · 1 m² · 17,97 kN/m³ + 0,420 m · 1 m² · 11,19 kN/m³ = 23,0 kN

Upward Force Calculation
Displaced water volume = 1,320 m · 1 m² = 1,320 m³
Upward force = 1,320 m³ · 9,81 kN/m³ = 12,9 kN

Safety Factor
F.S. = Downward Force / Upward Force = 23,0 / 12,9 = 1,78 OK! (F.S. > 1,20)

Data

Notes:
Detention System B4

Number of layers: 2

Basin Height: 1,320 m

Maximum top elevation: 264,960
Minimum top elevation: 264,630
Basin bed's elevation: 261,690
Groundwater table elevation: 263,500

Saturated soil unit weight: 21 kN/m³

Lateral earth pressure coefficient (Ka): 0,35

Water unit weight: 9,81 kN/m³

Allowable vertical pressure: 190 kPa

Allowable lateral pressure: 50 kPa

Traffic load above basin → CL-625 / HS-25

Load Factors
- -Load factor for overload: 1,7
- -Load factor for dead loads: 1,25

Verification of Allowable Pressures

* Pressures are calculated using the gratest backfill height (most critical case)

Vertical pressure on top of the basin (at 1,950m depth):
- -Weighted dead load = 51,2 kPa
- -Weighted overload = 18,5 kPa
- -Total weighted load = 69,6 kPa OK! (Weighted Pressure < Allowable pressure)

Lateral pressure at the bottom of the basin (at 3,270m depth):
- -Weighted dead load = 44,5 kPa
- -Weighted overload = 3,0 kPa
- -Total weighted load = 47,5 kPa OK! (Weighted Pressure < Allowable pressure)

Buoyancy (Archimedes' Force) Verification

* Buoyancy is verified using the smallest backfill height (Umost critical case)
Calculations are performed for a $1m^2$ section

Effective (submerged) soil unit weight = 21,00 kN/m³ - 9,81 kN/m³ = 11,19 kN/m³
Dry soil unit weight = 17,97 kN/m³ → Calculated from saturated unit weight and particle density of 2,65

The groundwater table is above the basin.

Downward Force Calculation
Height of dry soil above the basin = 1.130 m
Height of submerged soil above the basin = 0,490 m
Downward force = 1,130 m · 1 m² · 17,97 kN/m³ + 0,490 m · 1 m² · 11,19 kN/m³ = 25,8 kN

Upward Force Calculation
Displaced water volume = 1,320 m · 1 m² = 1,320 m³
Upward force = 1,320 m³ · 9,81 kN/m³ = 12,9 kN

Safety Factor
F.S. = Downward Force / Upward Force = 25,8 / 12,9 = 1,99 OK! (F.S. > 1,20)

APPENDIX B

SANITARY CALCULATIONS

Sanitary Servicing Analysis - Site A + B

Project Name: 12100 Creditview
Project Number: 24045
Location: Caledon
Date: 2/2/2026

Prepared By: LP
Checked By: TF

Standards Peel Region

Formulas

Peaking Factor (Harmon) = $1+14/[4+(P/1000)^{1/2}]$

Peak Flow = p(q)M(unit conversion) + infiltration

Existing Sanitary Design Flow

Land Type	Area (m^2)	# of Units /Floor Area	Density	Population (p)	Average Flow (q)	Peaking Factor (M)	Peak Flow (Q) (L/s)
Infiltration Allowance	98200				0.0002 m3/s/ha		1.96
Total	**98200**						**1.96**

Proposed Sanitary Design Flow

Land Type	Area (m^2)	# of Units / Floor Area	Density (ppha)	Population (p)	Average Flow (q)	Peaking Factor (M)	Peak Flow (Q) (L/s)
Infiltration Allowance	98200				0.0002 m3/s/ha		1.96
Retail A		15517 sq.m	50 ppha	78	302.8 L/cap/day	4.00	1.09
Retail B1		1283 sq.m	50 ppha	7	302.8 L/cap/day	4.00	0.10
Retail B2		1251 sq.m	50 ppha	7	302.8 L/cap/day	4.00	0.10
Retail B3		1324 sq.m	50 ppha	7	302.8 L/cap/day	4.00	0.10
Retail B4		1139 sq.m	50 ppha	6	302.8 L/cap/day	4.00	0.08
Retail B5		377 sq.m	50 ppha	2	302.8 L/cap/day	4.00	0.03
Total	**98200**	**20891**		**107**			**3.46**

Summary

Existing Sanitary Design Flow	1.96 L/s
Proposed Sanitary Design Flow	3.46 L/s
Increased Flow	1.50 L/s

Sanitary Servicing Analysis - Site C

Project Name:	12100 Creditview		
Project Number:	24045	Prepared By:	LP
Location:	Caledon	Checked By:	TF
Date:	2/2/2026		

Standards Peel Region

Formulas

Peaking Factor (Harmon) = $1+14/[4+(P/1000)^{1/2}]$

Peak Flow = p(q)M(unit conversion) + infiltration

Existing Sanitary Design Flow

Land Type	Area (m^2)	# of Units /Floor Area	Density	Population (p)	Average Flow (q)	Peaking Factor (M)	Peak Flow (Q) (L/s)
Infiltration Allowance	28200				0.0002 m3/s/ha		0.56
Total	**28200**						**0.56**

Proposed Sanitary Design Flow

Land Type	Area (m^2)	# of Units / Floor Area	Density (ppha)	Population (p)	Average Flow (q)	Peaking Factor (M)	Peak Flow (Q) (L/s)
Infiltration Allowance	28200				0.0002 m3/s/ha		0.56
Retail C1		4586 sq.m	50 ppha	23	302.8 L/cap/day	4.00	0.32
Retail C2		1555 sq.m	50 ppha	8	302.8 L/cap/day	4.00	0.11
Retail C3		935 sq.m	50 ppha	5	302.8 L/cap/day	4.00	0.07
Retail C4		697 sq.m	50 ppha	4	302.8 L/cap/day	4.00	0.06
Total	**28200**	**7773**		**40**			**1.13**

Summary

Existing Sanitary Design Flow	0.56 L/s
Proposed Sanitary Design Flow	1.13 L/s
Increased Flow	0.57 L/s

Sanitary Servicing Analysis - Downstream

Project Name: 12100 Creditview
Project Numb 24045 — Prepared By: LP
Location: Caledon — Checked By: TF
Date: 2/2/2026

	Peak Flow	
Site A+B	3.46	L/s
Site C	1.13	L/s
Total	**4.59**	**L/s**

Pipe	Diameter (m)	Slope (%)	Velocity (m/s)	Full Flow Capacity (L/s)	Pre-Dev. Total Flow (L/s)	Pre-Dev. % Full	Post-Dev % Full
Street A (by TYLin)	200	0.5	0.74	23.19	n/a	n/a	20%
*MH52A	250	1.64	1.55	76.16	13.20	**17%**	**23%**
**MH59A	300	1.73	1.80	127.19	28.70	**23%**	**26%**

*upstream leg of Paradise Homes subdivision
**downstream leg of Paradise Homes subdivision

APPENDIX C

WATER CALCULATIONS

Required Fire Flow - Retail A (Site A+B)

Project Name:	12100 Creditview		
Project Number:	24045	Prepared By:	LP
Location:	Caledon	Checked By:	TF
Date:	3/5/2026		

as per Fire Underwriters Survey Water Supply for Public Fire Protection, 2020

1. Initial Required Fire Flow (Step A, B, C)

Construction Type =	Type II Noncombustible Construction	
Construction Coefficient, C =	0.8	
Total Effective Area, A =	15517	m^2
Required Fire Flow, RFF =	21923.83616	LPM
RFF, rounded =	**22000**	**LPM**

2. Occupancy and Contents Adjustment Factor (Step D)

Contents =	Noncombustible contents	
Adjustment Factor =	-25%	
RFF =	**16500**	**LPM**

3. Automatic Sprinkler Protection (Step E)

Sprinkler Design	**Designed**	**Building Coverage**	**Credit**
Automatic sprinkler protection designed and installed in accordance with NFPA 13	Yes	100%	30%
Water supply is standard for both the system and Fire Department hose lines	Yes	100%	10%
Fully supervised	No	100%	0%
		Total Sprinkler Credit =	40%

Reduction =	**6600**	**LPM**

4. Exposure Adjustment Charge (Step F)

Direction	Distance	Charge
North	Greater than 30m	0%
South	Greater than 30m	0%
East	Greater than 30m	0%
West	Greater than 30m	0%

Total Charge =	0%	
Charge =	**0**	**LPM**

5. Final Required Fire Flow (Step G)

RFF =	16500	LPM
Reduction =	6600	LPM
Charge =	0	LPM
RFF =	9900	LPM

Final RFF, rounded =	**10000**	**LPM**
	2642	**GPM**
	167	**L/s**

Domestic Demand (Site A+B)

Project Name:	12100 Creditview		
Project Number:	24045	Prepared By:	LP
Location:	Caledon	Checked By:	TF
Date:	3/5/2026		

as per Peel Region Standards

Population =	107	
Per Capita Demand =	300	L/cap/day
Average Daily Demand =	32100	L/day
	0.37	L/s

	Average Day	Minimum Hour	Peak Hour	Maximum Day	
Peaking Factor	n/a	n/a	3.00	1.40	
Demand	**0.37**	**n/a**	**1.11**	**0.52**	**L/s**
	5.89	n/a	17.67	8.24	GPM

Head Loss Calculations (Max Day + Fire) - Site A+B

Project Name: 12100 Creditview
Project Number: 24045
Location: Caledon
Date: 3/5/2026

Prepared By: LP
Checked By: TF

Fire Flow = 167 L/s
Max Day Flow = 0.52 L/s
Total Flow = **167.2 L/s**

Major Losses (Hazen Williams Formula + Hardy Cross Methodology)

Pipe ID	Parallel / Series	Diameter	Area (m^2)	Length (m)	Adjusted Length* (m)	Flow (L/s)	Velocity (m/s)	Hydraulic Radius	S	Headloss (m)	Headloss (psi)
1	Series	600	0.2827	115	126.5	167.2	0.6	0.15	0.00	0.07	0.10
2	Series	300	0.0707	220	242	167.2	2.4	0.08	0.02	4.03	5.74
3	Series	250	0.0491	128	140.8	167	3.4	0.06	0.04	5.67	8.07
4	Parallel	250	0.0491	115	126.5	101	2.0	0.06	0.02	2.00	2.84
5	Parallel	250	0.0491	250	275	66	1.3	0.06	0.01	2.00	2.84
									Total major loss (psi) =		**16.75**

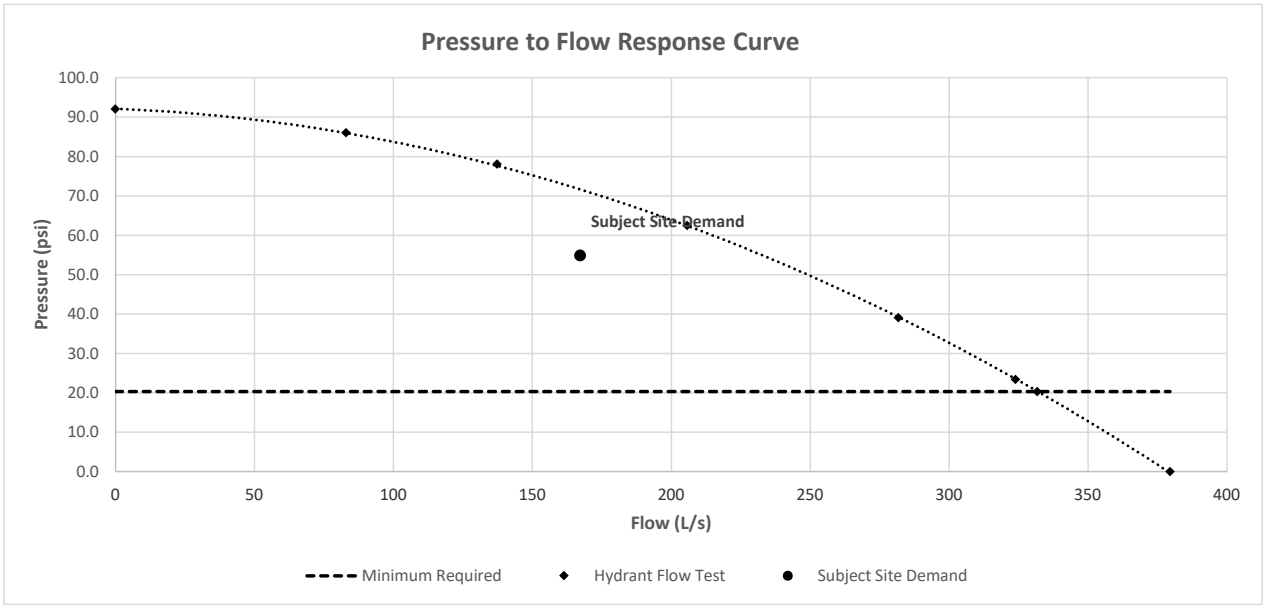
*adjusted length includes a 10% surcharge to account for minor losses

Total Headloss = 16.75 psi

Flow Test Results & Servicing Hydraulic Analysis

Pressure (psi)	*Flow (L/s)*	
92	0	*Static Pressure*
86	83.0	
78	137.3	

Flow Requirement =	***167***	L/s
Theoretical Pressure =	***71.7***	psi
With Pressure Losses =	***54.9***	psi
Minimum Required =	***20.3***	psi



Head Loss Calculations (Peak Hour) - Site A+B

Project Name: 12100 Creditview
Project Number: 24045
Location: Caledon
Date: 3/5/2026

Prepared By: LP
Checked By: TF

Max Day Flow = 1.11 L/s

Major Losses (Hazen Williams Formula + Hardy Cross Methodology)

Pipe ID	Parallel / Series	Diameter	Area (m^2)	Length (m)	Adjusted Length* (m)	Flow (L/s)	Velocity (m/s)	Hydraulic Radius	S	Headloss (m)	Headloss (psi)
1	Series	600	0.2827	115	126.5	1.1	0.0	0.15	0.00	0.00	0.00001
2	Series	300	0.0707	220	242	1.11	0.0	0.08	0.00	0.00	0.00054
3	Series	250	0.0491	128	140.8	1.11	0.0	0.06	0.00	0.00	0.00076
4	Parallel	250	0.0491	115	126.5	0.69	0.0	0.06	0.00	0.00	0.00028
5	Parallel	250	0.0491	250	275	0.43	0.0	0.06	0.00	0.00	0.00025

Total major loss (psi) = 0.00

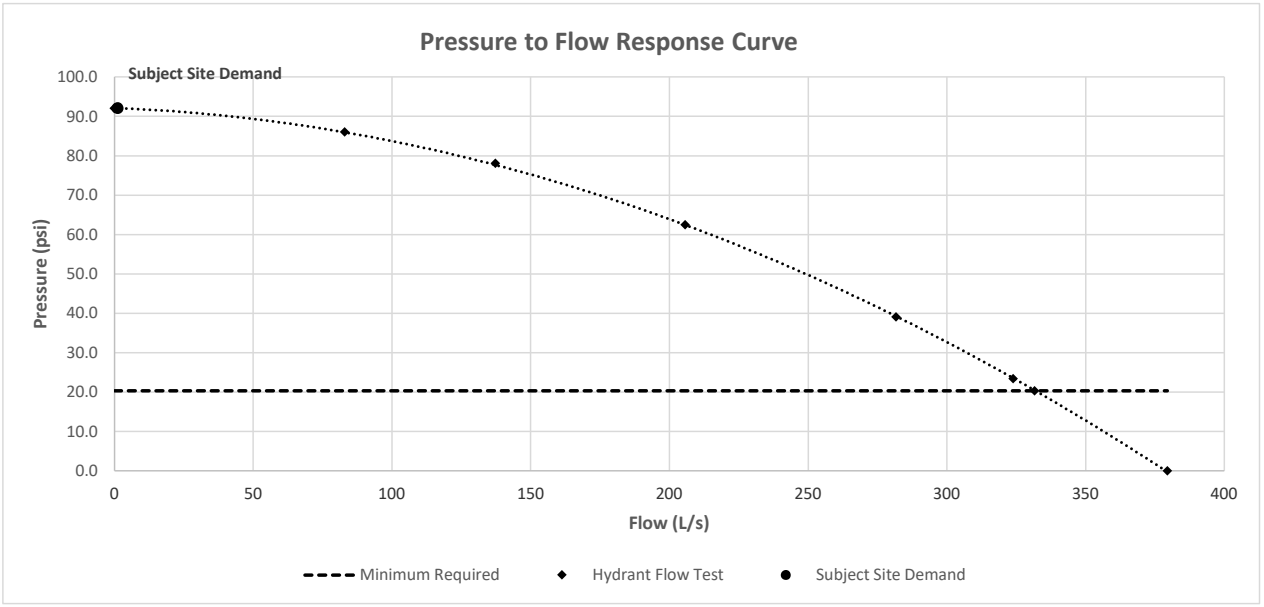
*adjusted length includes a 10% surcharge to account for minor losses

Total Headloss = 0.00 psi

Flow Test Results & Servicing Hydraulic Analysis

Pressure (psi)	*Flow (L/s)*	
92	0	*Static Pressure*
86	83.0	
78	137.3	

Flow Requirement =	***1***	L/s
Theoretical Pressure =	***92.1***	psi
With Pressure Losses =	***92.1***	psi
Minimum Required =	***20.3***	psi



Required Fire Flow - Retail C1/C2 (Site C)

Project Name:	12100 Creditview		
Project Number:	24045	Prepared By:	LP
Location:	Caledon	Checked By:	TF
Date:	3/5/2026		

as per Fire Underwriters Survey Water Supply for Public Fire Protection, 2020

1. Initial Required Fire Flow (Step A, B, C)

Construction Type =	Type II Noncombustible Construction	
Construction Coefficient, C =	0.8	
Total Effective Area, A =	5921	m^2
Required Fire Flow, RFF =	13542.85406	LPM
RFF, rounded =	**14000**	**LPM**

2. Occupancy and Contents Adjustment Factor (Step D)

Contents =	Noncombustible contents	
Adjustment Factor =	-25%	
RFF =	**10500**	**LPM**

3. Automatic Sprinkler Protection (Step E)

Sprinkler Design	Designed	Building Coverage	Credit
Automatic sprinkler protection designed and installed in accordance with NFPA 13	Yes	100%	30%
Water supply is standard for both the system and Fire Department hose lines	Yes	100%	10%
Fully supervised	No	100%	0%
		Total Sprinkler Credit =	40%

Reduction =	**4200**	**LPM**

4. Exposure Adjustment Charge (Step F)

Direction	Distance	Charge
North	Greater than 30m	0%
South	Greater than 30m	0%
East	Greater than 30m	0%
West	Greater than 30m	0%

Total Charge =	0%	
Charge =	**0**	**LPM**

5. Final Required Fire Flow (Step G)

RFF =	10500	LPM
Reduction =	4200	LPM
Charge =	0	LPM
RFF =	6300	LPM

Final RFF, rounded =	**6000**	**LPM**
	1585	**GPM**
	100	**L/s**

Domestic Demand (Site C)

Project Name:	12100 Creditview		
Project Number:	24045	Prepared By:	LP
Location:	Caledon	Checked By:	TF
Date:	3/5/2026		

as per Peel Region Standards

Population =	40	
Per Capita Demand =	300	L/cap/day
Average Daily Demand =	12000	L/day
	0.14	L/s

	Average Day	Minimum Hour	Peak Hour	Maximum Day	
Peaking Factor	n/a	n/a	3.00	1.40	
Demand	**0.14**	**n/a**	**0.42**	**0.19**	**L/s**
	2.20	n/a	6.60	3.08	GPM

Head Loss Calculations (Max Day + Fire) - Site C

Project Name: 12100 Creditview
Project Number: 24045
Location: Caledon
Date: 3/5/2026

Prepared By: LP
Checked By: TF

Fire Flow = 100 L/s
Max Day Flow = 0.19 L/s
Total Flow = **100.2 L/s**

Major Losses (Hazen Williams Formula + Hardy Cross Methodology)

Pipe ID	Parallel / Series	Diameter	Area (m^2)	Length (m)	Adjusted Length* (m)	Flow (L/s)	Velocity (m/s)	Hydraulic Radius	S	Headloss (m)	Headloss (psi)
1	Series	600	0.2827	115	126.5	100.2	0.4	0.15	0.00	0.03	0.04
2	Series	300	0.0707	108	118.8	100.2	1.4	0.08	0.01	0.77	1.09
3	Series	250	0.0491	29	31.9	100	2.0	0.06	0.02	0.50	0.71
4	Parallel	250	0.0491	45	49.5	66	1.3	0.06	0.01	0.35	0.50
5	Parallel	250	0.0491	148	162.8	34	0.7	0.06	0.00	0.35	0.50
									Total major loss (psi) =		**2.34**

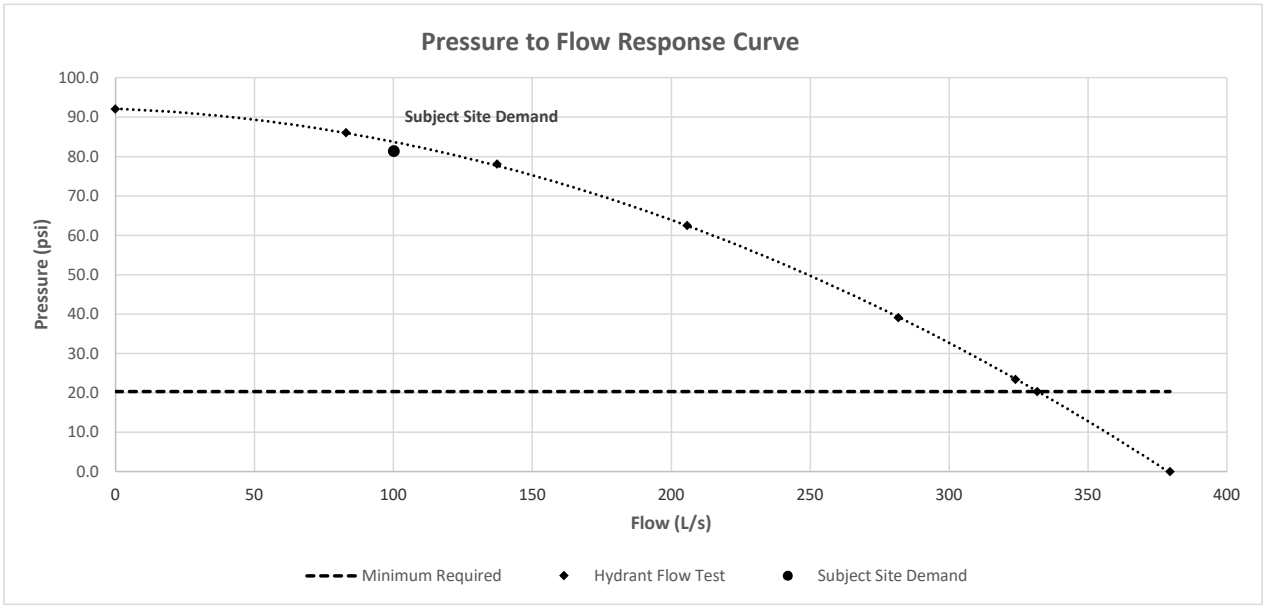
*adjusted length includes a 10% surcharge to account for minor losses

Total Headloss = 2.34 psi

Flow Test Results & Servicing Hydraulic Analysis

Pressure (psi)	*Flow (L/s)*	
92	0	*Static Pressure*
86	83.0	
78	137.3	

Flow Requirement =	***100***	L/s
Theoretical Pressure =	***83.7***	psi
With Pressure Losses =	***81.4***	psi
Minimum Required =	***20.3***	psi



Head Loss Calculations (Peak Hour) - Site C

Project Name: 12100 Creditview
Project Number: 24045
Location: Caledon
Date: 3/5/2026

Prepared By: LP
Checked By: TF

Max Day Flow = 0.42 L/s

Major Losses (Hazen Williams Formula + Hardy Cross Methodology)

Pipe ID	Parallel / Series	Diameter	Area (m^2)	Length (m)	Adjusted Length* (m)	Flow (L/s)	Velocity (m/s)	Hydraulic Radius	S	Headloss (m)	Headloss (psi)
1	Series	600	0.2827	115	126.5	0.4	0.0	0.15	0.00	0.00	0.00000
2	Series	300	0.0707	220	242	0.42	0.0	0.08	0.00	0.00	0.00009
3	Series	250	0.0491	128	140.8	0.42	0.0	0.06	0.00	0.00	0.00012
4	Parallel	250	0.0491	115	126.5	0.24	0.0	0.06	0.00	0.00	0.00004
5	Parallel	250	0.0491	250	275	0.18	0.0	0.06	0.00	0.00	0.00005

Total major loss (psi) = 0.00

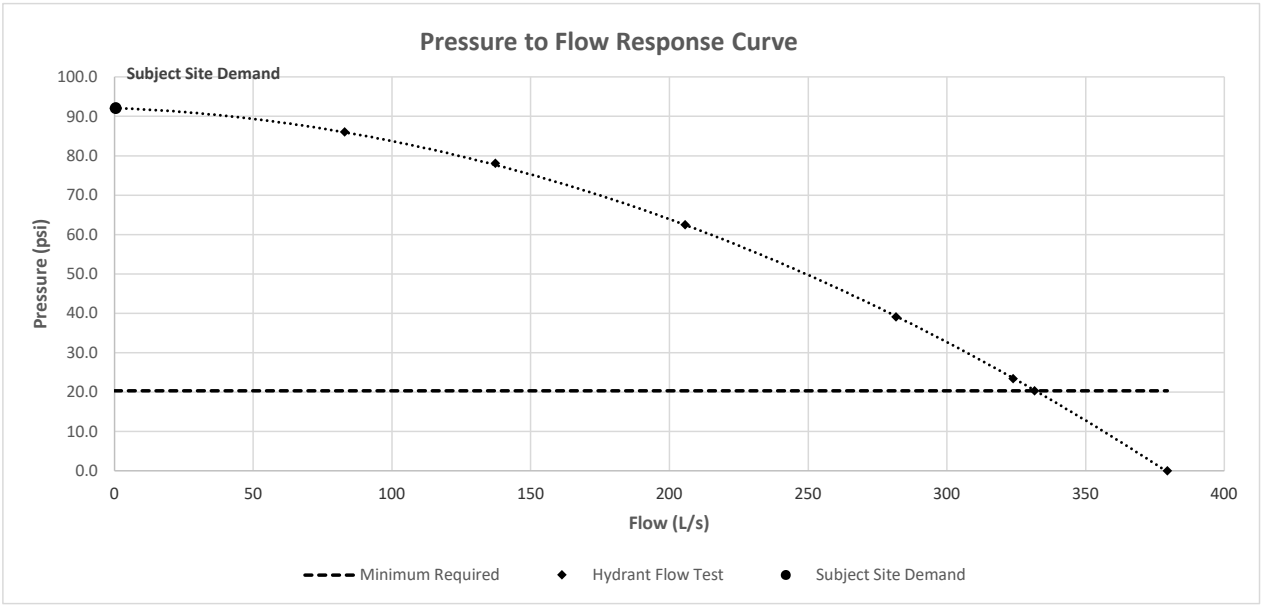
*adjusted length includes a 10% surcharge to account for minor losses

Total Headloss = 0.00 psi

Flow Test Results & Servicing Hydraulic Analysis

Pressure (psi)	*Flow (L/s)*	
92	0	*Static Pressure*
86	83.0	
78	137.3	

Flow Requirement =	***0***	L/s
Theoretical Pressure =	***92.1***	psi
With Pressure Losses =	***92.1***	psi
Minimum Required =	***20.3***	psi



APPENDIX D

SUPPORTING DOCUMENTS

Design Storm	Unit Flow Rates ($m^3/s/ha$)
100-Year Storm	0.01255
Regional Storm	0.05155

In addition to the required storage to control the Tertiary Plan area within the Etobicoke Creek subwatershed to the unit flow rate for the Regional storm event, an additional unit storage of 214 m^3/ha is required for Regional controls to account for the first 36 hours of the Regional event preceding the peak during the last 12 hours.

A summary of the Basin 1 quantity control requirements and unit flow rates from the Etobicoke Creek Hydrology Update is provided in **Appendix G.**

Fletcher's Creek

As per the Subwatershed Study for the Huttonville and Fletcher's Creeks (June 2011), the subject area contributes drainage to flow nodes F2 and F3, as per Figure 3G of the subwatershed study. **Table 3.5** and **Table 3.6** below summarizes the unit target rates for the required quantity control for the portion of the subject site draining to Fletcher's Creek.

Table 3.5: Quantity Control Criteria, Unit Flow Rates (Fletcher's Creek)

Design Storm	Unit Flow Rates [1] ($m^3/s/ha$)	
	Flow Node F2	Flow Node F3
25-Year Storm	0.0083	0.0083
100-Year Storm	0.0250	0.0260
Regional Storm	N/A	

[1] *While only the 25-year and 100-year targets were provided in the HFSWS, the other storms targets have historically been determined through interpolation and subsequently confirmed through model verification. No targets for the regional storm were provided in the HFSWS; only the model verification determined if the provided storage and flow control adequately mitigated the post-development flow increase.*

on Mayfield Road in order to convey drainage to channels, wetlands and facilities downstream. There is no practical way to consolidate runoff into shared ponds or larger detention areas due to grading constraints, and traditional, public wet-pond blocks are not feasible or practical for these small parcels.

Therefore, the quantity control requirements for each individual private site plan block along Mayfield Road will follow a hierarchy of evaluation:

1. Verify that the existing Mayfield Road sewers / culvert crossings (with no upgrades assumed) can convey the controlled 100-year peak. If it can, the block simply adheres to unit rates for the 2-year to 100-year events, as per the Huttonville Fletcher's Subwatershed Study and the Heritage Heights Subwatershed Study. If not, the allowable release rate must be reduced to match the pipe capacity, and additional on-site storage solutions (e.g., underground tanks, pipe storage, rooftop storage, surface storage, etc.) will be applied to ensure the 100-year peak never exceeds downstream capacity.

2. If outlet capacity is not limited, and where a conventional detention facility remains impractical, it is possible that post-development Regional peak flow is only marginally higher than the pre-development Regional flow. In this case, a "no-impact" analysis should be completed to demonstrate that releasing the uncontrolled Regional flows do not impact downstream water levels / infrastructure beyond acceptable thresholds (to be determined with the CVC). This would involve evaluating the downstream storm sewers, culverts/channels (HEC-RAS analysis) and overall hydrology (Huttonville Fletcher's HSP-F model). This approach was previously accepted by CVC for small areas in which meeting the Regional storage criteria was impractical and absence of the Regional volume had no effect downstream.

The individual requirements for each development block along Mayfield Road will be further refined through detailed design.

3.5.6. Downstream Hydrologic Assessment

A comparison of downstream flows was completed as part of the overall hydrologic assessment in order to confirm that the proposed SWM controls, including Regional control, will mitigate any increase in peak flows resulting from the subject development. A downstream assessment was completed for both Etobicoke Creek and Fletcher's Creek, as requested by the Town and TRCA. The analysis and results for Downstream Capacity Analysis memos for both Etobicoke Creek and Fletcher's Creek, provided in **Appendix C6** and **Appendix C7**.

As per the results summarized in the Downstream Capacity Analysis memos provided in **Appendix C6** and **Appendix C7**, there are no downstream impacts for either Etobicoke Creek or Fletcher's Creek resulting from the proposed development.

3.5.7. SWM Pond Inlet and Outlet Design

Inlet and outlet size and locations for each pond are shown on **Drawing 3.5A** to **Drawing 3.5G**. The size of inlet pipes has been minimized where possible; however, box culverts are preferred as they can provide greater conveyance capacity with less pipe depth in locations where cover is limited.

Etobicoke Creek

Erosion targets for Etobicoke Creek were established in the Mayfield West Comprehensive Environmental Impact Study and Management Plan (December 2014). As per the Mayfield West EIS, the erosion unitary target flow to be applied to the Tertiary Plan within the Etobicoke Creek subwatershed is 0.00031 $m^3/s/ha$, and the target unitary storage for erosion control is 325 m^3/ impervious ha.

The exceedance of the downstream erosion thresholds in Etobicoke Creek was evaluated under pre- and post-development conditions, as discussed further in **Section 3.5.9**. This analysis was completed in order to confirm that in applying the erosion control targets for the subject area, erosive impacts are not increased downstream in Etobicoke Creek, as a result of the Alloa development.

Fletchers Creek

As per the Subwatershed Study for the Huttonville and Fletcher's Creeks (June 2011), the Tertiary Plan outlets to Flow Nodes F2 and F3 of Fletcher's Creek. **Table 3.2** below summarizes the unit target rate and unit target volume for the required erosion control for the portion of the subject site draining to Fletcher's Creek, as per the HFSWS.

It should be noted that the erosion threshold for Fletcher's Creek was subsequently updated and further refined, based on discussions with CVC as part of the Mount Pleasant Sub-Area 51-1 and 51-2 EIR-FSR (August 2016). The agreed-upon erosion target unit flow rate for Fletcher's Creek was revised to 0.00041 $m^3/s/ha$. The updated unit flow rate for erosion control is to be applied to the Tertiary Plan area discharging Fletcher's Creek.

Table 3.2: Erosion Control Criteria (Fletcher's Creek)

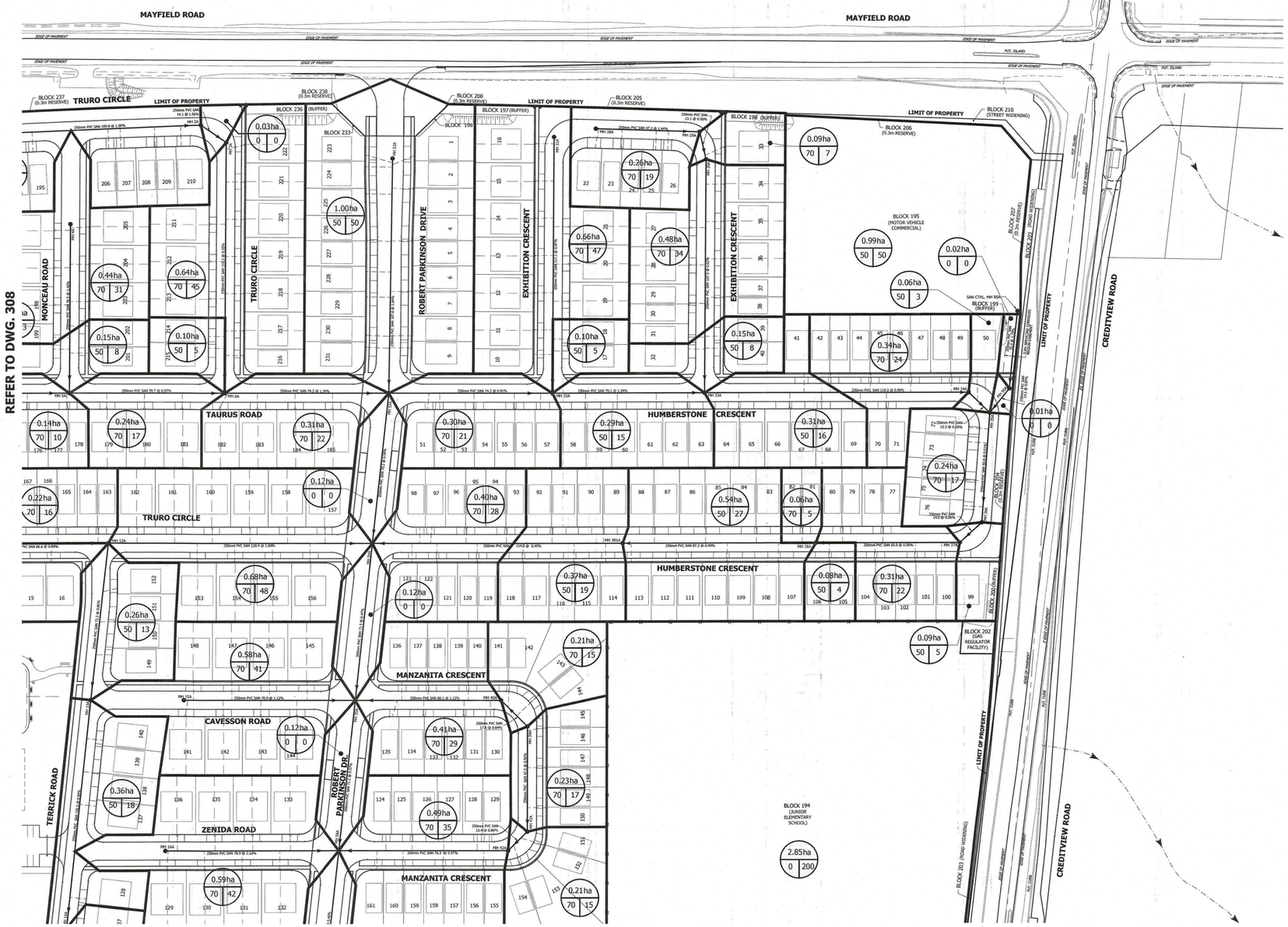
Subwatershed	Unit Flow Rates ($m^3/s/ha$)	Unit Volume (m^3/impervious ha)
Fletcher's Creek	0.00025 (HFWS – superseded) 0.00041 (EIR/FSS – approved)	250

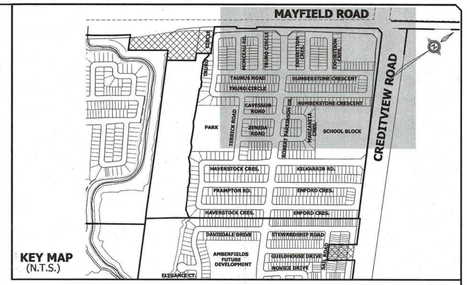
The proposed SWM plan for the Tertiary Plan area will be designed according to the erosion control criteria outlined in the subwatershed studies for Etobicoke Creek and Fletcher's Creek (as discussed above).

3.3.3. Quantity Control Requirements

Settlement Area Boundary Expansion

The Settlement Area Boundary Expansion (SABE) Scoped Subwatershed Study provided recommended ranges of unit volumes for 100-year and Regional level quantity control for Fletcher's Creek and Etobicoke Creek. The quantity control recommendations from the SABE study are summarized in **Table 3.3** below.





LEGEND

- SANITARY MANHOLE AND FLOW DIRECTION ARROW
- 0.10ha / 70 | 7 — DRAINAGE AREA (ha) / POPULATION / POPULATION PER Ha (P/Ha)
- DRAINAGE AREA BOUNDARY
- EXTERNAL DRAINAGE AREA BOUNDARY
- DOUBLE HOUSE CONNECTION
- SINGLE HOUSE CONNECTION

BENCHMARK NOTE

ELEVATIONS ARE GEODETIC AND ARE REFERRED TO MTO BENCHMARK 00819668355, LARGE CONCRETE CULVERT CARRYING HWY 7 OVER SMALL CREEK, 5.4 KM WEST OF THE NORTH JCT OF HWYS 7 AND 10 AND 27 M EAST OF PEEL REG RD 1. TABLET IS SET VERTICALLY IN THE TOP OF THE NORTH END, 37 CM SOUTH 15 CM EAST OF THE N.W. CORNER AND 16.8 M NORTH OF CENTRELINE OF PAVEMENT.

AS-CONSTRUCTED

No.	REVISION	DATE	BY
4	AS CONSTRUCTED	FEB. 2020	J.O.
3	ADDITIONAL MAYFIELD ROAD WIDENING BLOCK 210	DEC 12, 2013	J.O.
2	FINAL SUBMISSION	SEP 27, 2013	J.O.
1	PRE-SERVICING SUBMISSION	JULY 10, 2013	J.O.

FLOWER CITY **CITY OF BRAMPTON**
PLANNING, DESIGN & DEVELOPMENT
BRAMPTON.CA
MICHAEL WON, P. Eng., DIRECTOR OF DEVELOPMENT ENGINEERING SERVICES

LICENSED PROFESSIONAL ENGINEER — J. ORMONDE — 100089999 — FEB.28.2020 — PROVINCE OF ONTARIO

CITY FILE No. **C04W17.002**
PROJECT **11-368-PH.2**

urbantech
Urbantech Consulting, A Division of Leighton-Zoc Ltd.
3760 14th Avenue, Suite 201, Markham, Ontario L3R 3T7
Tel: 905.946.9461 fax: 905.946.9595
www.urbantech.com

PARADISE HOMES NORTH WEST INC.

BLOCK 51-1 - PHASE 2

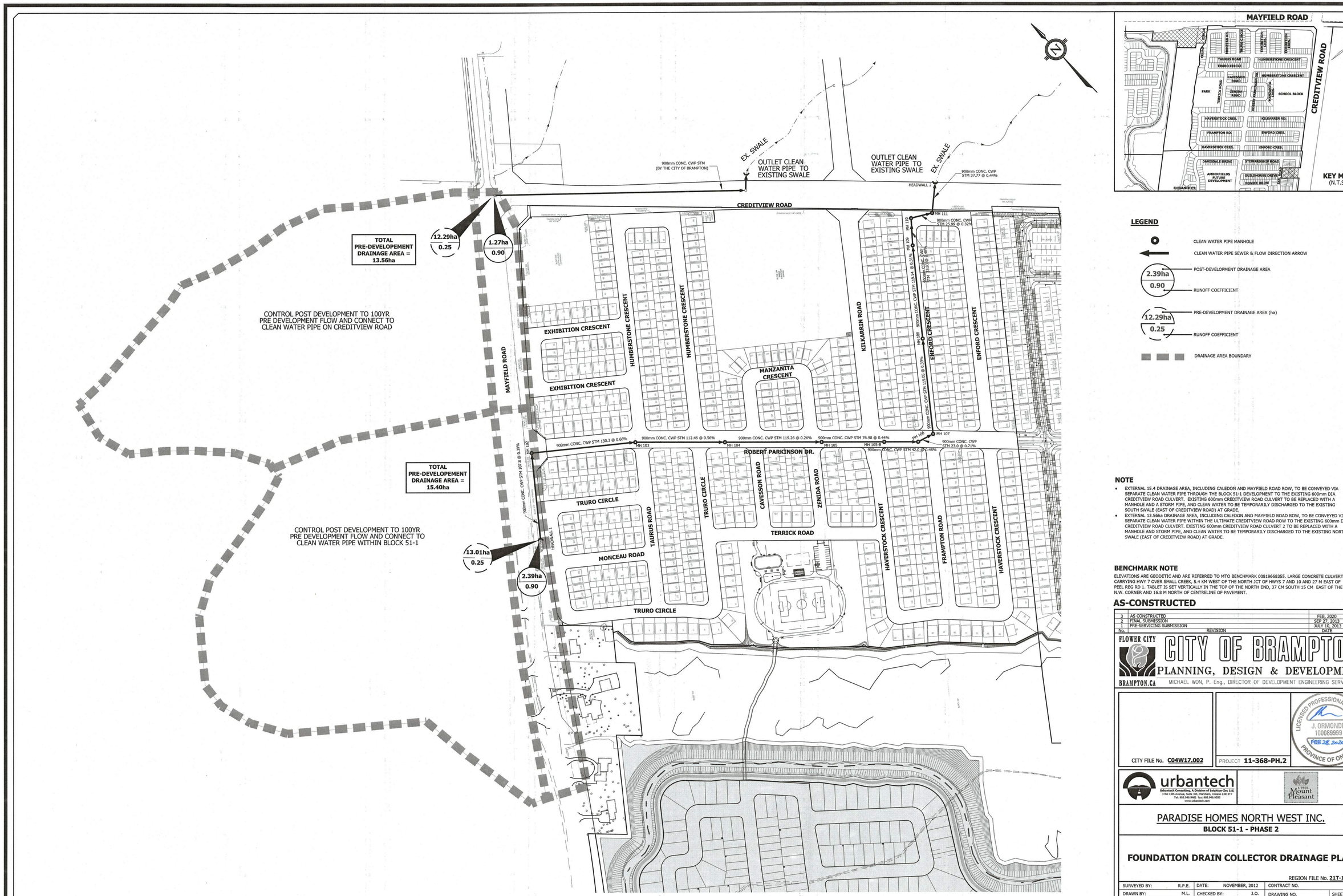
SANITARY DRAINAGE PLAN (PART 1)

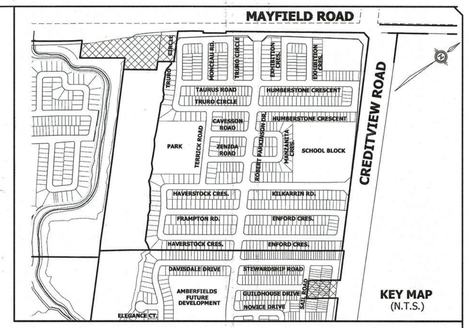
REGION FILE No. **21T-10011Ba**

SURVEYED BY:	R.P.E.	DATE: NOVEMBER, 2012		CONTRACT NO.	
DRAWN BY:	J.S.	CHECKED BY:	J.O.	DRAWING NO.	SHEET NO.
DESIGNED BY:	J.O.	CHECKED BY:	J.O.	C1-4-5	307
SCALE:	1:1000	DATE:	JAN 20, 2014		

File: P:\Projects\11-368-Phase 2\Drawings\As-Constructed\Drawings\300 - Drainage - Revised by: <XEILLINGHAM> - Fri, Feb 28 2020 - 4:47pm

AS-CONSTRUCTED C1-4-5





LEGEND

- CLEAN WATER PIPE MANHOLE
- CLEAN WATER PIPE SEWER & FLOW DIRECTION ARROW
- 2.39ha / 0.90 — POST-DEVELOPMENT DRAINAGE AREA & RUNOFF COEFFICIENT
- 12.29ha / 0.25 — PRE-DEVELOPMENT DRAINAGE AREA (ha) & RUNOFF COEFFICIENT
- DRAINAGE AREA BOUNDARY

NOTE

- EXTERNAL 15.4 DRAINAGE AREA, INCLUDING CALEDON AND MAYFIELD ROAD ROW, TO BE CONVEYED VIA SEPARATE CLEAN WATER PIPE THROUGH THE BLOCK 51-1 DEVELOPMENT TO THE EXISTING 600mm DIA CREDITVIEW ROAD CULVERT. EXISTING 600mm CREDITVIEW ROAD CULVERT TO BE REPLACED WITH A MANHOLE AND A STORM PIPE, AND CLEAN WATER TO BE TEMPORARILY DISCHARGED TO THE EXISTING SOUTH SWALE (EAST OF CREDITVIEW ROAD) AT GRADE.
- EXTERNAL 13.56ha DRAINAGE AREA, INCLUDING CALEDON AND MAYFIELD ROAD ROW, TO BE CONVEYED VIA SEPARATE CLEAN WATER PIPE WITHIN THE ULTIMATE CREDITVIEW ROAD ROW TO THE EXISTING 600mm DIA CREDITVIEW ROAD CULVERT. EXISTING 600mm CREDITVIEW ROAD CULVERT 2 TO BE REPLACED WITH A MANHOLE AND STORM PIPE, AND CLEAN WATER TO BE TEMPORARILY DISCHARGED TO THE EXISTING NORTH SWALE (EAST OF CREDITVIEW ROAD) AT GRADE.

BENCHMARK NOTE

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AS-CONSTRUCTED

No.	REVISION	DATE	BY
3	AS CONSTRUCTED	FEB, 2020	J.G.
2	FINAL SUBMISSION	SEP 27, 2013	J.O.
1	PRE-SERVICING SUBMISSION	JULY 10, 2013	J.O.

FLOWER CITY
CITY OF BRAMPTON
PLANNING, DESIGN & DEVELOPMENT
BRAMPTON.CA
MICHAEL WON, P. Eng., DIRECTOR OF DEVELOPMENT ENGINEERING SERVICES

LICENSED PROFESSIONAL ENGINEER — J. ORMONDE — 100089999 — FEB 28 2020 — PROVINCE OF ONTARIO

CITY FILE No. **C04W17.002**

PROJECT **11-368-PH.2**

urbantech
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Tel: 905.946.9461 fax: 905.946.9595
www.urbantech.com

Little Mount Pleasant

PARADISE HOMES NORTH WEST INC.
BLOCK 51-1 - PHASE 2

FOUNDATION DRAIN COLLECTOR DRAINAGE PLAN

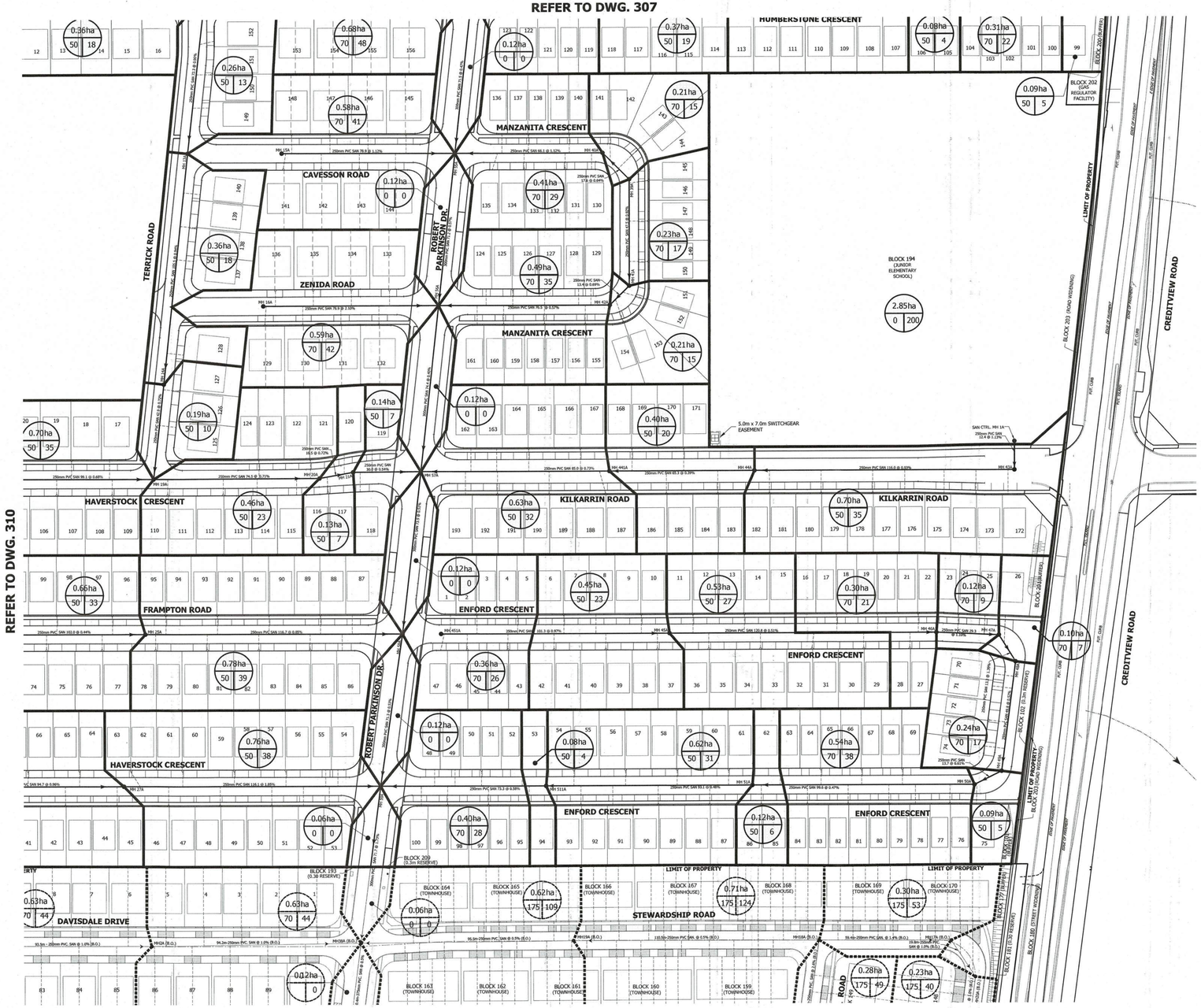
REGION FILE No. **21T-10011Ba**

SURVEYED BY:	R.P.E.	DATE:	NOVEMBER, 2012	CONTRACT NO.	
DRAWN BY:	M.L.	CHECKED BY:	J.O.	DRAWING NO.	SHEET NO.
DESIGNED BY:	M.Z.	CHECKED BY:	J.O.	C1-9-1	306
SCALE:	1:2000	DATE:	JAN 20, 2014		

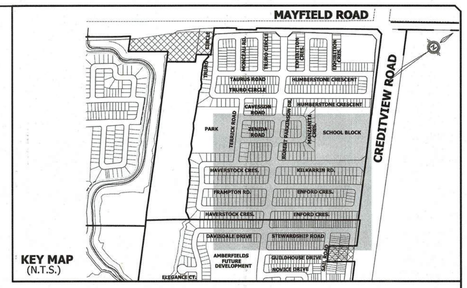
File: P:\Projects\11-368-Phase 2\Drawings\As-Constructed\Drawings\300 - Drainage - Revised by <JGILLINGHAM> - Fri, Feb 28 2020 - 4:45pm

REFER TO DWG. 307

REFER TO DWG. 310



REFER TO AMBER FIELDS LIMITED,
PROJECT No.: 11916
BY COUNTERPOINT ENGINEERING INC.



KEY MAP
(N.T.S.)

LEGEND

- SANITARY MANHOLE AND FLOW DIRECTION ARROW
- 0.10ha / 70 / 7 — DRAINAGE AREA (ha); POPULATION; POPULATION PER Ha (P/Ha)
- DRAINAGE AREA BOUNDARY
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AS-CONSTRUCTED

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FLOWER CITY
CITY OF BRAMPTON
PLANNING, DESIGN & DEVELOPMENT
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MICHAEL WON, P. Eng., DIRECTOR OF DEVELOPMENT ENGINEERING SERVICES

LICENSED PROFESSIONAL ENGINEER
J. ORMONDE
100089999
FEB 28, 2020
PROVINCE OF ONTARIO

CITY FILE No. **C04W17.002**

PROJECT **11-368-PH.2**

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Mount Pleasant

PARADISE HOMES NORTH WEST INC.

BLOCK 51-1 - PHASE 2

SANITARY DRAINAGE PLAN (PART 3)

REGION FILE No. **21T-10011Ba**

SURVEYED BY:	R.P.E.	DATE:	NOVEMBER, 2012	CONTRACT NO.	
DRAWN BY:	J.S.	CHECKED BY:	J.O.	DRAWING NO.	SHEET NO.
DESIGNED BY:	J.O.	CHECKED BY:	J.O.	C1-4-7	309
SCALE:	1:1000	DATE:	JAN 20, 2014		

File: P:\Projects\11-368-Phase 2\Drawings\As-Constructed\Drawings\300 - Drainage - Revised by <JGILLINGHAM> - Fri, Feb 28 2020 - 4:50pm

AS-CONSTRUCTED C1-4-7

urbantech

AS CONSTRUCTED - SANITARY SEWER DESIGN SHEET

Paradise Homes North West Inc. - Phase 2

Region of Peel

PROJECT DETAILS

Registered Plan No: 43M-1947/43M-1948/43M-1949
City File No: C04W17.002B
Region File No: 21T-10011Ba
Project No: 11-368-PH2
Date: 28-Feb-20
Designed by: M.L.
Checked by: J.O.

DESIGN CRITERIA

Min. Flow =	13	l/s	Avg. Domestic Flow =	302.8	l/c/d
Min Diameter =	250	mm	Infiltration =	0.200	l/s/ha
Mannings 'n'=	0.013				
Min. Velocity =	0.75	m/s	Max. Peaking Factor =	4.00	
Max. Velocity =	3.50	m/s	Min. Peaking Factor=	1.50	
			Domestic Sewage flow for < 1000 ppl = 0.013m³/s		
Factor of Safety =	0	%	(Region of Peel Std. 2-5-2)		

NOMINAL PIPE SIZE USED

LICENSED PROFESSIONAL ENGINEER
J. ORMONDE
100089995
FEB 28, 2020
PROVINCE OF ONTARIO

STREET	FROM MH	TO MH	RESIDENTIAL AREA (ha)	ACC. AREA (ha)	UNITS (#)	DENSITY (P/ha)	DENSITY (P/unit)	POP	ACCUM. RES. POP.	COMMERCIAL/INDUSTRIAL/INSTITUTIONAL AREA (ha)	ACC. AREA (ha)	EQUIV. POP. (p/ha)	FLOW RATE (l/s/ha)	EQUIV. POP.	ACCUM. EQUIV. POP.	FLOW CALCULATIONS INFILTRATION (l/s)	TOTAL ACCUM. POP.	PEAKING FACTOR	RES. FLOW (l/s)	MIN. RES. FLOW (l/s)	COMM. FLOW (l/s)	ACCUM. COMM. FLOW (l/s)	TOTAL FLOW (l/s)	PIPE DATA SLOPE (%)	PIPE DIAMETER (mm)	PIPE LENGTH (m)	FULL FLOW CAPACITY (l/s)	FULL FLOW VELOCITY (m/s)	ACTUAL VELOCITY (m/s)	PERCENT FULL (%)
FUTURE ALLOA PUMP STATION	100A	1A																						0.66	250	10.7	48.3	0.98	0.26	
TRURO CIRCLE	1A	2A	0.56	0.56		70		40	40							0.1	40	4.00	0.6	13.0			13.1	1.00	250	109.8	59.5	1.21	0.96	22%
TRURO CIRCLE	2A	3A	0.03	0.59					40							0.1	40	4.00	0.6	13.0			13.1	1.56	250	14.1	74.3	1.51	1.13	18%
TRURO CIRCLE	3A	6A	0.64	1.23		70		45	85							0.2	85	4.00	1.2	13.0			13.2	0.55	250	115.2	44.1	0.90	0.78	30%
		6A	0.10	0.10		50		5	5							0.0	5	4.00	0.1	13.0			13.0							
TAURUS ROAD	9A-E	5A	0.14	0.14		70		10	10							0.0	10	4.00	0.1	13.0			13.0	2.19	250	70.4	88.0	1.79	1.29	15%
TAURUS ROAD		5A	0.17	0.17		50		9	9							0.0	9	4.00	0.1	13.0			13.0							
MONCEAU ROAD	4A	5A	0.44	0.44		70		31	31							0.1	31	4.00	0.4	13.0			13.1	1.45	250	76.5	71.6	1.46	1.09	18%
		5A	0.15	0.15		50		8	8							0.0	8	4.00	0.1	13.0			13.0							
TAURUS ROAD	5A	6A	0.24	1.14		70		17	75							0.2	75	4.00	1.1	13.0			13.2	0.57	250	70.7	44.9	0.91	0.78	29%
TAURUS ROAD	6A	53A-S	0.31	2.78		70		22	187							0.6	187	4.00	2.6	13.0			13.6	1.24	250	74.2	66.2	1.35	1.04	20%
ROBERT PARKINSON DRIVE	52A	53A-S	1.00	1.00		50		50	50							0.2	50	4.00	0.7	13.0			13.2	1.64	250	107.6	76.2	1.55	1.15	17%
ROBERT PARKINSON DRIVE	53A-S	54A	0.12	3.90					237							0.8	237	4.00	3.3	13.0			13.8	0.58	250	70.2	45.3	0.92	0.80	30%
TRURO CIRCLE	7A	8A	0.34	0.34		70		24	24							0.1	24	4.00	0.3	13.0			13.1	0.99	250	49.1	59.2	1.21	0.95	22%
TRURO CIRCLE	8A	9A-S	0.16	0.50		50		8	32							0.1	32	4.00	0.4	13.0			13.1	0.72	250	22.7	50.5	1.03	0.85	26%
		9A-S	0.03	0.03		70		3	3							0.0	3	4.00	0.0	13.0			13.0							
TRURO CIRCLE	9A-S	10A	0.40	0.93		50		20	55							0.2	55	4.00	0.8	13.0			13.2	0.43	250	60.1	39.0	0.79	0.69	34%
TRURO CIRCLE	10A	11A	0.17	1.10		50		9	64							0.2	64	4.00	0.9	13.0			13.2	0.96	250	15.5	58.3	1.19	0.94	23%
TRURO CIRCLE	11A	12A-E	0.36	1.46		50		18	82							0.3	82	4.00	1.1	13.0			13.3	0.49	250	86.6	41.6	0.85	0.74	32%
		12A-E	0.22	0.22		70		16	16							0.0	16	4.00	0.2	13.0			13.0							
TRURO CIRCLE	12A-E	54A	0.68	2.36		70		48	146							0.5	146	4.00	2.0	13.0			13.5	1.60	250	120.4	75.2	1.53	1.15	18%
HUMBERSTONE CRESCENT	53A-E	32A	0.30	0.30		70		21	21							0.1	21	4.00	0.3	13.0			13.1	0.91	250	74.2	56.7	1.16	0.91	23%
EXHIBITION CRESCENT	31A	32A	0.66	0.66		70		47	47							0.1	47	4.00	0.7	13.0			13.1	0.97	250	117.1	58.6	1.19	0.94	22%
		32A	0.10	0.10		50		5	5							0.0	5	4.00	0.1	13.0			13.0							
HUMBERSTONE CRESCENT	32A	33A	0.29	1.35		50		15	88							0.3	88	4.00	1.2	13.0			13.3	1.34	250	70.1	68.8	1.40	1.07	19%
EXHIBITION CRESCENT	28A	29A	0.26	0.26		70		19	19							0.1	19	4.00	0.3	13.0			13.1	1.44	250	47.3	71.4	1.45	1.09	18%
EXHIBITION CRESCENT	29A	30A	0.09	0.35		70		7	26							0.1	26	4.00	0.4	13.0			13.1	0.50	250	13.1	42.0	0.86	0.75	31%
EXHIBITION CRESCENT	30A	33A	0.48	0.83		70		34	60							0.2	60	4.00	0.8	13.0			13.2	0.62	250	1047.5	46.8	0.95	0.81	28%
		33A	0.15	0.15		50		8	8							0.0	8	4.00	0.1	13.0			13.0							
HUMBERSTONE CRESCENT	33A	34A	0.31	2.64		50		16	172							0.5	172	4.00	2.4	13.0			13.5	0.49	250	119.3	41.6	0.85	0.74	32%
		34A	0.34	0.34		70		24	24							0.1	24	4.00	0.3	13.0			13.1							
HUMBERSTONE CRESCENT	34A	35A	0.06	3.04		50		3	199							0.6	199	4.00	2.8	13.0			13.6	0.50	250	13.3	42.0	0.86	0.75	32%
BLOCK 195 (COMMERCIAL)	DEALERSHIP	CTRL 95A	0.99	0.99		50		50	50							0.2	50	4.00	0.7	13.0			13.2		250					
HUMBERSTONE CRESCENT	CTRL 95A	96A	0.02	1.01					50							0.2	50	4.00	0.7	13.0			13.2	1.79	250	35.4	79.6	1.62	1.20	17%
HUMBERSTONE CRESCENT	96A	35A	0.01	1.02					50							0.2	50	4.00	0.7	13.0			13.2	0.87	250	14.1	55.5	1.13	0.92	24%
HUMBERSTONE CRESCENT	35A	36A	0.24	4.30		70		17	266							0.9	266	4.00	3.7	13.0			13.9	0.51	250	50.8	42.5	0.87	0.75	33%
HUMBERSTONE CRESCENT	36A	37A	0.09	4.39		50		5	271							0.9	271	4.00	3.8	13.0			13.9	0.26	250	14.0	30.3	0.62	0.59	46%
HUMBERSTONE CRESCENT	37A	38A	0.31	4.70		70		22	293							0.9	293	4.00	4.1	13.0			13.9	0.50	250	65.0	42.0	0.86	0.75	33%
		38A	0.08	0.08		50		4	4							0.0	4	4.00	0.1	13.0			13.0							
HUMBERSTONE CRESCENT	38A	381A	0.54	5.32		50		27	324							1.1	324	4.00	4.5	13.0			14.1	0.49	250	87.3	41.6	0.85	0.74	34%
		381A	0.06	0.06		70		5	5							0.0	5	4.00	0.1	13.0			13.0							
HUMBERSTONE CRESCENT	381A	54A	0.37	5.75		50		19	348							1.2	348	4.00	4.9	13.0			14.2	0.45	250	114.3	39.9	0.81	0.73	35%
		54A	0.40	0.40		70		28	28							0.1	28	4.00	0.4	13.0			13.1							
ROBERT PARKINSON DRIVE	54A	55A	0.12	12.53					759							2.5	759	3.87	10.3	13.0			15.5	0.47	300	71.5	66.3	0.94	0.74	23%
CAVESSON ROAD	15A	55A	0.58	0.58		70		41	41							0.1	41	4.00	0.6	13.0			13.1	1.12	250	78.9	62.9	1.28	0.99	21%

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TEL: 905.946.9461 FAX: 905.946.9595
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urbantech

AS CONSTRUCTED - SANITARY SEWER DESIGN SHEET

Paradise Homes North West Inc. - Phase 2

Region of Peel

PROJECT DETAILS

Registered Plan No: 43M-1947/43M-1948/43M-1949
City File No: C04W17.002B
Region File No: 21T-10011Ba
Project No: 11-368-PH2
Date: 28-Feb-20
Designed by: M.L.
Checked by: J.O.

DESIGN CRITERIA

Min. Flow =	13	l/s	Avg. Domestic Flow =	302.8	l/c/d
Min Diameter =	250	mm	Infiltration =	0.200	l/s/ha
Mannings 'n'=	0.013		Max. Peaking Factor =	4.00	
Min. Velocity =	0.75	m/s	Min. Peaking Factor=	1.50	
Max. Velocity =	3.50	m/s	Domestic Sewage flow for < 1000 ppl = 0.013m³/s		
Factor of Safety =	0	%	(Region of Peel Std. 2-5-2)		

NOMINAL PIPE SIZE USED

LICENSED PROFESSIONAL ENGINEER
J. ORMONDE
100089993
FEB 28, 2020
PROVINCE OF ONTARIO

STREET	FROM MH	TO MH	RESIDENTIAL AREA (ha)	RESIDENTIAL ACC. AREA (ha)	RESIDENTIAL UNITS (#)	RESIDENTIAL DENSITY (P/ha)	RESIDENTIAL DENSITY (P/unit)	RESIDENTIAL POP	RESIDENTIAL ACCUM. RES. POP.	COMMERCIAL/INDUSTRIAL/INSTITUTIONAL AREA (ha)	COMM/IND/INST ACC. AREA (ha)	COMM/IND/INST EQUIV. POP. (p/ha)	COMM/IND/INST FLOW RATE (l/s/ha)	COMM/IND/INST EQUIV. POP.	COMM/IND/INST ACCUM. EQUIV. POP.	FLOW CALCULATIONS INFILTRATION (l/s)	TOTAL ACCUM. POP.	PEAKING FACTOR	RES. FLOW (l/s)	MIN. RES. FLOW (l/s)	COMM. FLOW (l/s)	ACCUM. COMM. FLOW (l/s)	TOTAL FLOW (l/s)	PIPE DATA SLOPE (%)	PIPE DIAMETER (mm)	PIPE LENGTH (m)	FULL FLOW CAPACITY (l/s)	FULL FLOW VELOCITY (m/s)	ACTUAL VELOCITY (m/s)	PERCENT FULL (%)
MANZANITA CRESCENT	39A-N	40A	0.21	0.21		70		15	15							0.0	15	4.00	0.2	13.0			13.0	0.64	250	17.6	47.6	0.97	0.80	27%
MANZANITA CRESCENT	40A	55A	0.41	0.62		70		29	44							0.1	44	4.00	0.6	13.0			13.1	1.12	250	66.1	62.9	1.28	0.99	21%
ROBERT PARKINSON DRIVE	55A	56A	0.12	13.85					844							2.8	844	3.85	11.4	13.0			15.8	0.57	300	71.2	73.0	1.03	0.82	22%
ZENIDA ROAD	16A	56A	0.59	0.59		70		42	42							0.1	42	4.00	0.6	13.0			13.1	2.10	250	78.9	86.2	1.76	1.26	15%
MANZANITA CRESCENT	39A-S	41A	0.23	0.23		70		17	17							0.0	17	4.00	0.2	13.0			13.0	0.92	250	47.5	57.0	1.16	0.92	23%
MANZANITA CRESCENT	41A	42A	0.21	0.44		70		15	32							0.1	32	4.00	0.4	13.0			13.1	0.69	250	13.4	49.4	1.01	0.84	26%
MANZANITA CRESCENT	42A	56A	0.49	0.93		70		35	67							0.2	67	4.00	0.9	13.0			13.2	0.57	250	76.5	44.9	0.91	0.78	29%
ROBERT PARKINSON DRIVE	56A	57A	0.12	15.49					953							3.1	953	3.81	12.7	13.0			16.1	0.40	300	74.4	61.2	0.87	0.72	26%
TERRICK ROAD	12A-S	13A	0.26	0.26		50		13	13							0.1	13	4.00	0.2	13.0			13.1	0.90	250	72.3	56.4	1.15	0.91	23%
TERRICK ROAD	13A	14A	0.36	0.62		50		18	31							0.1	31	4.00	0.4	13.0			13.1	0.94	250	105.5	57.7	1.17	0.93	23%
TERRICK ROAD	14A	19A	0.19	0.81		50		10	41							0.2	41	4.00	0.6	13.0			13.2	0.72	250	42.9	50.5	1.03	0.85	26%
HAVERSTOCK CRESCENT	17A-N	18A	0.16	0.16		50		8	8							0.0	8	4.00	0.1	13.0			13.0	0.73	250	14.2	50.8	1.04	0.86	26%
HAVERSTOCK CRESCENT	18A	19A	0.70	0.86		50		35	43							0.2	43	4.00	0.6	13.0			13.2	0.68	250	99.1	49.0	1.00	0.83	27%
HAVERSTOCK CRESCENT	19A	20A	0.46	2.13		50		23	107							0.4	107	4.00	1.5	13.0			13.4	0.71	250	74.5	50.1	1.02	0.85	27%
HAVERSTOCK CRESCENT	20A	21A	0.13	2.26		50		7	114							0.5	114	4.00	1.6	13.0			13.5	0.72	250	16.5	50.5	1.03	0.85	27%
HAVERSTOCK CRESCENT	21A	57A	0.14	2.40		50		7	121							0.5	121	4.00	1.7	13.0			13.5	0.54	250	30.0	43.7	0.89	0.77	31%
BLOCK 194 (JUNIOR SCHOOL)	SCHOOL	CTRL 1A	2.85	2.85				200	200							0.6	200	4.00	2.8	13.0			13.6		250					
KILKARRIN ROAD	CTRL 1A	43A		2.85					200							0.6	200	4.00	2.8	13.0			13.6	1.13	250	12.4	63.2	1.29	0.99	21%
KILKARRIN ROAD	43A	44A	0.70	3.55		50		35	235							0.7	235	4.00	3.3	13.0			13.7	0.93	250	116.0	57.3	1.17	0.95	24%
KILKARRIN ROAD	44A	441A	0.40	3.95		50		20	255							0.8	255	4.00	3.6	13.0			13.8	0.39	250	65.3	37.1	0.76	0.68	37%
KILKARRIN ROAD	441A	57A	0.63	4.58		50		32	287							0.9	287	4.00	4.0	13.0			13.9	0.73	250	85.0	50.8	1.04	0.86	27%
ROBERT PARKINSON DRIVE	57A	58A	0.12	22.59					1361							4.5	1361	3.71	17.7	17.7			22.2	0.51	300	73.9	69.1	0.98	0.85	32%
HAVERSTOCK CRESCENT	17A-S	24A	0.25	0.25		50		13	13							0.1	13	4.00	0.2	13.0			13.1	1.04	250	60.3	60.6	1.24	0.98	22%
FRAMPTON ROAD	24A	25A	0.66	0.91		50		33	46							0.2	46	4.00	0.6	13.0			13.2	0.44	250	102.0	39.4	0.80	0.70	33%
FRAMPTON ROAD	25A	58A	0.78	1.69		50		39	85							0.3	85	4.00	1.2	13.0			13.3	0.85	250	116.7	54.8	1.12	0.90	24%
ROBERT PARKINSON DRIVE	58A	59A	0.12	24.40					1446							4.9	1446	3.69	18.7	18.7			23.6	0.53	300	71.3	70.4	1.00	0.87	34%
ENFORD CRESCENT	451A	45A	0.36	0.36		70		26	26							0.1	26	4.00	0.4	13.0			13.1	0.97	250	101.3	58.6	1.19	0.94	22%
		45A	0.45	0.45		50		23	23							0.1	23	4.00	0.3	13.0			13.1							
ENFORD CRESCENT	45A	46A	0.53	1.34		50		27	76							0.3	76	4.00	1.1	13.0			13.3	0.51	250	120.8	42.5	0.87	0.75	31%
		46A	0.30	0.30		70		21	21							0.1	21	4.00	0.3	13.0			13.1							
ENFORD CRESCENT	46A	47A	0.12	1.76		70		9	106							0.4	106	4.00	1.5	13.0			13.4	1.10	250	29.3	62.4	1.27	0.98	21%
ENFORD CRESCENT	47A	48A	0.10	1.86		70		7	113							0.4	113	4.00	1.6	13.0			13.4	1.39	250	13.3	70.1	1.43	1.09	19%
ENFORD CRESCENT	48A	49A	0.24	2.10		70		17	130							0.4	130	4.00	1.8	13.0			13.4	0.52	250	49.8	42.9	0.87	0.76	31%
ENFORD CRESCENT	49A	50A	0.09	2.19		50		5	135							0.4	135	4.00	1.9	13.0			13.4	0.61	250	13.7	46.4	0.95	0.80	29%
ENFORD CRESCENT	50A	51A	0.54	2.73		70		38	173							0.5	173	4.00	2.4	13.0			13.5	0.47	250	99.6	40.8	0.83	0.72	33%
		51A	0.12	0.12		50		6	6							0.0	6	4.00	0.1	13.0			13.0							
ENFORD CRESCENT	51A	511A	0.62	3.47		50		31	210							0.7	210	4.00	2.9	13.0			13.7	0.48	250	93.1	41.2	0.84	0.73	33%
ENFORD CRESCENT	511A	59A	0.08	3.55		50		4	214							0.7	214	4.00	3.0	13.0			13.7	0.58	250	73.3	45.3	0.92	0.80	30%
		59A	0.40	0.40		70		28	28							0.1	28	4.00	0.4	13.0			13.1							
HAVERSTOCK CRESCENT	23A	22A	0.25	0.25		50		13	13							0.1	13	4.00	0.2	13.0			13.1	1.44	250	50.4	71.4	1.45	1.09	18%
HAVERSTOCK CRESCENT	22A	26A	0.26	0.51		50		13	26							0.1	26	4.00	0.4	13.0			13.1	0.99	250	13.3	59.2	1.21	0.95	22%
HAVERSTOCK CRESCENT	26A	27A	0.63	1.14		50		32	58							0.2	58	4.00	0.8	13.0			13.2	0.96	250	94.7	58.3	1.19	0.94	23%
HAVERSTOCK CRESCENT	27A	59A	0.76	1.90		50		38	96							0.4	96	4.00	1.3	13.0			13.4	1.85	250	116.1	80.9	1.65	1.22	17%
ROBERT PARKINSON DRIVE	59A	38A (B.O.)	0.12	30.37					1784							6.1	1784	3.62	22.7	22.7			28.7	1.73	300	71.7	127.2	1.80	1.42	23%

***NOTE: For Sanitary Design Sheet downstream of 38A (B.O.), Please refer to Amber Fields Limited, Project No.: 11916, By Counterpoint Engineering.**

****NOTE: Alloa Pump Station will be constructed at a future date.**

Urbantech Consulting, A Division of Leighton-Zec Ltd.
3760 14th Avenue, Suite 301 Markham, Ontario L3R 3T7
TEL: 905.946.9461 FAX: 905.946.9595
www.urbantech.com

TYLIN CANADA
3381 Steeles Avenue East
Toronto, Ontario M2H 3S8
www.tylin.com

August 29, 2024

PROJECT NUMBER 10376

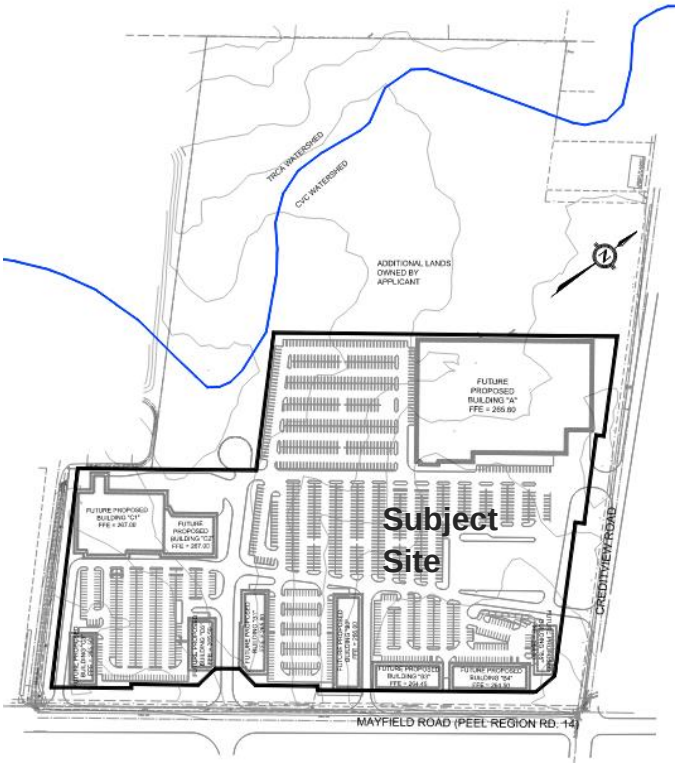
Town of Caledon
6311 Old Church Road
Caledon, Ontario
L7C 1J6

Re: Erosion and Sediment Control Report in Support of Site Alteration Permit Application – 12100 Creditview Road
Town of Caledon

1 Introduction and Project Description

This letter report has been prepared in support of a Site Alteration Permit application for approximately 12.9 ha of a proposed industrial development associated with 12100 Creditview Road in the Town of Caledon. The property is bound by Creditview Road to the northeast, Mayfield Road to the southeast, and existing vacant and agricultural land to the northwest and southwest as shown on **Figure 1-1.** This application is only for the southeastern portion of the property and the remaining lands are not proposed for development at this time.

Figure 1-1 Site Location



The Toronto and Region Conservation Authority (TRCA) Erosion and Sediment Control Guidelines for Urban Construction (2019) were used in the design of the erosion and sediment control plans. This letter outlines the criteria used in the design and the resulting technical characteristics of the temporary sediment control measures.

This letter report should be read in conjunction with the Site Alteration Control Plan (Drawings ESC-01 to ESC-03) prepared by TYLin (August 2024).

2 Existing Site Conditions

The subject site is currently agricultural land with an existing dwelling. The existing topography of the site has a gentle slope from west to east, towards the ditch located at Creditview and Mayfield Road with elevation differences of approximately 5.0-6.0m across the length of the site.

The TRCA and CVC watershed divide is located within the 12100 Creditview Road property. However, the subject area proposed to be developed and for the purpose of this application is located within the CVC watershed.

3 Existing Watercourse Conditions

There is no existing watercourse through the subject property.

4 Adjacent Areas and Features

The subject site is bound by Creditview Road to the northeast, Mayfield Road to the southeast, and existing vacant and agricultural land to the northwest and southwest. Adjacent lands to the east and west are being developed for commercial and residential uses. South of Mayfield Road, in the City of Brampton, there is an existing residential subdivision, developed as part of Block 51-1, Phase 2.

5 Receiving Water System

The erosion control pond will discharge to the existing 500mm diameter culvert along the Mayfield Road ditch just west of Creditview Road. The flows from the culvert will continue southerly through the clean water pipe to a realigned channel east of Thornbush Boulevard and eventually to Fletcher's Creek. The realigned channel is classified as warmwater community.

6 Soils

Soils in the area are Chinguacousy clay loam, which is characterized as a heavy textured till.

7 Critical Areas

No critical areas are located on the site.

8 Permanent Stabilization

The detailed erosion and sediment control plans (Drawings ESC-01 to ESC-03) provide the details regarding the site stabilization including the proposed seed mix to be used for stabilization.

9 Design Details of ESC Measures

9.1 Site Preparation

Prior to commencing the site alteration works, the subject site will be enclosed using silt fencing, as shown on the Site Alteration Control Plan (Drawings ESC-01 to ESC-03). Access to the subject site will be from Creditview Road and mud mats will be constructed and maintained during the duration of the construction.

Conveyance swales around the perimeter of the site will be extended to convey flows from the north and west portion of the site to the temporary SWM pond. The perimeter cut-off swales were graded to convey runoff based on existing grades. As the site is striped and filled, conveyance swales will be implemented according to Drawings ESC-01 to ESC-03. Overland swales have a trapezoidal cross section with 2:1 side slope, 0.60m bottom widths and a minimum depth of 0.5m to convey flows up to the 5-year flow. Refer to the attachments for calculations.

9.2 Temporary Sediment Control Pond

A Temporary sediment control pond shown on Drawing ESC-01 is proposed. The temporary sediment control pond is required to detain runoff long enough to allow soil particles to settle out of suspension. The temporary sediment control pond is located at the end of the drainage path. Flows will enter the temporary sediment control pond via overland swales, which have been sized to adequately convey the existing 5-year flows, as described in above sections.

9.2.1 Permanent Pool

The permanent pool has been designed with a minimum storage volume of 125 m^3/hectare of contributing drainage area. With a total tributary area of 12.9 ha, the temporary sediment control pond requires a permanent pool volume of 1,613 m^3.

The temporary sediment control pond design provides a total permanent pool volume of 2,240 m^3 at an elevation of 260.50 m with a maximum depth of 1.0 m. The sediment forebay is proposed to pre-treat incoming flows. The designed forebay length is 49.4m, which exceeds the required settling length of 12 m and the required dispersion length of 5 m. Please refer to the attachments for detailed calculations.

9.2.2 Active Storage

As per the Erosion and Sediment Control Guidelines (2019) the active storage component of the temporary sediment control pond should have a minimum 48-hour drawdown time; and should be designed with a minimum storage volume of 125 m^3/hectare of contributing drainage area. With a total tributary area of 12.9 ha, the temporary sediment control pond requires 1,613m^3 of active storage. An active storage volume of 2,310m^3 has been provided within the temporary sediment control pond between the elevations of 260.50m (permanent pool level) and 261.20m (maximum high water level).

The required outflow of 14L/s is calculated by dividing the required active storage volume for 12.9 ha at 125 m^3/ha (1,613 m^3) by the minimum drawdown time of 48 hours ([Volume / drawdown time] x 1.5).

The required outflow rate will be achieved through the implementation of a vertical riser pipe, discharging through a 200 mm diameter PVC pipe fitted with a 90 mm diameter orifice plate set at an invert elevation of 260.50 m, which is equal to the permanent pool water level. The outlet details are shown on Drawing ESC-01-03**.**

Table 9-1 Summary of Temporary Sediment Control Pond Specifications

Pond Component	Stage (m)	Depth (m)	Required / Provided Storage Volume (m^3)	Design Release Rate (L/s)	Outlet Description
Permanent Pool	260.50	1.0	1,613/2,240	---	---
Required Active Storage	261.00	0.50	1,613/1,650	12	Control provided by a 90 mm diameter orifice set at 260.50 m
Provided Active Storage	261.20	0.70	1,613/2,310	14	

10 Record Keeping Procedures and Maintenance

During construction the designated site inspector shall inspect the site as per the notes on Drawing ESC-01 and ensure that all required maintenance is completed. A sample Inspection Report template is attached to this letter.

The following are the maintenance and inspection activities outlined on Drawing ESC-01.

Inspections

- Weekly inspection of all sediment control measures and after each rain event, any failure must be repaired immediately.

Sediment Trap

- The sediment trap will require cleaning when sediment accumulation reaches 50% of the height of the sediment trap.
- Sediment trap inlet, outlet, and side slopes should be inspected weekly and after each rainfall and significant snowmelt events.

Temporary Sediment Pond

- Sediment accumulation in the pond must be measured a minimum of once every six (6) months. The pond will require cleaning when sediment accumulation reaches 50% of the forebay design capacity (or 0.6m depth).
- Sediment pond embankments, outlet, and spillway should be inspected weekly and after each rainfall and significant snowmelt events.

Sediment Fences

- Sediment control fences must be inspected regularly, and after every rainfall, to identify failed sections. Any repairs must be undertaken immediately to restore the fencing.
- When sediment accumulates to the half the height of the geotextile it should be removed and disposed of in a controlled area.
- A supply of sediment control fence should be kept on site to provide for quick repairs, or the installation of additional fence as required.

Mud Mat

- The granular material will require periodic replacement as it becomes contaminated by vehicle traffic.
- Sediment shall be removed from public roads by shovelling or sweeping and disposed of properly in a controlled sediment disposal area.

Conveyance Swales

- Conveyance swales should be inspected periodically, and cleaning will be required when the measured depth of the sediments accumulated reaches 30% of depth behind flow interruption devices.

11 Emergency Contact

A list of emergency and non-emergency contacts will be kept on construction site all the time.

12 Closing

We trust that this Erosion and Sediment Control Plan satisfies your requirements. Should you have any questions or comments please contact the undersigned.

Sincerely,

T.Y. LIN INTERNATIONAL CANADA INC.

Rosalie Chung, P.Eng.
Water Resources Engineer
rosalie.chung@tylin.com

Encl: Temporary Sediment Pond Calculations
Cut of Swales Calculations
Inspection Report Template

ATTACHMENTS

Temporary Sediment Ponds Calculations

Temporary Sediment Control Pond **Project#:** **10376**

Storage Requirements **Date:** **August 2024**

Erosion & Sediment Control Guideline for Urban Construction
Sediment Pond

Drainage Area:	12.9	ha
Permanent Pool Volume:	125	m^3/hectare drainage area
Active Storage Volume:	125	m^3/hectare drainage area
Required Permanent Pool Volume:	**1,613**	**m^3**
Required Active Storage Volume:	**1,613**	**m^3**
Total	**3225**	**m^3**

Drawdown Time
(Minimum 48 hr Drawdown Time)

Active Storage Volume:	**1,613**	**m^3**
Estimated Peak Release Rate	**14.0**	**L/s**

(1.5 times of average flow)

Temporary Sediment Control Pond
Provided Storage Calculations

Project#: 10376
Date: August 2024

POND CHARACTERISTICS

Base of Pond:	259.50	
N.W.L.:	260.50	masl
Increment for Volume:	0.1	m
Required Permanent Pool Volume:	**1,613**	m^3
Required Active Pool Volume:	**1,613**	m^3
Permanent Pool Volume Provided:	**2,240**	m^3

VOLUME

Known Water Level:	261.00	
	INCL. P.P.	ACTIVE ONLY
Lower Known Elevation:	260.5	
Lower Known Volume:	2,240.25	
Upper Known Elevation:	261.2	
Upper Known Volume:	4,550.74	
Volume of Known W.L. Elevation:	**3,891**	**1,650**
Active Storage Required:		**1,613**

Water Level of Known Volume

Known Volume:	565	1613
	INCL. P.P.	ACTIVE ONLY
Lower Known Elevation:	259.5	260.50
Lower Known Volume:	0	0.00
Upper Known Elevation:	260.5	261.20
Upper Known Volume:	2240.246	2310.50
W.L. Elevation of Known Volume:	**259.75**	**260.99**

Permanent Pool Volume Provided:	**2,240**	m^3
Active Pool Volume Provided:	**2,310**	m^3

STAGE / STORAGE INFORMATION

	Elevation (m)	Stage (m)	Area 1 (m^2)	Area 2 (m^2)	Total Area (m^2)	Avg. Area (m^2)	Incremental Storage (m^3)	Cumulative Storage (m^3)	Cumulative Storage above Permanent Pool (m^3)
Pond Base:	259.50	0.00	445.2	1,181.5	1,626.7		0.0		
NWL	260.50	1.00	935.7	1,918.1	2,853.8	2,240.2	2,240.2	**2,240**	**0**
HWL/Regional	261.20	1.70	3,747.6		3,747.6	3,300.7	2,310.5	**4,551**	**2,310**
Freeboard	261.50	2.00	4,094.0		4,094.0	3,920.8	1,176.2	**5,727**	**3,487**

Temporary Sediment Control Pond **Project#: 10376**

Release Rate and Orifice Sizing August 2024

Allowable Release Rate = 0.014 m^3/s (Estimated Release Rate)

CALCULATE DIAMETER KNOWING Q & H	
$Q(m^3/s)$ =	0.014
Td (m) =	0.70
Approx A =	0.0061
Approx D =	88
$A(m^2)$ =	0.006
D(mm) =	**90**

Orifice Plate	
DIA (mm) =	**90**
AREA (m^2) =	0.006
COEFF =	**0.62**
GRAVITY =	9.81
K =	1.0

TOTAL DEPTH m	Invert= 260.50 m Head m	Qp m^3/s	TOTAL FLOW Qp m^3/s	ELEVATION m	
0.00	**0.000**	**0.000**	**0.000**	**260.50**	NWL
0.100	0.055	0.004	0.004	260.60	
0.200	0.155	0.007	0.007	260.70	
0.300	0.255	0.009	0.009	260.80	
0.400	0.355	0.010	0.010	260.90	
0.500	0.455	0.012	0.012	261.00	
0.600	0.555	0.013	0.013	261.10	
0.700	**0.655**	**0.014**	**0.014**	**261.20**	hwl
0.800	0.755	0.015	0.015	261.30	
0.900	0.855	0.016	0.016	261.40	
1.000	**0.955**	**0.017**	**0.017**	**261.50**	Free board

ORIFICE FLOW

$Qp(m^3/s) = COEF \times AREA \times (2 \times GRAVITY \times HEAD / K)^{0.5}$

$Approx\ A = Q / (COEF \times (2 \times GRAVITY \times Td / K)^{0.5})$

$Approx\ D = ((Approx\ A / PI)^{0.5}) \times 2 \times 1000$

$A\ (m^2) = Q / (COEF \times (2 \times GRAVITY \times (Td - (0.5 \times Approx\ D / 1000)) / K)^{0.5})$

$D(mm) = ((A / PI)^{0.5}) \times 2 \times 1000$

WEIR FLOW $Q(m^3/s) = C \times L \times H^{1.5}$ C=1.5

Temporary Sediment Control Pond **Project#: 10376**

Drawdown Time

Stage-Storage-Discharge:

	Stage		Storage	Total Flow	Drain Time at Each Interval	Total Drain Time
	Water Elevation (m)	Water Elevation Above Orifice Inv. (m)	(m^3)	(m^3/s)	(hrs)	(hrs)
Orifice Invert	260.50	0.00	0	0.000	na	0.00
	260.60	0.10	275	0.004	18.62	18.62
	260.70	0.20	660	0.007	15.57	34.19
	260.80	0.30	990	0.009	10.39	44.58
	260.90	0.40	1,320	0.010	8.81	53.39
	261.00	0.50	1,650	0.012	7.78	61.17
	261.10	0.60	1,980	0.013	7.04	68.21
HWL	261.20	0.70	2,310	0.014	6.48	**74.70**

FOREBAY CALCULATIONS

PROJECT #: 10376

Temporary Sediment Control Pond

August 2024

PERMANENT POOL REQUIREMENTS

INPUT AREA

LENGTH TO WIDTH RATIO (r):	4.2		
PEAK QUALITY STORM RELEASE RATE:	0.0140	m^3/s	
2 YEAR PEAK STORM FLOW INTO POND:	0.37	m^3/s	
PARTICLE SETTLING VELOCITY (v_s):	3.00E-04	m/s	3.00E-4 FOR 150um PARTICLES
PROVIDED PERMANENT POOL DEPTH:	1.00	m	
PERMANENT POOL BERM TARGET VELOCITY:	0.5	m/s	0.5 STANDARD

SETTLING LENGTH CALCULATION

PERMANENT POOL LENGTH:	**14**	

DISPERSION LENGTH CALCULATION

PERMANENT POOL LENGTH:	**6**	

PERMANENT POOL DIMENSIONS (REQUIRED)

PERMANENT POOL LENGTH:	**14**	
PERMANENT POOL WIDTH:	**3**	

Provided Forebay dimensions:

PERMANENT POOL LENGTH:	49.4	m
PERMANENT POOL WIDTH:	11.9	m
PERMANENT POOL DEPTH:	**1.00**	m

Temporary Sediment Control Pond **Project#: 10376**

Emergency Spillway

Date: August 2024

SWM Pond Emergency Spillway

Weir Parameters

Weir Length (L)	4	m	
Weir Top Width (Bt)	8	m	
Weir Bottom Width (Bb)	5	m	
Median Width (B)	6.5	m	
MAX Qinlet (100 year peak flow)	0.813	m^3/s	(rational method)
Crest Elevation	261.20	m	
Top of Weir Elevation	261.50	m	
Depth of Weir	0.30	m	

Weir Calculations ($Q = Cd * b * H^{3/2}$)

Water Level (H)	H/L	Cd	Q
0.05	0.013	1.40	0.10
0.10	0.025	1.40	0.29
0.15	0.038	1.48	0.56
0.20	0.050	1.52	0.88
0.25	0.063	1.53	1.24
0.30	0.075	1.55	1.66

Therefore, maximum capacity of spillway is

1.66 m^3/s

Note: The minimum weir bottom width shall be 8.0m long as per the Erosion & Sediment Control Guideline for Urban Construction

Cut-Off Swales

12100 Creditview Road
Town of Caledon

Project # : 10376

Date: August 2024

Preconstruction Conditions

Runoff coefficient calculation

Feature	*Area (ha)*	*Runoff Coefficient*	*Imperviousness*
Site	*12.90*	*0.25*	*0.07*
Overall Total	***12.90***	***0.25***	***0.07***

Time of Concentration

Upland Method

Area (ha)	12.90	
Length (m)	390	
Slope (%)	1.03	
Velocity (m/s)	0.21	pasture lands
N	3	
Tc (hr)	0.51	

Note:
-Velocity is obtained from Figure A.5.2
-Tc = L / V
-Tp = (N-1)/N*Tc

Tc = 30.40 min

Rainfall Intensity (Town of Milton)

Return Period	*A*	*B*	*C*	*Rainfall Intensity, i*	
2 year	*779.0*	*6.0*	*0.821*	*40.783*	*mm/hr*
5 year	*959.0*	*5.7*	*0.802*	*53.958*	*mm/hr*
10 year	*1089.0*	*5.7*	*0.796*	*62.807*	*mm/hr*
25 year	*1234.0*	*5.5*	*0.786*	*73.879*	*mm/hr*
50 year	*1323.0*	*5.3*	*0.779*	*81.777*	*mm/hr*
100 year	*1435.0*	*5.2*	*0.775*	*90.012*	*mm/hr*

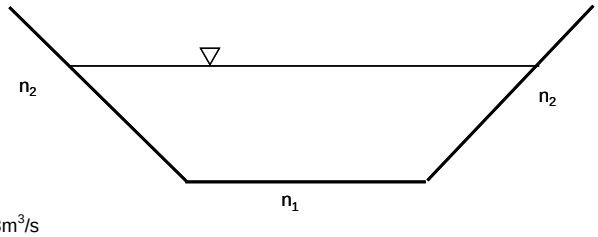
Existing Peak Discharge

Rational Runoff Coefficient, c	*0.25*	
Drainage Area, A	*12.90*	*ha*
2 Year Peak Discharge, Q_2	*0.368*	*m^3/s*
5 Year Peak Discharge, Q_5	*0.487*	*m^3/s*
10 Year Peak Discharge, Q_{10}	*0.567*	*m^3/s*
25 Year Peak Discharge, Q_{25}	*0.667*	*m^3/s*
50 Year Peak Discharge, Q_{50}	*0.738*	*m^3/s*
100 Year Peak Discharge, Q_{100}	*0.813*	*m^3/s*

Manning's Equation Calculator
for Trapezoidal Channels

Input:

Bottom Width =	**0.60**	m
Bottom 'n_1' =	0.025	
Side Slope =	2	:1
Side 'n_2' =	0.025	
Long. Slope =	0.0076	m/m
Depth =	0.50	m



Output:

Flow =	1.301	m^3/s	> 5 year flow of 0.38m^3/s
Velocity =	1.627	m/s	

Top Width of water = 2.60 m

Freeboard **0.22**

Summary of Channel Dimenstions and Check for high velocities:

2 :1

Slope	Flow depth		Ditch Width	Flow (m3/s)	Velocity (m/s)	Note
0.005	0.31		1.83	0.380	1.018	
0.006	0.29		1.78	0.380	1.089	
0.007	0.28		1.73	0.380	1.152	
0.008	0.27		1.70	0.380	1.210	Use Rip-Rap Class I
0.009	0.27		1.66	0.380	1.263	Use Rip-Rap Class I
0.010	0.26		1.64	0.380	1.313	Use Rip-Rap Class I
0.011	0.25		1.61	0.380	1.359	Use Rip-Rap Class I
0.012	0.25		1.59	0.380	1.403	Use Rip-Rap Class I

Note:
As per TRCA Erosion and Control Guideline "The typical threshold velocity before a well-grassed channel begins to erode is 1.2 m/s"

Inspection Report Template

Erosion and Sediment Control Guide
For Urban Construction

Prepared by:
Toronto and Region Conservation Authority

2019

APPENDIX F: ESC INSPECTION REPORT TEMPLATE

ESC INSPECTION REPORT TEMPLATE

Date:_____ Weather/Time:_____

Project Site:_____ Reason for Visit:_____

Inspector Name:_____

Recipients:

List of report recipients and e-mail

ACTION ITEMS:

Item Number	Location	Description	Date	Completion Date	Weeks Recurring

a table listing active/ongoing maintenance, repair and replacement requirements can be used to summarize a detailed report. This can provide quick reference "Checklist/To Do" for the contractor.

Detailed ESC Report to Follow:

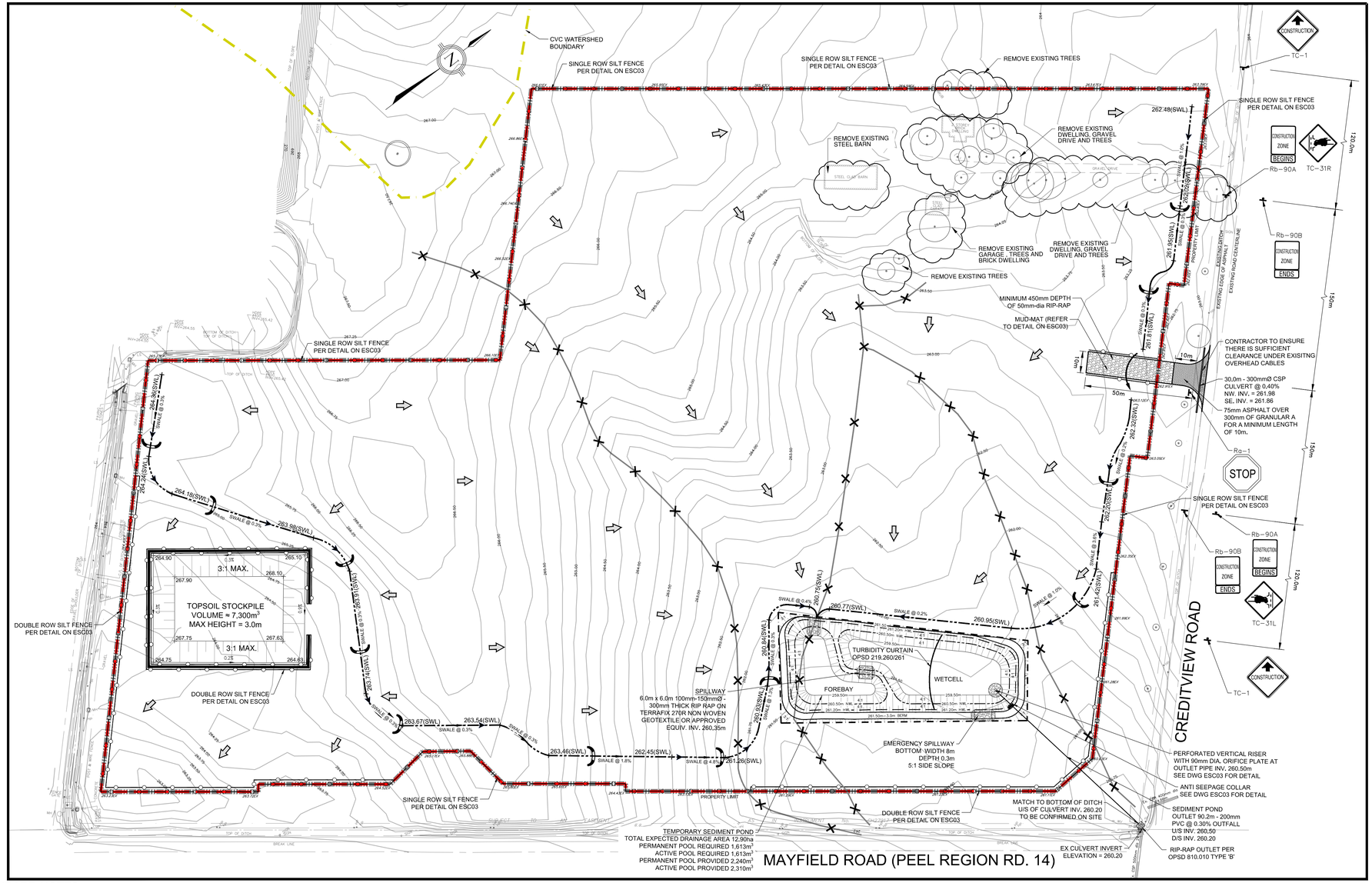
Item #:

Clear and concise description of what should be done…action item including a representative date stamped photo of the concern.

This should be done for each item every inspection.

MAP – *attach a site plan/drawing and note the action items (new and recurring) that appear on the corresponding inspection report to ensure locations of corrective/actions items are clear. This is particularly useful for large projects.*

Signature_____ Date_____


CVC WATERSHED BOUNDARY
SINGLE ROW SILT FENCE PER DETAIL ON ESC03
REMOVE EXISTING TREES
REMOVE EXISTING STEEL BARN
REMOVE EXISTING DWELLING, GRAVEL DRIVE AND TREES
REMOVE EXISTING GARAGE, TREES AND BRICK DWELLING
MINIMUM 450mm DEPTH OF 50mm-dia RIP-RAP
MUD-MAT (REFER TO DETAIL ON ESC03)
CONTRACTOR TO ENSURE THERE IS SUFFICIENT CLEARANCE UNDER EXISITNG OVERHEAD CABLES
30.0m - 300mmØ CSP CULVERT @ 0.40%
N/V. INV. = 261.98
SE. INV. = 261.86
75mm ASPHALT OVER 300mm OF GRANULAR A FOR A MINIMUM LENGTH OF 10m.
TOPSOIL STOCKPILE VOLUME ≈ 7,300m³ MAX HEIGHT = 3.0m
3:1 MAX.
DOUBLE ROW SILT FENCE PER DETAIL ON ESC03
SPILLWAY 6.0m x 6.0m 100mm-150mmØ - 300mm THICK RIP RAP ON TERRAFIX 270R NON WOVEN GEOTEXTILE OR APPROVED EQUIV. INV. 260.35m
TURBIDITY CURTAIN OPSD 219.260/261
FOREBAY
WETCELL
EMERGENCY SPILLWAY BOTTOM WIDTH 8m DEPTH 0.3m 5:1 SIDE SLOPE
PERFORATED VERTICAL RISER WITH 90mm DIA. ORIFICE PLATE AT OUTLET PIPE INV. 260.50m SEE DWG ESC03 FOR DETAIL
ANTI SEEPAGE COLLAR SEE DWG ESC03 FOR DETAIL
SEDIMENT POND OUTLET 90.2m - 200mm PVC @ 0.30% OUTFALL U/S INV. 260.50 D/S INV. 260.20
RIP-RAP OUTLET PER OPSD 810.010 TYPE 'B'
MATCH TO BOTTOM OF DITCH U/S OF CULVERT INV. 260.20 TO BE CONFIRMED ON SITE
EX CULVERT INVERT ELEVATION = 260.20
TEMPORARY SEDIMENT POND
TOTAL EXPECTED DRAINAGE AREA 12.90ha
PERMANENT POOL REQUIRED 1,613m³
ACTIVE POOL REQUIRED 1,613m³
PERMANENT POOL PROVIDED 2,240m³
ACTIVE POOL PROVIDED 2,310m³
MAYFIELD ROAD (PEEL REGION RD. 14)
CREDITVIEW ROAD
CONSTRUCTION
TC-1
TC-31R
TC-31L
CONSTRUCTION ZONE BEGINS
CONSTRUCTION ZONE ENDS
Rb-90A
Rb-90B
Rb-1
STOP
120.0m
150m
DOUBLE ROW SILT FENCE PER DETAIL ON ESC03
SINGLE ROW SILT FENCE PER DETAIL ON ESC03
DOUBLE ROW SILT FENCE PER DETAIL ON ESC03
SINGLE ROW SILT FENCE PER DETAIL ON ESC03
DOUBLE ROW SILT FENCE PER DETAIL ON ESC03
SINGLE ROW SILT FENCE PER DETAIL ON ESC03
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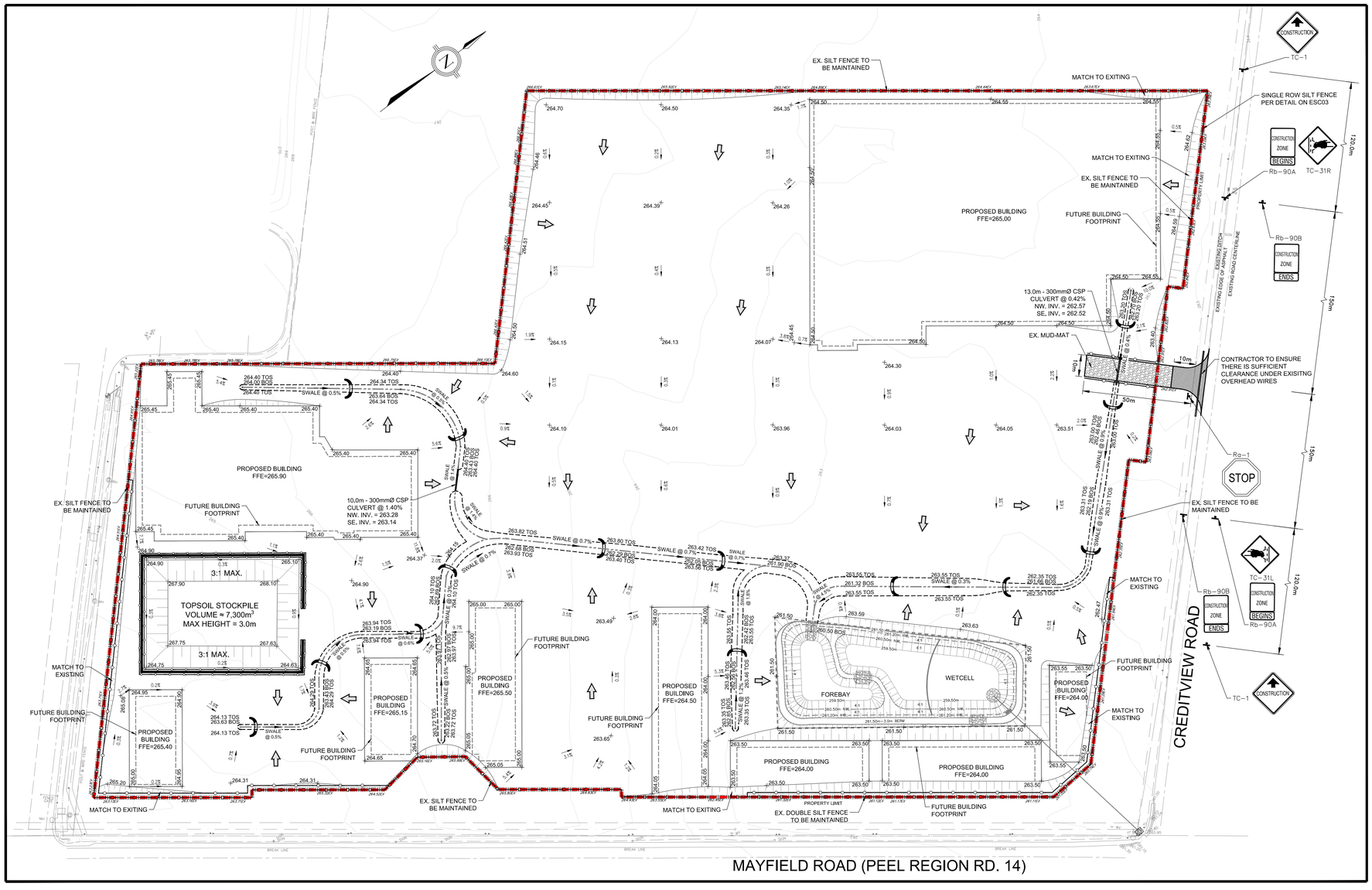
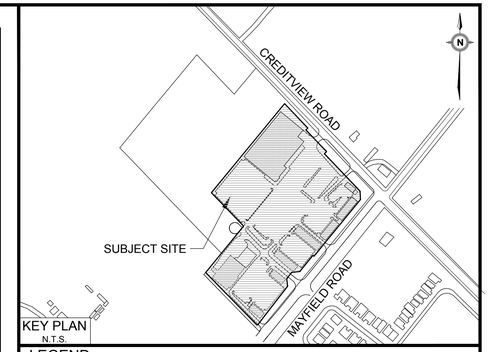
SING





LEGEND

- FILTREXX CHECK DAM AS PER DETAIL (ESC03)
- 265.11 — PRE-GRADE ELEVATIONS
- 265.36 TOS — PROPOSED TOP OF SWALE
- 265.36 BOS — PROPOSED BOTTOM OF SWALE
- 265.65 EX — EXISTING ELEVATION
- 265 — EXISTING CONTOUR
- STRAW BALES — DOUBLE ROW SILT FENCE (AS PER DETAIL ON ESC03)
- SILT CONTROL FENCE (AS PER DETAIL ON ESC03)
- SWALE @ 1.60% — CUT OFF SWALES AS PER DETAIL ON ESC03
- SWALE @ 2.00% — EXISTING STAGE 1 SWALE
- OVERLAND FLOW DIRECTION
- PROPERTY LIMIT
- CONSTRUCTION LIMIT – STAGE 2
- MUD-MAT (AS PER DETAIL ON ES03)

REGION NOTES:

1. THE APPLICANT, APPLICANT'S REPRESENTATIVE CONSULTANT, CONTRACTOR AND SUB CONTRACTOR ARE RESPONSIBLE TO ENSURE THAT THEIR DESIGN AND CONSTRUCTION PRACTICES CONFORM TO THE LATEST REGION OF PEEL STANDARDS, SPECIFICATIONS AND DESIGN CRITERIA, POSTED ON THE REGION OF PEEL'S WEBSITE (www.peelregion.ca/pw/standards).

No.	REVISIONS	Date	By	Approved
1	FIRST SUBMISSION	AUGUST 2024	U.A.	A.A.

BENCHMARK: SET CUT CROSS 0.35m FROM SOUTH FACE OF CONCRETE HEAD WALL ALONG EAST SIDE OF ENTRANCE ROAD. 200m NORTH OF MAYFIELD ROAD. ELEVATION 265.29m

ELEVATION: ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM THE CITY OF BRAMPTON HORIZONTAL CONTROL MONUMENT: No. 042200357 AT ELEVATION=260.691m

LICENSED PROFESSIONAL ENGINEER — A.A. AHMADZAI — 100161453 — PROVINCE OF ONTARIO

REGION FILE No: XX | Designed By: | TOWN FILE No: XX

TOWN OF CALEDON

TYLin
3381 Steeles Avenue East, Suite 315
Toronto, ON
M2H 3S8
p: 905.738.5700
f: 905.738.0065

12100 CREDITVIEW DEVELOPMENTS LTD.

EROSION & SEDIMENTATION PLAN STAGE 2 (PRE-GRADE)

SCALE: 1:1000	CHECKED BY: A.A.	PROJECT NO.	10376
DESIGNED BY: U.A.	DRAWN BY: U.A./R.P.	DRAWING NO.	ESC02
CHECKED BY: D.M.	DATE: AUGUST 2024	SHEET NO.	02

CVC STANDARD NOTES

1. "EROSION AND SEDIMENT CONTROL (ESC) MEASURES WILL BE IMPLEMENTED PRIOR TO, AND MAINTAINED DURING THE CONSTRUCTION PHASES, TO PREVENT ENTRY OF SEDIMENT INTO THE WATER. ALL DAMAGED EROSION AND SEDIMENT CONTROL MEASURES SHOULD BE REPAIRED AND/OR REPLACED WITHIN 48 HOURS OF THE INSPECTION."
2. "DISTURBED AREAS WILL BE MINIMIZED TO THE EXTENT POSSIBLE, AND TEMPORARILY OR PERMANENTLY STABILIZED OR RESTORED AS THE WORK PROGRESSES."
3. "ALL IN-WATER AND NEAR WATER WORKS WILL BE CONDUCTED IN THE DRY WITH APPROPRIATE EROSION AND SEDIMENT CONTROLS."
4. "THE EROSION AND SEDIMENT CONTROL STRATEGIES OUTLINED ON THE PLANS ARE NOT STATIC AND MAY NEED TO BE UPGRADED/AMENDED AS SITE CONDITIONS CHANGE TO MINIMIZE SEDIMENT LADEN RUNOFF FROM LEAVING THE WORK AREAS. IF THE PRESCRIBED MEASURES ON THE PLANS ARE NOT EFFECTIVE IN PREVENTING THE RELEASE OF A DELETERIOUS SUBSTANCE, INCLUDING SEDIMENT, THEN ALTERNATIVE MEASURES MUST BE IMPLEMENTED IMMEDIATELY TO MINIMIZE POTENTIAL ECOLOGICAL IMPACTS. CVC ENFORCEMENT OFFICER SHOULD BE IMMEDIATELY CONTACTED. ADDITIONAL ESC MEASURES TO BE KEPT ON SITE AND USED AS NECESSARY."
5. "AN ENVIRONMENTAL MONITOR WILL ATTEND THE SITE TO INSPECT ALL NEW CONTROLS, AS WELL AS ON A WEEKLY BASIS, OR FOLLOWING RAIN/SNOWMELT EVENT, TO MONITOR ALL WORKS, AND IN PARTICULAR WORKS RELATED TO EROSION AND SEDIMENT CONTROLS, DEWATERING OR UNWATERING, RESTORATION AND IN- OR NEAR-WATER WORKS. SHOULD CONCERNS ARISE ON SITE THE ENVIRONMENTAL MONITOR WILL CONTACT THE CVC ENFORCEMENT OFFICER AS WELL AS THE PROPONENT."
6. "ALL ACTIVITIES, INCLUDING MAINTENANCE PROCEDURES, WILL BE CONTROLLED TO PREVENT THE ENTRY OF PETROLEUM PRODUCTS, DEBRIS, RUBBLE, CONCRETE OR OTHER DELETERIOUS SUBSTANCES INTO THE WATER. VEHICULAR REFUELING AND MAINTENANCE WILL BE CONDUCTED A MINIMUM OF 30 METRES FROM THE WATER."
7. "ALL GRADES WITHIN THE REGULATORY FLOOD PLAIN WILL BE MAINTAINED OR MATCHED."
8. "THE PROPONENT/CONTRACTOR SHALL MONITOR THE WEATHER SEVERAL DAYS IN ADVANCE OF THE ONSET OF THE PROJECT TO ENSURE THAT THE WORKS WILL BE CONDUCTED DURING FAVOURABLE WEATHER CONDITIONS. SHOULD AN UNEXPECTED STORM ARISE, THE CONTRACTOR WILL REMOVE ALL UNFIXED ITEMS FROM THE REGIONAL STORM FLOOD PLAIN THAT WOULD HAVE THE POTENTIAL TO CAUSE A SPILL OR AN OBSTRUCTION TO FLOW, E.G., FUEL TANKS, PORTA-POTTIES, MACHINERY, EQUIPMENT, CONSTRUCTION MATERIALS, ETC."
9. "ALL DEWATERING/UNWATERING SHALL BE TREATED AND RELEASED TO THE ENVIRONMENT AT LEAST 30 METRES FROM A WATERCOURSE OR WETLAND AND ALLOWED TO DRAIN THROUGH A ELL-VEGETATED AREA. NO DEWATERING EFFLUENT SHALL BE SENT DIRECTLY TO ANY WATERCOURSE, WETLAND OR FOREST, OR ALLOWED TO DRAIN ONTO DISTURBED SOILS WITHIN THE WORK AREA. THESE CONTROL MEASURES SHALL BE MONITORED FOR EFFECTIVENESS AND MAINTAINED OR REVISED TO MEET THE OBJECTIVE OF PREVENTING THE RELEASE OF SEDIMENT LADEN WATER."
10. "ALL ACCESS TO THE WORK SITE SHALL BE FROM EITHER SIDE OF THE WATERCOURSE. NO EQUIPMENT OR VEHICLES ARE PERMITTED TO CROSS THROUGH THE WATERCOURSE UNLESS APPROVED BY CVC."
11. "IN ORDER TO COMPLY WITH THE MIGRATORY BIRDS CONVECTION ACT, CVC RECOMMENDS THAT TREE REMOVALS BE COMPLETED BETWEEN AUGUST 1 AND APRIL 1."
12. "TO PROTECT LOCAL FISH POPULATIONS DURING THEIR SPAWNING, NURSERY AND MIGRATORY PERIODS, IN-WATER/NEAR-WATER ACTIVITIES, MAY ONLY OCCUR DURING THE FOLLOWING TIME PERIOD. JULY 1 TO SEPT 15.
13. "FISH AND WILDLIFE STRANDED WITHIN THE WORK AREA SHALL BE CAPTURED AND RELEASED LIVE IN SUITABLE HABITAT UPSTREAM OF THE WORK AREA UNDER THE SUPERVISION OF A QUALIFIED AQUATIC BIOLOGIST. A PERMIT FROM THE MINISTRY OF NATURAL RESOURCES IS REQUIRED."
14. "PLEASE NOTIFY CVC ENFORCEMENT OFFICER AND CVC PROJECT MANAGER 48 HOURS PRIOR TO COMMENCING CONSTRUCTION."
15. "AN ENVIRONMENTAL MONITOR WILL BE ON SITE, AND PROVIDE ADVICE, TO ENSURE THAT ACTIVITIES THAT COULD HAVE A NEGATIVE IMPACT TO THE NATURAL ENVIRONMENT ARE EFFECTIVELY MITIGATED AS CONSTRUCTION PROCEEDS. THE ENVIRONMENTAL MONITOR SHALL NOTIFY THE CVC ENFORCEMENT OFFICER AND PROJECT MANAGER IF AN ISSUE ARISES."

EROSION AND SEDIMENT CONTROL GENERAL NOTES (TOWN OF CALEDON)

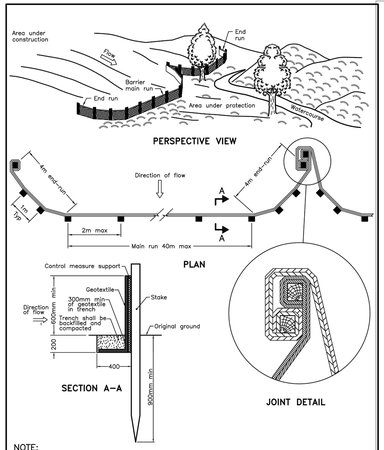
1. ALL CONSTRUCTION VEHICLES MUST ENTER AND EXIT THE SITE ONLY FROM THE APPROVED ACCESS ROUTE(S) AS SHOWN ON THE PLANS. CONSTRUCTION ACCESS WILL BE MAINTAINED TO THE SATISFACTION OF THE TOWN/REGION. STREET SWEEPING IS REQUIRED AS NEEDED.
2. NO CONSTRUCTION ACTIVITY OR MACHINERY SHALL BE ALLOWED BEYOND THE SILT FENCE OR LIMITS OF THE SITE WORKS.
3. THE CONTRACTOR IS RESPONSIBLE TO IMPLEMENT DUST CONTROL MEASURES AND CONSTRUCTION BEST PRACTICE GUIDELINES AS APPROVED BY THE TOWN AND/OR CONSERVATION AUTHORITY
4. ALL DISTURBED GROUND LEFT INACTIVE FOR 30 DAYS SHALL BE VEGETATED, SUBJECT TO WEATHER CONDITIONS. DISTURBED AREAS ARE TO BE HYDROSEEDED (OR APPROVED EQUIVALENT) TO THE SATISFACTION OF THE TOWN.
5. ALL TOPSOIL STOCKPILES SHALL BE SURROUNDED WITH SEDIMENT CONTROL FENCE. THE MAXIMUM SIDE SLOPE SHALL BE 2:1 (H:V). ONCE TOPSOIL STRIPPING IS COMPLETED THE STOCKPILE SHALL BE VEGETATED, SUBJECT TO WEATHER CONDITIONS, BY HYDROSEEDED, OR AN APPROVED EQUIVALENT, TO THE SATISFACTION OF THE TOWN

SUMMARY CHART FOR ESC STAGING

ESC MEASURE	TIMING FOR INSTALLATION	INSPECTION MAINTENANCE REQUIREMENTS	TIMING FOR REMOVAL
STAGE 2 – PRE-GRADING			
1. Install cut-off swales where shown. 2. Fill existing stage 1 swales. 3. Pre-grade site to elevations shown. 4. Maintain ESC measures as required.	Prior to site servicing.	- Consultant to arrange inspection with Town staff once installation is complete. - Consultant to undertake weekly inspections and after each rainfall event, including weekly reporting. - Regular maintenance to remove accumulated sediment and repair esc measures.	Prior to final topsoil and sodding of lot/block areas.

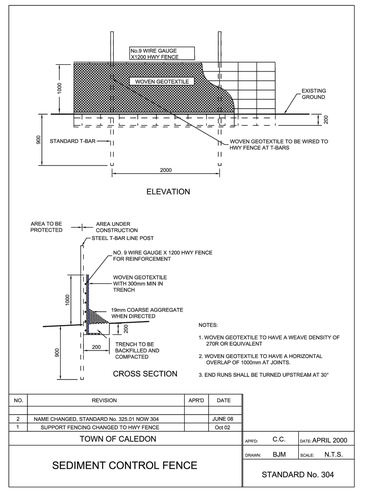
SEED MIXTURE

NATIVE PRAIRIE LOW GROW GRASS MIXTURE	
% OF MIXTURE	COMPOSITION TYPE
25%	FOWL BLUEGRASS (POA PALUSTRIS)
30%	CANADA WILD RYE (ELYMUS CANADENSIS)
15%	LITTLE BLUESTEM (SCHIZACHYRIUM SCORPARIUM)
30%	SAND DROPSEED (SPOROBOLUS CRYPTANDRUS)



NOTE:
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2021	Rev	3
HEAVY–DUTY SILT FENCE BARRIER			
OPSD 219.130			



NOTES:
1. WOVEN GEOTEXTILE TO HAVE A WEAVE DENSITY OF 270R OR EQUIVALENT
2. WOVEN GEOTEXTILE TO HAVE A HORIZONTAL OVERLAP OF 1000mm AT JOINTS.
3. END RUNS SHALL BE TURNED UPSTREAM AT 30°

NO.	REVISION	APR'D	DATE
2	NAME CHANGED, STANDARD No. 325.01 NOW 304		JUNE 08
1	SUPPORT FENCING CHANGED TO HWY FENCE		Oct 02

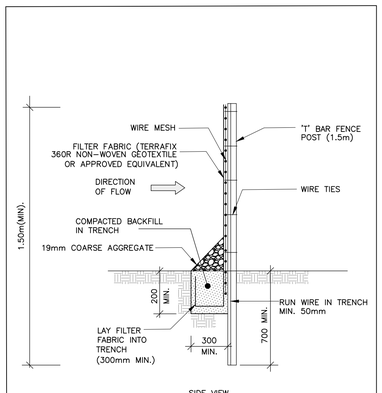
TOWN OF CALEDON

SEDIMENT CONTROL FENCE

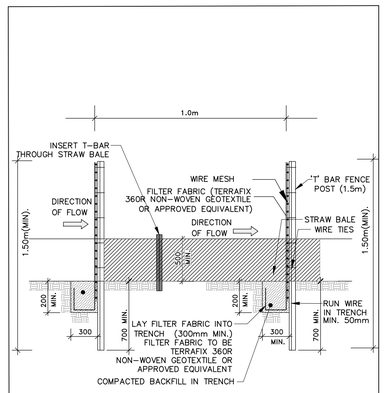
APR'D: C.C. DATE: APRIL 2000
DRAWN: BJM SCALE: N.T.S.

STANDARD No. 304

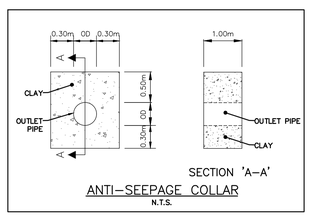
✳ GEOTEXTILE TO BE 270R TERRAFIX OR APPROVED EQUIVALENT. GEOTEXTILE USED SHOULD NOT HAVE A PLASTIC MESH LAYER.



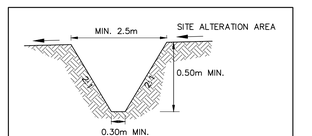
SIDE VIEWSEDIMENT CONTROL FENCE
AS PER TOWN OF CALEDON STD. 304 (MODIFIED)
N.T.S.



SIDE VIEW DOUBLE SILT FENCE
AS PER OPSD 219.130
N.T.S.

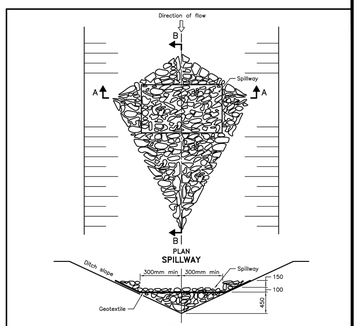


ANTI–SEEPAGE COLLAR
N.T.S.



CUT–OFF SWALE TYPICAL SECTION
N.T.S.
SWALE TO BE SEEDED WITH THE SEED MIX FOR STABILIZATION OF DISTURBED AREAS PROVIDED ON DWG. ESC-01

SWALE SLOPE	FILTER SOCK CHECK DAM SPACING
0 - 1%	45m
1 - 2%	20m
2 - 3%	15m
3 - 4%	10m
4 - 5%	9m



NOTE:
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2006	Rev	1
ROCK FLOW CHECK DAM V–DITCH			
OPSD 219.210			

THE SILTATION CONTROL PLAN IS INTENDED TO ASSIST THE CONTRACTOR IN THE LAYOUT AND CONSTURCTION OF THE SILTATION CONTROL FEATURES ONLY. THIS DRAWING SHALL NOT BE USED FOR CONSTRUCTION OF SITE SERVICES

ALL CONTROL WORKS SHALL BE IN PLACE PRIOR TO THE START OF STRIPPING OPERATIONS

NO IN-WATER WORKS ALLOWED BETWEEN APRIL 1ST TO JUNE 30TH, UNLESS AUTHORIZED BY DFO, MNR AND CH.

SILT / ENVIRONMENTAL CONTROL MEASURES TO BE INSPECTED AS REQUIRED, BY THE PROJECT ENVIRONMENTAL CONSULTANT DURING ALL PHASES OF CONSTRUCTION.

NOTES:
1. ALL MATERIAL TO MEET FILTREXX® SPECIFICATIONS.
2. CHECK DAM SHOULD BE USED IN AREAS THAT DRAIN 10 ACRES OR LESS.
3. SEDIMENT SHOULD BE REMOVED FROM BEHIND CHECK DAM ONCE THE ACCUMULATED HEIGHT HAS REACHED ½ THE HEIGHT OF THE CHECK DAM.
4. CHECK DAM CAN BE DIRECT SEEDED AT THE TIME OF INSTALLATION.
5. CONTRACTOR IS REQUIRED TO BE A FILTREXX CERTIFIED™ INSTALLER.

FILTREXX® CHECK DAM
NTS

NOTES:
1 The thickness of the rip–rap layer shall be at least 1.5 times the rip–rap mean diameter.
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2018	Rev	3
GENERAL RIP–RAP LAYOUT FOR SEWER AND CULVERT OUTLETS			
OPSD 810.010			

NOTES
1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE NOTED.
2. TEMPORARY CONSTRUCTION ACCESS SHALL BE REMOVED FROM THE REGIONAL ROAD ALLOWANCE AND ALL UNDISTURBED AREAS SHALL BE RESTORED TO ORIGINAL OR BETTER CONDITION.

MUD MAT FOR TEMPORARY CONSTRUCTION ACCESS

METRIC N.T.S.

TEMPORARY SEDIMENT POND
OUTLET DETAIL
N.T.S.

No.	REVISIONS	Date	By	Approved
1	FIRST SUBMISSION	AUGUST 2024	U.A.	A.A.

BENCHMARK: SET CUT CROSS 0.35m FROM SOUTH FACE OF CONCRETE HEAD WALL ALONG EAST SIDE OF ENTRANCE ROAD. 200m NORTH OF MAYFIELD ROAD. ELEVATION 265.29m

ELEVATION: ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM THE CITY OF BRAMPTON HORIZONTAL CONTROL MONUMENT: No. 042200357 AT ELEVATION=260.691m

LICENSED PROFESSIONAL ENGINEER
A.A.AHMADZAI
100161453
PROVINCE OF ONTARIO

REGION FILE No: XX
Designed By:
TOWN FILE No: XX

TOWN OF CALEDON

TYLin
3381 Steeles Avenue East,
Suite 315
Toronto, ON
M2H 3S8
p: 905.738.5700
f: 905.738.0065

12100 CREDITVIEW DEVELOPMENTS LTD.

EROSION & SEDIMENTATION PLAN DETAILS

SCALE: AS SHOWN	CHECKED BY: A.A.	PROJECT NO. 10376
DESIGNED BY: U.A.	DRAWN BY: U.A./R.P.	DRAWING NO. ESC03
CHECKED BY: D.M.	DATE: AUGUST 2024	SHEET NO. 03

P:\888-003\4. Drawings\2024 08 August\Alloa Phase 1 Tertiary Plan Aug 20 24 - Internal Use Only.dwg

LEGEND

RESIDENTIAL
- DETACHED
- TOWNHOUSE
- MEDIUM - HIGH DENSITY
- MIXED-USE

COMMERCIAL
- COMMERCIAL BLOCK

INSTITUTIONAL
- ELEMENTARY SCHOOLS

OPEN SPACE
- NEIGHBOURHOOD PARK
- OPEN SPACE
- NATURAL HERITAGE SYSTEM (WOODLOT)
- NATURAL HERITAGE SYSTEM
- SWM PONDS
- GREENBELT PLAN AREA

OTHER
- SECONDARY PLAN BOUNDARY
- BLOCK PLAN BOUNDARY
- HIGHWAY 413 FOCUSED ANALYSIS AREA
- MUNICIPAL INFRASTRUCTURE
- FUTURE EMPLOYMENT
- FUTURE RESIDENTIAL

HIGHWAY 413
HIGHWAY 413 TRANSITWAY
NHS (GREENBELT) 1.30ha (3.21ac)
NHS (WOODLOT) 0.04ha (0.10ac)
HIGHWAY 413 TRANSITWAY
NHS (CHANNEL & BUFFERS) 6.98ha (17.25ac)
NHS (GREENBELT) 3.42ha (8.45ac)
MEDIUM - HIGH DENSITY RESIDENTIAL 1.05ha (2.59ac)
MEDIUM - HIGH DENSITY RESIDENTIAL 0.86ha (2.13ac)
MEDIUM - HIGH DENSITY RESIDENTIAL 0.42ha (1.04ac)
MEDIUM - HIGH DENSITY RESIDENTIAL 0.60ha (1.48ac)
STREET 'C'
NEIGHBOURHOOD PARK 2.76ha (6.82ac)
NHS (WOODLOT) 3.61ha (8.92ac)
STREET 'F'
NHS (WOODLOT & WETLAND) 8.10ha (20.02ac)
NHS (BUFFER) 1.24ha (3.06ac)
STREET 'D'
BIRKHEAD DRIVE
NP
SWM POND 4.11ha (10.16ac)
NEIGH. PARK 2.22ha (5.49ac)
CATHOLIC ELEMENTARY SCHOOL 2.43ha (6.00ac)
SWM POND 3.76ha (9.29ac)
NHS (CHANNEL) 6.12ha (15.12ac)
PHASE 2 AREA
NHS (CHANNEL) 3.90ha (9.64ac)
NHS (CHANNEL & BUFFER) 10.22ha (25.25ac)
CREDITVIEW ROAD
MEDIUM - HIGH DENSITY RESIDENTIAL 0.82ha (2.03ac)
STREET 'F'
SWM POND 2.28ha (5.63ac)
NHS (WOODLOT) 2.14ha (5.29ac)
SWM POND 1.61ha (3.98ac)
LINDSAY AVENUE
CHINGUACOUSY ROAD
STREET 'B'
STREET 'B'
SW
COMMUNITY PARK 5.53ha (13.66ac)
NHS (WOODLOT & WETLAND) 1.82ha (4.50ac)
NHS (BUFFER) 0.57ha (1.41ac)
STREET 'E'
NEIGH. PARK 2.11ha (5.21ac)
NEIGHBOURHOOD PARK 2.22ha (5.49ac)
MEDIUM - HIGH DENSITY RESIDENTIAL 3.50ha (8.65ac)
TIM MANLEY AVENUE
SWM POND 1.69ha (4.18ac)
MEDIUM - HIGH DENSITY RESIDENTIAL 2.11ha (5.21ac)
PUBLIC ELEMENTARY SCHOOL 3.25ha (8.03ac)
PUBLIC ELEMENTARY SCHOOL 3.24ha (8.00ac)
STREET 'A'
STREET 'A'
TWEEDHILL AVENUE
ALLOA RESERVOIR, PUMPING STATION & FEEDMAIN
STREET 'G'
STREET 'F'
STREET 'E'
STREET 'D'
MEDIUM - HIGH DENSITY RESIDENTIAL 4.70ha (11.61ac)
JAMES MAYNARD ROAD
COMMERCIAL 9.72ha (24.02ac)
COMMERCIAL 2.78ha (6.87ac)
SWM POND 2.90ha (7.17ac)
SWM POND 4.31ha (10.65ac)
MIXED-USE 4.51ha (11.14ac)
MIXED-USE 2.80ha (6.92ac)
MIXED-USE 1.35ha (3.34ac)
MIXED-USE 1.41ha (3.48ac)
NHS (COMPENSATION) 0.39ha (0.96ac)
CALEDON WORKS YARD
MAYFIELD ROAD
EXISTING HYDRO TRANSFORMER
ROBERT PARKINSON DRIVE
THORNBRUSH BOULEVARD
CLOCKWORK DRIVE
BRISDALE DRIVE

ALLOA SECONDARY PLAN
TERTIARY PLAN - PHASE 1

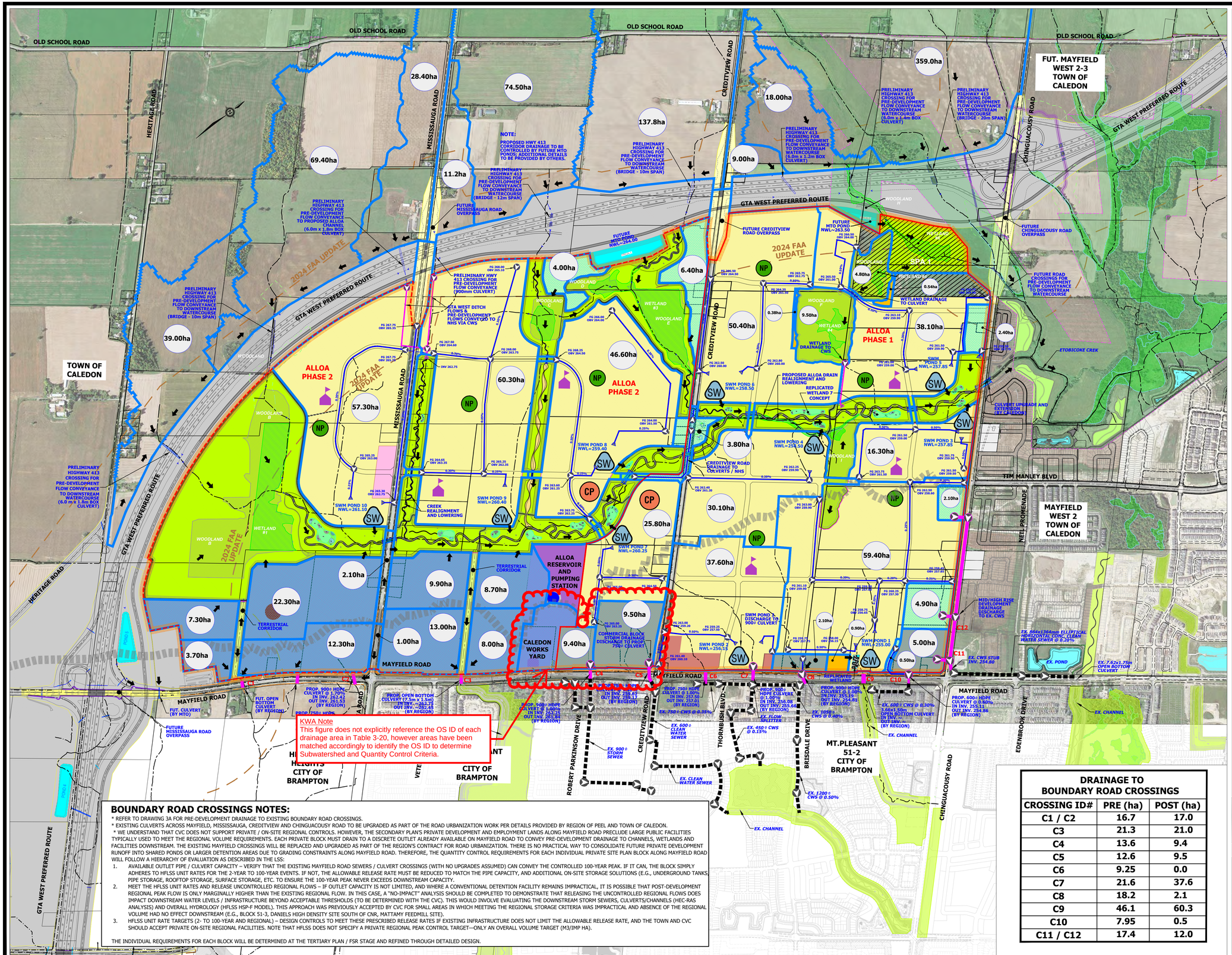
PART OF LOTS 18-21, CONCESSIONS 3 & 4, TOWNSHIP OF CHINGUACOUSY
TOWN OF CALEDON, REGIONAL MUNICIPALITY OF PEEL

0 50 100 150 200 250 300

SCALE 1:4000
AUGUST 20, 2024

GSAI
Glen Schnarr & Associates Inc.

TOWN OF CALEDON
PLANNING
RECEIVED
December 6, 2024



BOUNDARY ROAD CROSSINGS NOTES:

* REFER TO DRAWING 3A FOR PRE-DEVELOPMENT DRAINAGE TO EXISTING BOUNDARY ROAD CROSSINGS.
* EXISTING CULVERTS ACROSS MAYFIELD, MISSISSAUGA, CREDITVIEW AND CHINGUACOUSY ROAD TO BE UPGRADED AS PART OF THE ROAD URBANIZATION WORK PER DETAILS PROVIDED BY REGION OF PEEL AND TOWN OF CALEDON.
* WE UNDERSTAND THAT CVC DOES NOT SUPPORT PRIVATE / ON-SITE REGIONAL CONTROLS. HOWEVER, THE SECONDARY PLAN'S PRIVATE DEVELOPMENT AND EMPLOYMENT LANDS ALONG MAYFIELD ROAD PRECLUDE LARGE PUBLIC FACILITIES TYPICALLY USED TO MEET THE REGIONAL VOLUME REQUIREMENTS. EACH PRIVATE BLOCK MUST DRAIN TO A DISCRETE OUTLET ALREADY AVAILABLE ON MAYFIELD ROAD TO CONVEY PRE-DEVELOPMENT DRAINAGE TO CHANNELS, WETLANDS AND FACILITIES DOWNSTREAM. THE EXISTING MAYFIELD CROSSINGS WILL BE REPLACED AND UPGRADED AS PART OF THE REGION'S CONTRACT FOR ROAD URBANIZATION. THERE IS NO PRACTICAL WAY TO CONSOLIDATE FUTURE PRIVATE DEVELOPMENT RUNOFF INTO SHARED PONDS OR LARGER DETENTION AREAS DUE TO GRADING CONSTRAINTS ALONG MAYFIELD ROAD. THEREFORE, THE QUANTITY CONTROL REQUIREMENTS FOR EACH INDIVIDUAL PRIVATE SITE PLAN BLOCK ALONG MAYFIELD ROAD WILL FOLLOW A HIERARCHY OF EVALUATION AS DESCRIBED IN THE LSS:

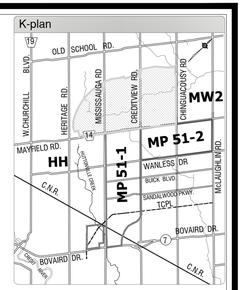
1. AVAILABLE OUTLET PIPE / CULVERT CAPACITY – VERIFY THAT THE EXISTING MAYFIELD ROAD SEWERS / CULVERT CROSSINGS (WITH NO UPGRADES ASSUMED) CAN CONVEY THE CONTROLLED 100-YEAR PEAK. IF IT CAN, THE BLOCK SIMPLY ADHERES TO HFLSS UNIT RATES FOR THE 2-YEAR TO 100-YEAR EVENTS. IF NOT, THE ALLOWABLE RELEASE RATE MUST BE REDUCED TO MATCH THE PIPE CAPACITY, AND ADDITIONAL ON-SITE STORAGE SOLUTIONS (E.G., UNDERGROUND TANKS, PIPE STORAGE, ROOFTOP STORAGE, SURFACE STORAGE, ETC. TO ENSURE THE 100-YEAR PEAK NEVER EXCEEDS DOWNSTREAM CAPACITY.
2. MEET THE HFLSS UNIT RATES AND RELEASE UNCONTROLLED REGIONAL FLOWS – IF OUTLET CAPACITY IS NOT LIMITED, AND WHERE A CONVENTIONAL DETENTION FACILITY REMAINS IMPRACTICAL, IT IS POSSIBLE THAT POST-DEVELOPMENT REGIONAL PEAK FLOW IS ONLY MARGINALLY HIGHER THAN THE EXISTING REGIONAL FLOW. IN THIS CASE, A "NO-IMPACT" ANALYSIS SHOULD BE COMPLETED TO DEMONSTRATE THAT RELEASING THE UNCONTROLLED REGIONAL FLOWS DOES IMPACT DOWNSTREAM WATER LEVELS / INFRASTRUCTURE BEYOND ACCEPTABLE THRESHOLDS (TO BE DETERMINED WITH THE CVC). THIS WOULD INVOLVE EVALUATING THE DOWNSTREAM STORM SEWERS, CULVERTS/CHANNELS (HEC-RAS ANALYSIS) AND OVERALL HYDROLOGY (HFLSS HSP-F MODEL). THIS APPROACH WAS PREVIOUSLY ACCEPTED BY CVC FOR SMALL AREAS IN WHICH MEETING THE REGIONAL STORAGE CRITERIA WAS IMPRACTICAL AND ABSENCE OF THE REGIONAL VOLUME HAD NO EFFECT DOWNSTREAM (E.G., BLOCK 51-3, DANIELS HIGH DENSITY SITE SOUTH OF CNR, MATTAMY FEEDMILL SITE).
3. HFLSS UNIT RATE TARGETS (2- TO 100-YEAR AND REGIONAL) – DESIGN CONTROLS TO MEET THESE PRESCRIBED RELEASE RATES IF EXISTING INFRASTRUCTURE DOES NOT LIMIT THE ALLOWABLE RELEASE RATE, AND THE TOWN AND CVC SHOULD ACCEPT PRIVATE ON-SITE REGIONAL FACILITIES. NOTE THAT HFLSS DOES NOT SPECIFY A PRIVATE REGIONAL PEAK CONTROL TARGET—ONLY AN OVERALL VOLUME TARGET (M3/IMP HA).

THE INDIVIDUAL REQUIREMENTS FOR EACH BLOCK WILL BE DETERMINED AT THE TERTIARY PLAN / FSR STAGE AND REFINED THROUGH DETAILED DESIGN.

DRAINAGE TO BOUNDARY ROAD CROSSINGS

CROSSING ID#	PRE (ha)	POST (ha)
C1 / C2	16.7	17.0
C3	21.3	21.0
C4	13.6	9.4
C5	12.6	9.5
C6	9.25	0.0
C7	21.6	37.6
C8	18.2	2.1
C9	46.1	60.3
C10	7.95	0.5
C11 / C12	17.4	12.0

K-plan



LEGEND:

- ALLOA BOUNDARY
- GREENBELT
- ALLOA PHASE 1 BOUNDARY
- ALLOA PHASE 2 BOUNDARY
- EXISTING WOODLOT
- EXISTING WETLAND
- EXISTING WATERCOURSE
- EXISTING WATERSHED DRAINAGE BOUNDARY
- NEIGHBORHOOD AREA
- MAJOR COMMERCIAL / MIXED USE AREA
- EMPLOYMENT LANDS
- NEIGHBOURHOOD CENTRE
- SPECIAL POLICY AREA
- NATURAL HERITAGE SYSTEM
- TERRESTRIAL CORRIDOR
- PROPOSED ROAD CROSSING
- C1 — ROAD CROSSING / CULVERT ID#
- PROPOSED WATERCOURSE REALIGNMENT
- PROPOSED OVERLAND FLOW DIRECTION
- SW — PROPOSED SWM POND
- PROPOSED STORM DRAINAGE BOUNDARY TO SWM POND
- AREAS UNABLE TO DRAIN TO PUBLIC PONDS; ALTERNATIVE QUALITY & QUANTITY CONTROL REQUIRED (SEE NOTES ON THIS DWG.)
- PROPOSED DRAINAGE TO WETLANDS (SEE DWG 3G)
- 29.80ha — PROPOSED DRAINAGE AREA (IN HECTARES)
- EXISTING STORM SEWER / CLEAN WATER SEWER AND FLOW DIRECTION
- PROPOSED CLEAN WATER SEWER
- PROPOSED STORM SEWER
- FG 267.00 — APPROXIMATE FINISHED GRADE EL. (m)
- OBV 264.01 — APPROXIMATE SEWER OBVERT (m)

TOWN OF CALEDON
PLANNING
RECEIVED
August 18th, 2025

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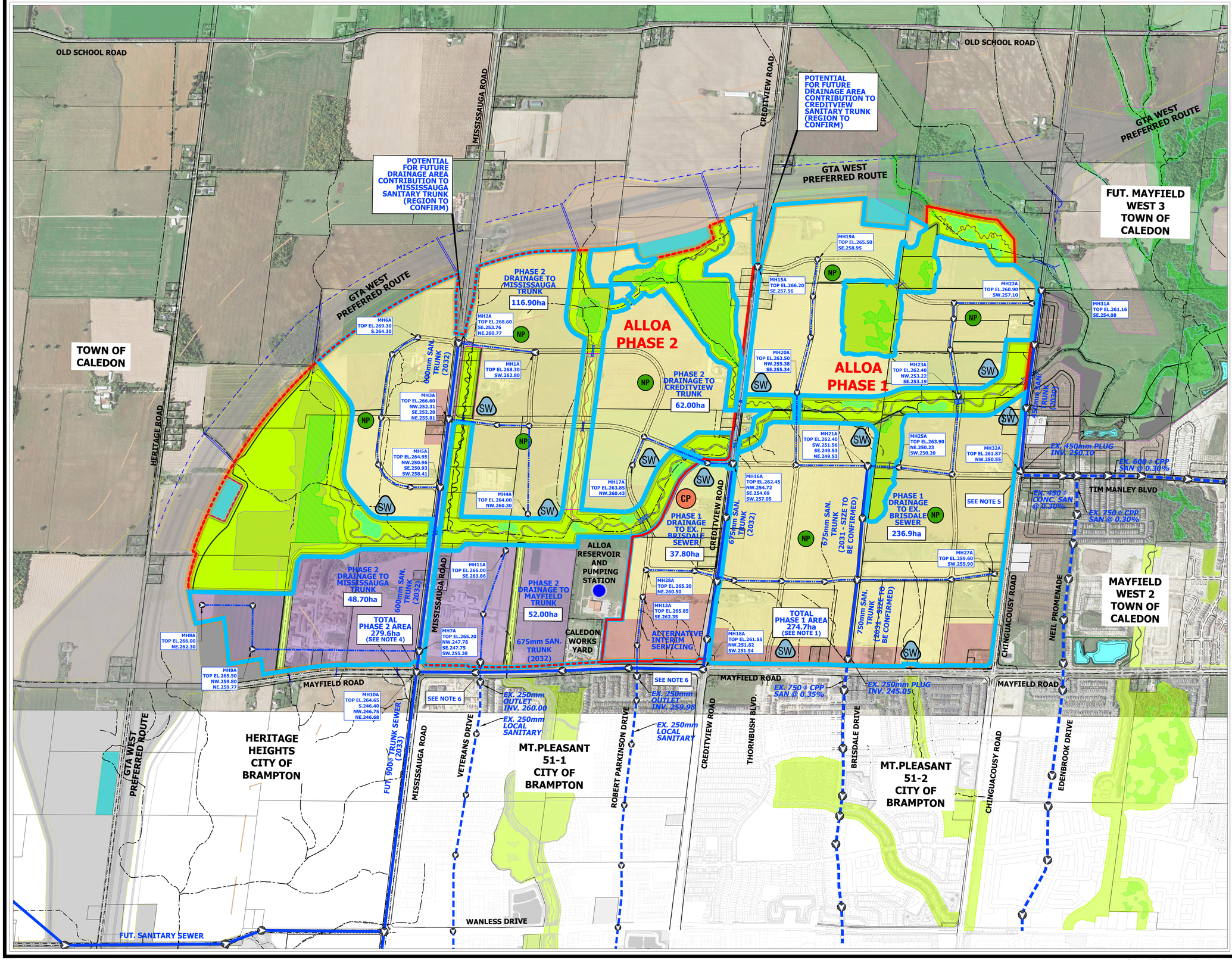
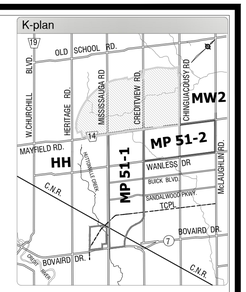
ALLOA SECONDARY PLAN
TOWN OF CALEDON
REGIONAL MUNICIPALITY OF PEEL
SERVICING STUDY

PRELIMINARY STORM SERVICING AND POND LOCATIONS

PROJECT No.	DATE	SCALE	DWG No.
20-665	JULY 2025	1:8,000	3D

File: P:\Projects\20-665 - Alloa Caledon (Argo - Peel)\Reports\Secondary Plan Scoped Servicing Study_Drawings & Figures\3_STORMWATER MANAGEMENT STRATEGY\DWG 3D_Storm Servicing.dwg - Revised by: <VPAVLOVIC> - Thu, Jun 26 2025 - 4:00pm





LEGEND:

- ALLOA BOUNDARY
- GREENBELT
- ALLOA PHASE 1 BOUNDARY
- ALLOA PHASE 2 BOUNDARY
- NATURAL HERITAGE SYSTEM
- SW — PROPOSED SWM POND
- NEIGHBORHOOD AREA
- MAJOR COMMERCIAL / MIXED USE AREA
- EMPLOYMENT LANDS
- EXISTING SANITARY SEWER AND FLOW DIRECTION
- PROPOSED LOCAL SANITARY SEWER AND FLOW DIRECTION
- PROPOSED TRUNK SANITARY SEWER AND FLOW DIRECTION
- PROPOSED SANITARY DRAINAGE AREA BOUNDARY
- 37.60ha — PROPOSED SANITARY DRAINAGE AREA IN HECTARES
- MH18A TOP EL.261.55 NW.251.62 SW.251.54 — SANITARY MANHOLE ID / SANITARY MANHOLE TOP ELEVATION / SANITARY SEWER OBVERT ELEVATION

ALLOA WASTEWATER SERVICING NOTES:

1. ALLOA PHASE 1 LANDS HAVE BEEN ACCOMMODATED FOR WASTEWATER SERVICING IN THE EXISTING 750mm TRUNK SEWER ON BRISDALE DRIVE WITHIN EXISTING MOUNT PLEASANT BLOCK 51-2. AS PER APPROVED BLOCK 51-2 EIR/FSR AND RELEVANT BLOCK 51-2 DETAILED SUBDIVISION DESIGNS, THE DRAINAGE CONTRIBUTION TO BRISDALE TRUNK SEWER COMPRISES OF ESTIMATED 502.9ha OF EXTERNAL DRAINAGE AND POPULATION OF 25,460 WHICH WOULD GENERATE THE FLOW OF 329.2L/S AT THE UPSTREAM END OF BRISDALE PIPE SYSTEM.
2. PER THE CURRENT ALLOA SECONDARY PLAN, ESTIMATED PHASE 1 DEVELOPMENT AREA (INCLUDING SWM PONDS AND EXCLUDING NHS) COMPRISES OF APPROXIMATELY 274.9ha OF DEVELOPABLE LAND, AND A RESIDENTIAL POPULATION OF 24,596. FURTHER ANALYSIS IS REQUIRED TO CONFIRM THAT ALL DRAINAGE CAN FLOW TOWARDS BRISDALE, OR IF SOME DRAINAGE SHOULD BE DIVERTED TO THE CREDITVIEW SANITARY TRUNK SEWER.
3. REGION OF PEEL IDENTIFIED NECESSARY SEWER IMPROVEMENTS ON/AND SOUTH OF BRISDALE DRIVE WHICH WILL BE TRIGGERED BY THE PLANNED DEVELOPMENTS NORTH OF MAYFIELD ROAD INCLUDING ALLOA PHASE 1. EXTERNAL INFRASTRUCTURE IMPROVEMENTS BY PEEL WILL BE IMPLEMENTED IN CONJUNCTION WITH THE ALLOA PHASE 1 PLANNING APPROVALS AND INITIAL PHASES OF DEVELOPMENT.
4. AS CAPTURED ON THIS PLAN, AND CONSISTENT WITH THE PEEL REGION WASTEWATER DEVELOPMENT CHARGES 2024 MAP, ALLOA PHASE 2 LANDS WILL BE SERVICED WITH A NETWORK OF FUTURE TRUNK SEWERS ON CREDITVIEW, MAYFIELD AND MISSISSAUGA ROAD. THROUGH THE UPCOMING PEEL MASTER SERVICING PLAN UPDATE, REGION TO CONFIRM EXTENT OF THE DRAINAGE AREA TO THE PROPOSED TRUNK SEWERS EXTERNAL TO ALLOA.
5. THIS PLAN REFLECTS THE ULTIMATE PHASE 1 SERVICING CONCEPT BASED ON THE APPROVED BLOCK 51-2 AND MW2 SUPPORTING STUDIES. HOWEVER, AND SUBJECT TO THE PEEL REGION CONFIRMATION, A PORTION OF ALLOA PHASE 1 LANDS COULD BE PERMANENTLY ACCOMMODATED IN THE EXISTING TIM MANLEY TRUNK SANITARY SEWER WITHIN MW2.
6. SHOULD ANY ALLOA LANDS ALONG MAYFIELD ROAD PROCEED WITH DEVELOPMENT AHEAD OF THE ADJACENT PROPERTIES, AND SUBJECT TO REGION'S CONFIRMATION OF THE DOWNSTREAM SEWER CAPACITY, CONSIDERATION SHOULD BE GIVEN TO THE INTERIM SERVICING VIA EXTENSION OF EXISTING 250mm SANITARY OUTLETS ON ROBERT PARKINSON DRIVE AND VETERANS DRIVE IN BLOCK 51-2. FOLLOWING COMPLETION OF THE MAYFIELD AND MISSISSAUGA TRUNK SEWERS, THE INTERIM SERVICES WOULD BE DECOMMISSIONED AND FLOWS DIVERTED TO THE PERMANENT OUTLETS.
7. IF REQUIRED TO ACCOMMODATE DEVELOPMENT TIMING, ALLOA LANDOWNER'S GROUP TO ENTER INTO A FRONT ENDING AGREEMENT WITH PEEL FOR DELIVERY OF NECESSARY REGIONAL INFRASTRUCTURE AHEAD OF THE CAPITAL PROGRAM PLANNING SCHEDULE.

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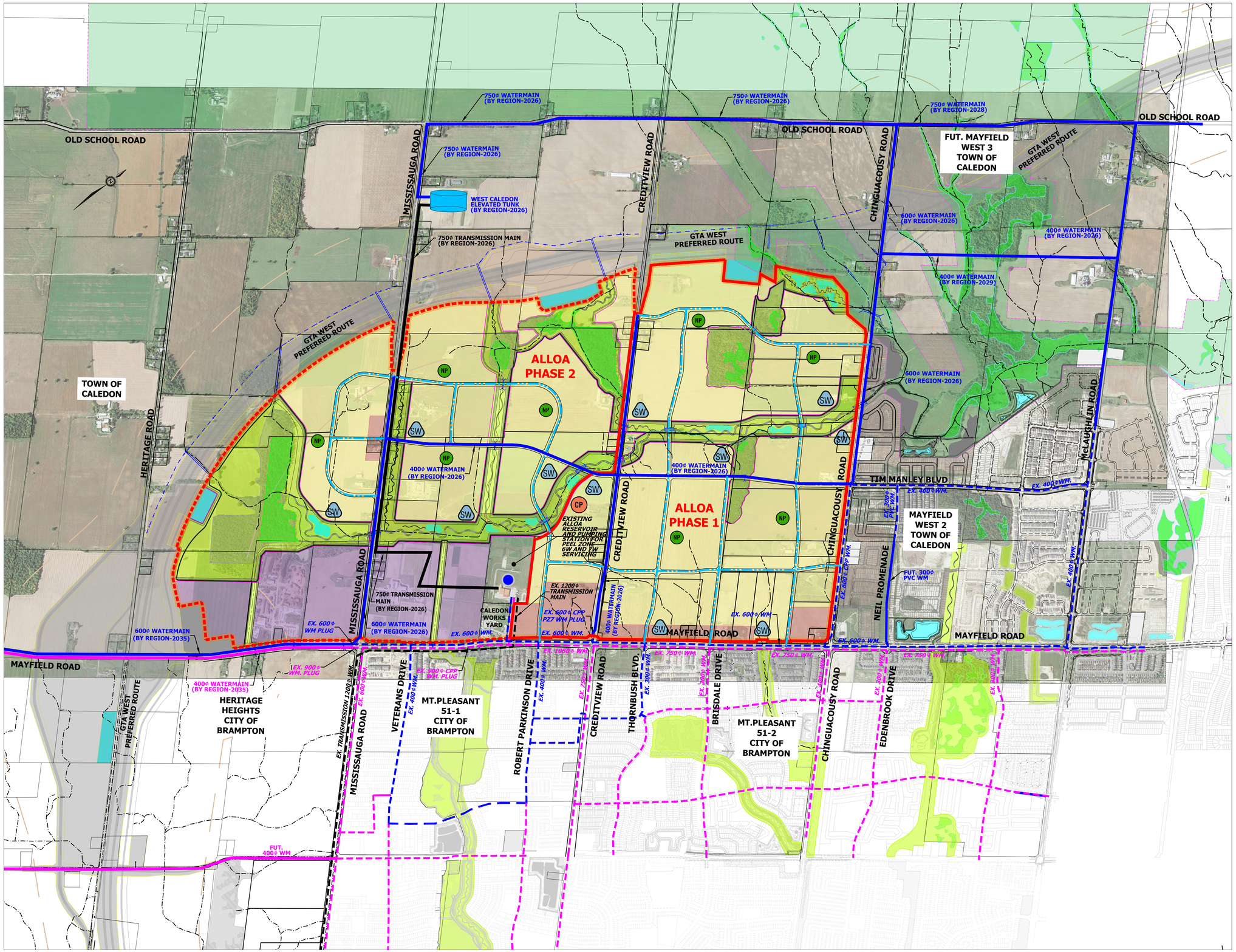
A Division of Leighton-Zec Ltd.
3760 14th Avenue, Suite 301,
Markham, ON. L3R 3T7
TEL 905.946.9461 • urbantech.com

ALLOA SECONDARY PLAN
TOWN OF CALEDON
REGIONAL MUNICIPALITY OF PEEL
SERVICING STUDY

PRELIMINARY WASTEWATER SERVICING

PROJECT No.	DATE	SCALE	DWG No.
20-665	JULY 2024	1:8000	5.1

File: P:\Projects\20-665 - Alloa Caledon (Argo - Peel)\Reports\Secondary Plan Scoped Servicing Study_Drawings & Figures\5_SANITARY SERVICING\5.1_Wastewater Servicing.dwg - Revised by <JOHMONDE> - Mon, Jun 24 2024 - 3:37pm


OLD SCHOOL ROAD
750ø WATERMAIN (BY REGION-2026)
750ø WATERMAIN (BY REGION-2025)
750ø WATERMAIN (BY REGION-2025)
OLD SCHOOL ROAD
OLD SCHOOL ROAD
FUT. MAYFIELD WEST 3 TOWN OF CALEDON
GTA WEST PREFERRED ROUTE
MISSISSAUGA ROAD
750ø WATERMAIN (BY REGION-2026)
CREDITVIEW ROAD
CHINGUACOUSY ROAD
WEST CALEDON ELEVATED TUNK (BY REGION-2026)
600ø WATERMAIN (BY REGION-2026)
400ø WATERMAIN (BY REGION-2026)
750ø TRANSMISSION MAIN (BY REGION-2026)
GTA WEST PREFERRED ROUTE
400ø WATERMAIN (BY REGION-2029)
GTA WEST PREFERRED ROUTE
ALLOA PHASE 2
NP
NP
TOWN OF CALEDON
HERITAGE ROAD
NP
SW
600ø WATERMAIN (BY REGION-2026)
SW
SW
SW
400ø WATERMAIN (BY REGION-2026)
NP
SW
SW
400ø WATERMAIN (BY REGION-2026)
SW
SW
TIM MANLEY BLVD
McLAUGHLIN ROAD
CP
EXISTING ALLOA RESERVOIR AND PUMPING STATION FOR PEEL ZONE 6W AND 7W SERVICING
CREDITVIEW ROAD
ALLOA PHASE 1
NP
NP
EX. 300ø CPP WM.
EX. 400ø WM.
CHINGUACOUSY ROAD
EX. 400ø WM.
MAYFIELD WEST 2 TOWN OF CALEDON
FUT. 300ø PVC WM
EX. 1200ø TRANSMISSION MAIN
EX. 600ø CPP PZ7 WM PLUG
400ø WATERMAIN (BY REGION-2026)
EX. 600ø WM.
SW
MAYFIELD ROAD
EX. 600ø WM.
NEIL PROMENADE
EX. 400ø WM.
MAYFIELD ROAD
600ø WATERMAIN (BY REGION-2035)
EX. 600ø WM PLUG
MISSISSAUGA ROAD
750ø TRANSMISSION MAIN (BY REGION-2026)
600ø WATERMAIN (BY REGION-2026)
CALEDON WORKS YARD
EX. 600ø WM.
EX. 600ø WM.
EX. 900ø WM. PLUG
EX. 350ø CPP WM. PLUG
EX. 400ø WM.
EX. 750ø WM.
EX. 750ø WM.
EX. 750ø WM.
EX. 750ø WM.
EX. 300ø WM.
EX. 400ø WM.
EX. 300ø WM.
EX. 400ø WM.
EX. 300ø WM.
EX. 400

Luan Phan

From: Kate Rothwell <krothwell@urbantech.com>
Sent: Wednesday, April 1, 2026 10:05 AM
To: Luan Phan; Ted Fair; Dragan Zec
Cc: Stephanie Volpentesta; Charlotte Pattee; Vinci Patrick; Andrew Fata
Subject: RE: SPA 2024-0092 - 2ND SUBMISSION COMMENTS

Hi Luan,

I would opt to demonstrate that the required erosion volume is provided with best efforts for the erosion flow control, as the flow is governed/restricted by municipal requirements for the orifice size.

Kate Rothwell, M.Eng., P.Eng.
Associate, Water Resources
Urbantech® Consulting
A Division of Leighton-Zec Ltd.
3760 14th Avenue, Suite 301, Markham, ON L3R 3T7
krothwell@urbantech.com • www.urbantech.com
TEL 905-946-9461 Ext.426 • **DIR** 905-752-1728 • **MOB** 416-705-1460

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From: Luan Phan <luan.phan@kwasitedev.com>
Sent: March 31, 2026 10:00 AM
To: Kate Rothwell <krothwell@urbantech.com>; Ted Fair <ted.fair@kwasitedev.com>; Dragan Zec <dzec@urbantech.com>
Cc: Stephanie Volpentesta <stephaniev@fieldgatecommercial.com>; Charlotte Pattee <charlottep@fieldgatedevelopments.com>; Vinci Patrick <vinci.patrick@kwasitedev.com>; Andrew Fata <afata@urbantech.com>
Subject: RE: SPA 2024-0092 - 2ND SUBMISSION COMMENTS

Hi Kate,

Thank you for your feedback! We will review and update accordingly.

Regarding the best efforts approach, would it be more accepting/beneficial to meet the unitary flow target, or the unitary volume target for erosion control?

i.e. for Block A, our erosion control requirements is 1630m^3 and 3.0L/s for the volume and flow, respectively per your report. With the minimum orifice of 75mm, we can choose to either restrict our flow at 3.0L/s and provide the best efforts volume at low head (which will be less than 1630m^3), or we can choose to achieve the 1630m^3 volume, and provide the consequential flow rate at higher head (which will be greater than 3.0L/s).

Thank you,

Luan (Lu) Phan, P. Eng.
KWA Site Development Consulting Inc.
(437) 453-3130

From: Kate Rothwell <krothwell@urbantech.com>
Sent: Monday, March 30, 2026 6:54 PM
To: Luan Phan <luan.phan@kwasitedev.com>; Ted Fair <ted.fair@kwasitedev.com>; Dragan Zec <dzec@urbantech.com>
Cc: Stephanie Volpentesta <stephaniev@fieldgatecommercial.com>; Charlotte Pattee <charlottep@fieldgatedevelopments.com>; Vinci Patrick <vinci.patrick@kwasitedev.com>; Andrew Fata <afata@urbantech.com>
Subject: RE: SPA 2024-0092 - 2ND SUBMISSION COMMENTS

Hi Luan,

Since your total volume is set by the unitary targets anyway, I would go with “best efforts” for the erosion control component using the minimum 75 mm orifice control, in addition to your 5 mm retention. This is what we have proposed for a couple of the Alloa ponds where the 75 mm extended detention orifice could not meet the erosion target.

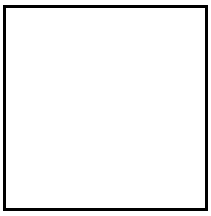
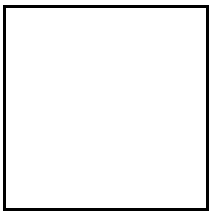
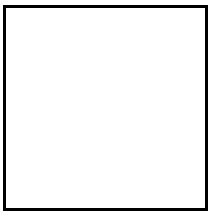
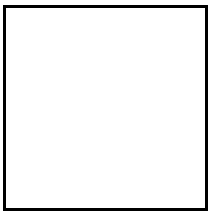
If the Town is not receptive to a “best efforts” approach with the 75 mm orifice and 5mm retention for erosion control, we could also potentially do a model verification and add your site to our hydrology model to do an erosion exceedance comparison for pre and post conditions.

If you want to have a quick call to discuss further, please don’t hesitate to reach out.

Thanks,

Kate Rothwell, M.Eng., P.Eng.
Associate, Water Resources
Urbantech® Consulting
A Division of Leighton-Zec Ltd.
3760 14th Avenue, Suite 301, Markham, ON L3R 3T7

krothwell@urbantech.com • www.urbantech.com
TEL 905-946-9461 Ext.426 • **DIR** 905-752-1728 • **MOB** 416-705-1460

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From: Luan Phan <luan.phan@kwasitedev.com>
Sent: March 27, 2026 3:58 PM
To: Kate Rothwell <krothwell@urbantech.com>; Ted Fair <ted.fair@kwasitedev.com>; Dragan Zec <dzec@urbantech.com>
Cc: Stephanie Volpentesta <stephaniev@fieldgatecommercial.com>; Charlotte Pattee <charlottep@fieldgatedevelopments.com>; Vinci Patrick <vinci.patrick@kwasitedev.com>; Andrew Fata <afata@urbantech.com>
Subject: RE: SPA 2024-0092 - 2ND SUBMISSION COMMENTS

Hi Kate,

Our site is broken up into three blocks:

Block A: 7.25ha, imp. 100%
Block B: 2.58ha, imp. 100%
Block C: 2.81ha, imp 100%

So quite a small flow rate to meet the erosion control criteria. It's looking like a 75mm orifice would be a significant challenge for our site.

Luan (Lu) Phan, P. Eng.
KWA Site Development Consulting Inc.
(437) 453-3130

From: Kate Rothwell <krothwell@urbantech.com>
Sent: Friday, March 27, 2026 3:47 PM
To: Luan Phan <luan.phan@kwasitedev.com>; Ted Fair <ted.fair@kwasitedev.com>; Dragan Zec <dzec@urbantech.com>
Cc: Stephanie Volpentesta <stephaniev@fieldgatecommercial.com>; Charlotte Pattee <charlottep@fieldgatedevelopments.com>; Vinci Patrick <vinci.patrick@kwasitedev.com>; Andrew Fata <afata@urbantech.com>
Subject: RE: SPA 2024-0092 - 2ND SUBMISSION COMMENTS

Hi Luan,

What is your site area and imperviousness?

Kate Rothwell, M.Eng., P.Eng.
Associate, Water Resources
Urbantech® Consulting
A Division of Leighton-Zec Ltd.
3760 14th Avenue, Suite 301, Markham, ON L3R 3T7
krothwell@urbantech.com • www.urbantech.com
TEL 905-946-9461 Ext.426 • **DIR** 905-752-1728 • **MOB** 416-705-1460

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From: Luan Phan <luan.phan@kwasitedev.com>
Sent: March 27, 2026 3:20 PM
To: Kate Rothwell <krothwell@urbantech.com>; Ted Fair <ted.fair@kwasitedev.com>; Dragan Zec <dzec@urbantech.com>
Cc: Stephanie Volpentesta <stephaniev@fieldgatecommercial.com>; Charlotte Pattee <charlottep@fieldgatedevelopments.com>; Vinci Patrick <vinci.patrick@kwasitedev.com>; Andrew Fata <afata@urbantech.com>
Subject: RE: SPA 2024-0092 - 2ND SUBMISSION COMMENTS

Hi Kate,

Assuming we cannot meet the erosion control criteria, regarding your last point on 5mm retention in lieu of providing erosion control—our site is already designed to achieve 5mm retention for water balance purposes. Could this count towards the in-lieu erosion criteria you mentioned?

If so, could you elaborate how we would compare the 5mm retention volume with the 250m3/imp.ha volume (which is a detention volume across a flow rate of 0.00041m3/s/ha)? i.e. volumetrically the 5mm retention volume would always be 5x less than the erosion volume (which is based on the 25mm event).

Thanks!

Luan (Lu) Phan, P. Eng.
KWA Site Development Consulting Inc.
(437) 453-3130

From: Kate Rothwell <krothwell@urbantech.com>
Sent: Friday, March 27, 2026 2:05 PM
To: Ted Fair <ted.fair@kwasitedev.com>; Dragan Zec <dzec@urbantech.com>
Cc: Stephanie Volpentesta <stephaniev@fieldgatecommercial.com>; Charlotte Pattee <charlottep@fieldgatedevelopments.com>; Luan Phan <luan.phan@kwasitedev.com>; Vinci Patrick <vinci.patrick@kwasitedev.com>; Andrew Fata <afata@urbantech.com>
Subject: RE: SPA 2024-0092 - 2ND SUBMISSION COMMENTS

Some people who received this message don't often get email from krothwell@urbantech.com. Learn why this is important

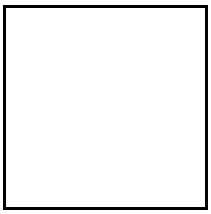
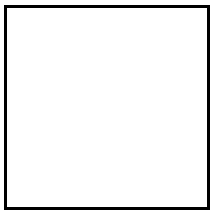
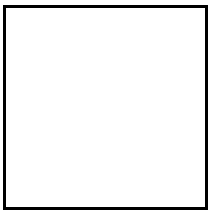
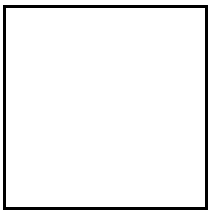
Hi Ted,

Just to clarify, the criteria you are referring to in Section 3.3.2 of the FSR is specific to erosion control, as opposed to the overall quantity control volume. For this specific subwatershed, stacked storage is not required (ie. the required erosion volume is included as part of the total 100-year volume), so your volume retention should not necessarily increase if you are able to provide an outlet with multiple controls. However, if your site area is small enough where the erosion target flow is not feasible (in this case I'm guessing your erosion target would be around 2-3 L/s, which can't be accommodated by a 75 mm orifice, for example), then I would propose using the 5 mm retention in lieu of providing erosion control via your storm outlet. In that case, you would still need to demonstrate how your 5 mm retention volume compares to the erosion volume requirement of 250 m3 / impervious ha.

Hope that clarifies things, but if a quick call is needed to discuss, please don't hesitate to reach out.

Thanks,

Kate Rothwell, M.Eng., P.Eng.
Associate, Water Resources
Urbantech® Consulting
A Division of Leighton-Zec Ltd.
3760 14th Avenue, Suite 301, Markham, ON L3R 3T7
krothwell@urbantech.com • www.urbantech.com
TEL 905-946-9461 Ext.426 • **DIR** 905-752-1728 • **MOB** 416-705-1460

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From: Ted Fair <ted.fair@kwasitedev.com>
Sent: March 26, 2026 11:11 AM
To: Kate Rothwell <krothwell@urbantech.com>; Dragan Zec <dzec@urbantech.com>
Cc: Stephanie Volpentesta <stephaniev@fieldgatecommercial.com>; Charlotte Pattee <charlottep@fieldgatedevelopments.com>; Luan Phan <luan.phan@kwasitedev.com>; Vinci Patrick <vinci.patrick@kwasitedev.com>
Subject: RE: SPA 2024-0092 - 2ND SUBMISSION COMMENTS

Hi Kate,

Thank you for sharing your latest report.

Just wanted to check and confirm our understanding of your report criteria, particularly as it relates to quantity and erosion controls.

We have, since the previous version, updated to achieve the quantity controls per node F2, which results in a quantity volume of 5600m3 for block A&B. Which is fairly substantial and starts to really take up considerable footprint on the site, with coverage under most of the parking lots. In addition to this we are retaining volumes for infiltration to the 5mm event per Geotech recommendations, though locations to achieve this objective are sparse given the high groundwater levels.

Now reviewing your report section 3.3.2, flows appear fairly restrictive and possibly further expanding volume retained requirements. We just wanted to confirm if this requirement per table 3.2 is applicable to our site? Or if the 5mm retention would be sufficient?

Thanks,

Ted Fair, P. Eng.
KWA Site Development Consulting Inc.
(437) 453-6474

From: Kate Rothwell <krothwell@urbantech.com>
Sent: March 25, 2026 11:34 AM
To: Ted Fair <ted.fair@kwasitedev.com>; Dragan Zec <dzec@urbantech.com>
Cc: Stephanie Volpentesta <stephaniev@fieldgatecommercial.com>; Charlotte Pattee <charlottep@fieldgatedevelopments.com>; Luan Phan <luan.phan@kwasitedev.com>; Vinci Patrick <vinci.patrick@kwasitedev.com>
Subject: RE: SPA 2024-0092 - 2ND SUBMISSION COMMENTS

Hi Ted,

Please see the following link for the most recent FSR:

26-03-20 - Final FSR Alloa Ph1

If you have any issues accessing the link, please let me know.

Thanks,

Kate Rothwell, M.Eng., P.Eng.
Manager, Water Resources
Urbantech® Consulting
A Division of Leighton-Zec Ltd.
3760 14th Avenue, Suite 301, Markham, ON L3R 3T7
krothwell@urbantech.com • www.urbantech.com
TEL 905-946-9461 Ext.426 • **DIR** 905-752-1728 • **MOB** 416-705-1460

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From: Ted Fair <ted.fair@kwasitedev.com>
Sent: March 25, 2026 10:07 AM
To: Dragan Zec <dzec@urbantech.com>; Kate Rothwell <krothwell@urbantech.com>
Cc: Stephanie Volpentesta <stephaniev@fieldgatecommercial.com>; Charlotte Pattee <charlottep@fieldgatedevelopments.com>; Luan Phan <luan.phan@kwasitedev.com>; Vinci Patrick <vinci.patrick@kwasitedev.com>
Subject: FW: SPA 2024-0092 - 2ND SUBMISSION COMMENTS
Importance: High

Dragan/Kate,

Per below comments from the Town, can you please kindly share your latest report > Urbantech Functional Servicing Study (**March 2026**)

Thanks,

Ted Fair, P. Eng.
KWA Site Development Consulting Inc.
(437) 453-6474

From: Tanjot Bal <Tanjot.Bal@caledon.ca>
Sent: Tuesday, March 24, 2026 10:38 PM
To: Charlotte Pattee <charlottep@fieldgatedevelopments.com>; Mike McLean <mikem@fieldgatedevelopments.com>
Cc: Herman Wessels <hermanw@gsai.ca>
Subject: SPA 2024-0092 - 2ND SUBMISSION COMMENTS

Good evening Charlotte and Mike,

Please find comments below from Natural Heritage and Water Resource staff for the Costco SPA. I would request these comments be addressed in the 3rd submission package.

Water Resource Comments:

Hydrologeological Investigation Report (GEMTEC, 2025)

1. The Hydrogeological Investigation Report lacks sufficient detail to understand the long-term dewatering needs for the site, the potential impacts and associated mitigation strategies. This is of particular concern given the artesian groundwater conditions identified in the eastern portion of the site. This should be further discussed and the site plan should be designed to avoid permanent dewatering where reasonably feasible. Should permanent dewatering be needed, the applicant will need to assess how this impacts the overall water balance and groundwater conditions (e.g. levels and flow direction).
2. The Hydrogeological Investigation Report proposes a post-development infiltration target of 80% of pre-development conditions based on Conservation Ontario (2013). The Town requires that post-development infiltration match pre-development conditions (100%), unless otherwise justified and accepted by the Town. This is provided as an advisory comment.
3. The Town has concerns with the methodology and assumptions used to establish the water balance target in the GEMTEC report. Notwithstanding this concern, the application of the target within the Functional Servicing and Stormwater Management Report is acceptable. No revisions are required at this time provided the target remains unchanged in future submissions.
4. The report recommends a minimum 0.5 m separation between LID practices and seasonally high groundwater. The Town will generally accept a minimum 0.5 m vertical separation, subject to confirmation of groundwater conditions. Final acceptance will depend on verified groundwater elevations.
5. Based on the groundwater quality results presented, the Town has concerns regarding construction dewatering discharge. All dewatering activities must comply with the Region of Peel Sewer Use By-law and/or the Town's applicable by-law (whichever is more stringent). The applicant must identify proposed discharge locations, and any required treatment measures prior to discharge.

Functional Servicing and Stormwater Management Report (KWA, 2025)

1. Section 2.2 references TRCA criteria; however, the site is located within the CVC watershed. Please revise the report to reflect Credit Valley Conservation (CVC) criteria. The design must also incorporate the Town's Green Development Standards, and consideration of the Town's CLI-ECA requirements if any infrastructure is proposed within the public ROW.
2. The application has been permitted to proceed in advance of finalized Secondary and Tertiary Plan studies. The applicant is responsible for ensuring full consistency with the latest approved studies. Section 2.2 references outdated versions. Please provide a Letter of Conformance, signed by a P.Eng., confirming that all relevant recommendations from the latest Secondary Plan and Tertiary Plan studies have been incorporated.
3. Section 2.2 does not identify the applicable erosion control targets. Please update the report to include the criteria from the Urbantech Functional Servicing Study (March 2026), and describe the measures implemented to achieve erosion control requirements.
4. Section 2.5 identifies the allowable release rates from each block. These appear to be different from those identified in the Functional Servicing Study by Urbantech (March 2026) completed in support of the Tertiary Plan. Please confirm that the release rates from the Subwatershed Study and carried forward in the Tertiary Plan align with the release rates being achieved through the proposed stormwater management strategy.
5. Based on Servicing Drawings S1 and S2, it appears that CULTEC chamber systems are connected in series. Please confirm whether this is the case. If so, provide confirmation that the available

storage volume has been appropriately calculated, and the system performance reflects the proposed configuration.

6. The Hydrogeological Study completed by GEMTEC recommended that a second year of continuous groundwater monitoring be undertaken to confirm groundwater conditions. Can the applicant confirm if this was done in 2025 and if so, can this information be shared to assist with further confirming the preferred locations for meeting infiltration targets.
7. Please confirm that Gallery 1, 2, 3, 4 and 5, located with Block A, B and C have been designed to infiltrate the first 24.7mm of their respective drainage areas to compensate for the drainage areas being managed by CULTEC chambers that will be lined.
8. It is understood that Street G may be unable to meet water balance and erosion criteria due to a number of limiting factors. As a possible alternative option, the Town has requested that overcontrol be achieved through this SPA to ensure protection of the receiving system. The overcontrol should be provided in Block C and this should be addressed in the Functional Servicing & Stormwater Management Report.
9. CULTEC chambers are proposed in areas of high groundwater. Please provide a buoyancy analysis demonstrating that the system will remain stable under empty and saturated groundwater conditions, and no uplift or flotation will occur.
10. The proposed use of an Oil Grit Separator (OGS) in the gas bar area alone is not sufficient to achieve the required water quality treatment for this part of the site, particularly given this high-risk stormwater land use. Because of that, use of an OGS is generally not considered sufficient. OGS units are considered pretreatment devices and do not provide reliable removal of fine sediments and hydrocarbons. The stormwater management design should be revised to incorporate a filtration-based manufactured treatment device (e.g., Jellyfish or equivalent) downstream of the OGS to provide enhanced treatment. This area should also include grading to isolate fueling area drainage and a shut-off valves or spill containment feature.
11. The Functional Serving Report completed for the Tertiary Plan indicates that thermal mitigation is required. This is likely to be achieved through the proposed design but has not be discussed in the report. Please ensure the updated report covers provides discussion on how thermal mitigation is achieved through the proposed design.

Natural Heritage Comments:

- In the discussion on construction dewatering rates, the hydrogeological report indicates that some elements of the proposed development are below the high groundwater level and permanent dewatering recommendations are provided. Clarify if permanent dewatering is proposed and how it affects meeting the infiltration target. Note that permanent dewatering is not preferred. If it is not proposed, clarify why it isn't necessary despite development below the high groundwater level.
- It appears that stormwater drainage from the gas bar is routed through typical stormwater water quality infrastructure. Clarify how the risk of gas/oil contamination of the natural receiving waters has been minimized to the extent feasible. KWA
- The Green Development Standards (GDS) Checklist submitted with the first submission inaccurately indicates that all proposed landscape plantings are native and that no invasive species have been selected. In fact, the landscape plans propose a small proportion of native species, well below the 50% GDS metric, and some invasive species. Increase the proportion of native species. Note that native cultivars/varieties are not considered native species as is