650 Victoria Terrace

Functional Servicing and Stormwater Management Report

Project Location:
650 Victoria Terrace, Fergus, ON

Prepared for:
Dunpar Homes
105 Six Point Road
Etobicoke, ON M8Z 2X3

Prepared by:
MTE Consultants Inc.
520 Bingemans Centre Drive
Kitchener, ON N2B 3X9

August 14, 2025

MTE File No.: 63117_001

Engineers, Scientists, Surveyors.

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1.0 INTRODUCTION

MTE Consultants Inc. was retained by Dunpar Homes to complete a Functional Servicing and Stormwater Management (FSSWM) Report for a new mixed-use development to be constructed at 650 Victoria Terrace (herein referred to as 'the Site') in the Township of Centre Wellington in support of the Official Plan Amendment and Zoning By-Law Amendment Application. The current zoning of the Site is M1 Service Industrial. The property is proposed to be re-zoned as residential.

The Site is bounded to the northeast by Gzowski Street, to the southwest by Victoria Terrace, to the northwest by an existing residential development with rear yard open space containing municipal services (ownership unknown), and to the southeast by an open space corridor with existing municipal infrastructure, zoned Residential (ownership unknown). For the purpose of this report, north refers to the project north. For the exact location of the Site refer to Figure F1.

The proposed development for the Site is the demolition of an existing industrial printing factory and the construction of 19 townhouse blocks with 192 residential townhouse units and 1 industrial service block with 11 units, as well as associated parking and drive aisles. The proposed development also includes three driveway entrances off Victoria Terrace and two driveway entrances off Gzowski Street.

The purpose of this study is to support the Official Plan Amendment and Zoning By-Law Amendment Applications. This will be accomplished by reviewing the opportunities and constraints for the subject property with respect to servicing, grading, and stormwater management; reviewing the requirements of the reviewing agencies; describing the development concept; and demonstrating the functional serviceability of the property. Pending approval of the applications, detailed design of the Site will commence and be submitted to the Township in support of Site Plan Approval.

2.0 CRITERIA

2.1 Existing Topography

The Site encompasses an area of 4.77ha and currently comprises an industrial building with associated parking and multiple existing driveway entrances off Victoria Terrace and Gzowski Street. In the existing condition, based on the topographic survey completed by Van Harten, surface runoff from the Site drains from west to east and from south to north towards the existing municipal ditch adjacent to Gzowski Street and enters the existing municipal storm sewer trunk located near the northeast corner of the Site. There is an elevation difference of approximately 5m between the southwest and northeast corners of the Site: the highest elevation approximately 421m and the lowest elevation is approximately 416m. The Site is approximately 57% impervious in the existing condition.

MTE
Engineers, Scientists, Surveyors

PROJECT
650 VICTORIA TERRACE

TITLE
SITE LOCATION PLAN

Drawn	Scale	Figure
EJJ	N.T.S.	F1
Checked: JHN	Project No.: 63117_001	
Date (yyyy-mm-dd): 2025-07-25	Rev No.: 0	

CAD: P:\P\63117_001\63117_001-F1.DWG

Plot Date: July 31, 2025 - 4:15 PM

2.2 Existing Servicing

2.2.1 Water

There is an existing 250mm diameter municipal watermain along Victoria Terrace. There is an existing 300mm diameter municipal watermain along Gzowski Street. There is an existing 250mm diameter municipal watermain along Victoria Terrace. There is an existing 300mm diameter municipal watermain along Forfar Street. There are four existing municipal fire hydrants in close proximity to the Site: two along Gzowski Street and two along Victoria Terrace fronting the Site. The Site is currently serviced by a 250mm diameter water service off the Gzowski Street watermain, complete with an existing on-site fire hydrant. The existing water service will be decommissioned and capped at the municipal watermain as part of the redevelopment of the Site.

Two flow tests were performed by CFLS on existing hydrants along Gzowski Street and Victoria Terrace on July 22, 2025. Refer to Table 2.1 and 2.2 below for a summary of the flow test results.

Table 2.1 – Results of Flow Test – Victoria Terrace

Results of Flow Tests Completed July 22, 2025					
Test #	**Outlet Inside Diameter (in.)**	**Number of Outlets**	**Pitot Pressure (psi)**	**Residual Pressure (psi)**	**Flow @ Residual (gal/min)**
1	n/a	n/a	n/a	45	0
2	2.5	1	32	40	950
3	2.5	2	16 + 19	38	1,403

Table 2.2 – Results of Flow Tests – Gzowski Street

Results of Flow Tests Completed July 22, 2025					
Test #	**Outlet Inside Diameter (in.)**	**Number of Outlets**	**Pitot Pressure (psi)**	**Residual Pressure (psi)**	**Flow @ Residual (gal/min)**
1	n/a	n/a	n/a	51	0
2	2.5	1	28	46	888
3	2.5	2	16 + 22	42	1,459

Refer to Appendix A for the information obtained by Classic Fire + Life Safety.

2.2.2 Sanitary

There is an existing 375mm diameter municipal sanitary sewer within Gzowski Street right-of-way, flowing from west to east. There are multiple sanitary manholes along Gzowski Street that are approximately 4.7m to 5.0m deep. Along Victoria Terrace, a 200mm diameter sanitary sewer extends near the southwest corner of the Site, draining from east to west, and connects to the 375mm sanitary sewer on Gzowski Street via a 250mm diameter sanitary sewer running along the Site's west property boundary. An additional 200mm diameter sanitary sewer

is located near the southeast corner of the Site along Victoria Terrace, draining west to east. The existing building on the Site is currently serviced by a 100mm diameter sanitary connection to the Gzowski Street sewer. The existing sanitary service connection will be decommissioned and capped at property line as part of the redevelopment of the Site.

2.2.3 Storm

There are two existing segments of 300mm and 250mm diameter municipal storm sewers along Victoria Terrace. The 250mm diameter segment located near the southeast corner of the Site and drains west to east and connects to the storm sewer within the Forfar Street right-of-way. The 300mm diameter segment locates near the southwest corner of the Site drains east to west and connects to an existing 900mm storm sewer system running along the west property boundary, which outlets to the existing ditch along Gzowski Street at the northwest corner of the Site.

Gzowski Street generally has a rural road cross-section across a majority of the Site's frontage, until the eastern most driveway, where the ditch terminates and a system of existing catchbasins continue to convey runoff towards the east. Runoff collected from the roadside ditches and catchbasins ultimately drains to the existing 1800x1100mm municipal storm sewer located at the northeast corner of the Site, which flows east. There is an existing 1000mm diameter culvert at the existing driveway entrance that will be removed and replaced as part of the development.

In the existing condition, surface runoff from the majority of the Site is conveyed overland toward towards the ditch along Gzowski Street, where it enters a ditch inlet and discharges into the existing storm sewer.

2.3 Existing Soils Information

Geotechnical information for the property is currently not available. A geotechnical investigation will be required during detailed building design to determine the condition of the native soils, inform the stormwater management design, and recommend appropriate construction methods for the Site development.

2.4 Reviewing Agencies

Grading, servicing and stormwater management designs as well as this FSSWM Report will be required for submission to the Township of Centre Wellington in support of the Official Plan Amendment, the Zoning By-Law Amendment and the Site Plan Approval Application. The Township will also be responsible for the review and approval of site plans, site grading, servicing, stormwater management, lighting and landscape design and ultimately issuing building permits.

3.0 METHODOLOGY

Preliminary grading and servicing strategies for the proposed development have been developed based on the topographic survey, plan and profile information, and the Conceptual Site Plan prepared by Dunpar Homes, dated June 3, 2025.

3.1 Proposed Grading

Refer to the appended Functional Site Grading Plan (Drawing C2.1) for illustration of the proposed grading approach discussed herein.

The development will include 19 street townhouse blocks and one service industrial block, complete with common drive aisles, surface parking, landscaped open spaces, and amenity areas. The grading design will generally respect existing grades along Victoria Terrace, Gzowski Street, and the west property boundary. Proposed finished floor elevations (FFEs) range from 422.05m at the west end of the Site to 418.20m at the east end, following the natural slope across the property. In the existing condition, the parking area associated with the existing printing facility encroaches onto the existing open space corridor along the east property line of the Site. This parking area will be removed and regraded as part of the development. Currently, drainage from this external area, as well as a portion of the open space corridor, flows toward the northeast corner of the Site, where it enters a ditch inlet via an existing swale that traverses the property. As part of the grading strategy, this external swale will be regraded along the property line to direct flow to a proposed storm structure, which will outlet to the existing storm trunk sewer.

To support the vision of a cohesive and enhanced public realm, the eastbound lane of Gzowski Street fronting the Site is proposed to be urbanized. This will involve infilling the existing roadside ditch, from the northwest corner of the Site to the existing culvert at the current factory entrance, and installing curb and gutter, catchbasins, and a new culvert to accommodate stormwater conveyance. It is understood that the design and implementation of these external works will be reviewed by the Township. The on-site grading strategy will also involve directing the major overland flow toward the Gzowski Street right-of-way via the storm sewer system and proposed swale.

3.2 Proposed Servicing

Refer to the appended Functional Site Servicing Plan (Drawing C2.2) for illustration of the proposed servicing approach discussed herein.

3.2.1 Water

Two new connections to the 300mm diameter municipal watermain along Gzowski Street and to the 250mm diameter municipal watermain along Victoria Terrace have been proposed in order to service the Site and to address the request of the Township in the Pre-consultation comments to provide two connections to create redundancy within the system. Refer to Appendix E for the Pre-consultation Comments provided to the Township of Centre Wellington by Triton Engineering Services Limited, dated November 28, 2024. The required private watermain size will be determined during detailed design will likely be 200mm diameter. The water connection will enter from the driveway entrances from Gzowski Street and Victoria Terrace and branch out to service the building blocks with internal looping of the system to ensure redundancy of supply and increase fire flows. Check valves within accessible chambers will be proposed at property line where each service exits the Site. Each individual unit will be serviced with a minimum 25mm diameter domestic connection off the private watermains. It is anticipated that six new private hydrants will be required to service the proposed blocks.

Preliminary water demands were calculated for the proposed development and are included in Appendix A. The maximum day domestic demand for the development was determined to be 4.63L/s. In addition to the domestic demands, the pressures and flows in the private water system must be sufficient for firefighting conditions as established by the Ontario Building Code, OBC (2012), and by the Fire Underwriter's Survey's *Water Supply for Public Fire Protection*, FUS (2020). The minimum residual pressure under firefighting conditions is 140kPa (20.3psi) per OBC 2012 A-3.2.5.7 3(b).

Many municipalities in Ontario use both the OBC and the FUS fire flow requirements for assessing firefighting water supply requirements. Ideally, fire flow demands for new developments are calculated based on the FUS criteria; however, it is not reasonable to expect that the existing municipal watermain infrastructure always has the operational capacity to supply water at the rates prescribed in the FUS guidelines, especially in systems that pre-date the implementation of FUS criteria, such as this one. As a result, at no time shall the available fire flow be less than that required by the Ontario Building Code.

The largest building footprints for different townhouse blocks and the industrial building were used to calculate preliminary fire flow, assuming firewalls would divide the blocks. The residual pressures in the system were then calculated using worst case demands with various hydrant locations. Table 3.1 summarizes the residual pressure at each of the worst-case combinations of hydrants and fire demand.

Table 3.1 – Summary of Residual Pressure at Each Hydrant

Worst-case Hydrant + Worst Case Block	OBC Demand + Max Day Domestic Demand (L/min)	Resulting Residual Pressure (kPa)
Hydrant 3 + Block Q with Firewall	6300 (105L/s)	159
Hydrant 4 + Industrial Block with Firewall	4500 (75L/s)	215
Hydrant 5 + Block J with Firewall	6300 (105L/s)	187

In all cases, the residual pressures are greater than the minimum allowable pressure of 140.0kPa per OBC 2012. These results are provided in Appendix A. These fire flow calcs represent worst-case scenarios and do not adequately represent the fact that there are two connections to the municipal main. Water distribution modelling will be required during detailed design and residual pressures and need for additional building components will be confirmed at that time.

3.2.2 Sanitary

A sanitary flow design sheet has been prepared to determine the flows anticipated to be generated by the proposed development. Based on the Township's Water and Wastewater Servicing Master Plan (June 2025), the anticipated average sanitary flow generation rate is 300L/d/capita and the average density is 2.67 persons/unit based on the Development Charges Background Study for Township of Centre Wellington (April 2021). With the proposed development having a total of 192 townhome units, 11 service industrial units, and a Site area of 4.77ha including 0.4ha industrial, the resulting peak flow including infiltration is expected to be 8.38L/s from the Site. The anticipated flow rates from the proposed development should be incorporated into the Township's sanitary system model to assess available capacity and identify any potential downstream constraints within the existing municipal infrastructure. Refer to Appendix B for sanitary flow rate calculations.

It is proposed that the Site will be serviced by a new 200mm diameter sanitary sewer complete with a new manhole connecting into the existing 375mm diameter municipal sanitary sewer along Gzowski Street. The private sanitary sewer will be installed at a slope that provides depth for the servicing of each townhome while maintaining adequate capacity. The service sizes and inverts will be confirmed at detailed design.

3.2.3 Storm

As noted in Section 3.1, the eastbound lane of Gzowski Street fronting the Site is proposed to be urbanized to support the vision of a cohesive and enhanced public realm. This will include infilling the existing roadside ditch from the northwest corner of the Site to the existing culvert at the current factory entrance, and installing curb and gutter, along with a new culvert system and multiple catchbasins to capture and convey stormwater runoff. The proposed culvert system will begin at the northwest corner of the Site, where an existing 1150mm diameter culvert conveying flow from the west adjacent property, as well as an existing 900mm diameter storm sewer along the Site's west property line, currently outlet. The system will replace the existing 1000mm diameter culvert located at the driveway entrance of the existing printing factory and will outlet to the portion of the existing ditch being maintained, before ultimately discharging to the existing ditch outlet at the northeast corner of the Site. The proposed culvert has been preliminarily sized based on the existing 1000mm diameter driveway culvert. The final culvert sizing will be confirmed during detailed design based on an assessment of the upstream drainage area. The sewer sizes and inverts of the proposed catchbasins, capturing right-of-way runoff and connecting into the culvert system, will be confirmed at detailed design.

A private storm sewer system with two outlet points will be installed on-site to collect runoff generated from the interior rooftops, landscape, drive aisles and parking areas. The proposed stormwater management system consists of two branches of private storm sewers, each equipped with an oil-grit separator (OGS) unit. One branch outlets to the proposed municipal culvert system within Gzowski Street right-of-way, while the other discharges to an on-site connection to the existing municipal storm trunk sewer. The majority of Site runoff will be captured and conveyed through this private system, with remaining perimeter drainage directed overland to the municipal storm infrastructure via surface catchbasins and roadside collection systems.

In addition, as described in Section 3.1 of this report, a diversion swale will be constructed to redirect existing flows from the eastern external catchment area toward the east corner of the Site, where the regraded external swale will converge with the proposed overland flow swale and discharge to proposed DCBMH42, ultimately conveying runoff to the existing municipal storm trunk sewer.

4.0 PRELIMINARY STORMWATER MANAGEMENT DESIGN

4.1 SWM Criteria

The stormwater management design criteria for the subject Site, as established by the Township of Centre Wellington, are as follows:

i) Attenuation of post-development peak flows to pre-development (existing) levels for the 2-, 5-, 10-, 25-, 50-, and 100-year storm events has been implemented in keeping with best management practices and to reflect initial expectations outlined in the pre-consultation comments.

ii) Implementation of Enhanced (Level 1) water quality controls.

iii) Annual Water Balance Analysis.

iv) Implementation of Erosion and Sediment Control measures.

4.2 Water Quantity Control

In order to successfully complete the preliminary stormwater management design for the Site, the following specific tasks were undertaken:

i) Calculate the allowable runoff rates using MIDUSS NET.

ii) Determine the percent impervious of the Site and catchment parameters for inclusion in MIDUSSS modeling.

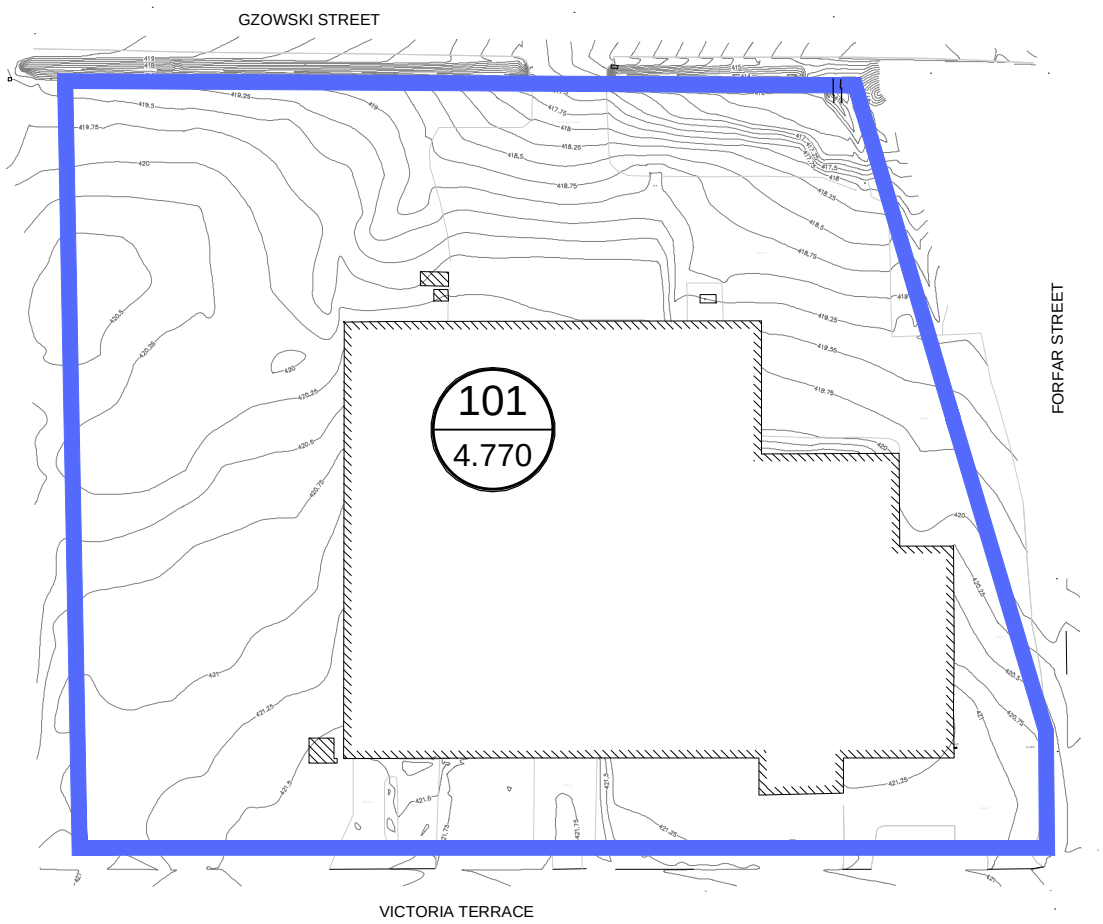
iii) Calculate post-development runoff hydrographs using MIDUSS NET.

The following table summarizes the catchments used in modeling of the Site. The post-development condition was separated into four catchment areas: the controlled area to DCBMH35, the industrial building rooftop, the controlled area to CBMH10, and the uncontrolled area. Figure F2 illustrates the limits of the pre-development catchment area. Figure F3 illustrates the limits of the post-development catchment areas.

Table 4.1 – Catchment Parameters

#	Catchment	Area (m)	% Impervious	Pervious CN	Impervious CN	Slope (%)	Flow Length (m)
Pre-Development Catchment Area							
101	Pre-Development	4.770	57	75	98	4.0	50
Post-Development Catchment Areas							
201	Industrial Building Rooftop	0.092	100	75	98	1.5	10.0
202	Controlled Area to DCBMH35	2.438	77	75	98	2.5	50.0
203	Controlled Area to CBMH10	1.303	82	75	98	2.5	40.0
204	Uncontrolled Area	0.937	86	75	98	4.0	5.0

A geotechnical investigation was not available for this development at the time this report was published. Therefore, a conservative value of 75 was used for the pervious CN. This CN value will be confirmed during detailed design, once a geotechnical investigation is provided.



LEGEND

SITE BOUNDARY

CATCHMENT 101

326.00 EXISTING CONTOURS

101 / 4.770 — SUB–CATCHMENT NUMBER / AREA (ha.)

0 20 40 60 80 100m

Engineers, Scientists, Surveyors

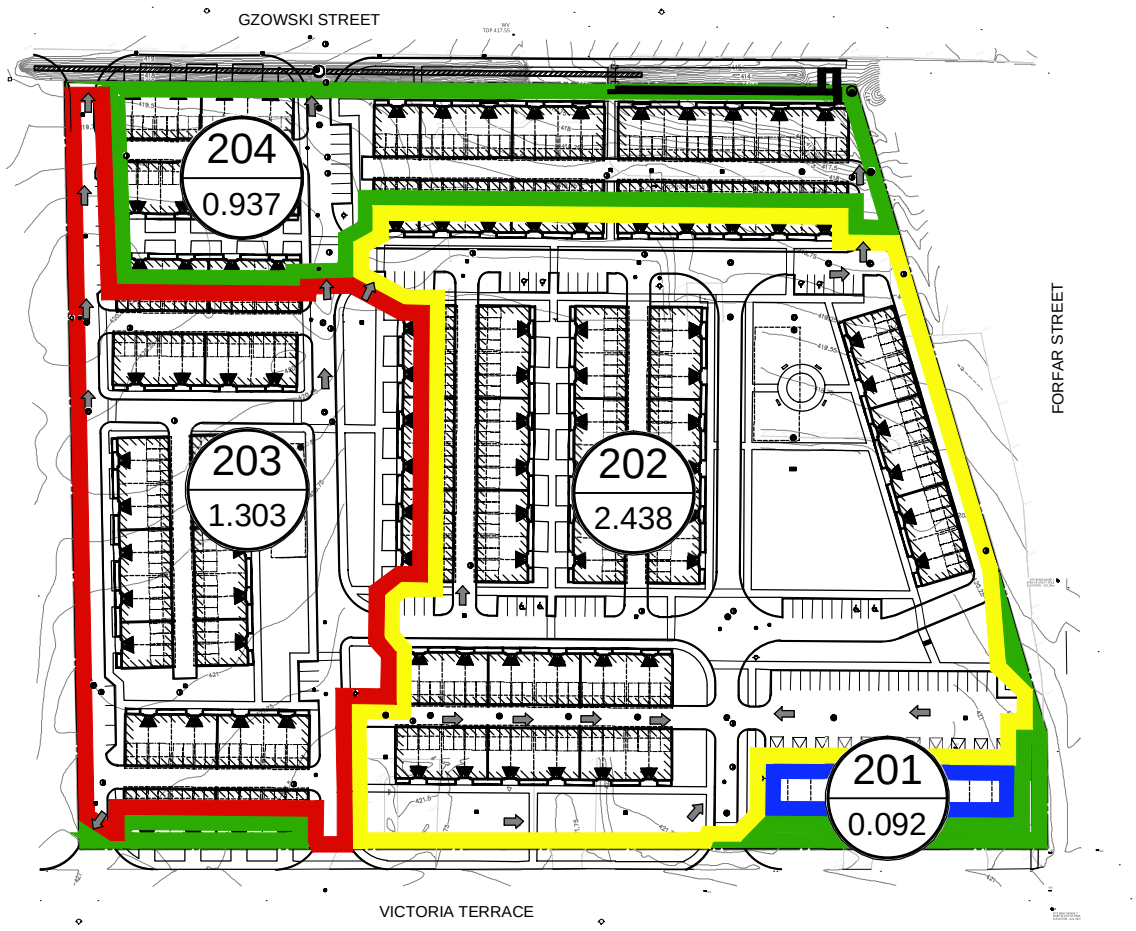
PROJECT

650 VICTORIA TERRACE

TITLE

PRE-DEVELOPMENT CATCHMENT AREA FIGURE

Drawn: EJJ	Scale: 1:2,000	Figure: **F2**
Checked: JHN	Project No.: 63117_001	
Date (yyyy-mm-dd): 2025-07-25	Rev No.: 0	



LEGEND

- SITE BOUNDARY
- CATCHMENT 201
- CATCHMENT 202
- CATCHMENT 203
- CATCHMENT 204
- 326.00 EXISTING CONTOURS
- 201 / 0.092 — SUB–CATCHMENT NUMBER / AREA (ha.)

0 20 40 60 80 100m

MTE
Engineers, Scientists, Surveyors

PROJECT
650 VICTORIA TERRACE

TITLE
POST-DEVELOPMENT CATCHMENT AREAS FIGURE

Drawn: EJJ	Scale: 1:2,000	Figure: F3
Checked: JHN	Project No.: 63117_001	
Date (yyyy-mm-dd): 2025-07-25	Rev No.: 0	

In order to achieve the stormwater management requirements for the Site, runoff generated from the interior rooftops, landscape, drive aisles and parking areas will be controlled with two properly sized outlet pipes for the proposed east and west storm sewer systems. Storage volume for the control outlet pipes will be provided in two underground storm tanks located in the western landscaped area and in the amenity on the east side of the Site. The following table illustrates the stage-storage-discharge relationship of the east and west storm system.

Table 4.2 – Stage-Storage-Discharge Information – East Storm Sewer System

Elevation (m)	Head (m)	Outlet Pipe Flow (m^3/s)	Volume (m^3)	Remarks
415.505	0.00	0.00000	0.00	Estimated Invert of Storm Outlet Pipe
417.900	2.40	0.8632	317.00	Top of Grate of DCBMH35
417.950	2.45	0.8751	318.10	6.0m Weir
418.000	2.50	0.9898	322.00	Contour

Table 4.3 – Stage-Storage-Discharge Information- West Storm Sewer System

Elevation (m)	Head (m)	Outlet Pipe Flow (m3/s)	Volume (m3)	Remarks
417.046	0.00	0.00000	0.00	Estimated Invert of Storm Outlet Pipe
419.050	2.00	0.3212	263.00	Top of Grate of CBMH10
419.200	2.15	0.3357	268.00	6.0m Weir
419.250	3.20	0.4432	276.00	Contour

With the installation of four flow control roof drains on the service industrial block rooftop, the addition of the 375mm diameter outlet control pipe with a 0.5% slope on the west system and the 600mm diameter outlet control pipe with a 0.5% slope on the east system, the post-development runoff from the controlled portion of the Site for the 100-year storm events is controlled to $0.992 m^3/s$. The following table summarizes the expected flows that will be generated by the whole Site. The post-development runoff from the Site is controlled well below the pre-development peak flow rates. Refer to Appendix C for the MIDUSS NET output. Please note that these flows are subject to change at the detailed design stage.

Table 4.4 – Summary of Flows

Modelling Condition	Pre-Development Peak Flow Rate (m^3/s)	Post-Development Peak Flow Rate (m^3/s)
2-Year Storm Event	0.684	0.502
5-Year Storm Event	0.955	0.690
10-Year Storm Event	1.135	0.814
25-Year Storm Event	1.370	0.975
50-Year Storm Event	1.553	1.099
100-Year Storm Event	1.726	1.217

4.3 Water Quality Control

Two oil-grit separators, Stormceptor Models EFO8 and EFO10, will be installed on the storm sewer systems to provide water quality control for the Site. The chosen units are expected to provide Enhanced Treatment Level (80% TSS Removal) water quality control. Refer to Appendix D for the sizing output from the Stormceptor Expert program. The Stormceptors will require regular annual maintenance to ensure they are operating properly. The owner may be required to enter into a maintenance agreement with a suitable contractor to complete this work. In addition, all the storm structures will have a 600 mm sump.

4.4 Water Balance/Budget Analysis

As noted in the pre-consultation comments, groundwater recharge is to be provided to the extent feasible, recognizing any applicable wellhead protection zone restrictions. A detailed infiltration water balance will be completed at the detailed design stage once a geotechnical investigation is completed for the Site, to confirm the feasibility and extent of recharge opportunities for the Site.

4.5 Erosion and Sediment Control

Precautions will need to be taken during construction to limit erosion and sedimentation. Typically, the following measures are recommended during construction for erosion and sedimentation control:

i) Erosion and sedimentation facilities are to be installed prior to any area grading operations.

ii) All erosion control measures are to be inspected and monitored by the contractor and repairs are to be completed as required.

iii) All materials and equipment used for the purpose of Site preparation and project completion should be operated and stored in a manner that prevents any deleterious substance from leaving the Site.

iv) Construction of temporary swales to direct runoff to a sedimentation basin, with rock check dams as required to control velocities.

v) Stripping and strategic placement of topsoil stockpiles. Placement of sediment control fencing around all stockpile areas.

vi) Re-vegetation of completed areas as soon as possible after construction, including those areas not slated for construction, within 60-days of rough grading.

vii) To minimize the amount of mud being tracked onto the roadway, a mud mat should be installed at the primary construction entrance.

Erosion and sediment control details will be provided at the detailed design stage in support of the Site Plan Approval application.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the foregoing analysis, it is concluded that:

i) The proposed grading design will respect the natural topography of the Site to achieve a reasonable cut/fill balance where possible. The design will generally respect existing grades along Victoria Terrace, Gzowski Street, the west property boundary, and will include regrading along the east property line.

ii) The proposed development will include urbanizing the eastbound lane of Gzowski Street from the north corner of the Site to the location of the existing culvert at the existing driveway entrance of the existing printing factory.

iii) Existing municipal infrastructure for water, sanitary, and storm is available within the Gzowski Street and Victoria Terrace rights-of-way and will be utilized to service the proposed development.

iv) A new municipal storm culvert and catchbasin system will be installed to replace the existing roadside ditch and culvert along Gzowski Street as described above. The proposed system will outlet to the portion of the existing roadside ditch being maintained and ultimately discharge to the existing ditch inlet connected to the municipal storm sewer at the east corner of the Site.

v) The expected maximum day domestic water demand for the Site is 4.63 L/s. Based on preliminary analysis using worst-case fire flow scenarios and assuming firewalls are installed within blocks, the maximum fire flow demand is estimated at 6,300 L/min (105 L/s). These flow rates are provided to the Township for inclusion in their water system model and confirmation of available capacity.

vi) The expected peak sanitary flow rate from the Site is 8.38 L/s. This flow rate is provided to the Township for inclusion in their model to evaluate available capacity and determine if any downstream constraints exist within the existing municipal sanitary system.

vii) The SWM criteria can be satisfied and with the implementation of on-site controls for water quantity and water quality. Infiltration Water Balance/LID methods will be explored during detailed design.

Additional grading, servicing and stormwater management details will be provided during detailed design.

All of which is respectfully submitted,

MTE Consultants Inc.

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https://mte85.sharepoint.com/sites/63117_001/Shared Documents/03- Reports/rpt_2025-08-14_FSSWM.docx

Appendix A

Fire Flow Analysis & Water Demand Design Sheet

CLASSIC FIRE + LIFE SAFETY

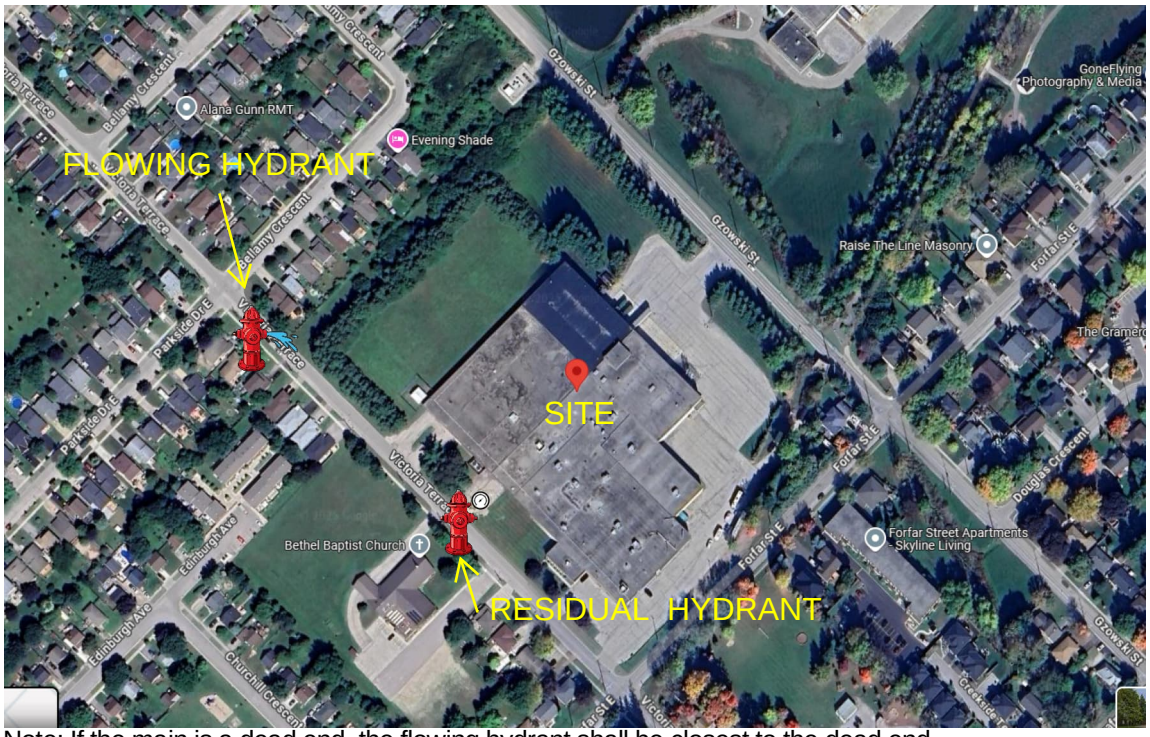
FLOW TEST REPORT

Form SD-003B RevDate: Nov 29, 2021

PROJECT INFORMATION			
Project Name:	650 Victoria Terrace Flow Test	Const. Project #:	25-CAM-690-0897
Site Address:	650 Victoria Terrace Fergus ON	Design Project #:	2025-CFLS-364
City Contact:	Mike Mullen	Phone #:	519-501-7252
CFLS Contact:	Dean Wanders	Phone #:	905-514-7417
Technical Contact:	**Andy Coghlin**	Phone #:	**519-476-0761**

SITE INFORMATION

SITE MAP



Note: If the main is a dead end, the flowing hydrant shall be closest to the dead end

ITEMS TO LABEL ON MAP	HYDRANTS USED	MAIN SIZE
☑ Static / Residual & Flow Hydrants	☑ City Hydrant(s)	City: 250 mm
☐ Flow Direction (if the main is dead end)	☐ Site Hydrant(s)	Site:

SITE NOTES

Main is ductile iron

CLASSIC FIRE + LIFE SAFETY

FLOW TEST REPORT

Form SD-003B RevDate: Nov 29, 2021

TEST INFORMATION			
Minimum Required Flow:	NA	Min Ports:	2
CFLS Personnel Present:	Dean Wanders	Test Date:	2025-07-22
City / External Company:	Centre Wellington	Test Time:	9:00pm

TEST EQUIPMENT	
☐ Hose Monsters with built in Pitot	Hose length used:
☐ Hand held pitot gauge	☑ Pollard diffuser elbow with built in Pitot
☐ Other:	

TEST RESULTS

Number of Ports	Outlet Size (IN)	Discharge Coefficient	Pitot Reading (PSI)				Total Flow (GPM)	Static / Residual Pressure (PSI)
0 Ports								45
1 Port	2.5	0.9	32				950	40
2 Ports	2.5	0.9	16	19			1,403	38
3 Ports	2.5	0.9					0	
4 Ports	2.5	0.9					0	
0 Ports	STATIC RE-CHECK							45

TEST NOTES

HYDRAULIC ADJUSTMENTS (FOR OFFICE USE ONLY)			
ADJUSTMENTS FOR HYDRAULIC GRADE LINE (HGL)			
Reservoir HGL (m):		Site Elevation (m):	
Theoretical Static Head (PSI):	0	PSI to subtract from test pressures:	45
OTHER HYDRAULIC ADJUSTMENTS			
Other adjustment as required by the City / AHJ:			

CLASSIC FIRE + LIFE SAFETY

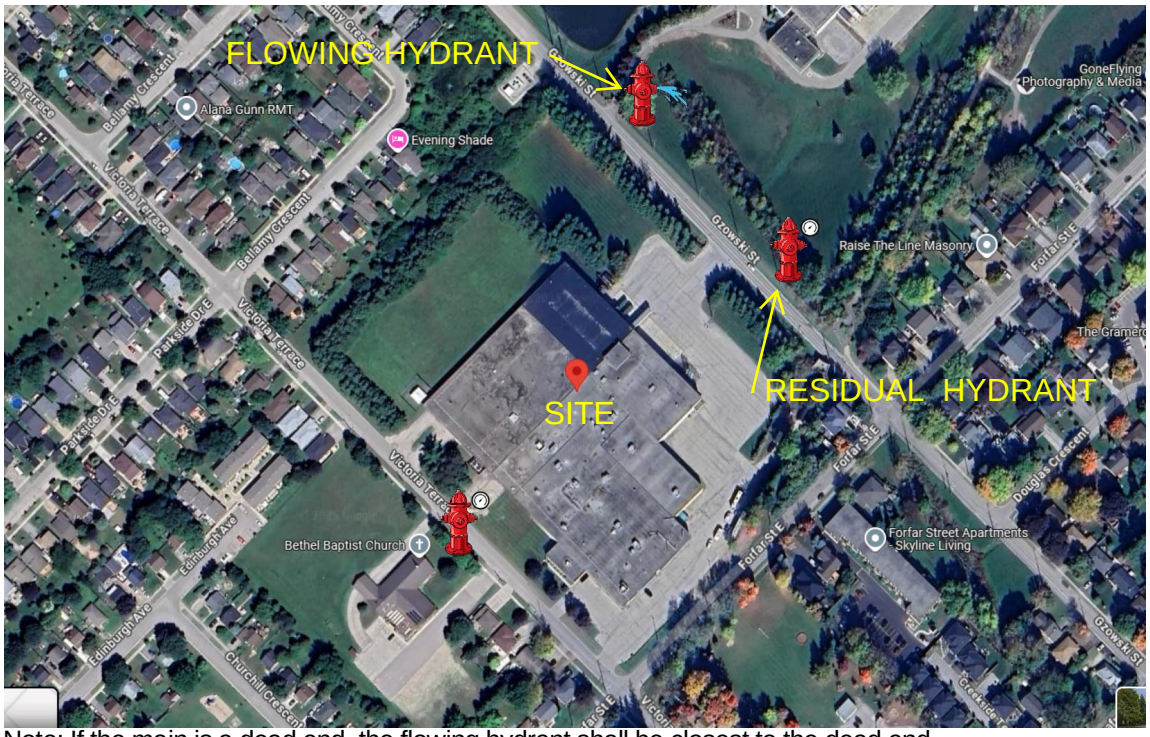
FLOW TEST REPORT

Form SD-003B RevDate: Nov 29, 2021

PROJECT INFORMATION			
Project Name:	Gzowski St Flow Test	Const. Project #:	25-CAM-690-0897
Site Address:	Gzowski St Flow Test Fergus ON	Design Project #:	2025-CFLS-364
City Contact:	Mike Mullen	Phone #:	519-501-7252
CFLS Contact:	Dean Wanders	Phone #:	905-514-7417
Technical Contact:	**Andy Coghlin**	Phone #:	**519-476-0761**

SITE INFORMATION

SITE MAP



Note: If the main is a dead end, the flowing hydrant shall be closest to the dead end

ITEMS TO LABEL ON MAP	HYDRANTS USED	MAIN SIZE
☑ Static / Residual & Flow Hydrants	☑ City Hydrant(s)	City: 300 mm
☐ Flow Direction (if the main is dead end)	☐ Site Hydrant(s)	Site:

SITE NOTES

Ductile iron main

CLASSIC FIRE + LIFE SAFETY

FLOW TEST REPORT

Form SD-003B RevDate: Nov 29, 2021

TEST INFORMATION			
Minimum Required Flow:	NA	Min Ports:	2
CFLS Personnel Present:	Dean Wanders	Test Date:	2025-07-22
City / External Company:	Centre Wellington	Test Time:	9:30pm

TEST EQUIPMENT	
☐ Hose Monsters with built in Pitot	Hose length used:
☐ Hand held pitot gauge	☑ Pollard diffuser elbow with built in Pitot
☐ Other:	

TEST RESULTS

Number of Ports	Outlet Size (IN)	Discharge Coefficient	Pitot Reading (PSI)				Total Flow (GPM)	Static / Residual Pressure (PSI)
0 Ports								51
1 Port	2.5	0.9	28				888	46
2 Ports	2.5	0.9	16	22			1,459	42
3 Ports	2.5	0.9					0	
4 Ports	2.5	0.9					0	
0 Ports	**STATIC RE-CHECK**							51

TEST NOTES

HYDRAULIC ADJUSTMENTS (FOR OFFICE USE ONLY)			
ADJUSTMENTS FOR HYDRAULIC GRADE LINE (HGL)			
Reservoir HGL (m):		Site Elevation (m):	
Theoretical Static Head (PSI):	0	PSI to subtract from test pressures:	51
OTHER HYDRAULIC ADJUSTMENTS			
Other adjustment as required by the City / AHJ:			

650 Victoria Terrace
WATER DEMANDS
Fergus, Ontario

Project #: 63117-100
Date: July 25, 2025
Date Printed: August 14, 2025
Designed By: JHN
Checked By: LEI

Proposed Site Plan :

Development Information[1]								Fire Flow[2]																Domestic Flow[3,4]					
								Ontario Building Code						Fire Underwriters Survey															
Node ID / Area ID / Building #	F.F.E. (m.a.s.l.)	Description	# of Units	Population	Bldg Area (1^{st} Floor)	Total Bldg Area	Building Volume	K	V	S_{tot}	Q	F	F	C	A	F	(2) Occupancy Reduction	(3) Sprinkler Protection	(4) Building Exposure	F	F	Fire Flow (Max OBC/FUS)	MOE Guidelines	Average Day	Max Day	Peak Hour	Minimum Hour	Max Day + Fire Flow
				# of people	m^2	m^2	m^3		m^3		*L*	*L/min*	*L/s*		m^2	*L/min*				*L/min*	*L/s*	*L/s*	*L/s*	*L/s*	*L/s*	*L/s*	*L/s*	*L/s*
-	Varies	Townhomes	192	513	493	1,971	5,913	23	5,913	1.50	203,999	6,300	105	1.00	1,478	8,459	-15%	0%	35%	10,000	167	167	1.780	1.780	4.450	6.675	0.801	171
-	Varies	Industrial	11	21	504	1,008	4,884	23	4,884	1.40	157,257	4,500	75	1.00	504	4,939	-15%	0%	40%	6,000	100	100	0.073	0.073	0.182	0.273	0.033	105
		TOTALS FOR SITE	**203**	**534**							**Max Fire Flow =**		**105**							**Max Fire Flow =**	**167**	**167**	**1.85**	**1.85**	**4.63**	**6.95**	**0.83**	**171**
																						Sum of Maximum Day Flows + Largest Fire Flow (L/s) =						**171**

Assumptions:

1 All building areas and populations are based on the Site Plan prepared by Dunpar Homes. Design population of 2.67 ppu was used for Townhouse buildings per the Development Charges Background Study for Township of Centre Wellington,dated April 16, 2021. The largest proposed Townhome & Commercial Blocks (6-unit section) building area and volume and were used to determine the fire flow demand, with proposed fire walls as shown on the drawings, as worst case scenario.

2 All townhouse blocks are classified as occupancy group C (Residential Occupancy).

3 Population for the commercial building is based on the assumed 500sqft per employees as per the Development Charges Background Study for Township of Centre Wellington,dated April 16, 2021.

3 Average Daily Demands per capita are based on the historic data Growth Scenario 1 in the Water and Wastewater Servicing Master Plan for Township of Centre Wellington,dated June 30 2025

Residential = 300 L/cap/day

4 Peaking Factors based on "*Design Guidelines for Drinking-Water Systems*" (MOE, 2008):

Average Day =	1
Maximum Day =	2.5
Peak Hour =	3.75
Minimum Hour =	0.45

650 Victoria Terrace

FIRE FLOW ANALYSIS

Fergus, Ontario

Project Number: 63117-100
Date: July 31, 2025
Design By: JHN
File: Q:\63117_001\Water + Fire\Site Fire Flow Analysis _ Rev 5.xlsx

CALCULATION OF RESIDUAL PRESSURE AT ON-SITE HYDRANT

Case 1: Block Q 6-unit section and hydrant 3

1. Boundary Conditions (Based on Fire Flow Test Results):	Metric		Imperial		
P0 - Starting Pressure	35.87	*m*	51	*psi*	
P1 - Pressure at Q1	29.54	*m*	42	*psi*	
Q1 - From Fire Flow Test	5523	*L/min*	1459	*U.S. gal/min*	
Q2 - Required Flow	6300	*L/min*	1664	*U.S. gal/min*	From: Water Demand calculations by MTE
P-loss 1	6.33	*m*	9	*psi*	
P-loss 2	8.08	*m*	11	*psi*	
P2 - Residual Pressure	**27.79**	***m***	**40**	***psi***	Extrapolated from Fire Flow Test Results

2. Friction Losses Through Water Service:					
Hazen-Williams Equation	**Metric**		**Imperial**		
C_{hw} = Pipe Friction Factor	150		150		
k = conversion factor	10.675		4.727		
n = constant	1.852		1.852		
m = constant	4.8704		4.8704		
Q = Flow	6300	L/min	1664	*U.S. gal/min*	
150mm dia.					
d = Pipe Diameter	150	mm	5.91	in	
p = Loss/Length	0.1579	m/m	0.0684	psi/ft	
Length	4	m	13	ft	
Loss	**0.63**	**m**	**0.9**	**psi**	Hydrant lead
200mm dia.					
d = Pipe Diameter	200	mm	7.87	in	
p = Loss/Length	0.0389	m/m	0.0169	psi/ft	
Length	153.6	m	504	ft	
Loss	**5.97**	**m**	**8.5**	**psi**	On-site watermain
Total Loss	**6.60**	**m**	**9.39**	**psi**	

3. Friction Losses Through Appurtenances:							
Appurtenances		Number	K	Velocity	Head Loss	Total Loss	
Dia. (mm)	*Type*			*m/s*	*m*	*m*	*psi*
200	Tee (Branch)	2	0.840	3.342	0.478	0.957	1.360
200	Tee (Through)	2	0.280	3.342	0.159	0.319	0.453
150	Tee (Branch)	1	0.900	5.942	1.619	1.619	2.303
150	Gate Valve	1	0.120	5.942	0.216	0.216	0.307
200	Gate Valve	1	0.112	3.342	0.064	0.064	0.091
150	150-200 Expander	0	0.407	5.942	0.732	0.000	0.000
Total Minor Losses						**3.175**	**4.514**

4. Elevation - Elevational differences from existing hydrant to proposed hydrant				
		Metric		**Imperial**
Elevation at Boundary (i.e. Residual Hydrant):	416	m	1365	ft
Elevation at Site Hydrant:	417.8	m	1371	ft
Elevation Difference = Loss/Gain	**1.8**	**m**	**2.6**	**psi**

ANALYSIS SUMMARY					
Total Losses	**11.578**	**m**			
	113.58	**kPa**	**16.5**	**psi**	
Residual Pressure after Losses	**16.21**	**m**			
	159	**kPa**	**23.1**	**psi**	**PASS**
Allowable Residual Pressure	*140*	*kPa*	*20.3*	*psi*	

650 Victoria Terrace

FIRE FLOW ANALYSIS

Fergus, Ontario

Project Number: 63117-100
Date: August 14, 2025
Design By: JHN
File: Q:\63117_001\Water + Fire\Site Fire Flow Analysis _ Rev 5.xlsx

CALCULATION OF RESIDUAL PRESSURE AT ON-SITE HYDRANT

Case 2: Industrial Block 6-unit section and hydrant 4

1. Boundary Conditions (Based on Fire Flow Test Results):	Metric		Imperial		
P0 - Starting Pressure	31.65	*m*	45	*psi*	
P1 - Pressure at Q1	26.72	*m*	38	*psi*	
Q1 - From Fire Flow Test	5311	*L/min*	1403	*U.S. gal/min*	
Q2 - Required Flow	4500	*L/min*	1189	*U.S. gal/min*	From: Water Demand calculations by MTE
P-loss 1	4.92	*m*	7	*psi*	
P-loss 2	3.62	*m*	5	*psi*	
P2 - Residual Pressure	**28.02**	***m***	**40**	***psi***	Extrapolated from Fire Flow Test Results

2. Friction Losses Through Water Service:					
Hazen-Williams Equation	**Metric**		**Imperial**		
C_{hw} = Pipe Friction Factor	150		150		
k = conversion factor	10.675		4.727		
n = constant	1.852		1.852		
m = constant	4.8704		4.8704		
Q = Flow	4500	L/min	1189	*U.S. gal/min*	
150mm dia.					
d = Pipe Diameter	150	mm	5.91	in	
p = Loss/Length	0.0846	m/m	0.0367	psi/ft	
Length	8	m	26	ft	
Loss	**0.68**	**m**	**1.0**	**psi**	Hydrant lead
200mm dia.					
d = Pipe Diameter	200	mm	7.87	in	
p = Loss/Length	0.0209	m/m	0.0090	psi/ft	
Length	187	m	614	ft	
Loss	**3.90**	**m**	**5.5**	**psi**	On-site watermain
Total Loss	**4.58**	**m**	**6.51**	**psi**	

3. Friction Losses Through Appurtenances:							
Appurtenances		Number	K	Velocity	Head Loss	Total Loss	
Dia. (mm)	*Type*			*m/s*	*m*	*m*	*psi*
200	Tee (Branch)	2	0.840	2.387	0.244	0.488	0.694
200	Tee (Through)	2	0.280	2.387	0.081	0.163	0.231
150	Tee (Branch)	1	0.900	4.244	0.826	0.826	1.175
150	Gate Valve	1	0.120	4.244	0.110	0.110	0.157
200	Gate Valve	1	0.112	2.387	0.033	0.033	0.046
150	150-200 Expander	0	0.407	4.244	0.374	0.000	0.000
Total Minor Losses						**1.620**	**2.303**

4. Elevation - Elevational differences from existing hydrant to proposed hydrant				
		Metric		**Imperial**
Elevation at Boundary (i.e. Residual Hydrant):	421.6	m	1383	ft
Elevation at Site Hydrant:	421.5	m	1383	ft
Elevation Difference = Loss/Gain	**-0.1**	**m**	**-0.1**	**psi**

ANALYSIS SUMMARY					
Total Losses	**6.096**	**m**			
	59.80	**kPa**	**8.7**	**psi**	
Residual Pressure after Losses	**21.93**	**m**			
	215	**kPa**	**31.2**	**psi**	**PASS**
Allowable Residual Pressure	*140*	*kPa*	*20.3*	*psi*	

650 Victoria Terrace

FIRE FLOW ANALYSIS

Fergus, Ontario

Project Number: 63117-100
Date: July 31, 2025
Design By: JHN
File: Q:\63117_001\Water + Fire\Site Fire Flow Analysis _ Rev 5.xlsx

CALCULATION OF RESIDUAL PRESSURE AT ON-SITE HYDRANT

Case 3: Block F 6-unit section and hydrant 5

1. Boundary Conditions (Based on Fire Flow Test Results):

	Metric		Imperial		
P0 - Starting Pressure	31.65	*m*	45	*psi*	
P1 - Pressure at Q1	26.72	*m*	38	*psi*	
Q1 - From Fire Flow Test	5311	*L/min*	1403	*U.S. gal/min*	
Q2 - Required Flow	6300	*L/min*	1664	*U.S. gal/min*	From: Water Demand calculations by MTE
P-loss 1	4.92	*m*	7	*psi*	
P-loss 2	6.75	*m*	10	*psi*	
P2 - Residual Pressure	**24.89**	***m***	**35**	***psi***	Extrapolated from Fire Flow Test Results

2. Friction Losses Through Water Service:

Hazen-Williams Equation	Metric		Imperial		
C_{hw} = Pipe Friction Factor	150		150		
k = conversion factor	10.675		4.727		
n = constant	1.852		1.852		
m = constant	4.8704		4.8704		
Q = Flow	6300	L/min	1664	*U.S. gal/min*	
150mm dia.					
d = Pipe Diameter	150	mm	5.91	in	
p = Loss/Length	0.1579	m/m	0.0684	psi/ft	
Length	9	m	30	ft	
Loss	**1.42**	**m**	**2.0**	**psi**	Hydrant lead
200mm dia.					
d = Pipe Diameter	200	mm	7.87	in	
p = Loss/Length	0.0389	m/m	0.0169	psi/ft	
Length	53	m	174	ft	
Loss	**2.06**	**m**	**2.9**	**psi**	On-site watermain
Total Loss	**3.48**	**m**	**4.95**	**psi**	

3. Friction Losses Through Appurtenances:							
Appurtenances		Number	K	Velocity	Head Loss	Total Loss	
Dia. (mm)	*Type*			*m/s*	*m*	*m*	*psi*
200	Tee (Branch)	1	0.840	3.342	0.478	0.478	0.680
200	Tee (Through)	1	0.280	3.342	0.159	0.159	0.227
150	Tee (Branch)	1	0.900	5.942	1.619	1.619	2.303
150	Gate Valve	1	0.120	5.942	0.216	0.216	0.307
200	Gate Valve	1	0.112	3.342	0.064	0.064	0.091
150	150-200 Expander	0	0.407	5.942	0.732	0.000	0.000
Total Minor Losses						**2.537**	**3.607**

4. Elevation - Elevational differences from existing hydrant to proposed hydrant				
		Metric		**Imperial**
Elevation at Boundary (i.e. Residual Hydrant):	421.6	m	1383	ft
Elevation at Site Hydrant:	421.45	m	1383	ft
Elevation Difference = Loss/Gain	**-0.15**	**m**	**-0.2**	**psi**

ANALYSIS SUMMARY

Total Losses	**5.868**	**m**			
	57.57	**kPa**	**8.3**	**psi**	
Residual Pressure after Losses	**19.02**	**m**			
	187	**kPa**	**27.1**	**psi**	**PASS**
Allowable Residual Pressure	*140*	*kPa*	*20.3*	*psi*	

650 Victoria Terrace
FIRE FLOW ANALYSIS
Fergus, Ontario

Project Number: 63117-001
Date: July 24, 2025
Design By: JHN

File: Q:\63117_001\Fire\Site Fire Flow Analysis _ Rev 5.xlsx

Step 1: Determining Water Supply Coefficient

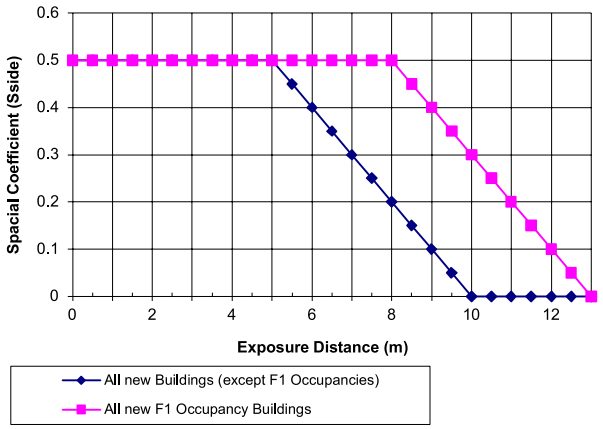
	Table 1 from OBC 2012 A3.2.5.7												
	Type of Construction	Classification by group or division in Accordance with Table 3.1.2.1 of the Ontario Building Code											
		A2	B1	B2	B3	C	D	A4	F3	A1	A3	E	F2	F1
1	Building is of Noncombustible construction with fire separation and fire-resistance ratings provided in accordance with Subsection 3.2.2 of the OBC, including loadbearing walls, columns and arches						10	12		14		17		23
2	Building is of Noncombustible construction or of heavy timber construction conforming to Article 3.1.4.6 of the OBC. Floor assemblies are fire separations but no fire-resistance rating. Roof assemblies, mezzanines, loadbearing walls, columns and arches do not have a fire-resistance rating.						16	19		22		27		37
3	Building is of Combustible Construction with fire separations and fire-resistance ratings provided in accordance with Subsection 3.2.2 of the OBC, including loadbearing walls, columns and arches. Noncombustible construction may be used in lieu of fire resistance rating where permitted in subsection 3.2.2 of the OBC						18	22		25		31		41
4	Building is of combustible construction. Floor assemblies are fire separations but with no fire-resistance rating. Roof assemblies, mezzanines, loadbearing walls, columns and arches do not have a fire-resistance rating.						23	28		32		39		53

Type of Construction	Building Classification	Water Supply Coefficient (K)
4	C	**23**

Step 2: Determine the Spacial Coefficient

	Distance	S_{side}
Exposure Distance 1 (m)	25.00	0.00
Exposure Distance 2 (m)	25.00	0.00
Exposure Distance 3 (m)	2.00	0.50
Exposure Distance 4 (m)	6.00	0.40
Exposure Distance 5 (m)		
	S_{tot}	**1.90**

Figure 1 - Spatial Coefficient vs Exposure Distance



Step 3: Determine Volume of Building

Building Length(m)	Building Width (m)	Building Height to the underside of roof deck (m)	Volume (m^3)
36.50	13.50	12.00	5913.00

Number of Stories	4

Step 4: Calculate Minimum Water Supply

$$Q = KVS_{tot}$$

Minimum Water Supply (L)	258398.10

Step 5: Calculate Minimum Supply Flow Rate

Table 2 from OBC 2012 A3.2.5.7			
Minimum Water Supply Flow Rates			
Building Code, Part 3 Buildings	Required Minimum Water Supply Flow Rate (L/min)		
One Storey Building with building area not exceeding 600 m2 (excluding F1 occupancy)	1800		
All Other Buildings	if Q> and	Q<=	
		108000	2700
	108000	135000	3600
	135000	162000	4500
	162000	190000	5400
	190000	270000	6300
	270000		9000

Minimum Water Supply Flow Rate (L/min)	6300

Step 6: Is a private fire reservoir required? No

650 Victoria Terrace
FIRE FLOW ANALYSIS
Fergus, Ontario

Project Number: 63117-001
Date: July 24, 2025
Design By: JHN

File: Q:\63117_001\Fire\Site Fire Flow Analysis _ Rev 5.xlsx

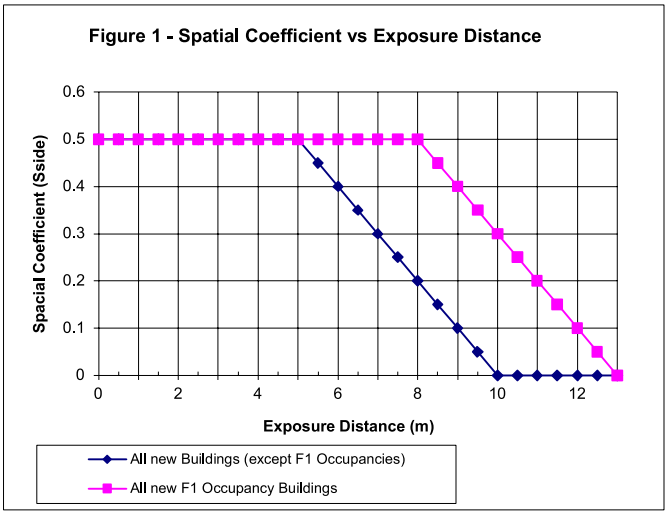
Step 1: Determining Water Supply Coefficient

	Table 1 from OBC 2012 A3.2.5.7												
	Type of Construction	Classification by group or division in Accordance with Table 3.1.2.1 of the Ontario Building Code											
		A2	B1	B2	B3	C	D	A4	F3	A1	A3	E	F2	F1
1	Building is of Noncombustible construction with fire separation and fire-resistance ratings provided in accordance with Subsection 3.2.2 of the OBC, including loadbearing walls, columns and arches						10	12		14		17		23
2	Building is of Noncombustible construction or of heavy timber construction conforming to Article 3.1.4.6 of the OBC. Floor assemblies are fire separations but no fire-resistance rating. Roof assemblies, mezzanines, loadbearing walls, columns and arches do not have a fire-resistance rating.						16	19		22		27		37
3	Building is of Combustible Construction with fire separations and fire-resistance ratings provided in accordance with Subsection 3.2.2 of the OBC, including loadbearing walls, columns and arches. Noncombustible construction may be used in lieu of fire resistance rating where permitted in subsection 3.2.2 of the OBC						18	22		25		31		41
4	Building is of combustible construction. Floor assemblies are fire separations but with no fire-resistance rating. Roof assemblies, mezzanines, loadbearing walls, columns and arches do not have a fire-resistance rating.						23	28		32		39		53

Type of Construction	Building Classification	Water Supply Coefficient (K)
4	C	**23**

Step 2: Determine the Spacial Coefficient

	Distance	S_{side}
Exposure Distance 1 (m)	6.00	0.40
Exposure Distance 2 (m)	25.00	0.00
Exposure Distance 3 (m)	9.00	0.10
Exposure Distance 4 (m)	18.00	0.00
Exposure Distance 5 (m)		
	S_{tot}	**1.50**



Step 3: Determine Volume of Building

Building Length(m)	Building Width (m)	Building Height to the underside of roof deck (m)	Volume (m^3)
36.50	13.50	12.00	5913.00

Number of Stories	4

Step 4: Calculate Minimum Water Supply

$$Q = KVS_{tot}$$

Minimum Water Supply (L)	203998.50

Step 5: Calculate Minimum Supply Flow Rate

Table 2 from OBC 2012 A3.2.5.7			
Minimum Water Supply Flow Rates			
Building Code, Part 3 Buildings	Required Minimum Water Supply Flow Rate (L/min)		
One Storey Building with building area not exceeding 600 m2 (excluding F1 occupancy)	1800		
All Other Buildings	if Q> and	Q<=	
		108000	2700
	108000	135000	3600
	135000	162000	4500
	162000	190000	5400
	190000	270000	6300
	270000		9000

Minimum Water Supply Flow Rate (L/min)	6300

Step 6: Is a private fire reservoir required? No

650 Victoria Terrace
FIRE FLOW ANALYSIS
Fergus, Ontario

Project Number: 63117-001
Date: July 24, 2025
Design By: JHN

File: Q:\63117_001\Fire\Site Fire Flow Analysis _ Rev 5.xlsx

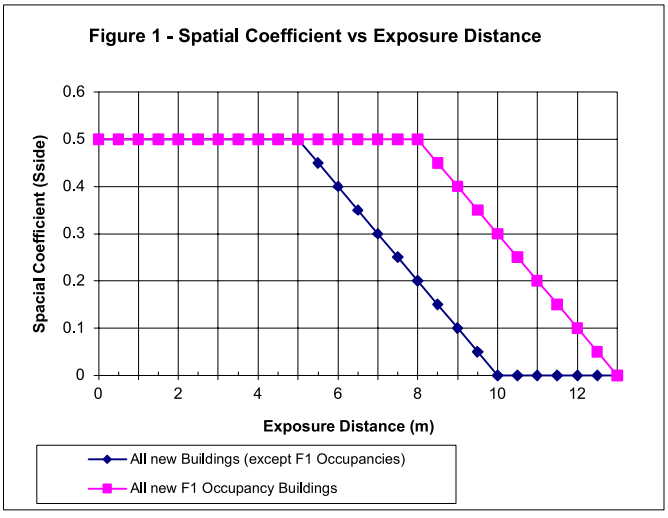
Step 1: Determining Water Supply Coefficient

	Table 1 from OBC 2012 A3.2.5.7												
	Type of Construction	Classification by group or division in Accordance with Table 3.1.2.1 of the Ontario Building Code											
		A2	B1	B2	B3	C	D	A4	F3	A1	A3	E	F2	F1
1	Building is of Noncombustible construction with fire separation and fire-resistance ratings provided in accordance with Subsection 3.2.2 of the OBC, including loadbearing walls, columns and arches						10	12		14		17		23
2	Building is of Noncombustible construction or of heavy timber construction conforming to Article 3.1.4.6 of the OBC. Floor assemblies are fire separations but no fire-resistance rating. Roof assemblies, mezzanines, loadbearing walls, columns and arches do not have a fire-resistance rating.						16	19		22		27		37
3	Building is of Combustible Construction with fire separations and fire-resistance ratings provided in accordance with Subsection 3.2.2 of the OBC, including loadbearing walls, columns and arches. Noncombustible construction may be used in lieu of fire resistance rating where permitted in subsection 3.2.2 of the OBC						18	22		25		31		41
4	Building is of combustible construction. Floor assemblies are fire separations but with no fire-resistance rating. Roof assemblies, mezzanines, loadbearing walls, columns and arches do not have a fire-resistance rating.						23	28		32		39		53

Type of Construction	Building Classification	Water Supply Coefficient (K)
4	C	23

Step 2: Determine the Spacial Coefficient

	Distance	S_{side}
Exposure Distance 1 (m)	25.00	0.00
Exposure Distance 2 (m)	45.00	0.00
Exposure Distance 3 (m)	8.00	0.20
Exposure Distance 4 (m)	8.00	0.20
Exposure Distance 5 (m)		
	S_{tot}	1.40



Step 3: Determine Volume of Building

Building Length(m)	Building Width (m)	Building Height to the underside of roof deck (m)	Volume (m^3)
36.00	14.00	9.69	4883.76

Number of Stories	2

Step 4: Calculate Minimum Water Supply

$$Q = KVS_{tot}$$

Minimum Water Supply (L)	157257.07

Step 5: Calculate Minimum Supply Flow Rate

Table 2 from OBC 2012 A3.2.5.7			
Minimum Water Supply Flow Rates			
Building Code, Part 3 Buildings	Required Minimum Water Supply Flow Rate (L/min)		
One Storey Building with building area not exceeding 600 m2 (excluding F1 occupancy)	1800		
All Other Buildings	if Q> and	Q<=	
		108000	2700
	108000	135000	3600
	135000	162000	4500
	162000	190000	5400
	190000	270000	6300
	270000		9000

Minimum Water Supply Flow Rate (L/min)	4500

Step 6: Is a private fire reservoir required? No

Appendix B

Sanitary Design Sheet

650 Victoria Terrace
TOWNSHIP OF CENTRE WELLINGTON

SANITARY SEWER DESIGN SHEET

ENGINEERING AND PUBLIC WORKS

Project Number: 63117-001
Date: July 25, 2025
Design By: JHN
Checked By: LEI
File: Q:\63117_001\SAN\Sanitary Sewer Design Sheet.xls

Design Parameters

Average Daily Flow

Residential[2]	0.00347	L/s/c	(300 L/p/d)
Commercial		L/s/ha	
Industrial	0.32	L/s/ha	
Inst. / School		L/s/ha	

Mannings "*n*"	0.013	
Min. Velocity	0.6	m/sec
Max. Velocity	3.0	m/sec
Residential Harmon Peaking Factor[3] (F)	F = 1 + 14/(4 + $P^{0.5}$)	
Commercial Peaking Factor		
Residential Areas Infiltration[3]	0.23	L/s/ha

LOCATION				RESIDENTIAL AREAS AND POPULATION						SCHOOL, INSTITUTIONAL			COMMERCIAL			INDUSTRIAL				INFILTRATION			DESIGN						
										HECTARES AND FLOW OF EACH ZONING																		
										0.00 *L/s/ha*			0.00 *L/s/ha*			0.32 *L/s/ha*												
STREET	AREA NO.	MANHOLE LOCATION FROM MH	MANHOLE LOCATION TO MH	AREA[1]	No. UNITS @ 2.67 PPU[3]	POPUL.	CUMUL POPUL.	PEAK FACTOR "F"[3]	PEAK RES. FLOW[3]	AREA	CUMUL AREA	PEAK FLOW	AREA	CUMUL AREA	PEAK FLOW	AREA	CUMUL AREA	PEAK FLOW	TOTALS-C-I FLOW	AREA	CUMUL AREA	INFIL FLOW[3]	TOTAL VOLUME FLOW	LENGTH	SLOPE	PIPE SIZE	CAPACITY	FULL FLOW VELOCITY
				ha	*Towns*[2]	*1000s*	*1000s*		*L/sec*	*ha*	*ha*	*L/sec*	*ha*	*ha*	*L/sec*	*ha*	*ha*	*L/sec*	*L/sec*	*ha*	*ha*	*L/sec*	*L/sec*	*m*	*%*	*mm*	*L/sec.*	*m/s*
Proposed Site Plan		MH26A	MH27A	4.77	192.00	0.513	0.513	3.968625	7.0642				0.40	0.40	0.0000	0.40	0.40	0.1280	0.0000	5.56	5.56	1.2788	8.3430	10.5	1.00	200	32.7818	1.044
		MH27A	Ex.MH																				8.3430	51.6	1.38	375	205.8617	1.865

NOTES:
1. Unit counts were based on the site plans prepared by Dunpar Homes.
2. Design population of 2.67 ppu for Townhouses and apartments, average daily domestic flow of 300 L/p/d are taken from Township of Centre Wellington Developent Manual (June 2024) and Development Charges Background Study for Township of Centre Wellington (April 2021)

Appendix C

MIDUSS Modelling Result

Pre-Development

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"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                            Version 2.25  rev. 473"
"                MIDUSS created                          Sunday, February 7, 2010"
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"                Company                                                       "
"                Date & Time last used:                 7/23/2025 at 10:50:10 AM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 85          IDF CURVE FIT"
"            1   Number of Storms"
"            1   Storm no."
"            2   Return interval"
"           12   Data Pairs"
"                  5.000    10.000    15.000    30.000    60.000"
"                120.000   180.000   240.000   360.000   720.000"
"               1080.000  1440.000   minutes"
"                 11.517    14.367    16.325    20.350    25.400"
"                 31.600     0.000     0.000    45.000    56.400"
"                  0.000    69.600   mm"
"                138.200    86.200    65.300    40.700    25.400"
"                 15.800     0.000     0.000     7.500     4.700"
"                  0.000     2.900   mm/hr"
"      414.876    mm/hr 'A' coeff."
"       0.0268    minutes 'B' coeff."
"      0.68196            'C' exponent"
"       0.1344           Std.error of estimate"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      414.880   Coefficient A"
"        0.027   Constant B"
"        0.682   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           137.921    mm/hr"
"             Total depth                  36.050    mm"
"            6   002hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 101"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          101   Pre-development"
"       57.400   % Impervious"
"        4.770   Total Area"
"       50.000   Flow length"
```

```
"        4.000   Overland Slope"
"        2.032   Pervious Area"
"       50.000   Pervious length"
"        4.000   Pervious slope"
"        2.738   Impervious Area"
"       50.000   Impervious length"
"        4.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.188   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.853   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.684     0.000     0.000     0.000 c.m/sec"
"             Catchment 101          Pervious   Impervious Total Area "
"             Surface Area           2.032      2.738      4.770      hectare"
"             Time of concentration  25.177     2.217      5.443      minutes"
"             Time to Centroid       141.118    93.311     100.027    minutes"
"             Rainfall depth         36.050     36.050     36.050     mm"
"             Rainfall volume        732.54     987.04     1719.58    c.m"
"             Rainfall losses        29.278     5.298      15.513     mm"
"             Runoff depth           6.772      30.752     20.537     mm"
"             Runoff volume          137.61     841.99     979.59     c.m"
"             Runoff coefficient     0.188      0.853      0.570      "
"             Maximum flow           0.028      0.680      0.684      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.684     0.684     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                     0.684     0.684     0.684     0.000"
" 38          START/RE-START TOTALS 101"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                      4.770    hectare"
"             Total Impervious area                     2.738    hectare"
"             Total % impervious                       57.400"
" 19          EXIT"
```

```
"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                            Version 2.25  rev. 473"
"                MIDUSS created                          Sunday, February 7, 2010"
"           10   Units used:                                          ie METRIC"
"                Job folder:                                   Q:\63117_001\SWM"
"                Output filename:                                     5 pre.out"
"                Licensee name:                                               A"
"                Company                                                       "
"                Date & Time last used:                 7/23/2025 at 11:11:41 AM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 85          IDF CURVE FIT"
"            1   Number of Storms"
"            1   Storm no."
"            5   Return interval"
"           12   Data Pairs"
"                  5.000    10.000    15.000    30.000    60.000"
"                120.000   180.000   240.000   360.000   720.000"
"               1080.000  1440.000   minutes"
"                 15.025    18.683    21.225    26.350    32.800"
"                 40.800     0.000     0.000    57.600    72.000"
"                  0.000    88.800   mm"
"                180.300   112.100    84.900    52.700    32.800"
"                 20.400     0.000     0.000     9.600     6.000"
"                  0.000     3.700   mm/hr"
"      544.711    mm/hr 'A' coeff."
"       0.0206    minutes 'B' coeff."
"      0.68602            'C' exponent"
"       0.0715           Std.error of estimate"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      544.710   Coefficient A"
"        0.021   Constant B"
"        0.686   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           180.063    mm/hr"
"             Total depth                  46.359    mm"
"            6   005hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 101"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          101   Predevelopment"
"       57.400   % Impervious"
"        4.770   Total Area"
"       50.000   Flow length"
```

```
"        4.000   Overland Slope"
"        2.032   Pervious Area"
"       50.000   Pervious length"
"        4.000   Pervious slope"
"        2.738   Impervious Area"
"       50.000   Impervious length"
"        4.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.252   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.877   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.955     0.000     0.000     0.000 c.m/sec"
"             Catchment 101          Pervious   Impervious Total Area "
"             Surface Area           2.032      2.738      4.770      hectare"
"             Time of concentration  19.130     1.974      4.991      minutes"
"             Time to Centroid       131.438    91.938     98.884     minutes"
"             Rainfall depth         46.359     46.359     46.359     mm"
"             Rainfall volume        942.03     1269.30    2211.33    c.m"
"             Rainfall losses        34.669     5.694      18.038     mm"
"             Runoff depth           11.690     40.665     28.322     mm"
"             Runoff volume          237.55     1113.39    1350.94    c.m"
"             Runoff coefficient     0.252      0.877      0.611      "
"             Maximum flow           0.065      0.944      0.955      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.955     0.955     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.955     0.955     0.955     0.000"
" 38          START/RE-START TOTALS 101"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                     4.770    hectare"
"             Total Impervious area                    2.738    hectare"
"             Total % impervious                      57.400"
" 19          EXIT"
```

```
"                MIDUSS Output ------------------------------------------------>"
"                MIDUSS version                            Version 2.25  rev. 473"
"                MIDUSS created                          Sunday, February 7, 2010"
"           10   Units used:                                          ie METRIC"
"                Job folder:                                   Q:\63117_001\SWM"
"                Output filename:                                    10 pre.out"
"                Licensee name:                                               A"
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"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 85          IDF CURVE FIT"
"            1   Number of Storms"
"            1   Storm no."
"           10   Return interval"
"           12   Data Pairs"
"                  5.000    10.000    15.000    30.000    60.000"
"                120.000   180.000   240.000   360.000   720.000"
"               1080.000  1440.000   minutes"
"                 17.317    21.517    24.425    30.350    37.700"
"                 46.800     0.000     0.000    66.000    81.600"
"                  0.000   103.200   mm"
"                207.800   129.100    97.700    60.700    37.700"
"                 23.400     0.000     0.000    11.000     6.800"
"                  0.000     4.300   mm/hr"
"      627.308    mm/hr 'A' coeff."
"       0.0136    minutes 'B' coeff."
"      0.68653           'C' exponent"
"       0.2024           Std.error of estimate"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      627.310   Coefficient A"
"        0.014   Constant B"
"        0.687   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity          207.399    mm/hr"
"             Total depth                 53.252    mm"
"            6   010hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 101"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          101   Predevelopment"
"       57.400   % Impervious"
"        4.770   Total Area"
"       50.000   Flow length"
```

```
"        4.000   Overland Slope"
"        2.032   Pervious Area"
"       50.000   Pervious length"
"        4.000   Pervious slope"
"        2.738   Impervious Area"
"       50.000   Impervious length"
"        4.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.291   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.889   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    1.135     0.000     0.000     0.000 c.m/sec"
"             Catchment 101          Pervious   Impervious Total Area "
"             Surface Area           2.032      2.738      4.770      hectare"
"             Time of concentration  16.788     1.858      4.774      minutes"
"             Time to Centroid       127.310    91.270     98.309     minutes"
"             Rainfall depth         53.252     53.252     53.252     mm"
"             Rainfall volume        1082.09    1458.03    2540.12    c.m"
"             Rainfall losses        37.779     5.936      19.501     mm"
"             Runoff depth           15.473     47.316     33.751     mm"
"             Runoff volume          314.41     1295.50    1609.91    c.m"
"             Runoff coefficient     0.291      0.889      0.634      "
"             Maximum flow           0.097      1.116      1.135      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    1.135     1.135     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    1.135     1.135     1.135     0.000"
" 38          START/RE-START TOTALS 101"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                     4.770    hectare"
"             Total Impervious area                    2.738    hectare"
"             Total % impervious                      57.400"
" 19          EXIT"
```

```
"                MIDUSS Output ------------------------------------------------>"
"                MIDUSS version                            Version 2.25  rev. 473"
"                MIDUSS created                          Sunday, February 7, 2010"
"           10   Units used:                                          ie METRIC"
"                Job folder:                                   Q:\63117_001\SWM"
"                Output filename:                                    25 pre.out"
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"                Company                                                       "
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"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 85          IDF CURVE FIT"
"            1   Number of Storms"
"            1   Storm no."
"           25   Return interval"
"           12   Data Pairs"
"                  5.000    10.000    15.000    30.000    60.000"
"                120.000   180.000   240.000   360.000   720.000"
"               1080.000  1440.000   minutes"
"                 20.283    25.150    28.525    35.350    43.900"
"                 54.400     0.000     0.000    76.200    94.800"
"                  0.000   117.600   mm"
"                243.400   150.900   114.100    70.700    43.900"
"                 27.200     0.000     0.000    12.700     7.900"
"                  0.000     4.900   mm/hr"
"      746.059    mm/hr 'A' coeff."
"       0.0851    minutes 'B' coeff."
"      0.69145            'C' exponent"
"       0.0835           Std.error of estimate"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      746.060   Coefficient A"
"        0.085   Constant B"
"        0.692   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           242.311    mm/hr"
"             Total depth                  61.692    mm"
"            6   025hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 101"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          101   Predevelopment"
"       57.400   % Impervious"
"        4.770   Total Area"
"       50.000   Flow length"
```

```
"        4.000   Overland Slope"
"        2.032   Pervious Area"
"       50.000   Pervious length"
"        4.000   Pervious slope"
"        2.738   Impervious Area"
"       50.000   Impervious length"
"        4.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.333   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.900   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    1.370     0.000     0.000     0.000 c.m/sec"
"             Catchment 101          Pervious   Impervious Total Area "
"             Surface Area           2.032      2.738      4.770      hectare"
"             Time of concentration  14.727     1.740      4.536      minutes"
"             Time to Centroid       123.256    90.502     97.555     minutes"
"             Rainfall depth         61.692     61.692     61.692     mm"
"             Rainfall volume        1253.60    1689.13    2942.73    c.m"
"             Rainfall losses        41.157     6.162      21.070     mm"
"             Runoff depth           20.535     55.531     40.623     mm"
"             Runoff volume          417.28     1520.43    1937.71    c.m"
"             Runoff coefficient     0.333      0.900      0.658      "
"             Maximum flow           0.155      1.337      1.370      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    1.370     1.370     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    1.370     1.370     1.370     0.000"
" 38          START/RE-START TOTALS 101"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                     4.770    hectare"
"             Total Impervious area                    2.738    hectare"
"             Total % impervious                      57.400"
" 19          EXIT"
```

```
"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                            Version 2.25  rev. 473"
"                MIDUSS created                          Sunday, February 7, 2010"
"           10   Units used:                                          ie METRIC"
"                Job folder:                                   Q:\63117_001\SWM"
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"                Company                                                       "
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" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 85          IDF CURVE FIT"
"            1   Number of Storms"
"            1   Storm no."
"           50   Return interval"
"           12   Data Pairs"
"                  5.000    10.000    15.000    30.000    60.000"
"                120.000   180.000   240.000   360.000   720.000"
"               1080.000  1440.000   minutes"
"                 22.467    27.850    31.575    39.100    48.500"
"                 60.000     0.000     0.000    84.600   104.400"
"                  0.000   129.600   mm"
"                269.600   167.100   126.300    78.200    48.500"
"                 30.000     0.000     0.000    14.100     8.700"
"                  0.000     5.400   mm/hr"
"      820.361    mm/hr 'A' coeff."
"       0.0100    minutes 'B' coeff."
"      0.69079           'C' exponent"
"       0.0666           Std.error of estimate"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      820.360   Coefficient A"
"        0.010   Constant B"
"        0.691   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity          269.499    mm/hr"
"             Total depth                 68.103    mm"
"            6   050hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 101"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          101   Prevelopment"
"       57.400   % Impervious"
"        4.770   Total Area"
"       50.000   Flow length"
```

```
"        4.000   Overland Slope"
"        2.032   Pervious Area"
"       50.000   Pervious length"
"        4.000   Pervious slope"
"        2.738   Impervious Area"
"       50.000   Impervious length"
"        4.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.361   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.907   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    1.553     0.000     0.000     0.000 c.m/sec"
"             Catchment 101          Pervious   Impervious Total Area "
"             Surface Area           2.032      2.738      4.770      hectare"
"             Time of concentration  13.541     1.664      4.373      minutes"
"             Time to Centroid       121.029    90.109     97.161     minutes"
"             Rainfall depth         68.103     68.103     68.103     mm"
"             Rainfall volume        1383.87    1864.65    3248.52    c.m"
"             Rainfall losses        43.522     6.357      22.189     mm"
"             Runoff depth           24.581     61.746     45.914     mm"
"             Runoff volume          499.49     1690.60    2190.09    c.m"
"             Runoff coefficient     0.361      0.907      0.674      "
"             Maximum flow           0.196      1.506      1.553      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    1.553     1.553     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    1.553     1.553     1.553     0.000"
" 38          START/RE-START TOTALS 101"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                     4.770    hectare"
"             Total Impervious area                    2.738    hectare"
"             Total % impervious                      57.400"
" 19          EXIT"
```

```
"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                            Version 2.25  rev. 473"
"                MIDUSS created                          Sunday, February 7, 2010"
"           10   Units used:                                          ie METRIC"
"                Job folder:                                   Q:\63117_001\SWM"
"                Output filename:                                   100 pre.out"
"                Licensee name:                                               A"
"                Company                                                       "
"                Date & Time last used:                 7/21/2025 at 2:34:45 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 85          IDF CURVE FIT"
"            1   Number of Storms"
"            1   Storm no."
"          100   Return interval"
"           12   Data Pairs"
"                  5.000    10.000    15.000    30.000    60.000"
"                120.000   180.000   240.000   360.000   720.000"
"               1080.000  1440.000   minutes"
"                 24.583    30.450    34.525    42.750    53.000"
"                 65.600     0.000     0.000    92.400   114.000"
"                  0.000   141.600   mm"
"                295.000   182.700   138.100    85.500    53.000"
"                 32.800     0.000     0.000    15.400     9.500"
"                  0.000     5.900   mm/hr"
"      901.088    mm/hr 'A' coeff."
"       0.0426    minutes 'B' coeff."
"      0.69168           'C' exponent"
"       0.0434           Std.error of estimate"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      901.090   Coefficient A"
"        0.043   Constant B"
"        0.692   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity          294.251    mm/hr"
"             Total depth                 74.447    mm"
"            6   100hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 101"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          101   Pre-development"
"       57.400   % Impervious"
"        4.770   Total Area"
"       50.000   Flow length"
```

```
"        4.000   Overland Slope"
"        2.032   Pervious Area"
"       50.000   Pervious length"
"        4.000   Pervious slope"
"        2.738   Impervious Area"
"       50.000   Impervious length"
"        4.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.387   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.912   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    1.726     0.000     0.000     0.000 c.m/sec"
"             Catchment 101          Pervious   Impervious Total Area "
"             Surface Area           2.032      2.738      4.770      hectare"
"             Time of concentration  12.631     1.604      4.245      minutes"
"             Time to Centroid       119.154    89.793     96.824     minutes"
"             Rainfall depth         74.447     74.447     74.447     mm"
"             Rainfall volume        1512.77    2038.34    3551.11    c.m"
"             Rainfall losses        45.636     6.539      23.194     mm"
"             Runoff depth           28.810     67.908     51.253     mm"
"             Runoff volume          585.43     1859.31    2444.74    c.m"
"             Runoff coefficient     0.387      0.912      0.688      "
"             Maximum flow           0.240      1.663      1.726      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    1.726     1.726     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    1.726     1.726     1.726     0.000"
" 38          START/RE-START TOTALS 101"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                    4.770    hectare"
"             Total Impervious area                   2.738    hectare"
"             Total % impervious                     57.400"
" 19          EXIT"
```

Post-Development

```
"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                            Version 2.25  rev. 473"
"                MIDUSS created                          Sunday, February 7, 2010"
"           10   Units used:                                          ie METRIC"
"                Job folder:                             Q:\63117_001\SWM\Post"
"                Output filename:                                   2 post.out"
"                Licensee name:                                              A"
"                Company                                                      "
"                Date & Time last used:                  7/25/2025 at 5:56:22 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      414.880   Coefficient A"
"        0.027   Constant B"
"        0.682   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           137.921    mm/hr"
"             Total depth                  36.050    mm"
"            6   002hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 201"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          201   Industrial building rooftop"
"      100.000   % Impervious"
"        0.092   Total Area"
"       10.000   Flow length"
"        1.500   Overland Slope"
"        0.000   Pervious Area"
"       10.000   Pervious length"
"        1.500   Pervious slope"
"        0.092   Impervious Area"
"       10.000   Impervious length"
"        1.500   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.000   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.832   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.026     0.000     0.000     0.000 c.m/sec"
```

```
"             Catchment 201          Pervious   Impervious Total Area "
"             Surface Area           0.000      0.092      0.092      hectare"
"             Time of concentration  12.865     1.133      1.133      minutes"
"             Time to Centroid       124.471    91.368     91.368     minutes"
"             Rainfall depth         36.050     36.050     36.050     mm"
"             Rainfall volume        0.00       33.17      33.17      c.m"
"             Rainfall losses        29.296     6.041      6.041      mm"
"             Runoff depth           6.754      30.009     30.009     mm"
"             Runoff volume          0.00       27.61      27.61      c.m"
"             Runoff coefficient     0.000      0.832      0.832      "
"             Maximum flow           0.000      0.026      0.026      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.026     0.026     0.000     0.000"
" 54          POND DESIGN"
"         0.026   Current peak flow    c.m/sec"
"         0.031   Target outflow    c.m/sec"
"          27.6   Hydrograph volume    c.m"
"           11.   Number of stages"
"         0.000   Minimum water level    metre"
"         0.150   Maximum water level    metre"
"         0.000   Starting water level    metre"
"             0   Keep Design Data: 1 = True; 0 = False"
"                   Level Discharge    Volume"
"                   0.000     0.000     0.000"
"                 0.01500   0.00090   0.07667"
"                 0.03000   0.00180    0.6133"
"                 0.04500   0.00270     2.070"
"                 0.06000   0.00360     4.907"
"                 0.07500   0.00450     9.583"
"                 0.09000   0.00540    16.560"
"                  0.1050   0.00630    26.163"
"                  0.1200   0.00720    36.513"
"                  0.1350   0.00810    46.863"
"                  0.1500   0.00900    57.213"
"            1.   ROOFTOP"
"                 Roof area  Store area  Area/drain  Drain flow  Roof slope"
"                   hectare     hectare    sq.metre  L/min/25mm      g H:1V"
"                     0.092       0.069     180.000      22.500      66.667"
"               Using 4 roofdrains on roofstorage area of 690. square metre"
"               Peak outflow                   0.005    c.m/sec"
"               Maximum level                  0.078    metre"
"               Maximum storage               10.777    c.m"
"               Centroidal lag                 1.918   hours"
"                    0.026     0.026     0.005     0.000 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     0.026     0.005     0.005     0.000"
" 33          CATCHMENT 202"
"             1   Triangular SCS"
```

```
"            1   Equal length"
"            1   SCS method"
"          202   Controlled Area to CBMH35"
"       77.000   % Impervious"
"        2.438   Total Area"
"       50.000   Flow length"
"        2.500   Overland Slope"
"        0.561   Pervious Area"
"       50.000   Pervious length"
"        2.500   Pervious slope"
"        1.877   Impervious Area"
"       50.000   Impervious length"
"        2.500   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.188   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.853   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.446     0.005     0.005     0.000 c.m/sec"
"             Catchment 202          Pervious   Impervious Total Area "
"             Surface Area           0.561      1.877      2.438      hectare"
"             Time of concentration  28.989     2.553      4.185      minutes"
"             Time to Centroid       146.288    93.807     97.047     minutes"
"             Rainfall depth         36.050     36.050     36.050     mm"
"             Rainfall volume        202.15     676.75     878.90     c.m"
"             Rainfall losses        29.277     5.305      10.819     mm"
"             Runoff depth           6.773      30.744     25.231     mm"
"             Runoff volume          37.98      577.15     615.13     c.m"
"             Runoff coefficient     0.188      0.853      0.700      "
"             Maximum flow           0.007      0.445      0.446      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.446     0.449     0.005     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                     0.446     0.449     0.449     0.000"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     0.446     0.449     0.449     0.000"
" 54          POND DESIGN"
"        0.449   Current peak flow    c.m/sec"
"        0.700   Target outflow    c.m/sec"
"        642.7   Hydrograph volume    c.m"
"           4.   Number of stages"
"      415.505   Minimum water level    metre"
```

```
"      418.000   Maximum water level    metre"
"      415.505   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"                415.505     0.000     0.000"
"                417.900    0.8632   317.000"
"                417.950    0.8751   318.100"
"                418.000    0.9898   322.000"
"           1.   WEIRS"
"                  Crest      Weir     Crest      Left     Right"
"              elevation coefficie   breadth sideslope sideslope"
"                417.950     0.900     6.000     0.000     0.000"
"           1.   OUTFLOW PIPE"
"                Upstream Downstr'm      Pipe      Pipe   Manning     Entry"
"                  invert    invert    Length  Diameter       'n'   loss Ke"
"                415.505   415.383    24.500     0.600     0.015     0.500"
"             Peak outflow                 0.312    c.m/sec"
"             Maximum level              416.388    metre"
"             Maximum storage            116.903    c.m"
"             Centroidal lag               1.732   hours"
"                  0.446     0.449     0.312     0.000 c.m/sec"
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                Total Site"
"             Maximum flow                 0.312    c.m/sec"
"             Hydrograph volume          642.719    c.m"
"                     0.446     0.449     0.312     0.312"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                     0.446     0.000     0.312     0.312"
" 33          CATCHMENT 203"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          203   Controlled Area to CBMH10"
"       82.000   % Impervious"
"        1.303   Total Area"
"       40.000   Flow length"
"        2.500   Overland Slope"
"        0.235   Pervious Area"
"       40.000   Pervious length"
"        2.500   Pervious slope"
"        1.068   Impervious Area"
"       40.000   Impervious length"
"        2.500   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.188   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
```

```
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.853   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.265     0.000     0.312     0.312 c.m/sec"
"             Catchment 203          Pervious   Impervious Total Area "
"             Surface Area           0.235      1.068      1.303      hectare"
"             Time of concentration  25.357     2.233      3.299      minutes"
"             Time to Centroid       141.367    93.338     95.552     minutes"
"             Rainfall depth         36.050     36.050     36.050     mm"
"             Rainfall volume        84.55      385.18     469.73     c.m"
"             Rainfall losses        29.279     5.294      9.611      mm"
"             Runoff depth           6.771      30.756     26.438     mm"
"             Runoff volume          15.88      328.61     344.49     c.m"
"             Runoff coefficient     0.188      0.853      0.733      "
"             Maximum flow           0.003      0.265      0.265      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"              4   Add Runoff "
"                     0.265     0.265     0.312     0.312"
" 54          POND DESIGN"
"        0.265   Current peak flow    c.m/sec"
"        0.500   Target outflow    c.m/sec"
"        344.5   Hydrograph volume    c.m"
"           5.   Number of stages"
"      417.046   Minimum water level    metre"
"      419.250   Maximum water level    metre"
"      417.046   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"                417.046     0.000     0.000"
"                419.050    0.3212   263.000"
"                419.150    0.3309   264.200"
"                419.200    0.3357   268.000"
"                419.250    0.4432   276.000"
"             1.   WEIRS"
"                    Crest      Weir     Crest      Left     Right"
"                elevation coefficie   breadth sideslope sideslope"
"                  419.200     0.900     6.000     0.000     0.000"
"             1.   OUTFLOW PIPE"
"                 Upstream Downstr'm      Pipe      Pipe   Manning     Entry"
"                   invert    invert    Length  Diameter       'n'   loss Ke"
"                  417.046   416.786    52.000     0.375     0.015     0.500"
"               Peak outflow                  0.121    c.m/sec"
"               Maximum level                417.829    metre"
"               Maximum storage              102.769    c.m"
"               Centroidal lag                 1.820   hours"
"                    0.265     0.265     0.121     0.312 c.m/sec"
" 40          HYDROGRAPH   Combine    1"
```

```
"            6   Combine "
"            1   Node #"
"                Total Site"
"             Maximum flow                  0.430    c.m/sec"
"             Hydrograph volume           987.212    c.m"
"                    0.265     0.265     0.121     0.430"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.265     0.000     0.121     0.430"
" 33          CATCHMENT 204"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          204   Uncontrolled Area"
"       86.000   % Impervious"
"        0.937   Total Area"
"        5.000   Flow length"
"        4.000   Overland Slope"
"        0.131   Pervious Area"
"        5.000   Pervious length"
"        4.000   Pervious slope"
"        0.806   Impervious Area"
"        5.000   Impervious length"
"        4.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.187   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.798   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.247     0.000     0.121     0.430 c.m/sec"
"             Catchment 204          Pervious   Impervious Total Area "
"             Surface Area           0.131      0.806      0.937      hectare"
"             Time of concentration  6.324      0.557      0.769      minutes"
"             Time to Centroid       115.656    91.275     92.170     minutes"
"             Rainfall depth         36.050     36.050     36.050     mm"
"             Rainfall volume        47.29      290.50     337.79     c.m"
"             Rainfall losses        29.324     7.300      10.383     mm"
"             Runoff depth           6.726      28.750     25.667     mm"
"             Runoff volume          8.82       231.67     240.50     c.m"
"             Runoff coefficient     0.187      0.798      0.712      "
"             Maximum flow           0.004      0.245      0.247      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.247     0.247     0.121     0.430"
" 40          HYDROGRAPH Copy to Outflow"
```

```
"            8   Copy to Outflow"
"                     0.247     0.247     0.247     0.430"
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                Total Site"
"             Maximum flow                  0.502    c.m/sec"
"             Hydrograph volume          1227.708    c.m"
"                     0.247     0.247     0.247     0.502"
" 38          START/RE-START TOTALS 204"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                      4.770    hectare"
"             Total Impervious area                     3.844    hectare"
"             Total % impervious                       80.577"
" 19          EXIT"
```

```
"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                            Version 2.25  rev. 473"
"                MIDUSS created                          Sunday, February 7, 2010"
"           10   Units used:                                          ie METRIC"
"                Job folder:                             Q:\63117_001\SWM\Post"
"                Output filename:                                  5 post.out"
"                Licensee name:                                             A"
"                Company                                                     "
"                Date & Time last used:                  7/25/2025 at 6:24:24 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      544.710   Coefficient A"
"        0.021   Constant B"
"        0.686   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           180.063    mm/hr"
"             Total depth                  46.359    mm"
"            6   005hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 201"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          201   Industrial building rooftop"
"      100.000   % Impervious"
"        0.092   Total Area"
"       10.000   Flow length"
"        1.500   Overland Slope"
"        0.000   Pervious Area"
"       10.000   Pervious length"
"        1.500   Pervious slope"
"        0.092   Impervious Area"
"       10.000   Impervious length"
"        1.500   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.000   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.854   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.036     0.000     0.000     0.000 c.m/sec"
```

```
"             Catchment 201          Pervious   Impervious Total Area "
"             Surface Area           0.000      0.092      0.092      hectare"
"             Time of concentration  9.775      1.009      1.009      minutes"
"             Time to Centroid       118.162    90.102     90.102     minutes"
"             Rainfall depth         46.359     46.359     46.359     mm"
"             Rainfall volume        0.00       42.65      42.65      c.m"
"             Rainfall losses        34.714     6.752      6.752      mm"
"             Runoff depth           11.645     39.608     39.608     mm"
"             Runoff volume          0.00       36.44      36.44      c.m"
"             Runoff coefficient     0.000      0.854      0.854      "
"             Maximum flow           0.000      0.036      0.036      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.036     0.036     0.000     0.000"
" 54          POND DESIGN"
"         0.036   Current peak flow    c.m/sec"
"         0.031   Target outflow    c.m/sec"
"          36.4   Hydrograph volume    c.m"
"           11.   Number of stages"
"         0.000   Minimum water level    metre"
"         0.150   Maximum water level    metre"
"         0.000   Starting water level    metre"
"             0   Keep Design Data: 1 = True; 0 = False"
"                   Level Discharge    Volume"
"                   0.000     0.000     0.000"
"                 0.01500   0.00090   0.07667"
"                 0.03000   0.00180    0.6133"
"                 0.04500   0.00270     2.070"
"                 0.06000   0.00360     4.907"
"                 0.07500   0.00450     9.583"
"                 0.09000   0.00540    16.560"
"                  0.1050   0.00630    26.163"
"                  0.1200   0.00720    36.513"
"                  0.1350   0.00810    46.863"
"                  0.1500   0.00900    57.213"
"            1.   ROOFTOP"
"                 Roof area  Store area  Area/drain  Drain flow  Roof slope"
"                   hectare     hectare    sq.metre  L/min/25mm      g H:1V"
"                     0.092       0.069     180.000      22.500      66.667"
"               Using 4 roofdrains on roofstorage area of 690. square metre"
"               Peak outflow                   0.005    c.m/sec"
"               Maximum level                  0.088    metre"
"               Maximum storage               15.406    c.m"
"               Centroidal lag                 2.025   hours"
"                    0.036     0.036     0.005     0.000 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     0.036     0.005     0.005     0.000"
" 33          CATCHMENT 202"
"             1   Triangular SCS"
```

```
"            1   Equal length"
"            1   SCS method"
"          202   Controlled Area to CBMH35"
"       77.000   % Impervious"
"        2.438   Total Area"
"       50.000   Flow length"
"        2.500   Overland Slope"
"        0.561   Pervious Area"
"       50.000   Pervious length"
"        2.500   Pervious slope"
"        1.877   Impervious Area"
"       50.000   Impervious length"
"        2.500   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.252   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.882   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.622     0.005     0.005     0.000 c.m/sec"
"             Catchment 202          Pervious   Impervious Total Area "
"             Surface Area           0.561      1.877      2.438      hectare"
"             Time of concentration  22.027     2.273      3.829      minutes"
"             Time to Centroid       135.559    92.447     95.844     minutes"
"             Rainfall depth         46.359     46.359     46.359     mm"
"             Rainfall volume        259.95     870.28     1130.23    c.m"
"             Rainfall losses        34.657     5.488      12.197     mm"
"             Runoff depth           11.702     40.871     34.162     mm"
"             Runoff volume          65.62      767.26     832.88     c.m"
"             Runoff coefficient     0.252      0.882      0.737      "
"             Maximum flow           0.017      0.619      0.622      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.622     0.626     0.005     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                     0.622     0.626     0.626     0.000"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     0.622     0.626     0.626     0.000"
" 54          POND DESIGN"
"        0.626   Current peak flow    c.m/sec"
"        0.700   Target outflow    c.m/sec"
"        869.3   Hydrograph volume    c.m"
"           4.   Number of stages"
"      415.505   Minimum water level    metre"
```

```
"      418.000   Maximum water level    metre"
"      415.505   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"                415.505     0.000     0.000"
"                417.900    0.8632   317.000"
"                417.950    0.8751   318.100"
"                418.000    0.9898   322.000"
"           1.   WEIRS"
"                  Crest      Weir     Crest      Left     Right"
"              elevation coefficie   breadth sideslope sideslope"
"                417.950     0.900     6.000     0.000     0.000"
"           1.   OUTFLOW PIPE"
"               Upstream Downstr'm      Pipe      Pipe   Manning     Entry"
"                 invert    invert    Length  Diameter       'n'   loss Ke"
"                415.505   415.383    24.500     0.600     0.015     0.500"
"             Peak outflow                  0.421    c.m/sec"
"             Maximum level               416.686    metre"
"             Maximum storage             156.340    c.m"
"             Centroidal lag                1.717   hours"
"                  0.622     0.626     0.421     0.000 c.m/sec"
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                Total Site"
"             Maximum flow                  0.421    c.m/sec"
"             Hydrograph volume           869.319    c.m"
"                      0.622     0.626     0.421     0.421"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                      0.622     0.000     0.421     0.421"
" 33          CATCHMENT 203"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          203   Controlled Area to CBMH10"
"       82.000   % Impervious"
"        1.303   Total Area"
"       40.000   Flow length"
"        2.500   Overland Slope"
"        0.235   Pervious Area"
"       40.000   Pervious length"
"        2.500   Pervious slope"
"        1.068   Impervious Area"
"       40.000   Impervious length"
"        2.500   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.252   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
```

```
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.877   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.369     0.000     0.421     0.421 c.m/sec"
"             Catchment 203          Pervious   Impervious Total Area "
"             Surface Area           0.235      1.068      1.303      hectare"
"             Time of concentration  19.267     1.988      3.013      minutes"
"             Time to Centroid       131.641    91.967     94.321     minutes"
"             Rainfall depth         46.359     46.359     46.359     mm"
"             Rainfall volume        108.73     495.33     604.06     c.m"
"             Rainfall losses        34.672     5.689      10.906     mm"
"             Runoff depth           11.687     40.670     35.453     mm"
"             Runoff volume          27.41      434.54     461.95     c.m"
"             Runoff coefficient     0.252      0.877      0.765      "
"             Maximum flow           0.007      0.368      0.369      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"              4   Add Runoff "
"                     0.369     0.369     0.421     0.421"
" 54          POND DESIGN"
"        0.369   Current peak flow    c.m/sec"
"        0.500   Target outflow    c.m/sec"
"        462.0   Hydrograph volume    c.m"
"           5.   Number of stages"
"      417.046   Minimum water level    metre"
"      419.250   Maximum water level    metre"
"      417.046   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"                417.046     0.000     0.000"
"                419.050    0.3212   263.000"
"                419.150    0.3309   264.200"
"                419.200    0.3357   268.000"
"                419.250    0.4432   276.000"
"             1.   WEIRS"
"                    Crest      Weir     Crest      Left     Right"
"                elevation coefficie   breadth sideslope sideslope"
"                  419.200     0.900     6.000     0.000     0.000"
"             1.   OUTFLOW PIPE"
"                 Upstream Downstr'm      Pipe      Pipe   Manning     Entry"
"                   invert    invert    Length  Diameter       'n'   loss Ke"
"                  417.046   416.786    52.000     0.375     0.015     0.500"
"               Peak outflow                  0.162    c.m/sec"
"               Maximum level                418.092    metre"
"               Maximum storage              137.228    c.m"
"               Centroidal lag                 1.799   hours"
"                    0.369     0.369     0.162     0.421 c.m/sec"
" 40          HYDROGRAPH   Combine    1"
```

```
"            6   Combine "
"            1   Node #"
"                Total Site"
"             Maximum flow                  0.580    c.m/sec"
"             Hydrograph volume          1331.274    c.m"
"                    0.369     0.369     0.162     0.580"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.369     0.000     0.162     0.580"
" 33          CATCHMENT 204"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          204   Uncontrolled Area"
"       86.000   % Impervious"
"        0.937   Total Area"
"        5.000   Flow length"
"        4.000   Overland Slope"
"        0.131   Pervious Area"
"        5.000   Pervious length"
"        4.000   Pervious slope"
"        0.806   Impervious Area"
"        5.000   Impervious length"
"        4.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.251   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.816   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.334     0.000     0.162     0.580 c.m/sec"
"             Catchment 204          Pervious   Impervious Total Area "
"             Surface Area           0.131      0.806      0.937      hectare"
"             Time of concentration  4.805      0.496      0.702      minutes"
"             Time to Centroid       111.001    90.168     91.162     minutes"
"             Rainfall depth         46.359     46.359     46.359     mm"
"             Rainfall volume        60.81      373.57     434.38     c.m"
"             Rainfall losses        34.707     8.532      12.197     mm"
"             Runoff depth           11.652     37.827     34.162     mm"
"             Runoff volume          15.29      304.82     320.10     c.m"
"             Runoff coefficient     0.251      0.816      0.737      "
"             Maximum flow           0.009      0.329      0.334      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.334     0.334     0.162     0.580"
" 40          HYDROGRAPH Copy to Outflow"
```

```
"            8   Copy to Outflow"
"                     0.334     0.334     0.334     0.580"
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                Total Site"
"             Maximum flow                  0.690    c.m/sec"
"             Hydrograph volume          1651.374    c.m"
"                     0.334     0.334     0.334     0.690"
" 38          START/RE-START TOTALS 204"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                      4.770    hectare"
"             Total Impervious area                     3.844    hectare"
"             Total % impervious                       80.577"
" 19          EXIT"
```

```
"                MIDUSS Output ------------------------------------------------>"
"                MIDUSS version                            Version 2.25  rev. 473"
"                MIDUSS created                          Sunday, February 7, 2010"
"           10   Units used:                                          ie METRIC"
"                Job folder:                             Q:\63117_001\SWM\Post"
"                Output filename:                                  10 post.out"
"                Licensee name:                                              A"
"                Company                                                      "
"                Date & Time last used:                  7/25/2025 at 6:25:40 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      627.310   Coefficient A"
"        0.014   Constant B"
"        0.687   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           207.231    mm/hr"
"             Total depth                  53.114    mm"
"            6   010hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 201"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          201   Industrial building rooftop"
"      100.000   % Impervious"
"        0.092   Total Area"
"       10.000   Flow length"
"        1.500   Overland Slope"
"        0.000   Pervious Area"
"       10.000   Pervious length"
"        1.500   Pervious slope"
"        0.092   Impervious Area"
"       10.000   Impervious length"
"        1.500   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.000   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.864   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.042     0.000     0.000     0.000 c.m/sec"
```

```
"             Catchment 201          Pervious   Impervious Total Area "
"             Surface Area           0.000      0.092      0.092      hectare"
"             Time of concentration  8.592      0.950      0.950      minutes"
"             Time to Centroid       115.360    89.548     89.548     minutes"
"             Rainfall depth         53.114     53.114     53.114     mm"
"             Rainfall volume        0.00       48.86      48.86      c.m"
"             Rainfall losses        37.734     7.204      7.204      mm"
"             Runoff depth           15.380     45.910     45.910     mm"
"             Runoff volume          0.00       42.24      42.24      c.m"
"             Runoff coefficient     0.000      0.864      0.864      "
"             Maximum flow           0.000      0.042      0.042      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.042     0.042     0.000     0.000"
" 54          POND DESIGN"
"         0.042   Current peak flow    c.m/sec"
"         0.031   Target outflow    c.m/sec"
"          42.2   Hydrograph volume    c.m"
"           11.   Number of stages"
"         0.000   Minimum water level    metre"
"         0.150   Maximum water level    metre"
"         0.000   Starting water level    metre"
"             0   Keep Design Data: 1 = True; 0 = False"
"                   Level Discharge    Volume"
"                   0.000     0.000     0.000"
"                 0.01500   0.00090   0.07667"
"                 0.03000   0.00180    0.6133"
"                 0.04500   0.00270     2.070"
"                 0.06000   0.00360     4.907"
"                 0.07500   0.00450     9.583"
"                 0.09000   0.00540    16.560"
"                  0.1050   0.00630    26.163"
"                  0.1200   0.00720    36.513"
"                  0.1350   0.00810    46.863"
"                  0.1500   0.00900    57.213"
"            1.   ROOFTOP"
"                 Roof area  Store area  Area/drain  Drain flow  Roof slope"
"                   hectare     hectare    sq.metre  L/min/25mm      g H:1V"
"                     0.092       0.069     180.000      22.500      66.667"
"               Using 4 roofdrains on roofstorage area of 690. square metre"
"               Peak outflow                   0.006    c.m/sec"
"               Maximum level                  0.093    metre"
"               Maximum storage               18.498    c.m"
"               Centroidal lag                 2.092   hours"
"                    0.042     0.042     0.006     0.000 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     0.042     0.006     0.006     0.000"
" 33          CATCHMENT 202"
"             1   Triangular SCS"
```

```
"            1   Equal length"
"            1   SCS method"
"          202   Controlled Area to CBMH35"
"       77.000   % Impervious"
"        2.438   Total Area"
"       50.000   Flow length"
"        2.500   Overland Slope"
"        0.561   Pervious Area"
"       50.000   Pervious length"
"        2.500   Pervious slope"
"        1.877   Impervious Area"
"       50.000   Impervious length"
"        2.500   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.290   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.893   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.739     0.006     0.006     0.000 c.m/sec"
"             Catchment 202          Pervious   Impervious Total Area "
"             Surface Area           0.561      1.877      2.438      hectare"
"             Time of concentration  19.361     2.140      3.660      minutes"
"             Time to Centroid       131.060    91.806     95.271     minutes"
"             Rainfall depth         53.114     53.114     53.114     mm"
"             Rainfall volume        297.83     997.09     1294.92    c.m"
"             Rainfall losses        37.733     5.666      13.042     mm"
"             Runoff depth           15.381     47.448     40.072     mm"
"             Runoff volume          86.25      890.72     976.96     c.m"
"             Runoff coefficient     0.290      0.893      0.754      "
"             Maximum flow           0.024      0.735      0.739      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.739     0.744     0.006     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                     0.739     0.744     0.744     0.000"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     0.739     0.744     0.744     0.000"
" 54          POND DESIGN"
"        0.744   Current peak flow    c.m/sec"
"        0.700   Target outflow    c.m/sec"
"       1019.2   Hydrograph volume    c.m"
"           4.   Number of stages"
"      415.505   Minimum water level    metre"
```

```
"      418.000   Maximum water level    metre"
"      415.505   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"                415.505     0.000     0.000"
"                417.900    0.8632   317.000"
"                417.950    0.8751   318.100"
"                418.000    0.9898   322.000"
"           1.   WEIRS"
"                  Crest      Weir     Crest      Left     Right"
"              elevation coefficie   breadth sideslope sideslope"
"                417.950     0.900     6.000     0.000     0.000"
"           1.   OUTFLOW PIPE"
"               Upstream Downstr'm      Pipe      Pipe   Manning     Entry"
"                 invert    invert    Length  Diameter       'n'   loss Ke"
"                415.505   415.383    24.500     0.600     0.015     0.500"
"             Peak outflow                  0.492    c.m/sec"
"             Maximum level               416.878    metre"
"             Maximum storage             181.769    c.m"
"             Centroidal lag                1.711   hours"
"                  0.739     0.744     0.492     0.000 c.m/sec"
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                Total Site"
"             Maximum flow                  0.492    c.m/sec"
"             Hydrograph volume          1019.169    c.m"
"                      0.739     0.744     0.492     0.492"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                      0.739     0.000     0.492     0.492"
" 33          CATCHMENT 203"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          203   Controlled Area to CBMH10"
"       82.000   % Impervious"
"        1.303   Total Area"
"       40.000   Flow length"
"        2.500   Overland Slope"
"        0.235   Pervious Area"
"       40.000   Pervious length"
"        2.500   Pervious slope"
"        1.068   Impervious Area"
"       40.000   Impervious length"
"        2.500   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.290   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
```

```
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.889   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.436     0.000     0.492     0.492 c.m/sec"
"             Catchment 203          Pervious   Impervious Total Area "
"             Surface Area           0.235      1.068      1.303      hectare"
"             Time of concentration  16.935     1.872      2.878      minutes"
"             Time to Centroid       127.508    91.295     93.715     minutes"
"             Rainfall depth         53.114     53.114     53.114     mm"
"             Rainfall volume        124.57     567.50     692.07     c.m"
"             Rainfall losses        37.716     5.917      11.640     mm"
"             Runoff depth           15.398     47.197     41.473     mm"
"             Runoff volume          36.12      504.28     540.40     c.m"
"             Runoff coefficient     0.290      0.889      0.781      "
"             Maximum flow           0.011      0.434      0.436      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"              4   Add Runoff "
"                     0.436     0.436     0.492     0.492"
" 54          POND DESIGN"
"        0.436   Current peak flow    c.m/sec"
"        0.500   Target outflow    c.m/sec"
"        540.4   Hydrograph volume    c.m"
"           5.   Number of stages"
"      417.046   Minimum water level    metre"
"      419.250   Maximum water level    metre"
"      417.046   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"                417.046     0.000     0.000"
"                419.050    0.3212   263.000"
"                419.150    0.3309   264.200"
"                419.200    0.3357   268.000"
"                419.250    0.4432   276.000"
"             1.   WEIRS"
"                    Crest      Weir     Crest      Left     Right"
"                elevation coefficie   breadth sideslope sideslope"
"                  419.200     0.900     6.000     0.000     0.000"
"             1.   OUTFLOW PIPE"
"                 Upstream Downstr'm      Pipe      Pipe   Manning     Entry"
"                   invert    invert    Length  Diameter       'n'   loss Ke"
"                  417.046   416.786    52.000     0.375     0.015     0.500"
"               Peak outflow                  0.188    c.m/sec"
"               Maximum level                418.260    metre"
"               Maximum storage              159.358    c.m"
"               Centroidal lag                 1.789   hours"
"                    0.436     0.436     0.188     0.492 c.m/sec"
" 40          HYDROGRAPH   Combine    1"
```

```
"            6   Combine "
"            1   Node #"
"                Total Site"
"             Maximum flow                  0.678    c.m/sec"
"             Hydrograph volume          1559.569    c.m"
"                    0.436     0.436     0.188     0.678"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.436     0.000     0.188     0.678"
" 33          CATCHMENT 204"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          204   Uncontrolled Area"
"       86.000   % Impervious"
"        0.937   Total Area"
"        5.000   Flow length"
"        4.000   Overland Slope"
"        0.131   Pervious Area"
"        5.000   Pervious length"
"        4.000   Pervious slope"
"        0.806   Impervious Area"
"        5.000   Impervious length"
"        4.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.287   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.826   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.391     0.000     0.188     0.678 c.m/sec"
"             Catchment 204          Pervious   Impervious Total Area "
"             Surface Area           0.131      0.806      0.937      hectare"
"             Time of concentration  4.224      0.467      0.668      minutes"
"             Time to Centroid       109.143    89.604     90.648     minutes"
"             Rainfall depth         53.114     53.114     53.114     mm"
"             Rainfall volume        69.67      428.00     497.68     c.m"
"             Rainfall losses        37.894     9.244      13.255     mm"
"             Runoff depth           15.220     43.870     39.859     mm"
"             Runoff volume          19.97      353.51     373.48     c.m"
"             Runoff coefficient     0.287      0.826      0.750      "
"             Maximum flow           0.012      0.383      0.391      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.391     0.391     0.188     0.678"
" 40          HYDROGRAPH Copy to Outflow"
```

```
"            8   Copy to Outflow"
"                     0.391     0.391     0.391     0.678"
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                Total Site"
"             Maximum flow                  0.814    c.m/sec"
"             Hydrograph volume          1933.046    c.m"
"                     0.391     0.391     0.391     0.814"
" 38          START/RE-START TOTALS 204"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                      4.770    hectare"
"             Total Impervious area                     3.844    hectare"
"             Total % impervious                       80.577"
" 19          EXIT"
```

```
"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                            Version 2.25  rev. 473"
"                MIDUSS created                          Sunday, February 7, 2010"
"           10   Units used:                                          ie METRIC"
"                Job folder:                             Q:\63117_001\SWM\Post"
"                Output filename:                                  25 post.out"
"                Licensee name:                                              A"
"                Company                                                      "
"                Date & Time last used:                 7/25/2025 at 6:26:49 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      746.060   Coefficient A"
"        0.085   Constant B"
"        0.692   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           242.114    mm/hr"
"             Total depth                  61.533    mm"
"            6   025hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 201"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          201   Industrial building rooftop"
"      100.000   % Impervious"
"        0.092   Total Area"
"       10.000   Flow length"
"        1.500   Overland Slope"
"        0.000   Pervious Area"
"       10.000   Pervious length"
"        1.500   Pervious slope"
"        0.092   Impervious Area"
"       10.000   Impervious length"
"        1.500   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.000   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.874   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.050     0.000     0.000     0.000 c.m/sec"
```

```
"             Catchment 201          Pervious   Impervious Total Area "
"             Surface Area           0.000      0.092      0.092      hectare"
"             Time of concentration  7.536      0.889      0.889      minutes"
"             Time to Centroid       112.718    88.964     88.964     minutes"
"             Rainfall depth         61.533     61.533     61.533     mm"
"             Rainfall volume        0.00       56.61      56.61      c.m"
"             Rainfall losses        41.161     7.754      7.754      mm"
"             Runoff depth           20.372     53.779     53.779     mm"
"             Runoff volume          0.00       49.48      49.48      c.m"
"             Runoff coefficient     0.000      0.874      0.874      "
"             Maximum flow           0.000      0.050      0.050      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.050     0.050     0.000     0.000"
" 54          POND DESIGN"
"         0.050   Current peak flow    c.m/sec"
"         0.031   Target outflow    c.m/sec"
"          49.5   Hydrograph volume    c.m"
"           11.   Number of stages"
"         0.000   Minimum water level    metre"
"         0.150   Maximum water level    metre"
"         0.000   Starting water level    metre"
"             0   Keep Design Data: 1 = True; 0 = False"
"                   Level Discharge    Volume"
"                   0.000     0.000     0.000"
"                 0.01500   0.00090   0.07667"
"                 0.03000   0.00180    0.6133"
"                 0.04500   0.00270     2.070"
"                 0.06000   0.00360     4.907"
"                 0.07500   0.00450     9.583"
"                 0.09000   0.00540    16.560"
"                  0.1050   0.00630    26.163"
"                  0.1200   0.00720    36.513"
"                  0.1350   0.00810    46.863"
"                  0.1500   0.00900    57.213"
"            1.   ROOFTOP"
"                 Roof area  Store area  Area/drain  Drain flow  Roof slope"
"                   hectare     hectare    sq.metre  L/min/25mm      g H:1V"
"                     0.092       0.069     180.000      22.500      66.667"
"               Using 4 roofdrains on roofstorage area of 690. square metre"
"               Peak outflow                   0.006    c.m/sec"
"               Maximum level                  0.100    metre"
"               Maximum storage               22.643    c.m"
"               Centroidal lag                 2.180   hours"
"                    0.050     0.050     0.006     0.000 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     0.050     0.006     0.006     0.000"
" 33          CATCHMENT 202"
"             1   Triangular SCS"
```

```
"            1   Equal length"
"            1   SCS method"
"          202   Controlled Area to CBMH35"
"       77.000   % Impervious"
"        2.438   Total Area"
"       50.000   Flow length"
"        2.500   Overland Slope"
"        0.561   Pervious Area"
"       50.000   Pervious length"
"        2.500   Pervious slope"
"        1.877   Impervious Area"
"       50.000   Impervious length"
"        2.500   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.332   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.903   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.892     0.006     0.006     0.000 c.m/sec"
"             Catchment 202          Pervious   Impervious Total Area "
"             Surface Area           0.561      1.877      2.438      hectare"
"             Time of concentration  16.982     2.004      3.486      minutes"
"             Time to Centroid       126.578    91.039     94.555     minutes"
"             Rainfall depth         61.533     61.533     61.533     mm"
"             Rainfall volume        345.04     1155.13    1500.16    c.m"
"             Rainfall losses        41.110     5.978      14.059     mm"
"             Runoff depth           20.422     55.554     47.474     mm"
"             Runoff volume          114.51     1042.90    1157.42    c.m"
"             Runoff coefficient     0.332      0.903      0.772      "
"             Maximum flow           0.037      0.885      0.892      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.892     0.897     0.006     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                     0.892     0.897     0.897     0.000"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     0.892     0.897     0.897     0.000"
" 54          POND DESIGN"
"        0.897   Current peak flow    c.m/sec"
"        0.700   Target outflow    c.m/sec"
"       1206.9   Hydrograph volume    c.m"
"           4.   Number of stages"
"      415.505   Minimum water level    metre"
```

```
"      418.000   Maximum water level    metre"
"      415.505   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"                415.505     0.000     0.000"
"                417.900    0.8632   317.000"
"                417.950    0.8751   318.100"
"                418.000    0.9898   322.000"
"           1.   WEIRS"
"                  Crest      Weir     Crest      Left     Right"
"              elevation coefficie   breadth sideslope sideslope"
"                417.950     0.900     6.000     0.000     0.000"
"           1.   OUTFLOW PIPE"
"               Upstream Downstr'm      Pipe      Pipe   Manning     Entry"
"                 invert    invert    Length  Diameter       'n'   loss Ke"
"                415.505   415.383    24.500     0.600     0.015     0.500"
"             Peak outflow                  0.583    c.m/sec"
"             Maximum level               417.126    metre"
"             Maximum storage             214.505    c.m"
"             Centroidal lag                1.703   hours"
"                  0.892     0.897     0.583     0.000 c.m/sec"
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                Total Site"
"             Maximum flow                  0.583    c.m/sec"
"             Hydrograph volume          1206.891    c.m"
"                      0.892     0.897     0.583     0.583"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                      0.892     0.000     0.583     0.583"
" 33          CATCHMENT 203"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          203   Controlled Area to CBMH10"
"       82.000   % Impervious"
"        1.303   Total Area"
"       40.000   Flow length"
"        2.500   Overland Slope"
"        0.235   Pervious Area"
"       40.000   Pervious length"
"        2.500   Pervious slope"
"        1.068   Impervious Area"
"       40.000   Impervious length"
"        2.500   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.332   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
```

```
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.900   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.524     0.000     0.583     0.583 c.m/sec"
"             Catchment 203          Pervious   Impervious Total Area "
"             Surface Area           0.235      1.068      1.303      hectare"
"             Time of concentration  14.854     1.753      2.734      minutes"
"             Time to Centroid       123.440    90.523     92.989     minutes"
"             Rainfall depth         61.533     61.533     61.533     mm"
"             Rainfall volume        144.32     657.45     801.77     c.m"
"             Rainfall losses        41.098     6.150      12.440     mm"
"             Runoff depth           20.435     55.383     49.092     mm"
"             Runoff volume          47.93      591.74     639.67     c.m"
"             Runoff coefficient     0.332      0.900      0.798      "
"             Maximum flow           0.018      0.520      0.524      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"              4   Add Runoff "
"                     0.524     0.524     0.583     0.583"
" 54          POND DESIGN"
"        0.524   Current peak flow    c.m/sec"
"        0.500   Target outflow    c.m/sec"
"        639.7   Hydrograph volume    c.m"
"           5.   Number of stages"
"      417.046   Minimum water level    metre"
"      419.250   Maximum water level    metre"
"      417.046   Starting water level    metre"
"             0   Keep Design Data: 1 = True; 0 = False"
"                   Level Discharge    Volume"
"                 417.046     0.000     0.000"
"                 419.050    0.3212   263.000"
"                 419.150    0.3309   264.200"
"                 419.200    0.3357   268.000"
"                 419.250    0.4432   276.000"
"             1.   WEIRS"
"                    Crest      Weir     Crest      Left     Right"
"                elevation coefficie   breadth sideslope sideslope"
"                  419.200     0.900     6.000     0.000     0.000"
"             1.   OUTFLOW PIPE"
"                 Upstream Downstr'm      Pipe      Pipe   Manning     Entry"
"                   invert    invert    Length  Diameter       'n'   loss Ke"
"                 417.046   416.786    52.000     0.375     0.015     0.500"
"               Peak outflow                  0.223    c.m/sec"
"               Maximum level                418.483    metre"
"               Maximum storage              188.643    c.m"
"               Centroidal lag                 1.777   hours"
"                    0.524     0.524     0.223     0.583 c.m/sec"
" 40          HYDROGRAPH   Combine    1"
```

```
"            6   Combine "
"            1   Node #"
"                Total Site"
"             Maximum flow                  0.805    c.m/sec"
"             Hydrograph volume          1846.562    c.m"
"                    0.524     0.524     0.223     0.805"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.524     0.000     0.223     0.805"
" 33          CATCHMENT 204"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          204   Uncontrolled Area"
"       86.000   % Impervious"
"        0.937   Total Area"
"        5.000   Flow length"
"        4.000   Overland Slope"
"        0.131   Pervious Area"
"        5.000   Pervious length"
"        4.000   Pervious slope"
"        0.806   Impervious Area"
"        5.000   Impervious length"
"        4.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.325   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.834   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.464     0.000     0.223     0.805 c.m/sec"
"             Catchment 204          Pervious   Impervious Total Area "
"             Surface Area           0.131      0.806      0.937      hectare"
"             Time of concentration  3.705      0.437      0.632      minutes"
"             Time to Centroid       107.330    88.942     90.037     minutes"
"             Rainfall depth         61.533     61.533     61.533     mm"
"             Rainfall volume        80.72      495.84     576.56     c.m"
"             Rainfall losses        41.565     10.184     14.577     mm"
"             Runoff depth           19.968     51.348     46.955     mm"
"             Runoff volume          26.19      413.78     439.97     c.m"
"             Runoff coefficient     0.325      0.834      0.763      "
"             Maximum flow           0.017      0.452      0.464      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.464     0.464     0.223     0.805"
" 40          HYDROGRAPH Copy to Outflow"
```

```
"            8   Copy to Outflow"
"                     0.464     0.464     0.464     0.805"
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                Total Site"
"             Maximum flow                  0.975    c.m/sec"
"             Hydrograph volume          2286.532    c.m"
"                     0.464     0.464     0.464     0.975"
" 38          START/RE-START TOTALS 204"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                      4.770    hectare"
"             Total Impervious area                     3.844    hectare"
"             Total % impervious                       80.577"
" 19          EXIT"
```

```
"                MIDUSS Output ------------------------------------------------>"
"                MIDUSS version                            Version 2.25  rev. 473"
"                MIDUSS created                          Sunday, February 7, 2010"
"           10   Units used:                                          ie METRIC"
"                Job folder:                             Q:\63117_001\SWM\Post"
"                Output filename:                                  50 post.out"
"                Licensee name:                                              A"
"                Company                                                      "
"                Date & Time last used:                  7/25/2025 at 6:28:01 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      820.360   Coefficient A"
"        0.010   Constant B"
"        0.691   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           269.412    mm/hr"
"             Total depth                  68.032    mm"
"            6   050hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 201"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          201   Industrial building rooftop"
"      100.000   % Impervious"
"        0.092   Total Area"
"       10.000   Flow length"
"        1.500   Overland Slope"
"        0.000   Pervious Area"
"       10.000   Pervious length"
"        1.500   Pervious slope"
"        0.092   Impervious Area"
"       10.000   Impervious length"
"        1.500   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.000   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.880   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.056     0.000     0.000     0.000 c.m/sec"
```

```
"             Catchment 201          Pervious   Impervious Total Area "
"             Surface Area           0.000      0.092      0.092      hectare"
"             Time of concentration  6.923      0.850      0.850      minutes"
"             Time to Centroid       111.284    88.730     88.730     minutes"
"             Rainfall depth         68.032     68.032     68.032     mm"
"             Rainfall volume        0.00       62.59      62.59      c.m"
"             Rainfall losses        43.684     8.162      8.162      mm"
"             Runoff depth           24.349     59.871     59.870     mm"
"             Runoff volume          0.00       55.08      55.08      c.m"
"             Runoff coefficient     0.000      0.880      0.880      "
"             Maximum flow           0.000      0.056      0.056      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.056     0.056     0.000     0.000"
" 54          POND DESIGN"
"         0.056   Current peak flow    c.m/sec"
"         0.031   Target outflow    c.m/sec"
"          55.1   Hydrograph volume    c.m"
"           11.   Number of stages"
"         0.000   Minimum water level    metre"
"         0.150   Maximum water level    metre"
"         0.000   Starting water level    metre"
"             0   Keep Design Data: 1 = True; 0 = False"
"                   Level Discharge    Volume"
"                   0.000     0.000     0.000"
"                 0.01500   0.00090   0.07667"
"                 0.03000   0.00180    0.6133"
"                 0.04500   0.00270     2.070"
"                 0.06000   0.00360     4.907"
"                 0.07500   0.00450     9.583"
"                 0.09000   0.00540    16.560"
"                  0.1050   0.00630    26.163"
"                  0.1200   0.00720    36.513"
"                  0.1350   0.00810    46.863"
"                  0.1500   0.00900    57.213"
"            1.   ROOFTOP"
"                 Roof area  Store area  Area/drain  Drain flow  Roof slope"
"                   hectare     hectare    sq.metre  L/min/25mm      g H:1V"
"                     0.092       0.069     180.000      22.500      66.667"
"               Using 4 roofdrains on roofstorage area of 690. square metre"
"               Peak outflow                   0.006    c.m/sec"
"               Maximum level                  0.104    metre"
"               Maximum storage               25.753    c.m"
"               Centroidal lag                 2.243   hours"
"                    0.056     0.056     0.006     0.000 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     0.056     0.006     0.006     0.000"
" 33          CATCHMENT 202"
"             1   Triangular SCS"
```

```
"            1   Equal length"
"            1   SCS method"
"          202   Controlled Area to CBMH35"
"       77.000   % Impervious"
"        2.438   Total Area"
"       50.000   Flow length"
"        2.500   Overland Slope"
"        0.561   Pervious Area"
"       50.000   Pervious length"
"        2.500   Pervious slope"
"        1.877   Impervious Area"
"       50.000   Impervious length"
"        2.500   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.361   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.909   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     1.010     0.006     0.006     0.000 c.m/sec"
"             Catchment 202          Pervious   Impervious Total Area "
"             Surface Area           0.561      1.877      2.438      hectare"
"             Time of concentration  15.600     1.916      3.366      minutes"
"             Time to Centroid       124.125    90.619     94.169     minutes"
"             Rainfall depth         68.032     68.032     68.032     mm"
"             Rainfall volume        381.48     1277.15    1658.63    c.m"
"             Rainfall losses        43.481     6.163      14.746     mm"
"             Runoff depth           24.552     61.869     53.286     mm"
"             Runoff volume          137.67     1161.45    1299.12    c.m"
"             Runoff coefficient     0.361      0.909      0.783      "
"             Maximum flow           0.051      0.999      1.010      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     1.010     1.015     0.006     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                     1.010     1.015     1.015     0.000"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     1.010     1.015     1.015     0.000"
" 54          POND DESIGN"
"        1.015   Current peak flow    c.m/sec"
"        0.700   Target outflow    c.m/sec"
"       1354.2   Hydrograph volume    c.m"
"           4.   Number of stages"
"      415.505   Minimum water level    metre"
```

```
"      418.000   Maximum water level    metre"
"      415.505   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"                415.505     0.000     0.000"
"                417.900    0.8632   317.000"
"                417.950    0.8751   318.100"
"                418.000    0.9898   322.000"
"           1.   WEIRS"
"                  Crest      Weir     Crest      Left     Right"
"              elevation coefficie   breadth sideslope sideslope"
"                417.950     0.900     6.000     0.000     0.000"
"           1.   OUTFLOW PIPE"
"               Upstream Downstr'm      Pipe      Pipe   Manning     Entry"
"                 invert    invert    Length  Diameter       'n'   loss Ke"
"                415.505   415.383    24.500     0.600     0.015     0.500"
"             Peak outflow                  0.651    c.m/sec"
"             Maximum level               417.312    metre"
"             Maximum storage             239.192    c.m"
"             Centroidal lag                1.699   hours"
"                  1.010     1.015     0.651     0.000 c.m/sec"
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                Total Site"
"             Maximum flow                  0.651    c.m/sec"
"             Hydrograph volume          1354.184    c.m"
"                     1.010     1.015     0.651     0.651"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                     1.010     0.000     0.651     0.651"
" 33          CATCHMENT 203"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          203   Controlled Area to CBMH10"
"       82.000   % Impervious"
"        1.303   Total Area"
"       40.000   Flow length"
"        2.500   Overland Slope"
"        0.235   Pervious Area"
"       40.000   Pervious length"
"        2.500   Pervious slope"
"        1.068   Impervious Area"
"       40.000   Impervious length"
"        2.500   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.361   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
```

```
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.907   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.592     0.000     0.651     0.651 c.m/sec"
"             Catchment 203          Pervious   Impervious Total Area "
"             Surface Area           0.235      1.068      1.303      hectare"
"             Time of concentration  13.645     1.676      2.637      minutes"
"             Time to Centroid       121.176    90.128     92.621     minutes"
"             Rainfall depth         68.032     68.032     68.032     mm"
"             Rainfall volume        159.56     726.90     886.46     c.m"
"             Rainfall losses        43.490     6.342      13.029     mm"
"             Runoff depth           24.542     61.690     55.004     mm"
"             Runoff volume          57.56      659.14     716.70     c.m"
"             Runoff coefficient     0.361      0.907      0.808      "
"             Maximum flow           0.023      0.586      0.592      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"              4   Add Runoff "
"                     0.592     0.592     0.651     0.651"
" 54          POND DESIGN"
"        0.592   Current peak flow    c.m/sec"
"        0.500   Target outflow    c.m/sec"
"        716.7   Hydrograph volume    c.m"
"           5.   Number of stages"
"      417.046   Minimum water level    metre"
"      419.250   Maximum water level    metre"
"      417.046   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"                417.046     0.000     0.000"
"                419.050    0.3212   263.000"
"                419.150    0.3309   264.200"
"                419.200    0.3357   268.000"
"                419.250    0.4432   276.000"
"             1.   WEIRS"
"                    Crest      Weir     Crest      Left     Right"
"                elevation coefficie   breadth sideslope sideslope"
"                  419.200     0.900     6.000     0.000     0.000"
"             1.   OUTFLOW PIPE"
"                 Upstream Downstr'm      Pipe      Pipe   Manning     Entry"
"                   invert    invert    Length  Diameter       'n'   loss Ke"
"                  417.046   416.786    52.000     0.375     0.015     0.500"
"               Peak outflow                  0.249    c.m/sec"
"               Maximum level                418.654    metre"
"               Maximum storage              211.022    c.m"
"               Centroidal lag                 1.771   hours"
"                    0.592     0.592     0.249     0.651 c.m/sec"
" 40          HYDROGRAPH   Combine    1"
```

```
"            6   Combine "
"            1   Node #"
"                Total Site"
"             Maximum flow                  0.900    c.m/sec"
"             Hydrograph volume          2070.882    c.m"
"                    0.592     0.592     0.249     0.900"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.592     0.000     0.249     0.900"
" 33          CATCHMENT 204"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          204   Uncontrolled Area"
"       86.000   % Impervious"
"        0.937   Total Area"
"        5.000   Flow length"
"        4.000   Overland Slope"
"        0.131   Pervious Area"
"        5.000   Pervious length"
"        4.000   Pervious slope"
"        0.806   Impervious Area"
"        5.000   Impervious length"
"        4.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.354   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.840   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.522     0.000     0.249     0.900 c.m/sec"
"             Catchment 204          Pervious   Impervious Total Area "
"             Surface Area           0.131      0.806      0.937      hectare"
"             Time of concentration  3.403      0.418      0.610      minutes"
"             Time to Centroid       106.073    88.599     89.722     minutes"
"             Rainfall depth         68.032     68.032     68.032     mm"
"             Rainfall volume        89.24      548.22     637.46     c.m"
"             Rainfall losses        43.944     10.912     15.537     mm"
"             Runoff depth           24.089     57.120     52.496     mm"
"             Runoff volume          31.60      460.28     491.88     c.m"
"             Runoff coefficient     0.354      0.840      0.772      "
"             Maximum flow           0.021      0.505      0.522      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.522     0.522     0.249     0.900"
" 40          HYDROGRAPH Copy to Outflow"
```

```
"            8   Copy to Outflow"
"                     0.522     0.522     0.522     0.900"
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                Total Site"
"             Maximum flow                  1.099    c.m/sec"
"             Hydrograph volume          2562.766    c.m"
"                     0.522     0.522     0.522     1.099"
" 38          START/RE-START TOTALS 204"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                      4.770    hectare"
"             Total Impervious area                     3.844    hectare"
"             Total % impervious                       80.577"
" 19          EXIT"
```

```
"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                            Version 2.25  rev. 473"
"                MIDUSS created                          Sunday, February 7, 2010"
"           10   Units used:                                          ie METRIC"
"                Job folder:                             Q:\63117_001\SWM\Post"
"                Output filename:                                  100 post.out"
"                Licensee name:                                              A"
"                Company                                                      "
"                Date & Time last used:                 7/25/2025 at 6:03:13 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      901.090   Coefficient A"
"        0.043   Constant B"
"        0.692   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           294.108    mm/hr"
"             Total depth                  74.331    mm"
"            6   002hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 201"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          201   Industrial building rooftop"
"      100.000   % Impervious"
"        0.092   Total Area"
"       10.000   Flow length"
"        1.500   Overland Slope"
"        0.000   Pervious Area"
"       10.000   Pervious length"
"        1.500   Pervious slope"
"        0.092   Impervious Area"
"       10.000   Impervious length"
"        1.500   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.000   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.885   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.062     0.000     0.000     0.000 c.m/sec"
```

```
"             Catchment 201          Pervious   Impervious Total Area "
"             Surface Area           0.000      0.092      0.092      hectare"
"             Time of concentration  6.459      0.820      0.820      minutes"
"             Time to Centroid       109.957    88.529     88.529     minutes"
"             Rainfall depth         74.331     74.331     74.331     mm"
"             Rainfall volume        0.00       68.38      68.38      c.m"
"             Rainfall losses        45.788     8.548      8.548      mm"
"             Runoff depth           28.543     65.783     65.783     mm"
"             Runoff volume          0.00       60.52      60.52      c.m"
"             Runoff coefficient     0.000      0.885      0.885      "
"             Maximum flow           0.000      0.062      0.062      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.062     0.062     0.000     0.000"
" 54          POND DESIGN"
"         0.062   Current peak flow    c.m/sec"
"         0.031   Target outflow    c.m/sec"
"          60.5   Hydrograph volume    c.m"
"           11.   Number of stages"
"         0.000   Minimum water level    metre"
"         0.150   Maximum water level    metre"
"         0.000   Starting water level    metre"
"             0   Keep Design Data: 1 = True; 0 = False"
"                   Level Discharge    Volume"
"                   0.000     0.000     0.000"
"                 0.01500   0.00090   0.07667"
"                 0.03000   0.00180    0.6133"
"                 0.04500   0.00270     2.070"
"                 0.06000   0.00360     4.907"
"                 0.07500   0.00450     9.583"
"                 0.09000   0.00540    16.560"
"                  0.1050   0.00630    26.163"
"                  0.1200   0.00720    36.513"
"                  0.1350   0.00810    46.863"
"                  0.1500   0.00900    57.213"
"            1.   ROOFTOP"
"                 Roof area  Store area  Area/drain  Drain flow  Roof slope"
"                   hectare     hectare    sq.metre  L/min/25mm      g H:1V"
"                     0.092       0.069     180.000      22.500      66.667"
"               Using 4 roofdrains on roofstorage area of 690. square metre"
"               Peak outflow                   0.007    c.m/sec"
"               Maximum level                  0.109    metre"
"               Maximum storage               28.869    c.m"
"               Centroidal lag                 2.302   hours"
"                    0.062     0.062     0.007     0.000 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     0.062     0.007     0.007     0.000"
" 33          CATCHMENT 202"
"             1   Triangular SCS"
```

```
"            1   Equal length"
"            1   SCS method"
"          202   Controlled Area to CBMH35"
"       77.000   % Impervious"
"        2.438   Total Area"
"       50.000   Flow length"
"        2.500   Overland Slope"
"        0.561   Pervious Area"
"       50.000   Pervious length"
"        2.500   Pervious slope"
"        1.877   Impervious Area"
"       50.000   Impervious length"
"        2.500   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.388   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.914   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     1.121     0.007     0.007     0.000 c.m/sec"
"             Catchment 202          Pervious   Impervious Total Area "
"             Surface Area           0.561      1.877      2.438      hectare"
"             Time of concentration  14.555     1.847      3.275      minutes"
"             Time to Centroid       122.027    90.242     93.813     minutes"
"             Rainfall depth         74.331     74.331     74.331     mm"
"             Rainfall volume        416.80     1395.38    1812.19    c.m"
"             Rainfall losses        45.526     6.368      15.375     mm"
"             Runoff depth           28.805     67.963     58.956     mm"
"             Runoff volume          161.52     1275.83    1437.35    c.m"
"             Runoff coefficient     0.388      0.914      0.793      "
"             Maximum flow           0.063      1.107      1.121      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     1.121     1.126     0.007     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                     1.121     1.126     1.126     0.000"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     1.121     1.126     1.126     0.000"
" 54          POND DESIGN"
"        1.126   Current peak flow    c.m/sec"
"        0.700   Target outflow    c.m/sec"
"       1497.9   Hydrograph volume    c.m"
"           4.   Number of stages"
"      415.505   Minimum water level    metre"
```

```
"      418.000   Maximum water level    metre"
"      415.505   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"                415.505     0.000     0.000"
"                417.900    0.8632   317.000"
"                417.950    0.8751   318.100"
"                418.000    0.9898   322.000"
"           1.   WEIRS"
"                  Crest      Weir     Crest      Left     Right"
"              elevation coefficie   breadth sideslope sideslope"
"                417.950     0.900     6.000     0.000     0.000"
"           1.   OUTFLOW PIPE"
"               Upstream Downstr'm      Pipe      Pipe   Manning     Entry"
"                 invert    invert    Length  Diameter       'n'   loss Ke"
"                415.505   415.383    24.500     0.600     0.015     0.500"
"             Peak outflow                  0.717    c.m/sec"
"             Maximum level               417.496    metre"
"             Maximum storage             263.461    c.m"
"             Centroidal lag                1.695   hours"
"                  1.121     1.126     0.717     0.000 c.m/sec"
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                Total Site"
"             Maximum flow                  0.717    c.m/sec"
"             Hydrograph volume          1497.873    c.m"
"                     1.121     1.126     0.717     0.717"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                     1.121     0.000     0.717     0.717"
" 33          CATCHMENT 203"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          203   Controlled Area to CBMH10"
"       82.000   % Impervious"
"        1.303   Total Area"
"       40.000   Flow length"
"        2.500   Overland Slope"
"        0.235   Pervious Area"
"       40.000   Pervious length"
"        2.500   Pervious slope"
"        1.068   Impervious Area"
"       40.000   Impervious length"
"        2.500   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.386   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
```

```
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.912   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.655     0.000     0.717     0.717 c.m/sec"
"             Catchment 203          Pervious   Impervious Total Area "
"             Surface Area           0.235      1.068      1.303      hectare"
"             Time of concentration  12.731     1.616      2.562      minutes"
"             Time to Centroid       119.313    89.800     92.311     minutes"
"             Rainfall depth         74.331     74.331     74.331     mm"
"             Rainfall volume        174.34     794.20     968.53     c.m"
"             Rainfall losses        45.609     6.534      13.567     mm"
"             Runoff depth           28.721     67.797     60.764     mm"
"             Runoff volume          67.36      724.39     791.75     c.m"
"             Runoff coefficient     0.386      0.912      0.817      "
"             Maximum flow           0.028      0.648      0.655      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"              4   Add Runoff "
"                     0.655     0.655     0.717     0.717"
" 54          POND DESIGN"
"        0.655   Current peak flow    c.m/sec"
"        0.500   Target outflow    c.m/sec"
"        791.7   Hydrograph volume    c.m"
"           5.   Number of stages"
"      417.046   Minimum water level    metre"
"      419.250   Maximum water level    metre"
"      417.046   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"                417.046     0.000     0.000"
"                419.050    0.3212   263.000"
"                419.150    0.3309   264.200"
"                419.200    0.3357   268.000"
"                419.250    0.4432   276.000"
"             1.   WEIRS"
"                    Crest      Weir     Crest      Left     Right"
"                elevation coefficie   breadth sideslope sideslope"
"                  419.200     0.900     6.000     0.000     0.000"
"             1.   OUTFLOW PIPE"
"                 Upstream Downstr'm      Pipe      Pipe   Manning     Entry"
"                   invert    invert    Length  Diameter       'n'   loss Ke"
"                  417.046   416.786    52.000     0.375     0.015     0.500"
"               Peak outflow                  0.275    c.m/sec"
"               Maximum level                418.818    metre"
"               Maximum storage              232.575    c.m"
"               Centroidal lag                 1.766   hours"
"                     0.655     0.655     0.275     0.717 c.m/sec"
" 40          HYDROGRAPH   Combine    1"
```

```
"            6   Combine "
"            1   Node #"
"                Total Site"
"             Maximum flow                  0.992    c.m/sec"
"             Hydrograph volume          2289.622    c.m"
"                    0.655     0.655     0.275     0.992"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.655     0.000     0.275     0.992"
" 33          CATCHMENT 204"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          204   Uncontrolled Area"
"       86.000   % Impervious"
"        0.937   Total Area"
"        5.000   Flow length"
"        4.000   Overland Slope"
"        0.131   Pervious Area"
"        5.000   Pervious length"
"        4.000   Pervious slope"
"        0.806   Impervious Area"
"        5.000   Impervious length"
"        4.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.381   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.843   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.576     0.000     0.275     0.992 c.m/sec"
"             Catchment 204          Pervious   Impervious Total Area "
"             Surface Area           0.131      0.806      0.937      hectare"
"             Time of concentration  3.175      0.403      0.593      minutes"
"             Time to Centroid       104.959    88.285     89.427     minutes"
"             Rainfall depth         74.331     74.331     74.331     mm"
"             Rainfall volume        97.51      598.97     696.48     c.m"
"             Rainfall losses        46.007     11.650     16.460     mm"
"             Runoff depth           28.324     62.681     57.871     mm"
"             Runoff volume          37.16      505.10     542.25     c.m"
"             Runoff coefficient     0.381      0.843      0.779      "
"             Maximum flow           0.025      0.554      0.576      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.576     0.576     0.275     0.992"
" 40          HYDROGRAPH Copy to Outflow"
```

```
"            8   Copy to Outflow"
"                     0.576     0.576     0.576     0.992"
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                Total Site"
"             Maximum flow                  1.217    c.m/sec"
"             Hydrograph volume          2831.873    c.m"
"                     0.576     0.576     0.576     1.217"
" 38          START/RE-START TOTALS 204"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                      4.770    hectare"
"             Total Impervious area                     3.844    hectare"
"             Total % impervious                       80.577"
" 19          EXIT"
```

Appendix D

Stormceptor Sizing Result

Stormceptor®

Rinker MATERIALS

Stormceptor® EF Sizing Report

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

07/25/2025

Province:	Ontario
City:	Centre Wellington
Nearest Rainfall Station:	WATERLOO WELLINGTON AP
Climate Station Id:	6149387
Years of Rainfall Data:	34

Site Name:	East System

Drainage Area (ha):	2.88
% Imperviousness:	81.00

Runoff Coefficient 'c': 0.78

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

Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	85.77
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):	2773
Estimated Average Annual Sediment Volume (L/yr):	2255

Project Name:	650 Victoria Terrace
Project Number:	63117-001
Designer Name:	Jolie Nguyen
Designer Company:	MTE Consultants
Designer Email:	jnguyen@mte85.com
Designer Phone:	519-743-6500
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	53
EFO5	62
EFO6	69
EFO8	79
EFO10	85
EFO12	89

Recommended Stormceptor EFO Model: EFO10

Estimated Net Annual Sediment (TSS) Load Reduction (%): 85

Water Quality Runoff Volume Capture (%): > 90

imbrium

THIRD-PARTY TESTING AND VERIFICATION

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

PERFORMANCE

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

PARTICLE SIZE DISTRIBUTION (PSD)

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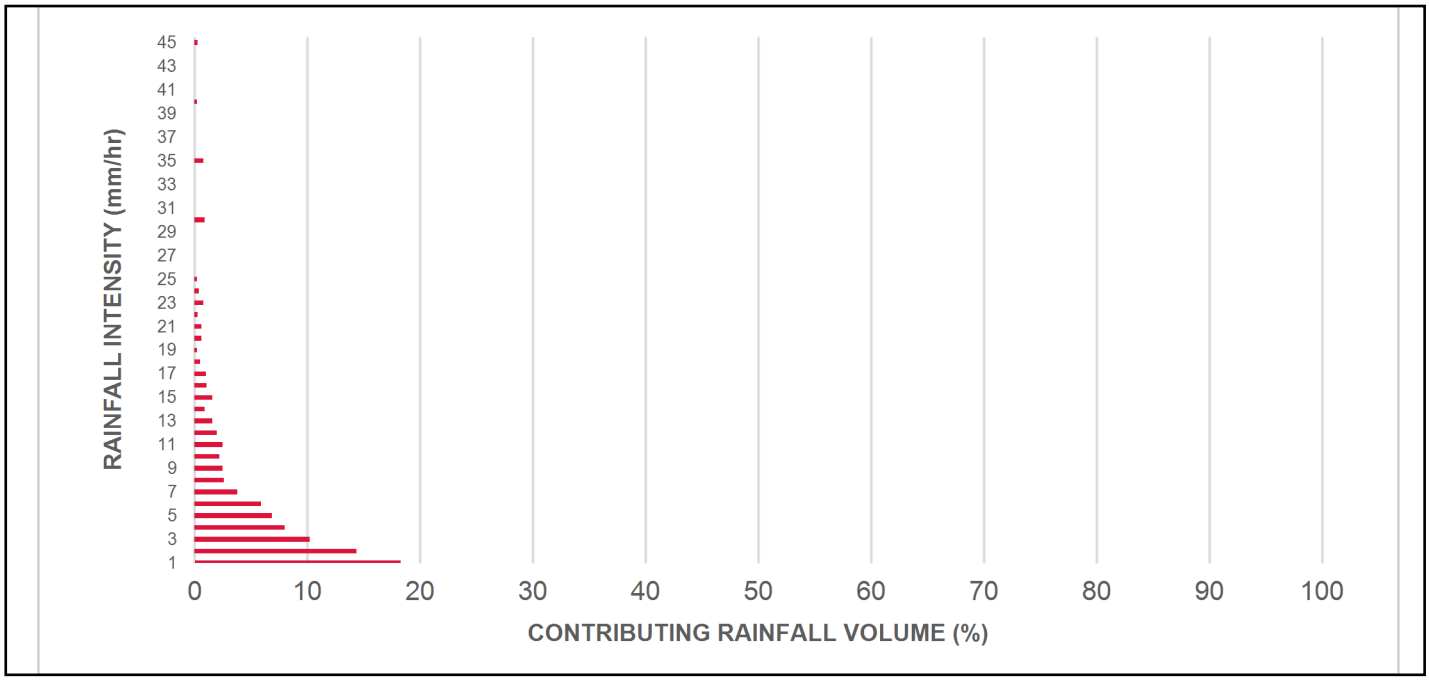
Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

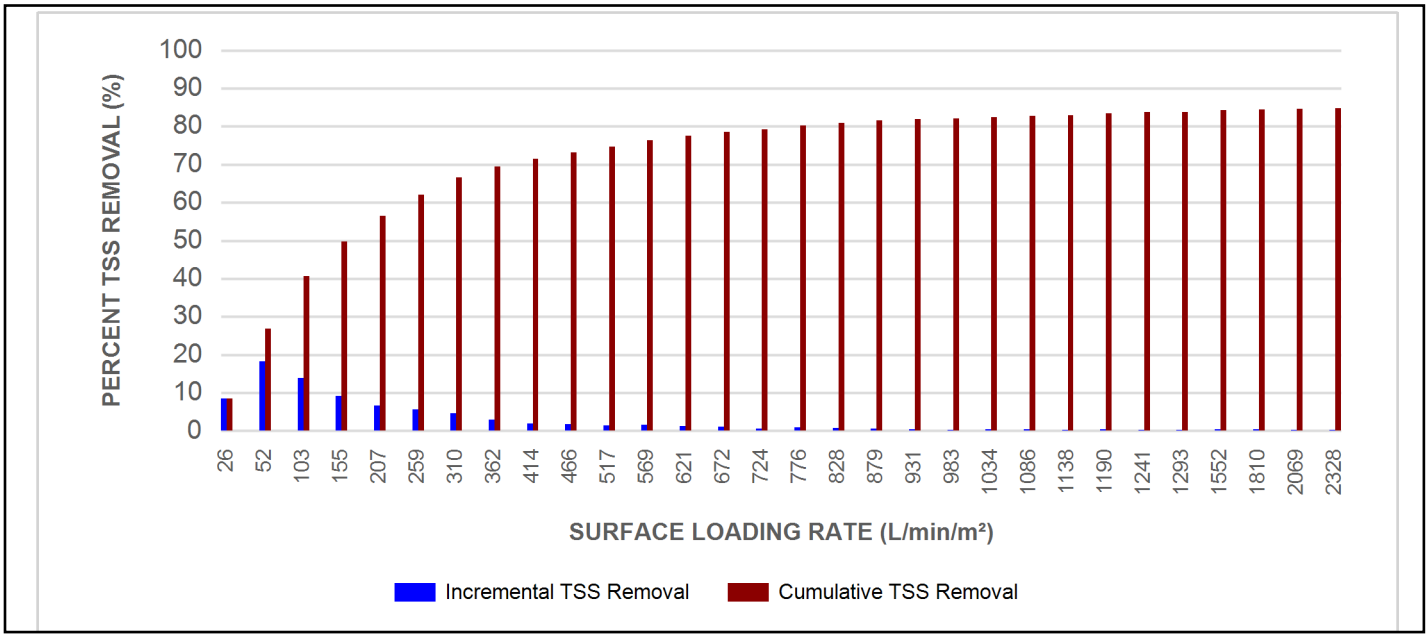
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.50	8.5	8.5	3.15	189.0	26.0	100	8.5	8.5
1.00	18.3	26.8	6.29	378.0	52.0	100	18.3	26.8
2.00	14.4	41.3	12.59	755.0	103.0	96	13.8	40.7
3.00	10.2	51.5	18.88	1133.0	155.0	89	9.1	49.8
4.00	8.0	59.5	25.17	1510.0	207.0	83	6.6	56.5
5.00	6.9	66.4	31.47	1888.0	259.0	81	5.6	62.0
6.00	5.9	72.3	37.76	2265.0	310.0	78	4.6	66.6
7.00	3.8	76.1	44.05	2643.0	362.0	76	2.9	69.5
8.00	2.6	78.7	50.34	3021.0	414.0	73	1.9	71.4
9.00	2.5	81.1	56.64	3398.0	466.0	71	1.8	73.2
10.00	2.2	83.3	62.93	3776.0	517.0	69	1.5	74.6
11.00	2.5	85.8	69.22	4153.0	569.0	66	1.7	76.3
12.00	2.0	87.8	75.52	4531.0	621.0	64	1.3	77.6
13.00	1.6	89.4	81.81	4909.0	672.0	64	1.0	78.6
14.00	0.9	90.4	88.10	5286.0	724.0	64	0.6	79.2
15.00	1.6	91.9	94.40	5664.0	776.0	63	1.0	80.2
16.00	1.1	93.0	100.69	6041.0	828.0	63	0.7	80.9
17.00	1.0	94.0	106.98	6419.0	879.0	62	0.7	81.6
18.00	0.5	94.6	113.27	6796.0	931.0	62	0.3	81.9
19.00	0.2	94.8	119.57	7174.0	983.0	62	0.1	82.0
20.00	0.6	95.4	125.86	7552.0	1034.0	61	0.4	82.4
21.00	0.6	96.1	132.15	7929.0	1086.0	60	0.4	82.8
22.00	0.3	96.4	138.45	8307.0	1138.0	59	0.2	83.0
23.00	0.8	97.2	144.74	8684.0	1190.0	57	0.5	83.4
24.00	0.4	97.6	151.03	9062.0	1241.0	56	0.2	83.7
25.00	0.2	97.8	157.33	9440.0	1293.0	55	0.1	83.8
30.00	0.9	98.7	188.79	11327.0	1552.0	47	0.4	84.2
35.00	0.8	99.5	220.26	13215.0	1810.0	40	0.3	84.5
40.00	0.2	99.7	251.72	15103.0	2069.0	36	0.1	84.6
45.00	0.3	100.0	283.19	16991.0	2328.0	32	0.1	84.7
Estimated Net Annual Sediment (TSS) Load Reduction =								**85 %**

Climate Station ID: 6149387 *Years of Rainfall Data*: 34

RAINFALL DATA FROM WATERLOO WELLINGTON AP 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

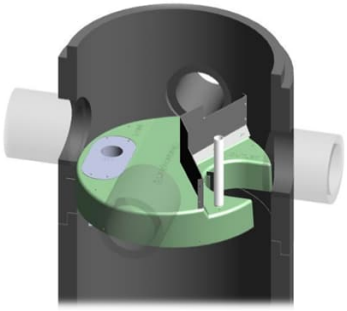
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test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

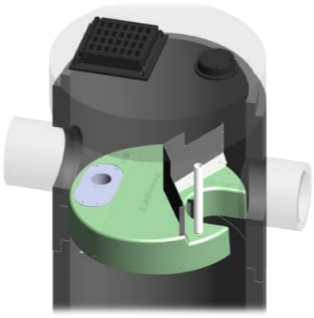
DESIGN FLEXIBILITY

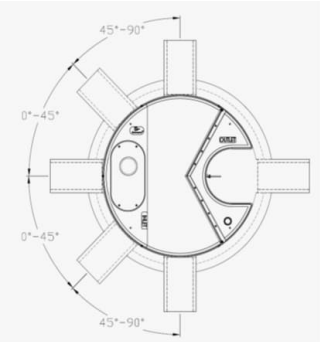
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend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

Stormceptor®

Rinker MATERIALS

Stormceptor® EF Sizing Report

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

07/25/2025

Province:	Ontario
City:	Centre Wellington
Nearest Rainfall Station:	WATERLOO WELLINGTON AP
Climate Station Id:	6149387
Years of Rainfall Data:	34

Site Name:	West System

Drainage Area (ha):	1.675
% Imperviousness:	86.00

Runoff Coefficient 'c': 0.81

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

Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	51.79
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):	1733
Estimated Average Annual Sediment Volume (L/yr):	1409

Project Name:	650 Victoria Terrace
Project Number:	63117-001
Designer Name:	Jolie Nguyen
Designer Company:	MTE Consultants
Designer Email:	jnguyen@mte85.com
Designer Phone:	519-743-6500
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	63
EFO5	72
EFO6	78
EFO8	86
EFO10	90
EFO12	94

Recommended Stormceptor EFO Model: EFO8

Estimated Net Annual Sediment (TSS) Load Reduction (%): 86

Water Quality Runoff Volume Capture (%): > 90

imbrium

THIRD-PARTY TESTING AND VERIFICATION

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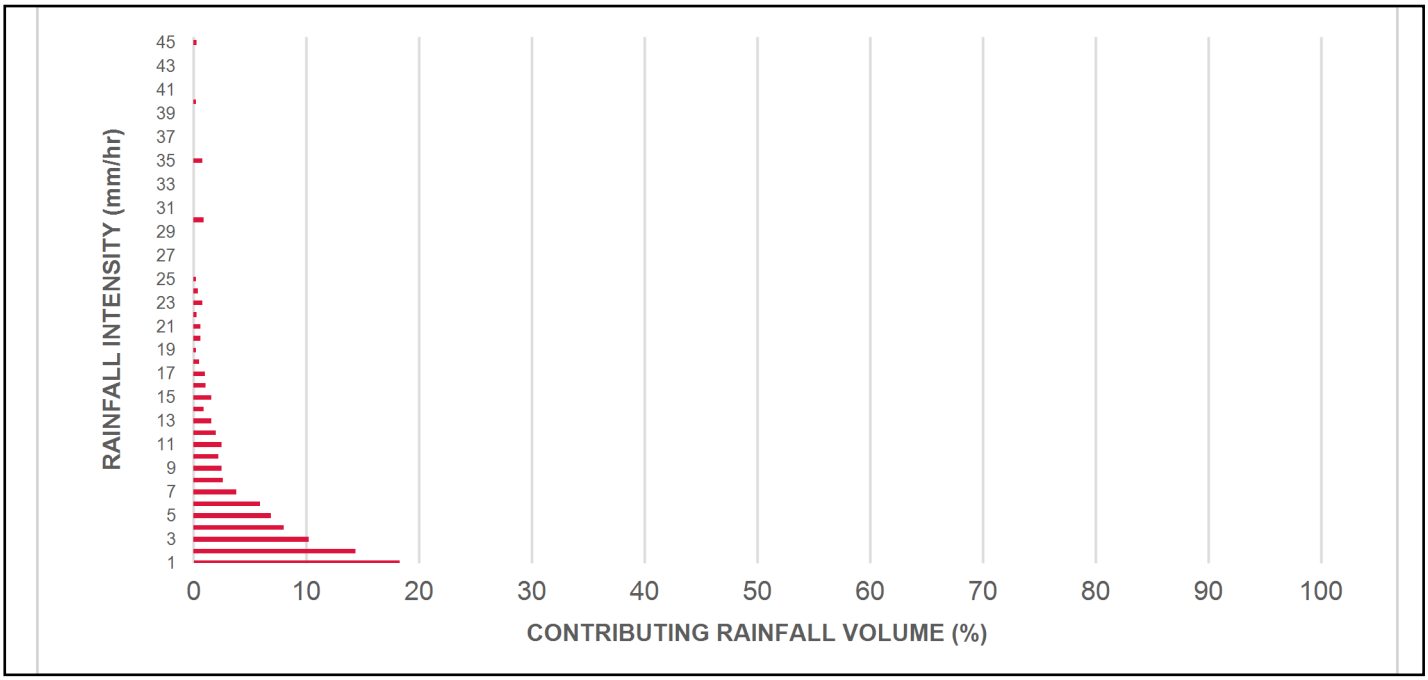
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

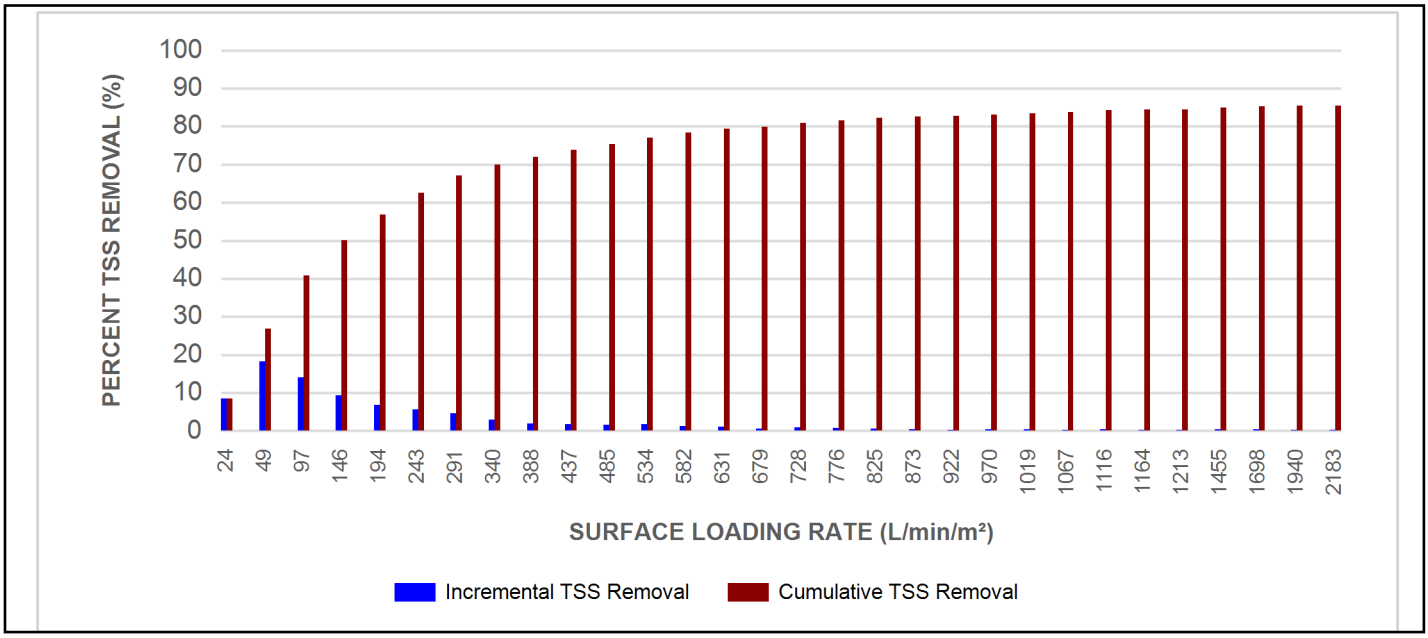
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.50	8.5	8.5	1.90	114.0	24.0	100	8.5	8.5
1.00	18.3	26.8	3.80	228.0	49.0	100	18.3	26.8
2.00	14.4	41.3	7.60	456.0	97.0	97	14.0	40.9
3.00	10.2	51.5	11.40	684.0	146.0	91	9.3	50.1
4.00	8.0	59.5	15.20	912.0	194.0	84	6.7	56.9
5.00	6.9	66.4	19.00	1140.0	243.0	81	5.6	62.5
6.00	5.9	72.3	22.80	1368.0	291.0	79	4.6	67.1
7.00	3.8	76.1	26.60	1596.0	340.0	77	2.9	70.0
8.00	2.6	78.7	30.40	1824.0	388.0	75	1.9	72.0
9.00	2.5	81.1	34.20	2052.0	437.0	72	1.8	73.8
10.00	2.2	83.3	38.00	2280.0	485.0	70	1.5	75.3
11.00	2.5	85.8	41.80	2508.0	534.0	68	1.7	77.0
12.00	2.0	87.8	45.60	2736.0	582.0	66	1.3	78.3
13.00	1.6	89.4	49.40	2964.0	631.0	64	1.0	79.3
14.00	0.9	90.4	53.20	3192.0	679.0	64	0.6	79.9
15.00	1.6	91.9	57.00	3420.0	728.0	64	1.0	80.9
16.00	1.1	93.0	60.80	3648.0	776.0	63	0.7	81.6
17.00	1.0	94.0	64.59	3876.0	825.0	63	0.7	82.3
18.00	0.5	94.6	68.39	4104.0	873.0	63	0.3	82.6
19.00	0.2	94.8	72.19	4332.0	922.0	62	0.1	82.8
20.00	0.6	95.4	75.99	4560.0	970.0	62	0.4	83.1
21.00	0.6	96.1	79.79	4788.0	1019.0	61	0.4	83.5
22.00	0.3	96.4	83.59	5016.0	1067.0	60	0.2	83.7
23.00	0.8	97.2	87.39	5244.0	1116.0	59	0.5	84.2
24.00	0.4	97.6	91.19	5472.0	1164.0	58	0.3	84.5
25.00	0.2	97.8	94.99	5700.0	1213.0	57	0.1	84.5
30.00	0.9	98.7	113.99	6839.0	1455.0	51	0.4	85.0
35.00	0.8	99.5	132.99	7979.0	1698.0	43	0.4	85.3
40.00	0.2	99.7	151.99	9119.0	1940.0	38	0.1	85.4
45.00	0.3	100.0	170.99	10259.0	2183.0	34	0.1	85.5
Estimated Net Annual Sediment (TSS) Load Reduction =								**86 %**

Climate Station ID: 6149387 *Years of Rainfall Data*: 34

RAINFALL DATA FROM WATERLOO WELLINGTON AP RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



imbrium

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

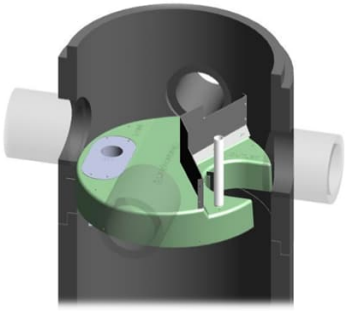
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test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

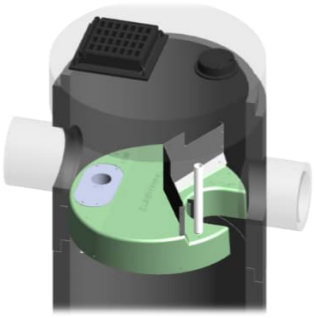
DESIGN FLEXIBILITY

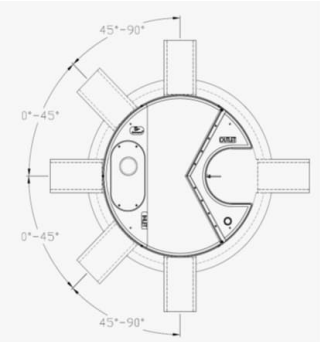
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend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

Appendix E

Pre-consultation Comments from Triton Engineering Services Limited

MANDATORY PRE-CONSULTATION
Meeting Notes

Centre Wellington

DATE OF MEETING: November 13, 2024

PRESENT:

	DEPARTMENT	NAME(S)
	Planning	Brett Salmon, Mariana Iglesias, Deanna Maiden, Chantalle Pellizzari
	Building	
	Development Engineering	Duy Lam
	Infrastructure	Brandon Buehler
	Economic Development	
	Source Water Protection	Kim Funk
	Consulting Engineer	Dustin Lyttle, Ray Kirtz
	County of Wellington	
	GRCA	
	School Board(s)	
	MTO	
	Applicant/Agent	Luke Johnston, Dunpar, Mehedi Kan, Dunpar, Michael Nemanic, Dunpar, Waleed Nawaz, Dunpar, Pierre Chauvin, MHBC Gillian Smith, MHBC

SITE INFORMATION

Municipal Address: 650 Victoria Terrace, Fergus

Current Zoning: M1- Service Industrial Current uses: Former Industrial Building

Current Official Plan Designation: Industrial

Proposed Land Use: Residential, Mixed-use, Commercial/Industrial

TYPE OF APPLICATION

☒ Zoning By-law Amendment

☒ Official Plan Amendment

☐ Draft Plan of Subdivision

☐ Draft Plan of Condominium

☐ Site Plan

☒ Other - Please describe: County Official Plan Amendment requirements to be confirmed by County

Brief description of proposed development:

200 residential units – blocks of townhomes, 11 industrial/commercial units, park block

MANDATORY PRE-CONSULTATION
Meeting Notes

Centre Wellington

Required information:

To ensure the appropriate information for each application is captured, Township staff may require the following plans, reports, and studies. Failure to provide the required information may result in an application being deemed incomplete.

	Application Types				
Plans, Reports, Studies *	Official Plan Amendment	Zoning by-law Amendment	Draft Plan of Subdivision	Draft Plan of Condo.	Site Plan Approval
Agricultural Impact Assessment	☐	☐	☐	☐	☐
Arborist Report	☒	☒	☐	☐	☐
Archeological Impact Assessment	☐	☐	☐	☐	☐
Architectural Elevation Plans	☐	☐	☐	☐	☒
Disclosure Report	☐	☐	☐	☐	☐
Dust Study	☐	☐	☐	☐	☐
Environmental Impact Assessment	☐	☐	☐	☐	☐
Environmental Site Assessment (Phase 1 & 2)	☒	☒	☐	☐	☐
Farm Data Sheets (Minimum Distance Separation)	☐	☐	☐	☐	☐
Farm Information Form	☐	☐	☐	☐	☐
Farm Viability/Agrologist Study	☐	☐	☐	☐	☐
Fiscal Impact Assessment	☐	☐	☐	☐	☐
Floodplain Study	☐	☐	☐	☐	☐
Functional Servicing Report (Water, Wastewater and Stormwater)	☒	☒	☐	☐	☐
Geotechnical Assessment	☒	☒	☐	☐	☐
Grading & Drainage Plans	☐	☐	☐	☐	☒
Heritage Impact Assessment	☐	☐	☐	☐	☐
Hydrogeological Impact Assessment	☒	☒	☐	☐	☐
Landscape Plans	☐	☐	☐	☐	☒

Lighting & Photometric Plans	☐	☐	☐	☐	☒
Noise Study	☒	☒	☐	☐	☐
Odour Study	☐	☐	☐	☐	☐
Planning Justification Report	☒	☒	☐	☐	☐
Sediment & Erosion Control Plans	☐	☐	☐	☐	☒
Shadow Analysis	☐	☐	☐	☐	☐
Site Plan – Including a Zoning Matrix	☒	☒	☐	☐	☒
Slope Stability Study	☐	☐	☐	☐	☐
Socio-Economic Impact	☐	☐	☐	☐	☐
Traffic Impact Assessment	☒	☒	☐	☐	☐
Tree Compensation Plans	☒	☒	☐	☐	☒
Tree Inventory and Protection Plans	☒	☒	☐	☐	☒
Urban Design Brief	☒	☒	☐	☐	☐
Vibration Study	☐	☐	☐	☐	☐
Visual Impact Study (Streetscape Plan)	☐	☐	☐	☐	☐
Water Balance Assessment	☐	☐	☐	☐	☒
Other: Parking Utilization					

*Terms of Reference available through Appendix A

Additional Staff Comments:

Planning	Refer to Urban Design Guidelines (https://www.centrewellington.ca/media/mi4ldty1/udg-april-22-2015.pdf) and Urban Design Manual – Private Realm (https://www.centrewellington.ca/media/ohedo1rc/cw-urban-design-standards-private-realm-december-1-2017.pdf) for design principles, the density is higher than OP policies suggest are appropriate, block lengths need to be reviewed, amenity area is not sufficient. Noise study required due to the location of existing industrial site (Nexan's) in close proximity. Brett – water and waste water allocation need to be considered and may be dealt with through Holding Zone provisions. Staging of development to be considered and provided when submitting your applications.
Building	
Development Engineering	See attached comments dated November 6, 2024
Infrastructure	
Source Water Protection	See comments dated November 13, 2024
Consulting Engineer	See comments dated November 28, 2024

County of Wellington	Conversion of employment lands is a new policy for the County. Further discussion with staff is required. County looks after Solid Waste and they will review the development and determine if collection can occur in private condo
GRCA	See attached email dated November 13, 2024
School Board(s)	
MTO	
Other	

TRITON ENGINEERING SERVICES LIMITED
Consulting Engineers

Memorandum

DATE:	November 28, 2024
TO:	Chantalle Pellizzari
FROM:	Dustin Lyttle
RE:	650 Victoria Terrace, Fergus. Pre-consultant Engineering Comments
FILE:	A6788A

Introduction:

The following comments are based on the documents submitted in advance of the Pre-consultation meeting held on November 13, 2024, and the additional information discussed and provided at that time.

Submitted Items List:

- Cover letter from Dunpar Developments Inc dated September 13, 2024
- Drawings A100/A101, Site Plan dated September 20, 2024 prepared by Dunpar Developments Inc
- Plan of Survey dated June 120, 2024 prepared by Van Harten. Pre-Consultation Comments:

General:

PC.1 All aspects of the development civil design must comply with the standards set forth in the Township Development Manual (June 2024). This includes:

- Design and submission requirements for roads, including walkways, sidewalks, and trails.
- Infrastructure installation, covering water mains, sanitary and storm sewers, and Groundwater Management Systems (GWMS), if required.
- Stormwater management and streetlighting/composite utility design.
- Parks and multi-use pathway design, which encompasses park layout, fencing, and other related features.
- Urban forestry, grading, and landscaping requirements.

Please ensure all designs and submissions meet these standards to align with Township regulations.

PC.2 The following reports and drawings are required for submission:

- Functional Servicing Report / Stormwater Management Report
- Water Balance Assessment
- Geotechnical Report
- Hydrogeological Study
- Traffic Impact Study (TIS) - TOR to be submitted for approval prior to undertaking TIS
- Grading / Servicing Plan, Sediment & Erosion Control Plan
- Lighting / Photometric Plans, Electrical Plans, Composite Utility Plan (CUP)
- Landscaping Plans, including Fencing
- Parking Study and Street Signage Plans

For a full list of submission requirements, refer to Section A - Engineering Submissions in the Township's Development Manual.

Sanitary System:

PC.3 Site is currently serviced to the trunk sewer located on a municipal block runs along the north side of the site. A trunk also exists along the Gzowski frontage to the east. Local sewers exist partially on Victoria Terrace (north and south ends).

PC.4 Flows from the site are currently conveyed down Gzowski through to downtown and eventually to the Fergus Wastewater Treatment Plant (WWTP). The impact on the downstream sewers from the loading will need to be reviewed by the Township.

PC.5 Sewage Treatment Reserve Capacity is currently constrained. The developer will need to request sanitary treatment allocation from the Township to support this development. The granting of such a request will be in accordance with the Township's Allocation Policy.

Water System:

PC.6 Trunk watermains (250 and 300 mm) exist on Gzowski, Victoria Terrace and Forfar. Any of these mains are expected to be available for servicing the site.

PC.7 A complete assessment of the expected available fire flow can be provided by the Township once additional details on the main layout/connections and the development are provided. This will need to be compared with fire flow requirements of the development. The results of this are expected to form part of the FSR required to support the development. However, fire flows to site are expected be good given the trunk mains on 3 sides.

PC.8 Given the size of the development, it is advisable that more then one service connection is provided. However, flow through on private mains is not permitted, therefore, check valves and access chambers, will be required at property line on all services.

PC.9 Water Supply Reserve Capacity is currently constrained. The developer will need to request water supply allocation from the Township to support this development. The granting of such a request will be in accordance with the Township's Allocation Policy.

Storm Water Management:

PC.10 This site is tributary to an unnamed watercourse that is situated to the south of the site and extends southerly to St.George Street where it is converted to a sewer which ultimately outlets to the Grand River. This watercourse does not have official status (i.e. not a municipal drain or located on an easement). The adequacy of this system will need to be further investigated (i.e., geomorphic assessment).

PC.11 The following criteria/approach for Stormwater management is expected.

- Quality Treatment: Enhanced Treatment Level (80% TSS Removal)
- Water Balance: Recharge to the extent feasible recognizing well protection zone restrictions as applicable.
- Quantity Control: Typically, a Post-to-Pre-Control is expected as a minimum. However, given the brownfield nature of the site and potential restrictions on the receiving watercourse/sewer site specific SWM strategy can be expected, including but not limited to the requirement for over control. This issue will be reviewed by the Township and Quantity Control criteria provided.

Transportation:

PC.12 TIS will be required, TOR for this to be determined in consultation with Township and County of Wellington Staff. Consideration for Active Transportation Master Plan and internal circulation to be considered.

PC.13 Connection to the existing rail-trail to be considered. Township to advise.

PC.14 Upgrades to roads/intersections/pedestrian facilities may be required to support this development. Township will advise as part of the formal submission once TIS has been completed which should provide recommendations.

Miscellaneous:

PC.15 Existing service connections (water/sanitary) not utilized for the subject development will need to be decommissioned back the main.

PC.16 Internal streets typical cross sections are to be provided for consideration. Access for emergency vehicles needs to be maintained at all times. On-street parking, if proposed, will need to consider this.

These comments are advisory for the applicant and do not need to be responded to. If you have any questions, please do not hesitate to contact us.

Source Water Protection – Planning Application Requirements

As part of the *Clean Water Act* and Source Protection Plan requirements, all proposed development that is subject to a *Planning Act* application on lands located within a vulnerable area shall ensure that proposed development work does not result in a threat to municipal drinking water quality and/or quantity.

Section 1: Property and Application Information

Property Address: 650 Victoria Terrace

Application Type:

☒ Official Plan Amendment
☒ Zoning By-law Amendment
☐ Site Plan
☐ Plan of Subdivision
☐ Plan of Condominium
Type:_____

Section 2: Documentation to be provided by the Risk Management Office

	Current Application	Future Application	Not Required
Section 59 Notice	☒	☒	☐
Risk Management Plan	☐	☒	☐

Section 3: Documentation required to be provided by the owner or their agents

	Current Application	Future Application	Not Required
Appendix A: Contact & Proposal Information	☒	☐	☐
Drinking Water Threats Disclosure Report	☐	☒	☐
Liquid Fuel Handling/Storage Spill Response Plan (>250L)	☐	☒	☐
Winter Maintenance Plan	☐	☒	☐
Chemical/ Waste Management Storage Spill Response Plan	☐	☒	☐
Hydrogeological Assessment Report	☒	☐	☐
Water Balance Assessment Report	☐	☒	☐
Recharge Infiltration Measures	☐	☒	☐
Functional Service Report – Source Protection Design	☐	☐	☒
Stormwater Management Report – Source Protection Design	☐	☒	☐
Record of Site Condition	☐	☒	☐
Phase 1 and/or Phase 2 Environmental Assessments	☐	☐	☒

Please see Appendix B for required documentation descriptions.

Section 4: Site specific information

Wellhead Protection Area (WHPA) and Vulnerability Scores:

WHPA ☐ A ☒ B ☒ C ☐ D ☒ Q Score ☐ 2 ☐ 4 ☒ 6 ☒ 8 ☐ 10

Issue Contributing Area (ICA): ☐ None ☒ Chloride ☐ Trichloroethylene ☐ Nitrate ☐ Sodium

Significant Groundwater Recharge Area: ☐ Yes ☒ No

Highly Vulnerable Aquifer: ☐ Yes ☒ No

For more information, please contact sourcewater@centrewellington.ca.

Sincerely,

Kim Funk, Source Protection Coordinator
519-846-9691 ext. 283
kfunk@centrewellington.ca

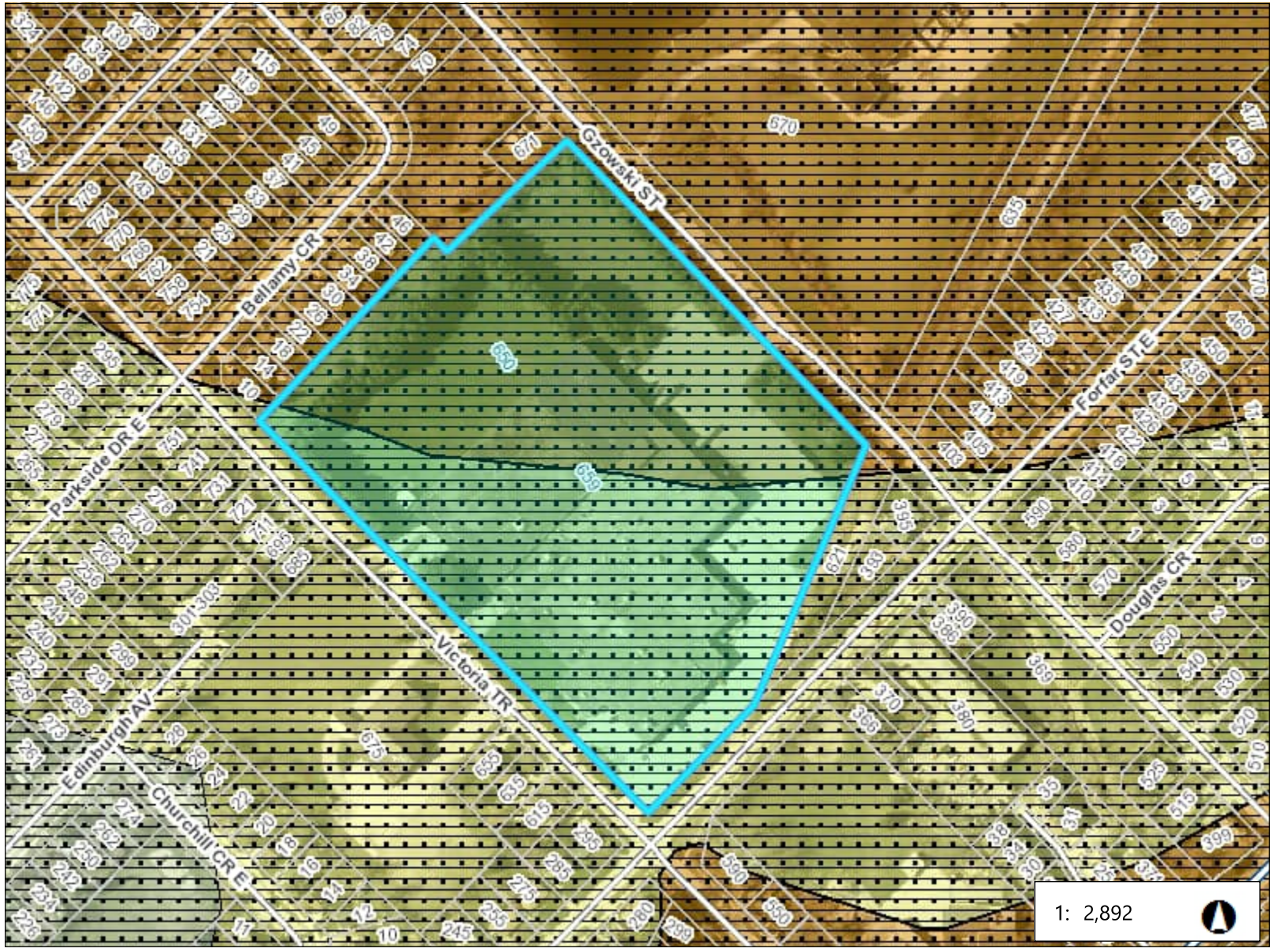
Attachment: WHPA Map(s)

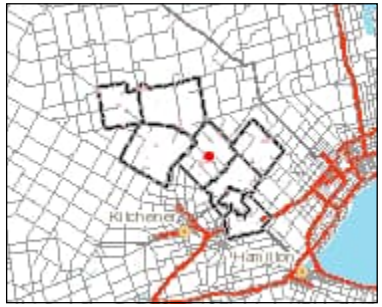
Resources:
Appendix A: Contact & Proposal Information
Appendix B: Source Water Protection required document descriptions
Appendix C: Guidance documents
Appendix D: Water Balance Terms of Reference

Please note that the requested documentation is applicable as per the information available as of the date signed above. If the proposed application type and/or proposed use changes, there may be additional requirements. Future planning and/or building applications may have additional requirements beyond those listed above or may require reports listed as "not required", based on the information provided at the time of application.

Explore Wellington

650 Victoria Terrace, Fergus





Legend

- Parcels
- Roads
  - Local Road
  - County Road
  - Highway
- Well Locations
  - Existing
  - Proposed
- Issue Contributing Area
  - Chloride
  - Nitrate
  - Sodium
  - TCE
- Wellhead Protection Area
  - A
  - B
  - C
  - D
- Vulnerability Score
  - 10
  - 8, D; 8; 8, C
  - 2, 4, 6 (A, B or C)
  - 2,4,6, D; 2,4, D; 2, 4, 6 (D); 4, D; 6,
- HVA
- RoadsLookup

Notes

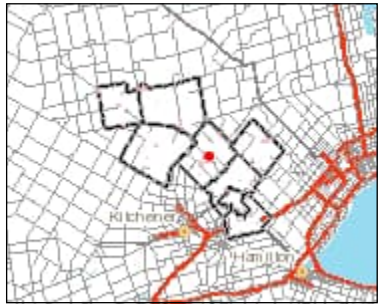
0.1 0 0.07 0.1 Kilometers

WGS_1984_Web_Mercator_Auxiliary_Sphere

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS IS NOT SURVEY DATA. Parcels - Teranet 2002, Wellington County 2022

650 Victoria Terrace, Fergus - Quantity



Legend

- Parcels
- Roads
  - Local Road
  - County Road
  - Highway
- Well Locations
  - Existing
  - Proposed
- WHPA Q1_Q2_Boundary
- WHPA Q1_Q2
  - Approved
  - Draft
- SGRA
- RoadsLookup

Notes

0.1 0 0.07 0.1 Kilometers

WGS_1984_Web_Mercator_Auxiliary_Sphere

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS IS NOT SURVEY DATA. Parcels - Teranet 2002, Wellington County 2022

Duy Lam Tran

From: Duy Lam Tran
Sent: November 6, 2024 2:52 PM
To: Mariana Iglesias
Cc: Chantalle Pellizzari; Lee Wheildon; Deanna Maiden
Subject: RE: Upcoming Preconsultation Meetings
Attachments: 650 Victoria Terrace_Site Plan_DevEng_11.06.2024.pdf; township-of-centre-wellington-development-manual-june-2024.pdf

Hi Mariana,

Development Engineering staff have completed a preliminary review of the submission for 650 Victoria Terrace and have identified the following additional information as required:

- Functional Servicing Report/Stormwater Management Report, Water Balance Assessment
- Geotechnical reporting
- Hydrogeological Study
- Traffic Impact Study (TIS)
- Grading/Servicing Plan/Sediment & Erosion Control Plan
- Lighting/Photometrics Plan(s), Electrical Plans
- Landscaping Plans/Fencing
- On-street parking/street signage plans
- Additional civil drawings may be required (this will be further determined by the resulting reporting/studies and may include but are not limited to (e.g. details plans, existing conditions drawings, proposed roadway drawings/plan and profile drawings, etc.). For a full list of submission requirements, please see the Township's Development Manual, Section A Engineering Submissions.

In addition to the above requirements, staff have confirmed and labeled on the attached Site Plan drawing what servicing may be available to the property, including the type, size.

My comments are also saved in Cityview and the folder.

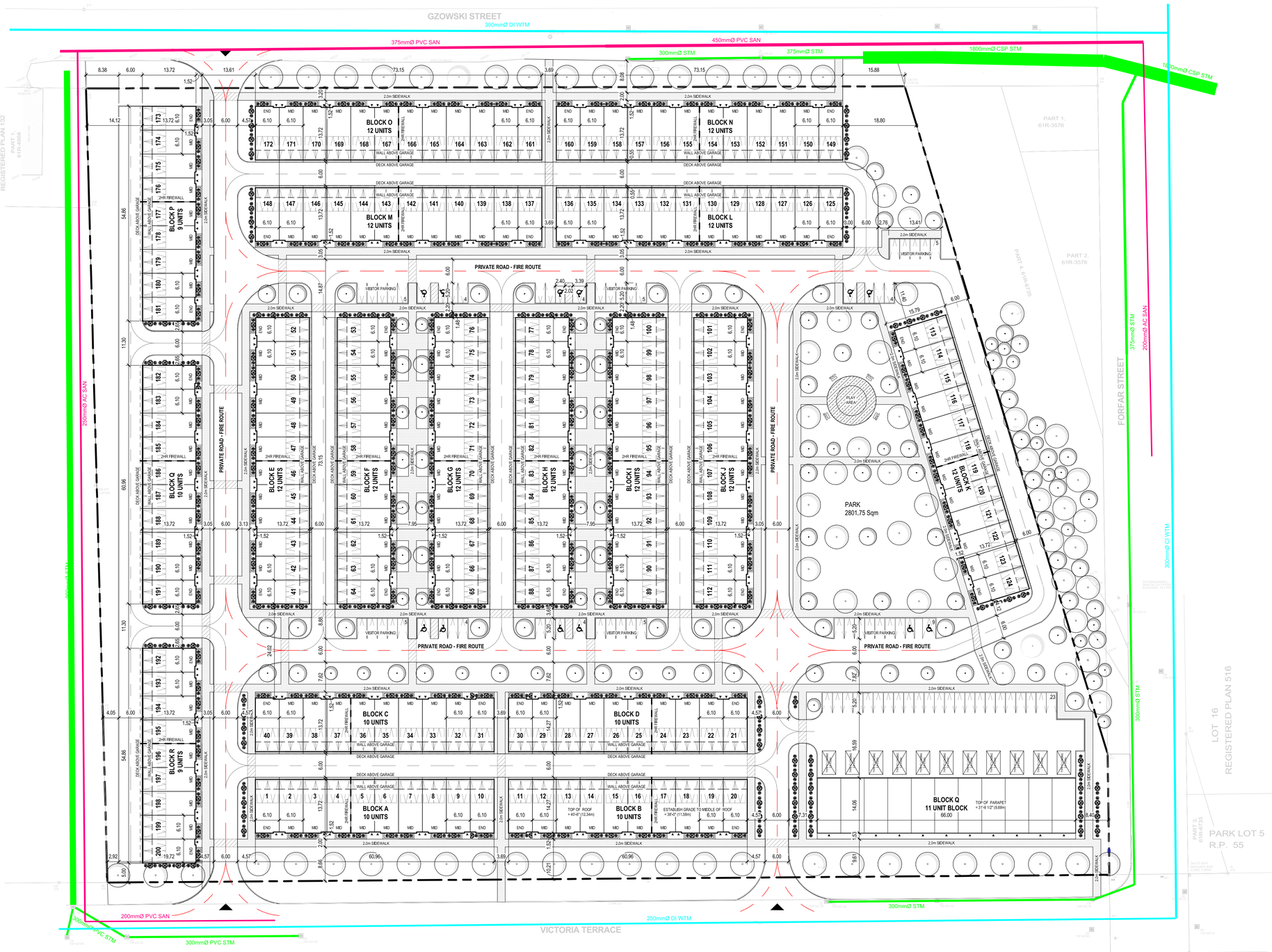
Should you have any questions or concerns, please do not hesitate to contact me.

Regards,

Duy Lam Tran C.E.T, CAN-CISEC.| Development Engineering Technologist

Township of Centre Wellington | 1 MacDonald Square, Elora, ON N0B 1S0
519.846.9691 x 246 CentreWellington.ca

From: Mariana Iglesias <MIglesias@centrewellington.ca>
Sent: Friday, November 1, 2024 2:41 PM



No.	DESCRIPTION	DATE

REVISION RECORD

PER CON		2024-09-20
	DESCRIPTION	DATE

ISSUED RECORD

D

DUNPAR

650 VICTORIA TERRACE
FERGUS

SCALE
1 : 500

DRAWING TITLE
SITE PLAN

CLIENT

DRAWN	PAGE NO.
CHECKED	A100
DATE 2024-09-20	

Site Data

650 Victoria Terrace Fergus — **2024-09-20**

	Meters	Ha	Acres
Total Site Area	47,775.95	4.78	11.81

Residential

By Model	Model	GFA (sq.ft.)	GFA (sq.mt.)	Building Area (sq.mt.)	No. of units	Total GFA (sq.ft.)	Total GFA (sq.mt.)	Total Building Area (sq.mt.)	Building Height (m)	No. of storeys
Block A	END	2,358.51	219.11	67.91	2	4,717.02	438.23	135.82	12.34	3
	MID	2,358.51	219.11	70.67	6	14,151.06	1,314.68	424.01	12.34	3
	MID FIRE	2,368.40	220.03	75.77	2	4,736.80	440.06	151.54	12.34	3
Block B	END	2,358.51	219.11	67.91	2	4,717.02	438.23	135.82	12.34	3
	MID	2,358.51	219.11	70.67	6	14,151.06	1,314.68	424.01	12.34	3
	MID FIRE	2,368.40	220.03	75.77	2	4,736.80	440.06	151.54	12.34	3
Block C	END	2,358.51	219.11	67.91	2	4,717.02	438.23	135.82	12.34	3
	MID	2,358.51	219.11	70.67	6	14,151.06	1,314.68	424.01	12.34	3
	MID FIRE	2,368.40	220.03	75.77	2	4,736.80	440.06	151.54	13.34	3
Block D	END	2,358.51	219.11	67.91	2	4,717.02	438.23	135.82	12.34	3
	MID	2,358.51	219.11	70.67	6	14,151.06	1,314.68	424.01	12.34	3
	MID FIRE	2,368.40	220.03	75.77	2	4,736.80	440.06	151.54	12.34	3
Block E	END	2,358.51	219.11	67.91	2	4,717.02	438.23	135.82	12.34	3
	MID	2,358.51	219.11	70.67	8	18,868.08	1,752.90	565.35	12.34	3
	MID FIRE	2,368.40	220.03	75.77	2	4,736.80	440.06	151.54	12.34	3
Block F	END	2,358.51	219.11	67.91	2	4,717.02	438.23	135.82	12.34	3
	MID	2,358.51	219.11	70.67	8	18,868.08	1,752.90	565.35	12.34	3
	MID FIRE	2,368.40	220.03	75.77	2	4,736.80	440.06	151.54	12.34	3
Block G	END	2,358.51	219.11	67.91	2	4,717.02	438.23	135.82	12.34	3
	MID	2,358.51	219.11	70.67	8	18,868.08	1,752.90	565.35	12.34	3
	MID FIRE	2,368.40	220.03	75.77	2	4,736.80	440.06	151.54	12.34	3
Block H	END	2,358.51	219.11	67.91	2	4,717.02	438.23	135.82	12.34	3
	MID	2,358.51	219.11	70.67	8	18,868.08	1,752.90	565.35	12.34	3
	MID FIRE	2,368.40	220.03	75.77	2	4,736.80	440.06	151.54	12.34	3
Block I	END	2,358.51	219.11	67.91	2	4,717.02	438.23	135.82	12.34	3
	MID	2,358.51	219.11	70.67	8	18,868.08	1,752.90	565.35	12.34	3
	MID FIRE	2,368.40	220.03	75.77	2	4,736.80	440.06	151.54	12.34	3
Block J	END	2,358.51	219.11	67.91	2	4,717.02	438.23	135.82	12.34	3
	MID	2,358.51	219.11	70.67	8	18,868.08	1,752.90	565.35	13.34	3
	MID FIRE	2,368.40	220.03	75.77	2	4,736.80	440.06	151.54	12.34	3
Block K	END	2,358.51	219.11	67.91	2	4,717.02	438.23	135.82	12.34	3
	MID	2,358.51	219.11	70.67	8	18,868.08	1,752.90	565.35	12.34	3
	MID FIRE	2,368.40	220.03	75.77	2	4,736.80	440.06	151.54	12.34	3
Block L	END	2,358.51	219.11	67.91	2	4,717.02	438.23	135.82	12.34	3
	MID	2,358.51	219.11	70.67	8	18,868.08	1,752.90	565.35	12.34	3
	MID FIRE	2,368.40	220.03	75.77	2	4,736.80	440.06	151.54	12.34	3
Block M	END	2,358.51	219.11	67.91	2	4,717.02	438.23	135.82	12.34	3
	MID	2,358.51	219.11	70.67	8	18,868.08	1,752.90	565.35	12.34	3
	MID FIRE	2,368.40	220.03	75.77	2	4,736.80	440.06	151.54	12.34	3
Block N	END	2,358.51	219.11	67.91	2	4,717.02	438.23	135.82	12.34	3
	MID	2,358.51	219.11	70.67	8	18,868.08	1,752.90	565.35	12.34	3
	MID FIRE	2,368.40	220.03	75.77	2	4,736.80	440.06	151.54	12.34	3
Block O	END	2,358.51	219.11	67.91	2	4,717.02	438.23	135.82	12.34	3
	MID	2,358.51	219.11	70.67	8	18,868.08	1,752.90	565.35	12.34	3
	MID FIRE	2,368.40	220.03	75.77	2	4,736.80	440.06	151.54	12.34	3
Block P	END	2,358.51	219.11	67.91	2	4,717.02	438.23	135.82	12.34	3
	MID	2,358.51	219.11	70.67	5	11,792.55	1,095.56	353.35	12.34	3
	MID FIRE	2,368.40	220.03	75.77	2	4,736.80	440.06	151.54	12.34	3
Block Q	END	2,358.51	219.11	67.91	2	4,717.02	438.23	135.82	12.34	3
	MID	2,358.51	219.11	70.67	6	14,151.06	1,314.68	424.01	12.34	3
	MID FIRE	2,368.40	220.03	75.77	2	4,736.80	440.06	151.54	12.34	3
Block R	END	2,358.51	219.11	67.91	2	4,717.02	438.23	135.82	12.34	3
	MID	2,358.51	219.11	70.67	5	11,792.55	1,095.56	353.35	12.34	3
	MID FIRE	2,368.40	220.03	75.77	2	4,736.80	440.06	151.54	12.34	3
				Total:	**200**	**472,058.04**	**43,855.63**	**14,218.04**		

Employment

By Model	Model	GFA (sq.ft.)	GFA (sq.mt.)	Building Area (sq.mt.)	No. of units	Total GFA (sq.ft.)	Total GFA (sq.mt.)	Total Building Area (sq.mt.)	Building Height (m)	No. of storeys
Block Q	END	1,668.90	155.05	84.40	2	3,337.80	310.09	168.80	9.39m	2
	MID	1,668.90	155.05	84.40	9	15,020.10	1,395.41	759.61	9.39m	2
			Total:	**169**	**11.00**	**18,357.90**	**1,705.50**			

Residential

By Block					No. of units	Total GFA (sq.ft.)	Total GFA (sq.mt.)	Total Building Area (sq.mt.)		
Block A	(Towns)				10	23,604.88	2,192.97	711.37		
Block B	(Towns)				10	23,604.88	2,192.97	711.37		
Block C	(Towns)				10	23,604.88	2,192.97	711.37		
Block D	(Towns)				10	23,604.88	2,192.97	711.37		
Block E	(Towns)				12	28,321.90	2,631.19	852.71		
Block F	(Towns)				12	28,321.90	2,631.19	852.71		
Block G	(Towns)				12	28,321.90	2,631.19	852.71		
Block H	(Towns)				12	28,321.90	2,631.19	852.71		
Block I	(Towns)				12	28,321.90	2,631.19	852.71		
Block J	(Towns)				12	28,321.90	2,631.19	852.71		
Block K	(Towns)				12	28,321.90	2,631.19	852.71		
Block L	(Towns)				12	28,321.90	2,631.19	852.71		
Block M	(Towns)				12	28,321.90	2,631.19	852.71		
Block N	(Towns)				12	28,321.90	2,631.19	852.71		
Block O	(Towns)				12	28,321.90	2,631.19	852.71		
Block P	(Towns)				9	21,246.37	1,973.85	640.70		
Block Q	(Towns)				10	23,604.88	2,192.97	711.37		
Block R	(Towns)				9	21,246.37	1,973.85	640.70		
				Total:	**200**	**472,058.04**	**43,855.63**	**14,218.04**		

Employment

Block Q	Emplyment				11	18,357.90	1,705.50	928.41		

		Total (sq.mt.)	%
Total Site GFA (Residental)	Proposed	43,855.63	
Total Site GFA (Industrial)	Proposed	1,705.50	
Total Paved Area	Proposed	12,767.56	26.72
Total Building Area Residential	Proposed	14,218.04	29.76
Total Building Area Commerical	Proposed	928.41	
Total Landscape Area	Proposed	14,236.11	29.80
PARKS			
PARK	Proposed	2,801.75	5.86
Site Density (unit/Ha)			
Townhouse + Employment			41.86
Floor space index (F.S.I)			0.92

Parking - Residential	Required	Proposed
Residential	200.00	400
Visitor	28.00	42
Barrier Free	12.00	12
Parking - Employment	**Required**	**Proposed**
Surface Parking		23
Loading Type "C" 3.5m x 6m		11

No.	DESCRIPTION	DATE

REVISION RECORD

DESCRIPTION	DATE
PER CON	2024-09-20

ISSUED RECORD

D
DUNPAR

650 VICTORIA TERRACE
FERGUS

SCALE
1 : 100

DRAWING TITLE
SITE PLAN - STATS

CLIENT

DRAWN RB
CHECKED AS
DATE 2024-09-20
PAGE NO. A-101

2024-09-20 10:50:45 AM

From: Jessica Conroy
To: Chantalle Pellizzari
Subject: RE: Preconsultation Meeting - 650 Victoria Terrace, Fergus
Date: November 13, 2024 8:59:51 AM

Good morning Chantalle,

GRCA does not have any concerns with this proposed re-development at 650 Victoria Terrace, Fergus.

I have looked into this further and the subject property does not contain any watercourses, floodplains, shorelines, wetlands, valley slopes or other natural hazard features of interest to GRCA. The property is not subject to Ontario Regulation 41/24. Therefore, permission from GRCA is not required.

Thank you,
Jessica

Jessica Conroy, MES Pl.
Resource Planner
Grand River Conservation Authority

400 Clyde Road, PO Box 729
Cambridge, ON N1R 5W6
Office: 519-621-2763 ext. 2230
Toll-free: 1-866-900-4722
Email: jconroy@grandriver.ca
www.grandriver.ca | Connect with us on social media

-----Original Appointment-----
From: Chantalle Pellizzari <CPellizzari@centrewellington.ca>
Sent: October 1, 2024 4:04 PM
To: Brett Salmon; Mariana Iglesias; Lee Wheildon; cbaker@centrewellington.ca; Source Water; Meagan Ferris; Zachary Prince; Planning; Mehedi Khan; Waleed Nawaz; Deanna Maiden; Jessica Conroy
Cc: Kim Funk; Danielle Walker; Adam Gilmore
Subject: Preconsultation Meeting - 650 Victoria Terrace, Fergus
When: November 13, 2024 9:00 AM-10:00 AM (UTC-05:00) Eastern Time (US & Canada).
Where: Microsoft Teams Meeting; Veteran's Hall B

Preconsultation meeting to discuss redevelopment of 650 Victoria Terrace, Fergus

Please join the meeting via the Teams link below.

Thank you,
Chantalle

Microsoft Teams meeting

Join on your computer, mobile app or room device
Click here to join the meeting

Meeting ID: 272 455 373 237
Passcode: pdRr8V
Download Teams | Join on the web

Or call in (audio only)

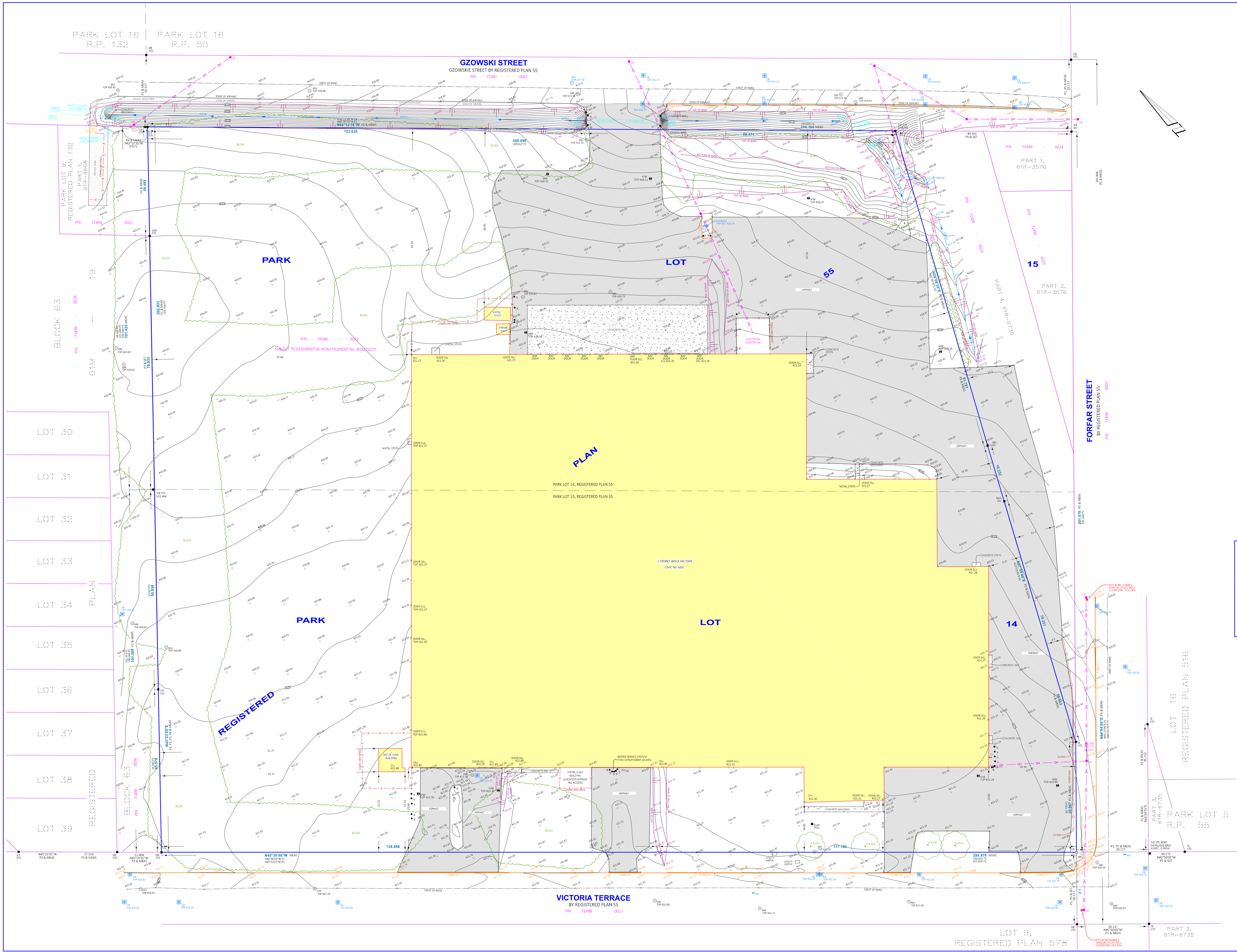
+1 647-794-5569,,702765688# Canada, Toronto

Phone Conference ID: 702 765 688#
Find a local number | Reset PIN

Learn More | Meeting options

Appendix F

Van Harten Survey – Existing Conditions



PART 2 SUMMARY REPORT:

CLIENT:

THIS PLAN WAS PREPARED FOR DUNPAR HOMES INC. AND THE UNDERSIGNED ACCEPTS NO RESPONSIBILITY FOR USE BY OTHER PARTIES.

DESCRIPTION OF PROPERTY:

650 VICTORIA TERRACE
PIN 71496-0022
PART OF PARK LOTS 14 AND 15, REGISTERED PLAN 55
AS IN INSTRUMENT No. ROS225375
GEOGRAPHIC TOWN OF FERGUS
TOWNSHIP OF CENTRE WELLINGTON
COUNTY OF WELLINGTON

EASEMENTS

-SUBJECT TO EASEMENT AS IN INSTRUMENT No. ROS225375.
WE HAVE INTERPRETED THIS EASEMENT TO BE OVER ALL OF PIN 71496-0022.

ADDITIONAL NOTES

-A PORTION OF THE ASPHALT PARKING LOT LIES SOUTHEAST OF THE SOUTHEAST LIMIT.

PLAN OF SURVEY OF
PART OF PARK LOTS 14 AND 15
REGISTERED PLAN 55
GEOGRAPHIC TOWN OF FERGUS
TOWNSHIP OF CENTRE WELLINGTON
COUNTY OF WELLINGTON

SCALE 1 : 300

0 5 10 15 metres

VAN HARTEN SURVEYING INC.

THE INTENDED PLOT SIZE OF THIS PLAN IS 1322 mm IN WIDTH BY 915 mm IN HEIGHT WHEN PLOTTED AT A SCALE OF 1:300

BEARING AND COORDINATE NOTE:

1. BEARINGS ARE GRID BEARINGS AND ARE DERIVED FROM GPS OBSERVATIONS AND ARE REFERRED TO THE UTM PROJECTION, ZONE 17, NAD 83 (CSRS-2010) ADJUSTMENT.
2. DISTANCES SHOWN ON THIS PLAN ARE ADJUSTED GROUND DISTANCES AND CAN BE CONVERTED TO GRID DISTANCES BY MULTIPLYING BY AN AVERAGED COMBINED SCALE FACTOR OF 0.99957.
3. COORDINATES ON THIS PLAN ARE UTM, ZONE 17, NAD83 (CSRS-2010) ADJUSTMENT AND ARE BASED ON GPS OBSERVATIONS FROM A NETWORK OF PERMANENT GPS REFERENCE STATIONS.

BEARING COMPARISONS:

FOR THE PURPOSES OF BEARING COMPARISONS, PREVIOUS SURVEYS HAVE BEEN ROTATED TO UTM BEARINGS BY THE ANGLES SHOWN BELOW.

PLAN	ROTATION FOR NORTHEAST BEARINGS
P1	- 1°36'55"
P2	- 0°57'25"
P3, P4	- 0°20'15"

BENCHMARK:

ELEVATIONS ARE BASED ON GPS OBSERVATIONS FROM PERMANENT REFERENCE STATIONS IN THE NAD83 (CSRS-2010) COORDINATE SYSTEM, WITH HEIGHTS CONVERTED TO ORTHOMETRIC ELEVATIONS ON THE CGVD28 DATUM (1978 ADJUSTMENT) WITH GEOID MODEL HTv2.0, AS SUPPLIED BY NATURAL RESOURCES CANADA.

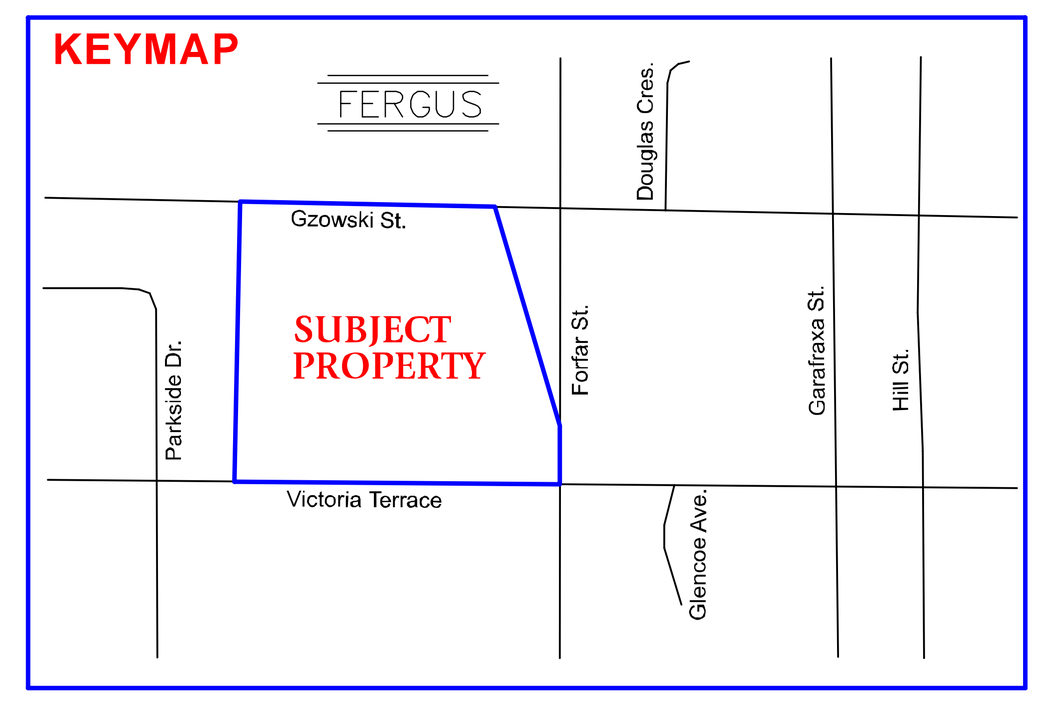
SITE BENCHMARK 1 : SPIKE IN UTILITY POLE SOUTHEAST OF SUBJECT PROPERTY ON FORFAR STREET HAVING AN ELEVATION OF 421.29m.

SITE BENCHMARK 2 : SPIKE IN UTILITY POLE AT INTERSECTION OF FORFAR STREET AND VICTORIA TERRACE HAVING AN ELEVATION OF 422.34m.

LEGEND:

- DENOTES SURVEY MONUMENT SET
- DENOTES SURVEY MONUMENT FOUND
- SIB DENOTES .025 X .025 X 1.20 STANDARD IRON BAR
- SSIB DENOTES .025 X .025 X 0.60 STANDARD IRON BAR
- IB DENOTES .015 X .015 X 0.60 IRON BAR
- TF DENOTES TOP OF FOUNDATION
- VH DENOTES VAN HARTEN SURVEYING INC., O.L.S.'S
- 375 DENOTES BLACK, SHOEMAKER, ROBINSON & DONALDSON LTD.
- OU DENOTES ORIGIN UNKNOWN
- P1 DENOTES REGISTERED PLAN 55
- P2 DENOTES INSTRUMENT No. ROS225375
- P3 DENOTES DEPOSITED PLAN 61M-19
- P4 DENOTES DEPOSITED PLAN 61R-4668
- P5 DENOTES DEPOSITED PLAN 61R-6735

OVERHEAD UTILITIES — OH —
FENCE LINE — X —
TOP OF BANK
EXISTING ELEVATION 294.55 ×
GAS VALVE GM
UTILITY POLE UP
GUY WIRE GUY
LIGHT STANDARD LS
GAS VALVE GV
WATER VALVE WV
CATCHBASIN CB
MANHOLE MH
BOLLARD B
MONITORING WELL MW
BUILDING
ASPHALT
GRAVEL
CONCRETE
DECIDUOUS TREE



SURVEYOR'S CERTIFICATE

I CERTIFY THAT:

1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT AND THE REGULATIONS MADE UNDER THEM.
2. THIS SURVEY WAS COMPLETED ON THE 11th DAY OF JUNE, 2024.

DATE: JUNE 12, 2024

JOHN S. SCOTT
ONTARIO LAND SURVEYOR

THIS PLAN OF SURVEY RELATES TO AOLS PLAN SUBMISSION FORM NUMBER 2216601.

METRIC:

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

Van Harten
LAND SURVEYORS - ENGINEERS

Waterloo	Guelph	Orangeville
Ph: 519-742-8371	Ph: 519-821-2763	Ph: 519-940-4110

www.vanharten.com info@vanharten.com

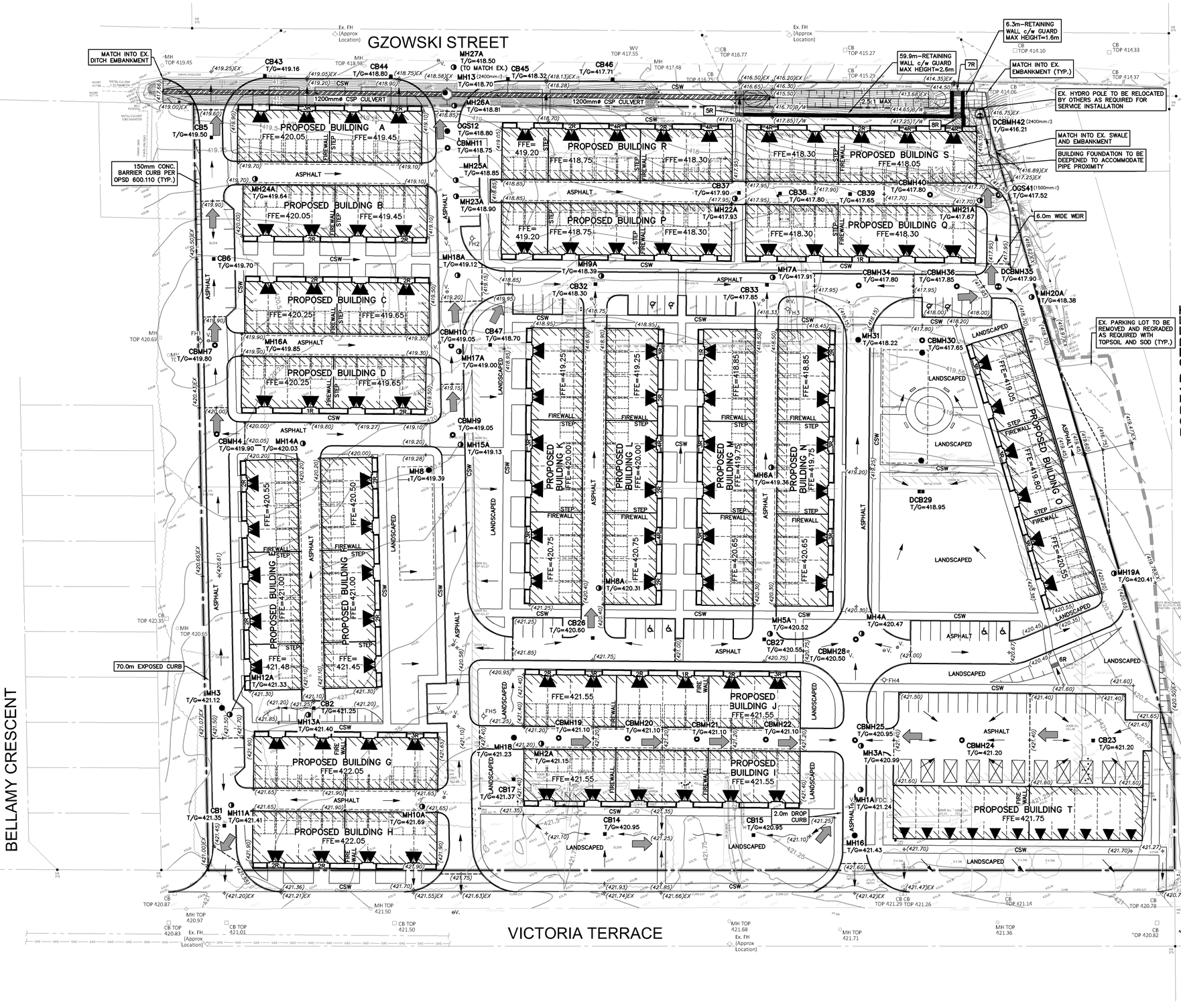
DRAWN BY: D.R.D. CHECKED BY: J.S.S. PROJECT No. 33471-24

Jun 19, 2024-9:53:42 AM
G:\FERGUS\055\AreaA\acad\P OF S PT PARK LTS 14-15 (33471-24-DUNPAR HOMES) UTM 2010.dwg

P:\P\63117_001\63117_001-C2

MTE FILE PATH:

August 14, 2025 – 8:57:02 AM – Plotted By: Emmett Johnstone

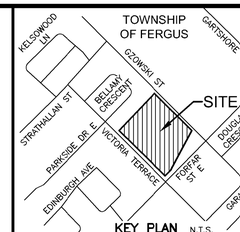


LEGEND OF EXISTING FEATURES

- SITE BOUNDARY
- EXISTING CONTOURS
- EXISTING CURB
- EXISTING BUILDING
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- EXISTING STORM SEWER

LEGEND OF PROPOSED FEATURES

- PROPOSED BUILDING
- MAN DOOR
- CONCRETE CURB
- EMBANKMENT (SLOPE AS NOTED)
- PROPOSED SPOT ELEVATIONS (EX =MAINTAIN EXISTING; T/G =TOP OF CASTING/GRATE; INV =INVERT ELEVATION; FFE =FINISHED FLOOR ELEVATION)
- DIRECTION OF DRAINAGE/SWALE
- DRAINAGE SPLIT (RIDGE)
- STORM STORAGE TANK
- LIMIT OF GRADING
- RETAINING WALL



GEODETIC BM ELEV. = m
REFER TO PLAN PREPARED BY VAN HARTEN.

SITE BENCHMARK ELEV. = m
REFER TO PLAN PREPARED BY VAN HARTEN.

NOTE TO CONTRACTOR :

DO NOT SCALE DRAWINGS.

CONTRACTORS MUST CHECK AND VERIFY ALL DIMENSIONS AND REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.

ALL DRAWINGS REMAIN THE PROPERTY OF THE ENGINEER AND SHALL NOT BE REPRODUCED OR REUSED WITHOUT THE ENGINEER'S WRITTEN PERMISSION.

THE OWNER/ARCHITECT/CONTRACTOR IS ADVISED THAT M.T.E. CONSULTANTS INC. CANNOT CERTIFY ANY COMPONENT OF THE SITE WORKS NOT INSPECTED DURING CONSTRUCTION. IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO NOTIFY M.T.E. CONSULTANTS INC. PRIOR TO COMMENCEMENT OF CONSTRUCTION TO ARRANGE FOR INSPECTION.

NOTE:

1. **PROPERTY LINE IS APPROXIMATE ONLY AND SHOULD NOT BE USED FOR DETERMINING SETBACKS OR LAYOUT.**
2. **EXISTING TOPOGRAPHICAL INFORMATION PROVIDED BY VAN HARTEN LAND SURVEYORS.**
3. **INVERTS DENOTED WITH "±" ARE TAKEN FROM AS-RECORDED PLAN AND PROFILE DRAWINGS COMPLETED BY TRITON ENGINEERING SERVICES LIMITED AND PROCTOR & REDFERN LIMITED AND ARE CONSIDERED APPROXIMATE ONLY. CONTRACTOR TO FIELD VERIFY AND REPORT ANY DISCREPANCIES TO ENGINEER.**
4. **THIS PLAN IS PART OF A SET OF PLANS WHICH COMPRISE OF THE FOLLOWING: C1.1, C2.1, C2.2 AND THE SWM REPORT.**

No.	REVISION	BY	YYYY-MM-DD
8.			
7.			
6.			
5.			
4.			
3.			
2.			
1.	ISSUED FOR OPA/ZBA	JWW	2025-08-07

MTE
Engineers, Scientists, Surveyors
519-743-6500

OWNER
2566201 ONTARIO INC.
105 SIX POINT ROAD ETOBICOKE

PROJECT
650 VICTORIA TERRACE
FERGUS ONTARIO

DRAWING
FUNCTIONAL SITE GRADING PLAN

Project Manager J.WIGGLESWORTH	Project No. 63117_001
Design By JHN	Checked By LEI
Drawn By GLC	Checked By JHN
Surveyed By OTHERS	Drawing No. C2.1
Date Jun.25/25	
Scale 1:500	Sheet 2 of 3

GZOWSKI STREET

BELLAMY CRESCENT

VICTORIA TERRACE

FORFAR STREET

PROPOSED BUILDING A FFE=420.05 FFE=419.45

PROPOSED BUILDING B FFE=420.05 FFE=419.45

PROPOSED BUILDING C FFE=420.25 FFE=419.65

PROPOSED BUILDING D FFE=420.25 FFE=419.65

PROPOSED BUILDING R FFE=418.75 FFE=418.30

PROPOSED BUILDING S FFE=418.30 FFE=418.05

PROPOSED BUILDING P FFE=418.75 FFE=418.30

PROPOSED BUILDING Q FFE=418.30 FFE=418.30

PROPOSED BUILDING K FFE=420.00

PROPOSED BUILDING L FFE=420.00

PROPOSED BUILDING M FFE=419.75

PROPOSED BUILDING N FFE=419.75

PROPOSED BUILDING O FFE=419.80 FFE=420.55

PROPOSED BUILDING E FFE=421.00 FFE=421.00

PROPOSED BUILDING G FFE=422.05

PROPOSED BUILDING H FFE=422.05

PROPOSED BUILDING J FFE=421.55

PROPOSED BUILDING I FFE=421.55

PROPOSED BUILDING T FFE=421.75

STORM STORAGE TANK

LANDSCAPED

1200mmø CSP CULVERT

2.5:1 MAX

LEGEND OF EXISTING FEATURES

- SITE BOUNDARY
- EXISTING CONTOURS
- EXISTING CURB
- EXISTING BUILDING
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- EXISTING STORM SEWER

LEGEND OF PROPOSED FEATURES

- PROPOSED BUILDING
- MAN DOOR
- CONCRETE CURB
- EMBANKMENT (SLOPE AS NOTED)
- SANITARY SEWER
- STORM SEWER
- WATERMAIN
- STORM STORAGE TANK
- RETAINING WALL

TOWNSHIP OF FERGUS

KELSWOOD DR

GARTSHORE ST

GZOWSKI ST

BELLAMY CRESCENT

STRATHALLAN ST

SITE

PARKSIDE DR E

VICTORIA TERRACE

DOUGLAS CRESCENT

FORFAR ST E

EDINBURGH AVE

GARAFRAXA ST E

ARLL ST E

KEY PLAN N.T.S.

GEODETIC BM ELEV. = m
REFER TO PLAN PREPARED BY VAN HARTEN.

SITE BENCHMARK ELEV. = m
REFER TO PLAN PREPARED BY VAN HARTEN.

NOTE TO CONTRACTOR :

DO NOT SCALE DRAWINGS.

CONTRACTORS MUST CHECK AND VERIFY ALL DIMENSIONS AND REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.

THE OWNER/ARCHITECT/CONTRACTOR IS ADVISED THAT M.T.E. CONSULTANTS INC. CANNOT CERTIFY ANY COMPONENT OF THE SITE WORKS NOT INSPECTED DURING CONSTRUCTION. IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO NOTIFY M.T.E. CONSULTANTS INC. PRIOR TO COMMENCEMENT OF CONSTRUCTION TO ARRANGE FOR INSPECTION.

NOTE:

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650 VICTORIA TERRACE

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DRAWING

FUNCTIONAL SITE SERVICING PLAN

Project Manager J.WIGGLESWORTH	Project No. 63117_001
Design By JHN	Checked By LEI
Drawn By GLC	Checked By JHN
Surveyed By OTHERS	Drawing No. C2.2
Date Jun.25/25	
Scale 1:500	Sheet 3 of 3