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37 Wildpine Court

Ottawa, Ontario

Servicing and Stormwater Management Report

August 27, 2026

37 WILDPINE COURT
OTTAWA, ONTARIO
SERVICING AND STORMWATER MANAGEMENT REPORT

Prepared By:

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February 20, 2026
Revised: August 27, 2026

Novatech File: 125077
Ref: R-2025-79

August 27, 2026

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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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).

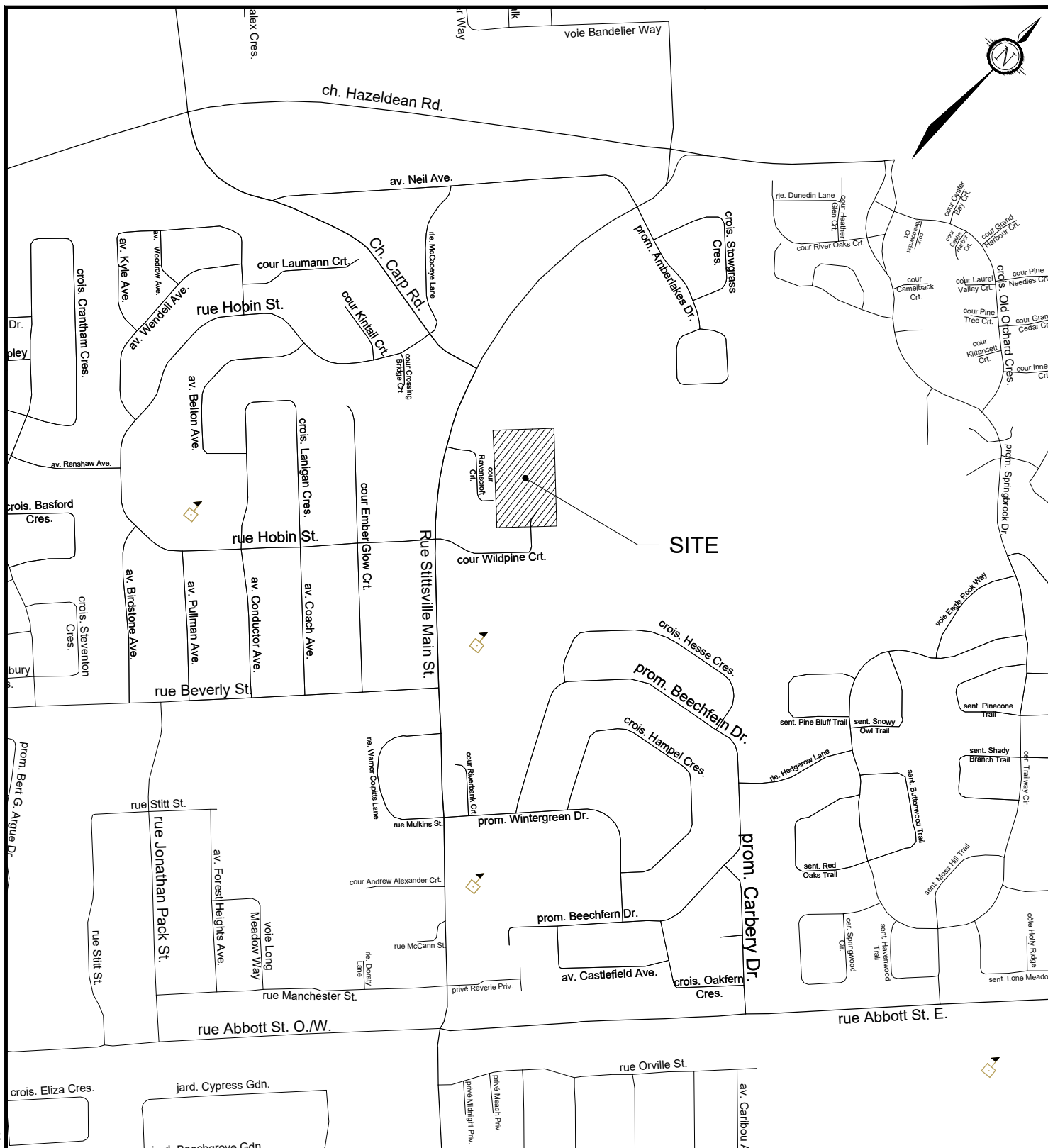
The detailed design for the proposed development is based on the preliminary design works completed in the above noted J.L. Richards report.

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
JUNE 2025

JOB
125077

FIGURE
KP-1

37 WILDPINE COURT

DEVELOPMENT LIMIT

WILDPINE CRT

WILDPINE CRT

RAVENSCROFT CRT

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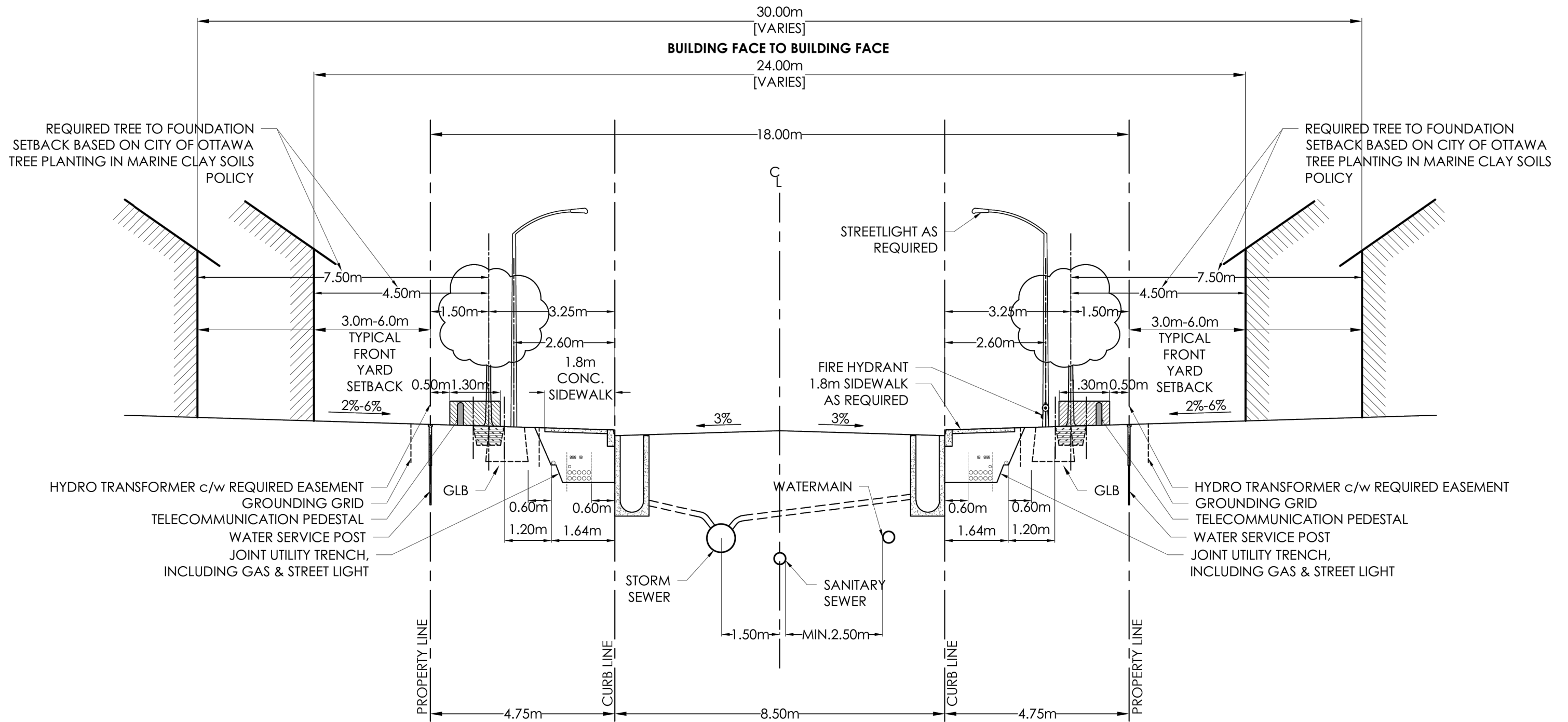
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CITY OF OTTAWA
37 WILDPINE COURT

EXISTING CONDITIONS
PLAN

SCALE 1 : 1000

DATE AUG 2025 JOB 125077 FIGURE FIG-2



NOTE:

TREE SETBACKS ARE TO FOLLOW THE RECOMMENDATIONS IN THE GEOTECHNICAL REPORT

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CITY OF OTTAWA
37 WILDPINE COURT

ROW CROSS-SECTION

SCALE

N.T.S

DATE

AUG 2026

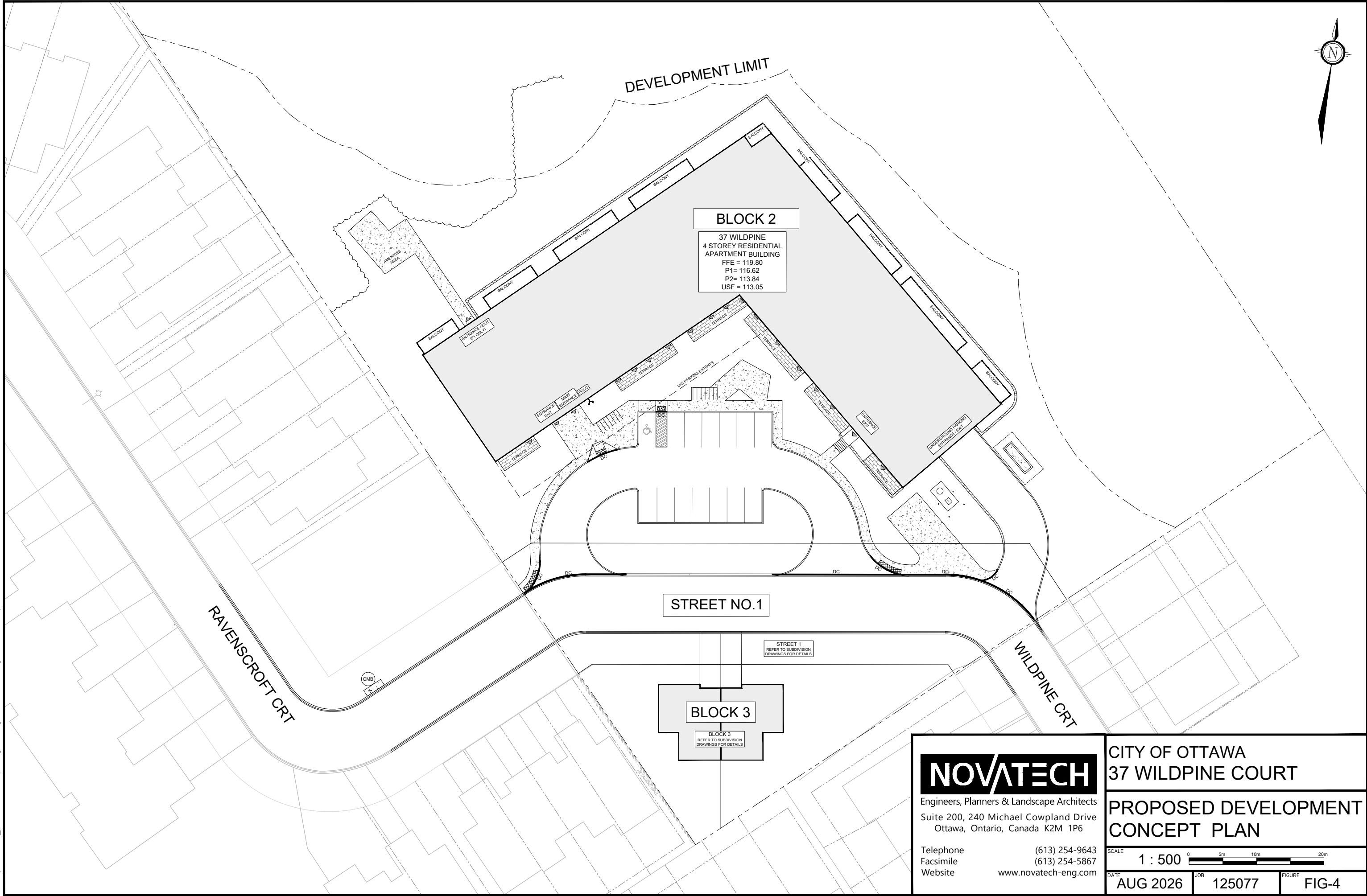
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FIGURE

FIG-3

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- 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 watermain 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 watermain 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. 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)
Block 2	1 Bed	2 Bed	155	0.50	1.26	2.77	133
	60	34					
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 June 12th, 2026. 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 Ravenscroft Court	
Maximum HGL	159.5
Peak Hour	155.4
Max Day + Fire Flow HGL	154.8
Connection 2 to Existing 300mm Watermain in Wildpine Court	
Maximum HGL	159.5
Peak Hour	155.3
Max Day + Fire Flow HGL	154.4

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 (HYD3)
Max Day + Fire Flow	201.32	20psi (Min)	53.07 (HYD4)
Peak Hour	2.87	40psi (Min)	53.49 (HYD3)

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 average day conditions, 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.

6.4 Age Analysis

A water quality age analysis was done in relation to the 37 Wildpine Court development. The analysis evaluates the water age in the proposed watermain system for the subject development. The City of Ottawa Water Design Guidelines (July 2010) provides the following criteria for analyzing age in watermain:

- The total travel time of 5 days or less during basic daily demands is reasonable.
- A residence time of 8 days should not be exceeded.

For further age analysis data, the City of Ottawa Infrastructure Master Plan shows the spatial distribution of average water age in 2018 and 2046. It was observed that water age in most pressure zones is generally under 5 days. The 37 Wildpine Court development is located within the City of Ottawa ME water distribution pressure zone. Based on the City of Ottawa Infrastructure Master Plan the average travel time in the ME pressure zone is currently approximately 4 days. In the future, the 2046 model forecast the travel time in the ME pressure zone is reduced to approximately 2 days.

The water demands for the analysis were calculated using City Ottawa Water Design Guidelines (July 2010). The basic demand was calculated based on a demand of 200L/day multiplied by the building population. The basic demand was determined to be 0.37L/s.

The EPANET hydraulic water model generated for the 37 Wildpine Court development watermain design was used to complete the age analysis. The water quality was analyzed for a period of 8 days using the basic day demand. Graphs of Block 2 and 3 connections can be found in **Appendix B** which outlines the water age trend for the two connections in the hydraulic model. Both connections do not exceed 12 hours in age through the 8 day period.

In conclusion, based on the hydraulic modelling water age within the watermain does not exceed the maximum allowable criteria outlined in the City of Ottawa Water Design Guidelines (July 2010). The results indicate that no additional structure is required to effectively manage water retention and maintain acceptable water quality conditions. We trust that the watermain satisfies the City of Ottawa condition ME for the 37 Wildpine Court development.

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 2.05 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

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.

CLI ECA Requirements:

- Water Balance
 - Meet subwatershed requirements or match post-development recharge to pre-development levels.
- Water Quality
 - Control the 90th percentile storm event and if conventional methods are necessary, then enhanced, normal, or basic levels of protection (80%, 70%, or 60% respectively) for suspended solids removal.
 - Must use the ETV particle size distribution for manufactured treatment devices.
 - For retrofit scenarios, improve the level of water quality control currently provided on site.
- Erosion Control (Watershed)
 - As per erosion assessment completed in watershed/sub watershed plan, Master Stormwater Management Plan, Master Environmental Servicing Plan, Drainage Plan, Class EA, local site study, geomorphologic study, or erosion analysis; or
 - As per the Detailed Design Approach or Simplified Design Approach methods described in the *Stormwater Management Planning and Design Manual* (MOE, 2003).
- Water Quantity
 - As per municipal standards
- Flood Control (Watershed Hydrology)
 - Manage peak flow control as per watershed/sub watershed plans, municipal criteria being a minimum 100 year return storm, municipal guidelines and standards.
- Construction Erosion and Sediment Control'
 - Manage construction erosion and sediment control through development and implementation of an erosion and sediment control (ESC) plan.

9.2 Existing Off-Site Storm Infrastructure – Wildpine Court

The storm infrastructure servicing Wildpine Court includes existing 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 Existing Off-Site Storm Infrastructure – Ravenscroft Court

The existing storm sewer servicing Ravenscroft Court ranges from 300mm to 375mm in diameter and outlets to Stittsville Main Street. A field investigation was conducted and there were no ICDs found in the road catchbasins. The grates were based on the *Goulbourn Engineering Standards* (May 1999) detail S-18. The catchbasin lid in the middle of the cul-de-sac (EX-CB1) has a modified grate with only 8 small openings. It is assumed that this lid serves as an inlet control to the storm system. Refer to **Appendix E** for information on the catchbasin lids.

The existing major system outlet is at the cul-de-sac and was designed to spill offsite to the wetland area. As part of the proposed development, the existing cul-de-sac will be altered so that Ravenscroft Court will connect to Wildpine Court via Street 1, and the major system will need to be redesigned accordingly.

9.4 Stormwater Management Design

9.4.1 Stormwater Quality Control

Subdivision (OGS Unit)

An OGS unit is proposed in the road extension upstream of the outlet to the existing Wildpine storm sewer. A Stormceptor EFO4 water quality treatment unit has been sized using the ETV particle size distribution to provide long term TSS removal for the road drainage and rear yards (flows from CBs 3, 4, 5, and 6). Based on the upstream drainage area of 0.23 ha with 50.3% imperviousness, the Stormceptor EFO4 will provide 65% 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 (Bioretention Swales)

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

The west bioretention 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 due to poor soils (infiltration rates below 15 mm/hr). 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. The west bioswale will treat mostly by infiltration while the east bioswale will treat by filtration through the sand filter layer. 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.

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)	0.243	0.287
% Imperviousness	46.9%	72.3%
Required Storage Volume for 80 % TSS Removal (m ³ /ha)	28.0	35.8
Required Volume (m ³)	6.8	10.3
Clearstone Volume Provided (m ³)	18.0	18.3
Surface Storage Volume Provided (m ³)	96.6	97.3
Sand Filter Flow Rate (L/s)	1.6	1.7
Infiltration Rate (mm/hr)	14	30
Infiltration with Clogging Factor (mm/hr)	7	15
Drawdown Time for Clearstone (hours)	0.5 ⁽¹⁾	10.7
Drawdown Time at Surface (hours)	19.0 ⁽²⁾	66.7
Drawdown Time at Max. Storage (hours)	19.5 ⁽¹⁾⁽²⁾	77.3

⁽¹⁾ Drawdown Times account for subdrain outflows

⁽²⁾ Drawdown Times account for sand filter flow rate

9.4.2 Quantity Control

Subdivision

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

- LMF 73 ICDs are proposed to be installed on both rear yard pipes.
- The road catchbasins (CB 3 and 4) will have LMF 95 ICDs on both catchbasins to maximize ponding in the 100-year to limit inflows to the Wildpine Sewer to prevent HGL issues. These ICDs are size to inlet the 2-year flow with no ponding.
- Quantity control storage will be provided with surface storage in the road sag.

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

Storm runoff from the roof will outlet to an super pipe along the building adjacent to the bioswales. This super pipe will drain to the west bioretention swale via a 120mm diameter ICD. The west pervious area of the site will be captured by the west bioretention cell.

Storm runoff from the parking lot and underground parking entrance will be captured by the on-site storm sewer system and outlet to the east bioretention sale. The east pervious area will also outlet to the east bioretention swale.

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

9.5 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 inlet control devices (ICDs).
- Calculate the 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

Design storms used in the analysis 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

9.5.1 Pre-Development Conditions

Model Parameters

Pre-development drainage areas are shown on the Pre-Development Drainage Area Plan (drawing **125077-XSWM**):

- The proposed development area has been divided into two subcatchments based on the two drainage outlets (wetland and Poole Creek).
- Off-site subcatchments were delineated based on the contributing drainage area to each of the road catchbasins.
- The 10 Wildpine Court subcatchments were taken from the *10 Wildpine Servicing and Stormwater Management Report* (Novatech, February 2017).

Pre-development model parameters are summarized in **Table 9.3**. The Pre-Development Drainage Area Plan (drawing **125077-XSWM**), 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%	50%	48	46	3.5%
A-2	0.556	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%
R-1	0.280	0.30	14.3%	100%	34	83	2.0%
R-2	0.380	0.63	61.4%	40%	23	165	2.0%
R-3	0.420	0.63	61.4%	40%	27	153	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: 3.707

9.5.2 Post-Development Conditions

Model Parameters

Post-Development catchment areas are shown on Post-Development Drainage Area Plan (Drawing **125077-SWM**).

- The site has been divided into subcatchments based on the drainage areas tributary to each stormwater control (i.e., rear yard ICD, road ICD, pipe storage, 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.

The post-development model parameters are summarized in **Table 9.4**. The Post-Development Drainage Area Plan (Drawing **125077-SWM**), 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 (%)
Subdivision 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	0.079	0.70	71.4%	0%	10	82	2.0%
Site Plan Areas							
B-1	0.200	0.90	100.0%	100%	20	100	0.5%
B-2	0.165	0.66	65.7%	0%	22	75	2.0%
B-3	0.078	0.25	7.1%	0%	9	83	2.0%
B-4	0.087	0.26	8.6%	0%	8	103	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%
R-1	0.280	0.30	14.3%	100%	34	83	2.0%
R-2	0.380	0.63	61.4%	40%	23	165	2.0%
R-3	0.420	0.63	61.4%	40%	27	153	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: 3.706

9.5.3 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. Due to modifications of the Ravenscroft cul-de-sac to connect to the proposed street, the existing catchbasins within the cul-de-sac will be removed and replaced with new catchbasins fitted with ICDs to match the inlet rates of the existing grates. **Appendix E** provides photographs of the existing grates. 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

Orifice Name	Catchbasin ID	ICD Size & Inlet Rate				2-yr Approach Flow*
		Diameter	Max Head	Calculated 2-yr Capture Rate	2-yr Capture Rate**	
		(mm)	(m)	(L/s)	(L/s)	(L/s)
O-CB5	CB5	LMF73	1.72	7.1	2.3	2.4
O-CB6	CB6	LMF73	1.72	7.1	2.0	2.1
O-CB3	CB-3/4	LMF95	1.47	10.0	9.9	20.7
O-CB4	CB-3/4	LMF95	1.47	10.0	9.9	
Existing - Ravenscroft						
O-CB1	CB1/2	127	1.14	37.1	23.0	55.6
O-CB2	CB1/2	152	1.12	52.8	32.5	

Hydraulic Grade Line

The PCSWMM model was used to simulate the 100-year HGL elevations in the subdivision storm sewer and the receiving Wildpine storm sewer system. 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 proposed 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 9.6**.

Table 9.6: Comparison of HGLs on Wildpine Sewer (100yr Event)

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 (+0.00)	116.38 (+0.00)
EX-MH102	115.54	115.92	115.92	115.94	116.06 (+0.12)	115.83 (-0.11)
EX-MH103	114.44	114.82 (as 375mm) 114.89 (as 450mm)	114.92	115.18	115.30 (+0.12)	114.99 (-0.17)
EX-MH104	114.97	115.27	N/A	115.19	115.36 (+0.17)	115.09 (-0.10)

It was also confirmed that the proposed ICDs in the modified Ravenscroft cul-de-sac will improve or maintain HGLs in that storm sewer system. A comparison of the changes to the Ravenscroft sewer HGL is provided in **Table 9.7**.

Table 9.7: Comparison of HGLs on Ravenscroft Sewers (100yr Event)

Manhole ID	MH Invert Elevation (m)	Obvert Elevation (m)	100-year HGL (m)		
			Pre-Dev Model	Post-Dev Model	Difference
EX-MH111	117.53	117.91	118.76	118.59	-0.17
EX-MH115	117.56	117.86	118.85	118.63	-0.22
EX-MH121	117.68	117.98	119.16	118.80	-0.36
EX-MH131	117.87	118.17	120.04	120.03	-0.01
EX-MH141	117.97	118.27	120.04	120.03	-0.01
EX-MH151	118.07	118.37	120.05	120.04	-0.01

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	-

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							
CB-1-2	119.53	119.61	0.08	119.68	0.15	Y	0.07
CB-3-4	117.50	117.66	0.16	117.70	0.20	Y	0.04
Rear Yard Catchbasin Manholes							
CB5	119.10	119.30	0.20	118.63	0.00	N	0.00
CB6	117.60	117.90	0.30	117.18	0.00	N	0.00
LD1	118.65	119.10	0.45	118.63	0.00	N	0.00
LD2	118.50	117.60	0.00	117.18	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	Velocity	Max. Static Depth	Total Depth (static + dynamic)	Velocity x Depth	Peak Flow	Velocity	Total Depth	Velocity x Depth
	(m ³ /s)	(m/s)	(m)	(m)	(m ² /s)	(m ³ /s)	(m/s)	(m)	(m ² /s)
Catchbasins On-Grade									
CB1-2	0.183	0.23	0.08	0.15	0.03	0.228	0.29	0.17	0.05
CB-3-4	0.124	0.18	0.16	0.20	0.04	0.197	0.22	0.23	0.05
High Points									
0+141	0.032	0.11	-	0.04	<0.01	0.074	0.15	0.07	0.01
0+175	0.074	0.23	-	0.05	0.01	0.127	0.29	0.06	0.02

Peak Flows

The release rates for the subdivision are presented in **Table 9.11**. In pre-development, the site area that outlets to Poole Creek would sheet flow directly into the creek. In post-development, the site is now routed through the Wildpine sewer which previously did not receive flows from the proposed development; therefore, the modelled peak flows from the subdivision have increased from pre-development due to the increase in area to the Wildpine storm sewer. During all storm events, post-development flows exceed pre-development to the Wildpine outlet. However, **Section 9.5.5** demonstrates that the overall flows from both the site plan and subdivision in the 100-year storm event will be below overall pre-development levels..

Table 9.11: Peak Flows (Subdivision)

Storm Distribution->		Area (ha)	% Imperv.	3hr Chicago			
Return Period->				25mm	2yr	5yr	100yr
Stittsville Main Street ⁽¹⁾	Pre	1.08	49.2%	87	111	156	283
	Post	1.08	49.2%	88	109	159	265
	Diff	0	0.0%	1	-2	3	-18
10 Wildpine Major/Swale ⁽²⁾	Pre	0.58	42.4%	11	12	20	65
	Post	0.58	42.4%	11	12	20	65
	Diff	0	0.0%	0	0	0	0
Wildpine Sewer ⁽³⁾	Pre	1.271	56.3%	99	126	164	216
	Post	1.516	55.4%	122	154	198	260
	Diff	0.245	-0.8%	23	28	34	44
Wildpine Major ⁽⁴⁾	Pre	N/A	N/A	0	0	0	126
	Post	N/A	N/A	0	0	1	136
	Diff	N/A	N/A	0	0	1	10
Subdivision Total	Pre	2.931	50.9%	197	249	340	690
	Post	3.176	50.9%	221	275	378	726
	Diff	0.245	0.0%	24	26	38	36

⁽¹⁾ Sum of PCSWMM Outfalls "1+114", "OF-Ravenscroft", and "OF-Ravenscroft-RY"

⁽²⁾ PCSWMM Outfall "OF-ExDR"

⁽³⁾ PCSWMM Outfall "HW"

⁽⁴⁾ PCSWMM Outfall "OF-Ex-Maj"

9.5.4 Model Results – Site Plan

Runoff from the site plan will be directed to the super pipe and bioretention swales. Any storage in the bioswales that relies solely on infiltration for drawdown is assumed to be full at the start of the simulation.

- The west bioretention swale will receive controlled outflows from the superpipe (controlled using a 120mm ICD) and surface runoff from the west pervious area. The west bioretention swale will drain solely by infiltration and is assumed to be full.
- The east bioretention swale will receive flows from the parking lot and east grassed area that inlet via the bioswale inlet swales. The east bioretention swale will outlet through a subdrain.

The infiltration rate between the east bioswale surface storage and the underlying clearstone storage layer was modelled based calculations of flows through the sand filter. Bioretention swale sand filter flows are 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	114.95	116.15	1.20	14.2
BioSwaleWest	Infiltration	114.95	116.21	1.26	87.9
Super Pipe	120mm Dia. ICD	116.18	116.99	0.81	26.7

The storage locations mentioned in the previous table 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	18.0	96.6	114.7	18.0	80.8	98.8
BioSwaleWest	18.3	97.3	115.6	18.3	97.6	115.9
Super Pipe	66.5	0.0	66.5	55.0	0.0	55.0

¹ 100-year 3-hour Chicago Storm

Peak Flows

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 the west bioswale was assumed to be full due to City requirements to not account for infiltration storage. This causes there to be flows from the west bioswale during all storm events.

Table 9.14: Peak Flows from Site Plan

Storm Distribution->		Area (ha)	Imperv. (%)	3-hour Chicago			
Return Period->				25mm	2yr	5yr	100yr
Poole Creek ⁽¹⁾	Pre	0.556	22.9%	21	27	46	123
	Post	0.243	46.9%	2	2	2	14
	Diff	-0.313	24.1%	-19	-25	-44	-109
Wetland ⁽²⁾	Pre	0.220	7.1%	3	4	11	45
	Post	0.287	72.3%	25	29	42	88
	Diff	0.067	65.1%	22	25	31	43
Site Plan Total	Pre	0.776	18.4%	24	31	57	168
	Post	0.530	60.7%	27	31	44	102
	Diff	-0.246	42.3%	3	0	-13	-66

⁽¹⁾ Sum of PCSWMM Outfalls "OF-EastSubdrain" (post-development only), and "OF-Creek"

⁽²⁾ PCSWMM Outfall "OF-Wetland" (and "1+162" in pre-development only)

9.5.5 Model Results – Overall Development

The release rates for the entire development to the wetland and Poole Creek 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 spills from the west bioswale (assumed to be full). In larger storm events, flows are reduced due to the storage and infiltration provided by the bioswales and the restricted outflows from the east bioretention swale subdrain.

Table 9.15: Peak Flows

Storm Distribution->		Area (ha)	Imperv. (%)	3-hour Chicago			
Return Period->				25mm	2yr	5yr	100yr
Subdivision Total	Pre	2.931	50.9%	197	249	340	690
	Post	3.176	50.9%	221	275	378	726
	Diff	0.245	0.0%	24	26	38	36
Site Plan Total	Pre	0.776	18.4%	24	31	57	168
	Post	0.530	60.7%	27	31	44	102
	Diff	-0.246	42.3%	3	0	-13	-66
Total Development	Pre	3.707	44.1%	221	280	397	858
	Post	3.706	52.3%	248	306	422	828
	Diff	-0.001	8.2%	27	26	25	-30

9.6 Major Overland Flow Routes

Subdivision

A major overland flow route has been 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 a road sag with 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. It should be noted that due to the changes to the Ravencroft cul-de-sac, the overland flows are now directed to Wildpine Court along the proposed road extension. 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**).

9.7 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 Poole Creek, 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 at the minor system outfall. In reality, Poole Creek will have different timing in its peak flows and water levels 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 minimal impact on the downstream watercourses. The overall 100-year peak flows to Poole Creek are controlled to pre-development levels.

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

Table 9.16: 100-year Water Levels in Poole Creek (12-hour SCS Storm Event)

PCSWMM Node	Water Level (m)		
	Original 2021 Model	With 37 Wildpine	Difference
PJ083	114.18	114.18	0.00
PSto084	114.54	114.54	0.00
PJ085	115.26	115.26	0.00
PJ125	113.18	113.18	0.00
PJ126	113.36	113.36	0.00
PJ127	113.85	113.86	0.01
PJ128	114.03	114.03	0.00

Table 9.17: 100-year Flows in Poole Creek (12-hour SCS Storm Event)

PCSWMM Conduit	Flows (cms)			
	Original 2021 Model	With 37 Wildpine	Difference	% Difference
PC084_1	5.811	5.934	0.123	2.1%
PC084_2	8.618	8.789	0.171	2.0%
PC085	14.422	14.460	0.038	0.3%
PC126	9.986	10.152	0.166	1.7%
PC127	10.039	10.181	0.142	1.4%
PC128	10.059	10.129	0.070	0.7%

The model results indicate an increase in peak flow within Poole Creek at all locations noted in **Table 9.17**, 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 near the east bioswale outlet. This change is minor and localized and should not have a significant impact downstream of the proposed development.

10.0 OPERATIONS AND MAINTENANCE

The east and west bioswales and their respective level spreader outlets will require regular inspections and maintenance to ensure they operate as designed.

10.1 Operations

West Bioswale

The west bioswale will receive upstream drainage from the building roof (area B-1) outletting into the super pipe along the northeast and northwest sides of the building. Flows from the super pipe will be controlled by a 120mm diameter ICD and will outlet to the east swale that inlets to the bioswale. The west pervious area (area B-4) will flow overland to the bioswale. As runoff fills the west bioswale, it will infiltrate through the 150mm topsoil layer and be filtered by the 300mm sand filter layer. Runoff will then percolate through the clearstone layer and into the native soil. This infiltration will feed the wetland base flows. Larger storm events will fill the bioswale before it can drain by infiltration. Runoff will spill over the berm along the northwest property line with the wetland. This berm will act as a level spreader to disperse flows as sheet flow to the wetland to prevent erosion.

The flows over the level spreader are expected to flow at less than 5cm over the length of the level spreader (over 30m). During the stress test simulation in PCSWMM, the flow depth is only 1cm with a flow of 83 L/s. This would result in a velocity of 0.28 m/s. This velocity is less than 1 m/s, which does not require erosion protection, thus no rip rap is proposed.

East Bioswale

The east bioswale will receive upstream drainage from the parking lot storm sewers (area B-2) outletting into the south swale that inlets to the bioswale. The east pervious area (area B-3) will flow overland to the bioswale. As runoff fills the east bioswale, it will infiltrate through the 150mm topsoil layer and be filtered by the 300mm sand filter layer. Runoff will then percolate through the clearstone layer until outletting through the 150mm diameter subdrain. The subdrain outlets to a 250mm diameter pipe that outlets to a headwall at the property line with Poole Creek.

Should there be a large storm event, or the sand layer or subdrain become blocked, the bioswale will fill up and spill over the berm along the northeast property line with Poole Creek. This berm will act as a level spreader to disperse flows to the creek via sheet flow to prevent erosion. The flows are expected to flow at less than 5cm over the length of the level spreader (over 30m). Velocities along this length are expected to be less than 1 m/s, resulting in flows low enough to not cause concern for erosion of the bank, thus no rip rap is proposed.

Winter Operations

In winter, snow will accumulate in the bioswales. No runoff is expected from the upstream drainage while the snow is frozen. Snow storage should be kept away from the bioswales, to minimize the dry time during the spring melt and prevent compaction of the subsoils. The proposed parking areas have snow storage proposed between the parking lot and building, far from the bioswales.

When the soils are saturated during the spring melt, the bioswales will likely not infiltrate well through the sand layer and into the native soils. In this case, the snowmelt and storm runoff will fill the bioswale surface storage and spill over the level spreader to disperse flows to the creek or wetland.

10.2 Maintenance

Inspections

Bioswales should be inspected twice annually. They should be inspected for the following:

- Inspect bioswale surface for debris (trash, sediment).
- Check for quality of vegetation in the swale.
- Check the perimeter and level spreader for signs of erosion.
- Check the subdrain outlet (headwall) for any blockages.
- Check for standing water in the bioswales (may show signs of sand filter blockage).

It should be noted that the bioswales have the following drawdown times, so standing water may be expected within 3 days of a rain event:

- West Bioswale: 19.5 hours (0.8 days)
- East bioswale: 77.3 hours (3.2 days)

Maintenance

Following the inspection, the following maintenance tasks should be performed if there are any issues noted during the inspection:

- Remove any trash in the bioswale
- A significant build-up of sediment should be removed
- Re-plant or re-seed any dead or dying vegetation.
- Repair any erosion along the level spreader and reinforce with rip rap if needed.
- Clear any blockages at the subdrain outlet (headwall).
- Replace the sand layer if drawdown time appear affected by sand filter quality. Re-establish grading and vegetation.

11.0 WATER BALANCE

The *Upper Pool Creek Subwatershed Study*, prepared by Marshall Macklin Monaghan 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 Watershed/ Subwatershed Study*. The HIS results are summarized in **Table 11.1**.

Table 11.1: 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%

12.0 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.

13.0 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 to 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.

14.0 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:



Melanie Schroeder, P.Eng.
Project Engineer
Water Resources

Prepared by:

A handwritten signature in blue ink, appearing to read "Ayesha".

Ayesha Bibi, EIT.
Land Development Engineering

Reviewed by:

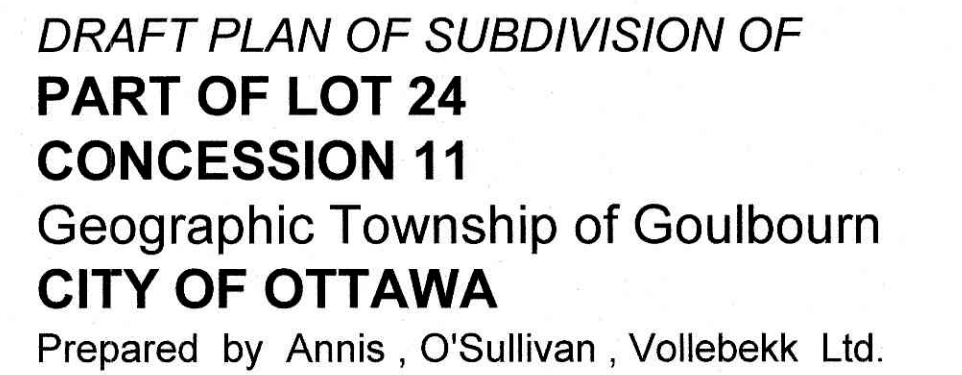


Cara Ruddle, P.Eng.
Senior Project Manager
Land Development Engineering

APPENDIX A

Legal Plan

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



Metric

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

January 3, 2024
Date


T. Hartwick
ONTARIO LAND SURVEYOR

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.


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

- (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

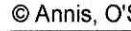
NOTES AND LEGEND

+ 65.00	denotes	Location of Elevations
□ TB-B	"	Bell Terminal Box
□ TB-C	"	Cable Terminal Box
○ B	"	Bollard
	"	Deciduous Tree
	"	Coniferous Tree

NOTES AND LEGEND

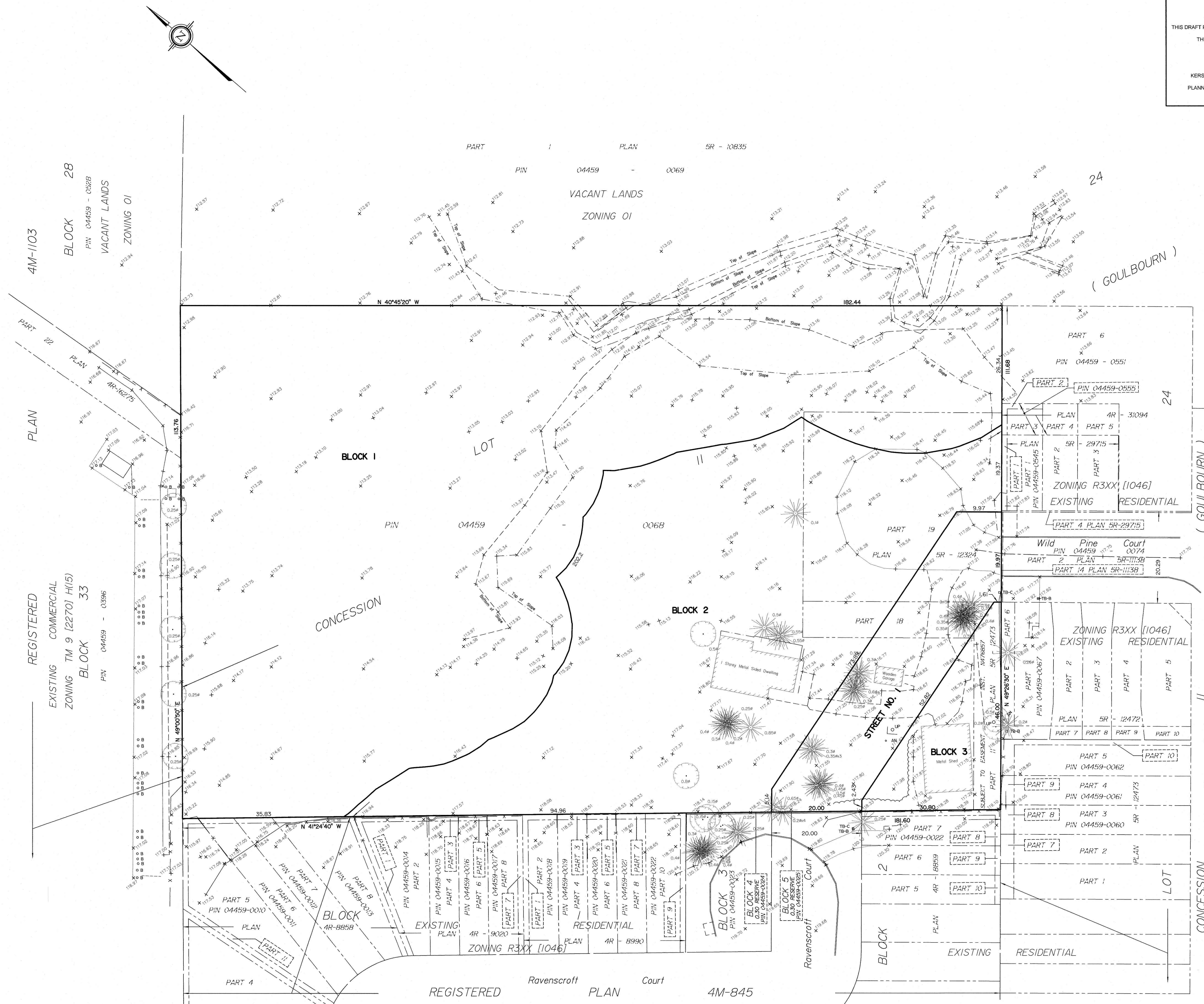
+ 65.00	denotes	Location of Elevations
□ TB-B	"	Bell Terminal Box
□ TB-C	"	Cable Terminal Box
○ B	"	Bollard
	"	Deciduous Tree
	"	Coniferous Tree

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**Ontario
Land Surveyors**

Job No.	21023-20	Zeynon	PI	L1	L2	CI	G	DO	DPS	F	FLN
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APPENDIX B

Water Servicing Information

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 architectural 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 Distribution 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)

Boundary Conditions 37 Wildpine Court– 2026

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	31.2	0.52
Maximum Daily Demand	78.0	1.30
Peak Hour	172.2	2.87
Fire Flow Demand #1	12,000.0	200.00

Location



Results

Existing Conditions

Connection 1 - Ravenscroft Court

Demand Scenario	Head (m)	Pressure¹ (psi)
Maximum HGL	159.5	57
Peak Hour	155.4	51
Max Day plus Fire Flow #1	154.8	50

¹ Ground Elevation = 119.6 m

Connection 2 - Wildpine Court

Demand Scenario	Head (m)	Pressure¹ (psi)
Maximum HGL	159.5	57
Peak Hour	155.3	51
Max Day plus Fire Flow #1	154.4	49

¹ Ground Elevation = 119.7 m

Notes

1. Demands for proposed Connection 1 and Connection 2 at existing water main along Ravenscroft Crt and Wildpine Crt were assigned to upstream junction at Stittsville Main St–Ravenscroft Crt Intersection and Stittsville Main St–Wildpine Crt–Hobin St Intersection off the public looped watermain. The engineer must calculate headloss off the dead-end main.

Disclaimer

The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermain 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.

FUS - Fire Flow Calculations

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

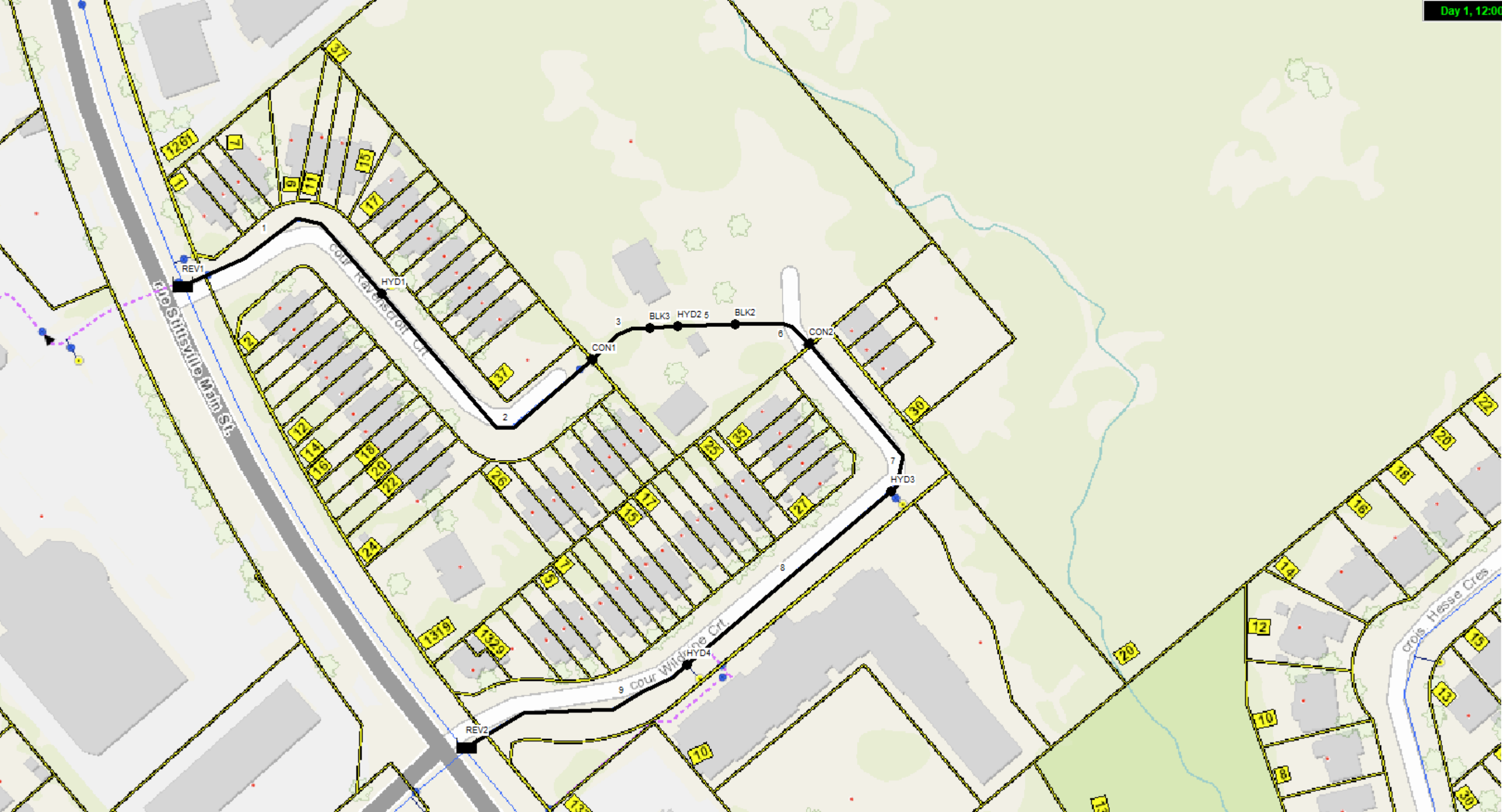
Legend: Input by User

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	



Water Demand Design Sheet



Novatech Project #: 125077

Project Name: 37 Wildpine Court

Date: 7/28/2026

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														
Node	Residential Input & Average Demand							Maximum Day & Peak Hour Demand						Design Fire Demand	
	Singles	Semis / Towns	Apts (2-BR)	Apts (1-BR)	Apts (Avg)	Pop. Equiv.	Res. Average Day Flow Demand (L/s)	Maximum Day Demand			Peak Hour Demand			Required Fire Flow (RFF)	Max Day + RFF (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)	
Junc BLK3		2				5.40	0.02	2.50	1.50	0.04	5.50	2.70	0.10	12,000	200.04
Junc BLK2			34	60		155.40	0.50	2.50	1.50	1.26	5.50	2.70	2.77	12,000	201.26
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	Singles	Semis/ Towns	Apts (2-BR)	Apts (1-BR)	Apts (Avg)
Population Equiv.	3.4	2.7	2.1	1.4	1.8
Daily 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
10,000	Low Density - Singles/Towns 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



Maximum Pressure During Average Day (AVDY) Conditions

Novatech Project #: 125077

Project Name: 37 Wildpine Court

Date: 7/28/2026

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 BLK3	118.94	0.02	159.5	40.56	58
Junc BLK2	118.03	0.5	159.5	41.47	59
Junc HYD2	118.76	0	159.5	40.74	58
Junc HYD4	118.15	0	159.5	41.35	59
Junc HYD3	117.65	0	159.5	41.85	60
Junc HYD1	120.28	0	159.5	39.22	56
Junc CON1	119.62	0	159.5	39.88	57
Junc CON2	117.7	0	159.5	41.8	59
Resvr REV1	159.5	-0.26	159.5	0	0
Resvr REV2	159.5	-0.26	159.5	0	0

Minimum Pressure During Peak Hour (PKHR) Conditions

Novatech Project #: 125077

Project Name: 37 Wildpine Court

Date: 7/28/2026

Input By: AB

Reviewed By: CR

Drawing Reference: 125077- GP

Legend: Input by User No Input Required

Acceptable (≥ 40 psi)

Unacceptable (< 40 psi)

Note: Hydraulic modelling completed using EPANET 2.0.

Node	Elevation (m)	Demand (L/s)	Total Head (m)	Pressure (m)	Pressure (psi)
Junc BLK3	118.94	0.10	155.33	36.39	52
Junc BLK2	118.03	2.77	155.32	37.29	53
Junc HYD2	118.76	0.00	155.33	36.57	52
Junc HYD4	118.15	0.00	155.31	37.16	53
Junc HYD3	117.65	0.00	155.32	37.67	54
Junc HYD1	120.28	0.00	155.37	35.09	50
Junc CON1	119.62	0.00	155.34	35.72	51
Junc CON2	117.70	0.00	155.32	37.62	53
Resvr REV1	155.40	-5.77	155.40	0.00	0
Resvr REV2	155.30	2.90	155.30	0.00	0

Water Demand Design Sheet



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

Novatech Project #: 125077

Project Name: 37 Wildpine Court

Date: 7/28/2026

Input By: AB

Reviewed By: CR

Drawing Reference: 125077- GP

Legend: Input by User No Input Required

Acceptable (≥ 20 psi)

Unacceptable (< 20 psi)

Note: Hydraulic modelling completed using EPANET 2.0.

Node	Elevation (m)	Demand (L/s)	Total Head (m)	Pressure (m)	Pressure (psi)
Junc BLK3	118.94	0.04	150.85	31.91	45
Junc BLK2	118.03	1.26	150.83	32.80	47
Junc HYD2	118.76	66.67	150.76	32.00	46
Junc HYD4	118.15	0.00	155.47	37.32	53
Junc HYD3	117.65	66.67	151.11	33.46	48
Junc HYD1	120.28	66.67	152.94	32.66	46
Junc CON1	119.62	0.00	151.37	31.75	45
Junc CON2	117.70	0.00	150.90	33.20	47
Resvr REV1	159.50	-114.01	159.50	0.00	0
Resvr REV2	159.50	-87.30	159.50	0.00	0

Table 1-1: Average Water Age per Pressure Zone

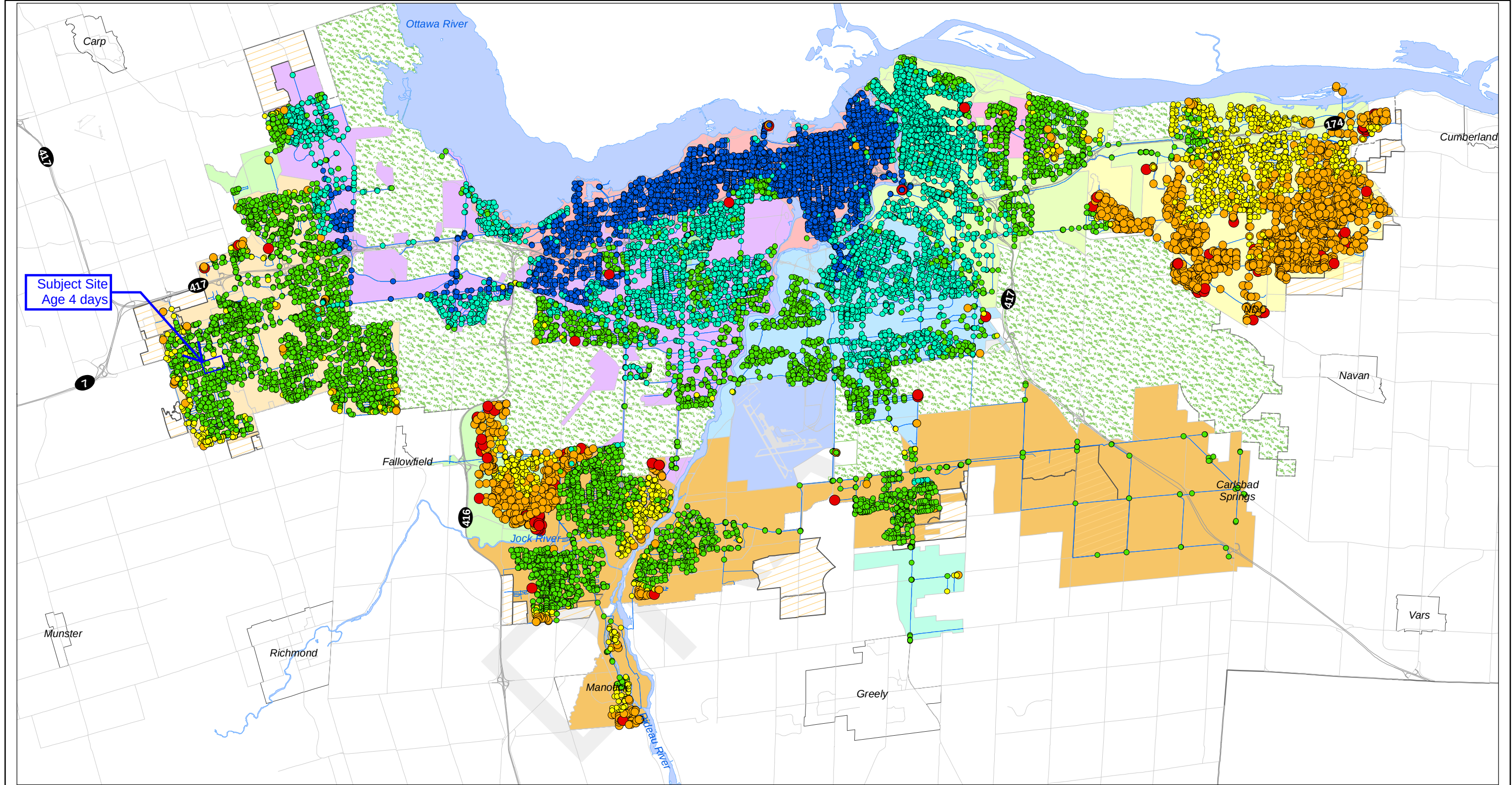
Pressure Zone	Average Water Age			
	hrs		days	
	2018	2046	2018	2046
1E	73.9	57.7	3	2
1W	24.2	16.4	1	1
2C	64.3	46.6	3	2
2E	167.1	131.0	7	5
2W	58.6	44.3	2	2
3SW	130.4	141.8	5	6
3W	108.2	80.7	5	3
LEIT	167.1	116.9	7	5
ME	92.6	49.6	4	2
MG	113.8	81.1	5	3
MONT	111.9	101.5	5	4
SUC	127.4	96.9	5	4
YOW ⁽¹⁾	115.4	62.6	5	3

Notes:

(1) The water distribution system within YOW is not modelled. The reported water age is only for a single node.

Figure 1-1 shows the spatial distribution of average water age in 2046. Water age in most pressure zones is generally under 5 days (120 hours). However, higher water age is observed at the extremities of the system, in 2E, 3SW (west of the Fallowfield PS), in 3W (in Stittsville), in MG and in the eastern part of SUC. Besides increased distance from the sources (water purification plants, WPPs), higher water age can be due to storage in the system, which increases the residence time of water. It is noted that the City's Water Design Guidelines stated that the total travel time of 5 days or less during basic day demand is reasonable and that a residence time of 8 days should not be exceeded. In **Figure 1-1**, nodes with water age exceeding 8 days generally correspond to dead-end watermains.





Infrastructure Master Plan - Figure 1-1
Model Results: 2046 BSDY - Average Water Age

Legend

Average Water Age

- Water Age ≤ 24 hrs
- 24 hrs < Water Age ≤ 48 hrs
- 48 hrs < Water Age ≤ 96 hrs
- 96 hrs < Water Age ≤ 120 hrs
- 120 hrs < Water Age ≤ 168 hrs
- Water Age > 192 hrs

Watermains

- Urban Expansion Area

Pressure Zones

1E	3SW	MG
1W	3W	MONT
2C	EMR	SHADOW RIDGE
2E	LEIT	SUC
2W	ME	YOW

Greenbelt

Notes

1. Coordinate System: NAD 1983 CSRS MTM 9

2. Data Sources: Background layers and growth projections provided by the City of Ottawa; hydraulic modelling results

Scale

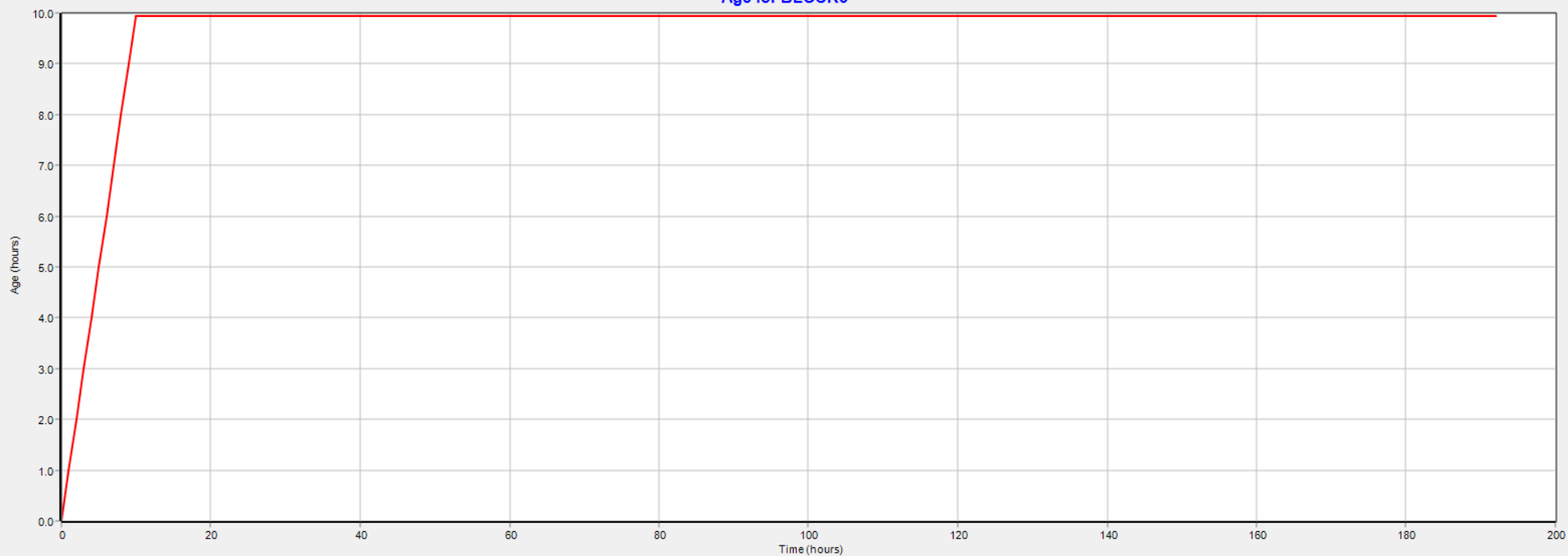
0 5 Kilometers

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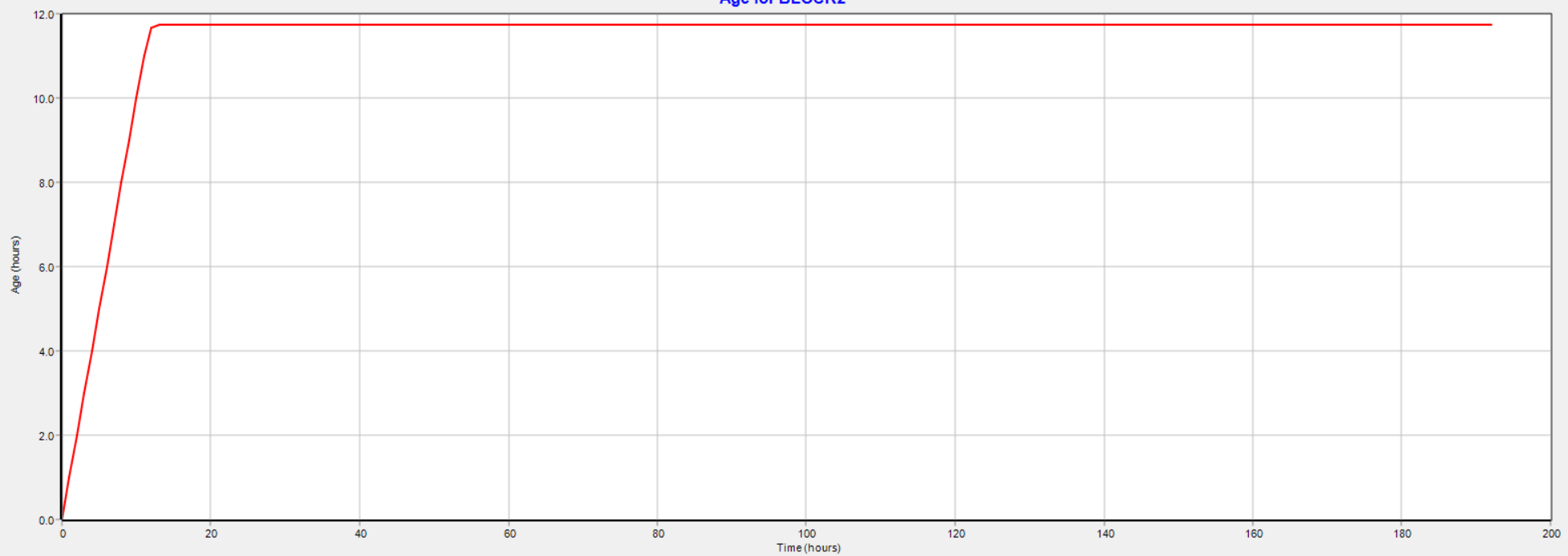
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Ottawa

Age for BLOCK3



Age for BLOCK2



APPENDIX C

Sanitary Servicing Information

SANITARY SEWER DESIGN SHEET



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							
Street	Area ID	From MH	To MH	Residential Flow										Extraneous Flow Area Method		Total Design Flow	Proposed Sewer Pipe Sizing / Design							
				Semis / Towns	Apts 1 Bed Unit	Apts 2 Bed Unit	Population	Cumulative Population	Average Pop. Flow	Design Peaking Factor M	Peak Design Pop. Flow	Res. Drainage Area	Cumulative Res. Drainage Area	Cumulative Extraneous Drainage Area	Design Extraneous Flow	Total Peak Design Flow	Pipe Length	Pipe Size (mm) and Material	Pipe ID Actual	Roughness	Design Grade	Capacity	Full Flow Velocity	Q(D) / Qfull
							(in 1000's)	(in 1000's)	Q(q) (L/s)		Q(p) (L/s)	(ha.)	(ha.)	(ha.)	Q(e) (L/s)	Q(D) (L/s)	(m)		(m)	n	So (%)	Qfull (L/s)	(m/s)	
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	2.05	10.8	200 PVC	0.203	0.013	0.50	24.2	0.75	8.5%
Totals				2	60	34	0.161	0.161	0.52	3.54	1.85	0.607	0.607	0.607	0.20	2.05	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

2.7
- 1 Bed Apts

1.4
- 2 Bed Apts

2.1
- P = Residential Population =

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

Design = 35000

Annual / Rare = 10000
- Industrial

28000

17000
- Commercial / Institutional

L/gross ha/day

L/gross ha/day
- ICI Peak *

Design = 1.5

Annual / Rare = 1.0

* ICI Peak = 1.0 Default, 1.5 if ICI in contributing area is >20% (design only)

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 (m²)

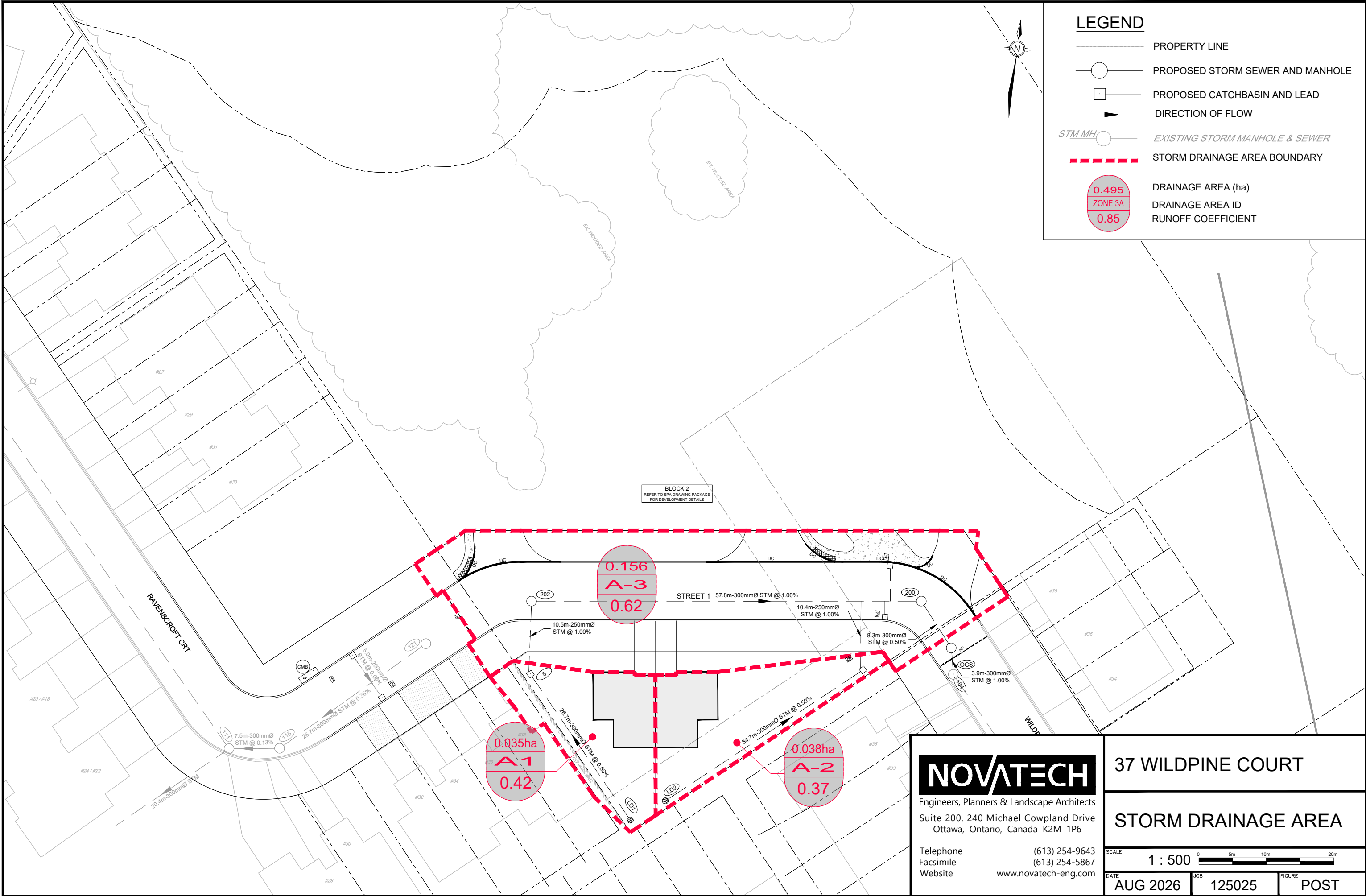
R = Hydraulic Radius of wetted area (dia./4 for full pipes)

So = Pipe slope/gradient

APPENDIX D

Storm Servicing Information

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STORM SEWER DESIGN SHEET



Novatech Project #: 125077

Project Name: 37 Wildpine Court

Date: 8/25/2026

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											Design Capacity								
				Flow							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	0.42	0.04		10.00	76.81	3.1	10.5	250 PVC	0.254	0.013	1.00	62.0	1.22	0.14	5.1%
	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	6.1	57.8	300 PVC	0.3048	0.013	1.00	100.9	1.38	0.70	6.0%
Street One	A3	200	OGS	0.156	0.62	0.27	0.35	10.84	73.73	25.7	8.3	300 PVC	0.3048	0.013	0.50	71.3	0.98	0.14	36.1%
Street One		OGS	EX100				0.35	10.98	73.24	25.5	3.9	300 PVC	0.3048	0.013	1.00	100.9	1.38	0.05	25.3%
Totals				0.229							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

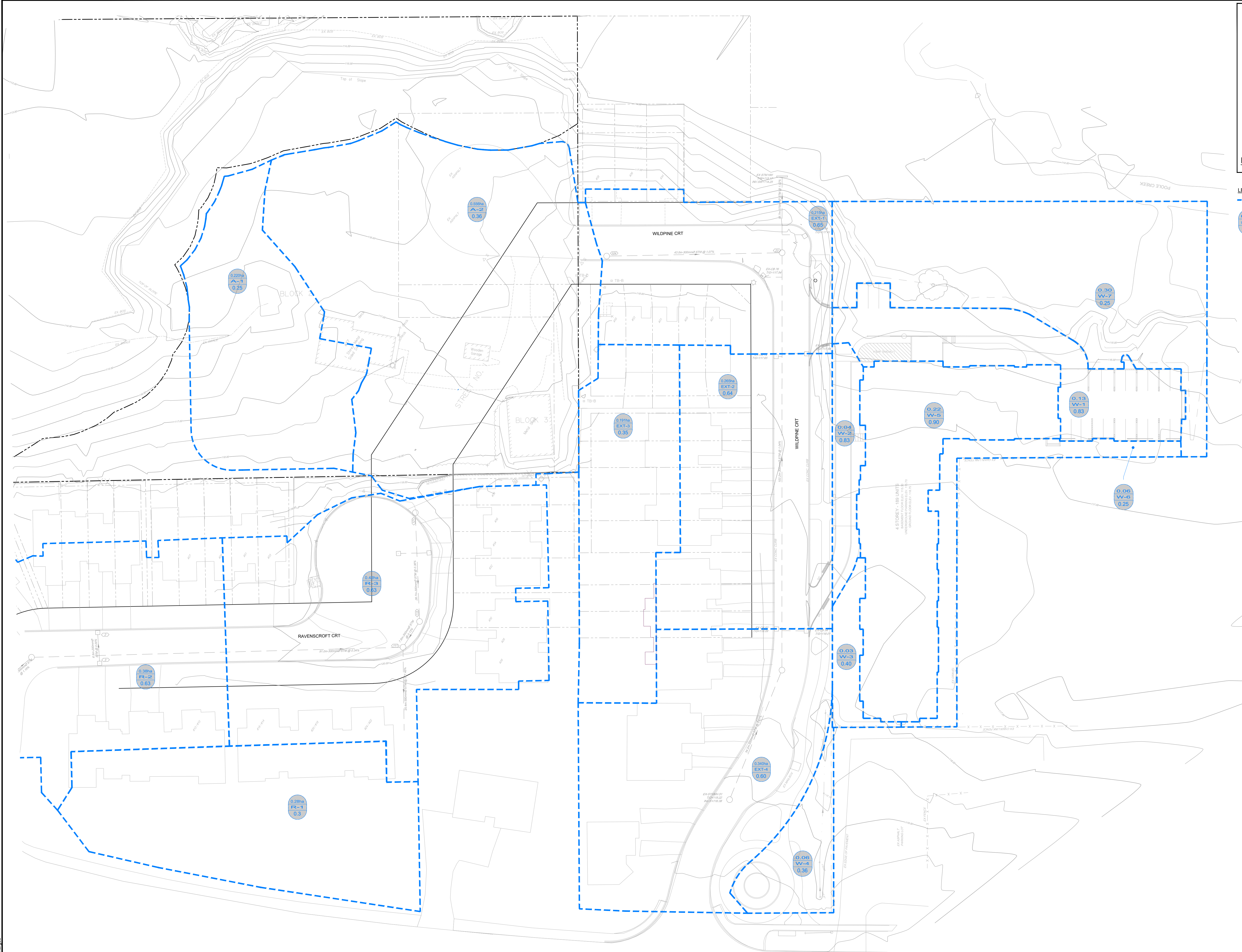
Q full = 1000*(1/n)*A_p*R^{2/3}*So^{0.5}

Definitions

Q full = Capacity (L/s)
n = Manning coefficient of roughness (0.013)
A_p = Pipe flow area (m²)
R = Hydraulic Radius of wetted area (dia./4 for full pipes)
So = Pipe slope/gradient

APPENDIX E

Stormwater Management Calculations



NORTH

LEGEND

PROPOSED DRAINAGE AREA

0.50 DRAINAGE AREA
#-# DRAINAGE AREA NUMBER
0.10 RUNOFF COEFFICIENT

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

No	REVISION	DATE	BY
2	ISSUED WITH SERVICING AND SWM REPORT	AUG 27/26	CJR
1	CLIENT REVIEW	SEPT 17/25	CJR

SCALE

1:400

0 4 8 12 16

DESIGN	MH/AB
CHECKED	MH
DRAWN	AB
CHECKED	MH
APPROVED	MH/CR

FOR REVIEW ONLY	

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

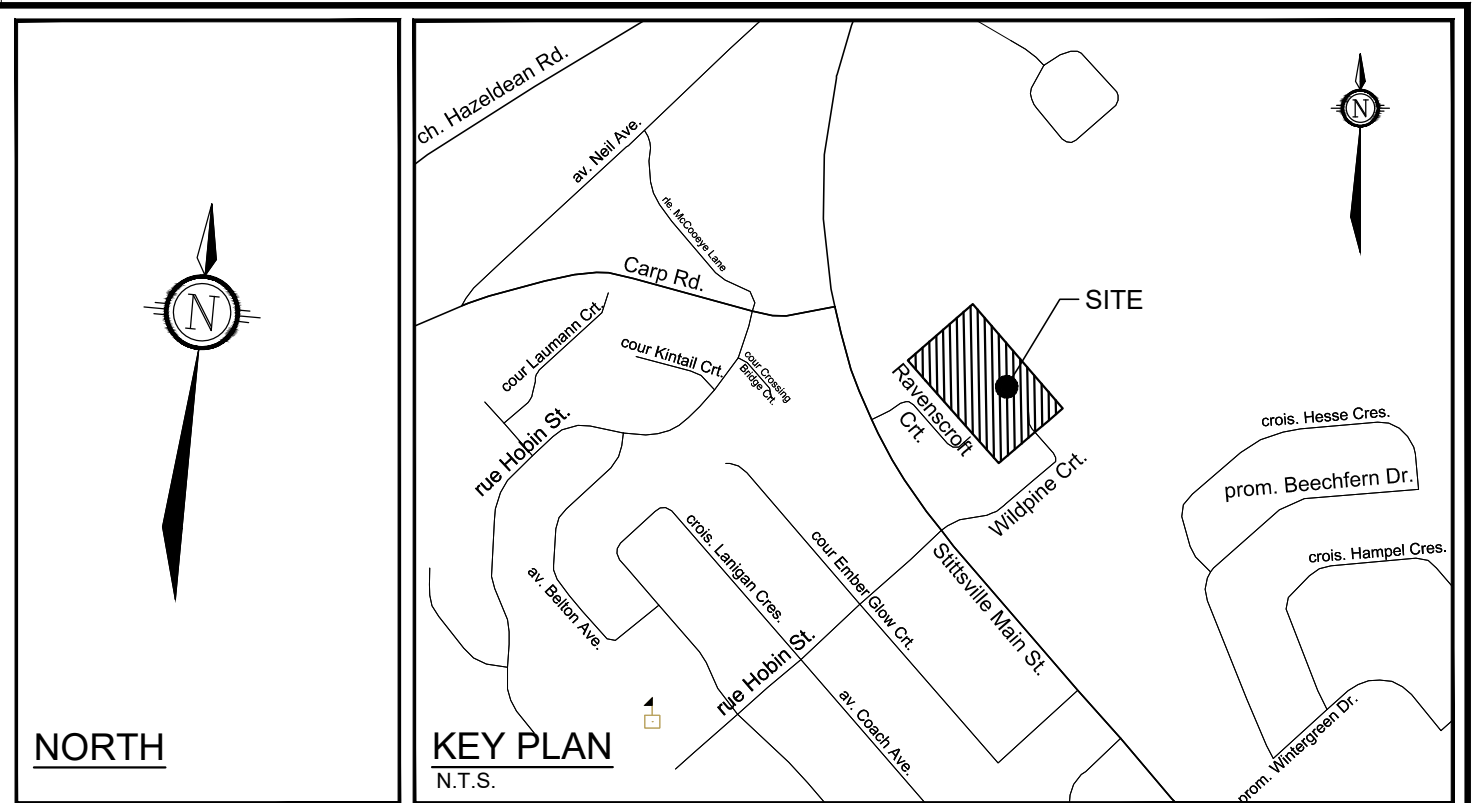
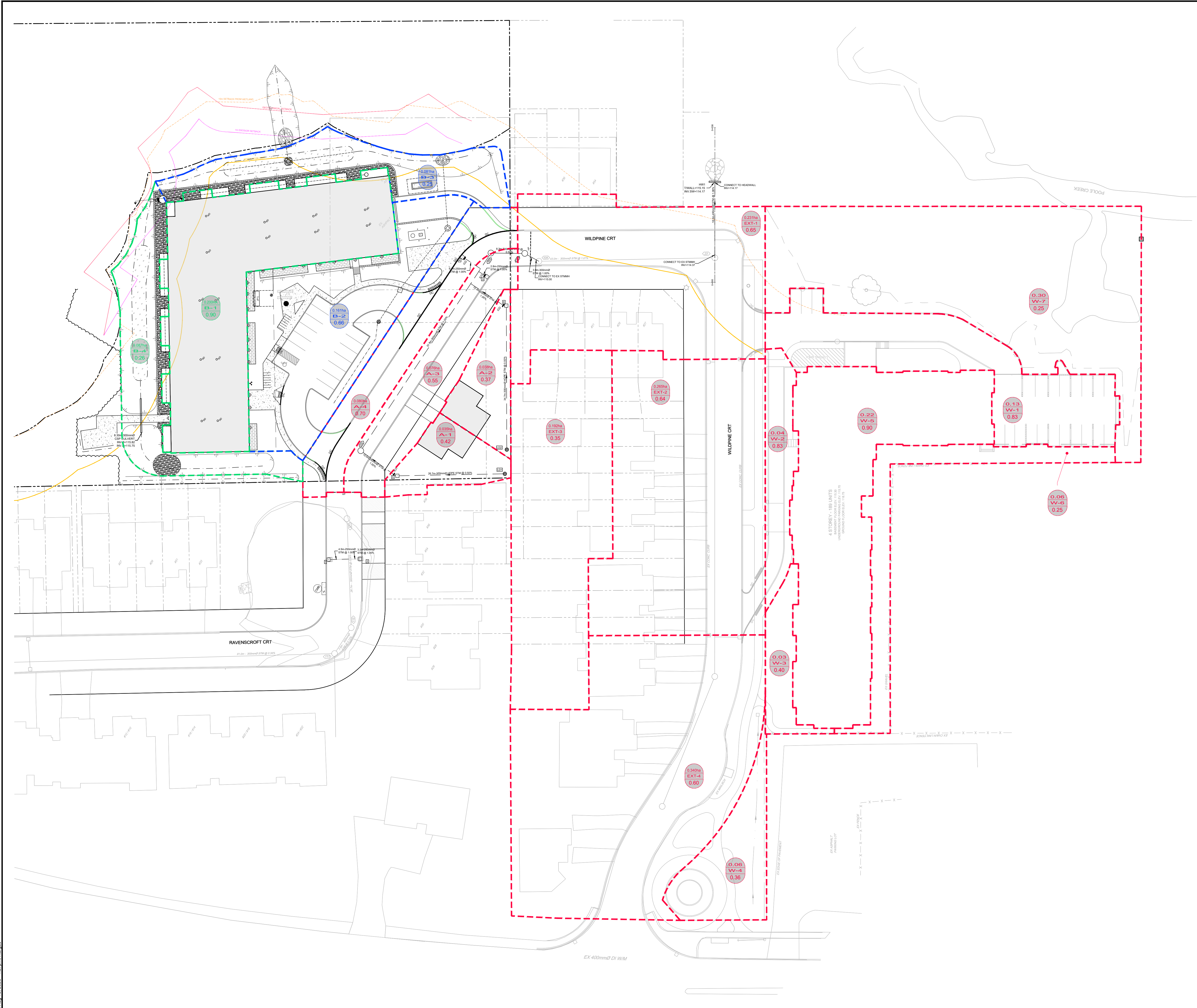
LOCATION
CITY OF OTTAWA
37 WILDPINE COURT

DRAWING NAME
PRE-DEVELOPMENT
DRAINAGE AREA PLAN

PROJECT No.
125077

REV
REV #2

DRAWING No.
125077-XSWM



LEGEND
--- PROPOSED DRAINAGE AREA
0.50 DRAINAGE AREA
0.10 DRAINAGE AREA NUMBER
0.10 RUNOFF COEFFICIENT

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

No.	REVISION	DATE	BY
2	ISSUED WITH SERVICING AND SWM REPORT	AUG 27/26	CJR
1	CLIENT REVIEW	SEPT 17/25	CJR

SCALE
1:400
0 4 8 12 16

DESIGN	MH/AB
CHECKED	MH
DRAWN	AB
CHECKED	MH
APPROVED	MH/CR

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Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

LOCATION CITY OF OTTAWA 37 WILDPINE COURT	PROJECT No. 125077
DRAWING NAME POST-DEVELOPMENT DRAINAGE AREA PLAN	REV # 2
DRAWING No. 125077-SWM	

REFER TO 125077 - ND FOR ADDITIONAL NOTES

Imbrium® Systems

ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

07/16/2026

Province:	Ontario	Project Name:	37 Wildpine
City:	Ottawa	Project Number:	125077
Nearest Rainfall Station:	OTTAWA CDA RCS	Designer Name:	Melanie Schroeder
Climate Station Id:	6105978	Designer Company:	Novatech
Years of Rainfall Data:	20	Designer Email:	m.schroeder@novatech-eng.com
		Designer Phone:	613-254-9643
Site Name:	ROW & RY	EOR Name:	
		EOR Company:	
Drainage Area (ha):	0.23	EOR Email:	
% Imperviousness:	50.30	EOR Phone:	
Runoff Coefficient 'c': 0.60			

Particle Size Distribution:	CA ETV
Target TSS Removal (%):	60.0

Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	4.47
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	Yes
Upstream Orifice Control Flow Rate to Stormceptor (L/s):	33.00
Peak Conveyance (maximum) Flow Rate (L/s):	
Influent TSS Concentration (mg/L):	200
Estimated Average Annual Sediment Load (kg/yr):	102
Estimated Average Annual Sediment Volume (L/yr):	83

**Net Annual Sediment
(TSS) Load Reduction
Sizing Summary**

Stormceptor Model	TSS Removal Provided (%)
EFO4	65
EFO5	67
EFO6	68
EFO8	70
EFO10	70
EFO12	70

Recommended Stormceptor EFO Model: **EFO4**
Estimated Net Annual Sediment (TSS) Load Reduction (%): **65**
Water Quality Runoff Volume Capture (%): **> 90**

THIRD-PARTY TESTING AND VERIFICATION

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

PERFORMANCE

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

PARTICLE SIZE DISTRIBUTION (PSD)

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

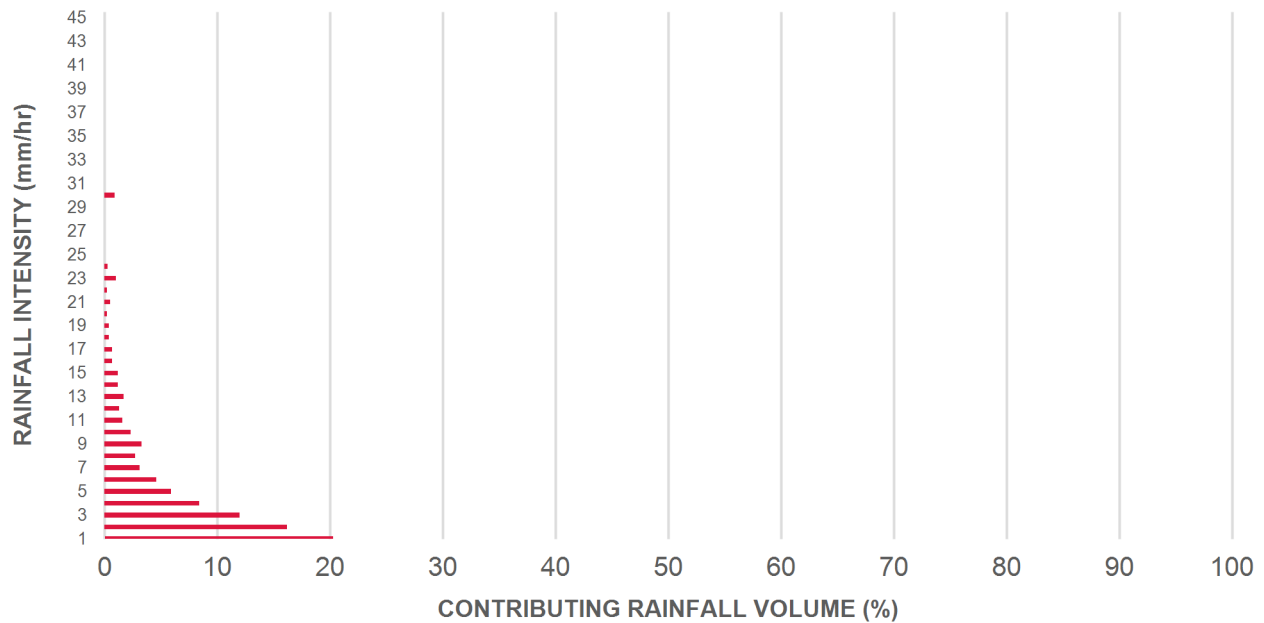
Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

Upstream Flow Controlled Results

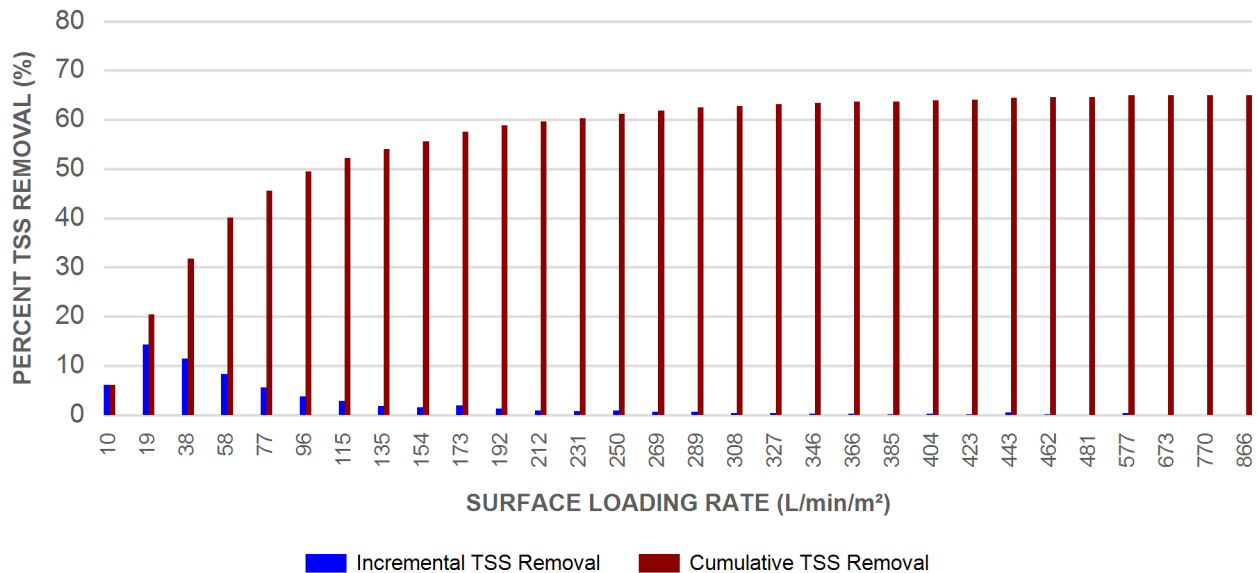
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.50	8.6	8.6	0.19	12.0	10.0	70	6.1	6.1
1.00	20.3	29.0	0.38	23.0	19.0	70	14.3	20.4
2.00	16.2	45.2	0.77	46.0	38.0	70	11.4	31.8
3.00	12.0	57.2	1.15	69.0	58.0	69	8.3	40.1
4.00	8.4	65.6	1.54	92.0	77.0	66	5.5	45.6
5.00	5.9	71.6	1.92	115.0	96.0	63	3.8	49.4
6.00	4.6	76.2	2.31	139.0	115.0	62	2.8	52.2
7.00	3.1	79.3	2.69	162.0	135.0	60	1.8	54.0
8.00	2.7	82.0	3.08	185.0	154.0	58	1.6	55.6
9.00	3.3	85.3	3.46	208.0	173.0	57	1.9	57.5
10.00	2.3	87.6	3.85	231.0	192.0	55	1.3	58.8
11.00	1.6	89.2	4.23	254.0	212.0	54	0.8	59.6
12.00	1.3	90.5	4.62	277.0	231.0	53	0.7	60.3
13.00	1.7	92.2	5.00	300.0	250.0	53	0.9	61.2
14.00	1.2	93.5	5.39	323.0	269.0	52	0.6	61.9
15.00	1.2	94.6	5.77	346.0	289.0	52	0.6	62.5
16.00	0.7	95.3	6.16	369.0	308.0	51	0.4	62.8
17.00	0.7	96.1	6.54	392.0	327.0	50	0.4	63.2
18.00	0.4	96.5	6.93	416.0	346.0	50	0.2	63.4
19.00	0.4	96.9	7.31	439.0	366.0	49	0.2	63.6
20.00	0.2	97.1	7.70	462.0	385.0	49	0.1	63.7
21.00	0.5	97.5	8.08	485.0	404.0	48	0.2	63.9
22.00	0.2	97.8	8.47	508.0	423.0	47	0.1	64.0
23.00	1.0	98.8	8.85	531.0	443.0	47	0.5	64.5
24.00	0.3	99.1	9.23	554.0	462.0	46	0.1	64.6
25.00	0.9	100.0	9.62	577.0	481.0	46	0.4	65.0
30.00	0.9	100.9	11.54	693.0	577.0	43	0.4	65.4
35.00	-0.9	100.0	13.47	808.0	673.0	42	N/A	65.1
40.00	0.0	100.0	15.39	923.0	770.0	41	0.0	65.1
45.00	0.0	100.0	17.32	1039.0	866.0	41	0.0	65.1
Estimated Net Annual Sediment (TSS) Load Reduction =								65 %

Climate Station ID: 6105978 Years of Rainfall Data: 20

RAINFALL DATA FROM OTTAWA CDA RCS RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



Maximum Pipe Diameter / Peak Conveyance

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

SCOUR PREVENTION AND ONLINE CONFIGURATION

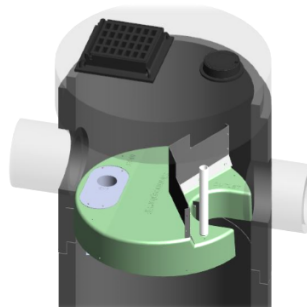
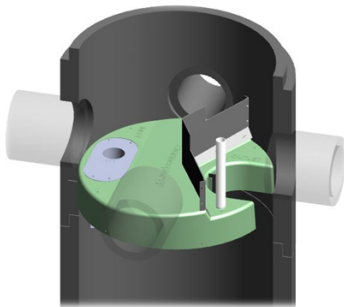
► **Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test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

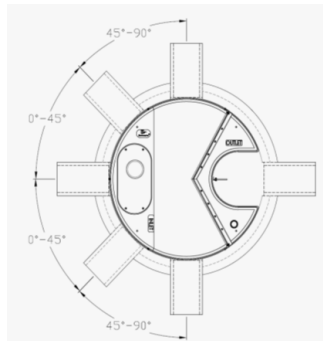
DESIGN FLEXIBILITY

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

OIL CAPTURE AND RETENTION

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



**INLET-TO-OUTLET DROP**

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

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

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

HEAD LOSS

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

For submerged conditions the applicable K value is 3.0.

Pollutant Capacity

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

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

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

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

STANDARD STORMCEPTOR EF/EFO DRAWINGS

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

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

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

Table of TSS Removal vs Surface Loading Rate Based on Third-Party Test Results
Stormceptor® EFO

SLR (L/min/m ²)	TSS % REMOVAL	SLR (L/min/m ²)	TSS % REMOVAL	SLR (L/min/m ²)	TSS % REMOVAL	SLR (L/min/m ²)	TSS % REMOVAL
1	70	660	42	1320	35	1980	24
30	70	690	42	1350	35	2010	24
60	67	720	41	1380	34	2040	23
90	63	750	41	1410	34	2070	23
120	61	780	41	1440	33	2100	23
150	58	810	41	1470	32	2130	22
180	56	840	41	1500	32	2160	22
210	54	870	41	1530	31	2190	22
240	53	900	41	1560	31	2220	21
270	52	930	40	1590	30	2250	21
300	51	960	40	1620	29	2280	21
330	50	990	40	1650	29	2310	21
360	49	1020	40	1680	28	2340	20
390	48	1050	39	1710	28	2370	20
420	47	1080	39	1740	27	2400	20
450	47	1110	38	1770	27	2430	20
480	46	1140	38	1800	26	2460	19
510	45	1170	37	1830	26	2490	19
540	44	1200	37	1860	26	2520	19
570	43	1230	37	1890	25	2550	19
600	42	1260	36	1920	25	2580	18
630	42	1290	36	1950	24	2600	26

STANDARD PERFORMANCE SPECIFICATION FOR “OIL GRIT SEPARATOR” (OGS) STORMWATER QUALITY TREATMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

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

1.2 REFERENCE STANDARDS & PROCEDURES

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

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

1.3 SUBMITTALS

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

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

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

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

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

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

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

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

3.2 SIZING METHODOLOGY

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

3.2.1 Sediment removal efficiency for a given surface loading rate and its associated flow rate shall be based on sediment removal efficiency demonstrated at the seven (7) tested surface loading rates specified in the protocol, ranging 40 L/min/m² to 1400 L/min/m², and as stated in the ISO 14034 ETV Verification Statement for the OGS device.

3.2.2 Sediment removal efficiency for surface loading rates between 40 L/min/m² and 1400 L/min/m² shall be based on linear interpolation of data between consecutive tested surface loading rates.

3.2.3 Sediment removal efficiency for surface loading rates less than the lowest tested surface loading rate of 40 L/min/m² shall be assumed to be identical to the sediment removal efficiency at 40 L/min/m². No extrapolation shall be allowed that results in a sediment removal efficiency that is greater than that demonstrated at 40 L/min/m².

3.2.4 Sediment removal efficiency for surface loading rates greater than the highest tested surface loading rate of 1400 L/min/m² shall assume zero sediment removal for the portion of flow that exceeds 1400 L/min/m², and shall be calculated using a simple proportioning formula, with 1400 L/min/m² in the numerator and the higher surface loading rate in the denominator, and multiplying the resulting fraction times the sediment removal efficiency at 1400 L/min/m².

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

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

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

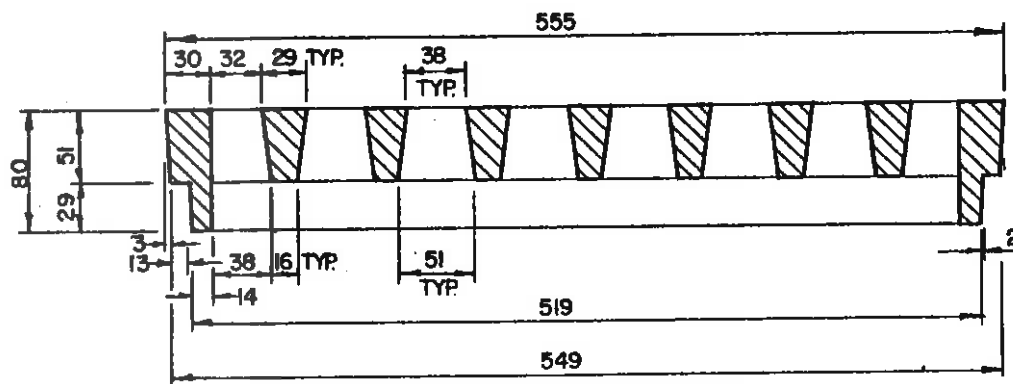
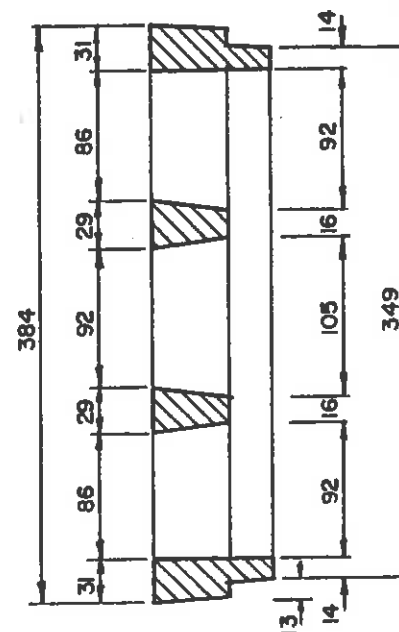
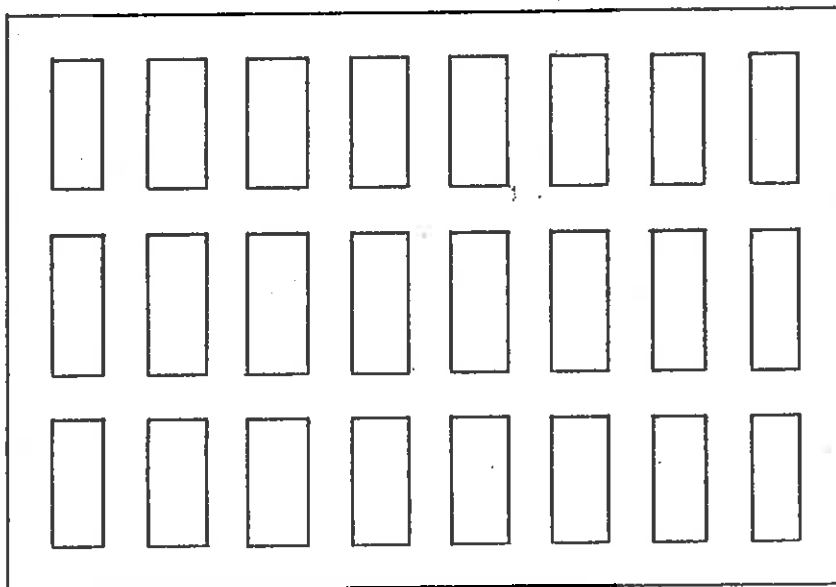
3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m².

3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators**, with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-

entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to assess whether light liquids captured after a spill are effectively retained at high flow rates.

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m² to 2600 L/min/m²) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators**. However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.



SEE NOTES ON DWG. S-15

ALL DIMENSIONS ARE IN MILLIMETRES
UNLESS SHOWN OTHERWISE

SCALE:
N.T.S.

TOWNSHIP OF GOULBOURN

DRAWN: I. D. M.
CHECKED: A. J. R.

REVISION DATE:
AUGUST 1985

STANDARD CATCH BASIN COVER

DWG. NO:
S-18

EXISTING CATCHBASINS IN RAVENSCOURT CUL-DE-SAC

EX CB 1A - near curb of roundabout (Google Street View)



EX CB 1 - middle of roundabout (Google Street View)



Closeup EX CB 1 (from Site visit) with noted dimensions of openings



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

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 analyze 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

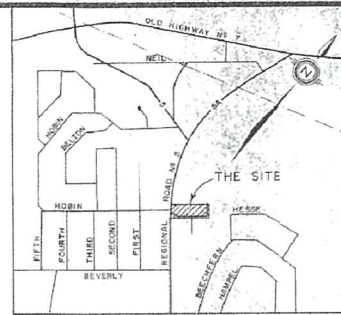
	Pipe Obvert	5 Year HGL	100 Year HGL Uncontrolled*	100 Year HGL Controlled
MH103	114.85 (u/s)	114.91	115.28	114.92
MH 102	115.92 (u/s)	115.92	118.28	115.92
MH 101	116.68 (d/s)	116.68	118.28	116.68

*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'.



KEY PLAN
N.T.S.

LOT #	BACKYARD	SIDEYARD	GARAGE	CHIM
1	170.01	119.88	119.92	119.95
2	119.98	-	119.91	119.85
3	119.96	119.94	119.99	119.98
4	119.80	119.86	119.89	119.83
5	119.77	-	119.66	119.72
6	119.74	-	119.71	119.71
7	119.68	-	119.71	119.68
8	119.63	119.65	119.70	119.65
9	119.59	119.43	119.54	119.57
10	119.59	-	119.23	119.55
11	119.39	-	119.24	119.50
12	119.32	-	119.25	119.87
13	119.35	-	119.25	119.85
14	119.36	119.28	119.16	119.74
15	119.35	-	119.17	119.76
16	119.30	-	119.18	119.60
17	119.41	-	119.18	119.81
18	119.41	119.25	119.19	119.83

AS BUILT GRADING

LEGEND

- EXISTING ELEVATION
- PROPOSED ELEVATION
- PROPOSED & ROAD ELEVATION
- PROPOSED & SWALE ELEVATION
- PROPOSED SWALE
- PROPOSED SURFACE DRAINAGE
- PROPOSED CATCH BASIN
- SERVICE LOCATION
- PROPOSED SANITARY SEWER
- PROPOSED STORM SEWER
- PROPOSED WATER MAIN
- PROPOSED TERRACING
- PROPOSED STREET LIGHT (Also refer to notes 7 & 8)
- MINIMUM BOTTOM OF FOOTING ELEVATION (RAISE IF REQUIRED TO ACCOMMODATE THE PROPOSED LOT GRADING)
- AS BUILT SWALE, PROPERTY LINE GRADE

NOTES

- 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
- Concrete mountable curb and gutter to be in accordance with Township of Guelph's Drawing No. R-20.
- Rear yard catch basin to be placed in one lot only - 300 mm minimum from property line.
- 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
- 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.
- 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.
- Street light within Regional Road right-of-way shall consist of a concrete span 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.
- Internal street light at Station 2 + 10 to be in accordance with Township of Guelph's Drawing Number R-26.

POSTAL BOX LAY-BY DETAIL
N.T.S.

WEeping TILE INFILTRATION AREA ASSUMED STORM DRAINAGE AREAS

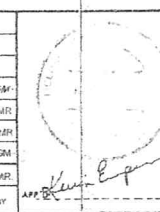
CROSS SECTION A-A
N.T.S.

CROSS SECTION B-B
N.T.S.

CROSS SECTION C-C
N.T.S.

BENCH MARK
NAIL IN HYDRO POLE 6" ABOVE
GROUND S.W. CORNER OF SITE
AT ENTRANCE TO ROW EAST
SIDE OF R.R. No. 5
ELEV. = 119.567

NO.	REVISIONS	DATE	BY	APP.
1	AS BUILT LOT GRADING	1987/03	GM	
2	REV. EASEMENT	1/11/88	NMR	
3	REV. EASEMENTS, ADDED POSTAL LAY-BY	20/10/88	NMR	
4	CUL-DE-SAC REVISED	27/09/88	GM	
5	REINSTATEMENT NOTES ADDED	24/06/88	NMR	



CLIENT	LANTANA DEVELOPMENTS INC.
PROJECT	WILD PINE COURT
TITLE	GRADING & DRAINAGE PLAN
DESIGNED BY	OLIVER MANGIONE McCALLA & ASSOCIATES LIMITED
CHECKED BY	Consulting Engineers
DATE	SEPTEMBER, 1987
SCALE	600
DRAWING NO.	88-6288-GP1
REV	5



POST-DEVELOPMENT 5 YEAR HGL SPREADSHEET MODEL

Area	MANHOLE			INVERT ELEVATION			OBVERT ELEVATION		GROUND ELEVATION	COVER	PIPE PARAMETERS			TOTAL FLOW	TOTAL CAPT FLOW	Model row #	Q _{cap} (m³/s)	Q _{in} /Q _{cap}	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'	(m³/s)	(m³/s)				Pipe Area (m²)	L/D	Friction Factor (f)	Velocity V (m/s)	V²/2g	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	0.179		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/c², 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	0.55	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	m²	0.066
Perimeter	m	2.14
R=A/P	m	0.03
n		0.016
Slope	m/m	0.02
Q _{max}	m³/s	0.057
V _{max}	m/s	0.866

Max Surface Flow 100 year event = Q₁₀₀ - Q_{CAP} = 0.281 - 0.166 = 0.1154 m³/s
Maximum Surface Flow 100 year event Per side of the Road = 0.0577 m³/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)

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

θ : Angle between inflow and outflow 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



POST-DEVELOPMENT UNCONTROLLED 100 YEAR HGL SPREADSHEET MODEL

Area	MANHOLE			INVERT ELEVATION			OBVERT ELEVATION		GROUND ELEVATION	COVER	PIPE PARAMETERS			TOTAL FLOW (m³/s)	Model row #	Q _{cap} (m³/s)	Q _{in} / Q _{cap}	COMPUTATIONAL COLUMNS					HEAD LOSS HL (m)	SURCHARGE Upstream (m)	HGL			PIPE SLOPE (%)
	U/S	D/S		U/S (m)			D/S (m)			Upstream (m)	Upstream (m)	Dia (mm)	Length (m)	'n'				Pipe Area (m²)	L/D	Friction Factor (f)	Velocity V (m/s)	V²/2g			U/S (m)	D/S (m)	SLOPE (%)	
	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)

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

θ : Angle between inflow and outflow 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



POST-DEVELOPMENT CONTROLLED 100 YEAR HGL SPREADSHEET MODEL

Area	MANHOLE			INVERT ELEVATION			OBVERT ELEVATION		GROUND ELEVATION	COVER	PIPE PARAMETERS			TOTAL FLOW	TOTAL CAPT FLOW	Model row #	Q _{cap} (m³/s)	Q _{in} /Q _{cap}	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'	(m³/s)	(m³/s)				Pipe Area (m²)	L/D	Friction Factor (f)	Velocity V (m/s)	V²/2g	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	0.186		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	103	NE	115.54	E	114.47	115.92	114.85	118.29	2.38	375	102.2	0.013	0.281	0.139		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	102	N	116.38	SE	115.57	116.68	115.87	119.22	2.54	300	34.2	0.013	0.004	0.004		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/c², 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									
	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	m²	0.078
Perimeter	m	2.33
R=A/P	m	0.03
n		0.016
Slope	m/m	0.02
Q _{max}	m³/s	0.071
V _{max}	m/s	0.917

Max Surface Flow 100 year event = Q₁₀₀ - Q_{CAP} = 0.281 - 0.139 = 0.1425 m³/s
Maximum Surface Flow 100 year event Per side of the Road = 0.0713 m³/s

Maximum Flow Depth = 0.068 m

Equations for Manhole Loss

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

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

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)

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

θ : Angle between inflow and outflow 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

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

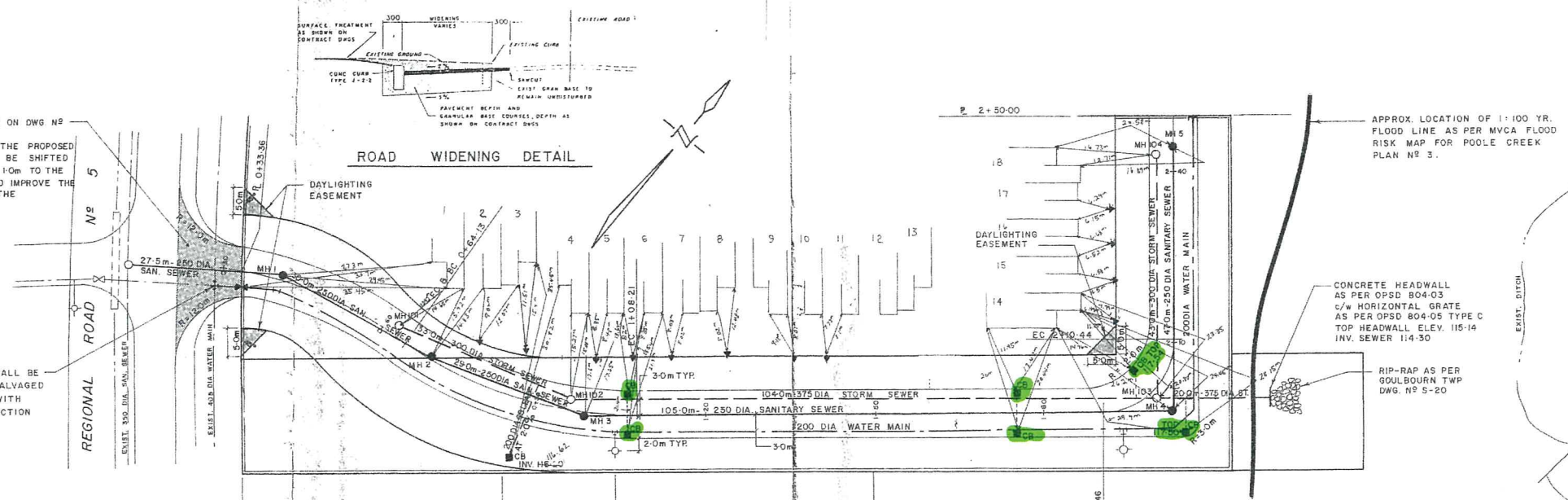
If C_B applies (outlet pipe > 825mm) it can not exceed 0.95

If outlet pipe < 825mm CB =1.0



SEE NOTES 4 & 5 ON DWG. N° 88-6288-GP1
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

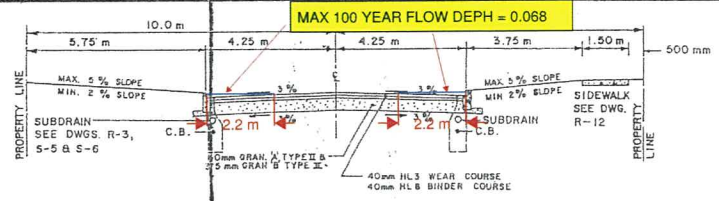
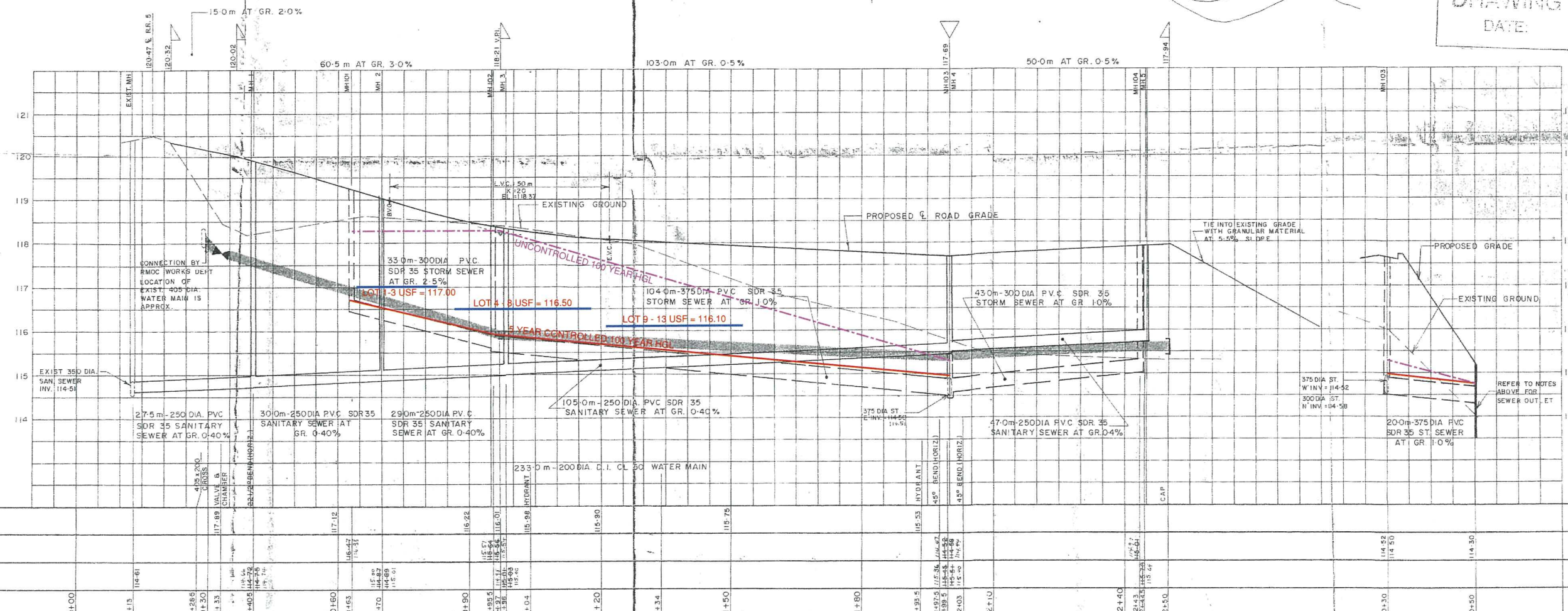


NOTE
REFER TO DWG. N° 88-6288-GP1
FOR GRADING & DRAINAGE DETAILS.

F/8776

F/8776

RECORD
DRAWING
DATE



TYPICAL ROAD CROSS SECTION
N.T.S.

CLIENT		LANTANA DEVELOPMENTS INC.	
PROJECT		WILD PINE COURT	
TITLE		PLAN & PROFILE	
DESIGN		OLIVER MANGIONE McCALLA & ASSOCIATES LIMITED	
DRAWN		Consulting Engineers	
DATE		SEPTEMBER, 1987	
SCALE		1:500 HORIZ. 1:50 VERT.	
DRAWING NO.		88-6288-1	
REV.			

REVISIONS

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

37 Wildpine (125077)

Bioswale Quality Calculations

Underground (Clearstone) Portion of Bioswales

Location	Subdrain Storage Volume			Clear Stone Storage Volume ⁽¹⁾					Total Underground Storage ⁽²⁾	Drawdown / Retention Time ⁽³⁾			
	Diameter (mm)	Length of Pipe (m)	Subdrain Storage Volume Provided (m³)	Depth of Clearstone (m)	Width of Clearstone (m)	Length of Infiltration Swale (m)	Bottom Area (m²)	Clearstone Storage Volume Provided (m³)		Native Soil Infiltration Rate (L/s)	Subdrain Release Rate (L/s)	Calculated Retention Time for Underground Storage	
East Bioswale (Areas B-2 & B-3)	150	31.60	0.6	0.40	3.50	31.60	110.60	17.5	18.0	0.2	10.8	0.5	0.02
West Bioswale (Area B-1 & B-4)	150	0.00	0.0	0.40	3.50	32.64	114.24	18.3	18.3	0.5	N/A	10.7	0.4

⁽¹⁾ Total clearstone storage provided is based on an assumed 40% void ratio for the clearstone trench (exclude volume occupied by subdrain).

⁽²⁾ Total underground storage provided is based on the total volume of the clearstone trench and subdrain (exclude voids of the sand filter)

⁽³⁾ Drawdown time is based on the infiltration rates Geotechnical Investigation prepared 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).

Only account for subdrain release rate since poor soils require subdrain - treatment provided by sandfilter

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

Surface Portion of Bioswales

Location	Surface Storage ⁽¹⁾				Drawdown / Retention Time ⁽³⁾				
	Bottom Width of Swale (m)	Length of Infiltration Swale (m)	Bioretention Swale Bottom Area (m ²)	Maximum Bioretention Swale (m ³)	Sand Filter Flow Rate ⁽²⁾ (L/s)	Native Soil Infiltration Rate (L/s)	Subdrain Release Rate (L/s)	Calculated Retention Time for Surface Storage	
								(hours)	(days)
East Bioswale (Areas B-2 & B-3)	3.50	31.60	110.60	96.6	1.6	0.2	10.8	19.0	0.8
West Bioswale (Area B-1 & B-4)	3.50	32.64	114.24	97.3	1.7	0.5	N/A	66.7	2.8

⁽¹⁾ Volume of surface portion of bioswales (refer to storage curves)

⁽²⁾ Drawdown time is based on the Equation 4.20 in the Stormwater Management Planning and Design Manual (MOE, 2003).

Using a longevity factor of 1 (MOE Table 4.12)

Using percolation rate of sand = 210 mm/hr (MOE Table 4.4)

⁽³⁾ Drawdown time of the surface storage is based on the more restrictive of the clearstone release rate and the sand filter.

The East Bioswale is most restricted by the sand filter due to the high release rate of the subdrain

The West Bioswale is most restricted by the native soil infiltration rate

Water Quality, Erosion and Flood Control Storage Requirements Based on Modelling
The outflow from the sand filter should be based on Equation 4.20.

$$Q = f \times \left(\frac{P}{3,600,000} \right) \times (LW \times n)$$

Equation 4.20: Sand Filter Discharge

where Q = flowrate (m³/s) out of the sand filter
f = longevity factor
P = percolation rate for sand (mm/h)
L = length of the filter (m)
W = width of the filter (m)
n = void space in the sand filter (typically 0.25)

37 Wildpine (125077)

Bioswale Quality Calculations

Quality Calculations - Bioswales

Location	Catchment Parameters		Quality Requirements ⁽¹⁾		15mm Runoff Volume ⁽²⁾ (m ³)	Storage Volumes			Drawdown / Retention Time					
	Drainage Area	Percent Impervious	Required Volume	Required Volume		Underground Storage	Surface Storage	Total Storage	Calculated Retention Time for Underground Storage		Calculated Retention Time for Surface Storage		Total Retention Time	
	(ha)	(%)	(m ³ /ha)	(m ³)		(m ³)	(m ³)	(m ³)	(hours)	(days)	(hours)	(days)	(hours)	(days)
East Bioswale (Areas B-2 & B-3)	0.243	46.9%	28.0	6.8	36.5	18.0	96.6	114.7	0.5	0.02	19.0	0.8	19.5	0.8
West Bioswale (Area B-1 & B-4)	0.287	72.3%	35.8	10.3	43.1	18.3	97.3	115.6	10.7	0.4	66.7	2.8	77.3	3.2

⁽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⁾ The Stormwater Management Planning and Design Manual (MOE, 2003) recommends storage provided for the 15mm storm event.
Flows only to bypass the infiltration / filter system above the 15mm storm event

MOE SWMP Manual Table 3.2

80% TSS Removal for Infiltration

% Impervious	Storage Volume (m ³ /ha)
0.35	25
0.55	30
0.7	35
0.85	40

37 Wildpine (125077) Pre-Development Model Parameters

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	0.556	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%
R-1	0.280	0.30	14.3%	100%	34	83	2.0%
R-2	0.380	0.63	61.4%	40%	23	165	2.0%
R-3	0.420	0.63	61.4%	40%	27	153	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:	3.707	0.51	44.1%				

37 Wildpine (125077) Post-Development Model Parameters

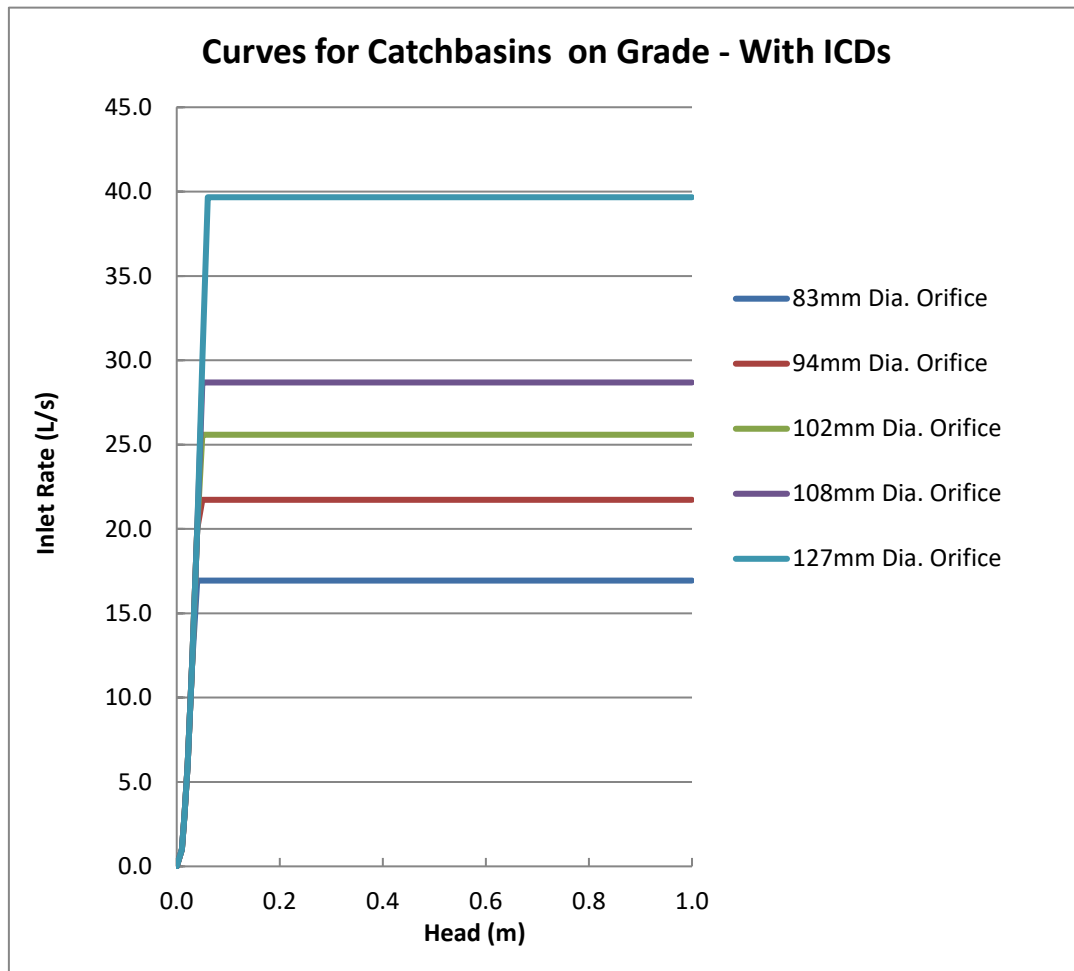
Area ID	Catchment Area (ha)	Runoff Coefficient (C)	Percent Impervious (%)	No Depression (%)	Flow Path Length (m)	Equivalent Width (m)	Average Slope (%)
Subdivision Areas							
A-1	0.035	0.42	31.4%	100%	13	28	2.0%
A-2	0.038	0.37	24.3%	100%	11	34	2.0%
A-3	0.076	0.55	50.0%	0%	11	71	2.0%
A-4	0.079	0.70	71.4%	0%	10	82	2.0%
Site Plan Areas							
B-1	0.200	0.90	100.0%	100%	20	100	0.5%
B-2	0.165	0.66	65.7%	0%	22	75	2.0%
B-3	0.078	0.25	7.1%	0%	9	83	2.0%
B-4	0.087	0.26	8.6%	0%	8	103	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%
R-1	0.280	0.30	14.3%	100%	34	83	2.0%
R-2	0.380	0.63	61.4%	40%	23	165	2.0%
R-3	0.420	0.63	61.4%	40%	27	153	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:	3.706	0.57	52.3%				

Project Name

Inlet Control Device Parameters

Orifice Name	Catchbasin ID	ICD Size & Inlet Rate				2-yr Approach Flow* (L/s)	RATIONAL METHOD			
		Diameter (mm)	Max Head (m)	Calculated 2-yr Capture Rate (L/s)	2-yr Capture Rate* (L/s)		Area ID	Area (ha)	C	2-yr Approach Flow (L/s)
O-CB5	CB5	LMF73	1.72	7.1	2.3	2.4	A-1	0.035	0.42	3.2
O-CB6	CB6	LMF73	1.72	7.1	2.0	2.1	A-2	0.038	0.37	3.0
O-CB3	CB3-4	LMF95	1.47	10.0	9.9	20.7	A-3 & A-4	0.155	0.63	20.8
O-CB4	CB3-4	LMF95	1.47	10.0	9.9					
Existing - Ravenscroft										
O-CB1	CB1-2	127	1.14	37.1	23.0	55.6	R-3	0.420	0.63	56.7
O-CB2	CB1-2	152	1.12	52.8	32.5					

*From PCSWMM Model, 2-year 3-hour Chicago storm distribution



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.

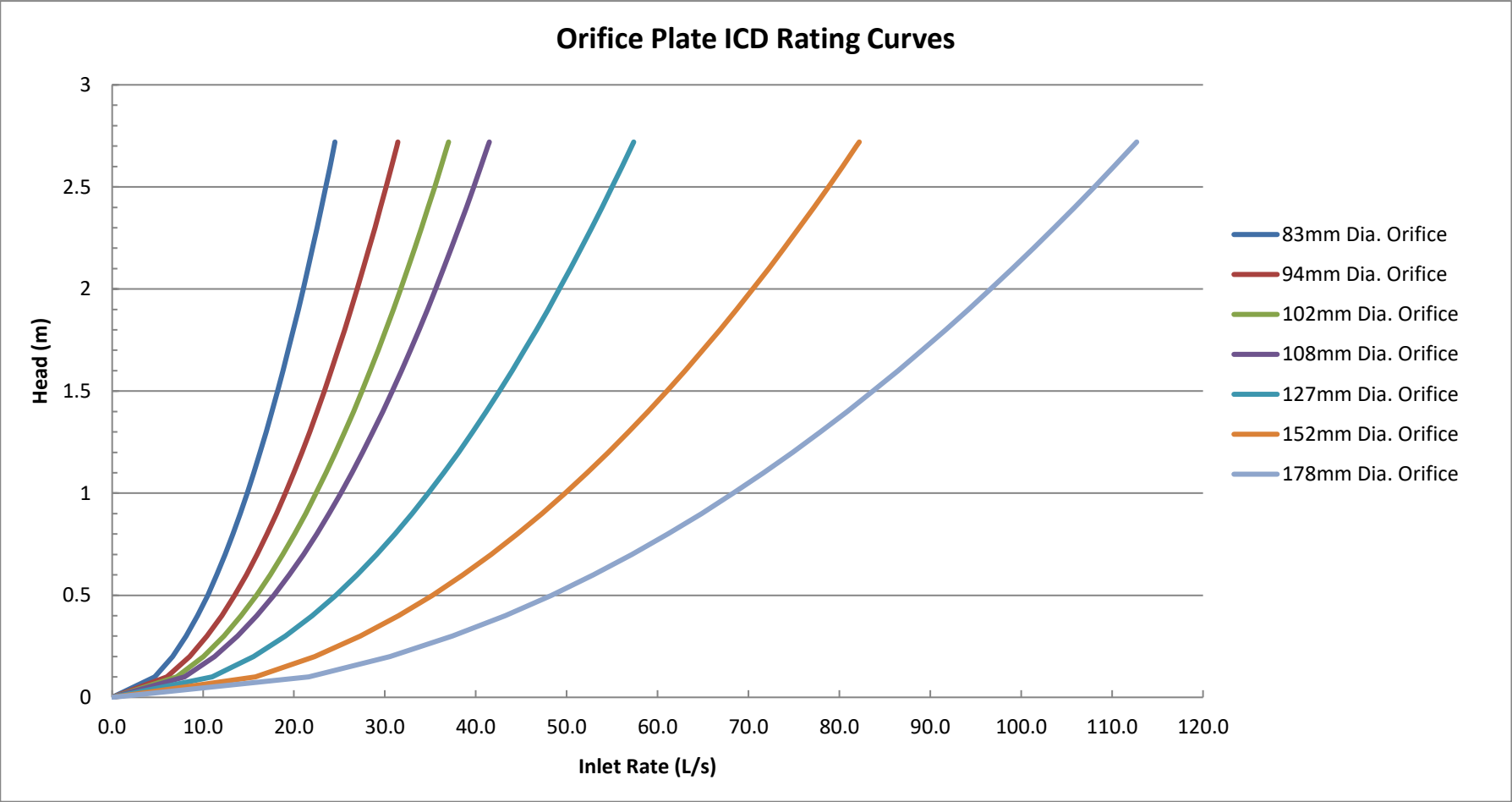
Novatech reviewed the methodology used to create this standard curve (described below) and determined that it was suitable for general use in other dual-drainage models.

- MTO Design Chart 4.04 provides the relationship between the gutter flow rate (Q_g) 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_g) 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_a) 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_g) 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_a vs. Q_c) varies significantly with road grade, flow depth vs. captured flow (D vs. Q_c) does not.

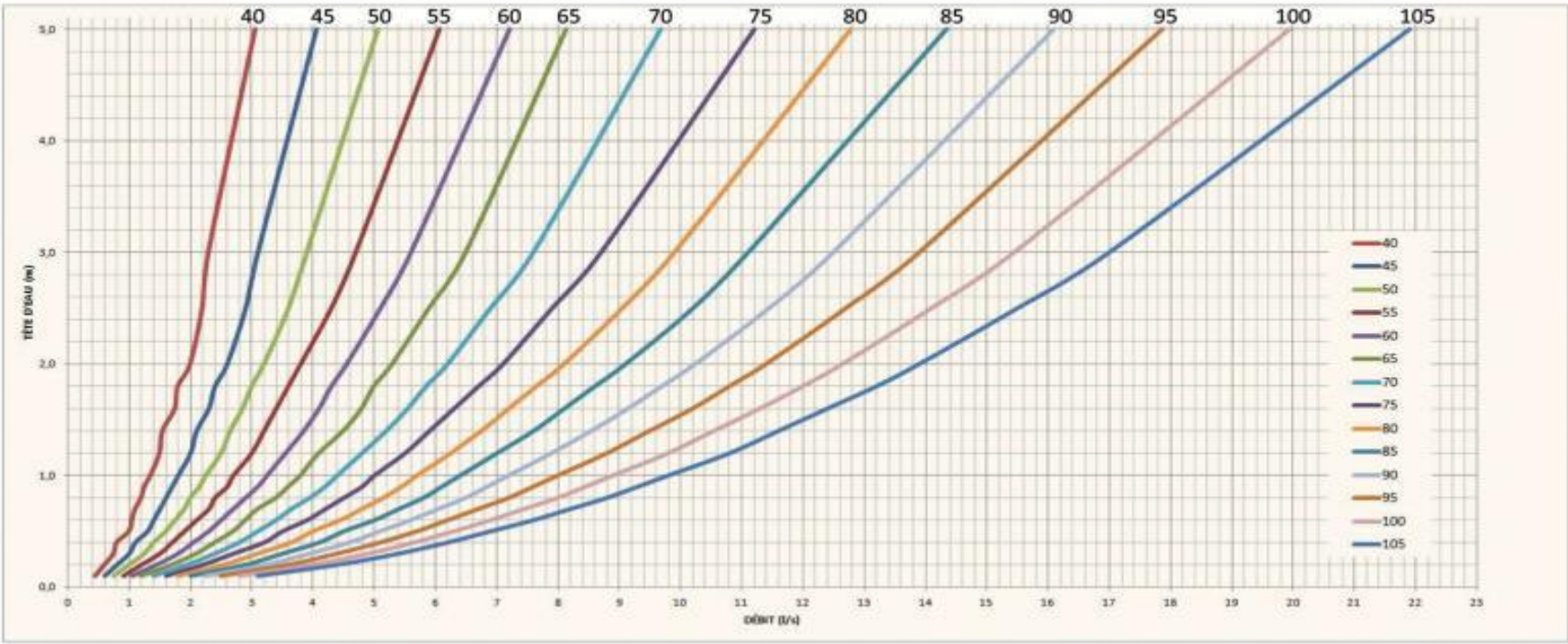
Since there was very little difference in the flow depth vs. captured flow curves for different road slopes, this family of curves was averaged to create a single standard curve for use in dual-drainage models.

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 CIB frame).



37 Wildpine (125077)
ICD Rating Curves



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Storage Curves

Proposed Storage Curves

Junction ID	Storage Curve			
ClearstoneEast	Elevation	Depth	Area	Volume
Notes	(m)	(m)	(m ²)	(m ³)
Bottom of Clearstone	114.95	0.00	45.02	0.0
Top of Clearstone	115.35	0.40	45.02	18.0
	115.351	0.401	0.00	18.0
Top of Storage Node ⁽¹⁾	116.50	1.55	0.00	18.0

⁽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 Swale	115.75	0.00	110.59	0.0
	115.80	0.05	131.58	6.1
	115.85	0.10	150.70	13.1
	115.90	0.15	171.41	21.2
	115.95	0.20	194.52	30.3
	116.00	0.25	219.63	40.7
	116.05	0.30	246.99	52.3
	116.10	0.35	276.65	65.4
	116.15	0.40	308.63	80.1
Top of Swale ⁽¹⁾	116.20	0.45	355.17	96.6
	116.201	0.451	0.00	96.8
Top of Storage Node ⁽²⁾	116.50	0.75	0.00	96.8

⁽¹⁾ Top of swale accounts for total surface volume of 96.6m³

⁽²⁾ Top of storage node is based on 0.30m of flow depth over berm / level spreader

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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	45.65	0.0
Top of Clearstone	115.35	0.40	45.65	18.3
	115.351	0.401	0.00	18.3
Top of Sand Filter	115.749	0.799	0.00	18.3
Bottom of Swale	115.75	0.800	114.21	18.3
	115.80	0.850	133.22	24.5
	115.85	0.900	153.92	31.7
	115.90	0.950	175.79	39.9
	115.95	1.000	199.84	49.3
	116.00	1.050	223.37	59.9
	116.05	1.100	249.42	71.7
	116.10	1.150	277.17	84.9
	116.15	1.200	306.57	99.5
Top of Swale ⁽¹⁾	116.20	1.25	341.10	115.7
	116.201	1.251	0.00	115.9
Top of Storage Node ⁽²⁾	116.50	1.55	0.00	115.9

⁽¹⁾ Top of swale accounts for total surface volume of 97.4m³ plus 18.3m³ of clearstone

⁽²⁾ Top of storage node is based on 0.30m of flow depth over berm / level spreader

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Storage Curves

Pre-Development - Ravenscroft Storage Curves

Junction ID	Storage Curve			
EX-CB9	Elevation (m)	Depth (m)	Area (m ²)	Volume (m ³)
Notes				
CB T/G ⁽¹⁾	119.53	0.00	0.00	0.00
	119.54	0.01	0.70	0.00
	119.55	0.02	6.30	0.04
	119.56	0.03	7.82	0.11
	119.57	0.04	14.63	0.22
	119.58	0.05	23.19	0.41
	119.59	0.06	33.55	0.69
	119.60	0.07	45.75	1.09
	119.61	0.08	58.44	1.61
	119.62	0.09	80.68	2.31
	119.63	0.10	106.49	3.24
	119.64	0.11	138.08	4.47
	119.65	0.12	178.23	6.05
	119.66	0.13	223.04	8.05
	119.67	0.14	271.79	10.53
	119.68	0.15	329.21	13.53
	119.69	0.16	383.27	17.10
	119.70	0.17	448.16	21.25
	119.71	0.18	524.06	26.11
	119.72	0.19	612.74	31.80
	119.73	0.20	710.45	38.41
	119.74	0.21	760.42	45.77
	119.75	0.22	805.99	53.60
	119.76	0.23	871.73	61.99
Max Ponding ⁽²⁾	119.77	0.24	889.90	70.80
	119.771	0.241	0.00	71.24
Top of Storage Node ⁽¹⁾	120.53	1.00	0.00	71.24

⁽¹⁾ Based on T/G in from Ravenscroft Survey

⁽²⁾ Based on volume and head provided based on cul-de-sac survey (70.8m³)

⁽³⁾ Top of storage node is based on 1.0m above T/G

37 Wildpine (125077)

Storage Curves

Existing / Offsite Storage Curves (10 Wildpine)

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 (3.51m³)

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 (6.491m³)

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 (110m³)

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

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	117.65	115.26	115.27	0.00	0.00	115.56	116.42	1.16	1.15
MH202	300	115.72	116.02	119.43	115.77	115.77	0.00	0.00	116.07	116.42	0.65	0.65
OGS	300	115.04	115.34	117.73	115.17	115.17	0.00	0.00	115.47	N/A	-	-
Proposed Site Plan												
MH1	200	116.18	116.38	117.80	116.99	117.41	0.61	1.03	117.29	N/A	-	-
NYLO3	900	116.29	117.19	117.82	116.99	117.41	0.00	0.22	117.29	N/A	-	-
NYLO6	900	116.23	117.13	117.82	117.00	117.41	0.00	0.28	117.30	N/A	-	-
Ravenscroft Storm Sewer												
EX-MH111	375	117.53	117.91	119.66	118.59	118.61	0.69	0.70	118.89	Unknown	-	-
EX-MH115	300	117.56	117.86	119.65	118.63	118.66	0.77	0.80	118.93	Unknown	-	-
EX-MH121	300	117.68	117.98	119.67	118.80	118.83	0.82	0.85	119.10	Unknown	-	-
EX-MH131	300	117.87	118.17	120.22	120.03	120.09	1.86	1.92	120.33	Unknown	-	-
EX-MH141	300	117.97	118.27	120.27	120.03	120.09	1.76	1.82	120.33	Unknown	-	-
EX-MH151	300	118.07	118.37	120.35	120.04	120.10	1.67	1.73	120.34	Unknown	-	-
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	116.05	0.00	0.13	116.13	Unknown	-	-
EX-MH103	450	114.44	114.89	117.54	114.99	115.03	0.10	0.14	115.29	Unknown	-	-
EX-MH104	300	114.97	115.27	117.68	115.09	115.10	0.00	0.00	115.39	Unknown	-	-

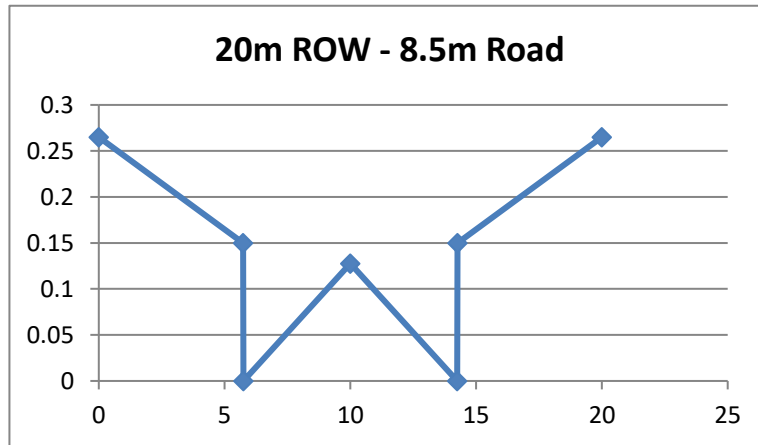
¹ From PCSWMM Model, 3-hour Chicago storm distribution

37 Wildpine (125077)
ROW Ponding Depths

Structure	T/G (m)	Max. Static Ponding (Spill Depth)		2-yr Event (3hr)				5-yr Event (3hr)				100-yr Event (3hr)				100-yr Event (+20%) (3hr)			
		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)
Road Sags																			
CB3-4	117.50	117.66	0.16	117.48	0.00	N	0.00	117.56	0.06	N	0.00	117.70	0.20	Y	0.04	117.73	0.23	Y	0.07
Rear Yards																			
CB5	119.10	119.30	0.20	117.55	0.00	N	0.00	117.71	0.00	N	0.00	118.63	0.00	N	0.00	118.88	0.00	N	0.00
CB6	117.60	117.90	0.30	116.01	0.00	N	0.00	116.42	0.00	N	0.00	117.18	0.00	N	0.00	117.88	0.28	N	0.00
LD1	118.65	119.10	0.45	117.65	0.00	N	0.00	117.71	0.00	N	0.00	118.63	0.00	N	0.00	118.88	0.23	N	0.00
LD2	118.50	117.60	0.00	116.78	0.00	N	0.00	116.78	0.00	N	0.00	117.18	0.00	N	0.00	117.88	0.00	N	0.00
Offsite - Ravenscroft																			
CB1-2	119.53	119.61	0.08	118.84	0.00	N	0.00	119.46	0.00	N	0.00	119.68	0.15	Y	0.07	119.70	0.17	Y	0.09
EX-CB2-3	120.02	120.27	0.25	120.07	0.05	N	0.00	120.09	0.07	N	0.00	120.14	0.12	N	0.00	120.19	0.17	N	0.00
Offsite - Wildpine																			
EX-CB-A/B	118.00	118.00	0.00	118.03	0.03	Y	0.03	118.04	0.04	Y	0.04	118.07	0.07	Y	0.07	118.08	0.08	Y	0.08
EX-CB-C/D	117.64	117.64	0.00	117.68	0.04	Y	0.04	117.69	0.05	Y	0.05	117.72	0.08	Y	0.08	117.73	0.09	Y	0.09
EX-CB-E/F	117.41	117.50	0.09	117.43	0.02	N	0.00	117.52	0.11	Y	0.02	117.64	0.23	Y	0.14	117.68	0.27	Y	0.18

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



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	Intensity	Duration	Intensity
min	mm/hr	min	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



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

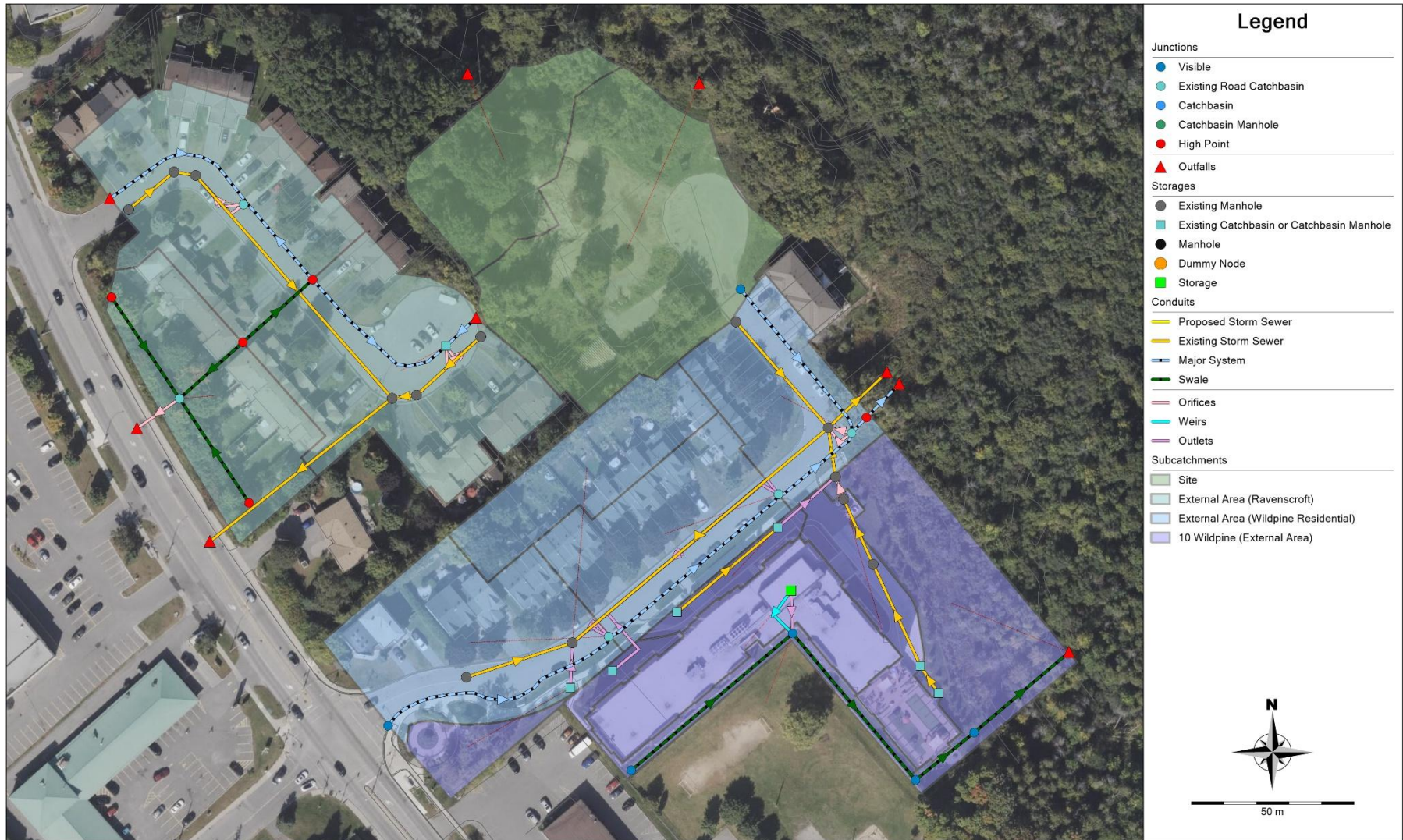
37 Wildpine (125077)
Design Storm Time Series Data
SCS Design Storms



S2-24.stm		S5-24.stm		S100-24.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
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)
Pre-Development – PCSWMM Model Schematics

Overall Model Schematic

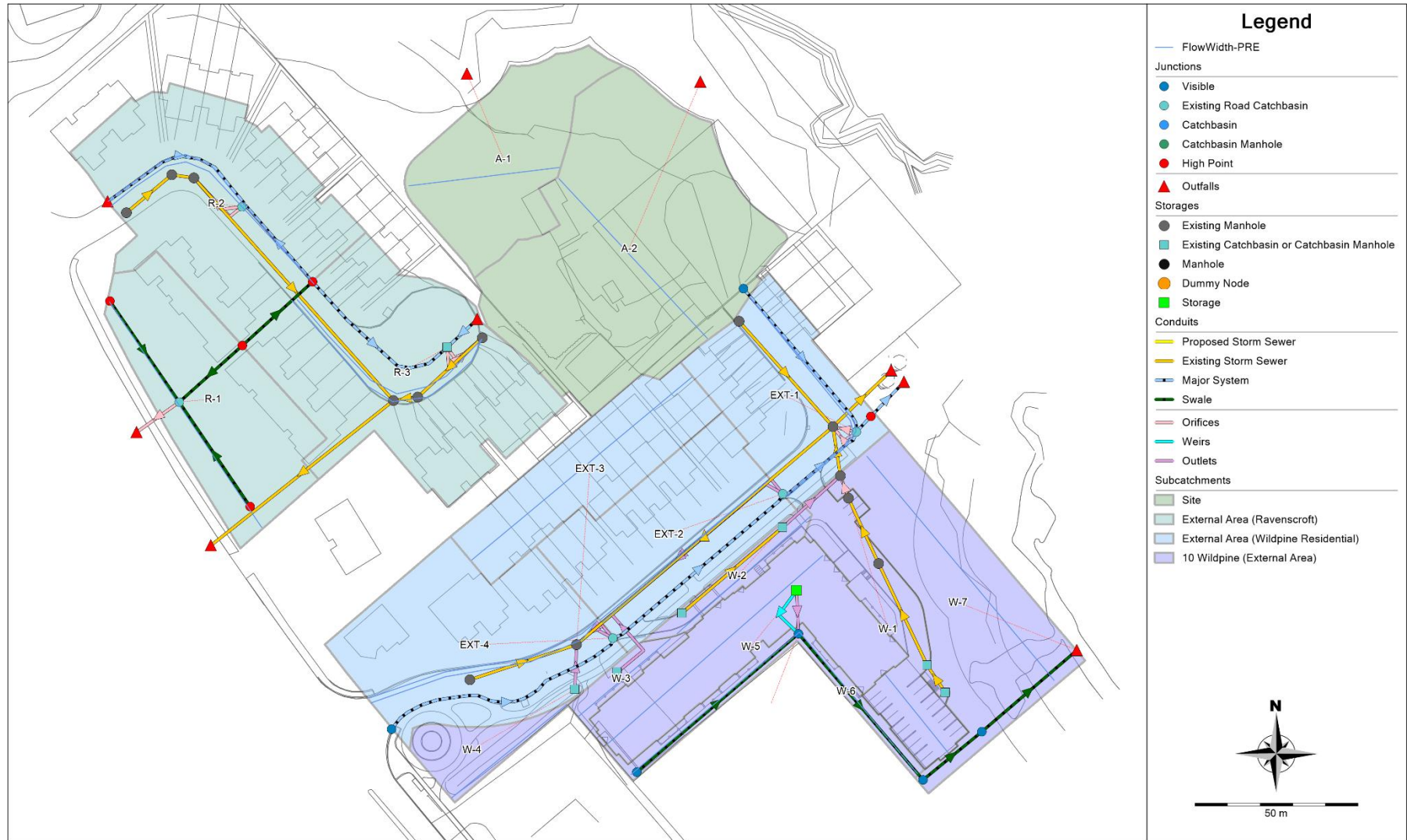


Date: 2026-08-18

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

Subcatchments and Flow Paths

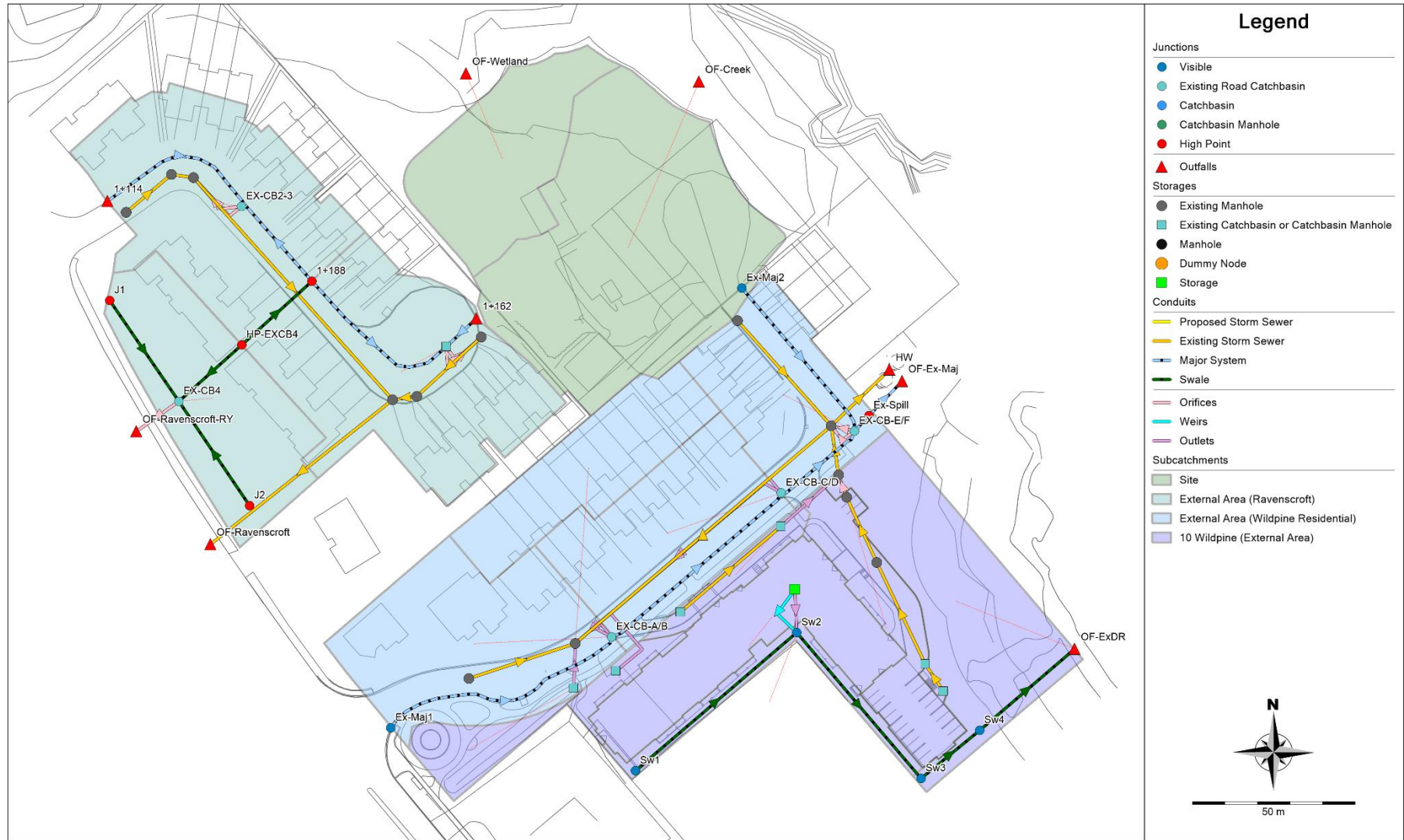


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37 Wildpine (125077) Pre-Development – PCSWMM Model Schematics

Junctions and Outfalls

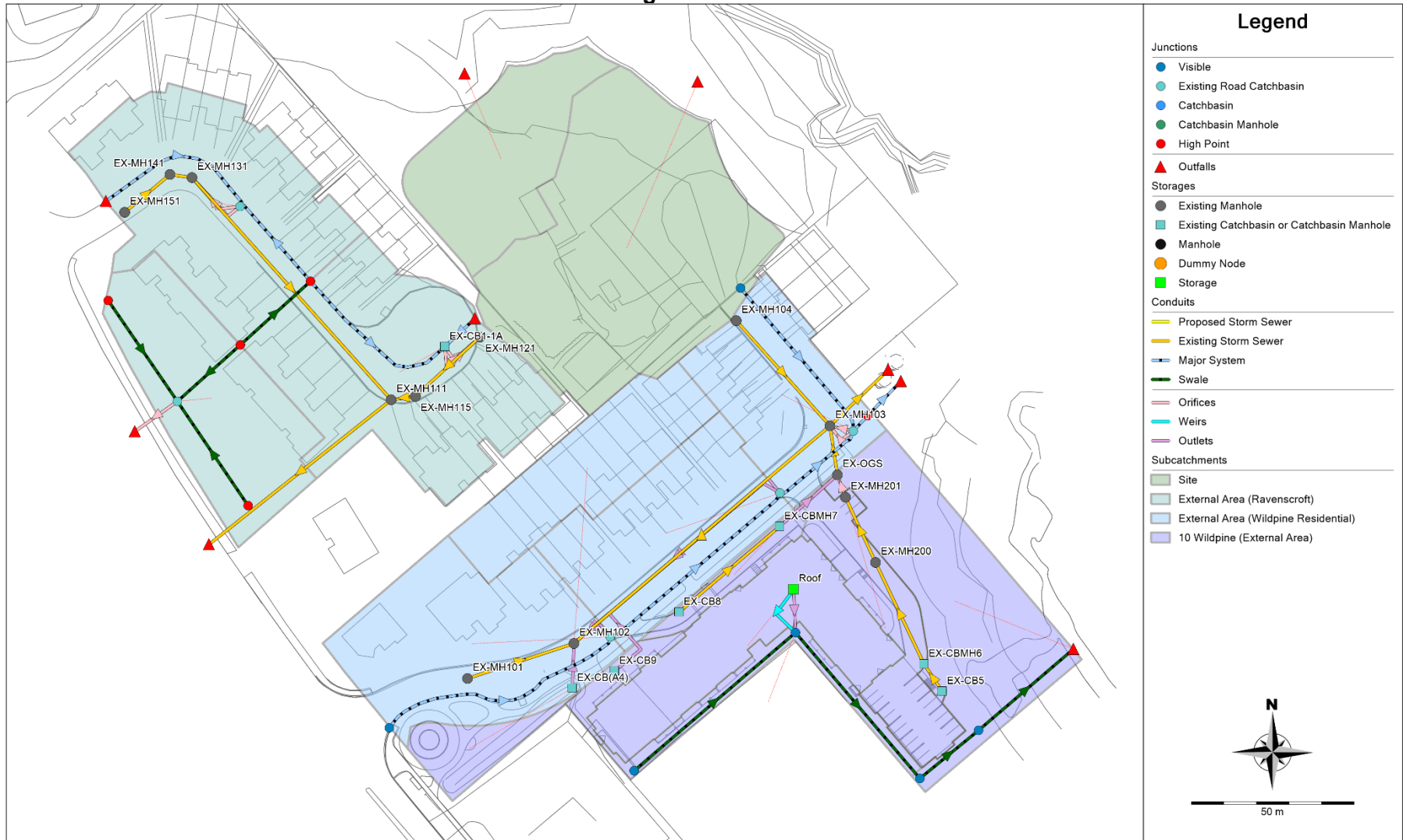


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37 Wildpine (125077) Pre-Development – PCSWMM Model Schematics

Storage Nodes



Date: 2026-08-18

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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 Ravenscroft Ct, Wildpine Sewer and 10 Wildpine Warehouse development

Element Count

Number of rain gages 1
Number of subcatchments ... 16
Number of nodes 46
Number of links 50
Number of pollutants 0
Number of land uses 0

Raingage Summary

Name	Data Source	Data Type	Recording 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
R-1	0.28	82.84	14.30	2.0000	Raingage	EX-CB4
R-2	0.38	165.41	61.40	2.0000	Raingage	EX-CB2-3
R-3	0.42	153.36	61.40	2.0000	Raingage	EX-CB1-1A

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

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
1+188	JUNCTION	120.27	1.00	0.0	
EX-CB2-3	JUNCTION	120.02	1.00	0.0	
EX-CB4	JUNCTION	118.30	3.05	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-Maj2	JUNCTION	117.64	1.00	0.0	
Ex-Spill	JUNCTION	117.50	1.00	0.0	
HP-EXCB4	JUNCTION	120.78	1.00	0.0	
J1	JUNCTION	120.67	1.00	0.0	
J2	JUNCTION	120.72	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	
1+114	OUTFALL	120.40	0.27	0.0	
1+162	OUTFALL	119.77	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-Ravenscroft	OUTFALL	117.32	0.38	0.0	
OF-Ravenscroft-RY	OUTFALL	118.30	0.00	0.0	
OF-Wetland	OUTFALL	116.00	0.00	0.0	
EX-CB (A4)	STORAGE	116.64	2.31	0.0	

37 Wildpine (125077)

Pre-Development PCSWMM Model Results - 100-year 3-hour Chicago Storm Event

EX-CB1-1A	STORAGE	119.53	1.00	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-MH111	STORAGE	117.53	2.13	0.0
EX-MH115	STORAGE	117.56	2.09	0.0
EX-MH121	STORAGE	117.68	1.99	0.0
EX-MH131	STORAGE	117.87	2.35	0.0
EX-MH141	STORAGE	117.97	2.30	0.0
EX-MH151	STORAGE	118.07	2.28	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
EXMH101-EXMH102	EX-MH101	EX-MH102	CONDUIT	34.2	2.3691	0.0130
EXMH102-EXMH103	EX-MH102	EX-MH103	CONDUIT	102.2	1.0470	0.0130
EXMH103-HW	EX-MH103	HW	CONDUIT	18.8	1.0107	0.0130
EXMH104-EXMH103	EX-MH104	EX-MH103	CONDUIT	43.0	1.0698	0.0130
EXMH111-OF	EX-MH111	OF-Ravenscroft	CONDUIT	70.7	0.2970	0.0130
EXMH115-EXMH111	EX-MH115	EX-MH111	CONDUIT	7.5	0.1333	0.0130
EXMH121-EXMH115	EX-MH121	EX-MH115	CONDUIT	26.7	0.3745	0.0130
EXMH131-EXMH111	EX-MH131	EX-MH111	CONDUIT	91.0	0.3407	0.0130
EXMH141-EXMH131	EX-MH141	EX-MH131	CONDUIT	6.7	1.1941	0.0130
EXMH151-EXMH141	EX-MH151	EX-MH141	CONDUIT	18.0	0.4444	0.0130
EXMH200-EXMH201	EX-MH200	EX-MH201	CONDUIT	20.0	0.1000	0.0130

EXOGS-EXMH103	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
MS07	1+114	EX-CB2-3	CONDUIT	53.0	0.7170	0.0160
MS08	1+188	EX-CB2-3	CONDUIT	32.0	0.7813	0.0160
MS09	1+188	EX-CB1-1A	CONDUIT	35.0	2.1148	0.0160
MS10	1+162	EX-CB1-1A	CONDUIT	3.0	8.0257	0.0130
Spill-EXCB4a	HP-EXCB4	EX-CB4	CONDUIT	26.0	1.6926	0.0130
Spill-EXCB4b	HP-EXCB4	1+188	CONDUIT	29.0	1.7589	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
Swale-R1	J1	EX-CB4	CONDUIT	34.0	0.9706	0.0350
Swale-R2	J2	EX-CB4	CONDUIT	37.6	1.0107	0.0350
O-CB-E	EX-CB-E/F	EX-MH103	ORIFICE			
O-CB-F	EX-CB-E/F	EX-MH103	ORIFICE			
O-EXCB1	EX-CB1-1A	EX-MH121	ORIFICE			
O-EXCB1A	EX-CB1-1A	EX-MH121	ORIFICE			
O-EXCB2	EX-CB2-3	EX-MH131	ORIFICE			
O-EXCB3	EX-CB2-3	EX-MH131	ORIFICE			
O-EXCB4	EX-CB4	OF-Ravenscroft-RY	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

37 Wildpine (125077)

Pre-Development PCSWMM Model Results - 100-year 3-hour Chicago Storm Event

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
EXMH101-EXMH102	CIRCULAR	0.30	0.07	0.07	0.30	1	148.85
EXMH102-EXMH103	CIRCULAR	0.38	0.11	0.09	0.38	1	179.42
EXMH103-HW	CIRCULAR	0.38	0.11	0.09	0.38	1	176.28
EXMH104-EXMH103	CIRCULAR	0.30	0.07	0.07	0.30	1	100.03
EXMH111-OF	CIRCULAR	0.38	0.11	0.09	0.38	1	95.56
EXMH115-EXMH111	CIRCULAR	0.30	0.07	0.07	0.30	1	35.31
EXMH121-EXMH115	CIRCULAR	0.30	0.07	0.07	0.30	1	59.18
EXMH131-EXMH111	CIRCULAR	0.30	0.07	0.07	0.30	1	56.44
EXMH141-EXMH131	CIRCULAR	0.30	0.07	0.07	0.30	1	105.68
EXMH151-EXMH141	CIRCULAR	0.30	0.07	0.07	0.30	1	64.47
EXMH200-EXMH201	HORIZ_ELLIPSE	1.22	1.89	0.37	1.92	1	2383.13
EXOXS-EXMH103	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
MS07	20mROW-8.5mRoad	0.27	2.37	0.13	20.00	1	3147.90
MS08	20mROW-8.5mRoad	0.27	2.37	0.13	20.00	1	3285.97
MS09	20mROW-8.5mRoad	0.27	2.37	0.13	20.00	1	5406.19
MS10	RECT_OPEN	1.00	3.00	0.60	3.00	1	46510.07
Spill-EXCB4a	TRAPEZOIDAL	1.00	3.00	0.47	6.00	1	18261.47
Spill-EXCB4b	TRAPEZOIDAL	1.00	3.00	0.47	6.00	1	18615.92
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
Swale-R1	TRAPEZOIDAL	1.00	3.00	0.47	6.00	1	5136.51
Swale-R2	TRAPEZOIDAL	1.00	3.00	0.47	6.00	1	5241.42

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

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

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	0.496
Total Precipitation	0.266	71.667
Evaporation Loss	0.000	0.000
Infiltration Loss	0.096	25.843
Surface Runoff	0.172	46.472
Final Storage	0.002	0.496
Continuity Error (%)	-0.897	

	Volume	Volume
Flow Routing Continuity	hectare-m	10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.172	1.722

Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.173	1.727
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 (%)	-0.336	

Time-Step Critical Elements
None

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 : 1.99 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 :

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Pre-Development PCSWMM Model Results - 100-year 3-hour Chicago Storm Event

2.000 - 1.516 sec : 99.34 %
1.516 - 1.149 sec : 0.30 %
1.149 - 0.871 sec : 0.33 %
0.871 - 0.660 sec : 0.02 %
0.660 - 0.500 sec : 0.01 %

Subcatchment Runoff Summary

Peak Runoff		Total	Total	Total	Total	Imperv	Perv	Total	Total
Runoff	Coeff	Precip	Runon	Evap	Infil	Runoff	Runoff	Runoff	Runoff
Subcatchment		mm	mm	mm	mm	mm	mm	mm	10^6 ltr
LPS									
A-1		71.67	0.00	0.00	43.33	5.09	23.83	28.92	0.06
45.24	0.404								
A-2		71.67	0.00	0.00	36.81	16.44	18.79	35.24	0.20
122.64	0.492								
EXT-1		71.67	0.00	0.00	15.75	46.14	10.74	56.88	0.12
99.49	0.794								
EXT-2		71.67	0.00	0.00	16.47	45.15	10.84	55.99	0.15
119.42	0.781								
EXT-3		71.67	0.00	0.00	35.60	15.35	21.55	36.90	0.07
61.37	0.515								
EXT-4		71.67	0.00	0.00	19.14	40.99	12.29	53.28	0.18
146.70	0.743								
R-1		71.67	0.00	0.00	39.67	10.26	22.35	32.61	0.09
68.37	0.455								
R-2		71.67	0.00	0.00	17.19	44.09	11.13	55.22	0.21
167.97	0.770								
R-3		71.67	0.00	0.00	17.25	44.11	10.99	55.10	0.23
182.54	0.769								
W-1		71.67	0.00	0.00	4.45	65.03	2.89	67.92	0.09
62.52	0.948								
W-2		71.67	0.00	0.00	4.38	64.68	3.22	67.90	0.03
19.55	0.947								

W-3		71.67	0.00	0.00	31.98	20.51	20.19	40.70	0.01
11.22	0.568								
W-4		71.67	0.00	0.00	35.15	16.43	20.82	37.24	0.02
18.35	0.520								
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	41.38	5.09	26.75	31.84	0.02
21.85	0.444								
W-7		71.67	0.00	0.00	45.18	5.09	21.74	26.83	0.08
42.23	0.374								

Node Depth Summary

		Average	Maximum	Maximum	Time of Max	Reported
		Depth	Depth	HGL	Occurrence	Max Depth
Node	Type	Meters	Meters	Meters	days hr:min	Meters
1+188	JUNCTION	0.00	0.00	120.27	0 00:00	0.00
EX-CB2-3	JUNCTION	0.00	0.12	120.14	0 01:11	0.12
EX-CB4	JUNCTION	0.00	0.38	118.68	0 01:10	0.38
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
HP-EXCB4	JUNCTION	0.00	0.00	120.78	0 00:00	0.00
J1	JUNCTION	0.00	0.00	120.67	0 00:00	0.00
J2	JUNCTION	0.00	0.00	120.72	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
1+114	OUTFALL	0.00	0.00	120.40	0 00:00	0.00
1+162	OUTFALL	0.00	0.00	119.77	0 00:00	0.00
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

37 Wildpine (125077)

Pre-Development PCSWMM Model Results - 100-year 3-hour Chicago Storm Event

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-Ravenscroft	OUTFALL	0.01	0.38	117.69	0	01:03	0.38
OF-Ravenscroft-RY	OUTFALL	0.00	0.00	118.30	0	00:00	0.00
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-CB1-1A	STORAGE	0.00	0.18	119.71	0	01:13	0.18
EX-CB5	STORAGE	0.02	0.81	115.51	0	01:22	0.80
EX-CB8	STORAGE	0.02	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	0.85
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-MH111	STORAGE	0.02	1.23	118.76	0	01:15	1.23
EX-MH115	STORAGE	0.02	1.29	118.85	0	01:16	1.29
EX-MH121	STORAGE	0.02	1.48	119.16	0	01:15	1.48
EX-MH131	STORAGE	0.02	2.17	120.04	0	01:13	2.16
EX-MH141	STORAGE	0.02	2.07	120.04	0	01:13	2.07
EX-MH151	STORAGE	0.01	1.98	120.05	0	01:13	1.97
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	0.98
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

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
1+188	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr
EX-CB2-3	JUNCTION	167.97	167.97	0 01:10	0.21	0.21	-0.005
EX-CB4	JUNCTION	68.37	68.37	0 01:10	0.0913	0.0913	-0.004

EX-CB-A/B	JUNCTION	146.70	146.70	0 01:10	0.181	0.181	-0.037
EX-CB-C/D	JUNCTION	119.42	203.47	0 01:10	0.148	0.214	-0.387
EX-CB-E/F	JUNCTION	99.49	239.28	0 01:10	0.122	0.221	0.407
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	125.66	0 01:12	0	0.0683	0.010
HP-EXCB4	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr
J1	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr
J2	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	21.85	28.15	0 01:10	0.0191	0.183	0.477
Sw3	JUNCTION	0.00	26.64	0 01:10	0	0.182	0.020
Sw4	JUNCTION	0.00	26.10	0 01:11	0	0.182	0.012
1+114	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
1+162	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
HW	OUTFALL	0.00	215.99	0 01:15	0	0.605	0.000
OF-Creek	OUTFALL	122.64	122.64	0 01:10	0.196	0.196	0.000
OF-ExDR	OUTFALL	42.23	64.67	0 01:11	0.0805	0.262	0.000
OF-Ex-Maj	OUTFALL	0.00	125.66	0 01:12	0	0.0683	0.000
OF-Ravenscroft	OUTFALL	0.00	215.37	0 01:16	0	0.442	0.000
OF-Ravenscroft-RY	OUTFALL	0.00	67.77	0 01:10	0	0.0913	0.000
OF-Wetland	OUTFALL	45.24	45.24	0 01:10	0.0636	0.0636	0.000
EX-CB (A4)	STORAGE	18.35	18.35	0 01:10	0.0223	0.0224	0.012
EX-CB1-1A	STORAGE	182.54	182.54	0 01:10	0.231	0.231	-0.001
EX-CB5	STORAGE	0.00	1.62	0 01:04	0	0.00108	0.086
EX-CB8	STORAGE	0.00	14.48	0 01:05	0	0.00546	0.150
EX-CB9	STORAGE	11.22	11.22	0 01:10	0.0122	0.0122	0.036
EX-CBMH6	STORAGE	0.00	9.04	0 01:04	0	0.00701	0.019
EX-CBMH7	STORAGE	19.55	19.55	0 01:10	0.0271	0.0328	-0.028
EX-MH101	STORAGE	0.00	0.00	0 00:00	0	0	0.000 ltr
EX-MH102	STORAGE	61.37	169.41	0 01:10	0.0705	0.337	0.010
EX-MH103	STORAGE	0.00	219.33	0 01:10	0	0.607	-0.082
EX-MH104	STORAGE	0.00	6.42	0 01:06	0	0.00157	0.177
EX-MH111	STORAGE	0.00	218.38	0 01:13	0	0.441	-0.110
EX-MH115	STORAGE	0.00	104.69	0 01:14	0	0.231	-0.098
EX-MH121	STORAGE	0.00	106.43	0 01:13	0	0.231	0.023
EX-MH131	STORAGE	0.00	146.26	0 01:11	0	0.22	0.054
EX-MH141	STORAGE	0.00	25.56	0 01:04	0	0.0152	-0.111
EX-MH151	STORAGE	0.00	13.95	0 01:04	0	0.00473	0.511
EX-MH200	STORAGE	0.00	35.70	0 01:05	0	0.034	0.077
EX-MH201	STORAGE	62.52	62.52	0 01:10	0.0883	0.117	-0.049

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

EX-OGS	STORAGE	0.00	20.63	0	01:39	0	0.117	0.026
Roof	STORAGE	109.05	109.05	0	01:10	0.159	0.159	-2.994

Node Surcharge Summary

No nodes were surcharged.

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	13.4	0 01:29	4.05
EX-CB1-1A	0.000	0.3	0.0	0.0	0.026	36.1	0 01:13	106.43
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	2.95
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	14.5	0 01:12	160.29
EX-MH103	0.000	8.6	0.0	0.0	0.001	23.9	0 01:15	218.67
EX-MH104	0.000	0.1	0.0	0.0	0.000	8.0	0 01:15	6.56
EX-MH111	0.000	0.8	0.0	0.0	0.001	57.8	0 01:15	215.37
EX-MH115	0.000	0.8	0.0	0.0	0.001	61.7	0 01:16	105.89
EX-MH121	0.000	0.9	0.0	0.0	0.002	74.4	0 01:15	104.69

EX-MH131	0.000	0.9	0.0	0.0	0.002	92.1	0 01:13	127.33
EX-MH141	0.000	0.7	0.0	0.0	0.002	90.0	0 01:13	14.11
EX-MH151	0.000	0.6	0.0	0.0	0.002	87.0	0 01:13	6.76
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	40.10
EX-OGS	0.000	7.6	0.0	0.0	0.001	23.6	0 01:15	22.80
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
1+114	0.00	0.00	0.00	0.000
1+162	0.00	0.00	0.00	0.000
HW	10.35	39.42	215.99	0.605
OF-Creek	7.50	18.29	122.64	0.196
OF-ExDR	28.44	5.87	64.67	0.262
OF-Ex-Maj	1.23	52.18	125.66	0.068
OF-Ravenscroft	8.95	34.79	215.37	0.442
OF-Ravenscroft-RY	6.84	9.69	67.77	0.091
OF-Wetland	6.68	6.95	45.24	0.064
System	7.78	167.19	800.13	1.728

Street Flow Summary

Back	Peak	Peak	Peak	Maximum	Maximum	Peak	Avg.	Bypass
Flow	Capture	Bypass	Peak	Maximum	Maximum	Flow	Flow	Flow

37 Wildpine (125077)

Pre-Development PCSWMM Model Results - 100-year 3-hour Chicago Storm Event

Freq / Inlet	Flow	Flow	Spread	Depth	Inlet	Inlet	Inlet	Capture	Capture	Freq
Street Conduit	LPS	LPS	m	m	Design	Location		Pcnt	Pcnt	Pcnt
Pcnt	LPS	LPS								

MS01		0.000	1.212	0.036						
MS02		85.824	2.581	0.077						
MS03		143.733	4.250	0.153						
MS04		0.000	3.799	0.114						
MS07		0.000	1.980	0.059						
MS08		0.000	1.980	0.059						
MS09		0.000	2.988	0.090						

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
EXMH101-EXMH102	CONDUIT	0.00	0 00:00	0.00	0.00	0.50
EXMH102-EXMH103	CONDUIT	160.29	0 01:10	1.50	0.89	1.00
EXMH103-HW	CONDUIT	215.99	0 01:15	1.96	1.23	1.00
EXMH104-EXMH103	CONDUIT	6.56	0 01:18	0.15	0.07	0.86
EXMH111-OF	CONDUIT	215.37	0 01:16	1.95	2.25	1.00
EXMH115-EXMH111	CONDUIT	105.89	0 01:18	1.50	3.00	1.00
EXMH121-EXMH115	CONDUIT	104.69	0 01:14	1.48	1.77	1.00
EXMH131-EXMH111	CONDUIT	117.82	0 01:13	1.67	2.09	1.00
EXMH141-EXMH131	CONDUIT	25.56	0 01:04	0.37	0.24	1.00
EXMH151-EXMH141	CONDUIT	13.95	0 01:04	0.29	0.22	1.00
EXMH200-EXMH201	CONDUIT	35.70	0 01:05	0.08	0.01	0.79
EXOGS-EXMH103	CONDUIT	22.80	0 01:38	0.24	0.25	1.00
MS01	CONDUIT	0.00	0 00:00	0.00	0.00	0.14
MS02	CONDUIT	85.82	0 01:10	0.43	0.03	0.29

MS03	CONDUIT	143.73	0 01:10	0.40	0.04	0.58
MS04	CONDUIT	0.00	0 00:00	0.00	0.00	0.43
MS05	CONDUIT	125.66	0 01:12	1.54	0.13	0.55
MS06	CONDUIT	125.66	0 01:12	4.03	0.06	0.34
MS07	CONDUIT	0.00	0 00:00	0.00	0.00	0.22
MS08	CONDUIT	0.00	0 00:00	0.00	0.00	0.22
MS09	CONDUIT	0.00	0 00:00	0.00	0.00	0.34
MS10	CONDUIT	0.00	0 00:00	0.00	0.00	0.09
Spill-EXCB4a	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
Spill-EXCB4b	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
Swale1	CONDUIT	0.00	0 00:00	0.00	0.00	0.41
Swale2	CONDUIT	26.64	0 01:10	0.69	0.55	0.79
Swale3	CONDUIT	26.10	0 01:11	0.61	0.49	0.83
Swale4	CONDUIT	25.66	0 01:12	0.50	0.76	0.90
Swale-R1	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
Swale-R2	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
O-CB-E	ORIFICE	24.82	0 01:12			1.00
O-CB-F	ORIFICE	24.82	0 01:12			1.00
O-EXCB1	ORIFICE	16.59	0 01:13			
O-EXCB1A	ORIFICE	89.84	0 01:13			
O-EXCB2	ORIFICE	73.13	0 01:11			
O-EXCB3	ORIFICE	73.13	0 01:11			
O-EXCB4	ORIFICE	67.77	0 01:10			1.00
O-EXMH201	ORIFICE	16.90	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

Adjusted ----- Fraction of Time in Flow Class -----

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

Conduit	/Actual Length	Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
EXCB5-EXCBMH6	1.00	0.00	0.14	0.00	0.86	0.00	0.00	0.00	0.82	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
EXMH101-EXMH102	1.00	0.94	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EXMH102-EXMH103	1.00	0.00	0.63	0.00	0.37	0.00	0.00	0.00	0.99	0.00
EXMH103-HW	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
EXMH104-EXMH103	1.00	0.00	0.95	0.00	0.05	0.00	0.00	0.00	0.97	0.00
EXMH111-OF	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.95	0.00
EXMH115-EXMH111	1.00	0.00	0.00	0.00	0.06	0.00	0.00	0.94	0.00	0.00
EXMH121-EXMH115	1.00	0.00	0.00	0.00	0.03	0.00	0.00	0.97	0.01	0.00
EXMH131-EXMH111	1.00	0.00	0.00	0.00	0.04	0.00	0.00	0.96	0.02	0.00
EXMH141-EXMH131	1.00	0.93	0.03	0.00	0.04	0.00	0.00	0.00	0.97	0.00
EXMH151-EXMH141	1.00	0.00	0.00	0.00	0.01	0.00	0.00	0.99	0.00	0.00
EXMH200-EXMH201	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
EXOGS-EXMH103	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	0.00	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	0.79	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS08	1.00	0.79	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS09	1.00	0.75	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS10	1.00	0.75	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Spill-EXCB4a	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Spill-EXCB4b	1.00	1.00	0.00	0.00	0.00	0.00	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
Swale-R1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Swale-R2	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

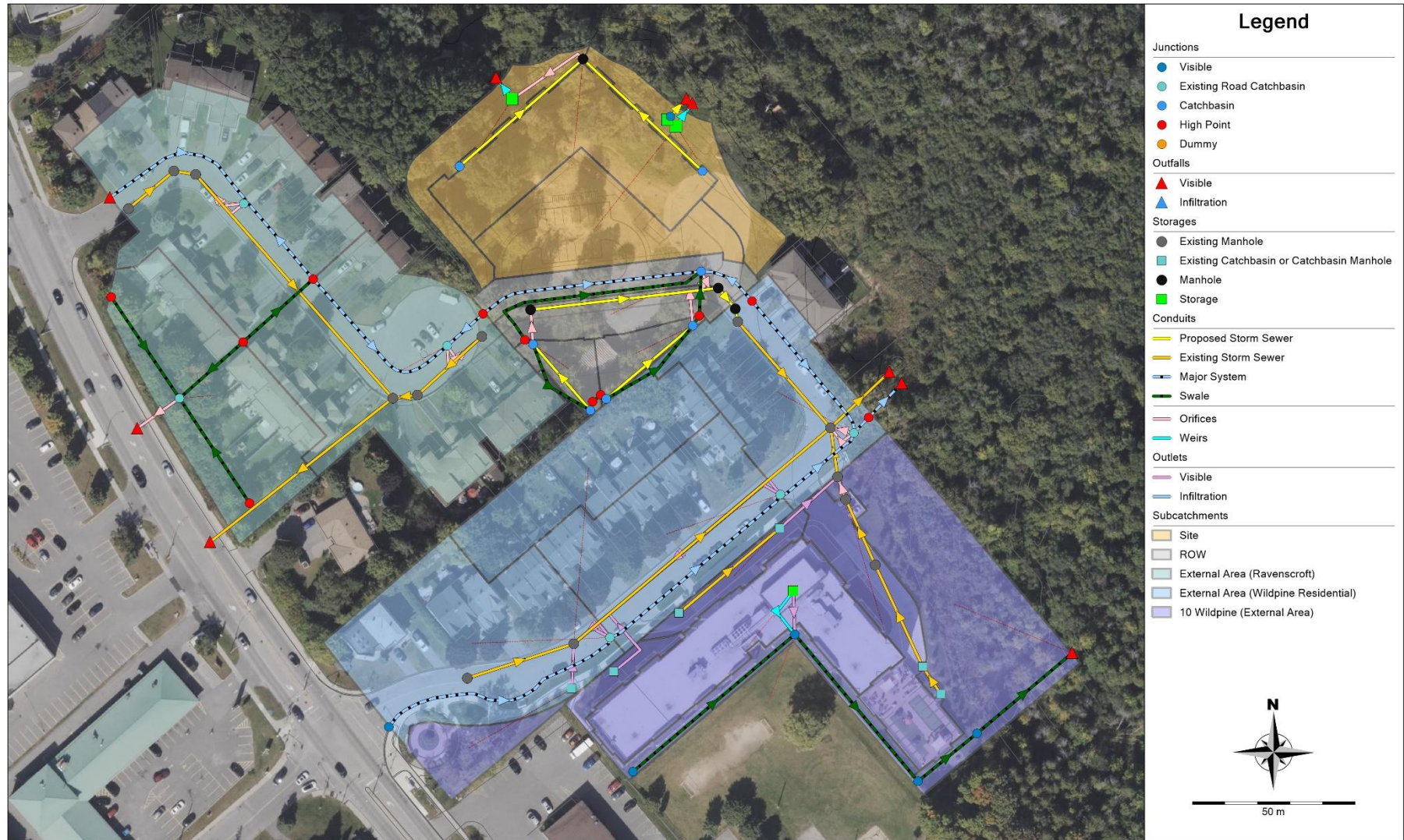
Conduit Surcharge Summary

Conduit	Hours Full			Hours	Hours
	Both Ends	Upstream	Dnstream	Above Full Normal Flow	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
EXMH102-EXMH103	0.04	0.04	0.48	0.01	0.01
EXMH103-HW	0.56	0.56	48.00	0.25	0.38
EXMH104-EXMH103	0.01	0.01	0.53	0.01	0.01
EXMH111-OF	0.44	0.44	0.46	0.46	0.44
EXMH115-EXMH111	0.46	0.47	0.46	0.51	0.46
EXMH121-EXMH115	0.44	0.44	0.46	0.42	0.40
EXMH131-EXMH111	0.42	0.42	0.46	0.35	0.34
EXMH141-EXMH131	0.39	0.39	0.41	0.01	0.01
EXMH151-EXMH141	0.37	0.37	0.38	0.01	0.01
EXOGS-EXMH103	0.45	0.45	0.56	0.01	0.01

Analysis begun on: Tue Aug 18 13:23:42 2026
Analysis ended on: Tue Aug 18 13:23:45 2026
Total elapsed time: 00:00:03

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

Overall Model Schematic

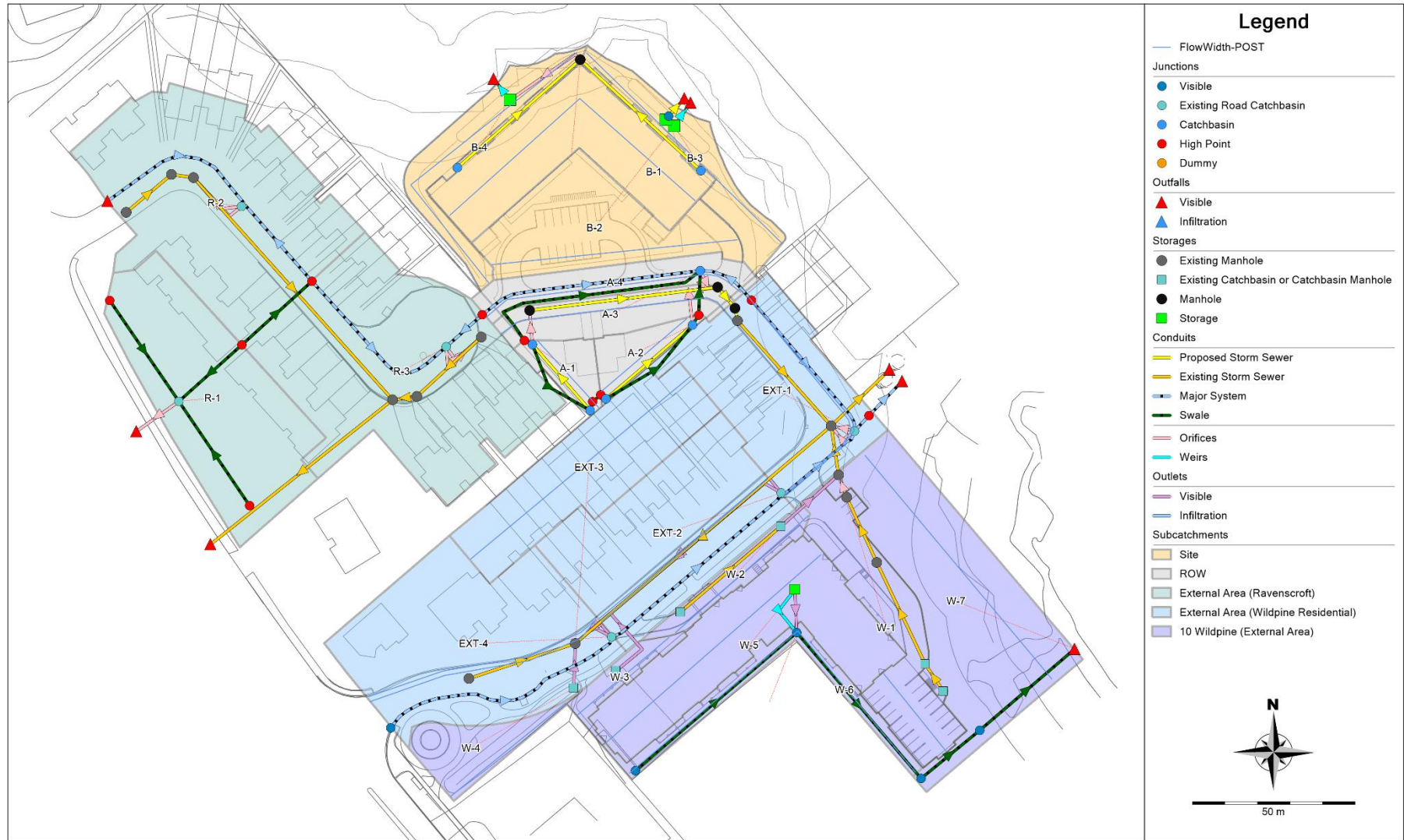


Date: 2026-08-18

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

Subcatchments and Flow Paths

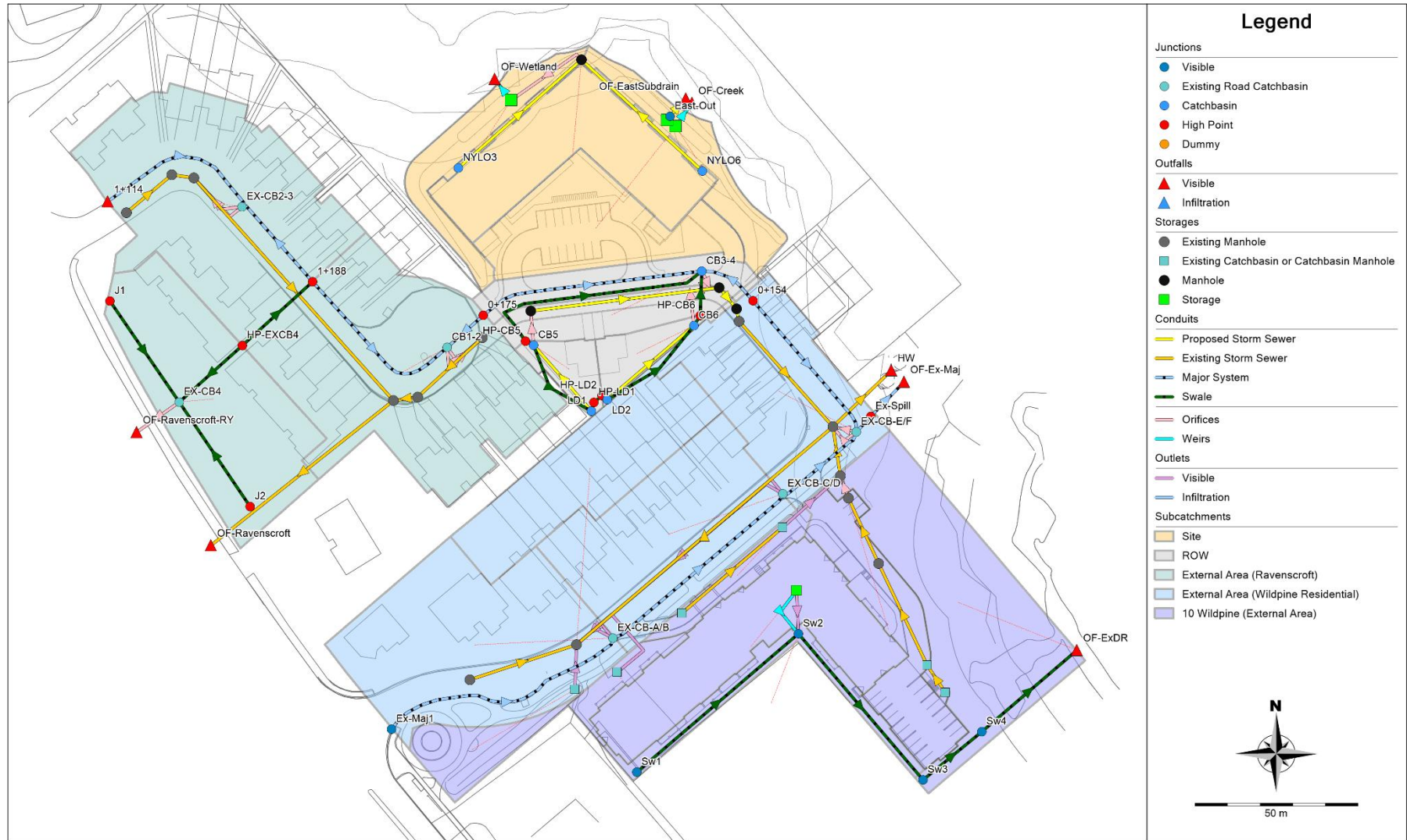


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37 Wildpine (125077) Post-Development – PCSWMM Model Schematics

Junctions and Outfalls

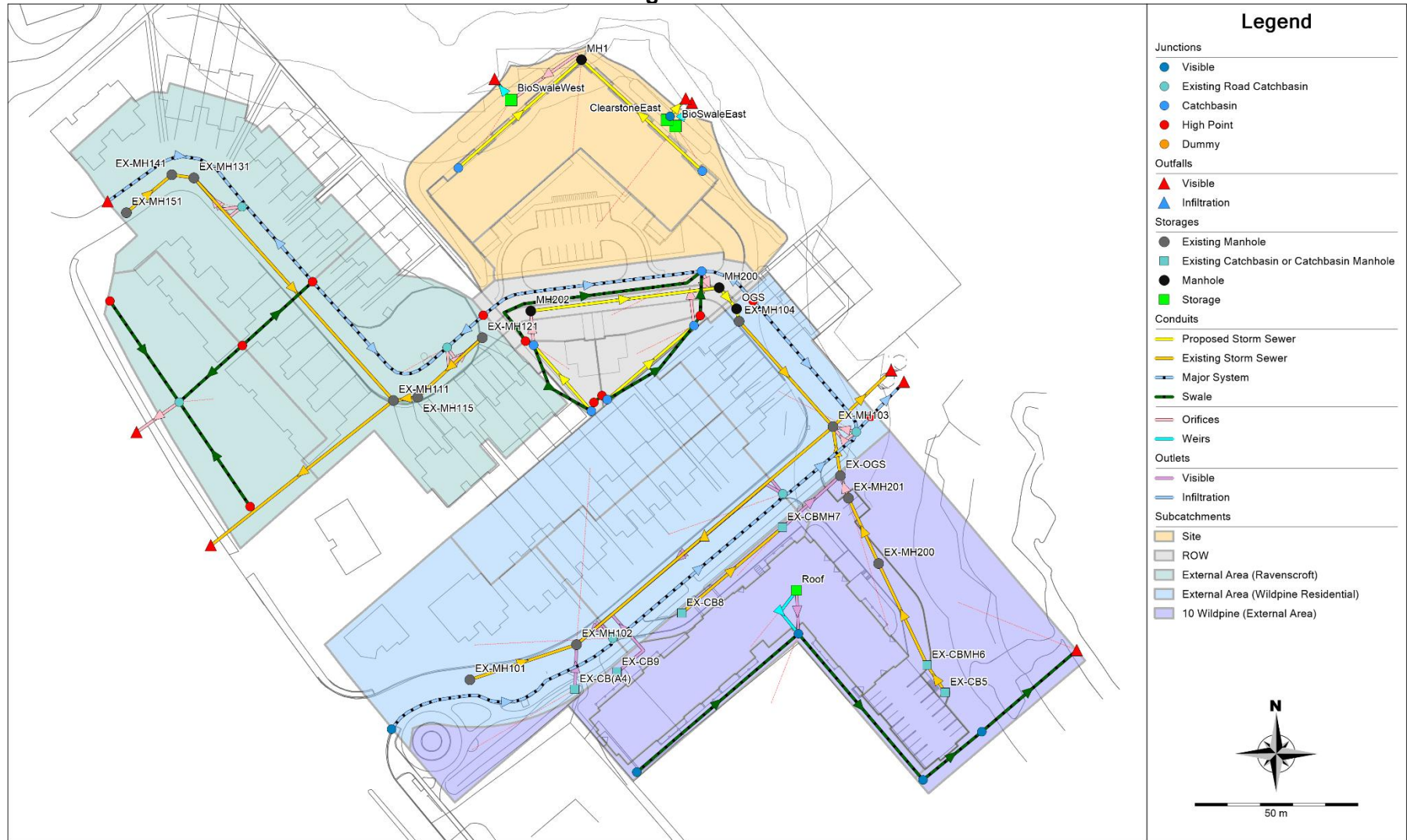


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37 Wildpine (125077) Post-Development – PCSWMM Model Schematics

Storage Nodes



Date: 2026-08-18

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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 subdivision
WARNING 04: minimum elevation drop used for Conduit EastSubdrain

Element Count

Number of rain gages 1
Number of subcatchments ... 22
Number of nodes 66
Number of links 79
Number of pollutants 0
Number of land uses 0

Raingage Summary

Name	Data Source	Data Type	Recording 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	CB3-4
A-4	0.08	81.70	71.40	2.0000	Raingage	CB3-4
B-1	0.20	100.25	100.00	0.5000	Raingage	MH1
B-2	0.17	75.30	65.70	2.0000	Raingage	BioSwaleEast
B-3	0.08	82.95	7.10	2.0000	Raingage	BioSwaleEast
B-4	0.09	103.04	8.60	2.0000	Raingage	BioSwaleWest
EXT-1	0.23	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
R-1	0.28	82.84	14.30	2.0000	Raingage	EX-CB4
R-2	0.38	165.41	61.40	2.0000	Raingage	EX-CB2-3
R-3	0.42	153.36	61.40	2.0000	Raingage	CB1-2
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

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
0+154	JUNCTION	117.66	1.00	0.0	
0+175	JUNCTION	119.61	1.00	0.0	
1+188	JUNCTION	120.27	1.00	0.0	
CB1-2	JUNCTION	118.33	2.20	0.0	
CB3-4	JUNCTION	116.00	2.50	0.0	
CB5	JUNCTION	117.35	2.75	0.0	
CB6	JUNCTION	115.85	2.75	0.0	
East-Out	JUNCTION	114.95	1.55	0.0	
EX-CB2-3	JUNCTION	120.02	1.00	0.0	
EX-CB4	JUNCTION	118.30	3.05	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	
HP-CB5	JUNCTION	119.30	0.30	0.0	
HP-CB6	JUNCTION	117.90	0.30	0.0	
HP-EXCB4	JUNCTION	120.78	1.00	0.0	
HP-LD1	JUNCTION	118.80	0.30	0.0	
HP-LD2	JUNCTION	118.75	0.30	0.0	

37 Wildpine (125077)

Post-Development PCSWMM Model Results - 100-year 3-hour Chicago Storm Event

J1	JUNCTION	120.67	1.00	0.0
J2	JUNCTION	120.72	1.00	0.0
LD1	JUNCTION	117.65	2.00	0.0
LD2	JUNCTION	116.78	2.72	0.0
NYLO3	JUNCTION	116.29	1.53	0.0
NYLO6	JUNCTION	116.23	1.59	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
1+114	OUTFALL	120.40	0.27	0.0
HW	OUTFALL	114.17	0.45	0.0
OF-Creek	OUTFALL	116.20	0.00	0.0
OF-EastSubdrain	OUTFALL	114.90	0.25	0.0
OF-ExDR	OUTFALL	114.38	0.15	0.0
OF-Ex-Maj	OUTFALL	115.17	0.30	0.0
OF-Ravenscroft	OUTFALL	117.32	0.38	0.0
OF-Ravenscroft-RY	OUTFALL	118.30	0.00	0.0
OF-Wetland	OUTFALL	116.20	0.00	0.0
BioSwaleEast	STORAGE	115.75	0.75	0.0
BioSwaleWest	STORAGE	114.95	1.55	0.0
ClearstoneEast	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	114.37	3.17	0.0
EX-MH104	STORAGE	114.97	2.71	0.0
EX-MH111	STORAGE	117.53	2.13	0.0
EX-MH115	STORAGE	117.56	2.09	0.0
EX-MH121	STORAGE	117.68	1.99	0.0
EX-MH131	STORAGE	117.87	2.35	0.0
EX-MH141	STORAGE	117.97	2.30	0.0
EX-MH151	STORAGE	118.07	2.28	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

MH1	STORAGE	116.18	1.62	0.0
MH200	STORAGE	115.11	2.54	0.0
MH202	STORAGE	115.72	3.71	0.0
OGS	STORAGE	115.04	2.69	0.0
Roof	STORAGE	120.00	1.00	0.0

Link Summary

Name	From Node	To Node	Type	Length	%Slope	Roughness
EastOutlet	East-Out	OF-EastSubdrain	CONDUIT	7.3	0.6849	0.0130
EastSubdrain	ClearstoneEast	East-Out	CONDUIT	3.0	0.0102	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
EXMH101-EXMH102	EX-MH101	EX-MH102	CONDUIT	34.2	2.3691	0.0130
EXMH102-EXMH103	EX-MH102	EX-MH103	CONDUIT	102.2	1.0470	0.0130
EXMH103-HW	EX-MH103	HW	CONDUIT	18.8	1.0639	0.0130
EXMH104-EXMH103	EX-MH104	EX-MH103	CONDUIT	43.0	1.0698	0.0130
EXMH111-OF	EX-MH111	OF-Ravenscroft	CONDUIT	70.7	0.2970	0.0130
EXMH115-EXMH111	EX-MH115	EX-MH111	CONDUIT	7.5	0.1333	0.0130
EXMH121-EXMH115	EX-MH121	EX-MH115	CONDUIT	26.7	0.3745	0.0130
EXMH131-EXMH111	EX-MH131	EX-MH111	CONDUIT	91.0	0.3407	0.0130
EXMH141-EXMH131	EX-MH141	EX-MH131	CONDUIT	6.7	1.1941	0.0130
EXMH151-EXMH141	EX-MH151	EX-MH141	CONDUIT	18.0	0.4444	0.0130
EXMH200-EXMH201	EX-MH200	EX-MH201	CONDUIT	20.0	0.1000	0.0130
EXOGS-EXMH103	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	34.7	0.5187	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	0+154	EX-CB-E/F	CONDUIT	51.4	0.4863	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	1+114	EX-CB2-3	CONDUIT	53.0	0.7170	0.0160
MS08	1+188	EX-CB2-3	CONDUIT	32.0	0.7813	0.0160

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

MS09	1+188	CB1-2	CONDUIT	56.0	1.3215	0.0160
MS10	0+175	CB1-2	CONDUIT	15.0	0.5333	0.0160
MS11	0+175	CB3-4	CONDUIT	69.0	3.0590	0.0160
MS12	0+154	CB3-4	CONDUIT	18.8	0.8511	0.0160
NYLO3-MH1	NYLO3	MH1	CONDUIT	50.0	0.1000	0.0130
NYLO6-MH1	NYLO6	MH1	CONDUIT	50.0	0.1000	0.0130
OGS-EXMH104	OGS	EX-MH104	CONDUIT	3.9	1.0257	0.0130
Spill-CB5a	HP-CB5	CB5	CONDUIT	3.0	6.6815	0.0350
Spill-CB5b	HP-CB5	CB3-4	CONDUIT	3.0	75.0000	0.0350
Spill-CB6a	HP-CB6	CB6	CONDUIT	3.0	10.0504	0.0350
Spill-CB6b	HP-CB6	CB3-4	CONDUIT	3.0	13.4535	0.0350
Spill-EXCB4a	HP-EXCB4	EX-CB4	CONDUIT	26.0	1.6926	0.0130
Spill-EXCB4b	HP-EXCB4	1+188	CONDUIT	29.0	1.7589	0.0130
Spill-LD1a	HP-LD1	LD1	CONDUIT	3.0	5.0063	0.0350
Spill-LD1b	CB5	LD1	CONDUIT	3.0	15.1717	0.0350
Spill-LD2a	LD2	CB6	CONDUIT	3.0	31.4485	0.0350
Spill-LD2b	HP-LD2	LD2	CONDUIT	3.0	8.3624	0.0350
Spill-RY	HP-LD1	HP-LD2	CONDUIT	3.0	1.6669	0.0350
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
Swale-R1	J1	EX-CB4	CONDUIT	34.0	0.9706	0.0350
Swale-R2	J2	EX-CB4	CONDUIT	37.6	1.0107	0.0350
O-CB1	CB1-2	EX-MH121	ORIFICE			
O-CB2	CB1-2	EX-MH121	ORIFICE			
O-CB3	CB3-4	MH200	ORIFICE			
O-CB4	CB3-4	MH200	ORIFICE			
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-EXCB2	EX-CB2-3	EX-MH131	ORIFICE			
O-EXCB3	EX-CB2-3	EX-MH131	ORIFICE			
O-EXCB4	EX-CB4	OF-Ravenscroft-RY	ORIFICE			
O-EXMH201	EX-MH201	EX-OGS	ORIFICE			
O-MH1	MH1	BioSwaleWest	ORIFICE			
Maj-EastBio	BioSwaleEast	OF-Creek	WEIR			
Maj-WestBio	BioSwaleWest	OF-Wetland	WEIR			
Roof-Spill	Roof	Sw2	WEIR			
EastOverflow	BioSwaleEast	East-Out	OUTLET			

EastSandFilter	BioSwaleEast	ClearstoneEast	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

Cross Section Summary

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
EastOutlet	CIRCULAR	0.25	0.05	0.06	0.25	1	49.22
EastSubdrain	CIRCULAR	0.15	0.02	0.04	0.15	1	1.54
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
EXMH101-EXMH102	CIRCULAR	0.30	0.07	0.07	0.30	1	148.85
EXMH102-EXMH103	CIRCULAR	0.38	0.11	0.09	0.38	1	179.42
EXMH103-HW	CIRCULAR	0.45	0.16	0.11	0.45	1	294.09
EXMH104-EXMH103	CIRCULAR	0.30	0.07	0.07	0.30	1	100.03
EXMH111-OF	CIRCULAR	0.38	0.11	0.09	0.38	1	95.56
EXMH115-EXMH111	CIRCULAR	0.30	0.07	0.07	0.30	1	35.31
EXMH121-EXMH115	CIRCULAR	0.30	0.07	0.07	0.30	1	59.18
EXMH131-EXMH111	CIRCULAR	0.30	0.07	0.07	0.30	1	56.44
EXMH141-EXMH131	CIRCULAR	0.30	0.07	0.07	0.30	1	105.68
EXMH151-EXMH141	CIRCULAR	0.30	0.07	0.07	0.30	1	64.47
EXMH200-EXMH201	HORIZ_ELLIPSE	1.22	1.89	0.37	1.92	1	2383.13
EXOGS-EXMH103	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	69.65
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

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MS04	20mROW-8.5mRoad	0.27	2.37	0.13	20.00	1	2592.60
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	3147.90
MS08	20mROW-8.5mRoad	0.27	2.37	0.13	20.00	1	3285.97
MS09	20mROW-8.5mRoad	0.27	2.37	0.13	20.00	1	4273.68
MS10	20mROW-8.5mRoad	0.27	2.37	0.13	20.00	1	2714.96
MS11	20mROW-8.5mRoad	0.27	2.37	0.13	20.00	1	6502.02
MS12	20mROW-8.5mRoad	0.27	2.37	0.13	20.00	1	3429.74
NYLO3-MH1	CIRCULAR	0.90	0.64	0.23	0.90	1	572.51
NYLO6-MH1	CIRCULAR	0.90	0.64	0.23	0.90	1	572.51
OGS-EXMH104	CIRCULAR	0.30	0.07	0.07	0.30	1	97.94
Spill-CB5a	TRAPEZOIDAL	0.30	0.27	0.14	1.80	1	543.54
Spill-CB5b	TRAPEZOIDAL	0.30	0.27	0.14	1.80	1	1821.07
Spill-CB6a	TRAPEZOIDAL	0.30	0.27	0.14	1.80	1	666.63
Spill-CB6b	TRAPEZOIDAL	0.30	0.27	0.14	1.80	1	771.28
Spill-EXCB4a	TRAPEZOIDAL	1.00	3.00	0.47	6.00	1	18261.47
Spill-EXCB4b	TRAPEZOIDAL	1.00	3.00	0.47	6.00	1	18615.92
Spill-LD1a	TRAPEZOIDAL	0.30	0.27	0.14	1.80	1	470.49
Spill-LD1b	TRAPEZOIDAL	0.30	0.27	0.14	1.80	1	819.06
Spill-LD2a	TRAPEZOIDAL	0.30	0.27	0.14	1.80	1	1179.23
Spill-LD2b	TRAPEZOIDAL	0.30	0.27	0.14	1.80	1	608.08
Spill-RY	TRAPEZOIDAL	0.30	0.27	0.14	1.80	1	271.49
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
Swale-R1	TRAPEZOIDAL	1.00	3.00	0.47	6.00	1	5136.51
Swale-R2	TRAPEZOIDAL	1.00	3.00	0.47	6.00	1	5241.42

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

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Post-Development PCSWMM Model Results - 100-year 3-hour Chicago Storm Event

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	0.544
Total Precipitation	0.266	71.667
Evaporation Loss	0.000	0.000
Infiltration Loss	0.080	21.689
Surface Runoff	0.188	50.736
Final Storage	0.002	0.544
Continuity Error (%)	-1.051	

	Volume	Volume
Flow Routing Continuity	hectare-m	10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.188	1.880
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.001
External Outflow	0.186	1.859
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000

Initial Stored Volume	0.013	0.130
Final Stored Volume	0.013	0.131
Continuity Error (%)	1.014	

Highest Continuity Errors
Node BioSwaleWest (8.74%)
Node CB3-4 (1.54%)

Time-Step Critical Elements
Link OGS-EXMH104 (3.02%)

Highest Flow Instability Indexes
Link O-MH1 (69)
Link Maj-WestBio (7)
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 : 2.05

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Post-Development PCSWMM Model Results - 100-year 3-hour Chicago Storm Event

% of Steps Not Converging : 0.00
Time Step Frequencies :
2.000 - 1.516 sec : 97.46 %
1.516 - 1.149 sec : 2.11 %
1.149 - 0.871 sec : 0.40 %
0.871 - 0.660 sec : 0.01 %
0.660 - 0.500 sec : 0.01 %

Subcatchment Runoff Summary

Peak Runoff		Total	Total	Total	Total	Imperv	Perv	Total	Total
Runoff Coeff		Precip	Runon	Evap	Infil	Runoff	Runoff	Runoff	Runoff
Subcatchment		mm	mm	mm	mm	mm	mm	mm	10^6 ltr
LPS									
A-1		71.67	0.00	0.00	30.53	22.52	19.82	42.34	0.01
14.07	0.591								
A-2		71.67	0.00	0.00	33.67	17.42	21.91	39.33	0.01
14.98	0.549								
A-3		71.67	0.00	0.00	22.09	35.86	14.92	50.78	0.04
33.91	0.709								
A-4		71.67	0.00	0.00	12.56	51.22	8.91	60.13	0.05
37.43	0.839								
B-1		71.67	0.00	0.00	0.00	72.08	0.00	72.08	0.14
99.18	1.006								
B-2		71.67	0.00	0.00	15.23	47.18	10.00	57.18	0.09
74.82	0.798								
B-3		71.67	0.00	0.00	41.35	5.09	26.82	31.91	0.02
28.67	0.445								
B-4		71.67	0.00	0.00	40.61	6.16	26.61	32.77	0.03
33.10	0.457								
EXT-1		71.67	0.00	0.00	15.76	46.14	10.69	56.83	0.13
106.60	0.793								
EXT-2		71.67	0.00	0.00	16.47	45.15	10.84	55.99	0.15
119.42	0.781								

EXT-3		71.67	0.00	0.00	35.61	15.35	21.54	36.89	0.07
61.58	0.515								
EXT-4		71.67	0.00	0.00	19.14	40.99	12.29	53.28	0.18
146.70	0.743								
R-1		71.67	0.00	0.00	39.67	10.26	22.35	32.61	0.09
68.37	0.455								
R-2		71.67	0.00	0.00	17.19	44.09	11.13	55.22	0.21
167.97	0.770								
R-3		71.67	0.00	0.00	17.25	44.11	10.99	55.10	0.23
182.54	0.769								
W-1		71.67	0.00	0.00	4.45	65.03	2.89	67.92	0.09
62.52	0.948								
W-2		71.67	0.00	0.00	4.38	64.68	3.22	67.90	0.03
19.55	0.947								
W-3		71.67	0.00	0.00	31.98	20.51	20.19	40.70	0.01
11.22	0.568								
W-4		71.67	0.00	0.00	35.15	16.43	20.82	37.24	0.02
18.35	0.520								
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	41.38	5.09	26.75	31.84	0.02
21.85	0.444								
W-7		71.67	0.00	0.00	45.18	5.09	21.74	26.83	0.08
42.23	0.374								

Node Depth Summary

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
0+154	JUNCTION	0.00	0.04	117.70	0 01:18	0.04
0+175	JUNCTION	0.00	0.05	119.66	0 01:12	0.05
1+188	JUNCTION	0.00	0.00	120.27	0 00:00	0.00
CB1-2	JUNCTION	0.02	1.35	119.68	0 01:11	1.35
CB3-4	JUNCTION	0.06	1.70	117.70	0 01:18	1.70
CB5	JUNCTION	0.02	1.28	118.63	0 01:14	1.28
CB6	JUNCTION	0.02	1.33	117.18	0 01:14	1.33

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East-Out	JUNCTION	0.01	0.11	115.06	0	01:32	0.11
EX-CB2-3	JUNCTION	0.00	0.12	120.14	0	01:11	0.12
EX-CB4	JUNCTION	0.01	0.38	118.68	0	01:10	0.38
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
HP-CB5	JUNCTION	0.00	0.00	119.30	0	00:00	0.00
HP-CB6	JUNCTION	0.00	0.00	117.90	0	00:00	0.00
HP-EXCB4	JUNCTION	0.00	0.00	120.78	0	00:00	0.00
HP-LD1	JUNCTION	0.00	0.00	118.80	0	00:00	0.00
HP-LD2	JUNCTION	0.00	0.00	118.75	0	00:00	0.00
J1	JUNCTION	0.00	0.00	120.67	0	00:00	0.00
J2	JUNCTION	0.00	0.00	120.72	0	00:00	0.00
LD1	JUNCTION	0.01	0.98	118.63	0	01:14	0.98
LD2	JUNCTION	0.00	0.40	117.18	0	01:15	0.40
NYLO3	JUNCTION	0.02	0.70	116.99	0	01:22	0.70
NYLO6	JUNCTION	0.02	0.77	117.00	0	01:21	0.76
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
1+114	OUTFALL	0.00	0.00	120.40	0	00:00	0.00
HW	OUTFALL	0.53	0.53	114.70	0	00:00	0.53
OF-Creek	OUTFALL	0.00	0.00	116.20	0	00:00	0.00
OF-EastSubdrain	OUTFALL	0.01	0.09	114.99	0	01:33	0.09
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-Ravenscroft	OUTFALL	0.01	0.38	117.69	0	01:02	0.38
OF-Ravenscroft-RY	OUTFALL	0.00	0.00	118.30	0	00:00	0.00
OF-Wetland	OUTFALL	0.00	0.00	116.20	0	00:00	0.00
BioSwaleEast	STORAGE	0.07	0.40	116.15	0	01:28	0.40
BioSwaleWest	STORAGE	1.25	1.26	116.21	0	01:11	1.26
ClearstoneEast	STORAGE	0.02	0.11	115.06	0	01:33	0.11
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	0.25	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	0.33	0.62	114.99	0	01:11	0.62
EX-MH104	STORAGE	0.01	0.12	115.09	0	01:16	0.12
EX-MH111	STORAGE	0.02	1.06	118.59	0	01:15	1.06
EX-MH115	STORAGE	0.02	1.07	118.63	0	01:15	1.07
EX-MH121	STORAGE	0.02	1.12	118.80	0	01:15	1.12
EX-MH131	STORAGE	0.02	2.16	120.03	0	01:13	2.15
EX-MH141	STORAGE	0.02	2.06	120.03	0	01:13	2.05
EX-MH151	STORAGE	0.02	1.97	120.04	0	01:13	1.95
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	0.51	114.99	0	01:11	0.51
MH1	STORAGE	0.05	0.81	116.99	0	01:21	0.81
MH200	STORAGE	0.01	0.15	115.26	0	01:16	0.15
MH202	STORAGE	0.00	0.05	115.77	0	01:15	0.05
OGS	STORAGE	0.01	0.13	115.17	0	01:16	0.13
Roof	STORAGE	0.02	0.14	120.14	0	02:03	0.14

Node Inflow Summary

Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
0+154	JUNCTION	0.00	32.44	0 01:12	0	0.0117	20.156
0+175	JUNCTION	0.00	73.69	0 01:11	0	0.0279	-5.525
1+188	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr
CB1-2	JUNCTION	182.54	182.54	0 01:10	0.231	0.232	-0.061
CB3-4	JUNCTION	71.34	123.75	0 01:11	0.0861	0.115	1.562
CB5	JUNCTION	14.07	14.07	0 01:10	0.0148	0.0168	-0.065
CB6	JUNCTION	14.98	14.98	0 01:10	0.0149	0.0164	-0.096
East-Out	JUNCTION	0.00	14.23	0 01:32	0	0.12	-0.001
EX-CB2-3	JUNCTION	167.97	167.97	0 01:10	0.21	0.21	0.003
EX-CB4	JUNCTION	68.37	68.37	0 01:10	0.0913	0.0913	-0.003
EX-CB-A/B	JUNCTION	146.70	146.70	0 01:10	0.181	0.181	-0.031

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EX-CB-C/D	JUNCTION	119.42	203.49	0	01:10	0.148	0.214	-0.420
EX-CB-E/F	JUNCTION	106.60	246.37	0	01:10	0.131	0.239	-0.318
Ex-Maj1	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 ltr
Ex-Spill	JUNCTION	0.00	136.37	0	01:12	0	0.0809	0.007
HP-CB5	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 ltr
HP-CB6	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 ltr
HP-EXCB4	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 ltr
HP-LD1	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 ltr
HP-LD2	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 ltr
J1	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 ltr
J2	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 ltr
LD1	JUNCTION	0.00	5.35	0	01:07	0	0.00202	0.425
LD2	JUNCTION	0.00	6.80	0	01:09	0	0.00148	0.930
NYLO3	JUNCTION	0.00	22.28	0	01:09	0	0.0137	0.344
NYLO6	JUNCTION	0.00	22.19	0	01:07	0	0.0147	0.164
Sw1	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 ltr
Sw2	JUNCTION	21.85	28.15	0	01:10	0.0191	0.183	0.469
Sw3	JUNCTION	0.00	26.64	0	01:10	0	0.182	0.020
Sw4	JUNCTION	0.00	26.11	0	01:11	0	0.182	0.012
1+114	OUTFALL	0.00	0.00	0	00:00	0	0	0.000 ltr
HW	OUTFALL	0.00	260.02	0	01:11	0	0.744	0.000
OF-Creek	OUTFALL	0.00	0.00	0	00:00	0	0	0.000 ltr
OF-EastSubdrain	OUTFALL	0.00	14.23	0	01:33	0	0.119	0.000
OF-ExDR	OUTFALL	42.23	64.68	0	01:11	0.0805	0.262	0.000
OF-Ex-Maj	OUTFALL	0.00	136.37	0	01:12	0	0.0809	0.000
OF-Ravenscroft	OUTFALL	0.00	196.81	0	01:15	0	0.415	0.000
OF-Ravenscroft-RY	OUTFALL	0.00	67.75	0	01:10	0	0.0913	0.000
OF-Wetland	OUTFALL	0.00	87.88	0	01:11	0	0.147	0.000
BioSwaleEast	STORAGE	103.48	103.48	0	01:10	0.119	0.119	0.011
BioSwaleWest	STORAGE	33.10	56.45	0	01:10	0.0285	0.289	9.573
ClearstoneEast	STORAGE	0.00	4.54	0	01:22	0	0.0858	0.002
EX-CB (A4)	STORAGE	18.35	18.35	0	01:10	0.0223	0.0224	0.051
EX-CB5	STORAGE	0.00	1.34	0	01:03	0	0.000976	0.062
EX-CB8	STORAGE	0.00	14.38	0	01:05	0	0.00554	0.095
EX-CB9	STORAGE	11.22	11.22	0	01:10	0.0122	0.0122	0.093
EX-CBMH6	STORAGE	0.00	7.60	0	01:04	0	0.00646	-0.014
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	61.58	169.63	0	01:10	0.0708	0.337	0.014
EX-MH103	STORAGE	0.00	260.80	0	01:10	0	0.744	-0.018
EX-MH104	STORAGE	0.00	33.24	0	01:16	0	0.132	-0.003

EX-MH111	STORAGE	0.00	199.30	0	01:13	0	0.414	-0.012
EX-MH115	STORAGE	0.00	88.58	0	01:05	0	0.204	-0.188
EX-MH121	STORAGE	0.00	92.39	0	01:05	0	0.204	0.033
EX-MH131	STORAGE	0.00	146.27	0	01:11	0	0.22	0.022
EX-MH141	STORAGE	0.00	28.50	0	01:04	0	0.0151	-0.143
EX-MH151	STORAGE	0.00	16.57	0	01:04	0	0.00467	0.392
EX-MH200	STORAGE	0.00	31.71	0	01:05	0	0.0311	0.036
EX-MH201	STORAGE	62.52	62.52	0	01:10	0.0883	0.114	-0.036
EX-OGS	STORAGE	0.00	20.29	0	01:27	0	0.116	0.024
MH1	STORAGE	99.18	99.18	0	01:10	0.144	0.173	-0.054
MH200	STORAGE	0.00	33.25	0	01:15	0	0.132	0.011
MH202	STORAGE	0.00	5.98	0	01:14	0	0.0148	-0.085
OGS	STORAGE	0.00	33.24	0	01:16	0	0.132	0.000
Roof	STORAGE	109.05	109.05	0	01:10	0.159	0.159	-2.939

Node Surcharge Summary

No nodes were surcharged.

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
BioSwaleEast	0.012	12.3	0.0	0.0	0.081	83.4	0 01:28	15.03
BioSwaleWest	0.116	99.9	0.0	0.0	0.116	100.0	0 00:19	87.88

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ClearstoneEast	0.001	4.7	0.0	0.0	0.005	27.1	0	01:33	2.70
EX-CB (A4)	0.000	0.4	0.0	0.0	0.009	13.4	0	01:29	4.05
EX-CB5	0.000	1.2	0.0	0.0	0.000	41.3	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	38.7	0	01:22	1.34
EX-CBMH7	0.000	6.2	0.0	0.0	0.002	41.3	0	01:23	17.26
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	10.6	0	01:10	166.41
EX-MH103	0.000	10.5	0.0	0.0	0.001	19.6	0	01:11	260.02
EX-MH104	0.000	0.2	0.0	0.0	0.000	4.4	0	01:16	33.23
EX-MH111	0.000	0.9	0.0	0.0	0.001	49.6	0	01:15	196.81
EX-MH115	0.000	0.9	0.0	0.0	0.001	51.4	0	01:15	88.21
EX-MH121	0.000	0.9	0.0	0.0	0.001	56.5	0	01:15	88.58
EX-MH131	0.000	1.0	0.0	0.0	0.002	91.8	0	01:13	129.80
EX-MH141	0.000	0.7	0.0	0.0	0.002	89.7	0	01:13	16.57
EX-MH151	0.000	0.7	0.0	0.0	0.002	86.5	0	01:13	7.80
EX-MH200	0.001	5.2	0.0	0.0	0.005	26.6	0	01:22	7.60
EX-MH201	0.001	6.1	0.0	0.0	0.005	27.5	0	01:22	41.80
EX-OGS	0.000	7.5	0.0	0.0	0.001	17.3	0	01:11	21.30
MH1	0.000	2.8	0.0	0.0	0.001	50.3	0	01:21	65.27
MH200	0.000	0.3	0.0	0.0	0.000	6.0	0	01:16	33.24
MH202	0.000	0.1	0.0	0.0	0.000	1.4	0	01:15	5.97
OGS	0.000	0.2	0.0	0.0	0.000	4.8	0	01:16	33.24
Roof	0.009	8.3	0.0	0.0	0.102	93.0	0	02:03	6.30

Outfall Loading Summary

Outfall Node	Flow	Avg	Max	Total
	Freq Pcnt	Flow LPS	Flow LPS	Volume 10^6 ltr
1+114	0.00	0.00	0.00	0.000
HW	11.91	49.59	260.02	0.744
OF-Creek	0.00	0.00	0.00	0.000
OF-EastSubdrain	36.39	2.08	14.23	0.119
OF-ExDR	28.97	6.39	64.68	0.262

OF-Ex-Maj	1.60	50.16	136.37	0.081
OF-Ravenscroft	9.61	35.53	196.81	0.415
OF-Ravenscroft-RY	7.53	10.47	67.75	0.091
OF-Wetland	9.44	12.30	87.88	0.147
System	11.72	166.51	783.61	1.860

Street Flow Summary

Back Flow Freq	Peak Capture / Inlet Street Pcnt	Peak Bypass Conduit LPS	Peak	Maximum	Maximum	Inlet Design	Inlet Location	Inlet	Peak	Avg.	Bypass
			Flow LPS	Spread m	Depth m				Flow Capture Pcnt	Flow Capture Pcnt	Flow Freq Pcnt
MS01			0.000	1.212	0.036						
MS02			85.821	2.581	0.077						
MS03			143.697	4.250	0.155						
MS04			12.526	4.241	0.128						
MS07			0.000	1.980	0.059						
MS08			0.000	1.980	0.059						
MS09			0.000	2.489	0.075						
MS10			73.685	3.275	0.098						
MS11			68.473	3.873	0.116						
MS12			32.443	3.865	0.116						

Link Flow Summary

Maximum Time of Max Maximum Max/ Max/

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Link	Type	Flow LPS	Occurrence days hr:min	Veloc m/sec	Full Flow	Full Depth
EastOutlet	CONDUIT	14.23	0 01:33	0.78	0.29	0.40
EastSubdrain	CONDUIT	2.94	0 01:22	0.44	1.92	0.72
EXCB5-EXCBMH6	CONDUIT	1.34	0 01:03	0.03	0.02	1.00
EXCB8-EXCBMH7	CONDUIT	14.38	0 01:05	0.16	0.05	1.00
EXCBMH6-EXMH200	CONDUIT	7.60	0 01:04	0.08	0.08	1.00
EXMH101-EXMH102	CONDUIT	0.00	0 00:00	0.00	0.00	0.44
EXMH102-EXMH103	CONDUIT	166.41	0 01:10	1.61	0.93	0.89
EXMH103-HW	CONDUIT	260.02	0 01:11	1.63	0.88	1.00
EXMH104-EXMH103	CONDUIT	33.23	0 01:16	0.70	0.33	0.70
EXMH111-OF	CONDUIT	196.81	0 01:15	1.78	2.06	1.00
EXMH115-EXMH111	CONDUIT	88.21	0 01:23	1.25	2.50	1.00
EXMH121-EXMH115	CONDUIT	88.58	0 01:05	1.25	1.50	1.00
EXMH131-EXMH111	CONDUIT	122.76	0 01:13	1.74	2.17	1.00
EXMH141-EXMH131	CONDUIT	28.50	0 01:04	0.41	0.27	1.00
EXMH151-EXMH141	CONDUIT	16.57	0 01:04	0.35	0.26	1.00
EXMH200-EXMH201	CONDUIT	31.71	0 01:05	0.07	0.01	0.72
EXOGS-EXMH103	CONDUIT	21.30	0 01:39	0.24	0.24	1.00
LD1-CB5	CONDUIT	5.35	0 01:07	0.17	0.08	1.00
LD2-CB6	CONDUIT	6.80	0 01:09	0.21	0.10	1.00
MH200-OGS	CONDUIT	33.24	0 01:16	0.98	0.50	0.49
MH202-MH200	CONDUIT	5.97	0 01:15	0.36	0.06	0.29
MS01	CONDUIT	0.00	0 00:00	0.00	0.00	0.14
MS02	CONDUIT	85.82	0 01:10	0.43	0.03	0.29
MS03	CONDUIT	143.70	0 01:10	0.40	0.04	0.59
MS04	CONDUIT	12.53	0 01:18	0.10	0.00	0.48
MS05	CONDUIT	136.37	0 01:12	1.59	0.14	0.56
MS06	CONDUIT	136.37	0 01:12	4.12	0.06	0.35
MS07	CONDUIT	0.00	0 00:00	0.00	0.00	0.22
MS08	CONDUIT	0.00	0 00:00	0.00	0.00	0.22
MS09	CONDUIT	0.00	0 00:00	0.00	0.00	0.28
MS10	CONDUIT	73.69	0 01:11	0.23	0.03	0.37
MS11	CONDUIT	68.47	0 01:12	0.18	0.01	0.44
MS12	CONDUIT	32.44	0 01:12	0.11	0.01	0.44
NYLO3-MH1	CONDUIT	22.28	0 01:09	0.12	0.04	0.81
NYLO6-MH1	CONDUIT	22.19	0 01:07	0.10	0.04	0.88
OGS-EXMH104	CONDUIT	33.24	0 01:16	1.20	0.34	0.42
Spill-CB5a	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
Spill-CB5b	CONDUIT	0.00	0 00:00	0.00	0.00	0.33

Spill-CB6a	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
Spill-CB6b	CONDUIT	0.00	0 00:00	0.00	0.00	0.33
Spill-EXCB4a	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
Spill-EXCB4b	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
Spill-LD1a	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
Spill-LD1b	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
Spill-LD2a	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
Spill-LD2b	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
Spill-RY	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
Swale1	CONDUIT	0.00	0 00:00	0.00	0.00	0.41
Swale2	CONDUIT	26.64	0 01:10	0.69	0.55	0.79
Swale3	CONDUIT	26.11	0 01:11	0.61	0.49	0.83
Swale4	CONDUIT	25.65	0 01:12	0.50	0.76	0.90
Swale-R1	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
Swale-R2	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
O-CB1	ORIFICE	38.09	0 01:05			1.00
O-CB2	ORIFICE	54.36	0 01:05			1.00
O-CB3	ORIFICE	10.60	0 01:18			1.00
O-CB4	ORIFICE	10.60	0 01:18			1.00
O-CB5	ORIFICE	5.98	0 01:14			1.00
O-CB6	ORIFICE	6.11	0 01:14			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-EXCB2	ORIFICE	73.13	0 01:11			
O-EXCB3	ORIFICE	73.13	0 01:11			
O-EXCB4	ORIFICE	67.75	0 01:10			1.00
O-EXMH201	ORIFICE	16.46	0 01:28			1.00
O-MH1	ORIFICE	26.73	0 01:21			1.00
Maj-EastBio	WEIR	0.00	0 00:00			0.00
Maj-WestBio	WEIR	87.88	0 01:11			0.04
Roof-Spill	WEIR	0.00	0 00:00			0.00
EastOverflow	DUMMY	13.43	0 01:28			
EastSandFilter	DUMMY	1.60	0 00:13			
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			

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Flow Classification Summary

Conduit	Adjusted /Actual Length	-----		Fraction of		Time in Flow Class		-----		Inlet Ctrl
		Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	
EastOutlet	1.00	0.00	0.00	0.00	0.88	0.12	0.00	0.00	0.00	0.00
EastSubdrain	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
EXCB5-EXCBMH6	1.00	0.00	0.13	0.00	0.87	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	0.02	0.00
EXCBMH6-EXMH200	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
EXMH101-EXMH102	1.00	0.94	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EXMH102-EXMH103	1.00	0.00	0.63	0.00	0.37	0.00	0.00	0.00	1.00	0.00
EXMH103-HW	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
EXMH104-EXMH103	1.00	0.00	0.80	0.00	0.20	0.00	0.00	0.00	1.00	0.00
EXMH111-OF	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.95	0.00
EXMH115-EXMH111	1.00	0.00	0.00	0.00	0.06	0.00	0.00	0.94	0.00	0.00
EXMH121-EXMH115	1.00	0.00	0.00	0.00	0.03	0.00	0.00	0.97	0.01	0.00
EXMH131-EXMH111	1.00	0.00	0.00	0.00	0.04	0.00	0.00	0.96	0.02	0.00
EXMH141-EXMH131	1.00	0.93	0.03	0.00	0.04	0.00	0.00	0.00	0.97	0.00
EXMH151-EXMH141	1.00	0.00	0.00	0.00	0.01	0.00	0.00	0.99	0.01	0.00
EXMH200-EXMH201	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
EXOGS-EXMH103	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	0.02	0.00	0.00	0.98	0.00	0.00
LD2-CB6	1.00	0.00	0.00	0.00	0.01	0.00	0.00	0.99	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	0.03	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	0.00	0.00	0.00	0.01	0.00	0.00	0.99	0.01	0.00
MS05	1.00	0.00	0.00	0.00	0.01	0.01	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	0.79	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS08	1.00	0.79	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS09	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00

MS10	1.00	0.00	0.00	0.00	0.01	0.00	0.00	0.99	0.00	0.00
MS11	1.00	0.00	0.00	0.00	0.02	0.00	0.00	0.98	0.02	0.00
MS12	1.00	0.00	0.00	0.00	0.02	0.00	0.00	0.98	0.01	0.00
NYLO3-MH1	1.00	0.00	0.01	0.00	0.05	0.00	0.00	0.94	0.02	0.00
NYLO6-MH1	1.00	0.00	0.92	0.00	0.08	0.00	0.00	0.00	0.93	0.00
OGS-EXMH104	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
Spill-CB5a	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Spill-CB5b	1.00	0.98	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Spill-CB6a	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Spill-CB6b	1.00	0.98	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Spill-EXCB4a	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Spill-EXCB4b	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Spill-LD1a	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Spill-LD1b	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Spill-LD2a	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Spill-LD2b	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Spill-RY	1.00	1.00	0.00	0.00	0.00	0.00	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	0.33	0.00
Swale-R1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Swale-R2	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Conduit Surge Summary

Conduit	-----		Hours		Hours	
	Both	Ends	Upstream	Dnstream	Above Full Normal Flow	Capacity Limited
EastSubdrain	0.01		0.01	0.01	13.72	0.01
EXCB5-EXCBMH6	1.05		1.05	1.14	0.01	0.01
EXCB8-EXCBMH7	0.65		0.65	1.42	0.01	0.01
EXCBMH6-EXMH200	0.99		0.99	1.20	0.01	0.01
EXMH102-EXMH103	0.01		0.01	0.33	0.01	0.01
EXMH103-HW	0.37		0.37	48.00	0.01	0.22
EXMH104-EXMH103	0.01		0.01	0.39	0.01	0.01

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

EXMH111-OF	0.40	0.40	0.42	0.42	0.40
EXMH115-EXMH111	0.43	0.44	0.43	0.45	0.41
EXMH121-EXMH115	0.40	0.41	0.42	0.38	0.36
EXMH131-EXMH111	0.39	0.39	0.42	0.36	0.36
EXMH141-EXMH131	0.37	0.37	0.39	0.01	0.01
EXMH151-EXMH141	0.35	0.35	0.36	0.01	0.01
EXOGS-EXMH103	0.32	0.32	0.38	0.01	0.01
LD1-CB5	0.40	0.40	0.50	0.01	0.01
LD2-CB6	0.16	0.16	0.32	0.01	0.01

Analysis begun on: Tue Aug 18 13:24:11 2026
Analysis ended on: Tue Aug 18 13:24:15 2026
Total elapsed time: 00:00:04

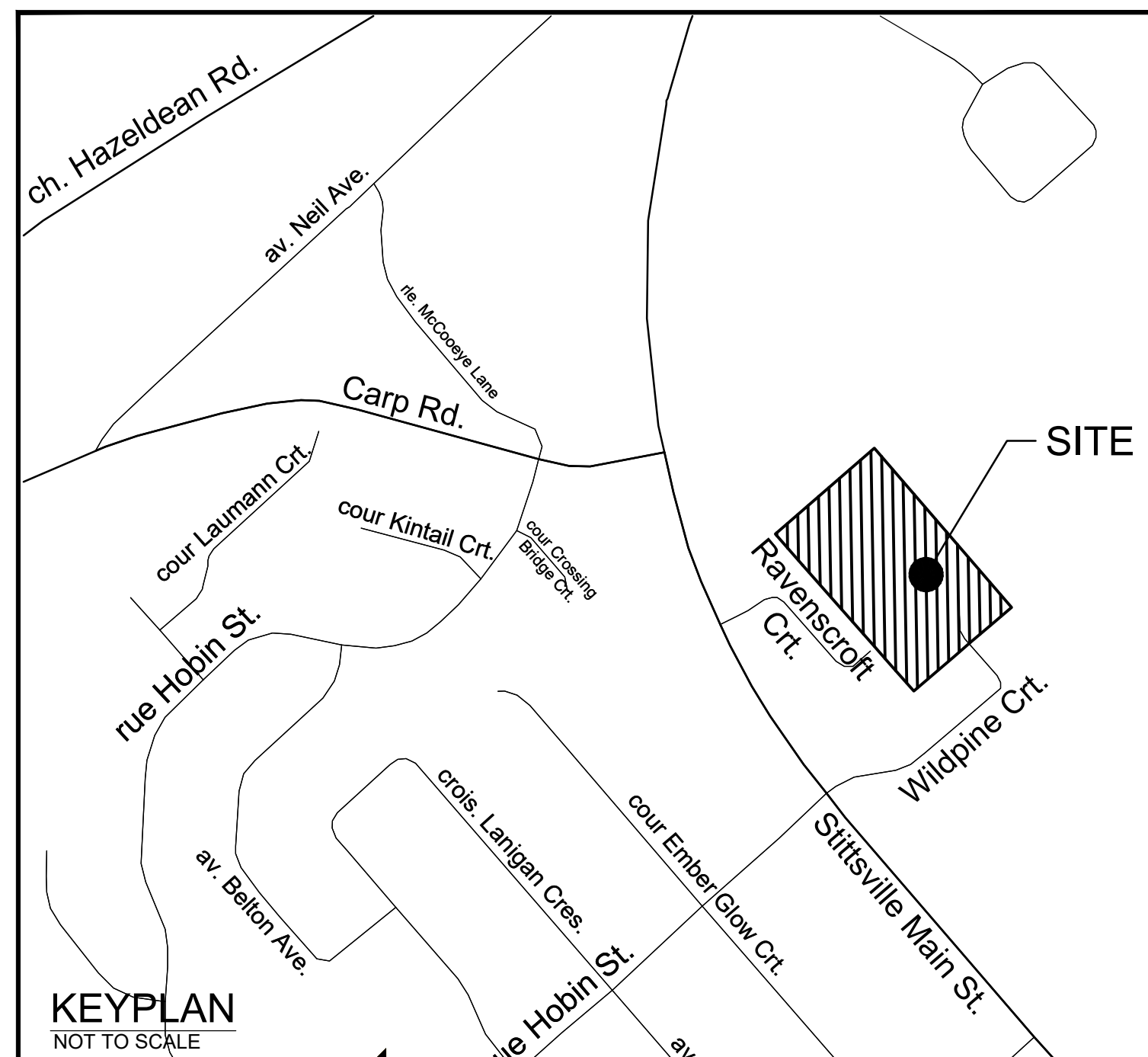
APPENDIX F

Drawings

37 WILDPINE COURT STREET 1

CITY OF OTTAWA

ROADS, SEWERS AND WATERMAINS



INDEX

125077 - ND	NOTES AND DETAILS PLAN STREET 1
125077 - ESC	EROSION SEDIMENT CONTROL PLAN STREET 1
125077 - REM	EXISTING CONDITIONS AND REMOVALS PLAN STREET 1
125077 - GP	GENERAL PLAN OF SERVICES STREET 1
125077 - PP	PLAN AND PROFILE STA 1+000.00 - 1+174.83 STREET 1
125077 - GR	GRADING PLAN STREET 1

PROJECT No. 125077

REVISED PER CITY COMMENTS

125077 - 37 WILDPINE COURT - STREET 1, AUG 27, 2026

GENERAL NOTES:

- DIMENSIONS AND LAYOUT INFORMATION SHALL BE CONFIRMED PRIOR TO COMMENCEMENT OF CONSTRUCTION.
- THE ORIGINAL TOPOGRAPHY AND GROUND ELEVATIONS, SERVICING AND SURVEY INFORMATION SHOWN ARE SUPPLIED FOR INFORMATION PURPOSES ONLY. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE ACCURACY OF ALL INFORMATION OBTAINED FROM THIS PLAN.
- CO-ORDINATE AND SCHEDULE ALL WORK WITH OTHER TRADES AND CONTRACTORS.
- DETERMINE THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION. PROTECT AND ASSUME RESPONSIBILITY FOR ALL EXISTING UTILITIES WHETHER OR NOT SHOWN ON THESE DRAWINGS.
- OBTAIN ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OF OTTAWA BEFORE COMMENCING CONSTRUCTION.
- BEFORE COMMENCING CONSTRUCTION OBTAIN AND PROVIDE PROOF OF COMPREHENSIVE, ALL RISK AND OPERATIONAL LIABILITY INSURANCE FOR \$5,000,000.00. INSURANCE POLICY TO NAME OWNERS, ENGINEERS AND ARCHITECTS AS CO-INSURED.
- CONNECT TO EXISTING SYSTEMS AS DETAILED, INCLUDING ALL RESTORATION WORK NECESSARY TO REINSTATE SURFACES TO EXISTING CONDITIONS OR BETTER.
- RESTORE ALL TRENCHES AND SURFACE FEATURES TO EXISTING CONDITIONS OR BETTER AND TO THE SATISFACTION OF MUNICIPAL AUTHORITIES.
- ASPHALT RESTORATION SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA DETAIL R-10. THICKNESS OF GRANULAR MATERIAL AND ASPHALT LAYERS TO MATCH EXISTING. BOULEVARDS SHALL BE REINSTATE WITH 100mm OF TOPSOIL, SEED AND MULCH.
- REMOVE FROM SITE ALL EXCESS EXCAVATED MATERIAL, ORGANIC MATERIAL AND DEBRIS UNLESS OTHERWISE INSTRUCTED BY ENGINEER. EXCAVATE AND REMOVE FROM SITE ANY CONTAMINATED MATERIAL. ALL CONTAMINATED MATERIAL SHALL BE DISPOSED OF AT A LICENSED LANDFILL FACILITY.
- ALL ELEVATIONS ARE GEODETIC AND UTILITY METRIC UNITS.
- ALL FENCING TO BE LOCATED 0.15m INSIDE PROPERTY LINE. REFER TO LANDSCAPING PLAN FOR DETAILS.
- PERFORATED PIPE SUB-DRAINS TO BE PROVIDED AT SUBGRADE LEVEL EXTENDING FROM THE ROADSIDE CATCHBASIN FOR A DISTANCE OF 3.0m, PARALLEL TO THE CURB IN TWO DIRECTIONS.
- REFER TO GEOTECHNICAL REPORT (FILE GEOTECHNICAL INVESTIGATION AND SLOPE STABILITY ANALYSIS, PROPOSED RESIDENTIAL DEVELOPMENT, DATED JUNE 15, 2023), PREPARED BY EXP SERVICES INC. FOR SUBSURFACE SOIL AND GROUNDWATER CONDITIONS, CONSTRUCTION RECOMMENDATIONS, AND GEOTECHNICAL INSPECTION REQUIREMENTS. THE GEOTECHNICAL CONSULTANT IS TO REVIEW ON-SITE CONDITIONS AFTER EXCAVATION PRIOR TO PLACEMENT OF THE GRANULAR MATERIAL.
- REFER TO THE STORMWATER MANAGEMENT REPORT NO. R-2025-79 DATED FEBRUARY 20, 2026 PREPARED BY NOVATECH.
- SAW CUT AND KEY GRIND ASPHALT AT ALL ROAD CUTS AND ASPHALT TIE IN POINTS AS PER CITY OF OTTAWA STANDARDS (R10).

SEWER NOTES:

- SPECIFICATIONS:

ITEM	SPEC. No.	REFERENCE
CATCHBASIN (600x600mm)	705.010	OPSD
TWIN INLET CATCHBASIN(600x1450)	705.020	OPSD
STORM / SANITARY MANHOLE (1200)	701.010	OPSD
STORM MANHOLE (1500)	701.011	OPSD
ROADSIDE CB, FRAME & COVER	S2 & S19	CITY OF OTTAWA
CURB INLET CB, FRAME & COVER	S2 & S22	CITY OF OTTAWA
SEWER TRENCHING	S6 & S7	CITY OF OTTAWA
SERVICING	S11.3	CITY OF OTTAWA
STORM/SANITARY MH FRAME	S25	CITY OF OTTAWA
SANITARY COVER	S24	CITY OF OTTAWA
STORM COVER (CLOSED)	S24.1	CITY OF OTTAWA
STORM COVER (OPEN)	S28.1	CITY OF OTTAWA
INSULATION FOR SHALLOW SEWERS	S35	CITY OF OTTAWA
SANITARY SEWER	PVC DR 35	CITY OF OTTAWA
CATCHBASIN LEAD	PVC DR 35	CITY OF OTTAWA
- INSULATE ALL PIPES (SAN/STM) THAT HAVE LESS THAN 2.0m COVER WITH HI-40 INSULATION AS PER CITY DETAIL S35.
- SERVICES ARE TO BE CONSTRUCTED TO PROPERTY LINE AT MINIMUM SLOPE OF 1.0% (2.0% IS PREFERRED).
- PIPE BEDDING, COVER AND BACKFILL ARE TO BE COMPACTED TO AT LEAST 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY. THE USE OF CLEAR CRUSHED STONE AS A BEDDING LAYER SHALL BE PERMITTED.
- SEWER SERVICE CONNECTIONS PER CITY OF OTTAWA DETAILS S11 AND S11.1.
- FLEXIBLE CONNECTIONS ARE REQUIRED FOR CONNECTING PIPES TO MANHOLES (FOR EXAMPLE KOR-AN-SEAL, PSX: POSITIVE SEAL AND DURASEAL). THE CONCRETE CRADLE FOR THE PIPE CAN BE ELIMINATED.
- THE OWNER SHALL REQUIRE THAT THE SERVICING CONTRACTOR PERFORM FIELD TESTS FOR QUALITY CONTROL OF ALL SANITARY SEWERS. LEAKAGE TESTING SHALL BE COMPLETED IN ACCORDANCE WITH OPSS 410.07.16 AND 407.07.24. DYE TESTING IS TO BE COMPLETED ON ALL SANITARY SEWERS TO CONFIRM PROPER CONNECTION TO THE SANITARY SEWER MAIN. THE FIELD TESTS SHALL BE PERFORMED IN THE PRESENCE OF A CERTIFIED PROFESSIONAL ENGINEER WHO SHALL SUBMIT A CERTIFIED COPY OF TEST RESULTS.
- STORM MANHOLES AND CBMHS SHALL HAVE 300mm SUMPS UNLESS OTHERWISE INDICATED.
- ENSURE MANHOLE CHIMNEY IS ROTATED TO BEST AVOID STANDARD WHEEL PATHING.
- CONTRACTOR TO TELEVIEW (CCTV) ALL PROPOSED SEWERS, 200mmØ OR GREATER PRIOR TO BASE COURSE ASPHALT. UPON COMPLETION OF CONTRACT, THE CONTRACTOR IS RESPONSIBLE TO FLUSH AND CLEAN ALL SEWERS & APPURTENANCES.

WATERMAIN NOTES:

- SPECIFICATIONS:

ITEM	SPEC. No.	REFERENCE
WATERMAIN TRENCHING	W17	CITY OF OTTAWA
THERMAL INSULATION IN SHALLOW TRENCHES	W22	CITY OF OTTAWA
THERMAL INSULATION AT OPEN STRUCTURES	W23	CITY OF OTTAWA
WATERMAIN CROSSING BELOW SEWER	W25	CITY OF OTTAWA
WATERMAIN	PVC DR 18	CITY OF OTTAWA
- SUPPLY AND CONSTRUCT ALL WATERMANS AND APPURTENANCES IN ACCORDANCE WITH THE CITY OF OTTAWA STANDARDS AND SPECIFICATIONS. EXCAVATION, INSTALLATION, BACKFILL AND RESTORATION OF ALL WATERMANS BY THE CONTRACTOR. CONNECTIONS AND SHUT-OFFS AT THE MAIN AND CHLORINATION OF THE WATER SYSTEM SHALL BE PERFORMED BY CITY OFFICIALS.
- WATERMAIN SHALL BE MINIMUM 2.4m DEPTH BELOW GRADE UNLESS OTHERWISE INDICATED.
- PROVIDE MINIMUM 0.25m CLEARANCE BETWEEN OUTSIDE OF PIPES AT ALL CROSSINGS.
- WATER SERVICE IS TO BE CONSTRUCTED TO WITHIN 1.0m OF FOUNDATION WALL AND CAPPED, UNLESS OTHERWISE INDICATED.

GRADING AND PAVEMENT NOTES:

- ALL TOPSOIL, ORGANIC OR DELETERIOUS MATERIAL MUST BE ENTIRELY REMOVED FROM BENEATH THE PROPOSED HARD SURFACE (ie. PAVEMENT, CURB, SIDEWALK, ETC.) AREAS AS DIRECTED BY THE SITE ENGINEER OR GEOTECHNICAL ENGINEER.
- EXPOSED SUBGRADES IN PROPOSED PAVED AREAS SHOULD BE HEAVILY PROOF ROLLED WITH A LARGE (10 TON) VIBRATORY STEEL DRUM ROLLER UNDER DRY CONDITIONS AND INSPECTED BY THE GEOTECHNICAL ENGINEER PRIOR TO THE PLACEMENT OF GRANULARS.
- ANY SOFT AREAS EVIDENT FROM THE PROOF ROLLING SHOULD BE SUB-EXCAVATED AND REPLACED WITH SUITABLE MATERIAL THAT IS FROST COMPATIBLE WITH THE EXISTING SOILS AS RECOMMENDED BY THE GEOTECHNICAL ENGINEER.
- THE GRANULAR BASE SHOULD BE PLACED IN MAXIMUM 300mm LIFTS AND COMPACTED TO AT LEAST 100% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY VALUE. ANY ADDITIONAL GRANULAR FILL USED BELOW THE PROPOSED PAVEMENT SHOULD BE PLACED IN MAXIMUM 300mm LIFTS AND COMPACTED TO AT LEAST 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY VALUE.
- BUILD ROADWAYS WITH 3% CROSSFALL INCLUDING SUBGRADE AND GRANULAR BASE.
- ROADWAY SUBGRADE TO BE INSPECTED BY THE GEOTECHNICAL ENGINEER AT THE TIME OF CONSTRUCTION TO REVIEW IF A WOVEN GEOTEXTILE IS REQUIRED BELOW THE GRANULAR MATERIALS, AND TO CONFIRM THE DEPTH AND COMPACTION OF GRANULAR B'.
- PRIOR TO PLACEMENT OF TOPLIFT, THE CONTRACTOR SHALL ADJUST ALL STRUCTURES TO FINAL GRADE PER CITY OF OTTAWA STANDARDS.
- MINIMUM OF 2% GRADE FOR ALL GRASS AREAS UNLESS OTHERWISE NOTED.
- MAXIMUM TERRACING GRADE TO BE 3:1 UNLESS OTHERWISE NOTED.
- ALL GRADES BY CURBS ARE EDGE OF PAVEMENT GRADES UNLESS OTHERWISE INDICATED.
- ALL CURBS SHALL BE MOUNTABLE CURB WITH GUTTER UNLESS OTHERWISE NOTED AND CONSTRUCTED PER CITY OF OTTAWA STANDARD (SC1.3).
- REFER TO LANDSCAPE PLAN FOR PLANTING AND OTHER LANDSCAPE FEATURE DETAILS.
- CONTRACTOR TO PROVIDE THE CONSULTANT WITH A GRADING PLAN INDICATING AS-BUILT ELEVATIONS OF ALL DESIGN GRADES SHOWN ON THE PLAN.

PAVEMENT STRUCTURE:

- 40 mm HL 3/212.5 CAT B
50 mm HL 8 OR SP 10 CAT B
150mm GRAN "A"
450mm GRAN "B" TYPE II

EROSION AND SEDIMENT CONTROL NOTES:

THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES, TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECEIVING WATERCOURSE, DURING CONSTRUCTION ACTIVITIES. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.

- THE OWNER AGREES TO PREPARE AND IMPLEMENT AN EROSION AND SEDIMENT CONTROL PLAN TO THE SATISFACTION OF THE CITY OF OTTAWA, APPROPRIATE TO THE SITE CONDITIONS, PRIOR TO UNDERTAKING ANY SITE ALTERATIONS (FILLING, GRADING, REMOVAL OF VEGETATION, ETC.) AND DURING ALL PHASES OF SITE PREPARATION AND CONSTRUCTION IN ACCORDANCE WITH THE CURRENT BEST MANAGEMENT PRACTICES FOR EROSION AND SEDIMENT CONTROL, SUCH AS BUT NOT LIMITED TO INSTALLING FILTER CLOTHS ACROSS MANHOLE/CATCHBASIN LIDS TO PREVENT SEDIMENTS FROM ENTERING STRUCTURES AND INSTALL AND MAINTAIN A LIGHT DUTY SILT FENCE BARRIER AS REQUIRED.
- THE CONTRACTOR SHALL PLACE FILTER BAGS UNDER THE CATCHBASIN AND MANHOLE GRATES FOR THE DURATION OF CONSTRUCTION AND WILL REMAIN IN PLACE DURING ALL PHASES OF CONSTRUCTION.
- SILT FENCING FOR ENTIRE PERIMETER OF SITE, SHALL BE UTILIZED TO CONTROL EROSION FROM THE SITE DURING CONSTRUCTION.
- THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.
- PROVIDE MUD MATS AT ALL CONSTRUCTION ACCESS POINTS TO MINIMIZE SEDIMENT TRANSPORT OFFSITE.
- EROSION AND SEDIMENT CONTROL MEASURES MAY BE MODIFIED IN THE FIELD AT THE DISCRETION OF THE CITY OF OTTAWA SITE INSPECTOR OR CONSERVATION AUTHORITY.
- ENVIRONMENTAL IMPACT STATEMENT (FILE NO: HEAFY980.1 PREPARED BY KILGOUR & ASSOCIATES Ltd.) RECOMMEND THE FOLLOWING MITIGATION MEASURES:
 - SILT FENCE PAIRED WITH STURDY CONSTRUCTION FENCE ALONG THE PROJECT PERIMETER.
 - RETENTION OF EXISTING VEGETATION AND STABILIZATION OF EXPOSED SOILS WITH VEGETATION WHERE POSSIBLE.
 - LIMITING THE DURATION OF SOIL EXPOSURE AND PHASING PROJECT WORKS.
 - LIMITING THE SIZE OF DISTURBED AREAS BY MINIMIZING NONSENTENTIAL CLEARING AND GRADING.
 - MINIMIZING THE TOTAL SLOPE LENGTH AND THE GRADIENT OF DISTURBED AREAS.
 - REFUELLING OF MACHINERY SHOULD OCCUR >30 M FROM THE WETLAND AND POOLE CREEK AND ALL MACHINERY WILL REMAIN ON THE PROJECT-SIDE OF SILT AND CONSTRUCTION FENCE.
 - MAINTAINING OVERLAND SHEET FLOW AND AVOIDING CONCENTRATED FLOWS.
 - STORING/STOCKPILING MATERIALS >30m AWAY FROM THE WETLAND AND POOLE CREEK.

WATERMAIN TABLE				
STA	F/G ELEVATION	TOP OF WATERMAIN	DESCRIPTION	
0+073.87	119.73	117.25	CONNECT TO EXISTING 200mmØ WATERMAIN	
0+076.75	119.62	117.14	11.25° HORIZONTAL BEND	
0+081.01	119.60	116.99	22.5° HORIZONTAL BEND	
0+108.80	118.90	116.02	TEE	
0+109.58	118.88	115.99	VALVE AND VALVE BOX	
0+110.34	118.86	115.97	TEE	
0+111.23	118.81	115.94	HYDRANT TEE	
0+144.20	117.65	115.49	11.25° HORIZONTAL BEND	
0+144.98	117.65	115.48	45° HORIZONTAL BEND	
0+150.61	117.73	115.23	22.5° VERTICAL BEND	
0+153.04	117.73	115.68	22.5° VERTICAL BEND	
0+153.89	117.76	115.68	CONNECT TO EXISTING 200mmØ WATERMAIN	

STM MANHOLE TABLE				
MANHOLE ID	STATION	T/G ELEV	INVERT	SIZE
OGS	0+152.70	117.73	NW=115.07 S=115.04	STORM/CEPTOR EFOK
23	WILDPINE COURT	117.63	NW=114.51 SW=114.47 NE=114.37	1,200 mm dia
104	0+156.13	117.68	SE=114.97	1,200 mm dia
200	0+144.33	117.65	SE=115.11 W=115.14	1,200 mm dia
202	0+086.34	119.46	E=115.72 S=117.25	1,200 mm dia

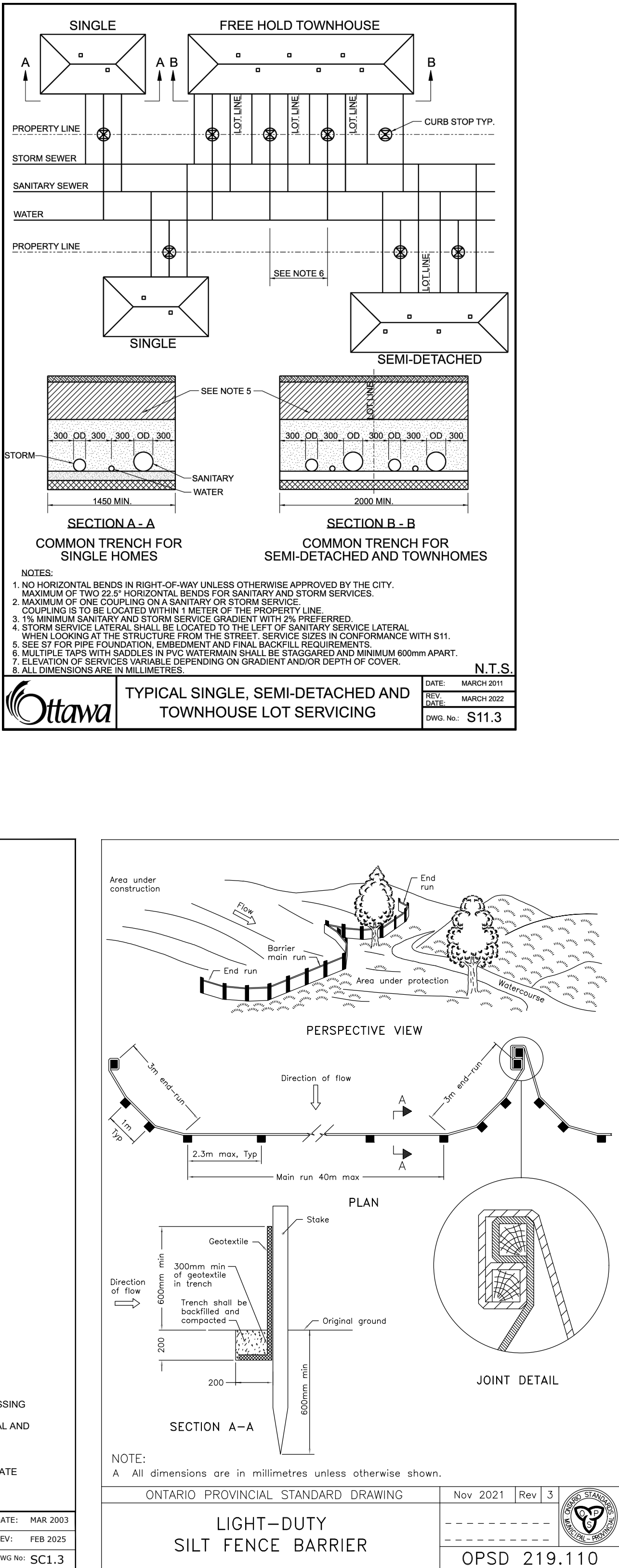
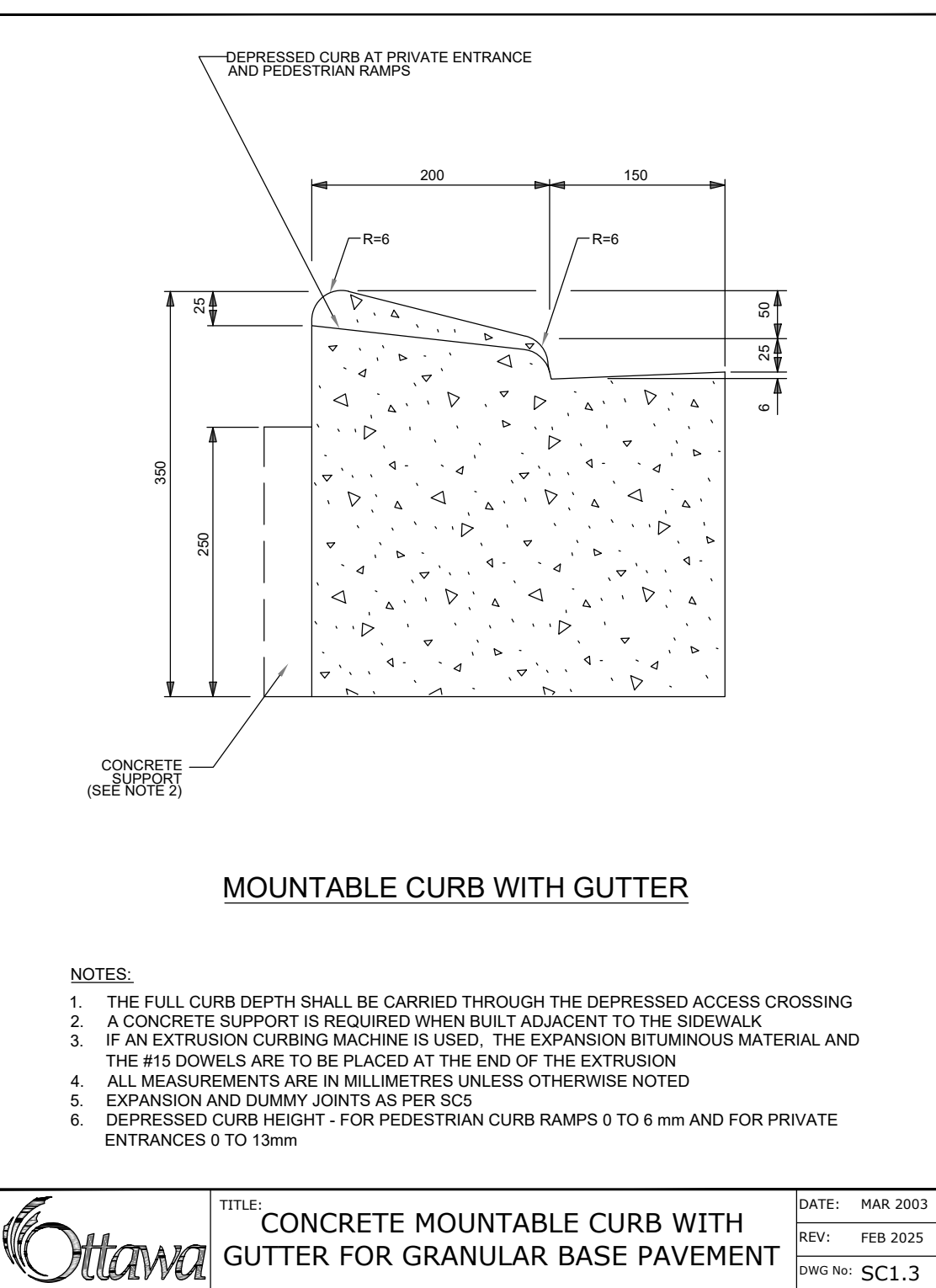
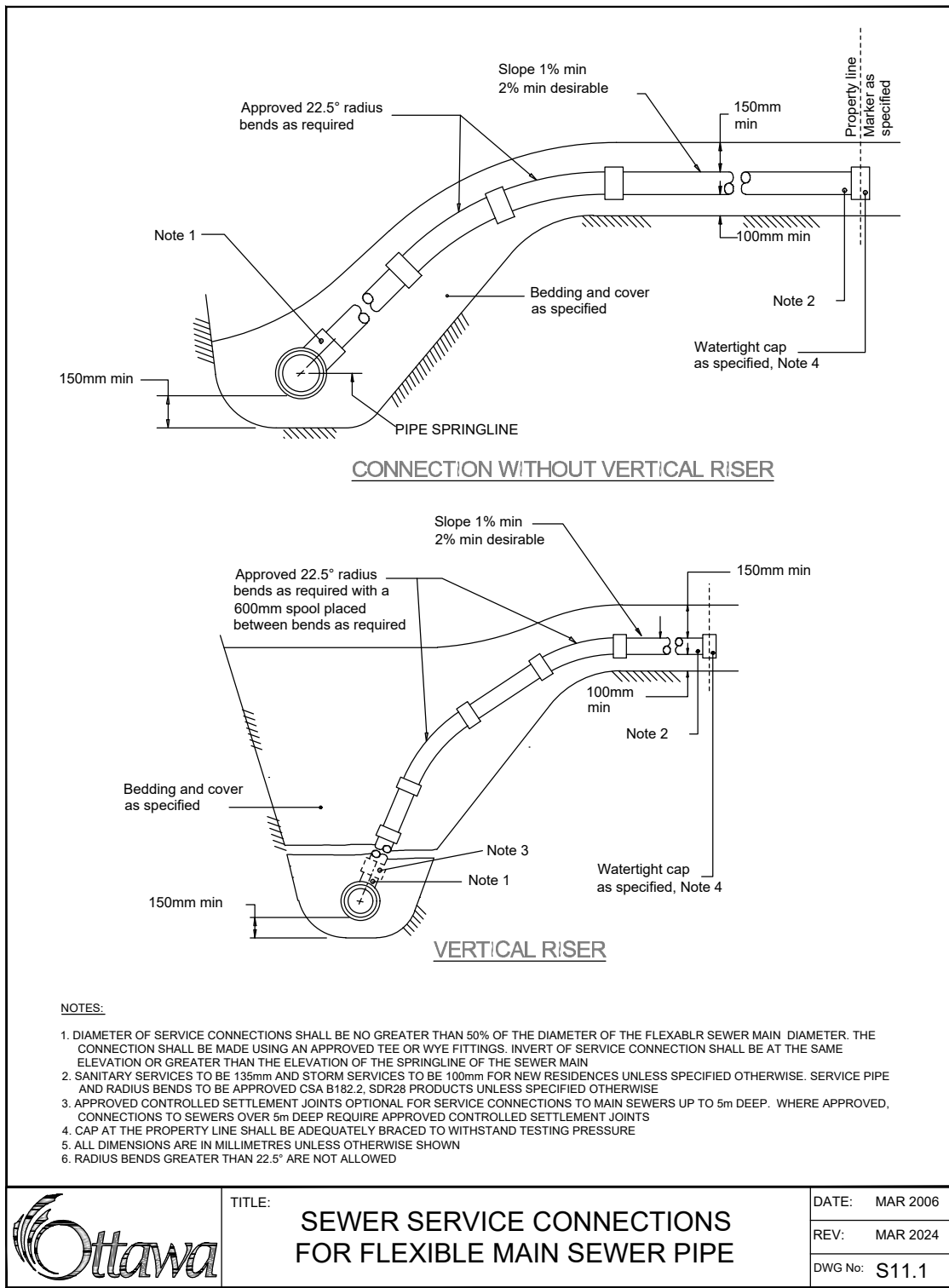
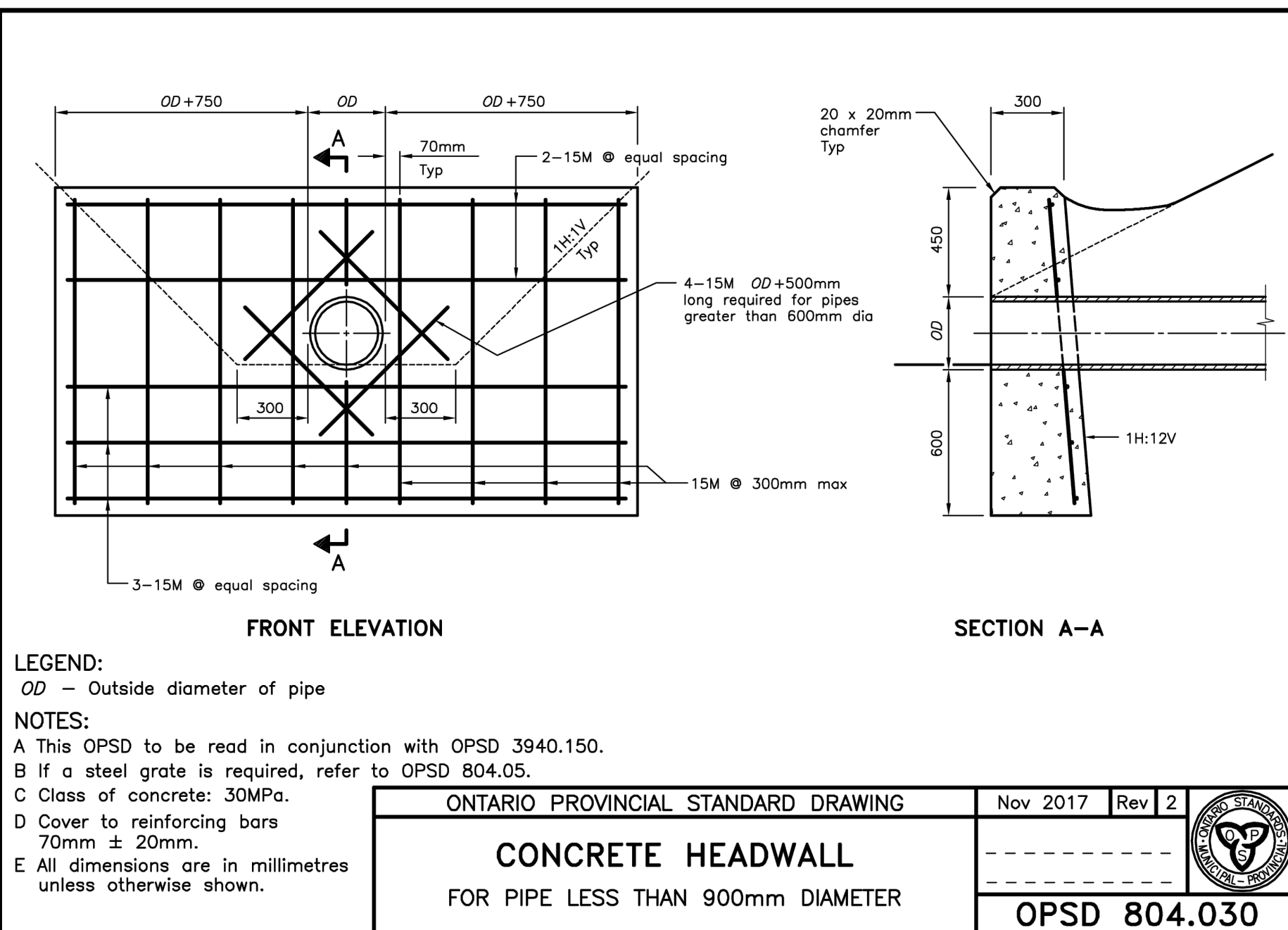
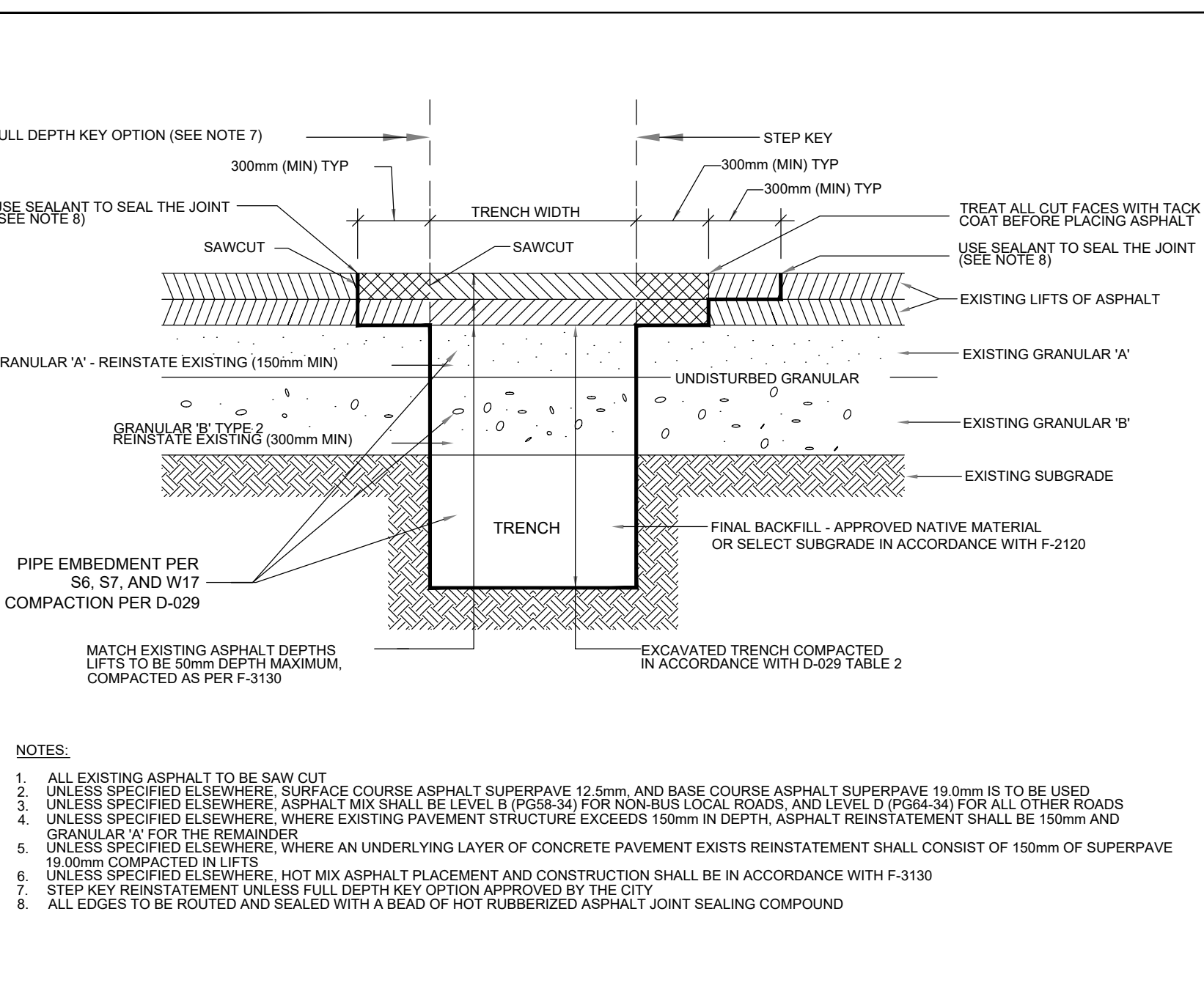
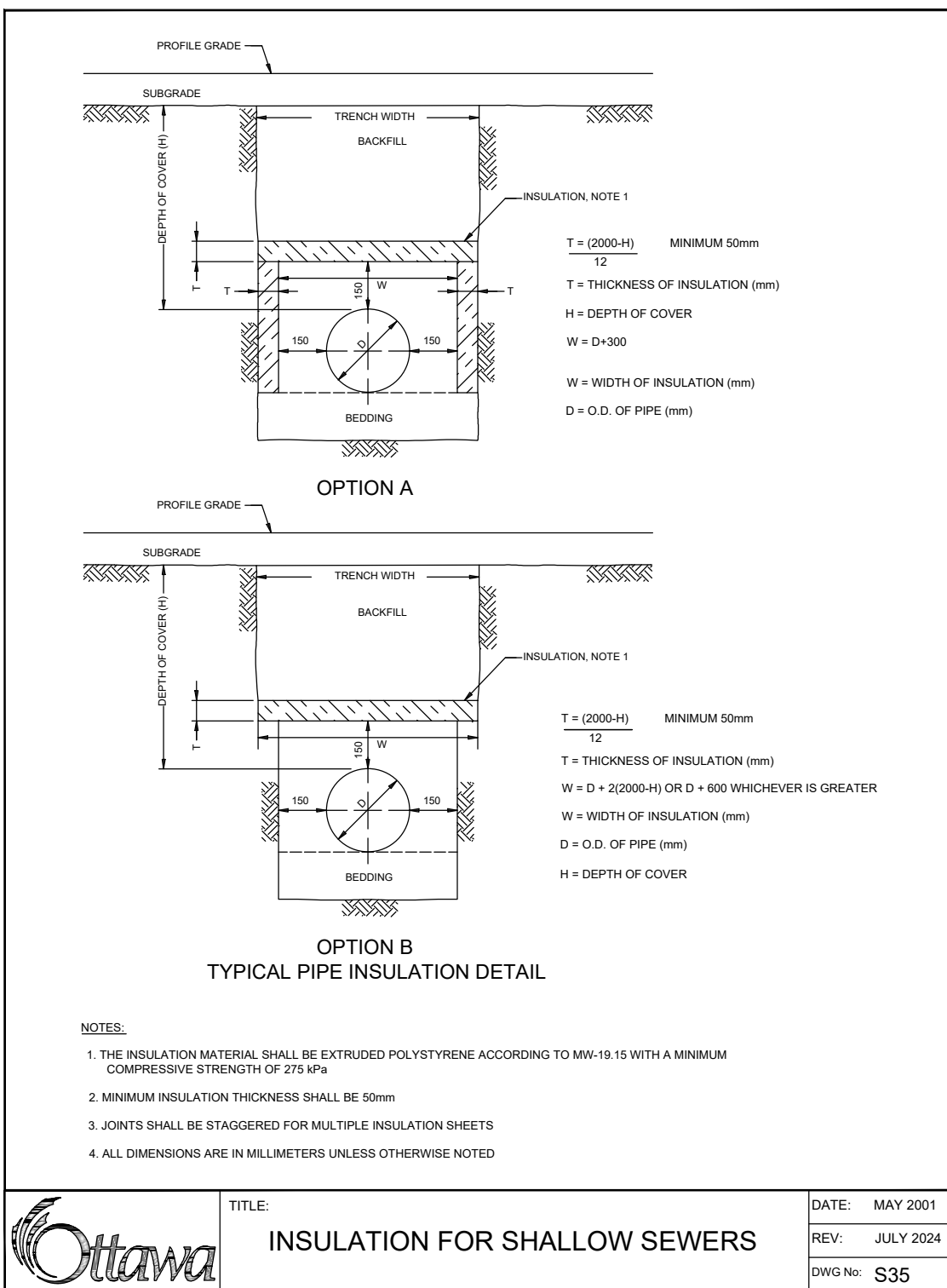
SAN MANHOLE TABLE				
MANHOLE ID	STATION	T/G ELEV	INVERT	
5	0+154.82	117.76	SE=115.64	
101	0+144.83	117.59	SE=115.69 W=115.72	
103	0+096.21	119.03	E=116.04	

CATCHBASIN TABLE				
CB No.	STATION	T/G ELEVATION	INVERT	SIZE
1	0+058.28	119.56	117.71±	600mmx600mm
2	0+058.43	119.53	118.13±	600mmx600mm
3	0+139.13	117.50	116.00	600mmx600mm
4	0+139.13	117.50	116.25	600mmx600mm
5	0+085.90	119.10	117.52 117.35	600mmx600mm
6	0+135.11	117.60	116.60 115.85	600mmx600mm

NOTE: PROPOSED CB LEADS TO BE 250mmØ PVC @ 1.0% UNLESS NOTED OTHERWISE

LANDSCAPE DRAIN TABLE			
MANHOLE ID	T/G ELEV	INVERT	
LD1	118.65	NW=117.65	
LD2	118.50	NE=116.78	

INLET CONTROL DEVICE TABLE					
LOCATION	DESIGN EVENT	ICD TYPE AND SIZE	ELEV (m)	HEAD (m)	RELEASE RATE (L/s)
CB1	1:100 YEAR	PLATE 127mm	119.73	1.35	54.4
CB2	1:100 YEAR	PLATE 152mm	119.73	1.35	38.1
CB3	1:100 YEAR	LMF 95	116.18	1.70	10.6
CB4	1:100 YEAR	LMF 95	116.18	1.70	10.6
CB5	1:100 YEAR	LMF 73	116.18	1.28	6.0
CB6	1:100 YEAR	LMF73	116.18	1.33	6.1



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SCALE			DESIGN	
AS SHOWN			MH	
			MH	
			AB	
			MH	
			MH/CR	
4.	REVISED PER CITY COMMENTS	AUG 27/26	CJR	
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2.	ISSUED FOR CITY REVIEW	OCT 15/25	CJR	
1.	CLIENT REVIEW	SEPT 17/25	CJR	
No.	REVISION	DATE	BY	

FOR REVIEW ONLY

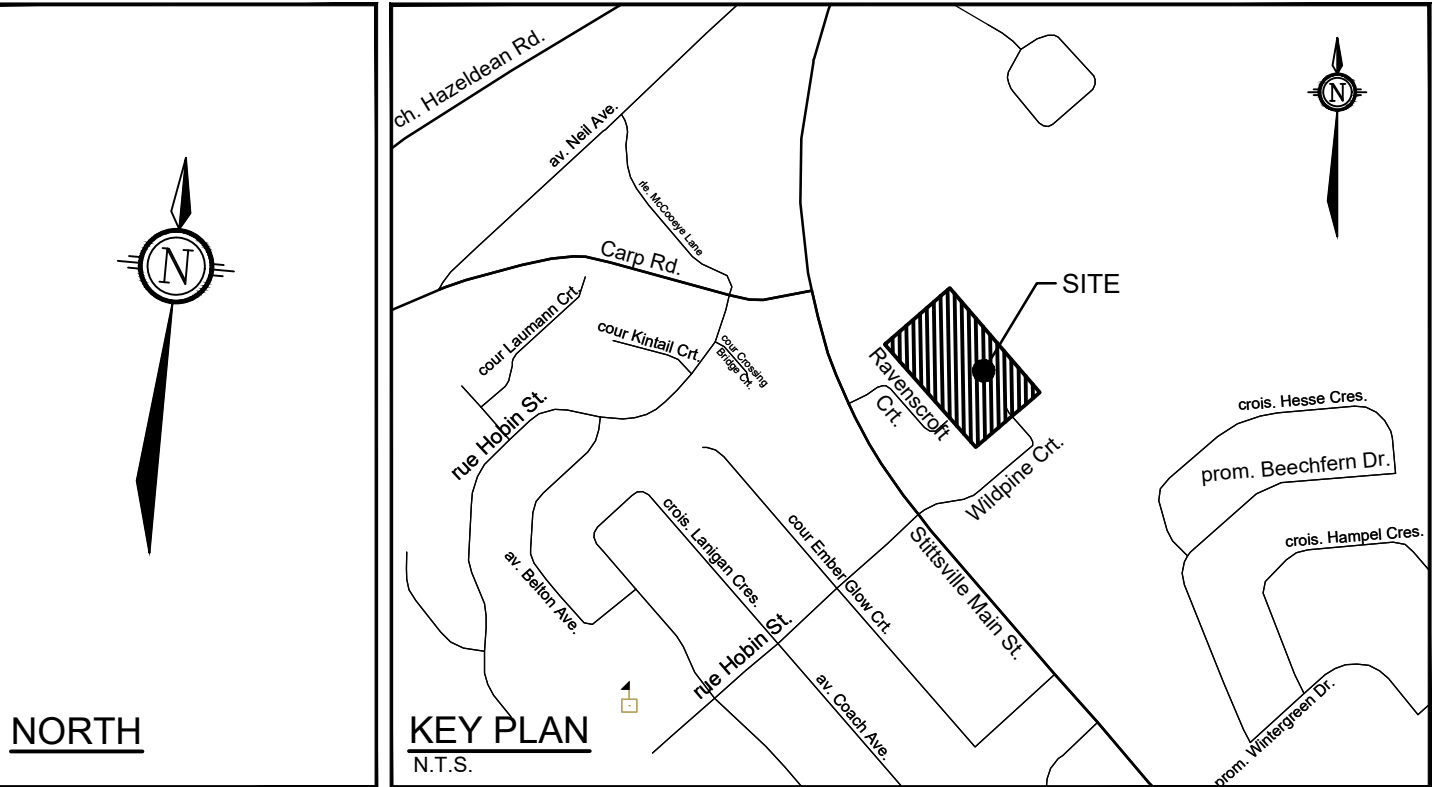
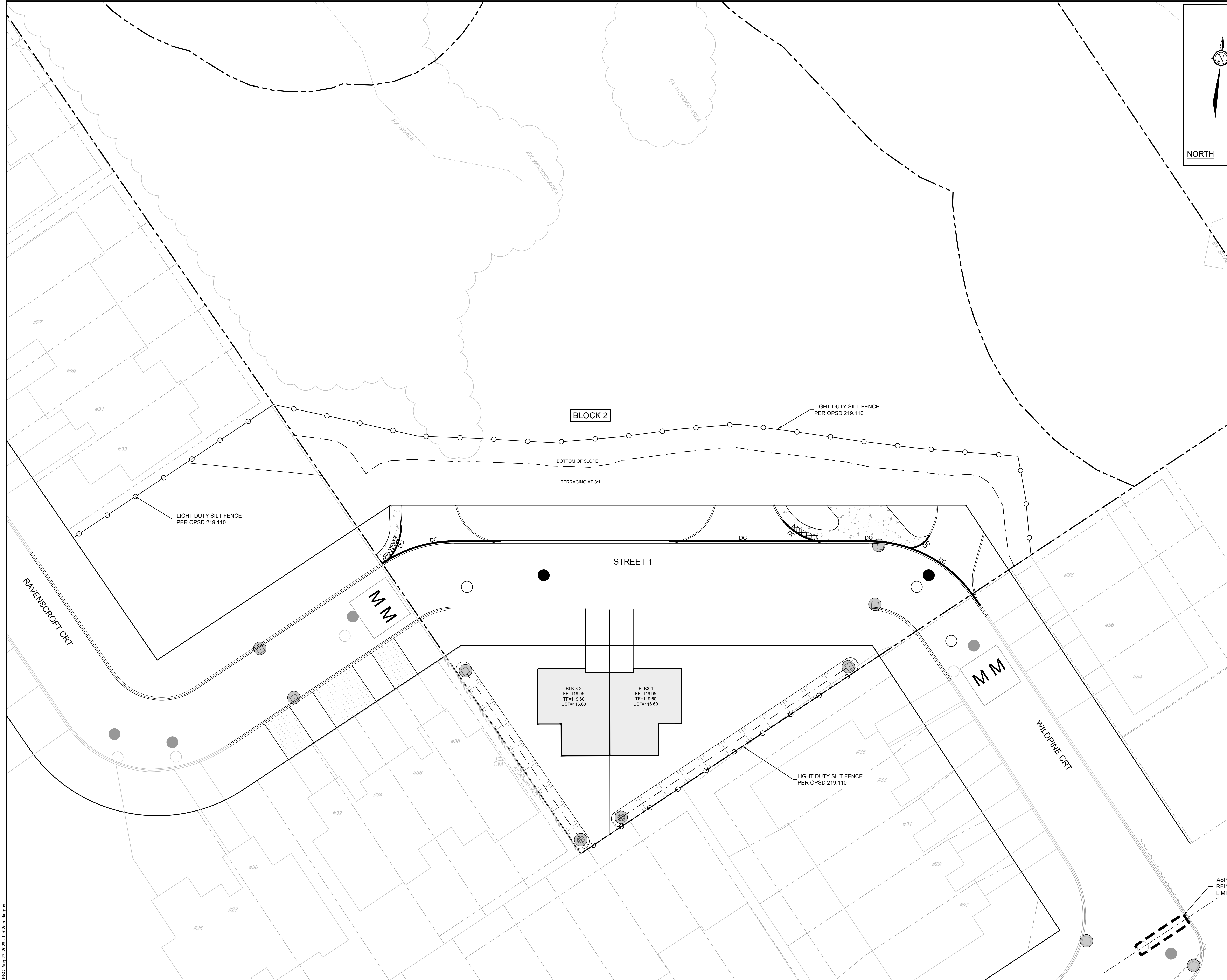


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Website www.novatech-eng.com

LOCATION
CITY OF OTTAWA
37 WILDPINE COURT

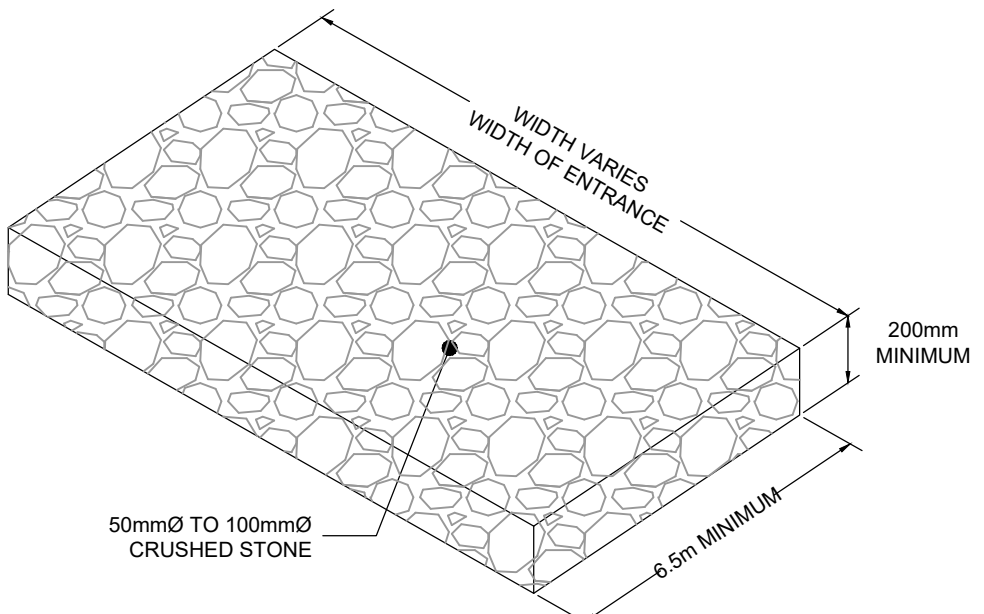
DRAWING NAME
NOTES AND DETAILS

PROJECT No.	125077
REV	REV # 4
DRAWING No.	125077-ND1



- LEGEND**
- PROPERTY LINE
 - PROPOSED BARRIER CURB
 - PROPOSED DEPRESSED CURB
 - PROPOSED CATCHBASIN MANHOLE
 - PROPOSED CATCHBASIN
 - PROPOSED STORM MANHOLE
 - LIGHT DUTY SILT FENCE (OPSD 219.110)
 - PROPOSED FILTER BAGS AT CATCHBASINS AND CATCHBASIN MANHOLES
 - PROPOSED MUD MAT
 - EXISTING VALVE & VALVE BOX
 - EXISTING VALVE & LEAD
 - EXISTING SANITARY MANHOLE
 - EXISTING STORM MANHOLE
 - EXISTING CATCHBASIN
 - EXISTING DITCH CENTERLINE
 - EXISTING UTILITY POLE
 - EXISTING UTILITY POLE ANCHORS
 - EXISTING STREETLIGHT

- EROSION AND SEDIMENT CONTROL NOTES:**
- THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES, TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECEIVING WATERCOURSE, DURING CONSTRUCTION ACTIVITIES. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.
- 1) THE OWNER AGREES TO PREPARE AND IMPLEMENT AN EROSION AND SEDIMENT CONTROL PLAN TO THE SATISFACTION OF THE CITY OF OTTAWA, APPROPRIATE TO THE SITE CONDITIONS, PRIOR TO UNDERTAKING ANY SITE ALTERATIONS (FILLING, GRADING, REMOVAL OF VEGETATION, ETC.) AND DURING ALL PHASES OF SITE PREPARATION AND CONSTRUCTION IN ACCORDANCE WITH THE CURRENT BEST MANAGEMENT PRACTICES FOR EROSION AND SEDIMENT CONTROL, SUCH AS BUT NOT LIMITED TO INSTALLING FILTER CLOTHS ACROSS MANHOLE/CATCHBASIN LIDS TO PREVENT SEDIMENTS FROM ENTERING STRUCTURES AND INSTALL AND MAINTAIN A LIGHT DUTY SILT FENCE BARRIERS AS REQUIRED.
 - 2) THE CONTRACTOR SHALL PLACE FILTER BAGS UNDER THE CATCHBASIN AND MANHOLE GRATES FOR THE DURATION OF CONSTRUCTION AND WILL REMAIN IN PLACE DURING ALL PHASES OF CONSTRUCTION.
 - 3) SILT FENCING FOR ENTIRE PERIMETER OF SITE, SHALL BE UTILIZED TO CONTROL EROSION FROM THE SITE DURING CONSTRUCTION.
 - 4) THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.
 - 5) PROVIDE MUD MATS AT ALL CONSTRUCTION ACCESS POINTS TO MINIMIZE SEDIMENT TRANSPORT OFFSITE.
 - 6) EROSION AND SEDIMENT CONTROL MEASURES MAY BE MODIFIED IN THE FIELD AT THE DISCRETION OF THE CITY OF OTTAWA SITE INSPECTOR OR CONSERVATION AUTHORITY.
 - 7) ENVIRONMENTAL IMPACT STATEMENT (FILE NO.: HEAFY989.1 PREPARED BY KILGOUR & ASSOCIATES LTD.) RECOMMEND THE FOLLOWING MITIGATION MEASURES:
 - SILT FENCE PAIRED WITH STURDY CONSTRUCTION FENCE ALONG THE PROJECT PERIMETER.
 - RETENTION OF EXISTING VEGETATION AND STABILIZATION OF EXPOSED SOILS WITH VEGETATION WHERE POSSIBLE.
 - LIMITING THE DURATION OF SOIL EXPOSURE AND PHASING PROJECT WORKS.
 - LIMITING THE SIZE OF DISTURBED AREAS BY MINIMIZING NONESSENTIAL CLEARING AND GRADING.
 - MINIMIZING THE TOTAL SLOPE LENGTH AND THE GRADIENT OF DISTURBED AREAS.
 - REFUELING OF MACHINERY SHOULD OCCUR >30 M FROM THE WETLAND AND POOLE CREEK AND ALL MACHINERY WILL REMAIN ON THE PROJECT-SIDE OF SILT AND CONSTRUCTION FENCE.
 - MAINTAINING OVERLAND SHEET FLOW AND AVOIDING CONCENTRATED FLOWS.
 - STORING/STOCKPILING MATERIALS >30m AWAY FROM THE WETLAND AND POOLE CREEK.



MUD MAT DETAIL
NOT TO SCALE

REFER TO 125077-ND FOR ADDITIONAL NOTES

NOTE:
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2.	ISSUED FOR CITY REVIEW	OCT 15/25	CJR
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SCALE

1:200

0 2 4 6 8

DESIGN: MH/AB

CHECKED: MH

DRAWN: AB

CHECKED: MH

APPROVED: MH/CR

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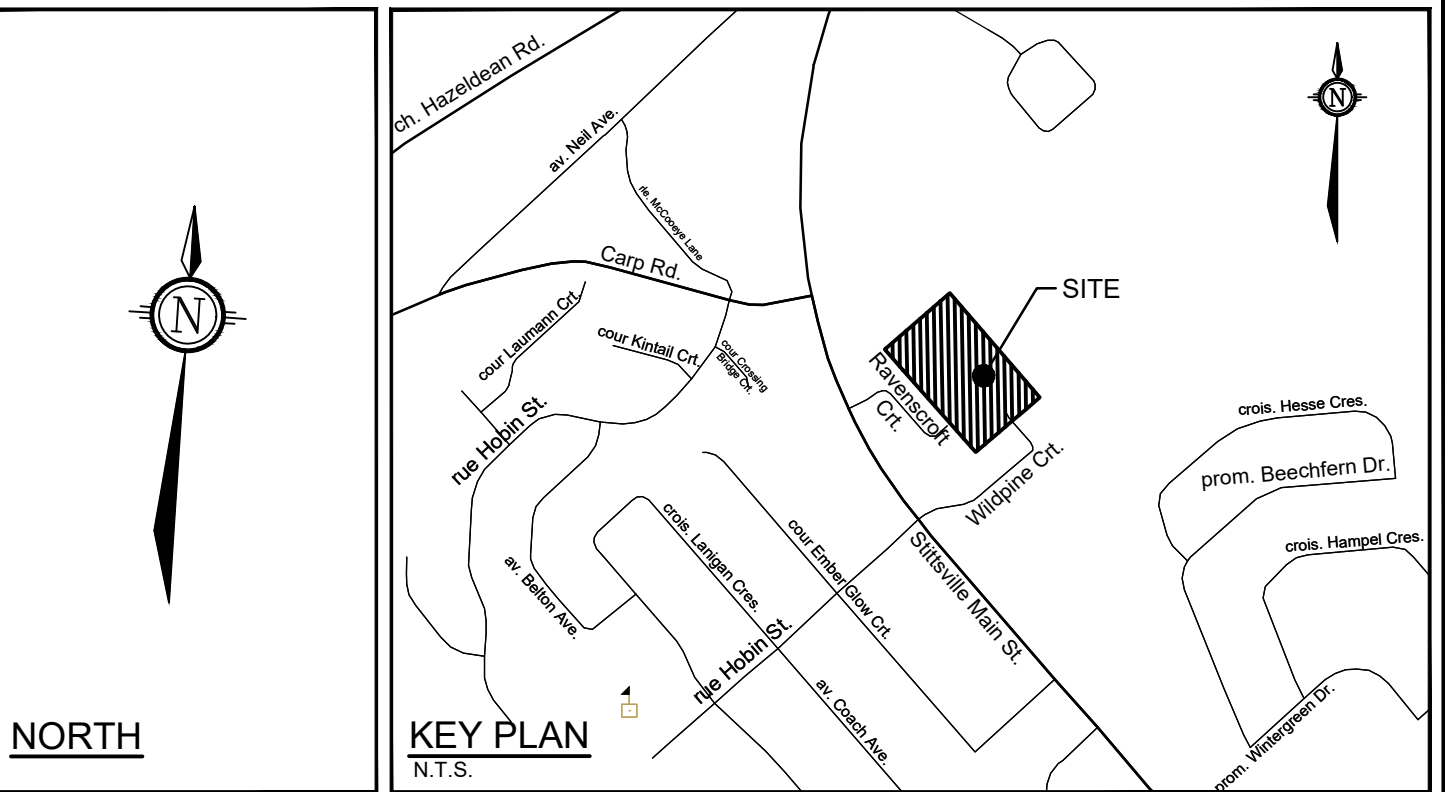
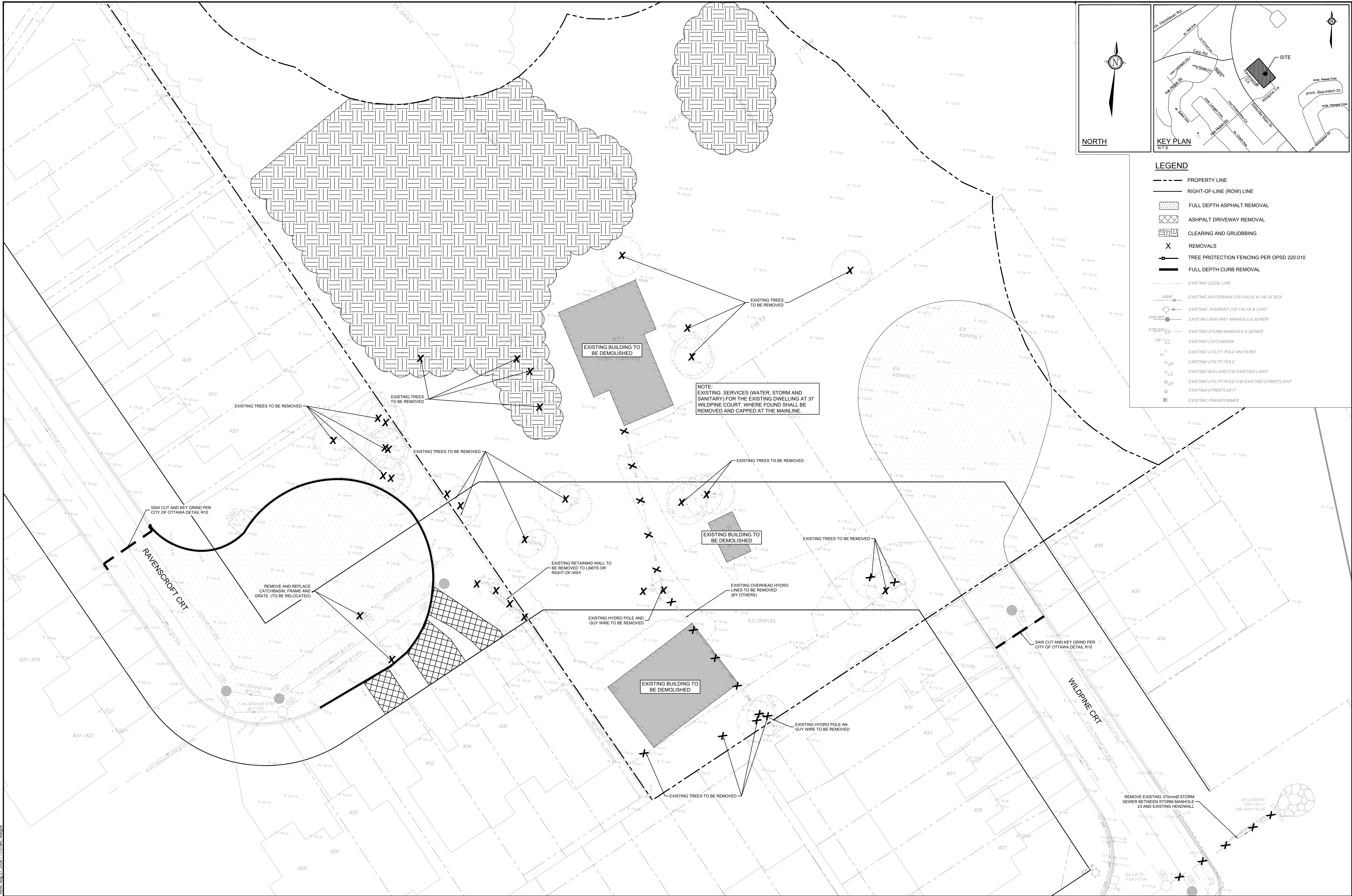
LOCATION
CITY OF OTTAWA
37 WILDPINE COURT

DRAWING NAME
EROSION & SEDIMENT CONTROL PLAN
STREET 1

PROJECT No.: 125077
REV # 4
DRAWING No.: 125077-ESC

M:\0951\125077\125077-ESC-ND.dwg, ESC, Aug 27, 2025 - 11:02am, Martin

PLANSET-01012 - 10/3/2025/01/01/01



- LEGEND**
- PROPERTY LINE
 - RIGHT-OF-LINE (ROW) LINE
 - [Pattern] FULL DEPTH ASPHALT REMOVAL
 - [Pattern] ASPHALT DRIVEWAY REMOVAL
 - [Pattern] CLEARING AND GRUBBING
 - X REMOVALS
 - [Symbol] TREE PROTECTION FENCING PER OPSD 220.010
 - FULL DEPTH CURB REMOVAL
 - EXISTING LEGAL LINE
 - [Symbol] EXISTING WATERMAIN C/W VALVE & VALVE BOX
 - [Symbol] EXISTING HYDRANT C/W VALVE & LEAD
 - [Symbol] EXISTING SANITARY MANHOLE & SEWER
 - [Symbol] EXISTING STORM MAINHOLE & SEWER
 - [Symbol] EXISTING CATCHBASIN
 - [Symbol] EXISTING UTILITY POLE ANCHORS
 - [Symbol] EXISTING UTILITY POLE
 - [Symbol] EXISTING BOLLARD C/W EXISTING LIGHT
 - [Symbol] EXISTING UTILITY POLE C/W EXISTING STREETLIGHT
 - [Symbol] EXISTING STREETLIGHT
 - [Symbol] EXISTING TRANSFORMER

NOTE:
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SCALE
1:200
0 2 4 6 8

DESIGN	RK
CHECKED	MH
DRAWN	RK
CHECKED	MH
APPROVED	MH/CR

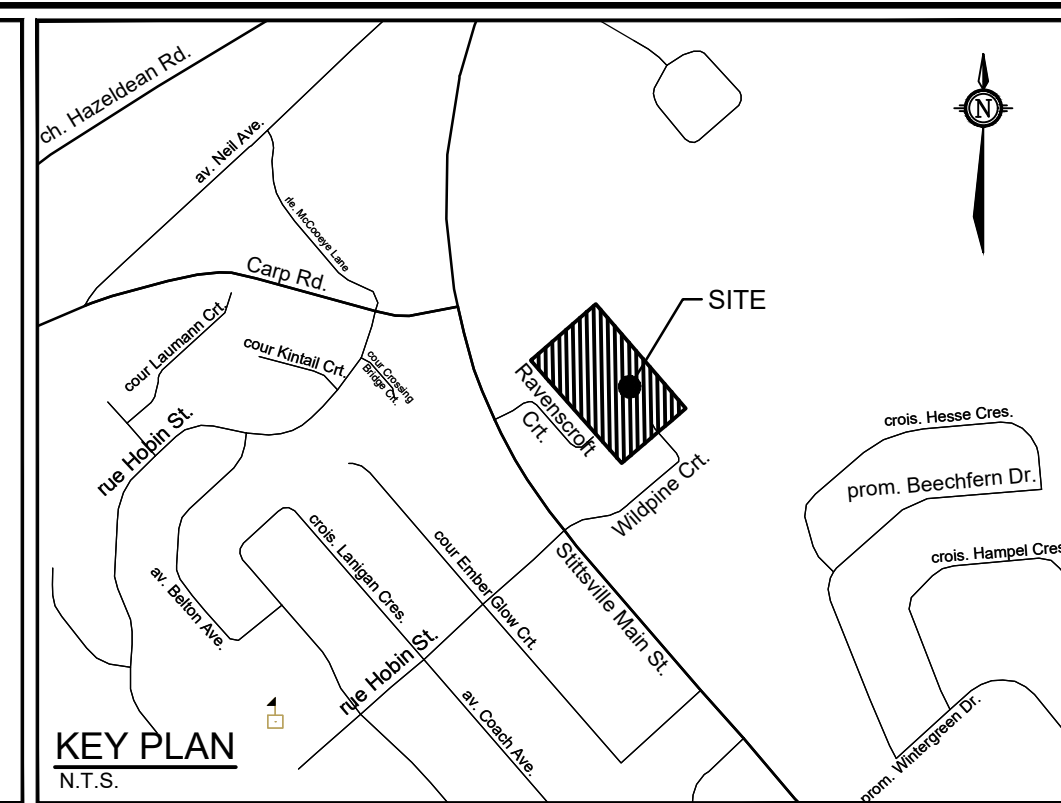
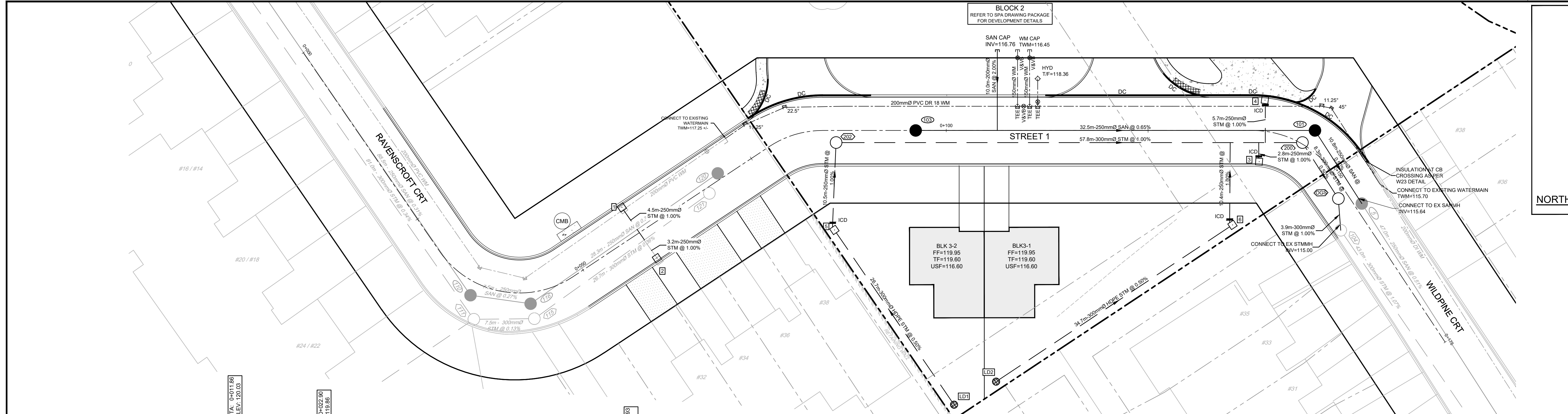


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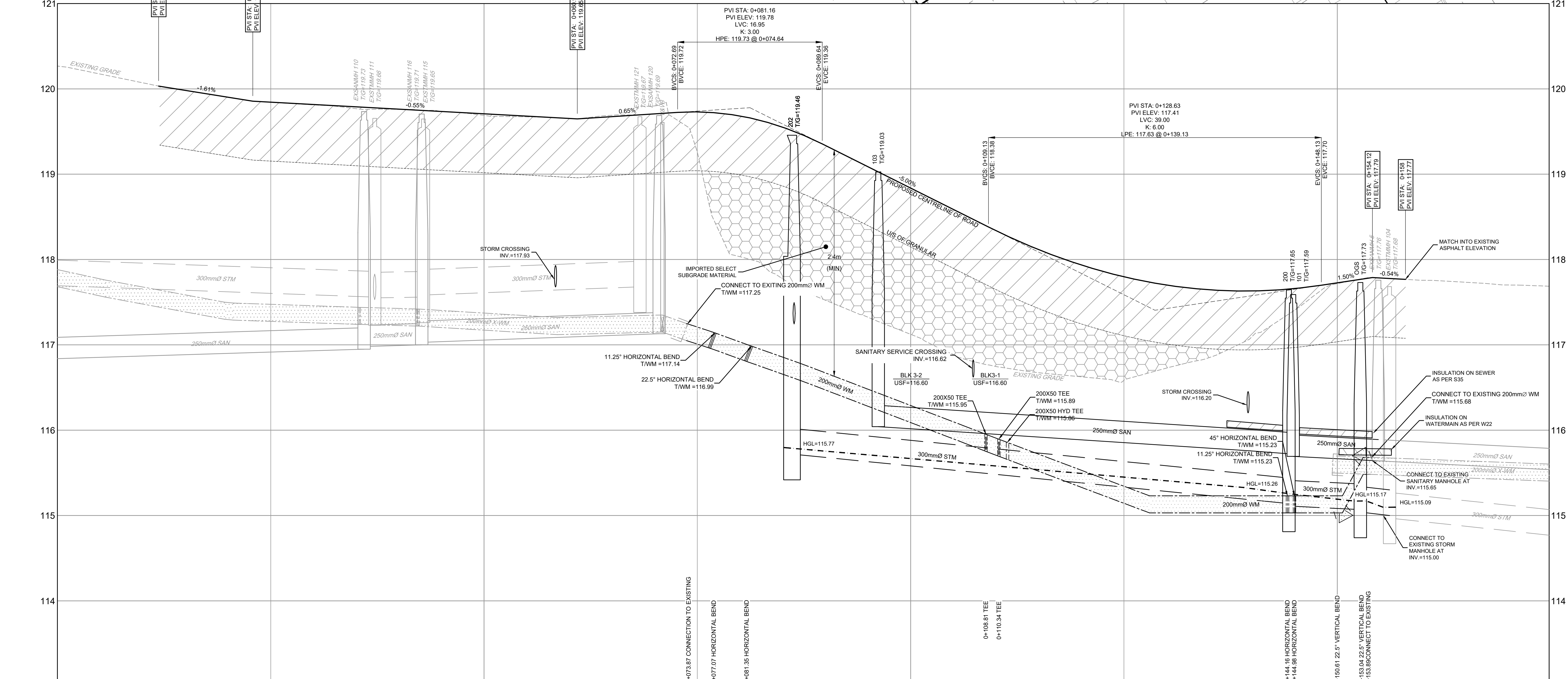
LOCATION
CITY OF OTTAWA
37 WILDPINE COURT
DRAWING NAME
**EXISTING CONDITIONS
AND REMOVALS PLAN
STREET 1**

PROJECT No:	125077
REV	REV # 4
DRAWING No:	125077-REM



- LEGEND**
- PROPERTY LINE
 - EASEMENT LIMIT
 - PROPOSED MOUNTABLE CURB
 - PROPOSED DEPRESSED MOUNTABLE CURB
 - PROPOSED CAP
 - PROPOSED SANITARY SEWER AND MANHOLE
 - PROPOSED STORM SEWER AND MANHOLE
 - PROPOSED CATCHBASIN & LEAD
 - PROPOSED TWIN INLET CATCHBASIN (800X1450)
 - PROPOSED NYLOPLAST MANHOLE
 - PROPOSED INSULATION
 - PROPOSED WATER MAIN
 - PROPOSED HYDRANT C/W LEAD & VALVE
 - PROPOSED TOP OF BOTTOM FLANGE
 - PROPOSED VALVE AND VALVE BOX
 - PROPOSED BEND AND THROSTBLOCK 11.25°, 22.5°, 45° or TEE
 - EX. WATERMAIN C/W V&VB
 - EX. HYDRANT C/W VALVE & LEAD
 - EX. SANITARY MANHOLE & SEWER
 - EX. STORM MANHOLE & SEWER
 - EX. CATCHBASIN
 - EX. SWALE CENTERLINE
 - EX. UTILITY POLE ANCHORS
 - EX. UTILITY POLE
 - EX. LIGHT BOLLARD
 - EX. UTILITY POLE C/W STREETLIGHT
 - EX. STREETLIGHT

WATERMAIN TABLE			
STA	FIG	TOP OF WATERMAIN	DESCRIPTION
0+07.87	119.73	117.25	CONNECT TO EXISTING 200mmØ WATERMAIN
0+07.75	119.62	117.14	11.25° HORIZONTAL BEND
0+08.01	119.60	116.99	22.5° HORIZONTAL BEND
0+108.80	118.90	116.02	TEE
0+108.58	118.88	115.99	VALVE AND VALVE BOX
0+110.34	118.86	115.97	TEE
0+111.33	118.81	115.94	HYDRANT TEE
0+144.20	117.65	115.49	11.25° HORIZONTAL BEND
0+144.98	117.65	115.48	45° HORIZONTAL BEND
0+150.81	117.73	115.23	22.5° VERTICAL BEND
0+152.04	117.73	115.68	22.5° VERTICAL BEND
0+153.88	117.76	115.68	CONNECT TO EXISTING 200mmØ WATERMAIN



PROPOSED ELEVATION	119.84	119.81	119.60	119.67	119.26	117.27	117.12	116.77	116.59	116.82	117.76
TOP OF WM ELEVATION	117.50	117.48	117.44	117.42	117.25	117.21	117.14	116.99	116.77	116.59	117.76
STORM SEWER INVERTS	90.98m - 300mmØ STM @ 0.34%		7.50m - 250mmØ SAN @ 0.13%		26.66m - 300mmØ STM @ 0.36%		57.8m - 300mmØ PVC DR 35 STM @ 1.00%		8.25m - 300mmØ PVC DR 35 STM @ 0.50%		42.88m - 300mmØ STM @ 1.07%
SANITARY SEWER INVERTS	88.45m - 250mmØ SAN @ 0.31%		7.50m - 250mmØ SAN @ 0.27%		28.26m - 250mmØ SAN @ 0.35%		32.51m - 250mmØ lpx PVC DR 35 SAN @ 0.65%		10.75m - 250mmØ PVC DR 35 SAN @ 0.50%		46.97m - 250mmØ SAN @ 0.51%
EXISTING ELEVATION	119.64	119.60	119.60	119.67	119.26	117.27	117.12	116.77	116.59	116.82	117.76

CHAINAGE	0+00	0+05	0+05.65 SANMH 0+05.75 SANMH 0+05.85 SANMH	0+10	0+15	0+20	0+25	0+30	0+35	0+40	0+45	0+50	0+55	0+60	0+65	0+70	0+75	0+80	0+85	0+90	0+95	0+100	0+105	0+110	0+115	0+120	0+125	0+130	0+135	0+140	0+145	0+150	0+155	0+160	0+165	0+170	0+175	0+180	0+185	0+190	0+195	0+200	0+205	0+210	0+215	0+220	0+225	0+230	0+235	0+240	0+245	0+250	0+255	0+260	0+265	0+270	0+275	0+280	0+285	0+290	0+295	0+300	0+305	0+310	0+315	0+320	0+325	0+330	0+335	0+340	0+345	0+350	0+355	0+360	0+365	0+370	0+375	0+380	0+385	0+390	0+395	0+400	0+405	0+410	0+415	0+420	0+425	0+430	0+435	0+440	0+445	0+450	0+455	0+460	0+465	0+470	0+475	0+480	0+485	0+490	0+495	0+500	0+505	0+510	0+515	0+520	0+525	0+530	0+535	0+540	0+545	0+550	0+555	0+560	0+565	0+570	0+575	0+580	0+585	0+590	0+595	0+600	0+605	0+610	0+615	0+620	0+625	0+630	0+635	0+640	0+645	0+650	0+655	0+660	0+665	0+670	0+675	0+680	0+685	0+690	0+695	0+700	0+705	0+710	0+715	0+720	0+725	0+730	0+735	0+740	0+745	0+750	0+755	0+760	0+765	0+770	0+775	0+780	0+785	0+790	0+795	0+800	0+805	0+810	0+815	0+820	0+825	0+830	0+835	0+840	0+845	0+850	0+855	0+860	0+865	0+870	0+875	0+880	0+885	0+890	0+895	0+900	0+905	0+910	0+915	0+920	0+925	0+930	0+935	0+940	0+945	0+950	0+955	0+960	0+965	0+970	0+975	0+980	0+985	0+990	0+995	0+1000
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SCALE

0 2 4 6 8 10

HORIZONTAL

1:25

0 0.2 0.4 0.6 0.8 1.0

VERTICAL

DESIGN

MH/AB

CHECKED

MH

DRAWN

AB

CHECKED

MH

APPROVED

MH/CR

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER

M. J. WHELAN

10021255

AUG 27/2026

PROVINCE OF ONTARIO

LOCATION

CITY OF OTTAWA

37 WILDPINE COURT

DRAWING NAME

PLAN AND PROFILE

STA 0+000 - 0+174.83

STREET 1

PROJECT NO.

125077

REV

REV # 4

DRAWING NO.

125077-PP

NOVATECH

Engineers, Planners & Landscape Architects

Suite 200, 240 Michael Cowland Drive

Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643

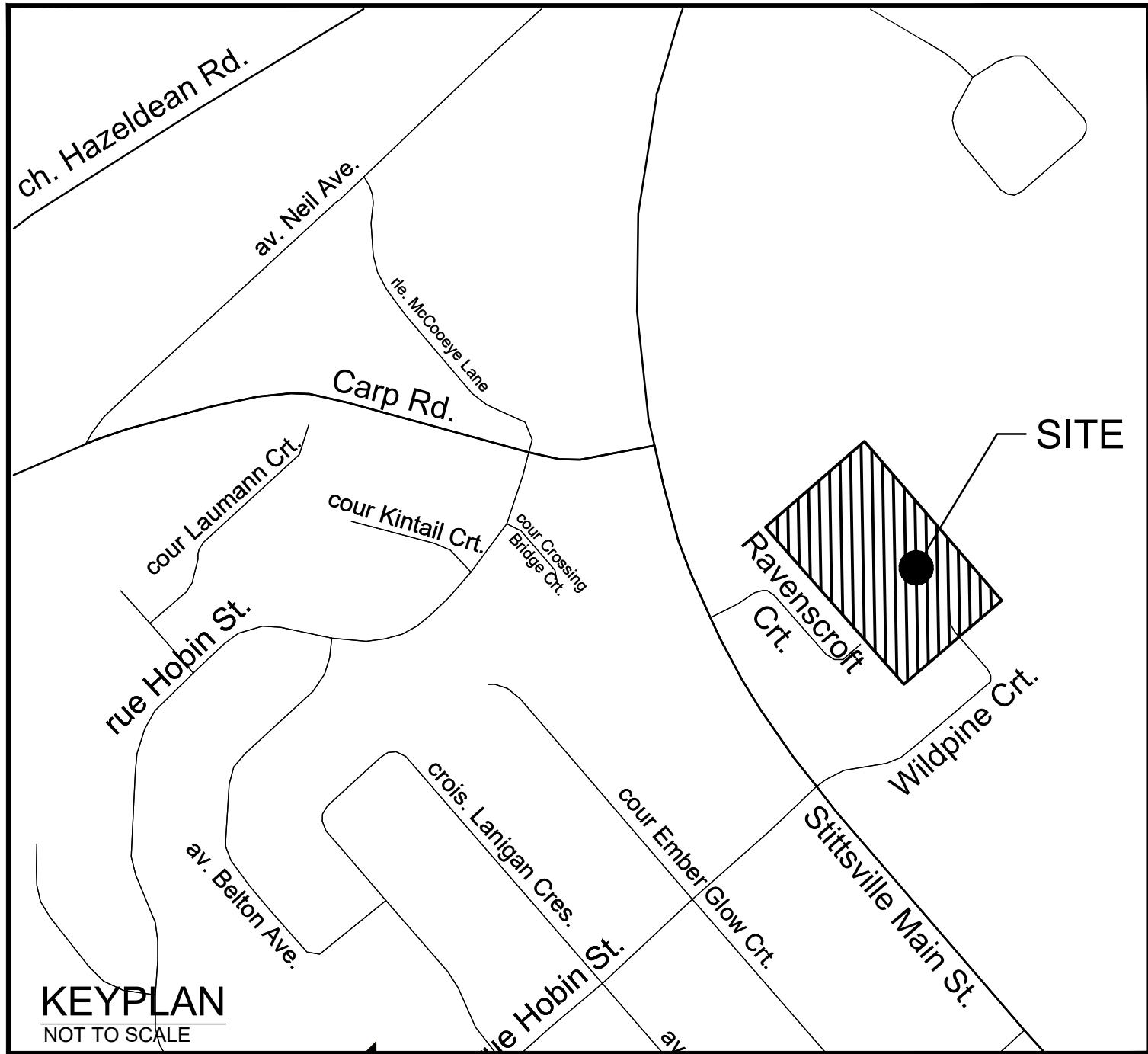
Facsimile (613) 254-5867

Website www.novatech-eng.com

37 WILDPINE COURT
BLOCK 2

CITY OF OTTAWA

PARKING, SEWERS AND WATERMAINS



INDEX

125077 - ND B2	NOTES AND DETAILS BLOCK 2
125077 - ESC B2	EROSION SEDIMENT CONTROL PLAN BLOCK 2
125077 - GP B2	GENERAL PLAN OF SERVICES BLOCK 2
125077 - GR B2	GRADING PLAN BLOCK 2

PROJECT No. 125077

REVISED PER CITY COMMENTS

GENERAL NOTES:

- DIMENSIONS AND LAYOUT INFORMATION SHALL BE CONFIRMED PRIOR TO COMMENCEMENT OF CONSTRUCTION.
- THE ORIGINAL TOPOGRAPHY AND GROUND ELEVATIONS, SERVING AND SURVEY INFORMATION SHOWN ARE SUPPLIED FOR INFORMATION PURPOSES ONLY. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE ACCURACY OF ALL INFORMATION OBTAINED FROM THIS PLAN.
- COORDINATE AND SCHEDULE ALL WORK WITH OTHER TRADES AND CONTRACTORS.
- DETERMINE THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION. PROTECT AND ASSUME RESPONSIBILITY FOR ALL EXISTING UTILITIES WHETHER OR NOT SHOWN ON THESE DRAWINGS.
- OBTAIN ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OF OTTAWA BEFORE COMMENCING CONSTRUCTION.
- BEFORE COMMENCING CONSTRUCTION OBTAIN AND PROVIDE PROOF OF COMPREHENSIVE, ALL RISK AND OPERATIONAL LIABILITY INSURANCE FOR \$5,000,000.00. INSURANCE POLICY TO NAME OWNERS, ENGINEERS AND ARCHITECTS AS CO-INSURED.
- CONNECT TO EXISTING SYSTEMS AS DETAILED, INCLUDING ALL RESTORATION WORK NECESSARY TO REINSTATE SURFACES TO EXISTING CONDITIONS OR BETTER.
- RESTORE ALL TRENCHES AND SURFACE FEATURES TO EXISTING CONDITIONS OR BETTER AND TO THE SATISFACTION OF MUNICIPAL AUTHORITIES.
- ASPHALT RESTORATION SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA DETAIL R-10. THICKNESS OF GRANULAR MATERIAL AND ASPHALT LAYERS TO MATCH EXISTING. BOULEVARDS SHALL BE REINTEGRATED WITH 100mm OF TOPSOIL, SEED AND MULCH.
- REMOVE FROM SITE ALL EXCESS EXCAVATED MATERIAL, ORGANIC MATERIAL AND DEBRIS UNLESS OTHERWISE INSTRUCTED BY ENGINEER. EXCAVATE AND REMOVE FROM SITE ANY CONTAMINATED MATERIAL. ALL CONTAMINATED MATERIAL SHALL BE DISPOSED OF AT A LICENSED LANDFILL FACILITY.
- ALL ELEVATIONS ARE GEODETIC AND UTILIZE METRIC UNITS.
- ALL FENCING TO BE LOCATED 0.15m INSIDE PROPERTY LINE. REFER TO LANDSCAPING PLAN FOR DETAILS.
- PERFORATED PIPE SUB-DRAINS TO BE PROVIDED AT SUBGRADE LEVEL EXTENDING FROM THE ROADSIDE CATCHBASIN FOR A DISTANCE OF 3.0m, PARALLEL TO THE CURB IN TWO DIRECTIONS.
- REFER TO GEOTECHNICAL REPORT (FILE NO: HEAFEY989.1 PREPARED BY KILGOUR & ASSOCIATES LTD.) RECOMMEND THE FOLLOWING MITIGATION MEASURES:
 - SILT FENCING PAIRED WITH STURDY CONSTRUCTION FENCE ALONG THE PROJECT PERIMETER.
 - RETENTION OF EXISTING VEGETATION AND STABILIZATION OF EXPOSED SOILS WITH VEGETATION WHERE POSSIBLE.
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 - MINIMIZING THE TOTAL SLOPE LENGTH AND THE GRADIENT OF DISTURBED AREAS.
 - REFUELLING OF MACHINERY SHOULD OCCUR >30 M FROM THE WETLAND AND POOLE CREEK AND ALL MACHINERY WILL REMAIN ON THE PROJECT-SIDE OF SILT AND CONSTRUCTION FENCE.
 - MAINTAINING OVERLAND SHEET FLOW AND AVOIDING CONCENTRATED FLOWS.
 - STORING STOCKPILING MATERIALS >30m AWAY FROM THE WETLAND AND POOLE CREEK.
- CONTRACTOR TO PROVIDE THE CONSULTANT WITH A GENERAL PLAN OF SERVICES INDICATING ALL SERVING AS-BUILT INFORMATION. AS-BUILT INFORMATION MUST INCLUDE: PIPE MATERIAL, SIZES, LENGTHS, SLOPES, INVERT AND TIC ELEVATIONS, STRUCTURE LOCATIONS, VALVE AND HYDRANT LOCATIONS, TWM ELEVATIONS AND ANY ALIGNMENT CHANGES, ETC.

GRADING AND PAVEMENT NOTES:

- ALL TOPSOIL, ORGANIC OR DELETERIOUS MATERIAL MUST BE ENTIRELY REMOVED FROM BENEATH THE PROPOSED HARD SURFACE (ie. PAVEMENT, CURB, SIDEWALK, ETC.) AREAS AS DIRECTED BY THE SITE ENGINEER OR GEOTECHNICAL ENGINEER.
- EXPOSED SUBGRADES IN PROPOSED PAVED AREAS SHOULD BE HEAVILY PROOF ROLLED WITH A LARGE (10 TON) VIBRATORY STEEL DRUM ROLLER UNDER DRY CONDITIONS AND INSPECTED BY THE GEOTECHNICAL ENGINEER PRIOR TO THE PLACEMENT OF GRANULARS.
- ANY SOFT AREAS EVIDENT FROM THE PROOF ROLLING SHOULD BE SUB-EXCAVATED AND REPLACED WITH SUITABLE MATERIAL THAT IS FROST COMPATIBLE WITH THE EXISTING SOILS AS RECOMMENDED BY THE GEOTECHNICAL ENGINEER.
- THE GRANULAR BASE SHOULD BE PLACED IN MAXIMUM 300mm LIFTS AND COMPACTED TO AT LEAST 100% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY VALUE. ANY ADDITIONAL GRANULAR FILL USED BELOW THE PROPOSED PAVEMENT SHOULD BE PLACED IN MAXIMUM 300mm LIFTS AND COMPACTED TO AT LEAST 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY VALUE.
- BUILD ROADWAYS WITH 3% CROSSFALL INCLUDING SUBGRADE AND GRANULAR BASE.
- ROADWAY SUBGRADE TO BE INSPECTED BY THE GEOTECHNICAL ENGINEER AT THE TIME OF CONSTRUCTION TO REVIEW IF A WOVEN GEOTEXTILE IS REQUIRED BELOW THE GRANULAR MATERIALS; AND TO CONFIRM THE DEPTH AND COMPACTION OF GRANULAR 'B'.
- PRIOR TO PLACEMENT OF TOP/LIFT, THE CONTRACTOR SHALL ADJUST ALL STRUCTURES TO FINAL GRADE PER CITY OF OTTAWA STANDARDS.
- MINIMUM OF 2% GRADE FOR ALL GRASS AREAS UNLESS OTHERWISE NOTED.
- MAXIMUM TERRACING GRADE TO BE 3:1 UNLESS OTHERWISE NOTED.
- ALL GRADES BY CURBS ARE EDGE OF PAVEMENT GRADES UNLESS OTHERWISE INDICATED.
- ALL CURBS SHALL BE BARRIER CURB (150mm) UNLESS OTHERWISE NOTED AND CONSTRUCTED PER CITY OF OTTAWA STANDARD (SC1.1).
- REFER TO LANDSCAPE PLAN FOR PLANTING AND OTHER LANDSCAPE FEATURE DETAILS.
- CONTRACTOR TO PROVIDE THE CONSULTANT WITH A GRADING PLAN INDICATING AS-BUILT ELEVATIONS OF ALL DESIGN GRADES SHOWN ON THE PLAN.

SEWER NOTES:

- SPECIFICATIONS:

ITEM	SPEC. No.	REFERENCE
CATCHBASIN (600x600mm)	705.010	OPSD
SANITARY MANHOLE (1200mm)	701.010	OPSD
STORM MANHOLE (1800mm)	701.010	OPSD
STORM MANHOLE (900mm)	NYLOPLAST (OR APPROVED EQUIVALENT)	OPSD
CB, FRAME & COVER	401.010	OPSD
STORM / SANITARY MH FRAME & COVER	401.010	OPSD
SEWER TRENCH - BEDDING (GRANULAR A)		
COVER (GRANULAR A OR GRANULAR B TYPE I, WITH MAXIMUM PARTICLE SIZE <25mm)		
STORM SEWER <450mmØ	PVC DR 35	
STORM SEWER <450mmØ	HDPE	
SANITARY SEWER	PVC DR 35	
CATCHBASIN LEAD	PVC DR 35	
- INSULATE ALL PIPES (SAN/STM) THAT HAVE LESS THAN 1.5m COVER WITH 50mm X 1200mm H-40 INSULATION. PROVIDE 150mm CLEARANCE BETWEEN PIPE AND INSULATION PER CITY OF OTTAWA DETAIL S35.
- SERVICES ARE TO BE CONSTRUCTED TO 1.0m FROM FACE OF BUILDING AT A MINIMUM SLOPE OF 1.0%.
- PIPE BEDDING, COVER AND BACKFILL ARE TO BE COMPACTED TO AT LEAST 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY. THE USE OF CLEAR CRUSHED STONE AS A BEDDING LAYER SHALL NOT BE PERMITTED.
- SEWER SERVICE CONNECTIONS PER CITY OF OTTAWA DETAILS S11 AND S11.1.
- FLEXIBLE CONNECTIONS ARE REQUIRED FOR CONNECTING PIPES TO MANHOLES (FOR EXAMPLE KOR-N-SEAL, FOX POSITIVE SEAL AND DURASEAL). THE CONCRETE CRADLE FOR THE PIPE CAN BE ELIMINATED.
- THE OWNER SHALL REQUIRE THAT THE SITE SERVING CONTRACTOR PERFORM FIELD TESTS FOR QUALITY CONTROL OF ALL SANITARY SEWERS. LEAKAGE TESTING SHALL BE COMPLETED IN ACCORDANCE WITH OPSD 410/07.16, 410/07.16.04 AND 401/07.24. DYE TESTING IS TO BE COMPLETED ON ALL SANITARY SERVICES TO CONFIRM PROPER CONNECTION TO THE SANITARY SEWER MAIN. THE FIELD TESTS SHALL BE PERFORMED IN THE PRESENCE OF A CERTIFIED PROFESSIONAL ENGINEER WHO SHALL SUBMIT A CERTIFIED COPY OF THE TEST RESULTS.
- STORM MANHOLES AND CBHMS ARE TO HAVE 300mm SUMPS UNLESS OTHERWISE INDICATED.
- ENSURE MANHOLE CHIMNEY IS ROTATED TO BEST AVOID WHEEL PATHING.
- CONTRACTOR TO TELETYPE (CCTV) ALL PROPOSED SEWERS, 200mmØ OR GREATER PRIOR TO BASE COURSE ASPHALT. UPON COMPLETION OF CONTRACT, THE CONTRACTOR IS RESPONSIBLE TO FLUSH AND CLEAN ALL SEWERS & APPURTENANCES.

WATERMAIN NOTES:

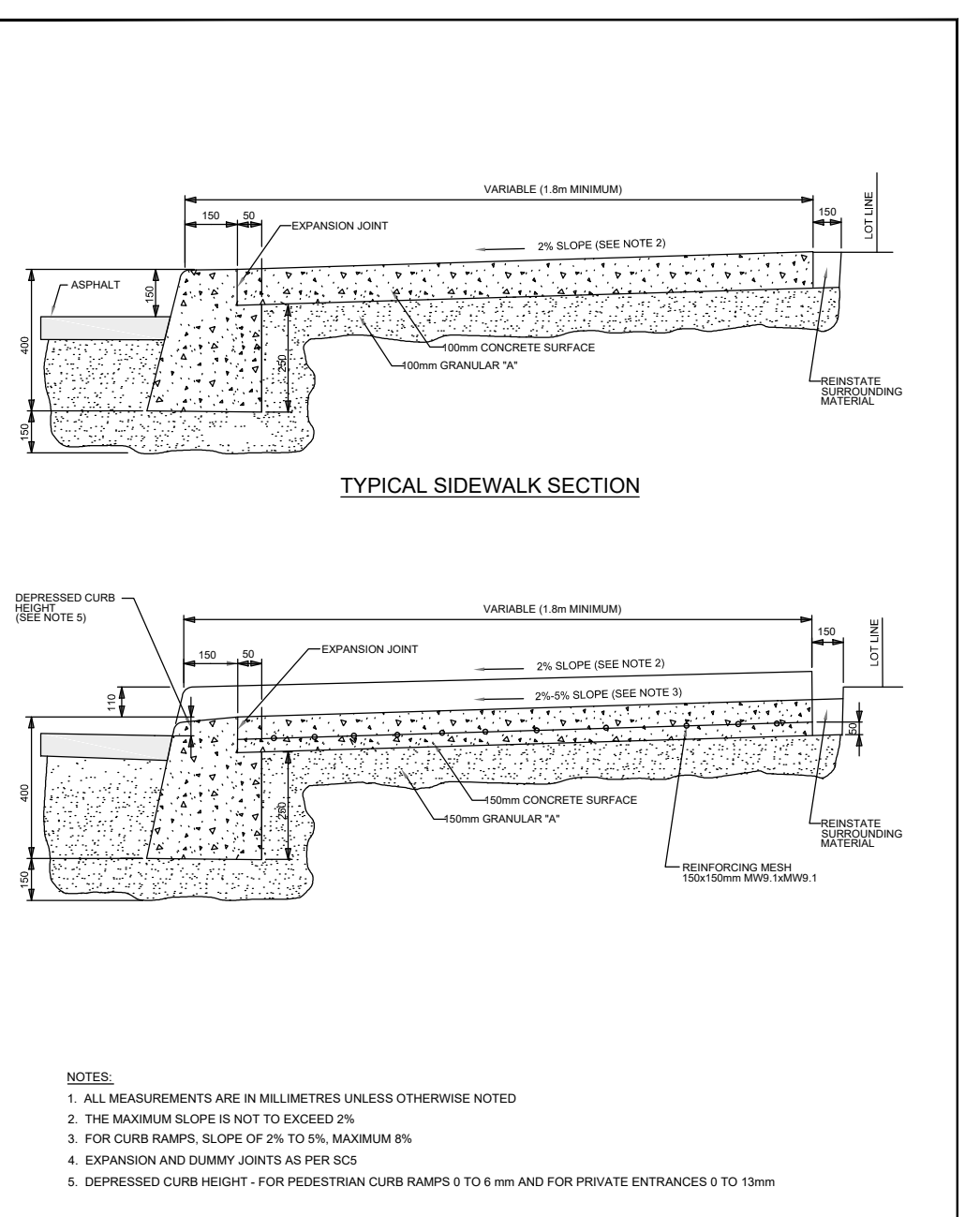
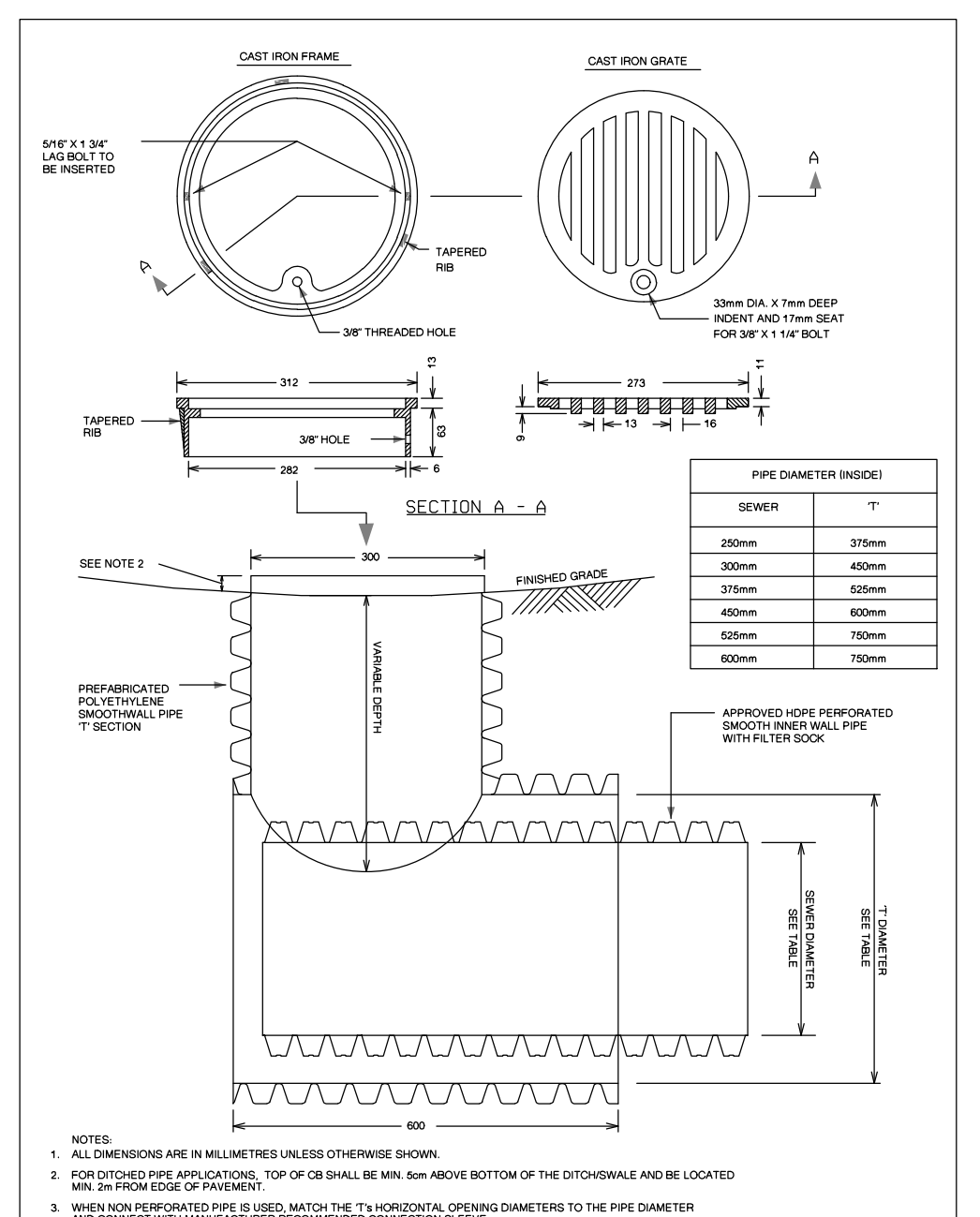
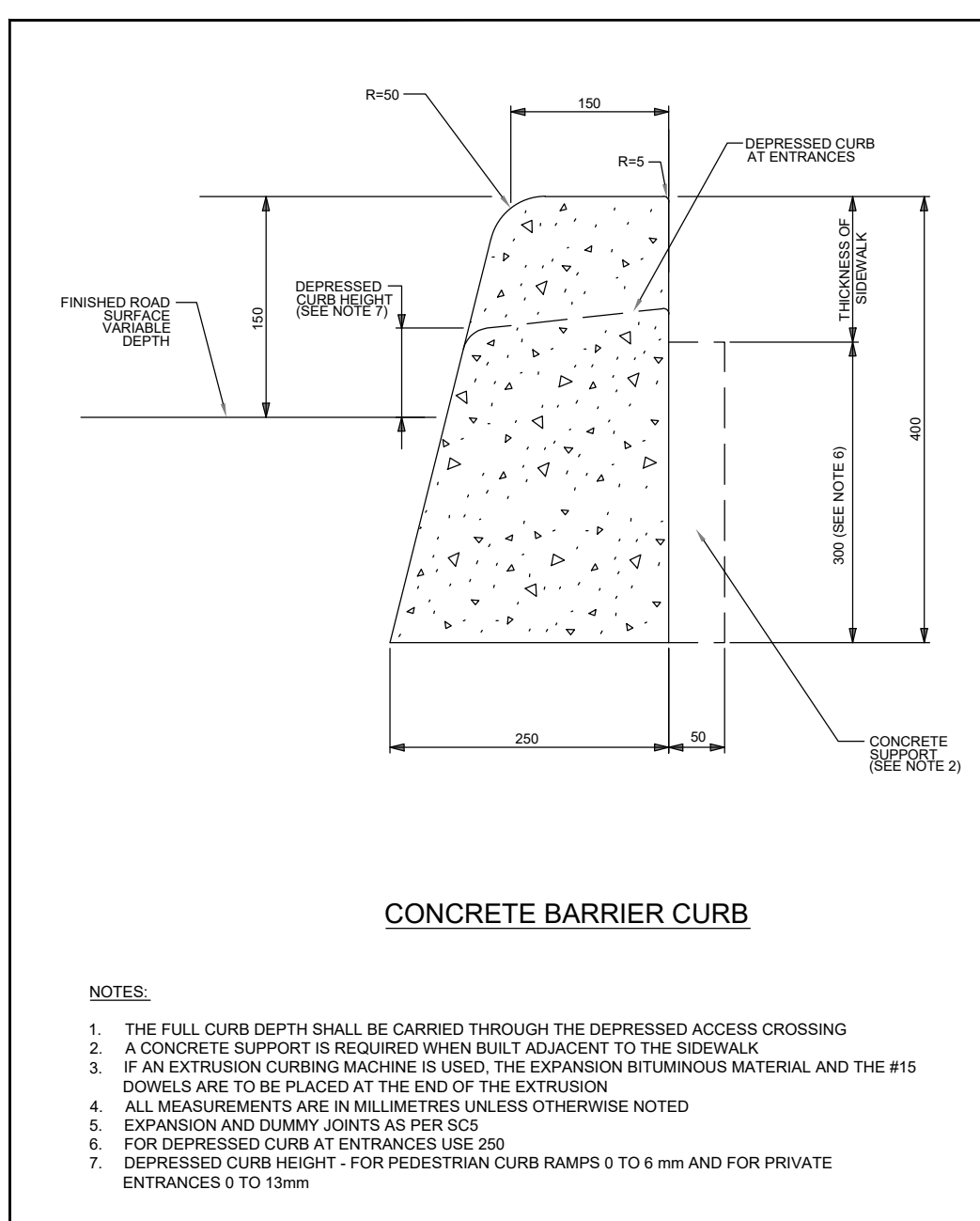
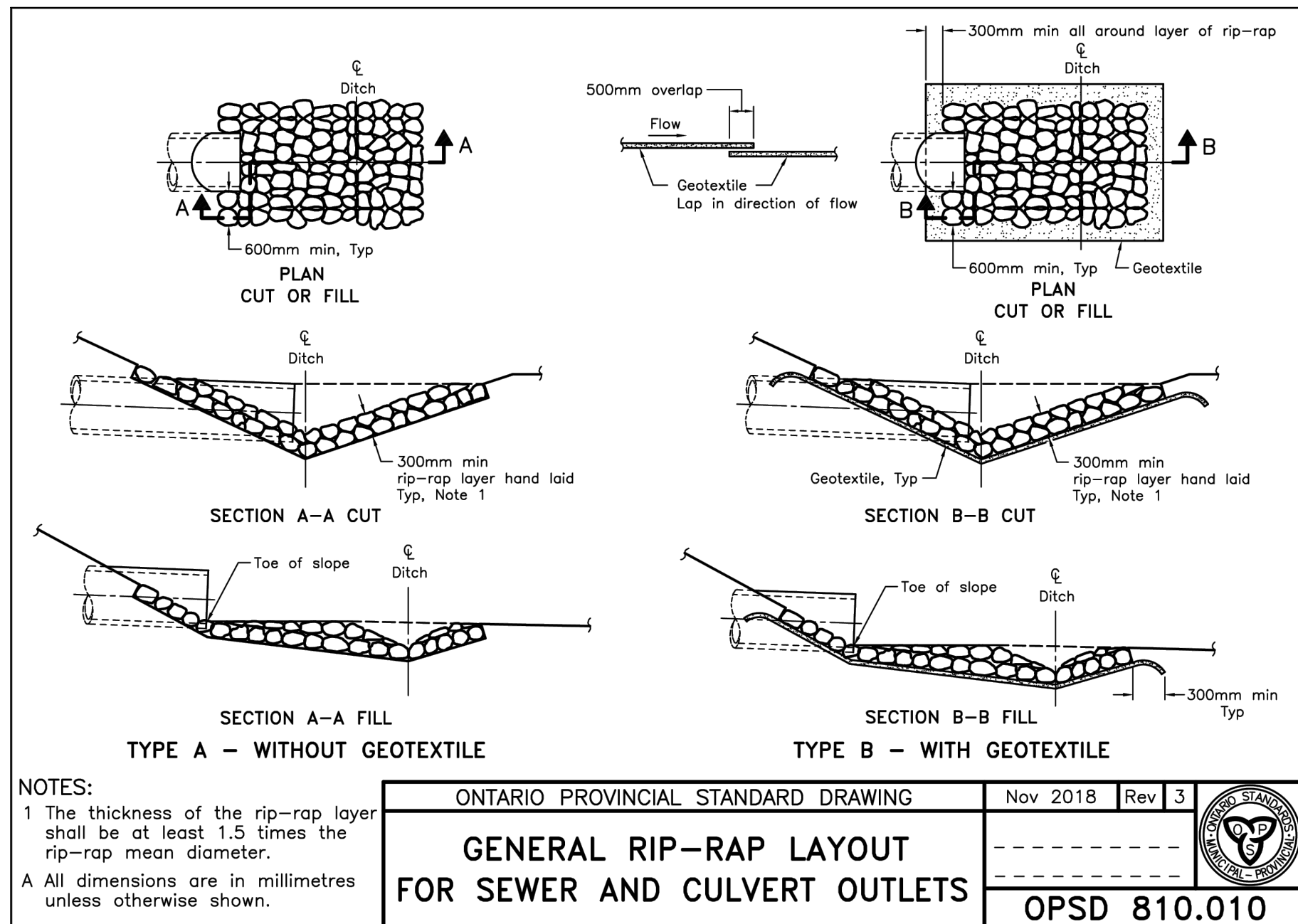
- SPECIFICATIONS:

ITEM	SPEC. No.	REFERENCE
WATERMAIN TRENCHING	W17	CITY OF OTTAWA
THERMAL INSULATION IN SHALLOW TRENCHES	W22	CITY OF OTTAWA
WATERMAIN CROSSING BELOW SEWER	W25 / W25.2	CITY OF OTTAWA
WATERMAIN VALVE BOX	W24	CITY OF OTTAWA
- SUPPLY AND CONSTRUCT ALL WATERMANS AND APPURTENANCES IN ACCORDANCE WITH THE CITY OF OTTAWA STANDARDS AND SPECIFICATIONS. EXCAVATION, INSTALLATION, BACKFILL AND RESTORATION OF ALL WATERMANS BY THE CONTRACTOR. CONNECTIONS AND SHUT-OFFS AT THE MAIN AND CHLORINATION OF THE WATER SYSTEM SHALL BE PERFORMED BY CITY OFFICIALS.
- WATERMAIN SHALL BE MINIMUM 2.4m DEPTH BELOW GRADE UNLESS OTHERWISE INDICATED.
- PROVIDE MINIMUM 0.25m CLEARANCE BETWEEN OUTSIDE OF PIPES AT ALL CROSSINGS.
- WATER SERVICE IS TO BE CONSTRUCTED TO WITHIN 1.0m OF FOUNDATION WALL AND CAPPED, UNLESS OTHERWISE INDICATED.

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

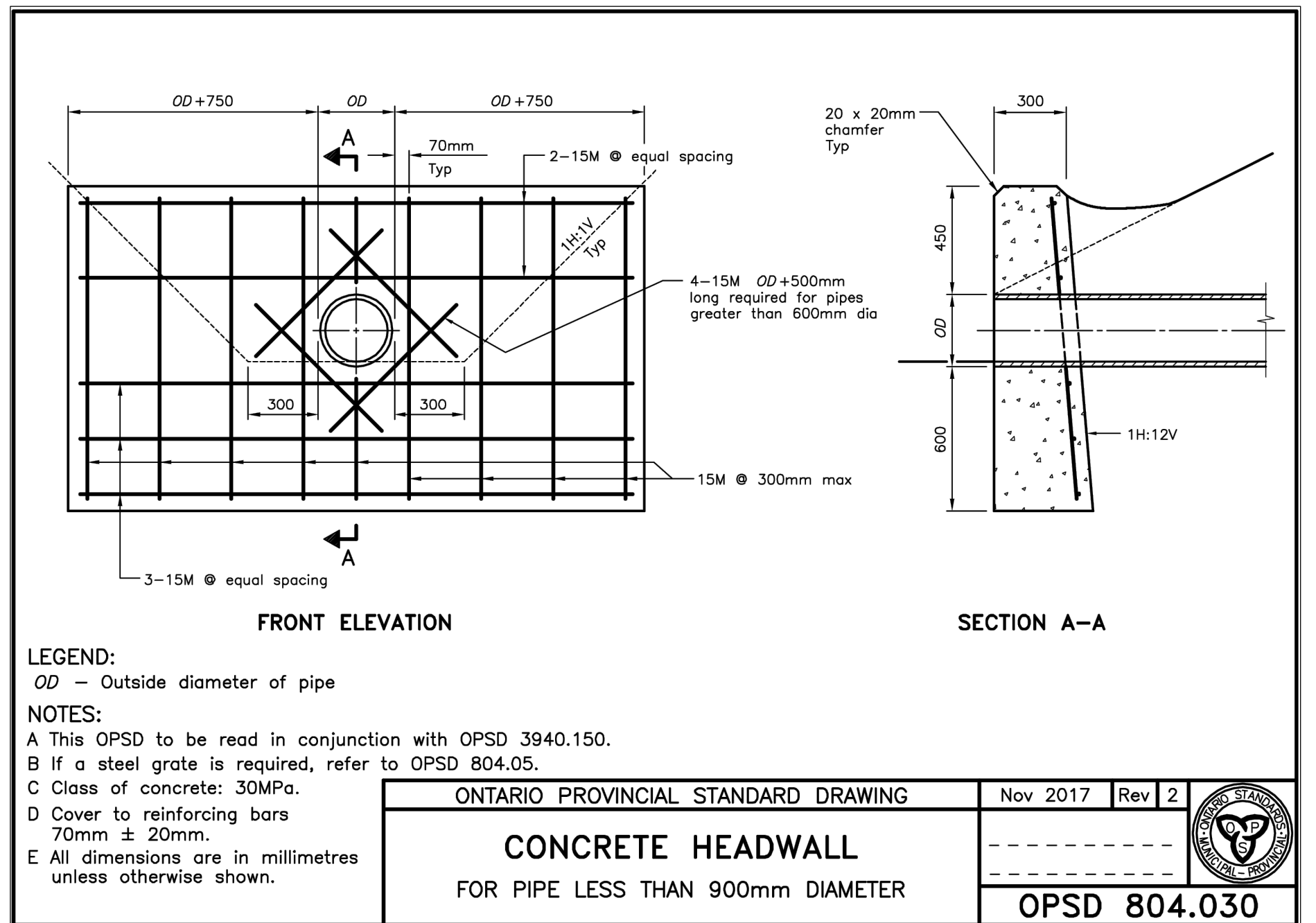
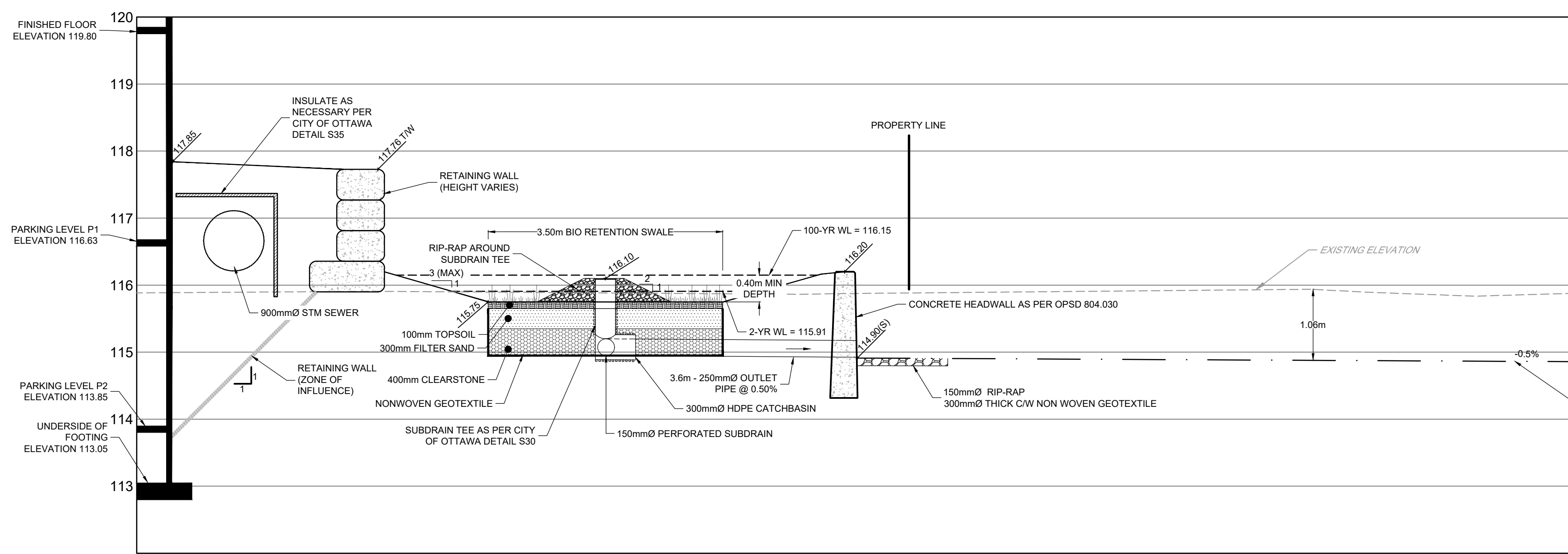
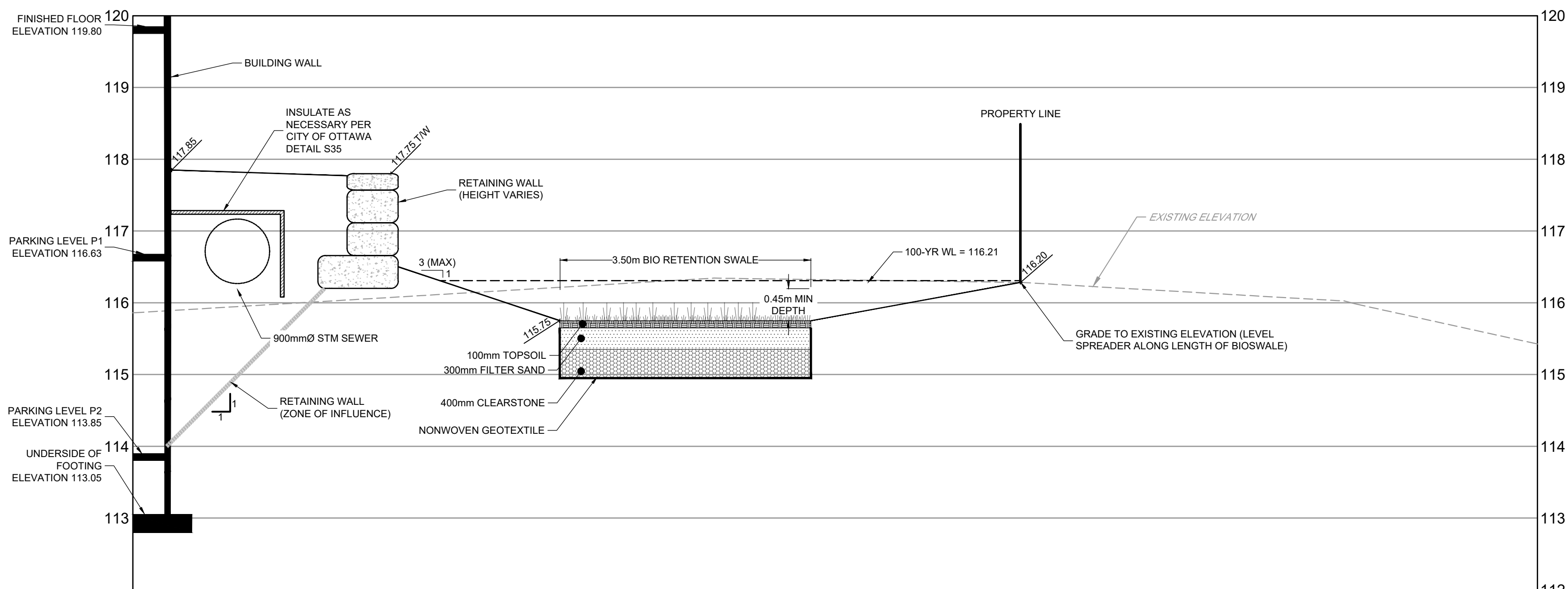
EROSION AND SEDIMENT CONTROL NOTES:

- THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES, TO PROVIDE PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECEIVING WATERCOURSE, DURING CONSTRUCTION ACTIVITIES. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.
- THE OWNER AGREES TO PREPARE AND IMPLEMENT AN EROSION AND SEDIMENT CONTROL PLAN TO THE SATISFACTION OF THE CITY OF OTTAWA, APPROPRIATE TO THE SITE CONDITIONS, PRIOR TO UNDERTAKING ANY SITE ALTERATIONS (FILLING, GRADING, REMOVAL OF VEGETATION, ETC.) AND DURING ALL PHASES OF SITE PREPARATION AND CONSTRUCTION IN ACCORDANCE WITH THE CURRENT BEST MANAGEMENT PRACTICES FOR EROSION AND SEDIMENT CONTROL, SUCH AS BUT NOT LIMITED TO INSTALLING FILTER CLOTHS ACROSS MANHOLE/CATCHBASIN LIDS TO PREVENT SEDIMENTS FROM ENTERING STRUCTURES AND INSTALL AND MAINTAIN A LIGHT DUTY SILT FENCE BARRIER AS REQUIRED.
 - THE CONTRACTOR SHALL PLACE FILTER BAGS UNDER THE CATCHBASIN AND MANHOLE GRATES FOR THE DURATION OF CONSTRUCTION AND WILL REMAIN IN PLACE DURING ALL PHASES OF CONSTRUCTION.
 - SILT FENCING FOR ENTIRE PERIMETER OF SITE, SHALL BE UTILIZED TO CONTROL EROSION FROM THE SITE DURING CONSTRUCTION.
 - THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.
 - PROVIDE MUD MATS AT ALL CONSTRUCTION ACCESS POINTS TO MINIMIZE SEDIMENT TRANSPORT OFF-SITE.
 - EROSION AND SEDIMENT CONTROL MEASURES MAY BE MODIFIED IN THE FIELD AT THE DISCRETION OF THE CITY OF OTTAWA SITE INSPECTOR OR CONSERVATION AUTHORITY.
 - ENVIRONMENTAL IMPACT STATEMENT (FILE NO: HEAFEY989.1 PREPARED BY KILGOUR & ASSOCIATES LTD.) RECOMMEND THE FOLLOWING MITIGATION MEASURES:
 - SILT FENCE PAIRED WITH STURDY CONSTRUCTION FENCE ALONG THE PROJECT PERIMETER.
 - RETENTION OF EXISTING VEGETATION AND STABILIZATION OF EXPOSED SOILS WITH VEGETATION WHERE POSSIBLE.
 - LIMITING THE DURATION OF SOIL EXPOSURE AND PHASING PROJECT WORKS.
 - LIMITING THE SIZE OF DISTURBED AREAS BY MINIMIZING NONESSENTIAL CLEARING AND GRADING.
 - MINIMIZING THE TOTAL SLOPE LENGTH AND THE GRADIENT OF DISTURBED AREAS.
 - REFUELLING OF MACHINERY SHOULD OCCUR >30 M FROM THE WETLAND AND POOLE CREEK AND ALL MACHINERY WILL REMAIN ON THE PROJECT-SIDE OF SILT AND CONSTRUCTION FENCE.
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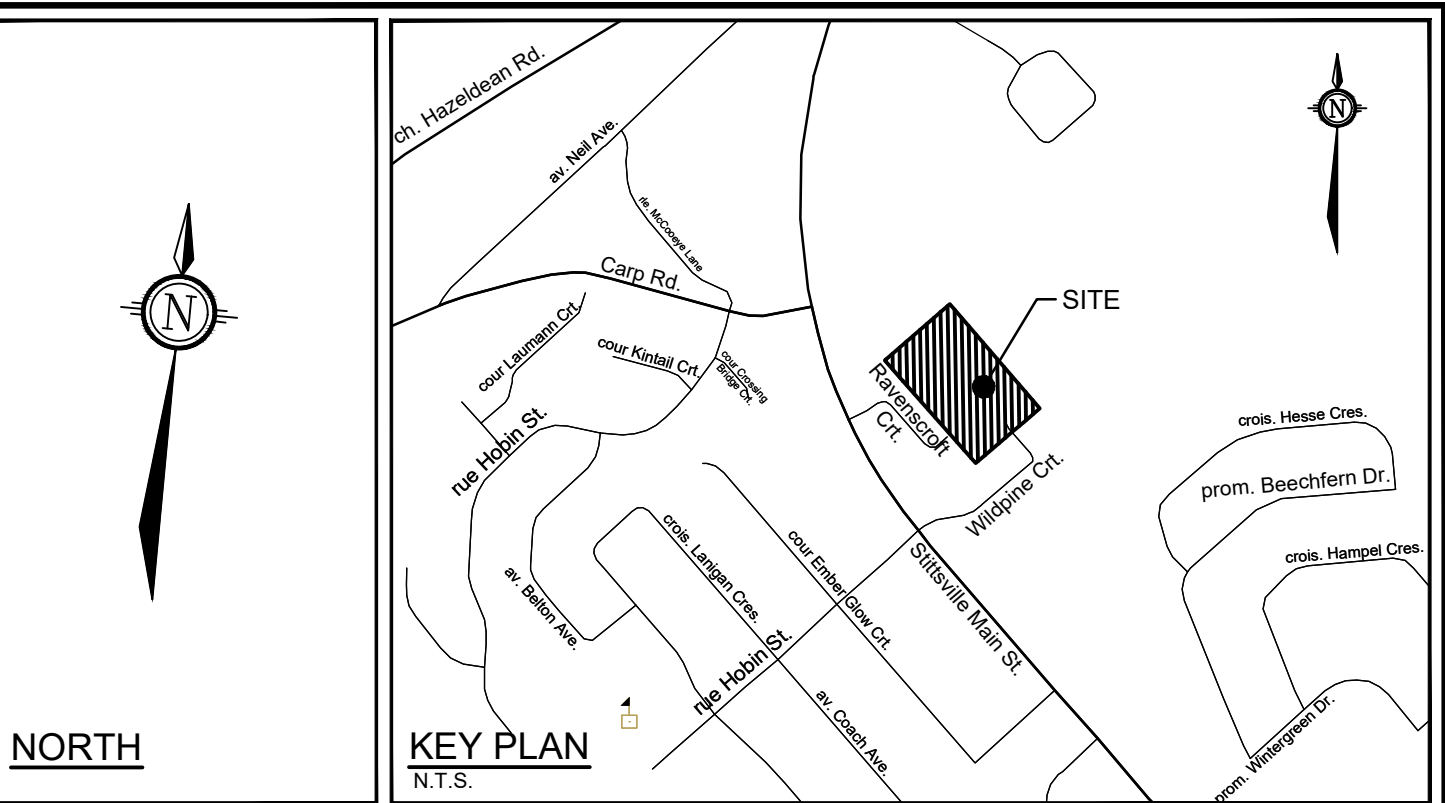
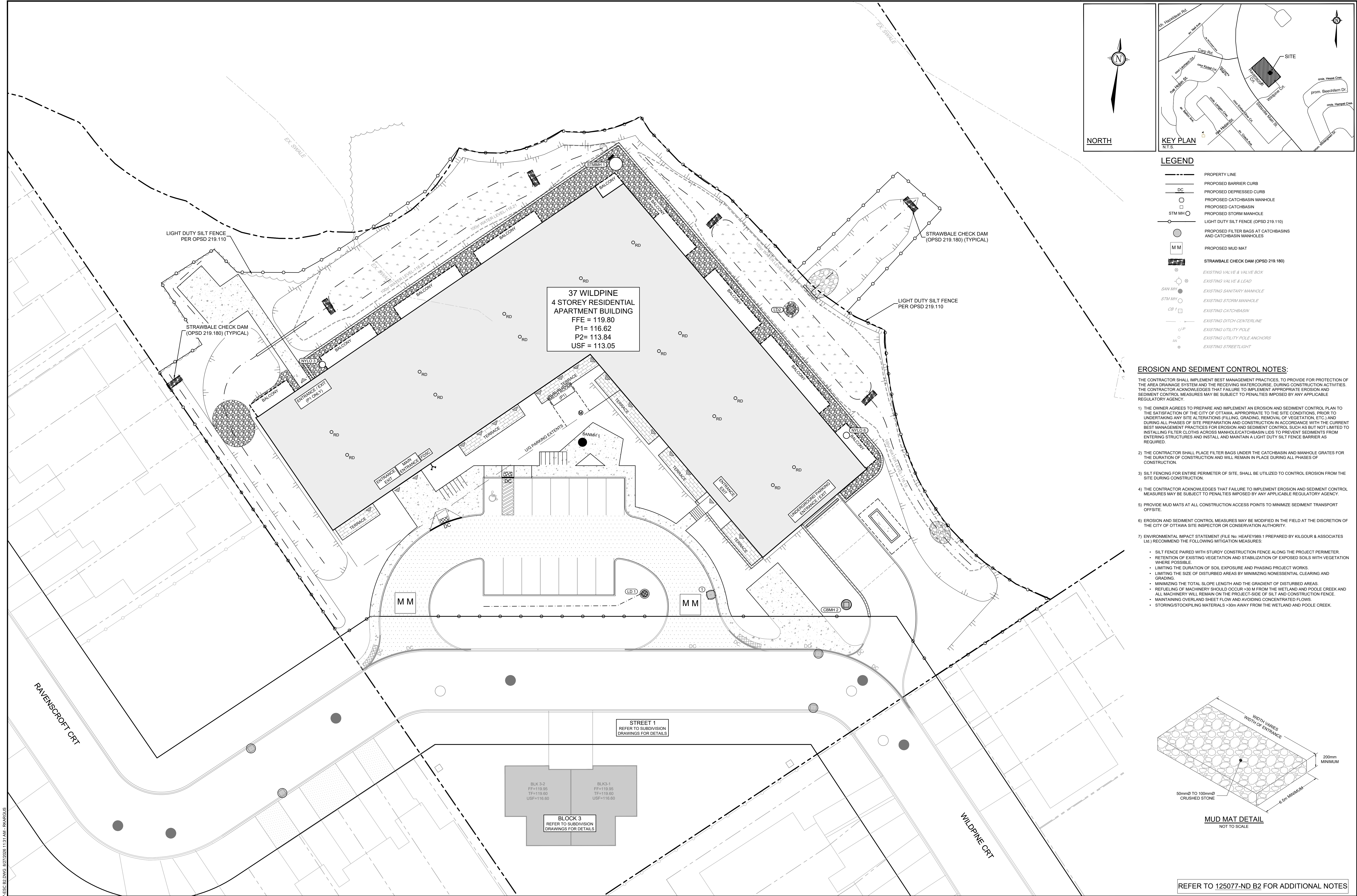


PAVEMENT STRUCTURE:

- LIGHT DUTY PAVEMENT
 - 50mm HL3 OR SP 12.5
 - 150mm GRANULAR "A" CRUSHED STONE
 - 300mm OPSS GRANULAR "B" TYPE II
- HEAVY DUTY PAVEMENT
 - 40 mm HL3/SP12.5 CAT B
 - 50 mm HL3 OR SP 19 CAT B
 - 150mm GRANULAR "A" CRUSHED STONE
 - 450mm GRANULAR "B" TYPE II

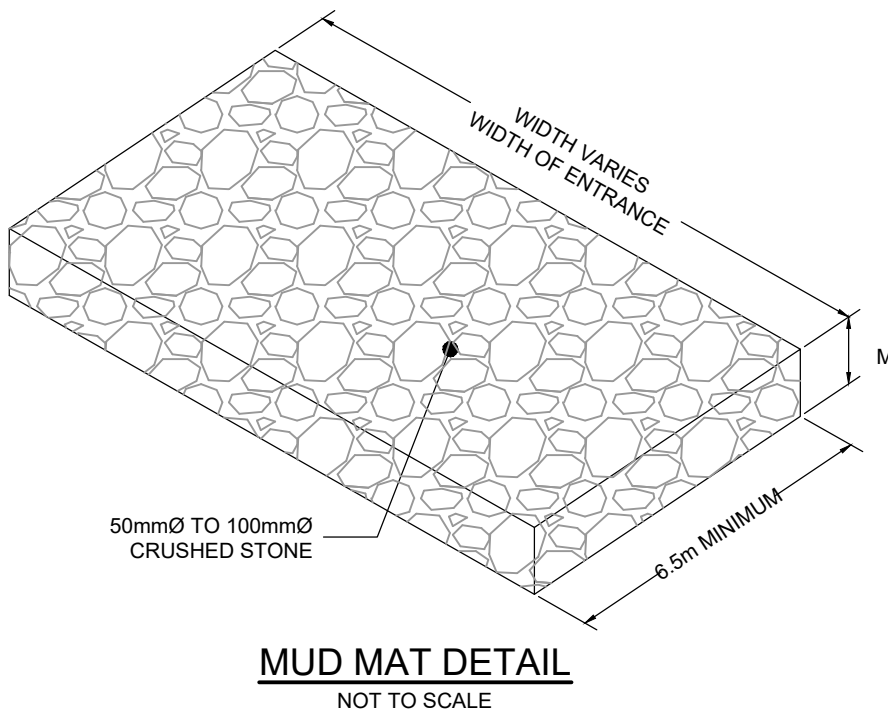


SCALE		DESIGN		FOR REVIEW ONLY		LOCATION	
AS SHOWN		3. REVISED PER CITY COMMENTS	AUG 27/2026	MJH		CITY OF OTTAWA	
		2. ISSUED FOR SITE PLAN APPLICATION	MAR 12/26	MJH		37 WILDRIVE COURT	
		1. ISSUED FOR COORDINATION	OCT 28/25	MJH		DRAWING NAME	
						NOTES AND DETAILS	
						BLOCK 2	
						PROJECT No.	
						125077	
						REV # 4	
						DRAWING No.	
						125077-NDB2	



- LEGEND**
- PROPERTY LINE
 - PROPOSED BARRIER CURB
 - PROPOSED DEPRESSED CURB
 - PROPOSED CATCHBASIN MANHOLE
 - PROPOSED CATCHBASIN
 - PROPOSED STORM MANHOLE
 - LIGHT DUTY SILT FENCE (OPSD 219.110)
 - PROPOSED FILTER BAGS AT CATCHBASINS AND CATCHBASIN MANHOLES
 - PROPOSED MUD MAT
 - STRAWBALE CHECK DAM (OPSD 219.180)
 - EXISTING VALVE & VALVE BOX
 - EXISTING VALVE & LEAD
 - EXISTING SANITARY MANHOLE
 - EXISTING STORM MANHOLE
 - EXISTING CATCHBASIN
 - EXISTING DITCH CENTERLINE
 - EXISTING UTILITY POLE
 - EXISTING UTILITY POLE ANCHORS
 - EXISTING STREETLIGHT

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REFER TO 125077-ND B2 FOR ADDITIONAL NOTES

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4. REVISED PER CITY COMMENTS AUG 27/26 MJH				CHECKED MJH				DRAWING NAME EROSION SEDIMENT CONTROL PLAN BLOCK 2		PROJECT NO. 125077	
3. ISSUED FOR SITE PLAN APPLICATION MAR 12/26 MJH				DRAWN TS				REV REV # 4		DRAWING NO. 125077-ESC2	
2. ISSUED FOR COORDINATION OCT 28/25 MJH				CHECKED MJH				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		PLANS/2017 - 1033mm/30mm	
1. CLIENT REVIEW SEPT 17/25 CJR				APPROVED MJH				PROVINCE OF ONTARIO AUG 27/2026			
No. REVISION DATE BY											

