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Myers Automotive Body Shop
100 Nipissing Court

Servicing and Stormwater Management Report

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100 NIPISSING COURT
OTTAWA, ONTARIO

SERVICING AND STORMWATER MANAGEMENT REPORT

Prepared By:

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Issued: November 14, 2025

Novatech File: 124176
Report Ref: R-2025-054

November 14, 2025

City of Ottawa
Planning, Real Estate and Economic Development Department
Development Review – West Branch
110 Laurier Avenue West
Ottawa, ON
K1P 1J1

Attention: **Abi Dieme**

Reference: **Servicing and Stormwater Management Report**
Proposed Automobile Body Shop
100 Nipissing Court, Ottawa, Ontario
Novatech File No.: 124176

Enclosed is a copy of the 'Servicing and Stormwater Management Report' for the proposed automobile body shop located at 100 Nipissing Court, in the City of Ottawa. This report addresses the approach to site servicing and stormwater management and is submitted in support of the Site Plan Control application.

Please contact the undersigned, should you have any questions or require additional information.

Yours truly,

NOVATECH

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Senior Project Manager | Land Development Engineering

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1.0 INTRODUCTION

Novatech has been retained to complete the site servicing and stormwater management design for the proposed auto body shop located at 100 Nipissing Court, in the City of Ottawa. This report addresses the approach to servicing and stormwater management and is being submitted in support of the Site Plan Control application.

1.1 Site Description and Location

The subject site is part of the Kanata West Business Park and is located on the west side of Nipissing Court. The site is bordered by UPS warehouse to the west, Team Harding store to the south, and Campeau Drive to the north.

The site is relatively flat, and it is covered by natural green features including grass, bushes, and trees. The legal description of the subject site is designated as Block 1, Part of Lot 3, Concession 1 (Geographic Township of Huntley), City of Ottawa. **Figure 1** provides an aerial view of the site.

Figure 1 – Aerial View of the Subject Site

1.2 Pre-Consultation Information

A pre-consultation meeting was held with the City of Ottawa on June 23, 2025, at which time the client was advised of the general submission requirements. Refer to **Appendix A** for a summary of the pre-consultation meeting feedback from the City.

Based on a review of **O. Reg. 525/98: Approval Exemptions**, a Ministry of the Environment, Conservation and Parks (MECP) Environmental Compliance Approval (ECA) is anticipated to be required because the industrial (vehicle service) use on the site.

1.3 Proposed Development

The proposed development is a 2-storey automobile body shop, having an area of approximately 1,981 m^2 (21,329 ft^2). The development will include paved parking lot, access driveways, loading area, and gravel vehicle storage area. The site will have two access driveways off Campeau Drive and one access from Nipissing Court. Refer to **Appendix B** for the proposed Site Plan.

The proposed development will be serviced by connecting to the existing municipal watermain, sanitary and storm sewers in Nipissing Court.

1.4 Background Documents

The following documents were reviewed in preparation of the report:

- Geotechnical Investigation - Proposed Commercial Development, 100 Nipissing Court, prepared by Paterson Group (PG7332-1, November 10, 2025).
- Design Brief, Kanata West Business Park – Phase 4, 425 Huntmar Drive, prepared by IBI Group, (1428-5.2.2, April 2019, Revised July 2019).
- City of Ottawa Sewer Design Guidelines (October 2012)
- Ottawa Design Guidelines – Water Distribution (July 2010)
- Stormwater Management Planning and Design Manual, Ministry of the Environment, Ontario (March 2003)

1.5 Site Servicing

The objective of the site servicing design is to provide proper sewage outlets, a suitable domestic water supply and to ensure that appropriate fire protection is provided for the proposed development. The servicing criteria, the expected sewage flows, and the water demands are to conform to the City of Ottawa municipal design guidelines for sewer and water distribution systems. Refer to the subsequent sections of the report for further details.

The City of Ottawa Servicing Study Guidelines for Development Applications requires that a Development Servicing Study Checklist be included to confirm that each applicable item is deemed complete and ready for review by City of Ottawa Infrastructure Approvals. A completed checklist is enclosed in **Appendix F** of the report.

2.0 WATER SERVICING

2.1 Existing Water Servicing

There is a 203mm diameter PVC watermain in Campau Drive and a 254mm diameter PVC watermain in Nipissing Court in front of the site.

2.2 Proposed Water Servicing

The proposed development will be serviced by connecting the proposed 150mm diameter water service to the existing 254mm diameter watermain in Nipissing Court. A new on-site fire hydrant will be provided within 45m unobstructed path from the building connection location.

2.2.1 Domestic Water Demands

The water demands for the proposed development were calculated based on the following criteria from Appendix 4-A of the City of Ottawa Sewer Design Guidelines and the peaking factors as per the City of Ottawa Water Distribution Design Guidelines:

- Average Water Demand per Vehicle Serviced per Day = 40 L/vehicle/day
- Average Water Demand per Vehicle Washed per Day = 200 L/vehicle/day
- Average Staff Water Demand = 75 L/employee/day
- Commercial Peak Factors
    - Max Day = 1.5
    - Peak Hour = 1.8

The calculated water demands are summarized in **Table 2.1** below. Detailed calculations are included in **Appendix C**.

Table 2.1: Domestic Water Demand Summary

Proposed Development	Avg. Daily Demand (L/s)	Max. Daily Demand (L/s)	Peak Hour Demand (L/s)
Automobile Body Shop	0.20	0.30	0.54

2.2.2 Fire Protection System

The proposed residential building will be fully sprinklered. Water supply for fire protection will be provided from the proposed on-site hydrant located within 45m unobstructed path from the fire department siamese connection location.

The Fire Underwriters Survey (FUS) was used to estimate fire flow requirements for the proposed development. The fire flow calculations are based on the building information provided by the architect (Type II Non-combustible construction with protected vertical openings between floors, and fully sprinklered building).

The fire flow demand is estimated to be 67 L/s (4,000 L/min). The detailed FUS fire flow calculations are included in **Appendix C**.

2.2.3 Watermain Hydraulic Analysis

The above domestic water demands, and fire flow requirements were provided to the City of Ottawa. These values were used to generate the municipal watermain network boundary conditions. **Table 2.2** summarizes the information provided by the City.

Table 2.2: Boundary Conditions

Demand Scenario	Head (m)	Pressure (psi)
Maximum HGL	161.9	80.0
Peak Hour	156.0	71.6
Max Day + Fire Flow (67 L/s)	155.7	71.1

The following design criteria were taken from Section 4.2.2 – 'Watermain Pressure and Demand Objectives' of the City of Ottawa Design Guidelines for Water Distribution:

- Maximum system pressure is not to exceed 552 kPa (80 psi)
- Minimum system pressures are to be >276 kPa (40 psi) under Peak Hour demand
- Minimum system pressures are to be >140 kPa (20 psi) under Max Day + Fire Flow demand

The hydraulic model EPANET was used for the purpose of analysing the performance of the proposed watermain. The model is based on the watermain boundary conditions provided by the City of Ottawa at the intersection of Nipissing Court and Campeau Drive.

A schematic representation of the hydraulic network in enclosed in **Appendix C**. The schematic depicts the junction and pipe numbers used in the model.

The modelling highlights the system pressures during 1) Maximum Day + Fire Flow Demand, 2) Peak Hour Demand, and 3) Average Day Demand conditions. The domestic water demands are applied at the building service (J4) and the fire flow demands are applied at the proposed fire hydrant location (J3). The 200 Nipissing Court domestic water demands are applied at the dead end of the Nipissing Court watermain (J5)

Tables 2.3, **2.4**, and **2.5** summarize the demands and hydraulic model results under the various operating conditions. Refer to **Appendix C** for detailed modelling results.

Table 2.3: Hydraulic Model Results – Maximum Day + Fire Flow Demand

Operating Condition	Minimum Pressure
Max Day + Fire Flow Demand	447.1 kPa (64.9 psi)

Table 2.4: Hydraulic Model Results – Peak Hour Demand

Operating Condition	Minimum Pressure
Peak Hour Demand	486.6 kPa (70.6 psi)

Table 2.5: Hydraulic Model Results – Average Day Demand

Operating Condition	Maximum Pressure
Average Day Demand	555.3 kPa (80.0 psi)

Based on the preceding analysis, the proposed watermain will provide adequate system pressures to the proposed residential building.

3.0 SANITARY SERVICING

3.1 Existing Sanitary Sewer

There is a 250mm diameter PVC sanitary sewer in Campeau Drive and a 250mm diameter PVC sanitary sewer in Nipissing Court in front of the site.

3.2 Proposed Sanitary Services

The proposed development will be serviced by a 150mm diameter sanitary service connected to the existing 250mm sanitary sewer in Nipissing Court. A monitoring manhole will be provided near the property line as per the City of Ottawa standards.

3.2.1 Peak Sanitary Flows

The theoretical peak sanitary flow for the proposed warehouse was calculated based on the following criteria from the City of Ottawa Sewer Design guidelines.:

- Average Sewage Volume per Vehicle Serviced per Day = 40 L/vehicle/day
- Average Sewage Volume Demand per Vehicle Washed per Day = 200 L/vehicle/day
- Average Sewage Volume per Staff = 75 L/employee/day
- Commercial peak Factor = 1.5
- Infiltration Rate = 0.28 L/s/ha

The peak sanitary flow calculations are summarized below in **Table 3.1**. Detailed calculations are included in **Appendix D**.

Table 3.1: Peak Sanitary Flow Summary

Proposed Development	Peak Flow (L/s)	Infiltration Flow (L/s)	Total Peak Flow (L/s)
Automobile Body Shop	0.30	0.40	0.70

The proposed 150mm diameter sanitary service at minimum slope of 1.0% has a capacity of 15.9 L/s.

3.2.2 Kanata West Business Park Sanitary Flow Allotment

The Design Brief Kanata West Business Park – Phase 4, provides design criteria which was used to calculate the sanitary flow allotment for the subject site. The Nipissing Court sanitary sewer was sized based on the following design criteria provided in the design brief:

- Industrial Sanitary Flow = 35,000 L/ha/day
- Industrial Peaking Factor =6.25 (MOE Chart)
- Infiltration Rate = 0.33 L/s/ha

The peak sanitary flow from the 1.21ha site including infiltration was calculated to be 3.46 L/s.

A copy of the sanitary drainage area plan and sanitary sewer design sheet from the Kanata West Business Park design brief are provided in **Appendix D** for reference.

Based on the above, there is adequate capacity within the existing sanitary infrastructure to service the proposed development.

4.0 STORM SERVICING AND STORMWATER MANAGEMENT

4.1 Existing Conditions

The existing lands consist primarily of brush with some trees. The site is relatively flat, with a gentle slope towards the southeast corner. Under existing conditions, storm runoff is collected by temporary swales outletting to a ditch inlet catchbasin (DICB) at the southeast corner of the site. The DICB connects to the 1950mm diameter trunk sewer along Nipissing Court which ultimately outlets to the existing SWM facility to the south (Pond 6 West).

4.2 Stormwater Management Criteria

As described in the pre-consultation meeting feedback from the City provided in **Appendix A**, the stormwater management criteria for the subject site were set in the Kanata West Business Park Phase 4 Design Brief and are summarized below.

4.2.1 Stormwater Quality Control

An *Enhanced* level of stormwater quality control is provided through the receiving stormwater pond to the south (Pond 6 West in the design brief). The pond design was based on the site (area '100B' in the design brief) having an area of 1.21 ha with an overall imperviousness of 93% and a minor system capture rate of 259 L/s. Based on the current site plan, the proposed development will have an area of 1.21 ha with a lower overall imperviousness of 84%, and flows will be controlled to the specified 259 L/s. As such, Pond 6 West should be able to provide the required quality control for the proposed development.

4.2.2 Stormwater Quantity Control

The maximum minor system (5-year) capture rate identified in the design brief is 259 L/s with a runoff coefficient of 0.85 (drainage area 100B in the design brief). Flows exceeding the maximum allowable capture rate must be detained on site.

4.2.3 Water Balance

The site is located within the Carp River Subwatershed and is therefore subject to infiltration requirements. As per the Kanata West Business Park Phase 4 Design Brief, each commercial block is required to provide engineered infiltration measures to achieve the required infiltration rates. The report identifies a target infiltration rate of 70-100 mm/year and specifies that post-development infiltration rates must be increased by 25% to compensate for areas that couldn't provide infiltration (i.e. roadway corridors). Therefore, the infiltration target for the site is approximately 88-125 mm/year.

4.3 Proposed Conditions

The proposed development will be serviced by on-site storm sewer systems ultimately outletting to the existing 1950 mm diameter concrete storm sewer along Nipissing Court. The on-site storm sewer systems will include storm sewers ranging in size from 250 mm to 450 mm in diameter. On-site storage will be provided via surface ponding in the parking areas as well as StormTech chambers under the proposed parking near the outlet of the site. Refer to the General Plan of Services and the Grading Plan (Drawings 124176-GP and 124176-GR).

The proposed storm drainage and stormwater management design for the site is discussed in the following sections of the report. Refer to the Post-Development Storm Drainage Area Plan (Drawing 124176-STM).

4.3.1 Building Areas 'R-01' and 'R-02'

Storm runoff from the building roof will sheet drain to downspouts along the southwest and northeast sides of the building, which will connect to a separate storm sewer system. The storm sewers will outlet to a StormTech chamber system which will provide infiltration of clean runoff from the building roof only and reduce runoff volumes to the existing downstream storm sewer and SWM facility.

4.3.2 Northwest Areas 'A-10' to 'A-13'

Storm runoff from the northwest parking areas will be captured by several catchbasins and routed around the north side of the building to the storm outlet. There will be an inlet control device (ICD) in CBMH-09 to control the flows from these areas. Ponding will occur at the catchbasins upstream of the ICD.

4.3.3 Southeast Areas 'A-01' to 'A-06'

Storm runoff from the southeast areas including the gravel storage area will be captured by several catchbasins and routed around the northeast side of the building to the storm outlet. There will be an ICD in CBMH-03 to control the flows from these areas. Ponding will occur at the catchbasins upstream of the ICD.

4.3.4 Northeast Areas 'A-07' to 'A-09'

Storm runoff from the northeast parking areas will be captured by several catchbasins and routed around the northeast side of the building to the storm outlet. These areas will flow uncontrolled to the storm outlet. As such, ponding will not occur at the catchbasins in these areas.

4.4 Hydrologic & Hydraulic Modeling

The performance of the proposed storm drainage system for the site was evaluated using the PCSWMM hydrologic / hydraulic model. The PCSWMM model schematics and 100-year model output data are provided in **Appendix E**.

4.4.1 Design Storms

The hydrologic analysis was completed using the following synthetic design storms which were used in the design and evaluation of the storm drainage and stormwater management system for the Kanata West Business Park – Phase 4:

- 3-hour Chicago storm distribution
- 12-hour SCS Type II storm distribution

The return periods analyzed include the 5 and 100-year storm events. The IDF parameters used to generate the design storms were taken from the City of Ottawa Sewer Design Guidelines.

The 3-hour Chicago storm distribution was used for the design of the storm drainage system as the allowable release rate taken from the Kanata West Business Park – Phase 4 Design Brief is based on this distribution. However, the storage requirements were analyzed using both the 3-hour Chicago and 12-hour SCS Type II storms as the 12-hour SCS Type II distribution generated the highest runoff volumes.

The proposed drainage system was also stress tested using a 100-year+20% design storm. This design storm has a 20% higher intensity and total volume compared to the 100-year event.

4.4.2 Model Development

A post-development model has been developed for the proposed site. The results of the modeling were used to ensure that the proposed storm drainage system adheres to the allowable release rate and resulting storage requirements.

Storm Drainage Areas

The site has been divided into subcatchments based on the proposed grading and storm drainage system. Refer to the Post-Development Storm Drainage Area Plan (Drawing 124176-STM).

Subcatchment Model Parameters

Hydrologic modeling parameters for each subcatchment were developed based on the proposed land use and grading. A summary of the model parameters is provided in **Table 4.1**.

Table 4.1: Subcatchment Parameters

Area ID	Area (ha)	Runoff Coefficient (C)	Percent Impervious (%)	No Depression (%)	Equivalent Width (m)	Average Slope (%)
A-01	0.075	0.60	57%	0%	35	2.2%
A-02	0.100	0.60	57%	0%	43	2.0%
A-03	0.127	0.52	46%	0%	46	1.9%
A-04	0.055	0.66	66%	0%	34	2.2%
A-05	0.110	0.81	87%	0%	48	2.1%
A-06	0.109	0.70	71%	0%	35	1.7%
A-07	0.046	0.90	100%	0%	19	1.5%
A-08	0.076	0.20	0%	0%	17	1.0%
A-09	0.065	0.90	100%	0%	25	1.7%
A-10	0.065	0.78	83%	0%	29	1.9%
A-11	0.094	0.73	76%	0%	33	1.9%
A-12	0.051	0.71	73%	0%	27	1.4%
A-13	0.068	0.65	64%	0%	24	1.2%
R-01	0.089	0.90	100%	100%	58	2.0%
R-02	0.085	0.90	100%	100%	55	2.0%

Infiltration

Infiltration losses for all subcatchments were modeled using Horton's infiltration equation, which defines the infiltration capacity of soil over the duration of a precipitation event using a decay function that ranges from an initial maximum infiltration rate to a minimum rate as the storm progresses. The following values from the City of Ottawa Sewer Design Guidelines were used for all catchments.

Horton's Equation:	Initial infiltration rate:	f_o = 76.2 mm/hr
$f(t) = f_c + (f_o - f_c)e^{-k(t)}$	Final infiltration rate:	f_c = 13.2 mm/hr
	Decay Coefficient:	k = 4.14/hr

Depression Storage

The following values for depression storage from the City of Ottawa Sewer Design Guidelines were used for all subcatchments.

- Depression Storage (pervious areas): 4.67 mm
- Depression Storage (impervious areas): 1.57 mm

The building roof was assumed to provide no depression storage (100% zero impervious parameter in PCSWMM).

Impervious Values

Runoff coefficients for each subcatchment were determined based on the existing and proposed land use. Refer to the Post-Development Storm Drainage Area Plan (Drawing 124176-STM) for details. Percent impervious values were calculated using the following equation from the City of Ottawa Sewer Design Guidelines:

%imp = (C – 0.20) / 0.70

Downstream Boundary Conditions

The Kanata West Business Park – Phase 4 Design Brief provides the 100-year HGL elevations in the downstream sewer along Nipissing Court. The HGL elevations are based on the SWMHYMO and XPSWMM models of the Kanata West Business Park developed by IBI Group. The 100-year HGL at the manhole immediately upstream of the site's storm outlet location (MH 120) is 103.12m based on the 3-hour Chicago distribution (provided in Table 4.6 of the design brief). The model was run using this elevation as an outfall boundary condition for the 100-year storm event. For the 5-year storm event, the model was run using a "normal" outfall condition.

4.4.3 Model Results

The PCSWMM model was used to ensure that peak flows are controlled to the allowable release rate and that flows exceeding the maximum allowable capture rate are detained on site.

ICDs & Storage Requirements

Table 4.2 summarizes the required ICD sizing and surface storage to meet the allowable release rate for the site. As shown in the table, sufficient surface storage is provided on site.

Table 4.2: ICDs & Storage Requirements

Return Period	ICD	Peak Flow (L/s)	HGL (m)	Required Storage Volume (m^3)	Max. Storage Provided (m^3)
Northwest					
5-Year	108mm Orifice	34	104.67 – 104.75	5	68
100-Year		40	105.86 – 105.92	27	
Southeast					
5-Year	152mm Orifice	67	105.27 – 105.35	9	179
100-Year		75	105.77 – 105.84	77	

Peak Flows

As shown in **Table 4.3**, peak flows from the site will be controlled to the allowable release rate during all storms up to and including the 100-year event. The results are based on the 3-hour Chicago storm distribution.

Table 4.3: Summary of Peak Flows

Outlet	Location	Catchment Areas	Peak Flow (L/s)	
			5-year	100-year
Nipissing Court Storm Sewer	Northwest	‘A-10’ to ‘A-13’	34	40
	Southeast	‘A-01’ to ‘A-06’	67	75
	Northeast*	‘A-07’ to ‘A-09’	33	64
	Building**	‘R-01’ to ‘R-02’	6	82
	Total* **		**130**	**246**
	Allowable		**259**	**259**

**Peak runoff from uncontrolled areas*
***Outflows from StormTech chamber system*
****Max. flow through 450mm diameter outlet pipe (accounts for timing of peak flows and routing through storm sewer system)*

Ponding at Catchbasins

Table 4.4 summarizes the ponding depths and elevations at each catchbasin. As shown in the table, there would be no ponding during the 5-year event, and ponding during the 100-year event will be detained on site as the actual ponding depths do not exceed the maximum static ponding depths.

Table 4.4: Ponding at Catchbasins

CB	T/G (m)	Max. Static Ponding (Spill Depth)		Ponding Elevation (m)			Ponding Depth (m)		
		Elev. (m)	Depth (m)	5-yr	100-yr	Stress Test	5-yr	100-yr	Stress Test
CB-01	105.76	105.97	0.21	104.75	105.92	105.97	0.00	0.16	0.21
CB-05	105.67	105.97	0.30	105.35	105.84	105.88	0.00	0.17	0.21
CB-12	105.67	105.93	0.26	105.32	105.82	105.85	0.00	0.15	0.18
CB-13	105.60	105.90	0.30	103.88	103.95	104.12	0.00	0.00	0.00
CBMH-02	105.67	105.90	0.23	105.32	105.81	105.85	0.00	0.14	0.18
CBMH-03	105.60	105.87	0.27	105.27	105.77	105.81	0.00	0.17	0.21
CBMH-04	105.75	105.90	0.15	103.25	104.02	104.19	0.00	0.00	0.00
CBMH-06	105.75	105.95	0.20	102.64	103.94	104.11	0.00	0.00	0.00
CBMH-07	105.71	105.99	0.28	104.75	105.91	105.96	0.00	0.20	0.25
CBMH-08	105.85	106.00	0.15	104.70	105.88	105.93	0.00	0.03	0.08
CBMH-09	105.79	105.97	0.18	104.67	105.86	105.90	0.00	0.07	0.11
CBMH-10	105.67	105.97	0.30	105.35	105.84	105.88	0.00	0.17	0.21
CBMH-11	105.67	105.97	0.30	105.31	105.81	105.85	0.00	0.14	0.18

<u>*Stress Test*</u>

Table 4.4 also provides the estimated ponding elevations for the stress test event. The stress test event represents a 20% increase (rainfall intensity and total precipitation) in the 100-year design event. The model results indicate that ponding during the stress test event would also be detained on site as the actual ponding depths do not exceed the maximum static ponding depths.

While the model results indicate no major overland flow, the site has been graded so that any ponding exceeding the maximum allowable depths would cascade off-site to the road entrance from Nipissing Court, ultimately discharging to the Nipissing Court storm sewer via the existing catchbasins.

4.5 Water Balance

The site is located within the Carp River Subwatershed and is therefore subject to infiltration requirements. As per the Kanata West Business Park – Phase 4 Design Brief, each commercial block is required to provide engineered infiltration measures to achieve the required infiltration rates. The report identifies a target infiltration rate of 70-100 mm/year and specifies that post-development infiltration rates must be increased by 25% to compensate for areas that couldn't provide infiltration (i.e. roadway corridors). Therefore, the infiltration target for the site is approximately 88-125 mm/year.

4.5.1 Methodology

The water balance analysis was completed using the Thornthwaite-Mather (1957) methodology. Post-development annual infiltration values were estimated based on proposed site conditions (land use, grading, soil characteristics, etc.). Refer to the model description provided in **Appendix E** for further details.

4.5.2 Post-Development Conditions

The proposed development is a 2-storey automobile body shop. The development will include paved parking lots, access driveways, loading areas, and a gravel vehicle storage area. Refer to **Appendix B** for the proposed Site Plan. The proposed development area is 1.21 ha at 84% imperviousness.

The water balance results indicate that, without engineered infiltration measures, the post-development infiltration would be 45 mm/year (538 m^3/year). However, with the proposed engineered infiltration measures, the post-development infiltration would be 98 mm/year (1,180 m^3/year), which meets the infiltration target. Refer to the detailed water balance calculations provided in **Appendix E**.

4.5.3 Engineered Infiltration Measures

A StormTech chamber system is proposed to be implemented to meet the infiltration target. As storm runoff from the building roof would be relatively clean, the StormTech chamber system has been designed to capture runoff from the building roof only, to mitigate the risk of groundwater contamination. To meet the target, it is required to infiltrate the first 30 mm of runoff from the roof, which translates to a total required infiltration storage volume of 52 m^3. The calculated storage requirement is based on the conservative assumption that infiltration via the engineered systems would only occur from May through November. There may be some additional infiltration during the colder months as the base of the chamber system would be well below the frost depth. Refer to the detailed water balance calculations provided in **Appendix E**.

The StormTech chamber system has been sized to provide approximately 54 m^3 of storage to meet the infiltration target. The bottom of the system (bottom of stone) has been set at an elevation of 103.16 m. Refer to the StormTech chamber system specifications provided in **Appendix E**. The geotechnical investigations indicate that bedrock is approximately 8 mbgs. Therefore, since the existing ground elevation in this location is approximately 105.10 m, the base of the infiltration system would have significant clearance from bedrock. The base of the system would also have 1m of freeboard from the groundwater level of 102.16 m documented in Table 2 of the Geotechnical Investigation report.

5.0 GEOTECHNICAL INVESTIGATIONS

A geotechnical Investigation report has been prepared by Patterson Group for the proposed development. Refer to the Geotechnical Investigation - Proposed Commercial Development, 100 Nipissing Court, (PG7332-1, November 10, 2025).

Clay seals will be provided in service trenches at selected spacing as per the geotechnical report recommendations.

6.0 EROSION AND SEDIMENT CONTROL

Temporary erosion and sediment control measures will be implemented on-site during construction in accordance with the Best Management Practices for Erosion and Sediment Control. This includes the following temporary measures:

- Filter socks (catch basin inserts) will be placed in existing and proposed catch basins and catch basin manholes, and will remain in place until vegetation has been established and construction is completed,
- Silt fencing will be placed along the surrounding construction limits,
- Mud mat will be installed at the site entrance,
- The contractor will be required to perform regular street sweeping and cleaning as required, to suppress dust and to provide safe and clean roadways adjacent to the construction site.
- Existing storm pond slope will not be disturbed in any way during construction
- No fill will be placed near the crest of slope

Erosion and sediment control measures should be inspected daily and after every rain event to determine maintenance, repair, or replacement requirements. These measures will be implemented prior to the commencement of construction and maintained in good order until vegetation has been established.

7.0 CONCLUSIONS AND RECOMMENDATIONS

This report has been prepared in support of the Site Plan Control applications for the proposed development. The conclusions are as follows:

Watermain

- The proposed development will be serviced by 150mm diameter water service connected to the existing 254mm diameter watermain in Nipissing Court.

- The water supply for fire protection will be provided from the new private fire hydrant located within 45m from the building siamese connection.
- The existing municipal watermain will provide adequate water supply and system pressures to the proposed development.

Sanitary Servicing

- The proposed development will be serviced by 150mm diameter sanitary service connected to the existing 250mm diameter sanitary sewer in Nipissing Court. The Nipissing Court sanitary sewer has been sized to service the subject site.
- There is adequate capacity within the proposed sanitary service and existing sanitary infrastructure to service the proposed development.

Stormwater Management

The following provides a summary of the storm sewer and stormwater management system:

- An *Enhanced* level of stormwater quality control is provided through the receiving stormwater pond to the south (Pond 6 West).
- Peak flows from the site to the Nipissing Court storm sewer will be controlled to the allowable 259 L/s during all storms up to and including the 100-year event using ICDs.
- Flows exceeding the allowable release rate will be stored within the surface ponding areas at the catchbasins.
- There will be no surface ponding during the 5-year storm event, and ponding will be detained on site during all storms up to and including the stress test event.
- The site has been graded to provide major overland flow routes to Nipissing Court.
- The StormTech chamber system has been designed to provide sufficient storage to meet the infiltration target.

It is recommended that the proposed site servicing and stormwater management design be approved for implementation.

NOVATECH

Prepared by:

Miroslav Savic, P.Eng.
Senior Project Manager
Land Development Engineering

Prepared by:

Olivia Renn, P.Eng.
Project Engineer
Water Resources

Reviewed by:

J. Lee Sheets, C.E.T.
Director
Land Development & Public Sector Infrastructure

APPENDIX A

Correspondence

File No.: PC2025-0171

June 27, 2025

Adam Thompson
Novatech Engineering
Via email: a.thompson@novatech-eng.com

Subject: **Pre-Consultation: Meeting Feedback**
Proposed Site Plan Control Application –100 Nipissing Court

Please find below information regarding next steps as well as consolidated comments from the above-noted pre-consultation meeting held on June 23, 2025.

Pre-Consultation Preliminary Assessment

1 ☐	2 ☐	3 ☒	4 ☐	5 ☐

One (1) indicates that considerable major revisions are required while five (5) suggests that the proposal appears to meet the City's key land use policies and guidelines. This assessment is purely advisory and does not consider technical aspects of the proposal or in any way guarantee application approval.

Next Steps

1. A review of the proposal and materials submitted for the above-noted pre-consultation has been undertaken. For your next submission, please submit the required Application Form, together with the necessary studies and/or plans to planningcirculations@ottawa.ca, copy (cc:) to the file lead and planning support.

2. In your subsequent pre-consultation or application submission, please ensure that all comments or issues detailed herein are addressed. A detailed cover letter stating how each issue has been addressed is requested with the submission materials. Please coordinate the numbering of your responses within the cover letter with the comment number(s) herein.

3. Please note, if your development proposal changes significantly in scope, design, or density it is recommended that a subsequent pre-consultation application be submitted.

Supporting Information and Material Requirements

1. The attached **Study and Plan Identification List** outlines the information and material that has been identified, during this phase of pre-consultation, as either required (R) or advised (A) as part of a future complete application submission.

    a. The required plans and studies must meet the City's Terms of Reference (ToR) and/or Guidelines, as available on Ottawa.ca. These ToR and Guidelines outline the specific requirements that must be met for each plan or study to be deemed adequate.

Consultation with Technical Agencies

1. You are encouraged to consult with technical agencies early in the development process and throughout the development of your project concept. A list of technical agencies and their contact information is enclosed.

Planning

Comments:

1. Please note that the following Official Plan policies apply to the site:

    a. The site is designated as Industrial and Logistics per Schedule B5 – Suburban West Transect.

    b. The site located at the intersection of Campeau Drive and Nipissing Court which are designated as collector Future and Local Existing respectively per Schedule C4 – Urban Road Network.

    c. The site is located within 200 metres of lands subject to the Bedrock Resource Overlay on Schedule B9 – Rural Transect.

    d. The site is subject to Area Specific Policy 2 – Kanata West, per Annex 5. Refer to Volume 2C of the Official Plan for all applicable policies.

2. Staff have no concerns with the proposed land use. “Automobile body shop” is a permitted use on the site. Further, auto service and body shops are permitted in the Industrial and Logistics designations per Policy 2(c) of Section 6.4.1 of the Official Plan.

3. Proximity to Bedrock Resource Area

    a. Mineral Aggregate Impact Assessment will be required as part of the submission package. Policy 3 of Section 5.6.3.2 of the Official Plan directs new development shall not be approved within 500 metres of lands within the Bedrock Resource Area Overlay unless it can be demonstrated through a mineral impact assessment that such development shall not conflict with current or future mineral aggregate extraction. Further, Policy 4 of Section 5.6.3.2 directs that new development may be approved within 500 metres of an existing licensed bedrock quarry if it can be demonstrated that the existing mineral aggregate operation, and potential future expansion of the operation in depth or extent, will not be affected by the development.

i. It is acknowledged that the proposed land use is not considered a sensitive use. Staff have reached out to the Policy team to confirm whether the required Mineral Aggregate Impact Assesment can be scoped down or waived.

4. Holding Symbol

   a. Please note that the site is subject to a holding symbol, which must be lifted prior to site plan approval. Staff have confirmed with the Zoning Interpretation team that per Exception 2166, all uses are prohibited on the site until the holding symbol is lifted.

   b. The criteria to lift the holding symbol is the following (can be found in the Exception 2166):

      i. The hold symbol may not be removed until such time as a vibration and noise study is submitted which demonstrates no impact to the adjacent quarries at 2448 Carp Road and 421 Huntmar Drive, to the satisfaction of the General Manager of Planning Growth Management Department

      ii. Partial removal of the "h" may be considered to provide for phased development. The submission and approval of an application to lift the holding provisions on a phased basis may be considered provided the requirements for that development phase satisfy the requirements for the lifting of the holding zone specified above.

   c. An application for Lifting of a Holding Symbol will be required prior to registration of Site Plan. More information on this process can be found here.

   d. As part of the application to Lift a Holding Symbol, please submit a site plan, planning rationale, plan of survey, and any other materials required to demonstrate the requirements of the hold have been satisfied.

5. Lot lines and Setbacks

   a. It appears that the lot lines may be mislabelled on the provided plan. Please refer to the below zoning definitions when determining lot lines:

      i. front lot line which means that lot line, not including a corner lot line, which abuts a street for the shortest distance, whether or not that line jogs or curves, and extending between the side lot lines, more or less for the full width of the lot, and where more than one such lot line exists, means a lot line which abuts the same street as the front lot line of an abutting lot; (By-law 2008-462)

ii. rear lot line which means the lot line furthest from and opposite the front lot line but if there is no such line, that point furthest from and opposite the front lot line; and

iii. side lot line which means a lot line other than a front lot line, a corner lot line, or a rear lot line. (By-law 2008-462)

iv. corner lot line which means that lot line that abuts a street and is also one line of a conveyed corner sight triangle, or a sight triangle included as part of a road on a plan of subdivision. (ligne de lot) (By-law 2008-462)

b. For the purposes of applying zoning, the lot lines are as follows:

i. Front Lot Line – Lot line abutting Campeau Drive

ii. Rear Lot Line – Lot line abutting 200 Nipissing Court

iii. Side Lot Line – Lot line abutting Nipissing Court

iv. Interior Lot Line – Lot line abutting 8825 Campeau Drive

c. Update the zoning chart and plan to reflect correct lot lines. Please also update the “provided” column to reflect what is actually being provided (i.e., measurement from the lot line to the building).

6. Parking Requirements

a. The following parking rate for Area C on Schedule 1A apply to the site, per Table 101

i. Automobile Body Shop – 3 parking spots per service bay.

b. Please confirm the number of service bays proposed for the site.

7. Bicycle Parking Requirements

a. The following bicycle parking rates apply to the site.

i. Office - 1 spot per 250m^2 of gross floor area.

ii. All other non-residential uses – 1 per 1500m^2 of gross floor area.

8. Loading Space Requirements

a. Refer to Section 113 of the Zoning By-law for loading space rates and provisions.

b. Per Table 113A(d), one loading space is required. Please note that where a loading space is required by the Zoning By-law, it must comply with the regulations set out in Table 113B, per Section 113(5).

9. Urban Exception 2166 requires any building or accessory building to be located a minimum of 100 metres away from the unopened road allowance adjacent the quarries at 2448 Carp Road and 421 Huntmar Drive. Please ensure that the site's compliance with the 100-metre setback is reflected in your Zoning Confirmation Report.

10. "Storage + Additional Parking"

    a. It is understood from the meeting that this area will be used to store materials related to the operations of the automobilie bodyshop, function like a storage yard, and the surface will be gravel.

    b. Staff have no concerns as "outdoor storage" is permitted on the site, per Exception 2166.

    c. Please consider opportunities to create a positive interface between the proposed outdoor storage area and Nipissing Court through tree planting, landscaping, screening, etc..

    d. Please note that if this area were to become formal vehicle parking in the future, the applicable provisions of the Zoning By-law would apply

11. Show the distances from the lot lines to the proposed building on the plan.

12. Confirm the proposed building height. Please note that the maximum permitted building height is 22m, per Table 205(h)(ii).

13. Confirm the lot coverage of the proposed development. Please note that the maximum permitted lot coverage is 55%, per Table 205(c).

14. Confirm the proposed floor space index (i.e., the ratio of the gross floor area of a building to the total area of the lot on which the building is located). Please note that the maximum permitted floor space index is 2, per Table 205 (g).

15. Please note that the minimum required aisle width is 6.7m, per Section 107(c)(i). It appears that 6.7m is being provided, but the wrong requirement is identified in the zoning chart.

16. Provide further information on how waste/recycling will be handled on site. If being stored outside, please refer to Section 110(3) of the Zoning By-law for provisions related to outdoor refuse and refuse loading areas contained within or accessed via a parking lot. Show location of the waste enclosure on the plan and provide a design detail.

17. Consider opportunities for increased landscaping in the parking lot. Include regular spacing of tree islands that support the growth of mature shade trees.

18. Consider opportunities for tree planting along abutting streets.

19. Staff are supportive of the proposed electric vehicle charging spaces.

20. Provide safe, direct and well-defined pedestrian and cycling connections between the proposed building and abutting public streets. Especially the existing sidewalk along Campeau Drive. No direct pedestrian connections currently provided.

21. Required Applications

    a. Site Plan (Standard). More infromation can be found here.

    b. Lifting of a Holding Symbol. More infromation can be found here.

Feel free to contact Colette Gorni, Planner II, for follow-up questions.

Urban Design

Comments:

22. Please ensure that trees are provided within the right of way.

23. Provide significant screening planting along Nipissing Court and along the Campeau Parking. Please look for areas to provide clusters of evergreen trees

24. Provide a walkway connection between the building and Campeau Drive.

25. Please ensure that the building engages with Campeau Drvive. Please ensure that this façade has windows and a clearly marked building entrance.

26. Required Submissions:

    a. Site Plan

    b. Landscape Plan

    c. Elevations

Feel free to contact Lisa Stern, Planner III, for follow-up questions.

Engineering

Comments:

Storm Design

27. The stormwater criteria for the subject site were set in the Kanata West Business Park Phase 4 Design Brief. Please refer to:

    a. Design Brief Kanata West Business Park – Phase 4, 425 Huntmar Drive, prepared by IBI Group, dated April 2019, revised July 2019

    b. Strom Drainage Area Plan, Drawing 500, prepared by IBI Group, revision 14, dated July 25, 2019

28. The maximum minor system (5-year) capture rate identified in the design brief is 259 L/s with a runoff coefficient of 0.85 (drainage area 100B)

29. Flows exceeding the maximum allowable capture rate must be detained on site

30. Quality control is provided through the receiving stormwater pond (Pond 6 West in the subdivision report)

31. The site is located within the Carp River subwatershed where proposed developments are subject to infiltration requirements. As per the subdivision design brief, each commercial block is required to provide engineered infiltration measures to achieve the required infiltrations rates. The report identifies a target infiltration rate of 70-100mm/year. It also specifies that post-development infiltration rates must be increased by 25% to compensate for areas that couldn't provide infiltration (i.e. roadway corridors)

Water Design

32. A water boundary condition request should be made for this development. Please provide the following information including supporting calculations:

    a. Location of Service

    b. Type of development

    c. Required fire flow

    d. Average daily demand: ___ l/s.

    e. Maximum daily demand: ___l/s.

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

33. Submission to include watermain system analysis demonstrating adequate pressure as per section 4.2.2 of the Water Distribution Guidelines.

34. Demonstrate adequate hydrant coverage for fire protection. Please review Technical Bulletin ISTB-2018-02, Appendix I table 1 – maximum flow to be considered from a given hydrant

35. Any proposed emergency route (to be satisfactory to Fire Services).

Sanitary Design

36. The allowable discharge rate for the subject site was set in the Kanata West Business Park Phase 4 Design Brief. Please refer to:

    a. Design Brief Kanata West Business Park – Phase 4, 425 Huntmar Drive, prepared by IBI Group, dated April 2019, revised July 2019

    b. Sanitary Drainage Area Plan, Drawing 501, prepared by IBI Group, revision 14, dated July 25, 2019

37. Please apply the wastewater design flow parameters in Technical Bulletin PIEDTB-2018-01.

Additional Comments

38. Sensitive Marine Clay (SMC) is widely found across Ottawa- geotechnical reports should include Atterberg Limits, consolidation testing, sensitivity values, and vane

39. Any existing easement identified should be shown on all plans

Feel free to contact Abi Dieme, Project Manager, for follow-up questions.

Transportation

Comments:

40. A Transportation Impact Assessment (TIA) is not required.

41. Complete and submit the Transportation Demand Management Measures Checklist and the Transportation Demand Management Supportive Development Design and Infrastructure Checklist in support of the application.

42. Ensure that the development proposal complies with the Right-of-Way protection requirements of the Official Plan's Schedule C16.

43. Corner triangles are required (measure on the property line/ROW protected line; no structure above or below this triangle), Collector to local: A 3 metre x 9 metre triangles, with the longer portion located on the collector road segment. (Note

Campeau is identified as a collector in the OP, and is erroneously shown as a local on GeoOttawa.)

44. Clear throat requirements for <10,000 light industrial development is 8m off a collector road. Ensure this length is provided. The clear throat length is measured from the ends of the driveway curb return radii at the roadway and the point of first conflict on-site. Note the minimum throat length provided must be maintained with the future ROW protection (as applicable).

45. Corner clearances should follow minimum distances set out within TAC Figure 8.8.2.

46. As the proposed site is commercial/industrial and for general public use, AODA legislation applies.

    a. Ensure all crosswalks located internally on the site provide a TWSI at the depressed curb, per requirements of the Integrated Accessibility Standards Regulation under the AODA.

    b. Clearly define accessible parking stalls and ensure they meet AODA standards (include an access aisle next to the parking stall and a pedestrian curb ramp at the end of the access aisle, as required).

    c. Please consider using the City's Accessibility Design Standards, which provide a summary of AODA requirements.

47. On site plan:

    a. Ensure site access meets the City's Private Approach Bylaw, including, but not limited to the following:

        i. For corner lots, "on a corner lot or a lot abutting on more than one road allowance, the minimum distance between the nearest limit of a private approach and an intersecting street line or its extension shall not be less than 6 metres." The "street line" means the lot line that abuts a public street;

        ii. Include dimensions of access width;

        iii. Two (2) two-way accesses are permitted along either frontage.

    b. Show all details of the roads abutting the site; include such items as pavement markings, signage, accesses, on-street parking, and/or sidewalks.

    c. Turning movement diagrams required for all accesses showing the largest vehicle to access/egress the site.

d. Turning movement diagrams required for internal movements (loading areas, garbage).

e. Show all curb radii measurements; ensure that all curb radii are reduced as much as possible and fall within TAC guidelines (Figure 8.5.1).

f. Show dimensions for site elements (i.e. lane/aisle widths, access width and throat length, parking stalls, sidewalks, pedestrian pathways, etc.)

g. Provide sidewalk along Nipissing Court, as per City Standards. Sidewalk is to be continuous across access as per City Specification 7.1.

h. Extend internal walkways beyond the limits of the subject lands to connect to existing or proposed public sidewalks.

48. A Surface Transportation Noise study is not required.

Feel free to contact Josiane Gervais, Transportation Project Manager, for follow-up questions.

Environment

Comments:

49. There are no triggers for an Environmental Impact Study.

50. Bird-Safe Design Guidelines - Please review and incorporate bird safe design elements, where feasible. Some of the risk factors include glass and related design traps such as corner glass and fly-through conditions, ventilation grates and open pipes, landscaping, light pollution. More guidance and solutions are available in the guidelines which can be found here: https://documents.ottawa.ca/sites/documents/files/birdsafedesign_guidelines_en.pdf

51. Please consider if there are features that can be added reduce the urban heat island effect (see OP 10.3). For example, this impact can be reduced by adding large canopy trees, green roofs or vegetation walls, or incorporating building with low heat absorbing materials.

Feel free to contact Matthew Hayley, Environmental Planner, for follow-up questions.

Forestry

Comments:

52. Several City trees are present on the Campeau frontage. A Tree Conservation Report is required, in accordance with Schedule E of the Tree Protection By-law. Ownership of all trees on the subject site and with Critical Root Zones extending

onto the subject site must be determined, and plans must show how they will be protected from proposed works.

53. The locations of vehicle entrances, curbs, buildings and structures should account for the retention and protection of trees on and adjacent to the site, particularly on the Campeau frontage.

54. A permit is required prior to removal of any protected trees on site. The tree permit will be released upon site plan approval. Monetary compensation for City trees must be paid before the permit is issued. Please contact the planner associated with the file or the Planning Forester, Nancy Young (Nancy.young@ottawa.ca) for information on obtaining the tree permit.

55. To ensure that no harm is caused to breeding birds, tree removal and vegetation clearing should be avoided during the migratory bird season (April 15 – August 15) as specified by The City of Ottawa's Environmental Impact Study Guidelines.

Landscape Plan

56. A Landscape Plan is required with this application and must address all requirements within the Landscape Plan Terms of Reference https://documents.ottawa.ca/sites/documents/files/landscape_tor_en.pdf , including the projection of canopy cover toward the target of 40%, and confirmation of adequate soil volumes to support any proposed trees.

57. Please confirm whether a geotechnical report has been prepared to determine whether Sensitive Marine Clay soils exist on site. If SMC soils are present, the Landscape Plan must address the recommended setbacks and other provisions in accordance with the Tree Planting in areas of Sensitive Marine Clay Soils policy.

58. Tree planting should be prioritized within the ROW or frontages, to provide screening of the parking and storage areas and to improve the streetscape. Trees should also be provided within the site at a recommended rate of 1 tree/5 parking spaces to mitigate the urban heat island effect of paved areas.

59. The Landscape Plan must show the setback distances between proposed and existing trees to buildings and underground structures to ensure that both the above and below-ground space proposed is sufficient for tree planting in the Right of Way and other landscaped areas.

60. The Official Plan section 4.8.2, sub 3 provides the following direction related to tree planting related to site plans:

    a. Preserve and provide space for mature, healthy trees on private and public property, including the provision of adequate volumes of high-quality soil as recommended by a Landscape Architect;

b. On urban properties subject to site plan control or community planning permits, development shall create tree planting areas within the site and in the adjacent boulevard, as applicable, that meet the soil volume requirements in any applicable City standards or best management practices or in accordance with the recommendation of a Landscape Architect;

Feel free to contact, Nancy Young, Forester, for follow-up questions.

Parkland

Comments:

61. Parkland Dedication requirements, determined in accordance with By-law No. 2022-280, appear to have been addressed at the time of plan of subdivision registration, City File: D07-16-14-0003. For this first site plan application at 100 Nipissing, there is no further parkland dedication requirement. Should the site be redeveloped at a future time, further parkland dedication may be required.

Feel free to contact Anissa.mcalpine@ottawa.ca, Parks Planner, for follow-up questions.

Conservation Authority

Comments:

62. The associated Conservation Authority for the site is the Mississippi Valley Conservation Authority.

    a. Further contact information can be found on the attached Technical Circulations form.

Other

63. The High Performance Development Standard (HPDS) is a collection of voluntary and required standards that raise the performance of new building projects to achieve sustainable and resilient design and will be applicable to Site Plan Control and Plan of Subdivision applications.

    a. The HPDS was passed by Council on April 13, 2022, but is not in effect at this time, as Council has referred the 2023 HPDS Update Report back to staff with the direction to bring forward an updated report to Committee at a later date. The timing of an updated report to Committee is unknown at this time, and updates will be shared when they are available.

    b. Please refer to the HPDS information at ottawa.ca/HPDS for more information.

64. Under the Affordable Housing Community Improvement Plan, a Tax Increment Equivalent Grant (TIEG) program was created to incentivize the development of affordable rental units. It provides a yearly fixed grant for 20 years. The grant helps offset the revenue loss housing providers experience when incorporating affordable units in their developments.

    a. To be eligible for the TIEG program you must meet the following criteria:

        i. the greater of five units OR 15 per cent of the total number of units within the development must be made affordable

        ii. provide a minimum of 15 per cent of each unit type in the development as affordable

        iii. enter into an agreement with the city to ensure the units maintain affordable for a minimum period of 20 years at or below the city-wide average market rent for the entire housing stock based on building form and unit type, as defined by the Canada Mortgage and Housing Corporation

        iv. must apply after a formal Site Plan Control submission, or Building Permit submission for projects not requiring Site Plan Control, and prior to Occupancy Permit issuance

    b. Please refer to the TIEG information *at Affordable housing community improvement plan / Plan d'améliorations communautaires pour le logement abordable for more details or contact the TIEG coordinator via email at affordablehousingcip@ottawa.ca.*

Should there be any questions, please do not hesitate to contact myself or the contact identified for the above areas / disciplines.

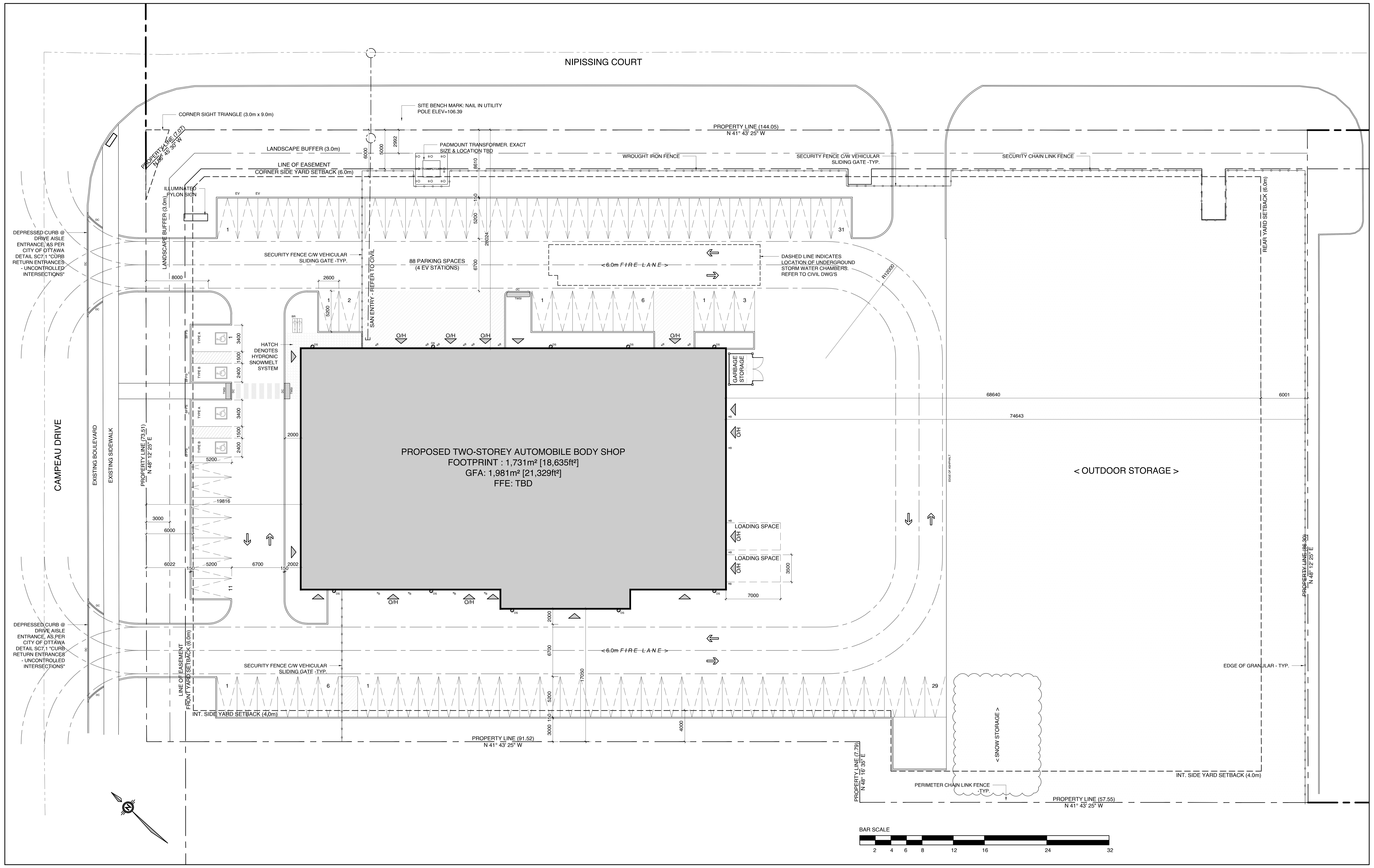
Yours Truly,

Nathan Wener, Student Planner
Development Review West

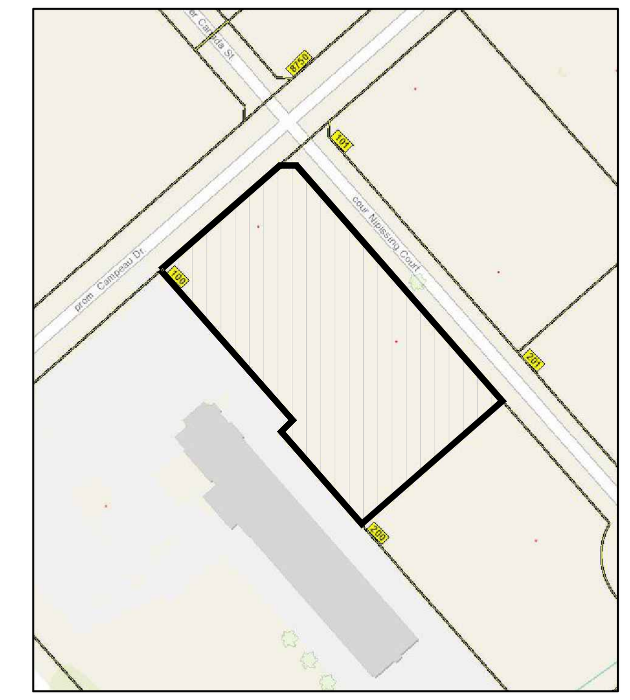
c.c. Colette Gorni, Planner II, Colette.gorni@ottawa.ca
Nancy Young, Forester, Nancy.young@ottawa.ca
Matthew Hayley, Environmental Planner, Matthew.hayley@ottawa.ca
Lisa Stern, Planner III, Lisa.stern@ottawa.ca
Anissa McAlpine, Parks Planner, anissa.mcalpine@ottawa.ca
Josiane Gervais, Transportation Project Manager, Josiane.gervais@ottawa.ca
Abi Dieme, Infrastructure Project Manager, abi.dieme@ottawa.ca
Robin van de Lande, Planner II, Robin.vandeLande@ottawa.ca

APPENDIX B

Site Plan



01 SITE PLAN
A1.0 SCALE: 1:300



02 KEY PLAN
A1.0 SCALE: N.T.S.

PROPERTY LEGAL DESCRIPTION
PLAN 4M-1642 PLAN OF SURVEY OF **PART OF LOT 3** **CONCESSION 1** (GEOGRAPHIC TOWNSHIP OF HUNTLEY) **CITY OF OTTAWA** PREPARED BY STANTEC GEOMATICS LTD. DATED JULY 17, 2019 PROJECT NO.: 161612445-432

BUILDING AREAS	SQ.M.	SQ.FT.
BUILDING FOOTPRINT	1,731m²	18,635ft²
GROSS FLOOR AREA: AUTOMOTIVE BODY SHOP OFFICE SECOND FLOOR TOTAL	 1,487.6m² 243.4m² 250m² 1,981m²	 16,015ft² 2620ft² 2,694ft² 21,329ft²

PROJECT ZONING REVIEW/STATISTICS	
MUNICIPALITY:	CITY OF OTTAWA
MUNICIPAL ADDRESS:	100 NIPISSING COURT, OTTAWA, ON.
REGISTERED OWNER:	ZENA INVESTMENT CORPORATION
LOT AREA:	12,138m²
ZONING ANALYSIS OTTAWA	
ZONE:	IP13 [2166]-h
PROPOSED USE:	2 STOREY AUTOMOBILE BODY SHOP

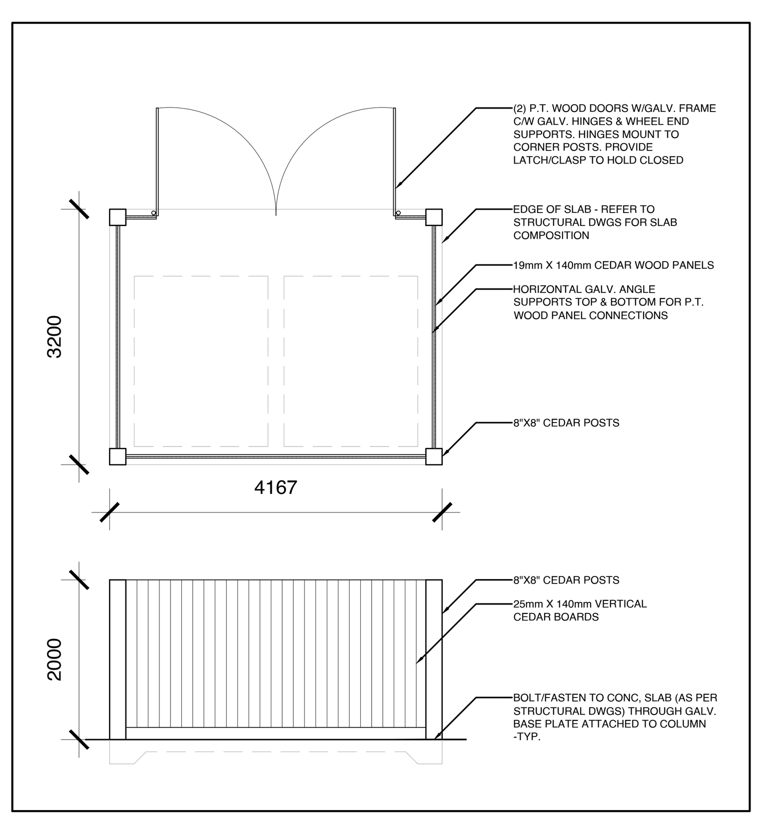
ZONING MECHANISM (IP13 [2166]-H)	REQUIRED	PROVIDED
MINIMUM LOT AREA	750m²	12,138.1m²
MAXIMUM BUILDING HEIGHT	22.0m	8.64m
MINIMUM FRONT YARD SETBACK	6.0m	19.8m
MINIMUM REAR YARD SETBACK	6.0m	74.6m
MINIMUM INTERIOR YARD SETBACK	4.0m	17.0m
MINIMUM CORNER YARD SETBACK	6.0m	28.0m
MAXIMUM LOT COVERAGE	55%	14.2%
MAXIMUM FLOOR SPACE INDEX	2	0.16
MINIMUM LANDSCAPE WIDTH ABUTTING STREET	3.0m	3.0m
PARKING & LOADING SPACE PROVISIONS		
MINIMUM REQUIRED VEHICLE PARKING SPACES	AUTOMOBILE BODY SHOP: 3 PER SERVICE BAY = 39 PARKING SPACES	
	REGULAR SPACES (NEW)	84 SPACES
	ACCESSIBLE SPACE (TYPE A) = 2 REQUIRED	2 SPACE
	ACCESSIBLE SPACE (TYPE B) = 2 REQUIRED	2 SPACE
	TOTAL	88 SPACES
BICYCLE PARKING REQUIRED	AUTOMOBILE BODY SHOP - 1 PER 1,500m² GFA = 1 SPACE	2 SPACES
MINIMUM AISLE WIDTH	PARKING LOT: 6.7m	6.7m
MINIMUM PARKING SPACE DIMENSIONS	LENGTH: 5.2m WIDTH: 2.6m	LENGTH: 5.2m WIDTH: 2.6m
PROVIDED LOADING	1 SPACE PER 1000-1999m²	2
MINIMUM WIDTH OF DRIVEWAY ACCESSING LOADING SPACE	SINGLE TRAFFIC LANE - 3.0m DOUBLE TRAFFIC LANE - 6.0m	DOUBLE TRAFFIC LANE - 6.7m
MINIMUM WIDTH OF LOADING SPACE	3.5m	3.5m
MINIMUM LENGTH OF LOADING SPACE	7m	7m
MINIMUM VERTICAL CLEARANCE OF LOADING SPACE	4.2m	N/A
MINIMUM LANDSCAPE WIDTH ABUTTING STREET	3.0m	3.0m
OUTDOOR REFUSE COLLECTION	MIN. SETBACK FROM A PUBLIC STREET: 9.0m	N/A
	MIN. SETBACK FROM ANY LOT LINE: 3.0m	17.0m
	SCREENING MIN. HEIGHT: 2.0m	2.0m

SITE PLAN NOTES

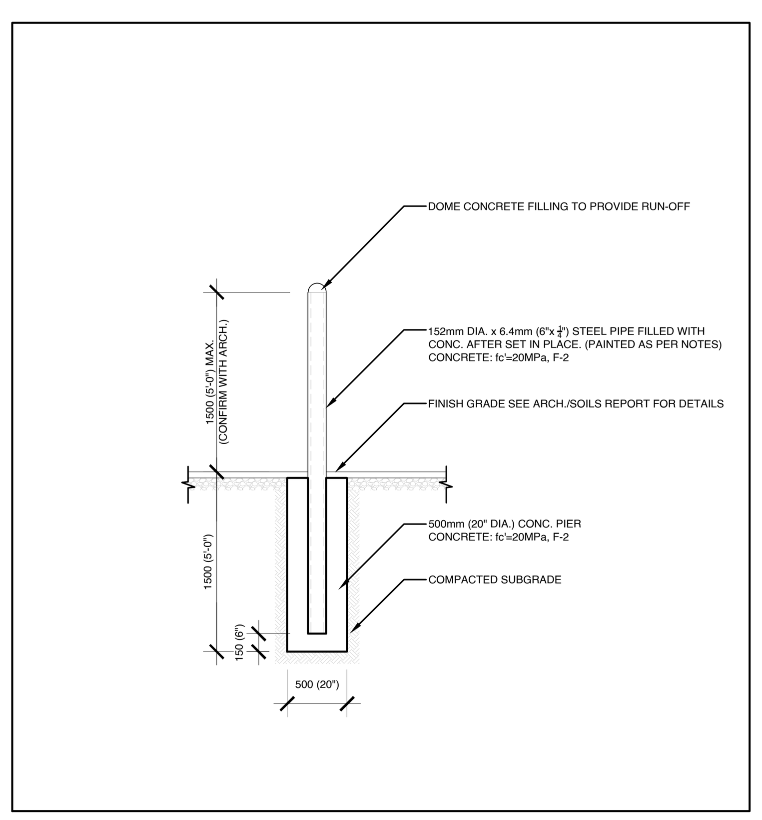
NOTE#	NOTE
(E)AS	EXISTING ASPHALT SURFACE - REFER TO SURVEY
(E)BU	EXISTING BUSHES - REFER TO SURVEY
(E)CSW	EXISTING CONCRETE CURB - REFER TO SURVEY
(E)GSW	EXISTING CONCRETE SIDEWALK - REFER TO SURVEY
(E)OHW	EXISTING OVERHEAD UTILITY WIRES - REFER TO SURVEY
(E)RW	EXISTING RETAINING WALL - REFER TO SURVEY
(E)T	EXISTING TREE - REFER TO SURVEY
(E)TR	EXISTING TREE TO BE REMOVED - REFER TO SURVEY
B	BOLLARD, 6MM X 125MM DIA. X 1050MM PAINTED GALVANIZED STEEL BOLLARD C/W WELDED CAP AND 6MM X 150MM BASE PLATE WITH 4 BOLT HOLES; SECURE TO PAVEMENT OR SIDEWALK AT LOCATIONS INDICATED WITH 16MM DIA. GALVANIZED CONCRETE OR ASPHALT ANCHORS DEPENDANT ON LOCATION.
BFPS	PROVIDE VERTICALLY-MOUNTED SIGN, MINIMUM 300MM WIDE X 600MM HIGH, MARKED WITH INTERNATIONAL SYMBOL OF ACCESSIBILITY. MOUNT NOT LESS THAN 1500MM ABOVE GRADE AND NOT MORE THAN 2000MM ABOVE GRADE. ENSURE TONAL CONTRAST BETWEEN BF PARKING SIGN AND BACKGROUND ENVIRONMENT. PROVIDE INFORMATION TEXT COMPLIANT WITH CITY OF OTTAWA BY LAW REQUIREMENTS. PROVIDE ADDITIONAL BILINGUAL SIGNAGE THAT IDENTIFIES TYPE "A" SPACES AS "VAN ACCESSIBLE/ FOURGONNETTE ACCESSIBLE".
BR	BIKE RACK - REFER TO LANDSCAPE
CC	CONCRETE CURB - REFER TO CIVIL
CP	CONCRETE PAD - REFER TO CIVIL
CSW	CONCRETE SIDEWALK - REFER TO CIVIL
CY	CANOPY C/W RECESSED POT LIGHTS - REFER TO ELECTRICAL
GM	GAS METER - REFER TO SITE SERVICING
PMT	PAD MOUNT TRANSFORMER - REFER TO CIVIL
PP	PAINTED PARKING LINES, TYP., - REFER TO CIVIL
RSL	ROOF STORM LINE - REFER TO CIVIL
RW	RETAINING WALL - REFER TO CIVIL
SL	SANITARY LINE - REFER TO CIVIL
STL	STORM LINE - REFER TO CIVIL
TWSI	TACTILE WALKING SURFACE INDICATOR (TWSI), FULL WIDTH OF CURB RAMP. RECESSED TO BE FLUSH WITH CONCRETE WALKING SURFACE. - REFER TO CIVIL
WTS	WATER SERVICE - REFER TO CIVIL
WTSL	WEEPING TILE STORM LINE - REFER TO CIVIL
DS	DOWNSPOUT

SITE PLAN SYMBOLS

O/H	NEW OVERHEAD DOOR
	NEW DOOR / ENTRANCE
	BICYCLE PARKING SPACE (1.8Mx0.6M)
	NO PARKING LINES
#	PARKING STALL COUNT PER ROW
S#	NEW SIGN, REFER TO SIGN LEGEND
S1	FIRE ROUTE SIGN
SL	STREET LIGHT
	DESIGNATED ACCESSIBLE PARKING SPACE AS PER AODA STANDARDS
V	VISITOR PARKING
	TWO WAY TRAFFIC
	DEPRESSED CURB (DC)
	TACTILE WALKING SURFACE INDICATORS (TWSI)
	PROPERTY LINE
	MINIMUM SETBACKS (ZONING)
	NEW CONSTRUCTION
	EXISTING BUILDINGS
	SOFT LANDSCAPING
	CONCRETE SIDEWALK
A	BUILDING MOUNTED LIGHTS REFER TO ELECTRICAL DWGs
	DOWNSPOUT CONNECTING TO UNDERGROUND STORM, AS PER CIVIL DWG'S



02 GARBAGE ENCLOSURE
A1.0 SCALE: 1:75



03 TYPICAL BOLLARD @ GRADE DETAIL
A1.0 SCALE: 1:50

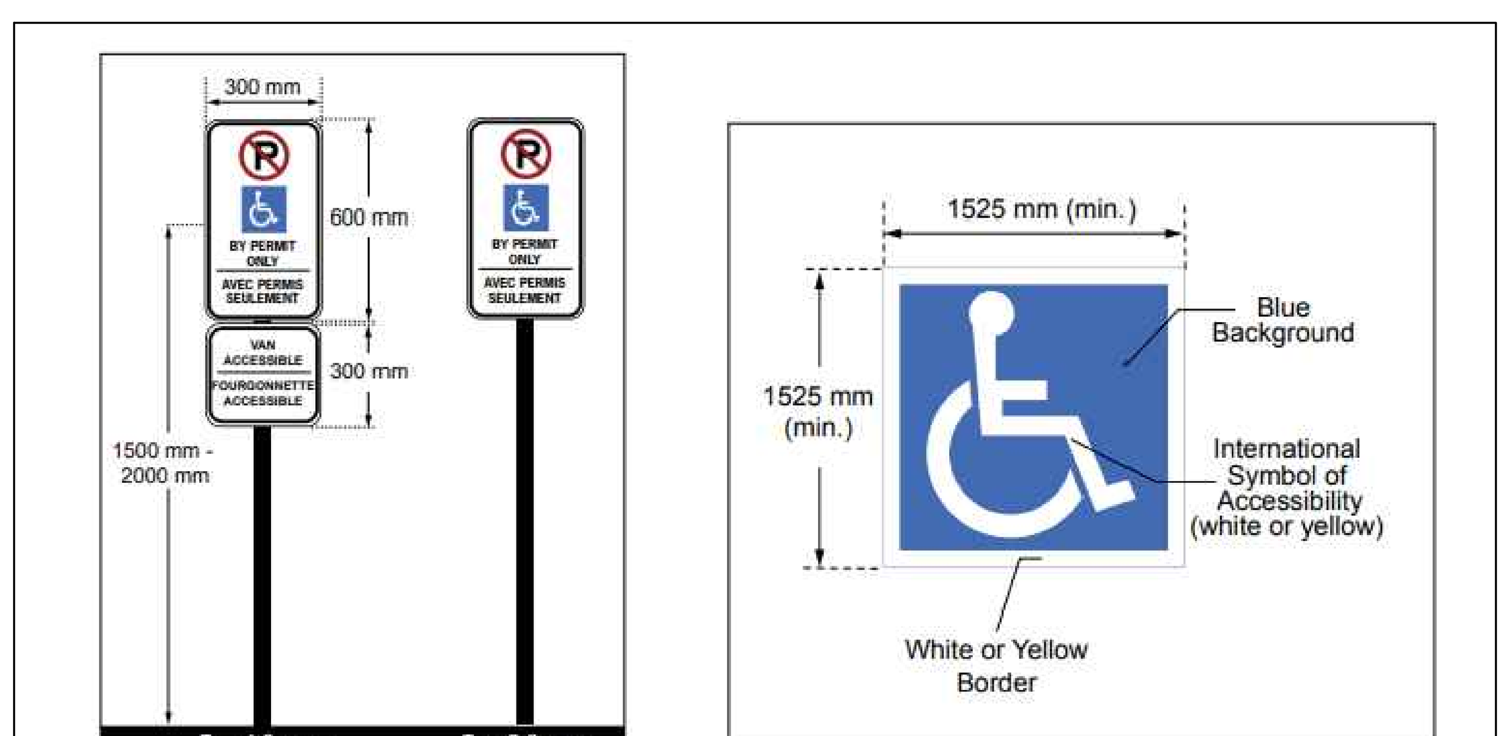


Figure 26: Accessible Parking Vertical Signage

Figure 27: Accessible Parking Pavement Marking

04 ACCESSIBLE PARKING SIGNAGE DETAIL
A1.0 SCALE: NTS

Myers Automotive Group

NOTES:

1. ALL WORK TO BE IN COMPLIANCE WITH LOCAL BUILDING CODES, REGULATIONS AND BY-LAWS.
2. ADDITIONAL DRAWINGS MAY BE ISSUED FOR CLARIFICATION TO ASSIST PROPER EXECUTION OF WORK. SUCH DRAWINGS WILL HAVE THE SAME MEANING AND INTENT AS IF THEY WERE INCLUDED WITH PLANS IN CONTRACT DOCUMENTS.
3. DO NOT SCALE DRAWINGS.
4. ALL SUB-CONTRACTORS TO TAKE THEIR OWN ON-SITE MEASUREMENTS AND BE RESPONSIBLE FOR THEIR ACCURACY.
5. NOTIFY LAWRENCE ARCHITECTS INC. FOR ANY ERRORS AND/OR OMISSIONS PRIOR TO START OF WORK.

SEAL: ONTARIO ASSOCIATION OF ARCHITECTS
BRANDON G. LAWRENCE
LICENCE
9092

NORTH ARROW: N

No.	DATE	REVISION
13	2025.11.14	ISSUED FOR SITE PLAN CONTROL
12	2025.11.12	ISSUED FOR REVIEW
11	2025.10.30	ISSUED FOR REVIEW
10	2025.10.29	ISSUED FOR COORDINATION
09	2025.09.18	ISSUED FOR REVIEW
08	2025.08.14	ISSUED FOR COORDINATION
07	2025.07.22	ISSUED FOR COORDINATION
06	2025.07.15	ISSUED FOR REVIEW
05	2025.06.30	ISSUED FOR REVIEW
04	2025.06.19	ISSUED FOR REVIEW
03	2025.06.09	ISSUED FOR PRE-CONSULTATION
02	2025.05.23	ISSUED FOR PRE-CONSULTATION
01	2025.05.22	ISSUED FOR REVIEW

LAWRENCE ARCHITECTS

205-18 DEAKIN STREET
OTTAWA, ONTARIO
K2E 8B7

T: 613.739.7770
E: INFO@LAWRENCEARC.COM

PROJECT:
MYERS AUTOMOTIVE - BODY SHOP
100 NIPISSING COURT, OTTAWA, ON.

SHEET TITLE:
SITE PLAN
GENERAL NOTES

DRAWN BY: **B.L.** CHECKED BY: **L.A.**

PLOT DATE: **2025.11.14**

JOB NUMBER: **LA-1152-25** SCALE: AS SHOWN

SHEET NUMBER: A1.0

PLAN #

APPLICATION #

APPENDIX C

Water Demands, FUS Calculations, Boundary Conditions

MYERS AUTOMOTIVE BODY SHOP
100 NIPISSING COURT
WATER DEMAND

Number of Staff	24	
Average Daily Demand	75	L/person/day
Number of Vehicles Serviced per Day	20	
Average Daily Demand	40	L/vehicle/day
Number of Vehicles Washed per Day	16	
Average Daily Demand	200	L/vehicle/day
Total Dayly Volume	5800	L/day
Average Day Demand	**0.20**	**L/s**
Maximum Day Demand (1.5 x avg. day)	**0.30**	**L/s**
Peak Hour Demand (1.8 x max. day)	**0.54**	**L/s**

Note: Daly Volumes as per Appendix 4-A in the City of Ottawa Sewer Design Guidelines

200 NIPISSING COURT
WATER DEMAND

Site Area	1.07	ha
Light Industrial Average Daily Demand	35,000	L/ha/day
Total Dayly Volume	37,450	L/day
Average Day Demand	**1.30**	**L/s**
Maximum Day Demand (1.5 x avg. day)	**1.95**	**L/s**
Peak Hour Demand (1.8 x max. day)	**3.51**	**L/s**

FUS - Fire Flow Calculations

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #:	124176
Project Name:	Template
Date:	7/15/2025
Input By:	MS
Reviewed By:	
Drawing Reference:	

Legend: Input by User / No Input Required
Reference: Fire Underwriter's Survey Guideline (2020) Formula Method

Building Description: 2 Storey Automobile Body Shop
Type II - Non-combustible construction

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction **C**	Type V - Wood frame		1.5	0.8	
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction	Yes	0.8		
		Type I - Fire resistive construction (2 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	1731			
		Second Floor Area (m^2)	250			
		Number of Floors/Storeys	2			
		Protected Openings (1 hr) if C<1.0	Yes			
		Area of structure considered (m^2)			**1,794**	
	F	**Base fire flow without reductions** $F = 220\ C\ (A)^{0.5}$				**7,000**
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**		**FUS Table 3**	**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	0%	7,000
		Limited combustible		-15%		
		Combustible	Yes	0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**		**FUS Table 4**	**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	-2,800
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	No	-10%		
		Cumulative Sub-Total			**-40%**	
		Area of Sprinklered Coverage (m²)	3462	100%		
		Cumulative Total			**-40%**	
5	**Exposure Surcharge**		**FUS Table 5**		**Surcharge**	
	(3)	North Side	>30m		0%	0
		East Side	>30m		0%	
		South Side	>30m		0%	
		West Side	>30m		0%	
		Cumulative Total			**0%**	
Results						
6	(1) + (2) + (3)	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**4,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**67**
				or	USGPM	1,057

Miro Savic

From: Brandon Lawrence <brandon@lawrencearc.com>
Sent: Tuesday, July 15, 2025 1:09 PM
To: Miro Savic
Cc: Adam Thompson; David Johnston
Subject: RE: 100 Nipissing - Building Construction Details for FUS (124176)

Hi Miro,

Please see response below in blue.

Regards,

BRANDON LAWRENCE, DIRECTOR
B.AS, M.Arch, OAA, MRAIC

LAWRENCE ARCHITECTS

205–18 Deakin Street, Nepean, ON K2E 8B7
T 613.739.7770
E brandon@lawrencearc.com

LAWRENCEARC.COM

From: Miro Savic <m.savic@novatech-eng.com>
Sent: Tuesday, July 15, 2025 8:51 AM
To: Brandon Lawrence <brandon@lawrencearc.com>
Cc: Adam Thompson <a.thompson@novatech-eng.com>; David Johnston <djohnston@myers.ca>
Subject: 100 Nipissing - Building Construction Details for FUS (124176)

Hello Brendon,

I'm preparing the FUS fire flow calculations to send to the City to obtain water boundary conditions and would like to confirm the following building construction details for the proposed automobile body shop.

Floor Areas:

- Gross Floor Area of each floor. GFA = 21,329sq.ft. (1,981sq.m.). [GF = 18,635sq.ft. & SF = 2,694sq.ft.]

Type of Construction:

- Fire Resistive Construction with a minimum 2-hour fire rating (Type I), or
- Non-Combustible Construction (Type II) – Type II
- Will vertical openings between floors be protected in accordance with the national building code (1-hour fire rating)? Yes

Sprinklers:

- Will the buildings be fully sprinklered? Yes

Refer to pages 21 and 22 in the attached document for the FUS definitions of the type of construction and the protected openings.

Please let me know if you have any questions.

Regards,

Miroslav Savic, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH
Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 205

100 NIPISSING COURT
WATERMAIN MODELING RESULTS

Maximum Day + Fire Flow Demand
Network Table - Nodes

	Elevation	Demand	Head	Pressure		
Node ID	m	LPS	m	m	kPa	psi
Junc J1	105.7	0	155.25	49.55	486.1	70.5
Junc J2	106.4	0	152.33	45.93	450.6	65.4
Junc J3	106.1	67	151.68	45.58	447.1	64.9
Junc J4	106.3	0.3	152.33	46.03	451.6	65.5
Junc J5	105.7	0.65	155.25	49.55	486.1	70.5
Resvr R1	155.7	-67.95	155.7	0	0.0	0.0

Maximum Day + Fire Flow Demand
Network Table - Links

	Length	Diameter	Roughness	Flow	Velocity	Unit Headloss
Link ID	m	mm		LPS	m/s	m/km
Pipe P1	43	250	110	67.95	1.38	10.40
Pipe P2	19.9	150	100	67.3	3.81	146.82
Pipe P3	4.5	150	100	67	3.79	145.61
Pipe P4	21	150	110	0.3	0.02	0.01
Pipe P5	187	250	110	0.65	0.01	0.00

Peak Hour Demand
Network Table - Nodes

	Elevation	Demand	Head	Pressure		
Node ID	m	LPS	m	m	kPa	psi
Junc J1	105.7	0	156	50.3	493.4	71.6
Junc J2	106.4	0	156	49.6	486.6	70.6
Junc J3	106.1	0	156	49.9	489.5	71.0
Junc J4	106.3	0.54	156	49.7	487.6	70.7
Junc J5	105.7	1.17	156	50.3	493.4	71.6
Resvr R1	156	-1.71	156	0	0.0	0.0

Peak Hour Demand
Network Table - Links

	Length	Diameter	Roughness	Flow	Velocity	Unit Headloss
Link ID	m	mm		LPS	m/s	m/km
Pipe P1	43	250	110	1.71	0.03	0.01
Pipe P2	19.9	150	100	0.54	0.03	0.02
Pipe P3	4.5	150	100	0	0.00	0.00
Pipe P4	21	150	110	0.54	0.03	0.02
Pipe P5	187	250	110	1.17	0.02	0.01

100 NIPISSING COURT
WATERMAIN MODELING RESULTS

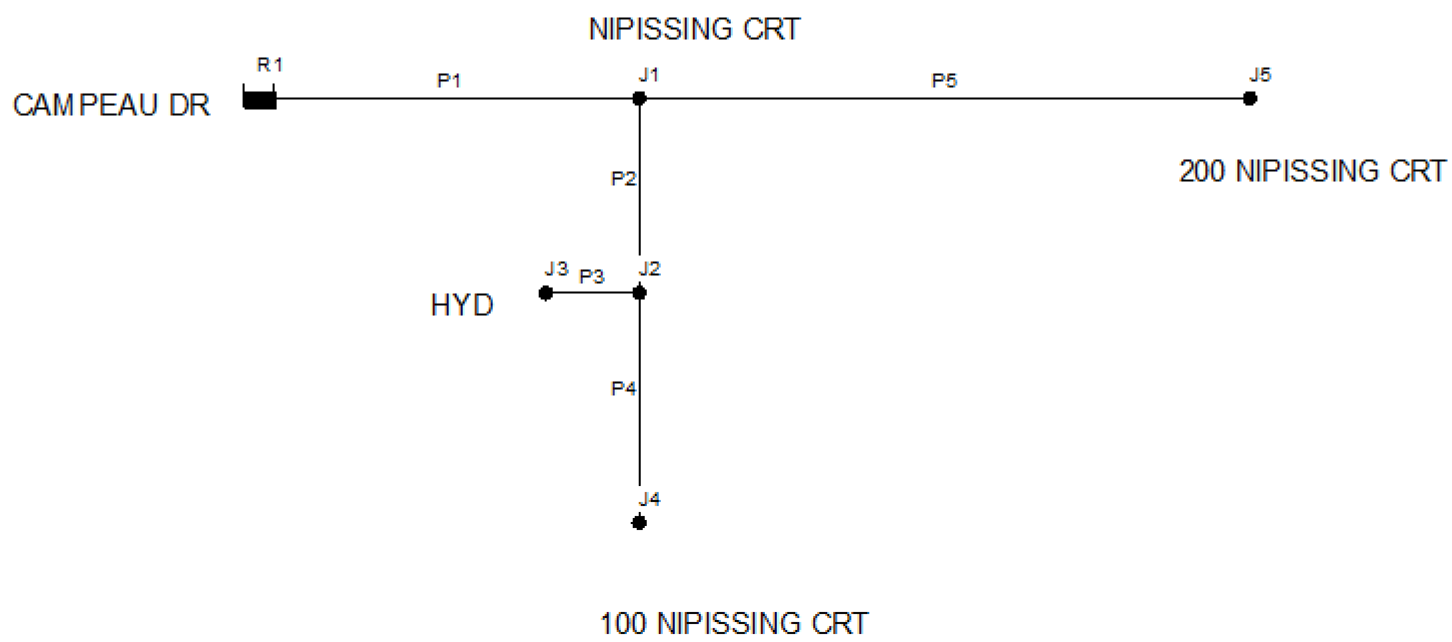
Average Day Demand
Network Table - Nodes

	Elevation	Demand	Head	Pressure		
Node ID	m	LPS	m	m	kPa	psi
Junc J1	105.7	0	161.9	56.2	551.3	80.0
Junc J2	106.4	0	161.9	55.5	544.5	79.0
Junc J3	106.1	0	161.9	55.8	547.4	79.4
Junc J4	106.3	0.2	161.9	55.6	545.4	79.1
Junc J5	105.75	0.43	161.9	56.15	550.8	79.9
Resvr R1	161.9	-0.63	161.9	0	0.0	0.0

Average Day Demand
Network Table - Links

	Length	Diameter	Roughness	Flow	Velocity	Unit Headloss
Link ID	m	mm		LPS	m/s	m/km
Pipe P1	43	250	110	0.63	0.01	0.00
Pipe P2	19.9	150	100	0.2	0.01	0.00
Pipe P3	4.5	150	100	0	0.00	0.00
Pipe P4	21	150	110	0.2	0.01	0.00
Pipe P5	187	250	110	0.43	0.01	0.00

100 NIPISSING COURT



Boundary Conditions
100 Nipissing Court

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	12	0.20
Maximum Daily Demand	18	0.30
Peak Hour	32	0.54
Fire Flow Demand #1	4,000	66.67

Location

Results

Connection 1 – Nipissing Court

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	161.9	80.0
Peak Hour	156.0	71.6
Max Day plus Fire Flow #1	155.7	71.1

[1] Ground Elevation = 105.7 m

Notes

1. The IWSD has recently updated their water modelling software. Any significant difference between previously received BC results and newly received BC results could be attributed to this update.
2. Demands for proposed Connection 1 at existing water main along Nipissing Court were assigned to upstream junction at Campeau Drive & Nipissing Court off the public looped watermains. The engineer must calculate headloss off the dead-end main.

Disclaimer

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

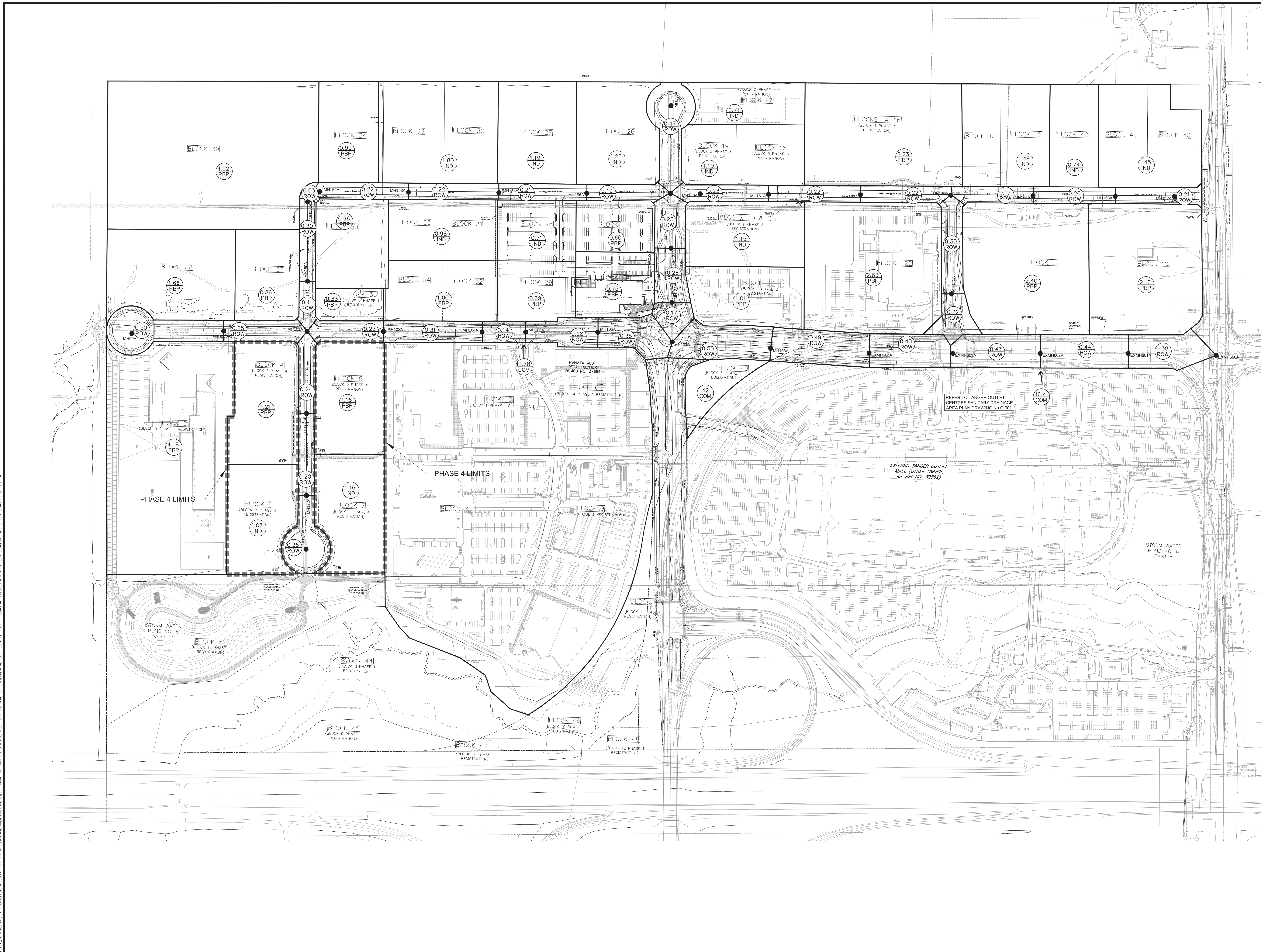
APPENDIX D

Sanitary Flow Calculation

MYERS AUTOMOTIVE BODY SHOP
100 NIPISSING COURT
SANITARY FLOW

Number of Staff	24	
Daily Volume	75	L/person/day
Average Sanitary Flow	0.06	L/s
Number of Vehicles Serviced per Day	20	
Daily Volume	40	L/vehicle/day
Average Sanitary Flow	0.03	L/s
Number of Vehicleds Washed per Day	16	
Daily Volume	200	L/vehicle/day
Average Sanitary Flow	0.11	L/s
Peak Factor	1.5	
Peak Sanitary Flow	**0.30**	**L/s**
Site Area	1.21	ha
Infiltration Allowance	0.33	L/s/ha
Peak Extraneous Flows	**0.40**	**L/s**
Total Peak Sanitary Flow	**0.70**	**L/s**

Note: Daly Volumes as per Appendix 4-A in the City of Ottawa Sewer Design Guidelines



LEGEND:

5.14 — AREA IN HECTARES
P.B.P. — LAND USE TYPE

PBP PRESTIGE BUSINESS PARK - 35 000 l/s/ha
IND LIGHT INDUSTRIAL - 35 000 l/s/ha
COM COMMERCIAL - 50 000 l/S/ha
ROW RIGHT OF WAY (INFILTRATION FLOW ONLY)

DRAINAGE AREA LIMITS
MH601A SANITARY MANHOLE & NUMBER
SANITARY SEWER & FLOW DIRECTION

No.	REVISIONS	By	Date
14	REVISED AS PER PHASE 4COMMENTS	LME	19:07:25
13	REVISED AS PER PHASE 4COMMENTS	LME	19:07:22
12	REVISED AS PER PHASE 4COMMENTS	LME	19:06:24
11	ISSUED FOR PHASE 4 REGISTRATION	LME	19:04:25
10	REVISED AS PER PHASE 3 COMMENTS	LME	19:03:08
9	ISSUED FOR PHASE 3 TENDER	LME	19:01:11
8	REVISED AS PER PHASE 3 COMMENTS	LME	18:12:14
7	REVISED FOR PHASE 3 REGISTRATION	LME	18:09:14
6	REVISED FOR PHASE 2 REGISTRATION	LME	18:04:20
5	REVISED AS PER CITY COMMENTS	LME	15:11:05
4	REVISED AS PER CITY COMMENTS	LME	15:10:15
3	REVISED AS PER NEW SITE PLAN AND CITY COMMENTS	LME	15:06:19
2	REVISED AS PER CITY COMMENTS	LME	15:04:08
1	ISSUED TO CITY FOR APPROVAL	LME	14:11:27

TAGGART REALTY MANAGEMENT

IBI GROUP
400 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

Project Title

KANATA WEST BUSINESS PARK PHASE 4

LICENSED PROFESSIONAL ENGINEER
L. M. ERION
13379508
2019/07/25
PROVINCE OF ONTARIO

Drawing Title

SANITARY DRAINAGE AREA PLAN

Scale 1:2000

Design	LME	Date	NOV. 2014
Drawn	DPS	Checked	TRB
Project No.	14289	Drawing No.	501

D07-16-14-0003_P4

#17661

IBI Group
400-333 Preston Street
Ottawa, Ontario
K1S 5N4

SANITARY SEWER DESIGN SHEET

PROJECT: KANATA WEST BUSINESS PARK
LOCATION: 333 HUNTMAR DRIVE
CLIENT: TAGGART

LOCATION: STREET	LOCATION: AREA ID	LOCATION: FROM MH	LOCATION: TO MH	RESIDENTIAL UNIT TYPES: SF	SD	TH	APT	RESIDENTIAL AREA (Ha)	POPULATION: IND	POPULATION: CUM	PEAK FACTOR	PEAK FLOW (L/s)	ICI AREAS AREA (Ha) PRESTIGE BUISNESS PK: IND	PRESTIGE BUISNESS PK: CUM	COMMERCIAL: IND	COMMERCIAL: CUM	INDUSTRIAL: IND	INDUSTRIAL: CUM	INDUSTRIAL: PF	ICI PEAK FLOW (L/s)	INFILTRATION ALLOWANCE AREA (Ha): IND	AREA (Ha): CUM	FLOW (L/s)	FIXED FLOW (L/s)	TOTAL FLOW (L/s)	PROPOSED SEWER DESIGN: CAPACITY (L/s)	LENGTH (m)	DIA (mm)	SLOPE (%)	VELOCITY (full) (m/s)	VELOCITY (actual) (m/s)	AVAILABLE CAPACITY L/s	AVAILABLE CAPACITY (%)
KANATA WEST BUSINESS PARK - Block number based on overall concept plan of subdivision																																	
Upper Canada Street	Blocks 30, 31, 33, 53	MH154A	MH153A														2.78	2.78	5.40	6.08	3.00	3.00	0.99	0.00	7.07	43.87	110.00	250	0.50	0.866	0.607	36.80	83.88
	Blocks 34, 35	MH153A	MH152A										1.86	1.86				2.78	5.40	6.99	2.08	5.08	1.68	0.00	8.66	39.24	114.86	250	0.40	0.774	0.601	30.57	77.92
	Blocks 39	MH152A	MH151A										4.52	6.38				2.78	5.40	9.18	4.55	9.63	3.18	0.00	12.36	36.70	10.84	250	0.35	0.724	0.611	24.34	66.32
		MH151A	MH150A											6.38				2.78	5.40	9.18	0.20	9.83	3.24	0.00	12.43	36.70	102.56	250	0.35	0.724	0.653	24.28	66.14
		MH150A	MH101A											6.38				2.78	5.40	9.18	0.11	9.94	3.28	0.00	12.46	36.70	63.86	250	0.35	0.724	0.653	24.24	66.04
Campeau Drive	Blocks 3, 38	MH99A	MH100A										5.84	5.84						2.84	6.34	6.34	2.09	0.00	4.93	50.02	112.75	250	0.65	0.987	0.607	45.09	90.14
	Blocks 37	MH100A	MH101A										0.86	6.70						3.26	1.11	7.45	2.46	0.00	5.72	51.91	101.44	250	0.70	1.024	0.630	46.19	88.99
Nipissing Court	Blocks 1, 7	MH123A	MH122A														2.23	2.23	6.25	5.65	2.59	2.59	0.85	0.00	6.50	50.02	65.18	250	0.65	0.987	0.607	43.52	87.00
		MH122A	MH121A															2.23	6.25	5.65	0.20	2.79	0.92	0.00	6.57	50.02	100.00	250	0.65	0.987	0.607	43.45	86.87
	Blocks 4, 5	MH121A	MH101A										2.37	2.37				2.23	6.25	6.80	2.61	5.40	1.78	0.00	8.58	85.51	97.00	250	1.90	1.688	1.038	76.93	89.97
Campeau Drive	Block 36	MH101A	MH103A										0.33	15.78				5.01	4.75	17.31	0.56	23.35	7.71	0.00	25.02	43.87	93.00	250	0.50	0.866	0.866	18.85	42.97
	Block 32, 54	MH103A	MH104A										1.00	16.78				5.01	4.75	17.80	1.31	24.66	8.14	0.00	25.93	43.87	120.00	250	0.50	0.866	0.900	17.93	40.88
Campeau Drive	Block 29	MH104A	MH105A										0.69	17.47				5.01	4.75	18.13	0.83	25.49	8.41	0.00	26.54	43.87	53.11	250	0.50	0.866	0.900	17.32	39.49
KWRC	Blocks 6, 8, 9, 10		MH 105A												11.78	11.78				5.73	11.78	11.78	3.89	0.00	9.61	39.24	12.01	250	0.40	0.774	0.601	29.62	75.50
Campeau Drive		MH105A	MH106A											17.47		11.78		5.01	4.75	23.86	0.28	37.55	12.39	0.00	36.25	59.68	87.77	300	0.35	0.818	0.851	23.43	39.26
	Block 24	MH106A	MH107A										0.75	18.22		11.78		5.01	4.75	24.22	1.10	38.65	12.75	0.00	36.98	59.68	90.92	300	0.35	0.818	0.851	22.70	38.04
Upper Canada Street	Blocks 27, 28	MH154A	MH156A														1.90	1.90	6.00	4.62	2.11	2.11	0.70	0.00	5.31	50.02	107.00	250	0.65	0.987	0.607	44.70	89.37
	Block 25	MH156A	MH131A										0.60	0.60				1.90	6.00	4.91	0.79	2.90	0.96	0.00	5.87	50.02	101.71	250	0.65	0.987	0.607	44.15	88.27
Palladium Drive	Blocks 17, 26	MH130A	MH131A											0.00			1.91	1.91	6.00	4.64	2.38	2.38	0.79	0.00	5.43	50.02	106.00	250	0.65	0.987	0.607	44.59	89.15
Palladium Drive		MH131A	MH132A											0.60				3.81	5.25	8.39	0.23	5.51	1.82	0.00	10.21	43.87	67.35	250	0.50	0.866	0.672	33.66	76.72
	Block 23	MH132A	MH133A										1.01	1.61				3.81	5.25	8.89	1.27	6.78	2.24	0.00	11.12	43.87	71.26	250	0.50	0.866	0.672	32.75	74.64
		MH133A	MH107A											1.61				3.81	5.25	8.89	0.17	6.95	2.29	0.00	11.18	107.45	42.79	250	3.00	2.121	1.304	96.28	89.60
Campeau Drive	Block 49	MH107A	MH108A											19.83	0.42	12.20		8.82	4.40	31.29	0.97	46.57	15.37	0.00	46.66	59.68	120.00	300	0.35	0.818	0.900	13.02	21.82
		MH108A	EX604A											19.83		12.20		8.82	4.40	31.29	0.49	47.06	15.53	0.00	46.82	59.68	120.00	300	0.35	0.818	0.900	12.86	21.55
	Block 22	MH 604A	MH 603A										2.63	22.46		12.20		8.82	4.40	32.57	3.03	50.09	16.53	0.00	49.10	62.51	102.12	300	0.38	0.857	0.942	13.42	21.46
Upper Canada Street	Blocks 18, 19, 20, 21	MH160A	MH161A											0.00			2.25	2.25	5.75	5.24	2.48	2.48	0.82	0.00	6.06	58.86	83.00	250	0.90	1.162	0.714	52.80	89.70
	Block 14- 16	MH161A	MH162A										2.23	2.23				2.25	5.75	6.32	2.45	4.93	1.63	0.00	7.95	50.02	112.00	250	0.65	0.987	0.692	42.07	84.10
		MH162A	MH140A											2.23				2.25	5.75	6.32	0.22	5.15	1.70	0.00	8.02	63.57	110.98	250	1.05	1.255	0.772	55.55	87.38
Upper Canada Street	Blocks 40, 41	MH167A	MH166A											0.00			1.45	1.45	6.25	3.67	1.66	1.66	0.55	0.00	4.22	51.91	72.00	250	0.70	1.024	0.611	47.69	91.87
	Block 42	MH166A	MH165A											0.00			0.74	2.19	5.70	5.06	0.94	2.60	0.86	0.00	5.91	50.02	100.00	250	0.65	0.987	0.607	44.10	88.17
	Blocks 12, 13	MH165A	MH140A											0.00			1.49	3.68	5.30	7.90	1.68	4.28	1.41	0.00	9.31	39.24	99.02	250	0.40	0.774	0.601	29.92	76.26
Journeyman Street		MH140A	MH141A											2.23				5.93	5.00	13.10	0.30	9.73	3.21	0.00	16.31	31.02	120.00	250	0.25	0.612	0.612	14.71	47.43
		MH141A	MH (84)											2.23				5.93	5.00	13.10	0.22	9.95	3.28	0.00	16.38	31.02	40.30	250	0.25	0.612	0.612	14.64	47.20
		Stub	MH 603A											2.23				5.93	5.00	13.10	0.00	9.95	3.28	0.00	16.38	31.63	32.98	250	0.26	0.624	0.624	15.26	48.22
Campeau Drive	Block 11	MH 603A	MH 602A										2.40	27.09		12.20		14.75	3.80	41.80	2.83	62.87	20.75	0.00	62.55	103.47	105.24	375	0.32	0.908	0.944	40.92	39.55
	Tanger Outlet Centres	MH 602A	MH 601A											27.09	16.40	28.60		14.75	3.80	49.78	16.84	79.71	26.30	0.00	76.08	109.75	107.73	375	0.36	0.963	1.032	33.67	30.68
	Block 52	MH 601A	MH 600A										2.16	29.25		28.60		14.75	3.80	50.83	2.54	82.25	27.14	0.00	77.97	109.75	106.95	375	0.36	0.963	1.032	31.78	28.96

Campeau Drive	Block XX	MH XXX	MH XXX	Light Grey = Constructed Sewer

Design Parameters:

Residential			ICI Areas			Peak Factor (PF)
SF	3.4	p/p/u				
TH/SD	2.7	p/p/u	P.B.P.	28,000	L/Ha/day	1.5
APT	1.8	p/p/u	COM	28,000	L/Ha/day	1.5
Other	60	p/p/Ha	IND	35,000	L/Ha/day	MOE Chart

Notes:
1. Manning's coefficient (n) = 0.013
2. Demand (per capita): 280 L/day 300 L/day
3. Infiltration allowance: 0.33 L/s/Ha 0.4 L/s/Ha
4. Residential Peaking Factor:
Harmon Formula = 1+(14/(4+P^0.5)) K=0.8
where P = population in thousands

Designed: LME

Checked:

Dwg. Reference: 14289-501

No.	Revision	Date
1.	City submission No. 1	2014-11-25
2.	City submission No. 2	2015-04-08
3.	City submission No. 3	2015-06-18
4.	City submission No. 4	2015-10-15
5.	Revised for Phase 2 Registration	2018-04-19
6.	Revised for Phase 3 Registration	2018-09-14
7.	Revised per City Comments (Phase 3)	2018-12-14
8.	Revised for Phase 4 Registration	2019-04-26
9.	Revised for Phase 4 Registration Comments	2019-06-24

File Reference:	Date:	Sheet No:
14289.5.7.1	2018-04-19	1 of 1

IBI Group
400-333 Preston Street
Ottawa, Ontario
K1S 5N4

SANITARY SEWER DESIGN SHEET

PROJECT: KANATA WEST BUSINESS PARK
LOCATION: 333 HUNTMAR DRIVE
CLIENT: TAGGART

LOCATION				RESIDENTIAL									ICI AREAS								INFILTRATION ALLOWANCE			FIXED	TOTAL	PROPOSED SEWER DESIGN							
				UNIT TYPES				AREA	POPULATION		PEAK	PEAK	AREA (Ha)							PEAK	AREA (Ha)		FLOW	FLOW	FLOW	CAPACITY	LENGTH	DIA	SLOPE	VELOCITY	VELOCITY	AVAILABLE CAPACITY	
STREET	AREA ID	FROM MH	TO MH	SF	SD	TH	APT	(Ha)	IND	CUM	FACTOR	FLOW (L/s)	PRESTIGE BUISNESS PK IND	PRESTIGE BUISNESS PK CUM	COMMERCIAL IND	COMMERCIAL CUM	INDUSTRIAL IND	INDUSTRIAL CUM	INDUSTRIAL PF	FLOW (L/s)	IND	CUM	(L/s)	(L/s)	(L/s)	(L/s)	(m)	(mm)	(%)	(full) (m/s)	(actual) (m/s)	L/s	(%)
KANATA WEST BUSINESS PARK																																	
Nipissing Court	Blocks 2, 4	MH123A	MH122A														2.23	2.23	5.75	5.19	2.59	2.59	0.85	0.00	6.05	50.02	65.15	250	0.65	0.987	0.219	43.97	87.91
		MH122A	MH121A															2.23	5.75	5.19	0.20	2.79	0.92	0.00	6.11	50.02	100.00	250	0.65	0.987	0.219	43.90	87.77
	Blocks 1, 3	MH121A	MH101A										2.37	2.37				2.23	5.75	6.35	2.61	5.40	1.78	0.00	8.13	85.51	97.00	250	1.90	1.688	0.375	77.39	90.49

Design Parameters:

Residential			ICI Areas			Peak Factor (PF)
SF	3.4	p/p/u	P.B.P.	28,000	L/Ha/day	1.5
TH/SD	2.7	p/p/u	COM	28,000	L/Ha/day	1.5
APT	1.8	p/p/u	IND	35,000	L/Ha/day	MOE Chart
Other	60	p/p/Ha				

Notes:
1. Manning's coefficient (n) = 0.013
2. Demand (per capita): 280 L/day 300 L/day
3. Infiltration allowance: 0.33 L/s/Ha 0.4 L/s/Ha
4. Residential Peaking Factor:
Harmon Formula = 1+(14/(4+P^0.5)) K=0.8
where P = population in thousands

Designed: LME

Checked:

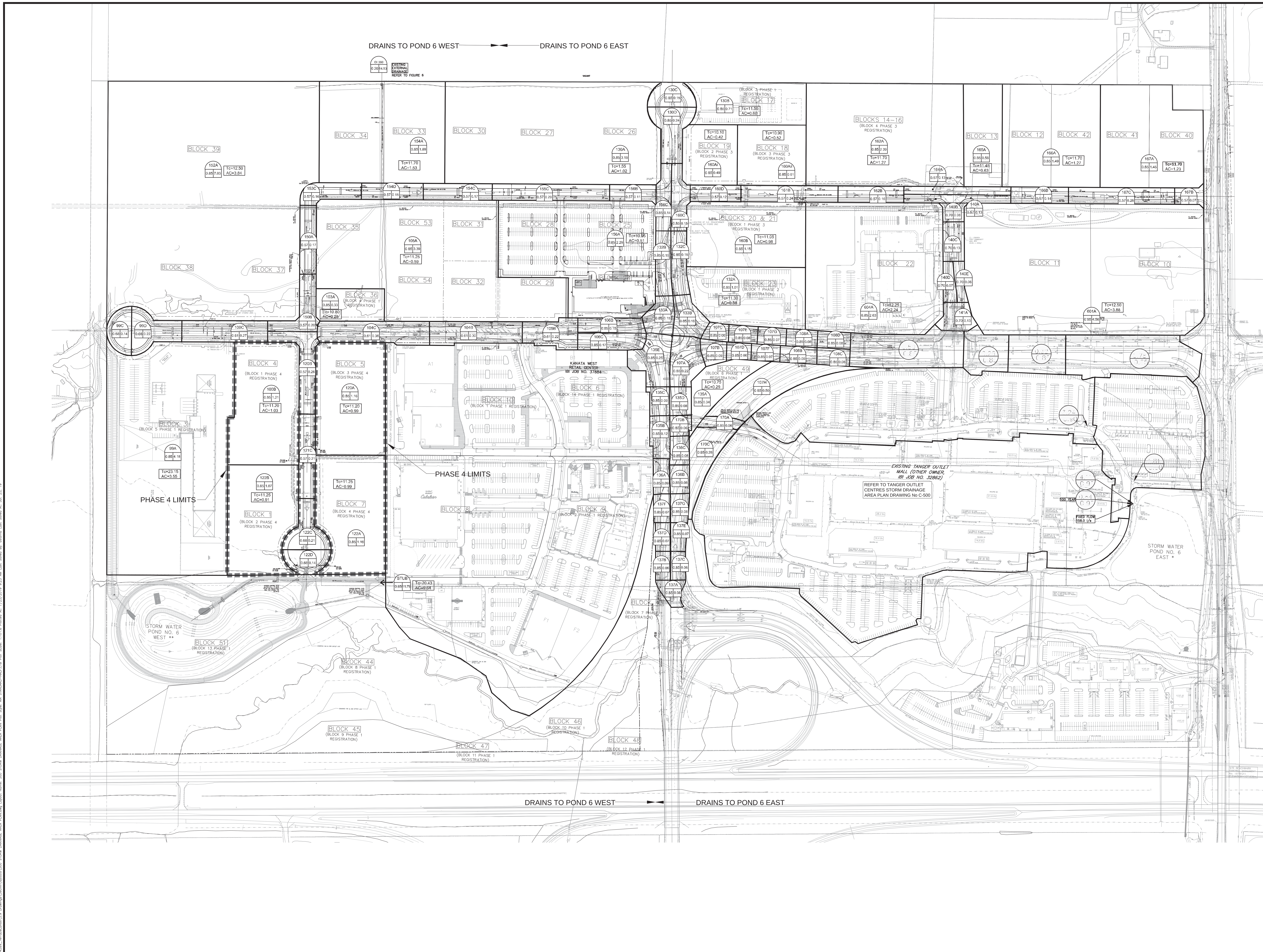
Dwg. Reference: 14289-501

No.	Revision	Date
1.	Issued for Phase 4 Registration	2018-12-14
2.	Revised for Phase 4 Registration	2019-06-24

File Reference:	Date:	Sheet No:
14289.5.7.1	2018-04-19	1 of 1

APPENDIX E

SWM Calculations



LEGEND:

- DRAINAGE AREA LIMITS
- MH601 STORM MANHOLE & NUMBER
- STORM SEWER & FLOW DIRECTION
- 604A / 0.85 / 2.63: AREA ID; AREA IN HECTARES; RUNOFF COEFFICIENT
- EMERGENCY OVERLAND FLOW ROUTE
- Tc=11.70 AC=1.23: ESTIMATED TIME OF CONCENTRATION IN MINUTES; PRODUCT OF AREA AND RUNOFF COEFFICIENT

EXISTING TANGER OUTLET CENTRE

- 0.56 / 0.85: AREA IN HECTARES; RUNOFF COEFFICIENT

No.	REVISIONS	By	Date
14	REVISED AS PER PHASE 4 COMMENTS	LME	19:07:25
13	REVISED AS PER PHASE 4 COMMENTS	LME	19:07:22
12	REVISED AS PER PHASE 4 COMMENTS	LME	19:06:24
11	ISSUED FOR PHASE 4 REGISTRATION	LME	19:04:25
10	REVISED AS PER PHASE 3 COMMENTS	LME	19:03:08
9	ISSUED FOR PHASE 3 TENDER	LME	19:01:11
8	REVISED AS PER PHASE 3 COMMENTS	LME	18:12:14
7	REVISED FOR PHASE 3 REGISTRATION	LME	18:09:14
6	REVISED FOR PHASE 2 REGISTRATION	LME	18:04:20
5	REVISED AS PER CITY COMMENTS	LME	15:11:05
4	REVISED AS PER CITY COMMENTS	LME	15:10:15
3	REVISED AS PER NEW SITE PLAN AND CITY COMMENTS	LME	15:06:19
2	REVISED AS PER CITY COMMENTS	LME	15:04:08
1	ISSUED TO CITY FOR APPOVAL	LME	14:11:27

TAGGART REALTY MANAGEMENT

IBI GROUP
400 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

Project Title

KANATA WEST BUSINESS PARK PHASE 4

LICENSED PROFESSIONAL ENGINEER L. M. ERION 13379508 2019/07/25 PROVINCE OF ONTARIO

Drawing Title

STORM DRAINAGE AREA PLAN

Scale 1:2000

Design	LME	Date	NOV. 2014
Drawn	DPS	Checked	TRB
Project No.	14289	Drawing No.	500

D07-16-14-0003_P4

#17661

IBI Group
400-333 Preston Street
Ottawa, Ontario
K1S 5N4

STORM SEWER DESIGN SHEET

PROJECT: KANATA WEST BUSINESS PARK
LOCATION: 333 HUNTMAR DRIVE
CLIENT: TAGGART

LOCATION				AREA (Ha)											RATIONAL DESIGN FLOW													SEWER DATA								
STREET	AREA ID	FROM MH	TO MH	C= 0.20	C= 0.57	C= 0.57	C= 0.61	C= 0.68	C= 0.68	C= 0.70	C= 0.85	C= 0.85	C= 0.90	C= 0.90	IND 2.78AC	CUM 2.78AC	INLET (min)	TIME IN PIPE	TOTAL (min)	i (5) (mm/hr)	i (10) (mm/hr)	i (100) (mm/hr)	5yr PEAK FLOW (L/s)	10yr PEAK FLOW (L/s)	100yr PEAK FLOW (L/s)	FIXED FLOW (L/s)	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	PIPE SIZE (mm) DIA	W	H	SLOPE (%)	VELOCITY (m/s)	AVAIL CAP (5yr) (L/s)	(%)
KANATA WEST BUSINESS PARK - PHASE 4																																				
Nipissing Court	Blocks 1, 3	MH120	MH121								2.37				5.60	5.60	11.05			98.96	115.97	169.50	554.18													
						0.26									0.41	0.41	11.05	0.74	11.79	98.96	115.97	169.50			69.83		624.0	6,120.78	88.44	1950			0.17	1.985	5496.76	89.80%
		MH121	MH122												0.00	5.60	11.79			95.59	112.01	163.68	535.34													
						0.21									0.33	0.74	11.79	0.73	12.52	95.59	112.01	163.68			121.90		657.2	7,119.4	100.84	1950			0.23	2.309	6462.20	90.77%
	Block 2, 4	MH122	MH123								2.23				5.27	10.87	12.52			92.53	108.41	158.39	1,005.80													
									0.35						0.66	1.41	12.52	0.77	13.29	92.53	108.41	158.39			222.76		1,228.6	6,638.9	99.19	1950			0.20	2.154	5410.35	81.49%

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

Notes:
1. Mannings coefficient (n) = 0.013
2. The Storm Sewer Design Sheet is for the rational method storm sewer design only, release rates for the individual blocks are included in Table 4.1 of the Design Brief, Kanata West Business Park, 333 Huntmar Drive, by IBI Group November 2015

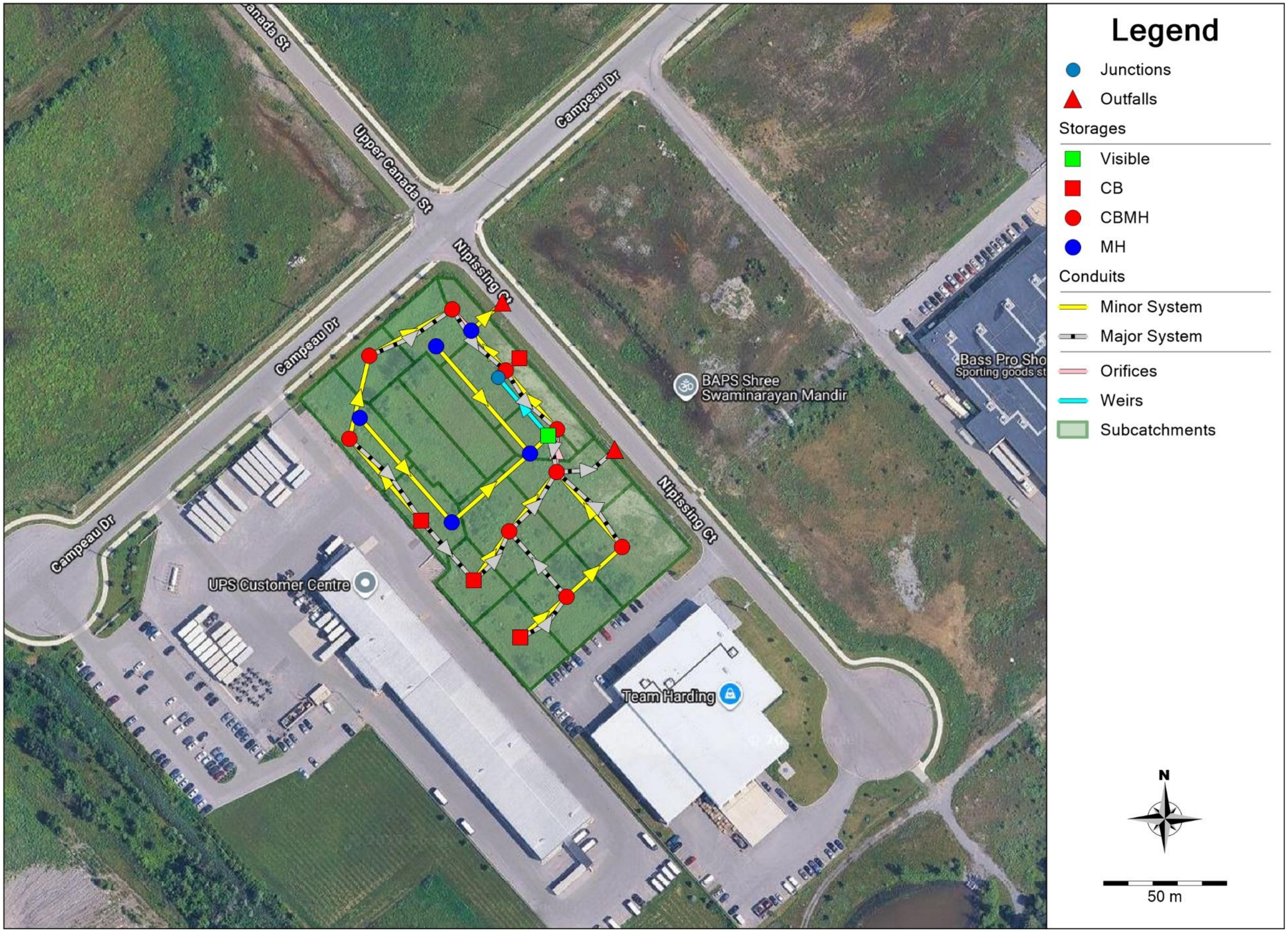
Designed: LME
Checked:
Dwg. Reference: 14289-500

No.	Revision	Date
1.	Phase 4 Registration	2019-04-26
2.	Revised for Phase 4 Registration	2019-06-24

File Reference:	Date:	Sheet No:
14289.5.7.1	2019-06-25	1 of 1

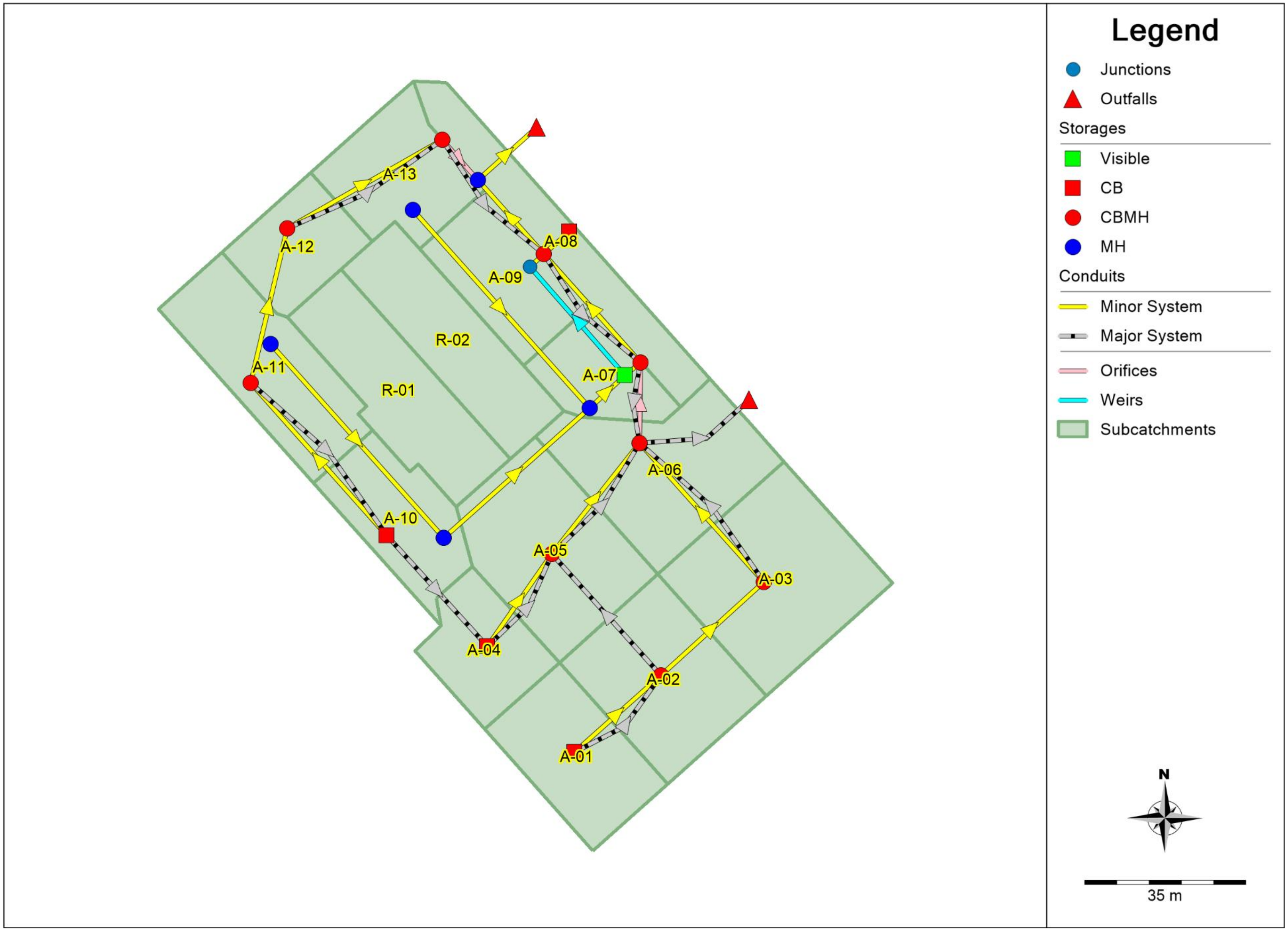
100 Nipissing Court (124176)
PCSWMM Model Schematic

Overall Model Schematic



100 Nipissing Court (124176)
PCSWMM Model Schematic

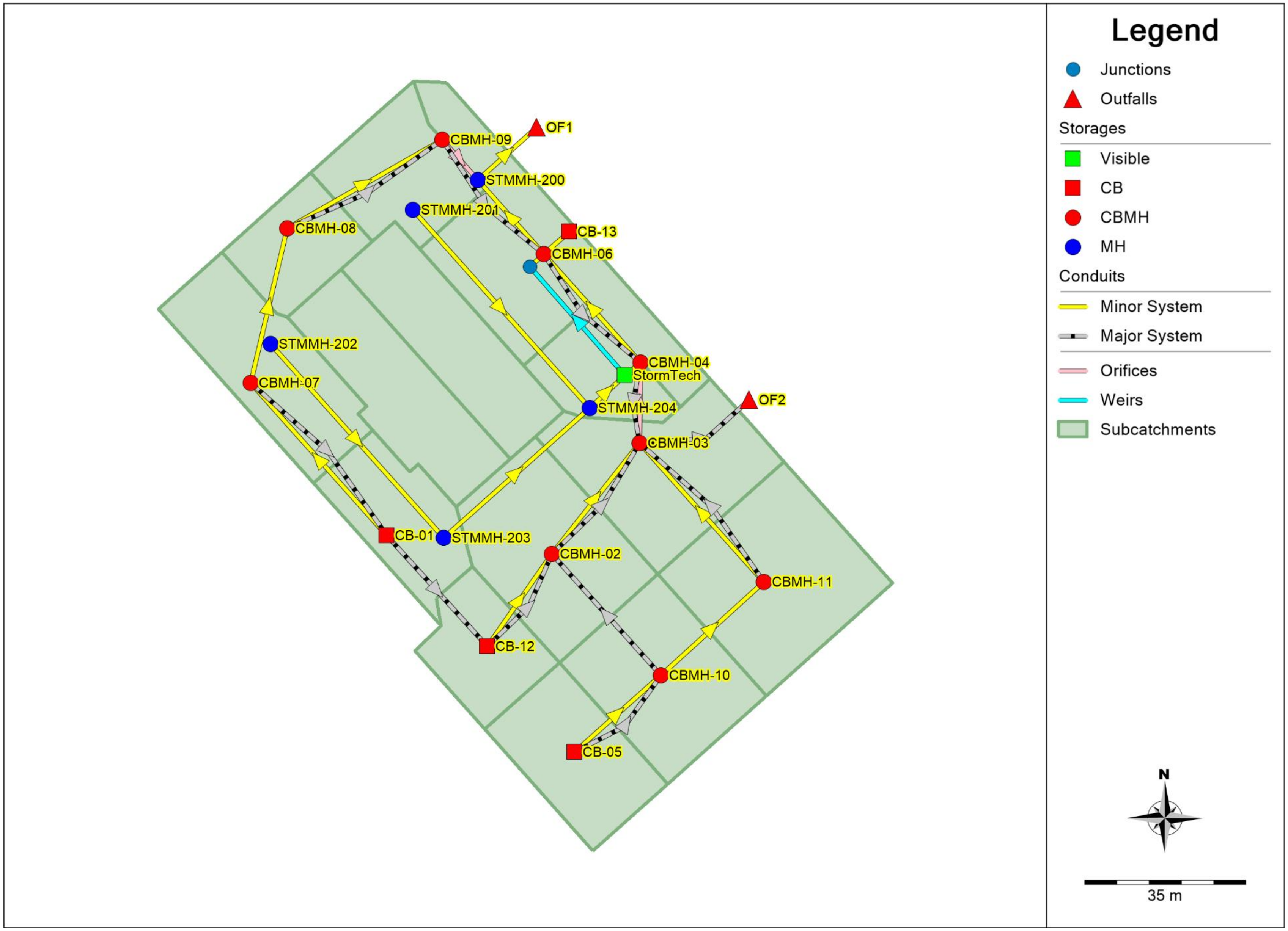
<u>**Catchment IDs**</u>



100 Nipissing Court (124176)
PCSWMM Model Schematic

NOVATECH
Engineers, Planners & Landscape Architects

Catchbasins, Manholes, Storages & Outfalls



M:\2024\124176\DATA\REPORTS\SERVICING&SWM\APPENDIX E\PCSWMM MODEL SCHEMATIC.DOCX

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.4)
------------------------------------------------------------

WARNING 04: minimum elevation drop used for Conduit C1
WARNING 04: minimum elevation drop used for Conduit C10
WARNING 04: minimum elevation drop used for Conduit C11
WARNING 04: minimum elevation drop used for Conduit C12
WARNING 04: minimum elevation drop used for Conduit C2
WARNING 04: minimum elevation drop used for Conduit C3
WARNING 04: minimum elevation drop used for Conduit C4
WARNING 04: minimum elevation drop used for Conduit C5
WARNING 04: minimum elevation drop used for Conduit C6
WARNING 04: minimum elevation drop used for Conduit C7
WARNING 04: minimum elevation drop used for Conduit C8
WARNING 04: minimum elevation drop used for Conduit C9
WARNING 02: maximum depth increased for Node CB-01
WARNING 02: maximum depth increased for Node CB-05
WARNING 02: maximum depth increased for Node CB-12
WARNING 02: maximum depth increased for Node CBMH-02
WARNING 02: maximum depth increased for Node CBMH-03
WARNING 02: maximum depth increased for Node CBMH-04
WARNING 02: maximum depth increased for Node CBMH-06
WARNING 02: maximum depth increased for Node CBMH-07
WARNING 02: maximum depth increased for Node CBMH-08
WARNING 02: maximum depth increased for Node CBMH-09
WARNING 02: maximum depth increased for Node CBMH-10
WARNING 02: maximum depth increased for Node CBMH-11

*************
Element Count
*************
Number of rain gages ...... 1
Number of subcatchments ... 15
Number of nodes ........... 22
Number of links ........... 33
Number of pollutants ...... 0
Number of land uses ....... 0
```

```
****************
Raingage Summary
****************
                                                Data       Recording
Name                Data Source                 Type       Interval
-----------------------------------------------------------------------
Raingage            C3hr-100yr                  INTENSITY   10 min.


********************
Subcatchment Summary
********************
Name                       Area     Width   %Imperv    %Slope Rain Gage            Outlet
-----------------------------------------------------------------------------------------------------------
A-01                       0.07     35.49     57.00    2.2000 Raingage             CB-05
A-02                       0.10     43.30     57.00    2.0000 Raingage             CBMH-10
A-03                       0.13     46.09     46.00    1.9000 Raingage             CBMH-11
A-04                       0.06     34.48     66.00    2.2000 Raingage             CB-12
A-05                       0.11     47.82     87.00    2.1000 Raingage             CBMH-02
A-06                       0.11     35.13     71.00    1.7000 Raingage             CBMH-03
A-07                       0.05     18.55    100.00    1.5000 Raingage             CBMH-04
A-08                       0.08     17.39      0.00    1.0000 Raingage             CB-13
A-09                       0.07     24.61    100.00    1.7000 Raingage             CBMH-06
A-10                       0.07     28.84     83.00    1.9000 Raingage             CB-01
A-11                       0.09     32.87     76.00    1.9000 Raingage             CBMH-07
A-12                       0.05     26.68     73.00    1.4000 Raingage             CBMH-08
A-13                       0.07     23.53     64.00    1.2000 Raingage             CBMH-09
R-01                       0.09     57.60    100.00    2.0000 Raingage             STMMH-202
R-02                       0.08     54.74    100.00    2.0000 Raingage             STMMH-201


************
Node Summary
************
                                         Invert      Max.    Ponded    External
Name                Type                  Elev.     Depth      Area    Inflow
-------------------------------------------------------------------------------
J1                  JUNCTION             103.49      2.40       0.0
OF1                 OUTFALL              102.05      0.45       0.0
```

OF2	OUTFALL	105.87	0.10	0.0
CB-01	STORAGE	104.01	2.08	0.0
CB-05	STORAGE	103.92	2.15	0.0
CB-12	STORAGE	103.92	2.15	0.0
CB-13	STORAGE	103.85	1.75	0.0
CBMH-02	STORAGE	103.79	2.28	0.0
CBMH-03	STORAGE	103.32	2.75	0.0
CBMH-04	STORAGE	103.04	3.01	0.0
CBMH-06	STORAGE	102.33	3.74	0.0
CBMH-07	STORAGE	103.76	2.33	0.0
CBMH-08	STORAGE	103.54	2.56	0.0
CBMH-09	STORAGE	102.78	3.32	0.0
CBMH-10	STORAGE	103.79	2.28	0.0
CBMH-11	STORAGE	103.59	2.48	0.0
STMMH-200	STORAGE	102.13	3.82	0.0
STMMH-201	STORAGE	104.15	1.97	0.0
STMMH-202	STORAGE	104.15	1.84	0.0
STMMH-203	STORAGE	103.82	2.21	0.0
STMMH-204	STORAGE	103.54	2.54	0.0
StormTech	STORAGE	103.16	2.73	0.0

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
112_(10)_(STM)	CBMH-06	STMMH-200	CONDUIT	21.4	0.5621	0.0130
112_(11)_(STM)	STMMH-200	OF1	CONDUIT	17.0	0.4717	0.0130
112_(19)_(STM)	CBMH-11	CBMH-03	CONDUIT	40.0	0.4999	0.0130
112_(20)_(STM)	STMMH-201	STMMH-204	CONDUIT	57.1	0.5082	0.0130
112_(21)_(STM)	CBMH-08	CBMH-09	CONDUIT	38.4	0.4954	0.0130
112_(22)_(STM)	STMMH-202	STMMH-203	CONDUIT	55.8	0.5014	0.0130
112_(24)_(STM)	CBMH-07	CBMH-08	CONDUIT	34.1	0.4980	0.0130
112_(35)_(STM)	STMMH-204	StormTech	CONDUIT	4.0	1.2408	0.0130
112_(36)_(STM)	STMMH-203	STMMH-204	CONDUIT	42.0	0.5006	0.0130
112_(37)_(STM)	CB-05	CBMH-10	CONDUIT	24.8	0.4845	0.0130
112_(38)_(STM)	CBMH-10	CBMH-11	CONDUIT	29.9	0.5020	0.0130
112_(39)_(STM)	J1	CBMH-06	CONDUIT	5.3	0.9381	0.0130
112_(41)_(STM)	CB-12	CBMH-02	CONDUIT	24.3	0.4940	0.0130
112_(42)_(STM)	CB-13	CBMH-06	CONDUIT	7.3	0.9629	0.0130
112_(43)_(STM)	StormTech	CBMH-04	CONDUIT	6.5	0.9245	0.0130
112_(7)_(STM)	CB-01	CBMH-07	CONDUIT	43.9	0.5013	0.0130
112_(8)_(STM)	CBMH-02	CBMH-03	CONDUIT	30.4	0.4928	0.0130
112_(9)_(STM)	CBMH-04	CBMH-06	CONDUIT	31.2	0.5125	0.0130
C1	CB-05	CBMH-10	CONDUIT	2.0	0.0152	0.0130
C10	CBMH-06	CBMH-04	CONDUIT	2.0	0.0152	0.0130
C11	CBMH-04	CBMH-03	CONDUIT	2.0	0.0152	0.0130
C12	CBMH-03	OF2	CONDUIT	2.0	0.0152	0.0130
C2	CBMH-10	CBMH-02	CONDUIT	2.0	0.0152	0.0130
C3	CBMH-11	CBMH-03	CONDUIT	2.0	0.0152	0.0130
C4	CB-12	CBMH-02	CONDUIT	2.0	0.0152	0.0130
C5	CBMH-02	CBMH-03	CONDUIT	2.0	0.0152	0.0130
C6	CBMH-07	CB-01	CONDUIT	2.0	0.0152	0.0130
C7	CB-01	CB-12	CONDUIT	2.0	0.0152	0.0130
C8	CBMH-08	CBMH-09	CONDUIT	2.0	0.0152	0.0130
C9	CBMH-09	CBMH-06	CONDUIT	2.0	0.0152	0.0130
112_(15)_(STM)	CBMH-09	STMMH-200	ORIFICE			
112_(17)_(STM)	CBMH-03	CBMH-04	ORIFICE			
W1	StormTech	J1	WEIR			

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
112_(10)_(STM)	CIRCULAR	0.38	0.11	0.09	0.38	1	131.46
112_(11)_(STM)	CIRCULAR	0.45	0.16	0.11	0.45	1	195.82
112_(19)_(STM)	CIRCULAR	0.30	0.07	0.07	0.30	1	68.37
112_(20)_(STM)	CIRCULAR	0.30	0.07	0.07	0.30	1	68.94
112_(21)_(STM)	CIRCULAR	0.30	0.07	0.07	0.30	1	68.07
112_(22)_(STM)	CIRCULAR	0.30	0.07	0.07	0.30	1	68.48
112_(24)_(STM)	CIRCULAR	0.25	0.05	0.06	0.25	1	41.97
112_(35)_(STM)	CIRCULAR	0.38	0.11	0.09	0.38	1	195.31
112_(36)_(STM)	CIRCULAR	0.30	0.07	0.07	0.30	1	68.42
112_(37)_(STM)	CIRCULAR	0.25	0.05	0.06	0.25	1	41.39

112_(38)_(STM)	CIRCULAR	0.25	0.05	0.06	0.25	1	42.14
112_(39)_(STM)	CIRCULAR	0.38	0.11	0.09	0.38	1	169.83
112_(41)_(STM)	CIRCULAR	0.25	0.05	0.06	0.25	1	41.80
112_(42)_(STM)	CIRCULAR	0.25	0.05	0.06	0.25	1	58.36
112_(43)_(STM)	CIRCULAR	0.38	0.11	0.09	0.38	1	168.60
112_(7)_(STM)	CIRCULAR	0.25	0.05	0.06	0.25	1	42.11
112_(8)_(STM)	CIRCULAR	0.25	0.05	0.06	0.25	1	41.75
112_(9)_(STM)	CIRCULAR	0.38	0.11	0.09	0.38	1	125.52
C1	RECT_OPEN	0.10	0.50	0.10	5.00	1	99.66
C10	RECT_OPEN	0.10	0.50	0.10	5.00	1	99.66
C11	RECT_OPEN	0.10	0.50	0.10	5.00	1	99.66
C12	RECT_OPEN	0.10	0.50	0.10	5.00	1	99.66
C2	RECT_OPEN	0.10	0.50	0.10	5.00	1	99.66
C3	RECT_OPEN	0.10	0.50	0.10	5.00	1	99.66
C4	RECT_OPEN	0.10	0.50	0.10	5.00	1	99.66
C5	RECT_OPEN	0.10	0.50	0.10	5.00	1	99.66
C6	RECT_OPEN	0.10	0.50	0.10	5.00	1	99.66
C7	RECT_OPEN	0.10	0.50	0.10	5.00	1	99.66
C8	RECT_OPEN	0.10	0.50	0.10	5.00	1	99.66
C9	RECT_OPEN	0.10	0.50	0.10	5.00	1	99.66

```
****************
Analysis Options
****************
Flow Units ............... LPS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Infiltration Method ...... HORTON
Flow Routing Method ...... DYNWAVE
Surcharge Method ......... EXTRAN
Starting Date ............ 11/01/2025 00:00:00
Ending Date .............. 11/02/2025 00:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:01:00
Wet Time Step ............ 00:01:00
Dry Time Step ............ 00:01:00
Routing Time Step ........ 2.00 sec
Variable Time Step ....... YES
Maximum Trials ........... 8
Number of Threads ........ 8
Head Tolerance ........... 0.001500 m

**************************        Volume         Depth
Runoff Quantity Continuity     hectare-m            mm
**************************     ---------       -------
Initial LID Storage ......         0.001         0.885
Total Precipitation ......         0.087        71.667
Evaporation Loss .........         0.000         0.000
Infiltration Loss ........         0.016        13.302
Surface Runoff ...........         0.071        58.447
Final Storage ............         0.001         0.885
Continuity Error (%) .....        -0.115

**************************        Volume        Volume
Flow Routing Continuity        hectare-m      10^6 ltr
**************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......         0.071         0.710
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.003
External Outflow .........         0.071         0.713
Flooding Loss ............         0.000         0.000
Evaporation Loss .........         0.000         0.000
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         0.007         0.065
Final Stored Volume ......         0.007         0.065
Continuity Error (%) .....         0.061
```

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**************************
Time-Step Critical Elements
**************************
Link 112_(35)_(STM) (15.92%)


*******************************
Highest Flow Instability Indexes
*******************************
Link 112_(15)_(STM) (116)


********************************
Most Frequent Nonconverging Nodes
********************************
Convergence obtained at all time steps.


*************************
Routing Time Step Summary
*************************
Minimum Time Step           :     0.27 sec
Average Time Step           :     1.84 sec
Maximum Time Step           :     2.00 sec
% of Time in Steady State   :     0.00
Average Iterations per Step :     2.00
% of Steps Not Converging   :     0.00
Time Step Frequencies       :
    2.000 -  1.516 sec      :    83.94 %
    1.516 -  1.149 sec      :     0.06 %
    1.149 -  0.871 sec      :    13.02 %
    0.871 -  0.660 sec      :     1.04 %
    0.660 -  0.500 sec      :     1.94 %


**************************
Subcatchment Runoff Summary
**************************
```

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff LPS	Runoff Coeff
A-01	71.67	0.00	0.00	19.09	40.91	11.75	52.67	0.04	32.84	0.735
A-02	71.67	0.00	0.00	19.14	40.91	11.70	52.61	0.05	43.16	0.734
A-03	71.67	0.00	0.00	24.31	33.02	14.42	47.43	0.06	49.02	0.662
A-04	71.67	0.00	0.00	14.98	47.38	9.41	56.79	0.03	25.51	0.792
A-05	71.67	0.00	0.00	5.70	62.43	3.63	66.07	0.07	53.49	0.922
A-06	71.67	0.00	0.00	12.90	50.95	7.89	58.84	0.06	49.39	0.821
A-07	71.67	0.00	0.00	0.00	71.75	0.00	71.75	0.03	22.82	1.001
A-08	71.67	0.00	0.00	48.47	0.00	23.21	23.21	0.02	8.80	0.324
A-09	71.67	0.00	0.00	0.00	71.75	0.00	71.75	0.05	32.24	1.001
A-10	71.67	0.00	0.00	7.47	59.56	4.73	64.29	0.04	31.33	0.897
A-11	71.67	0.00	0.00	10.62	54.54	6.60	61.13	0.06	44.00	0.853
A-12	71.67	0.00	0.00	11.92	52.39	7.45	59.84	0.03	23.84	0.835
A-13	71.67	0.00	0.00	16.14	45.92	9.67	55.60	0.04	29.16	0.776
R-01	71.67	0.00	0.00	0.00	71.77	0.00	71.77	0.06	44.14	1.001
R-02	71.67	0.00	0.00	0.00	71.77	0.00	71.77	0.06	42.16	1.001

100 Nipissing Court (124176)
PCSWMM Model Output (100-year 3-hour Chicago)

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.01	0.50	103.99	0 01:10	0.50
OF1	OUTFALL	1.07	1.07	103.12	0 00:00	1.07
OF2	OUTFALL	0.00	0.00	105.87	0 00:00	0.00
CB-01	STORAGE	0.09	1.91	105.92	0 01:20	1.91
CB-05	STORAGE	0.11	1.92	105.84	0 01:22	1.92
CB-12	STORAGE	0.11	1.90	105.82	0 01:20	1.90
CB-13	STORAGE	0.00	0.10	103.95	0 01:10	0.10
CBMH-02	STORAGE	0.12	2.02	105.81	0 01:19	2.02
CBMH-03	STORAGE	0.17	2.45	105.77	0 01:13	2.45
CBMH-04	STORAGE	0.10	0.98	104.02	0 01:10	0.98
CBMH-06	STORAGE	0.81	1.61	103.94	0 01:10	1.61
CBMH-07	STORAGE	0.11	2.15	105.91	0 01:19	2.15
CBMH-08	STORAGE	0.12	2.34	105.88	0 01:11	2.34
CBMH-09	STORAGE	0.50	3.08	105.86	0 01:11	3.08
CBMH-10	STORAGE	0.12	2.05	105.84	0 01:21	2.05
CBMH-11	STORAGE	0.14	2.22	105.81	0 01:17	2.22
STMMH-200	STORAGE	1.00	1.28	103.41	0 01:10	1.28
STMMH-201	STORAGE	0.01	0.19	104.34	0 01:06	0.19
STMMH-202	STORAGE	0.01	0.19	104.34	0 01:03	0.19
STMMH-203	STORAGE	0.06	0.33	104.15	0 01:10	0.33
STMMH-204	STORAGE	0.34	0.53	104.07	0 01:10	0.53
StormTech	STORAGE	0.71	0.86	104.02	0 01:10	0.86

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
J1	JUNCTION	0.00	81.07	0 01:10	0	0.108	0.068
OF1	OUTFALL	0.00	246.03	0 01:10	0	0.716	0.000
OF2	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
CB-01	STORAGE	31.33	31.33	0 01:10	0.0418	0.0422	0.174
CB-05	STORAGE	32.84	32.84	0 01:10	0.0395	0.0395	0.026
CB-12	STORAGE	25.51	28.88	0 01:10	0.0312	0.0318	0.015
CB-13	STORAGE	8.80	8.80	0 01:10	0.0176	0.0176	-0.145
CBMH-02	STORAGE	53.49	62.62	0 01:04	0.0727	0.104	0.201
CBMH-03	STORAGE	49.39	104.51	0 01:06	0.0642	0.32	-0.050
CBMH-04	STORAGE	22.82	104.43	0 01:05	0.033	0.372	-0.004
CBMH-06	STORAGE	32.24	208.77	0 01:10	0.0467	0.548	-0.003
CBMH-07	STORAGE	44.00	59.46	0 01:07	0.0575	0.0997	0.184
CBMH-08	STORAGE	23.84	54.73	0 01:07	0.0305	0.13	-0.037
CBMH-09	STORAGE	29.16	54.86	0 01:07	0.0378	0.169	-0.052
CBMH-10	STORAGE	43.16	49.15	0 01:05	0.0526	0.0921	0.190
CBMH-11	STORAGE	49.02	59.55	0 01:10	0.0603	0.152	-0.083
STMMH-200	STORAGE	0.00	246.06	0 01:10	0	0.718	-0.007
STMMH-201	STORAGE	42.16	42.16	0 01:10	0.061	0.061	1.331
STMMH-202	STORAGE	44.14	44.14	0 01:10	0.0639	0.0639	0.980
STMMH-203	STORAGE	0.00	44.97	0 01:04	0	0.0644	-0.788
STMMH-204	STORAGE	0.00	86.07	0 01:06	0	0.126	-0.507
StormTech	STORAGE	0.00	85.39	0 01:05	0	0.18	0.010

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Node Surcharge Summary
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Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters

STMMH-200	STORAGE	24.00	0.822	2.543

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Node Flooding Summary
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No nodes were flooded.

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Storage Volume Summary
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Storage Unit	Average Volume 1000 m³	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m³	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow LPS
CB-01	0.000	0.4	0.0	0.0	0.008	18.5	0 01:20	22.75
CB-05	0.001	0.5	0.0	0.0	0.014	13.2	0 01:22	38.32
CB-12	0.000	0.2	0.0	0.0	0.010	8.5	0 01:20	16.47
CB-13	0.000	0.3	0.0	0.0	0.000	5.6	0 01:10	9.48
CBMH-02	0.000	0.3	0.0	0.0	0.012	10.2	0 01:19	35.09
CBMH-03	0.000	0.3	0.0	0.0	0.016	9.6	0 01:13	74.91
CBMH-04	0.000	0.4	0.0	0.0	0.001	3.5	0 01:10	100.55
CBMH-06	0.001	2.5	0.0	0.0	0.002	4.9	0 01:10	207.35
CBMH-07	0.000	0.5	0.0	0.0	0.012	19.1	0 01:19	31.91
CBMH-08	0.000	0.3	0.0	0.0	0.003	6.6	0 01:11	34.74
CBMH-09	0.001	0.7	0.0	0.0	0.005	6.3	0 01:11	39.83
CBMH-10	0.001	0.5	0.0	0.0	0.017	13.8	0 01:21	47.48
CBMH-11	0.000	0.4	0.0	0.0	0.011	10.9	0 01:17	53.63
STMMH-200	0.001	26.1	0.0	0.0	0.001	33.4	0 01:10	246.03
STMMH-201	0.000	0.5	0.0	0.0	0.000	9.5	0 01:06	42.85
STMMH-202	0.000	0.6	0.0	0.0	0.000	10.4	0 01:03	44.97
STMMH-203	0.000	2.5	0.0	0.0	0.000	14.9	0 01:10	43.89
STMMH-204	0.000	13.2	0.0	0.0	0.001	20.8	0 01:10	85.39
StormTech	0.054	99.5	0.0	0.0	0.054	100.0	0 00:21	85.38

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**********************
Outfall Loading Summary
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Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
OF1	88.61	15.10	246.03	0.716
OF2	0.00	0.00	0.00	0.000
System	44.30	15.10	246.03	0.716

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*******************
Link Flow Summary
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Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
112_(10)_(STM)	CONDUIT	207.35	0 01:10	1.88	1.58	1.00
112_(11)_(STM)	CONDUIT	246.03	0 01:10	1.55	1.26	1.00
112_(19)_(STM)	CONDUIT	53.63	0 01:48	0.76	0.78	1.00
112_(20)_(STM)	CONDUIT	42.85	0 01:10	1.00	0.62	0.64
112_(21)_(STM)	CONDUIT	34.74	0 01:34	0.70	0.51	1.00
112_(22)_(STM)	CONDUIT	44.97	0 01:04	0.96	0.66	0.75
112_(24)_(STM)	CONDUIT	31.91	0 01:07	0.78	0.76	1.00
112_(35)_(STM)	CONDUIT	85.39	0 01:05	0.77	0.44	1.00
112_(36)_(STM)	CONDUIT	43.89	0 01:06	0.63	0.64	1.00
112_(37)_(STM)	CONDUIT	38.32	0 01:48	0.78	0.93	1.00
112_(38)_(STM)	CONDUIT	47.48	0 01:47	0.97	1.13	1.00
112_(39)_(STM)	CONDUIT	81.57	0 01:10	1.08	0.48	1.00
112_(41)_(STM)	CONDUIT	16.47	0 01:01	0.37	0.39	1.00
112_(42)_(STM)	CONDUIT	9.48	0 01:10	0.76	0.16	0.52

112_(43)_(STM)	CONDUIT	17.42	0	01:05	0.83	0.10	0.48
112_(7)_(STM)	CONDUIT	22.75	0	01:02	0.74	0.54	1.00
112_(8)_(STM)	CONDUIT	35.09	0	01:05	0.78	0.84	1.00
112_(9)_(STM)	CONDUIT	100.55	0	01:06	0.91	0.80	1.00
C1	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C10	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C11	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C12	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C2	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C3	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C4	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C5	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C6	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C7	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C8	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C9	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
112_(15)_(STM)	ORIFICE	39.83	0	01:15			1.00
112_(17)_(STM)	ORIFICE	74.91	0	01:31			1.00
W1	WEIR	81.07	0	01:10			0.08

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Flow Classification Summary
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Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
112_(10)_(STM)	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
112_(11)_(STM)	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
112_(19)_(STM)	1.00	0.00	0.00	0.00	0.07	0.00	0.00	0.93	0.02	0.00
112_(20)_(STM)	1.00	0.00	0.37	0.00	0.51	0.00	0.00	0.12	0.87	0.00
112_(21)_(STM)	1.00	0.00	0.00	0.00	0.05	0.00	0.00	0.95	0.00	0.00
112_(22)_(STM)	1.00	0.00	0.00	0.00	0.46	0.00	0.00	0.53	0.05	0.00
112_(24)_(STM)	1.00	0.00	0.00	0.00	0.05	0.00	0.00	0.95	0.00	0.00
112_(35)_(STM)	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
112_(36)_(STM)	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
112_(37)_(STM)	1.00	0.00	0.00	0.00	0.13	0.00	0.00	0.87	0.08	0.00
112_(38)_(STM)	1.00	0.00	0.00	0.00	0.05	0.00	0.00	0.95	0.00	0.00
112_(39)_(STM)	1.00	0.00	0.00	0.00	0.01	0.00	0.00	0.99	0.00	0.00
112_(41)_(STM)	1.00	0.00	0.00	0.00	0.13	0.00	0.00	0.87	0.09	0.00
112_(42)_(STM)	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
112_(43)_(STM)	1.00	0.59	0.00	0.00	0.00	0.00	0.00	0.41	0.00	0.00
112_(7)_(STM)	1.00	0.00	0.00	0.00	0.05	0.00	0.00	0.95	0.01	0.00
112_(8)_(STM)	1.00	0.00	0.00	0.00	0.05	0.00	0.00	0.95	0.00	0.00
112_(9)_(STM)	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.01	0.00
C1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C10	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C11	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C3	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C4	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C5	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C6	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C7	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C8	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C9	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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Conduit Surcharge Summary
****

Conduit	Hours Full Both Ends	Upstream	Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
112_(10)_(STM)	24.00	24.00	24.00	0.21	0.52
112_(11)_(STM)	24.00	24.00	24.00	0.16	0.63
112_(19)_(STM)	1.08	1.08	1.23	0.01	0.01
112_(21)_(STM)	1.01	1.01	1.14	0.01	0.01
112_(24)_(STM)	0.95	0.95	1.01	0.01	0.01
112_(35)_(STM)	0.35	0.35	24.00	0.01	0.01
112_(36)_(STM)	0.04	0.04	0.44	0.01	0.01

112_(37)_(STM)	0.96	0.96	1.00	0.01	0.01
112_(38)_(STM)	1.00	1.00	1.08	0.07	0.09
112_(39)_(STM)	0.10	0.10	0.11	0.01	0.01
112_(41)_(STM)	0.96	0.96	1.00	0.01	0.01
112_(7)_(STM)	0.86	0.86	0.94	0.01	0.01
112_(8)_(STM)	1.00	1.00	1.07	0.01	0.01
112_(9)_(STM)	0.42	0.42	0.82	0.01	0.01

```
Analysis begun on:  Fri Nov 14 09:27:59 2025
Analysis ended on:  Fri Nov 14 09:28:00 2025
Total elapsed time: 00:00:01
```

Overview

The Thornthwaite-Mather (1957) water balance models are conceptual models that are used to simulate steady-state climatic averages or continuous values of precipitation (rain + snow), snowpack, snowmelt, soil moisture, evapotranspiration, and water surplus (infiltration + runoff) (refer to **Figure 1**). Input parameters consist of daily precipitation *(PRECIP),* temperature *(MAX / MIN TEMP),* potential evapotranspiration *(PET)*, and the available water content *(AWC)* that can also be referred to as the water holding capacity of the soil. All water quantities in the model are based on monthly calculations and are represented as depths (volume per unit area) of liquid water over the area being simulated. *All model units are in millimetres (mm)*.

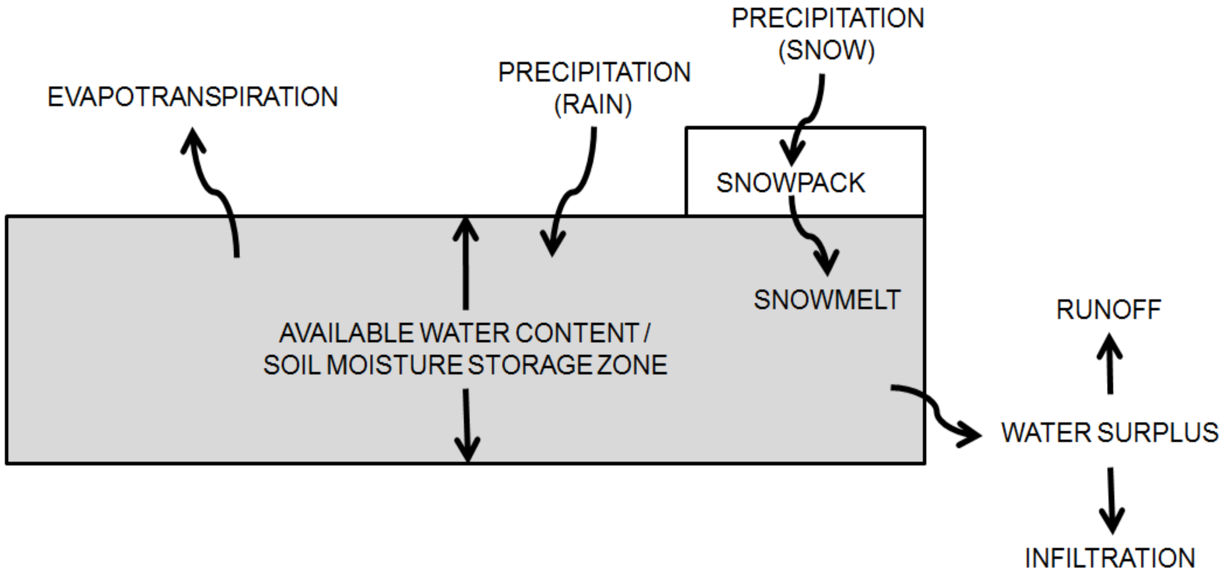


Figure 1: Conceptual Water Balance Model

Available Water Content (Water Holding Capacity)

The available water content (AWC) or water holding capacity of the soil was taken from Table 3.1 from the *Stormwater Management Planning & Design Manual (MOE, 2003)*, which has been reproduced in **Table 1** below. The available water content is the soil-moisture storage zone or the zone between the field capacity and vertical extent of the root zone.

Table 1: Water Holding Capacity Values (MOE, 2003)

Land Use / Soil Type	Hydrologic Soil Group	Water Holding Capacity (mm)
Urban Lawns / Shallow Rooted Crops (spinach, beans, beets, carrots)		
Fine Sand	A	50
Fine Sandy Loam	B	75
Silt Loam	C	125
Clay Loam	CD	100
Clay	D	75

Land Use / Soil Type	Hydrologic Soil Group	Water Holding Capacity (mm)
Moderately Rooted Crops (corn and cereal grains)		
Fine Sand	A	75
Fine Sandy Loam	B	150
Silt Loam	C	200
Clay Loam	CD	200
Clay	D	150
Pasture and Shrubs		
Fine Sand	A	100
Fine Sandy Loam	B	150
Silt Loam	C	250
Clay Loam	CD	250
Clay	D	200
Mature Forests		
Fine Sand	A	250
Fine Sandy Loam	B	300
Silt Loam	C	400
Clay Loam	CD	400
Clay	D	350

Precipitation

Daily precipitation *(PRECIP)* values consist of the total daily rainfall and water equivalent of snowmelt that fell on that day. Based on the mean daily temperature *(MEAN TEMP)* precipitation falls either as rainfall *(RAIN)* or the water equivalent of snowfall *(SNOW)*:

- *RAIN: If (MEAN TEMP >= 0, RAIN, SNOW)*
- *SNOW: If (MEAN TEMP < 0, SNOW, RAIN)*

Snowmelt / Snowpack / Water Input

Snowmelt *(MELT)* occurs if there is available snow (water equivalent) in the snowpack *(SNOWPACK)* and the maximum daily temperature *(MAX TEMP)* is greater than 0. The available snowmelt is limited to the available water in the snowpack.

Snowmelt is computed by a degree-day equation (Haith, 1985):

SNOWMELT (cm/d) = MELT COEFICIENT x [AIR TEMP (^{O}C) – MELT TEMP(^{O}C)]

The melt coefficient is typically 0.45 (cm of depth per degree-day, or cm x C^{-1} x day^{-1}) for northern climates (Haith, 1985). The melt temperature is assumed to be 0^{O}C. The air temperature is assumed to be the max temperature multiplied by a ratio of the max to min temperatures:

AIR TEMP = [*MAX TEMP / (MAX TEMP – MIN TEMP)]*

Therefore, the snowmelt equation is:

- *MELT: If (MAX TEMP > 0, IF(SNOWPACK > 0, MIN((0.45cm/°C-day*MAX TEMP*[MAX TEMP/(MAX TEMP – MIN TEMP)]*10mm/cm), SNOWPACK), 0), 0)*

Snow accumulates in the snowpack from the previous day if precipitation falls as snow and there is no snowmelt or the amount of snow that falls in a day exceeds the daily snowmelt:

$SNOWPACK_{N} = SNOWPACK_{N-1} + SNOW - MELT$

The initial snowmelt on day 1 (i.e. January 1) is assumed to be 0. The initial snowpack on day 1 is assumed to be the snowpack on the last day of simulation (i.e. December 31).

The total water input (W) is rain + snowmelt. This is the available water that fills the soil moisture storage zone each day.

Evaporation

Measured potential evaporation (PE) data (i.e. lake evaporation) is provided with the Environment Canada Climate Normals (see example below for Ottawa CDA). The data represents daily averages for each month over a 20+ year period.

▼ Evaporation

1981 to 2010 Canadian Climate Normals station data

Evaporation

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Code
Lake Evaporation (mm)	0	0	0	0	3.6	4.3	4.4	3.7	2.4	1.4	0	0	0	

The daily evaporation data was assumed to represent the middle or 15th of each month and 'smoothed' to represent the transition from month to month (see **Figure 2** below). As shown in **Figure 2**, this produces a more realistic curve of potential evapotranspiration.

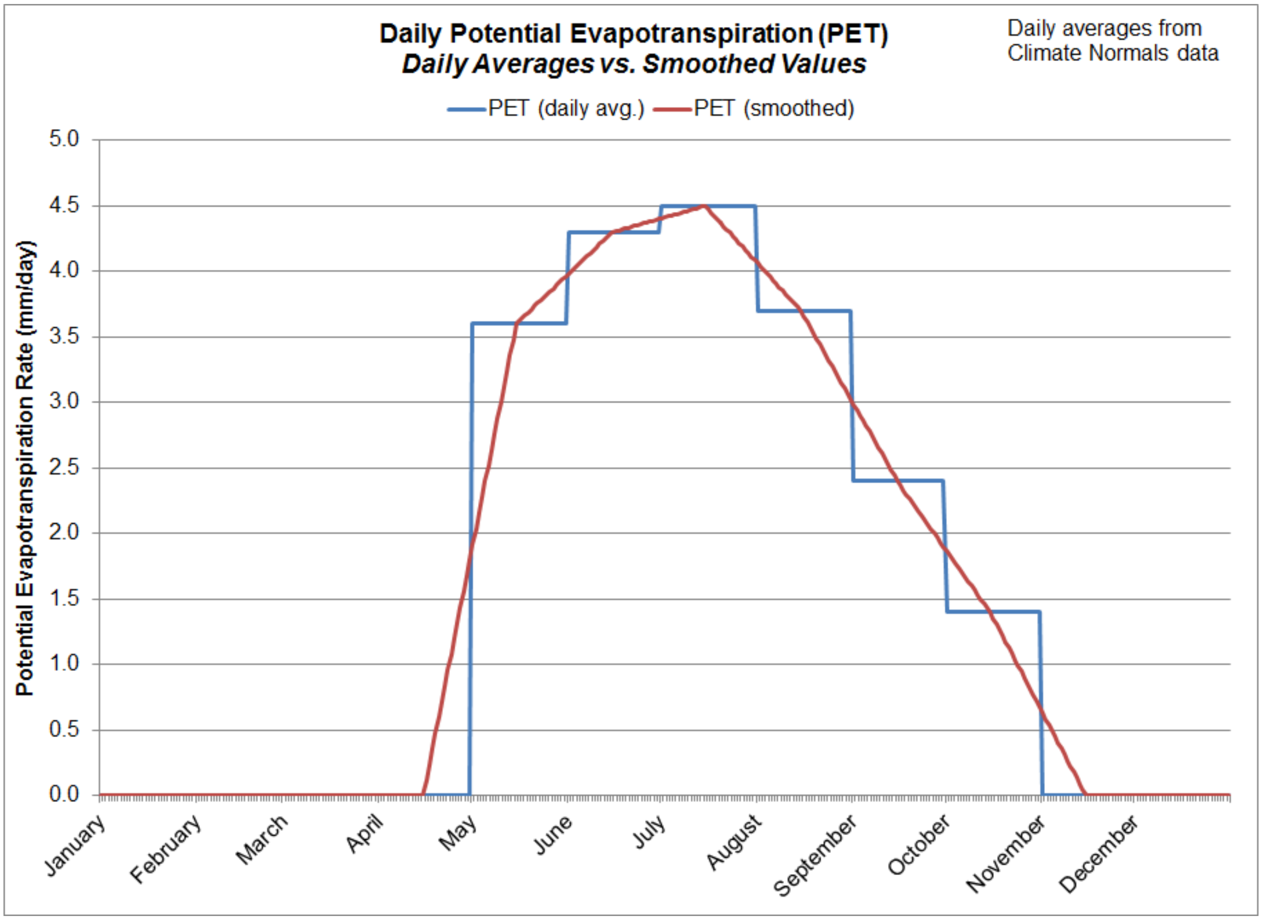


Figure 2: Daily Potential Evapotranspiration Rates (Daily Averages vs. Smoothed Values)

<u>Potential Evapotranspiration</u>

To convert potential evaporation data to potential crop evapotranspiration (PET) data a cover coefficient is applied based on land use and growing / dormant seasons:

PET = PE x Crop Cover Coefficient

Crop cover coefficients are based on the crop growth stages for different crop types (see **Figure 3**). A typical crop coefficient curve is shown in **Figure 4**, which depicts a crop that provides transpiration above the potential evaporation rates during the growing season.

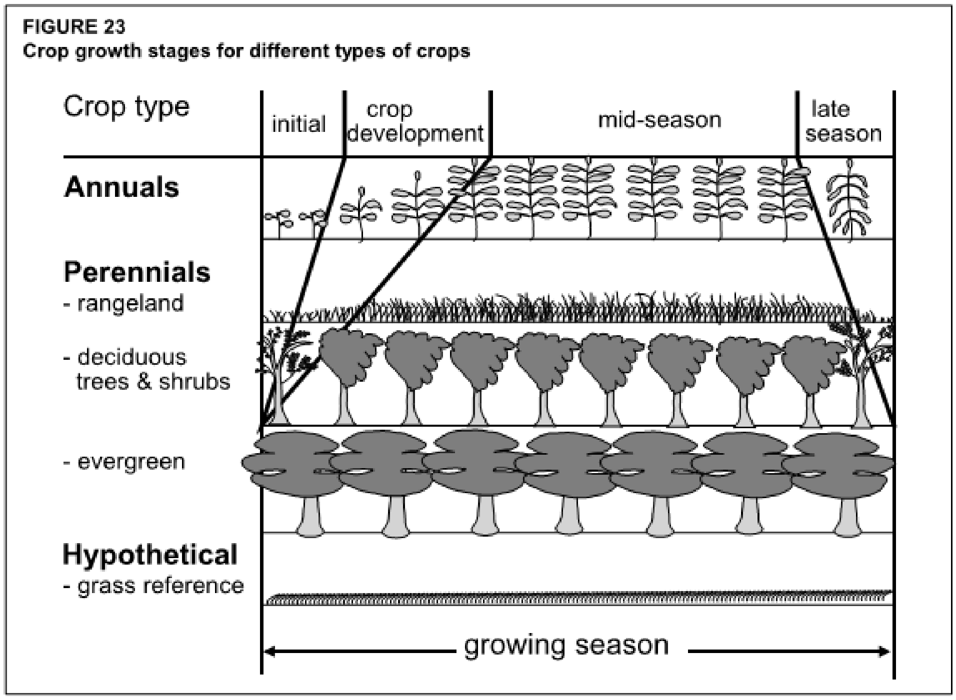


Figure 3: Crop Growth Stages for Different Types of Crops

Source: Food and Agriculture Organization of the United Nations (FAO), 1998, Crop Evapotranspiration - Guidelines for Computing Crop Water Requirements. FAO Irrigation and Drainage paper 56.

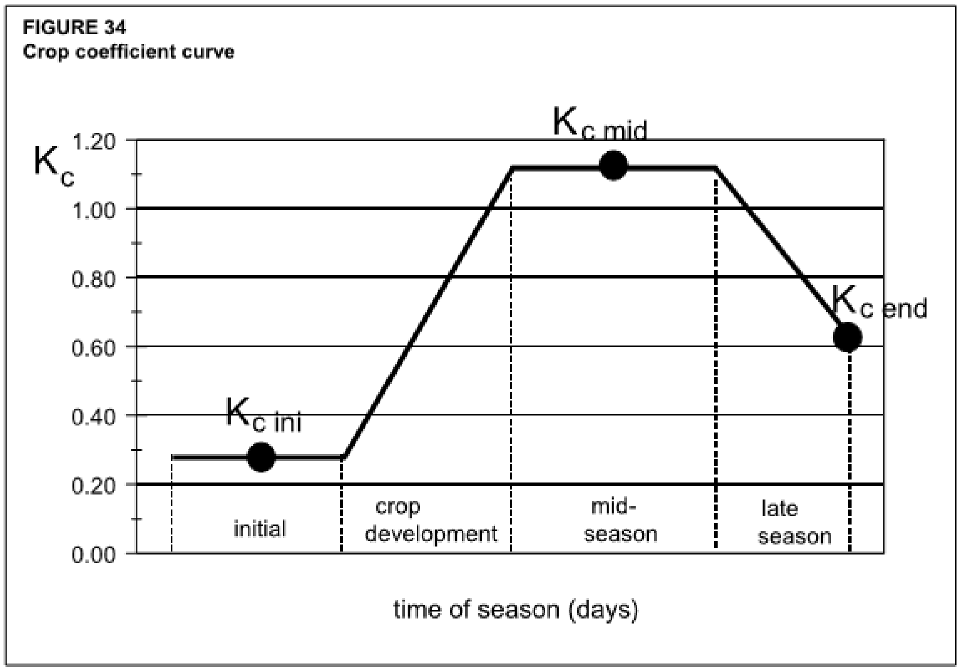


Figure 4: Crop Coefficient Curve

Source: Food and Agriculture Organization of the United Nations (FAO), 1998, Crop Evapotranspiration - Guidelines for Computing Crop Water Requirements. FAO Irrigation and Drainage paper 56.

The crop cover coefficients used in the water budget model for the various land use types is shown in **Table 2**. The growing / dormant seasons are shown in **Table 3**. The crop cover coefficients for the initial growing season are based on the average value of the dormant and middle of the growing season.

Table 2: Crop Cover Coefficients

Land Use	Dormant Season	Initial Growing Season	Middle of Growing Season	End of Growing Season
Urban Lawns / Shallow Rooted Crops*	0.40	0.78	1.15	0.55
Moderately Rooted Crops**	0.30	0.73	1.15	0.40
Pasture and Shrubs***	0.40	0.68	0.95	0.90
Mature Forest****	0.30	0.75	1.20	0.30
Impervious Areas	1.00	1.00	1.00	1.00

Reference: Data is based on Table 12 from the Food and Agriculture Organization of the United Nations (FAO), 1998, Crop Evapotranspiration - Guidelines for Computing Crop Water Requirements. FAO Irrigation and Drainage paper 56.

**Table 12, e. Legumes*
***Table 12, i. Cereals*
****Table 12, j. Forages (Alfalfa)*
*****Table 12, o. Wetlands*

Table 3: Crop Growing Season

Month(s)	Crop Growing Season
January – April	Dormant Season
May	Initial Growing Season
June - August	Middle of Growing Season
September	End of Growing Season
October - December	Dormant Season (harvest in October)

Reference: Food and Agriculture Organization of the United Nations (FAO), 1977, Crop Water Requirements. FAO Irrigation and Drainage paper 24.

Actual Evapotranspiration

Following Alley (1984), if the monthly water input (i.e. rain + snowmelt) is greater than the potential evapotranspiration (PET) rate, the actual evapotranspiration (AET) rate takes place at the potential evapotranspiration rate:

IF W > PET, then AET = PET

If the monthly water input is less than the potential evapotranspiration rate (i.e. W < PET) then the actual evapotranspiration rate is the sum of the water input and an increment removed from the available water in the soil moisture storage zone (SOIL WATER):

IF W < PET, then AET = W + ΔSOIL WATER

$$WHERE: \Delta SOIL\ WATER = SOIL\ WATER_{N-1} - SOIL\ WATER_{N}$$

Figure 5 shows a comparison of the average monthly potential evapotranspiration and actual evapotranspiration rates.

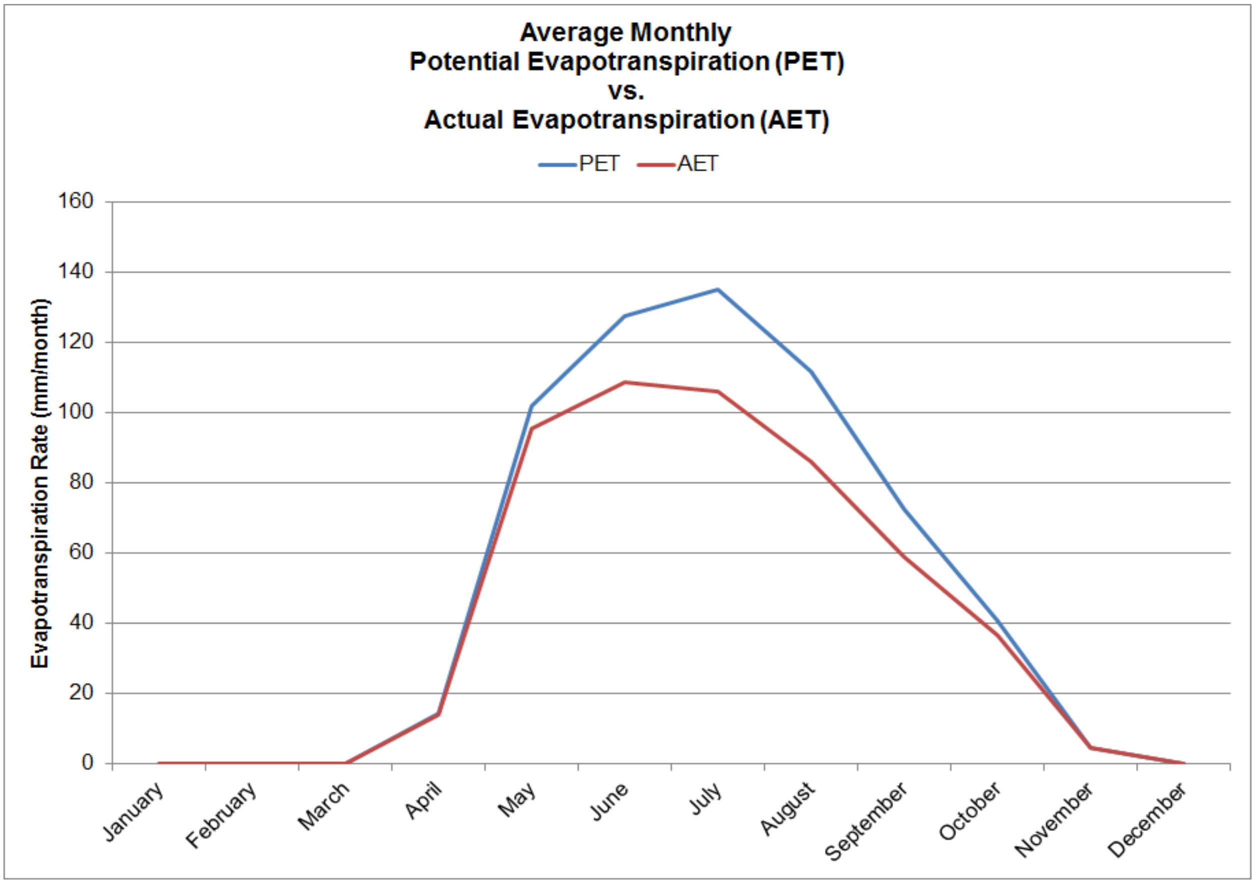


Figure 5: Average Monthly Potential Evapotranspiration vs. Actual Evapotranspiration

Soil Moisture

The soil moisture storage zone (SOIL WATER) is the amount of water available for actual evapotranspiration, but actual evapotranspiration is limited by the potential evapotranspiration rate.

The decrease / change in the soil moisture storage zone (ΔSOIL WATER) is based on the following relationship (Thornthwaite,1948), where AWC represents the available water content:

$$\Delta SOIL\ WATER = SOIL\ WATER_{N-1} \times [1-\exp(-((PET - W) / AWC))]$$

The soil moisture storage zone is replenished with rainwater and snowmelt (i.e. the water input) to the maximum value of the available water content (AWC):

$$SOIL\ WATER_N = min[(W - PET) + SOIL\ WATER_{N-1}), AWC]$$

Water Surplus

The water surplus (SURPLUS) is defined as the excess water that is greater than the available water content (AWC).

$$SURPLUS = W - AET - \Delta SOIL\ WATER$$

The water surplus represents the difference between precipitation and evapotranspiration. It is an estimate of the water that is available to contribute to infiltration and runoff (i.e. streamflow).

Infiltration / Runoff

The amount of water surplus that is infiltrated is determined by summing the infiltration factors (IF) based on topography, soils, and land cover. Since the water surplus represents infiltration and runoff; direct runoff is the amount of water surplus remaining after taking into account infiltration: (1.0 – infiltration factor = runoff factor). The infiltration and runoff factors were applied to the average monthly water surplus values:

$$INFILTRATION = IF \times SURPLUS$$

$$RUNOFF = (1.0 - IF) \times SURPLUS$$

The infiltration factors are shown in **Table 4**, which was reproduced from Table 3.1 in the *Stormwater Management Planning & Design Manual (MOE, 2003)*. These infiltration factors were initially presented in the document *"Hydrogeological Technical Information Requirements for Land Development Applications" (MOE, 1995)*.

Table 4: Infiltration Factors (MOE, 2003)

Description	Value of Infiltration Factor
Topography	
Flat Land, average slope < 0.6 m/km	0.3
Rolling Land, average slope 2.8 m/km to 3.8 m/km	0.2
Hilly Land, average slope 28 m/km to 47 m/km	0.1
Surficial Soils	
Tight impervious clay	0.1
Medium combination of clay and loam	0.2
Open sandy loam	0.4
Land Cover	
Cultivated Land	0.1
Woodland	0.2

Each soil type been assigned a corresponding infiltration factor as per Table 3.1 in the *Stormwater Management Planning & Design Manual (MOE, 2003),* as shown in **Table 5** below.

Table 5: Soils Infiltration Factors

Soil Type	Hydrologic Soil Group	Infiltration Factor
Coarse Sand	A	0.40
Fine Sand	AB	0.40
Fine Sandy Loam	B	0.40
Loam	BC	0.30
Silt Loam	C	0.20
Clay Loam	CD	0.15
Clay	D	0.10

The land use was combined into five (5) main categories (mature forest, row crops, pasture / meadow, urban lawns, and impervious areas) to be consistent with Table 3.1 in the *Stormwater Management Planning & Design Manual (MOE, 2003)*. The land use infiltration factors are shown in **Table 6** below.

Table 6: Land Use Infiltration Factor

Land Use	Infiltration Factor
Urban Lawns	0.10
Row Crops	0.10
Pasture / Meadow	0.10
Mature Forest	0.20
Impervious Areas	0.00

Land Use / Soils / Topography

The available water content (AWC), infiltration factors (IF), and crop cover coefficients (CROP COEF) are determined based on the combination of land use, soils and topography, as shown in **Table 7**.

Table 7: Model Parameters based on Land Use / Soils (existing areas)

Land Use	Soils (HSG)	AWC (mm)	IF (Land Use)	IF (Soils)	Crop Cover Coefficient			
					Dormant Season	Initial Growing Season	Middle of Growing Season	End of Growing Season
Urban Lawns	A	50	0.10	0.40	0.40	0.78	1.15	0.55
	AB	62.5		0.40				
	B	75		0.40				
	BC	100		0.30				
	C	125		0.20				
	CD	100		0.15				
	D	75		0.10				
Row Crops	A	75	0.10	0.40	0.30	0.73	1.15	0.40
	AB	112.5		0.40				
	B	150		0.40				
	BC	175		0.30				
	C	200		0.20				
	CD	200		0.15				
	D	150		0.10				
Pasture / Meadow	A	100	0.10	0.40	0.40	0.68	0.95	0.90
	AB	125		0.40				
	B	150		0.40				
	BC	200		0.30				
	C	250		0.20				
	CD	250		0.15				
	D	200		0.10				
Mature Forest	A	250	0.20	0.40	0.30	0.75	1.20	0.30
	AB	275		0.40				
	B	300		0.40				
	BC	350		0.30				
	C	400		0.20				
	CD	400		0.15				
	D	350		0.10				
Impervious Areas	A	1.57	0.00	0.00	1.00	1.00	1.00	1.00
	AB	1.57						
	B	1.57						
	BC	1.57						
	C	1.57						
	CD	1.57						
	D	1.57						

**For impervious areas, potential evapotranspiration is equal to potential evaporation (i.e. crop cover coefficient = 1.00).*

100 Nipissing Court (124176)
Water Balance Model Parameters

																Potential Evaporation Rates (AVG. mm/d)[3]											
																0.0	0.0	0.0	0.0	3.6	4.3	4.4	3.7	2.4	1.4	0.0	0.0
Surface Type	Area ID	Catchment Parameters						Infiltration Factor[1]				Crop Cover Coefficient[2]				Potential Evapotranspiration (AVG. mm/d)											
		AREA (m^2)	AREA (ha)	SOILS (HSG)	LAND USE	TOPOGRAPHY	AWC[1]	IF (soils)	IF (cover)	IF (topo)	IF (Total)	Dormant Season	Initial Growing Season	Middle of Growing Season	End of Growing Season	January	February	March	April	May	June	July	August	September	October	November	December
Impervious (buliding roof)	1	1740	0.17	B/C	IMPERVIOUS	ROLLING	1.57	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	3.60	4.30	4.40	3.70	2.40	1.40	0.00	0.00
Pervious (open space / grassed areas)	2	1940	0.19	B/C	LAWNS	ROLLING	100.00	0.30	0.10	0.15	0.55	0.40	0.78	1.15	0.55	0.00	0.00	0.00	0.00	2.81	4.95	5.06	4.26	1.32	0.56	0.00	0.00
Impervious (roads / parking)	3	8420	0.84	B/C	IMPERVIOUS	ROLLING	1.57	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	3.60	4.30	4.40	3.70	2.40	1.40	0.00	0.00

[1]Available Water Content (AWC) and Infiltration Factors (IF) for pervious areas based on Table 3.1 from the Stormwater Management Planning and Design Manual (MOE, 2003)

[2]Crop Cover Coefficients based on Table 12 from the Food and Agriculture Organization of the United Nations (FAO), 1998, Crop Evapotranspiration - Guidelines for Computing Crop Water Requirements - FAO Irrigation and Drainage paper 56

[3]Measured Potential Evaporation Data (i.e. Lake Evaporation) from the Environment Canada Canadian Climate Normals (Ottawa CDA, 1981-2010)

NOVATECH
Engineers, Planners & Landscape Architects

Water Balance for Area 1: Impervious (building roof)

Average Monthly Results													
Month	**Precip.**	**PET**	**Rain**	**Snow**	**Snowmelt**	**Water Input**	**W-PET**	**ΔSoil Water**	**AET**	**Surplus**	**Infiltration**	**Runoff**	**Additional Infiltration***
January	63.3	0.0	10.9	52.4	47.1	58.0	58.0	0.0	0.0	58.0	0.0	58.0	52.2
February	51.9	0.0	10.1	41.8	42.7	52.7	52.7	0.0	0.0	52.7	0.0	52.7	48.3
March	60.0	0.0	24.8	35.2	61.5	86.4	86.4	0.0	0.0	86.4	0.0	86.4	81.2
April	76.6	14.4	73.1	3.5	6.7	79.8	65.4	-1.0	8.0	72.9	0.0	72.9	70.9
May	78.2	102.1	78.2	0.0	0.0	78.2	-23.9	0.0	35.9	42.4	0.0	42.4	41.6
June	96.0	127.0	96.0	0.0	0.0	96.0	-31.0	-0.1	43.3	52.7	0.0	52.7	49.0
July	91.1	133.0	91.1	0.0	0.0	91.1	-41.8	-0.2	40.6	50.7	0.0	50.7	48.8
August	87.2	111.4	87.2	0.0	0.0	87.2	-24.2	-0.1	33.4	53.9	0.0	53.9	47.0
September	88.2	72.4	88.2	0.0	0.0	88.2	15.8	0.5	28.1	59.5	0.0	59.5	54.8
October	88.7	40.8	87.8	0.9	0.6	88.4	47.6	0.1	22.2	66.0	0.0	66.0	62.0
November	73.9	4.7	58.3	15.5	12.9	71.2	66.5	0.8	3.3	67.1	0.0	67.1	65.4
December	71.0	0.0	20.5	50.5	28.3	48.8	48.8	0.0	0.0	48.8	0.0	48.8	47.9
ANNUAL TOTAL	**926.1**	**605.8**	**726.2**	**199.8**	**199.8**	**926.0**	**320.3**	**0.0**	**214.9**	**711.2**	**0.0**	**711.2**	**368.7**

Total Number of Years = 30

**Based on capturing the first 30mm of rainfall from May - November*

Average Annual Results												
Year	**Precip.**	**PET**	**Rain**	**Snow**	**Snowmelt**	**Water Input**	**W-PET**	**ΔSoil Water**	**AET**	**Surplus**	**Infiltration**	**Runoff**
1988	836.1	605.8	713.0	123.1	133.9	846.9	241.1	0.0	205.8	641.1	0.0	641.1
1989	817.1	605.8	620.0	197.1	153.8	773.8	168.0	0.0	180.5	593.3	0.0	593.3
1990	976.7	605.8	777.6	199.1	232.7	1010.3	404.5	0.0	207.6	802.7	0.0	802.7
1991	820.2	605.8	619.1	201.1	204.0	823.1	217.4	0.0	191.6	631.5	0.0	631.5
1992	908.3	605.8	651.9	256.4	260.2	912.1	306.4	0.0	211.4	700.8	0.0	700.8
1993	1019.3	605.8	754.0	265.3	266.3	1020.3	414.5	0.0	243.6	776.7	0.0	776.7
1994	909.5	605.8	681.6	227.9	234.2	915.8	310.1	0.0	224.9	690.9	0.0	690.9
1995	1038.4	605.8	809.4	229.0	138.2	947.6	341.9	0.0	197.5	750.2	0.0	750.2
1996	1004.7	605.8	866.9	137.8	213.7	1080.6	474.8	0.0	220.2	860.4	0.0	860.4
1997	773.0	605.8	475.9	297.1	309.5	785.4	179.7	0.0	178.1	607.3	0.0	607.3
1998	841.6	605.8	630.0	211.6	192.8	822.8	217.1	0.0	209.4	613.4	0.0	613.4
1999	830.5	605.8	623.3	207.2	219.8	843.1	237.3	0.0	192.7	650.4	0.0	650.4
2000	987.4	605.8	783.0	204.4	162.0	945.0	339.3	0.0	240.8	704.2	0.0	704.2
2001	753.6	605.8	580.3	173.3	213.1	793.4	187.7	0.0	195.0	598.5	0.0	598.5
2002	867.9	605.8	687.7	180.2	189.6	877.3	271.6	0.0	194.6	682.8	0.0	682.8
2003	1068.5	605.8	820.4	248.1	255.3	1075.7	469.9	0.0	233.9	841.8	0.0	841.8
2004	919.7	605.8	756.2	163.5	124.4	880.6	274.9	0.0	220.1	660.5	0.0	660.5
2005	939.6	605.8	784.9	154.7	175.8	960.7	354.9	0.0	218.2	742.5	0.0	742.5
2006	1152.0	605.8	970.6	181.4	183.1	1153.7	547.9	0.0	241.1	912.6	0.0	912.6
2007	901.0	605.8	728.8	172.2	170.0	898.8	293.1	0.0	205.7	693.1	0.0	693.1
2008	1057.6	605.8	681.6	376.0	391.5	1073.1	467.3	0.0	234.1	838.9	0.0	838.9
2009	946.5	605.8	800.3	146.2	93.4	893.7	288.0	0.0	256.2	637.5	0.0	637.5
2010	970.2	605.8	867.0	103.2	159.0	1026.0	420.2	0.0	245.4	780.5	0.0	780.5
2011	878.2	605.8	676.6	201.6	179.8	856.4	250.7	0.0	217.9	638.6	0.0	638.6
2012	807.5	605.8	596.6	210.9	147.0	743.6	137.8	0.0	208.6	535.0	0.0	535.0
2013	881.4	605.8	704.2	177.2	217.5	921.7	316.0	0.0	231.7	690.0	0.0	690.0
2014	903.1	605.8	759.5	143.6	189.0	948.5	342.7	0.0	230.4	718.0	0.0	718.0
2015	785.7	605.8	648.3	137.4	108.6	756.9	151.2	0.0	200.5	556.4	0.0	556.4
2016	917.9	605.8	656.4	261.5	262.2	918.6	312.9	0.0	171.9	746.8	0.0	746.8
2017	1268.5	605.8	1061.5	207.0	214.0	1275.5	669.7	0.0	236.8	1038.7	0.0	1038.7
AVERAGE	**926.1**	**605.8**	**726.2**	**199.8**	**199.8**	**926.0**	**320.3**	**0.0**	**214.9**	**711.2**	**0.0**	**711.2**

PRECIP	Total Precipitation
PET	Potential Evapotranspiration
W	Water Input (Rain + Snowmelt)
Soil Water (SW)	Available Water in the Soil Moisture Storage Zone
ΔSoil Water	Change in Soil Water
AET	Actual Evapotranspiration

The water balance calculations are conducted on a daily time step
All units in mm

100 Nipissing Court (124176)
Water Balance Model Results - Area 2

Water Balance for Area 2: Pervious (open space / grassed areas)

Average Monthly Results												
Month	**Precip.**	**PET**	**Rain**	**Snow**	**Snowmelt**	**Water Input**	**W-PET**	**ΔSoil Water**	**AET**	**Surplus**	**Infiltration**	**Runoff**
January	63.3	0.0	10.9	52.4	47.1	58.0	58.0	0.0	0.0	58.0	31.9	26.1
February	51.9	0.0	10.1	41.8	42.7	52.7	52.7	0.0	0.0	52.7	29.0	23.7
March	60.0	0.0	24.8	35.2	61.5	86.4	86.4	0.0	0.0	86.4	47.5	38.9
April	76.6	11.2	73.1	3.5	6.7	79.8	68.6	-3.9	11.0	72.7	40.0	32.7
May	78.2	86.6	78.2	0.0	0.0	78.2	-8.4	-18.1	76.9	19.4	10.7	8.7
June	96.0	141.6	96.0	0.0	0.0	96.0	-45.6	-19.3	105.0	10.3	5.7	4.6
July	91.1	152.9	91.1	0.0	0.0	91.1	-61.8	-9.7	96.7	4.1	2.3	1.9
August	87.2	121.8	87.2	0.0	0.0	87.2	-34.6	3.8	77.1	6.2	3.4	2.8
September	88.2	46.5	88.2	0.0	0.0	88.2	41.7	36.7	35.7	15.8	8.7	7.1
October	88.7	17.6	87.8	0.9	0.6	88.4	70.8	9.9	17.0	61.4	33.8	27.6
November	73.9	1.9	58.3	15.5	12.9	71.2	69.3	0.6	1.9	68.8	37.8	30.9
December	71.0	0.0	20.5	50.5	28.3	48.8	48.8	0.0	0.0	48.8	26.8	21.9
ANNUAL TOTAL	**926.1**	**580.0**	**726.2**	**199.8**	**199.8**	**926.0**	**346.0**	**0.0**	**421.4**	**504.7**	**277.6**	**227.1**

Total Number of Years = 30

Average Annual Results												
Year	**Precip.**	**PET**	**Rain**	**Snow**	**Snowmelt**	**Water Input**	**W-PET**	**ΔSoil Water**	**AET**	**Surplus**	**Infiltration**	**Runoff**
1988	836.1	580.0	713.0	123.1	133.9	846.9	266.8	0.0	414.9	432.0	237.6	194.4
1989	817.1	580.0	620.0	197.1	153.8	773.8	193.8	0.0	397.5	376.3	207.0	169.3
1990	976.7	580.0	777.6	199.1	232.7	1010.3	430.2	0.0	417.5	592.8	326.0	266.8
1991	820.2	580.0	619.1	201.1	204.0	823.1	243.1	0.0	337.0	486.1	267.4	218.7
1992	908.3	580.0	651.9	256.4	260.2	912.1	332.1	0.0	451.5	460.6	253.3	207.3
1993	1019.3	580.0	754.0	265.3	266.3	1020.3	440.2	0.0	414.5	605.8	333.2	272.6
1994	909.5	580.0	681.6	227.9	234.2	915.8	335.8	0.0	482.7	433.1	238.2	194.9
1995	1038.4	580.0	809.4	229.0	138.2	947.6	367.6	0.0	422.0	525.6	289.1	236.5
1996	1004.7	580.0	866.9	137.8	213.7	1080.6	500.5	0.0	442.4	638.2	351.0	287.2
1997	773.0	580.0	475.9	297.1	309.5	785.4	205.4	0.0	324.0	461.4	253.8	207.6
1998	841.6	580.0	630.0	211.6	192.8	822.8	242.8	0.0	407.2	415.6	228.6	187.0
1999	830.5	580.0	623.3	207.2	219.8	843.1	263.0	0.0	378.3	464.8	255.7	209.2
2000	987.4	580.0	783.0	204.4	162.0	945.0	365.0	0.0	478.8	466.2	256.4	209.8
2001	753.6	580.0	580.3	173.3	213.1	793.4	213.4	0.0	351.4	442.0	243.1	198.9
2002	867.9	580.0	687.7	180.2	189.6	877.3	297.3	0.0	402.0	475.4	261.4	213.9
2003	1068.5	580.0	820.4	248.1	255.3	1075.7	495.6	0.0	439.9	635.8	349.7	286.1
2004	919.7	580.0	756.2	163.5	124.4	880.6	300.6	0.0	411.4	469.2	258.1	211.1
2005	939.6	580.0	784.9	154.7	175.8	960.7	380.7	0.0	416.9	543.8	299.1	244.7
2006	1152.0	580.0	970.6	181.4	183.1	1153.7	573.6	0.0	468.7	685.0	376.8	308.3
2007	901.0	580.0	728.8	172.2	170.0	898.8	318.8	0.0	421.4	477.4	262.6	214.8
2008	1057.6	580.0	681.6	376.0	391.5	1073.1	493.0	0.0	461.1	612.0	336.6	275.4
2009	946.5	580.0	800.3	146.2	93.4	893.7	313.7	0.0	477.2	416.6	229.1	187.5
2010	970.2	580.0	867.0	103.2	159.0	1026.0	445.9	0.0	434.0	592.0	325.6	266.4
2011	878.2	580.0	676.6	201.6	179.8	856.4	276.4	0.0	396.3	460.2	253.1	207.1
2012	807.5	580.0	596.6	210.9	147.0	743.6	163.5	0.0	363.9	379.7	208.8	170.9
2013	881.4	580.0	704.2	177.2	217.5	921.7	341.7	0.0	454.2	467.5	257.1	210.4
2014	903.1	580.0	759.5	143.6	189.0	948.5	368.4	0.0	461.0	487.5	268.1	219.4
2015	785.7	580.0	648.3	137.4	108.6	756.9	176.9	0.0	424.2	332.7	183.0	149.7
2016	917.9	580.0	656.4	261.5	262.2	918.6	338.6	0.0	389.6	529.0	291.0	238.1
2017	1268.5	580.0	1061.5	207.0	214.0	1275.5	695.4	0.0	500.1	775.4	426.5	348.9
AVERAGE	**926.1**	**580.0**	**726.2**	**199.8**	**199.8**	**926.0**	**346.0**	**0.0**	**421.4**	**504.7**	**277.6**	**227.1**

PRECIP	Total Precipitation
PET	Potential Evapotranspiration
W	Water Input (Rain + Snowmelt)
Soil Water (SW)	Available Water in the Soil Moisture Storage Zone
ΔSoil Water	Change in Soil Water
AET	Actual Evapotranspiration

The water balance calculations are conducted on a daily time step
All units in mm

Water Balance for Area 3: Impervious (roads / parking)

Average Monthly Results												
Month	**Precip.**	**PET**	**Rain**	**Snow**	**Snowmelt**	**Water Input**	**W-PET**	**ΔSoil Water**	**AET**	**Surplus**	**Infiltration**	**Runoff**
January	63.3	0.0	10.9	52.4	47.1	58.0	58.0	0.0	0.0	58.0	0.0	58.0
February	51.9	0.0	10.1	41.8	42.7	52.7	52.7	0.0	0.0	52.7	0.0	52.7
March	60.0	0.0	24.8	35.2	61.5	86.4	86.4	0.0	0.0	86.4	0.0	86.4
April	76.6	14.4	73.1	3.5	6.7	79.8	65.4	-1.0	8.0	72.9	0.0	72.9
May	78.2	102.1	78.2	0.0	0.0	78.2	-23.9	0.0	35.9	42.4	0.0	42.4
June	96.0	127.0	96.0	0.0	0.0	96.0	-31.0	-0.1	43.3	52.7	0.0	52.7
July	91.1	133.0	91.1	0.0	0.0	91.1	-41.8	-0.2	40.6	50.7	0.0	50.7
August	87.2	111.4	87.2	0.0	0.0	87.2	-24.2	-0.1	33.4	53.9	0.0	53.9
September	88.2	72.4	88.2	0.0	0.0	88.2	15.8	0.5	28.1	59.5	0.0	59.5
October	88.7	40.8	87.8	0.9	0.6	88.4	47.6	0.1	22.2	66.0	0.0	66.0
November	73.9	4.7	58.3	15.5	12.9	71.2	66.5	0.8	3.3	67.1	0.0	67.1
December	71.0	0.0	20.5	50.5	28.3	48.8	48.8	0.0	0.0	48.8	0.0	48.8
ANNUAL TOTAL	**926.1**	**605.8**	**726.2**	**199.8**	**199.8**	**926.0**	**320.3**	**0.0**	**214.9**	**711.2**	**0.0**	**711.2**

Total Number of Years = *30*

Average Annual Results												
Year	**Precip.**	**PET**	**Rain**	**Snow**	**Snowmelt**	**Water Input**	**W-PET**	**ΔSoil Water**	**AET**	**Surplus**	**Infiltration**	**Runoff**
1988	836.1	605.8	713.0	123.1	133.9	846.9	241.1	0.0	205.8	641.1	0.0	641.1
1989	817.1	605.8	620.0	197.1	153.8	773.8	168.0	0.0	180.5	593.3	0.0	593.3
1990	976.7	605.8	777.6	199.1	232.7	1010.3	404.5	0.0	207.6	802.7	0.0	802.7
1991	820.2	605.8	619.1	201.1	204.0	823.1	217.4	0.0	191.6	631.5	0.0	631.5
1992	908.3	605.8	651.9	256.4	260.2	912.1	306.4	0.0	211.4	700.8	0.0	700.8
1993	1019.3	605.8	754.0	265.3	266.3	1020.3	414.5	0.0	243.6	776.7	0.0	776.7
1994	909.5	605.8	681.6	227.9	234.2	915.8	310.1	0.0	224.9	690.9	0.0	690.9
1995	1038.4	605.8	809.4	229.0	138.2	947.6	341.9	0.0	197.5	750.2	0.0	750.2
1996	1004.7	605.8	866.9	137.8	213.7	1080.6	474.8	0.0	220.2	860.4	0.0	860.4
1997	773.0	605.8	475.9	297.1	309.5	785.4	179.7	0.0	178.1	607.3	0.0	607.3
1998	841.6	605.8	630.0	211.6	192.8	822.8	217.1	0.0	209.4	613.4	0.0	613.4
1999	830.5	605.8	623.3	207.2	219.8	843.1	237.3	0.0	192.7	650.4	0.0	650.4
2000	987.4	605.8	783.0	204.4	162.0	945.0	339.3	0.0	240.8	704.2	0.0	704.2
2001	753.6	605.8	580.3	173.3	213.1	793.4	187.7	0.0	195.0	598.5	0.0	598.5
2002	867.9	605.8	687.7	180.2	189.6	877.3	271.6	0.0	194.6	682.8	0.0	682.8
2003	1068.5	605.8	820.4	248.1	255.3	1075.7	469.9	0.0	233.9	841.8	0.0	841.8
2004	919.7	605.8	756.2	163.5	124.4	880.6	274.9	0.0	220.1	660.5	0.0	660.5
2005	939.6	605.8	784.9	154.7	175.8	960.7	354.9	0.0	218.2	742.5	0.0	742.5
2006	1152.0	605.8	970.6	181.4	183.1	1153.7	547.9	0.0	241.1	912.6	0.0	912.6
2007	901.0	605.8	728.8	172.2	170.0	898.8	293.1	0.0	205.7	693.1	0.0	693.1
2008	1057.6	605.8	681.6	376.0	391.5	1073.1	467.3	0.0	234.1	838.9	0.0	838.9
2009	946.5	605.8	800.3	146.2	93.4	893.7	288.0	0.0	256.2	637.5	0.0	637.5
2010	970.2	605.8	867.0	103.2	159.0	1026.0	420.2	0.0	245.4	780.5	0.0	780.5
2011	878.2	605.8	676.6	201.6	179.8	856.4	250.7	0.0	217.9	638.6	0.0	638.6
2012	807.5	605.8	596.6	210.9	147.0	743.6	137.8	0.0	208.6	535.0	0.0	535.0
2013	881.4	605.8	704.2	177.2	217.5	921.7	316.0	0.0	231.7	690.0	0.0	690.0
2014	903.1	605.8	759.5	143.6	189.0	948.5	342.7	0.0	230.4	718.0	0.0	718.0
2015	785.7	605.8	648.3	137.4	108.6	756.9	151.2	0.0	200.5	556.4	0.0	556.4
2016	917.9	605.8	656.4	261.5	262.2	918.6	312.9	0.0	171.9	746.8	0.0	746.8
2017	1268.5	605.8	1061.5	207.0	214.0	1275.5	669.7	0.0	236.8	1038.7	0.0	1038.7
AVERAGE	**926.1**	**605.8**	**726.2**	**199.8**	**199.8**	**926.0**	**320.3**	**0.0**	**214.9**	**711.2**	**0.0**	**711.2**

PRECIP	Total Precipitation
PET	Potential Evapotranspiration
W	Water Input (Rain + Snowmelt)
Soil Water (SW)	Available Water in the Soil Moisture Storage Zone
ΔSoil Water	Change in Soil Water
AET	Actual Evapotranspiration

The water balance calculations are conducted on a daily time step
All units in mm

100 Nipissing Court (124176)
Water Balance Model Results - Summary

NOVATECH
Engineers, Planners & Landscape Architects

Overall Post-Development Infiltration (without infiltration measures)

Area ID	Area (ha)	Infiltration (mm/yr)	Infiltration (m^3/yr)
1	0.17	0	0
2	0.19	278	538
3	0.84	0	0
TOTAL	**1.21**	**45**	**538**

Overall Post-Development Infiltration (with infiltration measures)

Area ID	Area (ha)	Infiltration (mm/yr)	Infiltration (m^3/yr)
1	0.17	369	641
2	0.19	278	538
3	0.84	0	0
TOTAL	**1.21**	**98**	**1,180**

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	

Advanced Drainage Systems, Inc.

SiteAssist™
FOR STORMTECH INSTALLATION INSTRUCTIONS VISIT OUR APP

100 NIPISSING COURT

OTTAWA, ON, CANADA

SC-310 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH SC-310.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE OR POLYETHYLENE COPOLYMERS.
3. CHAMBERS SHALL BE CERTIFIED TO CSA B184, "POLYMERIC SUB-SURFACE STORMWATER MANAGEMENT STRUCTURES", AND MEET THE REQUIREMENTS OF ASTM F2922 (POLETHYLENE) OR ASTM F2418 (POLYPROPYLENE), "STANDARD SPECIFICATION FOR CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE CSA S6 CL-625 TRUCK AND THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 50 mm (2").
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2922 SHALL BE GREATER THAN OR EQUAL TO 325 LBS/FT/%. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 23° C / 73° F), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2922 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.
10. MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH NOTE #6.32 FOR MANIFOLD SIZING GUIDANCE. DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
11. ADS DOES NOT DESIGN OR PROVIDE MEMBRANE LINER SYSTEMS. TO MINIMIZE THE LEAKAGE POTENTIAL OF LINER SYSTEMS, THE MEMBRANE LINER SYSTEM SHOULD BE DESIGNED BY A KNOWLEDGEABLE GEOTEXTILE PROFESSIONAL AND INSTALLED BY A QUALIFIED CONTRACTOR.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF THE SC-310 SYSTEM

1. STORMTECH SC-310 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH SC-310 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 80 mm (3") SPACING BETWEEN THE CHAMBER ROWS.
7. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE; AASHTO M43 #3, 357, 4, 467, 5, 56, OR 57.
8. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
9. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH SC-310 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
2. THE USE OF CONSTRUCTION EQUIPMENT OVER SC-310 & SC-740 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADERS, DUMP TRUCKS, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. FULL 900 mm (36") OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO THE CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

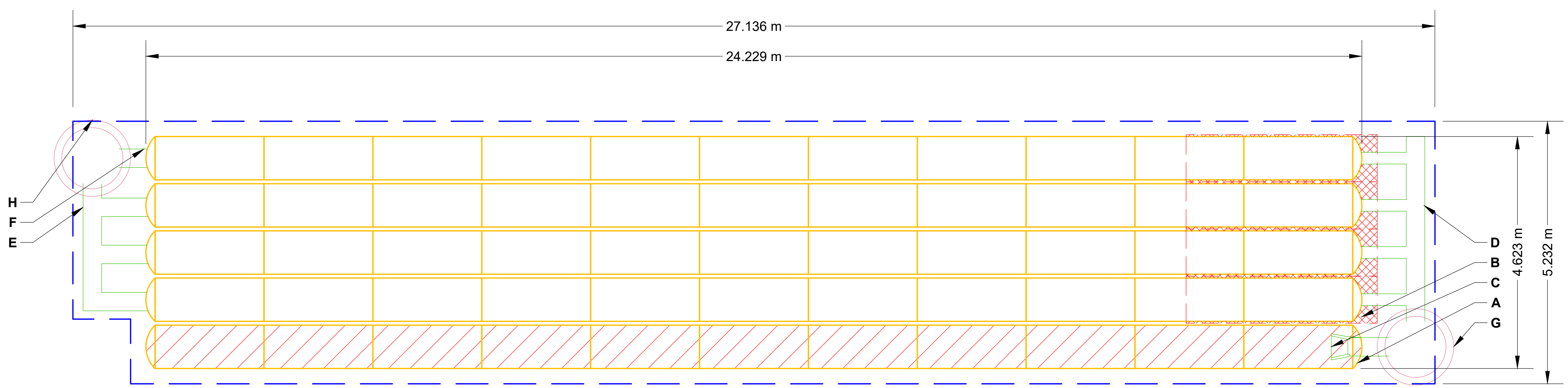
CONTACT STORMTECH AT 1-800-821-6710 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

PROPOSED LAYOUT	
55	STORMTECH SC-310 CHAMBERS
10	STORMTECH SC-310 END CAPS
152	STONE ABOVE (mm)
152	STONE BELOW (mm)
40	STONE VOID
53.8	INSTALLED SYSTEM VOLUME (m³) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)
140.5	SYSTEM AREA (m²)
64.7	SYSTEM PERIMETER (m)

PROPOSED ELEVATIONS	
MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	106.157
MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	104.277
MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	104.125
MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	104.125
MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	104.125
TOP OF STONE:	103.871
TOP OF SC-310 CHAMBER:	103.719
300 mm x 200 mm TOP MANIFOLD INVERT (200 mm PIPE):	103.401
300 mm x 300 mm BOTTOM MANIFOLD INVERT:	103.335
300 mm ISOLATOR ROW PLUS INVERT:	103.335
300 mm BOTTOM CONNECTION INVERT:	103.335
BOTTOM OF SC-310 CHAMBER:	103.312
300 mm x 200 mm TOP MANIFOLD INVERT (300 mm PIPE):	103.293
BOTTOM OF STONE:	103.160

*INVERT ABOVE BASE OF CHAMBER

PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
PREFABRICATED EZ END CAP	A	300 mm BOTTOM PREFABRICATED EZ END CAP, PART#: SC310ECEZ / TYP OF ALL 300 mm BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	23 mm	
PRE-CORED END CAP	B	200 mm TOP PRE-CORED END CAP, PART#: SC310EPE08TPC / TYP OF ALL 200 mm TOP CONNECTIONS	35 mm	
FLAMP	C	INSTALL FLAMP ON 300 mm ACCESS PIPE / PART#: SC31012RAMP		
MANIFOLD	D	300 mm x 200 mm REDUCING CONCENTRIC MOLDED FITTINGS (300 mm PIPE) 300 mm x 200 mm REDUCING CONCENTRIC MOLDED FITTINGS (200 mm PIPE)	-19 mm 89 mm	
MANIFOLD	E	300 mm x 300 mm BOTTOM MANIFOLD, ADS N-12	23 mm	
PIPE CONNECTION	F	300 mm BOTTOM CONNECTION	23 mm	
CONCRETE STRUCTURE	G	(DESIGN BY ENGINEER / PROVIDED BY OTHERS)		101 L/s IN
CONCRETE STRUCTURE	H	OCS (DESIGN BY ENGINEER / PROVIDED BY OTHERS)		113 L/s OUT



ISOLATOR ROW PLUS (SEE DETAIL)

PLACE MINIMUM 3.810 m OF ADSPLUS625 WOVEN GEOTEXTILE OVER BEDDING STONE AND UNDERNEATH CHAMBER FEET FOR SCOUR PROTECTION AT ALL CHAMBER INLET ROWS

BED LIMITS

NOTES

- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- **NOT FOR CONSTRUCTION**: THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.

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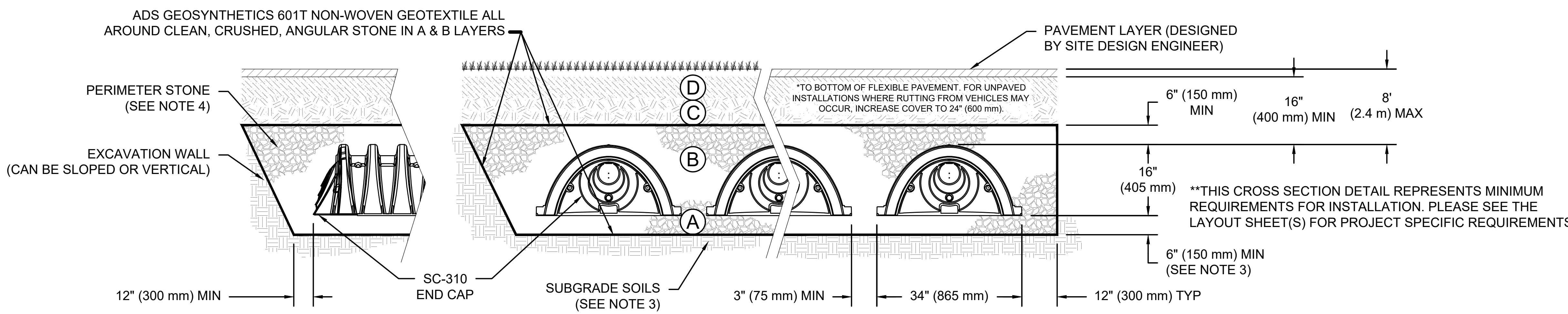
SCALE = 1 : 100

ACCEPTABLE FILL MATERIALS: STORMTECH SC-310 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER.	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 18" (460 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE[5]	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE[5]	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 6" (150 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.
5. WHERE RECYCLED CONCRETE AGGREGATE IS USED IN LAYERS 'A' OR 'B' THE MATERIAL SHOULD ALSO MEET THE ACCEPTABILITY CRITERIA OUTLINED IN TECHNICAL NOTE 6.20 "RECYCLED CONCRETE STRUCTURAL BACKFILL".



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2922 (POLETHYLENE) OR ASTM F2418 (POLYPROPYLENE), "STANDARD SPECIFICATION FOR CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
2. SC-310 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS. REFERENCE STORMTECH DESIGN MANUAL FOR BEARING CAPACITY GUIDANCE.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 325 LBS/FT/%. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

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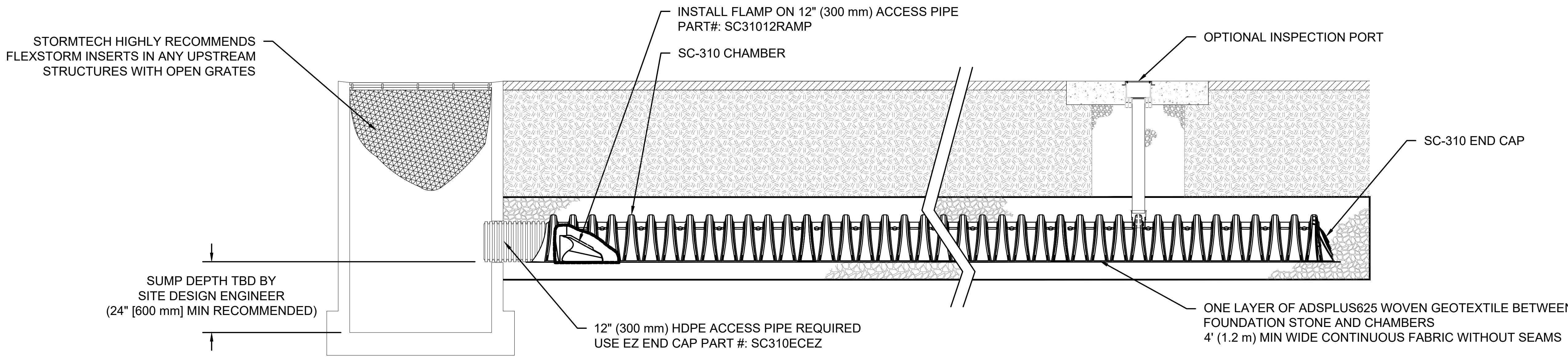

SC-310 ISOLATOR ROW PLUS DETAIL

NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR PLUS ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.

2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.

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SC-310 TECHNICAL SPECIFICATION

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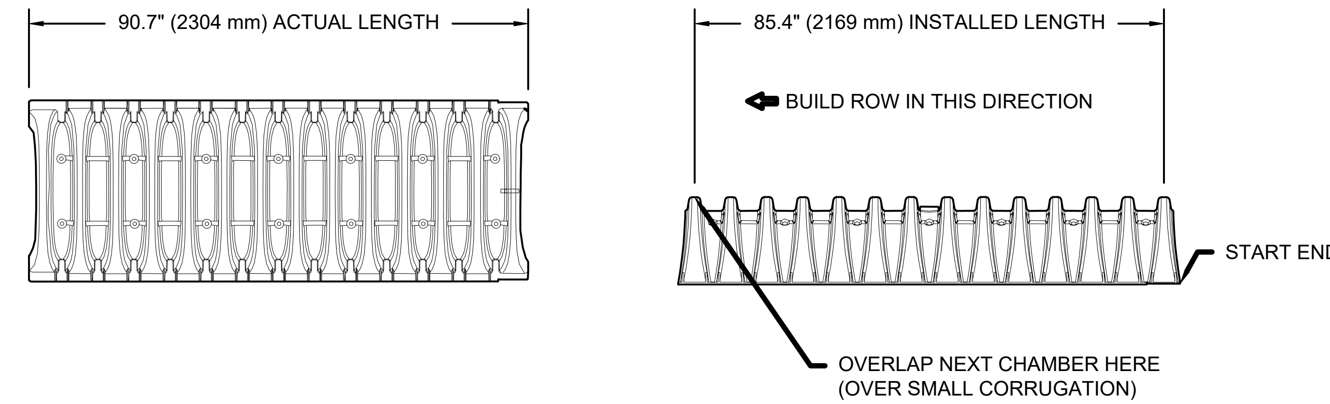
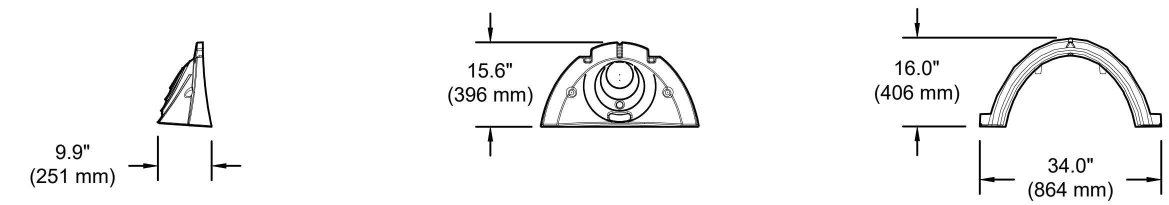


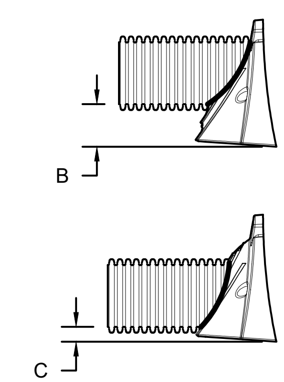


NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	34.0" X 16.0" X 85.4"	(864 mm X 406 mm X 2169 mm)
CHAMBER STORAGE	14.7 CUBIC FEET	(0.42 m³)
MINIMUM INSTALLED STORAGE*	29.3 CUBIC FEET	(0.83 m³)
WEIGHT	35.0 lbs.	(16.8 kg)

*ASSUMES 6" (152 mm) ABOVE, BELOW, AND 3" (75 mm) BETWEEN CHAMBERS

PART #	STUB	B	C
SC310EPE06TPC	6" (150 mm)	5.8" (147 mm)	---
SC310EPE06BPC		---	0.5" (13 mm)
SC310EPE08TPC	8" (200 mm)	3.5" (89 mm)	---
SC310EPE08BPC		---	0.6" (15 mm)
SC310EPE10TPC	10" (250 mm)	1.4" (36 mm)	---
SC310EPE10BPC		---	0.7" (18 mm)
SC310ECEZ*	12" (300 mm)	---	0.9" (23 mm)



ALL STUBS, EXCEPT FOR THE SC310ECEZ ARE PLACED AT BOTTOM OF END CAP SUCH THAT THE OUTSIDE DIAMETER OF THE STUB IS FLUSH WITH THE BOTTOM OF THE END CAP. FOR ADDITIONAL INFORMATION CONTACT STORMTECH AT 1-888-892-2694.

* FOR THE SC310ECEZ THE 12" (300 mm) STUB LIES BELOW THE BOTTOM OF THE END CAP APPROXIMATELY 0.25" (6 mm). BACKFILL MATERIAL SHOULD BE REMOVED FROM BELOW THE N-12 STUB SO THAT THE FITTING SITS LEVEL.

NOTE: ALL DIMENSIONS ARE NOMINAL; PRE-CORED END CAPS END WITH "PC"

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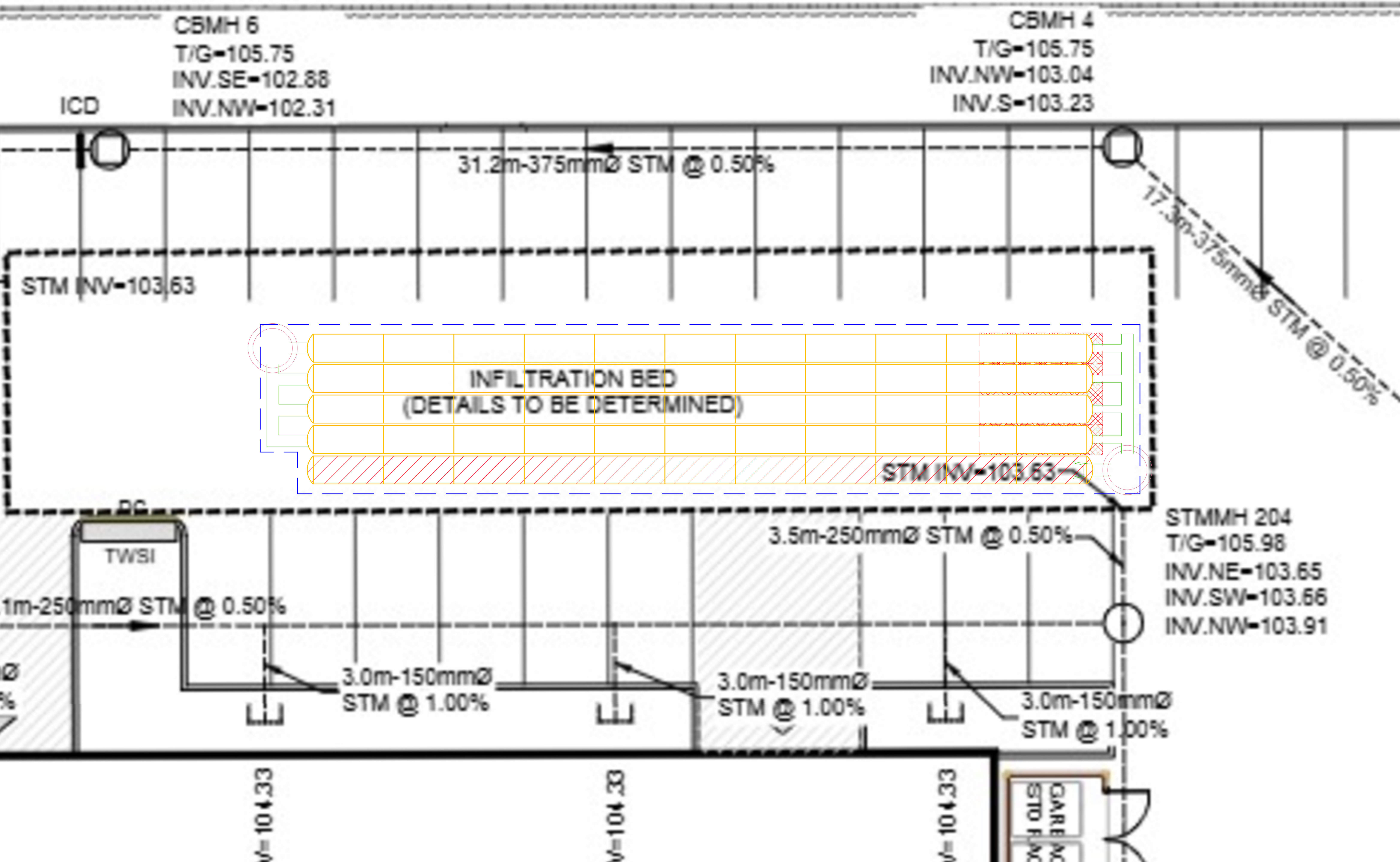


CBMH 6
T/G=105.75
INV.SE=102.88
INV.NW=102.31
ICD
CBMH 4
T/G=105.75
INV.NW=103.04
INV.S=103.23
31.2m-375mmØ STM @ 0.50%
17.3m-375mmØ STM @ 0.50%
STM INV=103.63
INFILTRATION BED
(DETAILS TO BE DETERMINED)
STM INV=103.63
STMMH 204
T/G=105.98
INV.NE=103.65
INV.SW=103.66
INV.NW=103.91
3.5m-250mmØ STM @ 0.50%
TWSI
1m-250mmØ STM @ 0.50%
3.0m-150mmØ
STM @ 1.00%
3.0m-150mmØ
STM @ 1.00%
3.0m-150mmØ
STM @ 1.00%

APPENDIX F

Development Servicing Study Checklist

Servicing study guidelines for development applications

4. Development Servicing Study Checklist

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

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

4.1 General Content

- ☐ Executive Summary (for larger reports only).
- ☒ Date and revision number of the report.
- ☒ Location map and plan showing municipal address, boundary, and layout of proposed development.
- ☒ Plan showing the site and location of all existing services.
- ☐ Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.
- ☒ Summary of Pre-consultation Meetings with City and other approval agencies.
- ☒ Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.
- ☒ Statement of objectives and servicing criteria.
- ☒ Identification of existing and proposed infrastructure available in the immediate area.
- ☐ Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).
- ☐ Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.
- ☐ Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.
- ☐ Proposed phasing of the development, if applicable.

☒ Reference to geotechnical studies and recommendations concerning servicing.

☒ All preliminary and formal site plan submissions should have the following information:
- Metric scale
- North arrow (including construction North)
- Key plan
- Name and contact information of applicant and property owner
- Property limits including bearings and dimensions
- Existing and proposed structures and parking areas
- Easements, road widening and rights-of-way
- Adjacent street names

4.2 Development Servicing Report: Water

☐ Confirm consistency with Master Servicing Study, if available

☒ Availability of public infrastructure to service proposed development

☒ Identification of system constraints

☒ Identify boundary conditions

☒ Confirmation of adequate domestic supply and pressure

☒ Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.

☒ Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.

☐ Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design

☒ Address reliability requirements such as appropriate location of shut-off valves

☐ Check on the necessity of a pressure zone boundary modification.

☒ Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range

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

4.3 Development Servicing Report: Wastewater

- ☒ Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).
- ☒ Confirm consistency with Master Servicing Study and/or justifications for deviations.
- ☐ Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.
- ☒ Description of existing sanitary sewer available for discharge of wastewater from proposed development.
- ☒ Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)
- ☐ Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.
- ☒ Description of proposed sewer network including sewers, pumping stations, and forcemains.
- ☐ Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).
- ☐ Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.
- ☐ Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.
- ☐ Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.
- ☐ Special considerations such as contamination, corrosive environment etc.

4.4 Development Servicing Report: Stormwater Checklist

- ☒ Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)
- ☐ Analysis of available capacity in existing public infrastructure.
- ☒ A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.
- ☒ Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.
- ☒ Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.
- ☒ Description of the stormwater management concept with facility locations and descriptions with references and supporting information.
- ☐ Set-back from private sewage disposal systems.
- ☐ Watercourse and hazard lands setbacks.
- ☐ Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.
- ☒ Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.
- ☒ Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).
- ☐ Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.
- ☒ Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.
- ☐ Any proposed diversion of drainage catchment areas from one outlet to another.
- ☒ Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.
- ☐ If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100 year return period storm event.
- ☐ Identification of potential impacts to receiving watercourses
- ☐ Identification of municipal drains and related approval requirements.
- ☒ Descriptions of how the conveyance and storage capacity will be achieved for the development.
- ☒ 100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.

☒ Inclusion of hydraulic analysis including hydraulic grade line elevations.

☒ Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.

☐ Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.

☐ Identification of fill constraints related to floodplain and geotechnical investigation.

4.5 Approval and Permit Requirements: Checklist

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

☐ Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.

☒ Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.

☐ Changes to Municipal Drains.

☐ Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)

4.6 Conclusion Checklist

☒ Clearly stated conclusions and recommendations

☐ Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.

☒ All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario

APPENDIX G

Drawings

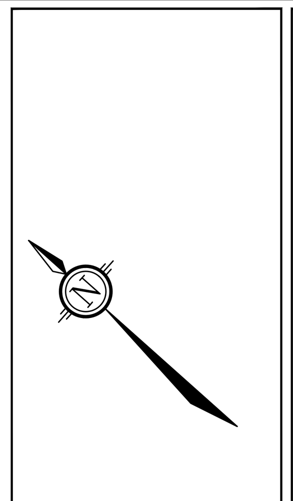
INLET CONTROL DEVICE 1 DATA TABLE								
DESIGN EVENT	ICD TYPE (PLUG TYPE)	OUTLET STRUCTURE	DIAMETER OF OUTLET PIPE (mm)	PEAK DESIGN FLOW (L/s)	DESIGN HEAD (m)	WATER ELEVATION (m)	VOLUME (m^3)	AVAILABLE STORAGE
1:2 YR	CIRCULAR PLUG TYPE 108mm ORIFICE	1200mmØ CBMH 9	300mmØ PVC	28.0	1.34	104.12	3.0	68.0 m^3
1:5 YR				34.0	1.89	104.67	5.0	
1:100 YR				40.0	3.08	105.86	27.0	

INLET CONTROL DEVICE 2 DATA TABLE								
DESIGN EVENT	ICD TYPE (PLUG TYPE)	OUTLET STRUCTURE	DIAMETER OF OUTLET PIPE (mm)	PEAK DESIGN FLOW (L/s)	DESIGN HEAD (m)	WATER ELEVATION (m)	VOLUME (m^3)	AVAILABLE STORAGE
1:2 YR	CIRCULAR PLUG TYPE 152mm ORIFICE	1200mmØ CBMH 3	375mmØ PVC	52.0	1.22	104.54	5.0	179.0 m^3
1:5 YR				67.0	1.95	105.27	9.0	
1:100 YR				75.0	2.45	105.77	77.0	

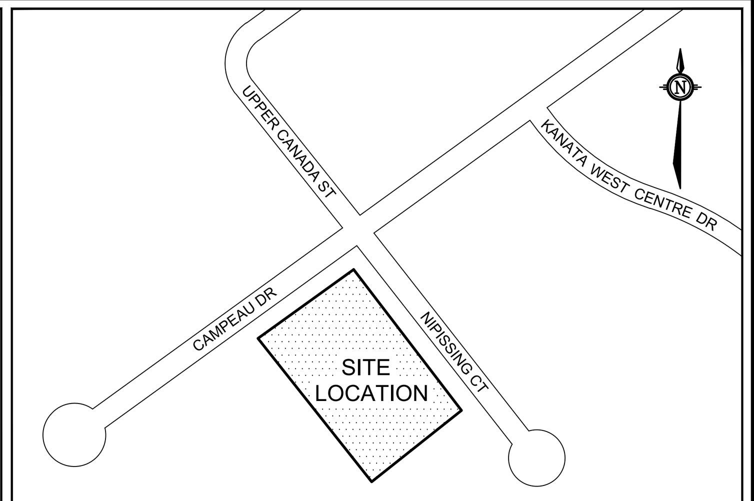
150mmØ WATERMAIN TABLE			
CHAINAGE	FINISHED GRADE	TOP OF WATERMAIN	COMMENT
1+000.0	105.58	103.18	CONNECT TO EXISTING
1+013.0	105.90	103.50	VALVE AND VALVE BOX
1+019.9	106.04	103.64	150mm HYDRANT TEE
1+025.0	105.99	103.59	TOP OF WATER
1+040.0	106.30	103.90	CAP AT BUILDING

LEGEND

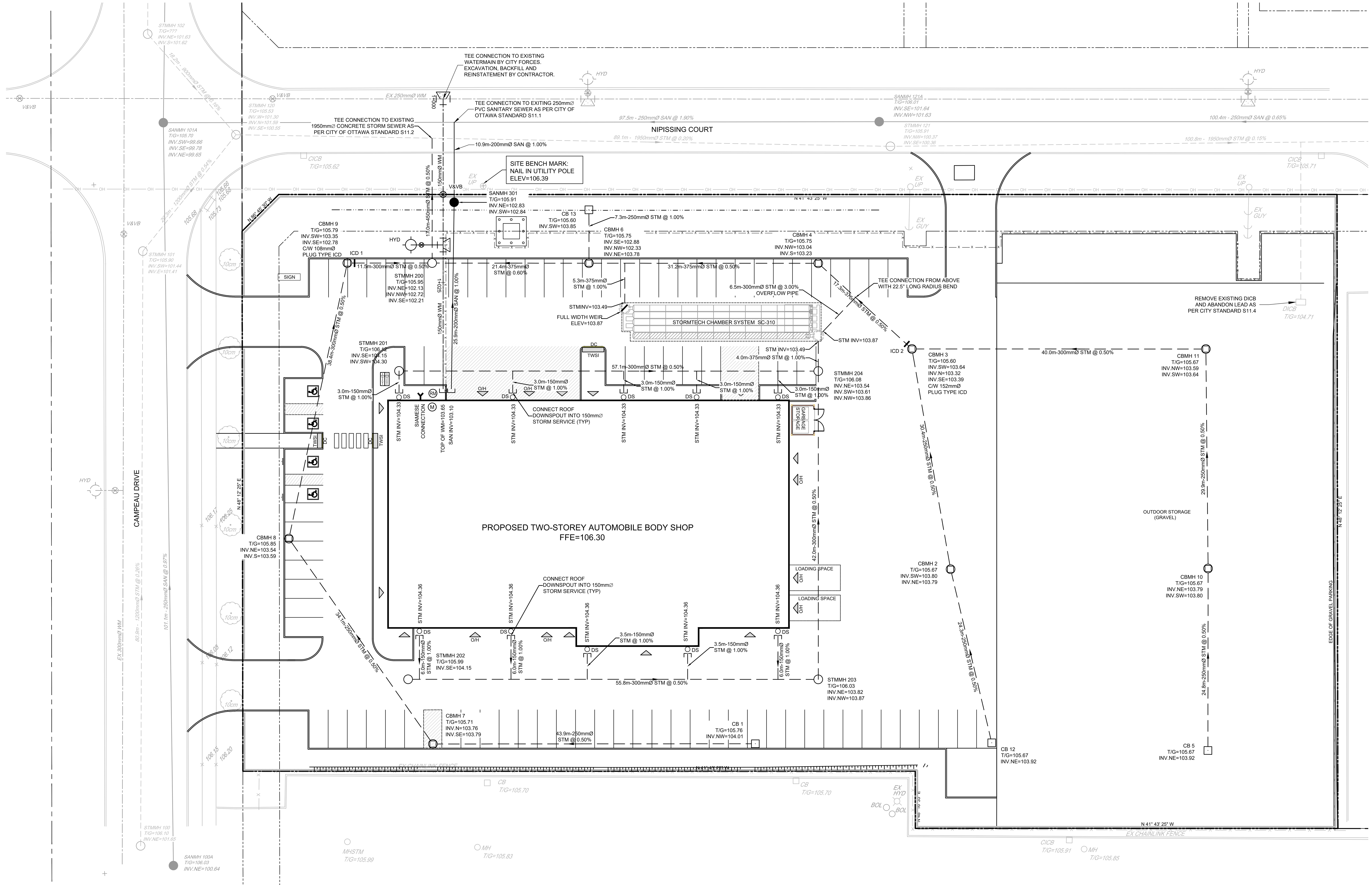
- PROPERTY LINE
- PROPOSED CURB
- DC PROPOSED DEPRESSED CURB
- PROPOSED CAP
- PROPOSED SANITARY SEWER AND MANHOLE
- PROPOSED STORM SEWER AND MANHOLE
- PROPOSED CATCHBASIN MANHOLE
- PROPOSED CATCHBASIN
- PROPOSED WATER SERVICE
- PROPOSED HYDRANT c/w LEAD & VALVE
- V&VB PROPOSED VALVE AND VALVE BOX
- PROPOSED BUILDING ENTRANCE
- DIRECTION OF FLOW
- M RM PROPOSED WATER METER AND REMOTE METER
- DS PROPOSED ROOF DOWN SPOUT
- *EXISTING UTILITY POLE C/W GUY WIRES*
- V&VC *EXISTING WATERMAIN C/W VALVE & VALVE CHAMBER*
- *EXISTING HYDRANT C/W VALVE & LEAD*
- SAN MH *EXISTING SANITARY MANHOLE & SEWER*
- STM MH *EXISTING STORM MANHOLE & SEWER*
- *EXISTING CATCHBASIN*



NORTH



KEY PLAN
N.T.S.



GENERAL NOTES:

1. COORDINATE AND SCHEDULE ALL WORK WITH OTHER TRADES AND CONTRACTORS.
2. DETERMINE THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION. PROTECT AND ASSUME RESPONSIBILITY FOR ALL EXISTING UTILITIES WHETHER OR NOT SHOWN ON THIS DRAWING.
3. OBTAIN ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OF OTTAWA BEFORE COMMENCING CONSTRUCTION.
4. BEFORE COMMENCING CONSTRUCTION OBTAIN AND PROVIDE PROOF OF COMPREHENSIVE, ALL RISK AND OPERATIONAL LIABILITY INSURANCE FOR $5,000,000.00. INSURANCE POLICY TO NAME OWNERS, ENGINEERS AND ARCHITECTS AS CO-INSURED.
5. RESTORE ALL DISTURBED AREAS ON-SITE AND OFF-SITE, INCLUDING TRENCHES AND SURFACES ON PUBLIC ROAD ALLOWANCES TO EXISTING CONDITIONS OR BETTER TO THE SATISFACTION OF THE CITY OF OTTAWA AND ENGINEER.
6. REMOVE FROM SITE ALL EXCESS EXCAVATED MATERIAL, ORGANIC MATERIAL AND DEBRIS UNLESS OTHERWISE INSTRUCTED BY ENGINEER. EXCAVATE AND REMOVE FROM SITE ANY CONTAMINATED MATERIAL. ALL CONTAMINATED MATERIAL SHALL BE DISPOSED OF AT A LICENSED LANDFILL FACILITY.
7. ALL ELEVATIONS ARE GEODETIC.
8. REFER TO GEOTECHNICAL INVESTIGATION REPORT PG7332-1, DATED NOVEMBER 10, 2025), PREPARED BY PATERSON GROUP, FOR SUBSURFACE CONDITIONS, CONSTRUCTION RECOMMENDATIONS AND GEOTECHNICAL INSPECTION REQUIREMENTS. THE GEOTECHNICAL CONSULTANT IS TO REVIEW ON-SITE CONDITIONS AFTER EXCAVATION PRIOR TO PLACEMENT OF THE GRANULAR MATERIAL.
9. REFER TO ARCHITECT'S AND LANDSCAPE ARCHITECT'S DRAWINGS FOR BUILDING AND HARD SURFACE AREAS AND DIMENSIONS.
10. REFER TO SERVICING AND STORMWATER MANAGEMENT REPORT(R-2025-054) PREPARED BY NOVATECH ENGINEERING CONSULTANTS LTD.
11. SAW CUT AND KEY GRIND ASPHALT AT ALL ROAD CUTS AND ASPHALT TIE IN POINTS AS PER CITY OF OTTAWA STANDARDS (R10).

WATERMAIN NOTES:

1. SPECIFICATIONS:

ITEM	SPEC. No.	REFERENCE
WATERMAIN TRENCHING	W17	CITY OF OTTAWA
THERMAL INSULATION IN SHALLOW TRENCHES	W22	CITY OF OTTAWA
THERMAL INSULATION BY OPEN STRUCTURES	W23	CITY OF OTTAWA
CONCRETE THRUST BLOCKS (UNDER 400mmØ)	W25.3	CITY OF OTTAWA
THRUST BLOCK TABLE (UNDER 400mmØ)	W25.4	CITY OF OTTAWA
WATERMAIN CROSSING BELOW SEWER	W25	CITY OF OTTAWA
WATERMAIN CROSSING ABOVE SEWER	W25.2	CITY OF OTTAWA
WATERMAIN (100mmØ AND LARGER)	PVC DR 18	

2. SUPPLY AND CONSTRUCT ALL WATERMAINS AND APPURTENANCES IN ACCORDANCE WITH THE CITY OF OTTAWA STANDARDS AND SPECIFICATIONS. EXCAVATION, INSTALLATION, BACKFILL AND RESTORATION OF ALL WATERMAINS BY THE CONTRACTOR. CONNECTIONS AND SHUT-OFFS AT THE MAIN AND CHLORINATION OF THE WATER SYSTEM SHALL BE PERFORMED BY CITY FORCES.
3. EXCAVATION, INSTALLATION, BACKFILL AND RESTORATION OF ALL WATERMAINS BY THE CONTRACTOR. CONNECTIONS AND SHUT-OFFS AT THE MAIN AND CHLORINATION OF THE WATER SYSTEM SHALL BE PERFORMED BY CITY OFFICIALS. EXCAVATION, INSTALLATION OF SERVICE, BACKFILL AND RESTORATION BY THE CONTRACTOR.
4. WATERMAIN SHALL BE MINIMUM 2.4m DEPTH BELOW GRADE UNLESS OTHERWISE INDICATED. WHERE DEPTH OF COVER IS LESS THAN 2.4m, WATERMAIN SHALL BE INSULATED PER CITY OF OTTAWA STANDARD DETAIL W22. WATERMAIN SHALL BE INSULATED BY OPEN STRUCTURES PER W23.
5. PROVIDE MINIMUM 0.25m SEPARATION OVER PIPES AND 0.50m SEPARATION UNDER PIPES AT ALL CROSSINGS.
6. WATER SERVICE IS TO BE CONSTRUCTED TO WITHIN 1.0m OF FOUNDATION WALL AND CAPPED, UNLESS OTHERWISE INDICATED.

SEWER NOTES:

1. SUPPLY AND CONSTRUCT ALL SEWERS AND APPURTENANCES IN ACCORDANCE WITH THE MOST CURRENT CITY OF OTTAWA STANDARDS AND SPECIFICATIONS.
2. SPECIFICATIONS:

ITEM	SPEC. No.	REFERENCE
CATCHBASIN (600x600mm)	705.010	OPSD
STORM / SANITARY MANHOLE (1200mmØ)	701.010	OPSD
CB, FRAME & COVER	S19	CITY OF OTTAWA
STORM / SANITARY MH FRAME & COVER	401.010 -TYPE 'A'	OPSD
CATCHBASIN MANHOLE FRAME & COVER	401.010-TYPE 'B'	OPSD
SEWER TRENCH	S6	CITY OF OTTAWA
DROP STRUCTURE	1003.010	OPSD
STORM SEWER	PVC DR 35 / CONC 65-D	
CATCHBASIN LEAD	PVC DR 35	
SEWER ABANDONMENT	S11.4	CITY OF OTTAWA

3. ALL SANITARY SERVICE LATERALS SHALL BE EQUIPPED WITH BACKFLOW PREVENTION DEVICES AS PER THE CITY OF OTTAWA STANDARD DETAILS S14.1 AND S14.2.
4. INSULATE ALL PIPES (SAN/STM) THAT HAVE LESS THAN 2.0m COVER WITH HI-40 INSULATION PER INSULATION DETAIL FOR SHALLOW SEWERS. PROVIDE 150mm CLEARANCE BETWEEN PIPE AND INSULATION.
5. SERVICES ARE TO BE CONSTRUCTED TO 1.0m FROM FACE OF BUILDING AT A MINIMUM SLOPE OF 1.0%.
6. PIPE BEDDING, COVER AND BACKFILL ARE TO BE COMPACTED TO AT LEAST 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY. THE USE OF CLEAR CRUSHED STONE AS A BEDDING LAYER SHALL NOT BE PERMITTED.
7. FLEXIBLE CONNECTIONS ARE REQUIRED FOR CONNECTING PIPES TO MANHOLES (FOR EXAMPLE KOR-N-SEAL, PSX: POSITIVE SEAL AND DURASEAL). THE CONCRETE CRADLE FOR THE PIPE CAN BE ELIMINATED.
8. THE OWNER SHALL REQUIRE THAT THE SITE SERVICING CONTRACTOR PERFORM FIELD TESTS FOR QUALITY CONTROL OF ALL SANITARY SEWERS. LEAKAGE TESTING SHALL BE COMPLETED IN ACCORDANCE WITH OPSS 410.07.16, 410.07.16.04 AND 407.07.24. DYE TESTING IS TO BE COMPLETED ON ALL SANITARY SERVICES TO CONFIRM PROPER CONNECTION TO THE SANITARY SEWER MAIN. THE FIELD TESTS SHALL BE PERFORMED IN THE PRESENCE OF A CERTIFIED PROFESSIONAL ENGINEER WHO SHALL SUBMIT A CERTIFIED COPY OF THE TEST RESULTS.
9. ALL STORM MANHOLES AND CATCHBASIN MANHOLES ARE TO HAVE 300mm SUMPS UNLESS OTHERWISE INDICATED. ALL CATCHBASINS ARE TO HAVE 600mm SUMPS UNLESS OTHERWISE INDICATED. ALL CATCHBASINS TO HAVE 3.0m OF FILTER-CLOTH WRAPPED 100mm PVC PERFORATED SUBDRAIN IN AN UPGRADIENT DIRECTION PER GEOTECHNICAL RECOMMENDATIONS.
10. ALL CATCHBASINS, MANHOLES AND/OR CATCHBASIN MANHOLES THAT ARE TO HAVE ICD'S INSTALLED WITHIN THEM ARE TO HAVE 600mm SUMPS.
11. CONTRACTOR TO TELEVISE (CCTV) ALL PROPOSED SEWERS, 200mmØ OR GREATER PRIOR TO BASE COURSE ASPHALT. UPON COMPLETION OF CONTRACT, THE CONTRACTOR IS RESPONSIBLE TO FLUSH AND CLEAN ALL SEWERS & APPURTENANCES
12. CONTRACTOR TO PROVIDE THE CONSULTANT WITH A GENERAL PLAN OF SERVICES INDICATING ALL SERVICING AS-BUILT INFORMATION SHOWN ON THIS PLAN. AS-BUILT INFORMATION MUST INCLUDE: PIPE MATERIAL, SIZES, LENGTHS, SLOPES, INVERT AND T/G ELEVATIONS, STRUCTURE LOCATIONS, VALVE AND HYDRANT LOCATIONS, T/WM ELEVATIONS AND ANY ALIGNMENT CHANGES, ETC.

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	REVISION	mm/dd/yy	BY
1	ISSUED FOR SPC APPLICATION	NOV 14/25	MS

SCALE 1:250

DESIGN MS / LSC; CHECKED MS; DRAWN LSC; CHECKED MS; APPROVED MS

FOR REVIEW ONLY

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11/14/2025
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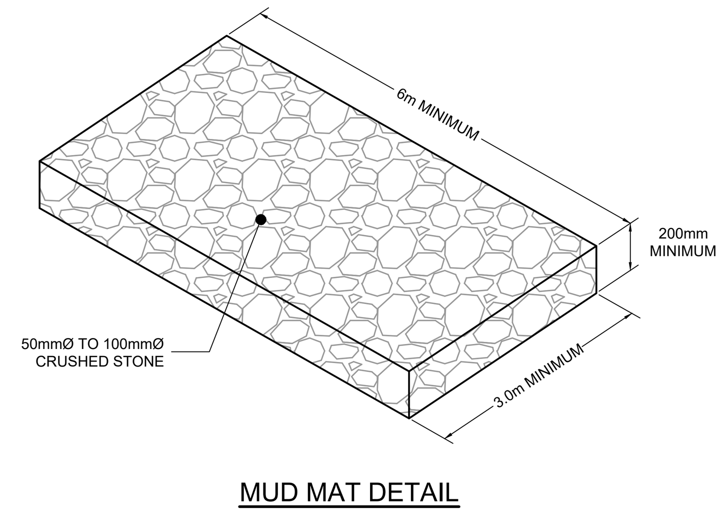
Facsimile (613) 254-5867
Website www.novatech-eng.com

LOCATION
CITY OF OTTAWA
100 NIPISSING COURT

DRAWING NAME
GENERAL PLAN OF SERVICES

PROJECT No. 124176
REV REV 1
DRAWING No. 124176-GP

PLANB1.DWG - 1000mmx707mm



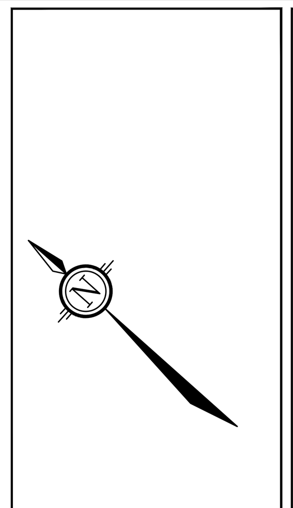
MUD MAT DETAIL
NOT TO SCALE

Erosion and Sediment Control Responsibilities:

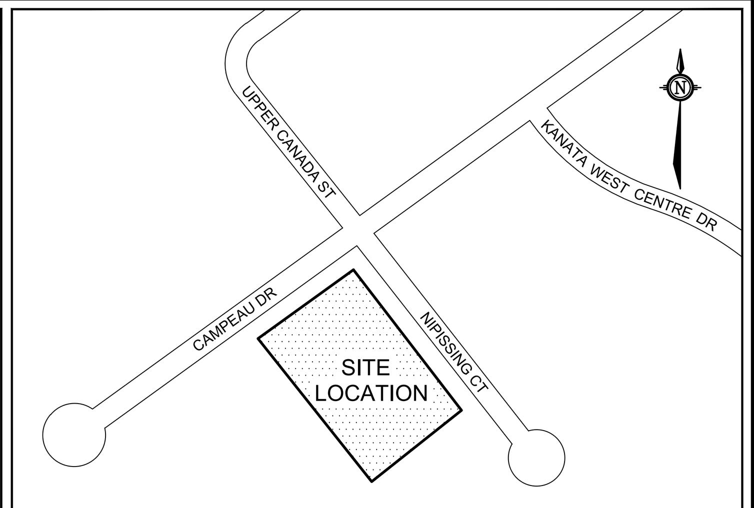
				During Construction			After Construction Prior to Final Acceptance		After Final Acceptance
	ESC Measure	Symbol	Specification	Installation Responsibility	Inspection/Maintenance Responsibility	Inspection Frequency	Approval to Remove	Removal Responsibility	Inspection/Maintenance Responsibility
Temporary Measures	Silt Fence	— · · — · · —	OPSD 219.110	Developer's Contractor	Developer's Contractor	Weekly (as a minimum)	Consultant	Developer's Contractor	N/A
	FILTER BAG	Location as Indicated in ESC Note #3	Erosion and Sediment Control Notes	Developer's Contractor	Developer's Contractor	Weekly (as a minimum)	Consultant	Developer's Contractor	N/A
	Mud Mat	MM	Drawing Details	Developer's Contractor	Developer's Contractor	Weekly (as a minimum)	Developer's Contractor	Developer's Contractor	N/A
	Dust Control	Location as Required Around Site	Erosion and Sediment Control Notes	Developer's Contractor	Developer's Contractor	Weekly (as a minimum)	Consultant	Developer's Contractor	N/A
	Stabilized Material Stockpiling	Location as Required by Contractor	Erosion and Sediment Control Notes	Developer's Contractor	Developer's Contractor	Weekly (as a minimum)	Developer's Contractor	Developer's Contractor	N/A
	Sediment Basin (for flows being pumped out of excavations)	Location as Required by Contractor	- - -	Developer's Contractor	Developer's Contractor	After Every Rainstorm	Developer's Contractor	Developer's Contractor	N/A

LEGEND

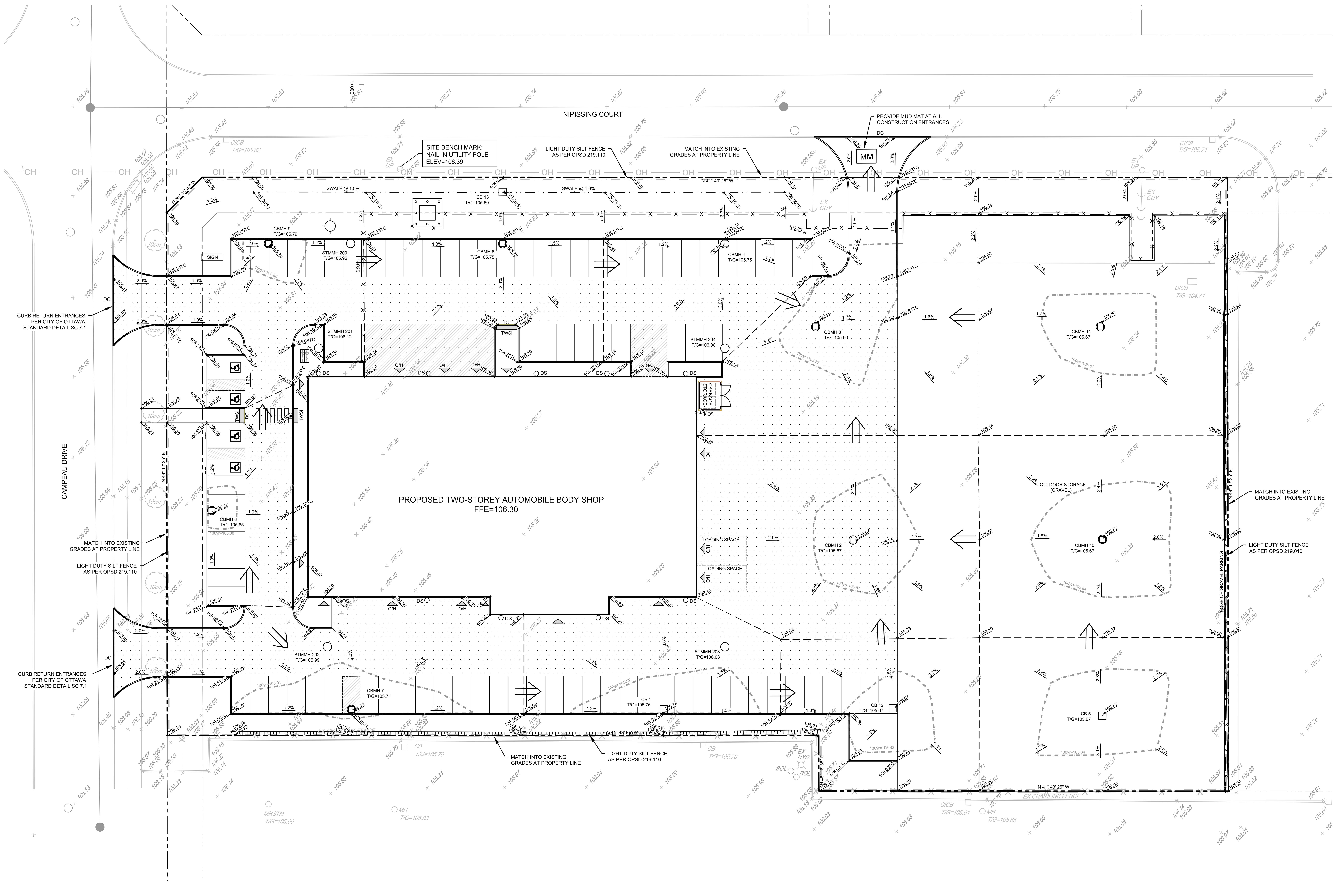
- PROPERTY LINE
- 90.00 — PROPOSED ELEVATION
- 76.45 — EXISTING ELEVATION
- 90.00 (D) — PROPOSED DITCH ELEVATION
- 90.00 (TOB) — PROPOSED TOP OF BANK ELEVATION
- PROPOSED BUILDING ENTRANCE
- DIRECTION OF MAJOR OVERLAND FLOW
- PROPOSED SAN MANHOLE
- PROPOSED STORM MANHOLE
- PROPOSED CATCHBASIN MANHOLE
- PROPOSED CATCHBASIN
- PROPOSED FIRE HYDRANT
- V&VB — PROPOSED VALVE AND VALVE BOX
- H.P. — PROPOSED HIGH POINT
- DS — PROPOSED ROOF DOWNSPOUT
- PROPOSED CURB
- PROPOSED LIGHT DUTY SILT FENCE AS PER OPSD 219.010
- 1:100 YR — APPROXIMATE PONDING LIMITS
- PROPOSED DEPRESSED CURB
- TACTILE WALKING SURFACE INDICATOR (TWSI) PER OPSD 310.039
- SWALE AND DIRECTION OF FLOW
- TERRACING 3:1 SLOPE MAX (UNLESS OTHERWISE INDICATED)
- 2.0% — SLOPE AND DIRECTION
- V&VC — *EXISTING VALVE & VALVE CHAMBER*
- V&VB — *EXISTING VALVE & VALVE BOX*
- HYD — *EXISTING HYDRANT*
- *EXISTING SANITARY MANHOLE*
- *EXISTING STORM MANHOLE*
- *EXISTING CATCHBASIN*
- UP — *EXISTING HYDRO POLE*
- SN — *EXISTING SIGN*
- GUY — *EXISTING GUY WIRE*



NORTH



KEY PLAN
N.T.S.



GENERAL NOTES:

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11. SAW CUT AND KEY GRIND ASPHALT AT ALL ROAD CUTS AND ASPHALT TIE IN POINTS AS PER CITY OF OTTAWA STANDARDS (R10).

GRADING NOTES:

1. ALL TOPSOIL, ORGANIC OR DELETERIOUS MATERIAL MUST BE ENTIRELY REMOVED FROM BENEATH THE PROPOSED PAVED AREAS AS DIRECTED BY THE SITE ENGINEER OR GEOTECHNICAL ENGINEER.
2. EXPOSED SUBGRADES IN PROPOSED PAVED AREAS SHOULD BE PROOF ROLLED WITH A LARGE STEEL DRUM ROLLER AND INSPECTED BY THE GEOTECHNICAL ENGINEER PRIOR TO THE PLACEMENT OF GRANULARS.
3. ANY SOFT AREAS EVIDENT FROM THE PROOF ROLLING SHOULD BE SUB-EXCAVATED AND REPLACED WITH SUITABLE MATERIAL THAT IS FROST COMPATIBLE WITH THE EXISTING SOILS AS RECOMMENDED BY THE GEOTECHNICAL ENGINEER.
4. THE GRANULAR BASE SHOULD BE COMPACTED TO AT LEAST 100% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY VALUE. ANY ADDITIONAL GRANULAR FILL USED BELOW THE PROPOSED PAVEMENT SHOULD BE COMPACTED TO AT LEAST 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY VALUE.
5. MINIMUM OF 2% GRADE FOR ALL GRASS AREAS UNLESS OTHERWISE NOTED.
6. MAXIMUM TERRACING GRADE TO BE 3:1 UNLESS OTHERWISE NOTED.
7. ALL GRADES BY CURBS ARE EDGE OF PAVEMENT GRADES UNLESS OTHERWISE INDICATED.
8. ALL CURBS SHALL BE BARRIER CURB (150mm) UNLESS OTHERWISE NOTED AND CONSTRUCTED AS PER CITY OF OTTAWA STANDARDS (SC1.1).
9. CONCRETE BARRIER CURB AND SIDEWALK SHALL BE AS PER CITY OF OTTAWA STANDARD SC1.4.
10. MONOLITHIC CONCRETE CURB AND SIDEWALK PER CITY OF OTTAWA STANDARD SC2
11. REFER TO LANDSCAPE PLAN FOR PLANTING AND OTHER LANDSCAPE FEATURE DETAILS.
12. CONTRACTOR TO PROVIDE THE CONSULTANT WITH A GRADING PLAN INDICATING AS-BUILT ELEVATIONS OF ALL DESIGN GRADES SHOWN ON THIS PLAN.

EROSION AND SEDIMENT CONTROL NOTES :

1. THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES, TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECEIVING WATERCOURSE, DURING CONSTRUCTION ACTIVITIES. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.
2. ALL EROSION AND SEDIMENT CONTROLS ARE TO BE INSTALLED TO THE SATISFACTION OF THE ENGINEER AND THE CITY OF OTTAWA. THEY ARE TO BE APPROPRIATE TO THE SITE CONDITIONS, PRIOR TO UNDERTAKING ANY SITE ALTERATIONS (FILLING, GRADING, REMOVAL OF VEGETATION, ETC.) AND DURING ALL PHASES OF SITE PREPARATION AND CONSTRUCTION. THESE PRACTICES ARE TO BE IMPLEMENTED IN ACCORDANCE WITH THE CURRENT BEST MANAGEMENT PRACTICES FOR EROSION AND SEDIMENT CONTROL AND SHOULD INCLUDE AS A MINIMUM THOSE MEASURES INDICATED ON THE PLAN.
3. TO PREVENT SURFACE EROSION FROM ENTERING ANY STORM SEWER SYSTEM DURING CONSTRUCTION, FILTER BAGS WILL BE PLACED UNDER GRATES OF NEARBY CATCHBASINS AND STRUCTURES. A LIGHT DUTY SILT FENCE BARRIER WILL ALSO BE INSTALLED AROUND THE CONSTRUCTION AREA (WHERE APPLICABLE).
4. EROSION AND SEDIMENT CONTROL MEASURES WILL BE IMPLEMENTED DURING CONSTRUCTION IN ACCORDANCE WITH THE "GUIDELINES ON EROSION AND SEDIMENT CONTROL FOR URBAN CONSTRUCTION SITES" (GOVERNMENT OF ONTARIO, MAY 1987). THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR MEETING ALL REGULATORY AGENCY REQUIREMENTS.
5. TO LIMIT EROSION: MINIMIZE THE AMOUNT OF EXPOSED SOILS AT ANY GIVEN TIME, RE-VEGETATE EXPOSED AREAS AND SLOPES AS SOON AS POSSIBLE AND PROTECT EXPOSED SLOPES WITH NATURAL OR SYNTHETIC MULCHES.
6. FOR MATERIAL STOCKPILING: MINIMIZE THE AMOUNT OF EXPOSED MATERIALS AT ANY GIVEN TIME; APPLY TEMPORARY SEEDING, TARPS, COMPACTION AND/OR SURFACE ROUGHENING AS REQUIRED TO STABILIZE STOCKPILED MATERIALS THAT WILL NOT BE USED WITHIN 14 DAYS.
7. THE SEDIMENT CONTROL MEASURES SHALL ONLY BE REMOVED WHEN, IN THE OPINION OF THE ENGINEER, THE MEASURES ARE NO LONGER REQUIRED. NO CONTROL MEASURES MAY BE PERMANENTLY REMOVED WITHOUT PRIOR AUTHORIZATION FROM THE ENGINEER.
8. THE CONTRACTOR SHALL IMMEDIATELY REPORT TO THE ENGINEER ANY ACCIDENTAL DISCHARGES OF SEDIMENT MATERIAL INTO ANY STORM SEWER SYSTEM. APPROPRIATE RESPONSE MEASURES, INCLUDING ANY REPAIRS TO EXISTING CONTROL MEASURES OR THE IMPLEMENTATION OF ADDITIONAL CONTROL MEASURES, SHALL BE CARRIED OUT BY THE CONTRACTOR WITHOUT DELAY.
9. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.
10. ROADWAYS ARE TO BE SWEPT AS REQUIRED OR AS DIRECTED BY THE ENGINEER AND/OR THE MUNICIPALITY.
11. THE CONTRACTOR SHALL ENSURE PROPER DUST CONTROL IS PROVIDED WITH THE APPLICATION OF WATER (AND IF REQUIRED, CALCIUM CHLORIDE) DURING DRY PERIODS. MONITOR DUST LEVELS DURING SITE PREPARATION/EXCAVATION, AND CONSTRUCTION ACTIVITIES, AND WHEN DUST LEVELS BECOME VISUALLY APPARENT SPRAY WATER TO MINIMIZE THE RELEASE OF DUST FROM GRAVEL, PAVED AREAS AND EXPOSED SOILS. USE CHEMICAL DUST SUPPRESSANTS ONLY WHERE NECESSARY ON PROBLEM AREAS.

PAVEMENT STRUCTURES:

LIGHT DUTY
50mm HL3/SP12.5mm CAT. B
150mm GRANULAR "A"
300mm GRANULAR "B" TYPE II

HEAVY DUTY
40mm HL3/SP12.5mm CAT. B
50mm HL8/SP19.0mm CAT. B
150mm GRANULAR "A"
400mm GRANULAR "B" TYPE II

OUTDOOR STORAGE AREA (GRAVEL)
150mm GRANULAR "A"
450mm GRANULAR "B" TYPE II
SEPARATION LAYER - WOVEN GEOTEXTILE
TERRAFIX 200W OR EQUIVALENT

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	REVISION	mm/dd/yy	BY
1	ISSUED FOR SPC APPLICATION	NOV 14/25	MS

SCALE 1:250

DESIGN	MS / LSC
CHECKED	MS
DRAWN	LSC
CHECKED	MS
APPROVED	MS

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER
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11/14/2025
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Telephone (613) 254-9643
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Website www.novatech-eng.com

LOCATION
CITY OF OTTAWA
100 NIPISSING COURT

DRAWING NAME
GRADING AND EROSION & SEDIMENT CONTROL PLAN

PROJECT No. 124176
REV: REV 1
DRAWING No. 124176-GR

INLET CONTROL DEVICE 1 DATA TABLE

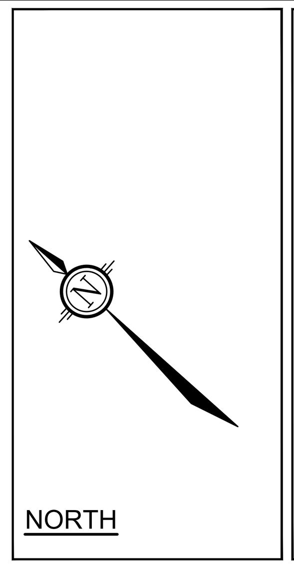
DESIGN EVENT	ICD TYPE (PLUG TYPE)	OUTLET STRUCTURE	DIAMETER OF OUTLET PIPE (mm)	PEAK DESIGN FLOW (L/s)	DESIGN HEAD (m)	WATER ELEVATION (m)	VOLUME (m^3)	AVAILABLE STORAGE
1:2 YR	CIRCULAR PLUG TYPE 108mm ORIFICE	1200mmØ CBMH 9	300mmØ PVC	28.0	1.34	104.12	3.0	68.0 m^3
1:5 YR				34.0	1.89	104.67	5.0	
1:100 YR				40.0	3.08	105.86	27.0	

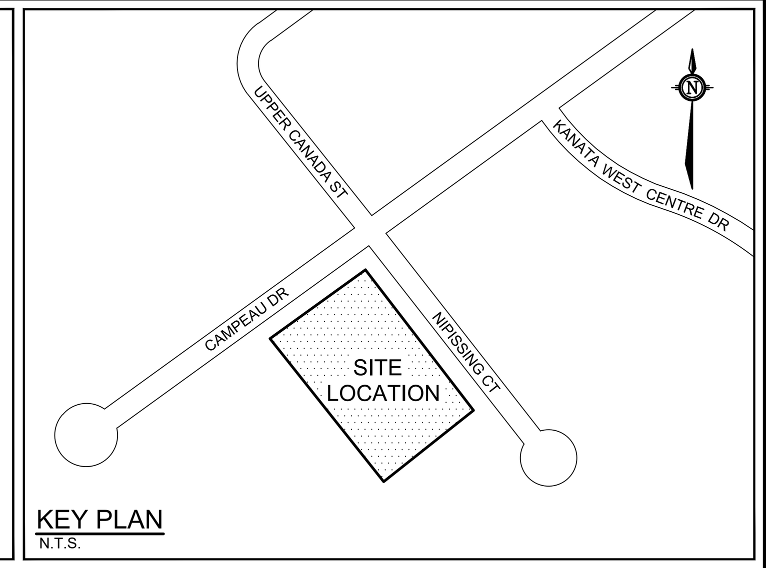
INLET CONTROL DEVICE 2 DATA TABLE

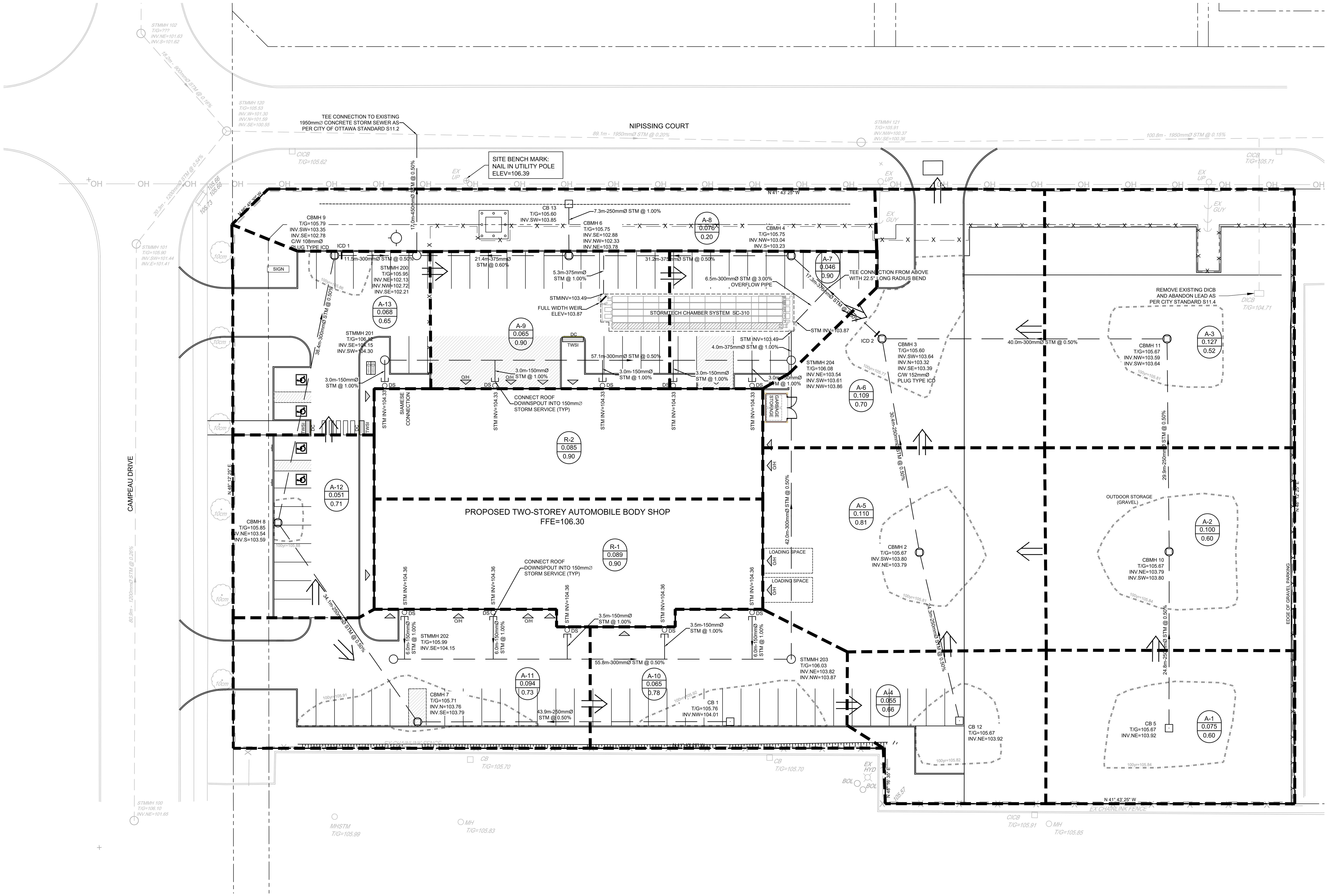
DESIGN EVENT	ICD TYPE (PLUG TYPE)	OUTLET STRUCTURE	DIAMETER OF OUTLET PIPE (mm)	PEAK DESIGN FLOW (L/s)	DESIGN HEAD (m)	WATER ELEVATION (m)	VOLUME (m^3)	AVAILABLE STORAGE
1:2 YR	CIRCULAR PLUG TYPE 152mm ORIFICE	1200mmØ CBMH 3	375mmØ PVC	52.0	1.22	104.54	5.0	179.0 m^3
1:5 YR				67.0	1.95	105.27	9.0	
1:100 YR				75.0	2.45	105.77	77.0	

LEGEND

- DRAINAGE AREA LIMITS
- A-2 / 0.153 / 0.88 — POST-DEVELOPMENT AREA ID; POST-DEVELOPMENT DRAINAGE AREA (ha); 1:5 YEAR WEIGHTED RUNOFF COEFICIENT
- 1:100 YEAR PONDING LIMIT
- PROPOSED BARRIER CURB
- DC — PROPOSED DEPRESSED CURB
- STM MH 01 — PROPOSED STORM MANHOLE
- CB 01 — PROPOSED CATCHBASIN
- CBMH 01 — PROPOSED CATCHBASIN MANHOLE
- DS — PROPOSED ROOF DOWN SPOUT
- PROPERTY LINE
- EXISTING EDGE OF PAVEMENT
- V&VB — EXISTING VALVE & VALVE BOX
- SP — EXISTING SERVICE POST
- HYD — EXISTING HYDRANT
- EX. CB — EXISTING CATCHBASIN
- EX. CBMH — EXISTING CATCHBASIN MH
- EX UP — EXISTING UTILITY POLE
- EX. STM MH — EXISTING STORM MH & SEWER







NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	REVISION	DATE	BY
1	ISSUED FOR SPC APPLICATION	NOV 14/25	MS

SCALE 1:250

DESIGN	MS / LSC
CHECKED	MS
DRAWN	LSC
CHECKED	MS
APPROVED	MS

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER
M. SAVIC
100102651
11/14/2025
PROVINCE OF ONTARIO

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LOCATION
CITY OF OTTAWA
100 NIPISSING COURT

DRAWING NAME
STORMWATER MANAGEMENT PLAN

PROJECT No. 124176
REV 1
DRAWING No. 124176-SWM

PLANB1.DWG - 1000mmx707mm