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560 Hazeldean Road Double Deck Subdivision

Concept Servicing Report

Assessment of Adequacy of Public Services and
Stormwater Site Management

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**CONCEPT SERVICING REPORT
ASSESSMENT OF ADEQUACY OF PUBLIC SERVICES
AND STORMWATER SITE MANAGEMENT**

**560 HAZELDEAN ROAD
DOUBLE DECK SUBDIVISION**

Prepared By:

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

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Novatech File: 100057
Ref: R-2025-70

January 20, 2026

Regional Group of Companies
1737 Woodward Drive, 2nd Floor
Ottawa, ON K2C 0P9

Attention: Stefanie Kaminski

**Reference: Concept Servicing Report
560 Hazeldean Road
Double Deck Subdivision
Our File No.: 100057**

Enclosed is the revised Concept Servicing Report for the Double Deck Subdivision at 560 Hazeldean Road. The report addresses development servicing for the subject property.

If you have any questions or comments, please do not hesitate to contact us.

Sincerely,

NOVATECH



Lucas Wilson, P.Eng.
Project Engineer – Land Development

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1.0 INTRODUCTION

1.1 Background

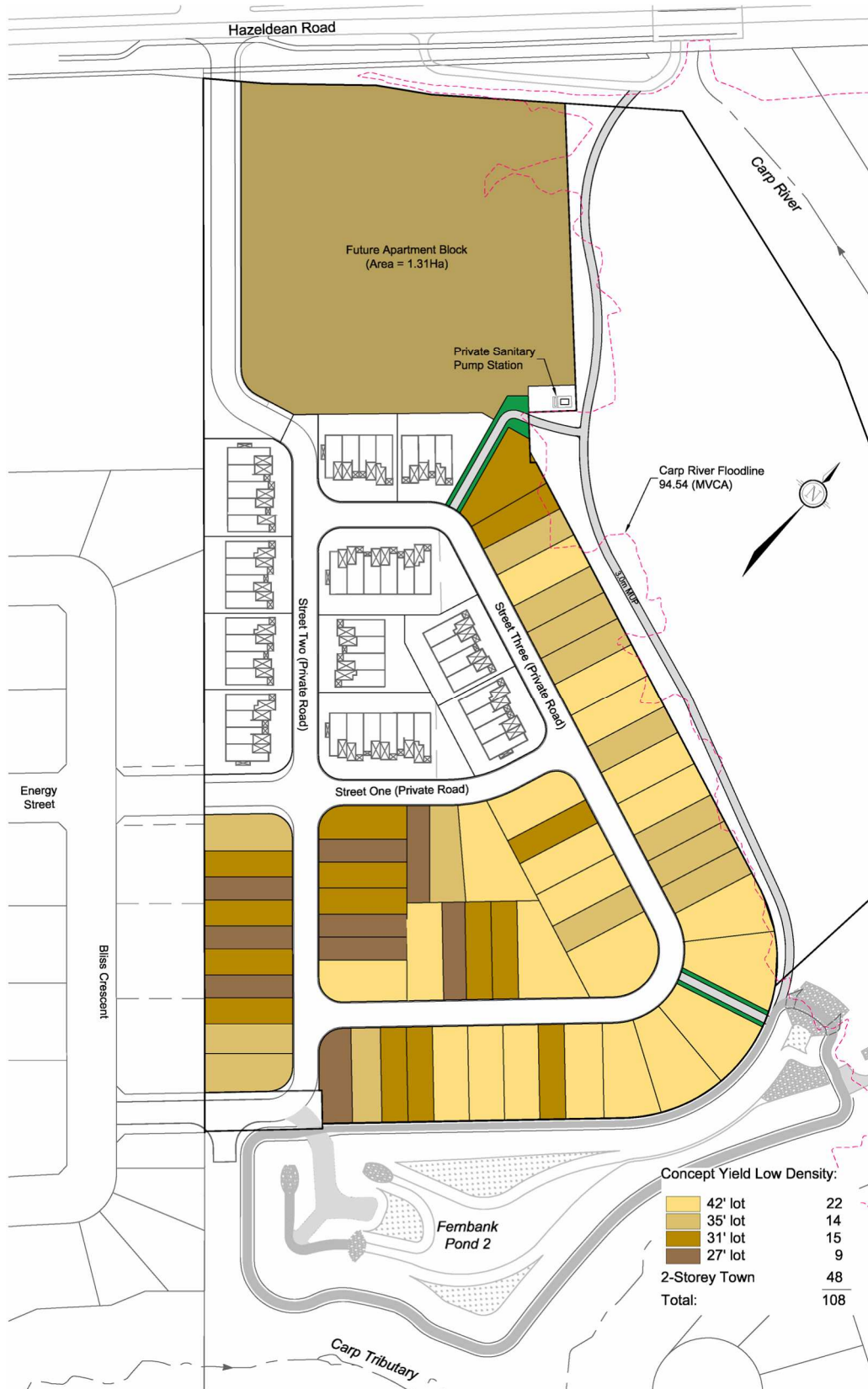
Novatech has been retained by Double Deck Regional Inc. (c/o Regional Group) to prepare this Conceptual Servicing Report in support of applications for Plan of Subdivision and Zoning By-law Amendment for their property municipally known as 560 Hazeldean Road. The Site is located within the community of Stittsville with frontage on Hazeldean Road. **Figure 1-1** shows the location of the Site currently operating as an instructional driving range facility. The Site will be developed with a mix of single detached homes (50 units) and townhouses (48 units) with a future apartment block (under separate Site Plan Control application) fronting on Hazeldean Road.



Figure 1-1: Key Plan

The proposed Site is approximately 8.74 ha (5.95 ha developed) and will be bordered by Hazeldean Road to the North, the Carp River to the east, Bradley Commons Subdivision (currently under construction) to the west (Richcraft), and a stormwater management facility (Pond 2) to the south. **Figure 1-2** shows the proposed Concept Plan.

This Concept Servicing Report provides information on the considerations and approach by which Novatech has analyzed the existing site information for the Site, and details how the development lands can be adequately serviced while meeting the City requirements and all other pertinent regulations. This study builds upon works completed for the Fernbank Community Design Plan [1] prepared by Walker, Nott, Dragicevic Associates Limited, the Fernbank Master Servicing Study [2] prepared by Novatech, the Fernbank Environmental Management Plan prepared by Novatech [3] and the Fernbank Community SWM Facility – Pond 2 Design Report prepared by Novatech [4].



2.0 TOPOGRAPHY AND GRADING

2.1 Existing Conditions

The Site generally slopes to the northeast towards the Carp River at approximately 1.0%. The maximum grade of approximately 97.0 m at the southwest corner of the property boundary, and a minimum elevation of approximately 94.0 m in the northeast corner give a total elevation differential of approximately 3.0 m across the entire site.

A small portion of the development extends into the Carp River Floodline (94.54 m – MVCA) while the majority is outside the MVCA flood plain. Some minor updates to the flood plain will be addressed through a Prohibited Activities, Exemption and Permits application with the MVCA but will result in no net loss to the flood plain volume.

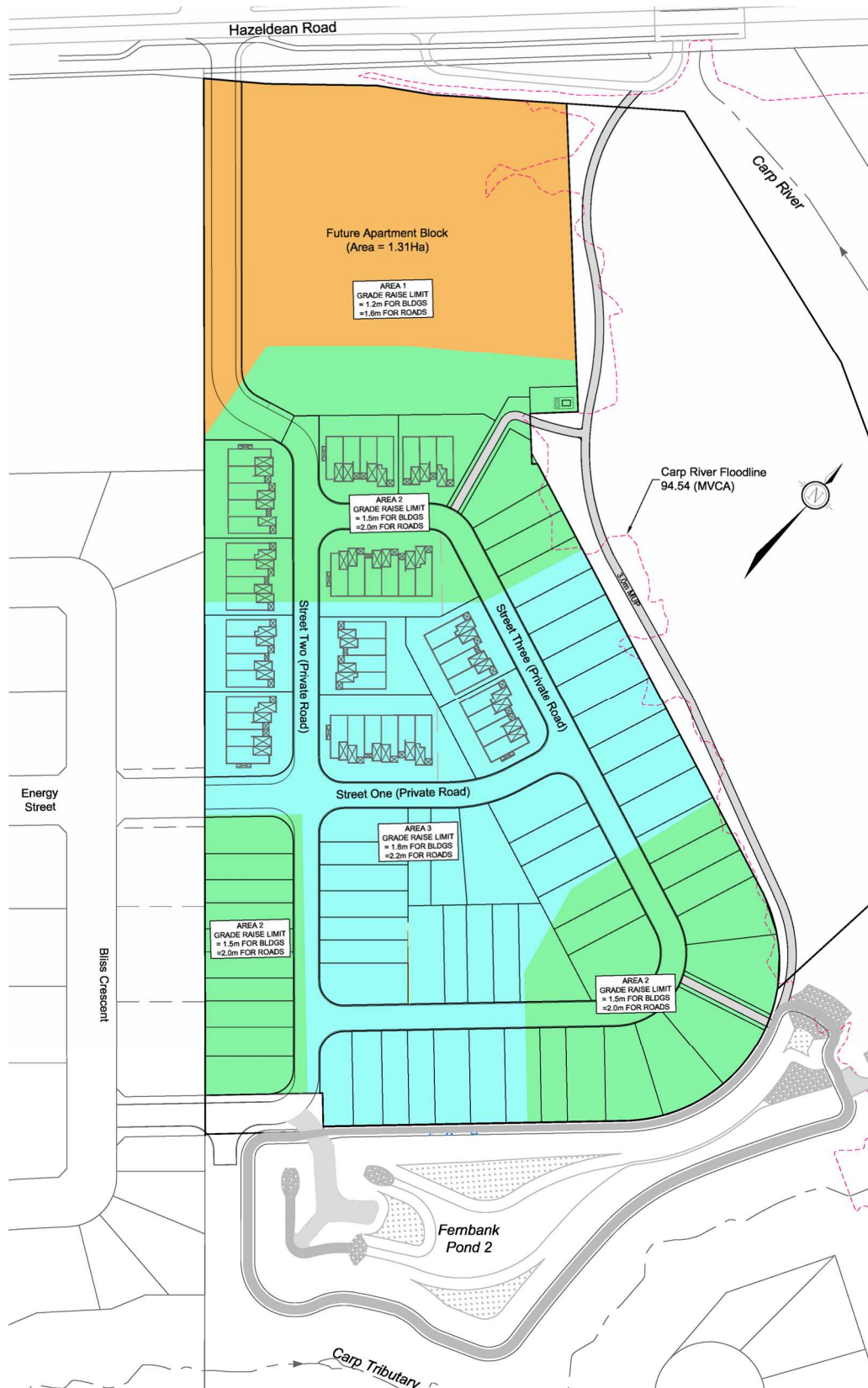
Paterson Group Inc. conducted a geotechnical investigation [5] in support of the proposed development.

The principle findings of these investigations determined that the soil profile consists of topsoil or asphalt underlain by fill and a clayey silt to silty clay deposit. Practical refusal to auguring was encountered at a depth of 7.3 m to 11.6 m at three (3) borehole locations. Long-term groundwater table can be expected at approximately 0.5 m to 1.5 m below ground surface. From a geotechnical perspective, it was noted that the site was suitable for the proposed development.

2.2 Proposed Conditions

Grade raise constraints are shown in **Figure 2-1** below and are described as Areas 1, 2 and 3. Where grade raise limits can not be achieved, light-weight fill will be used along the perimeter of the building and under the garage slab. DSK-20 (**Appendix C**) shows conceptual locations of light-weight fill. At the detailed design stage, the Grading Plan will be reviewed by the Geotechnical Engineer where specific light-weight fill requirements will be identified and implemented.

Existing elevations will be met along Hazeldean Road, the west property boundary (Bradley Commons) and Pond 2 to the south. The east property boundary shared with the Carp River will tie down at 3:1 to the existing grade. A preliminary grading plan is shown in **Appendix C**.

**Figure 2-1: Grade Raise Constraints**

3.0 WATER DISTRIBUTION

3.1 Existing Conditions

A 200 mm watermain is located west of the Site within Bliss Crescent, located within the adjacent Bradley Commons subdivision. Two 200 mm stubs were installed as part of the subdivision works, one located at the connection to Energy Street, and another located at the southwest corner by Pond 2.

3.2 Proposed Conditions

The Site will be connected to the existing watermain network by way of two separate feed points. Connections are proposed to the existing 200 mm diameter stubs located off Bliss Crescent in the adjacent subdivision to the west. The conceptual layout of the proposed watermain is shown on the Water Distribution Plan (**100057-WTR**). Refer to the Typical Roadway Cross-sections located in the Master Servicing Plan (**100057-MGP**) in **Appendix C** for the proposed locations of the watermains within the private roadways.

The watermain boundary conditions below were obtained from the City of Ottawa and have been included in **Appendix A**:

Boundary Condition Connection 1 (Energy Street):

Max HGL = 162.1 m

Peak Hour = 155.9 m

Max Day + FF of 167 L/s = 151.9 m

Max Day + FF of 233 L/s = 147.0 m

Max Day + FF of 250 L/s = 145.6 m

Max Day + FF of 267 L/s = 144.1 m

Boundary Condition Connection 2 (Bliss Crescent):

Max HGL = 162.1 m

Peak Hour = 155.9 m

Max Day + FF of 167 L/s = 148.6 m

Max Day + FF of 233 L/s = 141.0 m

Max Day + FF of 250 L/s = 138.8 m

Max Day + FF of 267 L/s = 136.4 m

City of Ottawa watermain design criteria are outlined in **Table 3.1**.

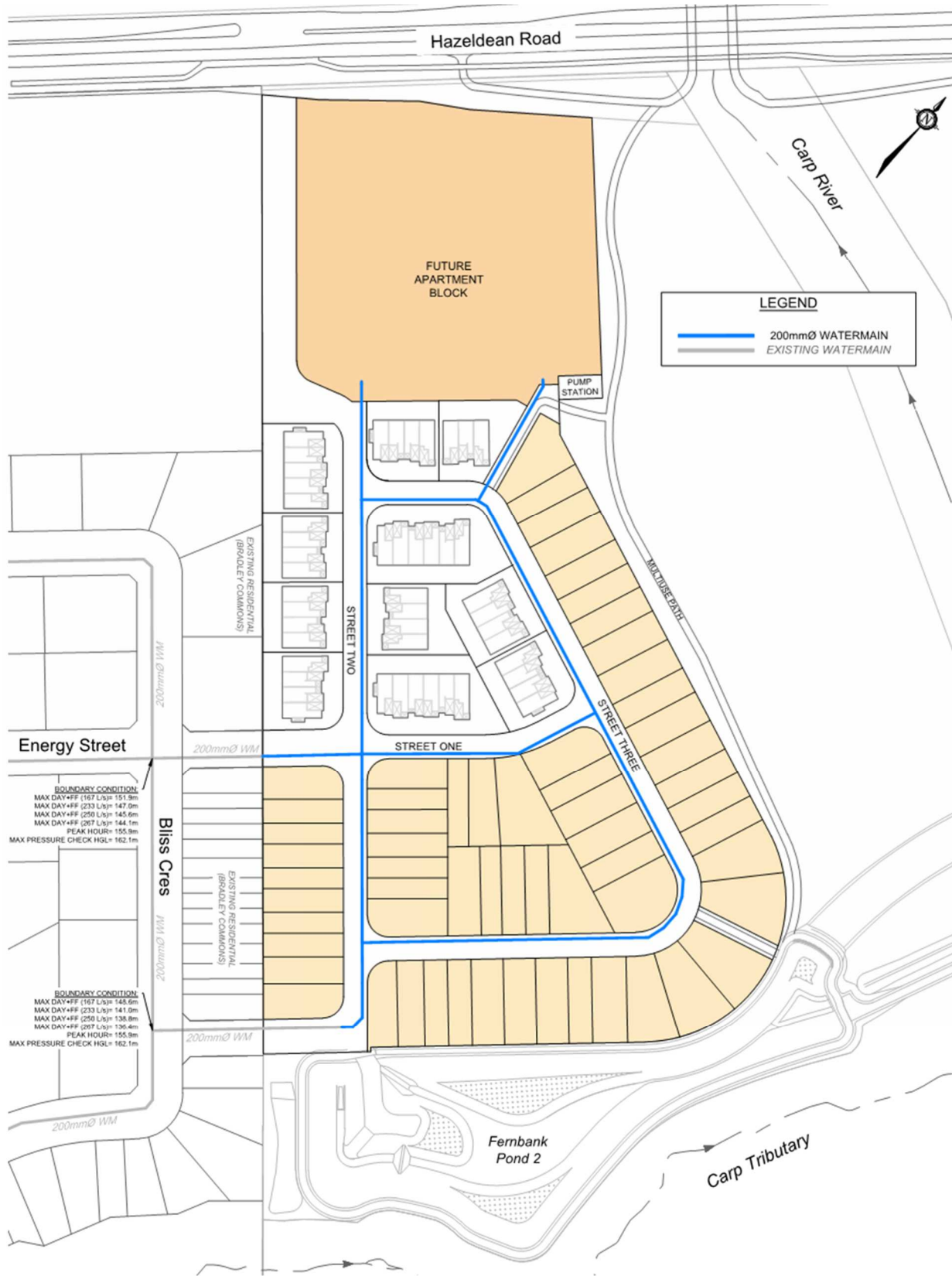


Figure 3-1: Watermain Layout

Table 3.1: Watermain Design Criteria

Design Parameter	Design Criteria
Single Family Home Population	3.4 people/unit
Townhouse Population	2.7 people/unit
Apartment Block Population	1.8 people/unit (Assumed 180 units)
Residential Demand	280 L/c/d
Maximum Day Demand	2.5 x Average Day
Peak Hour Demand	2.2 x Maximum Day
Fire Demand	167 L/s, 250 L/s, 267 L/s
Maximum Pressure	690 kPa (100psi) unoccupied areas
Maximum Pressure	552 kPa (80psi) occupied areas outside of ROW
Minimum Pressure	275 kPa (40 psi) except during fire flow
Minimum Pressure (Fire)	140 kPa (20 psi)

The City of Ottawa requires that proposed watermain networks meet Fire Underwriters Survey (FUS) fire flow requirements for units with adequate spacing. Adequate spacing implies a minimum separation of 10 m between the back of adjacent units for typical single family and townhome units, as per the City of Ottawa's Technical Bulletin ISDTP-2014-02. The building area for townhouses and singles without adequate spacing includes the building area of all adjacent units without adequate spacing (3m or more between units). Building units are reduced where fire walls (2 hr) are included. A fire flow of 167 L/s was used for residential dwelling types that met the bulletins requirements. Where adequate spacing is not achieved based on minimum zoning setbacks, the fire flows have been calculated in accordance with the FUS methodology for two scenarios. The first scenario provides for a minimum building separation of 3.0 m at critical locations. The second provides a 2-hour firewall at the same location. The maximum fire flow from the two scenarios was utilized for the watermain analysis. A fire flow of 217 L/s was used for the single units between Lots 21 to 26 (3 m separation scenario). A fire flow of 267 L/s was used for the 6-unit townhomes and single units between Lots 11 to 17 (3 m separation scenario) while a fire flow of 250 L/s was used for the future apartment block.

The proposed watermain was modeled using EPANET 2. The EPANET model layout is shown in drawing **100057-WTR**.

A summary of the model results is shown below in **Table 3.2**, **Table 3.3** and **Table 3.4**. Full model results are included in **Appendix A**.

Table 3.2: Summary of Hydraulic Model Results - Maximum Day + Fire Flow

Operating Condition	Minimum Pressure
252.62 L/s at APT	141.46 kPa (APT) (20.52 psi)
267.37 L/s at N1	173.15 kPa (N1) (25.11 psi)
267.22 L/s at N2	173.24 kPa (N2) (25.13 psi)
217.56 L/s at N3	346.69 kPa (N3) (50.28 psi)
267.64 L/s at N4	302.93 kPa (N1) (43.94 psi)
267.41 L/s at N5	293.02 kPa (N5) (42.50 psi)
217.50 L/s at N6	310.29 kPa (N6) (45.00 psi)

Table 3.3: Summary of Hydraulic Model Results - Peak Hour Demand

Operating Condition	Maximum Pressure	Minimum Pressure
11.721 L/s through system	582.13 kPa (APT) (84.43 psi)	571.73 kPa (N1) (82.92 psi)

Table 3.4: Summary of Hydraulic Model Results – Maximum Pressure Check

Operating Condition	Maximum Pressure	Minimum Pressure
2.131 L/s through system	643.54 kPa (APT) (93.34 psi)	633.04 kPa (N1) (91.81 psi)

Water modelling shows the planned network will meet minimum system pressure requirements during both the fire flow and peak hour design conditions. The maximum pressure check shows modelled system pressures are above 552 kPa (80 psi) throughout the subdivision, therefore pressure reducing valves will be required on all dwellings, installed immediately downstream of the isolation valve in the home, located downstream of the meter so it is owner maintained.

4.0 SANITARY SEWERS

4.1 Existing Conditions

An existing 250 mm sanitary cap has been provided by the adjacent landowner (Richcraft) as part of the Bradley Commons subdivision works at the limit of Energy Street. The existing sanitary system drains to the Hazeldean Pump Station via the Fernbank Trunk.

Previous design coordination with Richcraft accounted for a sanitary flow of 5.4 L/s from the Site to be routed through the Bradley Commons sanitary sewers.

4.2 Proposed Conditions

Design parameters are specified in the City of Ottawa Sewer Design Guidelines [6]. The peak design flow parameters in **Table 4.1** have been used in the sewer capacity analysis.

The existing 250 mm diameter sanitary stub, located at Energy Street, has an invert elevation of 95.68 m and is too high to provide a gravity outlet for the Site. Sanitary flow from the Site will be directed to a new private sanitary pump station located adjacent the southeast corner of the apartment block. The pump station will be designed as per the current City of Ottawa standards for “small pump stations”. A typical small pumping station is defined as installations with maximum capacities less than 15 L/s and electrical motor drivers of 5 horsepower or less. A small sewage pumping station would consist of a duplex pumping unit with submersible pumps in a wet well. A standby generator would provide backup in the event of a power failure. Pump station details will be provided at the detailed design stage. The sanitary sewers and pump station will be sized to service the proposed subdivision and apartment block.

The subdivision and apartment block produce a peak sanitary flow of 9.1 L/s. The sanitary sewer design sheet is located in **Appendix A**.

The on-site sanitary sewage pump station will discharge via a 263 m long 100 mm diameter forcemain to the existing 250 mm sanitary stub at Energy Street. The location of the internal gravity sanitary sewer, pump station and forcemain are shown on the Sanitary Drainage Area Plan (**100057-SAN**). Refer to the Typical Roadway Cross-sections located on the Master Servicing Plan (**100057-MGP**) for the locations of the gravity sanitary sewers and forcemains within the proposed private roadway.

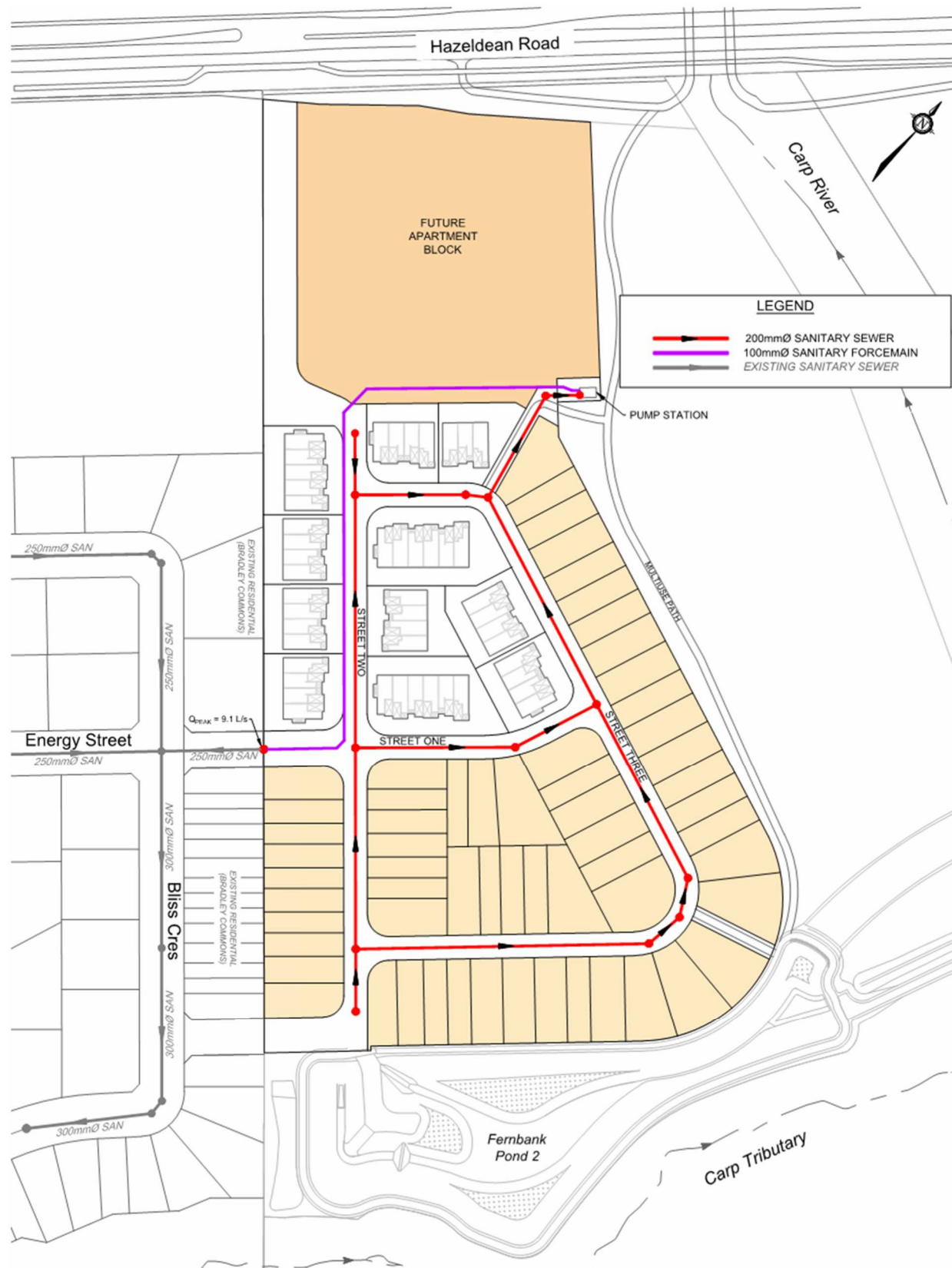
**Figure 4-1: Sanitary Sewer Layout**

Table 4.1: Sanitary Sewer Design Parameters

Parameter	Design Parameter
Single Unit Population	3.4 people/unit
Townhome Unit Population	2.7 people/unit
Apartment Block Unit Population	1.8 people/unit (Assumed 180 units)
Residential Flow Rate, Average Daily	280 L/cap/day
Residential Peaking Factor	Harmon Equation (min=2.0, max=4.0)
Infiltration Rate	0.33 L/s/ha
Minimum Pipe Size	200mm
Minimum Velocity	0.6 m/s
Maximum Velocity	3.0 m/s

The peak sanitary design flow of 9.1 L/s exceeds the 5.4 L/s flow previously used in assessing the downstream sanitary system in the Bradley Commons Subdivision. The 300 mm sewer crossing the Carp River West Tributary, installed at 0.14 % slope, has a capacity of 37.7 L/s. The proposed Site adds 3.7 L/s, increasing the flow through this critical sewer to 32.7 L/s. The above analysis shows there is sufficient capacity downstream to accommodate the additional flow. Refer to **Appendix A** for design sheets which include the proposed development and excerpts from the Bradley Commons – Phase 4 Servicing and Stormwater Management Report prepared by Stantec (February 2021) [7].

Sanitary HGL

Per City of Ottawa Technical Bulletin 2028-01, it must be demonstrated that the USFs are protected during normal pumping station conditions and catastrophic failure of the private pump station. An HGL analysis has been included in **Appendix A** using a boundary condition of 94.54m which represents the emergency spill elevation of the pump station set at the Carp River 100-year floodplain elevation. Our analysis demonstrates that 0.30 m of freeboard is maintained between the modelled HGL and USF elevations during a catastrophic failure scenario.

5.0 STORM SERVICING AND STORMWATER MANAGEMENT

5.1 Existing Drainage Conditions

The proposed Site is located within the Carp River Subwatershed, and is tributary to the Carp River, which falls under the jurisdiction of the Mississippi Valley Conservation Authority (MVCA). A portion of the Site, along the eastern property boundary, is located within the Carp River 1:100 year floodplain. Under existing conditions, the Site drains northeasterly towards the Carp River. Pond 2 is located directly south of the Site and has been designed to provide quality and quantity control for the development lands.

5.2 Stormwater Management Criteria

The following stormwater management criteria have been developed based on the criteria in the Fernbank EMP, and requirements of the MVCA and the City of Ottawa Sewer Design Guidelines (October 2012) and Technical Bulletin PIEDTB-2016-01 (September 2016) and the Fernbank Community SWM Facility – Pond 2 Design Report.

5.2.1 Minor System (Storm Sewers)

- Storm sewers are designed using the Rational Method with a 2-year return period.
- Inlet control devices (ICDs) are to be installed in road and rearyard catchbasins to control inflows to the storm sewers. When connecting rear-yard pipe systems to a municipal right-of-way, ICD's are typically installed in structures located within the right-of-way. As the proposed subdivision includes only private roadways with no municipal ROWs, ICDs are to be located within the rear-yards;
- Ensure that the 100-year hydraulic grade line is at least 0.3 m below the underside of footing (USF) elevations or the obvert of the mainline storm sewer, whichever is greater, for the proposed development.

5.2.2 Major System (Overland Flow)

- Overland flows are to be confined within the private roadways/rearyards for all storms up to and including the 100-year event, with no major system spilling to Pond 2;
- Maximum depth of flow (static + dynamic) on private streets shall not exceed 0.35 m during the 100-year event. The depth of flow may extend adjacent to the right-of-way provided that the water level must not touch any part of the building envelope and must remain below the lowest building opening during the stress test event;
- Under an emergency scenario, runoff that exceeds the available storage will be conveyed overland along defined major system flow routes towards the proposed major system outlet to the SWM Facility. There must be at least 15cm of vertical clearance between the spill elevation on the street and the ground elevation at the building envelope that is in the proximity of the flow route or ponding area;
- The product of the 100-year flow depth (m) on street and flow velocity (m/s) shall not exceed 0.60;

5.2.3 Water Quality & Quantity Control

- A *Normal* (70% TSS removal) level of quality control will be provided by Pond 2;

- Implement lot level and conveyance Best Management Practices to promote infiltration and treatment of storm runoff;
- Minor and major system flows to Pond 2 are not to exceed flows specified in the approved Pond 2 design report while ensuring no ponding occurs at the surface during the 2-year storm event;
- Post-development peak flows are not to exceed pre-development peak flows for all storms up to and including the 100-year event for outflows from Pond 2 due to the proposed development.

5.3 Storm Servicing Design

Storm servicing for the development will be provided using a dual drainage system. Runoff from frequent events will be conveyed by storm sewers (minor system), while flows from large storm events which exceed the capacity of the minor system will be conveyed overland along defined overland flow routes (major system). Pond 2 will serve as the outlet for both the major and minor systems.

Rear-yards which back onto the Carp River along the eastern property boundary, will sheet drain towards the Carp River, maintaining existing drainage pattern.

5.3.1 Minor System Design

The proposed storm sewers have been designed using the Rational Method to convey peak flows (surface drainage only) associated with a 2-year return period using the criteria outlined in **Table 5.1** and **Table 5.2**. Flows from the dwellings foundation drain (subdivision portion only) will connect to a separate 3rd pipe system and outlet to a proposed ditch at the southeast corner of the Site. The 3rd pipe outlet will be set at an elevation of 93.71 m, slightly above the 2-year water level in the Carp River (93.64m) provided by the 2024 Carp River Floodplain Mapping. The storm sewer design sheet is provided in **Appendix A**. The conceptual storm sewer system and post-development catchment areas are shown on the Storm Drainage Area Plan (**100057-STM**). Refer to the Typical Roadway Cross-sections located on the Master Servicing Plan (**100057-MGP**) for the proposed locations of the minor system storm sewers and the 3rd pipe system.

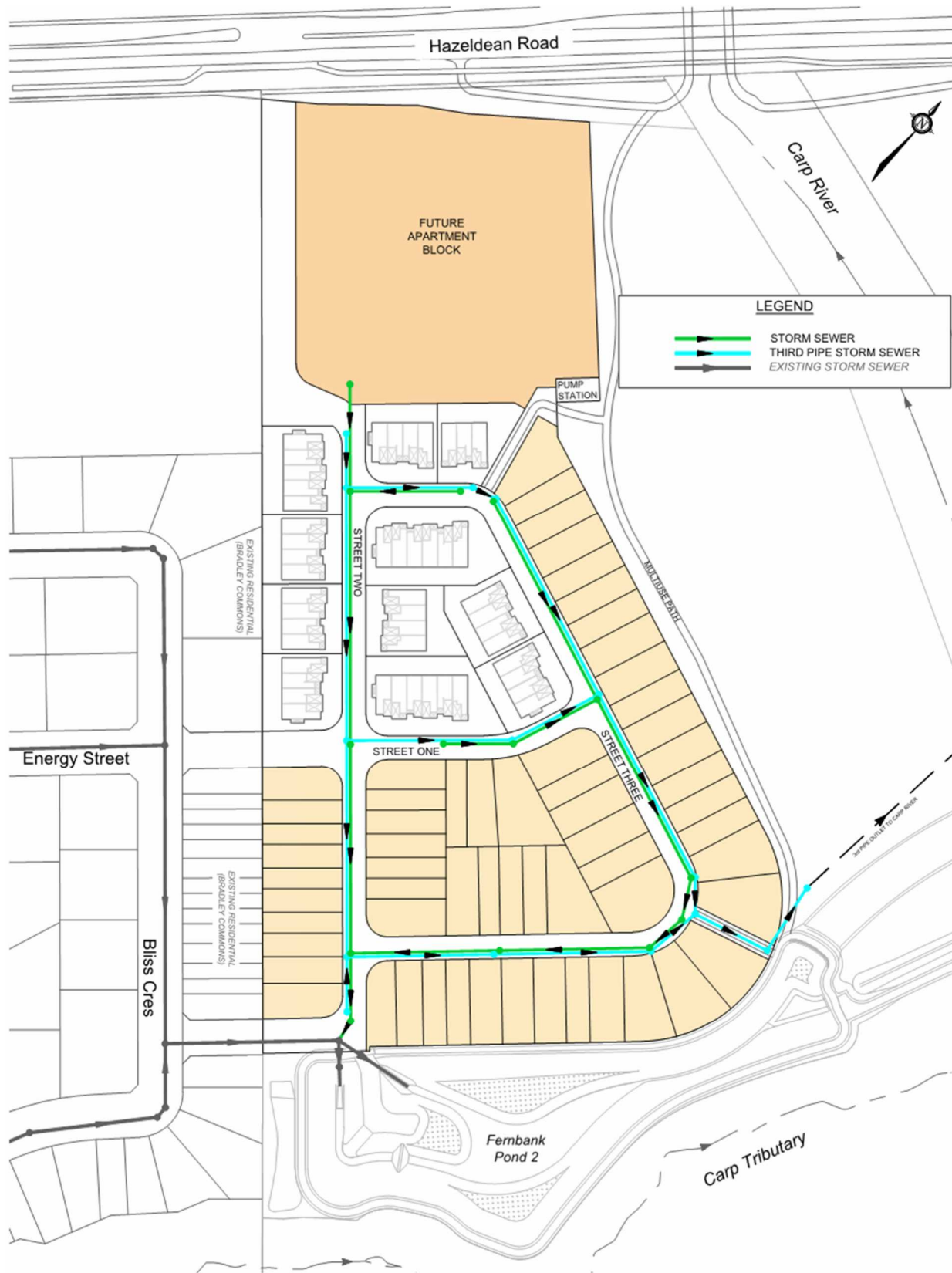
**Figure 5-1: Storm Sewer Layout**

Table 5.1: Storm Sewer Design Parameters

Parameter	Design Criteria
Proposed Development	2 Year Return Period
Storm Sewer Design	Rational Method / PCSWMM
IDF Rainfall Data	Ottawa Sewer Design Guidelines
Initial Time of Concentration (T_c)	10 min
Minimum Velocity	0.8 m/s
Maximum Velocity	3.0 m/s
Minimum Diameter	300 mm

Table 5.2: Runoff Coefficients

Land Use	Runoff Coefficient
Hard Surface	0.90
Grassed Surface	0.20
Apartment Block	0.80

Initial Time of Concentration

For conceptual design purposes, the subcatchment areas have been discretized as semi-lumped areas and do not represent each individual sewer section. A 10-minute initial time of concentration has been used to represent the travel time through the sewers in the uppermost reaches of the catchments.

At the detailed design stage, the catchment areas will be refined to reflect the areas tributary to each inlet of the sewer system.

Inlet Control Devices

Inlet control devices (ICDs) are to be installed in all catchbasins to limit inflows to the minor system capacity (1:2yr). ICDs sizes and catchbasin locations will be determined during the detailed design stage.

5.3.2 Major System Design

The major system design will conform to the design standards outlined in the Ottawa Sewer Design Guidelines (October 2012) and Technical Bulletin PIEDTB-2016-01 (September 2016). During detailed design, the private roadways and rear-yards will be designed to provide sufficient storage to contain the major system runoff from storm events exceeding the minor system capacity for all storms up to and including the 100-year design event. The site will be graded to provide an emergency overland flow route in the event of a catastrophic scenario, with major system flows routed to Pond 2 through Block 75, located at the southeast corner of the site.

Major System Flow Depths

For events exceeding the minor system design storm and up to the 100-year design storm, flow depths within the private roadway are to be limited to the maximum water depth (dynamic + static) of 0.35 m.

5.3.3 Groundwater Infiltration and Water Balance

As discussed in the Fernbank Environmental Management Plan, the hydrogeologic conditions of the Site will be altered by the increase in hard surfaces and the increased efficiency of stormwater conveyance. The net result will be a reduction in groundwater infiltration, which can potentially result in a reduction in the groundwater table, reduction of baseflow in watercourses, reduced well capacities and consolidation of the overburden, among other impacts.

The recommended infiltration target is to match pre-development infiltration rates. The water balance analysis in the Fernbank Environmental Management Plan indicates that maintaining annual pre-development infiltration should be achievable using infiltration best management practices; the types, locations, and suitability of infiltration BMPs will be dependent on site specific details and land use.

Given the presence of clay soils within the Subject Site, per the City of Ottawa Technical Bulletin IWSTB-2024-01 (April 29, 2024), low-impact development (LID) practices intended to promote infiltration are not permitted. As such, only typical lot-level and conveyance best management practices (BMPs) are to be implemented to mitigate any adverse impacts the proposed development may have.

Infiltration Best Management Practices

Infiltration of surface runoff will be accomplished using lot level and conveyance controls. The most suitable practices for groundwater infiltration include:

- Infiltration of runoff captured by rear yard catchbasins;
- Direct roof leaders to rear yard areas;
- The use of fine sandy loam topsoil in residential lawns.

In addition to the typical lot-level and conveyance BMPs, the rear-yards of Lots 44 to 60 have been graded to direct uncontrolled clean storm runoff to the adjacent wetland to increase infiltration and to help mitigate any adverse impacts as a result of the proposed development.

By implementing infiltration Best Management Practices as part of the storm drainage design for the Site, the impacts of development on the hydrologic cycle can be considerably reduced. Infiltration of clean runoff will also have additional benefits for stormwater management; by reducing the volume of “clean” water conveyed to Pond 2, the performance of Pond 2 will be increased.

5.3.4 SWM Facility – Pond 2

Water quantity control and water quality treatment will be provided by an end-of pipe stormwater management facility. Pond 2 has been sized to control and treat runoff from the development lands.

The original Pond 2 design report, accounted for a total drainage area of 5.95 ha with a weighted runoff coefficient of 0.70. The updated design accounts for an area of 5.95 ha with a weighted runoff coefficient of 0.71. The runoff coefficients have been calculated based on maximum zoning setbacks (See example calculated in **Appendix A**). Since the areas have remained unchanged and the runoff coefficient has not significantly increased, the SWM facility will provide quality treated as originally intended.

The original Pond 2 design accounted for minor and major system flow from the Double Deck Lands and are provided below:

- Minor Flows (MTO 12-hour SCS Distribution):
 - 2-year = 0.633 cms
 - 100-year = 0.733 cms
- Major Flows (MTO 12-hour SCS Distribution):
 - All storm up to 100-year = 0 cms

5.4 Hydrologic & Hydraulic Modelling

The *City of Ottawa Sewer Design Guidelines* (October 2012) require hydrologic modelling for all dual drainage systems. The performance of the proposed storm drainage system for the development lands was evaluated using the PCSWMM hydrologic/hydraulic model.

The Pond 2 detailed design PCSWMM model has been updated to include the proposed subdivision and apartment block to evaluate the impact of the proposed development on water levels and outflows of Pond 2.

The PCSWMM model is a semi-lumped model that represents both the minor and major system flows from the development. The results of the analysis were used to:

- Simulate major and minor system runoff from the site;
- Ensure the stormwater management facility is sufficiently sized to control runoff from the proposed development and the upstream drainage areas.

Modelling files have been provided as part of the submission package.

5.4.1 Design Storms

The hydrologic analysis was completed using the following synthetic design storms and historical storms. The IDF parameters used to generate the Chicago design storms were taken from the *Ottawa Design Guidelines - Sewer* (November 2004). The 12-Hour SCS MTO design storms were copied from the provided Carp River PCSWMM model, to ensure consistent results.

3 Hour Chicago Distribution:

2-year Event
5-year Event
10-year Event
100-year Event
100-year + 20% Event

12 Hour MTO SCS Distribution:

2-year Event
5-year Event
10-year Event
100-year Event
100-year + 20% Event

The 12-hour SCS storm (MTO distribution) generated the highest overall peak flows and has been used to compare minor and major system target rates to Pond 2 as well as Pond 2 outflows.

The 3-hour Chicago storm generated the highest intensities and has been used to determine the maximum surface ponding requirements.

5.4.2 Storm Drainage Areas

The site has been divided into subcatchments based on the proposed land use and roadway design. The catchment areas shown on the Storm Drainage Area Plan (**100057-STM**) correspond to the areas used in the Storm Sewer Design Sheet (**Appendix A**).

5.4.3 Model Parameters

The hydrologic parameters for each subcatchment were developed based on the Land Use and the Storm Drainage Area Plan (**100057-STM**). An overview of the modelling parameters is provided in **Table 5.3**.

Table 5.3: PCSWMM Model Parameters

Area ID	Area (ha)	Runoff Coeff. (C)	Percent Impervious (%)	Zero Impervious (%)	Curve Number (CN)	Equivalent Width (m)	Average Slope (%)
Site							
A-01	0.030	0.46	36.7	0	80.5	8.6	1
A-02	0.392	0.59	55.9	95	80.5	112.0	1
A-03	0.102	0.59	55.9	95	80.5	51.0	1
A-04	0.342	0.79	84.8	62	80.5	171.0	1
A-05	0.263	0.77	82.1	53	80.5	131.5	1
A-06	0.192	0.77	81.0	62	80.5	96.0	1
A-07	0.214	0.77	81.3	61	80.5	107.0	1
A-08	0.172	0.77	82.0	65	80.5	86.0	1
A-09	0.307	0.61	58.6	95	80.5	87.7	1
A-10	0.177	0.77	80.8	59	80.5	88.5	1
A-11	0.131	0.66	65.6	27	80.5	65.5	1
A-12	0.169	0.58	54.4	95	80.5	84.5	1
A-13	0.172	0.77	82.0	57	80.5	86.0	1
A-14	0.449	0.59	56.3	95	80.5	74.8	1
A-15	0.178	0.79	84.8	58	80.5	89.0	1
A-16	0.115	0.77	81.7	55	80.5	57.5	1
A-17	0.117	0.51	43.6	0	80.5	117.0	1
A-18	0.156	0.80	85.3	56	80.5	78.0	1
A-19	0.307	0.61	58.6	95	80.5	153.5	1
A-20	0.140	0.79	83.6	57	80.5	70.0	1
A-21	0.191	0.61	59.2	95	80.5	95.5	1

Area ID	Area (ha)	Runoff Coeff. (C)	Percent Impervious (%)	Zero Impervious (%)	Curve Number (CN)	Equivalent Width (m)	Average Slope (%)
Site							
A-22	0.145	0.67	66.9	36	80.5	72.5	1
A-23	1.528	0.80	85.1	26	80.5	127.3	1
TOTAL:	5.99	0.71	72.9				

Major System Storage

Major system storage within the private roadways is represented in the PCSWMM model as conduits matching the conceptual roadway cross-section. Major system storage within the rear-yards is represented in the PCSWMM model using storage nodes and correspond to the storage required to over control the rear-yards to ensure 2-year ponding does not occur at the surface of the private roadways while also meeting the minor system flow targets. The required rear-yard storage volumes are based on containing the runoff from the 100-year event within the rear-yards with no cascading overland flow.

As the project is only on the Draft Plan stage, detailed lot-level grading information is not yet available. The PCSWMM model is set up with the main trunk sewers, as outlined in the storm sewer design sheet with conceptual catch-basin locations.

The required rear-yard major system storage volumes are provided in **Section 5.4.4 “Model Results”** - refer to **Table 5.8**.

Runoff Coefficient/ Impervious Values

Impervious (%IMP) values for each subcatchment area were calculated based on the Runoff Coefficients (see **Table 5.2**) noted on the Storm Drainage Area Plan (**100057-STM**) using the equation:

$$\%IMP = \frac{(C - 0.2)}{0.7}$$

Depression Storage

The default values for depression storage in the City of Ottawa were used for all catchments.

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

Residential rooftops are assumed to provide no depression storage and all rainfall is converted to runoff. The percentage of rooftop area to total impervious area is represented by the ‘no depression storage’ column in **Table 5.3**.

Curve Number

The Carp River Watershed PCSWMM model uses an SCS Curve Number of 80.5, as such, the original Pond 2 model used the same SCS Curve Number. Thus, all subcatchments within the Site have been given a curve number value of 80.5, to remain consistent with the Carp River Watershed model and original Pond 2 model.

Equivalent Width

'Equivalent Width' refers to the width of the sub-catchment flow path. This parameter is calculated as described in the *Sewer Design Guidelines, October 2012, Section 5.4.5.6*. For areas where detailed roadway information is available, the total length of the street segment, multiplied by 2 (in areas where there is to be development on both sides of the street) has been used. In areas where detailed roadway information is not available, such as in the apartment block, a value of 225 m per ha has been used.

Modelling Files / Schematic

The PCSWMM model schematics are provided in **Appendix B**. Digital copies of the modelling files and model output for all storm events are provided as part of the submission package.

5.4.4 Model Results

The results of the PCSWMM model are summarized in the following sections. The original Pond 2 model, prepared by Novatech, has been updated to ensure that the water levels and outflows from the Pond haven't been negatively impacted due to the proposed development. The results of the updated PCSWMM model and previous results are summarized in the following sections.

Ponding Elevation

The 3-hour Chicago storm distribution has been used to determine the maximum surface ponding elevation within the private roadways to ensure no 2-year ponding is occurring and to confirm no major system overland flow is occurring during the 100-year storm event. Refer to the Table below for ponding elevations for conceptual catch-basin locations within the private roadway.

Table 5.4: Ponding Depths

Structure ID	STM Area ID	Max Static Ponding Depth (m)	Ponding Depth (m) ¹			
			2-yr	5-yr	100-yr	100-yr (+20%)
Catchbasins within Private Roadway						
CB_A04	A-04	0.23	0.00	0.07	0.18	0.23
CB_A05	A-05	0.26	0.00	0.06	0.15	0.23
CB_A06	A-06	0.28	0.00	0.07	0.18	0.23
CB_A07	A-07	0.34	0.00	0.07	0.16	0.25
CB_A08	A-08	0.20	0.00	0.07	0.20	0.24
CB_A10	A-10	0.18	0.00	0.07	0.21	0.23
CB_A11	A-11	0.20	0.00	0.05	0.11	0.22
CB_A13	A-13	0.08	0.00	0.07	0.12	0.13
CB_A15	A-15	0.19	0.00	0.05	0.20	0.23
CB_A16	A-16	0.14	0.00	0.06	0.14	0.15
CB_A17	A-17	0.15	0.00	0.00	0.10	0.15
CB_A18	A-18	0.14	0.00	0.07	0.16	0.17
CB_A20	A-20	0.12	0.00	0.07	0.14	0.15
CB_A22	A-22	0.28	0.00	0.05	0.13	0.17

Table 5.4 above confirms that no ponding is occurring during the 2-year storm event and major system spillage is not occurring at CB_A07 to the pathway easement during the 100-year storm event and stress test event. During detailed design, ponding elevations during the stress test event will be compared with the lowest building openings to ensure water levels within the rear-yard and private roadways do not touch the building envelopes.

Peak Flows

The development storm drainage system has been designed to meet minor and major system targets specified in the approved Pond 2 PCSWMM model. The SWM facility was designed to control post-development peak flows in the Carp River West Tributary to pre-development levels. A comparison of the original and updated Pond 2 peak flows are provided in **Table 5.5**.

Table 5.5: Pond 2 Inflows & Outflows (cms)

Storm Distribution->		MTO SCS Type II Storm Events			
Return Period->		2-year	5-year	10-year	100-year
Inflows (From Double Deck Lands)	<i>Minor</i>	0.546	0.636	0.656	0.733
	<i>Major</i>	0.000	0.000	0.000	0.000
	<i>Total</i>	0.546	0.636	0.656	0.733
Outflow	<i>Original</i>	0.135	0.394	0.687	2.705
	<i>Updated</i>	0.133	0.374	0.643	2.539
EMP Target		0.320	0.530	0.700	2.700

Area A-01 and A-02, consisting of rooftop and rear-yards, is proposed to sheet drain directly to the Carp River, matching existing drainage patterns. The 100-year peak flow being directed to the Carp River from A-01 and A-02 is 0.124 cms. Peak flow being directed to the Carp River from the proposed 3rd pipe foundation system is 0.044 cms (refer to Section 5.4.4 for foundation drain flow calculations). The total combined outflow to the Carp River during the 100-year MTO SCS storm event is 2.707 cms, roughly equivalent to the original Pond 2 design report value of 2.705 cms. As shown above, when combining the flows from Pond 2, foundation drainage and uncontrolled rear-yard runoff, pre-development flows are still being met.

Water Levels

A comparison of the water levels in Pond 2 are provided in the table below.

Table 5.6: Pond 2 Water Levels (m)

Storm Distribution->		MTO SCS Type II Storm Events			
Return Period->		2-year	5-year	10-year	100-year
Original		94.63	94.84	94.97	95.22
Updated		94.62	94.83	94.95	95.21

As shown above, the water levels in Pond 2 have decreased slightly compared with the original elevations.

Hydraulic Grade Line

Since the foundation drains are disconnected from the minor system storm sewer and instead are directed to a 3rd pipe system, the PCSWMM model was not used to calculate the hydraulic grade line (HGL). The HGL at the outlet of the pipe system was set at the 100-year floodplain elevation of 94.54m (2024 MVCA Mapping) and calculated upstream at an assumed slope of 0.1%. As the design is only at the draft plan stage, underside of footing (USF) elevations have not yet been determined. The HGL analysis will need to be revised at the detailed design stage to ensure the required 0.30 m freeboard is being provided between the USF and 100-year HGL elevations.

Table 5.7: 100-year HGL Elevations

Manhole ID	T/G Elevation (m)	Outlet pipe Obvert (m)	HGL Elevation (m)	Minimum USF (m)
Outlet	-	94.09	94.54	94.84
302	96.77	94.20	94.58	94.88
304	96.76	94.26	94.60	94.90
306	96.78	94.32	94.62	94.92
308	96.95	94.54	94.68	94.98
310	97.14	94.75	94.74	95.05
312	96.82	94.90	94.76	95.20
314 (310 side)	97.45	95.12	94.83	95.42
314 (320 side)	97.45	94.78	94.77	95.08
316	97.64	95.19	94.84	95.49
318	97.04	94.41	94.67	94.97
320	97.12	94.55	94.71	95.01
324	97.30	94.72	94.76	95.06
326	97.37	94.76	94.77	95.07
330 (326 side)	97.58	94.94	94.82	95.24
330 (314 side)	97.58	95.15	94.87	95.45

Note that the minimum USF calculated above is based on 0.30 m above either the HGL or the obvert of the pipe, whichever is greater.

Major System Storage

The storage required in the rear-yards has been evaluated on a per-hectare basis for each subcatchment. Refer to **Table 5.8**.

Table 5.8: Major System Storage

Drainage Area ID	Area (ha)	Storage Required (100-year)	
		Total Volume * (m3)	Per-Ha Volume (m3/ha)
CB_A03	0.102	12.5	122.5
CB_A09	0.307	57.3	154.1
CB_A12	0.169	20.6	105.9
CB_A14	0.449	87.8	195.5
CB_A19	0.307	67.5	220.0
CB_A21	0.191	24.6	128.8
CB_A23 (Apt Block)	1.528	247.1	161.7

*Total volume based on modified rational method (calculations included in Appendix B)

The major system storage volumes will be reassessed at the detailed design stage to ensure the appropriate major system storage is provided. See Appendix B for sample calculations on conceptual rear-yard trench requirements to meet volumes above.

3rd Pipe System Outlet Channel

The pipe system capturing foundation drainage will outlet to a proposed channel with an invert elevation of 93.71 m, which is set above the Carp River 2-year water level of 93.64 m within the vicinity of the channel. The channel will be a 0.30 m wide flat bottom ditch with 3:1 side slopes, running at 0.25 % and will outlet above the normal water level in the Carp River (93.13 m). The flows generated from the foundation drains were calculated per the City of Ottawa Sewer Design Guidelines and are based on 0.45 L/s per dwelling which results in a total flow of 44.1 L/s. The outlet channel has a minimum depth of 0.20 m with a capacity of 61.0 L/s.

6.0 EROSION AND SEDIMENT CONTROL

Erosion and sediment control measures will be implemented during construction in accordance with the “Guidelines on Erosion and Sediment Control for Urban Construction Sites” (Government of Ontario, May 1987). Detailed plans will be provided at the detailed design stage.

Typical erosion and sediment control measures recommended include, but are not limited to, the use of silt fences around perimeter of site (OPSD 219.110), filter fabric or inserts under catch basin/maintenance hole lids, heavy duty silt fence barrier (OPSD 219.130), straw bale check dams (OPSD 219.180), rock check dams (219.210 or OPSD 219.211), turbidity curtain (OPSD 219.260), dewatering trap (OPSD 219.240), temporary water passage system (OPSD 221.030), riprap (OPSS 511), mud mats, silt bags for dewatering operations, topsoil and sod to disturbed areas and natural grassed waterways. Dewatering and sediment control techniques will be developed for the individual situations based on the above guidelines and utilizing typical measures to ensure erosion and sediment control is controlled in an acceptable manner and there is no negative impact to adjacent lands, water bodies or water treatment/conveyance facilities.

It will be the responsibility of the Contractor to submit a detailed construction schedule and appropriate staging, dewatering and erosion and sediment control plans to the Contract Administrator for review and approval prior to the commencement of work.

All erosion and sediment control measures are to be installed to the satisfaction of the engineer, the municipality and the conservation authority prior to undertaking any site alterations (filling, grading, removal of vegetation, etc.) and remain present during all phases of site preparation and construction.

- A qualified inspector should conduct daily visits during construction to ensure that the contractor is working in accord with the design drawings and that mitigation measures are being implemented as specified.
 - A light duty silt fence barrier is to be installed in the locations shown on the Erosion and Sediment Control Plan.
 - Straw bale barriers are to be installed in drainage ditches
 - Inserts are to be placed under the grates of all proposed and existing catchbasins and structures.
 - After complete build-out, all sewers are to be inspected and cleaned and all sediment and construction fencing is to be removed.
- The contractor shall ensure that proper dust control is provided with the application of water (and if required, calcium chloride) during dry periods.
- The contractor shall immediately report to the engineer or inspector any accidental discharges of sediment material into any ditch or sewer system. Appropriate response measures shall be carried out by the contractor without delay.
- The contractor acknowledges that failure to implement erosion and sediment control measures may result in penalties imposed by any applicable regulatory agency.

A list of Best Management Practices, recommended by the Mississippi Valley Conservation Authority, for the development are provided below:

- Natural areas to be retained are to be isolated by sturdy construction fencing or similar barrier at least 1.0 m in height during construction in order to ensure their retention.
- Construction equipment will remain within the areas of active construction and will not cross the sediment control measures.
- Following construction, bare soils will be re-seeded to reduce surface erosion.
- Erosion and sediment control measures will be in place for the duration of construction and until the site is re-vegetated. Erosion and sediment control measures should be maintained in good condition for the duration of construction. These measures should be removed at the completion of construction once the site has stabilized.
- Disturbed areas should be replanted with locally grown native species.
- No woody vegetation should be removed between April 15th and August 15th unless a breeding bird survey is conducted.
- Should any species at risk be discovered and/or should any species at risk or their habitat be potentially impacted by on site activities, the Ministry of Natural Resources and Forestry (MNRF) should be contacted immediately and activities should be modified to avoid impacts until further direction is provided by MNRF.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the preceding, the report conclusions are summarized below:

- 1) There is adequate capacity in the existing infrastructure (sanitary, storm and water) to accommodate the planned development at 560 Hazeldean Road.
- 2) The proposed grading design generally follows the existing topographic contours with an emergency overland flow route to Pond 2.
- 3) Light weight fill will be used in select locations as required to comply with grade raise restrictions.
- 4) A private sanitary pump station will discharge to the existing sanitary system located in the adjacent Bradley Commons subdivision.
- 5) Pond 2 will provide quality and quantity control of stormwater runoff in compliance with City of Ottawa and MVCA criteria.
- 6) Water infrastructure is available to provide appropriate domestic supply and fire protection.

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

Prepared By:

Reviewed By:

NOVATECH



Lucas Wilson, P.Eng.
Project Engineer



Mark Bissett, P.Eng.
Senior Project Manager

References

- 1 “Fernbank Community Design Plan, Walker, Nott, Dragicevic Associates Ltd. [June 24, 2009]
- 2 “Fernbank Master Servicing Study”, Novatech [June 24, 2009]
- 3 “Fernbank Environmental Management Plan”, Novatech [June 24, 2009]
- 4 “Fernbank Community SWM Facility – Pond 2 Design Report”, Novatech [October 28, 2020]
- 5 “Geotechnical Investigation Double Deck”, Paterson Group [June 17, 2025]
- 6 “Sewer Design Guidelines”, Department of Public Works and Services, City of Ottawa [October 2012]
- 7 “Servicing and Stormwater Management Report – Bradley Commons Phase 4”, Stantec [February 17, 2021]

Appendix A: Sewer Design Sheets and Water Modelling

Storm Sewer Design Sheet (Rational Method)
Sanitary Sewer Design Sheets
Bradley Commons – Ph 4 Servicing Report Excerpts
Watermain Boundary Conditions
Watermain Modelling
C Value Calculations

SANITARY SEWER DESIGN SHEET



Novatech Project #: 100057
Project Name: 560 Hazeldean Road - Double Deck
Date: 12/22/2025
Input By: Lucas Wilson
Reviewed By: Mark Bissett
Drawing Reference: 100057-SAN

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										Industrial / Commercial / Institutional (ICI) Flow						Extraneous Flow Area Method		Total Design Flow	Proposed Sewer Pipe Sizing / Design									
				Singles	Semis / Towns	Apts	Park Area	Population	Cumulative Population	Average Pop. Flow	Design Peaking Factor M	Peak Design Pop. Flow	Res. Drainage Area	Cumulative Res. Drainage Area	Commercial / Institutional Area	Cumulative Commercial / Institutional Area	Average Design Commercial / Institutional Flow	Commercial / Institutional Peaking Factor	Cumulative ICI Area	Peak Design ICI Flow	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) / Q(Full)	
								(in 1000's)	(in 1000's)	Q(q) (L/s)		Q(p) (L/s)	(ha.)	(ha.)	(ha.)	(ha.)	(L/s)	Q (ici) (L/s)	(ha.)	Q(e) (L/s)	Q(D) (L/s)	(m)		(m)	n	So (%)	Q(full (L/s)	(m/s)				
	SAN7	119	117	3				0.010	0.010	0.03	3.73	0.12	0.190	0.190	0.000	0.000	0.00	1.00	0.000	0.00	0.190	0.06	0.19	24.9	200 PVC	0.203	0.013	0.65	27.6	0.85	0.7%	
	SAN6	117	123	14				0.048	0.058	0.19	3.64	0.68	0.520	0.710	0.000	0.000	0.00	1.00	0.000	0.00	0.710	0.23	0.92	80.8	200 PVC	0.203	0.013	0.35	20.2	0.62	4.5%	
	SAN5	123	125		17			0.046	0.104	0.34	3.59	1.21	0.530	1.240	0.000	0.000	0.00	1.00	0.000	0.00	1.240	0.41	1.62	101.2	200 PVC	0.203	0.013	0.35	20.2	0.62	8.0%	
	SAN3, SAN4	125	129		15			0.041	0.144	0.47	3.56	1.66	0.410	1.650	0.000	0.000	0.00	1.00	0.000	0.00	1.650	0.54	2.21	44.3	200 PVC	0.203	0.013	0.35	20.2	0.62	10.9%	
	SAN2	129	105		2			0.005	0.150	0.48	3.55	1.72	0.100	1.750	0.000	0.000	0.00	1.00	0.000	0.00	1.750	0.58	2.30	9.1	200 PVC	0.203	0.013	0.35	20.2	0.62	11.4%	
	SAN8	117	115	15				0.051	0.051	0.17	3.65	0.60	0.720	0.720	0.000	0.000	0.00	1.00	0.000	0.00	0.720	0.24	0.84	117.6	200 PVC	0.203	0.013	0.35	20.2	0.62	4.2%	
	SAN13	115	113	2				0.007	0.058	0.19	3.64	0.68	0.140	0.860	0.000	0.000	0.00	1.00	0.000	0.00	0.860	0.28	0.97	16.1	200 PVC	0.203	0.013	0.35	20.2	0.62	4.8%	
	SAN12	113	111	1				0.003	0.061	0.20	3.64	0.72	0.100	0.960	0.000	0.000	0.00	1.00	0.000	0.00	0.960	0.32	1.04	16.0	200 PVC	0.203	0.013	0.35	20.2	0.62	5.1%	
	SAN11	111	109	13				0.044	0.105	0.34	3.59	1.23	0.600	1.560	0.000	0.000	0.00	1.00	0.000	0.00	1.560	0.51	1.74	78.7	200 PVC	0.203	0.013	0.35	20.2	0.62	8.6%	
	SAN10	123	109	3	6			0.026	0.026	0.09	3.69	0.32	0.380	0.380	0.000	0.000	0.00	1.00	0.000	0.00	0.380	0.13	0.44	100.9	200 PVC	0.203	0.013	0.35	20.2	0.62	2.2%	
	SAN9	109	105	9	8			0.052	0.184	0.60	3.53	2.10	0.620	2.560	0.000	0.000	0.00	1.00	0.000	0.00	2.560	0.84	2.95	93.6	200 PVC	0.203	0.013	0.35	20.2	0.62	14.6%	
	SAN1	105	PUMP					0.000	0.334	1.08	3.45	3.73	0.080	4.390	0.000	0.000	0.00	1.00	0.000	0.00	4.390	1.45	5.17	61.4	250 PVC	0.254	0.013	0.35	36.7	0.72	14.1%	
	SAN15	APT	PUMP			180		0.324	0.324	1.05	3.45	3.62	1.590	1.590	0.000	0.000	0.00	1.00	0.000	0.00	1.590	0.52	4.15		200 PVC	0.203	0.013	0.35	20.2	0.62	20.5%	
		PUMP	STUB					0.000	0.658	2.13	3.33	7.09	0.000	5.980	0.000	0.000	0.00	1.00	0.000	0.00	5.980	1.97	9.07		200 PVC	0.203	0.013	0.32	19.4	0.60	46.8%	
Totals				60	48	180	0.000	0.658	0.658	2.13	3.33	7.09	5.980	5.980	0.000	0.000	0.00	1.00	0.000	0.00	5.980	1.97	9.07	744.6								

Demand Equation / Parameters

1. Q(D), Q(A), Q(R) = Q(p) + Q(f*d*) + Q(ici) + Q(e)
2. Q(p) = (P x q x M x K / 86,400)
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(f*d*) = 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)

P = Residential Population =
q = Average Capita Flow
M = Harmon Formula
K = Harmon Correction Factor
Typ. Service Diameter (mm) = 135
Typ. Service Length (m) = 15
I/I Pipe Rate (L/mm dia/m/hr) = 0.007
Q(f*d*) = Foundation Flow (L/s)
Q(ici) = Industrial / Commercial / Institutional Flow (L/s)
Q(e) = Extraneous Flow (L/s)

Institutional / Commercial / Industrial
Design = 35000 L/gross ha/day
Annual / Rare = 10000 L/gross ha/day

ICI Peak *
Design = 1.0
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_w*R^{2/3}*So^{0.5}

Definitions

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



Private Sanitary Pump Station
HYDRAULIC GRADE LINE ANALYSIS

This spreadsheet uses the Darcy-Weisbach equation to calculate hydraulic losses throuh a pipe network with a specified flow rate. Minor losses are accounted for including both pipe bend losses and structure losses.
The spreadsheet returns the upstream hydraulic grade line if surcharged or the pipe obvert if free flow conditions exist. The HGL slope is calculated and the minimum USF elevation must be at least +0.30m above the HGL.

560 HAZELDEAN ROAD, DOUBLE DECK - SANITARY SEWER DESIGN

LOCATION	MANHOLE		INVERT ELEVATION		GROUND ELEVATION	COVER	PIPE PARAMETERS			TOTAL FLOW	Q_{cap} (m³/s)	Q_{in}/Q_{cap}	COMPUTATIONAL COLUMNS					HEAD LOSS	SURCHARGE	HGL			PIPE	MIN. USF	Conceptual USF
	U/S	D/S	U/S (m)	D/S (m)	U/S (m)	U/S (m)	Dia (mm)	Length (m)	'n'	(m³/s)			Pipe Area (m²)	L/D	Friction Factor (f)	Velocity V (m/s)	$V^2/2g$	HL (m)	U/S (m)	U/S (m)	D/S (m)	SLOPE (%)	SLOPE (%)	U/S (m)	U/S (m)
Street 3																				94.54	<- OUTLET				
	103	PS	91.51	91.46	96.15	4.390	250	13.60	0.013	0.0052	0.038	0.14	0.051	54	0.03342	0.10	0.00	0.00	2.78	94.54	94.54	0.01	0.37	94.84	-
	105	103	91.73	91.57	97.09	5.160	200	46.70	0.013	0.0052	0.020	0.26	0.032	234	0.03600	0.16	0.00	0.01	2.62	94.55	94.54	0.03	0.34	94.85	-
	109	105	92.21	91.88	97.02	4.610	200	93.60	0.013	0.0030	0.020	0.15	0.032	468	0.03600	0.09	0.00	0.01	2.15	94.56	94.55	0.01	0.35	94.86	94.99
	111	109	92.50	92.22	96.90	4.200	200	78.70	0.013	0.0016	0.020	0.08	0.032	394	0.03600	0.05	0.00	0.00	1.86	94.56	94.56	0.00	0.36	94.86	94.89
	113	111	92.59	92.53	96.84	4.050	200	16.00	0.013	0.0010	0.021	0.05	0.032	80	0.03600	0.03	0.00	0.00	1.77	94.56	94.56	0.00	0.38	94.86	94.87
	115	113	92.68	92.62	96.97	4.090	200	16.10	0.013	0.0010	0.021	0.05	0.032	81	0.03600	0.03	0.00	0.00	1.68	94.56	94.56	0.00	0.37	94.86	94.91
	117	115	93.12	92.71	97.23	3.910	200	117.60	0.013	0.0008	0.020	0.04	0.032	588	0.03600	0.03	0.00	0.00	1.24	94.56	94.56	0.00	0.35	94.86	94.93
	129	105	91.82	91.79	97.20	5.180	200	9.10	0.013	0.0023	0.020	0.12	0.032	46	0.03600	0.07	0.00	0.00	2.53	94.55	94.55	0.01	0.33	94.85	95.11
	125	129	91.99	91.83	97.63	5.440	200	44.30	0.013	0.0022	0.021	0.11	0.032	222	0.03600	0.07	0.00	0.00	2.37	94.56	94.55	0.00	0.36	94.86	95.11
Street 1																									
	121	109	92.94	92.81	97.15	4.010	200	36.80	0.013	0.0004	0.020	0.02	0.032	184	0.03600	0.01	0.00	0.00	1.42	94.56	94.56	0.000	0.35	94.86	95.10
	123	121	94.07	93.54	97.51	3.240	200	64.10	0.013	0.0004	0.031	0.01	0.032	321	0.03600	0.01	0.00	0.00	0.29	94.56	94.56	0.00	0.83	94.86	95.10
Street 2																									
	123	125	92.26	91.91	97.51	5.050	200	101.20	0.013	0.0016	0.020	0.08	0.032	506	0.03600	0.05	0.00	0.00	2.10	94.56	94.56	0.00	0.35	94.86	95.43
	117	123	92.55	92.27	97.23	4.480	200	80.80	0.013	0.0009	0.020	0.05	0.032	404	0.03600	0.03	0.00	0.00	1.81	94.56	94.56	0.00	0.35	94.86	95.17
	119	117	92.72	92.56	96.88	3.960	200	24.90	0.013	0.0002	0.027	0.01	0.032	125	0.03600	0.01	0.00	0.00	1.64	94.56	94.56	0.00	0.64	94.86	95.16
	127	125	92.07	91.91	97.39	5.120	200	24.60	0.013	0.0002	0.028	0.01	0.032	123	0.03600	0.01	0.00	0.00	2.29	94.56	94.56	0.00	0.65	94.86	95.49

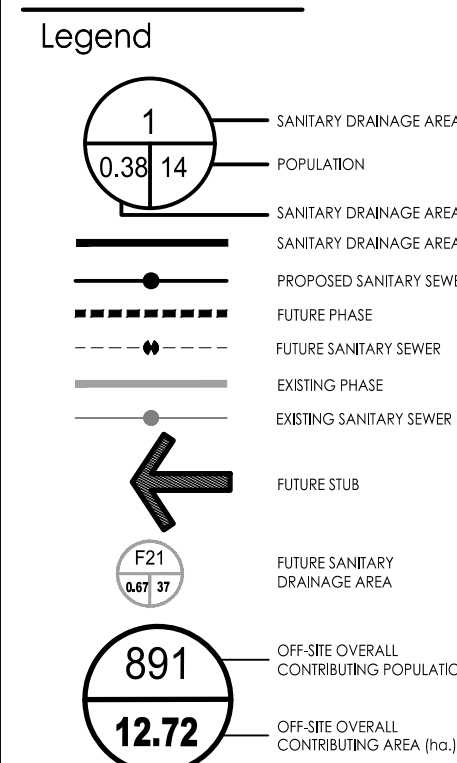
DESIGN PARAMETERS										Designed: LRW		PROJECT:	
Average Daily Flow=		280 L/cap/day		Industrial Peak Factor= per MOE graph		HGL=Major + Minor Losses						560 Hazeldean Road	
Comm/Inst Flow=		28000 L/ha/day		Extraneous Flow=		Major Loss= Pipe Friction (Darcy-Weisbach)						Double Deck Subdivision	
Industrial Flow=		35000 L/ha/day		Minimum Velocity=		Minor Loss= Head loss correction for flow through MH, changes		Checked: MAB				CLIENT:	
Max Res Peak Factor=		4.00		Manning's n=		in pipe size, and pipe bends						Regional	
Comm Peak Factor=		1.50				Friction Factor= $8g/c^2$, where $c=(1/n)*(D/4)^{1/6}$							
Indst Peak Factor=		1.50						Dwg. Reference: 100057-SAN				Date: December 18, 2025	

Bend Coefficients			
0	45	90	<----Bend (in degrees)
0.00	0.29	1.02	900 mm pipe or greater (benching)
0.00	0.40	1.32	825 mm pipe or smaller (300 mm sump)

Manhole Loss								
Diameters (mm)			Bend					HL _{MH}
U/S MH	Pipe In	Pipe Out	Angle	K _o	C _D	K _b	K _{tot}	(m)
1200	250	250	0	0.480	1.00	0.00	0.480	0.000
1200	200	250	59	0.480	1.95	0.40	1.338	0.002
1200	200	200	57	0.600	1.00	0.40	1.000	0.000
1200	200	200	0	0.600	1.00	0.00	0.600	0.000
1200	200	200	40	0.600	1.00	0.00	0.600	0.000
1200	200	200	37	0.600	1.00	0	0.600	0.000
1200	200	200	40	0.600	1.00	0	0.600	0.000
1200	200	200	67	0.600	1.00	0.4	1.000	0.000
1200	200	200	7	0.600	1.00	0	0.600	0.000
1200	200	200	90	0.600	1.00	1.32	1.920	0.000
1200	200	200	28	0.600	1.00	0.00	0.600	0.000
1200	200	200	90	0.600	1.00	1.32	1.920	0.000
1200	200	200	0	0.600	1.00	0.00	0.600	0.000
1200	200	200	0	0.600	1.00	0.00	0.600	0.000
1200	200	200	90	0.600	1.00	1.32	1.920	0.000



DESIGN PARAMETERS					
MAX PEAK FACTOR (RES.)=	4.0	AVG. DAILY FLOW / PERSON	280 l/p/day	MINIMUM VELOCITY	0.60 m/s
MIN PEAK FACTOR (RES.)=	2.0	COMMERCIAL	28,000 l/ha/day	MAXIMUM VELOCITY	3.00 m/s
PEAKING FACTOR (INDUSTRIAL):	2.4	INDUSTRIAL (HEAVY)	55,000 l/ha/day	MANNINGS n	0.013
PEAKING FACTOR (ICI >20%):	1.5	INDUSTRIAL (LIGHT)	35,000 l/ha/day	BEDDING CLASS	B
PERSONS / SINGLE	3.4	INSTITUTIONAL	28,000 l/ha/day	MINIMUM COVER	2.50 m
PERSONS / TOWNHOME	2.7	INFILTRATION	0.33 l/s/Ha	HARMON CORRECTION FACTOR	0.8
PERSONS / APARTMENT	1.8				



Notes

5	ISSUED FOR ECA	JP	SG	21.05.14
4	ISSUED FOR FOURTH SUBMISSION	JP	SG	21.01.04
3	ISSUED FOR THIRD SUBMISSION	JP	SG	20.11.05
2	ISSUED FOR SECOND SUBMISSION	JP	SG	20.04.15
1	ISSUED FOR FIRST SUBMISSION	JP	SG	19.07.09

Revision By Appd. YY.MM.DD

File Name:	160401217 SA PH4	JP	MJS	SG	19.04.09
		Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

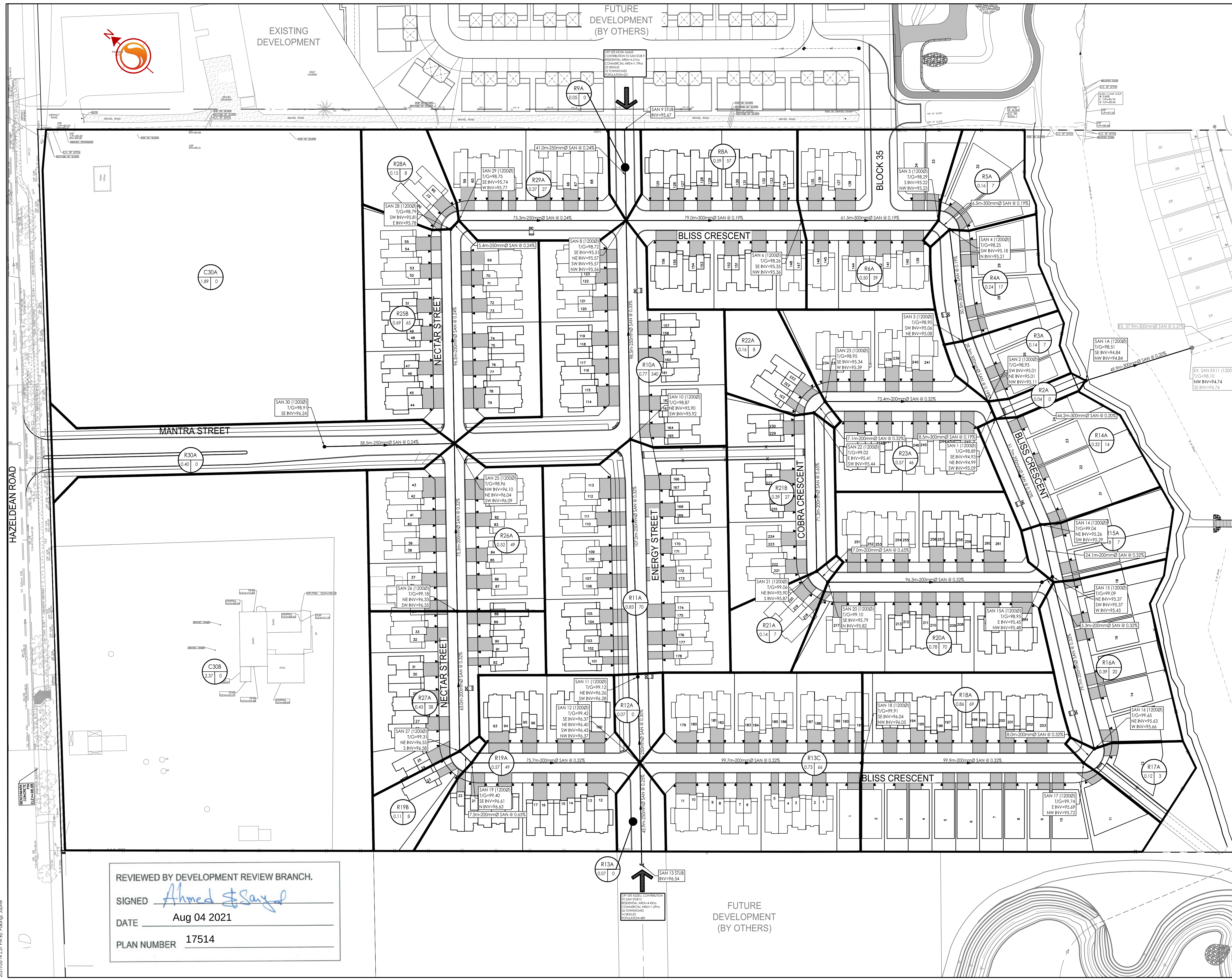
Client/Project
2118356 ONTARIO INC.

BRADLEY COMMONS
PHASE 4
OTTAWA, ON, CANADA

Title
SANITARY DRAINAGE PLAN

Project No.	Scale	0	7.5	22.5	37.5m
160401217	1:750				
Drawing No.	Sheet	Revision			

SA-1 30 of 31 5 DWG# 17514



REVIEWED BY DEVELOPMENT REVIEW BRANCH.

SIGNED *Ahmed S. Sayed*

DATE Aug 04 2021

PLAN NUMBER 17514

STORM SEWER DESIGN SHEET

FLOW RATES BASED ON RATIONAL METHOD



LOCATION				AREA (ha)			FLOW							TOTAL FLOW	SEWER DATA									
Street	Catchment ID	From Manhole	To Manhole	Area (ha)	C	AC (ha)	Indiv 2.78 AC	Accum 2.78 AC	Time of Concentration	Rainfall Intensity 2 Year (mm/hr)	Rainfall Intensity 5 Year (mm/hr)	Rainfall Intensity 100 Year (mm/hr)	Peak Flow (L/s)	Total Peak Flow, Q (L/s)	Dia. (m) Actual	Dia. (mm)	Type	Slope (%)	Length (m)	Capacity (L/s)	Velocity (m/s)	Flow Time (min)	Ratio Q/Q full	
	A-22, A-23	CAP	122	1.673	0.79	1.32	3.674	3.674	10.00	76.81			282.2	282.2	0.686	675	Conc	0.15	42.8	339.4	0.92	0.78	83%	
						0.00	0.000	0.000	10.00															
						0.00	0.000	0.000	10.00															
	A-03	124	122	0.102	0.59	0.06	0.167	0.167	10.00	76.81			12.8	12.8	0.305	300	PVC	0.35	44.2	59.6	0.82	0.90	22%	
						0.00	0.000	0.000	10.00															
						0.00	0.000	0.000	10.00															
	A-18, A-20, A-21	122	120	0.493	0.71	0.35	0.973	4.815	10.90	73.51			353.9	353.9	0.762	750	Conc	0.15	101.2	449.6	0.99	1.71	79%	
						0.00	0.000	0.000	10.90															
						0.00	0.000	0.000	10.90															
	A-13, A-16, A-17	120	102	0.404	0.69	0.28	0.775	5.590	12.61	68.04			380.3	380.3	0.838	825	Conc	0.15	83.8	579.7	1.05	1.33	66%	
						0.00	0.000	0.000	12.61															
						0.00	0.000	0.000	12.61															
	A-04, A-05	118	112	0.606	0.78	0.47	1.314	1.314	10.00	76.81			100.9	100.9	0.381	375	PVC	0.35	89.6	108.1	0.95	1.57	93%	
						0.00	0.000	0.000	10.00															
						0.00	0.000	0.000	10.00															
	A-15	116	114	0.178	0.79	0.14	0.391	0.391	10.00	76.81			30.0	30.0	0.305	300	PVC	0.35	28.0	59.6	0.82	0.57	50%	
						0.00	0.000	0.000	10.00															
						0.00	0.000	0.000	10.00															
	A-19	114	112	0.307	0.61	0.19	0.521	0.912	10.57	74.68			68.1	68.1	0.381	375	PVC	0.35	38.0	108.1	0.95	0.67	63%	
						0.00	0.000	0.000	10.57															
						0.00	0.000	0.000	10.57															
	A-06	112	110	0.192	0.77	0.15	0.411	2.637	11.57	71.25			187.8	187.8	0.533	525	Conc	0.20	80.8	200.5	0.90	1.50	94%	
						0.00	0.000	0.000	11.57															
						0.00	0.000	0.000	11.57															
	A-07	110	106	0.214	0.77	0.16	0.458	3.095	13.08	66.72			206.5	206.5	0.610	600	Conc	0.20	34.3	286.3	0.98	0.58	72%	
						0.00	0.000	0.000	13.08															
						0.00	0.000	0.000	13.08															
	A-08, A-09, A-14	106	104	0.928	0.63	0.58	1.625	4.720	13.66	65.13			307.4	307.4	0.686	675	Conc	0.15	60.0	339.4	0.92	1.09	91%	
						0.00	0.000	0.000	13.66															
						0.00	0.000	0.000	13.66															
	A-10	104	102	0.177	0.77	0.14	0.379	5.099	14.75	62.37			318.0	318.0	0.686	675	Conc	0.15	59.6	339.4	0.92	1.08	94%	
						0.00	0.000	0.000	14.75															
						0.00	0.000	0.000	14.75															
		102	100			0.00	0.000	10.688	15.83	59.88			640.0	640.0	0.991	975	Conc	0.15	27.2	905.1	1.17	0.39	71%	
						0.00	0.000	0.000	15.83															
						0.00	0.000	0.000	15.83															
	A11	100	1	0.113	0.66	0.07	0.207	10.896	16.21	59.04			643.3	643.3	0.991	975	Conc	0.15	9.3	905.1	1.17	0.13	71%	
						0.00	0.000	0.000	16.21															
						0.00	0.000	0.000	16.21															

Q = 2.78 AIC, where

Q = Peak Flow in Litres per Second (L/s)

A = Area in hectares (ha)

I = Rainfall Intensity (mm/hr), 2 year storm

C = Runoff Coefficient

Consultant:

Date:

Design By:

Client:

Regional

Novatech

December 22, 2025

Lucas Wilson

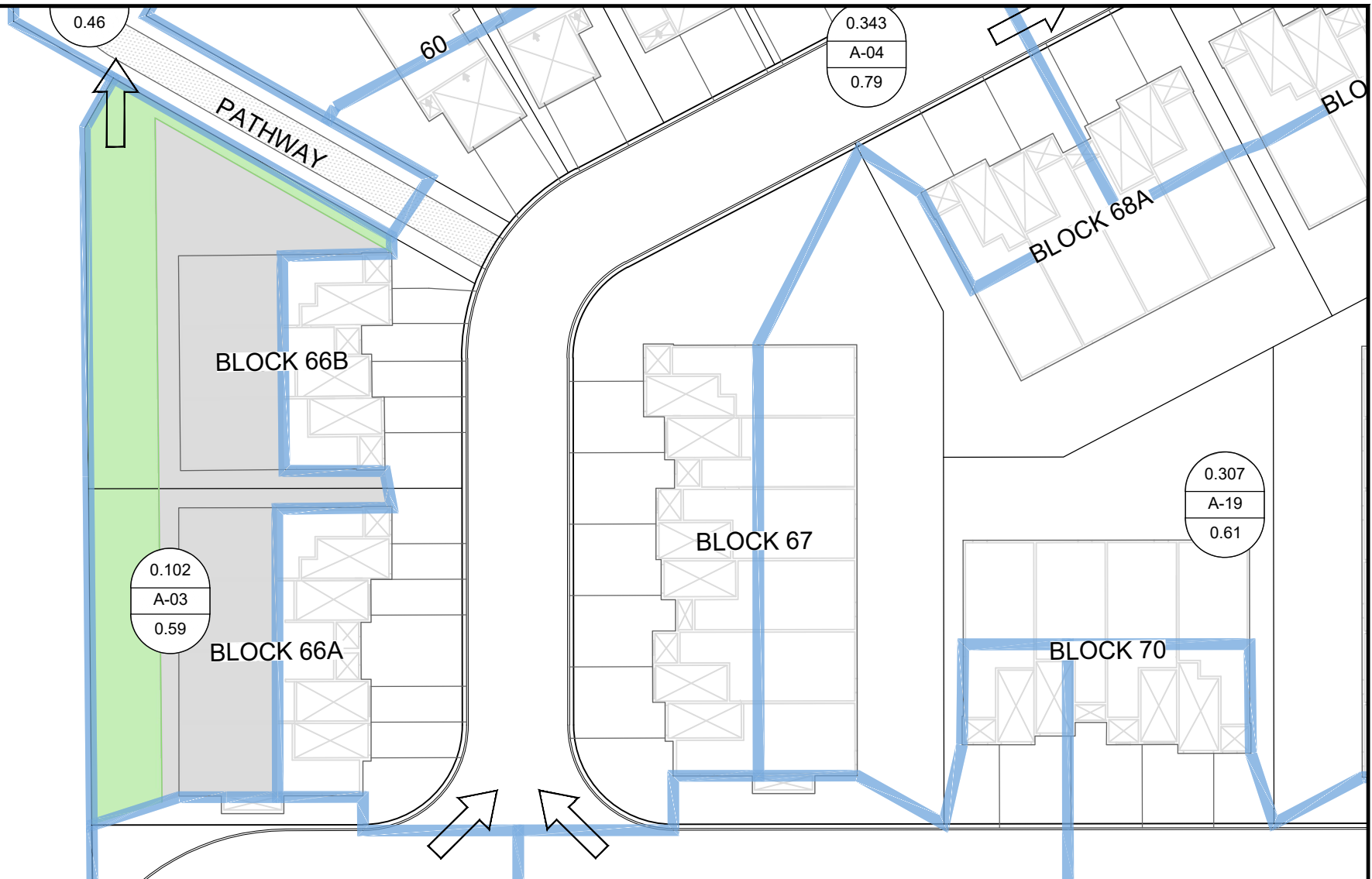
Dwg. Reference:

100057-STM

Checked By:

MAB

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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

CITY OF OTTAWA
560 HAZELDEAN ROAD
DOUBLE DECK SUBDIVISION
RUNOFF COEFFICIENT
SAMPLE CALCULATIONS
AREA A-03

SCALE 1 : 500

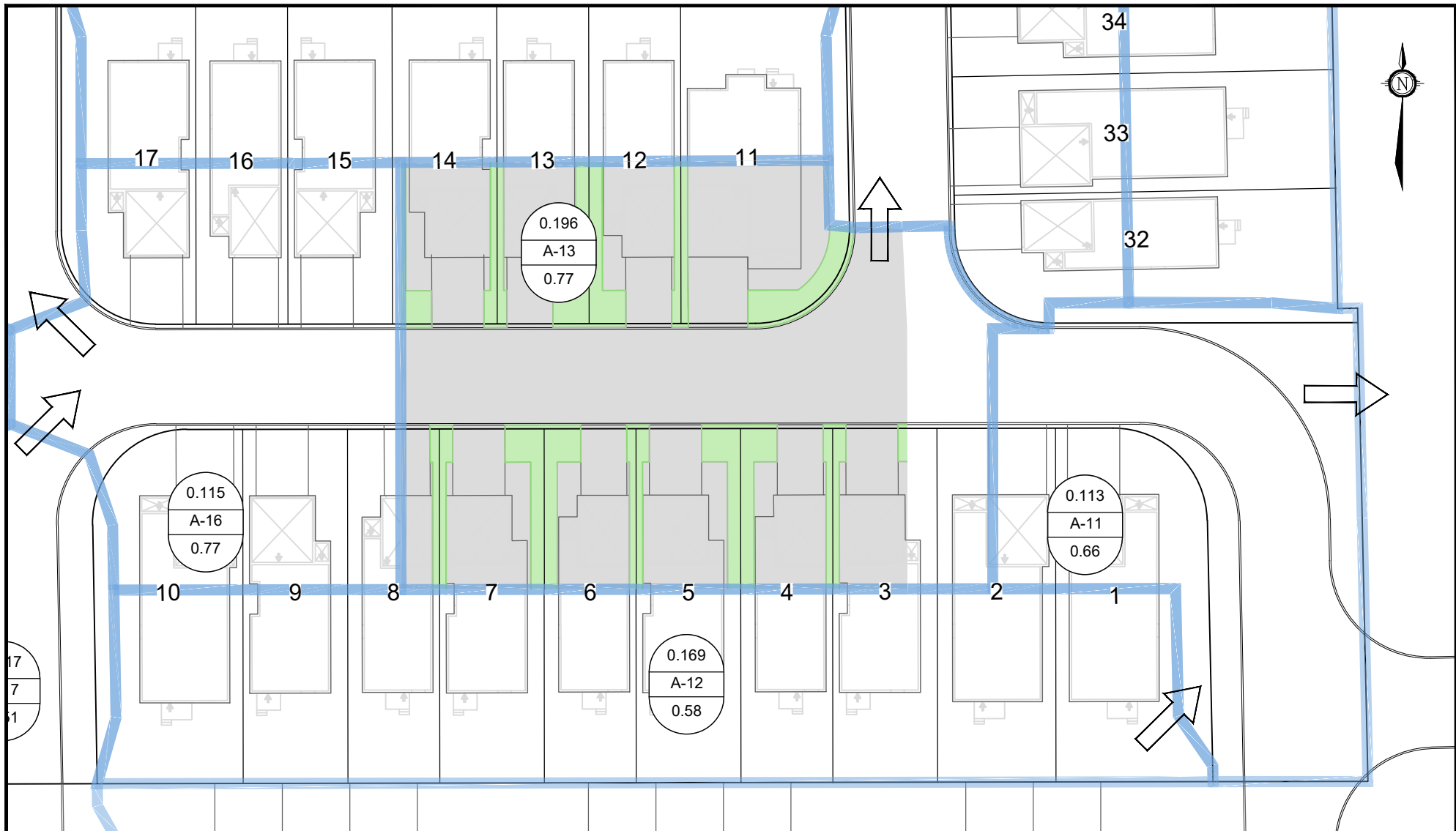
DATE
JANUARY 20, 2026

JOB
100057-05

FIGURE
DSK-29A

SHT8X11.DWG - 216mmx279mm

M:\2000\100057\SUBDIVISION\CAD\DESIGN\FIGURES\DSK\DWG\DSK29-C VALUE.DWG 1/21/2026 9:56 AM - DDUFOTN



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LEGEND

- ZONING SET BACK - PERVIOUS AREA
- ZONING SET BACK - IMPERVIOUS AREA

AREA A-13

TOTAL AREA =0.172 HECTARES
PERVIOUS AREA =0.031 HECTARES
IMPERVIOUS AREA =0.141 HECTARES

$C = ((\text{PERVIOUS AREA} \times 0.2) + (\text{Impervious Area} \times 0.9)) / \text{Total Area}$
 $C = 0.77$

CITY OF OTTAWA
560 HAZELDEAN ROAD
DOUBLE DECK SUBDIVISION
RUNOFF COEFFICIENT
SAMPLE CALCULATIONS
AREA A-13

SCALE 1 : 500

DATE JANUARY 20, 2026

JOB 100057-05

FIGURE DSK-29B

DOUBLE DECK - 560 HAZELDEAN ROAD
Water Demand

	Area (ha)	Units	Population	Average Day Demand (L/s)	Maximum Day Demand (L/s)	Peak Hour Demand (L/s)
Singles	N/A	60	204	0.661	1.653	3.636
Towns	N/A	48	130	0.420	1.050	2.310
Future Apartment Block:	N/A	180	324	1.050	2.625	5.775
Total	0.00	288	658	2.131	5.328	11.721

Water Demand Parameters

Singles	3.4	ppl/unit
Towns	2.7	ppl/unit
Future Block 10 Apartment Unit	1.8	ppl/unit
Residential Demand	280	L/c/day
Residential Max Day	2.5	x Avg Day
Residential Peak Hour	2.2	x Max Day
Residential Fire Flow	167/267	L/s

560 Hazeldean Road- Double Deck: Watermain Demand

Node	Singles	Towns	Future Apartment Unit	Total Population	Average Day Demand (L/s)	Maximum Day Demand (L/s)	Peak Hour Demand (L/s)	Fire Flow (L/s)
N1		17		46	0.149	0.372	0.818	267
N2	4	5		27	0.088	0.220	0.483	267
N3	14	8		69	0.224	0.561	1.233	167
N4	9	18		79	0.257	0.642	1.412	267
N5	15			51	0.165	0.413	0.909	167
N6	18			61	0.198	0.496	1.091	167
APT			180	324	1.050	2.625	5.775	250
Total	60	48	180	658	2.131	5.328	11.721	

Water Demand Parameters

Singles	3.4	ppl/unit	Residential Max Day	2.5	x Avg Day
Towns	2.7	ppl/unit	Residential Peak Hour	2.2	x Max Day
Future Apartment Unit	1.8	ppl/unit	Residential Fire Flow	267 (Max)	L/s
Residential Demand	280	L/c/day	Apartment Fire Flow	250	L/s

560 Hazeldean Road - Double Deck: Watermain Analysis

Network Table - Nodes - (Peak Hour)

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi
Junc N1	97.57	0.82	155.85	58.28	571.73	82.92
Junc N2	97.1	0.48	155.85	58.75	576.34	83.59
Junc N3	96.98	1.23	155.86	58.88	577.61	83.78
Junc N4	97.44	1.41	155.87	58.43	573.20	83.14
Junc N5	97.16	0.91	155.87	58.71	575.95	83.53
Junc N6	96.99	1.09	155.86	58.87	577.51	83.76
Junc APT	96	5.78	155.84	59.34	582.13	84.43
Resvr RES1	155.9	-6.49	155.9	0	0.00	0.00
Resvr RES2	155.9	-5.23	155.9	0	0.00	0.00

Network Table - Links - (Peak Hour)

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe P1	46	200	110	0.35	0.01	0.00	0.052
Pipe P2	97	200	110	-2.99	0.10	0.09	0.041
Pipe P3	97	200	110	2.77	0.09	0.08	0.042
Pipe P4	101	200	110	4.08	0.13	0.17	0.039
Pipe P5	84	200	110	6.49	0.21	0.40	0.037
Pipe P6	75	200	110	1.77	0.06	0.04	0.044
Pipe P7	115	200	110	5.23	0.17	0.27	0.038
Pipe P8	114	200	110	-2.55	0.08	0.07	0.042
Pipe P9	104	200	110	-1.46	0.05	0.03	0.046
Pipe P10	106	200	110	2.92	0.09	0.09	0.041
Pipe P11	109	200	110	-2.86	0.09	0.09	0.041

560 Hazeldean Road - Double Deck: Watermain Analysis

Network Table - Nodes - (Max Pressure Check)

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi	Age Hours
Junc N1	97.57	0.15	162.1	64.53	633.04	91.81	2.34
Junc N2	97.1	0.09	162.1	65	637.65	92.48	6.01
Junc N3	96.98	0.22	162.1	65.12	638.83	92.65	4.14
Junc N4	97.44	0.26	162.1	64.66	634.31	92.00	1.15
Junc N5	97.16	0.17	162.1	64.94	637.06	92.40	1.05
Junc N6	96.99	0.2	162.1	65.11	638.73	92.64	3.2
Junc APT	96	1.05	162.1	65.6	643.54	93.34	5.94
Resvr RES1	162.1	-1.18	162.1	0	0.00	0.00	0
Resvr RES2	162.1	-0.95	162.1	0	0.00	0.00	0

Network Table - Links - (Max Pressure Check)

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe P1	46	200	110	0.06	0.00	0.00	0.000
Pipe P2	97	200	110	-0.54	0.02	0.00	0.053
Pipe P3	97	200	110	0.50	0.02	0.00	0.056
Pipe P4	101	200	110	0.74	0.02	0.01	0.052
Pipe P5	84	200	110	1.18	0.04	0.02	0.047
Pipe P6	75	200	110	0.32	0.01	0.00	0.055
Pipe P7	115	200	110	0.95	0.03	0.01	0.049
Pipe P8	114	200	110	-0.46	0.01	0.00	0.056
Pipe P9	104	200	110	-0.27	0.01	0.00	0.059
Pipe P10	106	200	110	0.53	0.02	0.00	0.051
Pipe P11	109	200	110	-0.52	0.02	0.00	0.051

560 Hazeldean Road - Double Deck: Watermain Analysis

Network Table - Nodes (Max Day + FF 'APT')

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi
Junc N1	97.57	0.37	120.87	23.3	228.57	33.15
Junc N2	97.1	0.22	120.85	23.75	232.99	33.79
Junc N3	96.98	0.56	129.1	32.12	315.10	45.70
Junc N4	97.44	0.64	132.11	34.67	340.11	49.33
Junc N5	97.16	0.41	132.92	35.76	350.81	50.88
Junc N6	96.99	0.5	130.91	33.92	332.76	48.26
Junc APT	96	252.62	110.42	14.42	141.46	20.52
Resvr RES1	145.6	-166.02	145.6	0	0.00	0.00
Resvr RES2	138.8	-89.31	138.8	0	0.00	0.00

Network Table - Links (Max Day + FF 'APT')

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe P1	46	200	110	7.84	0.25	0.57	0.036
Pipe P2	97	200	110	-117.52	3.74	85.10	0.024
Pipe P3	97	200	110	68.21	2.17	31.07	0.026
Pipe P4	101	200	110	135.69	4.32	111.06	0.023
Pipe P5	84	200	110	166.02	5.28	161.35	0.023
Pipe P6	75	200	110	38.54	1.23	10.79	0.028
Pipe P7	115	200	110	89.31	2.84	51.19	0.025
Pipe P8	114	200	110	-50.37	1.60	17.72	0.027
Pipe P9	104	200	110	-49.87	1.59	17.40	0.027
Pipe P10	106	200	110	127.48	4.06	98.93	0.024
Pipe P11	109	200	110	-125.15	3.98	95.60	0.024

560 Hazeldean Road - Double Deck: Watermain Analysis

Network Table - Nodes (Max Day + FF 'N1')

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi
Junc N1	97.57	267.37	115.22	17.65	173.15	25.11
Junc N2	97.1	0.22	117.25	20.15	197.67	28.67
Junc N3	96.98	0.56	125.78	28.8	282.53	40.98
Junc N4	97.44	0.64	128.84	31.4	308.03	44.68
Junc N5	97.16	0.41	129.82	32.66	320.39	46.47
Junc N6	96.99	0.5	127.69	30.7	301.17	43.68
Junc APT	96	2.63	116.15	20.15	197.67	28.67
Resvr RES1	144.1	-177.42	144.1	0	0.00	0.00
Resvr RES2	136.4	-94.91	136.4	0	0.00	0.00

Network Table - Links (Max Day + FF 'N1')

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe P1	46	200	110	-82.20	2.62	43.89	0.025
Pipe P2	97	200	110	-119.64	3.81	87.96	0.024
Pipe P3	97	200	110	68.82	2.19	31.59	0.026
Pipe P4	101	200	110	150.58	4.79	134.67	0.023
Pipe P5	84	200	110	177.42	5.65	182.48	0.022
Pipe P6	75	200	110	42.62	1.36	13.00	0.028
Pipe P7	115	200	110	94.91	3.02	57.28	0.025
Pipe P8	114	200	110	-51.88	1.65	18.71	0.027
Pipe P9	104	200	110	-51.38	1.64	18.38	0.027
Pipe P10	106	200	110	-34.60	1.10	8.84	0.029
Pipe P11	109	200	110	-37.22	1.18	10.12	0.028

560 Hazeldean Road - Double Deck: Watermain Analysis

Network Table - Nodes (Max Day + FF 'N2')

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi
Junc N1	97.57	0.37	117.4	19.83	194.53	28.21
Junc N2	97.1	267.22	114.76	17.66	173.24	25.13
Junc N3	96.98	0.56	125.1	28.12	275.86	40.01
Junc N4	97.44	0.64	128.93	31.49	308.92	44.80
Junc N5	97.16	0.41	129.76	32.6	319.81	46.38
Junc N6	96.99	0.5	127.3	30.31	297.34	43.13
Junc APT	96	2.63	116.03	20.03	196.49	28.50
Resvr RES1	144.1	-176.9	144.1	0	0.00	0.00
Resvr RES2	136.4	-95.43	136.4	0	0.00	0.00

Network Table - Links (Max Day + FF 'N2')

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe P1	46	200	110	94.52	3.01	56.85	0.025
Pipe P2	97	200	110	-132.67	4.22	106.51	0.023
Pipe P3	97	200	110	77.70	2.47	39.54	0.025
Pipe P4	101	200	110	137.55	4.38	113.89	0.023
Pipe P5	84	200	110	176.90	5.63	181.49	0.022
Pipe P6	75	200	110	38.98	1.24	11.03	0.028
Pipe P7	115	200	110	95.43	3.04	57.86	0.025
Pipe P8	114	200	110	-56.03	1.78	21.58	0.027
Pipe P9	104	200	110	-55.53	1.77	21.23	0.027
Pipe P10	106	200	110	42.66	1.36	13.03	0.028
Pipe P11	109	200	110	40.03	1.27	11.58	0.028

560 Hazeldean Road - Double Deck: Watermain Analysis

Network Table - Nodes (Max Day + FF 'N3')

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi
Junc N1	97.57	0.37	135.25	37.68	369.64	53.61
Junc N2	97.1	0.22	134.66	37.56	368.46	53.44
Junc N3	96.98	217.56	132.32	35.34	346.69	50.28
Junc N4	97.44	0.64	137.95	40.51	397.40	57.64
Junc N5	97.16	0.41	138.1	40.94	401.62	58.25
Junc N6	96.99	0.5	135.06	38.07	373.47	54.17
Junc APT	96	2.63	134.92	38.92	381.81	55.38
Resvr RES1	148.2	-143.17	148.2	0	0.00	0.00
Resvr RES2	142.8	-79.15	142.8	0	0.00	0.00

Network Table - Links (Max Day + FF 'N3')

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe P1	46	200	110	42.47	1.35	12.92	0.028
Pipe P2	97	200	110	59.49	1.89	24.12	0.026
Pipe P3	97	200	110	95.64	3.04	58.10	0.025
Pipe P4	101	200	110	62.71	2.00	26.59	0.026
Pipe P5	84	200	110	143.17	4.56	122.66	0.023
Pipe P6	75	200	110	15.81	0.50	2.07	0.032
Pipe P7	115	200	110	79.15	2.52	40.93	0.025
Pipe P8	114	200	110	-62.93	2.00	26.76	0.026
Pipe P9	104	200	110	-62.43	1.99	26.37	0.026
Pipe P10	106	200	110	19.87	0.63	3.16	0.031
Pipe P11	109	200	110	17.24	0.55	2.43	0.032

560 Hazeldean Road - Double Deck: Watermain Analysis

Network Table - Nodes (Max Day + FF 'N4')

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi
Junc N1	97.57	0.37	128.45	30.88	302.93	43.94
Junc N2	97.1	0.22	128.47	31.37	307.74	44.63
Junc N3	96.98	0.56	128.61	31.63	310.29	45.00
Junc N4	97.44	267.64	128.36	30.92	303.33	43.99
Junc N5	97.16	0.41	130.21	33.05	324.22	47.02
Junc N6	96.99	0.5	129.36	32.37	317.55	46.06
Junc APT	96	2.63	128.45	32.45	318.33	46.17
Resvr RES1	144.1	-180.43	144.1	0	0.00	0.00
Resvr RES2	136.4	-91.9	136.4	0	0.00	0.00

Network Table - Links (Max Day + FF 'N4')

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe P1	46	200	110	-8.01	0.25	0.59	0.036
Pipe P2	97	200	110	-12.81	0.41	1.40	0.033
Pipe P3	97	200	110	-17.66	0.56	2.54	0.032
Pipe P4	101	200	110	-9.59	0.31	0.82	0.035
Pipe P5	84	200	110	180.43	5.74	188.25	0.022
Pipe P6	75	200	110	59.97	1.91	24.48	0.026
Pipe P7	115	200	110	91.90	2.93	53.96	0.025
Pipe P8	114	200	110	-31.52	1.00	7.44	0.029
Pipe P9	104	200	110	-31.02	0.99	7.22	0.029
Pipe P10	106	200	110	-1.95	0.06	0.04	0.044
Pipe P11	109	200	110	-4.58	0.15	0.21	0.039

560 Hazeldean Road - Double Deck: Watermain Analysis

Network Table - Nodes (Max Day + FF 'N5')

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi
Junc N1	97.57	0.37	131.46	33.89	332.46	48.22
Junc N2	97.1	0.22	131.38	34.28	336.29	48.77
Junc N3	96.98	0.56	131.09	34.11	334.62	48.53
Junc N4	97.44	0.64	131.87	34.43	337.76	48.99
Junc N5	97.16	267.41	127.03	29.87	293.02	42.50
Junc N6	96.99	0.5	129.13	32.14	315.29	45.73
Junc APT	96	2.63	131.41	35.41	347.37	50.38
Resvr RES1	144.1	-157.44	144.1	0	0.00	0.00
Resvr RES2	136.4	-114.89	136.4	0	0.00	0.00

Network Table - Links (Max Day + FF 'N5')

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe P1	46	200	110	14.67	0.47	1.81	0.032
Pipe P2	97	200	110	19.47	0.62	3.05	0.031
Pipe P3	97	200	110	33.09	1.05	8.14	0.029
Pipe P4	101	200	110	22.68	0.72	4.04	0.030
Pipe P5	84	200	110	157.44	5.01	146.25	0.023
Pipe P6	75	200	110	-101.02	3.22	64.30	0.024
Pipe P7	115	200	110	114.89	3.66	81.61	0.024
Pipe P8	114	200	110	51.50	1.64	18.46	0.027
Pipe P9	104	200	110	51.99	1.65	18.79	0.027
Pipe P10	106	200	110	7.64	0.24	0.54	0.036
Pipe P11	109	200	110	5.01	0.16	0.25	0.038

560 Hazeldean Road - Double Deck: Watermain Analysis

Network Table - Nodes (Max Day + FF 'N6')

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi
Junc N1	97.57	0.37	137.02	39.45	387.00	56.13
Junc N2	97.1	0.22	136.73	39.63	388.77	56.39
Junc N3	96.98	0.56	135.62	38.64	379.06	54.98
Junc N4	97.44	0.64	138.34	40.9	401.23	58.19
Junc N5	97.16	0.41	137.76	40.6	398.29	57.77
Junc N6	96.99	217.5	128.62	31.63	310.29	45.00
Junc APT	96	2.63	136.85	40.85	400.74	58.12
Resvr RES1	148.2	-140.15	148.2	0	0.00	0.00
Resvr RES2	142.8	-82.18	142.8	0	0.00	0.00

Network Table - Links (Max Day + FF 'N6')

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe P1	46	200	110	28.65	0.91	6.23	0.029
Pipe P2	97	200	110	39.61	1.26	11.35	0.028
Pipe P3	97	200	110	64.55	2.05	28.05	0.026
Pipe P4	101	200	110	42.83	1.36	13.12	0.028
Pipe P5	84	200	110	140.15	4.46	117.90	0.023
Pipe P6	75	200	110	-32.13	1.02	7.71	0.029
Pipe P7	115	200	110	82.18	2.62	43.88	0.025
Pipe P8	114	200	110	-113.90	3.63	80.30	0.024
Pipe P9	104	200	110	103.60	3.30	67.37	0.024
Pipe P10	106	200	110	13.81	0.44	1.61	0.033
Pipe P11	109	200	110	11.18	0.36	1.09	0.034

FUS - Fire Flow Calculations

Novatech Project #: 100057
Project Name: Double Deck - 560 Hazeldean Road
Date: 12/22/2025
Input By: Lucas Wilson
Reviewed By: Mark Bissett
Drawing Reference:

Legend: Input by User

No Input Required

Reference: Fire Underwriter's Survey Guideline (2020)
Formula Method

Building Description: 6-unit Townhome
Type V - Wood frame

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	Construction Material C	Type V - Wood frame	Yes	1.5	1.5	
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction		0.8		
		Type I - Fire resistive construction (2 hrs)		0.6		
2	Floor Area A	Building Footprint (m ²)	630		1,260	12,000
		Number of Floors/Storeys	2			
		Protected Openings (1 hr) if C<1.0	No			
		Area of structure considered (m ²)				
	F	Base fire flow without reductions				
		F = 220 C (A)^{0.5}				
Reductions or Surcharges						
3	Occupancy hazard reduction or surcharge		FUS Table 3	Reduction/Surcharge		10,200
	(1)	Non-combustible		-25%	-15%	
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	Sprinkler Reduction		FUS Table 4	Reduction		0
	(2)	Adequately Designed System (NFPA 13)	No	-30%	0%	
		Standard Water Supply	No	-10%		
		Fully Supervised System	No	-10%		
		Cumulative Sub-Total		0%		
		Area of Sprinklered Coverage (m²)	0	0%		
Cumulative Total		0%				
5	Exposure Surcharge		FUS Table 5	Surcharge		5,610
	(3)	North Side	20.1 - 30 m		10%	
		East Side	10.1 - 20 m		15%	
		South Side	3.1 - 10 m		20%	
		West Side	20.1 - 30 m		10%	
		Cumulative Total			55%	
Results						
6	(1) + (2) + (3)	Total Required Fire Flow, rounded to nearest 1000L/min			L/min	16,000
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	267
				or	USGPM	4,227

FUS - Fire Flow Calculations

Novatech Project #: 100057
Project Name: Double Deck - 560 Hazeldean Road
Date: 12/22/2025
Input By: Lucas Wilson
Reviewed By: Mark Bissett
Drawing Reference:

Legend: Input by User

No Input Required

Reference: Fire Underwriter's Survey Guideline (2020)
Formula Method

Building Description: 4-unit Townhome
Type V - Wood frame

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	Construction Material C	Type V - Wood frame	Yes	1.5	1.5	
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction		0.8		
		Type I - Fire resistive construction (2 hrs)		0.6		
2	Floor Area A	Building Footprint (m ²)	425		850	
		Number of Floors/Storeys	2			
		Protected Openings (1 hr) if C<1.0	No			
		Area of structure considered (m ²)				
	F	Base fire flow without reductions				10,000
		$F = 220 C (A)^{0.5}$				
Reductions or Surcharges						
3	Occupancy hazard reduction or surcharge		FUS Table 3	Reduction/Surcharge		
	(1)	Non-combustible		-25%	-15%	8,500
		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)	No	-30%	0	
		Standard Water Supply	No	-10%		
		Fully Supervised System	No	-10%		
		Cumulative Sub-Total		0%		
		Area of Sprinklered Coverage (m²)	0	0%		
Cumulative Total		0%				
5	Exposure Surcharge		FUS Table 5	Surcharge		
	(3)	North Side	3.1 - 10 m		20%	5,525
		East Side	10.1 - 20 m		15%	
		South Side	3.1 - 10 m		20%	
		West Side	20.1 - 30 m		10%	
		Cumulative Total			65%	
Results						
6	(1) + (2) + (3)	Total Required Fire Flow, rounded to nearest 1000L/min			L/min	14,000
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	233
				or	USGPM	3,699

FUS - Fire Flow Calculations

Novatech Project #: 100057
Project Name: Double Deck - 560 Hazeldean Road
Date: 12/22/2025
Input By: Lucas Wilson
Reviewed By: Mark Bissett
Drawing Reference:

Legend: Input by User

No Input Required

Reference: Fire Underwriter's Survey Guideline (2020)
Formula Method

Building Description: Single
Type V - Wood frame

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	Yes	1.5	1.5		
		Type IV - Mass Timber		Varies			
		Type III - Ordinary construction		1			
		Type II - Non-combustible construction		0.8			
		Type I - Fire resistive construction (2 hrs)		0.6			
2	Floor Area						
	A	Building Footprint (m ²)	215			430	
		Number of Floors/Storeys	2				
		Protected Openings (1 hr) if C<1.0	No				
		Area of structure considered (m ²)					
	F	Base fire flow without reductions					7,000
		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%	5,950	
		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)	No	-30%	0		
		Standard Water Supply	No	-10%			
		Fully Supervised System	No	-10%			
		Cumulative Sub-Total		0%			
		Area of Sprinklered Coverage (m ²)	0	0%			
		Cumulative Total		0%			
5	Exposure Surcharge		FUS Table 5	Surcharge			
	(3)	North Side	0 - 3 m		25%	4,463	
		East Side	3.1 - 10 m		20%		
		South Side	0 - 3 m		25%		
		West Side	20.1 - 30 m		10%		
		Cumulative Total			75%		
Results							
6	(1) + (2) + (3)	Total Required Fire Flow, rounded to nearest 1000L/min				L/min	10,000
		(2,000 L/min < Fire Flow < 45,000 L/min)			or	L/s	167
					or	USGPM	2,642

FUS - Fire Flow Calculations

Novatech Project #: 100057
Project Name: Double Deck - 560 Hazeldean Road
Date: 12/22/2025
Input By: Lucas Wilson
Reviewed By: Mark Bissett
Drawing Reference:

Legend: Input by User

No Input Required

Reference: Fire Underwriter's Survey Guideline (2020)
Formula Method

Building Description: Single Lots 11-17 (3m separation b/w Lots 14/15)
Type V - Wood frame

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	Yes	1.5	1.5		
		Type IV - Mass Timber		Varies			
		Type III - Ordinary construction		1			
		Type II - Non-combustible construction		0.8			
		Type I - Fire resistive construction (2 hrs)		0.6			
2	Floor Area						
	A	Building Footprint (m ²)	595			1,190	
		Number of Floors/Storeys	2				
		Protected Openings (1 hr) if C<1.0	No				
		Area of structure considered (m ²)					
	F	Base fire flow without reductions				11,000	
		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%	9,350	
		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)	No	-30%	0		
		Standard Water Supply	No	-10%			
		Fully Supervised System	No	-10%			
		Cumulative Sub-Total		0%			
		Area of Sprinklered Coverage (m ²)	0	0%			
		Cumulative Total		0%			
5	Exposure Surcharge		FUS Table 5	Surcharge			
	(3)	North Side	3.1 - 10 m		20%	6,545	
		East Side	3.1 - 10 m		20%		
		South Side	10.1 - 20 m		15%		
		West Side	10.1 - 20 m		15%		
		Cumulative Total			70%		
Results							
6	(1) + (2) + (3)	Total Required Fire Flow, rounded to nearest 1000L/min				L/min	16,000
		(2,000 L/min < Fire Flow < 45,000 L/min)			or	L/s	267
					or	USGPM	4,227

FUS - Fire Flow Calculations

Novatech Project #: 100057
Project Name: Double Deck - 560 Hazeldean Road
Date: 12/22/2025
Input By: Lucas Wilson
Reviewed By: Mark Bissett
Drawing Reference:

Legend: Input by User

No Input Required

Reference: Fire Underwriter's Survey Guideline (2020)
Formula Method

Building Description: Single Lots 11-17 (2hr Fire Wall b/w Lots 14/15)
Type V - Wood frame

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	Construction Material C	Type V - Wood frame	Yes	1.5	1.5	
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction		0.8		
		Type I - Fire resistive construction (2 hrs)		0.6		
2	Floor Area A	Building Footprint (m ²)	595		1,190	11,000
		Number of Floors/Storeys	2			
		Protected Openings (1 hr) if C<1.0	No			
		Area of structure considered (m ²)				
	F	Base fire flow without reductions $F = 220 C (A)^{0.5}$				
Reductions or Surcharges						
3	Occupancy hazard reduction or surcharge (1)	FUS Table 3		Reduction/Surcharge		9,350
		Non-combustible		-25%	-15%	
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	Sprinkler Reduction (2)	FUS Table 4		Reduction		0
		Adequately Designed System (NFPA 13)	No	-30%		
		Standard Water Supply	No	-10%		
		Fully Supervised System	No	-10%		
		Cumulative Sub-Total		0%		
		Area of Sprinklered Coverage (m ²)	0	0%		
Cumulative Total		0%				
5	Exposure Surcharge (3)	FUS Table 5		Surcharge		4,675
		North Side	2Hr Firewall		0%	
		East Side	3.1 - 10 m		20%	
		South Side	10.1 - 20 m		15%	
		West Side	10.1 - 20 m		15%	
		Cumulative Total		50%		
Results						
6	(1) + (2) + (3)	Total Required Fire Flow, rounded to nearest 1000L/min			L/min	14,000
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	233
				or	USGPM	3,699

FUS - Fire Flow Calculations

Novatech Project #: 100057
Project Name: Double Deck - 560 Hazeldean Road
Date: 12/22/2025
Input By: Lucas Wilson
Reviewed By: Mark Bissett
Drawing Reference:

Legend: Input by User

No Input Required

Reference: Fire Underwriter's Survey Guideline (2020)
Formula Method

Building Description: Single Lots 23-24 (3m separation)
Type V - Wood frame

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	Construction Material C	Type V - Wood frame	Yes	1.5	1.5	
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction		0.8		
		Type I - Fire resistive construction (2 hrs)		0.6		
2	Floor Area A	Building Footprint (m ²)	350		700	9,000
		Number of Floors/Storeys	2			
		Protected Openings (1 hr) if C<1.0	No			
		Area of structure considered (m ²)				
	F	Base fire flow without reductions				
		$F = 220 C (A)^{0.5}$				
Reductions or Surcharges						
3	Occupancy hazard reduction or surcharge (1)	FUS Table 3		Reduction/Surcharge		7,650
		Non-combustible		-25%	-15%	
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	Sprinkler Reduction (2)	FUS Table 4		Reduction		0
		Adequately Designed System (NFPA 13)	No	-30%		
		Standard Water Supply	No	-10%		
		Fully Supervised System	No	-10%		
		Cumulative Sub-Total		0%		
		Area of Sprinklered Coverage (m²)	0	0%		
Cumulative Total		0%				
5	Exposure Surcharge (3)	FUS Table 5		Surcharge		5,738
		North Side	3.1 - 10 m		20%	
		East Side	10.1 - 20 m		15%	
		South Side	3.1 - 10 m		20%	
		West Side	3.1 - 10 m		20%	
		Cumulative Total		75%		
Results						
6	(1) + (2) + (3)	Total Required Fire Flow, rounded to nearest 1000L/min			L/min	13,000
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	217
				or	USGPM	3,435

FUS - Fire Flow Calculations

Novatech Project #: 100057
Project Name: Double Deck - 560 Hazeldean Road
Date: 12/22/2025
Input By: Lucas Wilson
Reviewed By: Mark Bissett
Drawing Reference:

Legend: Input by User

No Input Required

Reference: Fire Underwriter's Survey Guideline (2020)
Formula Method

Building Description: Single Lots 23-24 (2hr Fre Wall)
Type V - Wood frame

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	Yes	1.5	1.5		
		Type IV - Mass Timber		Varies			
		Type III - Ordinary construction		1			
		Type II - Non-combustible construction		0.8			
		Type I - Fire resistive construction (2 hrs)		0.6			
2	Floor Area						
	A	Building Footprint (m ²)	350			700	
		Number of Floors/Storeys	2				
		Protected Openings (1 hr) if C<1.0	No				
		Area of structure considered (m ²)					
	F	Base fire flow without reductions				9,000	
		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%	7,650	
		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)	No	-30%	0		
		Standard Water Supply	No	-10%			
		Fully Supervised System	No	-10%			
		Cumulative Sub-Total		0%			
		Area of Sprinklered Coverage (m ²)	0	0%			
		Cumulative Total		0%			
5	Exposure Surcharge		FUS Table 5	Surcharge			
	(3)	North Side	2Hr Firewall		0%	2,678	
		East Side	10.1 - 20 m		15%		
		South Side	2Hr Firewall		0%		
		West Side	3.1 - 10 m		20%		
		Cumulative Total			35%		
Results							
6	(1) + (2) + (3)	Total Required Fire Flow, rounded to nearest 1000L/min				L/min	10,000
		(2,000 L/min < Fire Flow < 45,000 L/min)			or	L/s	167
					or	USGPM	2,642

FUS - Fire Flow Calculations

Novatech Project #: 100057
Project Name: Double Deck - 560 Hazeldean Road
Date: 12/22/2025
Input By: Lucas Wilson
Reviewed By: Mark Bissett
Drawing Reference:

Legend: Input by User

No Input Required

Reference: Fire Underwriter's Survey Guideline (2020)
Formula Method

Building Description: Future Apartments
Type V - Wood frame

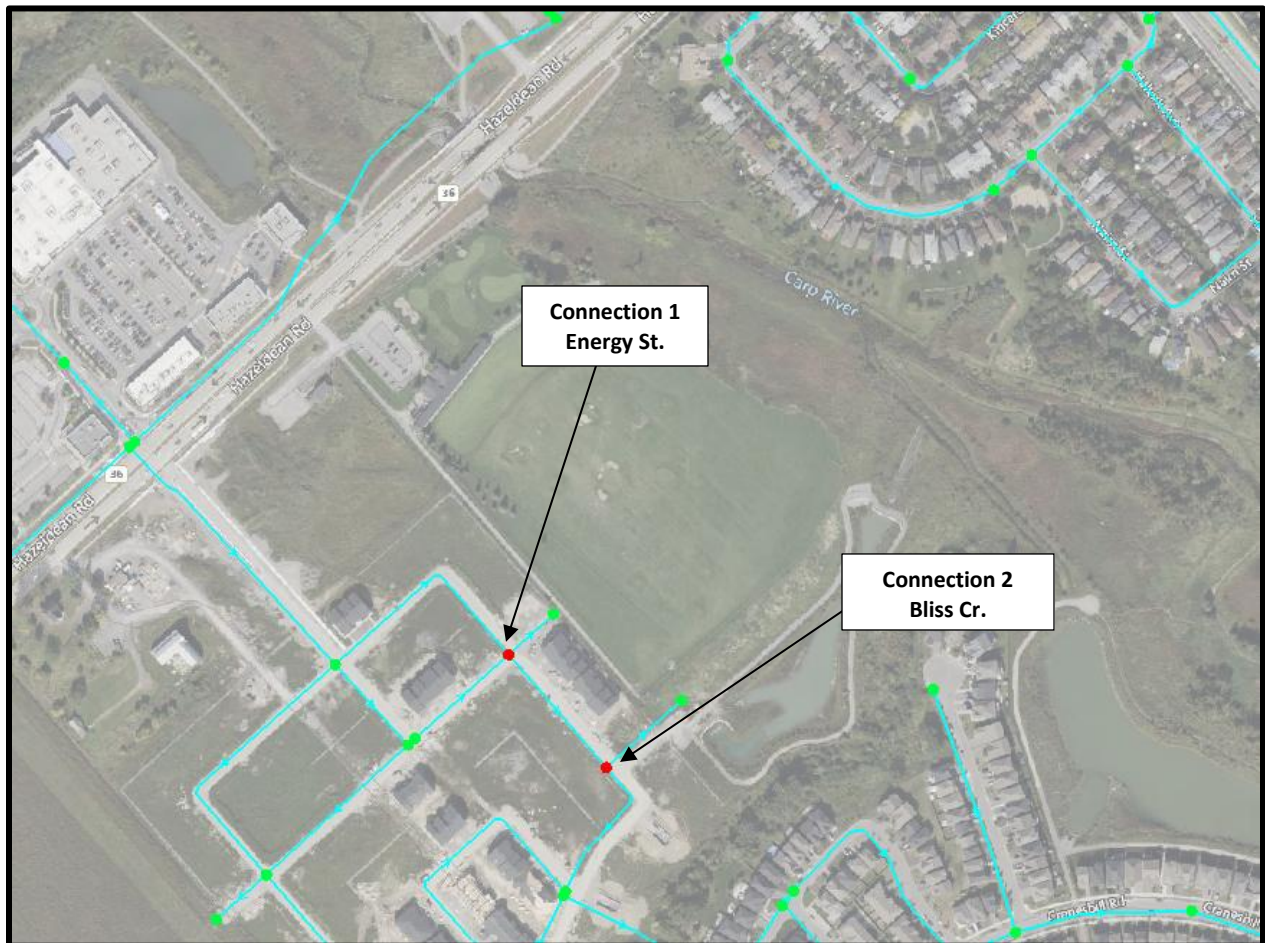
Step				Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow							
1	Construction Material				Multiplier		
	Coefficient related to type of construction C	Type V - Wood frame	Yes	1.5	1.5		
		Type IV - Mass Timber		Varies			
		Type III - Ordinary construction		1			
		Type II - Non-combustible construction		0.8			
		Type I - Fire resistive construction (2 hrs)		0.6			
2	Floor Area						
	A	Building Footprint (m ²)	912			5,472	
		Number of Floors/Storeys	6				
		Protected Openings (1 hr) if C<1.0	No				
		Area of structure considered (m ²)					
	F	Base fire flow without reductions					24,000
		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%	20,400	
		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%	-8,127	
		Standard Water Supply	Yes	-10%	-10%		
		Fully Supervised System	No	-10%			
		Cumulative Sub-Total		-40%			
		Area of Sprinklered Coverage (m ²)	5450	100%			
Cumulative Total		-40%					
5	Exposure Surcharge		FUS Table 5		Surcharge		
	(3)	North Side	>30m		0%	3,060	
		East Side	>30m		0%		
		South Side	>30m		0%		
		West Side	10.1 - 20 m		15%		
		Cumulative Total		15%			
Results							
6	(1) + (2) + (3)	Total Required Fire Flow, rounded to nearest 1000L/min				L/min	15,000
		(2,000 L/min < Fire Flow < 45,000 L/min)			or	L/s	250
					or	USGPM	3,963

Boundary Conditions 560 Hazeldean Road

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	121	2.02
Maximum Daily Demand	303	5.05
Peak Hour	667	11.12
Fire Flow Demand #1	10,000	166.67
Fire Flow Demand #2	14,000	233.33
Fire Flow Demand #3	15,000	250.00
Fire Flow Demand #4	16,000	266.67

Location



Results

Connection 1 – Energy Street

Demand Scenario	Head (m)	Pressure¹ (psi)
Maximum HGL	162.1	91.0
Peak Hour	155.9	82.1
Max Day plus Fire Flow #1	151.9	76.3
Max Day plus Fire Flow #2	147.0	69.5
Max Day plus Fire Flow #3	145.6	67.5
Max Day plus Fire Flow #4	144.1	65.3

¹ Ground Elevation = 98.2 m

Connection 2 – Bliss Crescent

Demand Scenario	Head (m)	Pressure¹ (psi)
Maximum HGL	162.1	92.1
Peak Hour	155.9	83.2
Max Day plus Fire Flow #1	148.6	72.8
Max Day plus Fire Flow #2	141.0	62.0
Max Day plus Fire Flow #3	138.8	58.8
Max Day plus Fire Flow #4	136.4	55.5

¹ Ground Elevation = 97.4 m

Notes

1. The IWSD has recently updated their water modelling software. Any significant difference between previously received BC results and newly received BC results could be attributed to this update.
2. Demands for proposed Connection 1 at existing water main along Energy Street were assigned to upstream junction at Bliss Crescent & Energy Street off the public looped watermain. The engineer must calculate headloss off the dead-end main.
3. Demands for proposed Connection 2 at existing water main stub off Bliss Crescent were assigned to upstream junction off the public looped watermain. The engineer must calculate headloss off the dead-end main.
4. As per the Ontario Building Code in areas that may be occupied, the static pressure at any fixture shall not exceed 552 kPa (80 psi.) Pressure control measures to be considered are as follows, in order of preference:
 - a. If possible, systems to be designed to residual pressures of 345 to 552 kPa (50 to 80 psi) in all occupied areas outside of the public right-of-way without special pressure control equipment.
 - b. Pressure reducing valves to be installed immediately downstream of the isolation valve in the home/ building, located downstream of the meter so it is owner maintained.

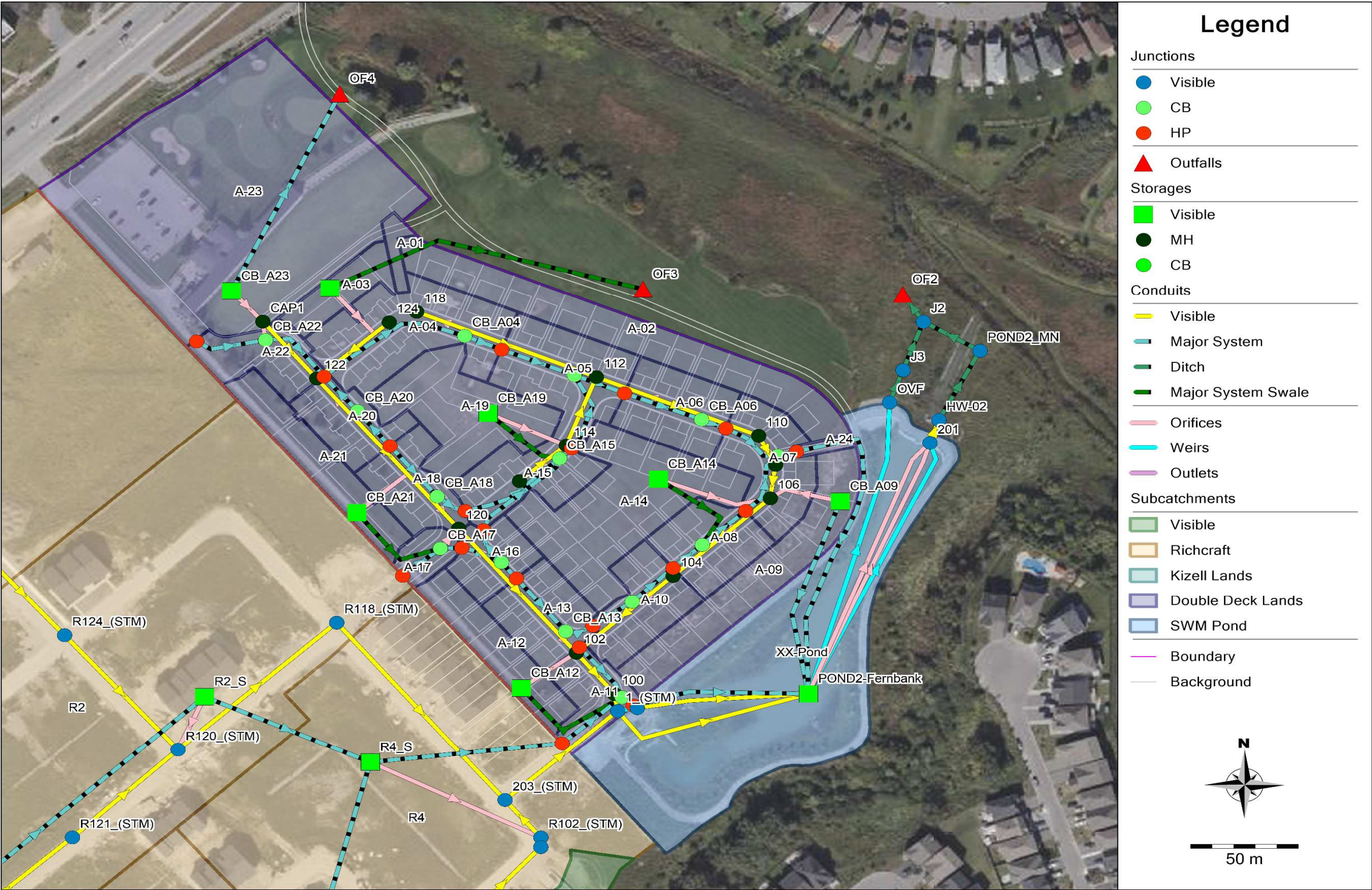
Disclaimer

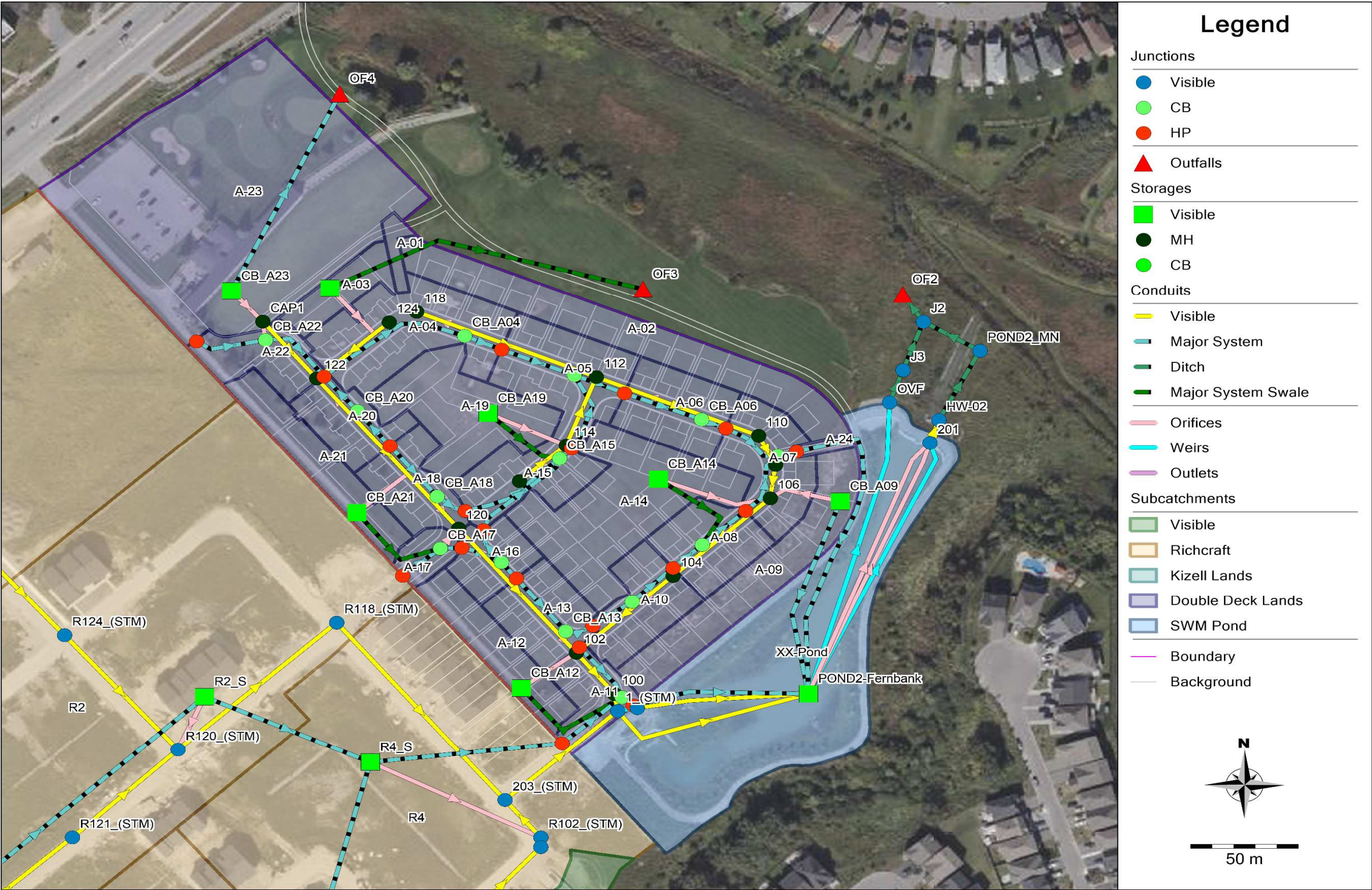
The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary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

Appendix B: Stormwater Documentation

PCSWMM Model Schematic
Outlet Channel Capacity Analysis
MVCA Floodplain Map
Pond 2 Design Report Excerpts
100-year Model Output – SCS Storm
Major System Storage Requirements





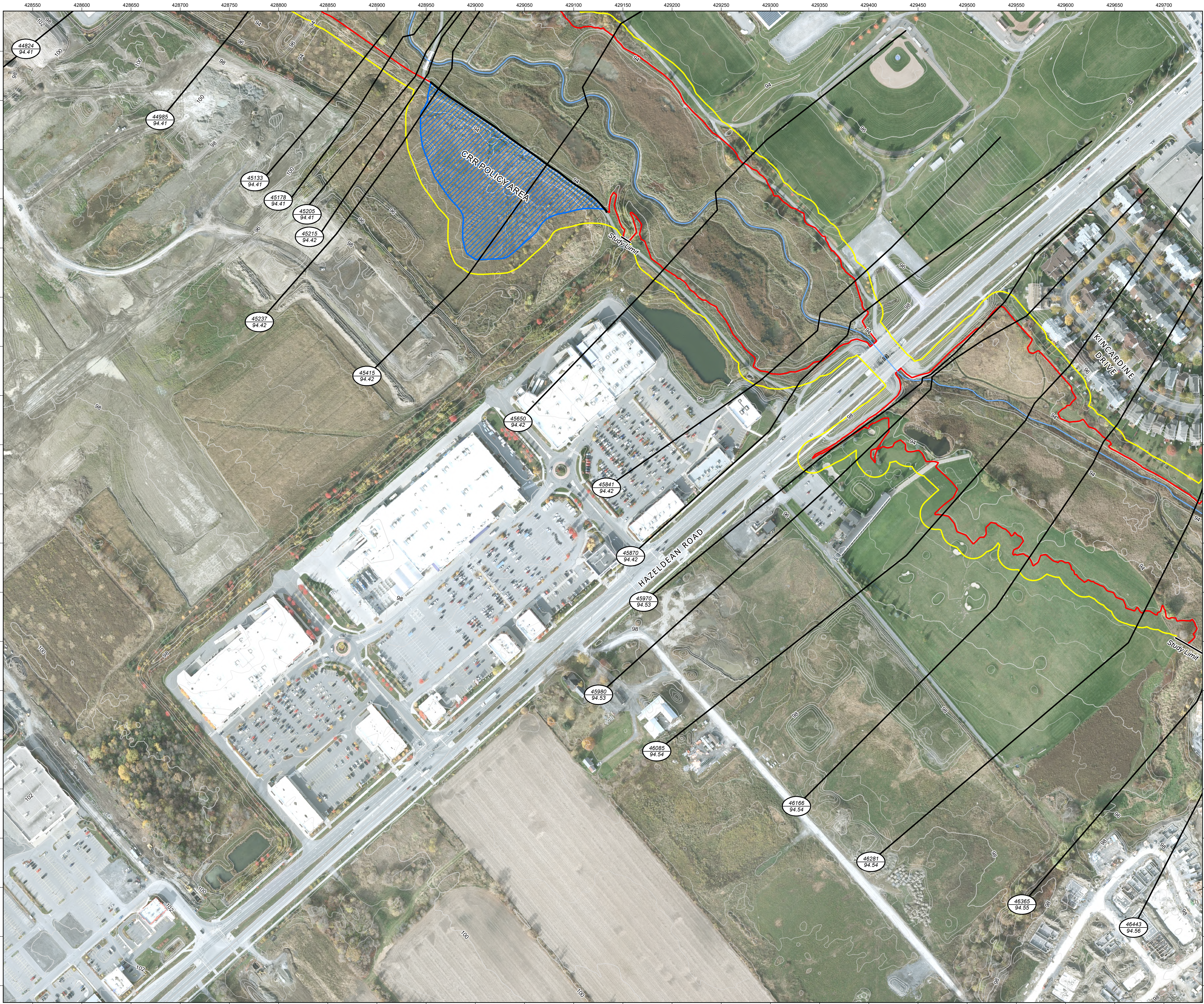


560 Hazeldean Road - Double Deck Subdivision**3rd Pipe System - Outlet Channel**

Parameter	Units	Ditch Capacity
		Prop.
Depth	m	0.20
Bottom Width	m	0.30
Side slope (L)	1 to X	3.0
Side slope (R)	1 to X	3.0
Top Width (L)	m	0.60
Top Width (R)	m	0.60
Top Width (total)	m	1.50
Area	m ²	0.180
Perimeter	m	1.56
R=A/P	m	0.12
n	-	0.035
Slope	m/m	0.0025
V	m/s	0.34
Q	m³/s	0.061

**Manning's equation for flat bottom ditch*

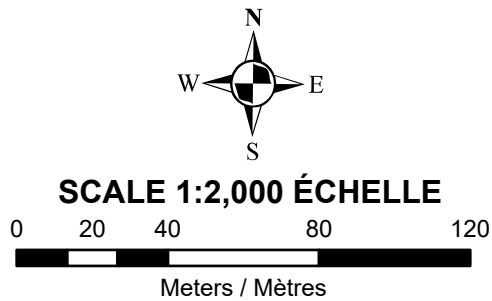
Date Expiré: 11/07/2024 1:22 PM



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This map is produced in part with data provided by the Ontario Geographic Data Exchange under License with the Ontario Ministry of Natural Resources and the Queen's Printer for Ontario, 2024

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Digital Elevation Information © City of Ottawa



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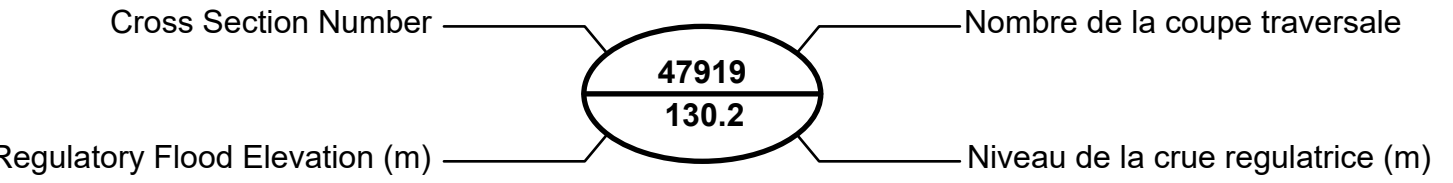
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Images aériennes © DRAPE 2019
Données à trigrammes numériques © Ville d'Ottawa

FLOOD HAZARD AND REGULATION MAP
CARP RIVER
CARTE DU RISQUE D'INONDATION ET DE RÉGULATION

LEGEND / LÉGENDE

- Regulatory Floodplain / La Crue Régulatrice
- Regulation Limit / Limite Réglementaire
- Contours / Courbes
- Cross Sections / La coupe transversale



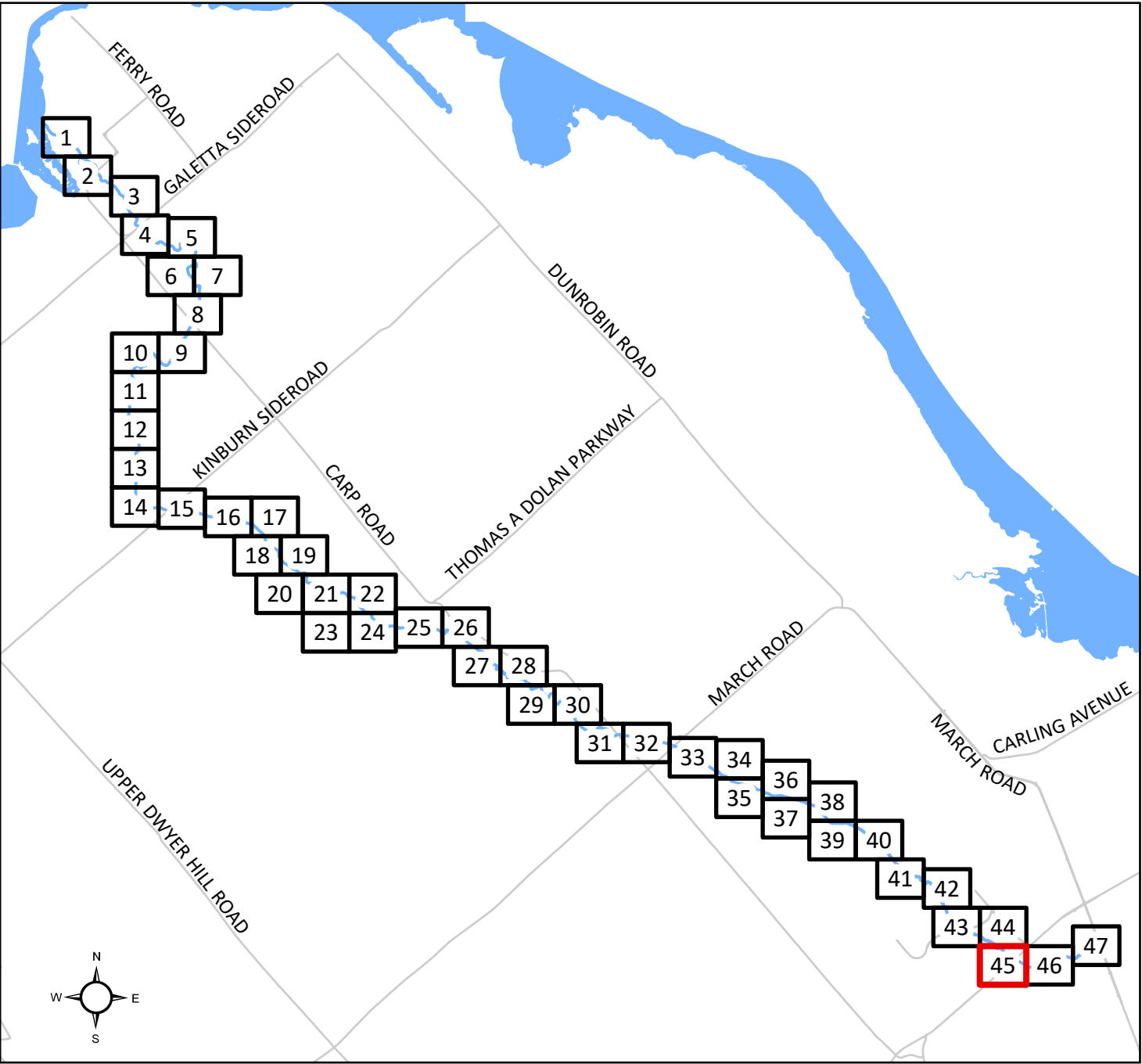
INDEX CONTOUR INTERVAL 2 METRES
WITH 0.5 METRE INTERMEDIATE CONTOUR
NORTH AMERICAN DATUM 1983

**COURBES DE NIVEAU PRINCIPALES DE 2.0 MÈTRE
AVEC COURBES DE NIVEAU INTERMÉDIAIRES DE 0.5 MÈTRES**
SYSTÈME DE RÉFÉRENCE GÉODÉSIQUE NORD-AMÉRIQUE 1983

GENERAL INFORMATION	RENSEIGNEMENTS GÉNÉRAUX
Vertical Datum: CGVD28	Niveau de référence vertical: CGVD28
Horizontal Datum: North American 1983	Niveau de référence horizontal: Nord-américain 1983
Map Projection: Ottawa Transverse Mercator Projection	Projection cartographique: Projection Mercator Transverse d'Ottawa



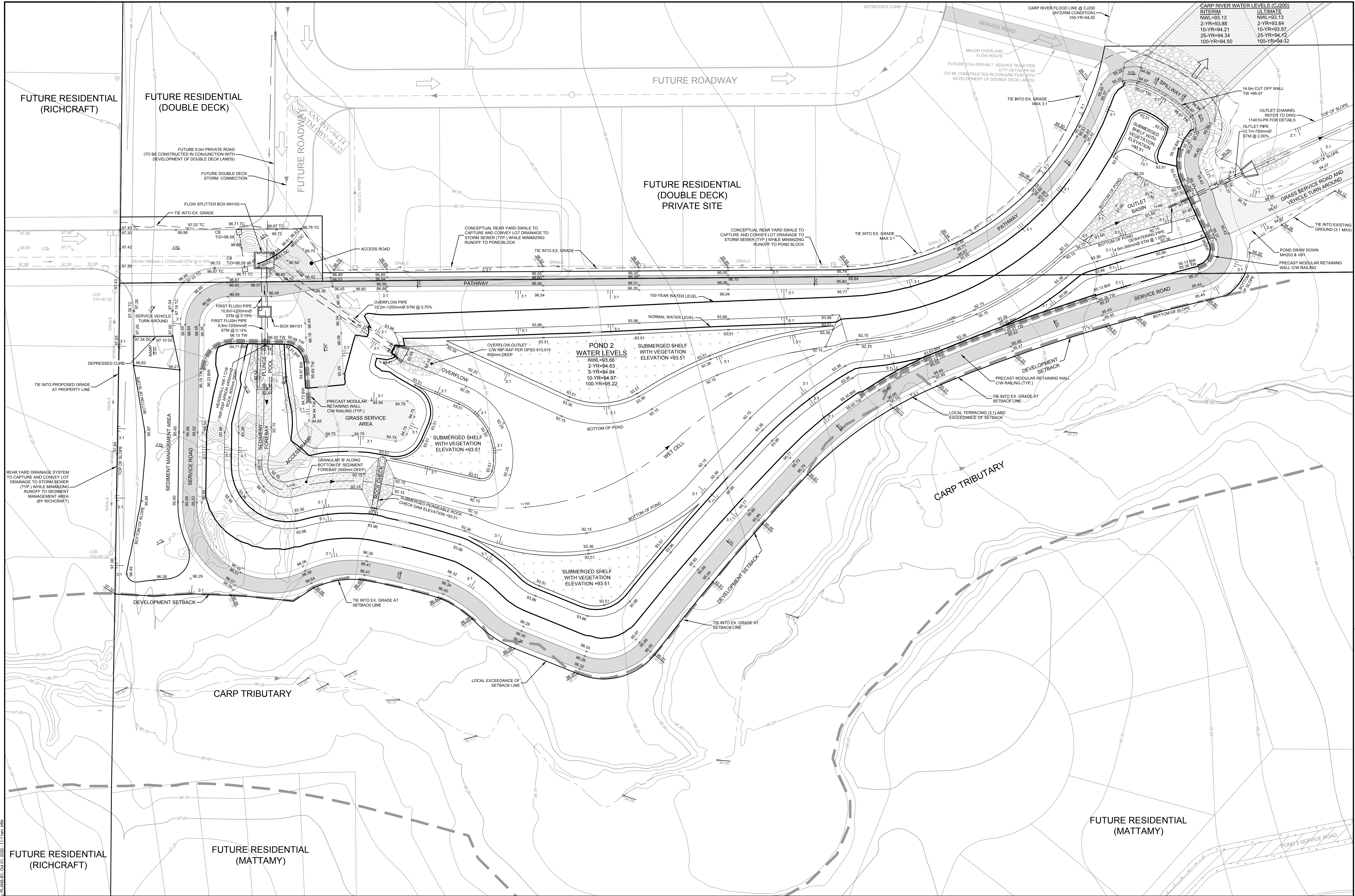
SHEET INDEX / TABLEAU D'ASSEMBLAGE



Note: The regulation limit represents all areas regulated under the Conservation Authorities Act, Section 28, Ontario Regulation 41/24. The regulation limit is defined as a buffer around all flooding hazards, erosion hazards, and wetlands. These areas are regulated in an effort to maintain the vitality of our watersheds while also protecting lives and property from natural hazards.

Remarque : La limite réglementaire représente toutes les zones réglementées en vertu de la Loi sur les offices de protection de la nature, article 28, Règlement de l'Ontario 41/24. La limite de régulation est définie comme une zone tampon autour de tous les risques d'inondation, d'érosion et de zones humides. Ces zones sont réglementées dans le but de maintenir la vitalité de nos bassins versants tout en protégeant les vies et les biens contre les risques naturels.

REVISIONS		
No.	Description	Date
1	Public Review	May 2, 2024
2	Board Approval	July 8, 2024
3	Final	July 11, 2024



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	No.	REVISION	DATE	BY
11.	ISSUED FOR CONSTRUCTION	MAR 19/21	MAB	8.	ISSUED FOR APPROVAL	APR 15/20	MAB
10.	CITY COMMENTS	SEP 30/20	MAB	7.	ISSUED FOR APPROVAL	AUG 14/19	MAB
9.	REVISED PER CITY COMMENTS	JUL 28/20	MAB	6.	ISSUED FOR REVIEW	JAN 3/19	MAB
				5.	UPDATED DESIGN PER CITY COMMENTS	SEP 20/16	MAB
				4.	ISSUED TO CITY FOR DRAFT PLAN APPROVAL	MAY 20/16	MAB
				3.	ISSUED FOR DESIGN COORDINATION	MAR 31/16	MAB
				2.	CIRCULATED TO M/C FOR COMMENT	FEB 1/16	MAB
				1.	ISSUED TO CITY OF OTTAWA	NOV 5/15	MAB

SCALE
1:300
0 3 6 9 12

FOR REVIEW ONLY

CITY OF OTTAWA
FERNBANK COMMUNITY - POND 2

GRADING PLAN

PROJECT No. 114010
REV # 11
DRAWING No. 114010-GR

FERNBANK COMMUNITY SWM FACILITY - POND 2
DESIGN REPORT

Prepared By:

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

First submission: January 4, 2019
Revision 1: August 14, 2019
Revision 2: April 15, 2020
Revision 3: July 28, 2020
Revision 4: October 16, 2020
Revision 5: October 28, 2020

Novatech File: 114010
Ref: R-2019-001

3.2 Model Results

Table 3.1 provides the total major and minor system inflows to Pond 2 and the outflows for each storm event. The SCS Storm events gave the largest peak flows and have been used to govern the design of the pond. Peak flows are from the Standalone Pond 2 PCSWMM model. Peak flows from the Interim and Ultimate Carp River models have been included in **Appendix D**.

Table 3.1: Pond 2 Inflows & Outflows (cms) Standalone PCSWMM Model - Novatech

Storm Distribution->		MTO SCS Type II Storm Events				
Return Period->		2-year	5-year	10-year	100-year	100-year+20%
Inflow	Minor	2.756	3.330	3.618	4.073	4.256
	Major	0.000	0.000	0.000	0.039	0.073
	Total	2.756	3.330	3.618	4.112	4.329
Outflow	Total	0.135	0.394	0.687	2.705	3.412
EMP Target		0.320	0.530	0.700	2.700	N/A

Peak flows from the standalone Novatech Pond 2 model have been compared to those from Stantec's model, which includes the detailed PCSWMM model for the Richcraft lands, to ensure that peak flows into and out of the pond are appropriately accounted for.

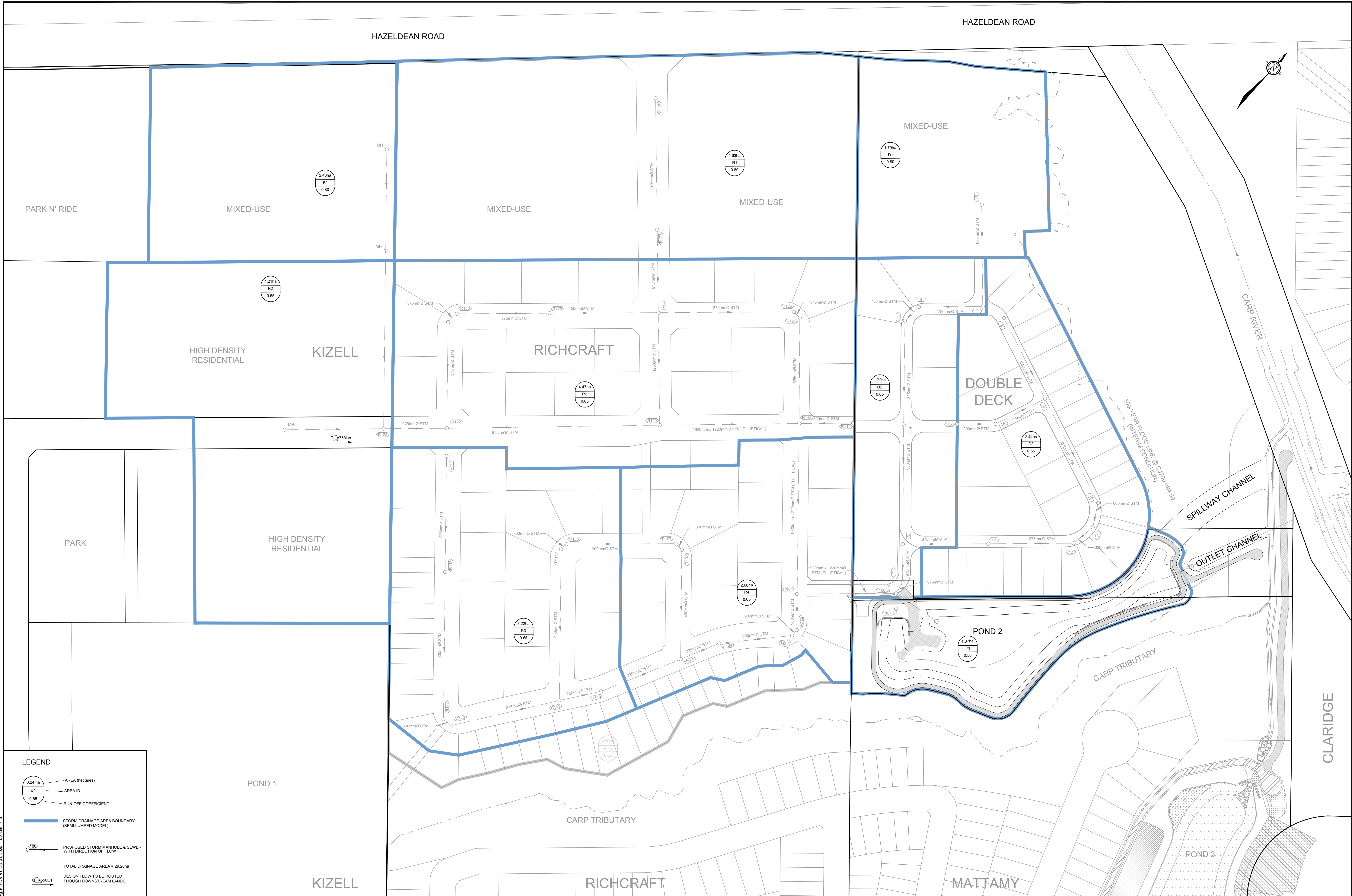
Table 3.2: Pond 2 Inflows & Outflows (cms) Standalone PCSWMM Model - Stantec

Storm Distribution->		MTO SCS Type II Storm Events				
Return Period->		2-year	5-year	10-year	100-year	100-year+20%
Inflow	Minor	2.792	3.445	3.642	4.048	4.269
	Major	0.000	0.000	0.000	0.000	0.000
	Total	2.792	3.445	3.642	4.048	4.269
Outflow	Total	0.129	0.349	0.639	2.614	3.527
EMP Target		0.320	0.530	0.700	2.700	N/A

As shown in **Table 3.2**, the outflows from the pond in the Stantec model are less than those accounted for in the Novatech model. However, during the 2, 5, and 10-year storm events, peak flows into the pond are slightly higher in the Stantec model. While the runoff from the subdivision has a higher peak, the total volume of runoff directed to the pond is less than anticipated by the Novatech model, resulting in slightly lower pond water levels and therefore lower peak flows leaving the pond, because the average runoff coefficient used for the residential area in the Stantec model is 0.58 versus the 0.65 used in the Novatech model for the same area. Pond water levels from each model are outlined in **Table 3.3**. As such, the Novatech model provides a more conservative analysis of the pond volume and outflows to the Carp River.

Table 3.3: Pond 2 Water Levels (m) Standalone PCSWMM Models

Storm Distribution->	MTO SCS Type II Storm Events				
Return Period->	2-year	5-year	10-year	100-year	100-year+20%
Novatech	94.63	94.84	94.97	95.22	95.26
Stantec	94.58	94.82	94.95	95.21	95.27



LEGEND

0.24 ha

D1

0.65

AREA (hectares)

AREA ID

RUN-OFF COEFFICIENT

100

PROPOSED STORM MANHOLE & SEWER WITH DIRECTION OF FLOW

Q_d = 768 L/s

Q_d = 550 L/s

TOTAL DRAINAGE AREA = 29.28ha

DESIGN FLOW TO BE ROUTED THROUGH DOWNSTREAM LANDS

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

8.	CITY COMMENTS	SEP 30/20	MAB
7.	REVISED PER COMMENTS	JUL 28/20	MAB
6.	ISSUED FOR APPROVAL	APR 15/20	MAB
5.	ISSUED FOR APPROVAL	AUG 14/19	MAB
4.	ISSUED FOR REVIEW	JAN 31/19	MAB
3.	UPDATED DESIGN PER CITY COMMENTS	SEP 20/16	MAB
2.	ISSUED TO CITY FOR DRAFT PLAN APPROVAL	MAY 20/16	MAB
1.	ISSUED FOR DESIGN COORDINATION	MAR 31/16	MAB
No.	REVISION	DATE	BY

SCALE

1:1000

1:1000

0 10 20 30 40

DESIGN	MAB
CHECKED	
DRAWN	MJP
	DTD
CHECKED	
	MAB
APPROVED	
	JGR

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

CITY OF OTTAWA
FERNBANK COMMUNITY - POND 2

STORM DRAINAGE AREA PLAN

PROJECT No.	114010
REV	REV # 8
DRAWING No.	114010-STM

Fernbank Community – Pond 2 PCSWMM Model MTO 100-year SCS Storm Model Output

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.013)

WARNING 03: negative offset ignored for Link C4
WARNING 02: maximum depth increased for Node J2
WARNING 02: maximum depth increased for Node POND2_MN

Element Count

Number of rain gages 1
Number of subcatchments ... 11
Number of nodes 46
Number of links 56
Number of pollutants 0
Number of land uses 0

Link Summary

Name	Data Source	Data Type	Recording Interval
RG1	MTO_100yr_12hrSCS	INTENSITY	15 min.

Subcatchment Summary

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
D1	1.79	122.00	86.00	0.5000	RG1	D1_S
D2	1.72	223.00	64.00	0.5000	RG1	D2_S
D3	2.44	220.00	64.00	0.5000	RG1	D3_S
K1	2.40	164.00	86.00	0.5000	RG1	K1_S
K2	4.21	247.00	64.00	0.5000	RG1	K2_S
R1	4.63	308.00	86.00	0.5000	RG1	R1_S
R2	4.47	320.00	64.00	0.5000	RG1	R2_S
R3	3.22	183.00	64.00	0.5000	RG1	R3_S
R4	2.60	152.00	64.00	0.5000	RG1	R4_S
X-R5	0.70	275.00	64.00	0.5000	RG1	CarpOut
XX-Pond	1.37	61.00	43.00	0.5000	RG1	POND2-Fernbank

Node Summary

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
12_(STM_(2))	JUNCTION	93.39	3.83	0.0	
13_(STM_(2))	JUNCTION	93.32	3.78	0.0	
17_(STM_(2))	JUNCTION	93.55	3.22	0.0	
18_(STM_(2))	JUNCTION	93.64	3.60	0.0	
2_(STM_(2))	JUNCTION	92.92	3.96	0.0	
201	JUNCTION	93.66	1.59	0.0	
203_(STM)	JUNCTION	93.33	5.02	0.0	
3_(STM_(2))	JUNCTION	92.95	4.10	0.0	
4_(STM_(2))	JUNCTION	93.12	3.81	0.0	
5_(STM_(2))	JUNCTION	93.28	3.67	0.0	
6_(STM_(2))	JUNCTION	93.38	3.56	0.0	
7_(STM_(2))	JUNCTION	93.43	3.28	0.0	
HW-02	JUNCTION	92.66	2.54	0.0	
J1	JUNCTION	99.75	0.35	0.0	
J2	JUNCTION	92.90	1.75	0.0	
J3	JUNCTION	93.70	1.30	0.0	
MH200_(STM)	JUNCTION	92.97	3.81	0.0	
MH200a	JUNCTION	92.97	3.81	0.0	
OVF	JUNCTION	94.12	1.38	0.0	
POND2_MN	JUNCTION	92.95	1.75	0.0	
R102_(STM)	JUNCTION	93.43	4.78	0.0	
R103_(STM)	JUNCTION	93.49	4.71	0.0	
R104_(STM)	JUNCTION	93.58	5.11	0.0	
R105_(STM)	JUNCTION	93.70	5.18	0.0	
R110_(STM)	JUNCTION	95.18	3.80	0.0	
R111_(STM)	JUNCTION	95.29	3.73	0.0	
R118_(STM)	JUNCTION	93.25	5.87	0.0	
R120_(STM)	JUNCTION	93.42	4.98	0.0	
R121_(STM)	JUNCTION	94.09	4.90	0.0	

Name	From Node	To Node	Type	Length	%Slope	Roughness
R122_(STM)	JUNCTION	94.25	5.97	0.0		
R123_(STM)	JUNCTION	94.41	5.32	0.0		
R124_(STM)	JUNCTION	93.60	5.29	0.0		
R127_(STM)	JUNCTION	93.91	4.94	0.0		
CarpOut	OUTFALL	0.00	0.00	0.0		
OF1	OUTFALL	99.91	0.35	0.0		
OF2	OUTFALL	92.88	1.76	0.0		
D1_S	STORAGE	96.20	1.75	0.0		
D2_S	STORAGE	95.65	1.75	0.0		
D3_S	STORAGE	95.80	1.75	0.0		
K1_S	STORAGE	98.05	1.75	0.0		
K2_S	STORAGE	98.05	1.75	0.0		
POND2-Fernbank	STORAGE	91.50	3.75	0.0		
R1_S	STORAGE	97.50	1.75	0.0		
R2_S	STORAGE	97.50	1.75	0.0		
R3_S	STORAGE	97.75	1.75	0.0		
R4_S	STORAGE	97.30	1.75	0.0		

Link Summary

Name	From Node	To Node	Type	Length	%Slope	Roughness
106_(STM)	R118_(STM)	203_(STM)	CONDUIT	119.9	0.1501	0.0130
108_(STM)	R120_(STM)	R118_(STM)	CONDUIT	98.0	0.1530	0.0130
110_(1)_(STM)	R122_(STM)	R121_(STM)	CONDUIT	82.9	0.1930	0.0130
110_(STM)	R121_(STM)	R120_(STM)	CONDUIT	66.7	0.1948	0.0130
112_(STM)	R124_(STM)	R120_(STM)	CONDUIT	78.7	0.2414	0.0130
118_(STM)	R102_(STM)	203_(STM)	CONDUIT	25.4	0.1575	0.0130
120_(STM)	R103_(STM)	R102_(STM)	CONDUIT	5.0	0.1988	0.0130
122_(1)_(STM)	R105_(STM)	R104_(STM)	CONDUIT	29.3	0.1704	0.0130
122_(STM)	R104_(STM)	R103_(STM)	CONDUIT	51.5	0.1553	0.0130
124_(1)_(STM)	R111_(STM)	R110_(STM)	CONDUIT	30.1	0.1330	0.0130
124_(STM)	R110_(STM)	R105_(STM)	CONDUIT	60.2	0.1660	0.0130
160_(STM)	R127_(STM)	R124_(STM)	CONDUIT	58.3	0.1543	0.0130
166_(STM)	R123_(STM)	R122_(STM)	CONDUIT	44.4	0.1350	0.0130
202_(14)_(STM)	MH200_(STM)	POND2-Fernbank	CONDUIT	17.3	0.1156	0.0130
202_(15)_(STM)_2	MH200a	POND2-Fernbank	CONDUIT	33.2	0.6936	0.0130
202_(27)_(STM)	203_(STM)	MH200_(STM)	CONDUIT	69.5	0.5037	0.0130
C1	K1_S	J1	CONDUIT	145.1	0.0345	0.0130
C10	R3_S	R4_S	CONDUIT	142.9	0.3149	0.0130
C11	R4_S	D2_S	CONDUIT	129.9	1.2705	0.0130
C12	D2_S	POND2-Fernbank	CONDUIT	124.3	1.8107	0.0130
C13	D1_S	D2_S	CONDUIT	218.1	0.2522	0.0130
C14	D3_S	D2_S	CONDUIT	181.2	0.0828	0.0130
C2	J1	R2_S	CONDUIT	209.6	0.2624	0.0130
C3	K2_S	J1	CONDUIT	59.6	0.0839	0.0130
C4	R1_S	OF1	CONDUIT	119.8	-0.5508	0.0130
C5	R2_S	R4_S	CONDUIT	152.1	0.1315	0.0130
C6	201	HW-02	CONDUIT	11.4	2.0215	0.0130
C7_1	OVF	J3	CONDUIT	30.0	1.4001	0.0350
C7_2	J3	J2	CONDUIT	45.0	0.6000	0.0350
C8	J2	OF2	CONDUIT	10.0	0.1272	0.0500
C9	POND2_MN	J2	CONDUIT	41.5	0.1277	0.0500
POND2-OUT	HW-02	POND2_MN	CONDUIT	58.5	0.1026	0.0320
STM-13_(1)_(STM_(2))	6_(STM_(2))	5_(STM_(2))	CONDUIT	13.7	0.1456	0.0130
STM-13_(STM_(2))	7_(STM_(2))	6_(STM_(2))	CONDUIT	44.9	0.1113	0.0130
STM-165_(STM_(2))	5_(STM_(2))	4_(STM_(2))	CONDUIT	72.9	0.1097	0.0130
STM-166_(STM_(2))	4_(STM_(2))	3_(STM_(2))	CONDUIT	84.3	0.1186	0.0130
STM-20_(STM_(2))	17_(STM_(2))	7_(STM_(2))	CONDUIT	34.5	0.1449	0.0130
STM-22_(STM_(2))	18_(STM_(2))	17_(STM_(2))	CONDUIT	37.1	0.1077	0.0130
STM-3_(1)_(1)_(STM_(2))	12_(STM_(2))	13_(STM_(2))	CONDUIT	60.0	0.1167	
0.0130						
STM-3_(1)_(STM_(2))	13_(STM_(2))	3_(STM_(2))	CONDUIT	60.0	0.1333	0.0130
STM-3_(2)_(STM_(2))	3_(STM_(2))	2_(STM_(2))	CONDUIT	27.0	0.1113	0.0130
STM-3_(STM_(2))	2_(STM_(2))	MH200_(STM)	CONDUIT	8.9	0.1121	0.0130
OR1	K1_S	R123_(STM)	ORIFICE			
OR2	K2_S	R123_(STM)	ORIFICE			
OR4	D1_S	18_(STM_(2))	ORIFICE			
OR5	D2_S	3_(STM_(2))	ORIFICE			
OR6	D3_S	12_(STM_(2))	ORIFICE			
OR7	R2_S	R120_(STM)	ORIFICE			
OR8	R4_S	R102_(STM)	ORIFICE			
OR9	R3_S	R111_(STM)	ORIFICE			
P2-2yr Orifice	POND2-Fernbank	201	ORIFICE			
P2-ED Orifice	POND2-Fernbank	201	ORIFICE			
202_(15)_(STM)_1	MH200_(STM)	MH200a	WEIR			
P2-100yrWeir	POND2-Fernbank	OVF	WEIR			
P2-5-10yrWeir	POND2-Fernbank	201	WEIR			
OR3	R1_S	R127_(STM)	OUTLET			

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Fernbank Community – Pond 2 PCSWMM Model MTO 100-year SCS Storm Model Output

***** Cross Section Summary *****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
106 (STM)	HORIZ ELLIPSE	1.22	1.89	0.37	1.93	1	2.91
108 (STM)	HORIZ ELLIPSE	1.22	1.89	0.37	1.93	1	2.94
110 (1) (STM)	CIRCULAR	0.97	0.75	0.24	0.97	1	0.98
110 (STM)	CIRCULAR	0.97	0.75	0.24	0.97	1	0.99
112 (STM)	CIRCULAR	1.20	1.13	0.30	1.20	1	1.92
118 (STM)	CIRCULAR	0.90	0.64	0.23	0.90	1	0.72
120 (STM)	CIRCULAR	0.90	0.64	0.23	0.90	1	0.81
122 (1) (STM)	CIRCULAR	0.82	0.53	0.21	0.82	1	0.59
122 (STM)	CIRCULAR	0.90	0.64	0.23	0.90	1	0.71
124 (1) (STM)	CIRCULAR	0.75	0.44	0.19	0.75	1	0.41
124 (STM)	CIRCULAR	0.82	0.53	0.21	0.82	1	0.58
160 (STM)	CIRCULAR	0.97	0.75	0.24	0.97	1	0.88
166 (STM)	CIRCULAR	0.97	0.75	0.24	0.97	1	0.82
202 (14) (STM)	CIRCULAR	1.20	1.13	0.30	1.20	1	1.33
202 (15) (STM) 2	CIRCULAR	1.20	1.13	0.30	1.20	1	3.25
202 (27) (STM)	HORIZ ELLIPSE	1.22	1.89	0.37	1.93	1	5.34
C1	18mROW	0.35	3.43	0.20	18.00	1	1.66
C10	18mROW	0.35	3.43	0.20	18.00	1	5.01
C11	18mROW	0.35	3.43	0.20	18.00	1	10.07
C12	18mROW	0.35	3.43	0.20	18.00	1	12.02
C13	18mROW	0.35	3.43	0.20	18.00	1	4.49
C14	18mROW	0.35	3.43	0.20	18.00	1	2.57
C2	18mROW	0.35	3.43	0.20	18.00	1	4.58
C3	18mROW	0.35	3.43	0.20	18.00	1	2.59
C4	18mROW	0.35	3.43	0.20	18.00	1	6.63
C5	18mROW	0.35	3.43	0.20	18.00	1	3.24
C6	CIRCULAR	0.75	0.44	0.19	0.75	1	1.58
C7_1	TRAPEZOIDAL	0.30	5.11	0.28	17.93	1	7.45
C7_2	TRAPEZOIDAL	0.30	5.11	0.28	17.93	1	4.88
C8	channel2	1.75	42.73	0.72	32.40	1	23.88
C9	channel2	1.75	42.73	0.72	32.40	1	23.93
POND2-OUT	TRAPEZOIDAL	1.00	4.00	0.55	7.00	1	2.68
STM-13 (1) (STM (2)) CIRCULAR		0.75	0.44	0.19	0.75	1	0.42
STM-13 (STM (2)) CIRCULAR		0.75	0.44	0.19	0.75	1	0.37
STM-165 (STM (2)) CIRCULAR		0.82	0.53	0.21	0.82	1	0.48
STM-166 (STM (2)) CIRCULAR		0.90	0.64	0.23	0.90	1	0.62
STM-20 (STM (2)) CIRCULAR		0.68	0.36	0.17	0.68	1	0.32
STM-22 (STM (2)) CIRCULAR		0.68	0.36	0.17	0.68	1	0.28
STM-3 (1) (STM (2)) CIRCULAR		0.68	0.36	0.17	0.68	1	0.29
STM-3 (1) (STM (2)) CIRCULAR		0.68	0.36	0.17	0.68	1	0.31
STM-3 (2) (STM (2)) CIRCULAR		0.97	0.75	0.24	0.97	1	0.75
STM-3 (STM (2)) CIRCULAR		0.97	0.75	0.24	0.97	1	0.75

***** Transect Summary *****

Transect 18mROW Area:

0.0005	0.0019	0.0043	0.0077	0.0121
0.0174	0.0236	0.0308	0.0390	0.0482
0.0583	0.0694	0.0815	0.0945	0.1085
0.1234	0.1393	0.1562	0.1739	0.1919
0.2098	0.2279	0.2466	0.2659	0.2859
0.3066	0.3279	0.3499	0.3726	0.3959
0.4198	0.4444	0.4697	0.4956	0.5222
0.5495	0.5774	0.6059	0.6351	0.6650
0.6956	0.7268	0.7586	0.7911	0.8243
0.8581	0.8926	0.9277	0.9635	1.0000

Hrad:

0.0172	0.0344	0.0516	0.0688	0.0860
0.1032	0.1204	0.1376	0.1548	0.1719
0.1891	0.2063	0.2235	0.2407	0.2579
0.2751	0.2923	0.3095	0.3340	0.3681
0.4022	0.4345	0.4658	0.4961	0.5253
0.5533	0.5802	0.6060	0.6307	0.6545
0.6774	0.6995	0.7208	0.7413	0.7611
0.7804	0.7990	0.8170	0.8345	0.8515
0.8681	0.8842	0.8999	0.9152	0.9301
0.9447	0.9590	0.9730	0.9866	1.0000

Width:

0.0262	0.0524	0.0786	0.1048	0.1310
0.1572	0.1834	0.2096	0.2358	0.2621

0.2883	0.3145	0.3407	0.3669	0.3931
0.4193	0.4455	0.4717	0.4870	0.4878
0.4886	0.4991	0.5170	0.5349	0.5528
0.5707	0.5886	0.6064	0.6243	0.6422
0.6601	0.6780	0.6959	0.7138	0.7317
0.7496	0.7674	0.7853	0.8032	0.8211
0.8390	0.8569	0.8748	0.8927	0.9106
0.9284	0.9463	0.9642	0.9821	1.0000

Transect channel2 Area:

0.0017	0.0035	0.0054	0.0074	0.0095
0.0116	0.0139	0.0162	0.0186	0.0211
0.0237	0.0283	0.0400	0.0580	0.0817
0.1066	0.1317	0.1568	0.1822	0.2076
0.2332	0.2589	0.2848	0.3108	0.3369
0.3632	0.3896	0.4161	0.4427	0.4692
0.4958	0.5223	0.5488	0.5754	0.6019
0.6285	0.6550	0.6815	0.7081	0.7346
0.7611	0.7877	0.8142	0.8408	0.8673
0.8938	0.9204	0.9469	0.9735	1.0000

Hrad:

0.0465	0.0901	0.1312	0.1703	0.2075
0.2432	0.2776	0.3108	0.3429	0.3741
0.4045	0.4002	0.3240	0.2616	0.2292
0.2271	0.2366	0.2516	0.2696	0.2893
0.3103	0.3319	0.3541	0.3766	0.3993
0.4223	0.4455	0.4691	0.4934	0.5178
0.5423	0.5667	0.5911	0.6156	0.6400
0.6643	0.6887	0.7129	0.7372	0.7614
0.7855	0.8096	0.8336	0.8576	0.8815
0.9053	0.9291	0.9528	0.9764	1.0000

Width:

0.0665	0.0698	0.0730	0.0762	0.0795
0.0827	0.0860	0.0892	0.0924	0.0957
0.0989	0.3212	0.5591	0.7971	0.9353
0.9405	0.9458	0.9511	0.9563	0.9616
0.9668	0.9721	0.9773	0.9826	0.9878
0.9931	0.9972	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000

NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.

***** Analysis Options *****

Flow Units CMS

Process Models:

Rainfall/Runoff	YES
RDII	NO
Snowmelt	NO
Groundwater	NO
Flow Routing	YES
Ponding Allowed	YES
Water Quality	NO
Infiltration Method	CURVE NUMBER
Flow Routing Method	DYNWAVE
Surcharge Method	EXTRAN
Starting Date	07/23/2009 00:00:00
Ending Date	07/25/2009 00:00:00
Antecedent Dry Days	0.0
Report Time Step	00:01:00
Wet Time Step	00:01:00
Dry Time Step	00:01:00
Routing Time Step	1.00 sec
Variable Time Step	NO
Maximum Trials	8
Number of Threads	4
Head Tolerance	0.001500 m

*****	Volume	Depth
Runoff Quantity Continuity	hectare-m	mm
*****	-----	-----

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Fernbank Community – Pond 2 PCSWMM Model MTO 100-year SCS Storm Model Output

```
Initial LID Storage ..... 0.034 1.161
Total Precipitation ..... 2.819 95.400
Evaporation Loss ..... 0.000 0.000
Infiltration Loss ..... 0.395 13.382
Surface Runoff ..... 2.424 82.030
Final Storage ..... 0.034 1.163
Continuity Error (%) ..... -0.015
```

```
***** Volume Volume
Flow Routing Continuity hectare-m 10^6 ltr
*****
Dry Weather Inflow ..... 0.000 0.000
Wet Weather Inflow ..... 2.424 24.240
Groundwater Inflow ..... 0.000 0.000
RDII Inflow ..... 0.000 0.000
External Inflow ..... 0.025 0.255
External Outflow ..... 2.340 23.396
Flooding Loss ..... 0.000 0.000
Evaporation Loss ..... 0.000 0.000
Exfiltration Loss ..... 0.000 0.000
Initial Stored Volume .... 0.507 5.067
Final Stored Volume ..... 0.618 6.182
Continuity Error (%) ..... -0.057
```

```
*****
Highest Continuity Errors
*****
Node MH200a (-2.12%)
```

```
*****
Highest Flow Instability Indexes
*****
Link 202_(15)_(STM) 1 (14)
Link STM-3_(STM) 2 (13)
Link 202_(15)_(STM) 2 (12)
Link 202_(14)_(STM) (12)
Link STM-3_(2)_(STM) (12)
```

```
*****
Routing Time Step Summary
*****
Minimum Time Step : 1.00 sec
Average Time Step : 1.00 sec
Maximum Time Step : 1.00 sec
Percent in Steady State : 0.00
Average Iterations per Step : 2.11
Percent Not Converging : 0.33
```

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

Total	Peak	Runoff	Total	Total	Total	Total	Imperv	Perv	Total
Runoff	Runoff	Coeff	Precip	Runon	Evap	Infil	Runoff	Runoff	Runoff
Subcatchment	Subcatchment		mm	mm	mm	mm	mm	mm	mm
10^6 ltr	10^6 ltr	CMS							
D1			95.40	0.00	0.00	5.84	89.57	7.51	89.57
1.60	0.57	0.939	95.40	0.00	0.00	15.09	80.32	19.25	80.32
D2									
1.38	0.47	0.842	95.40	0.00	0.00	15.20	80.22	19.15	80.22
D3									
1.96	0.64	0.841	95.40	0.00	0.00	5.84	89.57	7.51	89.57
K1									
2.15	0.76	0.939	95.40	0.00	0.00	15.35	80.06	18.99	80.06
K2									
3.37	1.05	0.839	95.40	0.00	0.00	5.84	89.57	7.51	89.57
R1									
4.15	1.46	0.939	95.40	0.00	0.00	15.27	80.14	19.07	80.14
R2									
3.58	1.14	0.840							

```
R3 95.40 0.00 0.00 15.37 80.04 18.98 80.04
2.58 0.80 0.839 95.40 0.00 0.00 15.36 80.05 18.99 80.05
R4
2.08 0.65 0.839 95.40 0.00 0.00 34.77 61.09 60.67 60.67
X-R5
0.42 0.16 0.636 95.40 0.00 0.00 24.95 70.45 29.43 70.45
XX-Pond
0.97 0.24 0.739
```

```
*****
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
12_(STM) (2)	JUNCTION	0.82	2.18	95.57	0 06:26	2.15
13_(STM) (2)	JUNCTION	0.89	2.19	95.51	0 06:26	2.16
17_(STM) (2)	JUNCTION	0.67	2.54	96.09	0 06:36	1.94
18_(STM) (2)	JUNCTION	0.66	2.49	96.13	0 06:36	1.88
2_(STM) (2)	JUNCTION	1.28	2.46	95.38	0 06:26	2.43
201	JUNCTION	0.20	0.69	94.35	0 10:45	0.69
203_(STM)	JUNCTION	0.88	2.20	95.53	0 06:25	2.17
3_(STM) (2)	JUNCTION	1.25	2.47	95.42	0 06:26	2.43
4_(STM) (2)	JUNCTION	1.09	2.52	95.64	0 06:36	2.27
5_(STM) (2)	JUNCTION	0.93	2.62	95.90	0 06:36	2.13
6_(STM) (2)	JUNCTION	0.83	2.56	95.94	0 06:36	2.05
7_(STM) (2)	JUNCTION	0.78	2.59	96.02	0 06:36	2.03
HW-02	JUNCTION	0.89	1.68	94.34	0 10:54	1.68
J1	JUNCTION	0.00	0.00	99.75	0 00:00	0.00
J2	JUNCTION	0.64	1.44	94.34	0 10:55	1.44
J3	JUNCTION	0.13	0.64	94.34	0 10:56	0.64
MH200_(STM)	JUNCTION	1.23	2.34	95.31	0 06:26	2.31
MH200a	JUNCTION	1.23	2.31	95.28	0 06:26	2.26
OVF	JUNCTION	0.03	0.22	94.34	0 10:56	0.22
POND2_MN	JUNCTION	0.60	1.39	94.34	0 10:54	1.39
R102_(STM)	JUNCTION	0.79	2.20	95.63	0 06:26	2.20
R103_(STM)	JUNCTION	0.73	2.14	95.63	0 06:26	2.14
R104_(STM)	JUNCTION	0.65	2.08	95.66	0 06:11	2.06
R105_(STM)	JUNCTION	0.57	2.00	95.70	0 06:12	1.99
R110_(STM)	JUNCTION	0.35	0.76	95.94	0 06:05	0.76
R111_(STM)	JUNCTION	0.35	0.76	96.05	0 06:04	0.76
R118_(STM)	JUNCTION	0.96	2.69	95.94	0 06:11	2.50
R120_(STM)	JUNCTION	0.80	2.87	96.29	0 06:11	2.53
R121_(STM)	JUNCTION	0.39	2.50	96.59	0 06:11	2.23
R122_(STM)	JUNCTION	0.34	2.94	97.19	0 06:26	2.42
R123_(STM)	JUNCTION	0.23	3.04	97.45	0 06:26	2.46
R124_(STM)	JUNCTION	0.73	3.05	96.65	0 06:25	2.38
R127_(STM)	JUNCTION	0.64	3.74	97.65	0 06:25	2.13
CarpOut	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
OF1	OUTFALL	0.00	0.00	99.91	0 00:00	0.00
OF2	OUTFALL	0.66	1.46	94.34	0 10:55	1.46
D1_S	STORAGE	0.06	1.72	97.92	0 06:05	1.72
D2_S	STORAGE	0.06	1.74	97.39	0 06:03	1.74
D3_S	STORAGE	0.07	1.73	97.53	0 06:04	1.73
K1_S	STORAGE	0.06	1.72	99.77	0 06:05	1.72
K2_S	STORAGE	0.07	1.73	99.78	0 06:06	1.73
POND2-Fernbank	STORAGE	2.70	3.72	95.22	0 06:27	3.72
R1_S	STORAGE	0.05	1.72	99.22	0 06:03	1.72
R2_S	STORAGE	0.05	1.61	99.11	0 06:01	1.61
R3_S	STORAGE	0.06	1.72	99.47	0 06:04	1.72
R4_S	STORAGE	0.06	1.70	99.00	0 06:04	1.70

```
*****
Node Inflow Summary
*****
```

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
12_(STM) (2)	JUNCTION	0.000	0.277	0 06:04	0	1.95	0.103
13_(STM) (2)	JUNCTION	0.000	0.277	0 06:05	0	1.95	0.285
17_(STM) (2)	JUNCTION	0.000	0.256	0 06:05	0	1.6	-0.142
18_(STM) (2)	JUNCTION	0.000	0.256	0 06:05	0	1.6	0.065
2_(STM) (2)	JUNCTION	0.000	0.732	0 06:11	0	4.88	0.053

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Fernbank Community – Pond 2 PCSWMM Model MTO 100-year SCS Storm Model Output

201	JUNCTION	0.000	1.209	0	06:23	0	20.2	0.012
203 (STM)	JUNCTION	0.000	3.178	0	06:03	0	17.9	0.148
3 (STM (2))	JUNCTION	0.000	0.732	0	06:04	0	4.9	0.241
4 (STM (2))	JUNCTION	0.000	0.257	0	06:11	0	1.6	0.691
5 (STM (2))	JUNCTION	0.000	0.256	0	06:11	0	1.6	0.301
6 (STM (2))	JUNCTION	0.000	0.256	0	06:05	0	1.6	0.109
7 (STM (2))	JUNCTION	0.000	0.256	0	06:05	0	1.6	0.045
HW-02	JUNCTION	0.000	1.209	0	06:23	0	20.2	-0.026
J1	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
J2	JUNCTION	0.000	17.415	0	00:00	0	23.1	0.062
J3	JUNCTION	0.000	1.495	0	06:28	0	2.72	-0.048
MH200 (STM)	JUNCTION	0.000	3.910	0	06:03	0	22.8	0.362
MH200a	JUNCTION	0.000	0.881	0	06:11	0	3.03	-2.079
OVF	JUNCTION	0.000	1.496	0	06:27	0	2.61	-0.016
POND2_MN	JUNCTION	0.000	1.196	0	06:31	0	20.2	0.004
R102 (STM)	JUNCTION	0.000	0.810	0	06:11	0	4.66	0.025
R103 (STM)	JUNCTION	0.000	0.468	0	06:11	0	2.58	-0.017
R104 (STM)	JUNCTION	0.000	0.468	0	06:11	0	2.58	-0.014
R105 (STM)	JUNCTION	0.000	0.405	0	06:05	0	2.58	0.025
R110 (STM)	JUNCTION	0.000	0.405	0	06:04	0	2.58	-0.026
R111 (STM)	JUNCTION	0.000	0.405	0	06:04	0	2.58	0.044
R118 (STM)	JUNCTION	0.000	2.432	0	06:03	0	13.3	0.172
R120 (STM)	JUNCTION	0.000	2.432	0	06:03	0	13.3	-0.090
R121 (STM)	JUNCTION	0.000	0.843	0	06:11	0	5.53	0.027
R122 (STM)	JUNCTION	0.000	0.813	0	06:11	0	5.52	-0.142
R123 (STM)	JUNCTION	0.000	0.801	0	06:05	0	5.52	-0.005
R124 (STM)	JUNCTION	0.000	0.824	0	06:11	0	4.13	-0.214
R127 (STM)	JUNCTION	0.000	0.813	0	06:03	0	4.15	0.276
CarpOut	OUTFALL	0.157	0.157	0	06:01	0.425	0.425	0.000
OF1	OUTFALL	0.000	0.000	0	00:00	0	0	0.000
ltr								
OF2	OUTFALL	0.000	17.415	0	00:00	0	23.2	0.000
D1_S	STORAGE	0.566	0.566	0	06:00	1.6	1.6	0.036
D2_S	STORAGE	0.474	0.474	0	06:00	1.38	1.38	-0.045
D3_S	STORAGE	0.643	0.643	0	06:00	1.96	1.96	0.038
K1_S	STORAGE	0.759	0.759	0	06:00	2.15	2.15	0.023
K2_S	STORAGE	1.050	1.050	0	06:00	3.37	3.37	0.011
POND2-Fernbank	STORAGE	0.238	4.112	0	06:00	0.965	28.6	0.013
R1_S	STORAGE	1.461	1.461	0	06:00	4.15	4.15	0.014
R2_S	STORAGE	1.144	1.144	0	06:00	3.58	3.58	0.015
R3_S	STORAGE	0.799	0.799	0	06:00	2.58	2.58	0.011
R4_S	STORAGE	0.648	0.648	0	06:00	2.08	2.08	0.013

Node Surcharge Summary

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

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
12 (STM (2))	JUNCTION	14.41	1.206	1.649
13 (STM (2))	JUNCTION	15.94	1.218	1.587
17 (STM (2))	JUNCTION	7.50	1.391	0.684
18 (STM (2))	JUNCTION	6.69	1.396	1.109
2 (STM (2))	JUNCTION	18.48	1.188	1.497
203 (STM)	JUNCTION	9.84	0.938	2.822
3 (STM (2))	JUNCTION	17.63	1.193	1.632
4 (STM (2))	JUNCTION	15.23	1.315	1.290
5 (STM (2))	JUNCTION	13.44	1.486	1.054
6 (STM (2))	JUNCTION	13.03	1.507	1.003
7 (STM (2))	JUNCTION	12.04	1.545	0.685
HW-02	JUNCTION	7.48	0.164	0.856
J3	JUNCTION	10.64	0.344	0.656
R102 (STM)	JUNCTION	8.30	0.968	2.582
R103 (STM)	JUNCTION	7.40	0.926	2.574
R104 (STM)	JUNCTION	5.42	0.877	3.033
R118 (STM)	JUNCTION	4.33	1.109	3.182
R120 (STM)	JUNCTION	0.96	1.112	2.113
R121 (STM)	JUNCTION	0.81	1.289	2.396
R122 (STM)	JUNCTION	0.73	1.732	3.033
R123 (STM)	JUNCTION	0.72	1.939	2.276
R124 (STM)	JUNCTION	0.73	1.330	2.245
R127 (STM)	JUNCTION	0.66	2.246	1.199

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 CMS
D1_S	0.002	1	0	0	0.222	84	0 06:05	0.259
D2_S	0.002	1	0	0	0.180	94	0 06:03	0.238
D3_S	0.003	1	0	0	0.267	90	0 06:04	0.282
K1_S	0.003	1	0	0	0.303	82	0 06:05	0.343
K2_S	0.005	1	0	0	0.434	88	0 06:06	0.458
POND2-Fernbank	8.208	51	0	0	15.691	98	0 06:27	2.705
R1_S	0.003	1	0	0	0.453	83	0 06:03	0.813
R2_S	0.001	0	0	0	0.169	36	0 06:01	0.820
R3_S	0.002	1	0	0	0.267	81	0 06:04	0.406
R4_S	0.002	1	0	0	0.199	76	0 06:04	0.345

Outfall Loading Summary

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
CarpOut	24.06	0.010	0.157	0.425
OF1	0.00	0.000	0.000	0.000
OF2	100.00	0.134	17.415	23.226
System	41.35	0.145	2.439	23.651

Link Flow Summary

Link	Type	Maximum Flow CMS	Time of Max Occurrence days hr:min	Maximum Veloc m/sec	Max/ Full Flow	Max/ Full Depth
106 (STM)	CONDUIT	2.432	0 06:03	1.29	0.83	1.00
108 (STM)	CONDUIT	2.432	0 06:03	1.29	0.83	1.00
110 (1) (STM)	CONDUIT	0.843	0 06:11	1.46	0.86	1.00
110 (STM)	CONDUIT	0.863	0 06:11	1.61	0.87	1.00
112 (STM)	CONDUIT	0.877	0 06:11	0.81	0.46	1.00
118 (STM)	CONDUIT	0.811	0 06:11	1.27	1.13	1.00
120 (STM)	CONDUIT	0.468	0 06:11	0.74	0.58	1.00
122 (1) (STM)	CONDUIT	0.468	0 06:11	0.88	0.79	1.00
122 (STM)	CONDUIT	0.468	0 06:11	0.74	0.66	1.00
124 (1) (STM)	CONDUIT	0.405	0 06:04	1.59	1.00	0.57
124 (STM)	CONDUIT	0.405	0 06:05	1.49	0.69	0.51
160 (STM)	CONDUIT	0.824	0 06:11	1.61	0.94	1.00
166 (STM)	CONDUIT	0.813	0 06:11	1.47	0.99	1.00
202 (14) (STM)	CONDUIT	3.544	0 05:52	3.13	2.67	1.00
202 (15) (STM)_2	CONDUIT	0.878	0 06:11	0.78	0.27	1.00
202 (27) (STM)	CONDUIT	3.178	0 06:03	1.68	0.60	1.00
C1	CHANNEL	0.000	0 00:00	0.00	0.00	0.00
C10	CHANNEL	0.001	0 06:04	0.16	0.00	0.04
C11	CHANNEL	0.000	0 06:04	0.01	0.00	0.06
C12	CHANNEL	0.039	0 06:03	0.74	0.00	0.17
C13	CHANNEL	0.003	0 06:05	0.10	0.00	0.09
C14	CHANNEL	0.005	0 06:04	0.11	0.00	0.10
C2	CHANNEL	0.000	0 00:00	0.00	0.00	0.00
C3	CHANNEL	0.000	0 00:00	0.00	0.00	0.00
C4	CHANNEL	0.000	0 00:00	0.00	0.00	0.00
C5	CHANNEL	0.000	0 00:00	0.00	0.00	0.01
C6	CONDUIT	1.209	0 06:23	3.95	0.76	0.96
C7_1	CONDUIT	1.495	0 06:28	0.45	0.20	0.87
C7_2	CONDUIT	1.496	0 06:28	0.37	0.31	1.00
C8	CHANNEL	17.415	0 00:00	3.22	0.73	0.83
C9	CHANNEL	1.139	0 06:45	0.53	0.05	0.81

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NOVATECH
Engineers, Planners & Landscape Architects

Conduit Surcharge Summary

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Analysis begun on: Wed Jul 29 17:03:57 2020
Analysis ended on: Wed Jul 29 17:04:10 2020
Total elapsed time: 00:00:13
```


560 Hazeldean Road – Double Deck Subdivision PCSWMM Model 3-hr 100-year Chicago Storm Model Output

EPA STORM WATER MANAGEMENT MODEL – VERSION 5.1 (Build 5.1.013)

Element Count

Number of rain gages 1
Number of subcatchments ... 32
Number of nodes 90
Number of links 117
Number of pollutants 0
Number of land uses 0

Rainingage Summary

Name	Data Source	Data Type	Recording Interval
RG1	OTT_CHI_100YR_03HR	INTENSITY	10 min.

Subcatchment Summary

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
A-01	0.03	8.57	36.70	1.0000	RG1	OF3
A-02	0.39	112.00	55.90	1.0000	RG1	OF3
A-03	0.10	51.00	55.90	1.0000	RG1	CB_A03
A-04	0.34	171.00	84.80	1.0000	RG1	CB_A04
A-05	0.26	131.50	82.10	1.0000	RG1	CB_A05
A-06	0.19	96.00	81.00	1.0000	RG1	CB_A06
A-07	0.21	107.00	81.30	1.0000	RG1	CB_A07
A-08	0.17	86.00	82.00	1.0000	RG1	CB_A08
A-09	0.31	87.71	58.60	1.0000	RG1	CB_A09
A-10	0.18	88.50	80.80	1.0000	RG1	CB_A10
A-11	0.13	65.50	65.60	1.0000	RG1	CB_A11
A-12	0.17	84.50	54.40	1.0000	RG1	CB_A12
A-13	0.17	86.00	82.00	1.0000	RG1	CB_A13
A-14	0.45	74.83	56.30	1.0000	RG1	CB_A14
A-15	0.18	89.00	84.80	1.0000	RG1	CB_A15
A-16	0.12	57.50	81.70	1.0000	RG1	CB_A16
A-17	0.12	117.00	43.60	1.0000	RG1	CB_A17
A-18	0.16	78.00	85.30	1.0000	RG1	CB_A18
A-19	0.31	153.50	58.60	1.0000	RG1	CB_A19
A-20	0.14	70.00	83.60	1.0000	RG1	CB_A20
A-21	0.19	95.50	59.20	1.0000	RG1	CB_A21
A-22	0.14	72.50	66.90	1.0000	RG1	CB_A22
A-23	1.53	127.33	85.10	1.0000	RG1	CB_A23
A-24	0.02	6.00	44.40	1.0000	RG1	POND2-Fernbank
K1	2.40	164.00	86.00	0.5000	RG1	K1_S
K2	4.21	247.00	64.00	0.5000	RG1	K2_S
R1	4.63	308.00	86.00	0.5000	RG1	R1_S
R2	4.47	320.00	64.00	0.5000	RG1	R2_S
R3	3.22	183.00	64.00	0.5000	RG1	R3_S
R4	2.60	152.00	64.00	0.5000	RG1	R4_S
X-R5	0.70	275.00	64.00	0.5000	RG1	CarpOut
XX-Pond	1.37	61.00	43.00	0.5000	RG1	POND2-Fernbank

Node Summary

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
1_ (STM)	JUNCTION	92.89	3.71	0.0	
201	JUNCTION	93.66	1.59	0.0	
203_ (STM)	JUNCTION	93.33	5.02	0.0	
CB_A04	JUNCTION	95.51	2.40	0.0	
CB_A05	JUNCTION	95.46	2.40	0.0	
CB_A06	JUNCTION	95.42	2.40	0.0	
CB_A07	JUNCTION	95.32	2.40	0.0	
CB_A08	JUNCTION	95.47	2.53	0.0	
CB_A10	JUNCTION	95.50	2.40	0.0	
CB_A11	JUNCTION	95.16	2.74	0.0	
CB_A13	JUNCTION	95.69	2.40	0.0	
CB_A15	JUNCTION	95.56	2.64	0.0	
CB_A16	JUNCTION	95.89	2.40	0.0	

CB_A17	JUNCTION	95.88	2.92	0.0
CB_A18	JUNCTION	95.89	2.40	0.0
CB_A20	JUNCTION	96.02	2.40	0.0
CB_A22	JUNCTION	95.86	2.40	0.0
HW-02	JUNCTION	92.66	2.54	0.0
J1	JUNCTION	99.75	0.35	0.0
J10	JUNCTION	97.43	1.00	0.0
J12	JUNCTION	97.47	1.00	0.0
J14	JUNCTION	97.17	1.00	0.0
J16	JUNCTION	96.76	1.00	0.0
J17	JUNCTION	97.80	1.00	0.0
J19	JUNCTION	97.43	1.00	0.0
J2	JUNCTION	92.90	1.75	0.0
J21	JUNCTION	97.14	1.00	0.0
J23	JUNCTION	97.15	1.00	0.0
J25	JUNCTION	97.12	1.00	0.0
J27	JUNCTION	97.10	1.00	0.0
J29	JUNCTION	97.06	1.00	0.0
J3	JUNCTION	93.70	1.30	0.0
J30	JUNCTION	97.07	1.00	0.0
J32	JUNCTION	97.08	1.00	0.0
J34	JUNCTION	97.43	1.00	0.0
J35	JUNCTION	97.23	1.00	0.0
J36	JUNCTION	97.42	1.00	0.0
J4	JUNCTION	97.62	1.00	0.0
J6	JUNCTION	97.54	1.00	0.0
J8	JUNCTION	97.64	1.00	0.0
MH200_ (STM)	JUNCTION	92.97	3.81	0.0
MH200a	JUNCTION	92.97	3.81	0.0
OVF	JUNCTION	94.12	1.38	0.0
POND2_MN	JUNCTION	92.95	1.75	0.0
R102_ (STM)	JUNCTION	93.43	4.78	0.0
R103_ (STM)	JUNCTION	93.49	4.71	0.0
R104_ (STM)	JUNCTION	93.58	5.11	0.0
R105_ (STM)	JUNCTION	93.70	5.18	0.0
R110_ (STM)	JUNCTION	95.18	3.80	0.0
R111_ (STM)	JUNCTION	95.29	3.73	0.0
R118_ (STM)	JUNCTION	93.25	5.87	0.0
R120_ (STM)	JUNCTION	93.42	4.98	0.0
R121_ (STM)	JUNCTION	94.09	4.90	0.0
R122_ (STM)	JUNCTION	94.25	5.97	0.0
R123_ (STM)	JUNCTION	94.41	5.32	0.0
R124_ (STM)	JUNCTION	93.60	5.29	0.0
R127_ (STM)	JUNCTION	93.91	4.94	0.0
CarpOut	OUTFALL	0.00	0.00	0.0
QF1	OUTFALL	99.91	0.31	0.0
QF2	OUTFALL	92.88	1.76	0.0
QF3	OUTFALL	94.34	1.20	0.0
QF4	OUTFALL	96.00	2.00	0.0
100	STORAGE	93.21	3.54	0.0
102	STORAGE	93.25	3.94	0.0
104	STORAGE	93.63	3.35	0.0
106	STORAGE	93.73	3.08	0.0
108	STORAGE	93.83	2.96	0.0
110	STORAGE	93.86	2.94	0.0
112	STORAGE	94.10	2.97	0.0
114	STORAGE	94.45	2.70	0.0
116	STORAGE	94.55	2.70	0.0
118	STORAGE	95.02	2.32	0.0
120	STORAGE	93.52	3.96	0.0
122	STORAGE	93.75	3.85	0.0
124	STORAGE	94.35	3.04	0.0
CAP1	STORAGE	93.89	3.08	0.0
CB_A03	STORAGE	95.16	2.40	0.0
CB_A09	STORAGE	94.29	2.40	0.0
CB_A12	STORAGE	95.66	2.40	0.0
CB_A14	STORAGE	95.29	2.40	0.0
CB_A19	STORAGE	95.53	2.40	0.0
CB_A21	STORAGE	96.12	2.40	0.0
CB_A23	STORAGE	95.60	2.40	0.0
K1_S	STORAGE	98.05	1.75	0.0
K2_S	STORAGE	98.05	1.75	0.0
POND2-Fernbank	STORAGE	91.50	3.75	0.0
R1_S	STORAGE	97.50	1.75	0.0
R2_S	STORAGE	97.50	1.75	0.0
R3_S	STORAGE	97.75	1.75	0.0
R4_S	STORAGE	97.30	1.75	0.0

Link Summary

23/12/2025

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560 Hazeldean Road – Double Deck Subdivision PCSWMM Model 3-hr 100-year Chicago Storm Model Output

Name	From Node	To Node	Type	Length	%Slope	Roughness
106_(STM)	R118_(STM)	203_(STM)	CONDUIT	119.9	0.1501	0.0130
108_(STM)	R120_(STM)	R118_(STM)	CONDUIT	98.0	0.1530	0.0130
110_(1)_(STM)	R122_(STM)	R121_(STM)	CONDUIT	82.9	0.1930	0.0130
110_(STM)	R121_(STM)	R120_(STM)	CONDUIT	66.7	0.1948	0.0130
112_(STM)	R124_(STM)	R120_(STM)	CONDUIT	78.7	0.2414	0.0130
118_(STM)	R102_(STM)	203_(STM)	CONDUIT	25.4	0.1575	0.0130
120_(STM)	R103_(STM)	R102_(STM)	CONDUIT	5.0	0.1988	0.0130
122_(1)_(STM)	R105_(STM)	R104_(STM)	CONDUIT	29.3	0.1704	0.0130
122_(STM)	R104_(STM)	R103_(STM)	CONDUIT	51.5	0.1553	0.0130
124_(1)_(STM)	R111_(STM)	R110_(STM)	CONDUIT	30.1	0.1330	0.0130
124_(STM)	R110_(STM)	R105_(STM)	CONDUIT	60.2	0.1660	0.0130
160_(STM)	R127_(STM)	R124_(STM)	CONDUIT	58.3	0.1543	0.0130
166_(STM)	R123_(STM)	R122_(STM)	CONDUIT	44.4	0.1350	0.0130
202_(14)_(STM)	MH200_(STM)	POND2-Fernbank	CONDUIT	17.3	0.1156	0.0130
202_(15)_(STM)_2	MH200a	POND2-Fernbank	CONDUIT	33.2	0.6936	0.0130
202_(27)_(STM)	203_(STM)	MH200_(STM)	CONDUIT	69.5	0.5037	0.0130
C1	K1_S	J1	CONDUIT	145.1	0.0345	0.0130
C10	R3_S	R4_S	CONDUIT	142.9	0.3149	0.0130
C11	R4_S	J36	CONDUIT	129.9	1.2166	0.0130
C12	CB_A09	POND2-Fernbank	CONDUIT	124.3	0.6679	0.0130
C13	CB_A23	OF4	CONDUIT	64.4	0.5435	0.0150
C17	CB_A12	CB_A11	CONDUIT	61.2	0.8332	0.0150
C19	CB_A03	OF3	CONDUIT	20.0	11.9341	0.0350
C2	J1	R2_S	CONDUIT	209.6	0.2624	0.0130
C21	CB_A19	CB_A15	CONDUIT	41.3	0.1937	0.0150
C22	CB_A14	CB_A08	CONDUIT	51.2	0.0781	0.0150
C25	J4	CB_A22	CONDUIT	33.4	1.0763	0.0130
C26	CB_A22	J6	CONDUIT	36.3	-0.7719	0.0130
C27	J8	CB_A20	CONDUIT	23.4	0.9395	0.0130
C28	CB_A20	J6	CONDUIT	23.4	-0.5119	0.0130
C29	J6	CB_A04	CONDUIT	75.0	0.8404	0.0130
C3	K2_S	J1	CONDUIT	59.6	0.0839	0.0130
C30	CB_A04	J21	CONDUIT	18.5	-1.2423	0.0130
C31	J21	CB_A05	CONDUIT	36.0	0.7771	0.0130
C32	CB_A05	J25	CONDUIT	25.0	-1.0383	0.0130
C33	J8	CB_A18	CONDUIT	33.8	1.0346	0.0130
C34	CB_A18	J10	CONDUIT	15.2	-0.9230	0.0130
C35	J10	CB_A15	CONDUIT	52.4	0.8978	0.0130
C36	CB_A15	J23	CONDUIT	7.5	-2.5443	0.0130
C37	J23	CB_A05	CONDUIT	42.3	0.6862	0.0130
C38	J25	CB_A06	CONDUIT	38.0	0.7899	0.0130
C39	CB_A06	J27	CONDUIT	12.1	-2.3053	0.0130
C4	R1_S	OF1	CONDUIT	119.8	-0.5508	0.0130
C40	J27	CB_A07	CONDUIT	29.7	1.2810	0.0130
C41	CB_A07	J29	CONDUIT	8.9	-3.8377	0.0130
C42	J29	POND2-Fernbank	CONDUIT	50.0	3.7226	0.0320
C43	J12	CB_A16	CONDUIT	10.8	1.6678	0.0130
C44	CB_A16	J34	CONDUIT	19.0	-0.7378	0.0130
C45	J34	CB_A15	CONDUIT	52.0	0.9039	0.0130
C46	J17	CB_A17	CONDUIT	22.2	2.3441	0.0130
C47	CB_A17	J19	CONDUIT	10.0	-1.4929	0.0130
C48	J19	CB_A16	CONDUIT	19.8	0.7074	0.0130
C49	J12	CB_A13	CONDUIT	35.5	1.0700	0.0130
C5	R2_S	R4_S	CONDUIT	152.1	0.1315	0.0130
C50	CB_A13	J14	CONDUIT	13.5	-0.5907	0.0130
C51	J14	CB_A10	CONDUIT	22.0	1.2286	0.0130
C52	CB_A10	J32	CONDUIT	25.6	-0.7023	0.0130
C53	J32	CB_A08	CONDUIT	18.0	1.1656	0.0130
C54	CB_A08	J30	CONDUIT	26.5	-0.7536	0.0130
C55	J30	CB_A07	CONDUIT	33.8	1.0358	0.0130
C56	J35	CB_A11	CONDUIT	32.6	2.0543	0.0130
C57	CB_A11	J16	CONDUIT	6.6	-3.0102	0.0130
C58	J36	CB_A11	CONDUIT	36.5	2.3548	0.0130
C59	J16	POND2-Fernbank	CONDUIT	20.0	27.2597	0.0350
C6	201	HW-02	CONDUIT	11.4	2.0215	0.0130
C7	CB_A21	CB_A17	CONDUIT	50.5	0.1386	0.0150
C7_1	OVF	J3	CONDUIT	30.0	1.4001	0.0350
C7_2	J3	J2	CONDUIT	45.0	0.6000	0.0350
C8	J2	OF2	CONDUIT	10.0	0.1272	0.0500
C9	POND2_MN	J2	CONDUIT	41.5	0.1277	0.0500
POND2-OUT	HW-02	POND2_MN	CONDUIT	58.5	0.1026	0.0320
STM-13_(STM)	124	122	CONDUIT	44.2	0.3394	0.0130
STM-16_(STM)	114	112	CONDUIT	38.0	0.3421	0.0130
STM-164_(STM)	116	114	CONDUIT	28.0	0.3568	0.0130
STM-165_(STM)	122	120	CONDUIT	101.2	0.1482	0.0130
STM-166_(STM)	120	102	CONDUIT	83.8	0.1432	0.0130
STM-20_(STM)	CAP1	122	CONDUIT	42.8	0.1636	0.0130
STM-3_(1)_(1)_(STM)	106	104	CONDUIT	60.0	0.1500	0.0130
STM-3_(1)_(STM)	104	102	CONDUIT	59.6	0.1510	0.0130
STM-3_(2)_(STM)	102	100	CONDUIT	27.2	0.1471	0.0130

STM-3_(STM)_2)	100	MH200_(STM)	CONDUIT	9.3	0.1075	0.0130
STM-5_(1)_(STM)	110	108	CONDUIT	17.1	0.1754	0.0130
STM-5_(STM)	108	106	CONDUIT	17.2	0.1744	0.0130
STM-7_(STM)	112	110	CONDUIT	80.8	0.1980	0.0130
STM-9_(STM)	118	112	CONDUIT	89.6	0.3460	0.0130
O-A01	CB_A03	124	ORIFICE			
O-A04	CB_A19	114	ORIFICE			
O-A05	CB_A14	106	ORIFICE			
O-A06	CB_A09	106	ORIFICE			
O-A11	CB_A12	102	ORIFICE			
O-A14	CB_A21	122	ORIFICE			
O-A15	CB_A23	CAP1	ORIFICE			
OR1	K1_S	R123_(STM)	ORIFICE			
OR10	CB_A17	120	ORIFICE			
OR11	CB_A16	120	ORIFICE			
OR12	CB_A15	116	ORIFICE			
OR13	CB_A13	102	ORIFICE			
OR14	CB_A11	100	ORIFICE			
OR15	CB_A10	104	ORIFICE			
OR16	CB_A08	106	ORIFICE			
OR17	CB_A07	110	ORIFICE			
OR18	CB_A06	112	ORIFICE			
OR19	CB_A05	112	ORIFICE			
OR2	K2_S	R123_(STM)	ORIFICE			
OR20	CB_A04	118	ORIFICE			
OR4	CB_A22	CAP1	ORIFICE			
OR5	CB_A20	122	ORIFICE			
OR6	CB_A18	120	ORIFICE			
OR7	R2_S	R120_(STM)	ORIFICE			
OR8	R4_S	R102_(STM)	ORIFICE			
OR9	R3_S	R111_(STM)	ORIFICE			
P2-2yr_Orifice	POND2-Fernbank	201	ORIFICE			
P2-ED_Orifice	POND2-Fernbank	201	ORIFICE			
202_(15)_(STM)_1	MH200_(STM)	MH200a	WEIR			
P2-100yrWeir	POND2-Fernbank	OVF	WEIR			
P2-5-10yrWeir	POND2-Fernbank	201	WEIR			
OR3	R1_S	R127_(STM)	OUTLET			

***** Cross Section Summary *****							
Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
106_(STM)	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2.91
108_(STM)	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2.94
110_(1)_(STM)	CIRCULAR	0.97	0.75	0.24	0.97	1	0.98
110_(STM)	CIRCULAR	0.97	0.75	0.24	0.97	1	0.99
112_(STM)	CIRCULAR	1.20	1.13	0.30	1.20	1	1.92
118_(STM)	CIRCULAR	0.90	0.64	0.23	0.90	1	0.72
120_(STM)	CIRCULAR	0.90	0.64	0.23	0.90	1	0.81
122_(1)_(STM)	CIRCULAR	0.82	0.53	0.21	0.82	1	0.59
122_(STM)	CIRCULAR	0.90	0.64	0.23	0.90	1	0.71
124_(1)_(STM)	CIRCULAR	0.75	0.44	0.19	0.75	1	0.41
124_(STM)	CIRCULAR	0.82	0.53	0.21	0.82	1	0.58
160_(STM)	CIRCULAR	0.97	0.75	0.24	0.97	1	0.88
166_(STM)	CIRCULAR	0.97	0.75	0.24	0.97	1	0.82
202_(14)_(STM)	CIRCULAR	1.20	1.13	0.30	1.20	1	1.33
202_(15)_(STM)_2	CIRCULAR	1.20	1.13	0.30	1.20	1	3.25
202_(27)_(STM)	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	5.34
C1	Pvt_Road	0.31	3.08	0.19	18.00	1	1.46
C10	Pvt_Road	0.31	3.08	0.19	18.00	1	4.41
C11	Pvt_Road	0.31	3.08	0.19	18.00	1	8.67
C12	Pvt_Road	0.31	3.08	0.19	18.00	1	6.42
C13	RECT_OPEN	1.00	3.00	0.60	3.00	1	10.49
C17	TRAPEZOIDAL	1.00	3.15	0.49	6.15	1	11.86
C19	TRAPEZOIDAL	1.00	3.15	0.49	6.15	1	19.24
C2	Pvt_Road	0.31	3.08	0.19	18.00	1	4.03
C21	TRAPEZOIDAL	1.00	3.15	0.49	6.15	1	5.72
C22	TRAPEZOIDAL	1.00	3.15	0.49	6.15	1	3.63
C25	Pvt_Road	0.31	3.08	0.19	18.00	1	8.15
C26	Pvt_Road	0.31	3.08	0.19	18.00	1	6.90
C27	Pvt_Road	0.31	3.08	0.19	18.00	1	7.62
C28	Pvt_Road	0.31	3.08	0.19	18.00	1	5.62
C29	Pvt_Road	0.31	3.08	0.19	18.00	1	7.20
C3	Pvt_Road	0.31	3.08	0.19	18.00	1	2.28
C30	Pvt_Road	0.31	3.08	0.19	18.00	1	8.76
C31	Pvt_Road	0.31	3.08	0.19	18.00	1	6.93
C32	Pvt_Road	0.31	3.08	0.19	18.00	1	8.01
C33	Pvt_Road	0.31	3.08	0.19	18.00	1	7.99
C34	Pvt_Road	0.31	3.08	0.19	18.00	1	7.55

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560 Hazeldean Road – Double Deck Subdivision PCSWMM Model 3-hr 100-year Chicago Storm Model Output

C35	Pvt_Road	0.31	3.08	0.19	18.00	1	7.45
C36	Pvt_Road	0.31	3.08	0.19	18.00	1	12.53
C37	Pvt_Road	0.31	3.08	0.19	18.00	1	6.51
C38	Pvt_Road	0.31	3.08	0.19	18.00	1	6.98
C39	Pvt_Road	0.31	3.08	0.19	18.00	1	11.93
C4	Pvt_Road	0.31	3.08	0.19	18.00	1	5.83
C40	Pvt_Road	0.31	3.08	0.19	18.00	1	8.89
C41	Pvt_Road	0.31	3.08	0.19	18.00	1	15.39
C42	RECT_OPEN	1.00	6.00	0.75	6.00	1	29.87
C43	Pvt_Road	0.31	3.08	0.19	18.00	1	10.15
C44	Pvt_Road	0.31	3.08	0.19	18.00	1	6.75
C45	Pvt_Road	0.31	3.08	0.19	18.00	1	7.47
C46	Pvt_Road	0.31	3.08	0.19	18.00	1	12.03
C47	Pvt_Road	0.31	3.08	0.19	18.00	1	9.60
C48	Pvt_Road	0.31	3.08	0.19	18.00	1	6.61
C49	Pvt_Road	0.31	3.08	0.19	18.00	1	8.13
C5	Pvt_Road	0.31	3.08	0.19	18.00	1	2.85
C50	Pvt_Road	0.31	3.08	0.19	18.00	1	6.04
C51	Pvt_Road	0.31	3.08	0.19	18.00	1	8.71
C52	Pvt_Road	0.31	3.08	0.19	18.00	1	6.59
C53	Pvt_Road	0.31	3.08	0.19	18.00	1	8.48
C54	Pvt_Road	0.31	3.08	0.19	18.00	1	6.82
C55	Pvt_Road	0.31	3.08	0.19	18.00	1	8.00
C56	Pvt_Road	0.31	3.08	0.19	18.00	1	11.26
C57	Pvt_Road	0.31	3.08	0.19	18.00	1	13.63
C58	Pvt_Road	0.31	3.08	0.19	18.00	1	12.06
C59	RECT_OPEN	1.00	3.00	0.60	3.00	1	31.84
C6	CIRCULAR	0.75	0.44	0.19	0.75	1	1.58
C7	TRAPEZOIDAL	1.00	3.15	0.49	6.15	1	4.84
C7_1	TRAPEZOIDAL	0.30	5.11	0.28	17.93	1	7.45
C7_2	TRAPEZOIDAL	0.30	5.11	0.28	17.93	1	4.88
C8	channel2	1.75	42.73	0.72	32.40	1	23.88
C9	channel2	1.75	42.73	0.72	32.40	1	23.93
POND2-OUT	TRAPEZOIDAL	1.00	4.00	0.55	7.00	1	2.68
STM-13_(STM)	CIRCULAR	0.30	0.07	0.07	0.30	1	0.06
STM-16_(STM)	CIRCULAR	0.30	0.07	0.07	0.30	1	0.06
STM-164_(STM)	CIRCULAR	0.30	0.07	0.07	0.30	1	0.06
STM-165_(STM)	CIRCULAR	0.75	0.44	0.19	0.75	1	0.43
STM-166_(STM)	CIRCULAR	0.82	0.53	0.21	0.82	1	0.54
STM-20_(STM)	CIRCULAR	0.68	0.36	0.17	0.68	1	0.34
STM-3_(1)_1_(STM)	CIRCULAR	0.68	0.36	0.17	0.68	1	0.33
STM-3_(1)_2_(STM)	CIRCULAR	0.68	0.36	0.17	0.68	1	0.33
STM-3_(2)_1_(STM)	CIRCULAR	0.97	0.75	0.24	0.97	1	0.86
STM-3_(2)_2_(STM)	CIRCULAR	0.97	0.75	0.24	0.97	1	0.73
STM-5_(1)_1_(STM)	CIRCULAR	0.60	0.28	0.15	0.60	1	0.26
STM-5_(1)_2_(STM)	CIRCULAR	0.60	0.28	0.15	0.60	1	0.26
STM-7_(STM)	CIRCULAR	0.53	0.22	0.13	0.53	1	0.19
STM-9_(STM)	CIRCULAR	0.38	0.11	0.09	0.38	1	0.10

Transect Summary

Transect channel2
Area:

0.0017	0.0035	0.0054	0.0074	0.0095
0.0116	0.0139	0.0162	0.0186	0.0211
0.0237	0.0283	0.0400	0.0580	0.0817
0.1066	0.1317	0.1568	0.1822	0.2076
0.2332	0.2589	0.2848	0.3108	0.3369
0.3632	0.3896	0.4161	0.4427	0.4692
0.4958	0.5223	0.5488	0.5754	0.6019
0.6285	0.6550	0.6815	0.7081	0.7346
0.7611	0.7877	0.8142	0.8408	0.8673
0.8938	0.9204	0.9469	0.9735	1.0000

Hrad:

0.0465	0.0901	0.1312	0.1703	0.2075
0.2432	0.2776	0.3108	0.3429	0.3741
0.4045	0.4002	0.3240	0.2616	0.2292
0.2271	0.2366	0.2516	0.2696	0.2893
0.3103	0.3319	0.3541	0.3766	0.3993
0.4223	0.4455	0.4691	0.4934	0.5178
0.5423	0.5667	0.5911	0.6156	0.6400
0.6643	0.6887	0.7129	0.7372	0.7614
0.7855	0.8096	0.8336	0.8576	0.8815
0.9053	0.9291	0.9528	0.9764	1.0000

Width:

0.0665	0.0698	0.0730	0.0762	0.0795
0.0827	0.0860	0.0892	0.0924	0.0957
0.0989	0.3212	0.5591	0.7971	0.9353

0.9405	0.9458	0.9511	0.9563	0.9616
0.9668	0.9721	0.9773	0.9826	0.9878
0.9931	0.9972	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000

Transect Pvt_Road
Area:

0.0006	0.0025	0.0057	0.0102	0.0159
0.0229	0.0312	0.0407	0.0516	0.0636
0.0770	0.0916	0.1076	0.1247	0.1422
0.1597	0.1772	0.1947	0.2123	0.2299
0.2475	0.2652	0.2828	0.3005	0.3185
0.3371	0.3565	0.3766	0.3974	0.4189
0.4411	0.4641	0.4878	0.5122	0.5373
0.5631	0.5896	0.6169	0.6449	0.6736
0.7030	0.7331	0.7640	0.7955	0.8278
0.8608	0.8945	0.9290	0.9641	1.0000

Hrad:

0.0159	0.0318	0.0477	0.0636	0.0794
0.0953	0.1112	0.1271	0.1430	0.1589
0.1748	0.1907	0.2065	0.2270	0.2586
0.2902	0.3217	0.3532	0.3846	0.4160
0.4473	0.4786	0.5098	0.5410	0.5699
0.5980	0.6250	0.6507	0.6752	0.6984
0.7204	0.7414	0.7613	0.7803	0.7985
0.8158	0.8324	0.8483	0.8635	0.8782
0.8923	0.9059	0.9190	0.9317	0.9439
0.9558	0.9673	0.9785	0.9894	1.0000

Width:

0.0351	0.0703	0.1054	0.1405	0.1757
0.2108	0.2459	0.2811	0.3162	0.3513
0.3865	0.4216	0.4567	0.4819	0.4826
0.4832	0.4839	0.4846	0.4853	0.4860
0.4867	0.4874	0.4881	0.4888	0.5049
0.5247	0.5445	0.5643	0.5841	0.6039
0.6237	0.6435	0.6633	0.6831	0.7029
0.7227	0.7425	0.7623	0.7821	0.8019
0.8218	0.8416	0.8614	0.8812	0.9010
0.9208	0.9406	0.9604	0.9802	1.0000

NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.

Analysis Options

Flow Units CMS

Process Models:

Rainfall/Runoff YES
RDII NO
Snowmelt NO
Groundwater NO
Flow Routing YES
Fonding Allowed YES
Water Quality NO
Infiltration Method CURVE_NUMBER
Flow Routing Method DYNWAVE
Surcharge Method EXTRAN
Starting Date 07/23/2009 00:00:00
Ending Date 07/25/2009 00:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Wet Time Step 00:01:00
Dry Time Step 00:01:00
Routing Time Step 1.00 sec
Variable Time Step NO
Maximum Trials 8
Number of Threads 4
Head Tolerance 0.001500 m

*****	Volume	Depth
Runoff Quantity Continuity	hectare-m	mm
*****	-----	-----
Initial LID Storage	0.033	1.103

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560 Hazeldean Road – Double Deck Subdivision PCSWMM Model 3-hr 100-year Chicago Storm Model Output

Total Precipitation 2.122 71.667
Evaporation Loss 0.000 0.000
Infiltration Loss 0.361 12.185
Surface Runoff 1.762 59.511
Final Storage 0.033 1.103
Continuity Error (%) -0.041

***** Volume Volume
Flow Routing Continuity hectare-m 10^6 ltr

Dry Weather Inflow 0.000 0.000
Wet Weather Inflow 1.762 17.620
Groundwater Inflow 0.000 0.000
RDII Inflow 0.000 0.000
External Inflow 0.131 1.307
External Outflow 1.796 17.958
Flooding Loss 0.000 0.000
Evaporation Loss 0.000 0.000
Exfiltration Loss 0.000 0.000
Initial Stored Volume 0.501 5.010
Final Stored Volume 0.603 6.029
Continuity Error (%) -0.211

Highest Continuity Errors

Node J36 (16.22%)
Node MH200a (-2.26%)
Node 118 (1.22%)

Highest Flow Instability Indexes

Link O-A06 (13)
Link 202_(15)_(STM)_1 (6)
Link STM-3_(STM)_2 (4)
Link 202_(15)_(STM)_2 (4)
Link 202_(14)_(STM) (4)

Routing Time Step Summary

Minimum Time Step : 1.00 sec
Average Time Step : 1.00 sec
Maximum Time Step : 1.00 sec
Percent in Steady State : 0.00
Average Iterations per Step : 2.06
Percent Not Converging : 0.13

Subcatchment Runoff Summary

Total	Peak	Runoff	Total	Total	Total	Total	Imperv	Perv	Total
Runoff	Runoff	Coeff	Precip	Runon	Evap	Infil	Runoff	Runoff	Runoff
Subcatchment	Subcatchment	Subcatchment	mm	mm	mm	mm	mm	mm	mm
10^6 ltr	CMS								
A-01	0.01	0.664	71.67	0.00	0.00	24.13	26.34	21.25	47.59
A-02	0.22	0.13	71.67	0.00	0.00	16.67	40.11	14.95	55.06
A-03	0.06	0.04	71.67	0.00	0.00	16.50	40.12	15.12	55.24
A-04	0.23	0.16	71.67	0.00	0.00	5.62	60.85	5.28	66.13
A-05	0.17	0.12	71.67	0.00	0.00	6.63	58.91	6.21	65.12
A-06	0.12	0.09	71.67	0.00	0.00	7.04	58.12	6.59	64.71
A-07	0.14	0.10	71.67	0.00	0.00	6.93	58.34	6.48	64.82

A-08 0.08 0.908 71.67 0.00 0.00 6.67 58.84 6.24 65.08
0.11 0.08 0.908 71.67 0.00 0.00 15.63 42.04 14.06 56.10
A-09 0.17 0.11 0.783 71.67 0.00 0.00 7.11 57.98 6.65 64.63
A-10 0.11 0.08 0.902 71.67 0.00 0.00 12.83 47.08 11.84 58.92
A-11 0.08 0.05 0.822 71.67 0.00 0.00 17.07 39.04 15.62 54.67
A-12 0.09 0.06 0.763 71.67 0.00 0.00 6.67 58.84 6.24 65.08
A-13 0.11 0.08 0.908 71.67 0.00 0.00 16.74 40.38 14.59 54.97
A-14 0.25 0.15 0.767 71.67 0.00 0.00 5.62 60.85 5.28 66.13
A-15 0.12 0.08 0.923 71.67 0.00 0.00 6.78 58.63 6.34 64.97
A-16 0.07 0.05 0.907 71.67 0.00 0.00 20.97 31.30 19.46 50.76
A-17 0.06 0.04 0.708 71.67 0.00 0.00 5.44 61.21 5.11 66.31
A-18 0.10 0.07 0.925 71.67 0.00 0.00 15.47 42.06 14.21 56.26
A-19 0.17 0.12 0.785 71.67 0.00 0.00 6.07 59.99 5.69 65.68
A-20 0.09 0.06 0.916 71.67 0.00 0.00 15.25 42.49 14.00 56.49
A-21 0.11 0.07 0.788 71.67 0.00 0.00 12.34 48.01 11.40 59.41
A-22 0.09 0.06 0.829 71.67 0.00 0.00 5.65 61.02 5.03 66.05
A-23 1.01 0.66 0.922 71.67 0.00 0.00 21.04 31.86 18.81 50.68
A-24 0.01 0.01 0.707 71.67 0.00 0.00 5.38 66.31 4.66 66.31
K1 1.59 0.96 0.925 71.67 0.00 0.00 14.54 57.14 11.26 57.14
K2 2.41 1.29 0.797 71.67 0.00 0.00 5.38 66.31 4.65 66.31
R1 3.07 1.85 0.925 71.67 0.00 0.00 14.38 57.31 11.43 57.31
R2 2.56 1.40 0.800 71.67 0.00 0.00 14.58 57.11 11.23 57.11
R3 1.84 0.98 0.797 71.67 0.00 0.00 14.55 57.14 11.25 57.14
R4 1.49 0.79 0.797 71.67 0.00 0.00 27.27 45.92 44.45 44.45
X-R5 0.31 0.20 0.620 71.67 0.00 0.00 24.31 47.36 16.53 47.36
XX-Pond 0.65 0.29 0.661

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
1_(STM)	JUNCTION	0.00	0.00	92.89	0 00:00	0.00
201	JUNCTION	0.21	0.68	94.34	0 10:55	0.68
203_(STM)	JUNCTION	0.84	1.95	95.28	0 01:44	1.95
CB_A04	JUNCTION	0.03	1.58	97.09	0 01:12	1.58
CB_A05	JUNCTION	0.03	1.55	97.01	0 01:12	1.55
CB_A06	JUNCTION	0.03	1.58	97.00	0 01:12	1.58
CB_A07	JUNCTION	0.03	1.56	96.88	0 01:12	1.56
CB_A08	JUNCTION	0.03	1.60	97.07	0 01:17	1.60
CB_A10	JUNCTION	0.03	1.61	97.11	0 01:12	1.61
CB_A11	JUNCTION	0.03	1.51	96.67	0 01:21	1.51
CB_A13	JUNCTION	0.02	1.52	97.21	0 01:10	1.52
CB_A15	JUNCTION	0.05	1.60	97.16	0 01:23	1.60
CB_A16	JUNCTION	0.03	1.54	97.43	0 01:12	1.54
CB_A17	JUNCTION	0.02	1.50	97.38	0 01:11	1.50
CB_A18	JUNCTION	0.02	1.56	97.45	0 01:12	1.56
CB_A20	JUNCTION	0.02	1.54	97.56	0 01:10	1.54
CB_A22	JUNCTION	0.03	1.53	97.39	0 01:19	1.53
HW-02	JUNCTION	0.92	1.68	94.34	0 10:55	1.68
J1	JUNCTION	0.00	0.00	99.75	0 00:00	0.00
J10	JUNCTION	0.00	0.02	97.45	0 01:11	0.02
J12	JUNCTION	0.00	0.00	97.47	0 00:00	0.00

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560 Hazeldean Road – Double Deck Subdivision PCSWMM Model 3-hr 100-year Chicago Storm Model Output

J14	JUNCTION	0.00	0.04	97.21	0	01:10	0.04
J16	JUNCTION	0.00	0.00	96.76	0	00:00	0.00
J17	JUNCTION	0.00	0.00	97.80	0	00:00	0.00
J19	JUNCTION	0.00	0.00	97.43	0	00:00	0.00
J2	JUNCTION	0.66	1.44	94.34	0	10:55	1.44
J21	JUNCTION	0.00	0.00	97.14	0	00:00	0.00
J23	JUNCTION	0.00	0.01	97.16	0	01:22	0.01
J25	JUNCTION	0.00	0.00	97.12	0	00:00	0.00
J27	JUNCTION	0.00	0.00	97.10	0	00:00	0.00
J29	JUNCTION	0.00	0.00	97.06	0	00:00	0.00
J3	JUNCTION	0.13	0.64	94.34	0	10:55	0.64
J30	JUNCTION	0.00	0.00	97.07	0	00:00	0.00
J32	JUNCTION	0.00	0.03	97.11	0	01:12	0.03
J34	JUNCTION	0.00	0.00	97.43	0	00:00	0.00
J35	JUNCTION	0.00	0.00	97.23	0	00:00	0.00
J36	JUNCTION	0.00	0.01	97.43	0	01:22	0.01
J4	JUNCTION	0.00	0.00	97.62	0	00:00	0.00
J6	JUNCTION	0.00	0.02	97.56	0	01:11	0.02
J8	JUNCTION	0.00	0.00	97.64	0	00:00	0.00
MH200_ (STM)	JUNCTION	1.20	2.18	95.15	0	01:57	2.18
MH200a	JUNCTION	1.20	2.16	95.13	0	02:00	2.16
OVF	JUNCTION	0.03	0.22	94.34	0	10:55	0.22
POND2_MN	JUNCTION	0.62	1.39	94.34	0	10:55	1.39
R102_ (STM)	JUNCTION	0.75	1.97	95.40	0	01:44	1.97
R103_ (STM)	JUNCTION	0.69	1.91	95.40	0	01:44	1.91
R104_ (STM)	JUNCTION	0.61	1.85	95.43	0	01:44	1.85
R105_ (STM)	JUNCTION	0.53	1.75	95.45	0	01:44	1.75
R110_ (STM)	JUNCTION	0.32	0.76	95.94	0	01:20	0.76
R111_ (STM)	JUNCTION	0.32	0.76	96.05	0	01:20	0.76
R118_ (STM)	JUNCTION	0.93	2.14	95.39	0	01:44	2.14
R120_ (STM)	JUNCTION	0.76	2.13	95.55	0	01:27	2.13
R121_ (STM)	JUNCTION	0.34	1.80	95.89	0	01:18	1.55
R122_ (STM)	JUNCTION	0.30	1.86	96.11	0	01:29	1.72
R123_ (STM)	JUNCTION	0.19	1.82	96.23	0	01:18	1.63
R124_ (STM)	JUNCTION	0.69	2.13	95.73	0	01:18	2.02
R127_ (STM)	JUNCTION	0.60	2.08	95.99	0	01:29	1.79
CarpOut	OUTFALL	0.00	0.00	0.00	0	00:00	0.00
OF1	OUTFALL	0.00	0.00	99.91	0	00:00	0.00
OF2	OUTFALL	0.67	1.46	94.34	0	10:55	1.46
OF3	OUTFALL	0.00	0.00	94.34	0	00:00	0.00
OF4	OUTFALL	0.00	0.00	96.00	0	00:00	0.00
100	STORAGE	0.96	1.96	95.17	0	01:57	1.96
102	STORAGE	0.92	1.93	95.18	0	01:58	1.93
104	STORAGE	0.54	1.62	95.25	0	01:40	1.62
106	STORAGE	0.45	1.58	95.31	0	01:39	1.58
108	STORAGE	0.35	1.51	95.34	0	01:39	1.51
110	STORAGE	0.32	1.51	95.37	0	01:39	1.50
112	STORAGE	0.18	1.41	95.51	0	01:39	1.41
114	STORAGE	0.07	1.16	95.61	0	01:39	1.16
116	STORAGE	0.05	1.10	95.65	0	01:39	1.10
118	STORAGE	0.01	0.60	95.62	0	01:38	0.59
120	STORAGE	0.65	1.68	95.20	0	01:58	1.68
122	STORAGE	0.42	1.50	95.25	0	01:45	1.50
124	STORAGE	0.09	0.90	95.25	0	01:45	0.90
CAP1	STORAGE	0.30	1.39	95.28	0	01:45	1.39
CB_A03	STORAGE	0.05	1.73	96.89	0	01:21	1.73
CB_A09	STORAGE	0.17	1.70	95.99	0	01:46	1.70
CB_A12	STORAGE	0.05	1.64	97.30	0	01:22	1.64
CB_A14	STORAGE	0.12	1.70	96.99	0	01:47	1.70
CB_A19	STORAGE	0.10	1.95	97.48	0	01:10	1.95
CB_A21	STORAGE	0.05	1.65	97.77	0	01:21	1.65
CB_A23	STORAGE	0.04	1.72	97.32	0	01:21	1.72
K1_S	STORAGE	0.04	1.74	99.79	0	01:21	1.74
K2_S	STORAGE	0.05	1.75	99.80	0	01:21	1.75
POND2-Fernbank	STORAGE	2.67	3.63	95.13	0	01:59	3.63
R1_S	STORAGE	0.04	1.75	99.25	0	01:18	1.75
R2_S	STORAGE	0.03	1.64	99.14	0	01:13	1.64
R3_S	STORAGE	0.04	1.73	99.48	0	01:20	1.73
R4_S	STORAGE	0.04	1.72	99.02	0	01:19	1.72

Node Inflow Summary

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10 ⁻⁶ ltr	Total Inflow Volume 10 ⁻⁶ ltr	Flow Balance Error Percent
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1_ (STM)	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
201	JUNCTION	0.000	1.144	0	01:59	0	15.6	0.008
203_ (STM)	JUNCTION	0.000	3.231	0	01:18	0	12.9	0.157
CB_A04	JUNCTION	0.159	0.160	0	01:10	0.226	0.228	-0.262
CB_A05	JUNCTION	0.120	0.120	0	01:10	0.171	0.172	-0.224
CB_A06	JUNCTION	0.087	0.087	0	01:10	0.124	0.124	0.028
CB_A07	JUNCTION	0.097	0.097	0	01:10	0.139	0.139	0.019
CB_A08	JUNCTION	0.078	0.079	0	01:10	0.112	0.119	-0.145
CB_A10	JUNCTION	0.080	0.119	0	01:10	0.114	0.13	0.094
CB_A11	JUNCTION	0.053	0.053	0	01:10	0.0772	0.08	-0.252
CB_A13	JUNCTION	0.078	0.078	0	01:10	0.112	0.112	-0.114
CB_A15	JUNCTION	0.083	0.186	0	01:10	0.118	0.183	-0.032
CB_A16	JUNCTION	0.052	0.052	0	01:10	0.0747	0.0747	0.004
CB_A17	JUNCTION	0.041	0.041	0	01:10	0.0594	0.0594	0.007
CB_A18	JUNCTION	0.073	0.073	0	01:10	0.103	0.104	-0.105
CB_A20	JUNCTION	0.065	0.065	0	01:10	0.092	0.0928	-0.267
CB_A22	JUNCTION	0.059	0.060	0	01:10	0.0861	0.0878	-0.159
HW-02	JUNCTION	0.000	1.144	0	01:59	0	15.6	-0.017
J1	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
J10	JUNCTION	0.000	0.025	0	01:09	0	0.00267	5.872
J12	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
J14	JUNCTION	0.000	0.042	0	01:10	0	0.0148	-1.249
J16	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
J17	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
J19	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
J2	JUNCTION	0.000	1.496	0	02:02	0	17.9	-0.082
J21	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
J23	JUNCTION	0.000	0.008	0	01:16	0	0.00202	28.495
J25	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
J27	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
J29	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
J3	JUNCTION	0.000	0.379	0	02:00	0	0.778	0.057
J30	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
J32	JUNCTION	0.000	0.046	0	01:10	0	0.00792	3.799
J34	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
J35	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
J36	JUNCTION	0.000	0.008	0	01:20	0	0.00342	19.356
J4	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
J6	JUNCTION	0.000	0.028	0	01:10	0	0.00519	21.463
J8	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
MH200_ (STM)	JUNCTION	0.000	3.876	0	01:18	0	16.4	0.338
MH200a	JUNCTION	0.000	0.618	0	01:44	0	1.81	-2.215
OVF	JUNCTION	0.000	0.379	0	01:59	0	0.513	-0.009
POND2_MN	JUNCTION	0.000	1.143	0	02:00	0	15.9	-0.019
R102_ (STM)	JUNCTION	0.000	0.790	0	01:27	0	3.32	0.226
R103_ (STM)	JUNCTION	0.000	0.445	0	01:27	0	1.83	-0.020
R104_ (STM)	JUNCTION	0.000	0.445	0	01:27	0	1.83	-0.110
R105_ (STM)	JUNCTION	0.000	0.407	0	01:20	0	1.83	0.094
R110_ (STM)	JUNCTION	0.000	0.407	0	01:20	0	1.83	-0.039
R111_ (STM)	JUNCTION	0.000	0.407	0	01:20	0	1.83	0.069
R118_ (STM)	JUNCTION	0.000	2.491	0	01:18	0	9.63	0.015
R120_ (STM)	JUNCTION	0.000	2.483	0	01:18	0	9.63	0.001
R121_ (STM)	JUNCTION	0.000	0.879	0	01:27	0	4.01	0.096
R122_ (STM)	JUNCTION	0.000	0.832	0	01:27	0	4	-0.203
R123_ (STM)	JUNCTION	0.000	0.807	0	01:21	0	4	-0.000
R124_ (STM)	JUNCTION	0.000	0.854	0	01:27	0	3.06	-0.289
R127_ (STM)	JUNCTION	0.000	0.828	0	01:18	0	3.07	0.423
CarpOut	OUTFALL	0.205	0.205	0	01:11	0.311	0.311	0.000
OF1	OUTFALL	0.000	0.000	0	00:00	0	0	0.000
ltr								
OF2	OUTFALL	0.000	2.314	0	02:25	0	18.7	0.000
OF3	OUTFALL	0.142	0.142	0	01:10	0.23	0.23	0.000
OF4	OUTFALL	0.000	0.000	0	00:00	0	0	0.000
ltr								
100	STORAGE	0.000	0.713	0	01:27	0	3.45	0.072
102	STORAGE	0.000	0.693	0	01:28	0	3.39	0.277
104	STORAGE	0.000	0.308	0	01:28	0	1.63	0.258

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106	STORAGE	0.000	0.278	0	01:28	0	1.5	0.016
108	STORAGE	0.000	0.215	0	01:28	0	0.966	0.048
110	STORAGE	0.000	0.220	0	01:05	0	0.96	-0.549
112	STORAGE	0.000	0.190	0	01:14	0	0.819	-0.010
114	STORAGE	0.000	0.047	0	01:41	0	0.294	0.291
116	STORAGE	0.000	0.034	0	01:23	0	0.182	-0.021
118	STORAGE	0.000	0.066	0	01:12	0	0.228	1.238
120	STORAGE	0.000	0.348	0	01:28	0	1.58	0.394
122	STORAGE	0.000	0.289	0	01:28	0	1.35	-0.136
124	STORAGE	0.000	0.014	0	02:03	0	0.0564	0.507
CAP1	STORAGE	0.000	0.234	0	01:20	0	1.1	0.184
CB_A03	STORAGE	0.037	0.037	0	01:10	0.0563	0.0563	0.014
CB_A09	STORAGE	0.109	0.109	0	01:10	0.172	0.172	-0.040
CB_A12	STORAGE	0.061	0.061	0	01:10	0.0924	0.0924	0.021
CB_A14	STORAGE	0.145	0.145	0	01:10	0.247	0.248	0.011
CB_A19	STORAGE	0.116	0.116	0	01:10	0.173	0.173	-0.089
CB_A21	STORAGE	0.072	0.072	0	01:10	0.108	0.108	0.032
CB_A23	STORAGE	0.661	0.661	0	01:10	1.01	1.01	0.020
K1_S	STORAGE	0.963	0.963	0	01:10	1.59	1.59	0.016
K2_S	STORAGE	1.286	1.286	0	01:10	2.41	2.41	-0.002
POND2-Fernbank	STORAGE	0.291	4.006	0	01:18	0.658	21.8	0.035
R1_S	STORAGE	1.849	1.849	0	01:10	3.07	3.07	0.008
R2_S	STORAGE	1.401	1.401	0	01:10	2.56	2.56	0.007
R3_S	STORAGE	0.979	0.979	0	01:10	1.84	1.84	0.008
R4_S	STORAGE	0.794	0.794	0	01:10	1.49	1.49	-0.008

Node Surcharging Summary

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

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
1_(STM)	JUNCTION	48.00	0.000	3.710
203_(STM)	JUNCTION	6.38	0.692	3.068
HW-02	JUNCTION	7.43	0.164	0.856
J3	JUNCTION	10.59	0.344	0.656
R102_(STM)	JUNCTION	5.02	0.741	2.809
R103_(STM)	JUNCTION	4.37	0.703	2.797
R104_(STM)	JUNCTION	3.42	0.650	3.260
R118_(STM)	JUNCTION	3.00	0.561	3.730
R120_(STM)	JUNCTION	0.78	0.376	2.849
R121_(STM)	JUNCTION	0.66	0.589	3.096
R122_(STM)	JUNCTION	0.57	0.659	4.106
R123_(STM)	JUNCTION	0.49	0.718	3.497
R124_(STM)	JUNCTION	0.47	0.418	3.157
R127_(STM)	JUNCTION	0.43	0.587	2.858

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 CMS
100	0.001	27	0	0	0.002	55	0 01:57	0.704
102	0.001	23	0	0	0.002	49	0 01:58	0.695
104	0.001	16	0	0	0.002	48	0 01:40	0.304
106	0.001	14	0	0	0.002	51	0 01:39	0.276
108	0.000	12	0	0	0.002	51	0 01:39	0.215
110	0.000	11	0	0	0.002	51	0 01:39	0.215
112	0.000	6	0	0	0.002	48	0 01:39	0.182
114	0.000	2	0	0	0.001	43	0 01:39	0.053
116	0.000	2	0	0	0.001	41	0 01:39	0.037
118	0.000	0	0	0	0.001	26	0 01:38	0.068
120	0.001	16	0	0	0.002	43	0 01:58	0.344
122	0.000	11	0	0	0.002	39	0 01:45	0.290
124	0.000	3	0	0	0.001	30	0 01:45	0.030

CAP1	0.000	10	0	0	0.002	45	0 01:45	0.234
CB_A03	0.000	1	0	0	0.016	89	0 01:21	0.010
CB_A09	0.003	3	0	0	0.078	74	0 01:46	0.017
CB_A12	0.000	1	0	0	0.027	48	0 01:22	0.016
CB_A14	0.005	3	0	0	0.114	72	0 01:47	0.019
CB_A19	0.001	4	0	0	0.031	100	0 01:05	0.114
CB_A21	0.001	1	0	0	0.032	52	0 01:21	0.019
CB_A23	0.003	1	0	0	0.261	85	0 01:21	0.213
K1_S	0.004	1	0	0	0.358	97	0 01:21	0.346
K2_S	0.006	1	0	0	0.481	98	0 01:21	0.461
POND2-Fernbank	7.954	50	0	0	14.946	94	0 01:59	1.523
R1_S	0.005	1	0	0	0.533	98	0 01:18	0.828
R2_S	0.001	0	0	0	0.224	47	0 01:13	0.830
R3_S	0.003	1	0	0	0.292	89	0 01:20	0.416
R4_S	0.002	1	0	0	0.222	84	0 01:19	0.355

Outfall Loading Summary

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10 ⁶ ltr
CarpOut	6.63	0.027	0.205	0.311
OF1	0.00	0.000	0.000	0.000
OF2	100.00	0.108	2.314	18.723
OF3	8.67	0.015	0.142	0.230
OF4	0.00	0.000	0.000	0.000
System	23.06	0.151	0.000	19.264

Link Flow Summary

Link	Type	Maximum Flow CMS	Time of Max Occurrence days hr:min	Maximum Veloc m/sec	Max/ Full Flow	Max/ Full Depth
106_(STM)	CONDUIT	2.493	0 01:18	1.32	0.86	1.00
108_(STM)	CONDUIT	2.491	0 01:18	1.45	0.85	1.00
110_(1)_(STM)	CONDUIT	0.879	0 01:27	1.60	0.89	1.00
110_(STM)	CONDUIT	0.898	0 01:27	1.77	0.91	1.00
112_(STM)	CONDUIT	0.948	0 01:27	1.06	0.49	1.00
118_(STM)	CONDUIT	0.789	0 01:27	1.42	1.10	1.00
120_(STM)	CONDUIT	0.446	0 01:27	0.70	0.55	1.00
122_(1)_(STM)	CONDUIT	0.445	0 01:27	1.11	0.75	1.00
122_(STM)	CONDUIT	0.445	0 01:27	0.77	0.62	1.00
124_(1)_(STM)	CONDUIT	0.407	0 01:20	1.59	1.00	0.57
124_(STM)	CONDUIT	0.407	0 01:20	1.49	0.70	0.51
160_(STM)	CONDUIT	0.854	0 01:27	1.73	0.97	1.00
166_(STM)	CONDUIT	0.832	0 01:27	1.51	1.01	1.00
202_(14)_(STM)	CONDUIT	3.879	0 01:18	3.43	2.93	1.00
202_(15)_(STM)_2	CONDUIT	0.616	0 01:44	0.54	0.19	1.00
202_(27)_(STM)	CONDUIT	3.231	0 01:18	1.71	0.61	1.00
C1	CHANNEL	0.000	0 00:00	0.00	0.00	0.00
C10	CHANNEL	0.010	0 01:20	0.26	0.00	0.09
C11	CHANNEL	0.008	0 01:20	0.64	0.00	0.06
C12	CHANNEL	0.000	0 00:00	0.00	0.00	0.00
C13	CONDUIT	0.000	0 00:00	0.00	0.00	0.00
C17	CONDUIT	0.000	0 00:00	0.00	0.00	0.00
C19	CONDUIT	0.000	0 00:00	0.00	0.00	0.00
C2	CHANNEL	0.000	0 00:00	0.00	0.00	0.00
C21	CONDUIT	0.103	0 01:10	0.80	0.02	0.18
C22	CONDUIT	0.001	0 01:17	0.09	0.00	0.04
C25	CHANNEL	0.000	0 00:00	0.00	0.00	0.20
C26	CHANNEL	0.004	0 01:11	0.10	0.00	0.22
C27	CHANNEL	0.000	0 00:00	0.00	0.00	0.22
C28	CHANNEL	0.028	0 01:10	0.11	0.00	0.24
C29	CHANNEL	0.004	0 01:11	0.14	0.00	0.32
C3	CHANNEL	0.000	0 00:00	0.00	0.00	0.00
C30	CHANNEL	0.000	0 00:00	0.00	0.00	0.29
C31	CHANNEL	0.000	0 00:00	0.00	0.00	0.24
C32	CHANNEL	0.000	0 00:00	0.00	0.00	0.24
C33	CHANNEL	0.000	0 00:00	0.00	0.00	0.25
C34	CHANNEL	0.025	0 01:09	0.14	0.00	0.27
C35	CHANNEL	0.004	0 01:11	0.03	0.00	0.34

23/12/2025

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560 Hazeldean Road – Double Deck Subdivision PCSWMM Model 3-hr 100-year Chicago Storm Model Output

C36	CHANNEL	0.008	0	01:16	0.02	0.00	0.35
C37	CHANNEL	0.002	0	01:22	0.11	0.00	0.24
C38	CHANNEL	0.000	0	00:00	0.00	0.00	0.30
C39	CHANNEL	0.000	0	00:00	0.00	0.00	0.30
C4	CHANNEL	0.000	0	00:00	0.00	0.00	0.00
C40	CHANNEL	0.000	0	00:00	0.00	0.00	0.26
C41	CHANNEL	0.000	0	00:00	0.00	0.00	0.26
C42	CONDUIT	0.000	0	00:00	0.00	0.00	0.00
C43	CHANNEL	0.000	0	00:00	0.00	0.00	0.22
C44	CHANNEL	0.000	0	00:00	0.00	0.00	0.22
C45	CHANNEL	0.000	0	00:00	0.00	0.00	0.33
C46	CHANNEL	0.000	0	00:00	0.00	0.00	0.16
C47	CHANNEL	0.000	0	00:00	0.00	0.00	0.16
C48	CHANNEL	0.000	0	00:00	0.00	0.00	0.22
C49	CHANNEL	0.000	0	00:00	0.00	0.00	0.20
C5	CHANNEL	0.000	0	00:00	0.00	0.00	0.03
C50	CHANNEL	0.042	0	01:10	0.13	0.01	0.26
C51	CHANNEL	0.040	0	01:10	0.06	0.00	0.38
C52	CHANNEL	0.046	0	01:10	0.08	0.01	0.38
C53	CHANNEL	0.018	0	01:12	0.06	0.00	0.36
C54	CHANNEL	0.000	0	00:00	0.00	0.00	0.32
C55	CHANNEL	0.000	0	00:00	0.00	0.00	0.26
C56	CHANNEL	0.000	0	00:00	0.00	0.00	0.18
C57	CHANNEL	0.000	0	00:00	0.00	0.00	0.18
C58	CHANNEL	0.005	0	01:22	0.16	0.00	0.20
C59	CONDUIT	0.000	0	00:00	0.00	0.00	0.50
C6	CONDUIT	1.144	0	01:59	3.90	0.72	0.96
C7	CONDUIT	0.000	0	00:00	0.00	0.00	0.00
C7_1	CONDUIT	0.379	0	02:00	0.40	0.05	0.87
C7_2	CONDUIT	0.360	0	02:02	0.36	0.07	1.00
C8	CHANNEL	2.314	0	02:25	1.25	0.10	0.83
C9	CHANNEL	1.151	0	01:57	0.50	0.05	0.81
POND2-OUT	CONDUIT	1.143	0	02:00	0.68	0.43	1.00
STM-13_(STM)	CONDUIT	0.030	0	02:00	0.61	0.54	1.00
STM-16_(STM)	CONDUIT	0.053	0	01:41	0.83	0.94	1.00
STM-164_(STM)	CONDUIT	0.037	0	01:41	0.72	0.64	1.00
STM-165_(STM)	CONDUIT	0.290	0	01:28	0.91	0.68	1.00
STM-166_(STM)	CONDUIT	0.344	0	01:28	0.64	0.63	1.00
STM-20_(STM)	CONDUIT	0.234	0	01:28	1.22	0.69	1.00
STM-3_(1)_1_(STM)	CONDUIT	0.276	0	01:28	0.84	0.85	1.00
STM-3_(1)_1_(STM)	CONDUIT	0.304	0	01:28	0.85	0.93	1.00
STM-3_(2)_1_(STM)	CONDUIT	0.695	0	01:27	0.93	0.81	1.00
STM-3_(STM)_2)	CONDUIT	0.704	0	01:27	0.94	0.96	1.00
STM-5_(1)_1_(STM)	CONDUIT	0.215	0	01:28	0.92	0.84	1.00
STM-5_(STM)	CONDUIT	0.215	0	01:28	0.92	0.84	1.00
STM-7_(STM)	CONDUIT	0.182	0	01:05	1.02	0.95	1.00
STM-9_(STM)	CONDUIT	0.068	0	01:14	1.07	0.66	1.00
O-A01	ORIFICE	0.010	0	01:21			1.00
O-A04	ORIFICE	0.011	0	01:10			1.00
O-A05	ORIFICE	0.019	0	01:47			1.00
O-A06	ORIFICE	0.017	0	01:05			1.00
O-A11	ORIFICE	0.016	0	01:22			1.00
O-A14	ORIFICE	0.019	0	01:21			1.00
O-A15	ORIFICE	0.213	0	01:21			1.00
OR1	ORIFICE	0.346	0	01:21			1.00
OR10	ORIFICE	0.022	0	01:11			1.00
OR11	ORIFICE	0.020	0	01:12			1.00
OR12	ORIFICE	0.034	0	01:23			1.00
OR13	ORIFICE	0.031	0	01:10			1.00
OR14	ORIFICE	0.018	0	01:21			1.00
OR15	ORIFICE	0.033	0	01:12			1.00
OR16	ORIFICE	0.032	0	01:17			1.00
OR17	ORIFICE	0.039	0	01:12			1.00
OR18	ORIFICE	0.035	0	01:12			1.00
OR19	ORIFICE	0.048	0	01:12			1.00
OR2	ORIFICE	0.461	0	01:21			1.00
OR20	ORIFICE	0.066	0	01:12			1.00
OR4	ORIFICE	0.021	0	01:19			1.00
OR5	ORIFICE	0.026	0	01:10			1.00
OR6	ORIFICE	0.030	0	01:12			1.00
OR7	ORIFICE	0.830	0	01:13			1.00
OR8	ORIFICE	0.347	0	01:19			1.00
OR9	ORIFICE	0.407	0	01:20			1.00
P2-2yr_Orifice	ORIFICE	0.133	0	02:00			1.00
P2-ED_Orifice	ORIFICE	0.031	0	02:00			1.00
202_(15)_(STM)_1	WEIR	0.618	0	01:44			0.27
P2-100yrWeir	WEIR	0.379	0	01:59			0.17
P2-5-10yrWeir	WEIR	0.979	0	01:59			0.96
OR3	DUMMY	0.828	0	01:18			

Flow Classification Summary

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class								
		Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
106_(STM)	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
108_(STM)	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.01	0.01	0.00
110_(1)_(STM)	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.79	0.00
110_(STM)	1.00	0.00	0.00	0.00	0.38	0.00	0.00	0.62	0.07	0.00
112_(STM)	1.00	0.00	0.00	0.00	0.68	0.00	0.00	0.32	0.24	0.00
118_(STM)	1.00	0.00	0.00	0.00	0.98	0.00	0.00	0.02	0.00	0.00
120_(STM)	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
122_(1)_(STM)	1.00	0.00	0.00	0.00	0.61	0.00	0.00	0.39	0.08	0.00
122_(STM)	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.01	0.21	0.00
124_(1)_(STM)	1.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
124_(STM)	1.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
160_(STM)	1.00	0.00	0.00	0.00	0.30	0.00	0.00	0.70	0.07	0.00
166_(STM)	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.05	0.00
202_(14)_(STM)	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
202_(15)_(STM)_2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
202_(27)_(STM)	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C10	1.00	0.99	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
C11	1.00	0.03	0.97	0.00	0.00	0.00	0.00	0.00	0.97	0.00
C12	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C17	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C19	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C21	1.00	0.98	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
C22	1.00	0.99	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
C25	1.00	0.98	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C26	1.00	0.00	0.00	0.00	0.02	0.00	0.00	0.98	0.02	0.00
C27	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C28	1.00	0.00	0.00	0.00	0.01	0.00	0.00	0.99	0.01	0.00
C29	1.00	0.00	0.00	0.00	0.01	0.00	0.00	0.99	0.01	0.00
C3	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C30	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C31	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C32	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C33	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C34	1.00	0.00	0.00	0.00	0.01	0.00	0.00	0.99	0.01	0.00
C35	1.00	0.00	0.00	0.00	0.03	0.00	0.00	0.97	0.03	0.00
C36	1.00	0.00	0.00	0.00	0.03	0.00	0.00	0.97	0.02	0.00
C37	1.00	0.00	0.00	0.00	0.01	0.00	0.00	0.99	0.01	0.00
C38	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C39	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C4	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C40	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C41	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C42	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C43	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C44	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C45	1.00	0.97	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C46	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C47	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C48	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C49	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C5	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C50	1.00	0.00	0.00	0.00	0.01	0.00	0.00	0.99	0.00	0.00
C51	1.00	0.00	0.00	0.00	0.01	0.00	0.00	0.99	0.01	0.00
C52	1.00	0.00	0.00	0.00	0.01	0.00	0.00	0.99	0.01	0.00
C53	1.00	0.00	0.00	0.00	0.01	0.00	0.00	0.99	0.01	0.00
C54	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C55	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C56	1.00	0.98	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C57	1.00	0.98	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C58	1.00	0.02	0.00	0.00	0.01	0.00	0.00	0.96	0.01	0.00
C59	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C6	1.00	0.00	0.00	0.00	0.37	0.05	0.00	0.59	0.13	0.00
C7	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C7_1	1.00	0.43	0.30	0.00	0.27	0.00	0.00	0.00	0.78	0.00
C7_2	1.00	0.43	0.00	0.00	0.47	0.00	0.00	0.11	0.14	0.00
C8	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C9	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.02	0.00
POND2-OUT	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.01	0.00
STM-13_(STM)	1.00	0.00	0.01	0.00	0.36	0.00	0.00	0.62	0.68	0.00
STM-16_(STM)	1.00	0.00	0.01	0.00	0.31	0.00	0.00	0.68	0.12	0.00
STM-164_(STM)	1.00	0.00	0.09	0.00	0.91	0.00	0.00	0.00	0.84	0.00

560 Hazeldean Road – Double Deck Subdivision PCSWMM Model 3-hr 100-year Chicago Storm Model Output

```
STM-165_(STM)      1.00  0.00  0.00  0.00  1.00  0.00  0.00  0.00  0.01  0.00
STM-166_(STM)      1.00  0.00  0.00  0.00  1.00  0.00  0.00  0.00  0.00  0.00
STM-20_(STM)       1.00  0.00  0.00  0.00  0.98  0.00  0.00  0.02  0.24  0.00
STM-3_(1)_(1)_(STM) 1.00  0.00  0.00  0.00  1.00  0.00  0.00  0.00  0.01  0.00
STM-3_(1)_(STM)    1.00  0.00  0.00  0.00  1.00  0.00  0.00  0.00  0.00  0.00
STM-3_(2)_(STM)    1.00  0.00  0.00  0.00  1.00  0.00  0.00  0.00  0.00  0.00
STM-3_(STM_(2))    1.00  0.00  0.00  0.00  1.00  0.00  0.00  0.00  0.00  0.00
STM-5_(1)_(STM)    1.00  0.00  0.08  0.00  0.92  0.00  0.00  0.00  0.14  0.00
STM-5_(STM)        1.00  0.00  0.02  0.00  0.97  0.00  0.00  0.02  0.13  0.00
STM-7_(STM)        1.00  0.00  0.05  0.00  0.58  0.00  0.00  0.37  0.30  0.00
STM-9_(STM)        1.00  0.00  0.00  0.00  0.09  0.00  0.00  0.91  0.06  0.00
```

Conduit Surcharge Summary

Conduit	----- Both Ends	Hours Full Upstream	----- Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
106_(STM)	3.54	3.54	6.40	0.01	0.26
108_(STM)	2.03	2.04	3.00	0.01	0.25
110_(1)_(STM)	0.57	0.57	0.68	0.01	0.01
110_(STM)	0.66	0.66	0.78	0.01	0.01
112_(STM)	0.49	0.49	1.05	0.01	0.01
118_(STM)	5.54	5.57	6.38	0.49	0.63
120_(STM)	4.85	4.85	5.02	0.01	0.01
122_(1)_(STM)	3.04	3.04	3.47	0.01	0.01
122_(STM)	3.42	3.42	4.37	0.01	0.01
124_(1)_(STM)	0.01	0.01	0.01	0.12	0.01
160_(STM)	0.43	0.43	0.47	0.01	0.01
166_(STM)	0.49	0.49	0.57	0.01	0.02
202_(14)_(STM)	18.87	18.93	19.44	0.94	0.69
202_(15)_(STM)_2	18.86	18.86	30.14	0.01	0.01
202_(27)_(STM)	7.42	7.42	18.13	0.01	0.01
C6	0.01	0.01	7.43	0.01	0.01
C7_1	0.01	0.01	10.14	0.01	0.01
C7_2	10.59	10.59	15.19	0.01	0.01
POND2-OUT	10.42	10.42	11.40	0.01	0.01
STM-13_(STM)	5.12	5.12	8.90	0.01	0.01
STM-16_(STM)	3.79	3.79	5.78	0.01	0.05
STM-164_(STM)	2.91	2.91	3.79	0.01	0.01
STM-165_(STM)	8.90	8.90	14.23	0.01	0.01
STM-166_(STM)	14.37	14.37	17.47	0.01	0.01
STM-20_(STM)	6.98	6.98	9.07	0.01	0.01
STM-3_(1)_(1)_(STM)	12.54	12.54	15.22	0.01	0.01
STM-3_(1)_(STM)	15.47	15.47	17.73	0.01	0.59
STM-3_(2)_(STM)	17.47	17.47	18.53	0.01	0.02
STM-3_(STM_(2))	18.52	18.53	18.79	0.01	0.93
STM-5_(1)_(STM)	10.45	10.45	11.61	0.01	0.40
STM-5_(STM)	11.61	11.61	12.71	0.01	0.27
STM-7_(STM)	5.74	5.74	10.25	0.01	0.01
STM-9_(STM)	0.24	0.24	1.22	0.01	0.01

Analysis begun on: Tue Dec 23 09:16:02 2025
Analysis ended on: Tue Dec 23 09:16:12 2025
Total elapsed time: 00:00:10

23/12/2025

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560 Hazeldean Road – Double Deck Subdivision PCSWMM Model MTO 100-year SCS Storm Model Output

EPA STORM WATER MANAGEMENT MODEL – VERSION 5.1 (Build 5.1.013)

Element Count

Number of rain gages 1
Number of subcatchments ... 32
Number of nodes 90
Number of links 117
Number of pollutants 0
Number of land uses 0

Raingage Summary

Name	Data Source	Data Type	Recording Interval
RG1	MTO_100yr_12hrSCS	INTENSITY	15 min.

Subcatchment Summary

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
A-01	0.03	8.57	36.70	1.0000	RG1	OF3
A-02	0.39	112.00	55.90	1.0000	RG1	OF3
A-03	0.10	51.00	55.90	1.0000	RG1	CB_A03
A-04	0.34	171.00	84.80	1.0000	RG1	CB_A04
A-05	0.26	131.50	82.10	1.0000	RG1	CB_A05
A-06	0.19	96.00	81.00	1.0000	RG1	CB_A06
A-07	0.21	107.00	81.30	1.0000	RG1	CB_A07
A-08	0.17	86.00	82.00	1.0000	RG1	CB_A08
A-09	0.31	87.71	58.60	1.0000	RG1	CB_A09
A-10	0.18	88.50	80.80	1.0000	RG1	CB_A10
A-11	0.13	65.50	65.60	1.0000	RG1	CB_A11
A-12	0.17	84.50	54.40	1.0000	RG1	CB_A12
A-13	0.17	86.00	82.00	1.0000	RG1	CB_A13
A-14	0.45	74.83	56.30	1.0000	RG1	CB_A14
A-15	0.18	89.00	84.80	1.0000	RG1	CB_A15
A-16	0.12	57.50	81.70	1.0000	RG1	CB_A16
A-17	0.12	117.00	43.60	1.0000	RG1	CB_A17
A-18	0.16	78.00	85.30	1.0000	RG1	CB_A18
A-19	0.31	153.50	58.60	1.0000	RG1	CB_A19
A-20	0.14	70.00	83.60	1.0000	RG1	CB_A20
A-21	0.19	95.50	59.20	1.0000	RG1	CB_A21
A-22	0.14	72.50	66.90	1.0000	RG1	CB_A22
A-23	1.53	127.33	85.10	1.0000	RG1	CB_A23
A-24	0.02	6.00	44.40	1.0000	RG1	POND2-Fernbank
K1	2.40	164.00	86.00	0.5000	RG1	K1_S
K2	4.21	247.00	64.00	0.5000	RG1	K2_S
R1	4.63	308.00	86.00	0.5000	RG1	R1_S
R2	4.47	320.00	64.00	0.5000	RG1	R2_S
R3	3.22	183.00	64.00	0.5000	RG1	R3_S
R4	2.60	152.00	64.00	0.5000	RG1	R4_S
X-R5	0.70	275.00	64.00	0.5000	RG1	CarpOut
XX-Pond	1.37	61.00	43.00	0.5000	RG1	POND2-Fernbank

Node Summary

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
1_ (STM)	JUNCTION	92.89	3.71	0.0	
201	JUNCTION	93.66	1.59	0.0	
203_ (STM)	JUNCTION	93.33	5.02	0.0	
CB_A04	JUNCTION	95.51	2.40	0.0	
CB_A05	JUNCTION	95.46	2.40	0.0	
CB_A06	JUNCTION	95.42	2.40	0.0	
CB_A07	JUNCTION	95.32	2.40	0.0	
CB_A08	JUNCTION	95.47	2.53	0.0	
CB_A10	JUNCTION	95.50	2.40	0.0	
CB_A11	JUNCTION	95.16	2.74	0.0	
CB_A13	JUNCTION	95.69	2.40	0.0	
CB_A15	JUNCTION	95.56	2.64	0.0	
CB_A16	JUNCTION	95.89	2.40	0.0	

CB_A17	JUNCTION	95.88	2.92	0.0
CB_A18	JUNCTION	95.89	2.40	0.0
CB_A20	JUNCTION	96.02	2.40	0.0
CB_A22	JUNCTION	95.86	2.40	0.0
HW-02	JUNCTION	92.66	2.54	0.0
J1	JUNCTION	99.75	0.35	0.0
J10	JUNCTION	97.43	1.00	0.0
J12	JUNCTION	97.47	1.00	0.0
J14	JUNCTION	97.17	1.00	0.0
J16	JUNCTION	96.76	1.00	0.0
J17	JUNCTION	97.80	1.00	0.0
J19	JUNCTION	97.43	1.00	0.0
J2	JUNCTION	92.90	1.75	0.0
J21	JUNCTION	97.14	1.00	0.0
J23	JUNCTION	97.15	1.00	0.0
J25	JUNCTION	97.12	1.00	0.0
J27	JUNCTION	97.10	1.00	0.0
J29	JUNCTION	97.06	1.00	0.0
J3	JUNCTION	93.70	1.30	0.0
J30	JUNCTION	97.07	1.00	0.0
J32	JUNCTION	97.08	1.00	0.0
J34	JUNCTION	97.43	1.00	0.0
J35	JUNCTION	97.23	1.00	0.0
J36	JUNCTION	97.42	1.00	0.0
J4	JUNCTION	97.62	1.00	0.0
J6	JUNCTION	97.54	1.00	0.0
J8	JUNCTION	97.64	1.00	0.0
MH200_ (STM)	JUNCTION	92.97	3.81	0.0
MH200a	JUNCTION	92.97	3.81	0.0
OVF	JUNCTION	94.12	1.38	0.0
POND2_MN	JUNCTION	92.95	1.75	0.0
R102_ (STM)	JUNCTION	93.43	4.78	0.0
R103_ (STM)	JUNCTION	93.49	4.71	0.0
R104_ (STM)	JUNCTION	93.58	5.11	0.0
R105_ (STM)	JUNCTION	93.70	5.18	0.0
R110_ (STM)	JUNCTION	95.18	3.80	0.0
R111_ (STM)	JUNCTION	95.29	3.73	0.0
R118_ (STM)	JUNCTION	93.25	5.87	0.0
R120_ (STM)	JUNCTION	93.42	4.98	0.0
R121_ (STM)	JUNCTION	94.09	4.90	0.0
R122_ (STM)	JUNCTION	94.25	5.97	0.0
R123_ (STM)	JUNCTION	94.41	5.32	0.0
R124_ (STM)	JUNCTION	93.60	5.29	0.0
R127_ (STM)	JUNCTION	93.91	4.94	0.0
CarpOut	OUTFALL	0.00	0.00	0.0
QF1	OUTFALL	99.91	0.31	0.0
QF2	OUTFALL	92.88	1.76	0.0
QF3	OUTFALL	94.34	1.20	0.0
QF4	OUTFALL	96.00	2.00	0.0
100	STORAGE	93.21	3.54	0.0
102	STORAGE	93.25	3.94	0.0
104	STORAGE	93.63	3.35	0.0
106	STORAGE	93.73	3.08	0.0
108	STORAGE	93.83	2.96	0.0
110	STORAGE	93.86	2.94	0.0
112	STORAGE	94.10	2.97	0.0
114	STORAGE	94.45	2.70	0.0
116	STORAGE	94.55	2.70	0.0
118	STORAGE	95.02	2.32	0.0
120	STORAGE	93.52	3.96	0.0
122	STORAGE	93.75	3.85	0.0
124	STORAGE	94.35	3.04	0.0
CAP1	STORAGE	93.89	3.08	0.0
CB_A03	STORAGE	95.16	2.40	0.0
CB_A09	STORAGE	94.29	2.40	0.0
CB_A12	STORAGE	95.66	2.40	0.0
CB_A14	STORAGE	95.29	2.40	0.0
CB_A19	STORAGE	95.53	2.40	0.0
CB_A21	STORAGE	96.12	2.40	0.0
CB_A23	STORAGE	95.60	2.40	0.0
K1_S	STORAGE	98.05	1.75	0.0
K2_S	STORAGE	98.05	1.75	0.0
POND2-Fernbank	STORAGE	91.50	3.75	0.0
R1_S	STORAGE	97.50	1.75	0.0
R2_S	STORAGE	97.50	1.75	0.0
R3_S	STORAGE	97.75	1.75	0.0
R4_S	STORAGE	97.30	1.75	0.0

Link Summary

23/12/2025

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560 Hazeldean Road – Double Deck Subdivision PCSWMM Model MTO 100-year SCS Storm Model Output

Name	From Node	To Node	Type	Length	%Slope	Roughness
106_(STM)	R118_(STM)	203_(STM)	CONDUIT	119.9	0.1501	0.0130
108_(STM)	R120_(STM)	R118_(STM)	CONDUIT	98.0	0.1530	0.0130
110_(1)_(STM)	R122_(STM)	R121_(STM)	CONDUIT	82.9	0.1930	0.0130
110_(STM)	R121_(STM)	R120_(STM)	CONDUIT	66.7	0.1948	0.0130
112_(STM)	R124_(STM)	R120_(STM)	CONDUIT	78.7	0.2414	0.0130
118_(STM)	R102_(STM)	203_(STM)	CONDUIT	25.4	0.1575	0.0130
120_(STM)	R103_(STM)	R102_(STM)	CONDUIT	5.0	0.1988	0.0130
122_(1)_(STM)	R105_(STM)	R104_(STM)	CONDUIT	29.3	0.1704	0.0130
122_(STM)	R104_(STM)	R103_(STM)	CONDUIT	51.5	0.1553	0.0130
124_(1)_(STM)	R111_(STM)	R110_(STM)	CONDUIT	30.1	0.1330	0.0130
124_(STM)	R110_(STM)	R105_(STM)	CONDUIT	60.2	0.1660	0.0130
160_(STM)	R127_(STM)	R124_(STM)	CONDUIT	58.3	0.1543	0.0130
166_(STM)	R123_(STM)	R122_(STM)	CONDUIT	44.4	0.1350	0.0130
202_(14)_(STM)	MH200_(STM)	POND2-Fernbank	CONDUIT	17.3	0.1156	0.0130
202_(15)_(STM)_2	MH200a	POND2-Fernbank	CONDUIT	33.2	0.6936	0.0130
202_(27)_(STM)	203_(STM)	MH200_(STM)	CONDUIT	69.5	0.5037	0.0130
C1	K1_S	J1	CONDUIT	145.1	0.0345	0.0130
C10	R3_S	R4_S	CONDUIT	142.9	0.3149	0.0130
C11	R4_S	J36	CONDUIT	129.9	1.2166	0.0130
C12	CB_A09	POND2-Fernbank	CONDUIT	124.3	0.6679	0.0130
C13	CB_A23	OF4	CONDUIT	64.4	0.5435	0.0150
C17	CB_A12	CB_A11	CONDUIT	61.2	0.8332	0.0150
C19	CB_A03	OF3	CONDUIT	20.0	11.9341	0.0350
C2	J1	R2_S	CONDUIT	209.6	0.2624	0.0130
C21	CB_A19	CB_A15	CONDUIT	41.3	0.1937	0.0150
C22	CB_A14	CB_A08	CONDUIT	51.2	0.0781	0.0150
C25	J4	CB_A22	CONDUIT	33.4	1.0763	0.0130
C26	CB_A22	J6	CONDUIT	36.3	-0.7719	0.0130
C27	J8	CB_A20	CONDUIT	23.4	0.9395	0.0130
C28	CB_A20	J6	CONDUIT	23.4	-0.5119	0.0130
C29	J6	CB_A04	CONDUIT	75.0	0.8404	0.0130
C3	K2_S	J1	CONDUIT	59.6	0.0839	0.0130
C30	CB_A04	J21	CONDUIT	18.5	-1.2423	0.0130
C31	J21	CB_A05	CONDUIT	36.0	0.7771	0.0130
C32	CB_A05	J25	CONDUIT	25.0	-1.0383	0.0130
C33	J8	CB_A18	CONDUIT	33.8	1.0346	0.0130
C34	CB_A18	J10	CONDUIT	15.2	-0.9230	0.0130
C35	J10	CB_A15	CONDUIT	52.4	0.8978	0.0130
C36	CB_A15	J23	CONDUIT	7.5	-2.5443	0.0130
C37	J23	CB_A05	CONDUIT	42.3	0.6862	0.0130
C38	J25	CB_A06	CONDUIT	38.0	0.7899	0.0130
C39	CB_A06	J27	CONDUIT	12.1	-2.3053	0.0130
C4	R1_S	OF1	CONDUIT	119.8	-0.5508	0.0130
C40	J27	CB_A07	CONDUIT	29.7	1.2810	0.0130
C41	CB_A07	J29	CONDUIT	8.9	-3.8377	0.0130
C42	J29	POND2-Fernbank	CONDUIT	50.0	3.7226	0.0320
C43	J12	CB_A16	CONDUIT	10.8	1.6678	0.0130
C44	CB_A16	J34	CONDUIT	19.0	-0.7378	0.0130
C45	J34	CB_A15	CONDUIT	52.0	0.9039	0.0130
C46	J17	CB_A17	CONDUIT	22.2	2.3441	0.0130
C47	CB_A17	J19	CONDUIT	10.0	-1.4929	0.0130
C48	J19	CB_A16	CONDUIT	19.8	0.7074	0.0130
C49	J12	CB_A13	CONDUIT	35.5	1.0700	0.0130
C5	R2_S	R4_S	CONDUIT	152.1	0.1315	0.0130
C50	CB_A13	J14	CONDUIT	13.5	-0.5907	0.0130
C51	J14	CB_A10	CONDUIT	22.0	1.2286	0.0130
C52	CB_A10	J32	CONDUIT	25.6	-0.7023	0.0130
C53	J32	CB_A08	CONDUIT	18.0	1.1656	0.0130
C54	CB_A08	J30	CONDUIT	26.5	-0.7536	0.0130
C55	J30	CB_A07	CONDUIT	33.8	1.0358	0.0130
C56	J35	CB_A11	CONDUIT	32.6	2.0543	0.0130
C57	CB_A11	J16	CONDUIT	6.6	-3.0102	0.0130
C58	J36	CB_A11	CONDUIT	36.5	2.3548	0.0130
C59	J16	POND2-Fernbank	CONDUIT	20.0	27.2597	0.0350
C6	201	HW-02	CONDUIT	11.4	2.0215	0.0130
C7	CB_A21	CB_A17	CONDUIT	50.5	0.1386	0.0150
C7_1	OVF	J3	CONDUIT	30.0	1.4001	0.0350
C7_2	J3	J2	CONDUIT	45.0	0.6000	0.0350
C8	J2	OF2	CONDUIT	10.0	0.1272	0.0500
C9	POND2_MN	J2	CONDUIT	41.5	0.1277	0.0500
POND2-OUT	HW-02	POND2_MN	CONDUIT	58.5	0.1026	0.0320
STM-13_(STM)	124	122	CONDUIT	44.2	0.3394	0.0130
STM-16_(STM)	114	112	CONDUIT	38.0	0.3421	0.0130
STM-164_(STM)	116	114	CONDUIT	28.0	0.3568	0.0130
STM-165_(STM)	120	122	CONDUIT	101.2	0.1482	0.0130
STM-166_(STM)	120	102	CONDUIT	83.8	0.1432	0.0130
STM-20_(STM)	CAP1	122	CONDUIT	42.8	0.1636	0.0130
STM-3_(1)_(1)_(STM)	106	104	CONDUIT	60.0	0.1500	0.0130
STM-3_(1)_(STM)	104	102	CONDUIT	59.6	0.1510	0.0130
STM-3_(2)_(STM)	102	100	CONDUIT	27.2	0.1471	0.0130

STM-3_(STM)_2)	100	MH200_(STM)	CONDUIT	9.3	0.1075	0.0130
STM-5_(1)_(STM)	110	108	CONDUIT	17.1	0.1754	0.0130
STM-5_(STM)	108	106	CONDUIT	17.2	0.1744	0.0130
STM-7_(STM)	112	110	CONDUIT	80.8	0.1980	0.0130
STM-9_(STM)	118	112	CONDUIT	89.6	0.3460	0.0130
O-A01	CB_A03	124	ORIFICE			
O-A04	CB_A19	114	ORIFICE			
O-A05	CB_A14	106	ORIFICE			
O-A06	CB_A09	106	ORIFICE			
O-A11	CB_A12	102	ORIFICE			
O-A14	CB_A21	122	ORIFICE			
O-A15	CB_A23	CAP1	ORIFICE			
OR1	K1_S	R123_(STM)	ORIFICE			
OR10	CB_A17	120	ORIFICE			
OR11	CB_A16	120	ORIFICE			
OR12	CB_A15	116	ORIFICE			
OR13	CB_A13	102	ORIFICE			
OR14	CB_A11	100	ORIFICE			
OR15	CB_A10	104	ORIFICE			
OR16	CB_A08	106	ORIFICE			
OR17	CB_A07	110	ORIFICE			
OR18	CB_A06	112	ORIFICE			
OR19	CB_A05	112	ORIFICE			
OR2	K2_S	R123_(STM)	ORIFICE			
OR20	CB_A04	118	ORIFICE			
OR4	CB_A22	CAP1	ORIFICE			
OR5	CB_A20	122	ORIFICE			
OR6	CB_A18	120	ORIFICE			
OR7	R2_S	R120_(STM)	ORIFICE			
OR8	R4_S	R102_(STM)	ORIFICE			
OR9	R3_S	R111_(STM)	ORIFICE			
P2-2yr_Orifice	POND2-Fernbank	201	ORIFICE			
P2-ED_Orifice	POND2-Fernbank	201	ORIFICE			
202_(15)_(STM)_1	MH200_(STM)	MH200a	WEIR			
P2-100yrWeir	POND2-Fernbank	OVF	WEIR			
P2-5-10yrWeir	POND2-Fernbank	201	WEIR			
OR3	R1_S	R127_(STM)	OUTLET			

Cross Section Summary							

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
106_(STM)	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2.91
108_(STM)	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2.94
110_(1)_(STM)	CIRCULAR	0.97	0.75	0.24	0.97	1	0.98
110_(STM)	CIRCULAR	0.97	0.75	0.24	0.97	1	0.99
112_(STM)	CIRCULAR	1.20	1.13	0.30	1.20	1	1.92
118_(STM)	CIRCULAR	0.90	0.64	0.23	0.90	1	0.72
120_(STM)	CIRCULAR	0.90	0.64	0.23	0.90	1	0.81
122_(1)_(STM)	CIRCULAR	0.82	0.53	0.21	0.82	1	0.59
122_(STM)	CIRCULAR	0.90	0.64	0.23	0.90	1	0.71
124_(1)_(STM)	CIRCULAR	0.75	0.44	0.19	0.75	1	0.41
124_(STM)	CIRCULAR	0.82	0.53	0.21	0.82	1	0.58
160_(STM)	CIRCULAR	0.97	0.75	0.24	0.97	1	0.88
166_(STM)	CIRCULAR	0.97	0.75	0.24	0.97	1	0.82
202_(14)_(STM)	CIRCULAR	1.20	1.13	0.30	1.20	1	1.33
202_(15)_(STM)_2	CIRCULAR	1.20	1.13	0.30	1.20	1	3.25
202_(27)_(STM)	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	5.34
C1	Pvt_Road	0.31	3.08	0.19	18.00	1	1.46
C10	Pvt_Road	0.31	3.08	0.19	18.00	1	4.41
C11	Pvt_Road	0.31	3.08	0.19	18.00	1	8.67
C12	Pvt_Road	0.31	3.08	0.19	18.00	1	6.42
C13	RECT_OPEN	1.00	3.00	0.60	3.00	1	10.49
C17	TRAPEZOIDAL	1.00	3.15	0.49	6.15	1	11.86
C19	TRAPEZOIDAL	1.00	3.15	0.49	6.15	1	19.24
C2	Pvt_Road	0.31	3.08	0.19	18.00	1	4.03
C21	TRAPEZOIDAL	1.00	3.15	0.49	6.15	1	5.72
C22	TRAPEZOIDAL	1.00	3.15	0.49	6.15	1	3.63
C25	Pvt_Road	0.31	3.08	0.19	18.00	1	8.15
C26	Pvt_Road	0.31	3.08	0.19	18.00	1	6.90
C27	Pvt_Road	0.31	3.08	0.19	18.00	1	7.62
C28	Pvt_Road	0.31	3.08	0.19	18.00	1	5.62
C29	Pvt_Road	0.31	3.08	0.19	18.00	1	7.20
C3	Pvt_Road	0.31	3.08	0.19	18.00	1	2.28
C30	Pvt_Road	0.31	3.08	0.19	18.00	1	8.76
C31	Pvt_Road	0.31	3.08	0.19	18.00	1	6.93
C32	Pvt_Road	0.31	3.08	0.19	18.00	1	8.01
C33	Pvt_Road	0.31	3.08	0.19	18.00	1	7.99
C34	Pvt_Road	0.31	3.08	0.19	18.00	1	7.55

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560 Hazeldean Road – Double Deck Subdivision PCSWMM Model MTO 100-year SCS Storm Model Output

C35	Pvt_Road	0.31	3.08	0.19	18.00	1	7.45
C36	Pvt_Road	0.31	3.08	0.19	18.00	1	12.53
C37	Pvt_Road	0.31	3.08	0.19	18.00	1	6.51
C38	Pvt_Road	0.31	3.08	0.19	18.00	1	6.98
C39	Pvt_Road	0.31	3.08	0.19	18.00	1	11.93
C4	Pvt_Road	0.31	3.08	0.19	18.00	1	5.83
C40	Pvt_Road	0.31	3.08	0.19	18.00	1	8.89
C41	Pvt_Road	0.31	3.08	0.19	18.00	1	15.39
C42	RECT_OPEN	1.00	6.00	0.75	6.00	1	29.87
C43	Pvt_Road	0.31	3.08	0.19	18.00	1	10.15
C44	Pvt_Road	0.31	3.08	0.19	18.00	1	6.75
C45	Pvt_Road	0.31	3.08	0.19	18.00	1	7.47
C46	Pvt_Road	0.31	3.08	0.19	18.00	1	12.03
C47	Pvt_Road	0.31	3.08	0.19	18.00	1	9.60
C48	Pvt_Road	0.31	3.08	0.19	18.00	1	6.61
C49	Pvt_Road	0.31	3.08	0.19	18.00	1	8.13
C5	Pvt_Road	0.31	3.08	0.19	18.00	1	2.85
C50	Pvt_Road	0.31	3.08	0.19	18.00	1	6.04
C51	Pvt_Road	0.31	3.08	0.19	18.00	1	8.71
C52	Pvt_Road	0.31	3.08	0.19	18.00	1	6.59
C53	Pvt_Road	0.31	3.08	0.19	18.00	1	8.48
C54	Pvt_Road	0.31	3.08	0.19	18.00	1	6.82
C55	Pvt_Road	0.31	3.08	0.19	18.00	1	8.00
C56	Pvt_Road	0.31	3.08	0.19	18.00	1	11.26
C57	Pvt_Road	0.31	3.08	0.19	18.00	1	13.63
C58	Pvt_Road	0.31	3.08	0.19	18.00	1	12.06
C59	RECT_OPEN	1.00	3.00	0.60	3.00	1	31.84
C6	CIRCULAR	0.75	0.44	0.19	0.75	1	1.58
C7	TRAPEZOIDAL	1.00	3.15	0.49	6.15	1	4.84
C7_1	TRAPEZOIDAL	0.30	5.11	0.28	17.93	1	7.45
C7_2	TRAPEZOIDAL	0.30	5.11	0.28	17.93	1	4.88
C8	channel2	1.75	42.73	0.72	32.40	1	23.88
C9	channel2	1.75	42.73	0.72	32.40	1	23.93
POND2-OUT	TRAPEZOIDAL	1.00	4.00	0.55	7.00	1	2.68
STM-13_(STM)	CIRCULAR	0.30	0.07	0.07	0.30	1	0.06
STM-16_(STM)	CIRCULAR	0.30	0.07	0.07	0.30	1	0.06
STM-164_(STM)	CIRCULAR	0.30	0.07	0.07	0.30	1	0.06
STM-165_(STM)	CIRCULAR	0.75	0.44	0.19	0.75	1	0.43
STM-166_(STM)	CIRCULAR	0.82	0.53	0.21	0.82	1	0.54
STM-20_(STM)	CIRCULAR	0.68	0.36	0.17	0.68	1	0.34
STM-3_(1)_1_(STM)	CIRCULAR	0.68	0.36	0.17	0.68	1	0.33
STM-3_(1)_2_(STM)	CIRCULAR	0.68	0.36	0.17	0.68	1	0.33
STM-3_(2)_1_(STM)	CIRCULAR	0.97	0.75	0.24	0.97	1	0.86
STM-3_(2)_2_(STM)	CIRCULAR	0.97	0.75	0.24	0.97	1	0.73
STM-5_(1)_1_(STM)	CIRCULAR	0.60	0.28	0.15	0.60	1	0.26
STM-5_(1)_2_(STM)	CIRCULAR	0.60	0.28	0.15	0.60	1	0.26
STM-7_(STM)	CIRCULAR	0.53	0.22	0.13	0.53	1	0.19
STM-9_(STM)	CIRCULAR	0.38	0.11	0.09	0.38	1	0.10

***** Transect Summary *****

Transect channel12 Area:

0.0017	0.0035	0.0054	0.0074	0.0095
0.0116	0.0139	0.0162	0.0186	0.0211
0.0237	0.0283	0.0400	0.0580	0.0817
0.1066	0.1317	0.1568	0.1822	0.2076
0.2332	0.2589	0.2848	0.3108	0.3369
0.3632	0.3896	0.4161	0.4427	0.4692
0.4958	0.5223	0.5488	0.5754	0.6019
0.6285	0.6550	0.6815	0.7081	0.7346
0.7611	0.7877	0.8142	0.8408	0.8673
0.8938	0.9204	0.9469	0.9735	1.0000

Hrad:

0.0465	0.0901	0.1312	0.1703	0.2075
0.2432	0.2776	0.3108	0.3429	0.3741
0.4045	0.4002	0.3240	0.2616	0.2292
0.2271	0.2366	0.2516	0.2696	0.2893
0.3103	0.3319	0.3541	0.3766	0.3993
0.4223	0.4455	0.4691	0.4934	0.5178
0.5423	0.5667	0.5911	0.6156	0.6400
0.6643	0.6887	0.7129	0.7372	0.7614
0.7855	0.8096	0.8336	0.8576	0.8815
0.9053	0.9291	0.9528	0.9764	1.0000

Width:

0.0665	0.0698	0.0730	0.0762	0.0795
0.0827	0.0860	0.0892	0.0924	0.0957
0.0989	0.3212	0.5591	0.7971	0.9353

0.9405	0.9458	0.9511	0.9563	0.9616
0.9668	0.9721	0.9773	0.9826	0.9878
0.9931	0.9972	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000

Transect Pvt_Road Area:

0.0006	0.0025	0.0057	0.0102	0.0159
0.0229	0.0312	0.0407	0.0516	0.0636
0.0770	0.0916	0.1076	0.1247	0.1422
0.1597	0.1772	0.1947	0.2123	0.2299
0.2475	0.2652	0.2828	0.3005	0.3185
0.3371	0.3565	0.3766	0.3974	0.4189
0.4411	0.4641	0.4878	0.5122	0.5373
0.5631	0.5896	0.6169	0.6449	0.6736
0.7030	0.7331	0.7640	0.7955	0.8278
0.8608	0.8945	0.9290	0.9641	1.0000

Hrad:

0.0159	0.0318	0.0477	0.0636	0.0794
0.0953	0.1112	0.1271	0.1430	0.1589
0.1748	0.1907	0.2065	0.2270	0.2586
0.2902	0.3217	0.3532	0.3846	0.4160
0.4473	0.4786	0.5098	0.5410	0.5699
0.5980	0.6250	0.6507	0.6752	0.6984
0.7204	0.7414	0.7613	0.7803	0.7985
0.8158	0.8324	0.8483	0.8635	0.8782
0.8923	0.9059	0.9190	0.9317	0.9439
0.9558	0.9673	0.9785	0.9894	1.0000

Width:

0.0351	0.0703	0.1054	0.1405	0.1757
0.2108	0.2459	0.2811	0.3162	0.3513
0.3865	0.4216	0.4567	0.4819	0.4826
0.4832	0.4839	0.4846	0.4853	0.4860
0.4867	0.4874	0.4881	0.4888	0.5049
0.5247	0.5445	0.5643	0.5841	0.6039
0.6237	0.6435	0.6633	0.6831	0.7029
0.7227	0.7425	0.7623	0.7821	0.8019
0.8218	0.8416	0.8614	0.8812	0.9010
0.9208	0.9406	0.9604	0.9802	1.0000

NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.

***** Analysis Options *****

Flow Units CMS

Process Models:

Rainfall/Runoff	 YES
RDII	 NO
Snowmelt	 NO
Groundwater	 NO
Flow Routing	 YES
Fonding Allowed	 YES
Water Quality	 NO
Infiltration Method	 CURVE_NUMBER
Flow Routing Method	 DYNWAVE
Surcharge Method	 EXTRAN
Starting Date	 07/23/2009 00:00:00
Ending Date	 07/25/2009 00:00:00
Antecedent Dry Days	 0.0
Report Time Step	 00:01:00
Wet Time Step	 00:01:00
Dry Time Step	 00:01:00
Routing Time Step	 1.00 sec
Variable Time Step	 NO
Maximum Trials	 8
Number of Threads	 4
Head Tolerance	 0.001500 m

*****	Volume	Depth
Runoff Quantity Continuity	hectare-m	mm
*****	-----	-----
Initial LID Storage	 0.033	1.103

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Total Precipitation	2.825	95.400
Evaporation Loss	0.000	0.000
Infiltration Loss	0.388	13.113
Surface Runoff	2.437	82.304
Final Storage	0.033	1.105
Continuity Error (%)	-0.019	

*****	Volume	Volume
Flow Routing Continuity	hectare-m	10 ⁶ ltr
*****	-----	-----
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	2.437	24.368
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.023	0.233
External Outflow	2.343	23.431
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.501	5.010
Final Stored Volume	0.621	6.206
Continuity Error (%)	-0.087	

Highest Continuity Errors

Node J36 (99.84%)
Node MH200a (-2.15%)

Highest Flow Instability Indexes

Link 202_(15)_(STM)_1 (14)
Link O-A06 (12)
Link 202_(15)_(STM)_2 (12)
Link STM-3_(STM_(2)) (12)
Link 202_(14)_(STM) (12)

Routing Time Step Summary

Minimum Time Step : 1.00 sec
Average Time Step : 1.00 sec
Maximum Time Step : 1.00 sec
Percent in Steady State : 0.00
Average Iterations per Step : 2.10
Percent Not Converging : 0.20

Subcatchment Runoff Summary

Total	Peak	Runoff	Total	Total	Total	Total	Imperv	Perv	Total
Runoff	Runoff	Coeff	Precip	Runon	Evap	Infil	Runoff	Runoff	Runoff
Subcatchment			mm	mm	mm	mm	mm	mm	mm
10 ⁶ ltr		CMS							
A-01			95.40	0.00	0.00	26.33	35.04	34.07	69.10
0.02	0.01	0.724							
A-02			95.40	0.00	0.00	18.27	53.36	23.80	77.16
0.30	0.12	0.809							
A-03			95.40	0.00	0.00	18.19	53.37	23.88	77.25
0.08	0.03	0.810							
A-04			95.40	0.00	0.00	6.24	80.95	8.26	89.21
0.31	0.12	0.935							
A-05			95.40	0.00	0.00	7.35	78.37	9.73	88.10
0.23	0.09	0.923							
A-06			95.40	0.00	0.00	7.81	77.32	10.32	87.65
0.17	0.06	0.919							
A-07			95.40	0.00	0.00	7.68	77.61	10.16	87.77
0.19	0.07	0.920							

A-08	0.15	0.06	0.923	95.40	0.00	0.00	7.39	78.28	9.78	88.06
A-09	0.24	0.09	0.821	95.40	0.00	0.00	17.15	55.94	22.35	78.29
A-10	0.15	0.06	0.918	95.40	0.00	0.00	7.89	77.13	10.43	87.56
A-11	0.11	0.04	0.852	95.40	0.00	0.00	14.17	62.63	18.65	81.28
A-12	0.13	0.05	0.803	95.40	0.00	0.00	18.82	51.94	24.69	76.63
A-13	0.15	0.06	0.923	95.40	0.00	0.00	7.39	78.28	9.78	88.06
A-14	0.35	0.13	0.809	95.40	0.00	0.00	18.21	53.73	23.48	77.21
A-15	0.16	0.06	0.935	95.40	0.00	0.00	6.24	80.95	8.26	89.21
A-16	0.10	0.04	0.922	95.40	0.00	0.00	7.52	77.99	9.94	87.94
A-17	0.08	0.03	0.757	95.40	0.00	0.00	23.21	41.63	30.60	72.24
A-18	0.14	0.05	0.937	95.40	0.00	0.00	6.03	81.43	7.99	89.42
A-19	0.24	0.09	0.821	95.40	0.00	0.00	17.07	55.94	22.43	78.37
A-20	0.12	0.05	0.930	95.40	0.00	0.00	6.73	79.80	8.92	88.72
A-21	0.15	0.06	0.824	95.40	0.00	0.00	16.82	56.52	22.10	78.62
A-22	0.12	0.05	0.858	95.40	0.00	0.00	13.63	63.87	17.95	81.81
A-23	1.36	0.50	0.935	95.40	0.00	0.00	6.18	81.20	8.03	89.24
A-24	0.01	0.01	0.759	95.40	0.00	0.00	23.06	42.39	29.99	72.38
K1	2.15	0.76	0.939	95.40	0.00	0.00	5.84	89.57	7.51	89.57
K2	3.37	1.05	0.839	95.40	0.00	0.00	15.35	80.06	18.99	80.06
R1	4.15	1.46	0.939	95.40	0.00	0.00	5.84	89.57	7.51	89.57
R2	3.58	1.14	0.840	95.40	0.00	0.00	15.27	80.14	19.07	80.14
R3	2.58	0.80	0.839	95.40	0.00	0.00	15.37	80.04	18.98	80.04
R4	2.08	0.65	0.839	95.40	0.00	0.00	15.36	80.05	18.99	80.05
X-R5	0.42	0.16	0.636	95.40	0.00	0.00	34.77	61.09	60.67	60.67
XX-Pond	0.97	0.24	0.739	95.40	0.00	0.00	24.95	70.45	29.43	70.45

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
L_(STM)	JUNCTION	0.00	0.00	92.89	0 00:00	0.00
201	JUNCTION	0.20	0.69	94.35	0 10:45	0.69
203_(STM)	JUNCTION	0.88	2.19	95.52	0 06:11	2.13
CB_A04	JUNCTION	0.03	1.56	97.07	0 06:00	1.56
CB_A05	JUNCTION	0.03	1.53	96.99	0 06:01	1.53
CB_A06	JUNCTION	0.03	1.57	96.99	0 06:00	1.57
CB_A07	JUNCTION	0.03	1.55	96.87	0 06:00	1.55
CB_A08	JUNCTION	0.03	1.57	97.04	0 06:01	1.57
CB_A10	JUNCTION	0.03	1.60	97.10	0 06:01	1.59
CB_A11	JUNCTION	0.04	1.51	96.67	0 06:01	1.51
CB_A13	JUNCTION	0.03	1.51	97.20	0 06:00	1.51
CB_A15	JUNCTION	0.05	1.61	97.17	0 06:03	1.61
CB_A16	JUNCTION	0.03	1.53	97.42	0 06:01	1.53
CB_A17	JUNCTION	0.02	1.51	97.39	0 06:00	1.51
CB_A18	JUNCTION	0.03	1.55	97.44	0 06:00	1.54
CB_A20	JUNCTION	0.03	1.53	97.55	0 06:00	1.53
CB_A22	JUNCTION	0.04	1.52	97.38	0 06:01	1.52
HW-02	JUNCTION	0.89	1.68	94.34	0 10:54	1.68
J1	JUNCTION	0.00	0.00	99.75	0 00:00	0.00
J10	JUNCTION	0.00	0.01	97.44	0 06:01	0.01
J12	JUNCTION	0.00	0.00	97.47	0 00:00	0.00

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J14	JUNCTION	0.00	0.03	97.20	0	06:00	0.03
J16	JUNCTION	0.00	0.00	96.76	0	00:00	0.00
J17	JUNCTION	0.00	0.00	97.80	0	00:00	0.00
J19	JUNCTION	0.00	0.00	97.43	0	00:00	0.00
J2	JUNCTION	0.64	1.44	94.34	0	10:55	1.44
J21	JUNCTION	0.00	0.00	97.14	0	00:00	0.00
J23	JUNCTION	0.00	0.02	97.17	0	06:04	0.02
J25	JUNCTION	0.00	0.00	97.12	0	00:00	0.00
J27	JUNCTION	0.00	0.00	97.10	0	00:00	0.00
J29	JUNCTION	0.00	0.00	97.06	0	00:00	0.00
J3	JUNCTION	0.13	0.64	94.34	0	10:56	0.64
J30	JUNCTION	0.00	0.00	97.07	0	00:00	0.00
J32	JUNCTION	0.00	0.02	97.10	0	06:01	0.02
J34	JUNCTION	0.00	0.00	97.43	0	00:00	0.00
J35	JUNCTION	0.00	0.00	97.23	0	00:00	0.00
J36	JUNCTION	0.00	0.00	97.42	0	06:06	0.00
J4	JUNCTION	0.00	0.00	97.62	0	00:00	0.00
J6	JUNCTION	0.00	0.01	97.55	0	06:01	0.01
J8	JUNCTION	0.00	0.00	97.64	0	00:00	0.00
MH200_(STM)	JUNCTION	1.23	2.31	95.28	0	06:26	2.29
MH200a	JUNCTION	1.23	2.29	95.26	0	06:26	2.25
OVF	JUNCTION	0.03	0.22	94.34	0	10:56	0.22
POND2_MN	JUNCTION	0.60	1.39	94.34	0	10:54	1.39
R102_(STM)	JUNCTION	0.79	2.18	95.61	0	06:12	2.18
R103_(STM)	JUNCTION	0.73	2.12	95.61	0	06:12	2.12
R104_(STM)	JUNCTION	0.65	2.06	95.64	0	06:12	2.06
R105_(STM)	JUNCTION	0.57	1.97	95.67	0	06:12	1.96
R110_(STM)	JUNCTION	0.35	0.76	95.94	0	06:05	0.76
R111_(STM)	JUNCTION	0.35	0.76	96.05	0	06:04	0.76
R118_(STM)	JUNCTION	0.96	2.71	95.96	0	06:11	2.45
R120_(STM)	JUNCTION	0.81	2.91	96.33	0	06:11	2.49
R121_(STM)	JUNCTION	0.39	2.55	96.64	0	06:11	1.96
R122_(STM)	JUNCTION	0.34	2.88	97.13	0	06:26	1.96
R123_(STM)	JUNCTION	0.23	2.96	97.37	0	06:26	1.88
R124_(STM)	JUNCTION	0.73	2.89	96.49	0	06:26	2.89
R127_(STM)	JUNCTION	0.64	3.31	97.22	0	06:26	3.31
CarpOut	OUTFALL	0.00	0.00	0.00	0	00:00	0.00
OF1	OUTFALL	0.00	0.00	99.91	0	00:00	0.00
OF2	OUTFALL	0.66	1.46	94.34	0	10:55	1.46
OF3	OUTFALL	0.00	0.00	94.34	0	00:00	0.00
OF4	OUTFALL	0.00	0.00	96.00	0	00:00	0.00
100	STORAGE	0.99	2.10	95.31	0	06:26	2.09
102	STORAGE	0.96	2.08	95.33	0	06:20	2.08
104	STORAGE	0.58	1.81	95.44	0	06:19	1.81
106	STORAGE	0.48	1.77	95.50	0	06:19	1.77
108	STORAGE	0.39	1.70	95.53	0	06:19	1.70
110	STORAGE	0.36	1.70	95.56	0	06:18	1.70
112	STORAGE	0.22	1.59	95.69	0	06:18	1.59
114	STORAGE	0.10	1.33	95.78	0	06:18	1.33
116	STORAGE	0.07	1.27	95.82	0	06:19	1.27
118	STORAGE	0.02	0.77	95.79	0	06:18	0.77
120	STORAGE	0.69	1.84	95.36	0	06:20	1.84
122	STORAGE	0.46	1.67	95.42	0	06:20	1.67
124	STORAGE	0.12	1.07	95.42	0	06:20	1.07
CAP1	STORAGE	0.34	1.56	95.45	0	06:20	1.56
CB_A03	STORAGE	0.06	1.74	96.90	0	06:03	1.74
CB_A09	STORAGE	0.21	1.72	96.01	0	06:31	1.72
CB_A12	STORAGE	0.06	1.65	97.31	0	06:03	1.65
CB_A14	STORAGE	0.15	1.71	97.00	0	06:31	1.71
CB_A19	STORAGE	0.13	1.94	97.47	0	06:00	1.94
CB_A21	STORAGE	0.06	1.66	97.78	0	06:03	1.66
CB_A23	STORAGE	0.06	1.70	97.30	0	06:04	1.70
K1_S	STORAGE	0.06	1.72	99.77	0	06:05	1.72
K2_S	STORAGE	0.07	1.73	99.78	0	06:06	1.73
POND2-Fernbank	STORAGE	2.70	3.71	95.21	0	06:25	3.71
R1_S	STORAGE	0.05	1.72	99.22	0	06:03	1.72
R2_S	STORAGE	0.05	1.61	99.11	0	06:01	1.61
R3_S	STORAGE	0.06	1.72	99.47	0	06:04	1.71
R4_S	STORAGE	0.06	1.70	99.00	0	06:04	1.70

Node Inflow Summary

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10 ⁶ ltr	Total Inflow Volume 10 ⁶ ltr	Flow Balance Error Percent
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1_(STM)	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
201	JUNCTION	0.000	1.209	0	06:23	0	20.3	0.012
203_(STM)	JUNCTION	0.000	3.178	0	06:03	0	17.9	0.165
CB_A04	JUNCTION	0.116	0.116	0	06:00	0.305	0.306	-0.277
CB_A05	JUNCTION	0.088	0.088	0	06:00	0.232	0.233	-0.170
CB_A06	JUNCTION	0.064	0.064	0	06:00	0.168	0.168	0.005
CB_A07	JUNCTION	0.072	0.072	0	06:00	0.188	0.188	-0.020
CB_A08	JUNCTION	0.058	0.058	0	06:00	0.151	0.153	-0.086
CB_A10	JUNCTION	0.059	0.083	0	06:00	0.155	0.166	0.031
CB_A11	JUNCTION	0.042	0.042	0	06:00	0.106	0.106	0.029
CB_A13	JUNCTION	0.058	0.058	0	06:00	0.151	0.152	-0.057
CB_A15	JUNCTION	0.060	0.144	0	06:00	0.159	0.227	-0.089
CB_A16	JUNCTION	0.039	0.039	0	06:00	0.101	0.101	-0.003
CB_A17	JUNCTION	0.035	0.035	0	06:00	0.0845	0.0845	0.001
CB_A18	JUNCTION	0.053	0.053	0	06:00	0.139	0.14	-0.095
CB_A20	JUNCTION	0.047	0.047	0	06:00	0.124	0.125	-0.151
CB_A22	JUNCTION	0.046	0.047	0	06:00	0.119	0.119	-0.119
HW-02	JUNCTION	0.000	1.208	0	06:23	0	20.3	-0.027
J1	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
J10	JUNCTION	0.000	0.015	0	06:00	0	0.00103	43.130
J12	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
J14	JUNCTION	0.000	0.025	0	06:00	0	0.0107	-1.362
J16	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
J17	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
J19	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
J2	JUNCTION	0.000	2.382	0	06:30	0	22.8	0.001
J21	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
J23	JUNCTION	0.000	0.027	0	06:00	0	0.0027	21.211
J25	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
J27	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
J29	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
J3	JUNCTION	0.000	1.331	0	06:25	0	2.35	-0.057
J30	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
J32	JUNCTION	0.000	0.027	0	06:00	0	0.00206	20.068
J34	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
J35	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
J36	JUNCTION	0.000	0.000	0	06:04	0	9.93e-06	9.915
ltr								
J4	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
J6	JUNCTION	0.000	0.016	0	05:58	0	0.00311	54.325
J8	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
MH200_(STM)	JUNCTION	0.000	3.851	0	06:04	0	22.6	0.363
MH200a	JUNCTION	0.000	0.848	0	06:11	0	2.92	-2.106
OVF	JUNCTION	0.000	1.333	0	06:25	0	2.23	-0.017
POND2_MN	JUNCTION	0.000	1.195	0	06:26	0	20.3	0.003
R102_(STM)	JUNCTION	0.000	0.808	0	06:11	0	4.66	0.027
R103_(STM)	JUNCTION	0.000	0.466	0	06:11	0	2.58	-0.016
R104_(STM)	JUNCTION	0.000	0.466	0	06:11	0	2.58	-0.012
R105_(STM)	JUNCTION	0.000	0.405	0	06:05	0	2.58	0.026
R110_(STM)	JUNCTION	0.000	0.405	0	06:04	0	2.58	-0.026
R111_(STM)	JUNCTION	0.000	0.405	0	06:04	0	2.58	0.044
R118_(STM)	JUNCTION	0.000	2.432	0	06:03	0	13.3	0.181
R120_(STM)	JUNCTION	0.000	2.432	0	06:03	0	13.3	-0.086
R121_(STM)	JUNCTION	0.000	0.844	0	06:11	0	5.53	0.018
R122_(STM)	JUNCTION	0.000	0.814	0	06:11	0	5.52	-0.149
R123_(STM)	JUNCTION	0.000	0.801	0	06:05	0	5.52	-0.006
R124_(STM)	JUNCTION	0.000	0.824	0	06:11	0	4.13	-0.225
R127_(STM)	JUNCTION	0.000	0.813	0	06:03	0	4.15	0.286
CarpOut	OUTFALL	0.157	0.157	0	06:01	0.425	0.425	0.000
OF1	OUTFALL	0.000	0.000	0	00:00	0	0	0.000
ltr								
OF2	OUTFALL	0.000	2.267	0	06:30	0	22.9	0.000
OF3	OUTFALL	0.124	0.124	0	06:00	0.323	0.323	0.000
OF4	OUTFALL	0.000	0.000	0	00:00	0	0	0.000
ltr								
100	STORAGE	0.000	0.748	0	06:11	0	4.7	0.061
102	STORAGE	0.000	0.709	0	06:11	0	4.61	0.260

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104	STORAGE	0.000	0.305	0	06:12	0	2.2	0.244
106	STORAGE	0.000	0.272	0	06:12	0	2.03	0.062
108	STORAGE	0.000	0.212	0	06:12	0	1.29	0.020
110	STORAGE	0.000	0.215	0	06:04	0	1.29	-0.080
112	STORAGE	0.000	0.185	0	06:02	0	1.1	-0.225
114	STORAGE	0.000	0.046	0	06:22	0	0.398	0.180
116	STORAGE	0.000	0.034	0	06:03	0	0.225	-0.018
118	STORAGE	0.000	0.066	0	06:00	0	0.307	0.879
120	STORAGE	0.000	0.355	0	06:12	0	2.16	0.519
122	STORAGE	0.000	0.289	0	06:12	0	1.83	0.086
124	STORAGE	0.000	0.014	0	06:40	0	0.0789	0.080
CAP1	STORAGE	0.000	0.233	0	06:04	0	1.48	0.032
CB_A03	STORAGE	0.031	0.031	0	06:00	0.0788	0.0788	0.008
CB_A09	STORAGE	0.092	0.092	0	06:00	0.24	0.24	-0.003
CB_A12	STORAGE	0.051	0.051	0	06:00	0.129	0.129	0.008
CB_A14	STORAGE	0.127	0.127	0	06:00	0.347	0.347	0.008
CB_A19	STORAGE	0.095	0.095	0	06:00	0.241	0.241	-0.046
CB_A21	STORAGE	0.059	0.059	0	06:00	0.15	0.15	0.009
CB_A23	STORAGE	0.505	0.505	0	06:00	1.36	1.36	0.015
K1_S	STORAGE	0.759	0.759	0	06:00	2.15	2.15	0.006
K2_S	STORAGE	1.050	1.050	0	06:00	3.37	3.37	0.010
POND2-Fernbank	STORAGE	0.243	4.031	0	06:00	0.978	28.3	0.035
R1_S	STORAGE	1.461	1.461	0	06:00	4.15	4.15	0.012
R2_S	STORAGE	1.144	1.144	0	06:00	3.58	3.58	0.013
R3_S	STORAGE	0.799	0.799	0	06:00	2.58	2.58	0.007
R4_S	STORAGE	0.648	0.648	0	06:00	2.08	2.08	0.016

Node Surcharge Summary

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

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
1_(STM)	JUNCTION	48.00	0.000	3.710
203_(STM)	JUNCTION	9.83	0.931	2.829
HW-02	JUNCTION	7.48	0.164	0.856
J3	JUNCTION	10.63	0.344	0.656
R102_(STM)	JUNCTION	8.28	0.945	2.605
R103_(STM)	JUNCTION	7.38	0.912	2.588
R104_(STM)	JUNCTION	5.44	0.861	3.049
R118_(STM)	JUNCTION	4.40	1.131	3.160
R120_(STM)	JUNCTION	0.92	1.154	2.071
R121_(STM)	JUNCTION	0.77	1.336	2.349
R122_(STM)	JUNCTION	0.72	1.675	3.090
R123_(STM)	JUNCTION	0.72	1.858	2.357
R124_(STM)	JUNCTION	0.72	1.178	2.397
R127_(STM)	JUNCTION	0.65	1.814	1.631

Node Flooding Summary

No nodes were flooded.

Storage Volume Summary

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Loss	Exfil Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
100	0.001	28	0	0	0.002	59	0 06:26	0.733
102	0.001	24	0	0	0.002	53	0 06:20	0.729
104	0.001	17	0	0	0.002	54	0 06:19	0.308
106	0.001	16	0	0	0.002	57	0 06:19	0.273
108	0.000	13	0	0	0.002	57	0 06:19	0.213
110	0.000	12	0	0	0.002	58	0 06:18	0.212
112	0.000	7	0	0	0.002	54	0 06:18	0.176
114	0.000	4	0	0	0.002	49	0 06:18	0.051
116	0.000	3	0	0	0.001	47	0 06:19	0.036
118	0.000	1	0	0	0.001	33	0 06:18	0.064
120	0.001	17	0	0	0.002	46	0 06:20	0.365
122	0.001	12	0	0	0.002	43	0 06:20	0.294

124	0.000	4	0	0	0.001	35	0 06:20	0.031
CAP1	0.000	11	0	0	0.002	51	0 06:20	0.234
CB_A03	0.000	1	0	0	0.017	96	0 06:03	0.010
CB_A09	0.004	4	0	0	0.088	83	0 06:31	0.016
CB_A12	0.000	1	0	0	0.029	51	0 06:03	0.016
CB_A14	0.006	4	0	0	0.121	77	0 06:31	0.019
CB_A19	0.001	4	0	0	0.031	100	0 05:49	0.094
CB_A21	0.000	1	0	0	0.033	54	0 06:03	0.019
CB_A23	0.002	1	0	0	0.228	74	0 06:04	0.211
K1_S	0.003	1	0	0	0.303	82	0 06:05	0.343
K2_S	0.005	1	0	0	0.434	88	0 06:06	0.458
POND2-Fernbank	8.214	52	0	0	15.598	98	0 06:25	2.541
R1_S	0.003	1	0	0	0.453	83	0 06:03	0.813
R2_S	0.001	0	0	0	0.169	36	0 06:01	0.820
R3_S	0.002	1	0	0	0.266	81	0 06:04	0.406
R4_S	0.002	1	0	0	0.199	76	0 06:04	0.345

Outfall Loading Summary

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10 ⁶ ltr
CarpOut	24.06	0.010	0.157	0.425
OF1	0.00	0.000	0.000	0.000
OF2	100.00	0.133	2.267	22.915
OF3	27.97	0.007	0.124	0.323
OF4	0.00	0.000	0.000	0.000
System	30.41	0.150	0.000	23.663

Link Flow Summary

Link	Type	Maximum Flow CMS	Time of Max Occurrence days hr:min	Maximum Veloc m/sec	Max/ Full Flow	Max/ Full Depth
106_(STM)	CONDUIT	2.432	0 06:03	1.29	0.83	1.00
108_(STM)	CONDUIT	2.432	0 06:03	1.29	0.83	1.00
110_(1)_(STM)	CONDUIT	0.844	0 06:11	1.47	0.86	1.00
110_(STM)	CONDUIT	0.864	0 06:11	1.61	0.87	1.00
112_(STM)	CONDUIT	0.879	0 06:11	0.82	0.46	1.00
118_(STM)	CONDUIT	0.808	0 06:11	1.27	1.12	1.00
120_(STM)	CONDUIT	0.466	0 06:11	0.73	0.58	1.00
122_(1)_(STM)	CONDUIT	0.466	0 06:11	0.87	0.79	1.00
122_(STM)	CONDUIT	0.466	0 06:11	0.73	0.65	1.00
124_(1)_(STM)	CONDUIT	0.405	0 06:04	1.59	1.00	0.57
124_(STM)	CONDUIT	0.405	0 06:05	1.49	0.69	0.51
160_(STM)	CONDUIT	0.824	0 06:11	1.62	0.94	1.00
166_(STM)	CONDUIT	0.814	0 06:11	1.47	0.99	1.00
202_(14)_(STM)	CONDUIT	3.476	0 05:53	3.07	2.62	1.00
202_(15)_(STM)_2	CONDUIT	0.845	0 06:11	0.75	0.26	1.00
202_(27)_(STM)	CONDUIT	3.178	0 06:03	1.68	0.60	1.00
C1	CHANNEL	0.000	0 00:00	0.00	0.00	0.00
C10	CHANNEL	0.001	0 06:04	0.16	0.00	0.04
C11	CHANNEL	0.000	0 06:04	0.00	0.00	0.01
C12	CHANNEL	0.000	0 00:00	0.00	0.00	0.00
C13	CONDUIT	0.000	0 00:00	0.00	0.00	0.00
C17	CONDUIT	0.000	0 00:00	0.00	0.00	0.00
C19	CONDUIT	0.000	0 00:00	0.00	0.00	0.00
C2	CHANNEL	0.000	0 00:00	0.00	0.00	0.00
C21	CONDUIT	0.084	0 06:00	0.75	0.01	0.17
C22	CONDUIT	0.000	0 00:00	0.00	0.00	0.02
C25	CHANNEL	0.000	0 00:00	0.00	0.00	0.20
C26	CHANNEL	0.001	0 06:01	0.10	0.00	0.22
C27	CHANNEL	0.000	0 00:00	0.00	0.00	0.21
C28	CHANNEL	0.016	0 05:58	0.11	0.00	0.23
C29	CHANNEL	0.001	0 06:01	0.14	0.00	0.28
C3	CHANNEL	0.000	0 00:00	0.00	0.00	0.00
C30	CHANNEL	0.000	0 00:00	0.00	0.00	0.26
C31	CHANNEL	0.000	0 00:00	0.00	0.00	0.22
C32	CHANNEL	0.000	0 00:00	0.00	0.00	0.22
C33	CHANNEL	0.000	0 00:00	0.00	0.00	0.23
C34	CHANNEL	0.015	0 06:00	0.14	0.00	0.24

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C35	CHANNEL	0.000	0	06:01	0.03	0.00	0.34
C36	CHANNEL	0.027	0	06:00	0.05	0.00	0.36
C37	CHANNEL	0.004	0	06:04	0.09	0.00	0.24
C38	CHANNEL	0.000	0	00:00	0.00	0.00	0.27
C39	CHANNEL	0.000	0	00:00	0.00	0.00	0.27
C4	CHANNEL	0.000	0	00:00	0.00	0.00	0.00
C40	CHANNEL	0.000	0	00:00	0.00	0.00	0.24
C41	CHANNEL	0.000	0	00:00	0.00	0.00	0.24
C42	CONDUIT	0.000	0	00:00	0.00	0.00	0.00
C43	CHANNEL	0.000	0	00:00	0.00	0.00	0.20
C44	CHANNEL	0.000	0	00:00	0.00	0.00	0.20
C45	CHANNEL	0.000	0	00:00	0.00	0.00	0.33
C46	CHANNEL	0.000	0	00:00	0.00	0.00	0.18
C47	CHANNEL	0.000	0	00:00	0.00	0.00	0.18
C48	CHANNEL	0.000	0	00:00	0.00	0.00	0.20
C49	CHANNEL	0.000	0	00:00	0.00	0.00	0.18
C5	CHANNEL	0.000	0	00:00	0.00	0.00	0.01
C50	CHANNEL	0.025	0	06:00	0.12	0.00	0.23
C51	CHANNEL	0.024	0	06:00	0.05	0.00	0.36
C52	CHANNEL	0.027	0	06:00	0.06	0.00	0.34
C53	CHANNEL	0.004	0	06:01	0.15	0.00	0.30
C54	CHANNEL	0.000	0	00:00	0.00	0.00	0.27
C55	CHANNEL	0.000	0	00:00	0.00	0.00	0.24
C56	CHANNEL	0.000	0	00:00	0.00	0.00	0.18
C57	CHANNEL	0.000	0	00:00	0.00	0.00	0.18
C58	CHANNEL	0.000	0	06:06	0.00	0.00	0.18
C59	CONDUIT	0.000	0	00:00	0.00	0.00	0.50
C6	CONDUIT	1.208	0	06:23	3.95	0.76	0.96
C7	CONDUIT	0.000	0	00:00	0.00	0.00	0.00
C7_1	CONDUIT	1.331	0	06:25	0.42	0.18	0.87
C7_2	CONDUIT	1.322	0	06:29	0.26	0.27	1.00
C8	CHANNEL	2.267	0	06:30	0.50	0.09	0.83
C9	CHANNEL	1.136	0	06:45	0.17	0.05	0.81
POND2-OUT	CONDUIT	1.195	0	06:26	0.37	0.45	1.00
STM-13_(STM)	CONDUIT	0.031	0	06:38	0.44	0.56	1.00
STM-16_(STM)	CONDUIT	0.051	0	06:22	0.79	0.91	1.00
STM-164_(STM)	CONDUIT	0.036	0	06:22	0.61	0.62	1.00
STM-165_(STM)	CONDUIT	0.294	0	06:12	0.67	0.69	1.00
STM-166_(STM)	CONDUIT	0.365	0	06:11	0.68	0.67	1.00
STM-20_(STM)	CONDUIT	0.234	0	06:12	0.65	0.69	1.00
STM-3_(1)_ (1)_ (STM)	CONDUIT	0.273	0	06:12	0.76	0.84	1.00
STM-3_(1)_ (STM)	CONDUIT	0.308	0	06:11	0.86	0.94	1.00
STM-3_(2)_ (STM)	CONDUIT	0.729	0	06:11	0.98	0.85	1.00
STM-3_(STM)_ (2)_	CONDUIT	0.733	0	06:11	0.98	1.00	1.00
STM-5_(1)_ (STM)	CONDUIT	0.212	0	06:12	0.75	0.83	1.00
STM-5_(STM)	CONDUIT	0.213	0	06:12	0.75	0.83	1.00
STM-7_(STM)	CONDUIT	0.176	0	06:04	0.81	0.92	1.00
STM-9_(STM)	CONDUIT	0.064	0	05:52	1.03	0.62	1.00
O-A01	ORIFICE	0.010	0	06:02			1.00
O-A04	ORIFICE	0.011	0	06:00			1.00
O-A05	ORIFICE	0.019	0	06:31			1.00
O-A06	ORIFICE	0.016	0	05:34			1.00
O-A11	ORIFICE	0.016	0	06:03			1.00
O-A14	ORIFICE	0.019	0	06:03			1.00
O-A15	ORIFICE	0.211	0	06:04			1.00
OR1	ORIFICE	0.343	0	06:05			1.00
OR10	ORIFICE	0.023	0	06:00			1.00
OR11	ORIFICE	0.020	0	06:01			1.00
OR12	ORIFICE	0.034	0	06:03			1.00
OR13	ORIFICE	0.031	0	06:00			1.00
OR14	ORIFICE	0.018	0	06:01			1.00
OR15	ORIFICE	0.032	0	06:01			1.00
OR16	ORIFICE	0.032	0	06:01			1.00
OR17	ORIFICE	0.039	0	06:01			1.00
OR18	ORIFICE	0.035	0	06:00			1.00
OR19	ORIFICE	0.048	0	06:01			1.00
OR2	ORIFICE	0.458	0	06:06			1.00
OR20	ORIFICE	0.066	0	06:00			1.00
OR4	ORIFICE	0.021	0	06:01			1.00
OR5	ORIFICE	0.026	0	06:00			1.00
OR6	ORIFICE	0.030	0	06:00			1.00
OR7	ORIFICE	0.820	0	06:01			1.00
OR8	ORIFICE	0.345	0	06:04			1.00
OR9	ORIFICE	0.405	0	06:04			1.00
P2-2yr_Orifice	ORIFICE	0.136	0	06:23			1.00
P2-ED_Orifice	ORIFICE	0.031	0	06:23			1.00
202_(15)_ (STM)_1	WEIR	0.848	0	06:11			0.34
P2-100yrWeir	WEIR	1.333	0	06:25			0.40
P2-5-10yrWeir	WEIR	1.041	0	06:16			1.00
OR3	DUMMY	0.813	0	06:03			

Flow Classification Summary

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class								
		Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
106_(STM)	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
108_(STM)	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.01	0.03	0.00
110_(1)_(STM)	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.75	0.00
110_(STM)	1.00	0.00	0.00	0.00	0.38	0.00	0.00	0.62	0.07	0.00
112_(STM)	1.00	0.00	0.00	0.00	0.69	0.00	0.00	0.31	0.25	0.00
118_(STM)	1.00	0.00	0.00	0.00	0.95	0.00	0.00	0.05	0.00	0.00
120_(STM)	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.01	0.00	0.00
122_(1)_(STM)	1.00	0.00	0.00	0.00	0.63	0.00	0.00	0.37	0.08	0.00
122_(STM)	1.00	0.00	0.00	0.00	0.95	0.00	0.00	0.05	0.12	0.00
124_(1)_(STM)	1.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
124_(STM)	1.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
160_(STM)	1.00	0.00	0.00	0.00	0.31	0.00	0.00	0.69	0.04	0.00
166_(STM)	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.03	0.00
202_(14)_(STM)	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
202_(15)_(STM)_2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
202_(27)_(STM)	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C10	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C11	1.00	0.13	0.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C17	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C19	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C21	1.00	0.98	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
C22	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C25	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C26	1.00	0.00	0.00	0.00	0.01	0.00	0.00	0.99	0.01	0.00
C27	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C28	1.00	0.00	0.00	0.00	0.01	0.00	0.00	0.99	0.01	0.00
C29	1.00	0.00	0.00	0.00	0.01	0.00	0.00	0.99	0.01	0.00
C3	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C30	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C31	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C32	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C33	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C34	1.00	0.00	0.00	0.00	0.01	0.00	0.00	0.99	0.01	0.00
C35	1.00	0.00	0.00	0.00	0.02	0.00	0.00	0.98	0.02	0.00
C36	1.00	0.00	0.00	0.00	0.02	0.00	0.00	0.98	0.02	0.00
C37	1.00	0.00	0.00	0.00	0.01	0.00	0.00	0.99	0.01	0.00
C38	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C39	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C4	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C40	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C41	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C42	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C43	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C44	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C45	1.00	0.98	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C46	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C47	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C48	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C49	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C5	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C50	1.00	0.00	0.00	0.00	0.01	0.00	0.00	0.99	0.00	0.00
C51	1.00	0.00	0.00	0.00	0.01	0.00	0.00	0.99	0.01	0.00
C52	1.00	0.00	0.00	0.00	0.01	0.00	0.00	0.99	0.01	0.00
C53	1.00	0.00	0.00	0.00	0.01	0.00	0.00	0.99	0.01	0.00
C54	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C55	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C56	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C57	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C58	1.00	0.12	0.01	0.00	0.01	0.00	0.00	0.86	0.87	0.00
C59	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C6	1.00	0.00	0.00	0.00	0.33	0.07	0.00	0.61	0.11	0.00
C7	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C7_1	1.00	0.52	0.25	0.00	0.23	0.00	0.00	0.00	0.70	0.00
C7_2	1.00	0.51	0.01	0.00	0.46	0.00	0.00	0.02	0.13	0.00
C8	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C9	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.04	0.00
POND2-OUT	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.03	0.00
STM-13_(STM)	1.00	0.00	0.01	0.00	0.38	0.00	0.00	0.62	0.58	0.00
STM-16_(STM)	1.00	0.00	0.00	0.00	0.32	0.00	0.00	0.68	0.07	0.00

560 Hazeldean Road – Double Deck Subdivision PCSWMM Model MTO 100-year SCS Storm Model Output

STM-164_(STM)	1.00	0.00	0.06	0.00	0.94	0.00	0.00	0.00	0.77	0.00
STM-165_(STM)	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.06	0.00
STM-166_(STM)	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
STM-20_(STM)	1.00	0.00	0.00	0.00	0.93	0.00	0.00	0.00	0.07	0.15
STM-3_(1)_(1)_(STM)	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.03	0.00
STM-3_(1)_(STM)	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.02	0.00
STM-3_(2)_(STM)	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
STM-3_(STM_(2))	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
STM-5_(1)_(STM)	1.00	0.00	0.02	0.00	0.98	0.00	0.00	0.00	0.04	0.00
STM-5_(STM)	1.00	0.00	0.00	0.00	0.93	0.00	0.00	0.07	0.00	0.00
STM-7_(STM)	1.00	0.00	0.03	0.00	0.62	0.00	0.00	0.35	0.28	0.00
STM-9_(STM)	1.00	0.00	0.00	0.00	0.15	0.00	0.00	0.85	0.12	0.00

Conduit Surcharge Summary

Conduit	----- Both Ends	Hours Full Upstream	----- Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
106_(STM)	5.76	5.76	9.85	0.01	0.32
108_(STM)	2.29	2.29	4.40	0.01	0.35
110_(1)_(STM)	0.72	0.72	0.81	0.01	0.01
110_(STM)	0.77	0.77	0.92	0.01	0.01
112_(STM)	0.73	0.73	1.18	0.01	0.01
118_(STM)	8.97	8.98	9.83	0.48	0.76
120_(STM)	8.04	8.04	8.27	0.01	0.02
122_(1)_(STM)	4.48	4.48	5.58	0.01	0.01
122_(STM)	5.44	5.44	7.38	0.01	0.01
160_(STM)	0.65	0.65	0.72	0.01	0.01
166_(STM)	0.72	0.72	0.72	0.01	0.01
202_(14)_(STM)	19.37	19.37	20.00	0.98	0.97
202_(15)_(STM)_2	19.36	19.36	31.84	0.01	0.01
202_(27)_(STM)	10.68	10.68	18.48	0.01	0.01
C6	0.01	0.01	7.48	0.01	0.01
C7_1	0.01	0.01	10.63	0.01	0.01
C7_2	10.63	10.63	15.19	0.01	0.01
POND2-OUT	10.46	10.46	11.40	0.01	0.01
STM-13_(STM)	8.51	8.51	11.69	0.01	0.01
STM-16_(STM)	6.39	6.39	9.26	0.01	0.05
STM-164_(STM)	4.00	4.00	6.39	0.01	0.01
STM-165_(STM)	11.69	11.69	14.79	0.01	0.01
STM-166_(STM)	14.90	14.90	17.75	0.01	0.01
STM-20_(STM)	10.38	10.38	11.79	0.01	0.01
STM-3_(1)_(1)_(STM)	13.65	13.65	15.59	0.01	0.01
STM-3_(1)_(STM)	15.82	15.82	18.02	0.01	0.52
STM-3_(2)_(STM)	17.75	17.75	18.91	0.01	0.03
STM-3_(STM_(2))	18.91	18.91	19.21	0.01	1.11
STM-5_(1)_(STM)	12.54	12.54	13.14	0.01	0.18
STM-5_(STM)	13.14	13.14	13.76	0.01	0.13
STM-7_(STM)	9.14	9.14	12.43	0.01	0.01
STM-9_(STM)	0.49	0.49	1.38	0.01	0.01

Analysis begun on: Tue Dec 23 09:13:00 2025
Analysis ended on: Tue Dec 23 09:13:10 2025
Total elapsed time: 00:00:10

23/12/2025

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CB_A03 REQUIRED STORAGE
2-YEAR EVENT (12-hour MTO SCS)

OTTAWA IDF CURVE

Area = 0.102 ha Qallow = 9.00 L/s
 C = 0.59 Vol(max) = 2.50 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m ³)
5	103.6	17.3	8.3	2.5
10	76.8	12.8	3.8	2.3
15	61.8	10.3	1.3	1.2
20	52.0	8.7	-0.3	-0.4
25	45.2	7.6	-1.4	-2.2
30	40.0	6.7	-2.3	-4.1
35	36.1	6.0	-3.0	-6.2
40	32.9	5.5	-3.5	-8.4
45	30.2	5.1	-3.9	-10.6
50	28.0	4.7	-4.3	-12.9
55	26.2	4.4	-4.6	-15.3
60	24.6	4.1	-4.9	-17.6
65	23.2	3.9	-5.1	-20.0
70	21.9	3.7	-5.3	-22.4
75	20.8	3.5	-5.5	-24.8
80	19.8	3.3	-5.7	-27.3
85	18.9	3.2	-5.8	-29.7
90	18.1	3.0	-6.0	-32.2

Notes: $Q = 2.78 \cdot C \cdot i \cdot A$
 Vol = Qnet x time
 Qnet = Q - Qallow

CB_A03 REQUIRED STORAGE
100-YEAR EVENT (12-hour MTO SCS)

OTTAWA IDF CURVE

Area = 0.102 ha Qallow = 10.00 L/s
 C = 0.59 Vol(max) = 12.52 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m ³)
5	242.7	40.6	30.6	9.2
10	178.6	29.9	19.9	11.9
15	142.9	23.9	13.9	12.5
20	120.0	20.1	10.1	12.1
25	103.8	17.4	7.4	11.1
30	91.9	15.4	5.4	9.7
35	82.6	13.8	3.8	8.0
40	75.1	12.6	2.6	6.2
45	69.1	11.6	1.6	4.2
50	64.0	10.7	0.7	2.1
55	59.6	10.0	0.0	-0.1
60	55.9	9.4	-0.6	-2.3
65	52.6	8.8	-1.2	-4.6
70	49.8	8.3	-1.7	-7.0
75	47.3	7.9	-2.1	-9.4
80	45.0	7.5	-2.5	-11.9
85	43.0	7.2	-2.8	-14.4
90	41.1	6.9	-3.1	-16.9

Notes: $Q = 2.78 \cdot C \cdot i \cdot A$
 Vol = Qnet x time
 Qnet = Q - Qallow

CB_A09 REQUIRED STORAGE 2-YEAR EVENT (12-hour MTO SCS)				
OTTAWA IDF CURVE				
Area =	0.307	ha	Qallow =	16.00
C =	0.61		Vol(max) =	14.54
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m ³)
5	103.6	53.9	37.9	11.4
10	76.8	40.0	24.0	14.4
15	61.8	32.2	16.2	14.5
20	52.0	27.1	11.1	13.3
25	45.2	23.5	7.5	11.3
30	40.0	20.8	4.8	8.7
35	36.1	18.8	2.8	5.8
40	32.9	17.1	1.1	2.7
45	30.2	15.7	-0.3	-0.7
50	28.0	14.6	-1.4	-4.2
55	26.2	13.6	-2.4	-7.8
60	24.6	12.8	-3.2	-11.6
65	23.2	12.1	-3.9	-15.4
70	21.9	11.4	-4.6	-19.3
75	20.8	10.8	-5.2	-23.2
80	19.8	10.3	-5.7	-27.2
85	18.9	9.9	-6.1	-31.3
90	18.1	9.4	-6.6	-35.4

Notes: $Q = 2.78 \cdot C^i \cdot A$
 $Vol = Q_{net} \times \text{time}$
 $Q_{net} = Q - Q_{allow}$

CB_A09 REQUIRED STORAGE 100-YEAR EVENT (12-hour MTO SCS)				
OTTAWA IDF CURVE				
Area =	0.307	ha	Qallow =	16.00
C =	0.61		Vol(max) =	57.29
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m ³)
5	242.7	126.4	110.4	33.1
10	178.6	93.0	77.0	46.2
15	142.9	74.4	58.4	52.6
20	120.0	62.4	46.4	55.7
25	103.8	54.1	38.1	57.1
30	91.9	47.8	31.8	57.3
35	82.6	43.0	27.0	56.7
40	75.1	39.1	23.1	55.5
45	69.1	35.9	19.9	53.9
50	64.0	33.3	17.3	51.9
55	59.6	31.0	15.0	49.6
60	55.9	29.1	13.1	47.2
65	52.6	27.4	11.4	44.5
70	49.8	25.9	9.9	41.7
75	47.3	24.6	8.6	38.7
80	45.0	23.4	7.4	35.6
85	43.0	22.4	6.4	32.4
90	41.1	21.4	5.4	29.2

Notes: $Q = 2.78 \cdot C^i \cdot A$
 $Vol = Q_{net} \times \text{time}$
 $Q_{net} = Q - Q_{allow}$

CB_A12 REQUIRED STORAGE
2-YEAR EVENT (12-hour MTO SCS)

OTTAWA IDF CURVE					L/s m3
Area =	0.169	ha	Qallow =	14.00	
C =	0.58		Vol(max) =	4.27	
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m³)	
5	103.6	28.2	14.2	4.3	
10	76.8	20.9	6.9	4.2	
15	61.8	16.8	2.8	2.5	
20	52.0	14.2	0.2	0.2	
25	45.2	12.3	-1.7	-2.5	
30	40.0	10.9	-3.1	-5.6	
35	36.1	9.8	-4.2	-8.8	
40	32.9	9.0	-5.0	-12.1	
45	30.2	8.2	-5.8	-15.6	
50	28.0	7.6	-6.4	-19.1	
55	26.2	7.1	-6.9	-22.7	
60	24.6	6.7	-7.3	-26.3	
65	23.2	6.3	-7.7	-30.0	
70	21.9	6.0	-8.0	-33.7	
75	20.8	5.7	-8.3	-37.5	
80	19.8	5.4	-8.6	-41.3	
85	18.9	5.2	-8.8	-45.1	
90	18.1	4.9	-9.1	-48.9	

Notes: $Q = 2.78 \cdot C \cdot i \cdot A$
 $Vol = Q_{net} \times time$
 $Q_{net} = Q - Q_{allow}$

CB_A12 REQUIRED STORAGE
100-YEAR EVENT (12-hour MTO SCS)

OTTAWA IDF CURVE				
Area =	0.169	ha	Qallow =	16.00
C =	0.58		Vol(max) =	20.64
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m ³)
5	242.7	66.1	50.1	15.0
10	178.6	48.7	32.7	19.6
15	142.9	38.9	22.9	20.6
20	120.0	32.7	16.7	20.0
25	103.8	28.3	12.3	18.4
30	91.9	25.0	9.0	16.3
35	82.6	22.5	6.5	13.7
40	75.1	20.5	4.5	10.7
45	69.1	18.8	2.8	7.6
50	64.0	17.4	1.4	4.3
55	59.6	16.2	0.2	0.8
60	55.9	15.2	-0.8	-2.8
65	52.6	14.3	-1.7	-6.5
70	49.8	13.6	-2.4	-10.2
75	47.3	12.9	-3.1	-14.1
80	45.0	12.3	-3.7	-18.0
85	43.0	11.7	-4.3	-21.9
90	41.1	11.2	-4.8	-25.9

Notes: $Q = 2.78 \cdot C \cdot i \cdot A$
 $Vol = Q_{net} \times time$
 $Q_{net} = Q - Q_{allow}$

CB_A14 REQUIRED STORAGE
2-YEAR EVENT (12-hour MTO SCS)

OTTAWA IDF CURVE					L/s m3
Area =	0.449	ha	Qallow =	17.00	
C =	0.59		Vol(max) =	25.64	
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m³)	
5	103.6	76.3	59.3	17.8	
10	76.8	56.6	39.6	23.7	
15	61.8	45.5	28.5	25.6	
20	52.0	38.3	21.3	25.6	
25	45.2	33.3	16.3	24.4	
30	40.0	29.5	12.5	22.5	
35	36.1	26.6	9.6	20.1	
40	32.9	24.2	7.2	17.3	
45	30.2	22.3	5.3	14.2	
50	28.0	20.7	3.7	11.0	
55	26.2	19.3	2.3	7.5	
60	24.6	18.1	1.1	3.9	
65	23.2	17.0	0.0	0.2	
70	21.9	16.1	-0.9	-3.6	
75	20.8	15.3	-1.7	-7.5	
80	19.8	14.6	-2.4	-11.5	
85	18.9	14.0	-3.0	-15.5	
90	18.1	13.4	-3.6	-19.6	

Notes: $Q = 2.78 \cdot C \cdot i \cdot A$
 Vol = Qnet x time
 Qnet = Q - Qallow

CB_A14 REQUIRED STORAGE
100-YEAR EVENT (12-hour MTO SCS)

OTTAWA IDF CURVE				
Area =	0.449	ha	Qallow =	19.00
C =	0.59		Vol(max) =	87.81
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m ³)
5	242.7	178.7	159.7	47.9
10	178.6	131.5	112.5	67.5
15	142.9	105.2	86.2	77.6
20	120.0	88.3	69.3	83.2
25	103.8	76.5	57.5	86.2
30	91.9	67.7	48.7	87.6
35	82.6	60.8	41.8	87.8
40	75.1	55.3	36.3	87.2
45	69.1	50.9	31.9	86.0
50	64.0	47.1	28.1	84.3
55	59.6	43.9	24.9	82.2
60	55.9	41.2	22.2	79.8
65	52.6	38.8	19.8	77.1
70	49.8	36.7	17.7	74.2
75	47.3	34.8	15.8	71.1
80	45.0	33.1	14.1	67.8
85	43.0	31.6	12.6	64.4
90	41.1	30.3	11.3	60.9

Notes: $Q = 2.78 \cdot C \cdot i \cdot A$
 Vol = Qnet x time
 Qnet = Q - Qallow

CB_A19 REQUIRED STORAGE 2-YEAR EVENT (12-hour MTO SCS)				
OTTAWA IDF CURVE				
Area =	0.307	ha	Qallow =	10.00
C =	0.61		Vol(max) =	20.51
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m ³)
5	103.6	53.9	43.9	13.2
10	76.8	40.0	30.0	18.0
15	61.8	32.2	22.2	19.9
20	52.0	27.1	17.1	20.5
25	45.2	23.5	13.5	20.3
30	40.0	20.8	10.8	19.5
35	36.1	18.8	8.8	18.4
40	32.9	17.1	7.1	17.1
45	30.2	15.7	5.7	15.5
50	28.0	14.6	4.6	13.8
55	26.2	13.6	3.6	12.0
60	24.6	12.8	2.8	10.0
65	23.2	12.1	2.1	8.0
70	21.9	11.4	1.4	5.9
75	20.8	10.8	0.8	3.8
80	19.8	10.3	0.3	1.6
85	18.9	9.9	-0.1	-0.7
90	18.1	9.4	-0.6	-3.0

Notes: $Q = 2.78 \cdot C \cdot i \cdot A$
 $Vol = Q_{net} \times \text{time}$
 $Q_{net} = Q - Q_{allow}$

CB_A19 REQUIRED STORAGE 100-YEAR EVENT (12-hour MTO SCS)				
OTTAWA IDF CURVE				
Area =	0.307	ha	Qallow =	11.00
C =	0.61		Vol(max) =	67.49
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m ³)
5	242.7	126.4	115.4	34.6
10	178.6	93.0	82.0	49.2
15	142.9	74.4	63.4	57.1
20	120.0	62.4	51.4	61.7
25	103.8	54.1	43.1	64.6
30	91.9	47.8	36.8	66.3
35	82.6	43.0	32.0	67.2
40	75.1	39.1	28.1	67.5
45	69.1	35.9	24.9	67.4
50	64.0	33.3	22.3	66.9
55	59.6	31.0	20.0	66.1
60	55.9	29.1	18.1	65.2
65	52.6	27.4	16.4	64.0
70	49.8	25.9	14.9	62.7
75	47.3	24.6	13.6	61.2
80	45.0	23.4	12.4	59.6
85	43.0	22.4	11.4	57.9
90	41.1	21.4	10.4	56.2

Notes: $Q = 2.78 \cdot C \cdot i \cdot A$
 $Vol = Q_{net} \times \text{time}$
 $Q_{net} = Q - Q_{allow}$

CB_A21 REQUIRED STORAGE
2-YEAR EVENT (12-hour MTO SCS)

OTTAWA IDF CURVE

Area = 0.191 ha Qallow = 18.00 L/s
 C = 0.61 Vol(max) = 4.66 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m ³)
5	103.6	33.5	15.5	4.7
10	76.8	24.9	6.9	4.1
15	61.8	20.0	2.0	1.8
20	52.0	16.9	-1.1	-1.4
25	45.2	14.6	-3.4	-5.1
30	40.0	13.0	-5.0	-9.1
35	36.1	11.7	-6.3	-13.3
40	32.9	10.6	-7.4	-17.7
45	30.2	9.8	-8.2	-22.2
50	28.0	9.1	-8.9	-26.8
55	26.2	8.5	-9.5	-31.4
60	24.6	8.0	-10.0	-36.2
65	23.2	7.5	-10.5	-41.0
70	21.9	7.1	-10.9	-45.8
75	20.8	6.7	-11.3	-50.7
80	19.8	6.4	-11.6	-55.6
85	18.9	6.1	-11.9	-60.5
90	18.1	5.9	-12.1	-65.5

Notes: $Q = 2.78 \cdot C \cdot i \cdot A$
 Vol = Qnet x time
 Qnet = Q - Qallow

CB_A21 REQUIRED STORAGE
100-YEAR EVENT (12-hour MTO SCS)

OTTAWA IDF CURVE

Area = 0.191 ha Qallow = 19.00 L/s
 C = 0.61 Vol(max) = 24.55 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m ³)
5	242.7	78.6	59.6	17.9
10	178.6	57.8	38.8	23.3
15	142.9	46.3	27.3	24.6
20	120.0	38.9	19.9	23.8
25	103.8	33.6	14.6	22.0
30	91.9	29.8	10.8	19.4
35	82.6	26.7	7.7	16.3
40	75.1	24.3	5.3	12.8
45	69.1	22.4	3.4	9.1
50	64.0	20.7	1.7	5.1
55	59.6	19.3	0.3	1.0
60	55.9	18.1	-0.9	-3.2
65	52.6	17.1	-1.9	-7.6
70	49.8	16.1	-2.9	-12.1
75	47.3	15.3	-3.7	-16.6
80	45.0	14.6	-4.4	-21.3
85	43.0	13.9	-5.1	-25.9
90	41.1	13.3	-5.7	-30.7

Notes: $Q = 2.78 \cdot C \cdot i \cdot A$
 Vol = Qnet x time
 Qnet = Q - Qallow

CB_A23 REQUIRED STORAGE
2-YEAR EVENT (12-hour MTO SCS)

OTTAWA IDF CURVE					L/s m3
Area =	1.528	ha	Qallow =	193.00	
C =	0.80		Vol(max) =	47.69	
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m³)	
5	103.6	352.0	159.0	47.7	
10	76.8	261.0	68.0	40.8	
15	61.8	209.9	16.9	15.2	
20	52.0	176.8	-16.2	-19.4	
25	45.2	153.5	-39.5	-59.3	
30	40.0	136.1	-56.9	-102.5	
35	36.1	122.5	-70.5	-148.0	
40	32.9	111.7	-81.3	-195.2	
45	30.2	102.8	-90.2	-243.6	
50	28.0	95.3	-97.7	-293.1	
55	26.2	88.9	-104.1	-343.4	
60	24.6	83.5	-109.5	-394.4	
65	23.2	78.7	-114.3	-445.9	
70	21.9	74.5	-118.5	-497.8	
75	20.8	70.7	-122.3	-550.2	
80	19.8	67.4	-125.6	-602.9	
85	18.9	64.4	-128.6	-656.0	
90	18.1	61.7	-131.3	-709.3	

Notes: $Q = 2.78 \cdot C \cdot i \cdot A$
 $Vol = Q_{net} \times time$
 $Q_{net} = Q - Q_{allow}$

CB_A23 REQUIRED STORAGE
100-YEAR EVENT (12-hour MTO SCS)

OTTAWA IDF CURVE				
Area =	1.528	ha	Qallow =	211.00
C =	0.80		Vol(max) =	247.13
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m³)
5	242.7	824.8	613.8	184.1
10	178.6	606.8	395.8	237.5
15	142.9	485.6	274.6	247.1
20	120.0	407.6	196.6	235.9
25	103.8	352.9	141.9	212.9
30	91.9	312.2	101.2	182.1
35	82.6	280.6	69.6	146.2
40	75.1	255.4	44.4	106.5
45	69.1	234.7	23.7	63.9
50	64.0	217.3	6.3	19.0
55	59.6	202.6	-8.4	-27.7
60	55.9	189.9	-21.1	-75.8
65	52.6	178.9	-32.1	-125.2
70	49.8	169.2	-41.8	-175.6
75	47.3	160.6	-50.4	-226.9
80	45.0	152.9	-58.1	-278.9
85	43.0	146.0	-65.0	-331.7
90	41.1	139.7	-71.3	-385.0

Notes: $Q = 2.78 \cdot C \cdot i \cdot A$
 $Vol = Q_{net} \times time$
 $Q_{net} = Q - Q_{allow}$

560 Hazeldean Road - Double Deck Subdivision
Rear Yard Trenches (Conceptual)

RYCB ID (STM Area ID)	Rear Yard Trench Dimensions (subdrain & clearstone)					Storage Volumes ²		
	Perf. Pipe Dia. (mm)	Length (m)	Width (m)	Height ¹ (m)	Area (m ²)	Perf. Pipe (m ³)	Clearstone (m ³)	Total (m ³)
CB_A03	250	58	0.85	0.55	49	2.8	9.7	12.6
CB_A09	375	174	0.98	0.68	170	19.2	38.1	57.3
CB_A12	250	95	0.85	0.55	81	4.7	15.9	20.6
CB_A14	600	146	1.20	0.90	175	41.3	46.6	87.8
CB_A19	450	165	1.05	0.75	173	26.2	41.5	67.7
CB_A21	300	96	0.90	0.60	86	6.8	18.0	24.8
TOTAL	-	734	-	-	735	101.0	169.8	270.8

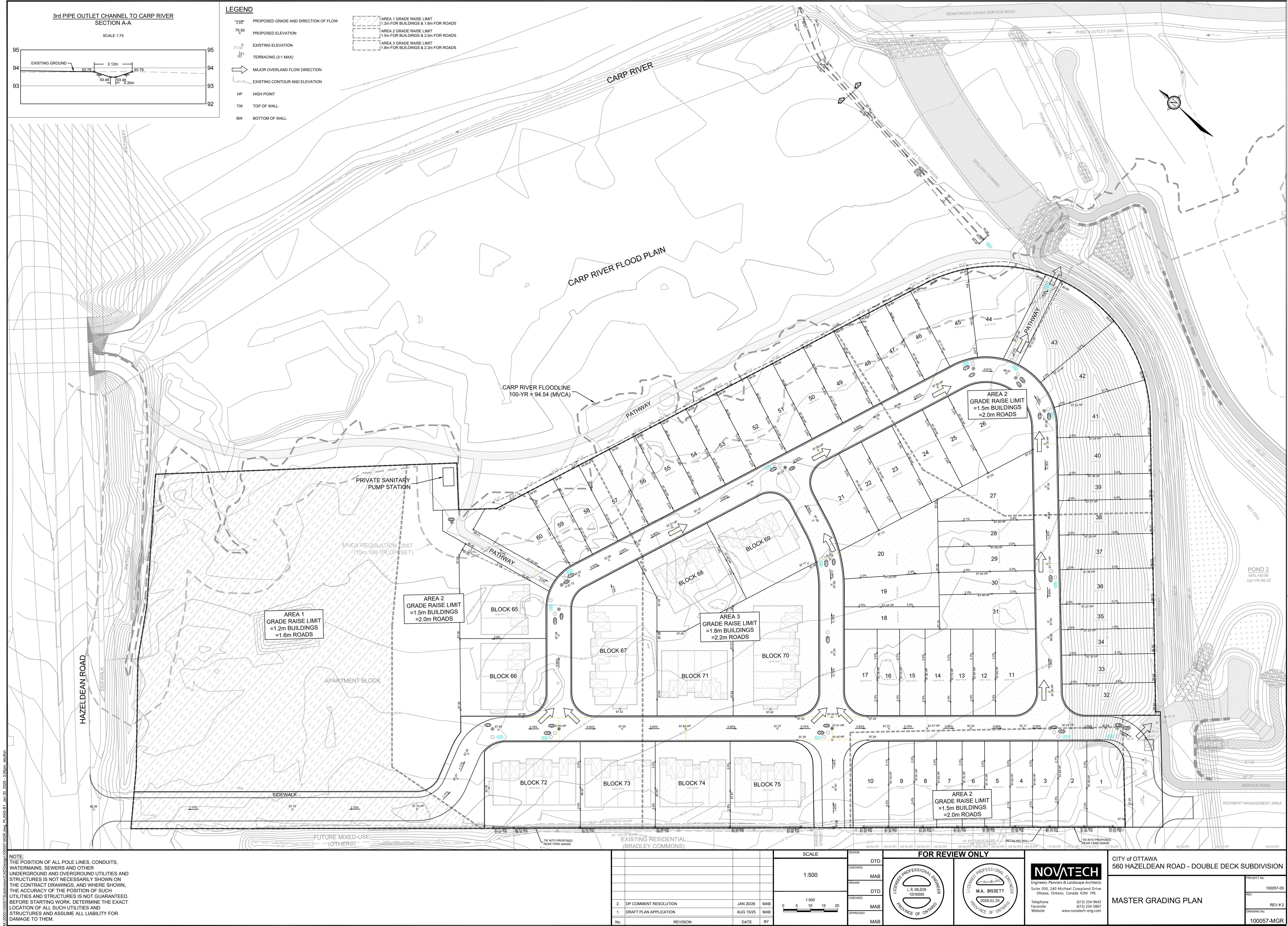
¹ Height of trench does not include 0.15m of clearstone below the subdrain.

² Assumed 40% void ratio for storage provided in the clearstone.

Appendix C: Drawings

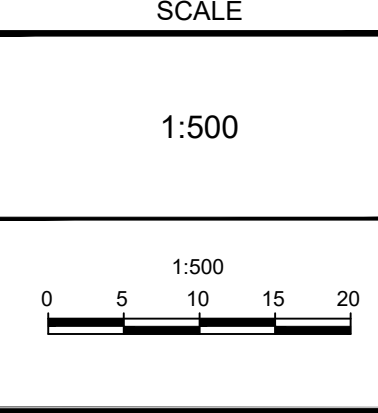
Master Grading Plan	100057-MGR
Master Servicing Plan	100057-MGP
Cut Fill Area Plan	100057-CFA
Water Distribution Plan	100057-WTR
Sanitary Drainage Area Plan	100057-SAN
Storm Drainage Area Plan	100057-STM

Light-Weight Fill Conceptual Locations
Energy Street and Street 2 Layout Figures

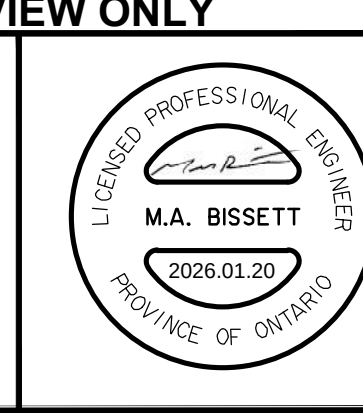
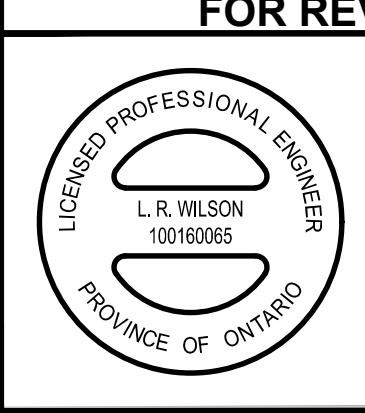


NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS,
WATERMAINS, SEWERS AND OTHER
UNDERGROUND AND OVERGROUND UTILITIES AND
STRUCTURES IS NOT NECESSARILY SHOWN ON
THE CONTRACT DRAWINGS, AND WHERE SHOWN,
THE ACCURACY OF THE POSITION OF SUCH
UTILITIES AND STRUCTURES IS NOT GUARANTEED.
BEFORE STARTING WORK, DETERMINE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

No.	REVISION	DATE	BY
2	DP COMMENT RESOLUTION	JAN 2026	MAB
1	DRAFT PLAN APPLICATION	AUG 1925	MAB



DESIGN	DTD
CHECKED	MAB
DRAWN	DTD
CHECKED	MAB
APPROVED	MAB



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

CITY OF OTTAWA 560 HAZELDEAN ROAD - DOUBLE DECK SUBDIVISION		PROJECT No: 100057-05
MASTER GRADING PLAN		REV # 2
		DRAWING No: 100057-MGR

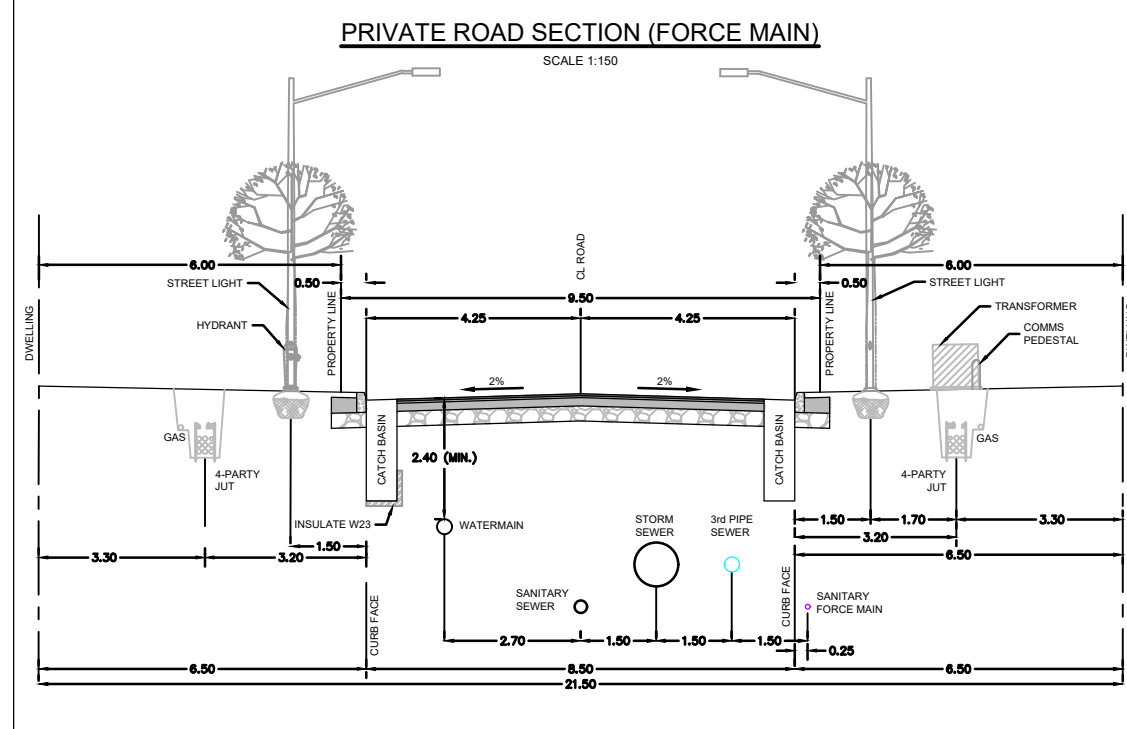
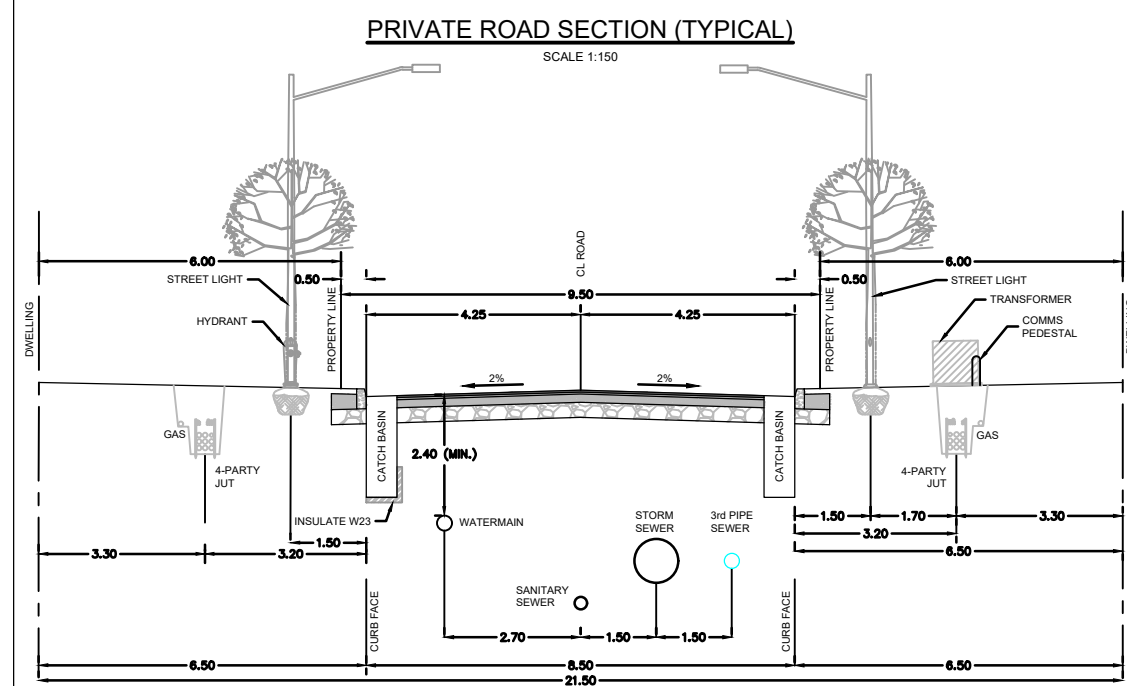
SAN MANHOLE TABLE			
MANHOLE ID	SIZE (mm)	T/G ELEV (m)	INVERT (m)
103	1200mmØ	94.75	S=91.57 NE=91.51
105	1200mmØ	97.09	N=91.73 SW=91.79 E=91.88
109	1200mmØ	97.02	W=92.21 E=92.22 S=92.81
111	1200mmØ	96.90	W=92.50 SE=92.53
113	1200mmØ	96.85	NW=92.59 S=92.62
115	1200mmØ	97.01	N=92.68 SW=92.71
117	1200mmØ	97.23	NE=93.12 SE=92.96 NW=92.55
119	1200mmØ	96.88	NW=92.72
121	1200mmØ	97.15	N=92.94 SW=93.54
123	1200mmØ	97.51	NE=94.07 SE=92.27 NW=92.20
125	1200mmØ	97.63	NE=91.99 SE=91.91 NW=91.91
127	1200mmØ	97.43	SE=92.07
129	1200mmØ	97.20	NE=91.82 SW=91.83
131	1200mmØ	97.88	NE=95.69 SW=95.68

STM MANHOLE TABLE			
MANHOLE ID	SIZE (mm)	T/G ELEV (m)	INVERT (m)
1	1200mmØ	96.60	N=93.20 SW=92.58 SE=92.91
100	1200mmØ	96.75	S=93.21 NW=93.21
102	1200mmØ	97.20	SE=93.25 NE=93.62 NW=93.40
104	1200mmØ	97.12	SW=93.71 NE=93.71
106	1800mmØ	96.97	SW=93.90 N=93.88
108	1200mmØ	96.82	S=93.91 SW=93.91
110	1800mmØ	96.87	SE=93.94 W=93.94
112	1800mmØ	96.98	E=94.10 W=94.71 S=94.32
114	1200mmØ	97.18	N=94.45 SW=94.45
116	1200mmØ	97.16	NE=94.55
118	1500mmØ	97.06	E=94.93
120	1200mmØ	97.47	NW=93.60 SE=93.52
122	1200mmØ	97.59	NE=94.20 SE=93.75 NW=93.82
124	1200mmØ	97.18	SW=94.35

3rd PIPE MANHOLE TABLE			
MANHOLE ID	SIZE (mm)	T/G ELEV (m)	INVERT (m)
302	1200mmØ	96.84	SE=93.86 W=93.86
304	1200mmØ	96.90	NW=93.82 S=93.82 E=93.82
306	1200mmØ	96.94	N=93.90 SW=94.02
308	1200mmØ	97.07	NE=94.24 SW=94.24
310	1200mmØ	97.18	SE=94.52 NE=94.45 NW=94.52
312	1200mmØ	96.82	NW=94.60
314	1200mmØ	97.43	NW=94.65 SE=94.82 NE=94.48
316	1200mmØ	97.39	SE=94.89
318	1200mmØ	96.94	E=94.07 W=94.11 S=94.11
320	1200mmØ	97.15	SW=94.25 N=94.25
324	1200mmØ	97.03	E=94.42 W=94.42
326	1200mmØ	97.10	E=94.46 SW=94.46
328	1200mmØ	95.50	N=93.74 W=93.74
330	1200mmØ	97.55	NW=94.81 SE=95.00 NE=94.64
HW1		94.37	S=93.67

LEGEND

- SANITARY MANHOLE, SEWER & FLOW DIRECTION
- STORM MANHOLE, SEWER & FLOW DIRECTION
- WATERMAIN AND DIAMETER
- VALVE & VALVE BOX
- HYDRANT C/W VALVE & LEAD
- CAP
- 3m BUILDING SEPERATION OR 2 HOUR FIREWALL REQUIRED (BY BUILDER)



NOTE:
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2	DP COMMENT RESOLUTION	JAN 2026	MAB
1	DRAFT PLAN APPLICATION	AUG 1525	MAB
No.	REVISION	DATE	BY

SCALE

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L.R. WILSON

10018005

PROVINCE OF ONTARIO

M.A. BISSETT

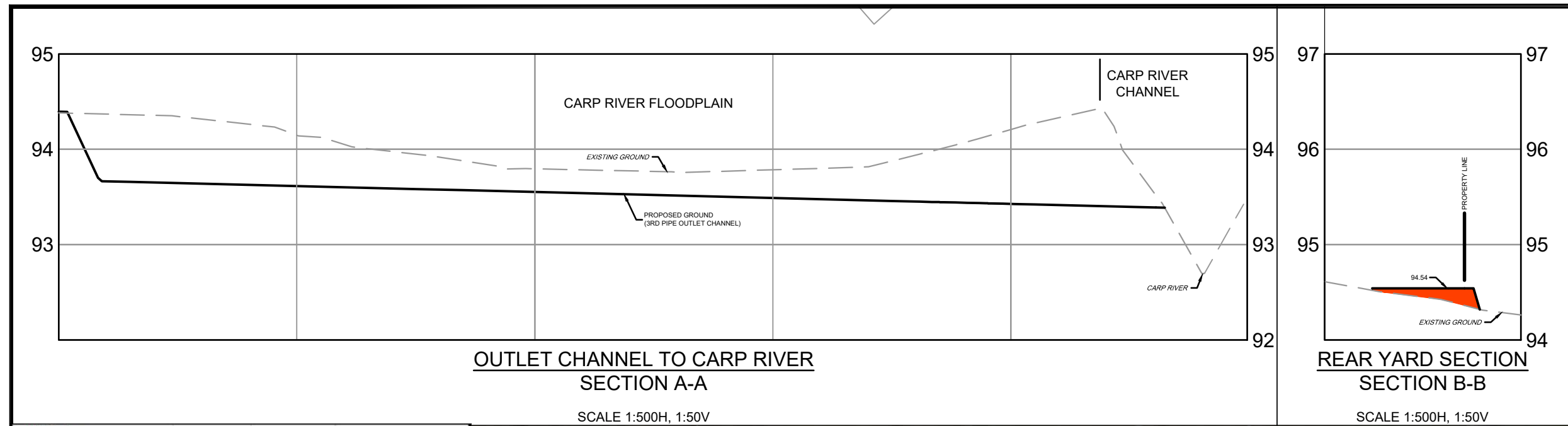
2026.01.20

PROVINCE OF ONTARIO

CITY OF OTTAWA - 560 HAZELDEAN ROAD
DOUBLE DECK SUBDIVISION

MASTER SERVICING PLAN

PROJECT No: 100057-05
REV # 2
DRAWING No: 100057-MGP



Fill Volumes		
Elevation Range vs OG	Depth Below 100-YR Floodline (94.54)	Fill Volume (m³)
94.54 - 94.29	0.00 - -0.25	93.1
94.29 - 94.04	-0.25 - -0.50	13.6
94.04 - 93.79	-0.50 - -0.75	0.5
Total		107.2
Cut Volumes		
Elevation Range vs OG	Depth Below 100-YR Floodline (94.54)	Cut Volume (m³)
94.54 - 94.29	0.00 - -0.25	90.7
94.29 - 94.04	-0.25 - -0.50	26.5
94.04 - 93.79	-0.50 - -0.75	0.0
Total		117.2



Elevations Table			
Number	Minimum Elevation	Maximum Elevation	Color
1	0.00	0.25	Yellow
2	0.25	0.50	Orange
3	0.50	0.75	Red

NOTE:
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No.	REVISION	DATE	BY
1.	DP COMMENT RESOLUTION	JAN 2026	MAB

SCALE

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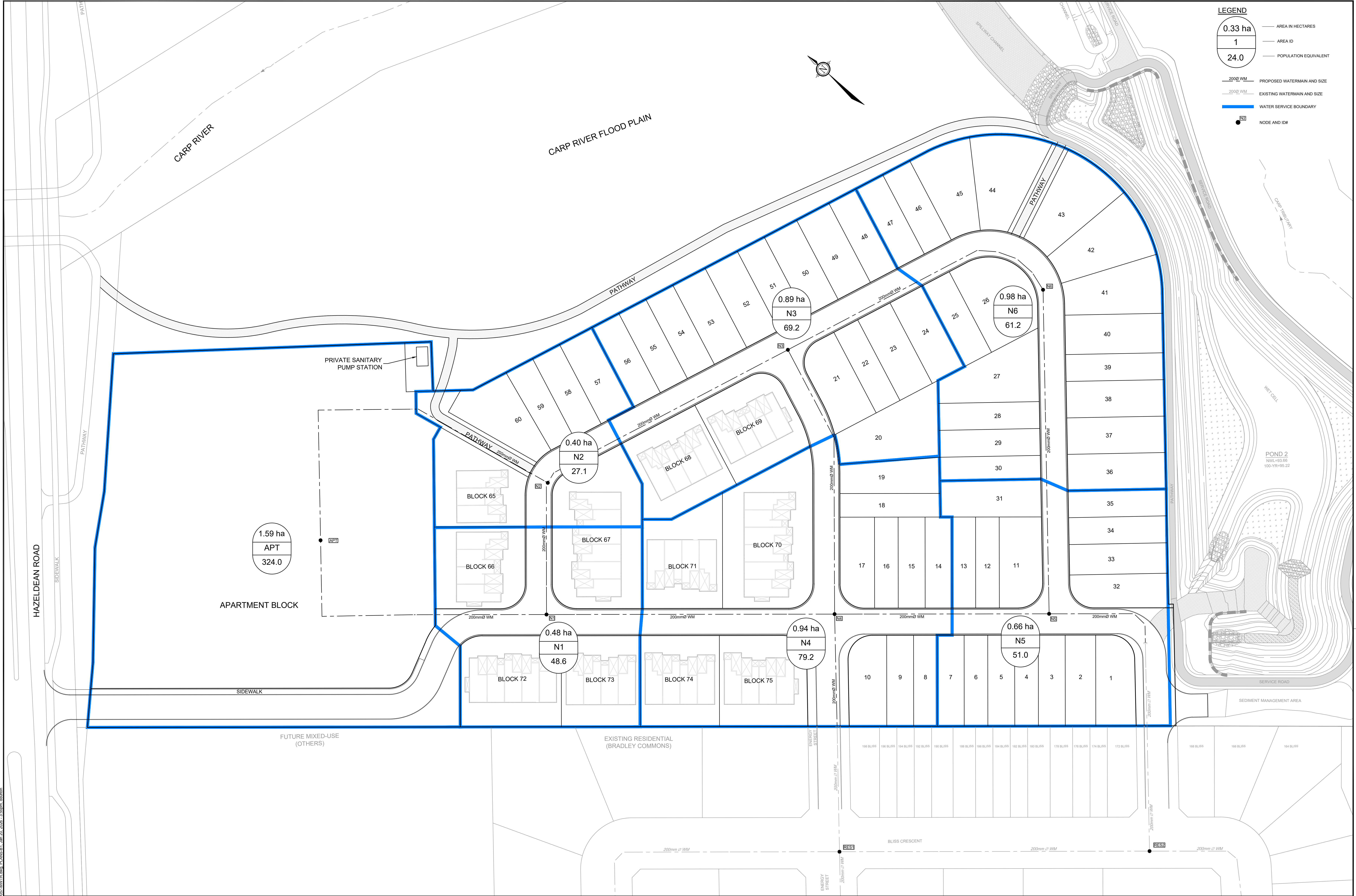
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PROVINCE OF ONTARIO

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

CITY OF OTTAWA
560 HAZELDEAN ROAD - DOUBLE DECK SUBDIVISION

CUT / FILL AREA PLAN

PROJECT No. 100057-05
REV 100057-05
DRAWING No. 100057-CFA



LEGEND

0.33 ha

1

24.0

AREA IN HECTARES

AREA ID

POPULATION EQUIVALENT

200 Ø WM

200 Ø WM

PROPOSED WATERMAIN AND SIZE

EXISTING WATERMAIN AND SIZE

WATER SERVICE BOUNDARY

N2

NODE AND ID#

NOTE:

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No.	REVISION	DATE	BY
2.	OP COMMENT RESOLUTION	JAN 20/26	MAB
1.	DRAFT PLAN APPLICATION	AUG 15/25	MAB

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Engineers, Planners & Landscape Architects

Suite 200, 240 Michael Cowpland Drive

Ottawa, Ontario, Canada K2M 1P6

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Facsimile (613) 254-5867

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CITY OF OTTAWA - 560 HAZELDEAN ROAD

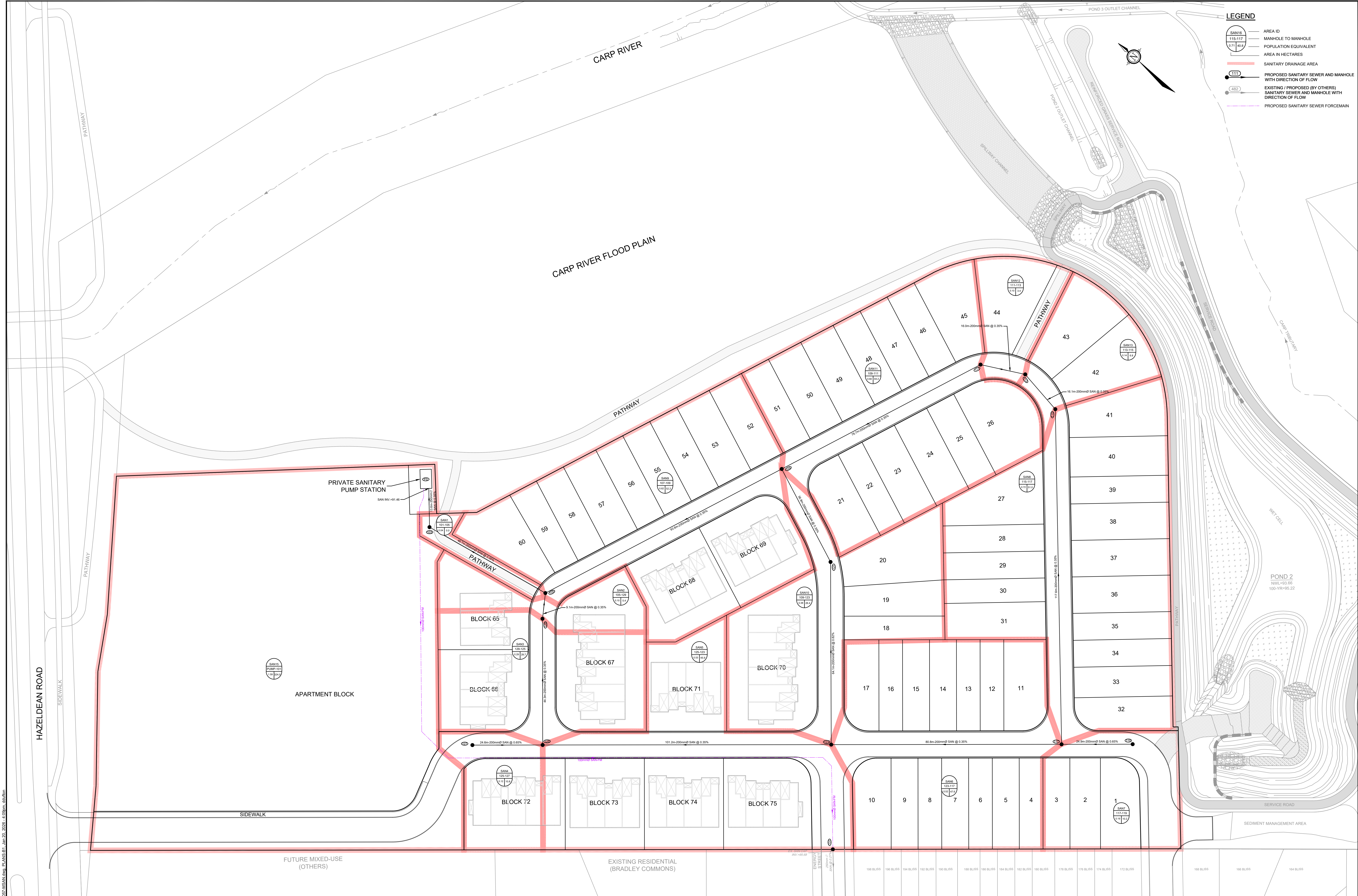
DOUBLE DECK SUBDIVISION

WATER DISTRIBUTION PLAN

PROJECT No. 100057-05

REV # 2

DRAWING No. 100057-WTR



NOTE:
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No.	REVISION	DATE	BY
2.	OP COMMENT RESOLUTION	JAN 20/26	MAB
1.	DRAFT PLAN APPLICATION	AUG 15/25	MAB

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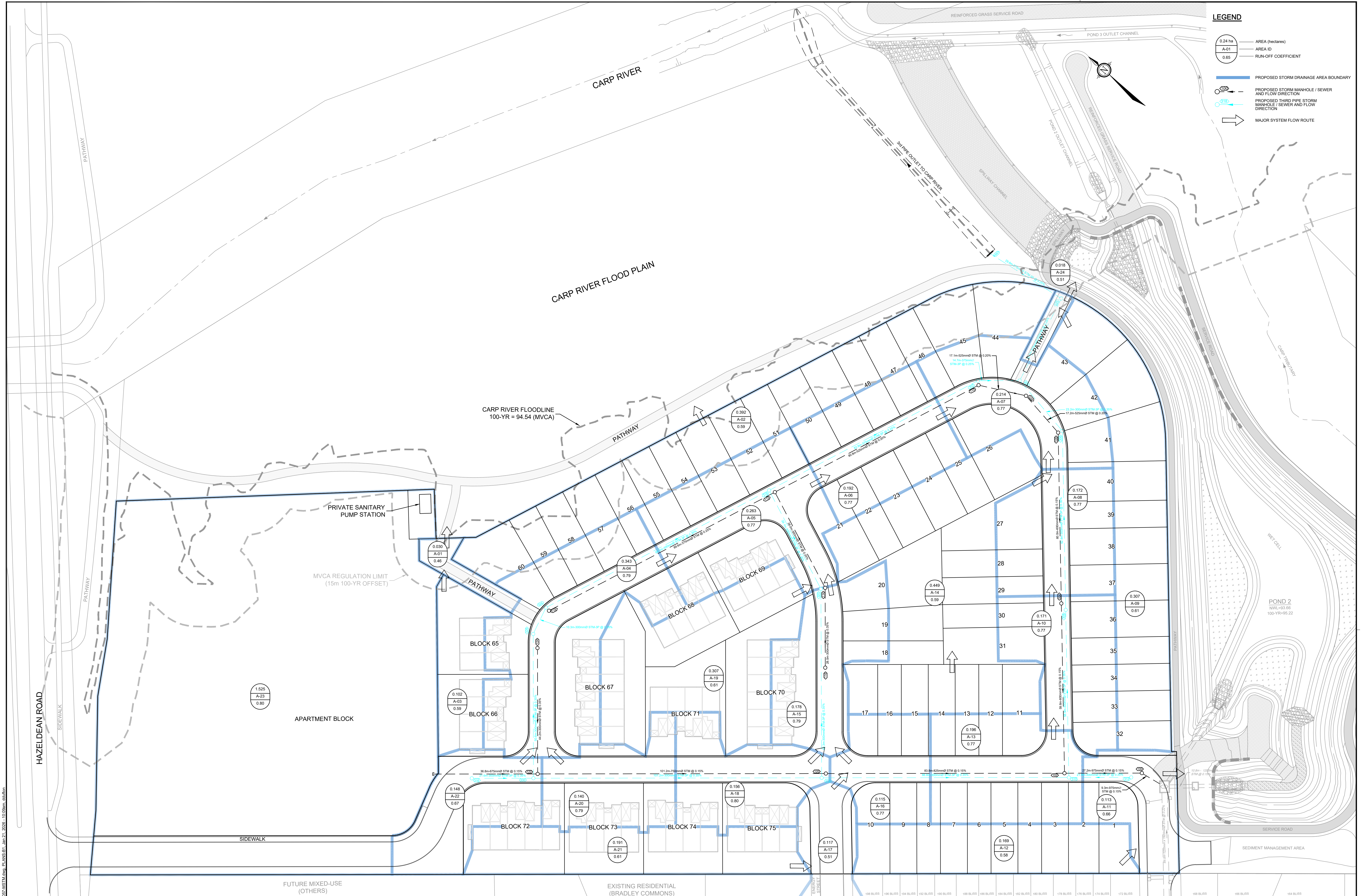
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NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
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CITY OF OTTAWA - 560 HAZELDEAN ROAD
DOUBLE DECK SUBDIVISION

SANITARY DRAINAGE AREA PLAN

PROJECT No.	REV	REV #	DRAWING No.
100057-05			
			100057-SAN



NOTE:
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No.	REVISION	DATE	BY
2.	OP COMMENT RESOLUTION	JAN 20/26	MAB
1.	DRAFT PLAN APPLICATION	AUG 15/25	MAB

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NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
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CITY OF OTTAWA - 560 HAZELDEAN ROAD
DOUBLE DECK SUBDIVISION

STORM DRAINAGE AREA PLAN

PROJECT No.
100057-05

REV
REV # 2

DRAWING No.
100057-STM

Elevations Table			
Number	Minimum Elevation	Maximum Elevation	Color
1	0.00	0.25	Red
2	0.25	0.50	Yellow
3	0.50	0.75	Cyan
4	0.75	1.00	Purple



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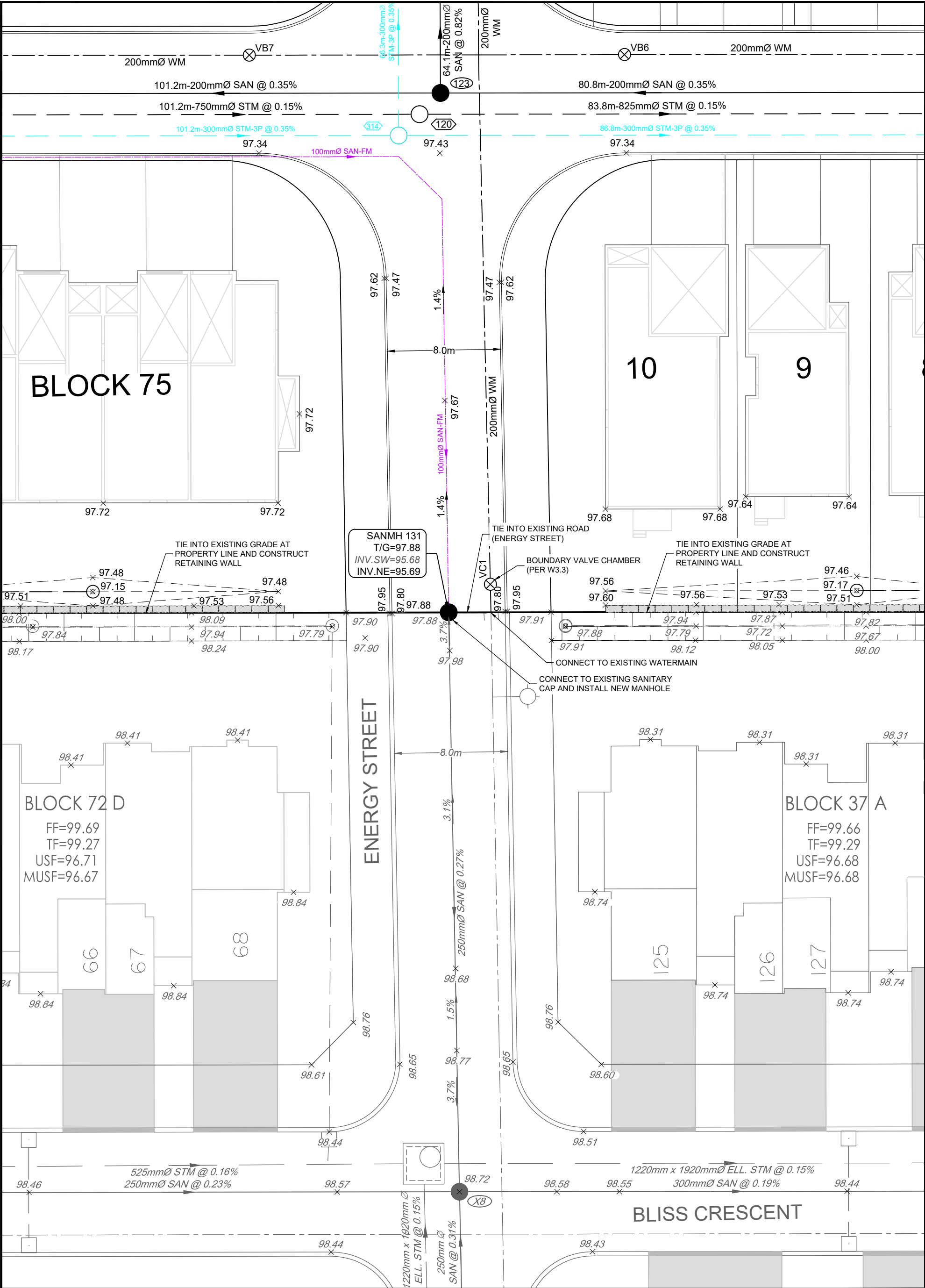
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CITY OF OTTAWA
560 HAZELDEAN ROAD
DOUBLE DECK SUBDIVISION

LIGHT WEIGHT FILL
LOCATIONS

SCALE 1 : 1000

DATE JANUARY 20, 2026 JOB 100057 FIGURE DSK-30



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Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
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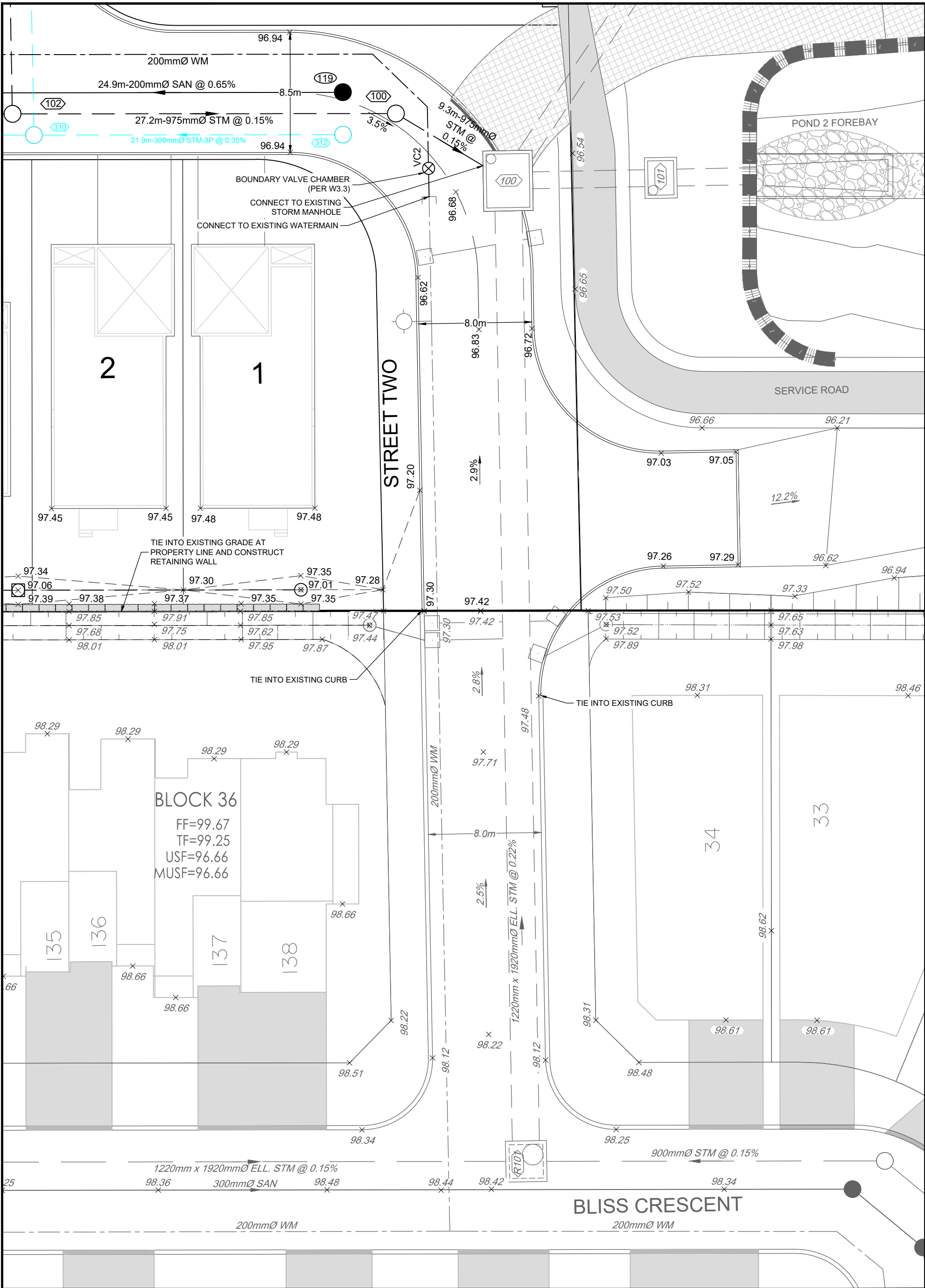
CITY OF OTTAWA
560 HAZELDEAN ROAD
DOUBLE DECK SUBDIVISION

ENERGY STREET TIE IN

SCALE 1 : 250

DATE JANUARY 20, 2026 JOB 100057-05 FIGURE DSK-28A

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Engineers, Planners & Landscape Architects
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Ottawa, Ontario, Canada K2M 1P6

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CITY OF OTTAWA
560 HAZELDEAN ROAD
DOUBLE DECK SUBDIVISION

STREET TWO TIE IN

SCALE 1 : 250

DATE JANUARY 20, 2026 JOB 100057-05 FIGURE DSK-28B