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37 Wildpine Court

Ottawa, Ontario

Servicing and Stormwater Management Report

February 20, 2026

37 WILDPINE COURT

OTTAWA, ONTARIO

SERVICING AND STORMWATER MANAGEMENT REPORT

Prepared By:

NOVATECH
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario
K2M 1P6

February 20, 2026

Novatech File: 125077
Ref: R-2025-79

February 20, 2025

City of Ottawa
Planning and Growth Management Department
110 Laurier Avenue West, 4th Floor
Ottawa, Ontario
K1P 1J1

Attention: Tamara Nahal

Reference: 37 Wildpine Court
Servicing and Stormwater Management Report
Our File No.: 125077

Please find enclosed the revised 'Servicing and Stormwater Management Report' for the above noted project. This report is being submitted in support of the Plan of Subdivision for the right-of-way portion (Street 1) and in support of a Site Plan Control Application for the proposed development within Block 2 of the above noted property.

Should you have any questions or require additional information, please contact the undersigned.

Yours truly,

NOVATECH

Cara Ruddle, P.Eng.
Senior Project Manager | Land Development Engineering

cc: Raad Akrawri, Zayoun Group
Carmine Zayoun, Zayoun Group

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LIST OF FIGURES

LIST OF APPENDICIES

1.0 INTRODUCTION

Novatech has been retained by Wildpine Trails Inc. (LHI) to prepare a Servicing and Stormwater Management Report for the proposed residential development located at 37 Wildpine Court within the City of Ottawa. The purpose of this report is to support the design of Street 1 through the Plan of Subdivision process and Block 2 through the Site Plan process. **Figure 1** Key Plan shows the site location. A copy of the legal plan is also included for reference in **Appendix A**.

2.0 EXISTING CONDITIONS

The parcel is approximately 2.0 hectares in size, with approximately 0.84 hectares of developable land due to the site location adjacent to Poole Creek. The parcel is located between two (2) existing cul-de-sacs, Ravencroft Court and Wildpine Court. The site is mostly vegetated and includes a single-family home with a garage. The existing cul-de-sac for Wildpine Court is also within the property boundaries. **Figure 2** shows the existing conditions and site topography of the property.

3.0 PROPOSED DEVELOPMENT

The proposed subdivision development consists of one (1) residential block (Block 3), a multi-unit residential block (Block 2) and a right-of-way block (Street 1). The right-of-way block is proposed to be a public road that runs through the proposed development to connect the existing Ravencroft Court and Wildpine Court roads on either side of the property. The right-of-way is proposed to be 18m wide and will comply to the 18m City of Ottawa ROW detail (**Figure 3)**. Additionally, Block 3 will be developed with a semi-detached residential 3 storey building. **Figure 4** shows the concept plan for the proposed development.

It is proposed to develop the Block 2 area with a 4-storey apartment building which consists of 94 residential units. The development will include a small surface parking area and an underground parking garage with access to the site from future Street 1. Block 2 is approximately 0.71 hectares in size. See **Figure 4** for the concept plan for the proposed development.

A preliminary design of the proposed development was completed by J.L.Richards as part of the Draft Plan of Subdivision process. Design information is provided in the following reports:

- ‘Assessment of Adequacy of Public Services Wildpine Trails’ prepared by J.L.Richards dated April 22, 2024 – Ver 4 (Reference as J.L. Richards report).

The detailed design for the proposed development is based on the preliminary design works completed in the above noted J.L. Richards report.

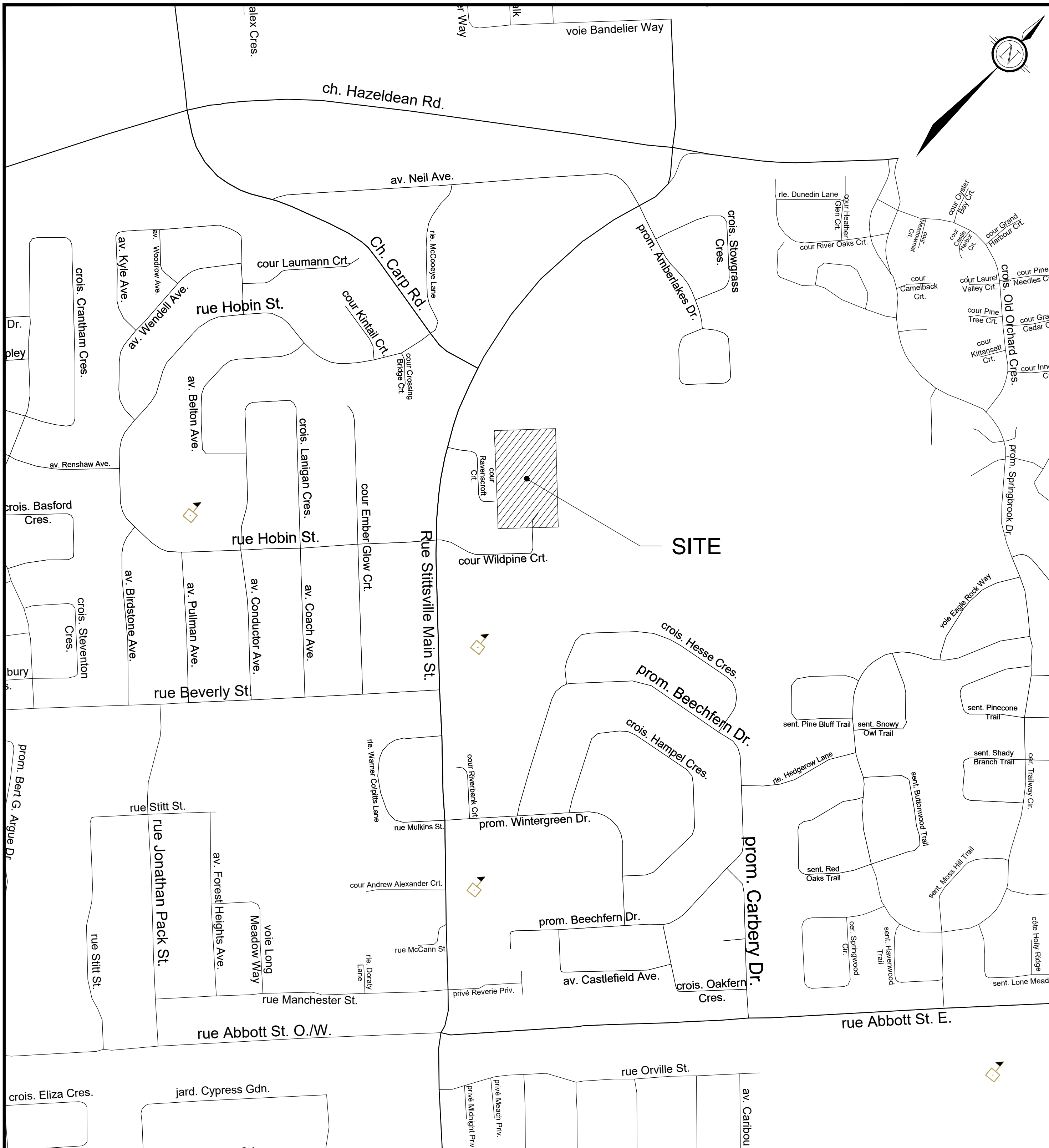
4.0 SITE CONSTRAINTS

A geotechnical investigation was completed by EXP Services Inc. and a report prepared entitled ‘Geotechnical Investigation and Slope Stability Analysis, Proposed Residential Development’ dated June 15, 2023. The report included the following recommendations:

- A grade raise of up to 3.0 m is considered acceptable from a geotechnical perspective.

- Some organic material was observed. Removal of organic materials will be required under the building, pipes and road surfaces.

- Perimeter and underfloor drainage systems are required for the proposed buildings.



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KEY PLAN

LOT 24, CONCESSION 11
CITY OF OTTAWA

WILDPINE TRAILS
37 WILDPINE COURT

DATE	JOB	FIGURE
JUNE 2025	125077	KP-1

SHT8X11.DWG - 216mmx279mm

C:\Temp\AcPublish_16796\125077-KP.dwg, 8x11 Keyplan, Jul 22, 2025 - 9:47am, abibi

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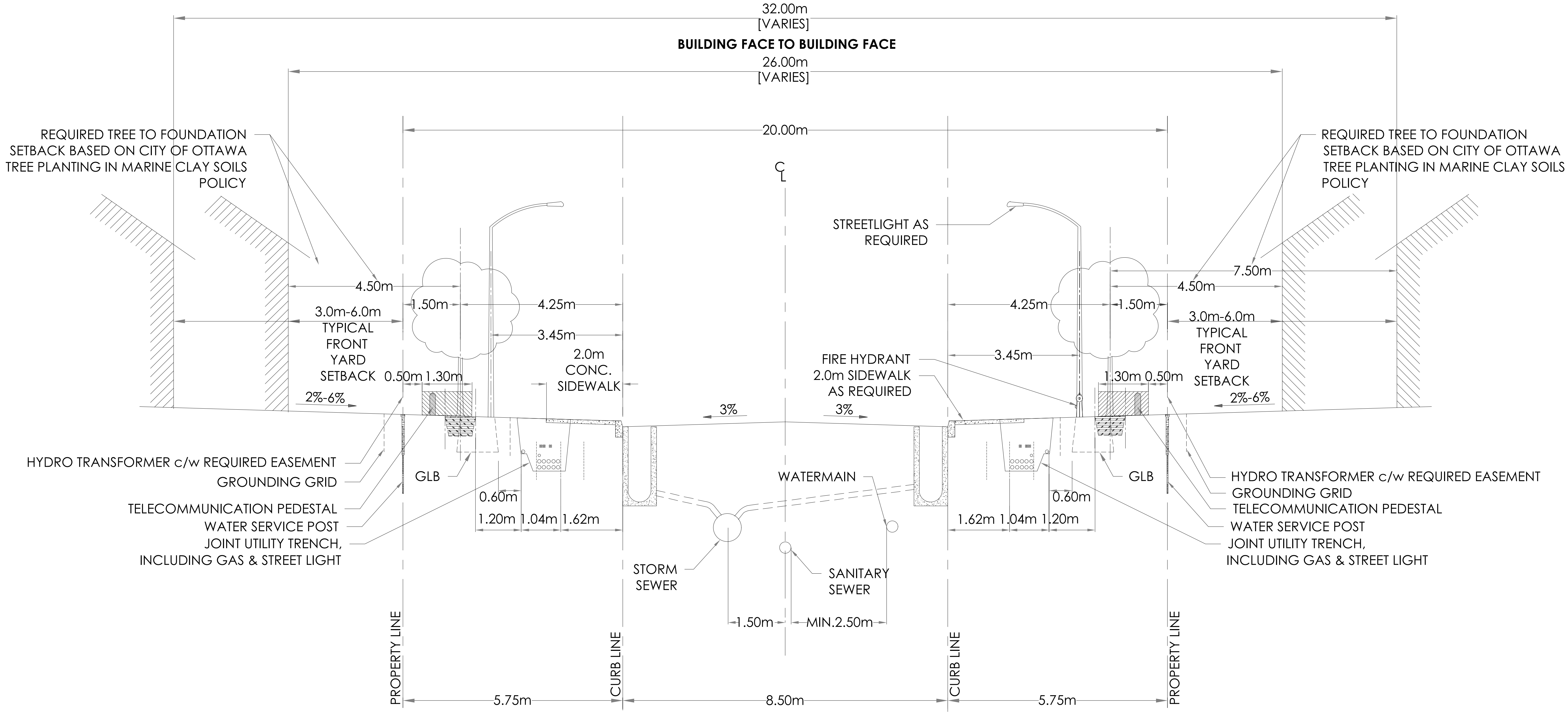
CITY OF OTTAWA
37 WILDPINE COURT

EXISTING CONDITIONS PLAN

SCALE 1 : 1000 (0 10 20 30 40)

DATE AUG 2025 | JOB 125077 | FIGURE FIG-2



NOTE:

TREE SETBACKS ARE TO FOLLOW THE RECOMMENDATIONS IN THE GEOTECHNICAL REPORT

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37 WILDPINE COURT
CITY OF OTTAWA

ROW CROSS-SECTION

SCALE	DATE	JOB	FIGURE
N.T.S	SEPT 2025	125077	FIG-3

SHT11X17.DWG - 279mmX432mm
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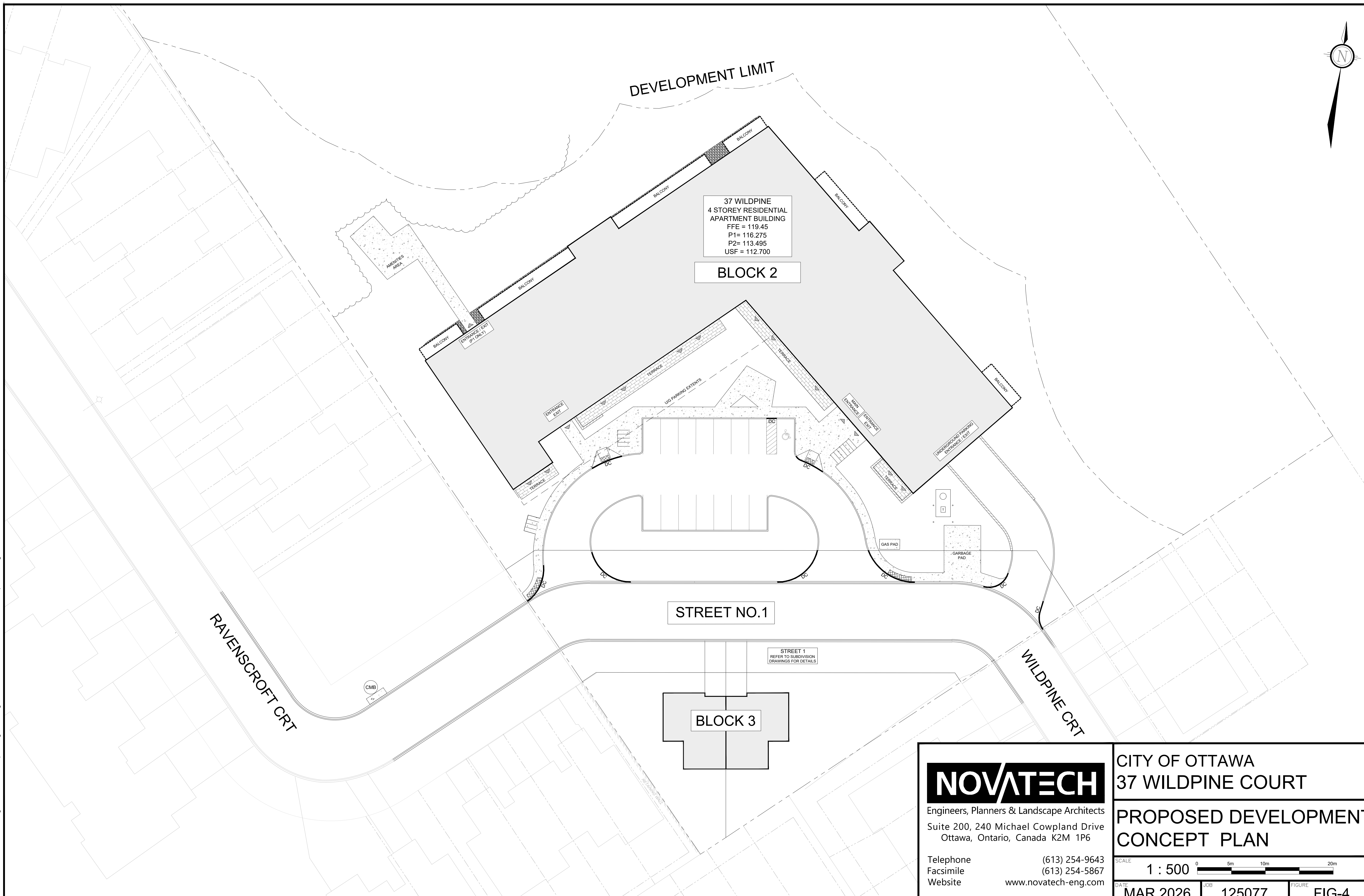

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CITY OF OTTAWA
37 WILDPINE COURT

PROPOSED DEVELOPMENT
CONCEPT PLAN

SCALE 1 : 500 (0, 5m, 10m, 20m)

DATE MAR 2026 | JOB 125077 | FIGURE FIG-4

SHT11X17.DWG - 279mmX432mm

- Given the groundwater elevations and the elevation of the underground parking structure, groundwater volumes pumped could be between 50,000 to 400,000 L/day or greater during the construction period. Therefore, it may be required to register on the Environmental Activity and Sector Registry (EASR) or obtain a Permit To Take Water.

- A slope stability analysis was also provided in the Geotechnical Report and a geotechnical setback, an erosion allowance and an erosion access allowance provided. This information is shown on Figure 2 in the EXP geotechnical report.

An Environmental Impact Statement was completed by KILGOUR & ASSOCIATES LTD. and a report prepared entitled 'Environmental Impact Statement, 37 Wildpine Court, Stittsville, Ottawa' dated June 15, 2023. The report included the following recommendations:

- Wetland – The subject site is resting on an existing wetland. The EIS Report states that any alteration to the site must be done from a 30m setback from the wetland. In order to alter an area closer to the wetland formal permission from MVCA will be required.

- Turtle Habitat – The proposed development falls within areas that are considered to be a Category 2 and Category 3 Blanding's Turtle Habitat by the MECP. Field studies conducted by KILGOUR & ASSOCIATES LTD. identified that these areas do not contain suitable Blanding's turtle habitat. Additional on-site environmental enhancements and compensation measures will be determined in consultation with the MECP through a Letter of Advice.

- Butternut Habitat - The proposed development area falls within 25 m of the Category 3 Butternut on the site. An authorization under the ESA to harm the Category 3 Butternut on the development must be obtained and all obligations of the authorization must be complied to. In addition, the development must implement the mitigation measures mentioned in the EIS report to reduce impacts to the Butternut trees.

5.0 REPORT REFERENCES

It should be noted that this report should be read in conjunction with the following engineering drawings:

General Plan of Services – Street 1 (dwg 125077-GP1)

Grading Plan – Street 1(dwg 125077-GR1)

Erosion and Sediment Control Plan – Street 1 (dwg 125077-ESC1)

Notes and Details Plan – Street 1 (dwg 125077-ND1)

General Plan of Services – Block 2 (dwg 125077-GPB2)

Grading Plan – Block 2 (dwg 125077-GRB2)

Erosion and Sediment Control Plan – Block 2 (dwg 125077-ESCB2)

Notes and Details Plan – Block 2 (dwg 125077-NDB2)

6.0 WATER SERVICING

6.1 Subdivision

There is an existing 200mm diameter watermain located within each of the existing Wildpine Court and Ravenscroft Court right-of-ways. It is proposed to service the subject property by installing a 200mm diameter watermain along Street 1 which would connect to both existing 200mm diameter watermains on Wildpine and Ravenscroft Courts.

The subject property is within the City of Ottawa 2W pressure zone. A hydrant within the Street 1 road allowance is proposed to provide fire protection. Additionally, Block 3 will be serviced by a 19mm water service for each unit that will connect to the proposed 200mm diameter watermain in Street 1. Refer to the General Plan of Services drawing (121214-GP1) for servicing details.

6.2 Site Plan

Block 2 will be serviced by two (2) 150mm diameter watermains that will connect to the proposed 200mm diameter watermain in Street 1. As per the City of Ottawa Technical Bulletin ISDTB-2014-02, the water services will be separated by an isolation valve in the right-of-way as the average day domestic demands are greater than 50 cubic meters of water per day. The proposed building is to be sprinklered and equipped with a Siamese connection located near the front entrance. The proposed municipal hydrant on Street 1 will also provide fire protection for the development and service the Siamese connection. The building will be constructed with a 2Hr firewall approximately in the middle of the building to reduce the exposure surcharge and the effective fire protection area. Refer to the General Plan of Services drawing (121214-GP1) for servicing details.

6.3 Water Demand Analysis

Water demand calculations have been calculated using criteria from Section 4 of the City of Ottawa Water Distribution Guidelines and the Ontario Building Code. The required fire demand was calculated using the 2020 Fire Underwriters Survey (FUS) Guidelines. The water demand and fire flow calculations are provided in **Appendix B** for reference. A summary of the water demand and fire flows are provided in **Table 6.1**.

Table 6.1: Domestic Water Demand Summary

Building	Number of Units		Population	Ave. Daily Demand (L/s)	Max. Daily Demand (L/s)	Peak Hour Demand (L/s)	Fire Flow (L/s)
	1 Bed	2 Bed					
Block 2	60	34	155	0.50	1.26	2.77	133
Block 3	2		5	0.02	0.04	0.10	200
Total	**96**		**160**	**0.52**	**1.30**	**2.87**	

The City of Ottawa provided boundary conditions from the City's water model based on water demand information provided during the preliminary subdivision design done by J.L. Richards dated April 22, 2024. These boundary conditions were used to determine whether the existing watermain infrastructure surrounding the development has capacity for the proposed development. The boundary conditions are provided below in **Table 6.2**.

Table 6.2: Water Boundary Conditions

Criteria	Head (m)
Connection 1 to Existing 300mm Watermain in Stittsville Main St.	
Minimum HGL	156.4
Maximum HGL	160.3
Max Day + Fire Flow 1 HGL Max Day + Fire Flow 2 HGL Max Day + Fire Flow 3 HGL	154.7 136.3 123.4

These boundary conditions were used to create a hydraulic model using EPANET for analyzing the performance of the proposed watermain system for the three revised theoretical conditions: 1) High Pressure check under Average Day conditions, 2) Peak Hour demand, 3) Maximum Day + Fire Flow Demand. The following **Table 6.3** summarizes the results from the hydraulic water analysis.

Table 6.3: Water Analysis Results Summary

Condition	Demand (L/s)	Min/Max Allowable Operating Pressures (psi)	Limits of Design Operating Pressures (psi)
High Pressure	0.52	80psi (Max)	60.82 (node 6)
Max Day + Fire Flow	134.3	20psi (Min)	46.29 (node 10)
Peak Hour	2.87	40psi (Min)	60.80 (node 6)

The above noted results from the hydraulic analysis include the proposed domestic demands from Block two (2) and Block three (3) development. The fire flows are based on Block two (2) requirements.

Based on the proceeding analysis it can be concluded that the watermain will provide adequate flow and pressures for the fire flow + maximum day demand and peak hour demand. The proposed fire hydrants surrounding the development on Street 1 will provide the required fire protection for the proposed development. Refer to **Appendix B** for hydraulic calculations and City of Ottawa boundary conditions.

7.0 SANITARY SERVICING

7.1 Subdivision

There is an existing 250mm diameter sanitary sewer located within each of the existing Wildpine Court and Ravenscroft Court right-of-ways. It is proposed to construct a 250mm diameter sanitary sewer within the proposed Street 1 right-of-way to service the proposed developments. The proposed sanitary sewer will connect into the existing 250mm diameter sanitary sewer along Wildpine Court as this sewer is at a lower elevation than the existing sewer along Ravenscroft Court.

Additionally, Block three (3) will be serviced with a 135mm sanitary services sewer connected to the proposed sanitary sewer in Street 1. Refer to the General Plan of Services drawing (125077-GP1) for servicing details.

7.2 Site Plan

Block two (2) will be serviced with a 200mm private sanitary service also connected to the proposed sanitary sewer in Street one (1). Refer to the General Plan of Services drawing (125077-GP1) for servicing details.

7.3 Sanitary Sewer Design

Sanitary flows for the proposed development were calculated using criteria from Section 4 of the City of Ottawa Sewer Design Guidelines as follows:

- Residential Average Flow = 280 L/capita/day
- 1 Bed apartment = 1.4 Person/unit
- 2 Bed apartment = 2.1 Person/unit
- 3 Bed apartment = 3.1 Person/unit
- Single unit = 3.4 Person/unit
- Residential Peaking Factor = Harmon Equation (max peaking factor = 4.0)
- Peak Extraneous Flows (Infiltration) = 0.33L/s/ha

The peak sanitary flow including infiltration for the proposed development was calculated to be 1.85 L/s. Detailed sanitary flow calculations are provided in **Appendix C** for reference.

8.0 STORM SERVICING

The proposed storm sewers have been sized to convey the uncontrolled 2-year storm event using the Rational Method. The design criteria used in sizing the storm sewers is summarized below in **Table 8.1**.

Table 8.1: Storm Sewer Design Parameters

Parameter	Design Criteria
Local Roads	2 Year Return Period
Storm Sewer Design	Rational Method
IDF Rainfall Data	Ottawa Sewer Design Guidelines
Initial Time of Concentration (Tc)	10 min
Minimum Velocity	0.8 m/s
Maximum Velocity	3.0 m/s
Minimum Diameter	250 mm

Refer to **Appendix D** for detailed storm drainage area plans and storm sewer design sheets.

8.1 Subdivision

There are existing 300mm diameter storm sewers at the property limits of the development at Ravenscroft Court and Wildpine Court. The Wildpine Court sewer will serve as the outlet for the road extension and townhouse development.

A 300mm diameter storm sewer will be constructed to service the road extension. Refer to the General Plan of Services (125077-GP1) for more details.

8.2 Site Plan

The Block 2 building will be serviced by a 200mm diameter gravity storm service that will convey foundation drainage and parking lot drainage to the west bioswale. The building roof drains and ramp trench drain (underground parking entrance) will be conveyed to the stormwater storage tank, where flows pumped at a controlled rate to the east bioswale. The bioswales will be discussed in more detail in the stormwater management section. Refer to the General Plan of Services (125077-GPB2) for more details.

9.0 STORM DRAINAGE AND STORMWATER MANAGEMENT

Under existing conditions, the proposed development outlets to Poole Creek. The west portion of the site drains to a wetland area, and the east portion drains directly to Poole Creek.

9.1 Stormwater Management Criteria

The following stormwater management criteria were developed based on consultation with the City and used in the development of the design:

Quality Control:

- An 'Enhanced' level of water quality treatment (80% long-term TSS removal) is required for the proposed development.

Quantity Control:

- Runoff to the Wildpine Court storm sewer is to be controlled to minimize the impact to the sewer HGL.
    - Post development peak flows to Poole Creek are to be controlled to pre-development levels for all storm events.
- Provide a minimum 0.30m of clearance to the proposed underside of footings (USFs).
- Ponding in both the parking areas and roadway is not to exceed 0.35m.
- Velocity x Depth is not to exceed 0.6m in the road of the right-of-way.

9.2 Existing Off-Site Storm Infrastructure – Wildpine Court

The storm infrastructure servicing Wildpine Court includes storm sewers with sizes ranging from 300mm to 375mm in diameter. This storm sewer system was not designed to receive drainage from the proposed development, since the existing residence drains directly to Poole Creek through overland flows. Flows from the road extension will be restricted to minimize impacts to this sewer.

The Wildpine storm sewer receives flows from existing residential dwellings and a retirement residence. Runoff from the retirement residence development is controlled to not exceed the capacity of the receiving storm sewer (refer to *Servicing and Stormwater Management Report, Wildpine Residence, 10 Wildpine*, prepared by Novatech, dated February 28, 2017). As part of the design of the retirement residence, 102mm diameter ICDs were added to the six (6) road catchbasins along Wildpine Court to allow for more available capacity within the storm sewer, as per the *Wildpine Storm Sewer Analysis Memorandum* prepared by Novatech dated February 15, 2017.

The storm sewer outlet pipe to Poole Creek is a 375mm diameter pipe that is currently at 85% capacity. The retirement residence has an onsite OGS unit for water quality treatment, but the residential and road runoff does not currently receive any treatment.

9.3 Stormwater Management Design

9.3.1 Stormwater Quality Control

Subdivision

An OGS unit is proposed in the road extension upstream of the outlet to the existing Wildpine storm sewer. A HydroDome HD 4 water quality treatment unit has been sized to provide an ‘Enhanced’ (80% long term TSS removal) level of treatment for the road drainage. The HydroDome HD 4 uses a siphon to capture sediment within the unit. Based on the upstream drainage area of 0.235 ha with 48.8% imperviousness, the HydroDome HD 4 will provide 83% annual TSS removal for 100% of the annual runoff generated using the ETV particle size distribution. Refer to the sizing and drawing details in **Appendix E**.

Site Plan

The proposed apartment building development is proposed to outlet to two bioretention swales. Both bioretention swales will be comprised of an upper topsoil layer, a filter layer, and an underlying clearstone storage trench that will provide the opportunity for infiltration. Refer to details on the Notes and Details Block 2 drawing (drawing **125077-NDB2**)

The west biorientation swale will not have an underdrain to maximize infiltration and promote groundwater flow to the wetland. The east bioretention swale will have a subdrain to help the system drain to Poole Creek. Both bioswales will provide water quality treatment (as well as quantity control up to and including the 100-year storm event) of runoff prior to reaching the wetland and Poole Creek. Runoff volumes that exceed the maximum storage capacity of the bioretention swales will spill over the top bank of the swales, similar to a level spreader, and outlet via overland sheet flow to Poole Creek. It should be noted that the bioswales do not overtop during storms up to and including the 100-year event.

The storage volumes provided are based on Table 3.2 of the Stormwater Management Planning and Design Manual (MOE, 2003). The bioretention swales have been designed to have a drawdown time of 24 to 48 hours. **Table 9.1** summarizes the sizing for the bioretention swales. Detailed calculations are provided in **Appendix E**.

Table 9.1: Bioretention Swale Sizing

Parameter	East Bioretention Swale (To Poole Creek)	West Bioretention Swale (To Wetland)
Drainage Area (ha)	0.315	0.208
% Imperviousness	68.7%	41.4%
Required Storage Volume for 80 % TSS Removal (m^3/ha)	34.6	26.6
Required Volume (m^3)	10.9	5.5
Clearstone Volume Provided (m^3)	18.6	18.3
Infiltration Rate (mm/hr)	14	30
Infiltration with Clogging Factor (mm/hr)	7	15
Drawdown Time for Clearstone (hours)	0.1*	10.7
Drawdown Time for Full Storage (hours)	0.8*	67.5

** Drawdown Times account for subdrain outflows*

It should be noted that the drawdown time for the east retention swale may be longer in practice since the model does not account for the infiltration through the topsoil and filter layer above the clearstone before it reaches the stormwater subdrain.

9.3.2 Quantity Control

Subdivision

Stormwater quantity controls are required for the development due to the limited available capacity within the existing Wildpine storm sewer.

- 83mm diameter ICDs are proposed to be installed on both rear yard pipes.
- To capture as much major flow as possible from the proposed on-grade road, two (2) double catchbasins (DCBs) are proposed to be installed in the roadway at the downstream limit of the develeopment. The two DCBs will be interconnected with a single 83mm diameter ICD to control flows as much as possible.
- Quantity control storage will be provided using three (3) MC-7200 chambers installed in the right-of-way and connected to the DCBs. The storage chambers will provide 31m^3 of underground storage.

The receiving 300mm diameter storm sewer has adequate capacity for the proposed flows but the capacity of the downstream 375mm diameter pipe at the Poole Creek outlet headwall will be exceeded (115% capacity). It is proposed to upsize the existing 375mm outlet pipe to a 450mm diameter pipe so that the capacity is less than 80%.

Site Plan

Stormwater for the roof and underground parking entrance will outlet to an underground storage tank. This tank will be pumped to the east bioretention swale. The east pervious area of the site will be captured by the east bioretention cell.

The parking lot will be captured by the on-site storm sewer system and outlet to the west bioretention sale. The west pervious area will also outlet to the west bioretention swale.

In addition to quality control and infiltration, the bioretention swales will also provide quantity control of stormwater prior to out letting to Poole Creek.

9.4 Stormwater Management Modeling

The performance of the proposed stormwater management system was evaluated using a dual-drainage model created in PCSWMM. The PCSWMM model simulates the storage and routing of flows through the proposed storm drainage network. The results of the analysis were used to:

- Calculate the storm sewer hydraulic grade line and ponding elevations for the 2-year, 5-year, and 100-year storm events.
- Determine required storage volumes and size the required inlet control devices (ICDs).
- Calculate the modelled runoff from the controlled and uncontrolled portions of the site under post-development conditions.
- Confirm flow depths and velocities over the proposed road.

Design Storms

The design storms used in the hydrologic analysis model include the 3-hour Chicago distribution, 12-hour SCS Type II and the 24-hour SCS Type II distribution for the 2-year, 5-year and 100-year storm events. IDF data was taken from the *City of Ottawa Sewer Design Guidelines* (OSDG) (October 2012). The 3-hour Chicago storm distribution was found to generate the highest peak flows and the model results from this distribution are documented in the following tables.

The proposed drainage system was also stress tested using a 3-hour Chicago storm that has 20% higher intensity and total volume compared to the 100-year event.

Boundary Conditions

The 100-year HGL in Poole Creek at the Wildpine Court headwall is 114.70m (from *Wildpine Storm Sewer Analysis Memorandum*, *Novatech, February 2017*). This elevation has been used as the boundary condition for the 100-year and stress test (100-year + 20%) events. For smaller storm events, a 'normal' boundary condition is assumed. **Table 9.2** summarizes the boundary condition HGL elevations for the Wildpine Court storm system (MH15). The *Wildpine Storm Sewer Analysis Memorandum* is included in **Appendix E**.

Table 9.2: Poole Creek Boundary Conditions at Wildpine Outlet Headwall

Return Period	Poole Creek Water Level (m)
2-year	'Normal'
5-year	'Normal'
100-year	114.70
100-year + 20%	114.70

9.4.1 Pre-Development Conditions

Model Parameters

The proposed development has been divided into two subcatchments based on the two drainage outlets (wetland and Poole Creek). The offsite drainage areas were based on approximate grading to each of the road catchbasins and the 10 Wildpine Court subcatchments were taken from the *10 Wildpine Servicing and Stormwater Management Report* (Novatech, February 2017). The sub-catchment areas are shown on the Pre-Development Drainage Area Plan (drawing **125077-XSWM**). The pre-development model parameters are summarized in **Table 9.3**. The model schematic, system parameters and output files are provided in **Appendix E**.

Table 9.3: Pre-Development Model Parameters

Area ID	Catchment Area (ha)	Runoff Coefficient (C)	Percent Impervious (%)	No Depression (%)	Flow Length (m)	Equivalent Width (m)	Average Slope (%)
Development Areas							
A-1	0.220	0.25	7.1%	100%	48	46	3.5%
A-2	0.559	0.36	22.9%	20%	84	66	3.5%
External Areas							
EXT-1	0.598	0.57	52.9%	45%	32	189	2.0%
EXT-2	0.096	0.66	65.7%	0%	12	82	2.0%
EXT-3	0.335	0.59	55.7%	35%	23	149	2.0%
W-1	0.130	0.83	90.0%	0%	43	31	0.5%
W-2	0.040	0.83	90.0%	0%	7	54	0.5%
W-3	0.030	0.40	28.6%	0%	8	37	0.5%
W-4	0.060	0.36	22.9%	0%	13	45	0.5%
W-5	0.220	0.90	100.0%	0%	25	87	0.5%
W-6	0.060	0.25	7.1%	0%	5	123	0.5%
W-7	0.300	0.25	7.1%	0%	34	89	0.5%
TOTAL:	**2.648**						

9.4.2 Post-Development Conditions

Model Parameters

For modeling purposes, the site has been divided into subcatchments based on the drainage areas tributary to each stormwater control (i.e., rear yard ICD, storage chamber, storm tank, bioswale). The roof area and parking garage entrance are represented as separate subcatchments due to having separate inlets to the storm tank. Offsite catchment areas are based on the same catchment boundaries as the existing conditions model. Catchment areas are shown on Post-Development Drainage Area Plan (drawing **125077-SWM**). The post-development model parameters are summarized in **Table 9.4**. The model schematic, system parameters and output files are provided in **Appendix E**.

Table 9.4: Post-Development Model Parameters

Area ID	Catchment Area (ha)	Runoff Coefficient (C)	Percent Impervious (%)	No Depression (%)	Flow Path Length (m)	Equivalent Width (m)	Average Slope (%)
Subdivsion Areas							
A-1	0.035	0.42	31.4%	100%	13	27	0.5%
A-2	0.038	0.37	24.3%	100%	11	36	0.5%
A-3	0.076	0.55	50.0%	0%	11	71	0.5%
A-4	0.086	0.66	65.7%	0%	11	82	0.5%
Site Plan Areas							
B-1	0.199	0.90	100.0%	0%	20	100	0.5%
B-2	0.036	0.43	32.9%	0%	21	17	0.5%
B-3	0.080	0.25	7.1%	0%	10	83	0.5%
B-4	0.208	0.49	41.4%	0%	15	140	0.5%
External Areas							
EXT-1	0.598	0.57	52.9%	45%	32	189	2.0%
EXT-2	0.096	0.66	65.7%	0%	12	82	2.0%
EXT-3	0.335	0.59	55.7%	35%	23	149	2.0%
W-1	0.130	0.83	90.0%	0%	43	31	0.5%
W-2	0.040	0.83	90.0%	0%	7	54	0.5%
W-3	0.030	0.40	28.6%	0%	8	37	0.5%
W-4	0.060	0.36	22.9%	0%	13	45	0.5%
W-5	0.220	0.90	100.0%	0%	25	87	0.5%
W-6	0.060	0.25	7.1%	0%	5	123	0.5%
W-7	0.300	0.25	7.1%	0%	34	89	0.5%
TOTAL:	**2.627**						

9.4.3 Model Results - Subdivision

Runoff from the subdivision will be directed to the Wildpine storm sewer, with flows restricted by the proposed ICDs to minimize impacts to the storm sewer. A summary of the ICD locations and peak flows is provided in **Table 9.5**.

Table 9.5: Subdivision Inlet Control Device Sizes and Design Flows

ICD	Location	ICD Size (mm)	ICD invert (m)	100-year 3-hour Chicago		
				HGL (m)	Head (m)	Release Rate (L/s)
O-CB5	CB5	83	117.35	117.83	0.48	9.8
O-CB6	CB6	83	115.85	116.65	0.80	12.8
O-DCB3/4	DCB-3/4-Dummy	83	115.15	116.70	1.55	17.8

The proposed ICDs will require upstream storage to control runoff. This storage will be provided by the rear yard pipes and the underground storage chambers in the right-of-way. The storage provided and the 100-year required storage are summarized in **Table 9.6**.

Table 9.6: Subdivision Storage Summary

Upstream ICD Location	Available Storage			Required 100-year Storage[1]		
	Underground Storage (m^3)	Surface Storage (m^3)	Total Storage (m^3)	Underground Storage (m^3)	Surface Storage (m^3)	Total Storage (m^3)
CB5	2.4	N/A	2.4	2.0	0.0	2.0
CB6	3.2	N/A	3.2	2.5	0.0	2.5
DCB-3/4-Dummy	31.8	0.0	31.8	29.5	0.0	29.5

[1] *100-year 3-hour Chicago Storm*

Hydraulic Grade Line

The PCSWMM model was used to simulate HGL elevations in the subdivision storm sewer and the receiving Wildpine storm sewer system during the 100-year storm event. Since there is an increase in drainage area and flow to the Wildpine sewer, the HGL elevations were reviewed to ensure the proposed development will have no adverse impacts on the existing residential dwellings.

The outlet sewer on Wildpine Court is a 375mm diameter pipe. The increase in flow will exceed the capacity of the existing sewer and result in pipe surcharging during the 100-year event. Since the USFs of the existing residential dwellings are unknown, surcharging of the sewer is not desirable. It is proposed to upsize the existing 375mm diameter sewer from MH 103 to the headwall to a 450mm diameter pipe. This will reduce the HGL to at or below the obvert of the storm sewer. A comparison of the changes to the Wildpine sewer HGL is provided in **Table 9.7**.

Table 9.7: Comparison of HGLs on Wildpine Sewer

Manhole ID	MH Invert Elevation (m)	Obvert Elevation (m)	100-year HGL (m)			
			2015 HGL Memo	Pre-Dev Model	Post-Dev Model 375mm	Post-Dev Model 450mm
EX-MH101	116.38	116.68	116.68	116.38	116.38	116.38
EX-MH102	115.54	115.92	115.92	115.94	116.08	115.83
EX-MH103	114.44	114.82 (as 375mm) 114.89 (as 450mm)	114.92	115.18	115.32	115.01
EX-MH104	114.97	115.27	N/A	115.19	115.39	115.10

The 100-year and stress-test HGL elevations in the existing and proposed sewers have been evaluated based on upsizing the outlet pipe to 450mm diameter. The results of this analysis are provided in **Table 9.8**.

Table 9.8: 100-year and Stress Test HGL Elevations (3-hour Chicago Storm)

Manhole ID	MH Invert Elevation (m)	T/G Elevation (m)	HGL - 100yr (m)	HGL - 100yr+20% (m)	Design USF (m)	Clearance (100yr) (m)
Proposed Storm Sewer						
MH200	115.11	117.88	115.28	115.30	116.42	1.14
MH202	115.72	119.56	115.78	115.81	116.42	0.64
OGS	115.04	117.76	115.18	115.22	N/A	-
Existing Wildpine Court Storm Sewer						
EX-MH101	116.38	119.22	116.38	116.38	Unknown	-
EX-MH102	115.54	118.29	115.83	116.08	Unknown	-
EX-MH103	114.44	117.54	115.01	115.06	Unknown	-
EX-MH104	114.97	117.68	115.10	115.18	Unknown	-

Major System

The major system has been designed for the 100-year event. During large storm events, storm runoff that exceeds the inlet capacity of the ICDs will pond on the surface. The major overland system is shown on the Grading Plan (drawing **125077-GR1**). A summary of the ponding depths for the 100-year storm event is provided in **Table 9.9**. Additional ponding depths for other Storm events are provided in **Appendix E**.

Table 9.9: Ponding at Catchbasins (100-year Event)

Structure	T/G (m)	Max. Static Ponding		100-year Ponding			
		Elev. (m)	Depth (m)	Elev. (m)	Depth (m)	Cascading Flow?	Cascade Depth (m)
Road On-Grade Catchbasins							
DCB-3/4	117.68	N/A	0.00	117.71	0.03	Y	0.03
Rear Yard Catchbasin Manholes							
CB5	119.10	119.36	0.26	117.83	0.00	N	0.00
CB6	117.60	117.90	0.30	116.65	0.00	N	0.00
LD1	118.65	118.80	0.15	117.83	0.00	N	0.00
LD2	118.50	118.50	0.00	116.78	0.00	N	0.00

Major system flows along the roadway were also confirmed to not have flows depths x velocity exceeding 0.60. A summary of the major system flows for the 100-year storm and stress test events are provided in **Table 9.10**.

Table 9.10: Major System Flows - Subdivision

Location	100-year					100-year +20%			
	Peak Flow (m^3/s)	Velocity (m/s)	Max. Static Depth (m)	Total Depth (static + dynamic) (m)	Velocity x Depth (m^2/s)	Peak Flow (m^3/s)	Velocity (m/s)	Total Depth (m)	Velocity x Depth (m^2/s)
Catchbasins On-Grade									
DCB-3/4	0.074	0.20	-	0.03	0.01	0.091	0.20	0.04	0.01
High Points									
0+141	0.000	0.00	-	0.00	0.00	0.000	0.00	0.00	0.00
0+175	0.000	0.00	-	0.00	0.00	0.000	0.00	0.00	0.00

Peak Flows

The release rates for the subdivision are presented in **Table 9.11**. The modelled peak flows have increased from pre-development due to the increase in area to the Wildpine storm sewer. The flows from the site plan area overcontrolled in the 100-year, so the overall peak flows will be below pre-development levels. Refer to **Section 9.4.5** for the overall results.

Table 9.11: Peak Flows (to Wildpine Sewer)

Storm Distribution->	Area	Imperv.	3-hour Chicago			
Return Period->	(ha)	(%)	25mm	2yr	5yr	100yr
Pre-Development	0.000	0.0%	99	126	164	216
Post-Development	0.235	48.8%	115	144	192	266
Difference	*0.235*	-	*16*	*18*	*28*	*50*

9.4.4 Model Results – Site Plan

Runoff from the site plan will be direct to the storage tanks and bioretention swales. The tank will outlet to the east bioretention swale via a pump. The east bioretention swale will outlet through a subdrain and infiltration of the native soils. The west bioretention swale will drain solely by infiltration. The onsite soils will have an approximate infiltration rate of 30 mm/hour based on the *Geotechnical Investigation and Slope Stability Analysis* (EXP, June 2023). Assuming a 50% blockage factor, an infiltration rate of 15 mm/hour was assumed, and based on the footprint of the clearstone layer, infiltration was modelled as 1 L/s. Bioretention swale infiltration and information is provided in **Appendix E**. A summary of the storage locations and peak flows is provided in **Table 9.12**.

Table 9.12: Site Plan Release Storage Release Rates

Location	Outflow Source	System Invert (m)	100-year 3-hour Chicago		
			HGL (m)	Depth (m)	Release Rate (L/s)
BioSwaleEast	Subdrain & Infiltration	114.95	115.18	0.23	58.9
BioSwaleWest	Infiltration	114.95	116.13	1.18	0.5
TANK	Pump	115.00	116.18	1.18	35.0

The above storage locations will store runoff based on the noted release rates. The storage provided and the 100-year required storage are summarized in **Table 9.13**.

Table 9.13: Storage Summary of Site Plan

Storage Location	Available Storage			Required 100-year Storage[1]		
	Underground Storage (m^3)	Surface Storage (m^3)	Total Storage (m^3)	Underground Storage (m^3)	Surface Storage (m^3)	Total Storage (m^3)
BioSwaleEast	18.6	96.6	115.3	10.7	0.0	10.7
BioSwaleWest	18.3	97.3	115.6	18.3	75.7	94.0
TANK	44.4	0.0	44.4	43.7	0.0	43.7

[1] 100-year 3-hour Chicago Storm

<u>*Peak Flows*</u>

The release rates for the proposed site are presented in **Table 9.14**. Post-development flows are increased from pre-development flows in smaller storm events. But in larger storm events flows are reduced due to the infiltration within the bioswales and the restricted outflows from the east bioretention swale subdrain. It should be noted that runoff rate in the retention cells to promote infiltrate though the topsoil and sand filter layer were not accounted for in the model; therefore, outflows from the east bioretention swale subdrain may be less then theoretically calculated flows for the more frequent storm events.

Table 9.14: Peak Flows from Site Plan

Storm Distribution->		Area	Imperv.	3-hour Chicago			
Return Period->		(ha)	(%)	25mm	2yr	5yr	100yr
Poole Creek	*Pre*	0.559	22.9%	21	28	46	123
	Post	0.315	68.7%	34	36	41	59
	Difference	*-0.244*	-	*13*	*8*	*-5*	*-64*
Wetland	*Pre*	0.220	7.1%	3	4	11	45
	Post	0.208	41.4%	0	0	0	0
	Difference	*-0.012*	-	*-3*	*-4*	*-11*	*-45*

The model was run without the subdrain in the east bioretention swale to check the impact on the flows from the east bioretention swale. The release rates are not exceeded in the smaller storm events. In the 100-year, the release rates are the same, but the east bioretention swale will fill up and spill over the banks and sheet flow to Poole Creek.

9.4.5 Model Results – Overall Development

The release rates for the entire development to the wetland and Poole are presented in **Table 9.15**. Post-development flows are increased from pre-development flows in smaller storm events due to the increase in area to the Wildpine sewer and the east bioretention subdrain. But in larger storm events flows are reduced due to the infiltration within the bioswales and the restricted outflows from the east bioretention swale subdrain.

Table 9.15: Peak Flows

Storm Distribution->	Area	Imperv.	3-hour Chicago			
Return Period->	(ha)	(%)	25mm	2yr	5yr	100yr
Pre-Development	0.779	18.4%	123	157	221	385
Post-Development	0.758	55.1%	149	179	233	324
Difference	*-0.021*	-	26	22	12	-61

9.5 Major Overland Flow Routes

Subdivision

A major overland flow route will be provided for storms greater than the 100-year storm event. The rear yards will spill to the proposed road extension. The road is graded toward Wildpine Court with double on-grade catchbasins to capture as much runoff as possible. Stormwater will be directed to Wildpine Court and spill to Poole Creek at the major system outlet at existing MH 103. The major overland system is shown on the Grading Plan (drawing 125077-GR1).

Site Plan

A major overland flow route will be provided for storms greater than the 100-year storm event. Stormwater will be directed to the wetland and Poole Creek. The major overland system is shown on the Grading Plan (drawing 125077-GRB2).

9.6 Carp River Watershed PCSWMM Model

The City of Ottawa has developed a PCSWMM model of the Carp River subwatershed and indicated that all new development within the watershed is to be represented in this model to confirm that the cumulative impacts of development are accounted for and that the proposed stormwater management strategies will have no adverse impact on water levels in the Carp River. Poole Creek is modelled as part of the Carp River watershed.

To evaluate the impact of the proposed development on the downstream Carp River, the 37 Wildpine PCSWMM model was integrated into the Carp River Watershed PCSWMM model provided by the City, following the protocol outlined in the *City of Ottawa Carp River PCSWMM Model Documentation*.

Boundary Conditions & Release Rates

The stormwater management design for the site was evaluated using fixed boundary condition water levels, assuming a fixed boundary condition at the minor system outfall. In reality, the peak within the Carp River will have a different timing in its peak flows than that of the development. This is a conservative approach that ensures that the proposed design will provide operate as designed above the boundary condition elevation for all storm events.

Design Storms

The Carp River PCSWMM model uses the 12-hour SCS distribution as the critical design event, as this distribution results in the highest peak flows and water levels in the Carp River. The SWM design for the proposed development is based on the 3-hour Chicago storm, as this storm distribution results in the highest peak flows and storage requirements for the site.

Model Results

The results of the analysis indicate that the proposed development will have a minimal impact on the downstream watercourses. The overall 100-year peak flows to Poole Creek are controlled to pre-development levels. The 2-year and the 5-year storm events exceed pre-development levels due to site restrictions and increased flows to the Wildpine sewer outlet. This causes slight increases in flow and HGL in the Carp River and Poole Creek but the impacts are considered to be negligible.

Table 9.16 and **Table 9.17** provides a comparison of the water levels and flows along the main Branch of the Carp River between the updated Carp River Models and the original 2021 models provided by the City of Ottawa.

Table 9.16: Water Levels in Carp River (12-hour SCS Storm Event)

PCSWMM Node	Water Level (m)								
	Original 2021 Model			With 37 Wildpine			Difference		
	2-year	5-year	100-year	2-year	5-year	100-year	2-year	5-year	100-year
PJ083	113.97	114.02	114.18	113.98	114.03	114.18	0.01	0.01	0
PSto084	114.33	114.39	114.54	114.34	114.39	114.54	0.01	0	0
PJ085	114.91	115.01	115.26	114.91	115.01	115.26	0	0	0
PJ125	112.88	112.99	113.18	112.89	112.99	113.18	0.01	0	0
PJ126	113.20	113.26	113.36	113.2	113.26	113.36	0	0	0
PJ127	113.68	113.72	113.85	113.68	113.73	113.85	0	0.01	0
PJ128	113.84	113.89	114.03	113.84	113.89	114.03	0	0	0

Table 9.17: Flows in Carp River (12-hour SCS Storm Event)

PCSWMM Conduit	Flows (cms)											
	Original 2021 Model			With 37 Wildpine			Difference			% Difference		
	2-year	5-year	100-year	2-year	5-year	100-year	2-year	5-year	100-year	2-year	5-year	100-year
PC084_1	1.305	2.136	5.811	1.367	2.245	5.911	0.062	0.109	0.100	4.8%	5.1%	1.7%
PC084_2	3.381	4.489	8.618	3.482	4.592	8.757	0.101	0.103	0.139	3.0%	2.3%	1.6%
PC085	4.711	6.840	14.422	4.730	6.875	14.462	0.019	0.035	0.040	0.4%	0.5%	0.3%
PC126	3.708	5.031	9.986	3.795	5.114	10.058	0.087	0.083	0.072	2.3%	1.6%	0.7%
PC127	3.748	5.067	10.039	3.835	5.144	10.116	0.087	0.077	0.077	2.3%	1.5%	0.8%
PC128	3.757	5.080	10.059	3.843	5.158	10.138	0.086	0.078	0.079	2.3%	1.5%	0.8%

The model results indicate an increase in peak flow within the Carp River at all locations noted in **Table 9.17**, especially in the smaller storm events. This is due to the 2-year and 5-eyar flows exceeding pre-development levels. The flow exceedances in the 100-year are due to the differences in peak timing within the development and the watercourse, resulting in an increase in flows. **Table 9.16** indicate that there are minor changes (increase of 1cm) in Poole Creek in some locations near the development outlets during the smaller storm events. There will be no change in the 100-year water levels in the watercourse.

10.0 WATER BALANCE

The *Upper Pool Creek Subwatershed Study*, prepared by Marshall Macklin Monoghan Limited (dated May 2000) does not specify any water balance requirements. The *Carp River Carp River Watershed/ Subwatershed Study* (December 2004) contains Environmental Fact Sheets that specify infiltration targets for Poole Creek. The infiltration targets are as follows:

- High recharge areas = 262 mm/year
- Moderate recharge areas = 104 mm/year
- Low recharge areas = 73 mm/year
- Assuming annual precipitation of 950 mm/year

The onsite soils per the *Geotechnical Investigation and Slope Stability Analysis* (EXP, June 2023) consist of silty sand mixed with gravel (fill) underlain by silty sand to sandy silt that is peat-like, sandy silt, or glacial till. The percolation tests completed as part of the geotechnical investigation demonstrate that some portions of the site have much higher infiltration capacity than others, ranging from 14 mm/hour to greater than 300 mm/hour, and the soils on site can be characterized as a mix of high and moderate recharge areas. Based on the above noted targets from the *Carp River Carp River Watershed/ Subwatershed Study* and assuming a 50/50 mix of high and moderate recharge areas, the infiltration target for the site would be approximately 183 mm/year (based on 950mm annual rainfall). This equates to an infiltration target of approximately 19% of all annual rainfall.

The *Hydraulic Impact Study Wildpine Trails,* prepared by J.L. Richards & Associates Ltd. dated April 2024, analyzes the water balance for the proposed development. The water balance assumes the post-development site layout will be similar to what is currently proposed, and the infiltration provided by bioretention swales is essentially unchanged in the current design. The *Hydraulic Impact Study* (HIS) used an annual precipitation volume of 820mm in their analysis (compared to 950mm in the *Carp River Watershed/Subwatershed Study*), so the infiltration targets have been compared based on percentage of annual precipitation.

The water balance analysis demonstrates that the infiltration provided by the proposed bioswales will maintain annual infiltration at very close to pre-development levels and will meet the infiltration targets from the *Carp River Carp River Watershed/ Subwatershed Study*. The HIS results are summarized in **Table 10.1**.

Table 10.1: Water Balance Summary from HIS

Scenario	Annual Precipitation (mm/year)	Annual Infiltration	
		(mm/year)	(as percent of Annual Precip.)
Target ***From Carp River Subwatershed Study***	**950**	**183**	**19%**
Pre-development	820	171	21%
Post-development (unmitigated)	820	36	4%
Post -development (mitigated)	820	156	19%

11.0 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 (catchbasin inserts) will be placed in existing and proposed catchbasins and catchbasin 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 mats will be installed at the site entrances;
- Strawbale or rock check dams will be installed in swales and ditches;
- 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;

Erosion and sediment control measures should be inspected daily and after every rain event to determine maintenance, repair or replacement requirements. Sediments or granulars that enter site sewers shall be removed immediately by the contractor. These measures will be implemented prior to the commencement of construction and maintained in good order until vegetation has been established. Refer to the Erosion and Sediment Control Plan (drawing 125077-ESC1) for additional information.

12.0 CONCLUSIONS AND RECOMMENDATIONS

Watermain

The analysis of the existing and proposed watermain network confirms the following:

- The two (2) proposed 150mm dia. watermain services which connect to the proposed 300mm watermain system within Street 1, and ultimately the existing 300mm dia. watermains in Ravenscroft and Wildpine Courts can service the proposed development.
- It is anticipated that there are adequate pressures in the existing watermain infrastructure to meet the required domestic demands for the development.
- It is anticipated that there is adequate flow to service the proposed fire protections system.

Sanitary Servicing

The analysis of the existing and proposed sanitary system confirms the following:

- The proposed 250mm diameter sanitary sewer in Street 1 will provide service connections for the Block 2 and Block 3 development.

Stormwater Management

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

- The proposed storm sewer system is to connect to the existing 300 to 375mm diameter storm sewer under Wildpine Court.
- Storm sewers (minor system) have been designed to convey the uncontrolled 2-year peak flow using the Rational Method.
- Underground storage is be provided within the rear yard storm sewer system and Stormtech MC-7200 chambers for the subdivision. The site plan has storage provided by the underground tank and the two bioretention swales.
- The subdivision inlet control devices and underground storage has been designed to ensure no static ponding is achieved in the 2-year event and control the 100-year flows to minimize impacts to the downstream Wildpine Court storm sewer.
- Controls for the site plan are provided by the pump rate of the storage tank and the infiltration and subdrain of the bioretention swales.
- Storm flows will be attenuated through the implementation of inlet control devices.
- The subdivision road and rear yards, and the site plan parking lot and swales have been graded to ensure that static ponding depths do not exceed 0.35m.
- Major overland flow route for Street 1 will be directed to Wildpine Court and ultimately Poole Creek. The Block 2 development has overland flow routes to Poole Creek and the wetland.
- Quality control of stormwater for the subdivision will be provided by the OGS unit. Quality control for the site plan will be provided by the bioretention swales.
- Infiltration targets will be met with the proposed bioretention swales.

Erosion and Sediment Control

- Erosion and sediment control measures (i.e. filter fabric, catchbasin inserts, silt fences, etc.) will be implemented prior to construction and are to remain in place until vegetation is established.

13.0 CLOSURE

The preceding report is respectfully submitted for review and approval. Please contact the undersigned should you have questions or require additional information.

NOVATECH

Prepared by:

LICENSED PROFESSIONAL ENGINEER
M. L. SCHROEDER
100213677
Feb. 20, 2026
PROVINCE OF ONTARIO

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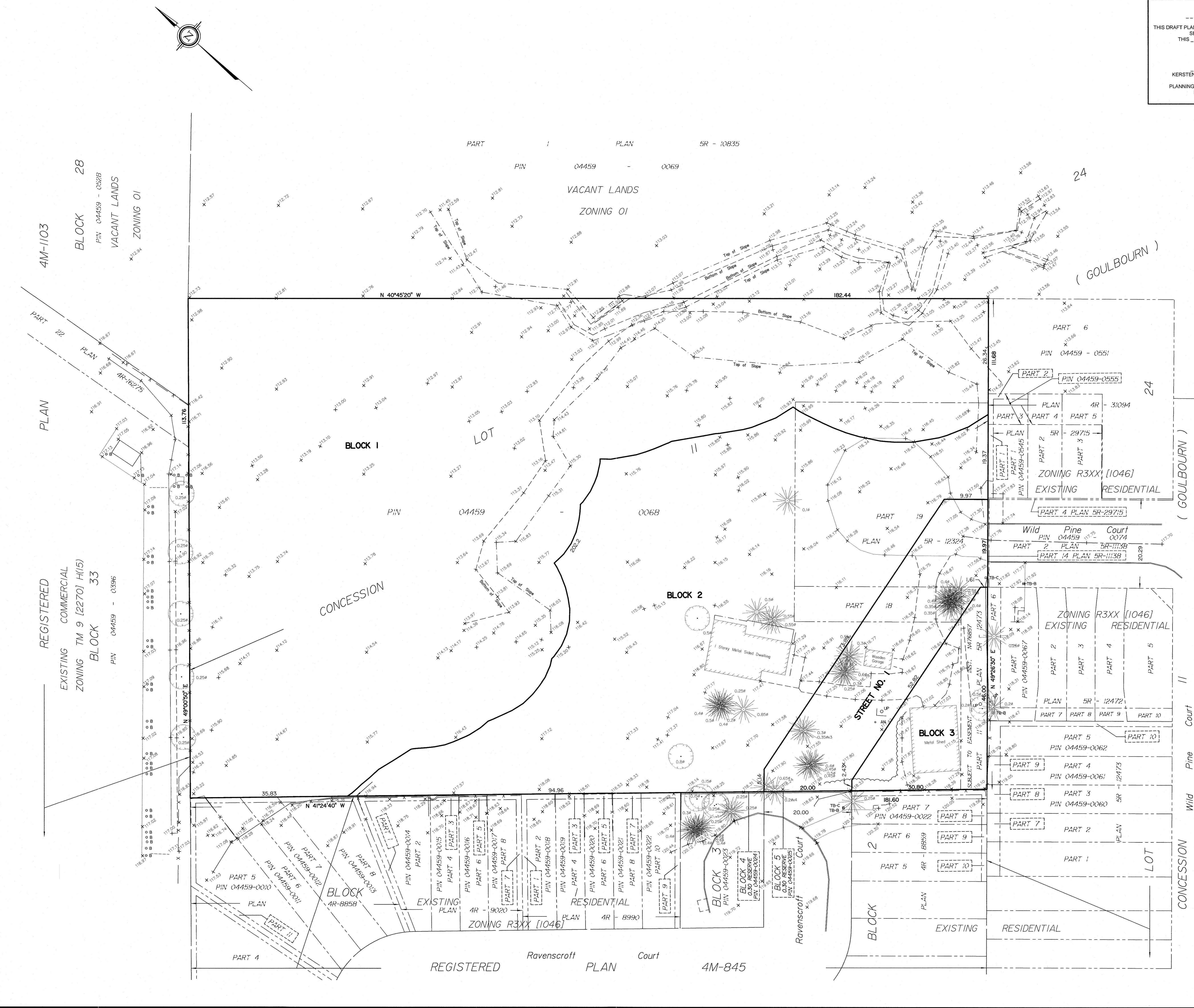
Senior Project Manager
Land Development Engineering

APPENDIX A
General Information

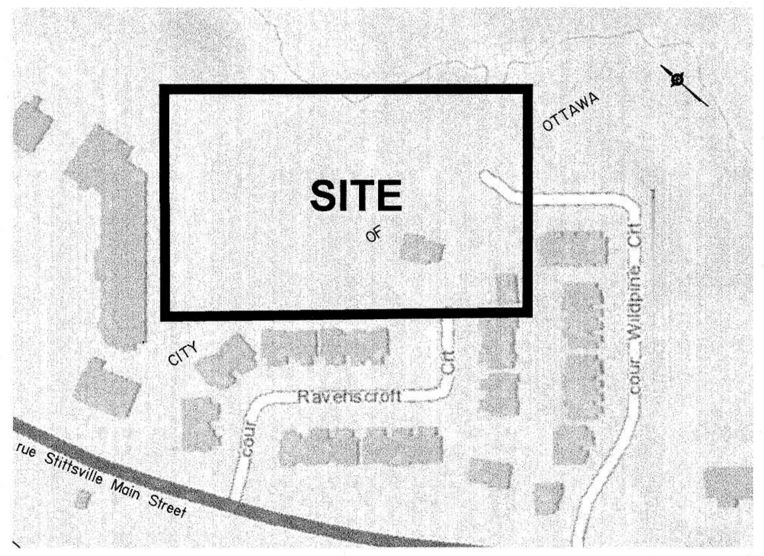


SUBJECT TO THE CONDITIONS, IF ANY, SET FORTH IN OUR LETTER DATED

____

THIS DRAFT PLAN IS APPROVED BY THE CITY OF OTTAWA UNDER SECTION 51 OF THE PLANNING ACT.
THIS ____ DAY OF _____________, 20__ .

____
KERSTEN NITSCHE, MCIP, RPP, ACTING MANAGER
DEVELOPMENT REVIEW-WEST
PLANNING, DEVELOPMENT AND BUILDING SERVICES
DEPARTMENT, CITY OF OTTAWA



KEY MAP
NOT TO SCALE

DRAFT PLAN OF SUBDIVISION OF
PART OF LOT 24
CONCESSION 11
Geographic Township of Goulbourn
CITY OF OTTAWA
Prepared by Annis , O'Sullivan , Vollebekk Ltd.

Scale 1 : 400

16 12 8 4 0 8 16 Metres

Metric

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

SURVEYOR'S CERTIFICATE

I CERTIFY THAT :
The boundaries of the lands to be subdivided and their relationship to adjoining lands have been accurately and correctly shown.

January 3, 2024
Date

T. Hartwick
ONTARIO LAND SURVEYOR

OWNER'S CERTIFICATE

This is to certify that I am the owner of the lands to be subdivided and that this plan was prepared in accordance with my instructions.

January 3, 2024
Date

Carmine Zayoun
Wild Pine Trails Inc.
I have authority to bind the corporation.

ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51-17 OF THE PLANNING ACT

(a) see plan
(b) see plan
(c) see plan
(d) multi-family residential housing, open space
(e) see plan
(f) see plan
(g) see plan
(h) City of Ottawa
(i) see soils report
(j) see plan
(k) sanitary, storm sewers, municipal water, bell, hydro, cable and gas to be available
(l) subject to instrument N476857, see plan for location

AREA SCHEDULE

BLOCK	AREA (sqm)
1	12 125
2	6 276
3	781
STREET	1 332
TOTAL	20 514

NOTES AND LEGEND

+ 65.00	denotes	Location of Elevations
▫ TB–B	"	Bell Terminal Box
▫ TB–C	"	Cable Terminal Box
o B	"	Bollard
(circle symbol)	"	Deciduous Tree
(star symbol)	"	Coniferous Tree

ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
Ontario Land Surveyors
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Nepean, Ont. K2E 7S6
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Email: Nepean@aovltd.com

Job No. 21203-20 Zayoun Pt Lt 24 CII GO DPS F | FL/M

APPENDIX B
Water Servicing Information

NOVATECH
Engineers, Planners & Landscape Architects

Proposed Development Conditions

	Block 2		Block 3	
	Bldg 1		Semi-detached	Totals
Number of units	1 Bed	60	2	96
	2 Bed	34		
Population	155		5	160.80
Total Daily Volume (Liters)	43512.0		1512.0	45024.00
Avg Day Demand (L/s)	0.504		0.018	0.52
Max Day Demand (L/s)	1.259		0.044	1.30
Peak Hour Demand (L/s)	2.770		0.096	2.87
Note: Number of units per architecural drawings				

Establishment	Daily Demand Volume		Source
1 Bed Apts	1.4	Person/unit	City of Ottawa Sewer Design Guidelines (Section 4)
2 Bed Apts	2.1	Person/unit	City of Ottawa Sewer Design Guidelines (Section 4)
Semi-detached	2.7	Person/unit	City of Ottawa Sewer Design Guidelines (Section 4)
Residential Average Flow	280	L/c/day	City of Ottawa Sewer Design Guidelines (Section 4)

Residential Peaking Factors City of Ottawa Water Distrubution Guidelines:

Conditions	Peaking Factor		Units	Source
Maximum Day	2.5	x avg day	L/c/day	City of Ottawa Sewer Design Guidelines (Section 4)
Peak Hour	2.2	x max day	L/c/day	City of Ottawa Sewer Design Guidelines (Section 4)

FUS - Fire Flow Calculations

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 125077
Project Name: 37 Wildpine Court
Date: 8/12/2025
Input By: AB
Reviewed By: CR
Drawing Reference: 125077- BP

Legend: Input by User
No Input Required
Reference: Fire Underwriter's Survey Guideline (2020)
Table Method
(Table 7 & Table 8)

Building Description: Semi-Detached with no firewall
Wood frame

Simple Method

Step			Choose	
1	**Construction Material**			
		Wood frame	Yes	
		Masonry or Brick	No	
2	**Housing Type**			
		Single Family	No	
		Semi-detached/Duplex	Yes	
		Row House	No	
3	**Total Effective Area**			
		Building Footprint (m^2)	183	
		Number of Floors/Storeys	3	
		Area of structure considered (m^2)	**549**	
		Less than 450m^2	**No**	
4	**Exposure Distance**		3.1 - 10 m	
Results				
5	**Total Required Fire Flow**		**L/min**	**8,000**
		or	L/s	**133**
		or	USGPM	2,114

FUS - Fire Flow Calculations

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 125077
Project Name: 37 Wildpine Court
Date: 2/18/2026
Input By: AB
Reviewed By: CR
Drawing Reference: 125077- BP

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

Building Description: Multi-Storey Tower
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)	1990			
		Number of Floors/Storeys	4			
		Protected Openings (1 hr) if C<1.0	No			
		Area of structure considered (m^2)			**5,970**	
	F	**Base fire flow without reductions**				**14,000**
		$F = 220\ C\ (A)^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**		**FUS Table 3**	**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**11,900**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**		**FUS Table 4**	**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-3,062**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	Yes	-10%	-10%	
				Cumulative Sub-Total	**-50%**	
		Area of Sprinklered Coverage (m^2)	4096.4	51%		
				Cumulative Total	**-26%**	
5	**Exposure Surcharge**		**FUS Table 5**		**Surcharge**	
	(3)	North Side	>30m		0%	**2,975**
		East Side	20.1 - 30 m		10%	
		South Side	>30m		0%	
		West Side	10.1 - 20 m		15%	
				Cumulative Total	**25%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**12,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**200**
				or	USGPM	3,170

Boundary Conditions
37 Wildpine

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	31	0.51
Maximum Daily Demand	147	2.45
Peak Hour	222	3.70
Fire Flow Demand #1 - Assumed Sprinkler Flow	4,152	69.20
Fire Flow Demand #2 - With Firewall	13,020	217.00
Fire Flow Demand #3 - Without Firewall	16,980	283.00

Location

Results

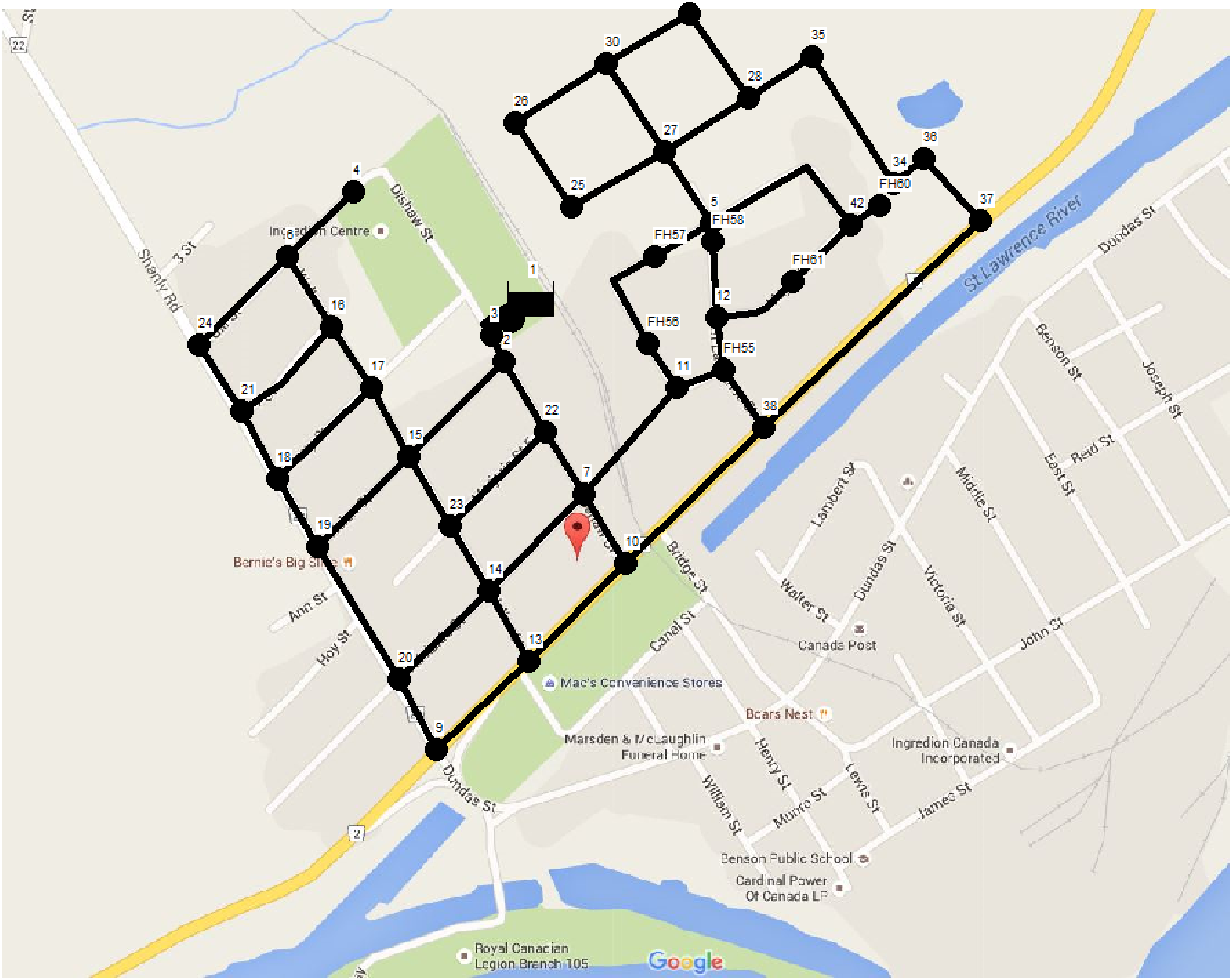
Connection 1 – Stittsville Main St.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	160.3	59.2
Peak Hour	156.4	53.6
Max Day plus Fire Flow #1	154.7	51.3
Max Day plus Fire Flow #2	136.3	25.2

Max Day plus Fire Flow #3	123.4	6.8
[1] Ground Elevation =	118.6	m

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.



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37
38
42
FH55
FH56
FH57
FH58
FH60
FH61
Shanly Rd
3 St
Dishaw St
St Lawrence River
Dundas St
Benson St
Joseph St
Reid St
East St
Middle St
Lambert St
Walter St
Victoria St
John St
Bridge St
Canal St
Canada Post
Ann St
Hoy St
Mac's Convenience Stores
Bears Nest
Marsden & McLaughlin
Funeral Home
Ingredion Canada
Incorporated
Henry St
William St
Munro St
Lewis St
James St
Benson Public School
Cardinal Power
Of Canada LP
Royal Canadian
Legion Branch 105
Google

Water Demand Design Sheet

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 125077
Project Name: 37 Wildpine Court
Date: 2/18/2026
Input By: AB
Reviewed By: CR
Drawing Reference: 125077- GP

Legend: Input by User | No Input Required
Calculated Cells →

Reference: Ottawa Design Guidelines - Water Distribution (2010 and TBs)
MOE Design Guidelines for Drinking-Water Systems (2008)
Fire Underwriter's Survey Guideline (2020)
Ontario Building Code, Part 3 (2012)

Small System = NO

Location	Total Water Demand														
	Residential Input & Average Demand							Maximum Day & Peak Hour Demand						Design Fire Demand	
								Maximum Day Demand			Peak Hour Demand			Required Fire Flow (RFF)	Max Day + RFF (L/s)
Node	Singles	Semis / Towns	Apts (2-BR)	Apts (1-BR)	Apts (Avg)	Pop. Equiv.	Res. Average Day Flow Demand (L/s)	Res. Peaking Factor	ICI Peaking Factor	Max Day Flow Demand (L/s)	Res. Peaking Factor	ICI Peaking Factor	Peak Hour Flow Demand (L/s)	FUS (L/min)	
J4		2				5.40	0.02	2.50	1.50	0.04	5.50	2.70	0.10	12,000	200.04
J6			34	60		155.40	0.50	2.50	1.50	1.26	5.50	2.70	2.77	12,000	201.26
J7						0.00	0.00	2.50	1.50	0.00	5.50	2.70	0.00		0.00
J8						0.00	0.00	2.50	1.50	0.00	5.50	2.70	0.00		0.00
J9						0.00	0.00	2.50	1.50	0.00	5.50	2.70	0.00		0.00
J10						0.00	0.00	2.50	1.50	0.00	5.50	2.70	0.00		0.00
J11						0.00	0.00	2.50	1.50	0.00	5.50	2.70	0.00		0.00
J12						0.00	0.00	2.50	1.50	0.00	5.50	2.70	0.00		0.00
J13						0.00	0.00	2.50	1.50	0.00	5.50	2.70	0.00		0.00
J14						0.00	0.00	2.50	1.50	0.00	5.50	2.70	0.00		0.00
J15						0.00	0.00	2.50	1.50	0.00	5.50	2.70	0.00		0.00
Totals	**0**	**2**	**34**	**60**	**0**	**160.80**	**0.52**	**2.50**	**1.50**	**1.30**	**5.50**	**2.70**	**2.87**		

Demand Parameters

Residential					
Unit Type Population Equiv.	Singles	Semis/ Towns	Apts (2-BR)	Apts (1-BR)	Apts (Avg)
	3.4	2.7	2.1	1.4	1.8
Dailly Demand	L/per person/day				
Average Demand	280				
Basic Demand	200				

Quick Fire Flow Reference Guide			
FUS (L/min)	Comments	OBC (L/min)	Comments
> 2,000	Min FUS	< 9,000	Unsprinklered Non-Combustible
	Low Density - Singles/Towns		
10,000	Complies w/ TB2014-01 Cap. (10m rear spacing, 6 units max, <600 m²)		
13,000	Non-complying w/TB2014-01. Calculate.		
15,000	**Medium Density** Back-to-back Towns.		

Water Demand Design Sheet

NOVATECH
Engineers, Planners & Landscape Architects

Maximum Pressure During Average Day (AVDY) Conditions

Novatech Project #: 125077
Project Name: 37 Wildpine Court
Date: 2/18/2026
Input By: AB
Reviewed By: CR
Drawing Reference: 125077- GP

Legend: Input by User | No Input Required
Acceptable (40psi - 80psi)
Acceptable w/ PRV (81psi - 100psi)
Unacceptable (< 40psi or > 100psi)

Note: Hydraulic modelling completed using EPANET 2.0.

Node	Elevation (m)	Demand (L/s)	Total Head (m)	Pressure (m)	Pressure (psi)
Junc 4	118.94	0.02	160.3	41.36	59
Junc 6	118.03	0.5	160.3	42.27	60
Junc 5	118.76	0	160.3	41.54	59
Junc 9	118.15	0	160.3	42.15	60
Junc 8	117.65	0	160.3	42.65	61
Junc 10	119.7	0	160.3	40.6	58
Junc 2	120.28	0	160.3	40.02	57
Junc 3	119.62	0	160.3	40.68	58
Junc 7	117.7	0	160.3	42.6	61
Resvr 1	160.3	-0.52	160.3	0	0

Water Demand Design Sheet

NOVATECH
Engineers, Planners & Landscape Architects

Minimum Pressure During Peak Hour (PKHR) Conditions

Novatech Project #: 125077
Project Name: 37 Wildpine Court
Date: 2/18/2026
Input By: AB
Reviewed By: CR
Drawing Reference: 125077- GP

Legend: Input by User | No Input Required
Acceptable (=> 40psi)
Unacceptable (< 40psi)

Note: Hydraulic modelling completed using EPANET 2.0.

Node	Elevation (m)	Demand (L/s)	Total Head (m)	Pressure (m)	Pressure (psi)
Junc 4	118.94	0.10	156.39	37.45	53
Junc 6	118.03	2.77	156.39	38.36	55
Junc 5	118.76	0.00	156.39	37.63	54
Junc 9	118.15	0.00	156.40	38.25	54
Junc 8	117.65	0.00	156.40	38.75	55
Junc 10	119.70	0.00	156.40	36.70	52
Junc 2	120.28	0.00	156.40	36.12	51
Junc 3	119.62	0.00	156.40	36.78	52
Junc 7	117.70	0.00	156.39	38.69	55
Resvr 1	156.40	-2.87	156.40	0.00	0

Water Demand Design Sheet

NOVATECH
Engineers, Planners & Landscape Architects

Minimum Pressure During Max Day Plus Fire Flow (MXDY+FF) Condition

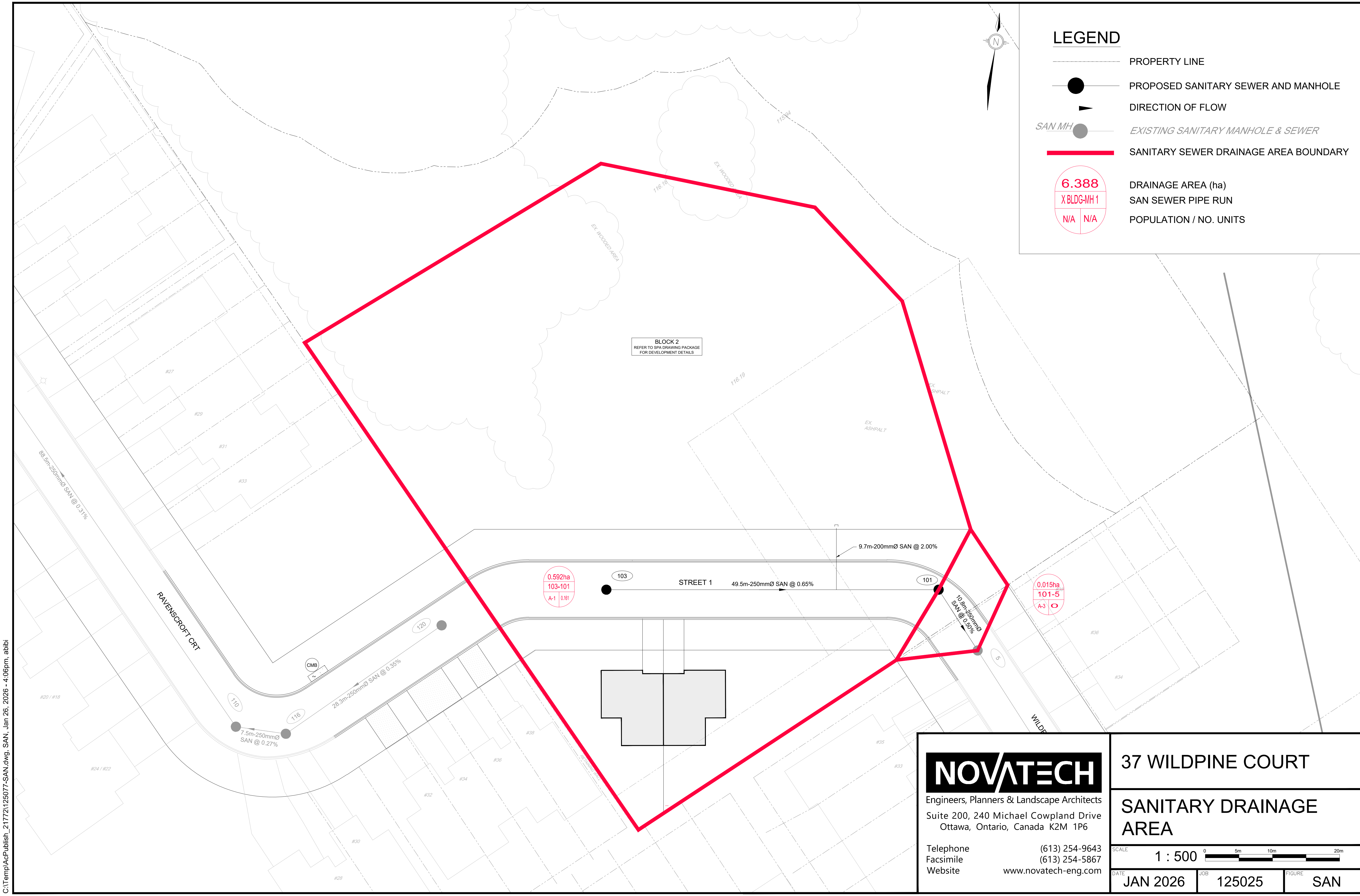
Novatech Project #: 125077
Project Name: 37 Wildpine Court
Date: 2/18/2026
Input By: AB
Reviewed By: CR
Drawing Reference: 125077- GP

Legend: Input by User | No Input Required
Acceptable (=> 20psi)
Unacceptable (< 20psi)

Note: Hydraulic modelling completed using EPANET 2.0.

Node	Elevation (m)	Demand (L/s)	Total Head (m)	Pressure (m)	Pressure (psi)
Junc 4	118.94	0.04	145.92	26.98	38
Junc 6	118.03	1.26	145.90	27.87	40
Junc 5	118.76	66.67	145.84	27.08	39
Junc 9	118.15	0.00	150.47	32.32	46
Junc 8	117.65	66.67	146.17	28.52	41
Junc 10	119.70	0.00	154.44	34.74	49
Junc 2	120.28	66.67	148.07	27.79	40
Junc 3	119.62	0.00	146.46	26.84	38
Junc 7	117.70	0.00	145.97	28.27	40
Resvr 1	154.70	-201.31	154.70	0.00	0

APPENDIX C
Sanitary Servicing Information



LEGEND
PROPERTY LINE
PROPOSED SANITARY SEWER AND MANHOLE
DIRECTION OF FLOW
SAN MH
EXISTING SANITARY MANHOLE & SEWER
SANITARY SEWER DRAINAGE AREA BOUNDARY
6.388
X BLDG-MH 1
N/A N/A
DRAINAGE AREA (ha)
SAN SEWER PIPE RUN
POPULATION / NO. UNITS
N
BLOCK 2
REFER TO SPA DRAWING PACKAGE FOR DEVELOPMENT DETAILS
EX. WOODED AREA
EX. ASHPALT
STREET 1
103
101
49.5m-250mmØ SAN @ 0.65%
9.7m-200mmØ SAN @ 2.00%
10.8m-250mmØ SAN @ 0.50%
0.592ha
103-101
A-1 0.161
0.015ha
101-5
A-3 0
RAVENSCROFT CRT
WILDP
CMB
120
116
110
5
28.3m-250mmØ SAN @ 0.35%
7.5m-250mmØ SAN @ 0.27%
88.5m-250mmØ SAN @ 0.31%
NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com
37 WILDPINE COURT
SANITARY DRAINAGE AREA
SCALE 1 : 500
0 5m 10m 20m
DATE JAN 2026
JOB 125025
FIGURE SAN
C:\Temp\AcPublish_21772\125077-SAN.dwg, SAN, Jan 26, 2026 - 4:06pm, abibi
SHT11X17.DWG - 279mmX432mm

SANITARY SEWER DESIGN SHEET

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 125077
Project Name: 37 Wildpine Court
Date: 2/18/2026
Input By: AB
Reviewed By: CR
Drawing Reference: 125077- GP

Legend:
- Design Input by User
- As-Built Input by User
- Cumulative Cell
- Calculated Design Cell Output
- Calculated Annual Cell Output
- Calculated Rare Cell Output

Reference: City of Ottawa - Sewer Design Guidelines (2012 and TBs)
MOE - Design Guidelines for Sewage Works (2008)

Location				Demand													Design Capacity							
				Residential Flow										Extraneous Flow Area Method		Total Design Flow	Proposed Sewer Pipe Sizing / Design							
Street	Area ID	From MH	To MH	Semis / Towns	Apts 1 Bed Unit	Apts 2 Bed Unit	Population (in 1000's)	Cumulative Population (in 1000's)	Average Pop. Flow Q(q) (L/s)	Design Peaking Factor M	Peak Design Pop. Flow Q(p) (L/s)	Res. Drainage Area (ha.)	Cumulative Res. Drainage Area (ha.)	Cumulative Extraneous Drainage Area (ha.)	Design Extraneous Flow Q(e) (L/s)	Total Peak Design Flow Q(D) (L/s)	Pipe Length (m)	Pipe Size (mm) and Material	Pipe ID Actual (m)	Roughness n	Design Grade So (%)	Capacity Qfull (L/s)	Full Flow Velocity (m/s)	Q(D) / Qfull
Street One	A1	103	101	2	60	34	0.161	0.161	0.52	3.54	1.85	0.592	0.592	0.592	0.20	2.04	49.5	200 PVC	0.203	0.013	0.65	27.6	0.85	7.4%
Street One	A2	101	EX-5				0.000	0.161	0.52	3.54	1.85	0.015	0.607	0.607	0.20	0.95	10.8	200 PVC	0.203	0.013	0.50	24.2	0.75	3.9%
Totals				**2**	**60**	**34**	**0.161**	**0.161**	**0.52**	**3.54**	**1.85**	**0.607**	**0.607**	**0.607**	**0.20**	**0.95**	**60.3**							

Demand Equation / Parameters

1. **Q(D), Q(A), Q(R) =** Q(p) + Q(fd) + Q(ici) + Q(e)
2. **Q(p) =** (P x q x M x K / 86,400) 0
3. **q =** 280 L/per person/day (design); 200 L/per person/day (annual and rare)
4. **M = Harmon Formula (maximum of 4.0)**
5. **K =** 0.8 (design); 0.6 (annual and rare)
6. **Park flow is considered equivalent to a single unit / ha**
   Park Demand = 4 single unit equivalent / park ha (~ 3,600 L/ha/day)
7. **Q(fd) =** 0.45 L/s/unit
8. **Q(ici) =** ICI Area x ICI Flow x ICI Peak
9. **Q(e) =** 0.33 L/s/ha (design); 0.30 L/s/ha (annual); 0.55 L/s/ha (rare)

Definitions

Q(D) = Peak Design Flow (L/s)
Q(A) = Peak Annual Flow (L/s)
Q(R) = Peak Rare Flow (L/s)
Q(p) = Peak Design Population Flow (L/s)
Q(q) = Average Population Flow (L/s)

	Semis / Towns	1 Bed Apts	2 Bed Apts
P = Residential Population =	2.7	1.4	2.1

q = Average Capita Flow
M = Harmon Formula
K = Harmon Correction Factor
Typ. Service Diameter (mm) = 135
Typ. Service Length (m) = 0
I/I Pipe Rate (L/mm dia/m/hr) = 0.007
Q(fd) = Foundation Flow (L/s)
Q(ici) = Industrial / Commercial / Institutional Flow (L/s)
Q(e) = Extraneous Flow (L/s)

Institutional / Commercial / Industrial	Industrial	Commercial / Institutional	
Design =	35000	28000	L/gross ha/day
Annual / Rare =	10000	17000	L/gross ha/day
ICI Peak *			
Design =	1.5	1.5	* ICI Peak = 1.0 Default, 1.5 if ICI in contributing area is >20% (design only)
Annual / Rare =		1.0	

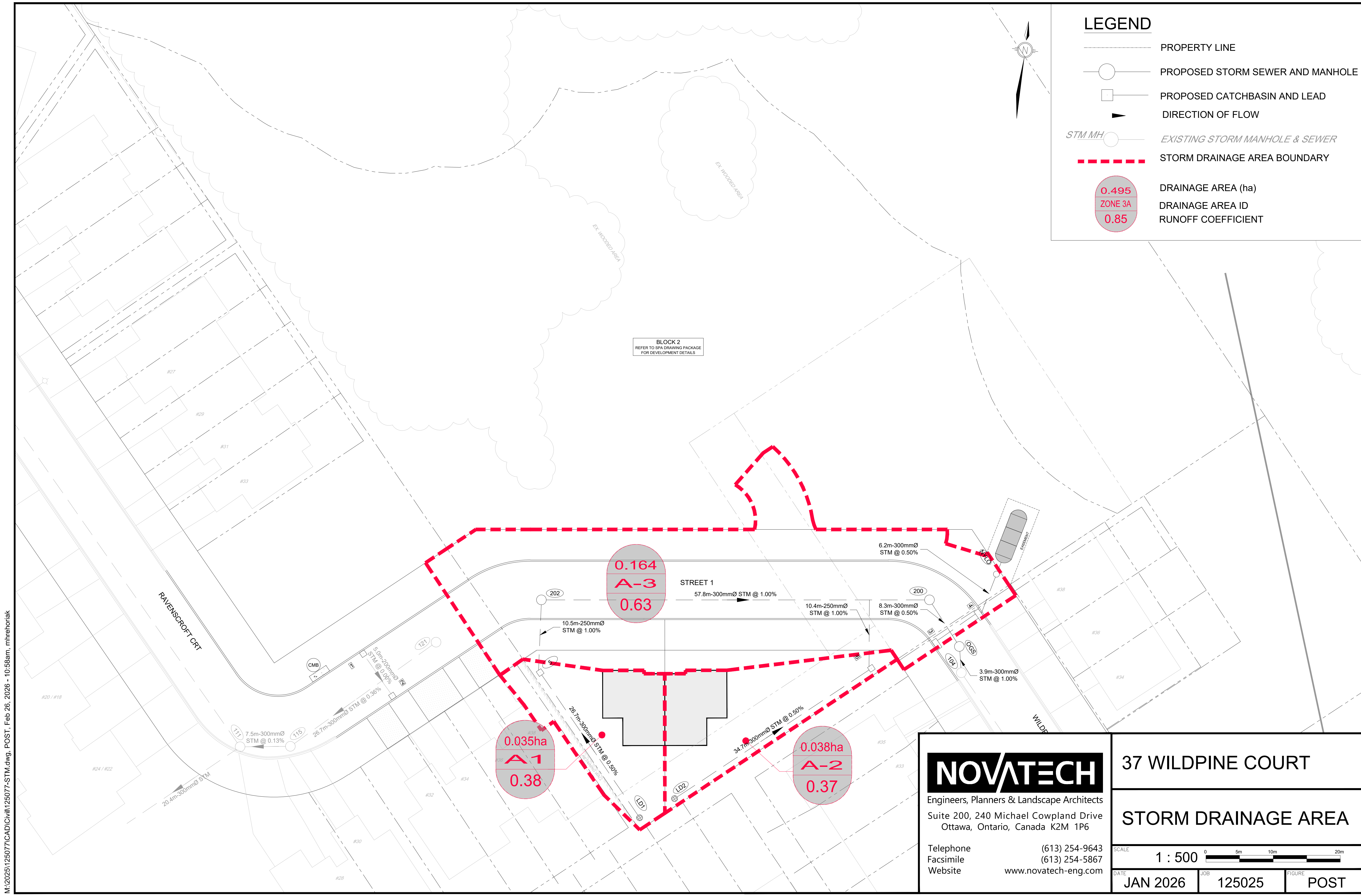
Capacity Equation

Q full = $1000*(1/n)*A_p*R^{2/3}*So^{0.5}$

Definitions

Q full = Capacity (L/s)
n = Manning coefficient of roughness (0.013)
A_p **=** Pipe flow area (m^2)
R = Hydraulic Radius of wetted area (dia./4 for full pipes)
So = Pipe slope/gradient

APPENDIX D
Storm Servicing Information


LEGEND
PROPERTY LINE
PROPOSED STORM SEWER AND MANHOLE
PROPOSED CATCHBASIN AND LEAD
DIRECTION OF FLOW
STM MH
EXISTING STORM MANHOLE & SEWER
STORM DRAINAGE AREA BOUNDARY
0.495
ZONE 3A
0.85
DRAINAGE AREA (ha)
DRAINAGE AREA ID
RUNOFF COEFFICIENT
BLOCK 2
REFER TO SPA DRAWING PACKAGE FOR DEVELOPMENT DETAILS
RAVENSCROFT CRT
STREET 1
0.164
A-3
0.63
0.035ha
A-1
0.38
0.038ha
A-2
0.37
57.8m-300mmØ STM @ 1.00%
10.5m-250mmØ STM @ 1.00%
10.4m-250mmØ STM @ 1.00%
8.3m-300mmØ STM @ 0.50%
6.2m-300mmØ STM @ 0.50%
3.9m-300mmØ STM @ 1.00%
26.7m-300mmØ STM @ 0.50%
34.7m-300mmØ STM @ 0.50%
7.5m-300mmØ STM @ 0.13%
26.7m-300mmØ STM @ 0.36%
20.4m-300mmØ STM
5.0m-200mmØ STM @ 0.00%
202
200
121
111
115
104
OGS
LD1
LD2
CMB
EASEMENT
EX. WOODED AREA
WILDP
NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com
37 WILDPINE COURT
STORM DRAINAGE AREA
SCALE
1 : 500
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JAN 2026
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STORM SEWER DESIGN SHEET

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 125077
Project Name: 37 Wildpine Court
Date: 2026-02-13
Input By: AB
Reviewed By: CR
Drawing Reference: 125077- GP

Storm Design Event = 2 Year

Legend: Design Input by User
As-Built Input by User
Cumulative Cell
Calculated Design Cell Output
Calculated Uncontrolled Peak Flow Cell Output
Design Input Restricted Peak Flow Cell

Reference: City of Ottawa - Sewer Design Guidelines (2012 and TBs)
MOE - Design Guidelines for Sewage Works (2008)

Location				Flow							Design Capacity / Proposed Sewer Pipe Sizing / Design								
Street	Area ID	From MH	To MH	Area A (ha.)	Runoff Coefficient C	Indivi. 2.78 AC	Accum. 2.78 AC	Time of Conc. Tc (min.)	Rain Intensity I (mm/hr)	Total Uncontrolled Peak Flow Q (L/s)	Pipe Length (m)	Pipe Size (mm) and Material	Pipe ID Actual (m)	Roughness n	Design Grade So (%)	Capacity Qfull (L/s)	Full Flow Velocity (m/s)	Time of Flow (min.)	Q / Qfull
	A1			0.035	0.38	0.04		10.00	76.81	2.8	10.5	250 PVC	0.254	0.013	1.00	62.0	1.22	0.14	4.6%
	A2			0.038	0.37	0.04		10.00	76.81	3.0	10.4	250 PVC	0.254	0.013	1.00	62.0	1.22	0.14	4.8%
Street One		202	200				0.08	10.14	76.27	5.8	57.8	300 PVC	0.3048	0.013	1.00	100.9	1.38	0.70	5.8%
Street One	A3	200	OGS	0.164	0.63	0.29	0.36	10.84	73.73	26.8	8.3	300 PVC	0.3048	0.013	0.50	71.3	0.98	0.14	37.5%
Street One		OGS	EX100				0.36	10.98	73.24	26.6	3.9	300 PVC	0.3048	0.013	1.00	100.9	1.38	0.05	26.4%
Totals				**0.237**							**90.9**								

Demand Equation / Parameters

1. Q = 2.78 ACI

Definitions

Q = Peak flow in litres per second (L/s)
A = Area in hectares (ha)
C = Weighted runoff coefficient (increased by 25% for 100-year)
I = Rainfall intensity in millimeters per hour (mm/hr)

Rainfall intensity is based on City of Ottawa IDF data presented in the City of Ottawa - Sewer Design Guidelines

Capacity Equation

Q full = $1000*(1/n)*A_p*R^{2/3}*So^{0.5}$

Definitions

Q full = Capacity (L/s)
n = Manning coefficient of roughness (0.013)
A_p = Pipe flow area (m^2)
R = Hydraulic Radius of wetted area (dia./4 for full pipes)
So = Pipe slope/gradient

APPENDIX E
Stormwater Management Calculations

Hydroworks Sizing Summary

37 Wildpine Court

Ottawa

09-30-2025

Recommended Size: HydroDome HD 4

Hydroworks Sizing Program Version 5.8.5

A HydroDome HD 4 is recommended to provide 80 % annual TSS removal based on a drainage area of .235 (ha) with an imperviousness of 48.8 % and Ottawa CDA, Ontario rainfall for the ETV particle size distribution.

The recommended HydroDome HD 4 treats 100 % of the annual runoff and provides 83 % annual TSS removal for the Ottawa CDA rainfall records and ETV particle size distribution.

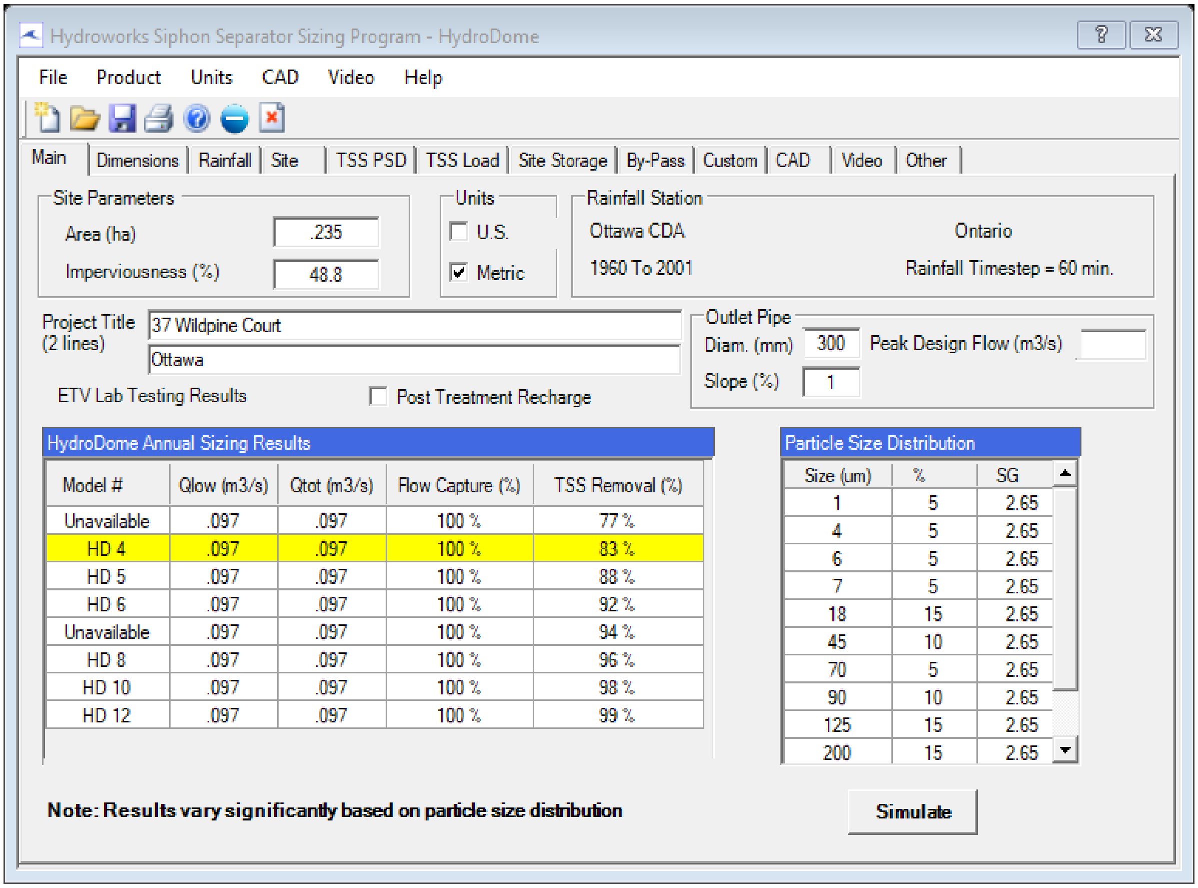
The HydroDome has a siphon which creates a discontinuity in headloss. Since a peak flow was not specified, headloss was calculated using the full pipe flow of .1 (m3/s) for the given 300 (mm) pipe diameter at 1% slope. The headloss was calculated to be 312 (mm) above the crown of the 300 (mm) outlet pipe.

This summary report provides the main parameters that were used for sizing. These parameters are shown on the summary tables and graphs provided in this report.

If you have any questions regarding this sizing summary please do not hesitate to contact Hydroworks at 888-290-7900 or email us at support@hydroworks.com.

The sizing program is for sizing purposes only and does not address any site specific parameters such as hydraulic gradeline, tailwater submergence, groundwater, soils bearing capacity, etc. Headloss calculations are not a hydraulic gradeline calculation since this requires a starting water level and an analysis of the entire system downstream of the HydroDome .

TSS Removal Sizing Summary



Hydroworks Siphon Separator Sizing Program - HydroDome

File Product Units CAD Video Help

Main | Dimensions | Rainfall | Site | TSS PSD | TSS Load | Site Storage | By-Pass | Custom | CAD | Video | Other

Site Parameters
Area (ha) .235
Imperviousness (%) 48.8

Units
☐ U.S.
☑ Metric

Rainfall Station
Ottawa CDA Ontario
1960 To 2001 Rainfall Timestep = 60 min.

Project Title (2 lines): 37 Wildpine Court / Ottawa

Outlet Pipe
Diam. (mm) 300 Peak Design Flow (m3/s)
Slope (%) 1

ETV Lab Testing Results ☐ Post Treatment Recharge

HydroDome Annual Sizing Results

Model #	Qlow (m3/s)	Qtot (m3/s)	Flow Capture (%)	TSS Removal (%)
Unavailable	.097	.097	100 %	77 %
HD 4	.097	.097	100 %	83 %
HD 5	.097	.097	100 %	88 %
HD 6	.097	.097	100 %	92 %
Unavailable	.097	.097	100 %	94 %
HD 8	.097	.097	100 %	96 %
HD 10	.097	.097	100 %	98 %
HD 12	.097	.097	100 %	99 %

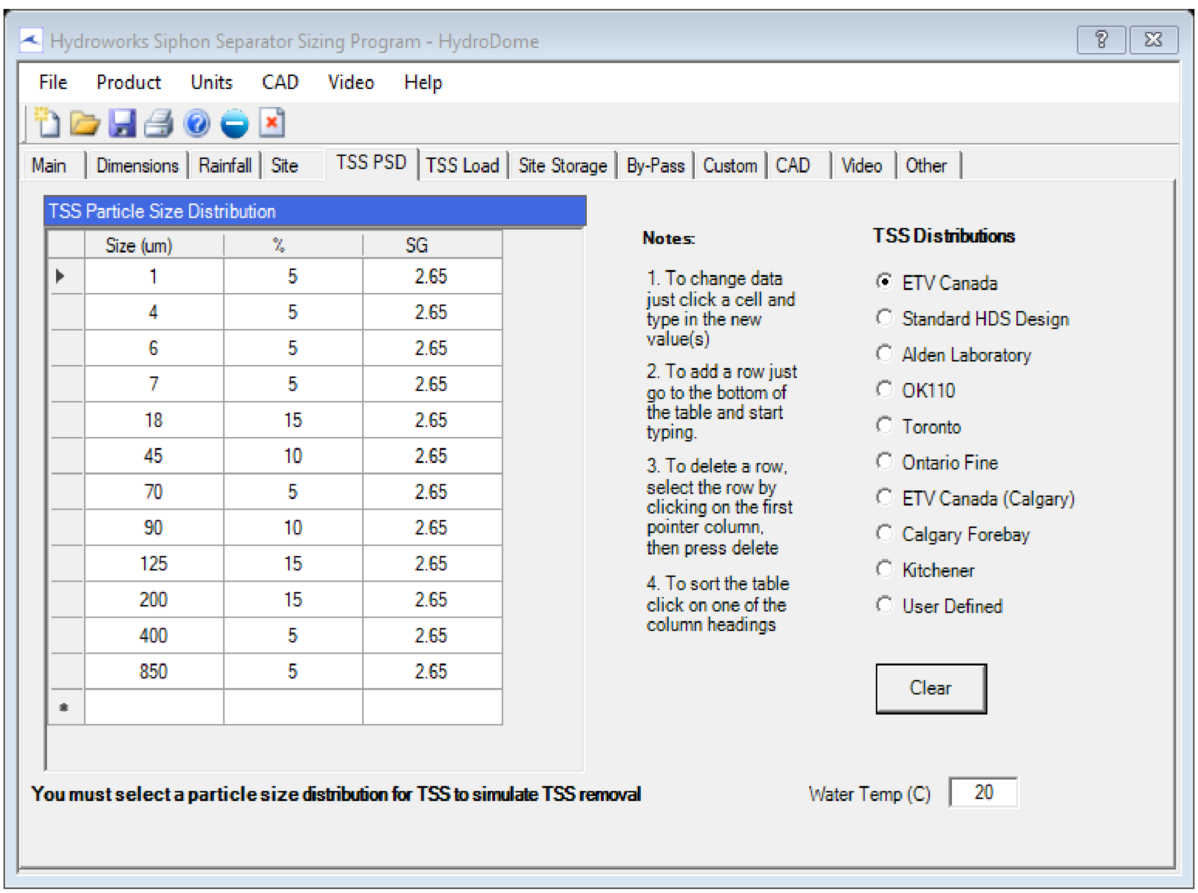
Particle Size Distribution

Size (um)	%	SG
1	5	2.65
4	5	2.65
6	5	2.65
7	5	2.65
18	15	2.65
45	10	2.65
70	5	2.65
90	10	2.65
125	15	2.65
200	15	2.65

Note: Results vary significantly based on particle size distribution

Simulate

TSS Particle Size Distribution



Hydroworks Siphon Separator Sizing Program - HydroDome

File Product Units CAD Video Help

Main | Dimensions | Rainfall | Site | TSS PSD | TSS Load | Site Storage | By-Pass | Custom | CAD | Video | Other

TSS Particle Size Distribution

Size (um)	%	SG
1	5	2.65
4	5	2.65
6	5	2.65
7	5	2.65
18	15	2.65
45	10	2.65
70	5	2.65
90	10	2.65
125	15	2.65
200	15	2.65
400	5	2.65
850	5	2.65

Notes:

1. To change data just click a cell and type in the new value(s)
2. To add a row just go to the bottom of the table and start typing.
3. To delete a row, select the row by clicking on the first pointer column, then press delete
4. To sort the table click on one of the column headings

TSS Distributions

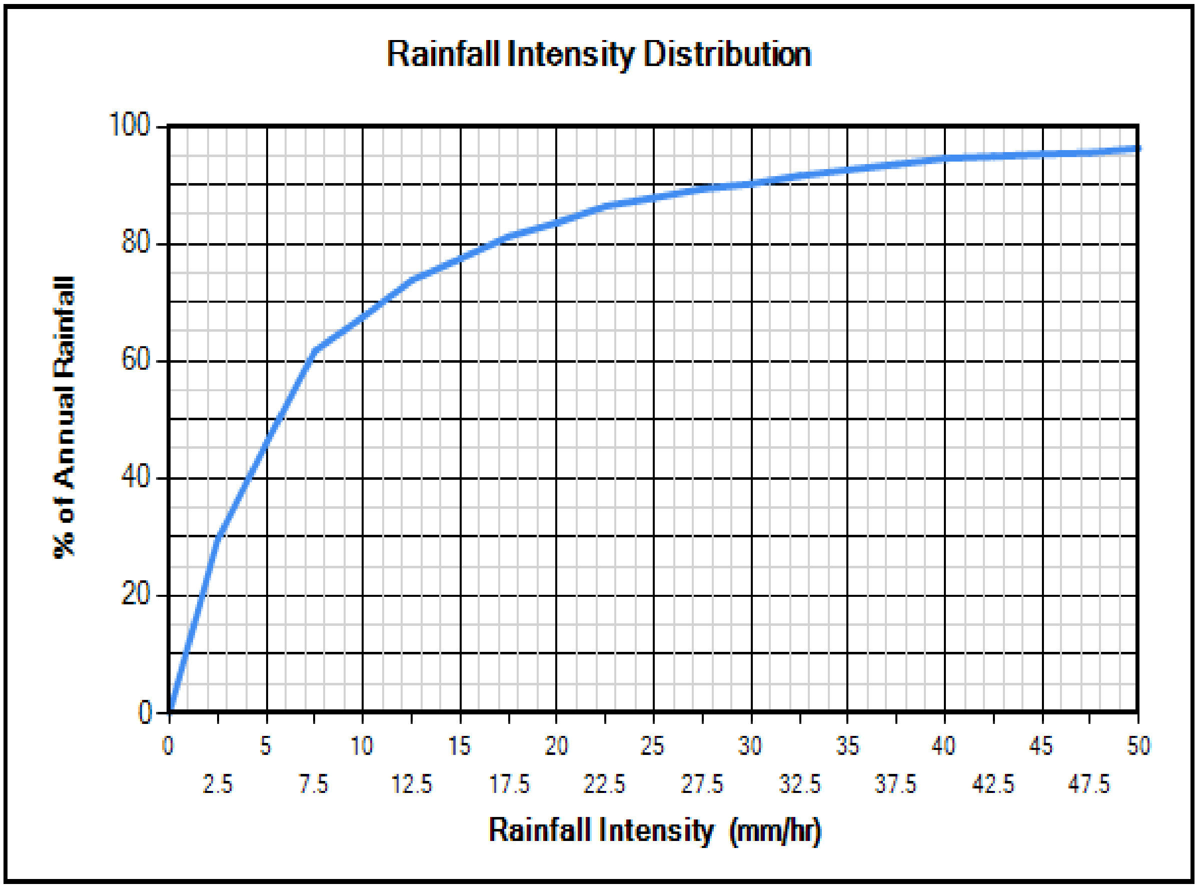
- (•) ETV Canada
- ( ) Standard HDS Design
- ( ) Alden Laboratory
- ( ) OK110
- ( ) Toronto
- ( ) Ontario Fine
- ( ) ETV Canada (Calgary)
- ( ) Calgary Forebay
- ( ) Kitchener
- ( ) User Defined

Clear

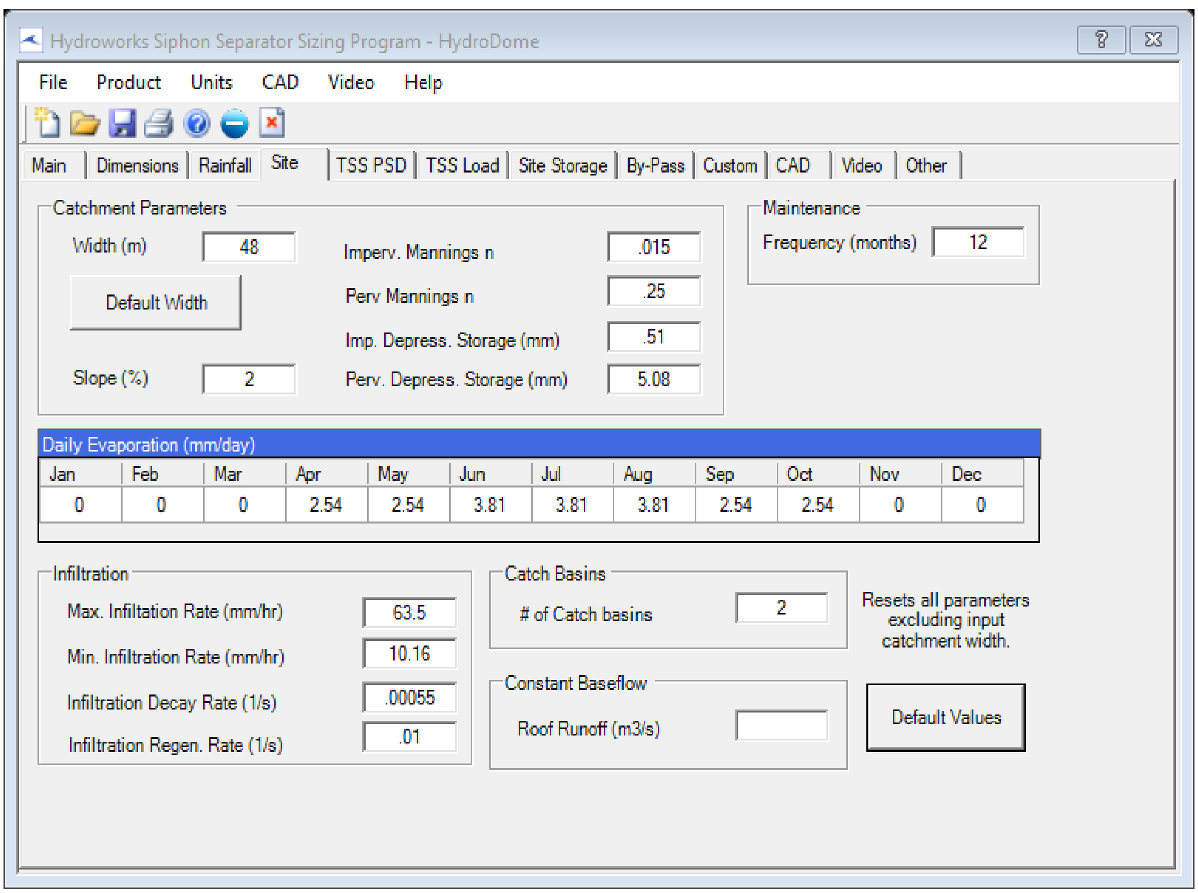
You must select a particle size distribution for TSS to simulate TSS removal

Water Temp (C) 20

Rainfall Station - Ottawa CDA, Ontario(1960 To 2001)



Site Physical Characteristics



Dimensions And Capacities

Hydroworks Siphon Separator Sizing Program - HydroDome

File | Product | Units | CAD | Video | Help

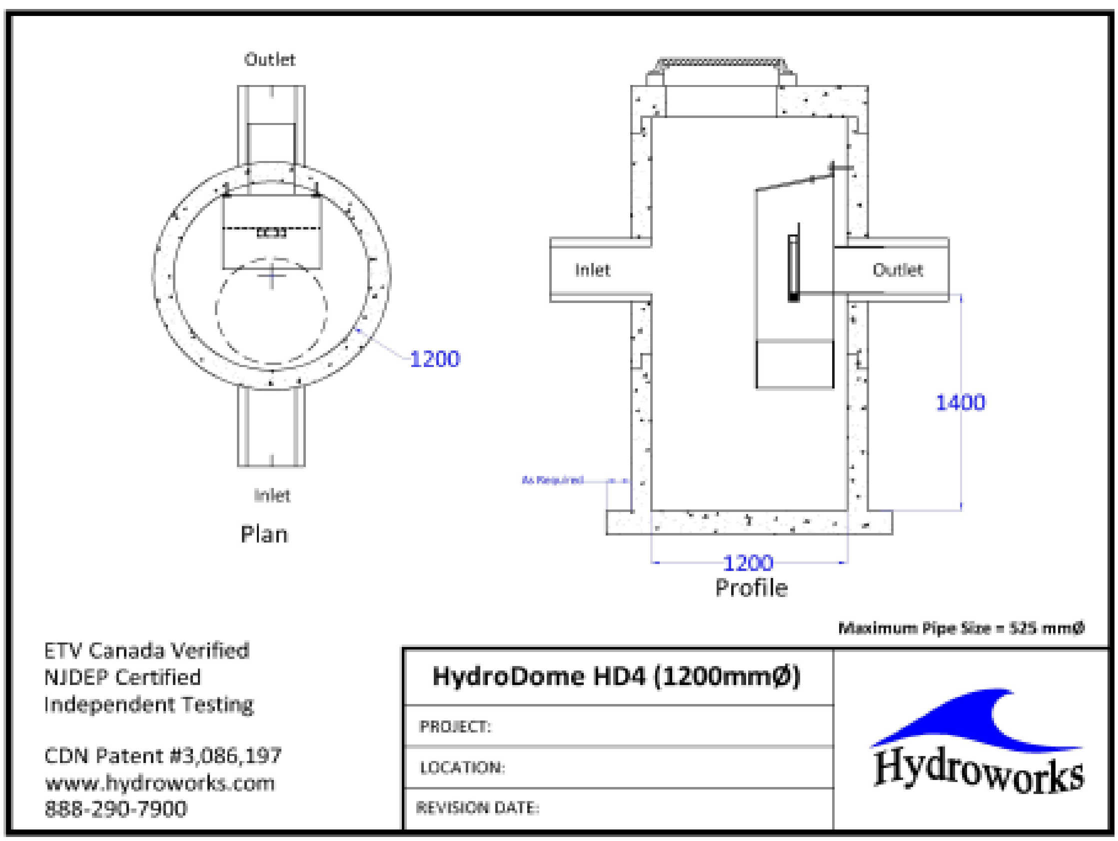
Main | Dimensions | Rainfall | Site | TSS PSD | TSS Load | Site Storage | By-Pass | Custom | CAD | Video | Other

Dimensions and Capacities

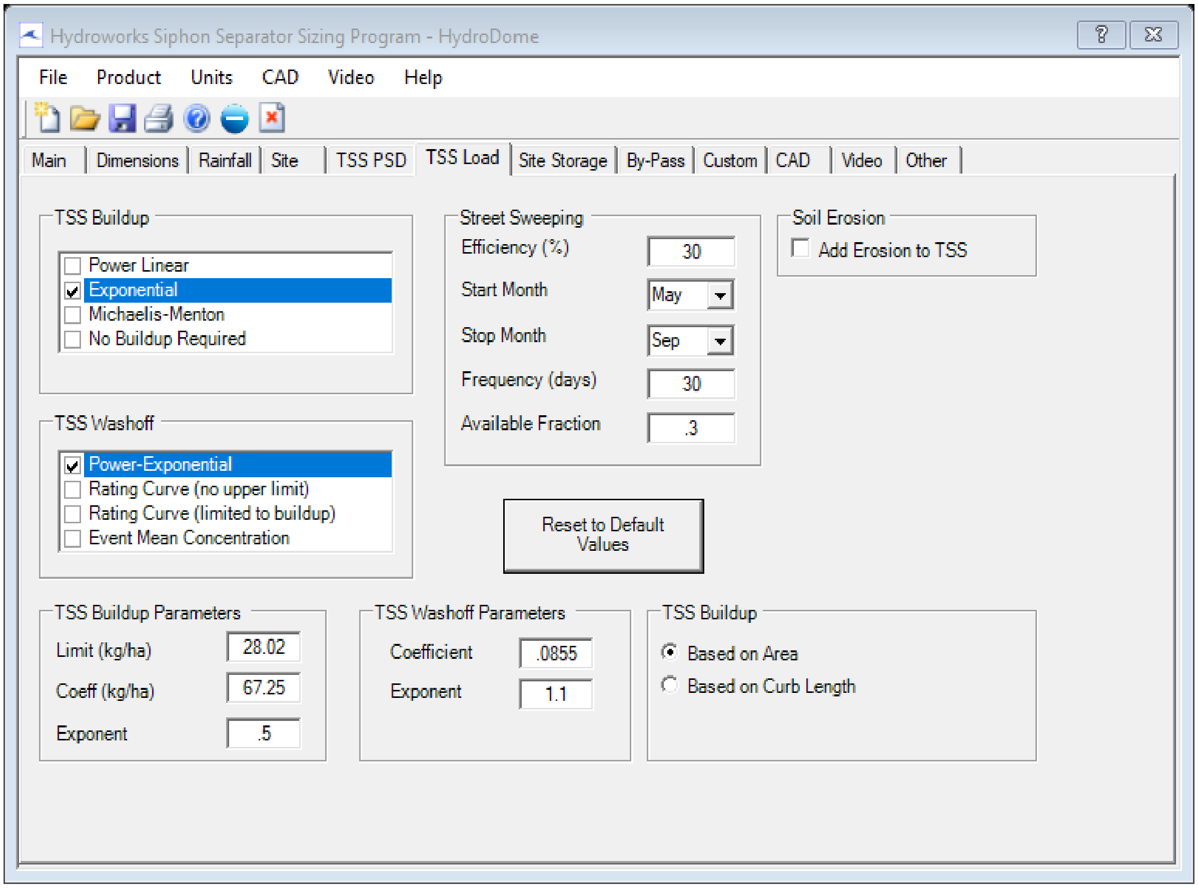
Model	Diam. (m)	Depth (m)	Float. Vol. (L)	Sediment Vol. (m3)	Total Vol. (m3)
HD 3	0.91	1.22	123	0.5	0.8
HD 4	1.22	1.37	266	0.9	1.6
HD 5	1.52	1.68	483	1.7	3.1
HD 6	1.83	1.98	803	2.9	5.2
HD 7	2.13	2.29	1226	4.6	8.2
HD 8	2.44	2.59	1863	6.8	12.1
HD 10	3.05	3.2	3617	13	23.3
HD 12	3.66	3.81	6224	22.2	40

Depth = Depth from outlet invert to inside bottom of tank

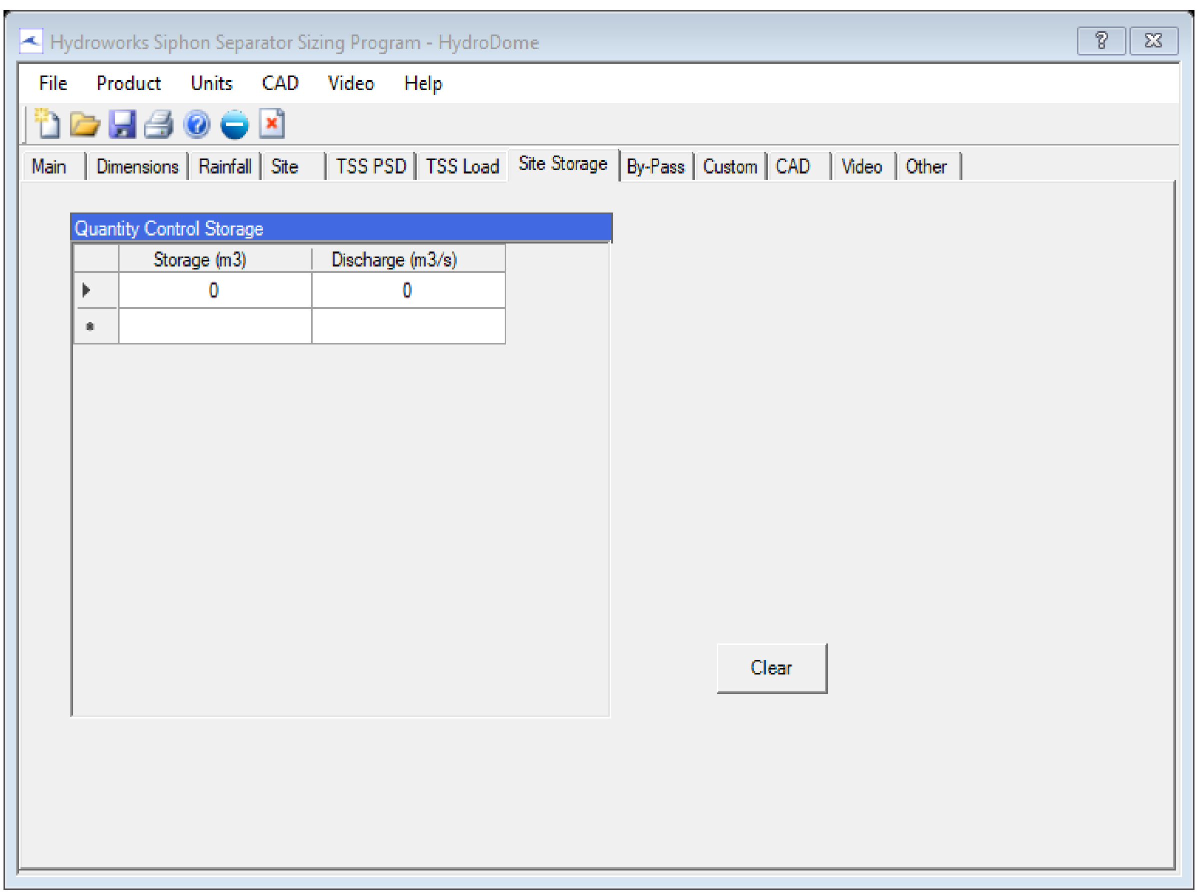
Generic HD 4 CAD Drawing



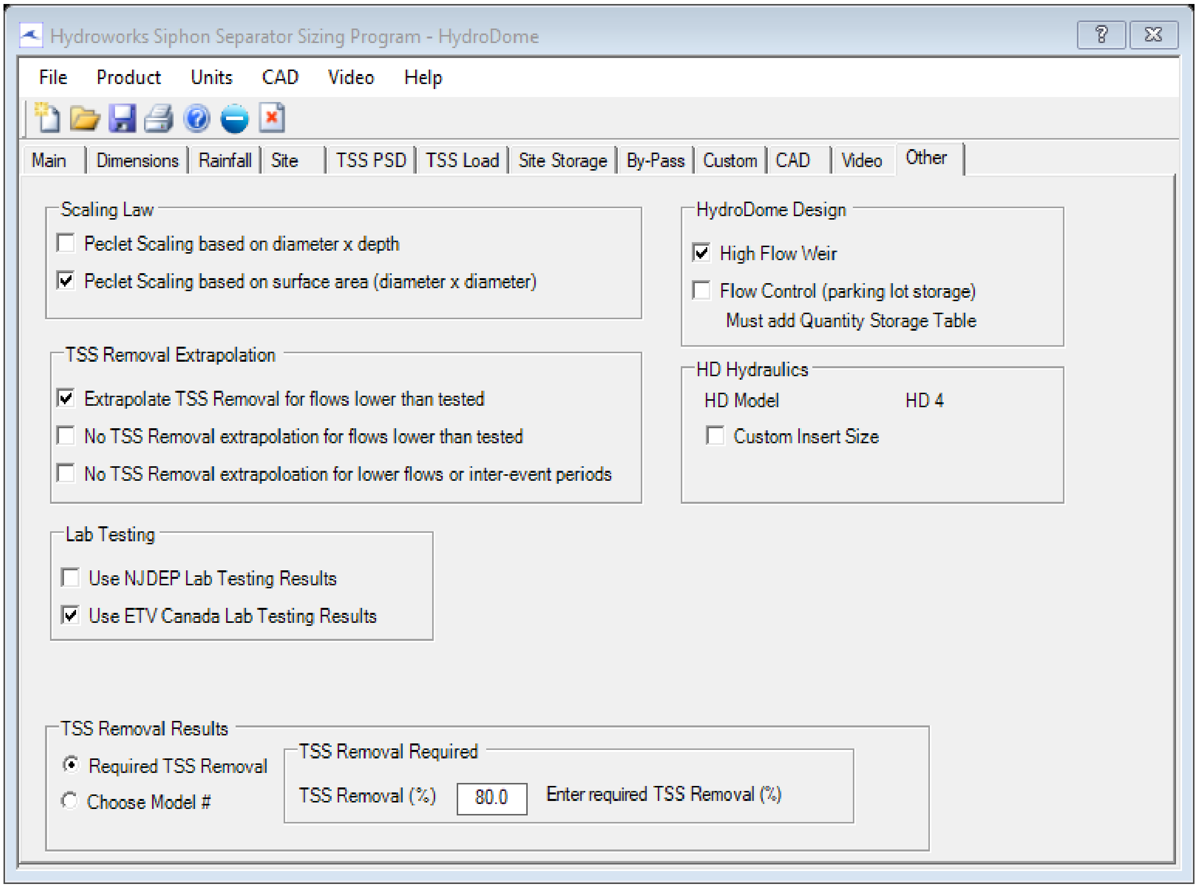
TSS Buildup And Washoff



Upstream Quantity Storage



Other Parameters

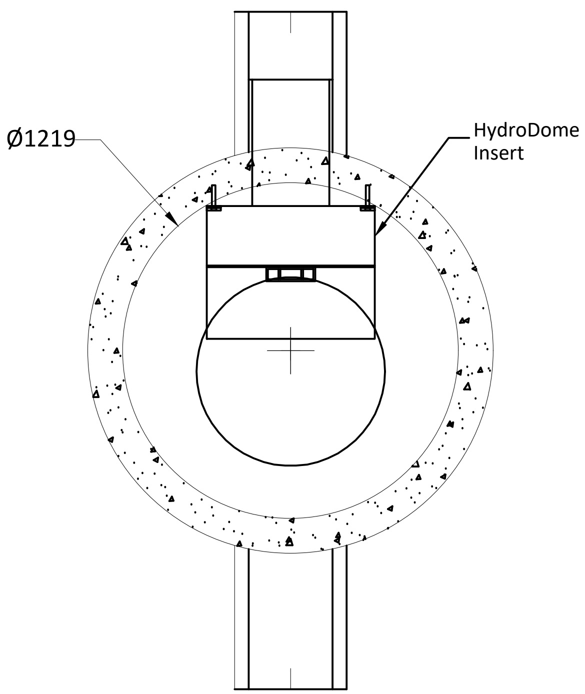


Flagged Issues

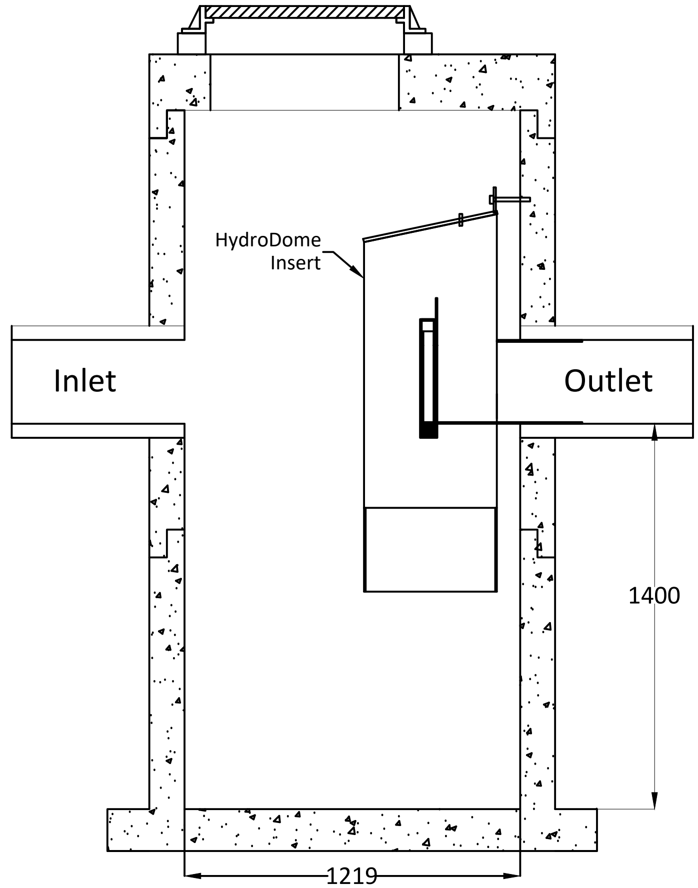
If there is underground detention storage upstream of the HydroDome please contact Hydroworks to ensure it has been modeled correctly.

Hydroworks Sizing Program - Version 5.8.5

1-800-290-7900
www.hydroworks.com



Plan



Profile

NOTES:

1. Sump depths shown are minimums. Additional depth can be added for site specific requirements.
2. HydroDome can be designed with either a closed cover or inlet grate.
3. Multiple inlet pipes allowed
4. Drops allowed
5. Contact Hydroworks if there is underground detention storage upstream of the HydroDome.

Canadian Infrastructure Products
www.c-i-p.ca
519-212-9161

HydroDome by Hydroworks, LLC
Canadian Patent #3,086,197
www.hydroworks.com
888-290-7900

NOT TO SCALE

Hydroworks HD4 (1200mmØ)

PROJECT:	Generic Drawing
LOCATION:	xxx
REVISION DATE:	July, 2024

Hydroworks

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	

ADS
Advanced Drainage Systems, Inc.

ADS SiteAssist™
FOR STORMTECH INSTALLATION INSTRUCTIONS VISIT OUR APP

37 WILDPINE

OTTAWA, ON, CANADA

MC-7200 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH MC-7200.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL BE CERTIFIED TO CSA B184, "POLYMERIC SUB-SURFACE STORMWATER MANAGEMENT STRUCTURES", AND MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 60x101.
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 75 mm (3").
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 500 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 F2418 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 MC-7200 CHAMBER SYSTEM

1. STORMTECH MC-7200 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH MC-7200 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-7200 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR 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 - 230 mm (9") SPACING BETWEEN THE CHAMBER ROWS.
7. INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 300 mm (12") INTO CHAMBER END CAPS.
8. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE; AASHTO M43 #3, 357, 4, 467, 5, 56, OR 57.
9. STONE SHALL BE BROUGHT UP EVENLY AROUND CHAMBERS SO AS NOT TO DISTORT THE CHAMBER SHAPE. STONE DEPTHS SHOULD NEVER DIFFER BY MORE THAN 300 mm (12") BETWEEN ADJACENT CHAMBER ROWS.
10. STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.
11. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIAL BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
12. 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 MC-7200 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-7200 CONSTRUCTION GUIDE".
2. THE USE OF EQUIPMENT OVER MC-7200 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-7200 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-7200 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 CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY USING THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

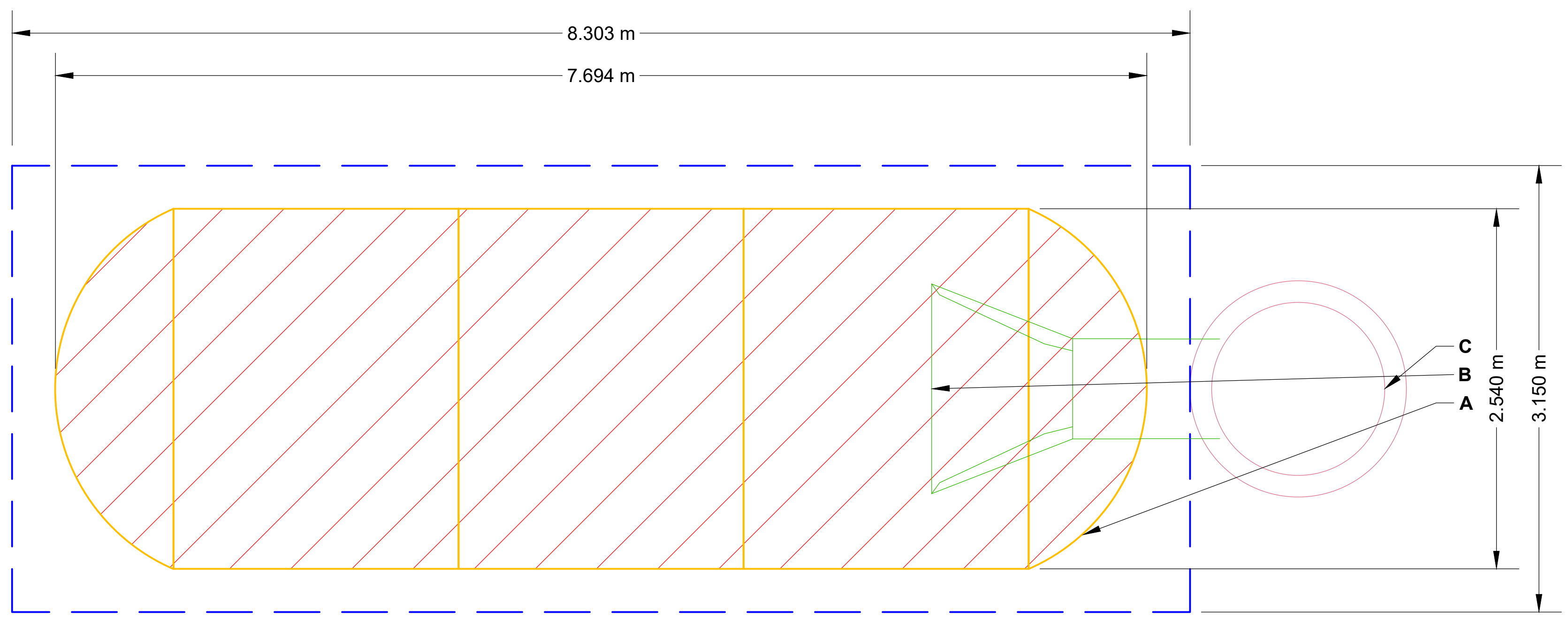
CONTACT STORMTECH AT 1-800-821-6710 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

PROPOSED LAYOUT	
3	STORMTECH MC-7200 CHAMBERS
2	STORMTECH MC-7200 END CAPS
305	STONE ABOVE (mm)
229	STONE BELOW (mm)
40	STONE VOID
31.8	INSTALLED SYSTEM VOLUME (m^3) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)
26.2	SYSTEM AREA (m^2)
22.9	SYSTEM PERIMETER (m)

PROPOSED ELEVATIONS	
MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	119.656
MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	118.285
MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	118.132
MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	118.132
MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	118.132
TOP OF STONE:	117.827
TOP OF MC-7200 CHAMBER:	117.523
600 mm ISOLATOR ROW PLUS INVERT:	116.056
BOTTOM OF MC-7200 CHAMBER:	115.999
BOTTOM OF STONE:	115.770

*INVERT ABOVE BASE OF CHAMBER

PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
PREFABRICATED END CAP	A	600 mm BOTTOM PARTIAL CUT END CAP, PART#: MC7200IEPP24B / TYP OF ALL 600 mm BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	57 mm	
FLAMP	B	INSTALL FLAMP ON 600 mm ACCESS PIPE / PART#: MCFLAMP		
CONCRETE STRUCTURE	C	(DESIGN BY ENGINEER / PROVIDED BY OTHERS)		



ISOLATOR ROW PLUS
(SEE DETAIL)

NO WOVEN GEOTEXTILE

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.

37 WILDPINE
OTTAWA, ON, CANADA

DATE: 09/29/2025
DRAWN: MS
PROJECT #:
CHECKED: N/A

DATE	DWN	CHK

StormTech®
Chamber System

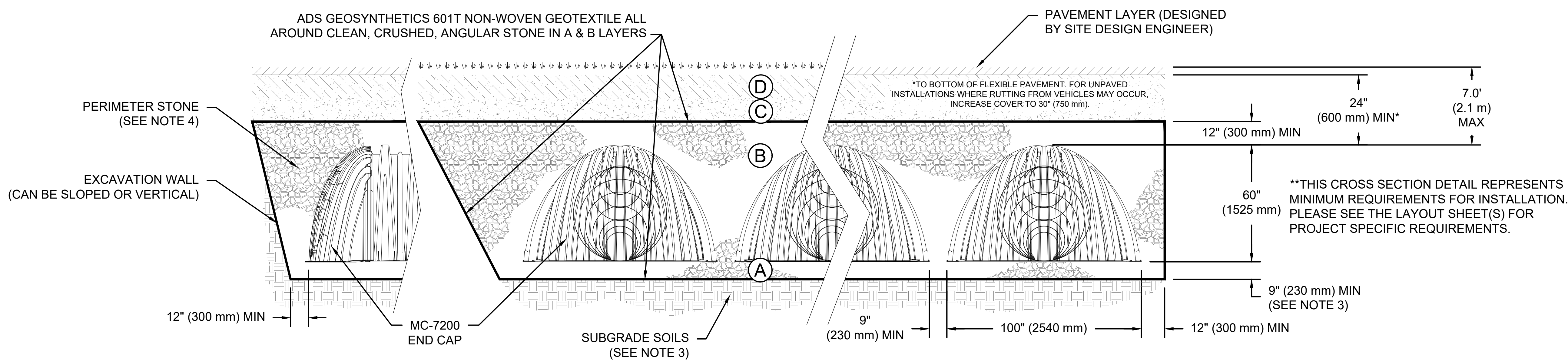
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

SCALE = 1 : 50

ACCEPTABLE FILL MATERIALS: STORMTECH MC-7200 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 24" (600 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 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
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 9" (230 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:

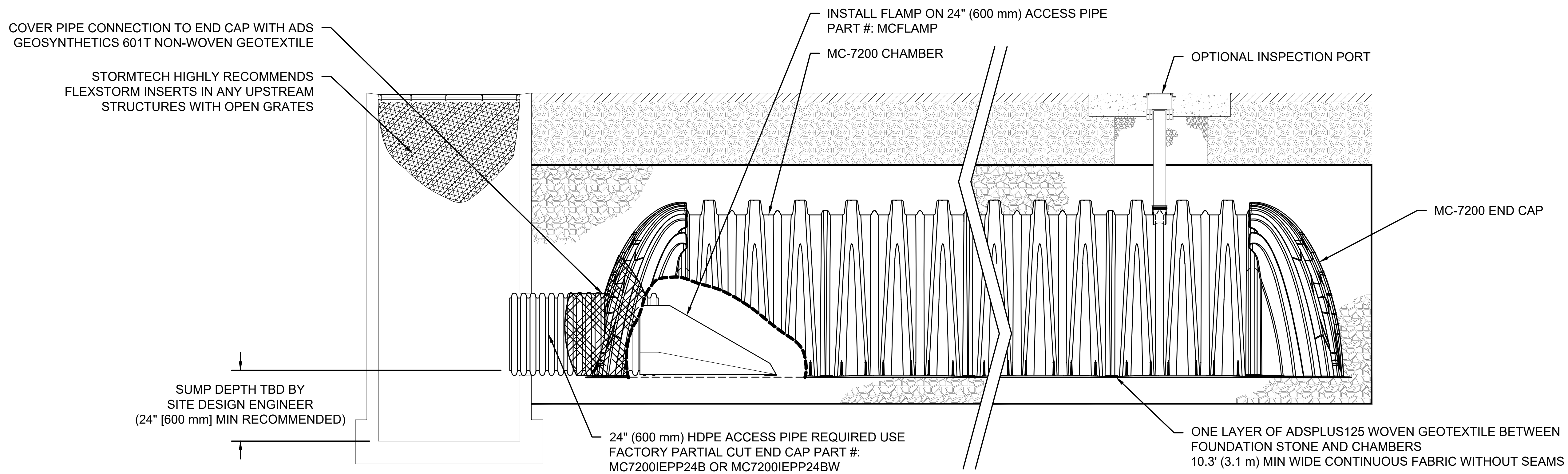
1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 60x101
2. MC-7200 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC 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 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 500 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.

37 WILDPINE
OTTAWA, ON, CANADA
DATE: 09/29/2025
DRAWN: MS
PROJECT #:
CHECKED: N/A

DATE	DWN	CHK

StormTech® Chamber System

ADS
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473



MC-7200 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.

37 WILDPINE
OTTAWA, ON, CANADA
DATE: 09/29/2025 | DRAWN: MS
PROJECT #: | CHECKED: N/A

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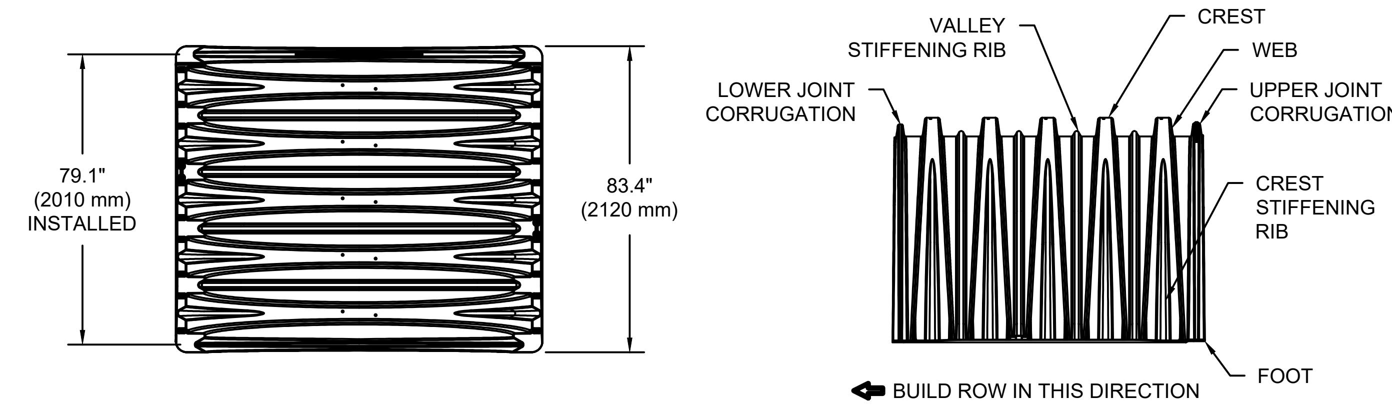
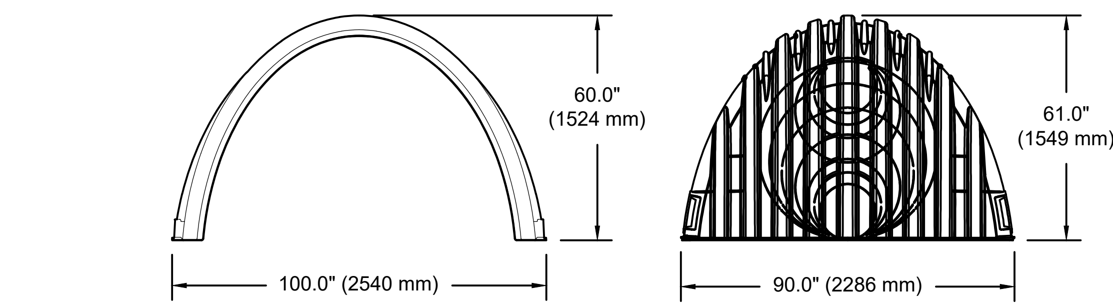
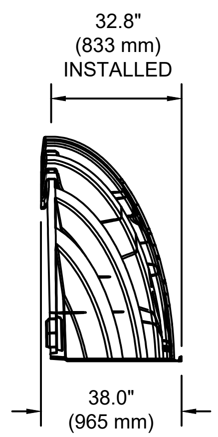
MC-7200 TECHNICAL SPECIFICATION

NTS







NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	100.0" X 60.0" X 79.1"	(2540 mm X 1524 mm X 2010 mm)
CHAMBER STORAGE	175.9 CUBIC FEET	(4.98 m³)
MINIMUM INSTALLED STORAGE*	267.3 CUBIC FEET	(7.56 m³)
WEIGHT (NOMINAL)	205 lbs.	(92.9 kg)

NOMINAL END CAP SPECIFICATIONS

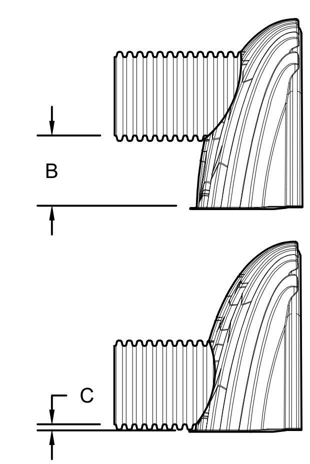
SIZE (W X H X INSTALLED LENGTH)	90.0" X 61.0" X 32.8"	(2286 mm X 1549 mm X 833 mm)
END CAP STORAGE	39.5 CUBIC FEET	(1.12 m³)
MINIMUM INSTALLED STORAGE*	115.3 CUBIC FEET	(3.26 m³)
WEIGHT (NOMINAL)	90 lbs.	(40.8 kg)

*ASSUMES 12" (305 mm) STONE ABOVE, 9" (229 mm) STONE FOUNDATION AND BETWEEN CHAMBERS, 12" (305 mm) STONE PERIMETER IN FRONT OF END CAPS AND 40% STONE POROSITY.

PARTIAL CUT HOLES AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
PARTIAL CUT HOLES AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
END CAPS WITH A PREFABRICATED WELDED STUB END WITH "W"

PART #	STUB	B	C
MC7200IEPP06T	6" (150 mm)	42.54" (1081 mm)	---
MC7200IEPP06B		---	0.86" (22 mm)
MC7200IEPP08T	8" (200 mm)	40.50" (1029 mm)	---
MC7200IEPP08B		---	1.01" (26 mm)
MC7200IEPP10T	10" (250 mm)	38.37" (975 mm)	---
MC7200IEPP10B		---	1.33" (34 mm)
MC7200IEPP12T	12" (300 mm)	35.69" (907 mm)	---
MC7200IEPP12B		---	1.55" (39 mm)
MC7200IEPP15T	15" (375 mm)	32.72" (831 mm)	---
MC7200IEPP15B		---	1.70" (43 mm)
MC7200IEPP18T	18" (450 mm)	29.36" (746 mm)	---
MC7200IEPP18TW			
MC7200IEPP18B		---	1.97" (50 mm)
MC7200IEPP18BW			
MC7200IEPP24T	24" (600 mm)	23.05" (585 mm)	---
MC7200IEPP24TW			
MC7200IEPP24B		---	2.26" (57 mm)
MC7200IEPP24BW			
MC7200IEPP30BW	30" (750 mm)	---	2.95" (75 mm)
MC7200IEPP36BW	36" (900 mm)	---	3.25" (83 mm)
MC7200IEPP42BW	42" (1050 mm)	---	3.55" (90 mm)

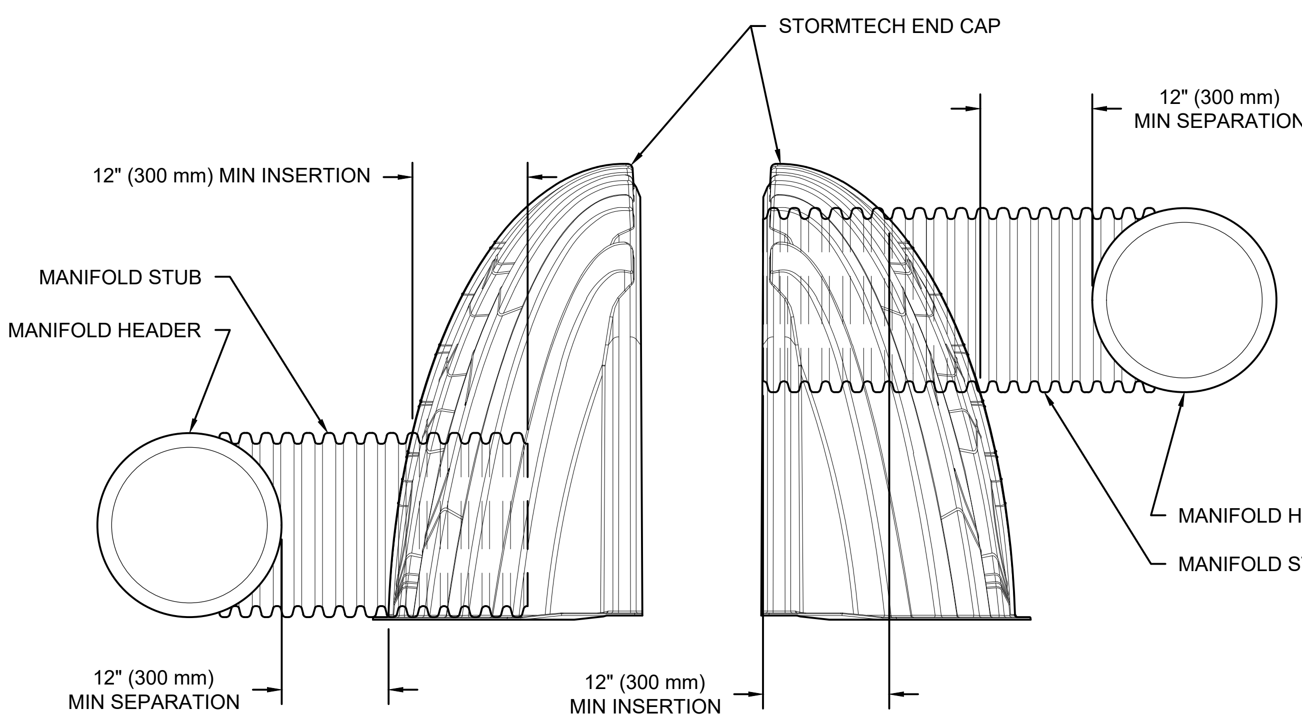
NOTE: ALL DIMENSIONS ARE NOMINAL



CUSTOM PREFABRICATED INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12-24" (300-600 mm) SIZE ON SIZE AND 15-48" (375-1200 mm) ECCENTRIC MANIFOLDS. CUSTOM INVERT LOCATIONS ON THE MC-7200 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 mm). THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHEST POSSIBLE FOR THE PIPE SIZE.

MC-SERIES END CAP INSERTION DETAIL

NTS



NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL FOR A PROPER FIT IN END CAP OPENING.

37 WILDPINE

OTTAWA, ON, CANADA

DATE: 09/29/2025 | DRAWN: MS | PROJECT #: | CHECKED: N/A

DATE	DWN	CHK

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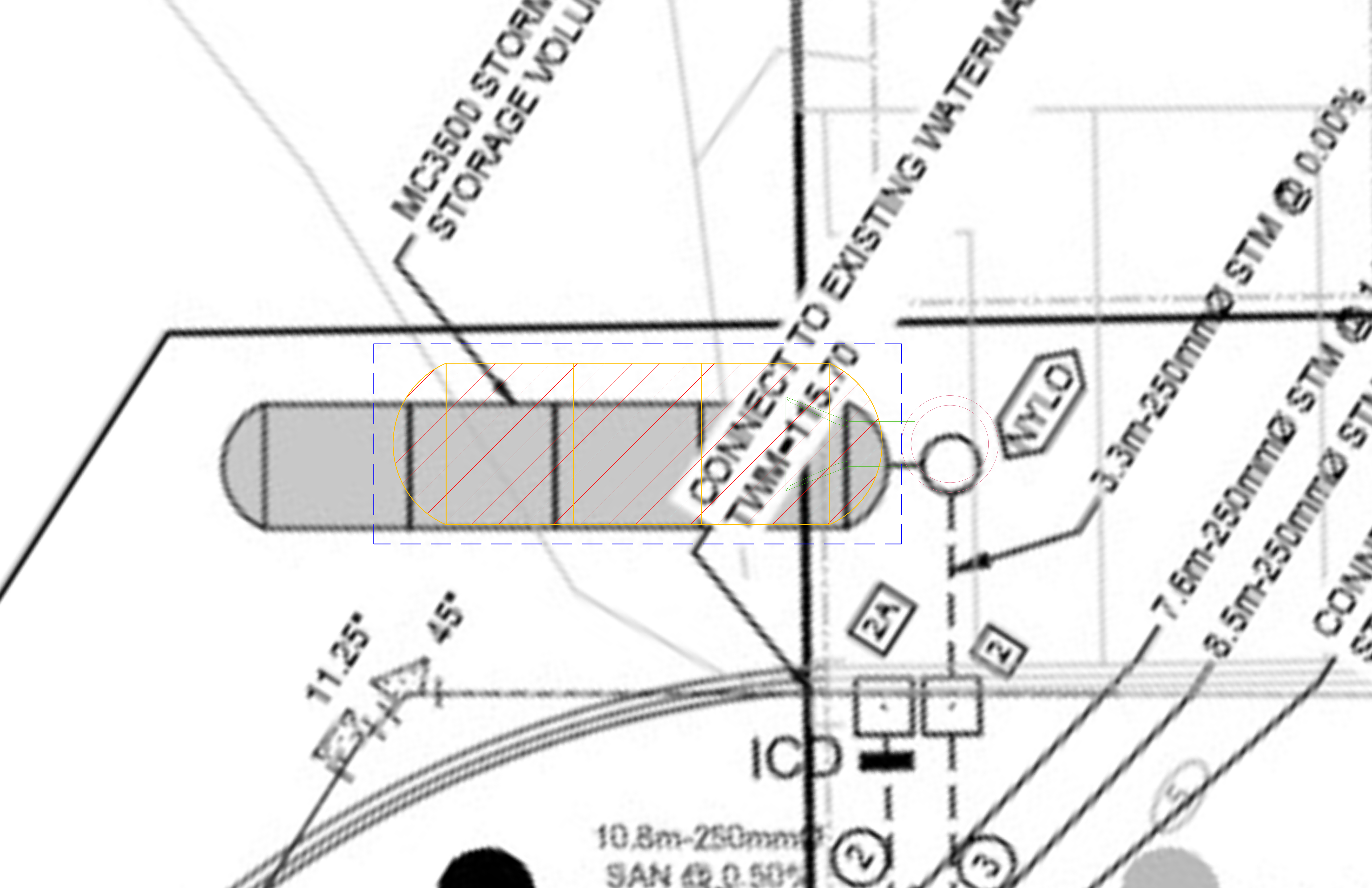
MC3500 STORM
STORAGE VOLU
CONNECT TO EXISTING WATERMA
3.3m-250mmØ STM @ 0.00%
NYLO
7.6m-250mmØ STM
8.5m-250mmØ STM
2A
2
ICD
11.25°
45°
10.8m-250mmØ
SAN @ 0.50%
2
3

37 Wildpine (125077)

Bioswale Quality Calculations

Location	Catchment Parameters		Quality Requirements [1]		Clear Stone Storage Volume [2]					Subdrain Storage Volume			Total Underground Storage	Surface Storage	Infiltration / Retention Time[3]							
	Drainage Area	Percent Impervious	Required Volume	Required Volume	Depth of Clearstone	Width of Clearstone	Length of Infiltration Swale	Bottom Area	Clearstone Storage Volume Provided	Diameter	Length of Pipe	Subdrain Storage Volume Provided		Maximum Biorention Swale Volume	Native Soil Infiltration Rate	Subdrain Release Rate	Caclulated Retention Time for Underground Storage		Caclulated Retention Time for Surface Storage		Total Retention Time	
	(ha)	(%)	(m^3/ha)	(m^3)	(m)	(m)	(m)	(m^2)	(m^3)	(mm)	(m)	(m^3)	(m^3)	(m^3)	(L/s)	(L/s)	(hours)	(days)	(hours)	(days)	(hours)	(days)
East Bioswale [4] (Areas B-1, B-2, B-3)	0.315	68.7%	34.6	10.9	0.40	3.50	31.60	110.60	17.1	250	31.60	1.6	18.6	96.6	0.2	42.0	0.1	0.01	0.6	0.0	0.8	0.0
West Bioswale (Area B-4)	0.208	41.4%	26.6	5.5	0.40	3.50	32.64	114.24	18.3	250	0.00	0.0	18.3	97.3	0.5	0.0	10.7	0.4	56.8	2.4	67.5	2.8

[1] Quality requirements based on 80% TSS removal for Infiltration based on Table 3.2 of the Stormwater Management Planning and Design Manual (MOE, 2003).

[2] Total storage provided is based on an assumed 40% void ratio for the clearstone trench (subdrain volume not accounted for).

[3] Infiltration rate / retention time is based on the Geotechnical Investigation preapred by exp dated June 15, 2023; Table X for silty sand.

Note: East Bioswale Infiltration rate estimated around 14mm/hr with a 50% clogging factor (7mm/hr).

Note: West Bioswale Infiltration rate estimated around 30mm/hr with a 50% clogging factor (15mm/hr).

[4] East Bioswale has a subdrain and will drain faster than by infiltration alone.

MOE SWMP Manual Table 3.2

80% TSS Removal for Infiltration

% Impervious	Storage Volume (m^3/ha)
35%	25
55%	30
70%	35
85%	40

NOVATECH
Engineers, Planners & Landscape Architects

M E M O R A N D U M

DATE:	FEBRUARY 15, 2017
TO:	SANTHOSH KURUVILLA / ERIC TOUSIGNANT
FROM:	CARA RUDDLE, P.ENG.
RE:	WILDPINE STORM SEWER ANALYSIS
CC:	J. LEE SHEETS, C.E.T.

A meeting was held at the City Hall on Tuesday Jan 31/17, to discuss the 10 Wildpine Court development and in particular the storm drainage to the existing Wildpine Court storm sewer system. The owners of 10 Wildpine Court have been asked to confirm capacity in the City owned Wildpine Court storm sewer. The owner has been able to locate the original design submission including the as-built plan and profile drawing and design sheet (attached for reference). The owner wishes to discharge more flow to the Wildpine sewer than drains there today. The City Infrastructure Approvals group has asked Novatech to confirm capacity in the pipe for our controlled 100-year flow of 25.6 L/s.

Preliminary Analysis (As provided in Lee Sheets email dated Feb 2/17)

Rather than model the existing network we would like to propose to increase the level of service in the Wildpine Court storm sewer by installing icd's in the 6 existing catchbasins. The longitudinal road grade is continuous from Stittsville Main Street to the elbow in the Wildpine Court where the storm sewer outlets, therefore there are no sags in the road. The level of service would be increased from a 5 year (1988) level of service to a fully protected HGL during all storm events.

Wildpine Court Storm Sewer Existing Capacity

The existing capacity of the sewer is shown on the original design sheet prepared by Oliver Mangione McCalla & Associates Ltd. which is attached for reference and is noted below.

MH 101 to MH 102	Q = 158 L/s
MH 102 to Outlet	Q = 183 L/s

Wildpine Court Storm Sewer Post Development Flows

It is proposed to install icd's within the 6 existing catchbasins along Wildpine Court to increase the level of service within the existing storm sewer. Therefore the post-development flows would include:

- Icd's - 20 L/s per icd with a maximum head of 1.3m,
- 5 L/s/ha assumed weeping tile drainage from the tributary area ,
- 10 Wildpine Court proposed flow

Suite 200, 240 Michael Cowpland Drive, Ottawa ON K2M 1P6 Tel: 613.254.9643 Fax: 613.254.5867 www.novatech-eng.com

Therefore, the total post-development flow to the Wildpine Court storm sewer is:

MH 101 to MH 102

- 5 icd's @ 20 L/s each = 100 L/s
- Contributing area (weeping tiles) = 1.6 ha x 5 L/s/ha = 8 L/s
- Controlled flow from 10 Wildpine (blvd cb) = 5.5 L/s

Total flow = 113.5 L/s

MH 102 to Outlet

- Controlled flow from upstream sewer = 113.5 L/s
- Contributing area (30 Wildpine + 27,29,31,33,35 Wildpine) =0.43ha x 5 L/s/ha = 2.15 L/s
- 1 icd @ 20 L/s each = 20 L/s
- Controlled flow from 10 Wildpine = 20.1 L/s

Total flow = 155.75 L/s

Therefore, there is an excess capacity of 27.2 L/s in the 100-year storm event and an increased level of service. There is also an option to use 15 L/s icd's but we do not feel it is required as the 20 L/s icd is a standard model icd in the City of Ottawa.

Detailed Analysis

The City asked that a spreadsheet model be prepared to further understand the existing and proposed HGL conditions. Therefore, a spreadsheet model was created in order to further anaylze the various flow conditions within the Wildpine Court storm sewer system. The following HGL conditions were analyzed in a spreadsheet model and are attached for reference:

- Post development 5-year controlled site flows from 10 Wildpine Court + the uncontrolled 5-year storm sewer flows from the existing residential and road ROW + the Weeping Tile Flows 5L/s/ha.
- Post Development 100-year controlled flows from 10 Wildpine Court + the uncontrolled 100-year storm sewer flows from the existing residential and road ROW + the Weeping Tile Flows 5L/s/ha.
- Post Development 100-year controlled flows from 10 Wildpine Court + the controlled 100-year storm sewer flows (6 ICD at 25L/s each) from the existing residential and road ROW + the Weeping Tile Flows 5L/s/ha.

The spreadsheet model shows that an icd of 25L/s can be installed in each of the existing catchbasins to provide an increased level of service and ensure that the 5 year storm enters the storm sewer system. The HGL elevations for each scenario have been sketched onto the existing OMM Plan and Profile drawing for the Wildpine Court Sewer. Also included on this plan are the USF elevations to illustrate the provided freeboard from the HGL to the USF. The 100 year surface depth of flow of 0.068m has also been shown on the cross section at the bottom of the OMM Plan and Profile Drawing. Please refer to the summary table below:

Summary of HGL Results for Wildpine Court Storm Sewer

	Pipe Obvert	5 Year HGL	100 Year HGL Uncontrolled*	100 Year HGL Controlled
MH103	114.85 (u/s)	114.91	115.28	114.92
MH 102	115.92 (u/s)	115.92	118.28	115.92
MH 101	116.68 (d/s)	116.68	118.28	116.68

*Assumes that 100 Year flow is captured which is over-conservative since flows will not likely be captured.

Summary

The 100 Year Controlled spreadsheet model presented concludes that with the installation of 6 – 25L/s icd's (102mm diameter at 1.3m head) in the existing catbasins, the existing Wildpine Court basements will be protected from adverse HGL conditions during storms up to and including the 100 year storm event.

Please advise of your concurrence with this proposal and we will include this memo as an appendix in our report entitled ' Servicing And Stormwater Management Report, Wildpine Residence, 10 Wildpine Court'.

Suite 200, 240 Michael Cowpland Drive, Ottawa ON K2M 1P6 Tel: 613.254.9643 Fax: 613.254.5867 www.novatech-eng.com

STORM SEWER DESIGN SHEET

Q = 2.78 AIR

Where Q peak flow in litres per second (L/s)
A area in hectares (ha)
I rainfall intensity in millimetres per hour (mm/h)
R runoff coefficient

LOCATION			AREAS (ha)								SEWER DATA					
STREET	FROM	TO	R = 0.5	R =	* R = 0.3	Indiv. 2.78 AR	Accum 2.78 AR	Time of Conc.	Rainfall Intensity I	Peak Flow Q (L/s)	Diameter (mm)	Slope (%)	Length (m)	Capacity (L/s) n = .013	Velocity (m/s)	Time of Flow (minutes)
			0.36			0.50	0.50									
He[illegible]a St.	MH#101	MH#102			0.18	0.15	0.65	20	70	46	300	2.5	33	158	2.1	
			0.79			1.10	1.75									
Hobin St.	MH#102	Outlet			0.17	0.14	1.89	20.3	68	129	375	1.0	124	183	1.6	
Hobin St.	MH#104	MH#103	–								300	1.0	43.0	101	1.4	

Sheet No.

* 10.0 m Strip abutting this development.

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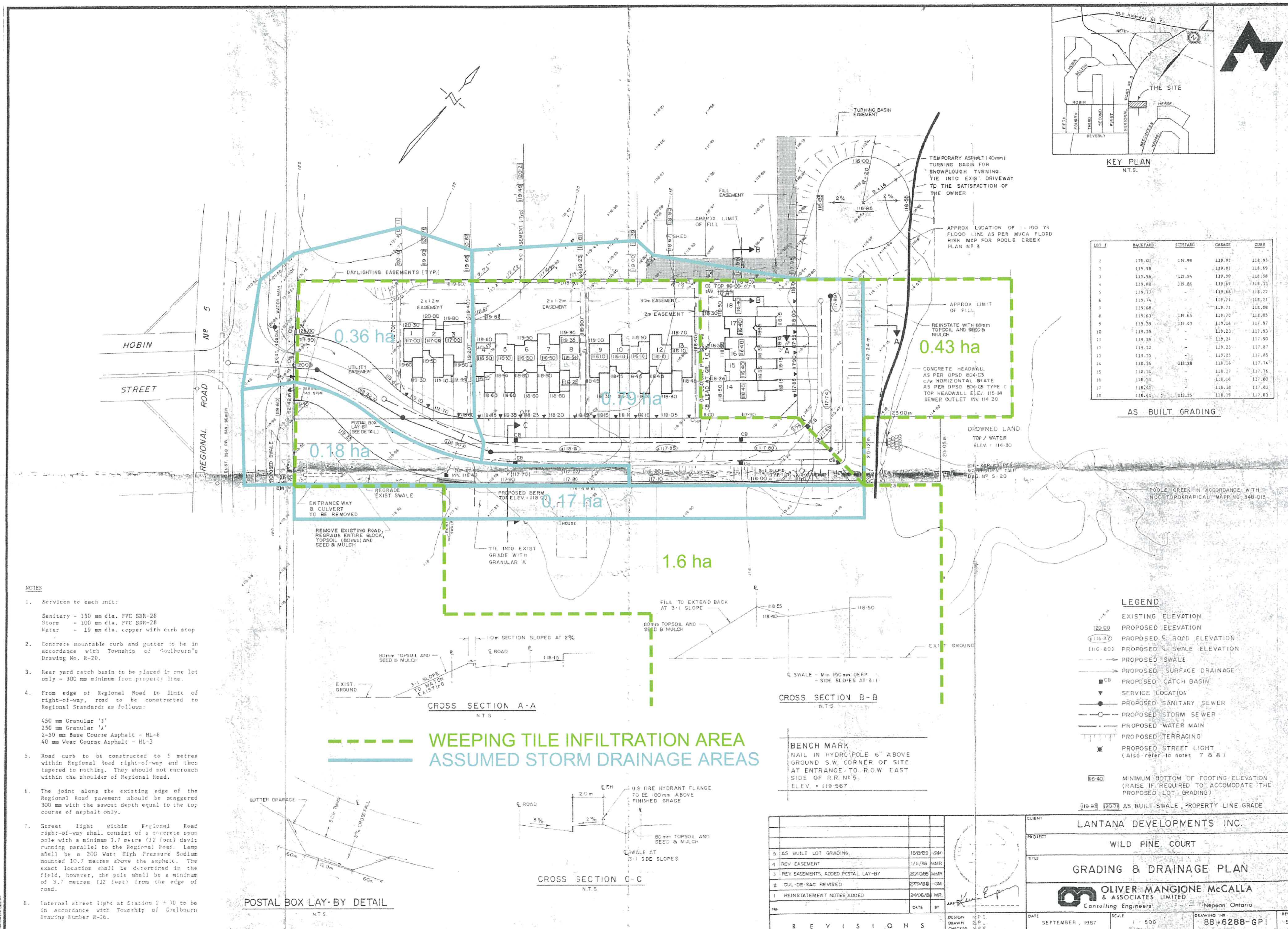
PROJECT Wild Pine Court
99-[illegible]289



NOTES

1. Services to each unit:

   Sanitary - 150 mm dia. PVC SDR-28
   Storm - 100 mm dia. PVC SDR-28
   Water - 19 mm dia. copper with curb stop

2. Concrete mountable curb and gutter to be in accordance with Township of Goulbourn's Drawing No. R-20.

3. Rear yard catch basin to be placed in one lot only - 300 mm minimum from property line.

4. From edge of Regional Road to limit of right-of-way, road to be constructed to Regional Standards as follows:

   450 mm Granular 'B'
   150 mm Granular 'A'
   2-50 mm Base Course Asphalt - HL-8
   40 mm Wear Course Asphalt - HL-3

5. Road curb to be constructed to 5 metres within Regional Road right-of-way and then tapered to nothing. They should not encroach within the shoulder of Regional Road.

6. The joint along the existing edge of the Regional Road pavement should be staggered 300 mm with the sawcut depth equal to the top course of asphalt only.

7. Street light within Regional Road right-of-way shall consist of a concrete spun pole with a minimum 3.7 metre (12 foot) davit running parallel to the Regional Road. Lamp shall be a 200 Watt High Pressure Sodium mounted 10.7 metres above the asphalt. The exact location shall be determined in the field, however, the pole shall be a minimum of 3.7 metres (12 feet) from the edge of road.

8. Internal street light at Station 2 + 30 to be in accordance with Township of Goulbourn Drawing Number R-26.

No.	REVISIONS	DATE	BY
5	AS BUILT LOT GRADING	16/8/89	GM
4	REV EASEMENT	1/11/88	MMR
3	REV EASEMENTS, ADDED POSTAL LAY-BY	20/10/88	MMR
2	CUL-DE-SAC REVISED	27/9/88	GM
1	REINSTATEMENT NOTES ADDED	24/06/88	MR

DESIGN K.P.E. DRAWN G.P. CHECKED K.P.E.

CLIENT: LANTANA DEVELOPMENTS INC.

PROJECT: WILD PINE COURT

TITLE: GRADING & DRAINAGE PLAN

OLIVER MANGIONE McCALLA & ASSOCIATES LIMITED
Consulting Engineers — Nepean, Ontario

DATE: SEPTEMBER, 1987 | SCALE: 1:500 | DRAWING Nº 88-6288-GP1 | REV 5

PROJECT #: 115072
PROJECT NAME: 10 WILDPINE COURT
LOCATION: CITY OF OTTAWA

DATE PREPARED: FEBRUARY 2, 2017

NOVATECH
Engineers, Planners & Landscape Architects

POST-DEVELOPMENT 5 YEAR HGL SPREADSHEET MODEL

Area	MANHOLE U/S	MANHOLE D/S		INVERT ELEVATION U/S (m)		INVERT ELEVATION D/S (m)	OBVERT ELEVATION U/S (m)	OBVERT ELEVATION D/S (m)	GROUND ELEVATION Upstream (m)	COVER Upstream (m)	PIPE PARAMETERS Dia (mm)	PIPE PARAMETERS Length (m)	PIPE PARAMETERS 'n'	TOTAL FLOW (m^3/s)	TOTAL CAPT FLOW (m^3/s)	Model row #	Q_{cap} (m^3/s)	Q_{in}/Q_{cap}	COMPUTATIONAL COLUMNS Pipe Area (m^2)	COMPUTATIONAL COLUMNS L/D	COMPUTATIONAL COLUMNS Friction Factor (f)	COMPUTATIONAL COLUMNS Velocity V (m/s)	COMPUTATIONAL COLUMNS $V^2/2g$	HEAD LOSS HL (m)	SURCHARGE Upstream (m)	HGL U/S (m)	HGL D/S (m)	HGL SLOPE (%)	PIPE SLOPE (%)
																										114.70	(100 year water in Poole Creek)		
	103	HW	N	114.44	E	114.25	114.82	114.63	117.63	2.82	375	18.0	0.013	0.290	0.179		0.188	0.95	0.114	48	0.0290	1.57	0.12	0.21	0.09	114.91	114.70	1.15	1.06
	102	103	NE	115.54	E	114.47	115.92	114.85	118.29	2.38	375	102.2	0.013	0.281	0.166		0.187	0.88	0.114	273	0.0290	1.45	0.11	0.90	0.00	115.92	114.91	0.99	1.05
	101	102	N	116.38	SE	115.57	116.68	115.87	119.22	2.54	300	34.2	0.013	0.004	0.003		0.155	0.02	0.073	114	0.0313	0.04	0.00	0.00	0.00	116.68	115.92	2.24	2.37

DESIGN PARAMETERS

DOWNSTREAM WATER LEVEL AT OUTLET = 114.70m

RETURN FREQUENCY = 5 YEAR SEWER + 5 YEAR CONTROLLED SITE FLOWS FROM 10 WILDPINE + WEEPING TILE 5L/s/ha

MINIMUM VELOCITY= 0.80 m/s
MANNING'S n= 0.013
MIN. HGL CLEARANCE = 0.30m

HGL=Major + Minor Losses
Major Loss= Pipe Friction (Darcy-Weisbach)
Friction Factor= 8g/c^2, where c=(1/n)*(D/4)^1/6
Minor losses = see equations on page 2

Manhole Loss

U/S MH	Diameters (mm) U/S MH	Diameters (mm) Pipe In	Diameters (mm) Pipe Out	Bend Angle	K_O	C_D	C_d	C_Q	C_B	K_{tot}	HL_{MH} (m)
103	1200	375	375	0	0.48	1.00	0.55	1.00	1.00	0.26	0.03
102	1200	300	375	20	0.92	1.00	0.45	1.00	1.00	0.42	0.04
101	1200		300	0	0.50	1.00	0.00	1.00	1.00	0.00	0.00

Depth of Sheet Flow during 100 Year Storm Event

Per Side of the Road

Depth	m	0.062
Side slope (L)	1 to X	1
Side slope (R)	1 to X	33
Top Width (L)	m	0.1
Top Width (R)	m	2.0
Area	m^2	0.066
Perimeter	m	2.14
R=A/P	m	0.03
n		0.016
Slope	m/m	0.02
Q_{max}	m^3/s	0.057
V_{max}	m/s	0.866

Max Surface Flow 100 year event = $Q_{100} - Q_{CAP}$ = 0.281 - 0.166 = 0.1154 m^3/s
Maximum Surface Flow 100 year event Per side of the Road = 0.0577 m^3/s

Maximum Flow Depth = 0.062 m

Equations for Manhole Loss

K_O: Initial head loss coefficient based on relative access hole size

$K_O = 0.1 \times (b/D_o) \times (1-\sin\theta) + 1.4 \times (b/D_o)^{0.15} \times \sin\theta$

b : Upstream manhole diameter (m)
D_o: Diameter of outlet pipe (m)
θ : Angle between pipes (degrees)

C_D: Correction facto for pipe diameter (pressure flow only)

If the depth of water in structure / diameter of the outlet pipe > 3.2 pressure flow applies

$C_D = (D_o/D_i)^3$

D_o: Diameter of outlet pipe (m)
D_i: Diameter of inlet pipe (m)

If the depth of water in structure / diameter of the outlet pipe < 3.2 pressure flow does not apply

$C_D = 1.00$

C_d: Correction factor for flow depth (free flow or low pressure flow)

If the depth of water in structure / diameter of the outlet pipe < 3.2 free flow or low pressure flow applies

$C_d = 0.5 \times (d_{MH}/D_o)^{0.6}$

D_o: Diameter of outlet pipe (m)
d_{MH}: Depth of water in the upstream manhole (m)

If the depth of water in structure / diameter of the outlet pipe > 3.2 pressure flow does not apply

$C_d = 1.00$

C_Q: Correction factor for relative flow (more than one inlet pipe to structure)

$C_Q = (1-2\sin\theta) \times (1-(Qi/Qo))^{0.75} + 1$

θ : Angle between inflow and outlfow pipes (degrees)
Q_i: Flow in the inlet pipe
Q_o: Flow in the outlet pipe

C_B: Correction factor for benching

Only applies when outlet pipe is > 825mm

$C_B = (0.3636 \times d_{MH}) - 0.202$

If C_B applies (outlet pipe > 825mm) it can not exceed 0.95
If outlet pipe < 825mm CB =1.0

PROJECT #: 115072
PROJECT NAME: 10 WILDPINE COURT
LOCATION: CITY OF OTTAWA

DATE PREPARED: FEBRUARY 10, 2017

NOVATECH
Engineers, Planners & Landscape Architects

POST-DEVELOPMENT UNCONTROLLED 100 YEAR HGL SPREADSHEET MODEL

Area	MANHOLE			INVERT ELEVATION			OBVERT ELEVATION		GROUND ELEVATION	COVER	PIPE PARAMETERS			TOTAL FLOW	Model row #	Q_{cap}	$Q_{in}/$	COMPUTATIONAL COLUMNS					HEAD LOSS	SURCHARGE	HGL			PIPE SLOPE
	U/S	D/S		U/S (m)		D/S (m)	U/S (m)	D/S (m)	Upstream (m)	Upstream (m)	Dia (mm)	Length (m)	'n'	(m^3/s)		(m^3/s)	Q_{cap}	Pipe Area (m^2)	L/D	Friction Factor (f)	Velocity V (m/s)	$V^2/2g$	HL (m)	Upstream (m)	U/S (m)	D/S (m)	SLOPE (%)	(%)
																									114.70	**(100 year water in Poole Creek)**		
	103	HW	N	114.44	E	114.25	114.82	114.63	117.63	2.82	375	18.0	0.013	0.290		0.188	1.54	0.114	48	0.0290	2.54	0.33	0.58	0.46	115.28	114.70	3.20	1.06
	102	103	NE	115.54	E	114.47	115.92	114.85	118.29	2.38	375	102.2	0.013	0.281		0.187	1.50	0.114	273	0.0290	2.46	0.31	3.01	2.37	118.28	115.28	2.94	1.05
	101	102	N	116.38	SE	115.57	116.68	115.87	119.22	2.54	300	34.2	0.013	0.004		0.155	0.02	0.073	114	0.0313	0.05	0.00	0.00	1.60	118.28	118.28	0.00	2.37

DESIGN PARAMETERS

DOWNSTREAM WATER LEVEL AT OUTLET = 114.70m

RETURN FREQUENCY = 100 YEAR SEWER + 100 YEAR CONTROLLED SITE FLOWS FROM 10 WILDPINE + WEEPING TILE 5L/s/ha

MINIMUM VELOCITY= 0.80 m/s
MANNING'S n= 0.013
MIN. HGL CLEARANCE = 0.30m

HGL=Major + Minor Losses
Major Loss= Pipe Friction (Darcy-Weisbach)
Friction Factor= 8g/c^2, where c=(1/n)*(D/4)^1/6
Minor losses = see equations on page 2

Manhole Loss

U/S MH	Diameters (mm)					Bend Angle	K_O	C_D	C_d	C_Q	C_B	K_{tot}	HL_{MH} (m)
	U/S MH	Pipe In		Pipe Out									
103	1200	375		375		0	0.48	1.00	0.74	1.00	1.00	0.35	0.12
102	1200	300		375		20	0.92	1.95	1.00	1.00	1.00	1.80	0.56
101	1200			300		0	0.50	1.00	1.00	1.00	1.00	0.50	0.00

Equations for Manhole Loss

K_O : Initial head loss coefficient based on relative access hole size

$K_O = 0.1 \times (b/D_o) \times (1-\sin\theta) + 1.4 \times (b/D_o)^{0.15} \times \sin\theta$

b : Upstream manhole diameter (m)
D_o: Diameter of outlet pipe (m)
θ : Angle between pipes (degrees)

C_D: Correction facto for pipe diameter (pressure flow only)

If the depth of water in structure / diameter of the outlet pipe > 3.2 pressure flow applies

$C_D = (D_o/D_i)^3$

D_o: Diameter of outlet pipe (m)
D_i: Diameter of inlet pipe (m)

If the depth of water in structure / diameter of the outlet pipe < 3.2 pressure flow does not apply

$C_D = 1.00$

C_d: Correction factor for flow depth (free flow or low pressure flow)

If the depth of water in structure / diameter of the outlet pipe < 3.2 free flow or low pressure flow applies

$C_d = 0.5 \times (d_{MH}/D_o)^{0.6}$

D_o: Diameter of outlet pipe (m)
d_{MH}: Depth of water in the upstream manhole (m)

If the depth of water in structure / diameter of the outlet pipe > 3.2 pressure flow does not apply

$C_d = 1.00$

C_Q: Correction factor for relative flow (more than one inlet pipe to structure)

$C_Q = (1-2\sin\theta) \times (1-(Qi/Qo))^{0.75} + 1$

θ : Angle between inflow and outlfow pipes (degrees)
Q_i: Flow in the inlet pipe
Q_o: Flow in the outlet pipe

C_B: Correction factor for benching

Only applies when outlet pipe is > 825mm

$C_B = (0.3636 \times d_{MH}) - 0.202$

If C_B applies (outlet pipe > 825mm) it can not exceed 0.95

If outlet pipe < 825mm CB =1.0

NOVATECH
Engineers, Planners & Landscape Architects

DATE PREPARED: JANUARY 2, 2017

POST-DEVELOPMENT CONTROLLED 100 YEAR HGL SPREADSHEET MODEL

Area	MANHOLE U/S	MANHOLE D/S		INVERT ELEVATION U/S (m)		INVERT ELEVATION D/S (m)	OBVERT ELEVATION U/S (m)	OBVERT ELEVATION D/S (m)	GROUND ELEVATION Upstream (m)	COVER Upstream (m)	PIPE PARAMETERS Dia (mm)	PIPE PARAMETERS Length (m)	PIPE PARAMETERS 'n'	TOTAL FLOW (m^3/s)	TOTAL CAPT FLOW (m^3/s)
	103	HW	N	114.44	E	114.25	114.82	114.63	117.63	2.82	375	18.0	0.013	0.290	0.186
	102	103	NE	115.54	E	114.47	115.92	114.85	118.29	2.38	375	102.2	0.013	0.281	0.139
	101	102	N	116.38	SE	115.57	116.68	115.87	119.22	2.54	300	34.2	0.013	0.004	0.004

MANHOLE U/S	Model row #	Q_{cap} (m^3/s)	Q_{in}/Q_{cap}	COMPUTATIONAL COLUMNS Pipe Area (m^2)	L/D	Friction Factor (f)	Velocity V (m/s)	$V^2/2g$	HEAD LOSS HL (m)	SURCHARGE Upstream (m)	HGL U/S (m)	HGL D/S (m)	HGL SLOPE (%)	PIPE SLOPE (%)
											114.70	(100 year water in Poole Creek)		
103		0.188	0.99	0.114	48	0.0290	1.63	0.14	0.22	0.11	114.92	114.70	1.25	1.06
102		0.187	0.74	0.114	273	0.0290	1.21	0.08	0.62	0.00	115.92	114.92	0.97	1.05
101		0.155	0.02	0.073	114	0.0313	0.05	0.00	0.00	0.00	116.68	115.92	2.24	2.37

DESIGN PARAMETERS

DOWNSTREAM WATER LEVEL AT OUTLET = 114.70m

RETURN FREQUENCY = EX SEWER CONTROLLED BY 6 - 25 L/s ICD + 100 YEAR CONTROLLED SITE FLOWS FROM 10 WILDPINE + WEEPING TILE 5 L/s/ha

MINIMUM VELOCITY= 0.80 m/s
MANNING'S n= 0.013
MIN. HGL CLEARANCE = 0.30m

HGL=Major + Minor Losses
Major Loss= Pipe Friction (Darcy-Weisbach)
Friction Factor= 8g/c^2, where c=(1/n)*(D/4)^1/6
Minor losses = see equations on page 2

Manhole Loss

U/S MH	Diameters (mm) U/S MH	Pipe In		Pipe Out	Bend Angle	K_O	C_D	C_d	C_Q	C_B	K_{tot}	HL_{MH} (m)
103	1200	375		375	0	0.48	1.00	0.56	1.00	1.00	0.27	0.04
102	1200	300		375	20	0.92	1.00	0.37	1.00	1.00	0.34	0.03
101	1200			300	0	0.50	1.00	0.01	1.00	1.00	0.00	0.00

Depth of Sheet Flow during 100 Year Storm Event

Per Side of the Road

Depth	m	0.068
Side slope (L)	1 to X	1
Side slope (R)	1 to X	33
Top Width (L)	m	0.1
Top Width (R)	m	2.2
Area	m^2	0.078
Perimeter	m	2.33
R=A/P	m	0.03
n		0.016
Slope	m/m	0.02
Q_{max}	m^3/s	0.071
V_{max}	m/s	0.917

Max Surface Flow 100 year event = Q_{100} - Q_{CAP} = 0.281 - 0.139 = 0.1425 m^3/s
Maximum Surface Flow 100 year event Per side of the Road = 0.0713 m^3/s

Maximum Flow Depth = 0.068 m

Equations for Manhole Loss

K_O : Initial head loss coefficient based on relative access hole size

K_O = 0.1 x (b/D_o) x (1-sinθ) + 1.4 x (b/D_o)$^{0.15}$ x sinθ

b : Upstream manhole diameter (m)
D_o: Diameter of outlet pipe (m)
θ : Angle between pipes (degrees)

C_D: Correction facto for pipe diameter (pressure flow only)

If the depth of water in structure / diameter of the outlet pipe > 3.2 pressure flow applies

C_D= (D_o/D_i)^3

D_o: Diameter of outlet pipe (m)
D_i: Diameter of inlet pipe (m)

If the depth of water in structure / diameter of the outlet pipe < 3.2 pressure flow does not apply

C_D= 1.00

C_d: Correction factor for flow depth (free flow or low pressure flow)

If the depth of water in structure / diameter of the outlet pipe < 3.2 free flow or low pressure flow applies

C_d= 0.5 x (d_{MH}/D_o)$^{0.6}$

D_o: Diameter of outlet pipe (m)
d_{MH}: Depth of water in the upstream manhole (m)

If the depth of water in structure / diameter of the outlet pipe > 3.2 pressure flow does not apply

C_d= 1.00

C_Q: Correction factor for relative flow (more than one inlet pipe to structure)

C_Q = (1-2sinθ) x (1-(Qi/Qo))$^{0.75}$ + 1

θ : Angle between inflow and outlfow pipes (degrees)
Q_i: Flow in the inlet pipe
Q_o: Flow in the outlet pipe

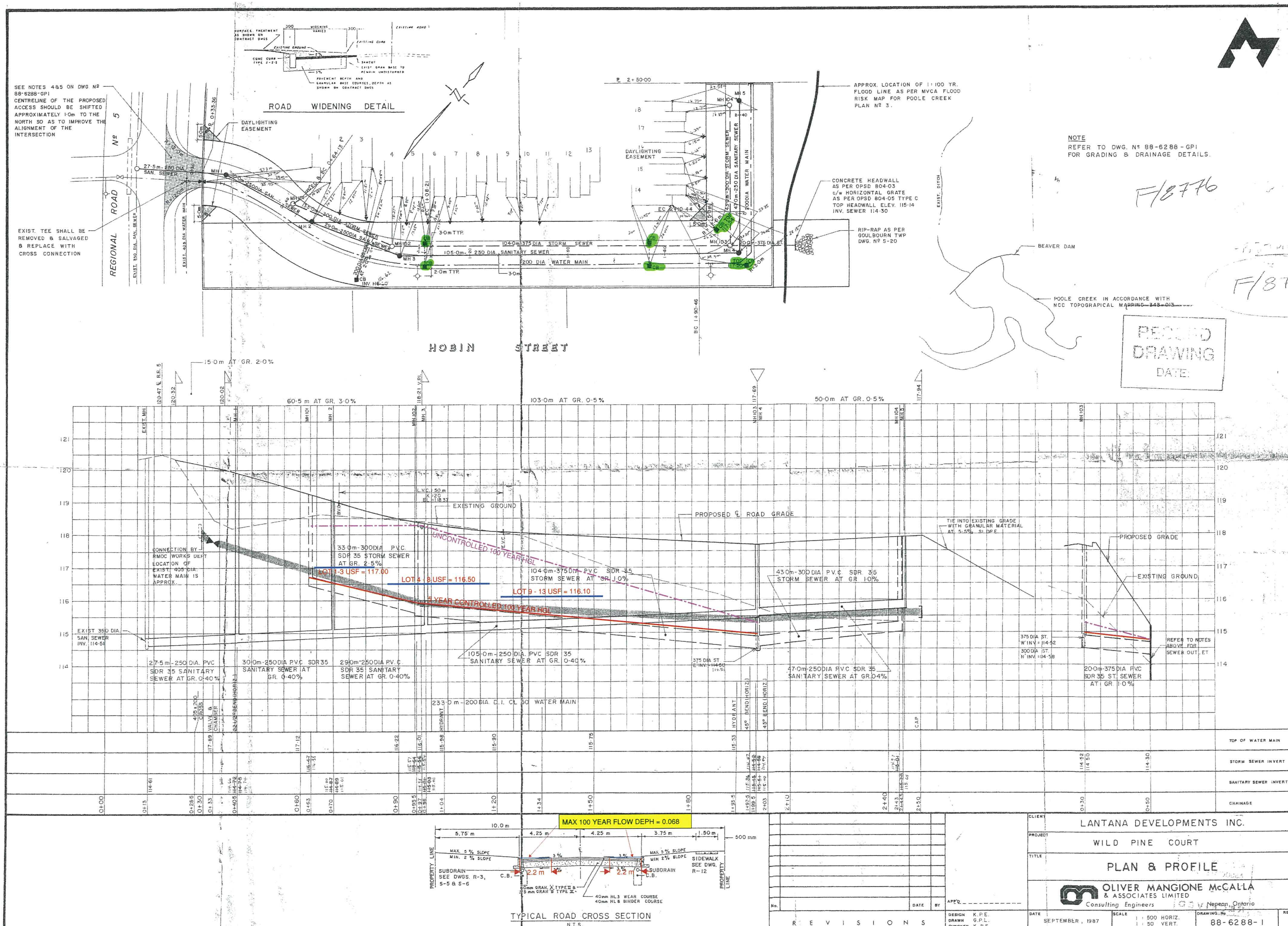
C_B: Correction factor for benching

Only applies when outlet pipe is > 825mm

C_B= (0.3636 x d_{MH}) - 0.202

If C_B applies (outlet pipe > 825mm) it can not exceed 0.95

If outlet pipe < 825mm CB =1.0



ROAD WIDENING DETAIL
SEE NOTES 4&5 ON DWG Nº 88-6288-GPI CENTRELINE OF THE PROPOSED ACCESS SHOULD BE SHIFTED APPROXIMATELY 1·0m TO THE NORTH SO AS TO IMPROVE THE ALIGNMENT OF THE INTERSECTION
EXIST. TEE SHALL BE REMOVED & SALVAGED & REPLACE WITH CROSS CONNECTION
REGIONAL ROAD Nº 5
DAYLIGHTING EASEMENT
27·5m - 250 DIA. SAN. SEWER
104·0m 375 DIA. STORM SEWER
105·0m - 250 DIA. SANITARY SEWER
200 DIA. WATER MAIN
APPROX. LOCATION OF 1:100 YR. FLOOD LINE AS PER MVCA FLOOD RISK MAP FOR POOLE CREEK PLAN Nº 3.
CONCRETE HEADWALL AS PER OPSD 804-03 c/w HORIZONTAL GRATE AS PER OPSD 804-05 TYPE C TOP HEADWALL ELEV. 115·14 INV. SEWER 114·30
RIP-RAP AS PER GOULBOURN TWP DWG. Nº S-20
NOTE
REFER TO DWG. Nº 88-6288-GPI FOR GRADING & DRAINAGE DETAILS.
BEAVER DAM
POOLE CREEK IN ACCORDANCE WITH NCC TOPOGRAPICAL MAPPING
F/8776
RECORD DRAWING
DATE:
HOBIN STREET
15·0m AT GR. 2·0%
60·5 m AT GR. 3·0%
103·0m AT GR. 0·5%
50·0m AT GR. 0·5%
EXISTING GROUND
PROPOSED ℄ ROAD GRADE
UNCONTROLLED 100 YEAR HGL
5 YEAR CONTROLLED 100 YEAR HGL
LOT 1-3 USF = 117.00
LOT 4 - 8 USF = 116.50
LOT 9 - 13 USF = 116.10
CONNECTION BY RMOC WORKS DEPT LOCATION OF EXIST. 405 DIA WATER MAIN IS APPROX.
33·0m - 300 DIA. P.V.C. SDR 35 STORM SEWER AT GR. 2·5%
104·0m - 375 DIA. PVC SDR 35 STORM SEWER AT GR. 1·0%
43·0m - 300 DIA P.V.C. SDR 35 STORM SEWER AT GR. 1·0%
TIE INTO EXISTING GRADE WITH GRANULAR MATERIAL AT 5·5% SLOPE
PROPOSED GRADE
EXISTING GROUND
REFER TO NOTES ABOVE FOR SEWER OUTLET
EXIST 350 DIA. SAN. SEWER INV. 114·51
27·5 m - 250 DIA. PVC SDR 35 SANITARY SEWER AT GR. 0·40%
30·0m - 250 DIA PVC SDR 35 SANITARY SEWER AT GR. 0·40%
29·0m - 250 DIA P.V.C SDR 35 SANITARY SEWER AT GR. 0·40%
105·0m - 250 DIA. PVC SDR 35 SANITARY SEWER AT GR. 0·40%
47·0m - 250 DIA PVC SDR 35 SANITARY SEWER AT GR. 0·4%
20·0m - 375 DIA PVC SDR 35 ST. SEWER AT GR. 1·0%
233·0 m - 200 DIA. C.I. CL 50 WATER MAIN
TOP OF WATER MAIN
STORM SEWER INVERT
SANITARY SEWER INVERT
CHAINAGE
MAX 100 YEAR FLOW DEPH = 0.068
TYPICAL ROAD CROSS SECTION
N.T.S.
PROPERTY LINE
SUBDRAIN SEE DWGS. R-3, S-5 & S-6
SIDEWALK SEE DWG. R-12
40mm HL3 WEAR COURSE
40mm HL8 BINDER COURSE
REVISIONS
CLIENT LANTANA DEVELOPMENTS INC.
PROJECT WILD PINE COURT
TITLE PLAN & PROFILE
OLIVER MANGIONE McCALLA & ASSOCIATES LIMITED Consulting Engineers Nepean, Ontario
DESIGN K.P.E.
DRAWN G.P.L.
CHECKED K.P.E.
DATE SEPTEMBER, 1987
SCALE 1:500 HORIZ. 1:50 VERT.
DRAWING No. 88-6288-1

37 Wildpine (125077)
Pre-Development Model Parameters

NOVATECH
Engineers, Planners & Landscape Architects

Pre-Development Subcatchment Parameters

Area ID	Catchment Area (ha)	Runoff Coefficient (C)	Percent Impervious (%)	No Depression (%)	Flow Path Length (m)	Equivalent Width (m)	Average Slope (%)
Development Areas							
A-1	0.220	0.25	7.1%	50%	48	46	3.5%
A-2	0.559	0.36	22.9%	20%	84	66	3.5%
External Areas							
EXT-1	0.215	0.65	64.3%	20%	13	162	2.0%
EXT-2	0.265	0.64	62.9%	35%	20	134	2.0%
EXT-3	0.191	0.35	21.4%	100%	22	87	2.0%
EXT-4	0.340	0.60	57.1%	35%	23	149	2.0%
W-1	0.130	0.83	90.0%	0%	43	31	0.5%
W-2	0.040	0.83	90.0%	0%	7	54	0.5%
W-3	0.030	0.40	28.6%	0%	8	37	0.5%
W-4	0.060	0.36	22.9%	0%	13	45	0.5%
W-5	0.220	0.90	100.0%	0%	25	87	0.5%
W-6	0.060	0.25	7.1%	0%	5	123	0.5%
W-7	0.300	0.25	7.1%	0%	34	89	0.5%
TOTAL:	**2.630**						

37 Wildpine (125077)
Post-Development Model Parameters

Engineers, Planners & Landscape Architects

Area ID	Catchment Area (ha)	Runoff Coefficient (C)	Percent Impervious (%)	No Depression (%)	Flow Path Length (m)	Equivalent Width (m)	Average Slope (%)
Subdivsion Areas							
A-1	0.035	0.42	31.4%	100%	13	28	2.0%
A-2	0.038	0.37	24.3%	100%	11	34	2.0%
A-3	0.076	0.55	50.0%	0%	11	71	2.0%
A-4	0.086	0.66	65.7%	0%	11	82	2.0%
Site Plan Areas							
B-1	0.199	0.90	100.0%	100%	20	100	0.5%
B-2	0.036	0.43	32.9%	0%	21	17	2.0%
B-3	0.080	0.25	7.1%	0%	10	83	2.0%
B-4	0.208	0.49	41.4%	0%	15	140	2.0%
External Areas							
EXT-1	0.231	0.65	64.3%	20%	14	162	2.0%
EXT-2	0.265	0.64	62.9%	35%	20	134	2.0%
EXT-3	0.192	0.35	21.4%	100%	22	87	2.0%
EXT-4	0.340	0.60	57.1%	35%	23	149	2.0%
W-1	0.130	0.83	90.0%	0%	43	31	0.5%
W-2	0.040	0.83	90.0%	0%	7	54	0.5%
W-3	0.030	0.40	28.6%	0%	8	37	0.5%
W-4	0.060	0.36	22.9%	0%	13	45	0.5%
W-5	0.220	0.90	100.0%	0%	25	87	0.5%
W-6	0.060	0.25	7.1%	0%	5	123	0.5%
W-7	0.300	0.25	7.1%	0%	34	89	0.5%
TOTAL:	**2.626**						

37 Wildpine (125077)
Catchbasin (On-Grade) with ICD Curves

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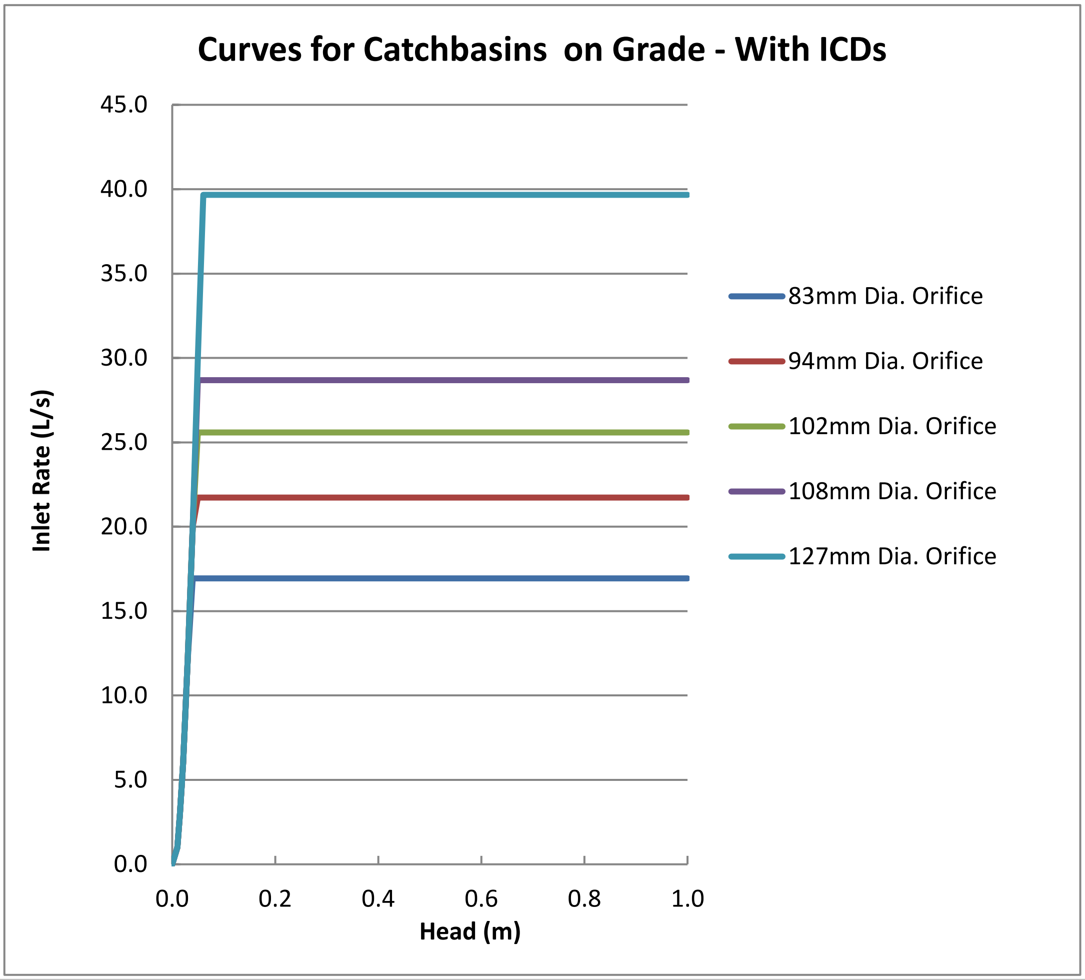


Curb Inlet Catchbasins on Continuous Grade

Depth vs. Captured Flow Curve

A standard depth vs. captured flow curve for catch basins on a continuous grade was provided to Novatech by City staff for use in a dual-drainage model of an existing residential neighbourhood. This standard curve was derived using the inlet curves in Appendix 7A of the Ottawa Sewer Design Guidelines.

Novatech reviewed the methodology used to create this standard curve (described below) and determined that it was suitable for general use in other dual-drainage models.

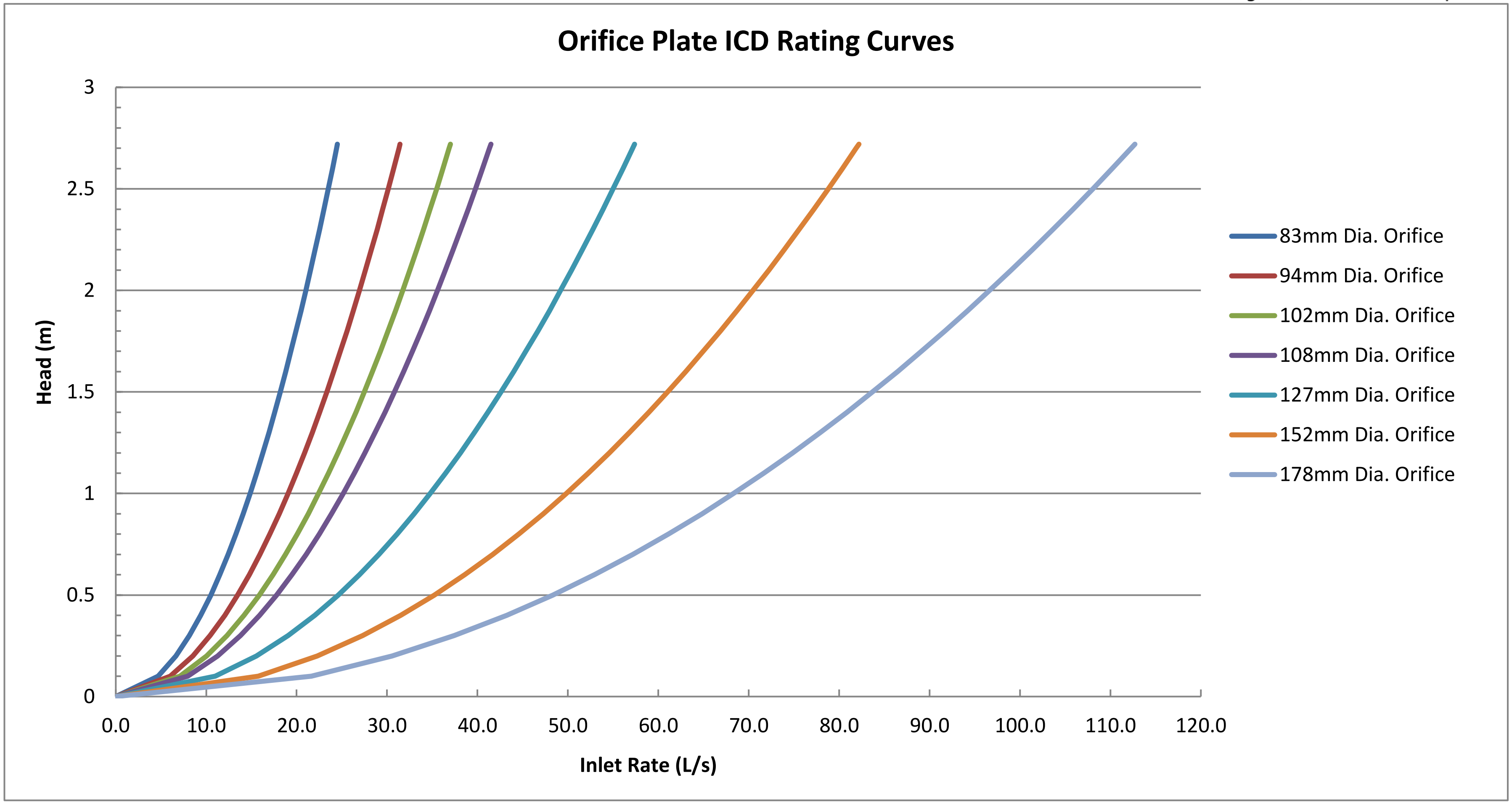
- MTO Design Chart 4.04 provides the relationship between the gutter flow rate (Q_t) and flow spread (T) for Barrier Curb.
- MTO Design Chart 4.12 provides the relationship between flow spread (T) and flow depth (D).
- The relationship between the gutter flow rate (Q_t) and flow depth (D) was determined for different road slopes using the above charts and Manning's equation (refer to pages 58-60 of the MTO Drainage Management Manual – Part 2);
- The relationship between approach flow (Q_t) and captured flow (Q_c) was determined for different road slopes using the design chart for Barrier Curb with Gutter (Appendix 7-A.2).
- Using the above information, a family of curves was developed to characterize the relationship between flow depth and captured flow for curb inlet catchbasins on different road slopes. The results of this exercise can be summarized as follows:
    - For a given flow depth, the gutter flow rate (Q_t) increases as the road slope increases.
    - The capture efficiency (Q_c) of curb inlet catchbasins decrease as the road slope increases.
    - The net result is that the relationship between flow depth and capture rate is largely independent of road slope: While approach flow vs. captured flow (Q_t vs. Q_c) varies significantly with road grade, flow depth vs. captured flow (D vs. Q_c) does not.

Since there was very little difference in the flow depth vs. captured flow curves for different road slopes, this family of curves was averaged to create a single standard curve for use in dual-drainage models.

Inlet Control Devices

The standard depth vs. capture flow curve was modified to account for the installation of ICDs in curb inlet catchbasins on continuous grade. Separate inlet curves were created for each standard ICD orifice size by capping the inlet rate on the depth vs. capture flow curve at the maximum flow rate through the ICD at a head of 1.2m (depth from centerline of CB lead to top of CICB frame).

37 Wildpine (125077)
ICD Rating Curves



Prepared By: Novatech Engineering Consultants
Date: 1/12/2026

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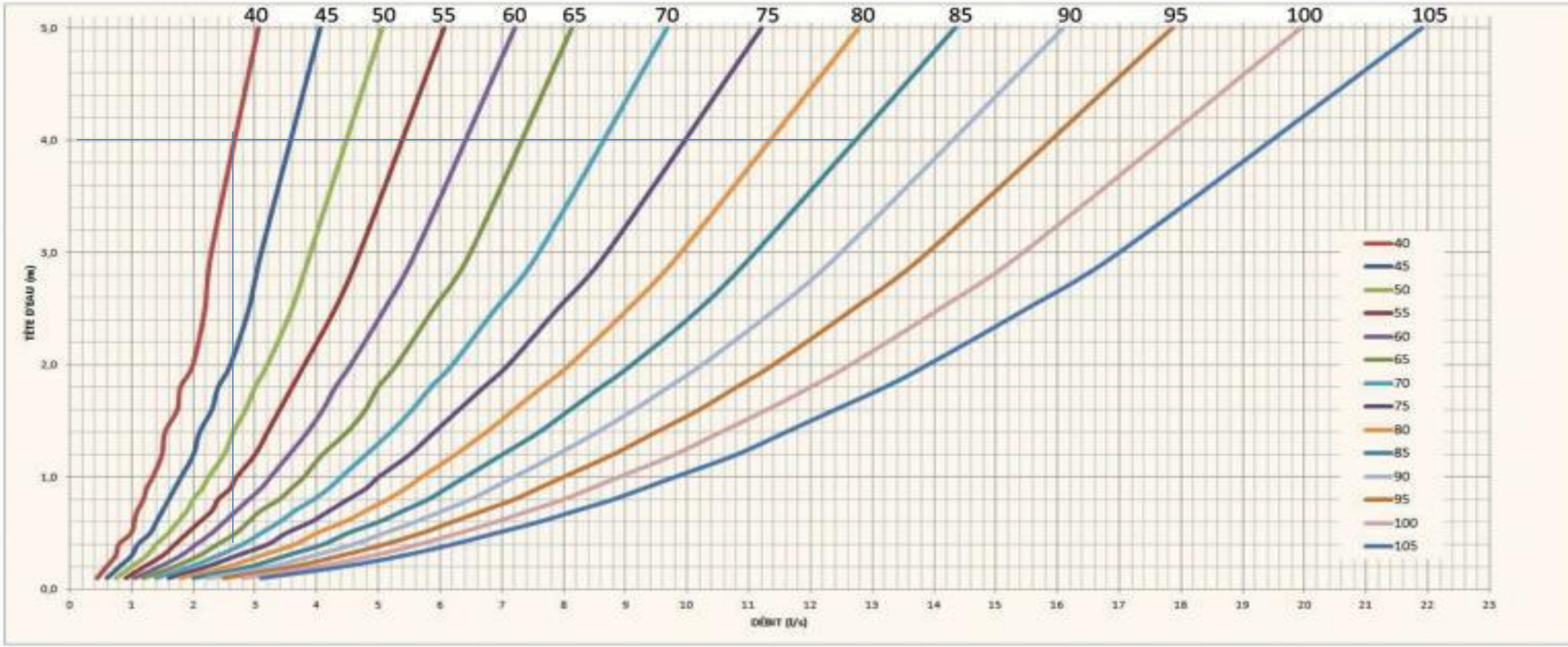
37 Wildpine (125077)
ICD Rating Curves



Prepared By: Novatech Engineering Consultants
Date: 1/12/2026

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Proposed Storage Curves

Junction ID	Storage Curve			
BioSwaleWest	Elevation	Depth	Area	Volume
Notes	(m)	(m)	(m^2)	(m^3)
Bottom of Clearstone	114.95	0.00	45.69	0.0
Top of Clearstone	115.35	0.40	45.69	18.3
	115.351	0.401	0.00	18.3
Top Filter Layer	115.749	0.799	0.00	18.3
Bottom of Swale	115.75	0.80	114.21	18.4
	115.80	0.85	133.22	24.5
	115.85	0.90	153.92	31.7
	115.90	0.95	175.79	40.0
	115.95	1.00	199.84	49.4
	116.00	1.05	223.37	59.9
	116.05	1.10	249.42	71.8
	116.10	1.15	277.17	84.9
	116.15	1.20	306.57	99.5
Top of Swale	116.20	1.25	341.10	115.7
	116.201	1.251	0.00	115.9
Top of Storage Node(1)	116.50	1.55	0.00	115.9

(1) Top of storage node is based on 0.30m of flow depth

Junction ID	Storage Curve			
BioSwaleEast	Elevation	Depth	Area	Volume
Notes	(m)	(m)	(m^2)	(m^3)
Bottom of Clearstone	114.95	0.00	46.57	0.0
Top of Clearstone	115.35	0.40	46.57	18.6
	115.351	0.401	0.00	18.7
Top Filter Layer	115.749	0.799	0.00	18.7
Bottom of Swale	115.75	0.80	110.59	18.7
	115.80	0.85	131.58	24.8
	115.85	0.90	150.70	31.8
	115.90	0.95	171.41	39.9
	115.95	1.00	194.52	49.0
	116.00	1.05	219.63	59.4
	116.05	1.10	246.99	71.0
	116.10	1.15	276.65	84.1
	116.15	1.20	308.63	98.8
Top of Swale	116.20	1.25	355.17	115.4
	116.201	1.251	0.00	115.5
Top of Storage Node(1)	116.50	1.55	0.00	115.5

(1) Top of storage node is based on 0.30m of flow depth

37 Wildpine (125077)

Storage Curves

Junction ID	Storage Curve			
TANK	Elevation	Depth	Area	Volume
Notes	(m)	(m)	(m^2)	(m^3)
Bottom of Tank	115.00	0.00	37.00	0.0
Top of Tank	116.20	1.20	37.00	44.4
	116.201	1.201	0.00	44.4
Overflow / Ground Elevation	116.740	1.740	0.00	44.4
Top of Storage Node(2)	117.04	2.04	0.00	44.4

(1) Based on height of tank and surface area in tank

(2) Top of storage node is based on 0.30m of flow depth overland

Junction ID	Storage Curve			
MC-7200	Elevation	Depth	Area	Volume
Notes	(m)	(m)	(m^2)	(m^3)
Bottom of Chambers	115.24	0.00	0.00	0.0
Top of Chambers	116.76	1.52	41.90	31.8
	116.761	1.521	0.00	31.9
Top of Storage Node(2)	117.83	2.59	0.00	31.9

(1) Based on height of Chamber (1.52m) and volume provided by 3 chambers (31.8m^3)

(2) Top of storage node is based on ground elevation

37 Wildpine (125077)

Storage Curves

Engineers, Planners & Landscape Architects

Existing / Offsite Storage Curves

Junction ID	Storage Curve			
EX-CB9	Elevation	Depth	Area	Volume
Notes	(m)	(m)	(m^2)	(m^3)
CB invert	116.55	0.00	0.36	0.00
CB T/G [(1)]	118.15	1.60	0.36	0.58
Max Ponding [(2)]	118.30	1.75	38.70	3.51

[(1)] Based on T/G in 10 Wildpine Drawings

[(2)] Based on volume and head provided in 10 Wildpine Report (3.51m^3)

Junction ID	Storage Curve			
EX-CB(A4)	Elevation	Depth	Area	Volume
Notes	(m)	(m)	(m^2)	(m^3)
CB invert	116.64	0.00	0.36	0.00
CB T/G [(1)]	117.95	1.31	0.36	0.47
Max Ponding [(2)]	118.25	1.61	39.73	6.49

[(1)] Based on T/G in 10 Wildpine Drawings

[(2)] Based on volume and head provided in 10 Wildpine Report (6.491m^3)

Junction ID	Storage Curve			
Roof	Elevation	Depth	Area	Volume
Notes	(m)	(m)	(m^2)	(m^3)
Estimated Roof Elevation	120.00	3.45	0.00	0.00
Max Ponding [(1)]	120.15	3.60	1466.60	110.00
	120.151	3.601	0.00	110.73
Top of Storage Node[(2)]	121.15	4.60	0.00	110.73

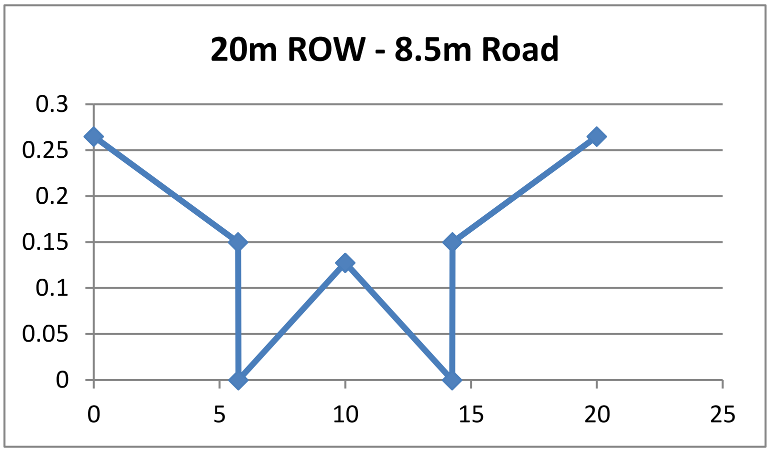
[(1)] Based on volume and head provided in 10 Wildpine Report (110m^3)

[(2)] Top of storage node is based on 1m above roof elevation

37 Wildpine (125077)
Roadway Cross-Sections

20m ROW - 8.5m Road

Station (m)	Depth (m)
0	0.265
5.74	0.15
5.75	0
10	0.128
14.25	0
14.26	0.15
20	0.265



37 Wildpine (125077)
Design Storm Time Series Data
Chicago Design Storms

NOVATECH
Engineers, Planners & Landscape Architects

C25mm-3.stm		C2-3.stm		C5-3.stm	
Duration	Intensity	Duration	Intensity	Duration	Intensity
min	mm/hr	min	mm/hr	min	mm/hr
0:00	0	0:00	0	0:00	0
0:10	2.21	0:10	2.81	0:10	3.68
0:20	2.75	0:20	3.5	0:20	4.58
0:30	3.68	0:30	4.69	0:30	6.15
0:40	5.73	0:40	7.3	0:40	9.61
0:50	14.29	0:50	18.21	0:50	24.17
1:00	60.28	1:00	76.81	1:00	104.19
1:10	18.9	1:10	24.08	1:10	32.04
1:20	9.7	1:20	12.36	1:20	16.34
1:30	6.53	1:30	8.32	1:30	10.96
1:40	4.94	1:40	6.3	1:40	8.29
1:50	3.99	1:50	5.09	1:50	6.69
2:00	3.37	2:00	4.29	2:00	5.63
2:10	2.92	2:10	3.72	2:10	4.87
2:20	2.58	2:20	3.29	2:20	4.3
2:30	2.32	2:30	2.95	2:30	3.86
2:40	2.1	2:40	2.68	2:40	3.51
2:50	1.93	2:50	2.46	2:50	3.22
3:00	1.79	3:00	2.28	3:00	2.98

37 Wildpine (125077)
Design Storm Time Series Data
Chicago Design Storms

C100-3.stm			C100-3+20%.stm	
Duration min	Intensity mm/hr		Duration min	Intensity mm/hr
0:00	0		0:00	0
0:10	6.05		0:10	6:14
0:20	7.54		0:20	9.05
0:30	10.16		0:30	12.19
0:40	15.97		0:40	19.16
0:50	40.65		0:50	48.78
1:00	178.56		1:00	214.27
1:10	54.05		1:10	64.86
1:20	27.32		1:20	32.78
1:30	18.24		1:30	21.89
1:40	13.74		1:40	16.49
1:50	11.06		1:50	13.27
2:00	9.29		2:00	11.15
2:10	8.02		2:10	9.62
2:20	7.08		2:20	8.5
2:30	6.35		2:30	7.62
2:40	5.76		2:40	6.91
2:50	5.28		2:50	6.34
3:00	4.88		3:00	5.86

37 Wildpine (125077)
Design Storm Time Series Data
SCS Design Storms

NOVATECH
Engineers, Planners & Landscape Architects

S2-12.stm		S5-12.stm		S100-12.stm	
Duration	Intensity	Duration	Intensity	Duration	Intensity
min	mm/hr	min	mm/hr	min	mm/hr
0:00	0.00	0:00	0	0:00	0
0:30	1.27	0:30	1.69	0:30	2.82
1:00	0.59	1:00	0.79	1:00	1.31
1:30	1.10	1:30	1.46	1:30	2.44
2:00	1.10	2:00	1.46	2:00	2.44
2:30	1.44	2:30	1.91	2:30	3.19
3:00	1.27	3:00	1.69	3:00	2.82
3:30	1.69	3:30	2.25	3:30	3.76
4:00	1.69	4:00	2.25	4:00	3.76
4:30	2.29	4:30	3.03	4:30	5.07
5:00	2.88	5:00	3.82	5:00	6.39
5:30	4.57	5:30	6.07	5:30	10.14
6:00	36.24	6:00	48.08	6:00	80.38
6:30	9.23	6:30	12.25	6:30	20.47
7:00	4.06	7:00	5.39	7:00	9.01
7:30	2.71	7:30	3.59	7:30	6.01
8:00	2.37	8:00	3.15	8:00	5.26
8:30	1.86	8:30	2.47	8:30	4.13
9:00	1.95	9:00	2.58	9:00	4.32
9:30	1.27	9:30	1.69	9:30	2.82
10:00	1.02	10:00	1.35	10:00	2.25
10:30	1.44	10:30	1.91	10:30	3.19
11:00	0.93	11:00	1.24	11:00	2.07
11:30	0.85	11:30	1.12	11:30	1.88
12:00	0.85	12:00	1.12	12:00	1.88

37 Wildpine (125077)
Design Storm Time Series Data
SCS Design Storms

Engineers, Planners & Landscape Architects

S2-24.stm		S5-24.stm		S100-24.stm	
Duration min	Intensity mm/hr	Duration min	Intensity mm/hr	Duration min	Intensity mm/hr
0:00	0.00	0:00	0	0:00	0
1:00	0.72	1:00	0.44	1:00	0.6
2:00	0.34	2:00	0.44	2:00	0.75
3:00	0.63	3:00	0.81	3:00	1.39
4:00	0.63	4:00	0.81	4:00	1.39
5:00	0.81	5:00	1.06	5:00	1.81
6:00	0.72	6:00	0.94	6:00	1.6
7:00	0.96	7:00	1.25	7:00	2.13
8:00	0.96	8:00	1.25	8:00	2.13
9:00	1.30	9:00	1.68	9:00	2.88
10:00	1.63	10:00	2.12	10:00	3.63
11:00	2.59	11:00	3.37	11:00	5.76
12:00	20.55	12:00	26.71	12:00	45.69
13:00	5.23	13:00	6.8	13:00	11.64
14:00	2.30	14:00	2.99	14:00	5.12
15:00	1.54	15:00	2	15:00	3.42
16:00	1.34	16:00	1.75	16:00	2.99
17:00	1.06	17:00	1.37	17:00	2.35
18:00	1.11	18:00	1.44	18:00	2.46
19:00	0.72	19:00	0.94	19:00	1.6
20:00	0.58	20:00	0.75	20:00	1.28
21:00	0.81	21:00	1.06	21:00	1.81
22:00	0.53	22:00	0.68	22:00	1.17
23:00	0.48	23:00	0.63	23:00	1.07
0:00	0.48	0:00	0.63	0:00	1.07

37 Wildpine (125077)
HGL Elevations

Manhole ID	Pipe / MH Information				HGL Information[1]		Surcharge Depth Above Pipe Obvert		USF Information		Clearance from USF	
	D/S Pipe Size (mm)	D/S Pipe Invert Elev. (m)	D/S Pipe Obvert Elev. (m)	MH T/G Elev. (m)	100-year (m)	100-year (+20%) (m)	100-year (m)	100-year (+20%) (m)	Minimum USF Elevation (m)	Design USF Elevation (m)	100-year (m)	100-year (+20%) (m)
Proposed Storm Sewer												
MH200	300	115.11	115.41	117.88	115.28	115.30	0.00	0.00	115.58	116.42	1.14	1.12
MH202	300	115.72	116.02	119.56	115.78	115.81	0.00	0.00	116.08	116.42	0.64	0.61
OGS	300	115.04	115.34	117.76	115.18	115.22	0.00	0.00	115.48	N/A	-	-
Existing Wildpine Storm Sewer												
EX-MH101	300	116.38	116.68	119.22	116.38	116.38	0.00	0.00	116.68	Unknown	-	-
EX-MH102	375	115.54	115.92	118.29	115.83	116.08	0.00	0.16	116.13	Unknown	-	-
EX-MH103	450	114.44	114.89	117.54	115.01	115.06	0.12	0.17	115.31	Unknown	-	-
EX-MH104	300	114.97	115.27	117.68	115.10	115.18	0.00	0.00	115.40	Unknown	-	-

[1] From PCSWMM Model, 3-hour Chicago storm distribution

37 Wildpine (125077)

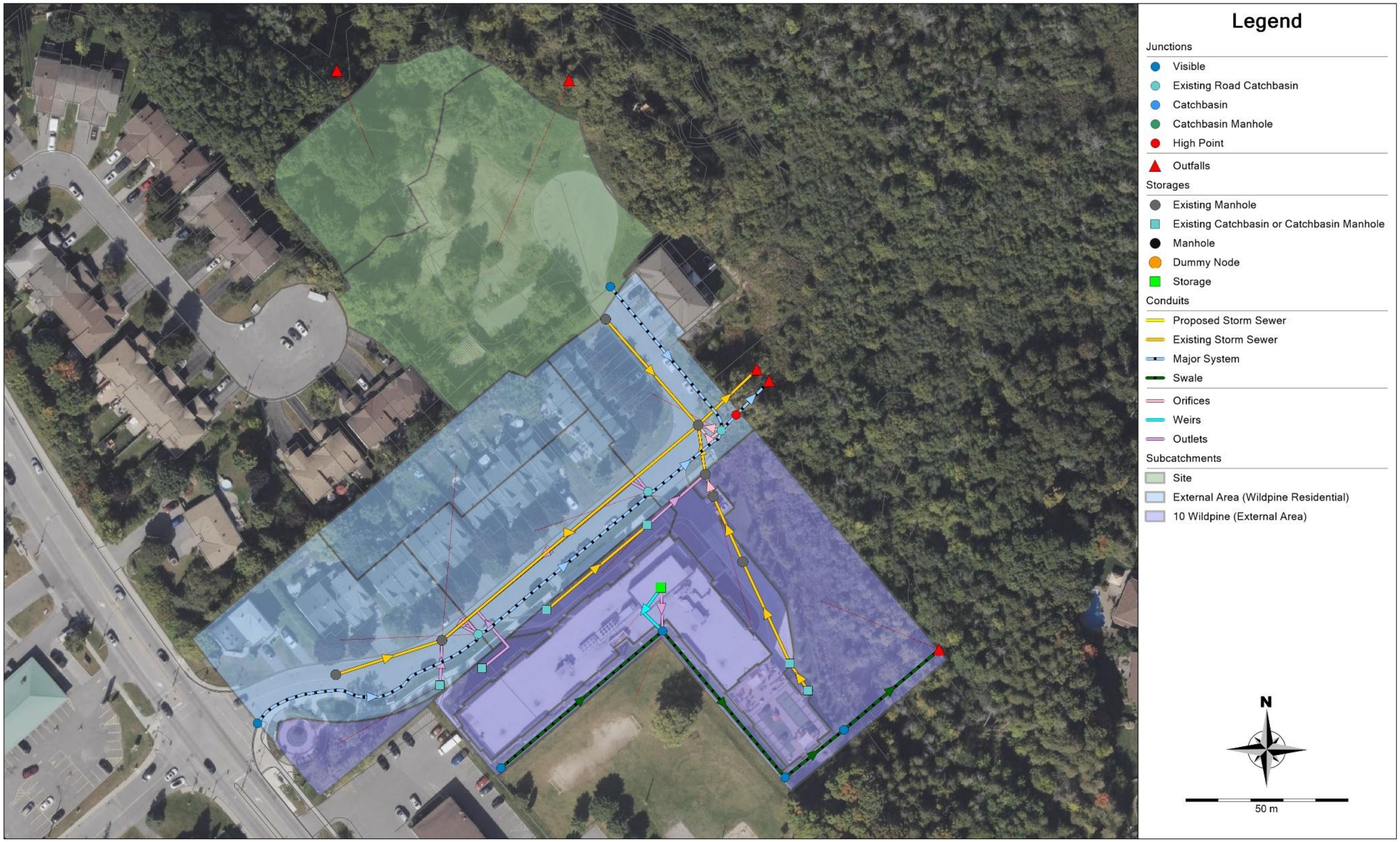
ROW Ponding Depths

NOVATECH
Engineers, Planners & Landscape Architects

Structure	T/G	Max. Static Ponding (Spill Depth)		2-yr Event (3hr)				5-yr Event (3hr)				100-yr Event (3hr)				100-yr Event (+20%) (3hr)			
	(m)	Elev. (m)	Depth (m)	Elev. (m)	Depth (m)	Cascading Flow?	Cascade Depth (m)	Elev. (m)	Depth (m)	Cascading Flow?	Cascade Depth (m)	Elev. (m)	Depth (m)	Cascading Flow?	Cascade Depth (m)	Elev. (m)	Depth (m)	Cascading Flow?	Cascade Depth (m)
On-grade																			
DCB-3/4	117.68	N/A	0.00	117.70	0.02	Y	0.02	117.70	0.02	Y	0.02	117.71	0.03	Y	0.03	117.72	0.04	Y	0.04
Rear Yards																			
CB5	119.10	119.36	0.26	117.42	0.00	N	0.00	117.51	0.00	N	0.00	117.83	0.00	N	0.00	118.89	0.00	N	0.00
CB6	117.60	117.90	0.30	115.91	0.00	N	0.00	116.01	0.00	N	0.00	116.65	0.00	N	0.00	116.84	0.00	N	0.00
LD1	118.65	118.80	0.15	117.65	0.00	N	0.00	117.65	0.00	N	0.00	117.83	0.00	N	0.00	118.89	0.24	Y	0.09
LD2	118.50	118.50	0.00	116.78	0.00	N	0.00	116.78	0.00	N	0.00	116.78	0.00	N	0.00	116.84	0.00	N	0.00

37 Wildpine (125077)
Pre-Development – PCSWMM Model Schematics

Overall Model Schematic



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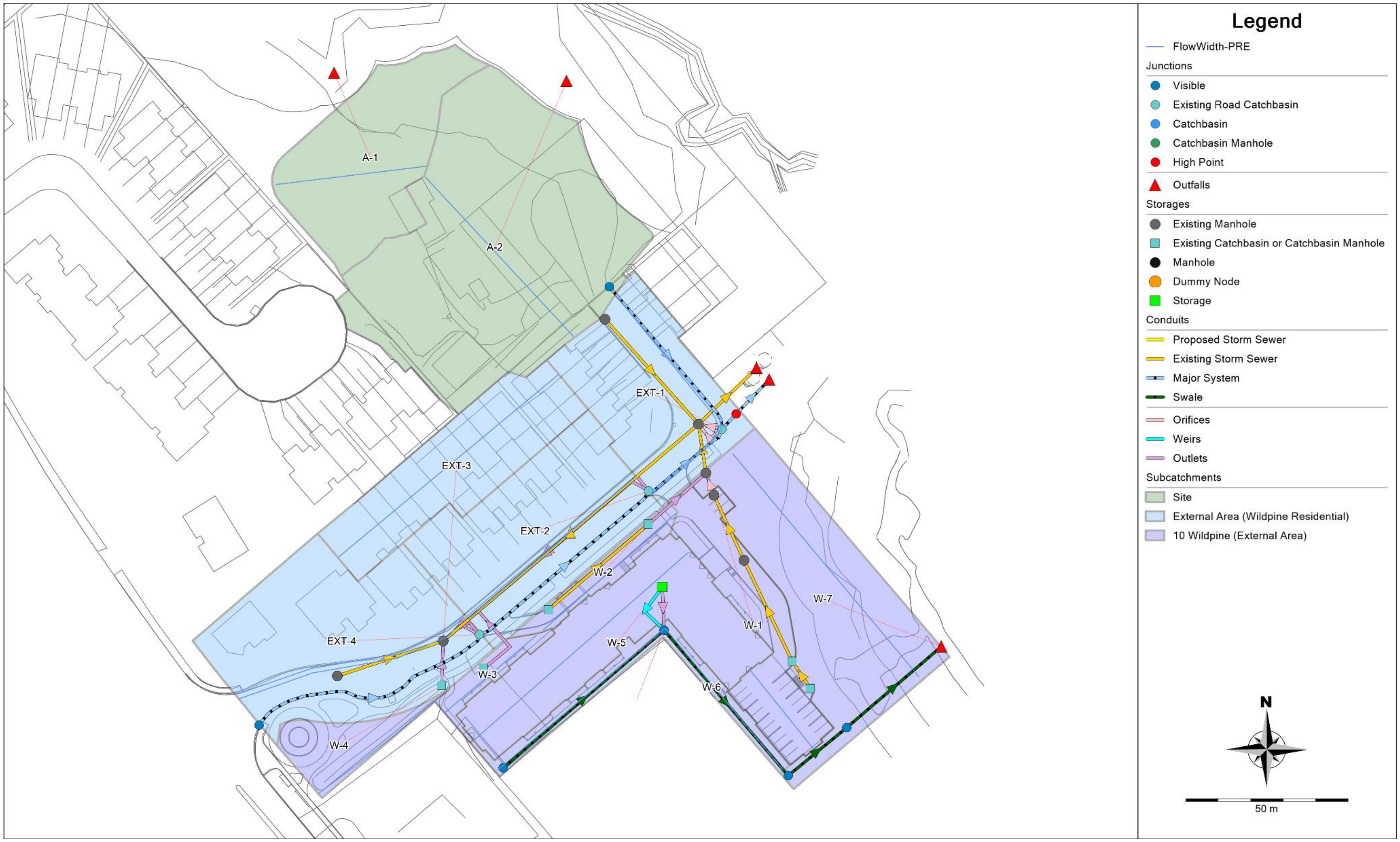
37 Wildpine (125077)
Pre-Development – PCSWMM Model Schematics

Subcatchments and Flow Paths



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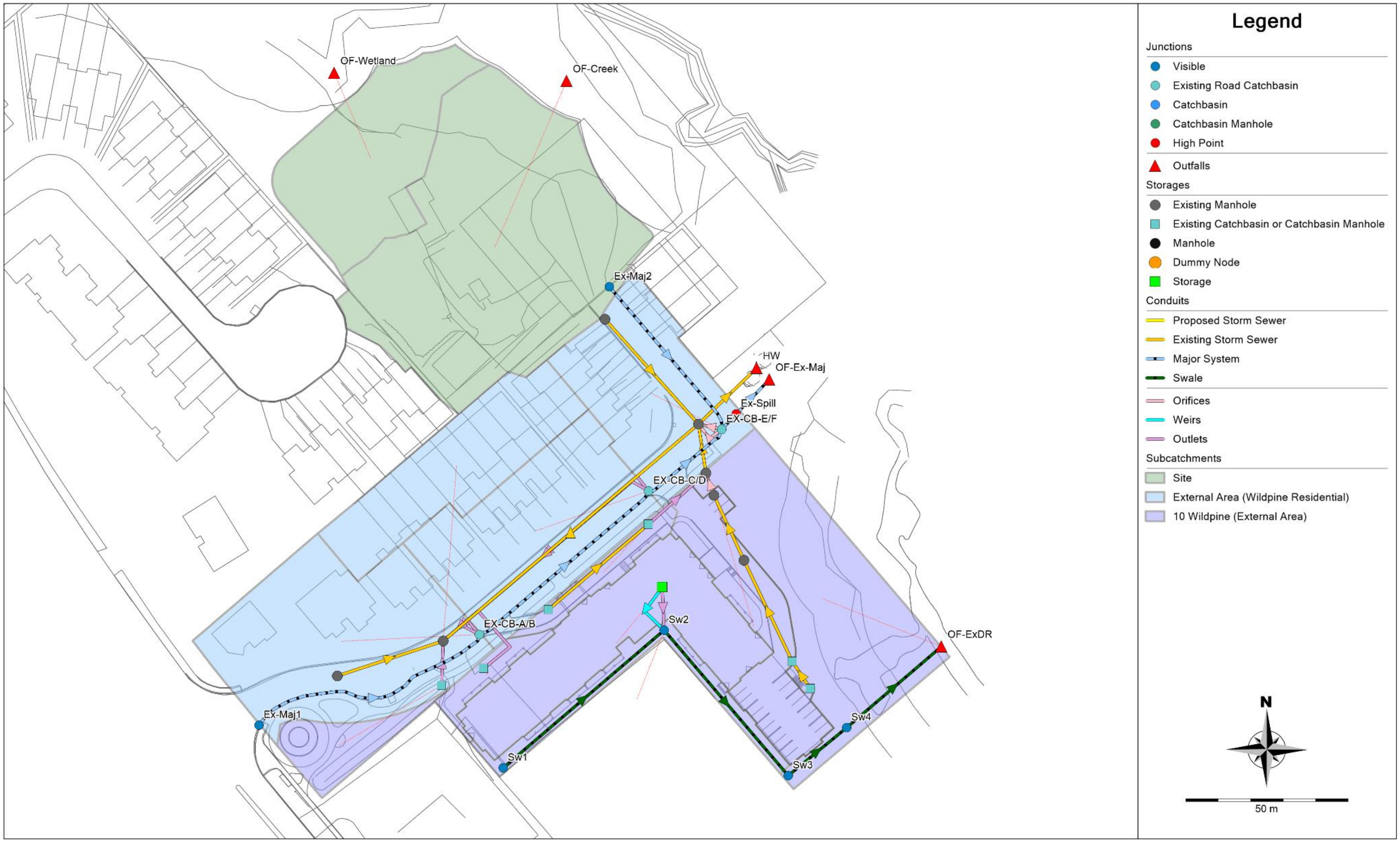
37 Wildpine (125077)
Pre-Development – PCSWMM Model Schematics

Junctions and Outfalls



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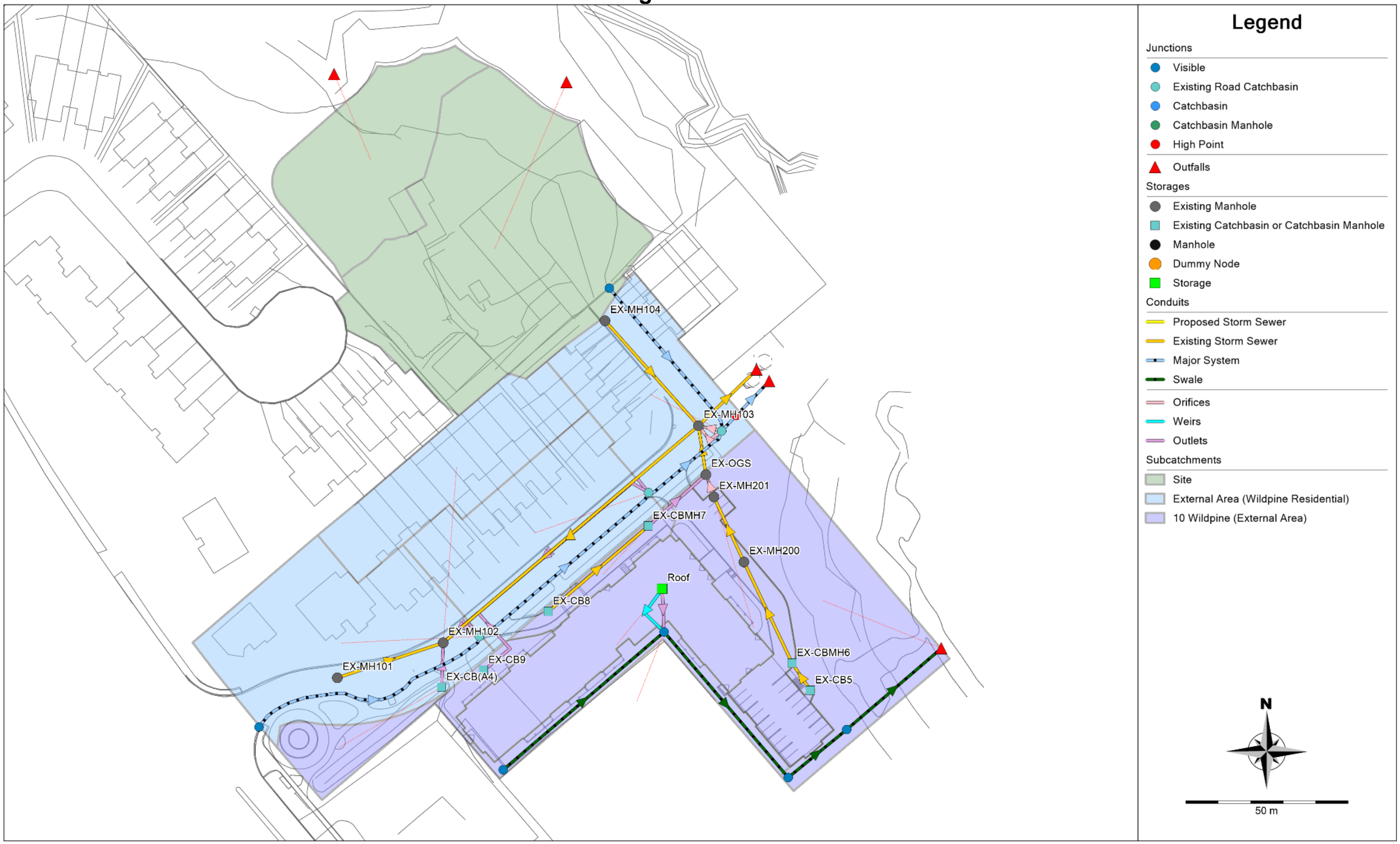
37 Wildpine (125077)
Pre-Development – PCSWMM Model Schematics

Storage Nodes



Date: 2026-01-12
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37 Wildpine (125077)
Pre-Development PCSWMM Model Results - 100-year 3-hour Chicago Storm Event

```
  EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.3)
  ------------------------------------------------------------

  Pre-development model for 37 Wildpine site plan and roadway. Includes offsite area of Wildpine Sewer and 10
Wildpine Wareouse development

  *************
  Element Count
  *************
  Number of rain gages ...... 1
  Number of subcatchments ... 13
  Number of nodes ........... 29
  Number of links ........... 31
  Number of pollutants ...... 0
  Number of land uses ....... 0


  ****************
  Raingage Summary
  ****************
                                                   Data       Recording
  Name                 Data Source                 Type       Interval
  ------------------------------------------------------------------------
  Raingage             04-C3hr-100yr               INTENSITY   10 min.


  ********************
  Subcatchment Summary
  ********************
  Name                          Area     Width   %Imperv    %Slope Rain Gage            Outlet
  -----------------------------------------------------------------------------------------------------------
  A-1                           0.22     46.20      7.10    3.5000 Raingage             OF-Wetland
  A-2                           0.56     66.36     22.90    3.5000 Raingage             OF-Creek
  EXT-1                         0.22    162.22     64.30    2.0000 Raingage             EX-CB-E/F
  EXT-2                         0.27    133.68     62.90    2.0000 Raingage             EX-CB-C/D
  EXT-3                         0.19     87.11     21.40    2.0000 Raingage             EX-MH102
  EXT-4                         0.34    148.88     57.10    2.0000 Raingage             EX-CB-A/B
  W-1                           0.13     30.55     90.00    0.5000 Raingage             EX-MH201
  W-2                           0.04     53.96     90.00    0.5000 Raingage             EX-CBMH7
  W-3                           0.03     36.75     28.60    0.5000 Raingage             EX-CB9
```

```
  W-4                           0.06     45.08     22.90    0.5000 Raingage             EX-CB(A4)
  W-5                           0.22     87.12    100.00    0.5000 Raingage             Roof
  W-6                           0.06    123.28      7.10    0.5000 Raingage             Sw2
  W-7                           0.30     88.86      7.10    0.5000 Raingage             OF-ExDR


  ************
  Node Summary
  ************
                                         Invert      Max.    Ponded    External
  Name                 Type               Elev.     Depth      Area    Inflow
  -------------------------------------------------------------------------------
  EX-CB-A/B            JUNCTION          118.00      1.00       0.0
  EX-CB-C/D            JUNCTION          117.64      1.00       0.0
  EX-CB-E/F            JUNCTION          116.11      2.30       0.0
  Ex-Maj1              JUNCTION          119.57      1.00       0.0
  Ex-Maj2              JUNCTION          117.64      1.00       0.0
  Ex-Spill             JUNCTION          117.50      1.00       0.0
  Sw1                  JUNCTION          117.65      1.00       0.0
  Sw2                  JUNCTION          117.00      1.00       0.0
  Sw3                  JUNCTION          115.55      1.00       0.0
  Sw4                  JUNCTION          114.84      1.00       0.0
  HW                   OUTFALL           114.25      0.38       0.0
  OF-Creek             OUTFALL           115.00      0.00       0.0
  OF-ExDR              OUTFALL           114.38      0.15       0.0
  OF-Ex-Maj            OUTFALL           115.17      0.30       0.0
  OF-Wetland           OUTFALL           116.00      0.00       0.0
  EX-CB(A4)            STORAGE           116.64      2.31       0.0
  EX-CB5               STORAGE           114.70      1.75       0.0
  EX-CB8               STORAGE           115.62      3.58       0.0
  EX-CB9               STORAGE           116.55      2.60       0.0
  EX-CBMH6             STORAGE           114.65      2.00       0.0
  EX-CBMH7             STORAGE           114.74      3.96       0.0
  EX-MH101             STORAGE           116.38      2.84       0.0
  EX-MH102             STORAGE           115.54      2.75       0.0
  EX-MH103             STORAGE           114.44      3.10       0.0
  EX-MH104             STORAGE           114.97      2.71       0.0
  EX-MH200             STORAGE           114.55      3.28       0.0
  EX-MH201             STORAGE           114.52      3.28       0.0
  EX-OGS               STORAGE           114.48      2.97       0.0
  Roof                 STORAGE           120.00      1.00       0.0
```

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
EXCB5-EXCBMH6	EX-CB5	EX-CBMH6	CONDUIT	9.6	0.4167	0.0130
EXCB8-EXCBMH7	EX-CB8	EX-CBMH7	CONDUIT	40.0	1.0001	0.0130
EXCBMH6-EXMH200	EX-CBMH6	EX-MH200	CONDUIT	33.2	0.2711	0.0130
EXMH104-EXMH23	EX-MH104	EX-MH103	CONDUIT	43.0	1.0698	0.0130
EXMH200-EXMH201	EX-MH200	EX-MH201	CONDUIT	20.0	0.1000	0.0130
EXMH23-HW	EX-MH103	HW	CONDUIT	18.8	1.0107	0.0130
EXMH50-EXMH23	EX-MH102	EX-MH103	CONDUIT	102.2	1.0470	0.0130
EXMH51-EXMH50	EX-MH101	EX-MH102	CONDUIT	34.2	2.3691	0.0130
EXOGS-EXMH23	EX-OGS	EX-MH103	CONDUIT	15.0	0.2667	0.0130
MS01	Ex-Maj1	EX-CB-A/B	CONDUIT	77.5	2.0262	0.0160
MS02	EX-CB-A/B	EX-CB-C/D	CONDUIT	68.2	0.5279	0.0160
MS03	EX-CB-C/D	EX-CB-E/F	CONDUIT	30.0	0.7667	0.0160
MS04	Ex-Maj2	EX-CB-E/F	CONDUIT	56.1	0.4100	0.0160
MS05	EX-CB-E/F	Ex-Spill	CONDUIT	3.0	-3.0014	0.0130
MS06	Ex-Spill	OF-Ex-Maj	CONDUIT	15.0	15.7242	0.0130
Swale1	Sw1	Sw2	CONDUIT	64.8	1.0031	0.0350
Swale2	Sw2	Sw3	CONDUIT	58.5	2.4794	0.0350
Swale3	Sw3	Sw4	CONDUIT	23.2	3.0618	0.0350
Swale4	Sw4	OF-ExDR	CONDUIT	38.1	1.2074	0.0350
O-CB-E	EX-CB-E/F	EX-MH103	ORIFICE			
O-CB-F	EX-CB-E/F	EX-MH103	ORIFICE			
O-EXMH201	EX-MH201	EX-OGS	ORIFICE			
Roof-Spill	Roof	Sw2	WEIR			
O-A4	EX-CB(A4)	EX-MH102	OUTLET			
O-A5	Roof	Sw2	OUTLET			
O-CB-A	EX-CB-A/B	EX-MH102	OUTLET			
O-CB-B	EX-CB-A/B	EX-MH102	OUTLET			
O-CB-C	EX-CB-C/D	EX-MH102	OUTLET			
O-CB-D	EX-CB-C/D	EX-MH102	OUTLET			
O-EXCB9	EX-CB9	EX-MH102	OUTLET			
O-EXCBMH7	EX-CBMH7	EX-OGS	OUTLET			

****

Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
EXCB5-EXCBMH6	CIRCULAR	0.30	0.07	0.07	0.30	1	62.42
EXCB8-EXCBMH7	CIRCULAR	0.45	0.16	0.11	0.45	1	285.13
EXCBMH6-EXMH200	CIRCULAR	0.38	0.11	0.09	0.38	1	91.29
EXMH104-EXMH23	CIRCULAR	0.30	0.07	0.07	0.30	1	100.03
EXMH200-EXMH201	HORIZ_ELLIPSE	1.22	1.89	0.37	1.92	1	2383.13
EXMH23-HW	CIRCULAR	0.38	0.11	0.09	0.38	1	176.28
EXMH50-EXMH23	CIRCULAR	0.38	0.11	0.09	0.38	1	179.42
EXMH51-EXMH50	CIRCULAR	0.30	0.07	0.07	0.30	1	148.85
EXOGS-EXMH23	CIRCULAR	0.38	0.11	0.09	0.38	1	90.55
MS01	20mROW-8.5mRoad	0.27	2.37	0.13	20.00	1	5291.82
MS02	20mROW-8.5mRoad	0.27	2.37	0.13	20.00	1	2700.99
MS03	20mROW-8.5mRoad	0.27	2.37	0.13	20.00	1	3255.15
MS04	20mROW-8.5mRoad	0.27	2.37	0.13	20.00	1	2380.38
MS05	TRAPEZOIDAL	0.30	0.27	0.14	1.80	1	980.80
MS06	TRAPEZOIDAL	0.30	0.27	0.14	1.80	1	2244.95
Swale1	TRAPEZOIDAL	0.15	0.06	0.07	0.84	1	30.81
Swale2	TRAPEZOIDAL	0.15	0.06	0.07	0.84	1	48.43
Swale3	TRAPEZOIDAL	0.15	0.06	0.07	0.84	1	53.82
Swale4	TRAPEZOIDAL	0.15	0.06	0.07	0.84	1	33.80

****
Street Summary
****

Street 20mROW-8.5mRoad
Area:

0.0004	0.0016	0.0036	0.0063	0.0099
0.0142	0.0193	0.0253	0.0320	0.0395
0.0478	0.0568	0.0667	0.0774	0.0888
0.1011	0.1141	0.1279	0.1425	0.1579
0.1741	0.1911	0.2088	0.2274	0.2464
0.2654	0.2844	0.3034	0.3226	0.3431
0.3646	0.3874	0.4114	0.4365	0.4629
0.4904	0.5191	0.5490	0.5801	0.6123
0.6458	0.6804	0.7162	0.7532	0.7914

```
            0.8307     0.8713     0.9130     0.9559     1.0000
Hrad:
            0.0204     0.0408     0.0612     0.0816     0.1020
            0.1224     0.1428     0.1632     0.1836     0.2040
            0.2244     0.2448     0.2652     0.2856     0.3060
            0.3264     0.3468     0.3672     0.3875     0.4079
            0.4283     0.4487     0.4691     0.4895     0.5286
            0.5686     0.6086     0.6485     0.6879     0.7243
            0.7575     0.7877     0.8153     0.8404     0.8633
            0.8843     0.9035     0.9212     0.9374     0.9524
            0.9662     0.9790     0.9910     1.0022     1.0127
            1.0226     1.0319     1.0407     1.0491     1.0000
Width:
            0.0177     0.0353     0.0530     0.0707     0.0883
            0.1060     0.1237     0.1413     0.1590     0.1767
            0.1943     0.2120     0.2297     0.2473     0.2650
            0.2827     0.3003     0.3180     0.3357     0.3533
            0.3710     0.3887     0.4063     0.4240     0.4250
            0.4250     0.4250     0.4250     0.4435     0.4700
            0.4965     0.5230     0.5495     0.5760     0.6025
            0.6290     0.6555     0.6820     0.7085     0.7350
            0.7615     0.7880     0.8145     0.8410     0.8675
            0.8940     0.9205     0.9470     0.9735     1.0000


****************
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 ............ 08/26/2025 00:00:00
```

```
Ending Date .............. 08/28/2025 00:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:01:00
Wet Time Step ............ 00:05:00
Dry Time Step ............ 00:05:00
Routing Time Step ........ 2.00 sec
Variable Time Step ....... YES
Maximum Trials ........... 8
Number of Threads ........ 1
Head Tolerance ........... 0.001500 m


**************************        Volume         Depth
Runoff Quantity Continuity     hectare-m            mm
**************************     ---------       -------
Initial LID Storage ......         0.001         0.523
Total Precipitation ......         0.188        71.667
Evaporation Loss .........         0.000         0.000
Infiltration Loss ........         0.071        26.950
Surface Runoff ...........         0.119        45.351
Final Storage ............         0.001         0.523
Continuity Error (%) .....        -0.879


**************************        Volume        Volume
Flow Routing Continuity        hectare-m      10^6 ltr
**************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......         0.119         1.192
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.000
External Outflow .........         0.120         1.197
Flooding Loss ............         0.000         0.000
Evaporation Loss .........         0.000         0.000
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         0.001         0.013
Final Stored Volume ......         0.001         0.014
Continuity Error (%) .....        -0.446
```

37 Wildpine (125077)
Pre-Development PCSWMM Model Results - 100-year 3-hour Chicago Storm Event

```
***************************
Time-Step Critical Elements
***************************
None

********************************
Highest Flow Instability Indexes
********************************
Link O-EXMH201 (5)
Link O-A5 (2)

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

*************************
Routing Time Step Summary
*************************
Minimum Time Step           :     0.31 sec
Average Time Step           :     1.99 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      :    99.36 %
    1.516 -  1.149 sec      :     0.29 %
    1.149 -  0.871 sec      :     0.33 %
    0.871 -  0.660 sec      :     0.01 %
    0.660 -  0.500 sec      :     0.00 %

***************************
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-1	71.67	0.00	0.00	43.23	5.09	23.93	29.02	0.06	45.40	0.405
A-2	71.67	0.00	0.00	36.75	16.44	18.86	35.30	0.20	123.33	0.493
EXT-1	71.67	0.00	0.00	15.72	46.14	10.78	56.92	0.12	99.54	0.794
EXT-2	71.67	0.00	0.00	16.43	45.15	10.88	56.03	0.15	119.51	0.782
EXT-3	71.67	0.00	0.00	35.52	15.35	21.64	36.98	0.07	61.51	0.516
EXT-4	71.67	0.00	0.00	19.10	40.99	12.33	53.32	0.18	146.83	0.744
W-1	71.67	0.00	0.00	4.44	65.03	2.90	67.93	0.09	62.53	0.948
W-2	71.67	0.00	0.00	4.37	64.68	3.23	67.91	0.03	19.55	0.948
W-3	71.67	0.00	0.00	31.91	20.51	20.27	40.78	0.01	11.24	0.569
W-4	71.67	0.00	0.00	35.07	16.43	20.90	37.33	0.02	18.39	0.521
W-5	71.67	0.00	0.00	0.00	72.15	0.00	72.15	0.16	109.05	1.007
W-6	71.67	0.00	0.00	41.28	5.09	26.85	31.94	0.02	21.90	0.446
W-7	71.67	0.00	0.00	45.08	5.09	21.83	26.92	0.08	42.39	0.376

```
******************
Node Depth Summary
******************

---------------------------------------------------------------------------------
                              Average  Maximum  Maximum  Time of Max    Reported
                                Depth    Depth      HGL   Occurrence   Max Depth
```

37 Wildpine (125077)
Pre-Development PCSWMM Model Results - 100-year 3-hour Chicago Storm Event

Node	Type	Meters	Meters	Meters	days hr:min	Meters
EX-CB-A/B	JUNCTION	0.00	0.07	118.07	0 01:10	0.07
EX-CB-C/D	JUNCTION	0.00	0.08	117.72	0 01:10	0.08
EX-CB-E/F	JUNCTION	0.25	1.53	117.64	0 01:12	1.53
Ex-Maj1	JUNCTION	0.00	0.00	119.57	0 00:00	0.00
Ex-Maj2	JUNCTION	0.00	0.00	117.64	0 00:00	0.00
Ex-Spill	JUNCTION	0.00	0.10	117.60	0 01:12	0.10
Sw1	JUNCTION	0.00	0.00	117.65	0 00:00	0.00
Sw2	JUNCTION	0.02	0.12	117.12	0 01:10	0.12
Sw3	JUNCTION	0.02	0.11	115.66	0 01:11	0.11
Sw4	JUNCTION	0.02	0.14	114.98	0 01:12	0.14
HW	OUTFALL	0.45	0.45	114.70	0 00:00	0.45
OF-Creek	OUTFALL	0.00	0.00	115.00	0 00:00	0.00
OF-ExDR	OUTFALL	0.02	0.14	114.52	0 01:12	0.14
OF-Ex-Maj	OUTFALL	0.00	0.10	115.27	0 01:12	0.10
OF-Wetland	OUTFALL	0.00	0.00	116.00	0 00:00	0.00
EX-CB(A4)	STORAGE	0.15	1.67	118.31	0 01:29	1.67
EX-CB5	STORAGE	0.02	0.81	115.51	0 01:22	0.81
EX-CB8	STORAGE	0.01	0.78	116.40	0 01:23	0.78
EX-CB9	STORAGE	0.16	1.79	118.34	0 01:28	1.79
EX-CBMH6	STORAGE	0.07	0.86	115.51	0 01:22	0.86
EX-CBMH7	STORAGE	0.24	1.66	116.40	0 01:23	1.66
EX-MH101	STORAGE	0.00	0.00	116.38	0 00:00	0.00
EX-MH102	STORAGE	0.01	0.40	115.94	0 01:12	0.40
EX-MH103	STORAGE	0.27	0.74	115.18	0 01:15	0.74
EX-MH104	STORAGE	0.00	0.22	115.19	0 01:15	0.22
EX-MH200	STORAGE	0.17	0.96	115.51	0 01:22	0.96
EX-MH201	STORAGE	0.20	0.99	115.51	0 01:22	0.99
EX-OGS	STORAGE	0.23	0.70	115.18	0 01:15	0.70
Roof	STORAGE	0.01	0.14	120.14	0 02:03	0.14

****
Node Inflow Summary
****

		Maximum Lateral Inflow	Maximum Total Inflow	Time of Max Occurrence	Lateral Inflow Volume	Total Inflow Volume	Flow Balance Error	
Node	Type	LPS	LPS	days hr:min	10^6 ltr	10^6 ltr	Percent	
EX-CB-A/B	JUNCTION	146.83	146.83	0 01:10	0.181	0.181	-0.037	
EX-CB-C/D	JUNCTION	119.51	203.66	0 01:10	0.148	0.214	-0.390	
EX-CB-E/F	JUNCTION	99.54	239.60	0 01:10	0.122	0.221	0.368	
Ex-Maj1	JUNCTION	0.00	0.00	0 00:00	0	0	0.000	ltr
Ex-Maj2	JUNCTION	0.00	0.00	0 00:00	0	0	0.000	ltr
Ex-Spill	JUNCTION	0.00	126.04	0 01:12	0	0.0686	0.010	
Sw1	JUNCTION	0.00	0.00	0 00:00	0	0	0.000	ltr
Sw2	JUNCTION	21.90	28.20	0 01:10	0.0192	0.183	0.477	
Sw3	JUNCTION	0.00	26.69	0 01:10	0	0.182	0.020	
Sw4	JUNCTION	0.00	26.16	0 01:11	0	0.182	0.012	
HW	OUTFALL	0.00	215.96	0 01:15	0	0.605	0.000	
OF-Creek	OUTFALL	123.33	123.33	0 01:10	0.197	0.197	0.000	
OF-ExDR	OUTFALL	42.39	64.88	0 01:11	0.0808	0.263	0.000	
OF-Ex-Maj	OUTFALL	0.00	126.04	0 01:12	0	0.0686	0.000	
OF-Wetland	OUTFALL	45.40	45.40	0 01:10	0.0638	0.0638	0.000	
EX-CB(A4)	STORAGE	18.39	18.39	0 01:10	0.0224	0.0224	0.012	
EX-CB5	STORAGE	0.00	1.62	0 01:04	0	0.00108	0.090	
EX-CB8	STORAGE	0.00	14.48	0 01:05	0	0.00547	0.153	
EX-CB9	STORAGE	11.24	11.24	0 01:10	0.0122	0.0123	0.020	
EX-CBMH6	STORAGE	0.00	9.04	0 01:04	0	0.00705	0.021	
EX-CBMH7	STORAGE	19.55	19.55	0 01:10	0.0272	0.0328	-0.028	
EX-MH101	STORAGE	0.00	0.00	0 00:00	0	0	0.000	ltr
EX-MH102	STORAGE	61.51	169.56	0 01:10	0.0706	0.337	0.010	
EX-MH103	STORAGE	0.00	219.34	0 01:10	0	0.607	-0.082	
EX-MH104	STORAGE	0.00	6.43	0 01:06	0	0.00157	0.178	
EX-MH200	STORAGE	0.00	35.70	0 01:05	0	0.0341	0.078	
EX-MH201	STORAGE	62.53	62.53	0 01:10	0.0883	0.117	-0.051	
EX-OGS	STORAGE	0.00	20.63	0 01:39	0	0.117	0.028	
Roof	STORAGE	109.05	109.05	0 01:10	0.159	0.159	-2.998	

****
Node Surcharge Summary
****

No nodes were surcharged.

****

37 Wildpine (125077)
Pre-Development PCSWMM Model Results - 100-year 3-hour Chicago Storm Event

Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

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
EX-CB(A4)	0.000	0.3	0.0	0.0	0.009	13.5	0 01:29	4.05
EX-CB5	0.000	1.1	0.0	0.0	0.000	46.1	0 01:22	0.33
EX-CB8	0.000	0.4	0.0	0.0	0.000	21.8	0 01:23	2.96
EX-CB9	0.000	0.1	0.0	0.0	0.005	4.1	0 01:28	1.84
EX-CBMH6	0.000	3.5	0.0	0.0	0.001	42.8	0 01:22	1.62
EX-CBMH7	0.000	6.0	0.0	0.0	0.002	41.9	0 01:23	17.24
EX-MH101	0.000	0.0	0.0	0.0	0.000	0.0	0 00:00	0.00
EX-MH102	0.000	0.3	0.0	0.0	0.000	14.7	0 01:12	160.32
EX-MH103	0.000	8.6	0.0	0.0	0.001	23.9	0 01:15	218.29
EX-MH104	0.000	0.1	0.0	0.0	0.000	8.0	0 01:15	6.40
EX-MH200	0.001	5.2	0.0	0.0	0.005	29.1	0 01:22	9.04
EX-MH201	0.001	6.1	0.0	0.0	0.005	30.0	0 01:22	40.05
EX-OGS	0.000	7.6	0.0	0.0	0.001	23.6	0 01:15	22.81
Roof	0.009	7.8	0.0	0.0	0.102	93.0	0 02:03	6.30

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
HW	10.41	39.05	215.96	0.605
OF-Creek	7.49	18.35	123.33	0.197
OF-ExDR	28.42	5.87	64.88	0.263
OF-Ex-Maj	1.22	52.75	126.04	0.069
OF-Wetland	6.66	6.96	45.40	0.064
System	10.84	122.98	544.35	1.198

****
Street Flow Summary
****

Street Conduit	Peak Flow LPS	Maximum Spread m	Maximum Depth m	Inlet Design	Inlet Location	Peak Flow Capture Pcnt	Avg. Flow Capture Pcnt	Bypass Flow Freq Pcnt	Back Flow Freq Pcnt	Peak Capture / Inlet LPS	Peak Bypass Flow LPS
MS01	0.000	1.212	0.036								
MS02	85.967	2.583	0.077								
MS03	143.974	4.250	0.153								
MS04	0.000	3.802	0.114								

****
Link Flow Summary
****

Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
EXCB5-EXCBMH6	CONDUIT	1.62	0 01:04	0.03	0.03	1.00
EXCB8-EXCBMH7	CONDUIT	14.48	0 01:05	0.16	0.05	1.00
EXCBMH6-EXMH200	CONDUIT	9.04	0 01:04	0.10	0.10	1.00

EXMH104-EXMH23	CONDUIT	6.43	0	01:06	0.15	0.06	0.86
EXMH200-EXMH201	CONDUIT	35.70	0	01:05	0.08	0.01	0.79
EXMH23-HW	CONDUIT	215.96	0	01:15	1.96	1.23	1.00
EXMH50-EXMH23	CONDUIT	160.32	0	01:10	1.50	0.89	1.00
EXMH51-EXMH50	CONDUIT	0.00	0	00:00	0.00	0.00	0.50
EXOGS-EXMH23	CONDUIT	22.81	0	01:38	0.24	0.25	1.00
MS01	CONDUIT	0.00	0	00:00	0.00	0.00	0.14
MS02	CONDUIT	85.97	0	01:10	0.43	0.03	0.29
MS03	CONDUIT	143.97	0	01:10	0.40	0.04	0.58
MS04	CONDUIT	0.00	0	00:00	0.00	0.00	0.43
MS05	CONDUIT	126.04	0	01:12	1.54	0.13	0.55
MS06	CONDUIT	126.04	0	01:12	4.04	0.06	0.34
Swale1	CONDUIT	0.00	0	00:00	0.00	0.00	0.41
Swale2	CONDUIT	26.69	0	01:10	0.69	0.55	0.79
Swale3	CONDUIT	26.16	0	01:11	0.61	0.49	0.83
Swale4	CONDUIT	25.72	0	01:12	0.50	0.76	0.90
O-CB-E	ORIFICE	24.82	0	01:12			1.00
O-CB-F	ORIFICE	24.82	0	01:12			1.00
O-EXMH201	ORIFICE	16.91	0	01:39			1.00
Roof-Spill	WEIR	0.00	0	00:00			0.00
O-A4	DUMMY	4.05	0	01:29			
O-A5	DUMMY	6.30	0	00:14			
O-CB-A	DUMMY	25.60	0	01:04			
O-CB-B	DUMMY	25.60	0	01:04			
O-CB-C	DUMMY	25.60	0	01:04			
O-CB-D	DUMMY	25.60	0	01:04			
O-EXCB9	DUMMY	1.84	0	01:28			
O-EXCBMH7	DUMMY	3.90	0	01:24			

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
		Fraction of Time in Flow Class								
EXCB5-EXCBMH6	1.00	0.00	0.12	0.00	0.88	0.00	0.00	0.00	0.81	0.00
EXCB8-EXCBMH7	1.00	0.00	0.00	0.00	0.05	0.00	0.00	0.95	0.02	0.00
EXCBMH6-EXMH200	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
EXMH104-EXMH23	1.00	0.00	0.95	0.00	0.05	0.00	0.00	0.00	0.97	0.00
EXMH200-EXMH201	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
EXMH23-HW	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
EXMH50-EXMH23	1.00	0.00	0.63	0.00	0.37	0.00	0.00	0.00	0.99	0.00
EXMH51-EXMH50	1.00	0.94	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EXOGS-EXMH23	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
MS01	1.00	0.89	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS02	1.00	0.87	0.02	0.00	0.11	0.00	0.00	0.00	0.05	0.00
MS03	1.00	0.89	0.00	0.00	0.01	0.00	0.00	0.10	0.01	0.00
MS04	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS05	1.00	0.00	0.00	0.00	0.01	0.00	0.00	0.99	0.97	0.00
MS06	1.00	0.00	0.00	0.00	0.99	0.01	0.00	0.00	0.00	0.00
Swale1	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Swale2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.38	0.00
Swale3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.99	0.00
Swale4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.34	0.00

****
Conduit Surcharge Summary
****

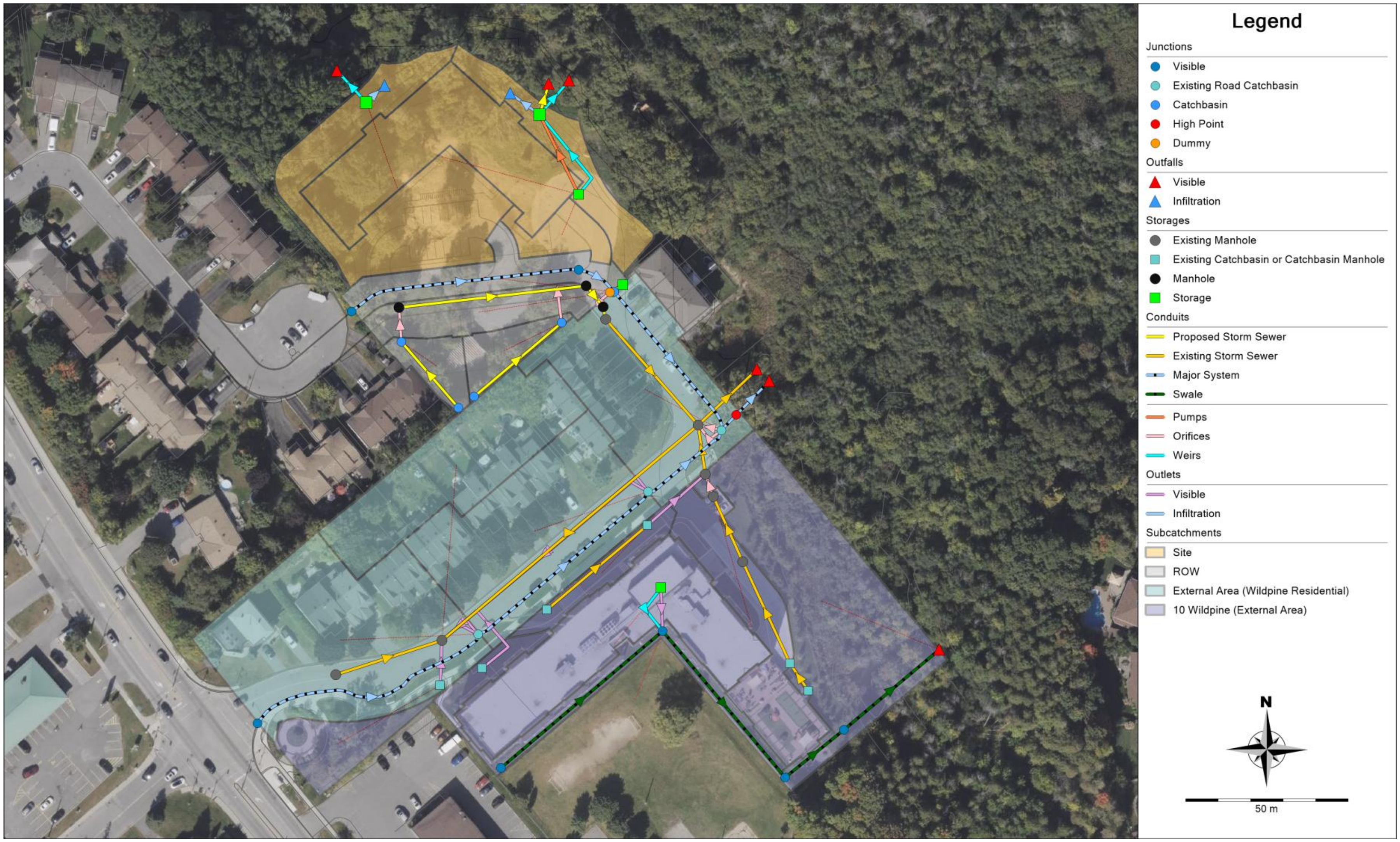
Conduit	Hours Full Both Ends	Hours Full Upstream	Hours Full Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
EXCB5-EXCBMH6	1.13	1.13	1.22	0.01	0.01
EXCB8-EXCBMH7	0.67	0.67	1.44	0.01	0.01
EXCBMH6-EXMH200	1.08	1.08	1.28	0.01	0.01
EXMH104-EXMH23	0.01	0.01	0.53	0.01	0.01
EXMH23-HW	0.56	0.56	48.00	0.25	0.38
EXMH50-EXMH23	0.05	0.05	0.48	0.01	0.01
EXOGS-EXMH23	0.46	0.46	0.56	0.01	0.01

Analysis begun on: Mon Nov 17 12:54:09 2025
Analysis ended on: Mon Nov 17 12:54:11 2025
Total elapsed time: 00:00:02

37 Wildpine (125077)
Post-Development – PCSWMM Model Schematics

NOVATECH
Engineers, Planners & Landscape Architects

Overall Model Schematic



Date: 2026-01-12
M:\2025\125077\DATA\Calculations\SWM\PCSWMM\125077-PCSWMM Schematics-POST.docx

37 Wildpine (125077)
Post-Development – PCSWMM Model Schematics

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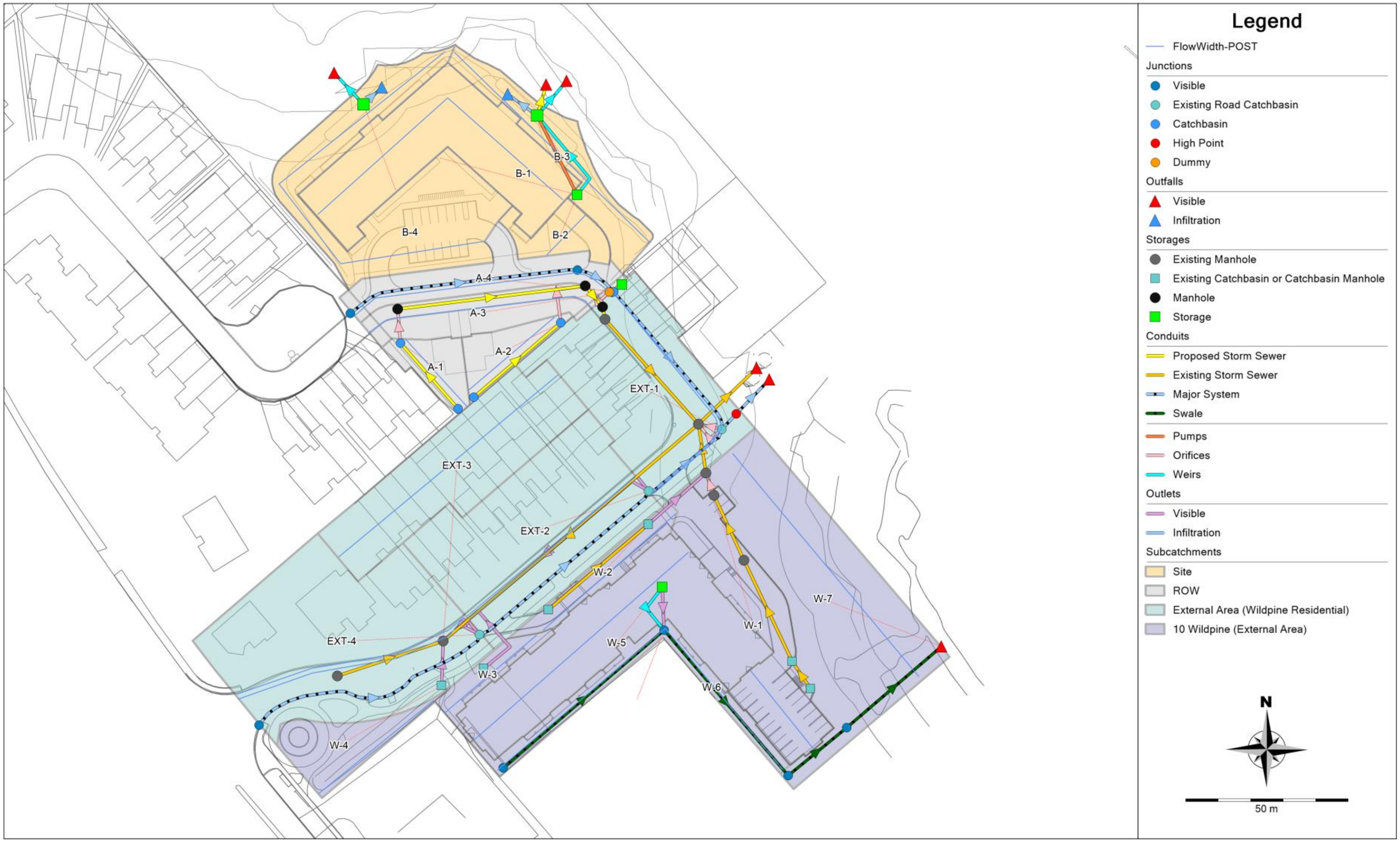
Subcatchments and Flow Paths



Date: 2026-01-12
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37 Wildpine (125077)
Post-Development – PCSWMM Model Schematics

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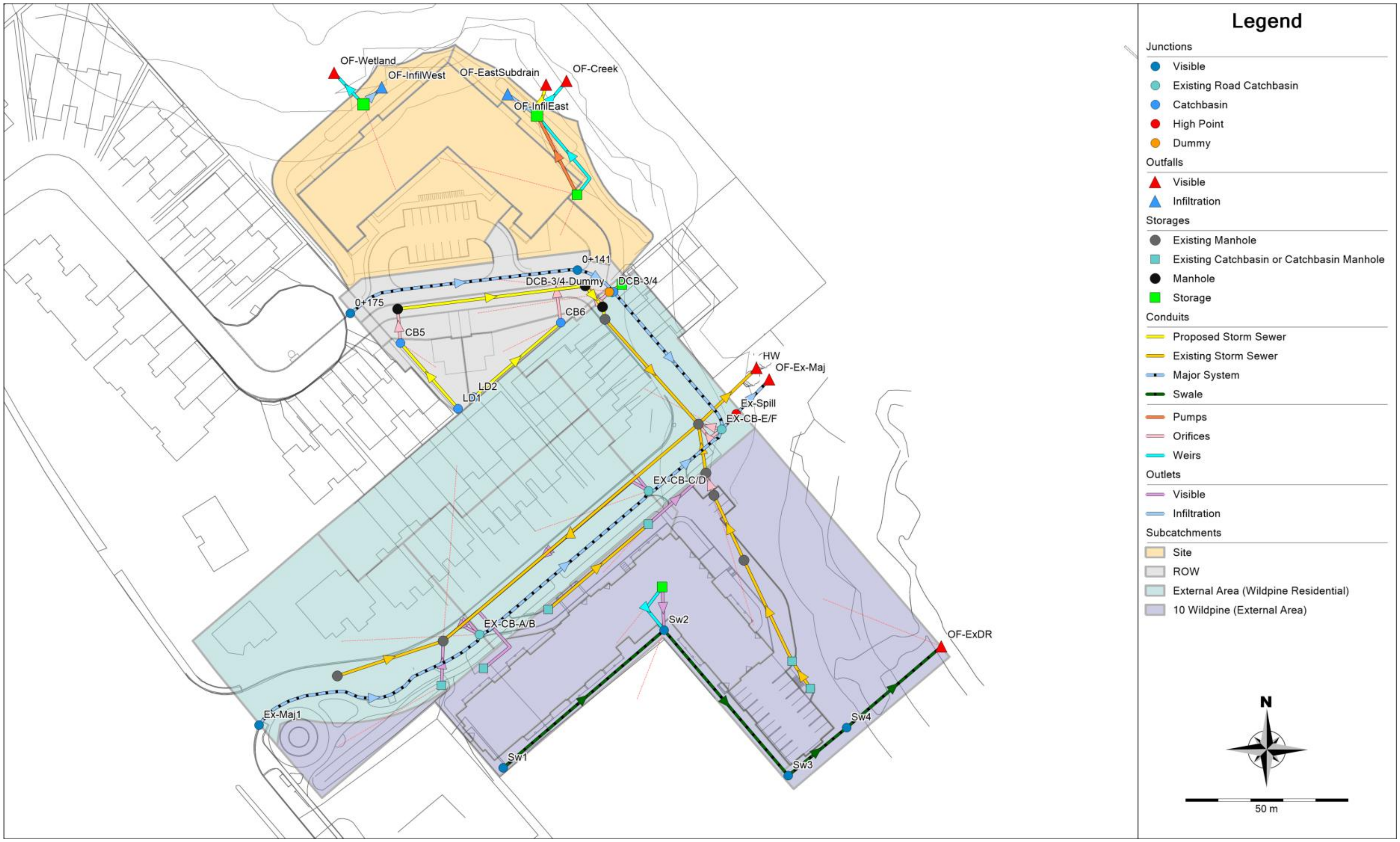
Junctions and Outfalls



Date: 2026-01-12
M:\2025\125077\DATA\Calculations\SWM\PCSWMM\125077-PCSWMM Schematics-POST.docx

37 Wildpine (125077)
Post-Development – PCSWMM Model Schematics

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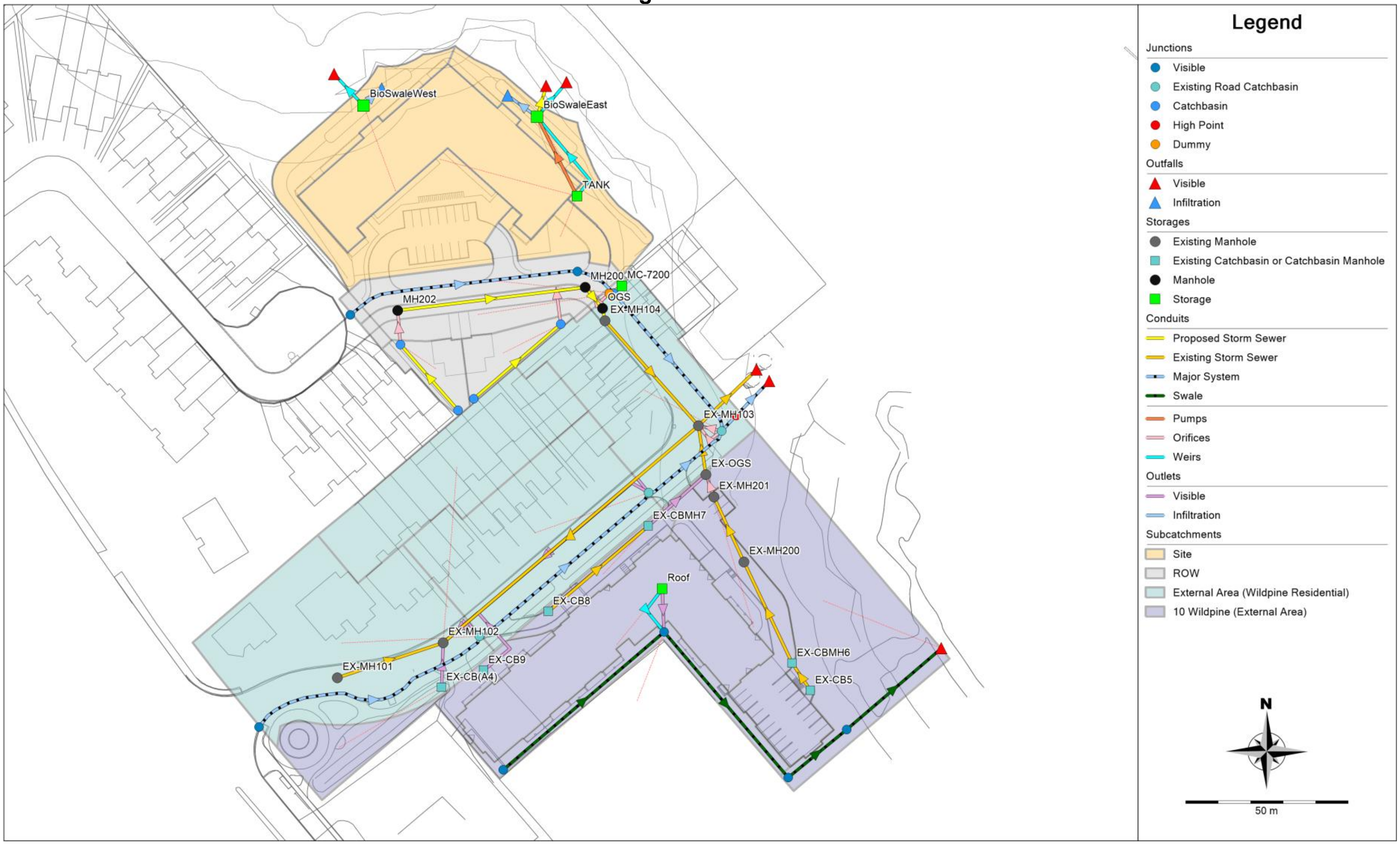
Storage Nodes



Date: 2026-01-12
M:\2025\125077\DATA\Calculations\SWM\PCSWMM\125077-PCSWMM Schematics-POST.docx

37 Wildpine (125077)
Post-Development PCSWMM Model Results - 100-year 3-hour Chicago Storm Event

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.3)
------------------------------------------------------------

Model for 37 Wildpine site plan and roadway

*************
Element Count
*************
Number of rain gages ...... 1
Number of subcatchments ... 19
Number of nodes ........... 46
Number of links ........... 51
Number of pollutants ...... 0
Number of land uses ....... 0


****************
Raingage Summary
****************
                                                Data       Recording
Name                Data Source                 Type       Interval
--------------------------------------------------------------------
Raingage            04-C3hr-100yr               INTENSITY   10 min.


********************
Subcatchment Summary
********************
Name                       Area     Width   %Imperv    %Slope Rain Gage            Outlet
------------------------------------------------------------------------------------------------------------
A-1                        0.04     27.79     31.40    2.0000 Raingage             CB5
A-2                        0.04     34.19     24.30    2.0000 Raingage             CB6
A-3                        0.08     71.07     50.00    2.0000 Raingage             DCB-3/4
A-4                        0.09     81.70     65.70    2.0000 Raingage             DCB-3/4
B-1                        0.20    100.25    100.00    0.5000 Raingage             TANK
B-2                        0.04     16.97     32.90    2.0000 Raingage             TANK
B-3                        0.08     82.95      7.10    2.0000 Raingage             BioSwaleEast
B-4                        0.21    140.02     41.40    2.0000 Raingage             BioSwaleWest
EXT-1                      0.23    162.22     64.30    2.0000 Raingage             EX-CB-E/F
EXT-2                      0.27    133.60     62.90    2.0000 Raingage             EX-CB-C/D
EXT-3                      0.19     87.11     21.40    2.0000 Raingage             EX-MH102
EXT-4                      0.34    148.88     57.10    2.0000 Raingage             EX-CB-A/B
W-1                        0.13     30.55     90.00    0.5000 Raingage             EX-MH201
W-2                        0.04     53.96     90.00    0.5000 Raingage             EX-CBMH7
W-3                        0.03     36.75     28.60    0.5000 Raingage             EX-CB9
W-4                        0.06     45.08     22.90    0.5000 Raingage             EX-CB(A4)
W-5                        0.22     87.12    100.00    0.5000 Raingage             Roof
W-6                        0.06    123.28      7.10    0.5000 Raingage             Sw2
W-7                        0.30     88.86      7.10    0.5000 Raingage             OF-ExDR

************
Node Summary
************
                                         Invert      Max.    Ponded    External
Name                Type                  Elev.     Depth      Area    Inflow
-------------------------------------------------------------------------------
0+141               JUNCTION             117.81      1.00       0.0
0+175               JUNCTION             119.61      1.00       0.0
CB5                 JUNCTION             117.35      2.75       0.0
CB6                 JUNCTION             115.85      2.75       0.0
DCB-3/4             JUNCTION             117.68      1.00       0.0
DCB-3/4-Dummy       JUNCTION             115.15      3.53       0.0
EX-CB-A/B           JUNCTION             118.00      1.00       0.0
EX-CB-C/D           JUNCTION             117.64      1.00       0.0
EX-CB-E/F           JUNCTION             116.11      2.30       0.0
Ex-Maj1             JUNCTION             119.57      1.00       0.0
Ex-Spill            JUNCTION             117.50      1.00       0.0
LD1                 JUNCTION             117.65      2.00       0.0
LD2                 JUNCTION             116.78      2.72       0.0
Sw1                 JUNCTION             117.65      1.00       0.0
Sw2                 JUNCTION             117.00      1.00       0.0
Sw3                 JUNCTION             115.55      1.00       0.0
Sw4                 JUNCTION             114.84      1.00       0.0
HW                  OUTFALL              114.25      0.45       0.0
OF-Creek            OUTFALL              115.00      0.00       0.0
OF-EastSubdrain     OUTFALL              114.91      0.25       0.0
OF-ExDR             OUTFALL              114.38      0.15       0.0
OF-Ex-Maj           OUTFALL              115.17      0.30       0.0
OF-InfilEast        OUTFALL              114.95      0.00       0.0
OF-InfilWest        OUTFALL              114.95      0.00       0.0
```

OF-Wetland	OUTFALL	116.00	0.00	0.0
BioSwaleEast	STORAGE	114.95	1.55	0.0
BioSwaleWest	STORAGE	114.95	1.55	0.0
EX-CB(A4)	STORAGE	116.64	2.31	0.0
EX-CB5	STORAGE	114.70	1.75	0.0
EX-CB8	STORAGE	115.62	3.58	0.0
EX-CB9	STORAGE	116.55	2.60	0.0
EX-CBMH6	STORAGE	114.65	2.00	0.0
EX-CBMH7	STORAGE	114.74	3.96	0.0
EX-MH101	STORAGE	116.38	2.84	0.0
EX-MH102	STORAGE	115.54	2.75	0.0
EX-MH103	STORAGE	114.44	3.10	0.0
EX-MH104	STORAGE	114.97	2.71	0.0
EX-MH200	STORAGE	114.55	3.28	0.0
EX-MH201	STORAGE	114.52	3.28	0.0
EX-OGS	STORAGE	114.48	2.97	0.0
MC-7200	STORAGE	115.24	3.60	0.0
MH200	STORAGE	115.11	2.77	0.0
MH202	STORAGE	115.72	3.84	0.0
OGS	STORAGE	115.04	2.72	0.0
Roof	STORAGE	120.00	1.00	0.0
TANK	STORAGE	115.00	2.04	0.0

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
DCB3/4-STORE	MC-7200	DCB-3/4-Dummy	CONDUIT	4.1	0.9757	0.0130
EastSubdrain	BioSwaleEast	OF-EastSubdrain	CONDUIT	7.3	0.5480	0.0130
EXCB5-EXCBMH6	EX-CB5	EX-CBMH6	CONDUIT	9.6	0.4167	0.0130
EXCB8-EXCBMH7	EX-CB8	EX-CBMH7	CONDUIT	40.0	1.0001	0.0130
EXCBMH6-EXMH200	EX-CBMH6	EX-MH200	CONDUIT	33.2	0.2711	0.0130
EXMH104-EXMH23	EX-MH104	EX-MH103	CONDUIT	43.0	1.0698	0.0130
EXMH200-EXMH201	EX-MH200	EX-MH201	CONDUIT	20.0	0.1000	0.0130
EXMH23-HW	EX-MH103	HW	CONDUIT	18.8	1.0107	0.0130
EXMH50-EXMH23	EX-MH102	EX-MH103	CONDUIT	102.2	1.0470	0.0130
EXMH51-EXMH50	EX-MH101	EX-MH102	CONDUIT	34.2	2.3691	0.0130
EXOGS-EXMH23	EX-OGS	EX-MH103	CONDUIT	15.0	0.2667	0.0130
LD1-CB5	LD1	CB5	CONDUIT	26.7	0.4869	0.0130
LD2-CB6	LD2	CB6	CONDUIT	35.0	0.5143	0.0130
MH200-OGS	MH200	OGS	CONDUIT	8.3	0.4819	0.0130
MH202-MH200	MH202	MH200	CONDUIT	57.8	1.0035	0.0130
MS01	Ex-Maj1	EX-CB-A/B	CONDUIT	77.5	2.0262	0.0160
MS02	EX-CB-A/B	EX-CB-C/D	CONDUIT	68.2	0.5279	0.0160
MS03	EX-CB-C/D	EX-CB-E/F	CONDUIT	30.0	0.7667	0.0160
MS04	DCB-3/4	EX-CB-E/F	CONDUIT	56.1	0.4813	0.0160
MS05	EX-CB-E/F	Ex-Spill	CONDUIT	3.0	-3.0014	0.0130
MS06	Ex-Spill	OF-Ex-Maj	CONDUIT	15.0	15.7242	0.0130
MS07	0+141	DCB-3/4	CONDUIT	13.1	0.9924	0.0160
MS08	0+175	0+141	CONDUIT	71.9	2.5043	0.0160
OGS-EXMH104	OGS	EX-MH104	CONDUIT	3.9	1.0257	0.0130
Swale1	Sw1	Sw2	CONDUIT	64.8	1.0031	0.0350
Swale2	Sw2	Sw3	CONDUIT	58.5	2.4794	0.0350
Swale3	Sw3	Sw4	CONDUIT	23.2	3.0618	0.0350
Swale4	Sw4	OF-ExDR	CONDUIT	38.1	1.2074	0.0350
Tank-OUT	TANK	BioSwaleEast	TYPE2 PUMP			
O-CB5	CB5	MH202	ORIFICE			
O-CB6	CB6	MH200	ORIFICE			
O-CB-E	EX-CB-E/F	EX-MH103	ORIFICE			
O-CB-F	EX-CB-E/F	EX-MH103	ORIFICE			
O-DCB3/4	DCB-3/4-Dummy	MH200	ORIFICE			
O-EXMH201	EX-MH201	EX-OGS	ORIFICE			
DCB-3/4-Spill	DCB-3/4-Dummy	DCB-3/4	WEIR			
Maj-EastBio	BioSwaleEast	OF-Creek	WEIR			
Maj-WestBio	BioSwaleWest	OF-Wetland	WEIR			
Roof-Spill	Roof	Sw2	WEIR			
Tank-Spill	TANK	BioSwaleEast	WEIR			
DCB-3/4-Grate	DCB-3/4	DCB-3/4-Dummy	OUTLET			
EastInfil	BioSwaleEast	OF-InfilEast	OUTLET			
O-A4	EX-CB(A4)	EX-MH102	OUTLET			
O-A5	Roof	Sw2	OUTLET			
O-CB-A	EX-CB-A/B	EX-MH102	OUTLET			
O-CB-B	EX-CB-A/B	EX-MH102	OUTLET			
O-CB-C	EX-CB-C/D	EX-MH102	OUTLET			
O-CB-D	EX-CB-C/D	EX-MH102	OUTLET			
O-EXCB9	EX-CB9	EX-MH102	OUTLET			
O-EXCBMH7	EX-CBMH7	EX-OGS	OUTLET			
WestInfil	BioSwaleWest	OF-InfilWest	OUTLET			

```
*********************
Cross Section Summary
*********************
                                         Full     Full     Hyd.     Max.   No. of     Full
Conduit            Shape                Depth     Area     Rad.    Width  Barrels     Flow
---------------------------------------------------------------------------------------
DCB3/4-STORE       CIRCULAR              0.30     0.07     0.07     0.30        1    95.52
EastSubdrain       CIRCULAR              0.25     0.05     0.06     0.25        1    44.02
EXCB5-EXCBMH6      CIRCULAR              0.30     0.07     0.07     0.30        1    62.42
EXCB8-EXCBMH7      CIRCULAR              0.45     0.16     0.11     0.45        1   285.13
EXCBMH6-EXMH200    CIRCULAR              0.38     0.11     0.09     0.38        1    91.29
EXMH104-EXMH23     CIRCULAR              0.30     0.07     0.07     0.30        1   100.03
EXMH200-EXMH201    HORIZ_ELLIPSE         1.22     1.89     0.37     1.92        1  2383.13
EXMH23-HW          CIRCULAR              0.45     0.16     0.11     0.45        1   286.64
EXMH50-EXMH23      CIRCULAR              0.38     0.11     0.09     0.38        1   179.42
EXMH51-EXMH50      CIRCULAR              0.30     0.07     0.07     0.30        1   148.85
EXOGS-EXMH23       CIRCULAR              0.38     0.11     0.09     0.38        1    90.55
LD1-CB5            CIRCULAR              0.30     0.07     0.07     0.30        1    67.48
LD2-CB6            CIRCULAR              0.30     0.07     0.07     0.30        1    69.35
MH200-OGS          CIRCULAR              0.30     0.07     0.07     0.30        1    67.14
MH202-MH200        CIRCULAR              0.30     0.07     0.07     0.30        1    96.88
MS01               20mROW-8.5mRoad       0.27     2.37     0.13    20.00        1  5291.82
MS02               20mROW-8.5mRoad       0.27     2.37     0.13    20.00        1  2700.99
MS03               20mROW-8.5mRoad       0.27     2.37     0.13    20.00        1  3255.15
MS04               20mROW-8.5mRoad       0.27     2.37     0.13    20.00        1  2579.08
MS05               TRAPEZOIDAL           0.30     0.27     0.14     1.80        1   980.80
MS06               TRAPEZOIDAL           0.30     0.27     0.14     1.80        1  2244.95
MS07               20mROW-8.5mRoad       0.27     2.37     0.13    20.00        1  3703.46
MS08               20mROW-8.5mRoad       0.27     2.37     0.13    20.00        1  5883.03
OGS-EXMH104        CIRCULAR              0.30     0.07     0.07     0.30        1    97.94
Swale1             TRAPEZOIDAL           0.15     0.06     0.07     0.84        1    30.81
Swale2             TRAPEZOIDAL           0.15     0.06     0.07     0.84        1    48.43
Swale3             TRAPEZOIDAL           0.15     0.06     0.07     0.84        1    53.82
Swale4             TRAPEZOIDAL           0.15     0.06     0.07     0.84        1    33.80


**************
Street Summary
**************

Street 20mROW-8.5mRoad
```

```
Area:
            0.0004     0.0016     0.0036     0.0063     0.0099
            0.0142     0.0193     0.0253     0.0320     0.0395
            0.0478     0.0568     0.0667     0.0774     0.0888
            0.1011     0.1141     0.1279     0.1425     0.1579
            0.1741     0.1911     0.2088     0.2274     0.2464
            0.2654     0.2844     0.3034     0.3226     0.3431
            0.3646     0.3874     0.4114     0.4365     0.4629
            0.4904     0.5191     0.5490     0.5801     0.6123
            0.6458     0.6804     0.7162     0.7532     0.7914
            0.8307     0.8713     0.9130     0.9559     1.0000
Hrad:
            0.0204     0.0408     0.0612     0.0816     0.1020
            0.1224     0.1428     0.1632     0.1836     0.2040
            0.2244     0.2448     0.2652     0.2856     0.3060
            0.3264     0.3468     0.3672     0.3875     0.4079
            0.4283     0.4487     0.4691     0.4895     0.5286
            0.5686     0.6086     0.6485     0.6879     0.7243
            0.7575     0.7877     0.8153     0.8404     0.8633
            0.8843     0.9035     0.9212     0.9374     0.9524
            0.9662     0.9790     0.9910     1.0022     1.0127
            1.0226     1.0319     1.0407     1.0491     1.0000
Width:
            0.0177     0.0353     0.0530     0.0707     0.0883
            0.1060     0.1237     0.1413     0.1590     0.1767
            0.1943     0.2120     0.2297     0.2473     0.2650
            0.2827     0.3003     0.3180     0.3357     0.3533
            0.3710     0.3887     0.4063     0.4240     0.4250
            0.4250     0.4250     0.4250     0.4435     0.4700
            0.4965     0.5230     0.5495     0.5760     0.6025
            0.6290     0.6555     0.6820     0.7085     0.7350
            0.7615     0.7880     0.8145     0.8410     0.8675
            0.8940     0.9205     0.9470     0.9735     1.0000


****************
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 ............ 08/26/2025 00:00:00
Ending Date .............. 08/28/2025 00:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:01:00
Wet Time Step ............ 00:05:00
Dry Time Step ............ 00:05:00
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 ......         0.002         0.581
Total Precipitation ......         0.188        71.667
Evaporation Loss .........         0.000         0.000
Infiltration Loss ........         0.056        21.422
Surface Runoff ...........         0.134        51.030
Final Storage ............         0.002         0.581
Continuity Error (%) .....        -1.087


**************************        Volume        Volume
Flow Routing Continuity        hectare-m      10^6 ltr
**************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......         0.134         1.340
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.001
External Outflow .........         0.133         1.334
Flooding Loss ............         0.000         0.000
Evaporation Loss .........         0.000         0.000
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         0.001         0.014
Final Stored Volume ......         0.003         0.028
Continuity Error (%) .....        -0.592


*************************
Highest Continuity Errors
*************************
Node DCB-3/4 (-1.45%)


***************************
Time-Step Critical Elements
***************************
Link OGS-EXMH104 (2.76%)


********************************
Highest Flow Instability Indexes
********************************
Link O-EXMH201 (6)
Link O-A5 (2)


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


*************************
Routing Time Step Summary
*************************
Minimum Time Step           :     0.50 sec
Average Time Step           :     1.98 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      :    98.64 %
      1.516 -  1.149 sec      :     0.91 %
      1.149 -  0.871 sec      :     0.41 %
      0.871 -  0.660 sec      :     0.02 %
      0.660 -  0.500 sec      :     0.02 %
```

```
  ***************************
  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-1	71.67	0.00	0.00	30.47	22.52	19.88	42.40	0.01	14.08	0.592
A-2	71.67	0.00	0.00	33.61	17.42	21.97	39.40	0.01	15.00	0.550
A-3	71.67	0.00	0.00	22.05	35.86	14.97	50.83	0.04	33.93	0.709
A-4	71.67	0.00	0.00	15.07	47.13	10.54	57.67	0.05	40.22	0.805
B-1	71.67	0.00	0.00	0.00	72.08	0.00	72.08	0.14	98.68	1.006
B-2	71.67	0.00	0.00	30.16	23.60	18.75	42.35	0.02	13.13	0.591
B-3	71.67	0.00	0.00	41.30	5.09	26.85	31.94	0.03	29.26	0.446
B-4	71.67	0.00	0.00	26.03	29.70	16.97	46.67	0.10	86.43	0.651
EXT-1	71.67	0.00	0.00	15.73	46.14	10.72	56.86	0.13	106.65	0.793
EXT-2	71.67	0.00	0.00	16.44	45.15	10.87	56.02	0.15	119.49	0.782
EXT-3	71.67	0.00	0.00	35.54	15.35	21.61	36.96	0.07	61.70	0.516
EXT-4	71.67	0.00	0.00	19.10	40.99	12.32	53.32	0.18	146.81	0.744
W-1	71.67	0.00	0.00	4.44	65.03	2.90	67.93	0.09	62.52	0.948
W-2	71.67	0.00	0.00	4.37	64.68	3.23	67.91	0.03	19.55	0.948
W-3	71.67	0.00	0.00	31.92	20.51	20.25	40.77	0.01	11.24	0.569
W-4	71.67	0.00	0.00	35.09	16.43	20.88	37.31	0.02	18.39	0.521
W-5	71.67	0.00	0.00	0.00	72.15	0.00	72.15	0.16	109.05	1.007
W-6	71.67	0.00	0.00	41.30	5.09	26.83	31.92	0.02	21.89	0.445
W-7	71.67	0.00	0.00	45.10	5.09	21.81	26.90	0.08	42.36	0.375

```
  ******************
  Node Depth Summary
  ******************
```

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days	Time of Max Occurrence hr:min	Reported Max Depth Meters
0+141	JUNCTION	0.00	0.00	117.81	0	00:00	0.00
0+175	JUNCTION	0.00	0.00	119.61	0	00:00	0.00
CB5	JUNCTION	0.01	0.48	117.83	0	01:12	0.48
CB6	JUNCTION	0.01	0.80	116.65	0	01:11	0.80
DCB-3/4	JUNCTION	0.00	0.03	117.71	0	01:10	0.03
DCB-3/4-Dummy	JUNCTION	0.04	1.55	116.70	0	01:21	1.55
EX-CB-A/B	JUNCTION	0.00	0.07	118.07	0	01:10	0.07
EX-CB-C/D	JUNCTION	0.00	0.08	117.72	0	01:10	0.08
EX-CB-E/F	JUNCTION	0.26	1.53	117.64	0	01:12	1.53
Ex-Maj1	JUNCTION	0.00	0.00	119.57	0	00:00	0.00
Ex-Spill	JUNCTION	0.00	0.11	117.61	0	01:12	0.11

LD1	JUNCTION	0.00	0.18	117.83	0	01:12	0.18
LD2	JUNCTION	0.00	0.00	116.78	0	00:00	0.00
Sw1	JUNCTION	0.00	0.00	117.65	0	00:00	0.00
Sw2	JUNCTION	0.02	0.12	117.12	0	01:10	0.12
Sw3	JUNCTION	0.02	0.11	115.66	0	01:11	0.11
Sw4	JUNCTION	0.02	0.14	114.98	0	01:12	0.14
HW	OUTFALL	0.45	0.45	114.70	0	00:00	0.45
OF-Creek	OUTFALL	0.00	0.00	115.00	0	00:00	0.00
OF-EastSubdrain	OUTFALL	0.01	0.20	115.11	0	01:11	0.20
OF-ExDR	OUTFALL	0.02	0.14	114.52	0	01:12	0.14
OF-Ex-Maj	OUTFALL	0.00	0.11	115.28	0	01:12	0.11
OF-InfilEast	OUTFALL	0.00	0.00	114.95	0	00:00	0.00
OF-InfilWest	OUTFALL	0.00	0.00	114.95	0	00:00	0.00
OF-Wetland	OUTFALL	0.00	0.00	116.00	0	00:00	0.00
BioSwaleEast	STORAGE	0.01	0.23	115.18	0	01:11	0.23
BioSwaleWest	STORAGE	0.97	1.18	116.13	0	03:13	1.18
EX-CB(A4)	STORAGE	0.16	1.67	118.31	0	01:29	1.67
EX-CB5	STORAGE	0.02	0.72	115.42	0	01:22	0.72
EX-CB8	STORAGE	0.02	0.76	116.38	0	01:23	0.75
EX-CB9	STORAGE	0.17	1.79	118.34	0	01:28	1.79
EX-CBMH6	STORAGE	0.07	0.77	115.42	0	01:22	0.77
EX-CBMH7	STORAGE	0.24	1.64	116.38	0	01:23	1.64
EX-MH101	STORAGE	0.00	0.00	116.38	0	00:00	0.00
EX-MH102	STORAGE	0.01	0.29	115.83	0	01:10	0.29
EX-MH103	STORAGE	0.26	0.57	115.01	0	01:11	0.57
EX-MH104	STORAGE	0.00	0.13	115.10	0	01:13	0.13
EX-MH200	STORAGE	0.17	0.87	115.42	0	01:22	0.87
EX-MH201	STORAGE	0.20	0.90	115.42	0	01:22	0.90
EX-OGS	STORAGE	0.22	0.53	115.01	0	01:11	0.53
MC-7200	STORAGE	0.04	1.46	116.70	0	01:21	1.46
MH200	STORAGE	0.01	0.17	115.28	0	01:12	0.17
MH202	STORAGE	0.00	0.06	115.78	0	01:13	0.06
OGS	STORAGE	0.01	0.14	115.18	0	01:12	0.14
Roof	STORAGE	0.02	0.14	120.14	0	02:03	0.14
TANK	STORAGE	0.02	1.18	116.18	0	01:19	1.18

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Node Inflow Summary
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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
0+141	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 ltr
0+175	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 ltr
CB5	JUNCTION	14.08	14.08	0	01:10	0.0148	0.0155	-0.079
CB6	JUNCTION	15.00	15.00	0	01:10	0.015	0.015	-0.003
DCB-3/4	JUNCTION	74.15	74.15	0	01:10	0.0882	0.0882	-1.430
DCB-3/4-Dummy	JUNCTION	0.00	63.99	0	01:10	0	0.112	-0.000
EX-CB-A/B	JUNCTION	146.81	146.81	0	01:10	0.181	0.181	-0.034
EX-CB-C/D	JUNCTION	119.49	203.68	0	01:10	0.148	0.214	-0.438
EX-CB-E/F	JUNCTION	106.65	255.62	0	01:10	0.131	0.237	0.907
Ex-Maj1	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 ltr
Ex-Spill	JUNCTION	0.00	136.89	0	01:12	0	0.0772	0.006
LD1	JUNCTION	0.00	2.95	0	01:09	0	0.000643	1.581
LD2	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 ltr
Sw1	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 ltr
Sw2	JUNCTION	21.89	28.19	0	01:10	0.0191	0.183	0.477
Sw3	JUNCTION	0.00	26.68	0	01:10	0	0.182	0.020
Sw4	JUNCTION	0.00	26.15	0	01:11	0	0.182	0.012
HW	OUTFALL	0.00	265.77	0	01:11	0	0.724	0.000
OF-Creek	OUTFALL	0.00	0.00	0	00:00	0	0	0.000 ltr
OF-EastSubdrain	OUTFALL	0.00	58.72	0	01:11	0	0.181	0.000
OF-ExDR	OUTFALL	42.36	64.85	0	01:11	0.0807	0.263	0.000
OF-Ex-Maj	OUTFALL	0.00	136.90	0	01:12	0	0.0772	0.000
OF-InfilEast	OUTFALL	0.00	0.20	0	00:10	0	0.00322	0.000
OF-InfilWest	OUTFALL	0.00	0.50	0	00:11	0	0.0861	0.000
OF-Wetland	OUTFALL	0.00	0.00	0	00:00	0	0	0.000 ltr
BioSwaleEast	STORAGE	29.26	64.26	0	01:10	0.0255	0.184	-0.011
BioSwaleWest	STORAGE	86.43	86.43	0	01:10	0.097	0.097	-2.948
EX-CB(A4)	STORAGE	18.39	18.39	0	01:10	0.0224	0.0224	0.008
EX-CB5	STORAGE	0.00	1.33	0	01:03	0	0.000977	0.111
EX-CB8	STORAGE	0.00	14.39	0	01:05	0	0.00555	0.136
EX-CB9	STORAGE	11.24	11.24	0	01:10	0.0122	0.0123	0.016
EX-CBMH6	STORAGE	0.00	7.45	0	01:04	0	0.00653	0.013
EX-CBMH7	STORAGE	19.55	19.55	0	01:10	0.0272	0.0329	-0.020
EX-MH101	STORAGE	0.00	0.00	0	00:00	0	0	0.000 ltr
EX-MH102	STORAGE	61.70	169.74	0	01:10	0.0709	0.338	0.015

EX-MH103	STORAGE	0.00	266.60	0	01:11	0	0.724	-0.022
EX-MH104	STORAGE	0.00	39.10	0	01:12	0	0.112	-0.002
EX-MH200	STORAGE	0.00	31.68	0	01:09	0	0.0311	0.056
EX-MH201	STORAGE	62.52	62.52	0	01:10	0.0883	0.114	-0.041
EX-OGS	STORAGE	0.00	20.66	0	01:26	0	0.116	0.024
MC-7200	STORAGE	0.00	46.50	0	01:10	0	0.03	0.017
MH200	STORAGE	0.00	39.18	0	01:12	0	0.112	0.015
MH202	STORAGE	0.00	9.78	0	01:12	0	0.0148	-0.117
OGS	STORAGE	0.00	39.10	0	01:12	0	0.112	0.000
Roof	STORAGE	109.05	109.05	0	01:10	0.159	0.159	-3.000
TANK	STORAGE	111.82	111.82	0	01:10	0.159	0.159	-0.015

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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
CB5	JUNCTION	0.03	0.013	2.267

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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
BioSwaleEast	0.000	0.3	0.0	0.0	0.011	9.3	0 01:11	58.92
BioSwaleWest	0.054	46.7	0.0	0.0	0.094	81.1	0 03:13	0.50
EX-CB(A4)	0.000	0.4	0.0	0.0	0.009	13.5	0 01:29	4.05
EX-CB5	0.000	1.1	0.0	0.0	0.000	41.1	0 01:22	0.25
EX-CB8	0.000	0.5	0.0	0.0	0.000	21.2	0 01:23	3.15
EX-CB9	0.000	0.1	0.0	0.0	0.005	4.1	0 01:28	1.84
EX-CBMH6	0.000	3.5	0.0	0.0	0.001	38.5	0 01:22	1.33
EX-CBMH7	0.000	6.2	0.0	0.0	0.002	41.3	0 01:23	17.27
EX-MH101	0.000	0.0	0.0	0.0	0.000	0.0	0 00:00	0.00
EX-MH102	0.000	0.3	0.0	0.0	0.000	10.7	0 01:10	166.19
EX-MH103	0.000	8.5	0.0	0.0	0.001	18.2	0 01:11	265.77
EX-MH104	0.000	0.2	0.0	0.0	0.000	4.8	0 01:13	39.08
EX-MH200	0.001	5.2	0.0	0.0	0.005	26.5	0 01:22	7.45
EX-MH201	0.001	6.1	0.0	0.0	0.005	27.4	0 01:22	41.57
EX-OGS	0.000	7.5	0.0	0.0	0.001	17.8	0 01:11	21.50
MC-7200	0.001	1.8	0.0	0.0	0.030	92.7	0 01:21	11.18
MH200	0.000	0.2	0.0	0.0	0.000	6.0	0 01:12	39.10
MH202	0.000	0.1	0.0	0.0	0.000	1.7	0 01:13	9.74
OGS	0.000	0.2	0.0	0.0	0.000	5.2	0 01:12	39.10
Roof	0.009	8.2	0.0	0.0	0.102	93.0	0 02:03	6.30
TANK	0.001	1.6	0.0	0.0	0.044	98.4	0 01:19	35.00

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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
HW	11.36	48.85	265.77	0.724
OF-Creek	0.00	0.00	0.00	0.000
OF-EastSubdrain	8.88	15.58	58.72	0.181
OF-ExDR	28.82	6.28	64.85	0.263
OF-Ex-Maj	1.49	51.53	136.90	0.077
OF-InfilEast	10.33	0.20	0.20	0.003
OF-InfilWest	99.64	0.50	0.50	0.086
OF-Wetland	0.00	0.00	0.00	0.000

System	20.07	122.94	523.50	1.334

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Street Flow Summary
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Street Conduit	Peak Flow LPS	Maximum Spread m	Maximum Depth m	Inlet Design	Inlet Location	Inlet	Peak Flow Capture Pcnt	Avg. Flow Capture Pcnt	Bypass Flow Freq Pcnt	Back Flow Freq Pcnt	Peak Capture / Inlet LPS	Peak Bypass Flow LPS
MS01	0.000	1.212	0.036									
MS02	85.945	2.582	0.077									
MS03	143.913	4.250	0.155									
MS04	8.992	4.245	0.130									
MS07	0.000	0.529	0.016									
MS08	0.000	0.176	0.000									

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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
DCB3/4-STORE	CONDUIT	46.50	0 01:10	0.66	0.49	1.00
EastSubdrain	CONDUIT	58.72	0 01:11	1.31	1.33	0.85
EXCB5-EXCBMH6	CONDUIT	1.33	0 01:03	0.03	0.02	1.00
EXCB8-EXCBMH7	CONDUIT	14.39	0 01:05	0.16	0.05	1.00
EXCBMH6-EXMH200	CONDUIT	7.45	0 01:04	0.08	0.08	1.00
EXMH104-EXMH23	CONDUIT	39.08	0 01:13	0.72	0.39	0.72
EXMH200-EXMH201	CONDUIT	31.68	0 01:09	0.07	0.01	0.72
EXMH23-HW	CONDUIT	265.77	0 01:11	1.67	0.93	1.00
EXMH50-EXMH23	CONDUIT	166.19	0 01:10	1.60	0.93	0.89
EXMH51-EXMH50	CONDUIT	0.00	0 00:00	0.00	0.00	0.44
EXOGS-EXMH23	CONDUIT	21.50	0 01:39	0.26	0.24	1.00
LD1-CB5	CONDUIT	2.95	0 01:09	0.20	0.04	0.80
LD2-CB6	CONDUIT	0.00	0 00:00	0.00	0.00	0.09
MH200-OGS	CONDUIT	39.10	0 01:12	1.02	0.58	0.53
MH202-MH200	CONDUIT	9.74	0 01:13	0.48	0.10	0.33
MS01	CONDUIT	0.00	0 00:00	0.00	0.00	0.14
MS02	CONDUIT	85.95	0 01:10	0.43	0.03	0.29
MS03	CONDUIT	143.91	0 01:10	0.39	0.04	0.59
MS04	CONDUIT	8.99	0 01:10	0.20	0.00	0.49
MS05	CONDUIT	136.89	0 01:12	1.60	0.14	0.56
MS06	CONDUIT	136.90	0 01:12	4.12	0.06	0.35
MS07	CONDUIT	0.00	0 00:00	0.00	0.00	0.06
MS08	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OGS-EXMH104	CONDUIT	39.10	0 01:12	1.25	0.40	0.46
Swale1	CONDUIT	0.00	0 00:00	0.00	0.00	0.41
Swale2	CONDUIT	26.68	0 01:10	0.69	0.55	0.79
Swale3	CONDUIT	26.15	0 01:11	0.61	0.49	0.83
Swale4	CONDUIT	25.71	0 01:12	0.50	0.76	0.90
Tank-OUT	PUMP	35.00	0 01:00		1.00	
O-CB5	ORIFICE	9.78	0 01:12			1.00
O-CB6	ORIFICE	12.83	0 01:11			1.00
O-CB-E	ORIFICE	24.87	0 01:12			1.00
O-CB-F	ORIFICE	24.87	0 01:12			1.00
O-DCB3/4	ORIFICE	17.76	0 01:23			1.00
O-EXMH201	ORIFICE	16.82	0 01:27			1.00
DCB-3/4-Spill	WEIR	10.42	0 01:10			0.03
Maj-EastBio	WEIR	0.00	0 00:00			0.00
Maj-WestBio	WEIR	0.00	0 00:00			0.00
Roof-Spill	WEIR	0.00	0 00:00			0.00
Tank-Spill	WEIR	0.00	0 00:00			0.00
DCB-3/4-Grate	DUMMY	53.57	0 01:10			
EastInfil	DUMMY	0.20	0 00:10			
O-A4	DUMMY	4.05	0 01:29			
O-A5	DUMMY	6.30	0 00:14			
O-CB-A	DUMMY	25.60	0 01:04			
O-CB-B	DUMMY	25.60	0 01:04			

O-CB-C	DUMMY	25.60	0	01:04
O-CB-D	DUMMY	25.60	0	01:04
O-EXCB9	DUMMY	1.84	0	01:28
O-EXCBMH7	DUMMY	3.87	0	01:23
WestInfil	DUMMY	0.50	0	00:11

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Flow Classification Summary
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Conduit	Adjusted /Actual Length	Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
		Fraction of Time in Flow Class								
DCB3/4-STORE	1.00	0.00	0.01	0.00	0.05	0.00	0.00	0.95	0.96	0.00
EastSubdrain	1.00	0.90	0.00	0.00	0.09	0.01	0.00	0.00	0.00	0.00
EXCB5-EXCBMH6	1.00	0.00	0.09	0.00	0.91	0.00	0.00	0.00	0.83	0.00
EXCB8-EXCBMH7	1.00	0.00	0.00	0.00	0.05	0.00	0.00	0.95	0.95	0.00
EXCBMH6-EXMH200	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
EXMH104-EXMH23	1.00	0.00	0.79	0.00	0.21	0.00	0.00	0.00	1.00	0.00
EXMH200-EXMH201	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
EXMH23-HW	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
EXMH50-EXMH23	1.00	0.00	0.63	0.00	0.37	0.00	0.00	0.00	1.00	0.00
EXMH51-EXMH50	1.00	0.94	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EXOGS-EXMH23	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
LD1-CB5	1.00	0.00	0.00	0.00	0.01	0.00	0.00	0.99	0.00	0.00
LD2-CB6	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH200-OGS	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
MH202-MH200	1.00	0.00	0.00	0.00	0.04	0.00	0.00	0.96	0.04	0.00
MS01	1.00	0.89	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS02	1.00	0.87	0.02	0.00	0.11	0.00	0.00	0.00	0.05	0.00
MS03	1.00	0.89	0.00	0.00	0.01	0.00	0.00	0.09	0.01	0.00
MS04	1.00	0.92	0.00	0.00	0.01	0.00	0.00	0.07	0.01	0.00
MS05	1.00	0.00	0.00	0.00	0.01	0.00	0.00	0.99	0.97	0.00
MS06	1.00	0.00	0.00	0.00	0.99	0.01	0.00	0.00	0.00	0.00
MS07	1.00	0.92	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS08	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OGS-EXMH104	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
Swale1	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Swale2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.38	0.00
Swale3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.99	0.00
Swale4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.34	0.00

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Conduit Surcharge Summary
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Conduit	Hours Full: Both Ends	Hours Full: Upstream	Hours Full: Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
DCB3/4-STORE	1.21	1.21	1.25	0.01	0.01
EastSubdrain	0.01	0.01	0.01	0.28	0.01
EXCB5-EXCBMH6	1.03	1.03	1.12	0.01	0.01
EXCB8-EXCBMH7	0.65	0.65	1.43	0.01	0.01
EXCBMH6-EXMH200	0.98	0.98	1.18	0.01	0.01
EXMH104-EXMH23	0.01	0.01	0.34	0.01	0.01
EXMH23-HW	0.23	0.23	48.00	0.01	0.23
EXMH50-EXMH23	0.01	0.01	0.29	0.01	0.01
EXOGS-EXMH23	0.28	0.28	0.33	0.01	0.01
LD1-CB5	0.01	0.01	0.03	0.01	0.01

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Pumping Summary
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Pump	Percent Utilized	Number of Start-Ups	Min Flow LPS	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr	Power Usage Kw-hr	% Time Off Pump Curve Low	% Time Off Pump Curve High
Tank-OUT	8.43	1	0.00	12.75	35.00	0.159	0.19	0.0	0.0

Analysis begun on: Mon Nov 17 16:23:04 2025
Analysis ended on: Mon Nov 17 16:23:07 2025
Total elapsed time: 00:00:03

APPENDIX F
Drawings