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560 Hazeldean Road
Double Deck Subdivision

Concept Servicing Report

Assessment of Adequacy of Public Services and Stormwater Site Management

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
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August 15, 2025
Revised: January 20, 2026
Revised: May 22, 2026

Novatech File: 100057
Ref: R-2025-70

Engineers, Planners & Landscape Architects

May 22, 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 (60 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]**.

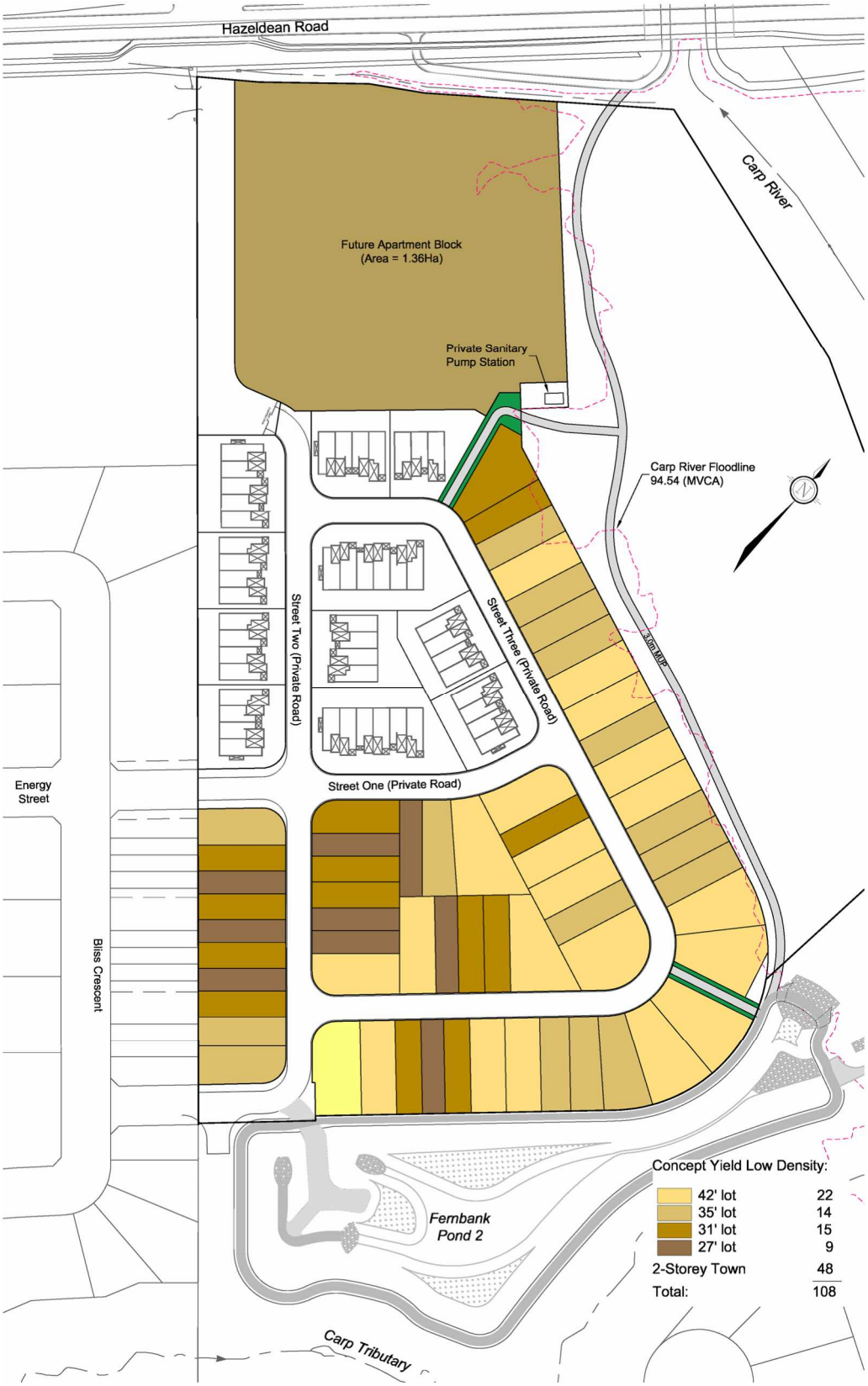


Figure 1-2: Concept Plan

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**.

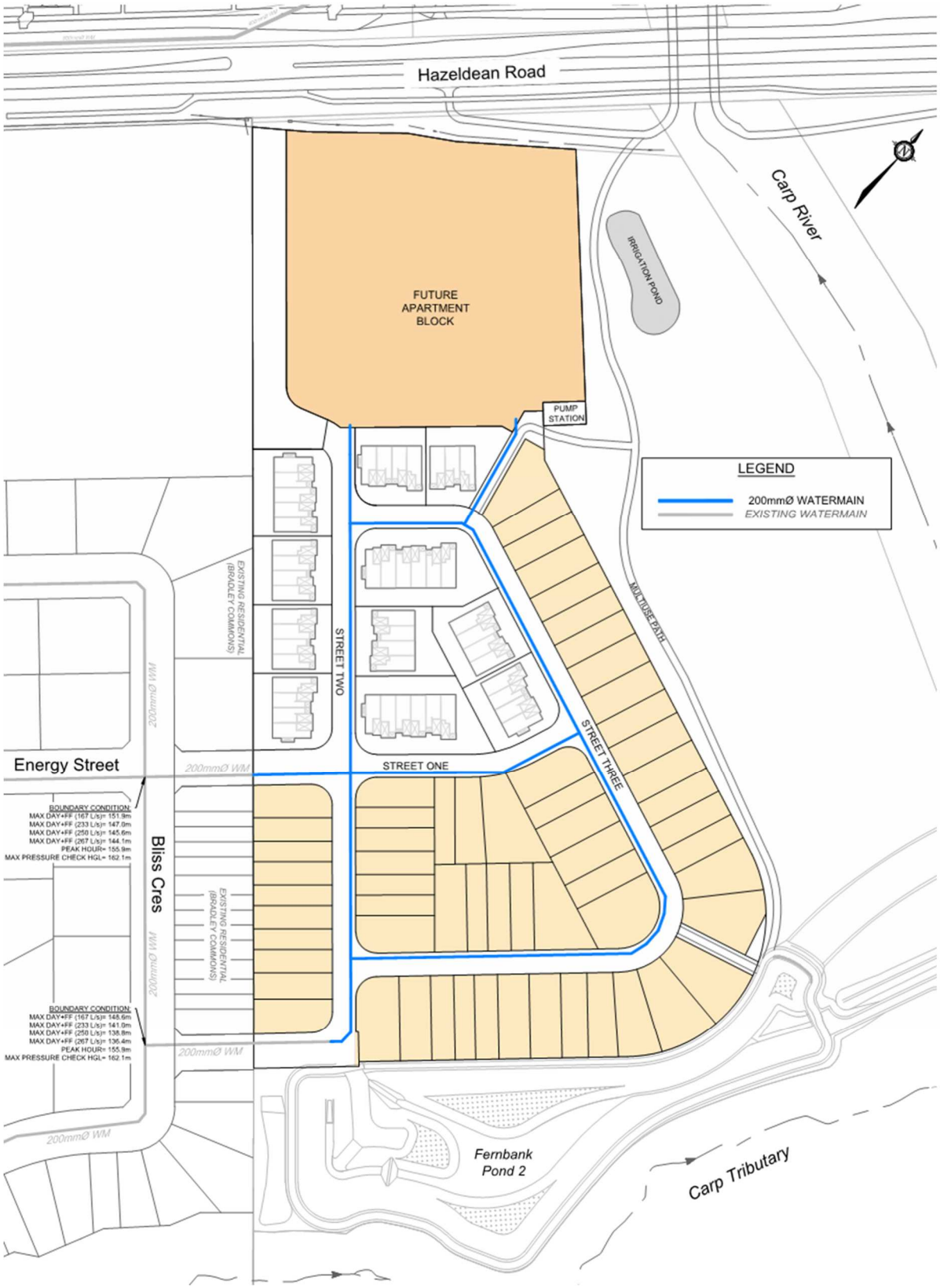


Figure 3-1: Watermain Layout

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.

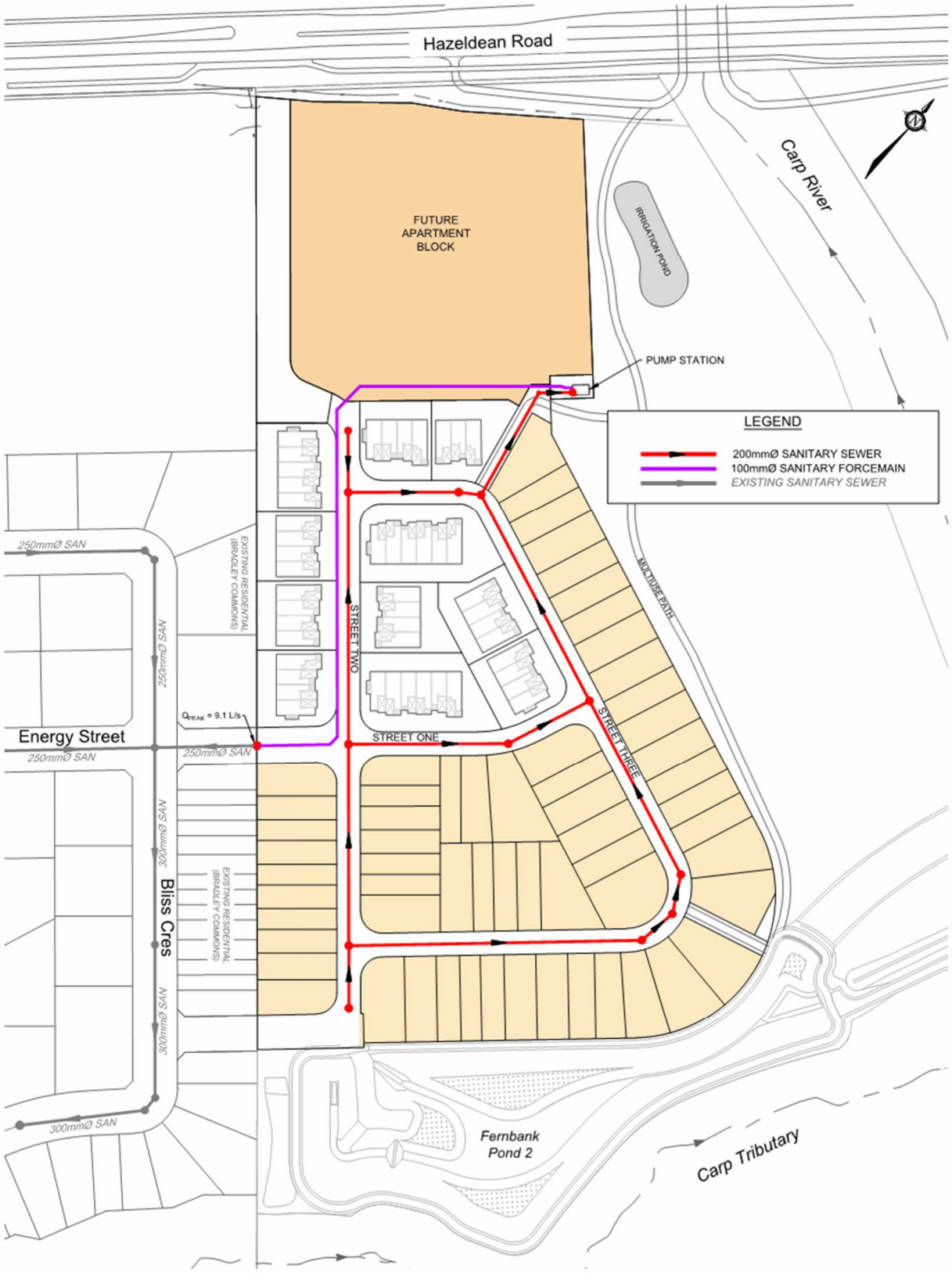


Figure 4-1: Sanitary Sewer Layout

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 has increased by **3.7 L/s** compared to the flow previously used to assess the downstream sanitary system in the Bradley Commons Subdivision. The potential bottleneck is the **300 mm** sewer crossing the Carp River West Tributary (SAN 1A to EX. SAN EX11), installed at a **0.14%** slope, with a capacity of **37.7 L/s**. The additional **3.7 L/s** raises the peak design flow through this section to **32.7 L/s** (up from **29.0 L/s** in the previous analysis), which remains within the available capacity. **Appendix A** includes the design sheets for the proposed development and excerpts from the *Bradley Commons – Phase 4 Servicing and Stormwater Management Report* (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 and will include an easement to permit maintenance access;
- 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 (emergency overflow) 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 (no allowance has been provided for the apartment block as the buildings will be slab-on-grade with no storm services). 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.

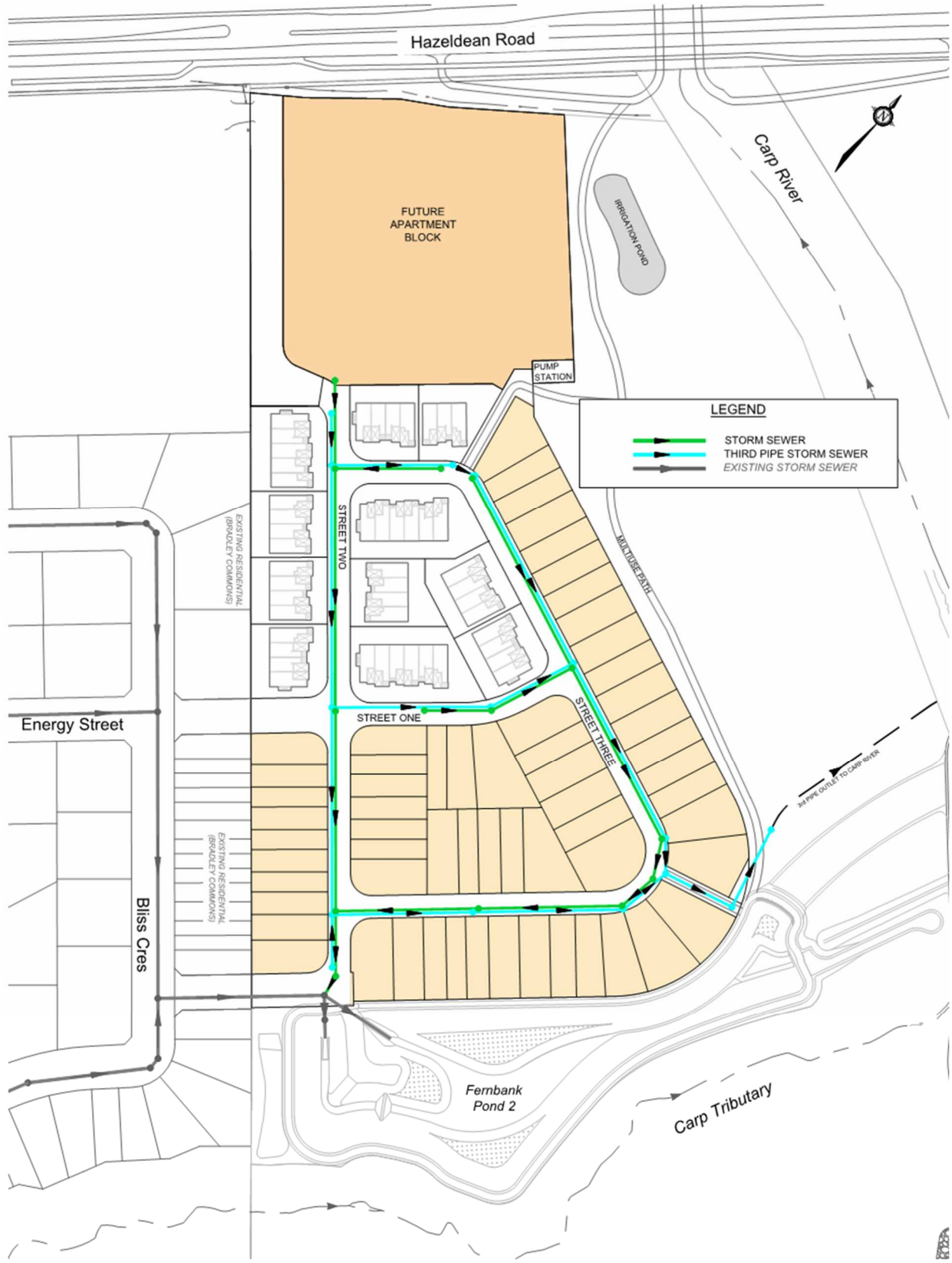


Figure 5-1: Storm Sewer Layout

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 76, 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:	*12 Hour MTO SCS Distribution*:
2-year Event	2-year Event
5-year Event	5-year Event
10-year Event	10-year Event
100-year Event	100-year Event
100-year + 20% 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	37.1	0	80.5	8.6	1
A-02	0.392	0.59	55.7	95	80.5	112.0	1
A-03	0.102	0.59	55.7	95	80.5	51.0	1
A-04	0.343	0.79	84.3	62	80.5	171.5	1
A-05	0.263	0.77	81.4	53	80.5	131.5	1
A-06	0.192	0.77	81.4	62	80.5	96.0	1
A-07	0.214	0.77	81.4	61	80.5	107.0	1
A-08	0.172	0.77	81.4	65	80.5	86.0	1
A-09	0.307	0.61	58.6	95	80.5	87.7	1
A-10	0.160	0.77	81.4	59	80.5	80.0	1
A-11	0.114	0.66	65.7	27	80.5	57.0	1
A-12	0.169	0.58	54.3	95	80.5	84.5	1
A-13	0.207	0.77	81.4	57	80.5	103.5	1
A-14	0.449	0.59	55.7	95	80.5	74.8	1
A-15	0.178	0.79	84.3	58	80.5	89.0	1
A-16	0.115	0.77	81.4	55	80.5	57.5	1
A-17	0.117	0.51	44.3	0	80.5	117.0	1
A-18	0.156	0.80	85.7	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	84.3	57	80.5	70.0	1
A-21	0.191	0.61	58.6	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	0.085	0.80	85.7	36	80.5	42.5	1
A-23	1.588	0.80	85.7	26	80.5	132.3	1
A-24	0.018	0.51	44.3	0	80.5	6.0	1
TOTAL:	**6.01**	**0.72**	**74.3**				

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 conduits matching conceptual clearstone trenches 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.

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 (Roadway Catchbasins)

Structure ID	Rim Elev.	Max Static Ponding		HGL and Ponding Depth							
				2-yr		5-yr		100-yr		100-yr (+20%)	
		Spill Elev. (m)	Depth (m)	HGL Elev. (m)	Depth (m)	HGL Elev. (m)	Depth (m)	HGL Elev. (m)	Depth (m)	HGL Elev. (m)	Depth (m)
CB_A04	96.91	97.14	0.23	96.91	0.00	96.98	0.07	97.12	0.21	97.17	0.26
CB_A05	96.86	97.12	0.26	96.86	0.00	96.92	0.06	97.01	0.15	97.06	0.20
CB_A06	96.82	97.10	0.28	96.82	0.00	96.89	0.07	97.00	0.18	97.05	0.23
CB_A07	96.72	97.06	0.34	96.72	0.00	96.79	0.07	96.88	0.16	96.97	0.25
CB_A08	96.87	97.07	0.20	96.87	0.00	96.94	0.07	97.07	0.20	97.11	0.24
CB_A10	96.90	97.08	0.18	96.90	0.00	96.97	0.07	97.11	0.21	97.13	0.23
CB_A11	96.56	96.76	0.20	96.32	0.00	96.59	0.03	96.66	0.10	96.79	0.23
CB_A13	97.09	97.17	0.08	97.09	0.00	97.17	0.08	97.22	0.13	97.23	0.14
CB_A15	96.96	97.15	0.19	96.96	0.00	97.01	0.05	97.07	0.11	97.14	0.18
CB_A16	97.29	97.43	0.14	97.29	0.00	97.35	0.06	97.43	0.14	97.45	0.16
CB_A17	97.28	97.43	0.15	96.28	0.00	96.74	0.00	97.38	0.10	97.45	0.17
CB_A18	97.29	97.43	0.14	97.29	0.00	97.36	0.07	97.45	0.16	97.46	0.17
CB_A20	97.42	97.47	0.05	97.41	0.00	97.49	0.07	97.52	0.10	97.53	0.11
CB_A22	97.39	97.47	0.08	97.22	0.00	97.45	0.06	97.51	0.12	97.52	0.13

Table 5.4 above confirms that no ponding occurs during the 2-year storm event and there is sufficient major system storage provided by the private roadway conduits to prevent major system overland flow 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)	*Minor*	0.510	0.615	0.641	0.709
	Major	0.000	0.000	0.000	0.000
	Total	0.510	0.615	0.641	0.709
Outflow	*Original*	0.135	0.394	0.687	2.705
	Updated	0.133	0.364	0.629	2.503
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). An estimated area of 0.118 ha with a runoff coefficient of 0.30 consisting mostly of grassed area from the Apartment block will sheet drain uncontrolled to the Carp River. Using the rational method, the total 100-year flow directed to the Carp River from the Apartment block is 0.022 cms. The total combined outflow to the Carp River during the 100-year MTO SCS storm event, including the rear-yards and Apartment block, is 2.693 cms, less than 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 and Apartment block runoff, pre-development flows are still being met.

Runoff Volumes

The Fernbank EMP outlined the following criteria: "*Increases in runoff volumes resulting from development are not to exceed an additional 40,000 m^3 above existing conditions for the 100-year event*."

The Pond 2 design report provided a pre- vs post-development comparison of the 100-year runoff volumes. Under post-development conditions (with BMPs, 70% IMP), the total volume increase from Ponds 1, 2 and 3 directed to the Carp River was 31,461 m^3, well within the allowable. The increase attributed to Pond 2 was 2,861 m^3 and accounted for only 9% of the total volume increase. Refer to **Appendix B** for Pond 2 volume comparison excerpts.

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	94.82	94.94	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	-	94.04	94.54	94.84
302	96.84	94.23	94.58	94.88
304	96.90	94.20	94.60	94.90
306	96.94	94.04	94.62	94.92
308	97.07	94.54	94.68	94.98
310	97.18	94.75	94.74	95.05
312	96.82	94.90	94.76	95.20
314 (310 side)	97.43	95.12	94.83	95.42
314 (320 side)	97.43	94.78	94.77	95.08
316	97.45	95.19	94.84	95.49
318	96.94	94.44	94.67	94.97
320	97.15	94.55	94.71	95.01
324	97.03	94.72	94.76	95.06
326	97.10	94.76	94.77	95.07
328	95.58	94.12	94.57	94.87
330 (326 side)	97.55	94.94	94.82	95.24
330 (314 side)	97.55	95.30	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	15.0	147.1
CB_A09	0.307	76.4	248.9
CB_A12	0.169	15.9	94.1
CB_A14	0.449	80.6	179.5
CB_A19	0.307	46.6	151.8
CB_A21	0.191	15.9	83.2
CB_A23 (Apt Block)	1.588	284.0	178.8

**Total volume based on PCSWMM values during the 3-hour Chicago Storm Event*

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 93.67 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.

5.4.5 Apartment Block Stormwater Management Allowances

The Apartment Block and access road to Hazeldean Road (1.588 ha) have been accounted for in the design of the subdivision and are to adhere to the following stormwater management criteria:

- Minor system inlet rate = 214 L/s (3-hour Chicago storm event);
- 100-year storm event contained on-site (284 m^3 of major system storage);
- Uncontrolled sheet drainage of 22 L/s directed to Carp River (Area = 0.118 ha, c = 0.30).

5.5 Climate Change Flood Vulnerable Area (1:350)

The Official Plan 10.3.1 policy states "*Where lands located in a climate change flood vulnerable area are subject to site plan control or plan of subdivision applications, flood risk will be evaluated, and mitigation measures will be applied as part of the planning and design of the site*."

As parts of the site are within the flood vulnerable area, discussion on potential mitigation measures is required. The following MVCA floodproofing and safe access standards provide guidance on potential measures that could be implemented within vulnerable areas:

- Underside of Floor Assembly and Building Openings: Underside of floor assembly and all building openings must be at least 0.3m above the 100- year flood level;
- Habitable Space: Habitable space is not permitted below the regulatory flood level;
- Flood-Resistant Foundation Design: Foundations, walls and floors located below the regulatory flood level must be engineered to withstand hydrostatic pressures that may be exerted during a flood;
- Material Durability: Construction materials used below the regulatory flood level must be resistant to deterioration caused by alternating wetting and drying cycles;
- Mechanical and Electrical Systems: All mechanical and electrical service shutoffs must be located at least 0.3m above the 100-year flood level;
- Flood-Resistant Ventilation and Drainage Systems: All ventilation openings (e.g., vents, air ducts) and drainage systems in basements must be designed to prevent the entry of floodwater. Backflow prevention should be incorporated into drainage systems to prevent sewage or stormwater from backing up into the building during a flood.

The flood vulnerable area consists mainly of the single units along the eastern property line adjacent the Carp River. Rear-yards along this property line are proposed to be raised 0.30m above the 100-year floodplain elevations and all units are intended to be walkouts ensuring all building openings set well above the 0.30 m clearance. At the detailed design stage, the above mitigation measures will be assessed and implemented as required.

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:

NOVATECH

Lucas Wilson, P.Eng.
Project Engineer

Reviewed By:

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
Engineers, Planners & Landscape Architects

Novatech Project #: 100057
Project Name: 560 Hazeldean Road - Double Deck
Date: 5/22/2026
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							
				Residential Flow										Industrial / Commercial / Institutional (ICI) Flow						Extraneous Flow Area Method		Total Design Flow	Proposed Sewer Pipe Sizing / Design							
Street	Area ID	From MH	To MH	Singles	Semis / Towns	Apts	Park Area	Population (in 1000's)	Cumulative Population (in 1000's)	Average Pop. Flow Q(q) (L/s)	Design Peaking Factor M	Peak Design Pop. Flow Q(p) (L/s)	Res. Drainage Area (ha.)	Cumulative Res. Drainage Area (ha.)	Commercial / Institutional Area (ha.)	Cumulative Commercial / Institutional Area (ha.)	Average Design Commercial / Institutional Flow (L/s)	Commercial / Institutional Peaking Factor	Cumulative ICI Area (ha.)	Peak Design ICI Flow Q (ici) (L/s)	Cumulative Extraneous Drainage Area (ha.)	Design Extraneous Flow Q(e) (L/s)	Total Peak Design Flow Q(D) (L/s)	Pipe Length (m)	Pipe Size (mm) and Material	Pipe ID Actual (m)	Roughness n	Design Grade So (%)	Capacity Qfull (L/s)	Full Flow Velocity (m/s)	Q(D) / Qfull
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	103					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	200 PVC	0.203	0.013	0.35	20.2	0.62	25.6%
SAN15		APT	103			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								
		103	PUMP					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	13.6	250 PVC	0.254	0.013	0.35	36.7	0.72	24.7%
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**	**758.2**							

Demand Equation / Parameters

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

Definitions

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

	Singles	Semis / Towns	Apts
P = Residential Population =	3.4	2.7	1.8
q = Average Capita Flow			
M = Harmon Formula			
K = Harmon Correction Factor			
Typ. Service Diameter (mm) =	135		
Typ. Service Length (m) =	15	15	
I/I Pipe Rate (L/mm dia/m/hr) =	0.007		

Q(fd) = Foundation Flow (L/s)
Q(ici) = Industrial / Commercial / Institutional Flow (L/s)
Q(e) = Extraneous Flow (L/s)

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

Capacity Equation

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

Definitions

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

560 Hazeldean Road - Double Deck Subdivision: 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.

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)

560 HAZELDEAN ROAD, DOUBLE DECK - SANITARY SEWER DESIGN

LOCATION	MANHOLE U/S	MANHOLE D/S	INVERT ELEVATION U/S (m)	INVERT ELEVATION D/S (m)	GROUND ELEVATION U/S (m)	COVER U/S (m)	PIPE PARAMETERS Dia (mm)	PIPE PARAMETERS Length (m)	PIPE PARAMETERS 'n'	TOTAL FLOW (m^3/s)	Q_{cap} (m^3/s)	Q_{in}/Q_{cap}	COMPUTATIONAL COLUMNS Pipe Area (m^2)	COMPUTATIONAL COLUMNS L/D	COMPUTATIONAL COLUMNS Friction Factor (f)	COMPUTATIONAL COLUMNS Velocity V (m/s)	COMPUTATIONAL COLUMNS $V^2/2g$	HEAD LOSS HL (m)	SURCHARGE U/S (m)	HGL U/S (m)	HGL D/S (m)	HGL SLOPE (%)	PIPE SLOPE (%)	MIN. USF U/S (m)	Conceptual USF 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

Manhole Loss

Diameters (mm) U/S MH	Pipe In	Pipe Out	Bend Angle	K_O	C_D	K_b	K_{tot}	HL_{MH} (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

Average Daily Flow=	280	L/cap/day	Industrial Peak Factor= per MOE graph		HGL=Major + Minor Losses
Comm/Inst Flow=	28000	L/ha/day	Extraneous Flow=	0.33 L/s/ha	Major Loss= Pipe Friction (Darcy-Weisbach)
Industrial Flow=	35000	L/ha/day	Minimum Velocity=	0.60 m/s	Minor Loss= Head loss correction for flow through MH, changes in pipe size, and pipe bends
Max Res Peak Factor=	4.00		Manning's n=	0.013	Friction Factor= 8g/c^2, where c=(1/n)*(D/4)^1/6
Comm Peak Factor=	1.50				
Indst Peak Factor=	1.50				

Designed: LRW

Checked: MAB

Dwg. Reference: 100057-SAN

PROJECT:
560 Hazeldean Road
Double Deck Subdivision

CLIENT:
Regional

Date: May 22, 2026

Stantec

SUBDIVISION:
HAZELDEAN CRAIG SUBDIVISION PHASE 4

DATE: 5/17/2021
REVISION: 2
DESIGNED BY: JP
CHECKED BY: DT

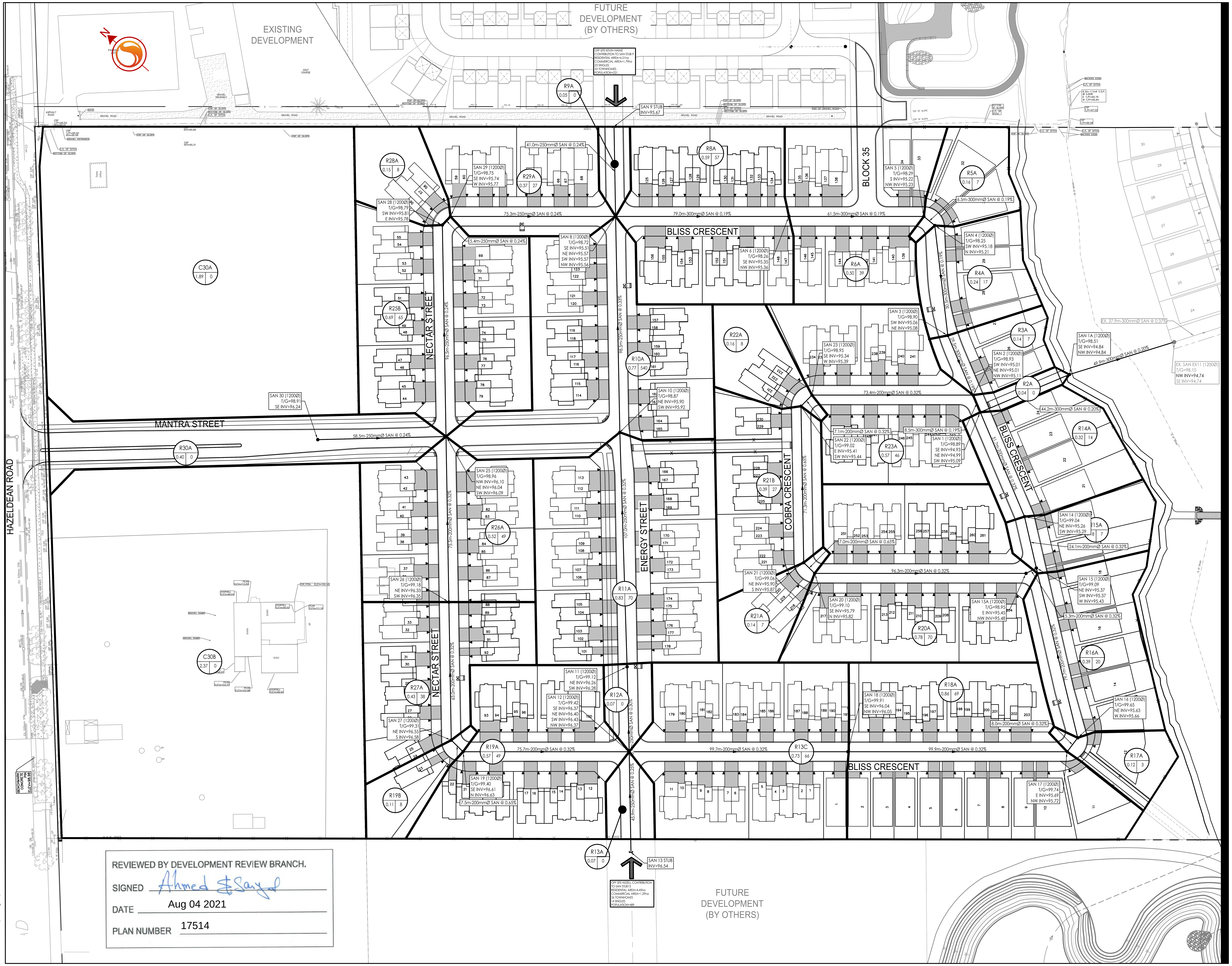
SANITARY SEWER DESIGN SHEET
(City of Ottawa)

FILE NUMBER: 160401217

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				

LOCATION			RESIDENTIAL AREA AND POPULATION									COMMERCIAL		INDUSTRIAL (L)		INDUSTRIAL (H)		INSTITUTIONAL		GREEN / UNUSED		C+I+I	INFILTRATION			TOTAL	PIPE							
AREA ID NUMBER	FROM M.H.	TO M.H.	AREA	SINGLE	UNITS TOWN	APT	POP.	CUMULATIVE AREA	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW	AREA	ACCU. AREA	AREA	ACCU. AREA	AREA	ACCU. AREA	AREA	ACCU. AREA	AREA	ACCU. AREA	PEAK FLOW	TOTAL AREA	ACCU. AREA	INFILT. FLOW	FLOW	LENGTH	DIA	MATERIAL	CLASS	SLOPE	CAP. (FULL)	CAP. V PEAK FLOW	VEL. (FULL)	VEL. (ACT.)
			(ha)					(ha)			(l/s)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(l/s)	(ha)	(ha)	(l/s)	(l/s)	(m)	(mm)			(%)	(l/s)	(%)	(m/s)	(m/s)
R21B	21	22	0.39	0	10	0	27	0.39	27	3.69	0.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.39	0.39	0.1	0.5	71.3	200	PVC	SDR 35	0.65	27.0	**1.67%**	0.85	0.26
R22A	22	23	0.16	0	3	0	8	0.54	35	3.67	0.4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.16	0.54	0.2	0.6	7.1	200	PVC	SDR 35	0.32	18.9	**3.16%**	0.60	0.23
R23A	23	2	0.57	0	17	0	46	1.11	81	3.61	0.9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.57	1.11	0.4	1.3	73.4	200	PVC	SDR 35	0.32	19.0	**6.92%**	0.60	0.29
KEVIN HAIME R9A	STUB 9	8	4.21	23	53	0	221	4.21	221	3.51	2.5	1.79	1.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.9	6.00	6.00	2.0	5.4	41.0	250	PVC	SDR 35	0.24	29.7	**18.06%**	0.60	0.37
R12A	12	11	0.07	0	0	0	0	0.84	54	3.65	0.6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.07	0.84	0.3	0.9	38.7	250	PVC	SDR 35	0.30	33.2	**2.76%**	0.67	0.24
R11A	11	10	0.83	0	26	0	70	1.67	124	3.57	1.4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.83	1.67	0.6	2.0	107.0	250	PVC	SDR 35	0.32	34.2	**5.82%**	0.69	0.31
R10A	10	8	0.77	0	20	0	54	2.44	178	3.53	2.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.77	2.44	0.8	2.8	98.5	250	PVC	SDR 35	0.33	34.9	**8.15%**	0.70	0.35
C30B, R30A, C30A	30	25	0.40	0	0	0	0	0.40	0	3.80	0.0	4.26	4.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.1	4.66	4.66	1.5	3.6	58.5	250	PVC	SDR 35	0.24	29.7	**12.16%**	0.60	0.33
R19B	19	27	0.11	0	3	0	8	0.11	8	3.74	0.1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.11	0.11	0.0	0.1	7.5	200	PVC	SDR 35	0.65	27.0	**0.50%**	0.85	0.18
R27A	27	26	0.43	0	14	0	38	0.54	46	3.66	0.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.43	0.54	0.2	0.7	63.0	200	PVC	SDR 35	0.32	18.9	**3.82%**	0.60	0.24
R26A	26	25	0.52	0	18	0	49	1.06	95	3.60	1.1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.52	1.06	0.4	1.5	75.5	200	PVC	SDR 35	0.32	18.9	**7.69%**	0.60	0.30
R25B	25	28	0.69	0	24	0	65	2.15	159	3.55	1.8	0.00	4.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.1	0.69	6.42	2.1	6.0	96.5	250	PVC	SDR 35	0.24	29.7	**20.27%**	0.60	0.39
R28A	28	29	0.15	0	3	0	8	2.31	167	3.54	1.9	0.00	4.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.1	0.15	6.57	2.2	6.2	5.4	250	PVC	SDR 35	0.24	29.7	**20.75%**	0.60	0.39
R29A	29	8	0.37	0	10	0	27	2.67	194	3.52	2.2	0.00	4.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.1	0.37	6.94	2.3	6.6	75.3	250	PVC	SDR 35	0.24	29.7	**22.16%**	0.60	0.40
R8A	8	6	0.59	0	21	0	57	9.91	651	3.33	7.0	0.00	6.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.9	0.59	15.96	5.3	15.2	79.0	300	PVC	SDR 35	0.19	41.9	**36.39%**	0.59	0.46
R6A	6	5	0.50	2	12	0	39	10.41	690	3.32	7.4	0.00	6.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.9	0.50	16.46	5.4	15.8	61.5	300	PVC	SDR 35	0.19	41.9	**37.74%**	0.59	0.47
R5A	5	4	0.16	2	0	0	7	10.57	697	3.32	7.5	0.00	6.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.9	0.16	16.62	5.5	15.9	6.5	300	PVC	SDR 35	0.19	41.9	**38.03%**	0.59	0.47
R4A	4	3	0.24	5	0	0	17	10.81	714	3.31	7.7	0.00	6.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.9	0.24	16.86	5.6	16.2	50.5	300	PVC	SDR 35	0.19	41.9	**38.63%**	0.59	0.47
R3A	3	2	0.14	2	0	0	7	10.95	720	3.31	7.7	0.00	6.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.9	0.14	17.00	5.6	16.3	29.5	300	PVC	SDR 35	0.19	41.5	**39.28%**	0.59	0.47
R2A	2	1	0.04	0	0	0	0	12.10	801	3.29	8.5	0.00	6.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.9	0.04	18.15	6.0	17.5	8.5	300	PVC	SDR 35	0.19	41.9	**41.75%**	0.59	0.48
R21A	21	20	0.14	2	0	0	7	0.14	7	3.74	0.1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.14	0.14	0.0	0.1	7.0	200	PVC	SDR 35	0.65	27.0	**0.47%**	0.85	0.18
R20A	20	15A	0.78	0	26	0	70	0.91	77	3.62	0.9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.78	0.91	0.3	1.2	96.3	200	PVC	SDR 35	0.32	18.9	**6.37%**	0.60	0.28
	15A	15	0.00	0	0	0	0	0.91	77	3.62	0.9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.00	0.91	0.3	1.2	5.3	200	PVC	SDR 35	0.32	18.9	**6.37%**	0.60	0.28
KIZZEL R13A	STUB 13	12	4.52	14	26	0	489	4.52	489	3.38	5.4	1.29	1.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.6	5.81	5.81	1.9	7.9	45.9	250	PVC	SDR 35	0.25	30.3	**26.08%**	0.61	0.43
R19A	19	12	0.57	0	18	0	49	0.57	49	3.65	0.6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.57	0.57	0.2	0.8	75.7	200	PVC	SDR 35	0.32	18.9	**4.04%**	0.60	0.24
R13C	12	18	0.73	1	23	0	66	5.82	603	3.34	6.5	0.00	1.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.4	0.73	7.11	2.3	9.3	99.7	200	PVC	SDR 35	0.32	18.9	**49.09%**	0.60	0.50
R18A	18	17	0.86	10	13	0	69	6.68	672	3.32	7.2	0.00	1.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.4	0.86	7.97	2.6	10.3	99.9	200	PVC	SDR 35	0.32	18.9	**54.50%**	0.59	0.52
R17A	17	16	0.12	1	0	0	3	6.80	676	3.32	7.3	0.00	1.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.4	0.12	8.09	2.7	10.4	8.0	200	PVC	SDR 35	0.32	18.9	**54.78%**	0.60	0.52
R16A	16	15	0.39	6	0	0	20	7.18	696	3.32	7.5	0.00	1.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.4	0.39	8.47	2.8	10.7	79.7	200	PVC	SDR 35	0.32	18.9	**56.55%**	0.60	0.53
R15A	15	14	0.18	2	0	0	7	8.28	780	3.29	8.3	0.00	1.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.4	0.18	9.57	3.2	11.9	24.1	200	PVC	SDR 35	0.32	18.9	**62.91%**	0.60	0.54
R14A	14	1	0.32	4	0	0	14	8.60	793	3.29	8.5	0.00	1.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.4	0.32	9.89	3.3	12.1	51.7	200	PVC	SDR 35	0.32	18.9	**64.18%**	0.60	0.55
	1	1A	0.00	0	0	0	0	20.69	1595	3.13	16.2	0.00	7.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.6	0.00	28.04	9.3	29.0	44.2	300	PVC	SDR 35	0.20	42.9	**67.51%**	0.61	0.57
	1A	EX11	0.00	0	0	0	0	20.69	1595	3.13	16.2	0.00	7.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.6	0.00	28.04	9.3	29.0	49.9	300	PVC	SDR 35	0.20	42.9	**67.52%**	0.61	0.57
																												300							



Stantec

Stantec Consulting Ltd.
400 - 1331 Clyde Avenue
Ottawa ON
Tel. 613.722.4420
www.stantec.com

Legend

- SANITARY DRAINAGE AREA ID#
- POPULATION
- SANITARY DRAINAGE AREA No.
- SANITARY DRAINAGE AREA
- PROPOSED SANITARY SEWER
- FUTURE PHASE
- FUTURE SANITARY SEWER
- EXISTING PHASE
- EXISTING SANITARY SEWER
- FUTURE STUB
- FUTURE SANITARY DRAINAGE AREA
- 891 OFF-SITE OVERALL CONTRIBUTING POPULATION
- 12.72 OFF-SITE OVERALL CONTRIBUTING AREA (ha.)

Notes

		By	Appd.	YY.MM.DD
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

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
160401217	1:750

Drawing No.	Sheet	Revision
SA-1	30 of 31	5

D07-16-13-0036

DWG# 17514

ORIGINAL SHEET - ARCH D

560 Hazeldean Road - Double Deck Subdivision

Project No.: 100057

STORM SEWER DESIGN SHEET

FLOW RATES BASED ON RATIONAL METHOD

NOVATECH
Engineers, Planners & Landscape Architects

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
Street 2	**A-22, A-23**	CAP	122	1.673	0.80	1.34	3.721	3.721	10.00	76.81			285.8	285.8	0.686	675	Conc	0.15	36.8	339.4	0.92	0.67	84%
						0.00	0.000	0.000	10.00														
						0.00	0.000	0.000	10.00														
Street 3	**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														
Street 2	**A-18, A-20, A-21**	122	120	0.487	0.72	0.35	0.975	4.863	10.90	73.51			357.5	357.5	0.762	750	Conc	0.15	101.2	449.6	0.99	1.71	80%
						0.00	0.000	0.000	10.90														
						0.00	0.000	0.000	10.90														
Street 2	**A-13, A-16, A-17**	120	102	0.439	0.70	0.31	0.854	5.717	12.61	68.04			389.0	389.0	0.838	825	Conc	0.15	83.8	579.7	1.05	1.33	67%
						0.00	0.000	0.000	12.61														
						0.00	0.000	0.000	12.61														
Street 3	**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														
Street 1	**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														
Street 1	**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														
Street 3	**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														
Street 3	**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														
Street 3	**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														
Street 3	**A-10**	104	102	0.160	0.77	0.12	0.342	5.062	14.75	62.37			315.8	315.8	0.686	675	Conc	0.15	59.6	339.4	0.92	1.08	93%
						0.00	0.000	0.000	14.75														
						0.00	0.000	0.000	14.75														
Street 2		102	100			0.00	0.000	10.780	15.83	59.88			645.5	645.5	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														
Street 2	**A11**	100	1	0.114	0.66	0.08	0.209	10.989	16.21	59.04			648.8	648.8	0.991	975	Conc	0.15	9.3	905.1	1.17	0.13	72%
						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)

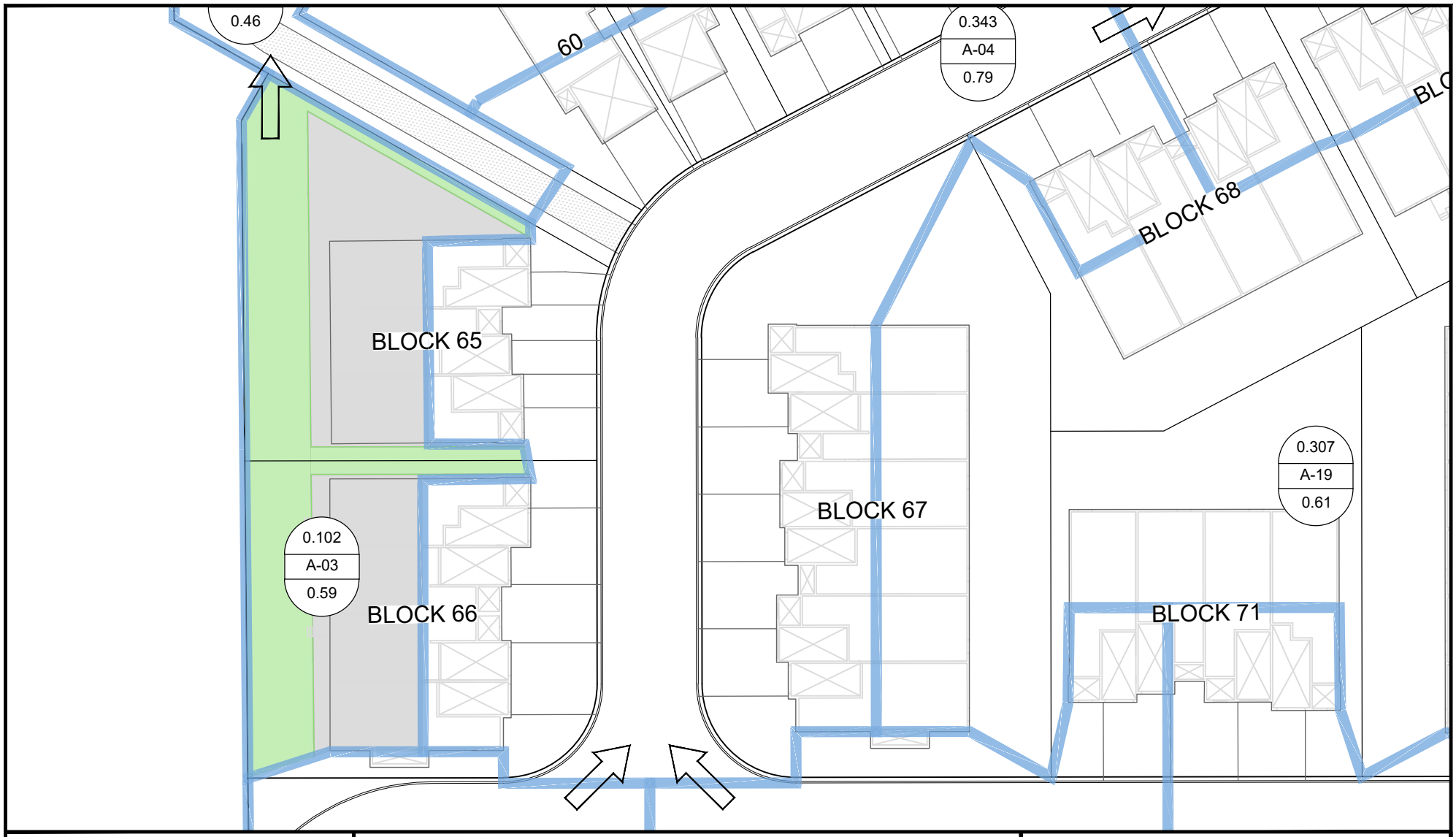
A = Area in hectares (ha)

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

C = Runoff Coefficient

LICENSED PROFESSIONAL ENGINEER
L. R. WILSON
100160065
2026.05.22
PROVINCE OF ONTARIO

Consultant:	**Novatech**
Date:	May 22, 2026
Design By:	Lucas Wilson
Client:	**Dwg. Reference:** / **Checked By:**
Regional	100057-STM / MAB



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Telephone (613) 254-9643
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Website www.novatech-eng.com

LEGEND

ZONING SET BACK - PERVIOUS AREA

ZONING SET BACK - IMPERVIOUS AREA

AREA A-03

TOTAL AREA	=0.102 HECTARES
PERVIOUS AREA	=0.045 HECTARES
IMPERVIOUS AREA	=0.057 HECTARES

C=((PERVIOUS AREA x 0.2)+(Impervious Area x0.9))/Total Area
C=0.59

CITY OF OTTAWA

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

SCALE 1 : 500 (0 5 10 15 20)

DATE MAY 26, 2026 | JOB 100057-05 | FIGURE DSK-29A

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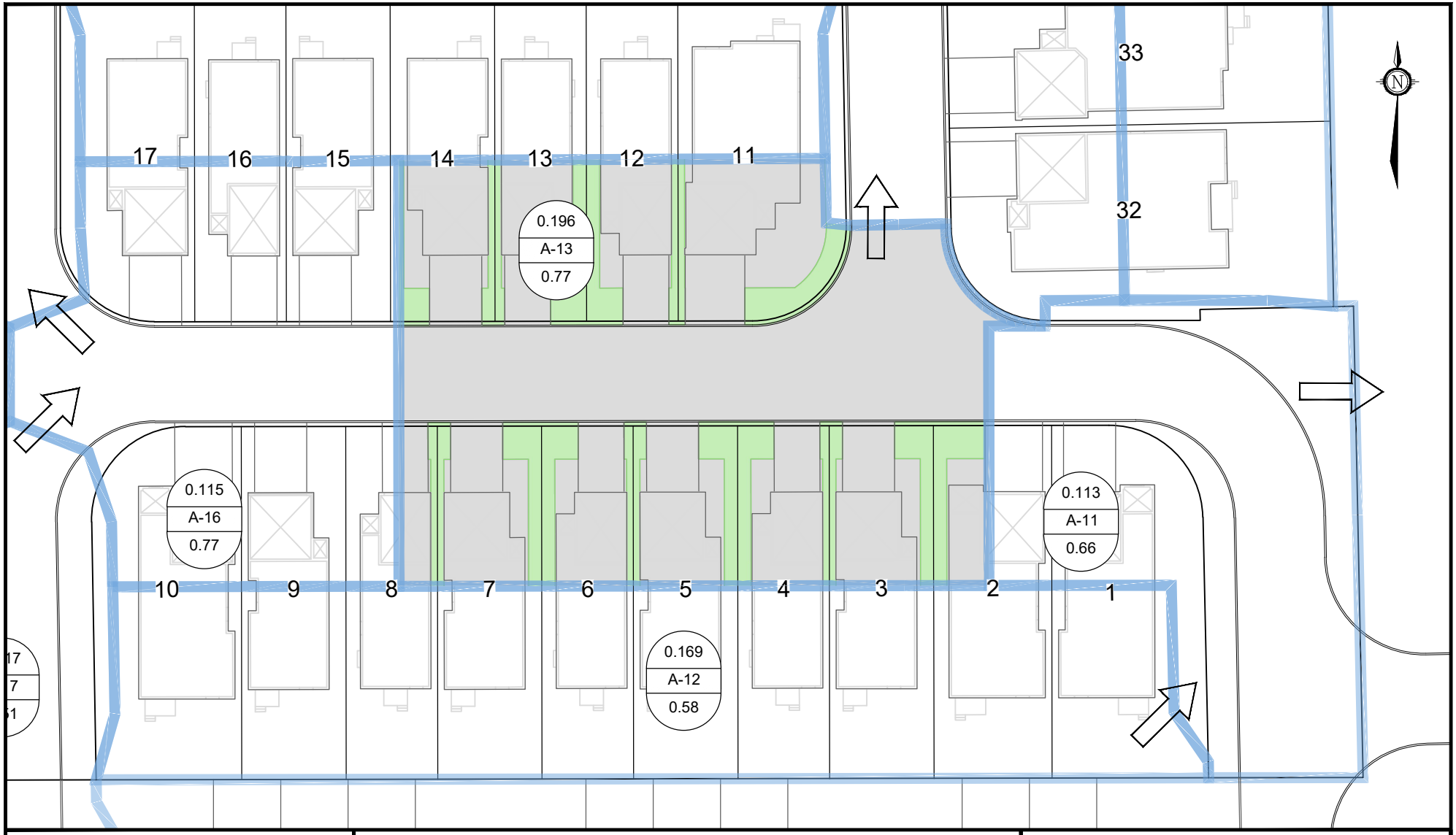

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LEGEND

ZONING SET BACK - PERVIOUS AREA

ZONING SET BACK - IMPERVIOUS AREA

AREA A-13

TOTAL AREA	=0.196 HECTARES
PERVIOUS AREA	=0.036 HECTARES
IMPERVIOUS AREA	=0.161 HECTARES

C=((PERVIOUS AREA x 0.2)+(Impervious Area x0.9))/Total Area
C=0.77

CITY OF OTTAWA

560 HAZELDEAN ROAD DOUBLE DECK SUBDIVISION

RUNOFF COEFFICIENT SAMPLE CALCULATIONS AREA A-13

SCALE 1 : 500 (0 5 10 15 20)

DATE MAY 21, 2026 | JOB 100057-05 | FIGURE DSK-29B

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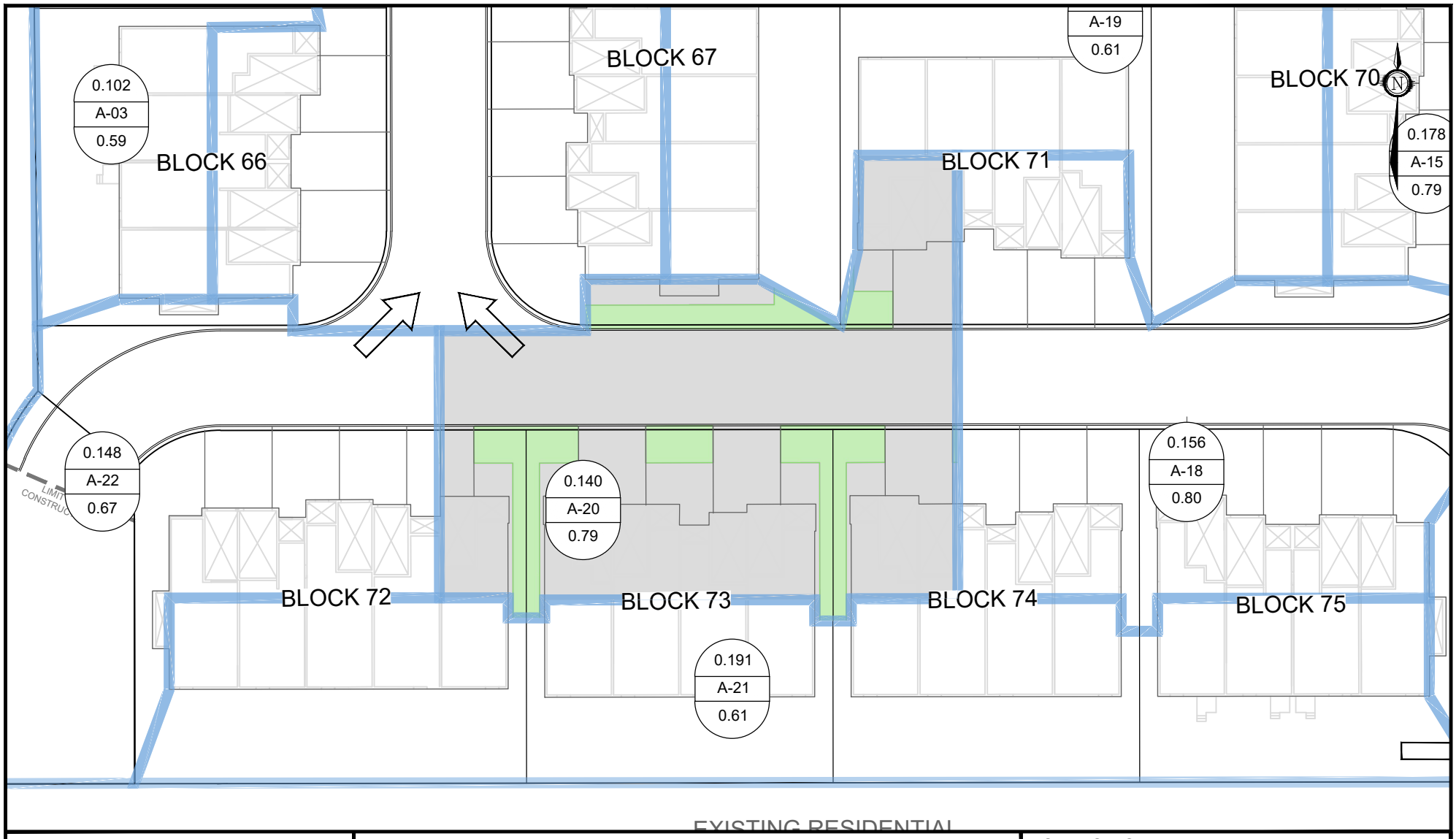
SHT8X11.DWG - 216mmx279mm



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LEGEND

ZONING SET BACK - PERVIOUS AREA

ZONING SET BACK - IMPERVIOUS AREA

AREA A-20

TOTAL AREA	=0.140 HECTARES
PERVIOUS AREA	=0.022 HECTARES
IMPERVIOUS AREA	=0.118 HECTARES

C=((PERVIOUS AREA x 0.2)+(Impervious Area x0.9))/Total Area
C=0.79

CITY OF OTTAWA

560 HAZELDEAN ROAD
DOUBLE DECK SUBDIVISION

RUNOFF COEFFICIENT SAMPLE CALCULATIONS AREA A-20

SCALE 1 : 500 (0 5 10 15 20)

DATE MAY 26, 2026 | JOB 100057-05 | FIGURE DSK-29C

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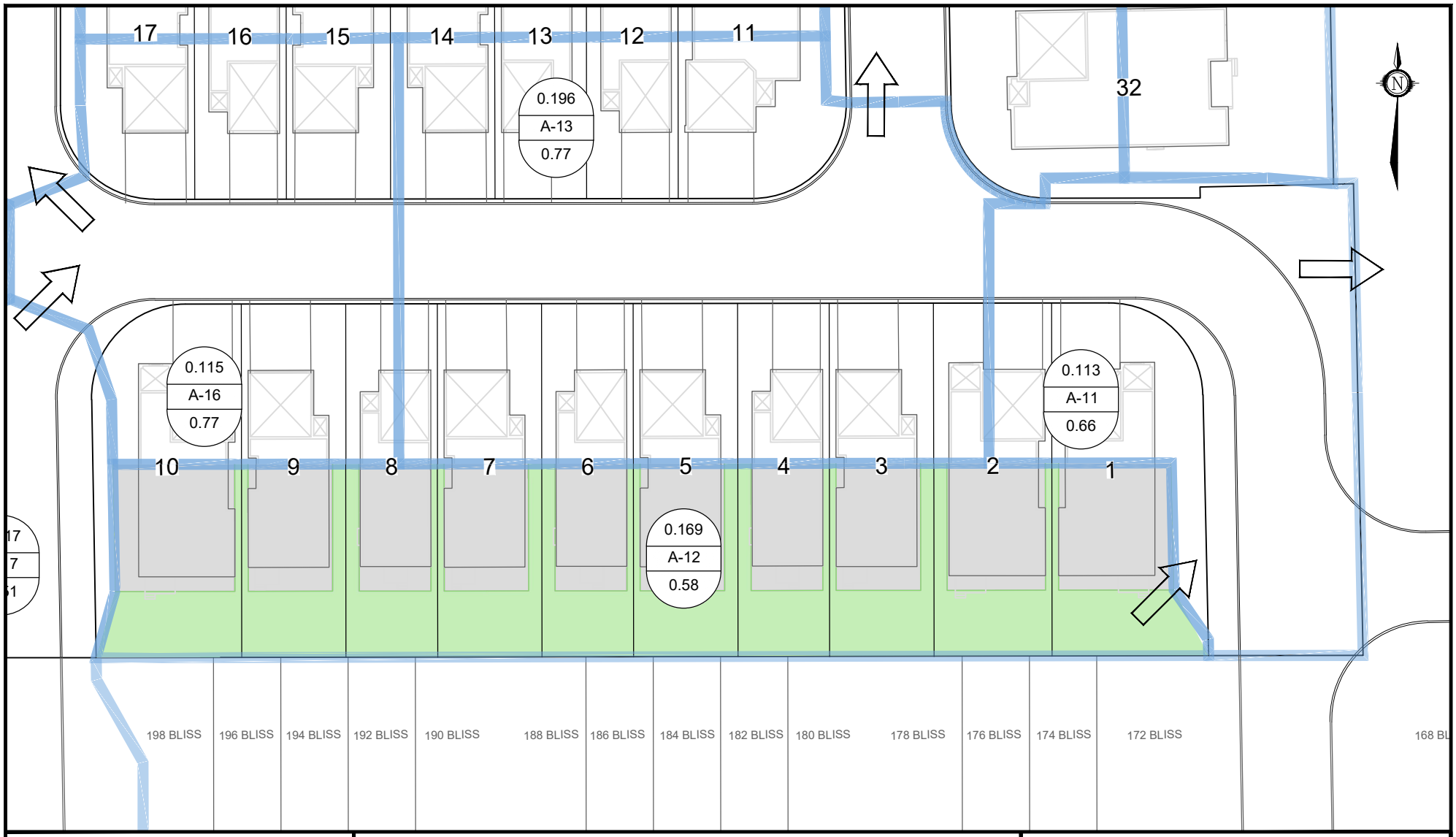

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LEGEND

ZONING SET BACK - PERVIOUS AREA

ZONING SET BACK - IMPERVIOUS AREA

AREA A-13

TOTAL AREA	=0.196 HECTARES
PERVIOUS AREA	=0.077 HECTARES
IMPERVIOUS AREA	=0.092 HECTARES

C=((PERVIOUS AREA x 0.2)+(Impervious Area x0.9))/Total Area
C=0.58

CITY OF OTTAWA

560 HAZELDEAN ROAD DOUBLE DECK SUBDIVISION

RUNOFF COEFFICIENT SAMPLE CALCULATIONS AREA A-12

SCALE 1 : 500 (0 5 10 15 20)

DATE MAY 26, 2026 | JOB 100057-05 | FIGURE DSK-29D

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SHT8X11.DWG - 216mmx279mm

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
Engineers, Planners & Landscape Architects

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**			**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)	630			
		Number of Floors/Storeys	2			
		Protected Openings (1 hr) if C<1.0	No			
		Area of structure considered (m^2)			**1,260**	
	F	**Base fire flow without reductions**				**12,000**
		$F = 220\ C\ (A)^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**		**FUS Table 3**	**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**10,200**
		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	20.1 - 30 m		10%	**5,610**
		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
Engineers, Planners & Landscape Architects

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**			**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)	425			
		Number of Floors/Storeys	2			
		Protected Openings (1 hr) if C<1.0	No			
		Area of structure considered (m^2)			**850**	
	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 (m^2)	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
Engineers, Planners & Landscape Architects

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			
		Number of Floors/Storeys	2			
		Protected Openings (1 hr) if C<1.0	No			
		Area of structure considered (m^2)			**430**	
	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
Engineers, Planners & Landscape Architects

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			
		Number of Floors/Storeys	2			
		Protected Openings (1 hr) if C<1.0	No			
		Area of structure considered (m^2)			**1,190**	
	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
Engineers, Planners & Landscape Architects

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**			**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			
		Number of Floors/Storeys	2			
		Protected Openings (1 hr) if C<1.0	No			
		Area of structure considered (m^2)			**1,190**	
	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	2Hr Firewall		0%	**4,675**
		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
Engineers, Planners & Landscape Architects

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**			**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			
		Number of Floors/Storeys	2			
		Protected Openings (1 hr) if C<1.0	No			
		Area of structure considered (m^2)			**700**	
	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	3.1 - 10 m		20%	**5,738**
		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
Engineers, Planners & Landscape Architects

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			
		Number of Floors/Storeys	2			
		Protected Openings (1 hr) if C<1.0	No			
		Area of structure considered (m^2)			**700**	
	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

Engineers, Planners & Landscape Architects

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

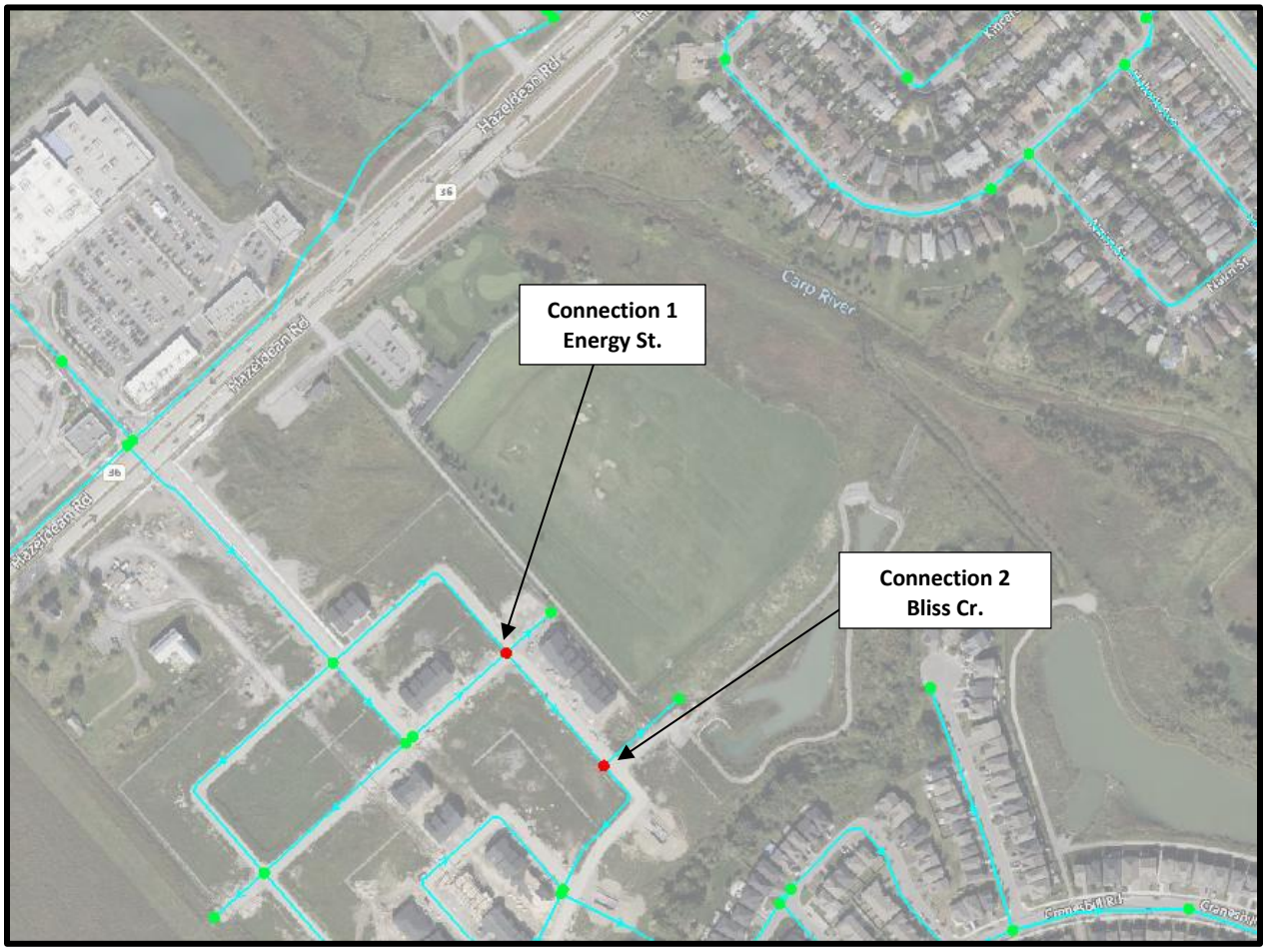
Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction C	Type V - Wood frame	Yes	1.5	1.5	
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction		0.8		
		Type I - Fire resistive construction (2 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	912			
		Number of Floors/Storeys	6			
		Protected Openings (1 hr) if C<1.0	No			
		Area of structure considered (m^2)			**5,472**	
	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)	Pressure[1] (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)	Pressure[1] (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 watermains. 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 watermains. 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 watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.

Appendix 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

Fernbank Community - Pond 2
PCSWMM Model Schematic

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Legend

- Junctions
- Outfalls
- Storages

Conduits

- Visible
- Major System
- Ditch
- Orifices
- Weirs
- Outlets

Subcatchments

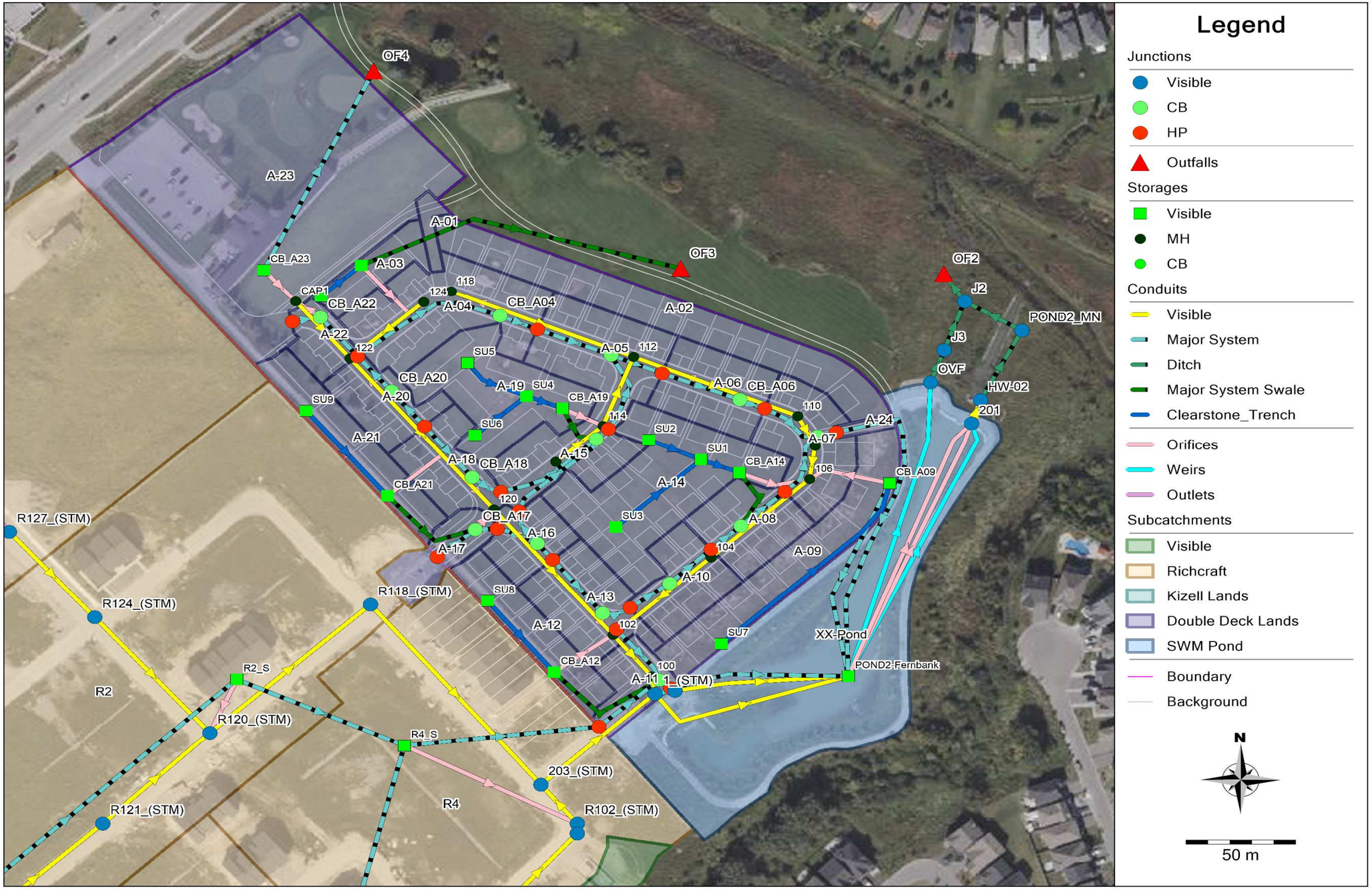
- Visible
- Richcraft
- Kizell Lands
- Double Deck Lands
- SWM Pond

N

200 m

560 Hazeldean Road - Double Deck Subdivision
PCSWMM Model Schematic

NOVATECH
Engineers, Planners & Landscape Architects



Legend

Junctions
- Visible
- CB
- HP
- Outfalls

Storages
- Visible
- MH
- CB

Conduits
- Visible
- Major System
- Ditch
- Major System Swale
- Clearstone_Trench
- Orifices
- Weirs
- Outlets

Subcatchments
- Visible
- Richcraft
- Kizell Lands
- Double Deck Lands
- SWM Pond
- Boundary
- Background

N

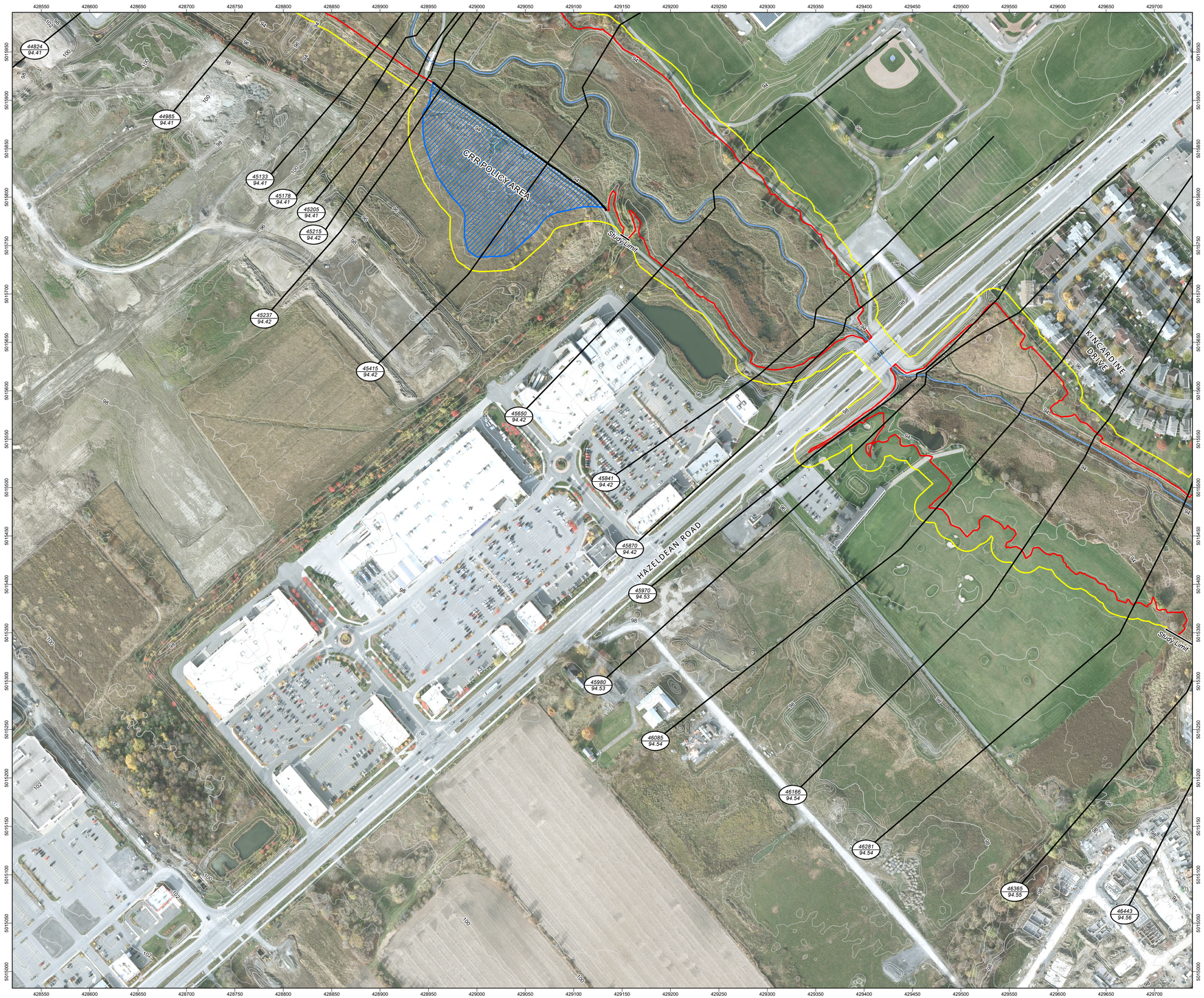
50 m

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	**m^3/s**	**0.061**

**Manning's equation for flat bottom ditch*



Date Exported: 11/07/2024 1:22 PM

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 traversale

Cross Section Number — Nombre de la coupe traversale
47919
130.2
Regulatory Flood Elevation (m) — Niveau de la crue regulatrice (m)

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

Vertical Datum: CGVD28
Horizontal Datum: North American 1983
Map Projection: Ottawa Transverse Mercator Projection

RENSEIGNMENTS GÉNÉRAUX

Niveau de référence vertical: CGVD28
Niveau de référence horizontal: Nord-american 1983
Projection cartographique: Projection Mercator Transverse d'Ottawa

Mississippi Valley Conservation Authority

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

LICENSED PROFESSIONAL ENGINEER
J. CUNDERLIK
100090561
JUL 11 2024
PROVINCE OF ONTARIO

N
W E
S

SCALE 1:2,000 ÉCHELLE

0 20 40 80 120
Meters / Mètres

CARP RIVER WATER LEVELS (CJ200)

INTERIM	ULTIMATE
NWL=93.13	NWL=93.13
2-YR=93.88	2-YR=93.64
10-YR=94.21	10-YR=93.97
25-YR=94.34	25-YR=94.12
100-YR=94.50	100-YR=94.32

CARP RIVER FLOOD LINE @ CJ200 (INTERIM CONDITION) 100-YR=94.50

POND 2 WATER LEVELS
NWL=93.66
2-YR=94.63
5-YR=94.84
10-YR=94.97
100-YR=95.22

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
11.	ISSUED FOR CONSTRUCTION	MAR 19/21	MAB
10.	CITY COMMENTS	SEP 30/20	MAB
9.	REVISED PER CITY COMMENTS	JUL 28/20	MAB
8.	ISSUED FOR APPROVAL	APR 15/20	MAB
7.	ISSUED FOR APPROVAL	AUG 14/19	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 MVC FOR COMMENT	FEB 1/16	MAB
1.	ISSUED TO CITY OF OTTAWA	NOV 5/15	MAB

SCALE 1:300 (1:300, 0 3 6 9 12)

DESIGN MAB
CHECKED MJP
DRAWN DTD
CHECKED MAB
APPROVED JGR

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER M.J. PETEPIECE 100079354 PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER M.A. BISSETT PROVINCE OF ONTARIO

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

GRADING PLAN

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

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
4.	ISSUED FOR CONSTRUCTION	MAR 19/21	MAB
3.	CITY COMMENTS	SEP 30/20	MAB
2.	REVISED PER COMMENTS	JUL 28/20	MAB
1.	ISSUED FOR APPROVAL	APR 15/20	MAB

SCALE
1:300 HORIZONTAL
1:30 VERTICAL

DESIGN MAB
CHECKED MJP
DRAWN DTD
CHECKED MAB
APPROVED JGR

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER M.J. PETEPIECE 100079354 PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER M.A. BISSETT PROVINCE OF ONTARIO

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CITY OF OTTAWA
FERNBANK COMMUNITY - POND 2

POND INLET
PLAN AND PROFILE

PROJECT No. 114010
REV REV # 4
DRAWING No. 114010-PR1

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

Table 3.4 (Interim Conditions) and **Table 3.5** (Ultimate Conditions) provide a comparison of the 100-year water levels and flows along the main Branch of the Carp River between the updated Carp River Models and the original March 2016 models provided by the City.

Table 3.4: 100-year Flows and Water Levels in Carp River (Interim Conditions)

Location on Carp River	PCSWMM Node	Original March 2016		With Fernbank Pond 2	
		Flow (m^3/s)	Water Level (m)	Flow (m^3/s)	Water Level (m)
Existing West Tributary	CJ201	12.84	94.51	13.09	94.52
Near Pond 2/3 Outfall	CJ200	12.54	94.50	13.06	94.50
Hazeldean Road	CJ199	11.41	94.49	11.73	94.50
Maple Grove Road	CJ172	11.22	94.44	11.22	94.45
Palladium Drive	CJ150	28.56	94.33	28.71	94.33
Highway 417	CJ120	29.10	94.24	29.25	94.24
Feedmill Creek	CJ106	29.98	94.00	30.23	94.00
Richardson Side Road	CJ050	39.36	93.38	39.54	93.38
Huntmar Drive	CJ032	53.96	93.06	54.07	93.06

Table 3.5: 100-year Flows and Water Levels in Carp River (Ultimate Conditions)

Location on Carp River	PCSWMM Node	Original March 2016		With Fernbank Ponds 2 and 3	
		Flow (m^3/s)	Water Level (m)	Flow (m^3/s)	Water Level (m)
Existing West Tributary	CJ201	14.63	94.40	8.28	94.37
Near Pond 2/3 Outfall	CJ200	14.92	94.32	14.69	94.32
Hazeldean Road	CJ199	14.22	94.31	14.10	94.31
Maple Grove Road	CJ172	16.63	94.19	16.43	94.19
Palladium Drive	CJ150	55.11	94.15	57.84	94.15
Highway 417	CJ120	32.51	93.98	32.65	93.97
Feedmill Creek	CJ106	44.68	93.69	43.92	93.68
Richardson Side Road	CJ050	43.76	93.47	43.07	93.45
Huntmar Drive	CJ032	58.46	93.11	56.87	93.10

The model results indicate slight changes in peak flow in the Carp River at most locations throughout the model. The release rates from Pond 2 are consistent with the release rates from the SWMHYMO model prepared as part of the Fernbank EMP.

The model results indicate that there will be almost no change to the modeled 100-year water levels in the Carp River under interim or future development conditions.

Runoff Volumes and Downstream Impacts

When the Fernbank EMP was written, it was assumed that the lands tributary to Pond 2 would have an average imperviousness of 56%. The current plans for the proposed residential developments have an average imperviousness of 69%. The Fernbank EMP states the following: *"The recommended areas for SWM blocks have been oversized to allow for flexibility in the configuration of the SWM facilities, as well as to allow provide flexibility for expansion of the SWM facilities to account for any intensification of development from the current land use plan."* (Page 88 Section 9.0, Fernbank EMP, Novatech, June 2009).

The design for the Pond 2 SWM facility accounts for the increase in runoff resulting from the increased impervious area, and will control flows based on the target release rates as outlined in the Fernbank EMP.

In terms of the runoff volume, the Fernbank EMP outlines the following criteria: *"Increases in runoff volumes resulting from development are not to exceed an additional 40,000m^3 above existing conditions for the 100-year event."*

To determine the magnitude and impact of additional runoff volume directed to the Carp River West Tributary due to the increased impervious, the SWMHYMO model submitted as a part of the Fernbank EMP was updated with a % impervious (TIMP) value of 0.70, up from the original 0.56. Results are as follows:

Table 3.6: 100-year Runoff Volume Comparison

Development Condition	100yr Runoff Volume (m3)				
	Pond 1	Pond 2	Pond 3	Total	Increase
Pre-Development	112,700	17,900	51,300	181,900	-
Post-Development (no BMPs, 56% IMP)	122,100	20,000	68,400	210,500	28,600
Post-Development (with BMPs, 56% IMP)	120,200	19,500	68,500	208,200	26,300
Post-Development (with BMPs, 70% IMP)	124,100*	20,761	68,500**	213,361	31,461

**From Kizell Lands Fernbank Pond 1 Concept Servicing Report*
***No change in %IMP for Pond 3, remains at original 56%*

As shown in the above table, the increase in impervious area does result in an increase to the runoff volume directed to the Carp River. However, the increase is well within the allowable overall increase for the Fernbank Community. The updated SWHYMO model has been included in **Appendix D**.

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
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 3/19	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

SCALE 1:1000

DESIGN	MAB
CHECKED	MJP
DRAWN	DTD
CHECKED	MAB
APPROVED	JGR

FOR REVIEW ONLY

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LICENSED PROFESSIONAL ENGINEER M.A. BISSETT 2020.09.30 PROVINCE OF ONTARIO

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CITY OF OTTAWA
FERNBANK COMMUNITY - POND 2

STORM DRAINAGE AREA PLAN

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

PLANB1.DWG - 1000mmx707mm

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

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```
  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


  ****************
  Raingage Summary
  ****************
                                                Data       Recording
  Name                 Data Source              Type       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
  ************
                                     Invert      Max.    Ponded    External
  Name                 Type           Elev.     Depth      Area    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
  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
```

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

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

                                    Full     Full     Hyd.     Max.   No. of     Full
Conduit          Shape             Depth     Area     Rad.    Width  Barrels     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)_(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
*************************     ---------       -------
```

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

NOVATECH
Engineers, Planners & Landscape Architects

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	

Flow Routing Continuity	Volume hectare-m	Volume 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_(2)) (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

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
D1	95.40	0.00	0.00	5.84	89.57	7.51	89.57	1.60	0.57	0.939
D2	95.40	0.00	0.00	15.09	80.32	19.25	80.32	1.38	0.47	0.842
D3	95.40	0.00	0.00	15.20	80.22	19.15	80.22	1.96	0.64	0.841
K1	95.40	0.00	0.00	5.84	89.57	7.51	89.57	2.15	0.76	0.939
K2	95.40	0.00	0.00	15.35	80.06	18.99	80.06	3.37	1.05	0.839
R1	95.40	0.00	0.00	5.84	89.57	7.51	89.57	4.15	1.46	0.939
R2	95.40	0.00	0.00	15.27	80.14	19.07	80.14	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
R4	95.40	0.00	0.00	15.36	80.05	18.99	80.05	2.08	0.65	0.839
X-R5	95.40	0.00	0.00	34.77	61.09	60.67	60.67	0.42	0.16	0.636
XX-Pond	95.40	0.00	0.00	24.95	70.45	29.43	70.45	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

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
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Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow 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
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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

POND2-OUT	CONDUIT	1.196	0	06:31	0.38	0.45	1.00
STM-13_(1)_(STM_(2))	CONDUIT	0.256	0	06:11	0.58	0.60	1.00
STM-13_(STM_(2))	CONDUIT	0.256	0	06:05	0.58	0.69	1.00
STM-165_(STM_(2))	CONDUIT	0.257	0	06:11	0.48	0.54	1.00
STM-166_(STM_(2))	CONDUIT	0.257	0	06:11	0.40	0.41	1.00
STM-20_(STM_(2))	CONDUIT	0.256	0	06:05	0.72	0.80	1.00
STM-22_(STM_(2))	CONDUIT	0.256	0	06:05	0.77	0.93	1.00
STM-3_(1)_(1)_(STM_(2))	CONDUIT	0.277	0	06:05	0.77	0.96	1.00
STM-3_(1)_(STM_(2))	CONDUIT	0.277	0	06:05	0.77	0.90	1.00
STM-3_(2)_(STM_(2))	CONDUIT	0.732	0	06:11	0.98	0.98	1.00
STM-3_(STM_(2))	CONDUIT	0.733	0	06:11	0.98	0.98	1.00
OR1	ORIFICE	0.343	0	06:05			1.00
OR2	ORIFICE	0.458	0	06:06			1.00
OR4	ORIFICE	0.256	0	06:05			1.00
OR5	ORIFICE	0.199	0	06:03			1.00
OR6	ORIFICE	0.277	0	06:04			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	0.137	0	06:23			1.00
P2-ED_Orifice	ORIFICE	0.032	0	06:23			1.00
202_(15)_(STM)_1	WEIR	0.881	0	06:11			0.35
P2-100yrWeir	WEIR	1.496	0	06:27			0.43
P2-5-10yrWeir	WEIR	1.041	0	06:15			1.00
OR3	DUMMY	0.813	0	06:03			

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Flow Classification Summary
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	Adjusted /Actual	Fraction of Time in Flow Class							
			Up	Down	Sub	Sup	Up	Down	Norm	Inlet
Conduit	Length	Dry	Dry	Dry	Crit	Crit	Crit	Crit	Ltd	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	1.00	0.00	0.00	0.00	0.04	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	0.24	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	0.13	0.00
124_(1)_(STM)	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
124_(STM)	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	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	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.87	0.00
C12	1.00	0.98	0.01	0.00	0.00	0.00	0.00	0.01	0.87	0.00
C13	1.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.87	0.00
C14	1.00	0.99	0.00	0.00	0.01	0.00	0.00	0.00	0.88	0.00
C2	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C3	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C4	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C5	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C6	1.00	0.00	0.00	0.00	0.33	0.07	0.00	0.61	0.11	0.00
C7_1	1.00	0.39	0.38	0.00	0.23	0.00	0.00	0.00	0.70	0.00
C7_2	1.00	0.39	0.00	0.00	0.47	0.00	0.00	0.14	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	0.04	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_(1)_(STM_(2))	1.00	0.00	0.00	0.00	0.98	0.00	0.00	0.01	0.01	0.00
STM-13_(STM_(2))	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
STM-165_(STM_(2))	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
STM-166_(STM_(2))	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
STM-20_(STM_(2))	1.00	0.00	0.00	0.00	0.93	0.00	0.00	0.07	0.02	0.00
STM-22_(STM_(2))	1.00	0.00	0.00	0.00	0.52	0.00	0.00	0.48	0.04	0.00
STM-3_(1)_(1)_(STM_(2))	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.04	0.00
STM-3_(1)_(STM_(2))	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
STM-3_(2)_(STM_(2))	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

****
Conduit Surcharge Summary

****

	Hours Full			Hours Above Full	Hours Capacity
Conduit	Both Ends	Upstream	Dnstream	Normal Flow	Limited
106_(STM)	5.76	5.76	9.86	0.01	0.33
108_(STM)	2.25	2.26	4.33	0.01	0.34
110_(1)_(STM)	0.73	0.73	0.84	0.01	0.01
110_(STM)	0.81	0.81	0.96	0.01	0.01
112_(STM)	0.74	0.74	1.18	0.01	0.01
118_(STM)	8.99	8.99	9.84	0.48	0.76
120_(STM)	8.07	8.07	8.30	0.01	0.04
122_(1)_(STM)	4.43	4.43	5.57	0.01	0.01
122_(STM)	5.42	5.42	7.40	0.01	0.01
160_(STM)	0.66	0.66	0.73	0.01	0.01
166_(STM)	0.72	0.72	0.73	0.01	0.01
202_(14)_(STM)	19.24	19.24	19.87	1.01	1.02
202_(15)_(STM)_2	19.23	19.23	31.71	0.01	0.01
202_(27)_(STM)	10.67	10.67	18.36	0.01	0.01
C6	0.01	0.01	7.48	0.01	0.01
C7_1	0.01	0.01	10.64	0.01	0.01
C7_2	10.64	10.64	15.19	0.01	0.01
POND2-OUT	10.46	10.46	11.40	0.01	0.01
STM-13_(1)_(STM_(2))	13.03	13.03	13.43	0.01	0.05
STM-13_(STM_(2))	12.04	12.04	13.03	0.01	0.01
STM-165_(STM_(2))	13.54	13.54	15.23	0.01	0.01
STM-166_(STM_(2))	15.35	15.35	17.76	0.01	0.01
STM-20_(STM_(2))	11.17	11.17	12.14	0.01	0.01
STM-22_(STM_(2))	6.69	6.69	7.50	0.01	0.01
STM-3_(1)_(1)_(STM_(2))	14.41	14.41	15.93	0.01	0.02
STM-3_(1)_(STM_(2))	15.93	15.93	17.90	0.01	0.94
STM-3_(2)_(STM_(2))	17.63	17.63	18.48	0.01	0.61
STM-3_(STM_(2))	18.48	18.48	18.78	0.01	1.14

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

NOVATECH
Engineers, Planners & Landscape Architects

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

  WARNING 03: negative offset ignored for Link C4
  WARNING 03: negative offset ignored for Link O-A05
  WARNING 02: maximum depth increased for Node CB_A08
  WARNING 02: maximum depth increased for Node CB_A11
  WARNING 02: maximum depth increased for Node CB_A15
  WARNING 02: maximum depth increased for Node CB_A17
  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 ... 32
  Number of nodes ........... 100
  Number of links ........... 127
  Number of pollutants ...... 0
  Number of land uses ....... 0


  ****************
  Raingage Summary
  ****************
                                                  Data       Recording
  Name                 Data Source                Type       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     37.10    1.0000 RG1                  OF3
  A-02                       0.39    112.00     55.70    1.0000 RG1                  OF3
  A-03                       0.10     51.00     55.70    1.0000 RG1                  CB_A03
  A-04                       0.34    171.50     84.30    1.0000 RG1                  CB_A04
  A-05                       0.26    131.50     81.40    1.0000 RG1                  CB_A05
  A-06                       0.19     96.00     81.40    1.0000 RG1                  CB_A06
  A-07                       0.21    107.00     81.40    1.0000 RG1                  CB_A07
  A-08                       0.17     86.00     81.40    1.0000 RG1                  CB_A08
  A-09                       0.31     87.71     58.60    1.0000 RG1                  CB_A09
  A-10                       0.16     80.00     81.40    1.0000 RG1                  CB_A10
  A-11                       0.11     57.00     65.70    1.0000 RG1                  CB_A11
  A-12                       0.17     84.50     54.30    1.0000 RG1                  CB_A12
  A-13                       0.21    103.50     81.40    1.0000 RG1                  CB_A13
  A-14                       0.45     74.83     55.70    1.0000 RG1                  CB_A14
  A-15                       0.18     89.00     84.30    1.0000 RG1                  CB_A15
  A-16                       0.12     57.50     81.40    1.0000 RG1                  CB_A16
  A-17                       0.12    117.00     44.30    1.0000 RG1                  CB_A17
  A-18                       0.16     78.00     85.70    1.0000 RG1                  CB_A18
  A-19                       0.31    153.50     58.60    1.0000 RG1                  CB_A19
  A-20                       0.14     70.00     84.30    1.0000 RG1                  CB_A20
  A-21                       0.19     95.50     58.60    1.0000 RG1                  CB_A21
  A-22                       0.08     42.50     85.70    1.0000 RG1                  CB_A22
  A-23                       1.59    132.33     85.70    1.0000 RG1                  CB_A23
  A-24                       0.02      6.00     44.30    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
  ************
                                     Invert      Max.    Ponded    External
  Name                 Type           Elev.     Depth      Area    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       95.99      2.40       0.0
  HP-CB_A04            JUNCTION       97.14      1.00       0.0
  HP-CB_A05            JUNCTION       97.12      1.00       0.0
  HP-CB_A06            JUNCTION       97.10      1.00       0.0
  HP-CB_A07            JUNCTION       97.06      1.00       0.0
  HP-CB_A08            JUNCTION       97.07      1.00       0.0
  HP-CB_A10            JUNCTION       97.08      1.00       0.0
  HP-CB_A11            JUNCTION       96.76      1.00       0.0
  HP-CB_A13            JUNCTION       97.17      1.00       0.0
  HP-CB_A15            JUNCTION       97.15      1.00       0.0
  HP-CB_A16            JUNCTION       97.43      1.00       0.0
  HP-CB_A17            JUNCTION       97.43      1.00       0.0
  HP-CB_A18            JUNCTION       97.43      1.00       0.0
  HP-CB_A20_A22        JUNCTION       97.47      1.00       0.0
  HW-02                JUNCTION       92.66      2.54       0.0
  J1                   JUNCTION       99.75      0.35       0.0
  J12                  JUNCTION       97.47      1.00       0.0
  J17                  JUNCTION       97.80      1.00       0.0
  J2                   JUNCTION       92.90      1.75       0.0
  J3                   JUNCTION       93.70      1.30       0.0
  J35                  JUNCTION       97.18      1.00       0.0
  J36                  JUNCTION       97.42      1.00       0.0
  J4                   JUNCTION       97.60      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
  OF1                  OUTFALL        99.91      0.31       0.0
  OF2                  OUTFALL        92.88      1.76       0.0
  OF3                  OUTFALL        94.34      1.20       0.0
  OF4                  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
SU1	STORAGE	95.44	2.23	0.0
SU10	STORAGE	95.41	2.00	0.0
SU2	STORAGE	95.78	2.00	0.0
SU3	STORAGE	96.00	2.00	0.0
SU4	STORAGE	95.83	2.10	0.0
SU5	STORAGE	96.15	1.94	0.0
SU6	STORAGE	95.98	2.00	0.0
SU7	STORAGE	95.29	2.00	0.0
SU8	STORAGE	96.16	2.00	0.0
SU9	STORAGE	96.85	2.00	0.0

****
Link Summary
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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
C14	SU3	SU1	CONDUIT	75.0	0.7467	0.0130
C15	SU2	SU1	CONDUIT	35.0	0.9715	0.0130
C16	SU1	CB_A14	CONDUIT	24.0	0.6250	0.0130
C17	CB_A12	CB_A11	CONDUIT	61.2	0.8332	0.0150
C18	SU5	SU4	CONDUIT	32.0	1.0001	0.0130
C19	CB_A03	OF3	CONDUIT	20.0	11.9341	0.0350
C2	J1	R2_S	CONDUIT	209.6	0.2624	0.0130
C20	SU4	CB_A19	CONDUIT	30.4	0.9869	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
C23	SU6	SU4	CONDUIT	45.0	0.3333	0.0130
C24	SU7	CB_A09	CONDUIT	127.0	0.7874	0.0130
C25	J4	CB_A22	CONDUIT	16.5	1.2728	0.0130
C26	CB_A22	HP-CB_A20_A22	CONDUIT	13.6	-0.5882	0.0130
C27	J8	CB_A20	CONDUIT	23.4	0.9395	0.0130
C28	CB_A20	HP-CB_A20_A22	CONDUIT	10.1	-0.4951	0.0130
C29	HP-CB_A20_A22	CB_A04	CONDUIT	75.0	0.7470	0.0130
C3	K2_S	J1	CONDUIT	59.6	0.0839	0.0130
C30	CB_A04	HP-CB_A04	CONDUIT	18.5	-1.2423	0.0130
C31	HP-CB_A04	CB_A05	CONDUIT	36.0	0.7771	0.0130
C32	CB_A05	HP-CB_A05	CONDUIT	25.0	-1.0383	0.0130
C33	J8	CB_A18	CONDUIT	33.8	1.0346	0.0130
C34	CB_A18	HP-CB_A18	CONDUIT	15.2	-0.9230	0.0130
C35	HP-CB_A18	CB_A15	CONDUIT	52.4	0.8978	0.0130
C36	CB_A15	HP-CB_A15	CONDUIT	7.5	-2.5443	0.0130
C37	HP-CB_A15	CB_A05	CONDUIT	42.3	0.6862	0.0130
C38	HP-CB_A05	CB_A06	CONDUIT	38.0	0.7899	0.0130
C39	CB_A06	HP-CB_A06	CONDUIT	12.1	-2.3053	0.0130
C4	R1_S	OF1	CONDUIT	119.8	-0.5508	0.0130
C40	HP-CB_A06	CB_A07	CONDUIT	29.7	1.2810	0.0130
C41	CB_A07	HP-CB_A07	CONDUIT	8.9	-3.8377	0.0130
C42	HP-CB_A07	POND2-Fernbank	CONDUIT	50.0	3.7226	0.0320
C43	J12	CB_A16	CONDUIT	10.8	1.6678	0.0130
C44	CB_A16	HP-CB_A16	CONDUIT	19.0	-0.7378	0.0130
C45	HP-CB_A16	CB_A15	CONDUIT	52.0	0.9039	0.0130
C46	J17	CB_A17	CONDUIT	22.2	2.3441	0.0130
C47	CB_A17	HP-CB_A17	CONDUIT	10.0	-1.4929	0.0130
C48	HP-CB_A17	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	HP-CB_A13	CONDUIT	13.5	-0.5907	0.0130
C51	HP-CB_A13	CB_A10	CONDUIT	22.0	1.2286	0.0130
C52	CB_A10	HP-CB_A10	CONDUIT	25.6	-0.7023	0.0130
C53	HP-CB_A10	CB_A08	CONDUIT	18.0	1.1656	0.0130
C54	CB_A08	HP-CB_A08	CONDUIT	26.5	-0.7536	0.0130
C55	HP-CB_A08	CB_A07	CONDUIT	33.8	1.0358	0.0130
C56	J35	CB_A11	CONDUIT	32.6	1.9009	0.0130
C57	CB_A11	HP-CB_A11	CONDUIT	6.6	-3.0102	0.0130
C58	J36	CB_A11	CONDUIT	36.5	2.3548	0.0130
C59	HP-CB_A11	POND2-Fernbank	CONDUIT	20.0	27.2597	0.0350
C6	201	HW-02	CONDUIT	11.4	2.0215	0.0130
C60	SU8	CB_A12	CONDUIT	73.3	0.6821	0.0130
C61	SU9	CB_A21	CONDUIT	73.0	1.0001	0.0130
C62	SU10	CB_A03	CONDUIT	25.0	1.0001	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
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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
C14	RECT_CLOSED	0.90	0.60	0.19	0.67	1	1.33
C15	RECT_CLOSED	0.90	0.60	0.19	0.67	1	1.52
C16	RECT_CLOSED	0.90	0.60	0.19	0.67	1	1.22
C17	TRAPEZOIDAL	1.00	3.15	0.49	6.15	1	11.86
C18	RECT_CLOSED	0.90	0.60	0.19	0.67	1	1.54
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
C20	RECT_CLOSED	0.90	0.60	0.19	0.67	1	1.53
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
C23	RECT_CLOSED	0.90	0.60	0.19	0.67	1	0.89
C24	RECT_CLOSED	0.90	0.60	0.19	0.67	1	1.37
C25	Pvt_Road	0.31	3.08	0.19	18.00	1	8.87
C26	Pvt_Road	0.31	3.08	0.19	18.00	1	6.03
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	5.53
C29	Pvt_Road	0.31	3.08	0.19	18.00	1	6.79
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
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	10.83
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
C60	RECT_CLOSED	0.55	0.21	0.11	0.39	1	0.32
C61	RECT_CLOSED	0.55	0.21	0.11	0.39	1	0.39
C62	RECT_OPEN	0.90	0.60	0.24	0.67	1	1.81
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)_(STM)	CIRCULAR	0.68	0.36	0.17	0.68	1	0.33
STM-3_(2)_(STM)	CIRCULAR	0.97	0.75	0.24	0.97	1	0.86
STM-3_(STM_(2))	CIRCULAR	0.97	0.75	0.24	0.97	1	0.73
STM-5_(1)_(STM)	CIRCULAR	0.60	0.28	0.15	0.60	1	0.26
STM-5_(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

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

NOVATECH
Engineers, Planners & Landscape Architects

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***********************************************************
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
**************************     ---------       -------
Initial LID Storage ......         0.033         1.103
Total Precipitation ......         2.122        71.667
Evaporation Loss .........         0.000         0.000
Infiltration Loss ........         0.360        12.144
Surface Runoff ...........         1.763        59.552
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 .......         1.763        17.633
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.129         1.293
External Outflow .........         1.796        17.956
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         6.033
Continuity Error (%) .....        -0.220


*************************
Highest Continuity Errors
*************************
Node J36 (15.83%)
Node MH200a (-2.39%)
Node 118 (1.15%)


*******************************
Highest Flow Instability Indexes
*******************************
Link 202_(15)_(STM)_1 (6)
Link STM-3_(STM_(2)) (5)
Link 202_(15)_(STM)_2 (5)
Link 202_(14)_(STM) (4)
Link 202_(27)_(STM) (3)


*************************
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 :     2.07
Percent Not Converging      :     0.14


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

---------------------------------------------------------------------------------------------------------------
                             Total      Total      Total      Total      Imperv      Perv      Total      Total
Peak  Runoff                 Precip     Runon      Evap       Infil      Runoff     Runoff     Runoff     Runoff
Runoff   Coeff  Subcatchment    mm         mm         mm         mm         mm         mm         mm     10^6 ltr
      CMS
---------------------------------------------------------------------------------------------------------------
  A-01                       71.67       0.00       0.00      23.97      26.62      21.12      47.74
0.01     0.01   0.666
  A-02                       71.67       0.00       0.00      16.74      39.96      15.02      54.98
0.22     0.13   0.767
  A-03                       71.67       0.00       0.00      16.57      39.98      15.19      55.16
0.06     0.04   0.770
  A-04                       71.67       0.00       0.00       5.81      60.49       5.45      65.94
0.23     0.16   0.920
  A-05                       71.67       0.00       0.00       6.89      58.41       6.45      64.86
0.17     0.12   0.905
  A-06                       71.67       0.00       0.00       6.89      58.41       6.45      64.86
0.12     0.09   0.905
  A-07                       71.67       0.00       0.00       6.89      58.41       6.45      64.86
0.14     0.10   0.905
  A-08                       71.67       0.00       0.00       6.89      58.41       6.45      64.86
0.11     0.08   0.905
  A-09                       71.67       0.00       0.00      15.63      42.04      14.06      56.10
0.17     0.11   0.783
  A-10                       71.67       0.00       0.00       6.89      58.41       6.45      64.86
0.10     0.07   0.905
  A-11                       71.67       0.00       0.00      12.79      47.15      11.80      58.95
0.07     0.05   0.823
  A-12                       71.67       0.00       0.00      17.11      38.97      15.66      54.63
0.09     0.06   0.762
  A-13                       71.67       0.00       0.00       6.89      58.41       6.45      64.86
0.13     0.09   0.905
  A-14                       71.67       0.00       0.00      16.97      39.95      14.78      54.74
0.25     0.14   0.764
  A-15                       71.67       0.00       0.00       5.81      60.49       5.45      65.94
0.12     0.08   0.920
  A-16                       71.67       0.00       0.00       6.89      58.41       6.45      64.86
0.07     0.05   0.905
  A-17                       71.67       0.00       0.00      20.71      31.80      19.22      51.02
0.06     0.04   0.712
  A-18                       71.67       0.00       0.00       5.29      61.49       4.97      66.46
0.10     0.07   0.927
  A-19                       71.67       0.00       0.00      15.47      42.06      14.21      56.26
0.17     0.12   0.785
  A-20                       71.67       0.00       0.00       5.81      60.49       5.45      65.94
0.09     0.06   0.920
  A-21                       71.67       0.00       0.00      15.47      42.06      14.21      56.26
0.11     0.07   0.785
  A-22                       71.67       0.00       0.00       5.29      61.49       4.97      66.46
0.06     0.04   0.927
  A-23                       71.67       0.00       0.00       5.42      61.45       4.84      66.28
1.05     0.69   0.925
  A-24                       71.67       0.00       0.00      21.08      31.79      18.85      50.64
0.01     0.01   0.707
  K1                         71.67       0.00       0.00       5.38      66.31       4.66      66.31
1.59     0.96   0.925
  K2                         71.67       0.00       0.00      14.54      57.14      11.26      57.14
2.41     1.29   0.797
  R1                         71.67       0.00       0.00       5.38      66.31       4.65      66.31
3.07     1.85   0.925
  R2                         71.67       0.00       0.00      14.38      57.31      11.43      57.31
2.56     1.40   0.800
```

R3			71.67	0.00	0.00	14.58	57.11	11.23	57.11
1.84	0.98	0.797							
R4			71.67	0.00	0.00	14.55	57.14	11.25	57.14
1.49	0.79	0.797							
X-R5			71.67	0.00	0.00	27.27	45.92	44.45	44.45
0.31	0.20	0.620							
XX-Pond			71.67	0.00	0.00	24.31	47.36	16.53	47.36
0.65	0.29	0.661							

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Node Depth Summary
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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	1.94
CB_A04	JUNCTION	0.03	1.61	97.12	0 01:15	1.61
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	1.50	96.66	0 01:13	1.50
CB_A13	JUNCTION	0.02	1.53	97.22	0 01:10	1.53
CB_A15	JUNCTION	0.03	1.51	97.07	0 01:13	1.51
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 01:11	1.56
CB_A20	JUNCTION	0.02	1.50	97.52	0 01:10	1.50
CB_A22	JUNCTION	0.02	1.52	97.51	0 01:10	1.52
HP-CB_A04	JUNCTION	0.00	0.00	97.14	0 00:00	0.00
HP-CB_A05	JUNCTION	0.00	0.00	97.12	0 00:00	0.00
HP-CB_A06	JUNCTION	0.00	0.00	97.10	0 00:00	0.00
HP-CB_A07	JUNCTION	0.00	0.00	97.06	0 00:00	0.00
HP-CB_A08	JUNCTION	0.00	0.00	97.07	0 01:16	0.00
HP-CB_A10	JUNCTION	0.00	0.03	97.11	0 01:12	0.03
HP-CB_A11	JUNCTION	0.00	0.00	96.76	0 00:00	0.00
HP-CB_A13	JUNCTION	0.00	0.04	97.21	0 01:10	0.04
HP-CB_A15	JUNCTION	0.00	0.00	97.15	0 00:00	0.00
HP-CB_A16	JUNCTION	0.00	0.00	97.43	0 00:00	0.00
HP-CB_A17	JUNCTION	0.00	0.00	97.43	0 00:00	0.00
HP-CB_A18	JUNCTION	0.00	0.02	97.45	0 01:11	0.02
HP-CB_A20_A22	JUNCTION	0.00	0.04	97.51	0 01:10	0.04
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
J12	JUNCTION	0.00	0.00	97.47	0 00:00	0.00
J17	JUNCTION	0.00	0.00	97.80	0 00:00	0.00
J2	JUNCTION	0.66	1.44	94.34	0 10:55	1.44
J3	JUNCTION	0.13	0.64	94.34	0 10:55	0.64
J35	JUNCTION	0.00	0.00	97.18	0 00:00	0.00
J36	JUNCTION	0.00	0.02	97.44	0 01:22	0.01
J4	JUNCTION	0.00	0.00	97.60	0 00:00	0.00
J8	JUNCTION	0.00	0.00	97.64	0 00:00	0.00
MH200_(STM)	JUNCTION	1.20	2.17	95.14	0 01:57	2.17
MH200a	JUNCTION	1.20	2.16	95.13	0 02:01	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	1.96	95.39	0 01:44	1.96
R103_(STM)	JUNCTION	0.69	1.91	95.40	0 01:44	1.91
R104_(STM)	JUNCTION	0.61	1.84	95.42	0 01:44	1.84
R105_(STM)	JUNCTION	0.53	1.74	95.44	0 01:44	1.74
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	2.13	95.38	0 01:44	2.13
R120_(STM)	JUNCTION	0.77	2.12	95.54	0 01:27	2.12
R121_(STM)	JUNCTION	0.34	1.80	95.89	0 01:18	1.54
R122_(STM)	JUNCTION	0.30	1.86	96.11	0 01:29	1.49
R123_(STM)	JUNCTION	0.19	1.82	96.23	0 01:18	1.38
R124_(STM)	JUNCTION	0.69	2.13	95.73	0 01:18	2.01
R127_(STM)	JUNCTION	0.60	2.07	95.98	0 01:29	1.78
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	1.95	95.16	0 01:58	1.95
102	STORAGE	0.92	1.92	95.17	0 01:58	1.92
104	STORAGE	0.54	1.60	95.23	0 01:40	1.60
106	STORAGE	0.45	1.56	95.29	0 01:39	1.56
108	STORAGE	0.35	1.49	95.32	0 01:39	1.49
110	STORAGE	0.32	1.49	95.35	0 01:39	1.49
112	STORAGE	0.18	1.40	95.50	0 01:39	1.40
114	STORAGE	0.07	1.14	95.59	0 01:39	1.14
116	STORAGE	0.05	1.08	95.63	0 01:40	1.08
118	STORAGE	0.01	0.60	95.62	0 01:39	0.60
120	STORAGE	0.65	1.67	95.19	0 01:58	1.67
122	STORAGE	0.43	1.48	95.23	0 01:58	1.48
124	STORAGE	0.09	0.89	95.24	0 01:45	0.89
CAP1	STORAGE	0.30	1.37	95.26	0 01:45	1.37
CB_A03	STORAGE	0.04	1.41	96.57	0 01:22	1.41
CB_A09	STORAGE	0.15	1.62	95.91	0 01:48	1.62
CB_A12	STORAGE	0.04	1.48	97.14	0 01:23	1.48
CB_A14	STORAGE	0.10	1.75	97.04	0 01:45	1.75
CB_A19	STORAGE	0.14	1.77	97.30	0 01:51	1.77
CB_A21	STORAGE	0.04	1.74	97.86	0 01:21	1.74
CB_A23	STORAGE	0.05	1.74	97.34	0 01:21	1.74
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
SU1	STORAGE	0.09	1.60	97.04	0 01:47	1.60
SU10	STORAGE	0.03	1.16	96.57	0 01:22	1.16
SU2	STORAGE	0.06	1.26	97.04	0 01:47	1.26
SU3	STORAGE	0.04	1.04	97.04	0 01:46	1.04
SU4	STORAGE	0.10	1.47	97.30	0 01:50	1.47
SU5	STORAGE	0.07	1.16	97.31	0 01:49	1.15
SU6	STORAGE	0.08	1.33	97.31	0 01:48	1.32
SU7	STORAGE	0.02	0.62	95.91	0 01:47	0.62
SU8	STORAGE	0.02	0.99	97.15	0 01:22	0.98
SU9	STORAGE	0.02	1.01	97.86	0 01:21	1.01

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Node Inflow Summary
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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
1_(STM)	JUNCTION	0.000	0.000	0 00:00	0	0	0.000
ltr							
201	JUNCTION	0.000	1.129	0 01:59	0	15.7	0.008
203_(STM)	JUNCTION	0.000	3.231	0 01:18	0	12.9	0.157
CB_A04	JUNCTION	0.159	0.198	0 01:10	0.226	0.244	0.294
CB_A05	JUNCTION	0.120	0.120	0 01:10	0.171	0.171	-0.142
CB_A06	JUNCTION	0.087	0.087	0 01:10	0.125	0.125	0.023
CB_A07	JUNCTION	0.097	0.097	0 01:10	0.139	0.139	-0.076
CB_A08	JUNCTION	0.078	0.079	0 01:10	0.112	0.121	-0.230
CB_A10	JUNCTION	0.073	0.123	0 01:10	0.104	0.123	0.216
CB_A11	JUNCTION	0.046	0.046	0 01:10	0.0672	0.0701	-0.218
CB_A13	JUNCTION	0.094	0.094	0 01:10	0.134	0.135	-0.074
CB_A15	JUNCTION	0.082	0.084	0 01:10	0.117	0.12	-0.217
CB_A16	JUNCTION	0.052	0.052	0 01:10	0.0746	0.0746	-0.068
CB_A17	JUNCTION	0.042	0.042	0 01:10	0.0597	0.0597	-0.008
CB_A18	JUNCTION	0.073	0.073	0 01:10	0.104	0.104	-0.158
CB_A20	JUNCTION	0.065	0.065	0 01:10	0.0923	0.0936	-0.125
CB_A22	JUNCTION	0.040	0.047	0 01:06	0.0565	0.0581	-0.044
HP-CB_A04	JUNCTION	0.000	0.000	0 00:00	0	0	0.000
ltr							
HP-CB_A05	JUNCTION	0.000	0.000	0 00:00	0	0	0.000
ltr							
HP-CB_A06	JUNCTION	0.000	0.000	0 00:00	0	0	0.000
ltr							
HP-CB_A07	JUNCTION	0.000	0.000	0 00:00	0	0	0.000
ltr							
HP-CB_A08	JUNCTION	0.000	0.005	0 01:15	0	0.000316	213.178
HP-CB_A10	JUNCTION	0.000	0.050	0 01:10	0	0.00977	2.955
HP-CB_A11	JUNCTION	0.000	0.000	0 00:00	0	0	0.000
ltr							
HP-CB_A13	JUNCTION	0.000	0.052	0 01:10	0	0.0191	-1.655
HP-CB_A15	JUNCTION	0.000	0.000	0 00:00	0	0	0.000
ltr							

HP-CB_A16	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
HP-CB_A17	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
HP-CB_A18	JUNCTION	0.000	0.023	0	01:09	0	0.0026	10.057
HP-CB_A20_A22	JUNCTION	0.000	0.055	0	01:07	0	0.0204	-3.288
HW-02	JUNCTION	0.000	1.129	0	01:59	0	15.7	-0.017
J1	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
J12	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								
J2	JUNCTION	0.000	1.443	0	02:03	0	17.9	-0.100
J3	JUNCTION	0.000	0.336	0	02:00	0	0.718	0.068
J35	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
J36	JUNCTION	0.000	0.008	0	01:20	0	0.00345	18.807
J4	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
J8	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
MH200_(STM)	JUNCTION	0.000	3.870	0	01:19	0	16.4	0.348
MH200a	JUNCTION	0.000	0.613	0	01:44	0	1.77	-2.337
OVF	JUNCTION	0.000	0.337	0	01:59	0	0.453	-0.009
POND2_MN	JUNCTION	0.000	1.129	0	02:00	0	15.9	-0.012
R102_(STM)	JUNCTION	0.000	0.789	0	01:27	0	3.32	0.229
R103_(STM)	JUNCTION	0.000	0.444	0	01:27	0	1.83	-0.018
R104_(STM)	JUNCTION	0.000	0.444	0	01:27	0	1.83	-0.109
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	0.014
R120_(STM)	JUNCTION	0.000	2.483	0	01:18	0	9.63	0.007
R121_(STM)	JUNCTION	0.000	0.880	0	01:27	0	4.01	0.098
R122_(STM)	JUNCTION	0.000	0.833	0	01:27	0	4	-0.202
R123_(STM)	JUNCTION	0.000	0.807	0	01:21	0	4	0.002
R124_(STM)	JUNCTION	0.000	0.854	0	01:27	0	3.06	-0.293
R127_(STM)	JUNCTION	0.000	0.828	0	01:18	0	3.07	0.421
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	2.379	0	01:57	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	0.693	0	01:27	0	3.46	0.072
102	STORAGE	0.000	0.668	0	01:28	0	3.4	0.297
104	STORAGE	0.000	0.305	0	01:28	0	1.62	0.260
106	STORAGE	0.000	0.278	0	01:28	0	1.51	-0.014
108	STORAGE	0.000	0.216	0	01:28	0	0.971	0.063
110	STORAGE	0.000	0.219	0	01:29	0	0.966	-0.523
112	STORAGE	0.000	0.189	0	01:15	0	0.828	0.016
114	STORAGE	0.000	0.044	0	01:41	0	0.292	0.252
116	STORAGE	0.000	0.033	0	01:13	0	0.12	-0.040
118	STORAGE	0.000	0.067	0	01:15	0	0.244	1.168
120	STORAGE	0.000	0.341	0	01:20	0	1.58	0.337
122	STORAGE	0.000	0.280	0	01:20	0	1.35	-0.130
124	STORAGE	0.000	0.016	0	02:06	0	0.0565	0.312
CAP1	STORAGE	0.000	0.230	0	01:21	0	1.11	0.200
CB_A03	STORAGE	0.037	0.037	0	01:10	0.0563	0.0661	-0.009
CB_A09	STORAGE	0.109	0.109	0	01:10	0.172	0.206	-0.003
CB_A12	STORAGE	0.061	0.061	0	01:10	0.0923	0.107	-0.005
CB_A14	STORAGE	0.144	0.144	0	01:10	0.246	0.36	-0.007
CB_A19	STORAGE	0.116	0.116	0	01:10	0.173	0.26	-0.008
CB_A21	STORAGE	0.072	0.072	0	01:10	0.107	0.122	-0.005
CB_A23	STORAGE	0.691	0.691	0	01:10	1.05	1.05	0.017
K1_S	STORAGE	0.963	0.963	0	01:10	1.59	1.59	0.004
K2_S	STORAGE	1.286	1.286	0	01:10	2.41	2.41	-0.002
POND2-Fernbank	STORAGE	0.291	4.000	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	-0.010
SU1	STORAGE	0.000	0.123	0	01:09	0	0.18	0.005
SU10	STORAGE	0.000	0.015	0	01:10	0	0.00985	0.055
SU2	STORAGE	0.000	0.034	0	01:09	0	0.0299	0.027
SU3	STORAGE	0.000	0.058	0	01:05	0	0.0361	0.029
SU4	STORAGE	0.000	0.098	0	01:09	0	0.131	0.002
SU5	STORAGE	0.000	0.027	0	01:08	0	0.0181	0.039
SU6	STORAGE	0.000	0.032	0	01:10	0	0.0255	0.039
SU7	STORAGE	0.000	0.079	0	01:08	0	0.0336	0.017
SU8	STORAGE	0.000	0.031	0	01:03	0	0.0147	0.032
SU9	STORAGE	0.000	0.038	0	01:04	0	0.0145	0.040

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

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
1_(STM)	JUNCTION	48.00	0.000	3.710
203_(STM)	JUNCTION	6.55	0.685	3.075
HW-02	JUNCTION	7.43	0.164	0.856
J3	JUNCTION	10.59	0.344	0.656
R102_(STM)	JUNCTION	5.14	0.735	2.815
R103_(STM)	JUNCTION	4.46	0.697	2.803
R104_(STM)	JUNCTION	3.45	0.641	3.269
R118_(STM)	JUNCTION	3.00	0.554	3.737
R120_(STM)	JUNCTION	0.77	0.369	2.856
R121_(STM)	JUNCTION	0.66	0.587	3.098
R122_(STM)	JUNCTION	0.50	0.654	4.111
R123_(STM)	JUNCTION	0.47	0.714	3.501
R124_(STM)	JUNCTION	0.46	0.410	3.165
R127_(STM)	JUNCTION	0.43	0.577	2.868

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Node Flooding Summary
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No nodes were flooded.

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Storage Volume Summary
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Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
100	0.001	27	0	0	0.002	55	0 01:58	0.684
102	0.001	23	0	0	0.002	49	0 01:58	0.675
104	0.001	16	0	0	0.002	48	0 01:40	0.302
106	0.001	15	0	0	0.002	51	0 01:39	0.276
108	0.000	12	0	0	0.002	50	0 01:39	0.215
110	0.000	11	0	0	0.002	51	0 01:39	0.216
112	0.000	6	0	0	0.002	47	0 01:39	0.181
114	0.000	2	0	0	0.001	42	0 01:39	0.048
116	0.000	2	0	0	0.001	40	0 01:40	0.034
118	0.000	0	0	0	0.001	26	0 01:39	0.071
120	0.001	16	0	0	0.002	42	0 01:58	0.329
122	0.000	11	0	0	0.002	39	0 01:58	0.274
124	0.000	3	0	0	0.001	29	0 01:45	0.029
CAP1	0.000	10	0	0	0.002	45	0 01:45	0.231
CB_A03	0.000	2	0	0	0.001	59	0 01:22	0.023
CB_A09	0.000	6	0	0	0.001	68	0 01:48	0.093
CB_A12	0.000	2	0	0	0.001	62	0 01:23	0.040
CB_A14	0.000	4	0	0	0.001	73	0 01:45	0.138
CB_A19	0.000	6	0	0	0.001	74	0 01:51	0.106
CB_A21	0.000	2	0	0	0.001	72	0 01:21	0.051
CB_A23	0.004	1	0	0	0.284	92	0 01:21	0.214
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	7.970	50	0	0	14.909	94	0 01:59	1.466
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
SU1	0.000	4	0	0	0.001	72	0 01:47	0.082
SU10	0.000	1	0	0	0.000	58	0 01:22	0.003
SU2	0.000	3	0	0	0.000	63	0 01:47	0.012
SU3	0.000	2	0	0	0.000	52	0 01:46	0.009
SU4	0.000	5	0	0	0.001	70	0 01:50	0.053
SU5	0.000	3	0	0	0.000	60	0 01:49	0.008
SU6	0.000	4	0	0	0.000	66	0 01:48	0.007
SU7	0.000	1	0	0	0.000	31	0 01:47	0.009

SU8	0.000	1	0	0	0.000	49	0 01:22	0.006
SU9	0.000	1	0	0	0.000	50	0 01:21	0.006

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Outfall Loading Summary
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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	2.379	18.709
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	19.250

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Link Flow Summary
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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	0.880	0 01:27	1.60	0.89	1.00
110_(STM)	CONDUIT	0.900	0 01:27	1.77	0.91	1.00
112_(STM)	CONDUIT	0.951	0 01:27	1.06	0.50	1.00
118_(STM)	CONDUIT	0.789	0 01:27	1.42	1.10	1.00
120_(STM)	CONDUIT	0.445	0 01:27	0.70	0.55	1.00
122_(1)_(STM)	CONDUIT	0.444	0 01:27	1.11	0.75	1.00
122_(STM)	CONDUIT	0.444	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	0.833	0 01:27	1.52	1.01	1.00
202_(14)_(STM)	CONDUIT	3.873	0 01:18	3.42	2.92	1.00
202_(15)_(STM)_2	CONDUIT	0.611	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	0.63	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
C14	CONDUIT	0.058	0 01:05	0.23	0.04	1.00
C15	CONDUIT	0.034	0 01:09	0.20	0.02	1.00
C16	CONDUIT	0.123	0 01:09	0.26	0.10	1.00
C17	CONDUIT	0.000	0 00:00	0.00	0.00	0.00
C18	CONDUIT	0.027	0 01:08	0.17	0.02	1.00
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
C20	CONDUIT	0.098	0 01:09	0.23	0.06	1.00
C21	CONDUIT	0.001	0 01:51	0.18	0.00	0.02
C22	CONDUIT	0.001	0 01:18	0.10	0.00	0.04
C23	CONDUIT	0.032	0 01:10	0.21	0.04	1.00
C24	CONDUIT	0.079	0 01:08	0.24	0.06	0.85
C25	CHANNEL	0.000	0 00:00	0.00	0.00	0.20
C26	CHANNEL	0.020	0 01:07	0.14	0.00	0.26
C27	CHANNEL	0.000	0 00:00	0.00	0.00	0.16
C28	CHANNEL	0.035	0 01:10	0.20	0.01	0.22
C29	CHANNEL	0.043	0 01:10	0.12	0.01	0.39
C3	CHANNEL	0.000	0 00:00	0.00	0.00	0.00
C30	CHANNEL	0.000	0 00:00	0.00	0.00	0.33
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	0.023	0 01:09	0.12	0.00	0.28
C35	CHANNEL	0.004	0 01:11	0.07	0.00	0.21
C36	CHANNEL	0.000	0 00:00	0.00	0.00	0.18
C37	CHANNEL	0.000	0 00:00	0.00	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	0.18
C46	CHANNEL	0.000	0 00:00	0.00	0.00	0.15
C47	CHANNEL	0.000	0 00:00	0.00	0.00	0.15
C48	CHANNEL	0.000	0 00:00	0.00	0.00	0.22
C49	CHANNEL	0.000	0 00:00	0.00	0.00	0.21
C5	CHANNEL	0.000	0 00:00	0.00	0.00	0.03
C50	CHANNEL	0.052	0 01:10	0.15	0.01	0.27
C51	CHANNEL	0.051	0 01:10	0.08	0.01	0.39
C52	CHANNEL	0.050	0 01:10	0.09	0.01	0.39
C53	CHANNEL	0.023	0 01:12	0.08	0.00	0.37
C54	CHANNEL	0.005	0 01:15	0.01	0.00	0.33
C55	CHANNEL	0.000	0 01:16	0.02	0.00	0.26
C56	CHANNEL	0.000	0 00:00	0.00	0.00	0.15
C57	CHANNEL	0.000	0 00:00	0.00	0.00	0.15
C58	CHANNEL	0.005	0 01:22	0.21	0.00	0.18
C59	CONDUIT	0.000	0 00:00	0.00	0.00	0.50
C6	CONDUIT	1.129	0 01:59	3.89	0.71	0.96
C60	CONDUIT	0.031	0 01:03	0.25	0.10	1.00
C61	CONDUIT	0.038	0 01:04	0.30	0.10	1.00
C62	CONDUIT	0.015	0 01:10	0.07	0.01	1.00
C7	CONDUIT	0.000	0 00:00	0.00	0.00	0.00
C7_1	CONDUIT	0.336	0 02:00	0.39	0.05	0.87
C7_2	CONDUIT	0.325	0 06:10	0.35	0.07	1.00
C8	CHANNEL	2.379	0 01:57	1.25	0.10	0.83
C9	CHANNEL	1.125	0 02:01	0.50	0.05	0.81
POND2-OUT	CONDUIT	1.129	0 02:00	0.68	0.42	1.00
STM-13_(STM)	CONDUIT	0.029	0 02:03	0.53	0.52	1.00
STM-16_(STM)	CONDUIT	0.048	0 01:41	0.80	0.85	1.00
STM-164_(STM)	CONDUIT	0.034	0 01:41	0.76	0.58	1.00
STM-165_(STM)	CONDUIT	0.274	0 01:28	0.90	0.64	1.00
STM-166_(STM)	CONDUIT	0.329	0 01:28	0.62	0.61	1.00
STM-20_(STM)	CONDUIT	0.231	0 01:28	1.24	0.68	1.00
STM-3_(1)_(1)_(STM)	CONDUIT	0.276	0 01:28	0.82	0.85	1.00
STM-3_(1)_(STM)	CONDUIT	0.302	0 01:28	0.85	0.93	1.00
STM-3_(2)_(STM)	CONDUIT	0.675	0 01:27	0.90	0.79	1.00
STM-3_(STM_(2))	CONDUIT	0.684	0 01:27	0.92	0.93	1.00
STM-5_(1)_(STM)	CONDUIT	0.216	0 01:28	0.94	0.84	1.00
STM-5_(STM)	CONDUIT	0.215	0 01:28	0.96	0.84	1.00
STM-7_(STM)	CONDUIT	0.181	0 01:29	1.03	0.94	1.00
STM-9_(STM)	CONDUIT	0.071	0 01:41	1.07	0.69	1.00
O-A01	ORIFICE	0.009	0 01:22			1.00
O-A04	ORIFICE	0.010	0 01:51			1.00
O-A05	ORIFICE	0.019	0 01:45			1.00
O-A06	ORIFICE	0.014	0 01:10			1.00
O-A11	ORIFICE	0.015	0 01:23			1.00
O-A14	ORIFICE	0.019	0 01:21			1.00
O-A15	ORIFICE	0.214	0 01:21			1.00
OR1	ORIFICE	0.346	0 01:21			1.00
OR10	ORIFICE	0.023	0 01:11			1.00
OR11	ORIFICE	0.020	0 01:12			1.00
OR12	ORIFICE	0.033	0 01:13			1.00
OR13	ORIFICE	0.038	0 01:10			1.00
OR14	ORIFICE	0.018	0 01:13			1.00
OR15	ORIFICE	0.030	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	0.067	0 01:15			1.00
OR4	ORIFICE	0.017	0 01:10			1.00
OR5	ORIFICE	0.026	0 01:10			1.00
OR6	ORIFICE	0.030	0 01:11			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	0.613	0 01:44			0.27
P2-100yrWeir	WEIR	0.337	0 01:59			0.16
P2-5-10yrWeir	WEIR	0.965	0 01:59			0.95
OR3	DUMMY	0.828	0 01:18			

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Flow Classification Summary
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Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
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	0.00	1.00	0.00	0.00
124_(STM)	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
160_(STM)	1.00	0.00	0.00	0.00	0.31	0.00	0.00	0.69	0.06	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
C14	1.00	0.80	0.08	0.00	0.12	0.00	0.00	0.00	0.91	0.00
C15	1.00	0.80	0.10	0.00	0.10	0.00	0.00	0.00	0.90	0.00
C16	1.00	0.12	0.68	0.00	0.20	0.00	0.00	0.00	0.89	0.00
C17	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C18	1.00	0.82	0.07	0.00	0.11	0.00	0.00	0.00	0.88	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
C20	1.00	0.36	0.45	0.00	0.18	0.00	0.00	0.00	0.86	0.00
C21	1.00	0.99	0.00	0.00	0.00	0.00	0.00	0.01	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
C23	1.00	0.82	0.03	0.00	0.15	0.00	0.00	0.00	0.87	0.00
C24	1.00	0.00	0.86	0.00	0.14	0.00	0.00	0.00	0.92	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	0.00	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	0.00	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	0.01	0.00	0.00	0.99	0.01	0.00
C36	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C37	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	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	0.99	0.01	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	0.02	0.00	0.00	0.98	0.02	0.00
C52	1.00	0.00	0.00	0.00	0.02	0.00	0.00	0.98	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	0.02	0.00	0.00	0.01	0.00	0.00	0.96	0.01	0.00
C55	1.00	0.02	0.00	0.00	0.01	0.00	0.00	0.97	0.01	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	0.02	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
C60	1.00	0.50	0.42	0.00	0.08	0.00	0.00	0.00	0.95	0.00
C61	1.00	0.48	0.45	0.00	0.07	0.00	0.00	0.00	0.95	0.00
C62	1.00	0.54	0.40	0.00	0.06	0.00	0.00	0.00	0.94	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	0.37	0.00	0.00	0.62	0.68	0.00
STM-16_(STM)	1.00	0.00	0.00	0.00	0.32	0.00	0.00	0.68	0.11	0.00
STM-164_(STM)	1.00	0.00	0.11	0.00	0.89	0.00	0.00	0.00	0.83	0.00
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	0.23	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	0.09	0.00	0.91	0.00	0.00	0.00	0.14	0.00
STM-5_(STM)	1.00	0.00	0.01	0.00	0.97	0.00	0.00	0.02	0.03	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

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Conduit Surcharge Summary
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Conduit	Hours Full: Both Ends	Upstream	Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
106_(STM)	3.58	3.58	6.57	0.01	0.26
108_(STM)	2.03	2.04	3.00	0.01	0.24
110_(1)_(STM)	0.50	0.50	0.67	0.01	0.01
110_(STM)	0.66	0.66	0.77	0.01	0.01
112_(STM)	0.47	0.47	1.05	0.01	0.01
118_(STM)	5.68	5.71	6.55	0.48	0.62
120_(STM)	4.96	4.96	5.14	0.01	0.01
122_(1)_(STM)	3.03	3.03	3.50	0.01	0.01
122_(STM)	3.45	3.45	4.46	0.01	0.01
124_(1)_(STM)	0.01	0.01	0.01	0.12	0.01
160_(STM)	0.43	0.43	0.45	0.01	0.01
166_(STM)	0.47	0.47	0.50	0.01	0.02
202_(14)_(STM)	18.97	19.03	19.54	0.91	0.67
202_(15)_(STM)_2	18.96	18.96	30.24	0.01	0.01
202_(27)_(STM)	7.62	7.62	18.23	0.01	0.01
C14	1.01	1.01	2.51	0.01	0.01
C15	1.72	1.72	2.51	0.01	0.01
C16	2.51	2.51	2.81	0.01	0.01
C18	1.85	1.85	2.77	0.01	0.01
C20	2.77	2.77	3.61	0.01	0.01
C23	2.37	2.37	2.77	0.01	0.01
C24	0.01	0.01	3.03	0.01	0.01
C6	0.01	0.01	7.43	0.01	0.01
C60	0.85	0.85	1.53	0.01	0.01
C61	0.71	0.71	1.37	0.01	0.01
C62	0.62	0.62	0.94	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)	5.24	5.24	9.12	0.01	0.01
STM-16_(STM)	3.87	3.87	5.95	0.01	0.01
STM-164_(STM)	2.92	2.92	3.87	0.01	0.01
STM-165_(STM)	9.12	9.12	14.35	0.01	0.01
STM-166_(STM)	14.49	14.49	17.56	0.01	0.01
STM-20_(STM)	7.16	7.16	9.29	0.01	0.01
STM-3_(1)_(1)_(STM)	12.70	12.70	15.32	0.01	0.01
STM-3_(1)_(STM)	15.58	15.58	17.83	0.01	0.59
STM-3_(2)_(STM)	17.56	17.56	18.63	0.01	0.01
STM-3_(STM_(2))	18.62	18.63	18.89	0.01	0.96
STM-5_(1)_(STM)	10.66	10.66	11.81	0.01	0.32
STM-5_(STM)	11.81	11.81	12.87	0.01	0.22
STM-7_(STM)	5.85	5.85	10.47	0.01	0.01
STM-9_(STM)	0.28	0.28	1.21	0.01	0.01

Analysis begun on: Thu May 21 21:22:52 2026
Analysis ended on: Thu May 21 21:23:02 2026
Total elapsed time: 00:00:10

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

NOVATECH
Engineers, Planners & Landscape Architects

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

  WARNING 03: negative offset ignored for Link C4
  WARNING 03: negative offset ignored for Link O-A05
  WARNING 02: maximum depth increased for Node CB_A08
  WARNING 02: maximum depth increased for Node CB_A11
  WARNING 02: maximum depth increased for Node CB_A15
  WARNING 02: maximum depth increased for Node CB_A17
  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 ... 32
  Number of nodes ........... 100
  Number of links ........... 127
  Number of pollutants ...... 0
  Number of land uses ....... 0


  ****************
  Raingage Summary
  ****************
                                                  Data       Recording
  Name                 Data Source                Type       Interval
  ----------------------------------------------------------------------
  RG1                  MTO_100yr_12hrSCS          INTENSITY   15 min.


  ********************
  Subcatchment Summary
  ********************
  Name                       Area     Width   %Imperv    %Slope Rain Gage            Outlet
  ----------------------------------------------------------------------------------------
--------
  A-01                       0.03      8.57     37.10    1.0000 RG1                  OF3
  A-02                       0.39    112.00     55.70    1.0000 RG1                  OF3
  A-03                       0.10     51.00     55.70    1.0000 RG1                  CB_A03
  A-04                       0.34    171.50     84.30    1.0000 RG1                  CB_A04
  A-05                       0.26    131.50     81.40    1.0000 RG1                  CB_A05
  A-06                       0.19     96.00     81.40    1.0000 RG1                  CB_A06
  A-07                       0.21    107.00     81.40    1.0000 RG1                  CB_A07
  A-08                       0.17     86.00     81.40    1.0000 RG1                  CB_A08
  A-09                       0.31     87.71     58.60    1.0000 RG1                  CB_A09
  A-10                       0.16     80.00     81.40    1.0000 RG1                  CB_A10
  A-11                       0.11     57.00     65.70    1.0000 RG1                  CB_A11
  A-12                       0.17     84.50     54.30    1.0000 RG1                  CB_A12
  A-13                       0.21    103.50     81.40    1.0000 RG1                  CB_A13
  A-14                       0.45     74.83     55.70    1.0000 RG1                  CB_A14
  A-15                       0.18     89.00     84.30    1.0000 RG1                  CB_A15
  A-16                       0.12     57.50     81.40    1.0000 RG1                  CB_A16
  A-17                       0.12    117.00     44.30    1.0000 RG1                  CB_A17
  A-18                       0.16     78.00     85.70    1.0000 RG1                  CB_A18
  A-19                       0.31    153.50     58.60    1.0000 RG1                  CB_A19
  A-20                       0.14     70.00     84.30    1.0000 RG1                  CB_A20
  A-21                       0.19     95.50     58.60    1.0000 RG1                  CB_A21
  A-22                       0.08     42.50     85.70    1.0000 RG1                  CB_A22
  A-23                       1.59    132.33     85.70    1.0000 RG1                  CB_A23
  A-24                       0.02      6.00     44.30    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
  ************
                                     Invert      Max.    Ponded    External
  Name                 Type           Elev.     Depth      Area    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       95.99      2.40       0.0
  HP-CB_A04            JUNCTION       97.14      1.00       0.0
  HP-CB_A05            JUNCTION       97.12      1.00       0.0
  HP-CB_A06            JUNCTION       97.10      1.00       0.0
  HP-CB_A07            JUNCTION       97.06      1.00       0.0
  HP-CB_A08            JUNCTION       97.07      1.00       0.0
  HP-CB_A10            JUNCTION       97.08      1.00       0.0
  HP-CB_A11            JUNCTION       96.76      1.00       0.0
  HP-CB_A13            JUNCTION       97.17      1.00       0.0
  HP-CB_A15            JUNCTION       97.15      1.00       0.0
  HP-CB_A16            JUNCTION       97.43      1.00       0.0
  HP-CB_A17            JUNCTION       97.43      1.00       0.0
  HP-CB_A18            JUNCTION       97.43      1.00       0.0
  HP-CB_A20_A22        JUNCTION       97.47      1.00       0.0
  HW-02                JUNCTION       92.66      2.54       0.0
  J1                   JUNCTION       99.75      0.35       0.0
  J12                  JUNCTION       97.47      1.00       0.0
  J17                  JUNCTION       97.80      1.00       0.0
  J2                   JUNCTION       92.90      1.75       0.0
  J3                   JUNCTION       93.70      1.30       0.0
  J35                  JUNCTION       97.18      1.00       0.0
  J36                  JUNCTION       97.42      1.00       0.0
  J4                   JUNCTION       97.60      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
  OF1                  OUTFALL        99.91      0.31       0.0
  OF2                  OUTFALL        92.88      1.76       0.0
  OF3                  OUTFALL        94.34      1.20       0.0
  OF4                  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
SU1	STORAGE	95.44	2.23	0.0
SU10	STORAGE	95.41	2.00	0.0
SU2	STORAGE	95.78	2.00	0.0
SU3	STORAGE	96.00	2.00	0.0
SU4	STORAGE	95.83	2.10	0.0
SU5	STORAGE	96.15	1.94	0.0
SU6	STORAGE	95.98	2.00	0.0
SU7	STORAGE	95.29	2.00	0.0
SU8	STORAGE	96.16	2.00	0.0
SU9	STORAGE	96.85	2.00	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	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
C14	SU3	SU1	CONDUIT	75.0	0.7467	0.0130
C15	SU2	SU1	CONDUIT	35.0	0.9715	0.0130
C16	SU1	CB_A14	CONDUIT	24.0	0.6250	0.0130
C17	CB_A12	CB_A11	CONDUIT	61.2	0.8332	0.0150
C18	SU5	SU4	CONDUIT	32.0	1.0001	0.0130
C19	CB_A03	OF3	CONDUIT	20.0	11.9341	0.0350
C2	J1	R2_S	CONDUIT	209.6	0.2624	0.0130
C20	SU4	CB_A19	CONDUIT	30.4	0.9869	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
C23	SU6	SU4	CONDUIT	45.0	0.3333	0.0130
C24	SU7	CB_A09	CONDUIT	127.0	0.7874	0.0130
C25	J4	CB_A22	CONDUIT	16.5	1.2728	0.0130
C26	CB_A22	HP-CB_A20_A22	CONDUIT	13.6	-0.5882	0.0130
C27	J8	CB_A20	CONDUIT	23.4	0.9395	0.0130
C28	CB_A20	HP-CB_A20_A22	CONDUIT	10.1	-0.4951	0.0130
C29	HP-CB_A20_A22	CB_A04	CONDUIT	75.0	0.7470	0.0130
C3	K2_S	J1	CONDUIT	59.6	0.0839	0.0130
C30	CB_A04	HP-CB_A04	CONDUIT	18.5	-1.2423	0.0130
C31	HP-CB_A04	CB_A05	CONDUIT	36.0	0.7771	0.0130
C32	CB_A05	HP-CB_A05	CONDUIT	25.0	-1.0383	0.0130
C33	J8	CB_A18	CONDUIT	33.8	1.0346	0.0130
C34	CB_A18	HP-CB_A18	CONDUIT	15.2	-0.9230	0.0130
C35	HP-CB_A18	CB_A15	CONDUIT	52.4	0.8978	0.0130
C36	CB_A15	HP-CB_A15	CONDUIT	7.5	-2.5443	0.0130
C37	HP-CB_A15	CB_A05	CONDUIT	42.3	0.6862	0.0130
C38	HP-CB_A05	CB_A06	CONDUIT	38.0	0.7899	0.0130
C39	CB_A06	HP-CB_A06	CONDUIT	12.1	-2.3053	0.0130
C4	R1_S	OF1	CONDUIT	119.8	-0.5508	0.0130
C40	HP-CB_A06	CB_A07	CONDUIT	29.7	1.2810	0.0130
C41	CB_A07	HP-CB_A07	CONDUIT	8.9	-3.8377	0.0130
C42	HP-CB_A07	POND2-Fernbank	CONDUIT	50.0	3.7226	0.0320
C43	J12	CB_A16	CONDUIT	10.8	1.6678	0.0130
C44	CB_A16	HP-CB_A16	CONDUIT	19.0	-0.7378	0.0130
C45	HP-CB_A16	CB_A15	CONDUIT	52.0	0.9039	0.0130
C46	J17	CB_A17	CONDUIT	22.2	2.3441	0.0130
C47	CB_A17	HP-CB_A17	CONDUIT	10.0	-1.4929	0.0130
C48	HP-CB_A17	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	HP-CB_A13	CONDUIT	13.5	-0.5907	0.0130
C51	HP-CB_A13	CB_A10	CONDUIT	22.0	1.2286	0.0130
C52	CB_A10	HP-CB_A10	CONDUIT	25.6	-0.7023	0.0130
C53	HP-CB_A10	CB_A08	CONDUIT	18.0	1.1656	0.0130
C54	CB_A08	HP-CB_A08	CONDUIT	26.5	-0.7536	0.0130
C55	HP-CB_A08	CB_A07	CONDUIT	33.8	1.0358	0.0130
C56	J35	CB_A11	CONDUIT	32.6	1.9009	0.0130
C57	CB_A11	HP-CB_A11	CONDUIT	6.6	-3.0102	0.0130
C58	J36	CB_A11	CONDUIT	36.5	2.3548	0.0130
C59	HP-CB_A11	POND2-Fernbank	CONDUIT	20.0	27.2597	0.0350
C6	201	HW-02	CONDUIT	11.4	2.0215	0.0130
C60	SU8	CB_A12	CONDUIT	73.3	0.6821	0.0130
C61	SU9	CB_A21	CONDUIT	73.0	1.0001	0.0130
C62	SU10	CB_A03	CONDUIT	25.0	1.0001	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			

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Cross Section Summary
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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
C14	RECT_CLOSED	0.90	0.60	0.19	0.67	1	1.33
C15	RECT_CLOSED	0.90	0.60	0.19	0.67	1	1.52
C16	RECT_CLOSED	0.90	0.60	0.19	0.67	1	1.22
C17	TRAPEZOIDAL	1.00	3.15	0.49	6.15	1	11.86
C18	RECT_CLOSED	0.90	0.60	0.19	0.67	1	1.54
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
C20	RECT_CLOSED	0.90	0.60	0.19	0.67	1	1.53
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
C23	RECT_CLOSED	0.90	0.60	0.19	0.67	1	0.89
C24	RECT_CLOSED	0.90	0.60	0.19	0.67	1	1.37
C25	Pvt_Road	0.31	3.08	0.19	18.00	1	8.87
C26	Pvt_Road	0.31	3.08	0.19	18.00	1	6.03
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	5.53
C29	Pvt_Road	0.31	3.08	0.19	18.00	1	6.79
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
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	10.83
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
C60	RECT_CLOSED	0.55	0.21	0.11	0.39	1	0.32
C61	RECT_CLOSED	0.55	0.21	0.11	0.39	1	0.39
C62	RECT_OPEN	0.90	0.60	0.24	0.67	1	1.81
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)_(STM)	CIRCULAR	0.68	0.36	0.17	0.68	1	0.33
STM-3_(2)_(STM)	CIRCULAR	0.97	0.75	0.24	0.97	1	0.86
STM-3_(STM_(2))	CIRCULAR	0.97	0.75	0.24	0.97	1	0.73
STM-5_(1)_(STM)	CIRCULAR	0.60	0.28	0.15	0.60	1	0.26
STM-5_(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

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

NOVATECH
Engineers, Planners & Landscape Architects

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***********************************************************
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.
***********************************************************

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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
**************************     ---------       -------
Initial LID Storage ......         0.033         1.103
Total Precipitation ......         2.825        95.400
Evaporation Loss .........         0.000         0.000
Infiltration Loss ........         0.387        13.068
Surface Runoff ...........         2.438        82.349
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 .......         2.438        24.383
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.025         0.246
External Outflow .........         2.345        23.452
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         6.209
Continuity Error (%) .....        -0.075


************************
Highest Continuity Errors
************************
Node J36 (99.85%)
Node MH200a (-2.09%)


*********************************
Highest Flow Instability Indexes
*********************************
Link 202_(15)_(STM)_1 (14)
Link 202_(15)_(STM)_2 (12)
Link 202_(14)_(STM) (12)
Link STM-3_(STM_(2)) (12)
Link 202_(27)_(STM) (11)


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  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      :     0.19


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

  ---------------------------------------------------------------------------------------------------------
                            Total      Total      Total      Total      Imperv      Perv      Total
Total     Peak  Runoff
                           Precip      Runon       Evap      Infil     Runoff    Runoff     Runoff
Runoff   Runoff   Coeff
  Subcatchment                 mm         mm         mm         mm         mm        mm         mm
10^6 ltr      CMS
  ---------------------------------------------------------------------------------------------------------
  A-01                      95.40       0.00       0.00      26.16      35.42     33.85      69.27
0.02     0.01   0.726
  A-02                      95.40       0.00       0.00      18.36      53.17     23.91      77.08
0.30     0.12   0.808
  A-03                      95.40       0.00       0.00      18.28      53.18     23.99      77.17
0.08     0.03   0.809
  A-04                      95.40       0.00       0.00       6.44      80.47      8.54      89.01
0.31     0.12   0.933
  A-05                      95.40       0.00       0.00       7.64      77.70     10.11      87.81
0.23     0.09   0.920
  A-06                      95.40       0.00       0.00       7.64      77.70     10.11      87.81
0.17     0.06   0.920
  A-07                      95.40       0.00       0.00       7.64      77.70     10.11      87.81
0.19     0.07   0.920
  A-08                      95.40       0.00       0.00       7.64      77.70     10.11      87.81
0.15     0.06   0.920
  A-09                      95.40       0.00       0.00      17.15      55.94     22.35      78.29
0.24     0.09   0.821
  A-10                      95.40       0.00       0.00       7.64      77.70     10.11      87.81
0.14     0.05   0.920
  A-11                      95.40       0.00       0.00      14.13      62.72     18.60      81.32
0.09     0.04   0.852
  A-12                      95.40       0.00       0.00      18.86      51.84     24.74      76.58
0.13     0.05   0.803
  A-13                      95.40       0.00       0.00       7.64      77.70     10.11      87.81
0.18     0.07   0.920
  A-14                      95.40       0.00       0.00      18.47      53.16     23.80      76.96
0.35     0.13   0.807
  A-15                      95.40       0.00       0.00       6.44      80.47      8.54      89.01
0.16     0.06   0.933
  A-16                      95.40       0.00       0.00       7.64      77.70     10.11      87.81
0.10     0.04   0.920
  A-17                      95.40       0.00       0.00      22.92      42.30     30.23      72.53
0.08     0.04   0.760
  A-18                      95.40       0.00       0.00       5.87      81.81      7.78      89.58
0.14     0.05   0.939
  A-19                      95.40       0.00       0.00      17.07      55.94     22.43      78.37
0.24     0.09   0.821
  A-20                      95.40       0.00       0.00       6.44      80.47      8.54      89.01
0.12     0.05   0.933
  A-21                      95.40       0.00       0.00      17.07      55.94     22.43      78.37
0.15     0.06   0.821
  A-22                      95.40       0.00       0.00       5.87      81.81      7.78      89.58
0.08     0.03   0.939
  A-23                      95.40       0.00       0.00       5.93      81.78      7.71      89.49
1.42     0.53   0.938
  A-24                      95.40       0.00       0.00      23.10      42.29     30.04      72.34
0.01     0.01   0.758
  K1                        95.40       0.00       0.00       5.84      89.57      7.51      89.57
2.15     0.76   0.939
  K2                        95.40       0.00       0.00      15.35      80.06     18.99      80.06
3.37     1.05   0.839
  R1                        95.40       0.00       0.00       5.84      89.57      7.51      89.57
4.15     1.46   0.939
  R2                        95.40       0.00       0.00      15.27      80.14     19.07      80.14
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
```

R4			95.40	0.00	0.00	15.36	80.05	18.99	80.05
2.08	0.65	0.839							
X-R5			95.40	0.00	0.00	34.77	61.09	60.67	60.67
0.42	0.16	0.636							
XX-Pond			95.40	0.00	0.00	24.95	70.45	29.43	70.45
0.97	0.24	0.739							

****
Node Depth Summary
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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	0.20	0.69	94.35	0 10:45	0.69
203_(STM)	JUNCTION	0.88	2.18	95.51	0 06:26	2.12
CB_A04	JUNCTION	0.04	1.58	97.09	0 06:01	1.58
CB_A05	JUNCTION	0.03	1.53	96.99	0 06:00	1.53
CB_A06	JUNCTION	0.03	1.57	96.99	0 06:00	1.57
CB_A07	JUNCTION	0.03	1.54	96.86	0 06:00	1.54
CB_A08	JUNCTION	0.03	1.57	97.04	0 06:01	1.57
CB_A10	JUNCTION	0.04	1.60	97.10	0 06:01	1.60
CB_A11	JUNCTION	0.03	1.50	96.66	0 06:01	1.50
CB_A13	JUNCTION	0.03	1.52	97.21	0 06:00	1.52
CB_A15	JUNCTION	0.03	1.50	97.06	0 06:00	1.50
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	1.55
CB_A20	JUNCTION	0.03	1.49	97.51	0 06:00	1.49
CB_A22	JUNCTION	0.03	1.51	97.50	0 06:00	1.51
HP-CB_A04	JUNCTION	0.00	0.00	97.14	0 00:00	0.00
HP-CB_A05	JUNCTION	0.00	0.00	97.12	0 00:00	0.00
HP-CB_A06	JUNCTION	0.00	0.00	97.10	0 00:00	0.00
HP-CB_A07	JUNCTION	0.00	0.00	97.06	0 00:00	0.00
HP-CB_A08	JUNCTION	0.00	0.00	97.07	0 00:00	0.00
HP-CB_A10	JUNCTION	0.00	0.02	97.10	0 06:02	0.02
HP-CB_A11	JUNCTION	0.00	0.00	96.76	0 00:00	0.00
HP-CB_A13	JUNCTION	0.00	0.03	97.20	0 06:00	0.03
HP-CB_A15	JUNCTION	0.00	0.00	97.15	0 00:00	0.00
HP-CB_A16	JUNCTION	0.00	0.00	97.43	0 00:00	0.00
HP-CB_A17	JUNCTION	0.00	0.00	97.43	0 00:00	0.00
HP-CB_A18	JUNCTION	0.00	0.01	97.44	0 06:00	0.01
HP-CB_A20_A22	JUNCTION	0.00	0.03	97.50	0 06:00	0.03
HW-02	JUNCTION	0.89	1.68	94.34	0 10:55	1.68
J1	JUNCTION	0.00	0.00	99.75	0 00:00	0.00
J12	JUNCTION	0.00	0.00	97.47	0 00:00	0.00
J17	JUNCTION	0.00	0.00	97.80	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 10:55	0.64
J35	JUNCTION	0.00	0.00	97.18	0 00:00	0.00
J36	JUNCTION	0.00	0.00	97.42	0 06:06	0.00
J4	JUNCTION	0.00	0.00	97.60	0 00:00	0.00
J8	JUNCTION	0.00	0.00	97.64	0 00:00	0.00
MH200_(STM)	JUNCTION	1.23	2.30	95.27	0 06:26	2.28
MH200a	JUNCTION	1.23	2.28	95.25	0 06:26	2.25
OVF	JUNCTION	0.03	0.22	94.34	0 10:55	0.22
POND2_MN	JUNCTION	0.60	1.39	94.34	0 10:55	1.39
R102_(STM)	JUNCTION	0.79	2.16	95.59	0 06:12	2.16
R103_(STM)	JUNCTION	0.73	2.11	95.60	0 06:12	2.11
R104_(STM)	JUNCTION	0.65	2.05	95.63	0 06:12	2.05
R105_(STM)	JUNCTION	0.57	1.96	95.66	0 06:12	1.95
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	2.67	95.92	0 06:11	2.43
R120_(STM)	JUNCTION	0.81	2.85	96.27	0 06:11	2.47
R121_(STM)	JUNCTION	0.39	2.49	96.58	0 06:11	1.94
R122_(STM)	JUNCTION	0.34	2.88	97.13	0 06:26	1.93
R123_(STM)	JUNCTION	0.23	2.96	97.37	0 06:26	1.86
R124_(STM)	JUNCTION	0.74	2.90	96.50	0 06:26	2.36
R127_(STM)	JUNCTION	0.64	3.34	97.25	0 06:26	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
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	1.00	2.09	95.30	0 06:26	2.08
102	STORAGE	0.96	2.07	95.32	0 06:20	2.07
104	STORAGE	0.58	1.80	95.43	0 06:19	1.80
106	STORAGE	0.48	1.76	95.49	0 06:19	1.76
108	STORAGE	0.39	1.68	95.51	0 06:18	1.68
110	STORAGE	0.36	1.68	95.54	0 06:18	1.68
112	STORAGE	0.22	1.58	95.68	0 06:19	1.58
114	STORAGE	0.10	1.32	95.77	0 06:19	1.31
116	STORAGE	0.07	1.25	95.80	0 06:19	1.24
118	STORAGE	0.02	0.76	95.78	0 06:19	0.76
120	STORAGE	0.69	1.83	95.35	0 06:20	1.83
122	STORAGE	0.46	1.65	95.40	0 06:20	1.65
124	STORAGE	0.12	1.05	95.40	0 06:21	1.05
CAP1	STORAGE	0.34	1.53	95.42	0 06:21	1.53
CB_A03	STORAGE	0.05	1.54	96.70	0 06:03	1.54
CB_A09	STORAGE	0.20	1.75	96.04	0 06:31	1.75
CB_A12	STORAGE	0.05	1.62	97.28	0 06:03	1.62
CB_A14	STORAGE	0.13	1.81	97.10	0 06:28	1.81
CB_A19	STORAGE	0.17	1.81	97.34	0 06:21	1.81
CB_A21	STORAGE	0.05	1.82	97.94	0 06:01	1.82
CB_A23	STORAGE	0.06	1.71	97.31	0 06:04	1.71
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
SU1	STORAGE	0.10	1.66	97.10	0 06:26	1.66
SU10	STORAGE	0.03	1.29	96.70	0 06:03	1.29
SU2	STORAGE	0.07	1.32	97.10	0 06:29	1.32
SU3	STORAGE	0.05	1.11	97.11	0 06:28	1.11
SU4	STORAGE	0.12	1.51	97.34	0 06:22	1.51
SU5	STORAGE	0.07	1.19	97.34	0 06:22	1.19
SU6	STORAGE	0.10	1.36	97.34	0 06:23	1.36
SU7	STORAGE	0.03	0.76	96.05	0 06:30	0.76
SU8	STORAGE	0.02	1.12	97.28	0 06:04	1.12
SU9	STORAGE	0.02	1.09	97.94	0 06:02	1.09

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Node Inflow Summary
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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
1_(STM)	JUNCTION	0.000	0.000	0 00:00	0	0	0.000
ltr							
201	JUNCTION	0.000	1.208	0 06:23	0	20.4	0.011
203_(STM)	JUNCTION	0.000	3.178	0 06:03	0	17.9	0.166
CB_A04	JUNCTION	0.116	0.140	0 06:00	0.305	0.317	0.224
CB_A05	JUNCTION	0.088	0.088	0 06:00	0.231	0.231	0.005
CB_A06	JUNCTION	0.064	0.064	0 06:00	0.169	0.169	0.019
CB_A07	JUNCTION	0.072	0.072	0 06:00	0.188	0.188	0.009
CB_A08	JUNCTION	0.058	0.058	0 06:00	0.151	0.156	-0.097
CB_A10	JUNCTION	0.054	0.084	0 06:00	0.141	0.155	0.151
CB_A11	JUNCTION	0.036	0.036	0 06:00	0.0927	0.0927	0.016
CB_A13	JUNCTION	0.069	0.069	0 06:00	0.182	0.182	-0.046
CB_A15	JUNCTION	0.060	0.060	0 06:00	0.158	0.164	-0.114
CB_A16	JUNCTION	0.039	0.039	0 06:00	0.101	0.101	0.019
CB_A17	JUNCTION	0.035	0.036	0 06:00	0.0849	0.0861	0.011
CB_A18	JUNCTION	0.053	0.053	0 06:00	0.14	0.14	-0.070
CB_A20	JUNCTION	0.047	0.047	0 06:00	0.125	0.126	-0.062
CB_A22	JUNCTION	0.029	0.036	0 05:54	0.0761	0.0786	0.008
HP-CB_A04	JUNCTION	0.000	0.000	0 00:00	0	0	0.000
ltr							
HP-CB_A05	JUNCTION	0.000	0.000	0 00:00	0	0	0.000
ltr							
HP-CB_A06	JUNCTION	0.000	0.000	0 00:00	0	0	0.000
ltr							
HP-CB_A07	JUNCTION	0.000	0.000	0 00:00	0	0	0.000
ltr							
HP-CB_A08	JUNCTION	0.000	0.000	0 00:00	0	0	0.000
ltr							
HP-CB_A10	JUNCTION	0.000	0.030	0 06:00	0	0.00265	14.663
HP-CB_A11	JUNCTION	0.000	0.000	0 00:00	0	0	0.000
ltr							
HP-CB_A13	JUNCTION	0.000	0.031	0 06:00	0	0.0144	-1.885
HP-CB_A15	JUNCTION	0.000	0.000	0 00:00	0	0	0.000
ltr							

HP-CB_A16	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
HP-CB_A17	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
HP-CB_A18	JUNCTION	0.000	0.013	0	06:00	0	0.000837	51.765
HP-CB_A20_A22	JUNCTION	0.000	0.032	0	05:55	0	0.0156	-3.730
HW-02	JUNCTION	0.000	1.208	0	06:23	0	20.4	-0.027
J1	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
J12	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								
J2	JUNCTION	0.000	2.337	0	06:30	0	22.8	0.001
J3	JUNCTION	0.000	1.295	0	06:25	0	2.27	-0.061
J35	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
J36	JUNCTION	0.000	0.000	0	06:04	0	9.98e-06	9.962
ltr								
J4	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
J8	JUNCTION	0.000	0.000	0	00:00	0	0	0.000
ltr								
MH200_(STM)	JUNCTION	0.000	3.848	0	06:04	0	22.6	0.353
MH200a	JUNCTION	0.000	0.834	0	06:11	0	2.9	-2.046
OVF	JUNCTION	0.000	1.296	0	06:25	0	2.15	-0.017
POND2_MN	JUNCTION	0.000	1.195	0	06:26	0	20.4	0.003
R102_(STM)	JUNCTION	0.000	0.807	0	06:11	0	4.66	0.028
R103_(STM)	JUNCTION	0.000	0.466	0	06:11	0	2.58	-0.013
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	0.201
R120_(STM)	JUNCTION	0.000	2.432	0	06:03	0	13.3	-0.081
R121_(STM)	JUNCTION	0.000	0.845	0	06:11	0	5.53	0.020
R122_(STM)	JUNCTION	0.000	0.813	0	06:11	0	5.52	-0.150
R123_(STM)	JUNCTION	0.000	0.801	0	06:05	0	5.52	-0.004
R124_(STM)	JUNCTION	0.000	0.825	0	06:11	0	4.13	-0.224
R127_(STM)	JUNCTION	0.000	0.813	0	06:03	0	4.15	0.285
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	2.239	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	0.723	0	06:11	0	4.72	0.061
102	STORAGE	0.000	0.685	0	06:11	0	4.64	0.259
104	STORAGE	0.000	0.304	0	06:12	0	2.19	0.244
106	STORAGE	0.000	0.275	0	06:12	0	2.04	0.061
108	STORAGE	0.000	0.214	0	06:12	0	1.3	0.020
110	STORAGE	0.000	0.214	0	06:05	0	1.3	-0.078
112	STORAGE	0.000	0.183	0	06:03	0	1.11	-0.219
114	STORAGE	0.000	0.042	0	06:20	0	0.4	0.160
116	STORAGE	0.000	0.033	0	06:01	0	0.165	-0.029
118	STORAGE	0.000	0.066	0	06:01	0	0.317	0.866
120	STORAGE	0.000	0.342	0	06:06	0	2.16	0.520
122	STORAGE	0.000	0.279	0	06:04	0	1.84	0.086
124	STORAGE	0.000	0.016	0	06:43	0	0.0789	0.074
CAP1	STORAGE	0.000	0.229	0	06:04	0	1.5	0.033
CB_A03	STORAGE	0.031	0.031	0	06:00	0.0787	0.0897	-0.004
CB_A09	STORAGE	0.092	0.092	0	06:00	0.24	0.285	-0.006
CB_A12	STORAGE	0.051	0.051	0	06:00	0.129	0.146	-0.002
CB_A14	STORAGE	0.126	0.126	0	06:00	0.346	0.465	-0.004
CB_A19	STORAGE	0.095	0.095	0	06:00	0.241	0.329	-0.004
CB_A21	STORAGE	0.059	0.059	0	06:00	0.15	0.165	-0.006
CB_A23	STORAGE	0.527	0.527	0	06:00	1.42	1.42	0.010
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	4.022	0	06:00	0.978	28.4	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
SU1	STORAGE	0.000	0.101	0	06:00	0	0.17	0.003
SU10	STORAGE	0.000	0.012	0	05:55	0	0.011	0.029
SU2	STORAGE	0.000	0.022	0	05:57	0	0.0171	0.021
SU3	STORAGE	0.000	0.041	0	05:48	0	0.0335	0.022
SU4	STORAGE	0.000	0.074	0	05:58	0	0.123	0.002
SU5	STORAGE	0.000	0.014	0	05:55	0	0.0139	0.025
SU6	STORAGE	0.000	0.021	0	05:58	0	0.0211	0.027
SU7	STORAGE	0.000	0.065	0	05:52	0	0.045	0.014
SU8	STORAGE	0.000	0.019	0	05:52	0	0.0163	0.017
SU9	STORAGE	0.000	0.027	0	05:47	0	0.0156	0.025

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

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
1_(STM)	JUNCTION	48.00	0.000	3.710
203_(STM)	JUNCTION	9.88	0.918	2.842
HW-02	JUNCTION	7.48	0.164	0.856
J3	JUNCTION	10.62	0.344	0.656
R102_(STM)	JUNCTION	8.33	0.933	2.617
R103_(STM)	JUNCTION	7.44	0.900	2.600
R104_(STM)	JUNCTION	5.56	0.851	3.059
R118_(STM)	JUNCTION	4.46	1.087	3.204
R120_(STM)	JUNCTION	0.91	1.092	2.133
R121_(STM)	JUNCTION	0.77	1.278	2.407
R122_(STM)	JUNCTION	0.72	1.676	3.089
R123_(STM)	JUNCTION	0.71	1.859	2.356
R124_(STM)	JUNCTION	0.72	1.182	2.393
R127_(STM)	JUNCTION	0.64	1.842	1.603

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Node Flooding Summary
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No nodes were flooded.

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Storage Volume Summary
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Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
100	0.001	28	0	0	0.002	59	0 06:26	0.709
102	0.001	24	0	0	0.002	52	0 06:20	0.705
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	0.275
108	0.000	13	0	0	0.002	57	0 06:18	0.214
110	0.000	12	0	0	0.002	57	0 06:18	0.214
112	0.000	7	0	0	0.002	53	0 06:19	0.176
114	0.000	4	0	0	0.002	49	0 06:19	0.046
116	0.000	3	0	0	0.001	46	0 06:19	0.032
118	0.000	1	0	0	0.001	33	0 06:19	0.067
120	0.001	17	0	0	0.002	46	0 06:20	0.350
122	0.001	12	0	0	0.002	43	0 06:20	0.273
124	0.000	4	0	0	0.001	35	0 06:21	0.030
CAP1	0.000	11	0	0	0.002	50	0 06:21	0.230
CB_A03	0.000	2	0	0	0.001	64	0 06:03	0.021
CB_A09	0.000	8	0	0	0.001	73	0 06:31	0.074
CB_A12	0.000	2	0	0	0.001	67	0 06:03	0.033
CB_A14	0.000	5	0	0	0.001	76	0 06:28	0.119
CB_A19	0.000	7	0	0	0.001	75	0 06:21	0.083
CB_A21	0.000	2	0	0	0.001	76	0 06:01	0.041
CB_A23	0.003	1	0	0	0.247	80	0 06:04	0.212
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	8.223	52	0	0	15.577	98	0 06:25	2.504
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
SU1	0.000	5	0	0	0.001	75	0 06:26	0.058
SU10	0.000	1	0	0	0.000	65	0 06:03	0.003
SU2	0.000	3	0	0	0.000	66	0 06:29	0.007
SU3	0.000	2	0	0	0.000	55	0 06:28	0.008
SU4	0.000	6	0	0	0.001	72	0 06:22	0.033
SU5	0.000	4	0	0	0.000	61	0 06:22	0.003
SU6	0.000	5	0	0	0.000	68	0 06:23	0.003

SU7	0.000	2	0	0	0.000	38	0	06:30	0.015
SU8	0.000	1	0	0	0.000	56	0	06:04	0.006
SU9	0.000	1	0	0	0.000	54	0	06:02	0.007

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Outfall Loading Summary
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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	2.239	22.950
OF3	27.98	0.007	0.124	0.323
OF4	0.00	0.000	0.000	0.000
System	30.41	0.150	0.000	23.698

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Link Flow Summary
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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	0.845	0	06:11	1.47	0.86	1.00
110_(STM)	CONDUIT	0.865	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	0.807	0	06:11	1.27	1.12	1.00
120_(STM)	CONDUIT	0.465	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	0.825	0	06:11	1.62	0.94	1.00
166_(STM)	CONDUIT	0.813	0	06:11	1.47	0.99	1.00
202_(14)_(STM)	CONDUIT	3.466	0	05:53	3.06	2.61	1.00
202_(15)_(STM)_2	CONDUIT	0.832	0	06:11	0.74	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	06:31	0.12	0.00	0.01
C13	CONDUIT	0.000	0	00:00	0.00	0.00	0.00
C14	CONDUIT	0.041	0	05:48	0.18	0.03	1.00
C15	CONDUIT	0.022	0	05:57	0.07	0.01	1.00
C16	CONDUIT	0.101	0	06:00	0.17	0.08	1.00
C17	CONDUIT	0.000	0	00:00	0.00	0.00	0.00
C18	CONDUIT	0.014	0	05:55	0.05	0.01	1.00
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
C20	CONDUIT	0.074	0	05:58	0.14	0.05	1.00
C21	CONDUIT	0.004	0	06:21	0.32	0.00	0.04
C22	CONDUIT	0.003	0	06:28	0.24	0.00	0.05
C23	CONDUIT	0.021	0	05:58	0.13	0.02	1.00
C24	CONDUIT	0.065	0	05:52	0.20	0.05	0.92
C25	CHANNEL	0.000	0	00:00	0.00	0.00	0.18
C26	CHANNEL	0.013	0	05:55	0.15	0.00	0.24
C27	CHANNEL	0.000	0	00:00	0.00	0.00	0.14
C28	CHANNEL	0.020	0	05:55	0.18	0.00	0.20
C29	CHANNEL	0.025	0	06:00	0.13	0.00	0.34
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	0.22
C32	CHANNEL	0.000	0	00:00	0.00	0.00	0.22
C33	CHANNEL	0.000	0	00:00	0.00	0.00	0.24
C34	CHANNEL	0.013	0	06:00	0.12	0.00	0.25
C35	CHANNEL	0.001	0	06:00	0.08	0.00	0.18
C36	CHANNEL	0.000	0	00:00	0.00	0.00	0.16
C37	CHANNEL	0.000	0	00:00	0.00	0.00	0.22
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	0.23
C41	CHANNEL	0.000	0	00:00	0.00	0.00	0.23
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	0.16
C46	CHANNEL	0.000	0	00:00	0.00	0.00	0.17
C47	CHANNEL	0.000	0	00:00	0.00	0.00	0.17
C48	CHANNEL	0.000	0	00:00	0.00	0.00	0.20
C49	CHANNEL	0.000	0	00:00	0.00	0.00	0.19
C5	CHANNEL	0.000	0	00:00	0.00	0.00	0.01
C50	CHANNEL	0.031	0	06:00	0.13	0.01	0.24
C51	CHANNEL	0.030	0	06:00	0.06	0.00	0.37
C52	CHANNEL	0.030	0	06:00	0.06	0.00	0.35
C53	CHANNEL	0.006	0	06:02	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	0.23
C56	CHANNEL	0.000	0	00:00	0.00	0.00	0.16
C57	CHANNEL	0.000	0	00:00	0.00	0.00	0.16
C58	CHANNEL	0.000	0	06:06	0.00	0.00	0.16
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
C60	CONDUIT	0.019	0	05:52	0.15	0.06	1.00
C61	CONDUIT	0.027	0	05:47	0.23	0.07	1.00
C62	CONDUIT	0.012	0	05:55	0.05	0.01	1.00
C7	CONDUIT	0.005	0	06:01	0.29	0.00	0.05
C7_1	CONDUIT	1.295	0	06:25	0.41	0.17	0.87
C7_2	CONDUIT	1.283	0	06:29	0.25	0.26	1.00
C8	CHANNEL	2.239	0	06:30	0.50	0.09	0.83
C9	CHANNEL	1.133	0	06:45	0.17	0.05	0.81
POND2-OUT	CONDUIT	1.195	0	06:26	0.36	0.45	1.00
STM-13_(STM)	CONDUIT	0.030	0	06:41	0.43	0.54	1.00
STM-16_(STM)	CONDUIT	0.046	0	06:21	0.77	0.82	1.00
STM-164_(STM)	CONDUIT	0.032	0	06:20	0.66	0.56	1.00
STM-165_(STM)	CONDUIT	0.273	0	06:12	0.62	0.64	1.00
STM-166_(STM)	CONDUIT	0.350	0	06:11	0.65	0.64	1.00
STM-20_(STM)	CONDUIT	0.230	0	06:12	0.64	0.68	1.00
STM-3_(1)_(1)_(STM)	CONDUIT	0.275	0	06:12	0.77	0.85	1.00
STM-3_(1)_(STM)	CONDUIT	0.308	0	06:11	0.86	0.94	1.00
STM-3_(2)_(STM)	CONDUIT	0.705	0	06:11	0.94	0.82	1.00
STM-3_(STM_(2))	CONDUIT	0.709	0	06:11	0.95	0.96	1.00
STM-5_(1)_(STM)	CONDUIT	0.214	0	06:12	0.76	0.83	1.00
STM-5_(STM)	CONDUIT	0.214	0	06:12	0.76	0.84	1.00
STM-7_(STM)	CONDUIT	0.176	0	06:12	0.81	0.92	1.00
STM-9_(STM)	CONDUIT	0.067	0	06:21	1.04	0.65	1.00
O-A01	ORIFICE	0.010	0	06:02			1.00
O-A04	ORIFICE	0.010	0	06:25			1.00
O-A05	ORIFICE	0.020	0	06:28			1.00
O-A06	ORIFICE	0.013	0	06:50			1.00
O-A11	ORIFICE	0.016	0	06:03			1.00
O-A14	ORIFICE	0.020	0	06:01			1.00
O-A15	ORIFICE	0.212	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	0.033	0	06:01			1.00
OR13	ORIFICE	0.038	0	06:00			1.00
OR14	ORIFICE	0.018	0	06:01			1.00
OR15	ORIFICE	0.030	0	06:01			1.00
OR16	ORIFICE	0.032	0	06:01			1.00
OR17	ORIFICE	0.039	0	06:00			1.00
OR18	ORIFICE	0.035	0	06:00			1.00
OR19	ORIFICE	0.048	0	06:00			1.00
OR2	ORIFICE	0.458	0	06:06			1.00
OR20	ORIFICE	0.066	0	06:01			1.00
OR4	ORIFICE	0.017	0	06:00			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	0.834	0	06:11			0.34
P2-100yrWeir	WEIR	1.296	0	06:25			0.39
P2-5-10yrWeir	WEIR	1.041	0	06:16			1.00
OR3	DUMMY	0.813	0	06:03			

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Flow Classification Summary
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Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
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	0.00	1.00	0.00	0.00
124_(STM)	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	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
C14	1.00	0.77	0.10	0.00	0.12	0.00	0.00	0.00	0.80	0.00
C15	1.00	0.77	0.12	0.00	0.11	0.00	0.00	0.00	0.79	0.00
C16	1.00	0.05	0.72	0.00	0.23	0.00	0.00	0.00	0.77	0.00
C17	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C18	1.00	0.78	0.08	0.00	0.13	0.00	0.00	0.00	0.77	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
C20	1.00	0.21	0.57	0.00	0.22	0.00	0.00	0.00	0.74	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	0.98	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
C23	1.00	0.78	0.04	0.00	0.18	0.00	0.00	0.00	0.75	0.00
C24	1.00	0.01	0.84	0.00	0.15	0.00	0.00	0.00	0.81	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	0.00	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	0.01	0.00	0.00	0.99	0.01	0.00
C36	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C37	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	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	0.99	0.01	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	0.87	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
C60	1.00	0.33	0.58	0.00	0.08	0.00	0.00	0.00	0.85	0.00
C61	1.00	0.31	0.62	0.00	0.07	0.00	0.00	0.00	0.85	0.00
C62	1.00	0.37	0.57	0.00	0.06	0.00	0.00	0.00	0.84	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	0.00	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
STM-164_(STM)	1.00	0.00	0.08	0.00	0.92	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	0.07	0.15	0.00
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	0.63	0.00	0.00	0.35	0.27	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	Hours Full: Both Ends	Upstream	Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
106_(STM)	5.90	5.90	9.90	0.01	0.32
108_(STM)	2.29	2.29	4.46	0.01	0.34
110_(1)_(STM)	0.72	0.72	0.81	0.01	0.01
110_(STM)	0.77	0.77	0.91	0.01	0.01
112_(STM)	0.73	0.73	1.17	0.01	0.01
118_(STM)	9.02	9.03	9.88	0.48	0.76
120_(STM)	8.10	8.10	8.33	0.01	0.01
122_(1)_(STM)	4.55	4.55	5.71	0.01	0.01
122_(STM)	5.56	5.56	7.44	0.01	0.01
160_(STM)	0.64	0.64	0.72	0.01	0.01
166_(STM)	0.71	0.71	0.72	0.01	0.01
202_(14)_(STM)	19.44	19.44	20.07	0.97	0.96
202_(15)_(STM)_2	19.42	19.42	31.91	0.01	0.01
202_(27)_(STM)	10.73	10.73	18.55	0.01	0.01
C14	1.15	1.15	2.64	0.01	0.01
C15	1.74	1.74	2.64	0.01	0.01
C16	2.64	2.64	3.05	0.01	0.01
C18	1.82	1.82	3.02	0.01	0.01
C20	3.02	3.02	4.27	0.01	0.01
C23	2.48	2.48	3.02	0.01	0.01
C24	0.01	0.01	3.57	0.01	0.01
C6	0.01	0.01	7.48	0.01	0.01
C60	0.85	0.85	1.52	0.01	0.01
C61	0.68	0.68	1.32	0.01	0.01
C62	0.69	0.69	0.97	0.01	0.01
C7_1	0.01	0.01	10.62	0.01	0.01
C7_2	10.62	10.62	15.19	0.01	0.01
POND2-OUT	10.46	10.46	11.40	0.01	0.01
STM-13_(STM)	8.55	8.55	11.73	0.01	0.01
STM-16_(STM)	6.50	6.50	9.28	0.01	0.01
STM-164_(STM)	4.21	4.21	6.50	0.01	0.01
STM-165_(STM)	11.73	11.73	14.85	0.01	0.01
STM-166_(STM)	14.96	14.96	17.82	0.01	0.01
STM-20_(STM)	10.43	10.43	11.83	0.01	0.01
STM-3_(1)_(1)_(STM)	13.69	13.69	15.65	0.01	0.01
STM-3_(1)_(STM)	15.88	15.88	18.09	0.01	0.47
STM-3_(2)_(STM)	17.82	17.82	18.98	0.01	0.02
STM-3_(STM_(2))	18.98	18.98	19.28	0.01	1.13
STM-5_(1)_(STM)	12.57	12.57	13.18	0.01	0.18
STM-5_(STM)	13.18	13.18	13.80	0.01	0.10
STM-7_(STM)	9.16	9.16	12.47	0.01	0.01
STM-9_(STM)	0.44	0.44	1.36	0.01	0.01

Analysis begun on: Thu May 21 14:06:07 2026
Analysis ended on: Thu May 21 14:06:17 2026
Total elapsed time: 00:00:10

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

NOVATECH
Engineers, Planners & Landscape Architects

RYCB ID (STM Area ID)	Rear Yard Trench Dimensions (subdrain & clearstone)					Storage Volumes[2]			Equivalent Width for Model[4] (m)
	Perf. Pipe Dia. (mm)	Length (m)	Width (m)	Height[1] (m)	Area (m^2)	Perf. Pipe (m^3)	Clearstone (m^3)	Total[3] (m^3)	
Subdivision Rear-yards									
CBA-03 (A03)	600	25	1.20	0.90	30	7.1	8.0	15.0	0.67
CBA-09 (A09)	600	127	1.20	0.90	152	35.9	40.5	76.4	0.67
CBA-12 (A12)	250	73.3	0.85	0.55	62	3.6	12.3	15.9	0.39
CBA-14 (A14)	600	134	1.20	0.90	161	37.9	42.7	80.6	0.67
CBA-19 (A19)	600	77.4	1.20	0.90	93	21.9	24.7	46.6	0.67
CBA-21 (A21)	250	73	0.85	0.55	62	3.6	12.2	15.8	0.39
TOTAL	**600**	**509.7**	**0.85**	**0.55**	**433**	**109.9**	**140.4**	**250.3**	**0.89**

[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.*

[3] *The total storage volume is represented in the PCSWMM model as rectangular conduits.*

[4] *Equivalent width for model = total storage (subdrain & clearstone) divided by the length and height of the rectangular conduit.*

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


3rd PIPE OUTLET CHANNEL TO CARP RIVER
SECTION A-A
SCALE 1:75
EXISTING GROUND
2.13m
93.77
93.79
93.48
93.48
0.30m
LEGEND
PROPOSED GRADE AND DIRECTION OF FLOW
PROPOSED ELEVATION
EXISTING ELEVATION
TERRACING (3:1 MAX)
MAJOR OVERLAND FLOW DIRECTION
EXISTING CONTOUR AND ELEVATION
HP HIGH POINT
TW TOP OF WALL
BW BOTTOM OF WALL
AREA 1 GRADE RAISE LIMIT 0.4m FOR BUILDINGS & 1.0m FOR ROADS
AREA 2 GRADE RAISE LIMIT 1.5m FOR BUILDINGS & 2.0m FOR ROADS
AREA 3 GRADE RAISE LIMIT 1.8m FOR BUILDINGS & 2.2m FOR ROADS
CARP RIVER
CARP RIVER FLOOD PLAIN
CARP RIVER FLOODLINE 100-YR = 94.54 (MVCA)
MVCA REGULATION LIMIT (15m 100-YR FLOODLINE OFFSET)
REINFORCED GRASS SERVICE ROAD
POND OUTLET CHANNEL
SPILLWAY CHANNEL
POND 2 NWL=93.66 100-YR=95.22
WET CELL
CARP TRIBUTARY
SERVICE ROAD
SEDIMENT MANAGEMENT AREA
PATHWAY
SIDEWALK
HAZELDEAN ROAD
BUILDING A GRADE RAISE LIMIT = 0.4m
BUILDING B GRADE RAISE LIMIT = 0.4m
AREA 1 GRADE RAISE LIMIT =1.0m ROADS
APARTMENT BLOCK
AREA 2 GRADE RAISE LIMIT =1.5m BUILDINGS =2.0m ROADS
AREA 3 GRADE RAISE LIMIT =1.8m BUILDINGS =2.2m ROADS
BLOCK 65
BLOCK 66
BLOCK 67
BLOCK 68
BLOCK 69
BLOCK 70
BLOCK 71
BLOCK 72
BLOCK 73
BLOCK 74
BLOCK 75
FUTURE MIXED-USE (OTHERS)
EXISTING RESIDENTIAL (BRADLEY COMMONS)
ENERGY STREET
RETAILING WALL
TIE INTO PROPOSED REAR YARD GRADE
TIE INTO EXISTING GRADE

NOTE:
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No.	REVISION	DATE	BY
3.	DP COMMENT RESOLUTION	MAY 22/26	MAB
2.	DP COMMENT RESOLUTION	JAN 20/26	MAB
1.	DRAFT PLAN APPLICATION	AUG 15/25	MAB

SCALE 1:500

DESIGN	DTD
CHECKED	MAB
DRAWN	DTD
CHECKED	MAB
APPROVED	MAB

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CITY of OTTAWA
560 HAZELDEAN ROAD - DOUBLE DECK SUBDIVISION

MASTER GRADING PLAN

PROJECT No. 100057-05
REV # 3
DRAWING No. 100057-MGR

PLANB1.DWG - 1000mmx707mm

SAN MANHOLE TABLE

MANHOLE ID	SIZE (mm)	T/G ELEV (m)	INVERT (m)
103	1200mmØ	96.01	W=92.10 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=92.56 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=92.26
125	1200mmØ	97.63	NE=91.99 SE=91.91 NW=91.91
127	1200mmØ	97.47	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=92.98 SE=92.97
100	1200mmØ	96.75	S=93.21 NW=93.21
102	1200mmØ	97.20	SE=93.25 NE=93.54 NW=93.40
104	1200mmØ	97.12	SW=93.63 NE=93.64
106	1800mmØ	96.97	SW=93.73 N=93.80
108	1200mmØ	96.82	S=93.83 NW=93.83
110	1800mmØ	96.87	SE=93.86 W=93.94
112	1800mmØ	96.98	E=94.10 W=94.71 S=94.24
114	1200mmØ	97.18	N=94.38 SW=94.45
116	1200mmØ	97.16	NE=94.55
118	1500mmØ	97.06	E=95.02
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

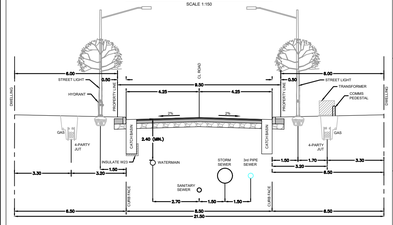
MANHOLE ID	SIZE (mm)	T/G ELEV (m)	INVERT (m)
HW1		94.35	S=93.65
302	1200mmØ	96.84	SE=93.86 W=93.86
304	1200mmØ	96.90	NW=93.82 S=93.82 E=93.82
306	1200mmØ	96.94	N=93.90 SW=94.02
308	1200mmØ	97.07	NE=94.24 SW=94.24
310	1200mmØ	97.18	SE=94.52 NE=94.45 NW=94.52
312	1200mmØ	96.82	NW=94.60
314	1200mmØ	97.43	NW=94.65 SE=94.82 NE=94.48
316	1200mmØ	97.45	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	95.58	N=93.74 W=93.75
330	1200mmØ	97.55	NW=94.81 SE=95.00 NE=94.64

LEGEND

- SANITARY MANHOLE, SEWER & FLOW DIRECTION
- STORM MANHOLE, SEWER & FLOW DIRECTION
- 200mmØ — WATERMAIN AND DIAMETER
- VB — VALVE & VALVE BOX
- HYD — HYDRANT C/W VALVE & LEAD
- CAP
- 3m BUILDING SEPERATION OR 2 HOUR FIREWALL REQUIRED (BY BUILDER)

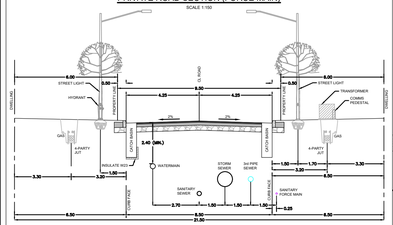
PRIVATE ROAD SECTION (TYPICAL)

SCALE 1:100



PRIVATE ROAD SECTION (FORCE MAIN)

SCALE 1:100



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No.	REVISION	DATE	BY
3.	DP COMMENT RESOLUTION	MAY 22/26	MAB
2.	DP COMMENT RESOLUTION	JAN 20/26	MAB
1.	DRAFT PLAN APPLICATION	AUG 15/25	MAB

SCALE 1:500

DESIGN DTD
CHECKED MAB
DRAWN DTD
CHECKED MAB
APPROVED MAB

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LICENSED PROFESSIONAL ENGINEER — L. R. WILSON — 100160065 — PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER — M.A. BISSETT — 2026.05.22 — PROVINCE OF ONTARIO

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CITY of OTTAWA - 560 HAZELDEAN ROAD
DOUBLE DECK SUBDIVISION

MASTER SERVICING PLAN

PROJECT No. 100057-05
REV REV # 3
DRAWING No. 100057-MGP

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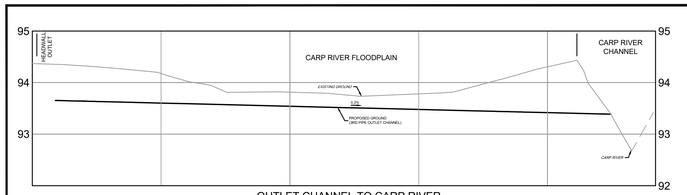
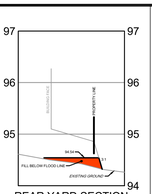


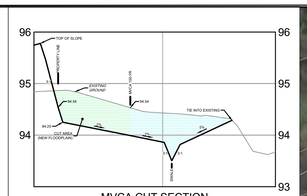
OUTLET CHANNEL TO CARP RIVER
SECTION A-A

SCALE 1:500H, 1:50V



REAR YARD SECTION
SECTION B-B

SCALE 1:500H, 1:50V



MVCA CUT SECTION
SECTION C-C

SCALE 1:500H, 1:50V

Fill Volumes

Elevation Range		Depth Below 100-YR Floodline (94.54)		Fill Volume (m^3)
94.54	94.29	0.00	-0.25	160.0
94.29	94.04	-0.25	-0.50	16.7
Total Fill				176.7

Cut Volumes

Elevation Range		Depth Below 100-YR Floodline (94.54)		Cut Volume (m^3)
94.54	94.29	0.00	-0.25	171.9
94.29	94.04	-0.25	-0.50	30.6
Total Cut				202.5

LEGEND

- FILL 94.54 - 94.29
- FILL 94.29 - 94.04
- CUT 94.54 - 94.04
- CUT WITHIN 100-YR

CARP RIVER
CARP RIVER CENTRELINE OF CHANNEL
TOP OF SLOPE
15m TOP OF SLOPE SETBACK
30m CENTRELINE SETBACK
CARP RIVER FLOOD PLAIN
HAZELDEAN BRIDGE
REINFORCED GRASS SERVICE ROAD
POND 1 OUTLET CHANNEL
NEW CARP RIVER FLOODLINE 100-YR = 94.54
CARP RIVER FLOODLINE 100-YR = 94.54 (MVCA)
AREA C2 CUT=293.8m³
TIE INTO EXISTING GROUND FROM CUT AREA
AREA C1 CUT =202.5m³ RANGE =94.54 - 94.25
IRRIGATION POND
SWALE
AREA F8 FILL=11.7m³
AREA F7 FILL=1.4m³
AREA F6 FILL=5.2m³
AREA F5 FILL=2.1m³
AREA F4 FILL=29.2m³
AREA F3 FILL=69.3m³
AREA F2 FILL=51.4m³
AREA F1 FILL=6.3m³
BOTTOM OF SLOPE
TOP OF SLOPE
BUILDING A
BUILDING B
PATHWAY
SIDEWALK
HAZELDEAN ROAD
SERVICE ROAD
SEDIMENT MANAGEMENT AREA
POND 2 NWL=93.66 100-YR=95.22
BLOCK 66
BLOCK 67
BLOCK 68
BLOCK 69
BLOCK 70
BLOCK 71
BLOCK 72
BLOCK 73
BLOCK 74
BLOCK 75

NOTE:
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No.	REVISION	DATE	BY
4.	DP COMMENT RESOLUTION	MAY 22/26	MAB
3.	REVISED MVCA CUT FILL APPLICATION	APR 13/26	MAB
2.	MVCA CUT FILL APPLICATION	JAN 26/26	MAB
1.	DP COMMENT RESOLUTION	JAN 20/26	MAB

SCALE 1:500

1:500
0 5 10 15 20

DESIGN
CHECKED MAB
DRAWN DTD
CHECKED MAB
APPROVED MAB

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L. R. WILSON 100160065 LICENSED PROFESSIONAL ENGINEER PROVINCE OF ONTARIO

M.A. BISSETT 2026.05.22 LICENCE PROFESSIONAL ENGINEER PROVINCE OF ONTARIO

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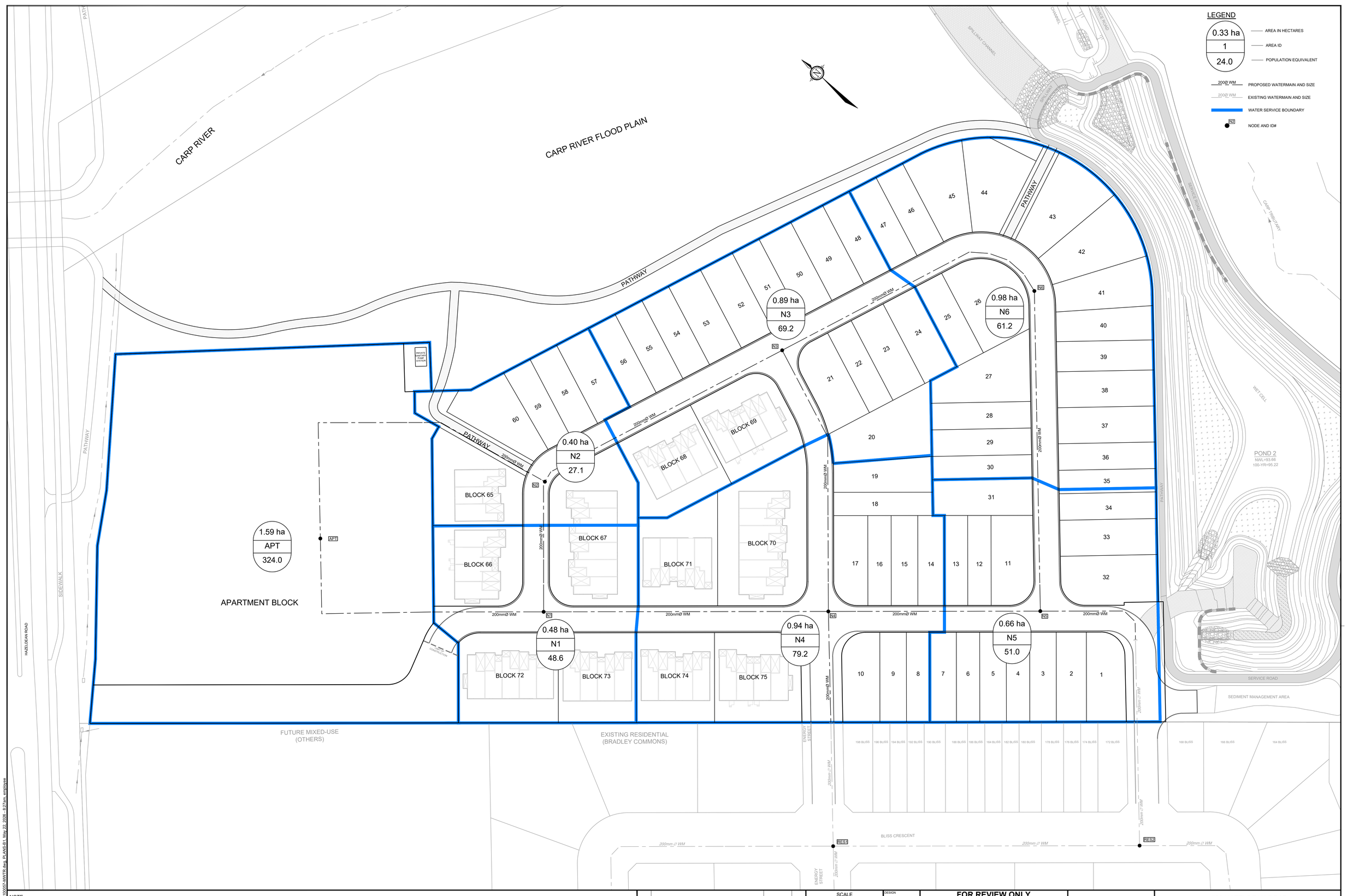
CITY of OTTAWA
560 HAZELDEAN ROAD - DOUBLE DECK SUBDIVISION

CUT / FILL AREA PLAN

PROJECT No. 100057-05
REV REV # 4
DRAWING No. 100057-CFA



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2.	DP COMMENT RESOLUTION	JAN 20/26	MAB
1.	DRAFT PLAN APPLICATION	AUG 15/25	MAB

SCALE
1:500
1:500
0 5 10 15 20

DESIGN LRW
CHECKED MAB
DRAWN DTD
CHECKED MAB
APPROVED MAB

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LICENSED PROFESSIONAL ENGINEER
L. R. WILSON
100160065
PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER
M.A. BISSETT
2026.05.22
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CITY of OTTAWA - 560 HAZELDEAN ROAD
DOUBLE DECK SUBDIVISION

WATER DISTRIBUTION PLAN

PROJECT No. 100057-05
REV REV # 3
DRAWING No. 100057-WTR

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
3.	DP COMMENT RESOLUTION	MAY 22/26	MAB
2.	DP COMMENT RESOLUTION	JAN 20/26	MAB
1.	DRAFT PLAN APPLICATION	AUG 15/25	MAB

SCALE 1:500

DESIGN	LRW
CHECKED	MAB
DRAWN	DTD
CHECKED	MAB
APPROVED	MAB

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER L. R. WILSON 100160065 PROVINCE OF ONTARIO

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CITY of OTTAWA - 560 HAZELDEAN ROAD
DOUBLE DECK SUBDIVISION

SANITARY DRAINAGE AREA PLAN

PROJECT No. 100057-05
REV REV # 3
DRAWING No. 100057-SAN

NOTE:
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3.	DP COMMENT RESOLUTION	MAY 22/26	MAB
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1.	DRAFT PLAN APPLICATION	AUG 15/25	MAB

SCALE 1:500

DESIGN LRW
CHECKED MAB
DRAWN DTD
CHECKED MAB
APPROVED MAB

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CITY of OTTAWA - 560 HAZELDEAN ROAD
DOUBLE DECK SUBDIVISION

STORM DRAINAGE AREA PLAN

PROJECT No. 100057-05
REV REV # 3
DRAWING No. 100057-STM

Elevations Table

Number	Minimum Elevation	Maximum Elevation	Color
1	0.00	0.25	
2	0.25	0.50	
3	0.50	0.75	
4	0.75	1.00	

CARP RIVER FLOOD PLAIN

CARP RIVER FLOODLINE
100-YR = 94.54 (MVCA)

PATHWAY

PRIVATE STORM PUMP STATION

APARTMENT BLOCK

BLOCK 65

BLOCK 66

BLOCK 67

BLOCK 68

BLOCK 69

BLOCK 70

BLOCK 71

BLOCK 72

BLOCK 73

BLOCK 74

BLOCK 75

FUTURE CONSTRUCTION

FUTURE MIXED-USE
(OTHERS)

EXISTING RESIDENTIAL
(BRADLEY COMMONS)

ENERGY STREET

198 BLISS

196 BLISS

194 BLISS

192 BLISS

190 BLISS

CARP TRIBUTARY

WET CELL

POND 2
NWL=93.66
100-YR=95.22

SEDIMENT MANAGEMENT AREA

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CITY OF OTTAWA

560 HAZELDEAN ROAD DOUBLE DECK SUBDIVISION

LIGHT WEIGHT FILL LOCATIONS

SCALE 1 : 1000 (0, 10, 20, 30, 40)

DATE MAY 22, 2026

JOB 100057

FIGURE DSK-30

SHT11X17.DWG - 279mmX432mm

VB7
200mmØ WM
66.3m-300mmØ STM-3P @ 0.35%
64.1m-200mmØ SAN @ 0.82%
200mmØ WM
VB6
200mmØ WM
101.2m-200mmØ SAN @ 0.35%
123
80.8m-200mmØ SAN @ 0.35%
101.2m-750mmØ STM @ 0.15%
83.8m-825mmØ STM @ 0.15%
314
120
101.2m-300mmØ STM-3P @ 0.35%
86.8m-300mmØ STM-3P @ 0.35%
97.34
100mmØ SAN-FM
97.43
97.34
97.62
97.47
1.4%
97.47
97.62
8.0m
BLOCK 75
10
9
97.72
97.67
100mmØ SAN-FM
200mmØ WM
97.72
97.72
1.4%
97.64
97.64
97.68
97.68
SANMH 131
T/G=97.88
INV.SW=95.68
INV.NE=95.69
TIE INTO EXISTING ROAD
(ENERGY STREET)
TIE INTO EXISTING GRADE AT
PROPERTY LINE AND CONSTRUCT
RETAINING WALL
BOUNDARY VALVE CHAMBER
(PER W3.3)
VC1
TIE INTO EXISTING GRADE AT
PROPERTY LINE AND CONSTRUCT
RETAINING WALL
97.48
97.15
97.48
97.48
97.53
97.56
97.51
97.95
97.80
97.88
97.80
97.95
97.56
97.60
97.56
97.53
97.46
97.17
97.51
98.00
97.84
98.09
97.94
98.24
97.79
97.90
97.90
97.88
97.91
97.94
97.79
98.12
97.87
97.72
98.05
97.82
97.67
98.00
98.17
3.7%
97.98
CONNECT TO EXISTING WATERMAIN
CONNECT TO EXISTING SANITARY
CAP AND INSTALL NEW MANHOLE
ENERGY STREET
8.0m
98.41
98.41
98.41
BLOCK 72 D
FF=99.69
TF=99.27
USF=96.71
MUSF=96.67
98.84
99
97
68
98.84
98.84
98.76
98.61
98.65
3.1%
250mmØ SAN @ 0.27%
98.68
1.5%
98.77
3.7%
98.65
98.76
98.31
98.31
98.31
98.31
BLOCK 37 A
FF=99.66
TF=99.29
USF=96.68
MUSF=96.68
98.74
125
126
127
98.74
98.74
98.74
98.60
98.51
98.44
525mmØ STM @ 0.16%
250mmØ SAN @ 0.23%
98.46
98.57
98.72
X8
98.58
98.55
1220mm x 1920mmØ ELL. STM @ 0.15%
300mmØ SAN @ 0.19%
98.44
BLISS CRESCENT
1220mm x 1920mm Ø ELL. STM @ 0.15%
250mm Ø SAN @ 0.31%
98.44
98.43

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CITY OF OTTAWA
560 HAZELDEAN ROAD
DOUBLE DECK SUBDIVISION

ENERGY STREET TIE IN

SCALE 1 : 250 (0 2 4 6 8 10)
DATE MAY 22, 2026
JOB 100057-05
FIGURE DSK-28A

SHT11X17.DWG - 279mmX432mm

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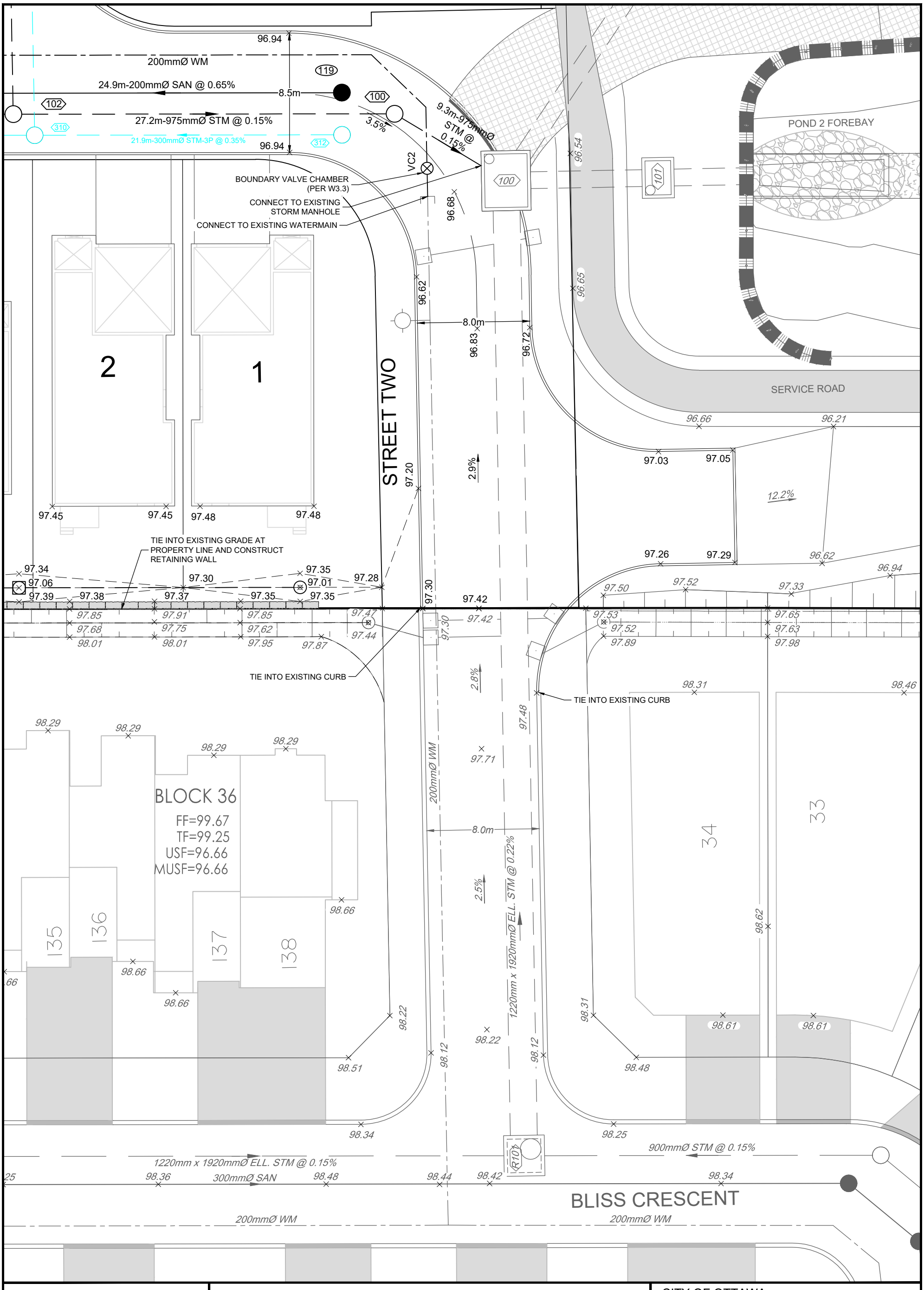

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CITY OF OTTAWA
560 HAZELDEAN ROAD
DOUBLE DECK SUBDIVISION

STREET TWO TIE IN

SCALE 1 : 250 (0 2 4 6 8 10)

DATE MAY 22, 2026 | JOB 100057-05 | FIGURE DSK-28B

SHT11X17.DWG - 279mmX432mm

M:\2000\100057\SUBDIVISION\CAD\DESIGN\FIGURES\DSK\DWG\DSK28-ENERGY STREET TIE IN.DWG 5/25/2026 3:51 PM - EMPLOYEE