

STORMWATER MANAGEMENT REPORT

23 Elizabeth Street North & 42 – 46 Park Street East

Project #: 25-0893

Prepared for: Edenshaw Elizabeth Developments Limited

Date: May 23, 2025

Report Version: 01



May 23, 2025

Edenshaw Elizabeth Developments Limited
129 Lakeshore Road E Suite 201
Mississauga, Ontario L5G 1E5

Attention: Roman Tsap, Development Manager

SUBJECT: STORMWATER MANAGEMENT REPORT, 23 ELIZABETH STREET NORTH & 42 – 46 PARK STREET EAST

EnVision Consultants Ltd. is pleased to present the enclosed Stormwater Management Report for the above-noted property. This report provides the conceptual stormwater management strategies for this development.



We thank you for utilizing EnVision for this assignment. If there are any questions regarding the enclosed report, please do not hesitate to contact us.

Yours sincerely,

Alex Williams, P.Eng.
Director – Land Development
awilliams@envisionconsultants.ca



QUALITY MANAGEMENT

ISSUE	FIRST ISSUE	REVISION 1	REVISION 2
PROJECT NUMBER	25-0893		
PROJECT REFERENCE	Stormwater Management Report, 23 Elizabeth Street North & 42 – 46 Park Street East		
VERSION NO.	01		
REMARKS	OPA/ZBA		
PREPARED BY	Michael Basciano, EIT		
SIGNATURE			
REVIEWED BY	Alex Williams, P.Eng.		
SIGNATURE			
DATE	May 23, 2025		

The original of this digital file will be kept by EnVision for a period of not less than 10 years. As the digital file transmitted to the intended recipient is no longer under the control of EnVision, its integrity cannot be assured. As such, EnVision does not guarantee any modifications made to this digital file subsequent to its transmission to the intended recipient



TABLE OF CONTENTS

1.	Introduction	1
1.1.	Site Location	1
1.2.	Stormwater Management Objectives	1
1.3.	Design Criteria	1
2.	Existing Conditions	4
2.1.	General	4
2.2.	Rainfall Information	4
2.3.	Allowable Flow Rates	5
3.	Proposed Conditions	8
3.1.	General	8
3.2.	Water Quantity	8
3.3.	Water Quality	12
3.4.	Runoff Volume Reduction (Water Balance)	12
3.5.	Erosion Control	13
4.	Closing	14
4.1.	Conclusions	14
4.2.	Certification and Signatures	15
4.3.	Qualifier	15



LIST OF TABLES

Table 2.1: Rainfall Parameters	4
Table 2.2: Existing Peak Flow Rates and Allowable Discharge Rate (Elizabeth Street North).....	5
Table 2.3: Existing Peak Flow Rates and Allowable Discharge Rate (Park Street East)	6
Table 3.1: Proposed Area Breakdown	8
Table 3.2: Summary of Modelling Results – Cistern.....	9
Table 3.3: Summary of Modelling Results – Total Site Flows	10
Table 3.4: Proposed Land-Use Area Breakdown.....	12

LIST OF FIGURES

Figure 1: Site Location	3
Figure 2: Existing Conditions	7
Figure 3: Proposed Conditions	11

LIST OF APPENDICES

APPENDIX A: Stormwater Management Calculations

APPENDIX B: Hydrologic Model Output



1. INTRODUCTION

EnVision Consultants Ltd. (EnVision) was retained by Edenshaw Elizabeth Developments Limited (the 'Client') to prepare a Stormwater Management Report for the property located at 23 Elizabeth Street North & 42 – 46 Park Street East (the 'Site'). It is our understanding that this assessment has been requested in support of the Official Plan Amendment (OPA) and Zoning By-Law Amendment (ZBA) for the proposed development including demolition of four existing two-storey dwellings and construction of a single new 30-storey residential high-rise with associated paved areas and landscaping. This report provides the conceptual framework for stormwater management for this development.

1.1. SITE LOCATION

The proposed Site is a 0.18 ha parcel of land located in the City of Mississauga and is situated within the Credit River – Norval to Port Credit subwatershed, which is under jurisdiction of Credit Valley Conservation (CVC). The property is composed of four two-storey residential dwellings. The proposed Site is a 35-storey residential high-rise adjacent to Park Street East to the south, Elizabeth Street North to the west, and high-density residential buildings located on the north and east sides of the property boundary. The Site location is illustrated in **Figure 1**.

1.2. STORMWATER MANAGEMENT OBJECTIVES

The objectives of the Stormwater Management Report are to:

- Determine the stormwater management needs specific to the site to ensure compliance with the City of Mississauga and CVC SWM guidelines.
- Assess different stormwater management methods that align with both the City's regulations and the requirements of the conservation authority and propose a preferred approach.
- Create a stormwater management report outlining the selected strategy, including technical details for the justification and sizing of the proposed stormwater management facilities.

1.3. DESIGN CRITERIA

The City of Mississauga issued the Development Requirements Manual (November 2020) to provide guidance on the management of stormwater rainfall and runoff for developments within the City. Furthermore, the Site is located within Credit River – Norval to Port Credit watershed, which is under the jurisdiction of the Credit Valley Conservation (CVC). The CVC issued the Stormwater Management Guideline (July 2022) which is also referenced during SWM analysis and design for the proposed development.

A summary of the of the stormwater management criteria applied for this project are as follows:



1.3.1. QUANTITY CONTROL

The City of Mississauga Development Requirements state sites situated in the Credit River – Norval to Port Credit subwatershed require no quantity control. However, in an effort to lower the HGL and improve surcharging conditions in the municipal sewer, the proposed SWM strategy shall ensure outlet flows do not exceed the 2-year pre-development level.

1.3.2. QUALITY CONTROL

The City of Mississauga SWM Guidelines require 80% total suspended solids (TSS) removal to provide enhanced (Level 1) protection for this site.

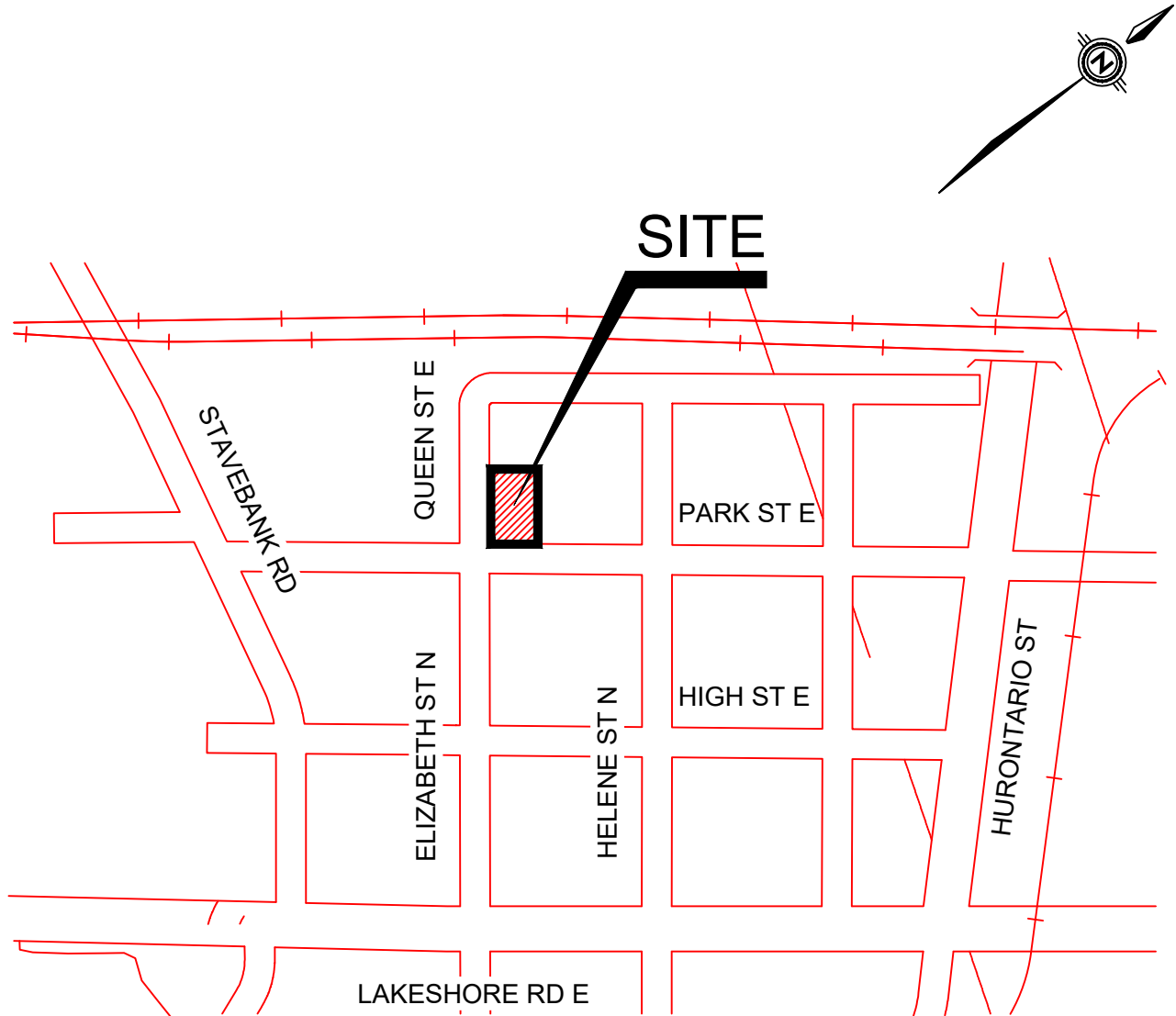
1.3.3. RUNOFF VOLUME REDUCTION (WATER BALANCE)

The runoff volume reduction requirement per City of Mississauga guidelines is retention of the first 5 mm of runoff, managed by use of infiltration, evapotranspiration, re-use or filtration.

1.3.4. EROSION CONTROL

The City of Mississauga's Development Requirements Manual includes no particular requirement for erosion control; however, it is mentioned that the implementation of runoff volume reduction strategies will assist in mitigating erosive forces from stormwater runoff on streams and watercourses during frequent storms.

FILENAME: C:\Users\MichaelBasciano\Documents\EnVision\EnVision - LD\Project Files\25-0893 23 Elizabeth St\Mun\FSR\25-0893_Fig 1.dwg
PLOTDATE: Feb 14, 2025 - 5:06pm, MichaelBasciano



CLIENT

EDENSHAW ELIZABETH
DEVELOPMENTS LIMITED

TITLE

23 ELIZABETH STREET NORTH
LOCATION PLAN



6415 Northwest Dr.
Mississauga, ON Canada
L4V 1X1
Office (905) 677-0202
E-mail admin@envisionconsultants.ca

Checked

D.A.

Drawn

M.R.

Date

FEB 2025

Scale

NTS

Proj. No.

25-0893

Figure No.

1

2. EXISTING CONDITIONS

2.1. GENERAL

The existing 0.18 ha site contains four two-storey residential dwellings with accompanying garages, driveways, walkways, and softscape areas. The existing runoff coefficient of the Site was approximated to have a value of 0.56. Based on the topographic survey, it was examined that approximately 0.08 ha of the property flows overland to Elizabeth Street North and approximately 0.10 ha of the property flows overland to Park Street East. Additionally, it was observed that a small portion at the northeast corner of the Site flows to the adjacent property to the east and an approximately 0.03 ha of external flows from the adjacent property to the east flow into the subject Site. These external flows will be accounted for in the post-development hydrologic model to meet the water quantity requirement. Existing conditions are illustrated in Figure 2.

2.2. RAINFALL INFORMATION

Rainfall information for the site was calculated using the following equation as outlined by City of Mississauga SWM Guidelines:

$$I = \frac{A}{(t_c + B)^C}$$

Where, I = Rainfall intensity (mm/hr)

t_c = Time of concentration (minutes)

A, B, C = Parameters as defined in City of Mississauga SWM Guidelines (tabularized below)

An initial time of concentration (t_c) of 15 minutes is recommended as per City of Mississauga SWM Guidelines.

Table 2.1: Rainfall Parameters

RETURN PERIOD	2-YEAR	5-YEAR	10-YEAR	25-YEAR	50-YEAR	100-YEAR
A	610	820	1010	1160	1300	1450
B	4.6	4.6	4.6	4.6	4.7	4.9
C	0.78	0.78	0.78	0.78	0.78	0.78

Per City of Mississauga Development Requirements Manual (Nov 2020)

2.3. ALLOWABLE FLOW RATES

The Site is located within the Credit River – Norval to Port Credit subwatershed. Although the City of Mississauga Development Requirements state quantity control is not required in this subwatershed, in an effort to lower the HGL and improve surcharging conditions in the municipal sewer, the proposed SWM strategy shall ensure outlet flows do not exceed the 2-year pre-development level.

As noted in Note 2 of page 8-22 of the City of Mississauga Development Requirements: where “pre-development” is listed as a part of the quantity control requirement, the pre-development runoff coefficient shall not exceed 0.50. Although the actual existing runoff coefficient is 0.56, the runoff coefficient of 0.50 shall govern when computing allowable flow rates. Based on the existing site conditions and rainfall parameters discussed previously, the Rational Method is used to calculate peak flows of 2 through 100-year storm events.

Post-development allowable flow rate calculations for the Site are contained in [Appendix A](#). The results are tabularized below in [Table 2.2](#).

Table 2.2: Existing Peak Flow Rates and Allowable Discharge Rate (Elizabeth Street North)

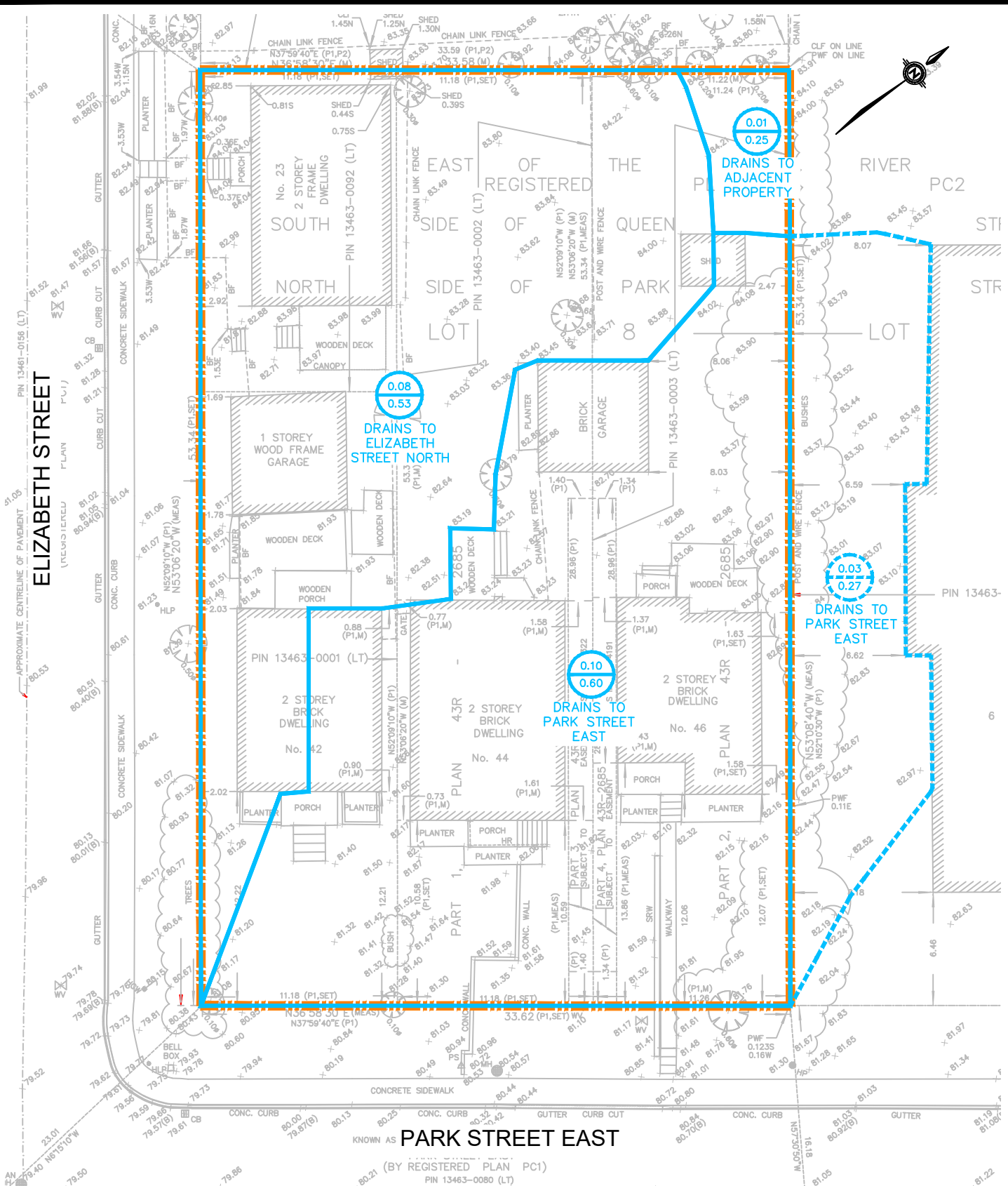
RETURN PERIOD	RUNOFF COEFFICIENT, C*	RAINFALL INTENSITY, I (mm/hr)	EXISTING PEAK FLOW RATE, Q (L/s)	ALLOWABLE FLOW RATE, Q (L/s)
2-Year	0.50	59.89	6.50	6.50
5-Year	0.50	80.51	8.74	
10-Year	0.50	99.17	10.77	
25-Year	0.55	113.89	13.60	
50-Year	0.60	127.13	16.56	
100-Year	0.63	140.69	19.09	

**Maximum runoff coefficient of 0.50 used to compute allowable flow rates; Adjustment factors of 1.1, 1.2, 1.25 applied to 25-year, 50-year and 100-year return periods, respectively*

Table 2.3: Existing Peak Flow Rates and Allowable Discharge Rate (Park Street East)

RETURN PERIOD	RUNOFF COEFFICIENT, C*	RAINFALL INTENSITY, I (mm/hr)	PEAK FLOW RATE, Q (L/s)	ALLOWABLE FLOW RATE, Q (L/s)
2-Year	0.50	59.89	8.03	8.03
5-Year	0.50	80.51	10.80	
10-Year	0.50	99.17	13.30	
25-Year	0.55	113.89	16.80	
50-Year	0.60	127.13	20.46	
100-Year	0.63	140.69	23.59	


*Maximum runoff coefficient of 0.50 used to compute allowable flow rates; Adjustment factors of 1.1, 1.2, 1.25 applied to 25-year, 50-year and 100-year return periods, respectively



LEGEND

- PROPERTY BOUNDARY
- CATCHMENT BOUNDARY
- EXTERNAL CATCHMENT BOUNDARY
- CARTCHMENT AREA
- RUNOFF COEFFICIENT

CLIENT	EDENSHAW ELIZABETH DEVELOPMENTS LIMITED
TITLE	23 ELIZABETH STREET NORTH
EXISTING CONDITIONS	



6415 Northwest Dr.
Mississauga, ON Canada
L4V 1X1
Office (905) 677-0202
E-mail admin@envisionconsultants.ca

Checked	M.B.	Drawn	V.L.
Date	MAY 2025	Proj. No.	25-0893
Scale	1:300	Figure No.	2

3. PROPOSED CONDITIONS

3.1. GENERAL

The proposed development consists of a 35-storey residential high-rise with associated outdoor amenity, softscape, and pedestrian walkway areas. Vehicular access to the Site is provided via Park Street East on the west side of the property. The proposed Site will convey flows to a stormwater cistern, which will outlet to Park Street East. Post-development conditions and stormwater catchments can be found in **Figure 3**. Proposed land-use types and associated runoff coefficients are shown below in **Table 3.1**.

Table 3.1: Proposed Area Breakdown

LAND-USE	AREA (m ²)	RUNOFF COEFFICIENT, C	% IMPERVIOUS
Roof Surface	915	0.90	100%
Amenity (Impervious)	481	0.90	100%
Amenity (Softscape)	93	0.25	0%
Impervious At-Grade	80	0.90	100%
Softscape At-Grade	190	0.25	0%
Uncontrolled Area	21	0.90	100%
Conveyed Lands (U/C)	17	0.25	0%
Total Site Area	1,792	0.79	81%
External Area	296	0.25	0%
Total Drainage Area	2,088	0.72	72%

3.2. WATER QUANTITY

As the proposed site will outlet flows to Park Street East, the target discharge rate to the municipal storm system from the site for the 2-year event is 8.03 L/s. Storm events with greater return periods shall be controlled to the 2-year level due to conservatively assumed downstream capacity. The allowable flow rate was computed using a maximum runoff coefficient of 0.50, as discussed in Section 2.3.

A proposed stormwater cistern is located within the underground parking structure to meet water quantity requirements for the Site. The cistern is designed with a footprint of 39 m² and a height of 4.0 m providing a total volume of 156 m³. A pump is proposed with a maximum discharge rate of 330 L/min (5.5

L/s) that will start discharging flows when the water level reaches 0.30 m above the base of the cistern. This sump height will provide a volume of 11.7 m³ for water balance purposes. The cistern will control runoff produced on the property as well as a portion of external area from an adjacent property that flows into the subject Site. Additionally, a constant groundwater flow is proposed to discharge directly to the municipal sewer. This flow was accounted for in the hydrologic model, found in [Appendix B](#).

A HydroCAD model of the project was developed and utilized to determine the required storage volume for the Site, and to calculate discharge rates achieved by the proposed flow controls for all storm events. The Modified Rational Method (a subroutine of the HydroCAD software) has been used for this modelling exercise. Adjustment factors of 1.1, 1.2, and 1.25 were applied to runoff coefficients of sub catchments for the 25-, 50-, and 100-year storm events, respectively.

Modelling results of the post-development condition for all storm events are summarized below, in [Table 3.2](#) and [Table 3.3](#). Full HydroCAD model output is provided in [Appendix B](#).

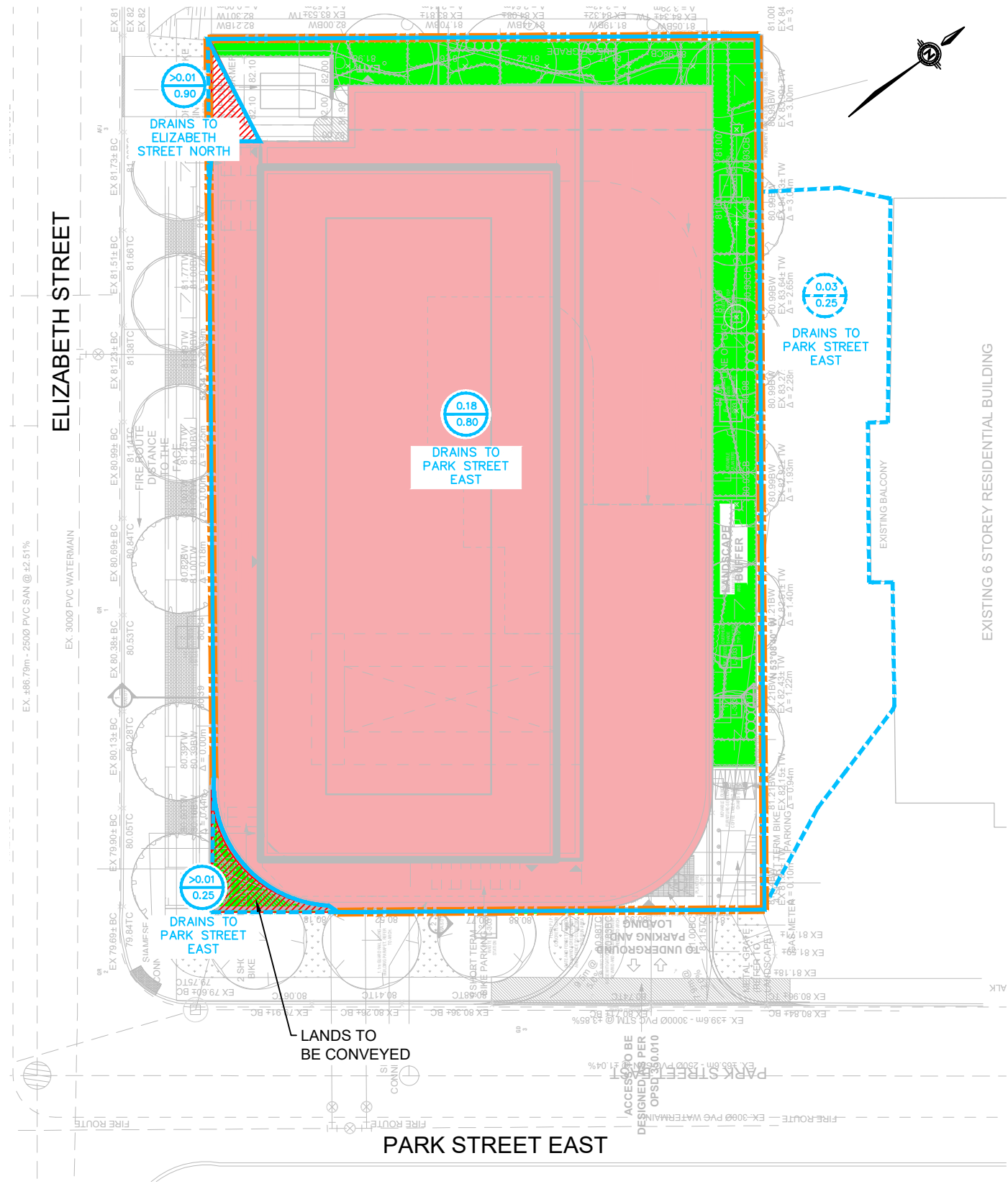
Table 3.2: Summary of Modelling Results – Cistern

STORM EVENT	PEAK ELEVATION IN CISTERN (m)	UTILIZED STORAGE* (m³)	PEAK FLOW RATE (L/s)
2-Year	0.654	23.1	5.50
5-Year	0.841	35.0	5.50
10-Year	1.014	46.0	5.50
25-Year	1.591	62.1	5.50
50-Year	1.851	72.2	5.50
100-Year	2.121	82.7	5.50

*Utilized storage volumes are modelled including a full sump volume.

Table 3.3: Summary of Modelling Results – Total Site Flows


STORM EVENT	FLOWS TO PARK ST. E VIA CISTERN (L/s)	ALLOWABLE FLOW RATE TO PARK ST. E (L/s)	FLOWS TO ELIZABETH ST. N UNCONTROLLED (L/s)	ALLOWABLE FLOW RATE TO ELIZABETH ST. N (L/s)
2-Year	5.50	8.03	0.2	6.50
5-Year	5.50		0.2	
10-Year	5.50		0.3	
25-Year	5.50		0.4	
50-Year	5.50		0.4	
100-Year	5.50		0.4	



LEGEND

- PROPERTY BOUNDARY
- CATCHMENT BOUNDARY
- EXTERNAL CATCHMENT BOUNDARY
- CATCHMENT AREA
- RUNOFF COEFFICIENT
- SOFTSCAPE AREA
- IMPERVIOUS ROOF
- UNCONTROLLED

CLIENT	EDENSHAW ELIZABETH DEVELOPMENTS LIMITED
TITLE	23 ELIZABETH STREET NORTH
PROPOSED CONDITIONS	



6415 Northwest Dr.
Mississauga, ON Canada
L4V 1X1
Office (905) 677-0202
E-mail admin@envisionconsultants.ca

Checked	M.B.	Drawn	V.L.
Date	MAY 2025	Proj. No.	25-0893
Scale	1:300	Figure No.	3



3.3. WATER QUALITY

Enhanced (Level 1) protection is required for the proposed development. As per the City of Mississauga SWM Guidelines, 80% total suspended solids (TSS) removal is required to meet this level of protection.

Majority of the proposed Site area is comprised of non-sediment generating surfaces such as roof, landscaping, and pedestrian walkways. These surfaces are considered to produce “clean” runoff in terms of TSS loading. The Site contains only about 9 m² of runoff-producing vehicular area which accounts for less than 1% of the total Site area. This area can be considered negligible – therefore, quality control will not be required.

3.4. RUNOFF VOLUME REDUCTION (WATER BALANCE)

Per City of Mississauga Requirements, the first 5 mm of runoff shall be retained onsite and managed in the form of infiltration, evapotranspiration, re-use or filtration. The Site includes 202 m² of softscape for green infrastructure and water balance. It is assumed that soft landscaping areas an abstract 5mm of rainfall, where the retained volume will be returned to the atmosphere by way of evapotranspiration. The remainder of the Site are impervious areas which are assumed to have an initial abstraction of 0 mm. A summary of land-use types and abstracted volume for the 5 mm storm event can be found in Table 3.3.

Table 3.4: Proposed Land-Use Water Balance Breakdown

LAND-USE	AREA (m ²)	INITIAL ABSTRACTION (m)	VOLUME ABSTRACTED (m ³)	5 mm VOLUME (m ³)	WATER BALANCE (m ³)
Roof Area	915	0.000	0.0	4.6	4.6
Amenity (Impervious)	481	0.000	0.0	2.4	2.4
Amenity (Softscape)	93	0.005	0.5	0.5	0.0
Impervious At-Grade	101	0.000	0.0	0.5	0.5
Softscape At-Grade	202	0.005	1.0	1.0	0.0
Total Site Area	1,792	-	1.5	9.0	7.5

The cistern provides a total sump volume of 11.7 m³ which is greater than the required water balance volume of 7.5 m³. As this development proposes an underground parking structure spanning most of the site, water re-use via infiltration is not practical. Water re-use via irrigation is most practical as the Site contains 202 m² of softscape area.



3.5. EROSION CONTROL

The City of Mississauga Development Guidelines state no particular requirement for erosion control; however, it is mentioned that the implementation of runoff volume reduction strategies will assist in mitigating erosive forces from stormwater runoff on streams and watercourses during frequent storms. Erosion control during construction is outlined in the Erosion and Sediment Control Plan provided in the FSR.

4. CLOSING

4.1. CONCLUSIONS

Based on the information obtained through the stormwater management analysis, EnVision presents the following conclusions and recommendations for the proposed development at 23 Elizabeth Street North & 42 – 46 Park Street East.

4.1.1. *QUANTITY CONTROL*

The stormwater cistern is designed with a total available storage of 156 m³ and flows will outlet to municipal sewer via mechanical pump with a maximum discharge rate of 5.5 L/s. The cistern will control post-development flows for the 2- through 100-year storms to the pre-development 2-year level of.

4.1.2. *QUALITY CONTROL*

As the site is mostly composed of areas that produce “clean” runoff, and the total vehicular area accounts for less than 1% of the total Site area, quality control will not be required for this Site.

4.1.3. *RUNOFF VOLUME REDUCTION (WATER BALANCE)*

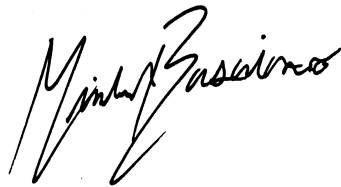
The Site is required to retain the runoff volume from a 5 mm rainfall event, which is equal to 7.5 m². A sump volume of 11.7 m³ is provided in the stormwater cistern for re-use.

4.1.4. *EROSION CONTROL*

No particular erosion control methods are stated in the City of Mississauga Development Guidelines outside of the water balance requirements. Erosion and sediment control measures will be applied during construction.

4.2. CERTIFICATION AND SIGNATURES

Prepared by



Michael Basciano, EIT
Designer – Land Development
mbasciano@envisionconsultants.ca

Reviewed by



Alex Williams, P.Eng.
Director – Land Development
awilliams@envisionconsultants.ca

4.3. QUALIFIER

EnVision prepared this report solely for the use of the intended recipient in accordance with the professional services agreement. In the event a contract has not been executed, the parties agree that the EnVision General Terms and Conditions, which were provided prior to the preparation of this report, shall govern their business relationship.

The report is intended to be used in its entirety. No excerpts may be taken to be representative of the findings in the assessment. The conclusions presented in this report are based on work performed by trained, professional and technical staff, in accordance with their reasonable interpretation of current and accepted engineering and scientific practices at the time the work was performed.

The content and opinions contained in the report are based on the observations and/or information available to EnVision at the time of preparation, using investigation techniques and engineering analysis methods consistent with those ordinarily exercised by EnVision and other engineering/scientific practitioners working under similar conditions, and subject to the same time, financial and physical constraints applicable to this project.

EnVision disclaims any obligation to update this report if, after the date of this report, any conditions appear to differ significantly from those presented in this report; however, EnVision reserves the right to amend or supplement this report based on additional information, documentation or evidence.

EnVision makes no other representations whatsoever concerning the legal significance of its findings. The intended recipient is solely responsible for the disclosure of any information contained in this report. If a third party makes use of, relies on, or makes decisions in accordance with this report, said third party is solely responsible for such use, reliance or decisions. EnVision does not accept responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken by said third party based on this report.



EnVision has provided services to the intended recipient in accordance with the professional services agreement between the parties and in a manner consistent with that degree of care, skill and diligence normally provided by members of the same profession performing the same or comparable services in respect of projects of a similar nature in similar circumstances. It is understood and agreed by EnVision and the recipient of this report that EnVision provides no warranty, express or implied, of any kind. Without limiting the generality of the foregoing, it is agreed and understood by EnVision and the recipient of this report that EnVision makes no representation or warranty whatsoever as to the sufficiency of its scope of work for the purpose sought by the recipient of this report.

In preparing this report, EnVision has relied in good faith on information provided by others, as noted in the report. EnVision has reasonably assumed that the information provided is correct and EnVision is not responsible for the accuracy or completeness of such information.

Unless otherwise agreed in writing by EnVision, the Report shall not be used to express or imply warranty as to the suitability of the site for a particular purpose. EnVision disclaims any responsibility for consequential financial effects on transactions or property values, or requirements for follow-up actions or costs.

This limitations statement is considered an integral part of this report.



APPENDIX A:

Stormwater Management Calculations

Stormwater Management Calculations

Existing Peak Discharge Rate - to Elizabeth Street North

Rational Method is undertaken to calculate existing runoff rate:

$$Q = 0.0028CiA$$

Where: Q = Peak flow rate (cubic metres/second)

C = Runoff coefficient

i = Rainfall intensity (mm/hour)

A = Catchment area (hectares)

Existing land use types and area measurements for flows to Elizabeth Street North are as follows:

Existing Land Use	Area (m ²)	Runoff C	Coverage
Impervious Area	333	0.90	43%
Grass/Landscape	448	0.25	57%
Total:	781	0.53	100%

Catchment Area, A: **0.08** ha

Runoff Coefficient: **0.53**

Rainfall intensity is calculated as follows:

$$i = \frac{A}{(t_c + B)^C}$$

Where: i = Rainfall intensity (mm/hour)

t_c = Duration (minutes)

A, B, C = Parameters as defined in City of Mississauga Development Requirements Manual (page 8-1)

Return Period (Yrs)	2	5	10	25	50	100
A	610	820	1010	1160	1300	1450
B	4.6	4.6	4.6	4.6	4.7	4.9
C	0.78	0.78	0.78	0.78	0.78	0.78
Runoff Coefficient*	0.53	0.53	0.53	0.58	0.63	0.66
t _c (min)**	15	15	15	15	15	15
t _c (hrs)	0.250	0.250	0.250	0.250	0.250	0.250
i (mm/hr)	59.89	80.51	99.17	113.89	127.13	140.69
Q (L/sec)	6.85	9.21	11.35	14.34	17.46	20.13

*Adjustment factors of 1.1, 1.2 and 1.25 are applied to 25, 50 and 100-year events respectively, per City of Mississauga Development Requirements Manual (page 8-2)

**Recommended time of concentration is 15 minutes

Stormwater Management Calculations

Existing Peak Discharge Rate - to Park Street East

Rational Method is undertaken to calculate existing runoff rate:

$$Q = 0.0028CiA$$

Where: Q = Peak flow rate (cubic metres/second)

C = Runoff coefficient

i = Rainfall intensity (mm/hour)

A = Catchment area (hectares)

Existing land use types and area measurements for flows to Park Street East are as follows:

Existing Land Use	Area (m ²)	Runoff C	Coverage
Impervious Area	510	0.90	53%
Grass/Landscape	455	0.25	47%
Total:	965	0.59	100%

Catchment Area, A: **0.10** ha

Runoff Coefficient: **0.59**

Rainfall intensity is calculated as follows:

$$i = \frac{A}{(t_c + B)^C}$$

Where: i = Rainfall intensity (mm/hour)

t_c = Duration (minutes)

A, B, C = Parameters as defined in City of Mississauga Development Requirements Manual (page 8-1)

Return Period (Yrs)	2	5	10	25	50	100
A	610	820	1010	1160	1300	1450
B	4.6	4.6	4.6	4.6	4.7	4.9
C	0.78	0.78	0.78	0.78	0.78	0.78
Runoff Coefficient*	0.59	0.59	0.59	0.65	0.71	0.74
t _c (min)**	15	15	15	15	15	15
t _c (hrs)	0.250	0.250	0.250	0.250	0.250	0.250
i (mm/hr)	59.89	80.51	99.17	113.89	127.13	140.69
Q (L/sec)	9.54	12.82	15.79	19.95	24.29	28.00

*Adjustment factors of 1.1, 1.2 and 1.25 are applied to 25, 50 and 100-year events respectively, per City of Mississauga Development Requirements Manual (page 8-2)

**Recommended time of concentration is 15 minutes

Stormwater Management Calculations

Allowable Peak Discharge Rate - to Elizabeth Street North

Rational Method is undertaken to calculate existing runoff rate: $Q = 0.0028CiA$

Where: Q = Peak flow rate (cubic metres/second)
C = Runoff coefficient
i = Rainfall intensity (mm/hour)
A = Catchment area (hectares)

Existing land use types and area measurements for flows to Elizabeth Street North are as follows:

Existing Land Use	Area (m ²)	Runoff C	Coverage
Impervious Area	333	0.90	43%
Grass/Landscape	448	0.25	57%
Total:	781	0.53	100%

Catchment Area, A: **0.08** ha
Runoff Coefficient*: **0.50**

*Maximum Runoff coefficient of 0.50 used as per City of Mississauga Development Requirements (pg 8-22 note 2)

Rainfall intensity is calculated as follows: $i = \frac{A}{(t_c + B)^C}$

Where: i = Rainfall intensity (mm/hour)
t_c = Duration (minutes)

A, B, C = Parameters as defined in City of Mississauga Development Requirements Manual (page 8-1)

Return Period (Yrs)	2	5	10	25	50	100
A	610	820	1010	1160	1300	1450
B	4.6	4.6	4.6	4.6	4.7	4.9
C	0.78	0.78	0.78	0.78	0.78	0.78
Runoff Coefficient*	0.50	0.50	0.50	0.55	0.60	0.63
t _c (min)**	15	15	15	15	15	15
t _c (hrs)	0.250	0.250	0.250	0.250	0.250	0.250
i (mm/hr)	59.89	80.51	99.17	113.89	127.13	140.69
Q (L/sec)	6.50	8.74	10.77	13.60	16.56	19.09

*Adjustment factors of 1.1, 1.2 and 1.25 are applied to 25, 50 and 100-year events respectively, per City of Mississauga Development Requirements Manual (page 8-2)

**Recommended time of concentration is 15 minutes

Therefore, the proposed development shall limit flows to Elizabeth St. North to the pre-development 2-year level of 6.5 L/s.

Stormwater Management Calculations

Allowable Peak Discharge Rate - to Park Street East

Rational Method is undertaken to calculate existing runoff rate:

$$Q = 0.0028CiA$$

Where: Q = Peak flow rate (cubic metres/second)

C = Runoff coefficient

i = Rainfall intensity (mm/hour)

A = Catchment area (hectares)

Existing land use types and area measurements for flows to Park Street East are as follows:

Existing Land Use	Area (m ²)	Runoff C	Coverage
Impervious Area	510	0.90	53%
Grass/Landscape	455	0.25	47%
Total:	965	0.59	100%

Catchment Area, A: **0.10** ha

Runoff Coefficient*: **0.50**

*Maximum Runoff coefficient of 0.50 used as per City of Mississauga Development Requirements (pg 8-22 note 2)

Rainfall intensity is calculated as follows:

$$i = \frac{A}{(t_c + B)^C}$$

Where: i = Rainfall intensity (mm/hour)

t_c = Duration (minutes)

A, B, C = Parameters as defined in City of Mississauga Development Requirements Manual (page 8-1)

Return Period (Yrs)	2	5	10	25	50	100
A	610	820	1010	1160	1300	1450
B	4.6	4.6	4.6	4.6	4.7	4.9
C	0.78	0.78	0.78	0.78	0.78	0.78
Runoff Coefficient*	0.50	0.50	0.50	0.55	0.60	0.63
t _c (min)**	15	15	15	15	15	15
t _c (hrs)	0.250	0.250	0.250	0.250	0.250	0.250
i (mm/hr)	59.89	80.51	99.17	113.89	127.13	140.69
Q (L/sec)	8.03	10.80	13.30	16.80	20.46	23.59

*Adjustment factors of 1.1, 1.2 and 1.25 are applied to 25, 50 and 100-year events respectively, per City of Mississauga Development Requirements Manual (page 8-2)

**Recommended time of concentration is 15 minutes

Therefore, the proposed development shall limit flows to Park St. East to the pre-development 2-year level of 8.03 L/s.

Stormwater Management Calculations

Water Balance Calculations

Proposed areas measurements and land use types are as follows:

Land Use	Area (m ²)	Runoff C	Impervious
Roof Area	915	0.90	100%
Amenity (Impervious)	481	0.90	100%
Amenity (Softscape)	93	0.25	0%
Impervious At-Grade	101	0.90	100%
Softscape At-Grade	202	0.25	0%
Total Area:	1,792	0.79	84%

For the purposes of water balance calculations, no initial abstraction is assumed for impervious surfaces.

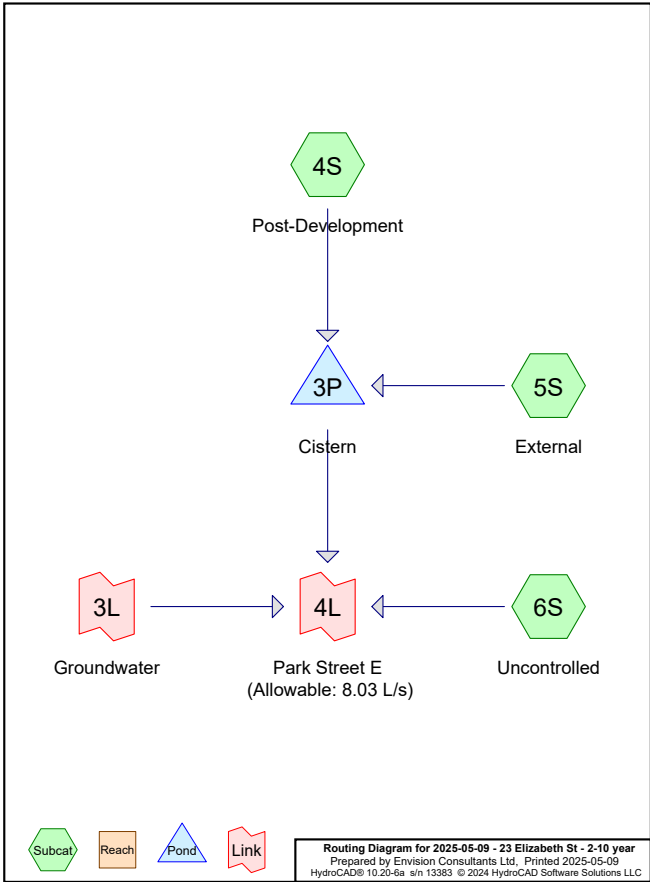
Surface Type	Area (m ²)	Initial Abstraction (m)	Volume Abstracted (m ³)	5mm Volume (m ³)	Water Balance (m ³)
Roof Area	915	0.000	0.0	4.6	4.6
Amenity (Impervious)	481	0.000	0.0	2.4	2.4
Amenity (Softscape)	93	0.005	0.5	0.5	0.0
Impervious At-Grade	101	0.000	0.0	0.5	0.5
Softscape At-Grade	202	0.005	1.0	1.0	0.0
Total Area:	1,792	-	1.5	9.0	7.5

Therefore, 7.5 m3 of runoff is produced from 5 mm of rainfall, and will need to be retained onsite.



APPENDIX B:

Hydrologic Model Output



2025-05-09 - 23 Elizabeth St - 2-10 year

Prepared by Envision Consultants Ltd
HydroCAD® 10.20-6a s/n 13383 © 2024 HydroCAD Software Solutions LLC

Printed 2025-05-09
Page 2

Area Listing (all nodes)

Area (sq-meters)	C	Description (subcatchment-numbers)
481.0	0.90	Amenity (Impervious) (4S)
93.0	0.25	Amenity (Softscape) (4S)
12.0	0.90	Conveyed Lands (6S)
296.0	0.25	External flow from adjacent property (5S)
71.0	0.90	Impervious At-Grade (4S)
915.0	0.90	Roof Area (4S)
190.0	0.25	Softscape At-Grade (4S)
21.0	0.90	Uncontrolled to Elizabeth Street N (6S)
9.0	0.90	Vehicular Surface (4S)
2,088.0	0.72	TOTAL AREA

2025-05-09 - 23 Elizabeth St -Canada-Mississauga 2-Year Duration=15 min, Inten=59.9 mm/hr
Prepared by Envision Consultants Ltd Printed 2025-05-09
HydroCAD® 10.20-6a s/n 13383 © 2024 HydroCAD Software Solutions LLC Page 3

Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 4S: Post-Development Runoff Area=1,759.0 m² 0.00% Impervious Runoff Depth=12 mm
Tc=15.0 min C=0.80 Runoff=0.0234 m³/s 21.1 m³

Subcatchment 5S: External Runoff Area=296.0 m² 0.00% Impervious Runoff Depth=4 mm
Tc=0.0 min C=0.25 Runoff=0.0012 m³/s 1.2 m³

Subcatchment 6S: Uncontrolled Runoff Area=33.0 m² 0.00% Impervious Runoff Depth=13 mm
Tc=15.0 min C=0.90 Runoff=0.0005 m³/s 0.4 m³

Pond 3P: Cistern Peak Elev=0.654 m Storage=25.5 m³ Inflow=0.0247 m³/s 22.2 m³
Outflow=0.0055 m³/s 22.2 m³

Link 3L: Groundwater Manual Hydrograph Inflow=0.0006 m³/s 13.0 m³
Primary=0.0006 m³/s 13.0 m³

Link 4L: Park Street E (Allowable: 8.03 L/s) Inflow=0.0066 m³/s 35.6 m³
Primary=0.0066 m³/s 35.6 m³

Total Runoff Area = 2,088.0 m² Runoff Volume = 22.7 m³ Average Runoff Depth = 11 mm
100.00% Pervious = 2,088.0 m² 0.00% Impervious = 0.0 m²

2025-05-09 - 23 Elizabeth St -Canada-Mississauga 2-Year Duration=15 min, Inten=59.9 mm/hr
Prepared by Envision Consultants Ltd Printed 2025-05-09
HydroCAD® 10.20-6a s/n 13383 © 2024 HydroCAD Software Solutions LLC Page 4

Summary for Subcatchment 4S: Post-Development

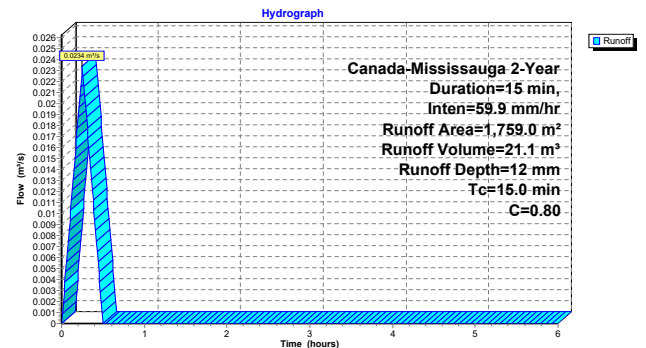
Runoff = 0.0234 m³/s @ 0.25 hrs, Volume= 21.1 m³, Depth= 12 mm
Routed to Pond 3P : Cistern

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Canada-Mississauga 2-Year Duration=15 min, Inten=59.9 mm/hr

Area (m ²)	C	Description
915.0	0.90	Roof Area
481.0	0.90	Amenity (Impervious)
93.0	0.25	Amenity (Softscape)
9.0	0.90	Vehicular Surface
71.0	0.90	Impervious At-Grade
190.0	0.25	Softscape At-Grade
1,759.0	0.80	Weighted Average
1,759.0		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m ³ /s)	Description
15.0					Direct Entry,

Subcatchment 4S: Post-Development



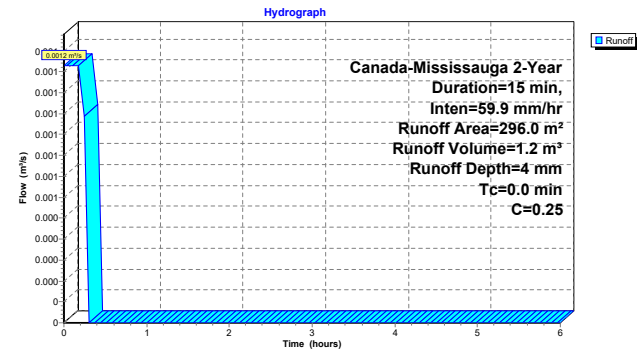
Summary for Subcatchment 5S: External

Runoff = 0.0012 m³/s @ 0.00 hrs, Volume= 1.2 m³, Depth= 4 mm
Routed to Pond 3P : Cistern

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Canada-Mississauga 2-Year Duration=15 min, Inten=59.9 mm/hr

Area (m²)	C	Description
296.0	0.25	External flow from adjacent property
296.0	100.00%	Pervious Area

Subcatchment 5S: External



Summary for Subcatchment 6S: Uncontrolled

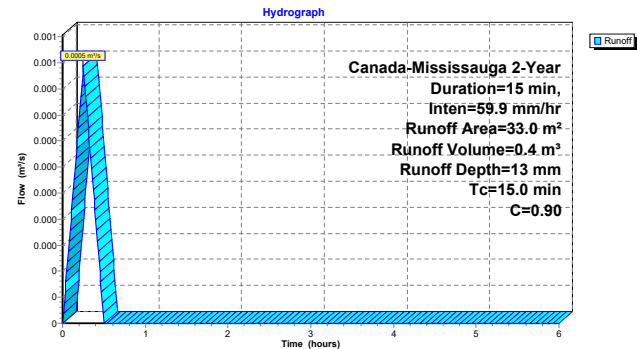
Runoff = 0.0005 m³/s @ 0.25 hrs, Volume= 0.4 m³, Depth= 13 mm
Routed to Link 4L : Park Street E (Allowable: 8.03 L/s)

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Canada-Mississauga 2-Year Duration=15 min, Inten=59.9 mm/hr

Area (m²)	C	Description
21.0	0.90	Uncontrolled to Elizabeth Street N
12.0	0.90	Conveyed Lands
33.0	0.90	Weighted Average
33.0	100.00%	Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
15.0					Direct Entry,

Subcatchment 6S: Uncontrolled



Summary for Pond 3P: Cistern

Inflow Area = 2,055.0 m², 0.00% Impervious, Inflow Depth = 11 mm for 2-Year event
Inflow = 0.0247 m³/s @ 0.25 hrs, Volume= 22.2 m³
Outflow = 0.0055 m³/s @ 0.09 hrs, Volume= 22.2 m³, Atten= 78%, Lag= 0.0 min
Primary = 0.0055 m³/s @ 0.09 hrs, Volume= 22.2 m³
Routed to Link 4L : Park Street E (Allowable: 8.03 L/s)

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Starting Elev= 0.300 m Surf.Area= 39.0 m² Storage= 11.7 m³
Peak Elev= 0.654 m @ 0.44 hrs Surf.Area= 39.0 m² Storage= 25.5 m³ (13.8 m³ above start)

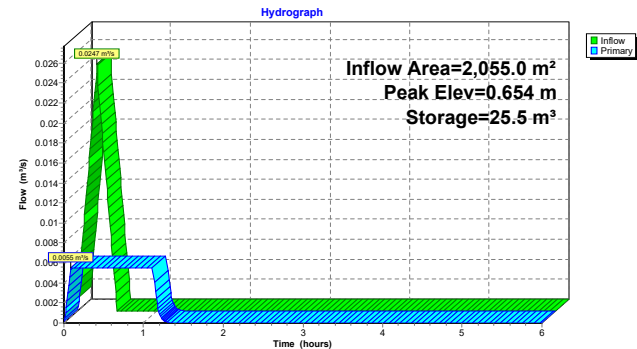
Plug-Flow detention time= 45.1 min calculated for 10.5 m³ (47% of inflow)
Center-of-Mass det. time= 21.8 min (36.4 - 14.6)

Volume	Invert	Avail. Storage	Storage Description
#1	0.000 m	156.0 m³	1.00 mW x 39.00 mL x 4.00 mH Prismatoid

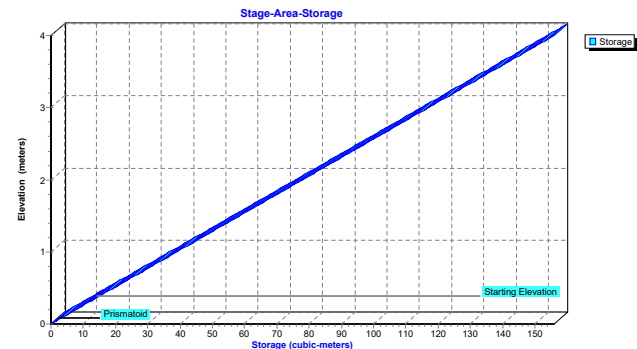
Device	Routing	Invert	Outlet Devices
#1	Primary	0.300 m	Pump Discharges@0.000 m Flow (l/min)= 329.9 330.0 Head (meters)= 4.000 0.000

Primary OutFlow Max=0.0055 m³/s @ 0.09 hrs HW=0.323 m (Free Discharge)
1=Pump (Pump Controls 0.0055 m³/s)

Pond 3P: Cistern



Pond 3P: Cistern

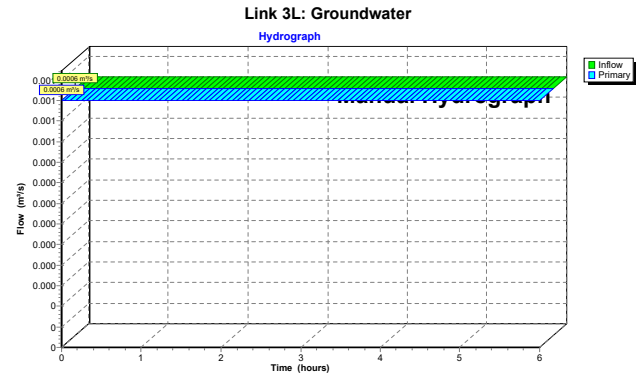


Stage-Area-Storage for Pond 3P: Cistern

Elevation (meters)	Storage (cubic-meters)	Elevation (meters)	Storage (cubic-meters)
0.000	0.0	2.600	101.4
0.050	2.0	2.650	103.3
0.100	3.9	2.700	105.3
0.150	5.8	2.750	107.3
0.200	7.8	2.800	109.2
0.250	9.8	2.850	111.2
0.300	11.7	2.900	113.1
0.350	13.7	2.950	115.1
0.400	15.6	3.000	117.0
0.450	17.6	3.050	119.0
0.500	19.5	3.100	120.9
0.550	21.5	3.150	122.8
0.600	23.4	3.200	124.8
0.650	25.4	3.250	126.8
0.700	27.3	3.300	128.7
0.750	29.3	3.350	130.7
0.800	31.2	3.400	132.6
0.850	33.1	3.450	134.6
0.900	35.1	3.500	136.5
0.950	37.1	3.550	138.5
1.000	39.0	3.600	140.4
1.050	41.0	3.650	142.3
1.100	42.9	3.700	144.3
1.150	44.9	3.750	146.3
1.200	46.8	3.800	148.2
1.250	48.8	3.850	150.2
1.300	50.7	3.900	152.1
1.350	52.7	3.950	154.1
1.400	54.6	4.000	156.0
1.450	56.5		
1.500	58.5		
1.550	60.5		
1.600	62.4		
1.650	64.4		
1.700	66.3		
1.750	68.3		
1.800	70.2		
1.850	72.2		
1.900	74.1		
1.950	76.0		
2.000	78.0		
2.050	79.9		
2.100	81.9		
2.150	83.8		
2.200	85.8		
2.250	87.8		
2.300	89.7		
2.350	91.7		
2.400	93.6		
2.450	95.6		
2.500	97.5		
2.550	99.5		

Summary for Link 3L: Groundwater

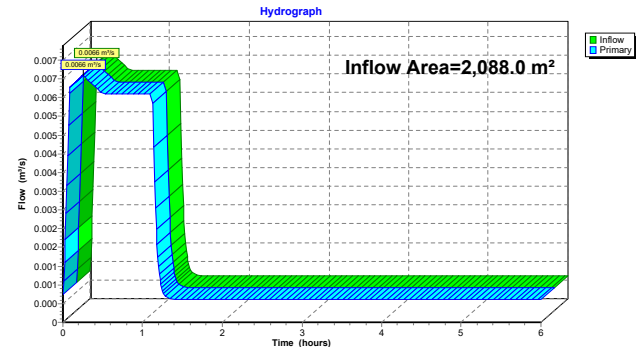
Inflow = 0.0006 m³/s @ 0.00 hrs, Volume= 13.0 m³
Primary = 0.0006 m³/s @ 0.00 hrs, Volume= 13.0 m³, Atten= 0%, Lag= 0.0 min
Routed to Link 4L : Park Street E (Allowable: 8.03 L/s)
Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
7 Point manual hydrograph, To= 0.00 hrs, dt= 1.00 hrs, m³/s =
0.0006 0.0006 0.0006 0.0006 0.0006 0.0006 0.0006



Summary for Link 4L: Park Street E (Allowable: 8.03 L/s)

Inflow Area = 2,088.0 m², 0.00% Impervious, Inflow Depth > 17 mm for 2-Year event
Inflow = 0.0066 m³/s @ 0.25 hrs, Volume= 35.6 m³
Primary = 0.0066 m³/s @ 0.25 hrs, Volume= 35.6 m³, Atten= 0%, Lag= 0.0 min
Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

Link 4L: Park Street E (Allowable: 8.03 L/s)



Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment4S: Post-Development Runoff Area=1,759.0 m² 0.00% Impervious Runoff Depth=16 mm
Tc=15.0 min C=0.80 Runoff=0.0315 m³/s 28.3 m³

Subcatchment5S: External Runoff Area=296.0 m² 0.00% Impervious Runoff Depth=5 mm
Tc=0.0 min C=0.25 Runoff=0.0017 m³/s 1.5 m³

Subcatchment6S: Uncontrolled Runoff Area=33.0 m² 0.00% Impervious Runoff Depth=18 mm
Tc=15.0 min C=0.90 Runoff=0.0007 m³/s 0.6 m³

Pond 3P: Cistern Peak Elev=0.841 m Storage=32.8 m³ Inflow=0.0332 m³/s 29.9 m³
Outflow=0.0055 m³/s 29.9 m³

Link 3L: Groundwater Manual Hydrograph Inflow=0.0006 m³/s 13.0 m³
Primary=0.0006 m³/s 13.0 m³

Link 4L: Park Street E (Allowable: 8.03 L/s) Inflow=0.0068 m³/s 43.5 m³
Primary=0.0068 m³/s 43.5 m³

Total Runoff Area = 2,088.0 m² Runoff Volume = 30.5 m³ Average Runoff Depth = 15 mm
100.00% Pervious = 2,088.0 m² 0.00% Impervious = 0.0 m²

Summary for Subcatchment 4S: Post-Development

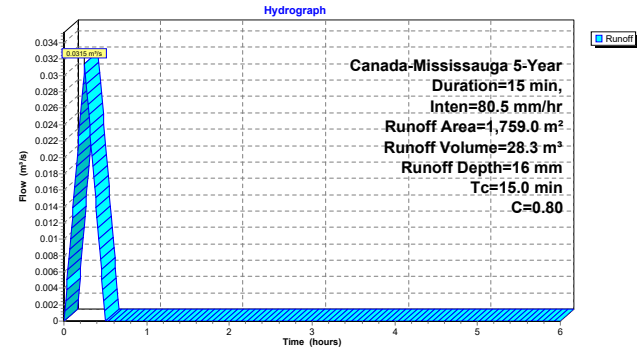
Runoff = 0.0315 m³/s @ 0.25 hrs, Volume= 28.3 m³, Depth= 16 mm
Routed to Pond 3P : Cistern

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Canada-Mississauga 5-Year Duration=15 min, Inten=80.5 mm/hr

Area (m²)	C	Description
915.0	0.90	Roof Area
481.0	0.90	Amenity (Impervious)
93.0	0.25	Amenity (Softscape)
9.0	0.90	Vehicular Surface
71.0	0.90	Impervious At-Grade
190.0	0.25	Softscape At-Grade
1,759.0	0.80	Weighted Average
1,759.0		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
15.0					Direct Entry,

Subcatchment 4S: Post-Development



Summary for Subcatchment 6S: Uncontrolled

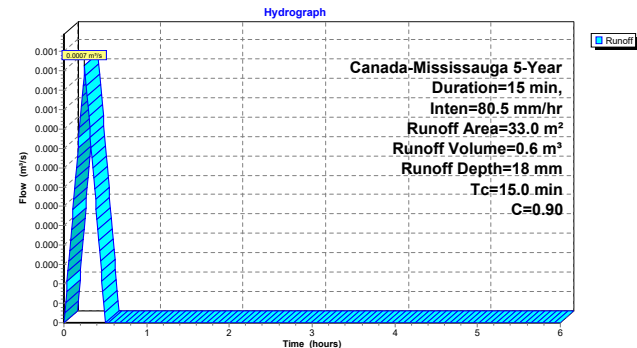
Runoff = 0.0007 m³/s @ 0.25 hrs, Volume= 0.6 m³, Depth= 18 mm
Routed to Link 4L : Park Street E (Allowable: 8.03 L/s)

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Canada-Mississauga 5-Year Duration=15 min, Inten=80.5 mm/hr

Area (m²)	C	Description
21.0	0.90	Uncontrolled to Elizabeth Street N
12.0	0.90	Conveyed Lands
33.0	0.90	Weighted Average
33.0		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
15.0					Direct Entry,

Subcatchment 6S: Uncontrolled



Summary for Pond 3P: Cistern

Inflow Area = 2,055.0 m², 0.00% Impervious, Inflow Depth = 15 mm for 5-Year event
Inflow = 0.0332 m³/s @ 0.25 hrs, Volume= 29.9 m³
Outflow = 0.0055 m³/s @ 0.07 hrs, Volume= 29.9 m³, Atten= 83%, Lag= 0.0 min
Primary = 0.0055 m³/s @ 0.07 hrs, Volume= 29.9 m³
Routed to Link 4L : Park Street E (Allowable: 8.03 L/s)

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Starting Elev= 0.300 m Surf.Area= 39.0 m² Storage= 11.7 m³
Peak Elev= 0.841 m @ 0.46 hrs Surf.Area= 39.0 m² Storage= 32.8 m³ (21.1 m³ above start)

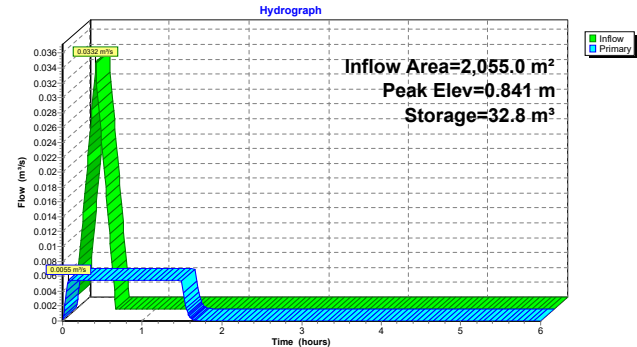
Plug-Flow detention time= 54.7 min calculated for 18.1 m³ (61% of inflow)
Center-of-Mass det. time= 32.8 min (47.4 - 14.6)

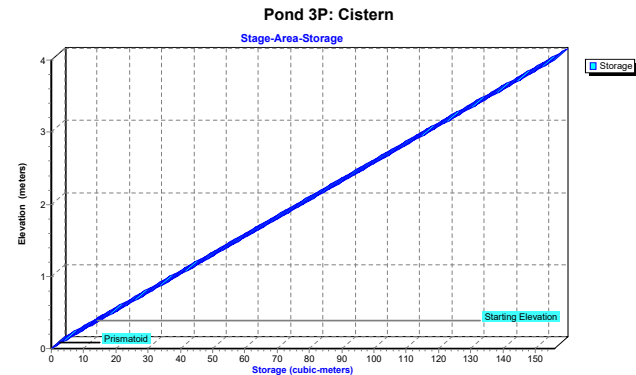
Volume	Invert	Avail.Storage	Storage	Description
#1	0.000 m	156.0 m³	1.00 mW x 39.00 mL x 4.00 mH	Prismatoid

Device	Routing	Invert	Outlet Devices
#1	Primary	0.300 m	Pump Discharges@ 0.000 m Flow (l/min)= 329.9 330.0 Head (meters)= 4.000 0.000

Primary OutFlow Max=0.0055 m³/s @ 0.07 hrs HW=0.322 m (Free Discharge)
1=Pump (Pump Controls 0.0055 m³/s)

Pond 3P: Cistern





Stage-Area-Storage for Pond 3P: Cistern

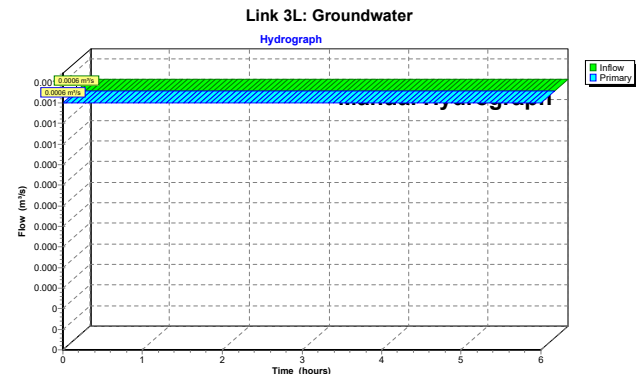
Elevation (meters)	Storage (cubic-meters)	Elevation (meters)	Storage (cubic-meters)
0.000	0.0	2.600	101.4
0.050	2.0	2.650	103.3
0.100	3.9	2.700	105.3
0.150	5.8	2.750	107.3
0.200	7.8	2.800	109.2
0.250	9.8	2.850	111.2
0.300	11.7	2.900	113.1
0.350	13.7	2.950	115.1
0.400	15.6	3.000	117.0
0.450	17.6	3.050	119.0
0.500	19.5	3.100	120.9
0.550	21.5	3.150	122.8
0.600	23.4	3.200	124.8
0.650	25.4	3.250	126.8
0.700	27.3	3.300	128.7
0.750	29.3	3.350	130.7
0.800	31.2	3.400	132.6
0.850	33.1	3.450	134.6
0.900	35.1	3.500	136.5
0.950	37.1	3.550	138.5
1.000	39.0	3.600	140.4
1.050	41.0	3.650	142.3
1.100	42.9	3.700	144.3
1.150	44.9	3.750	146.3
1.200	46.8	3.800	148.2
1.250	48.8	3.850	150.2
1.300	50.7	3.900	152.1
1.350	52.7	3.950	154.1
1.400	54.6	4.000	156.0
1.450	56.5		
1.500	58.5		
1.550	60.5		
1.600	62.4		
1.650	64.4		
1.700	66.3		
1.750	68.3		
1.800	70.2		
1.850	72.2		
1.900	74.1		
1.950	76.0		
2.000	78.0		
2.050	79.9		
2.100	81.9		
2.150	83.8		
2.200	85.8		
2.250	87.8		
2.300	89.7		
2.350	91.7		
2.400	93.6		
2.450	95.6		
2.500	97.5		
2.550	99.5		

Summary for Link 3L: Groundwater

Inflow = 0.0006 m³/s @ 0.00 hrs, Volume= 13.0 m³
Primary = 0.0006 m³/s @ 0.00 hrs, Volume= 13.0 m³, Atten= 0%, Lag= 0.0 min
Routed to Link 4L : Park Street E (Allowable: 8.03 L/s)

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

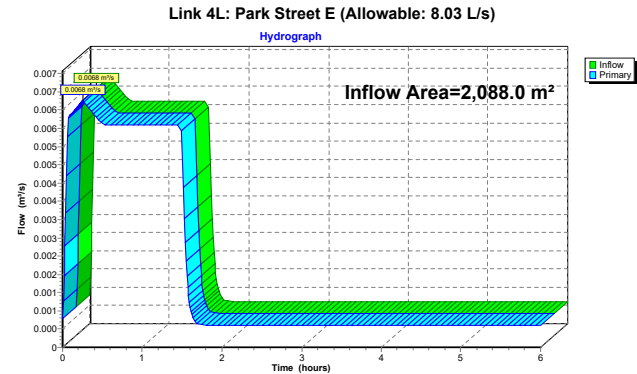
7 Point manual hydrograph, To= 0.00 hrs, dt= 1.00 hrs, m³/s =
0.0006 0.0006 0.0006 0.0006 0.0006 0.0006 0.0006



Summary for Link 4L: Park Street E (Allowable: 8.03 L/s)

Inflow Area = 2,088.0 m², 0.00% Impervious, Inflow Depth > 21 mm for 5-Year event
Inflow = 0.0068 m³/s @ 0.25 hrs, Volume= 43.5 m³
Primary = 0.0068 m³/s @ 0.25 hrs, Volume= 43.5 m³, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs



Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment4S: Post-Development Runoff Area=1,759.0 m² 0.00% Impervious Runoff Depth=20 mm
Tc=15.0 min C=0.80 Runoff=0.0388 m³/s 34.9 m³

Subcatchment5S: External Runoff Area=296.0 m² 0.00% Impervious Runoff Depth=6 mm
Tc=0.0 min C=0.25 Runoff=0.0020 m³/s 1.9 m³

Subcatchment6S: Uncontrolled Runoff Area=33.0 m² 0.00% Impervious Runoff Depth=22 mm
Tc=15.0 min C=0.90 Runoff=0.0008 m³/s 0.7 m³

Pond 3P: Cistern Peak Elev=1.014 m Storage=39.5 m³ Inflow=0.0409 m³/s 36.8 m³
Outflow=0.0055 m³/s 36.8 m³

Link 3L: Groundwater Manual Hydrograph Inflow=0.0006 m³/s 13.0 m³
Primary=0.0006 m³/s 13.0 m³

Link 4L: Park Street E (Allowable: 8.03 L/s) Inflow=0.0069 m³/s 50.5 m³
Primary=0.0069 m³/s 50.5 m³

Total Runoff Area = 2,088.0 m² Runoff Volume = 37.5 m³ Average Runoff Depth = 18 mm
100.00% Pervious = 2,088.0 m² 0.00% Impervious = 0.0 m²

Summary for Subcatchment 4S: Post-Development

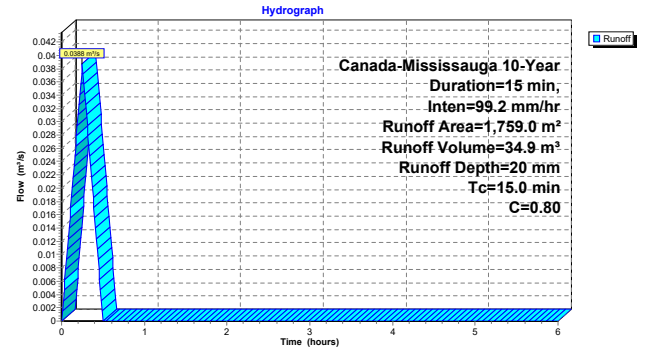
Runoff = 0.0388 m³/s @ 0.25 hrs, Volume= 34.9 m³, Depth= 20 mm
Routed to Pond 3P : Cistern

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Canada-Mississauga 10-Year Duration=15 min, Inten=99.2 mm/hr

Area (m²)	C	Description
915.0	0.90	Roof Area
481.0	0.90	Amenity (Impervious)
93.0	0.25	Amenity (Softscape)
9.0	0.90	Vehicular Surface
71.0	0.90	Impervious At-Grade
190.0	0.25	Softscape At-Grade
1,759.0	0.80	Weighted Average
1,759.0		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
15.0					Direct Entry,

Subcatchment 4S: Post-Development



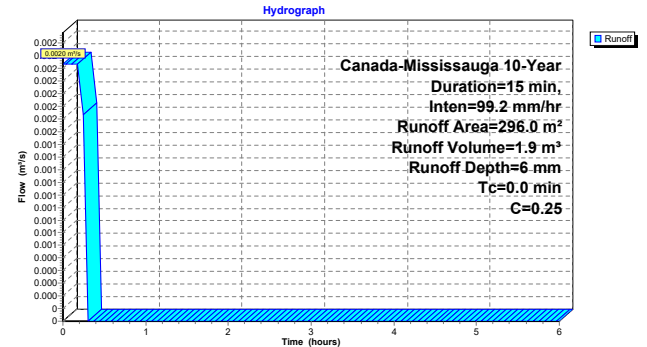
Summary for Subcatchment 5S: External

Runoff = 0.0020 m³/s @ 0.00 hrs, Volume= 1.9 m³, Depth= 6 mm
Routed to Pond 3P : Cistern

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Canada-Mississauga 10-Year Duration=15 min, Inten=99.2 mm/hr

Area (m²)	C	Description
296.0	0.25	External flow from adjacent property
296.0		100.00% Pervious Area

Subcatchment 5S: External



Summary for Subcatchment 6S: Uncontrolled

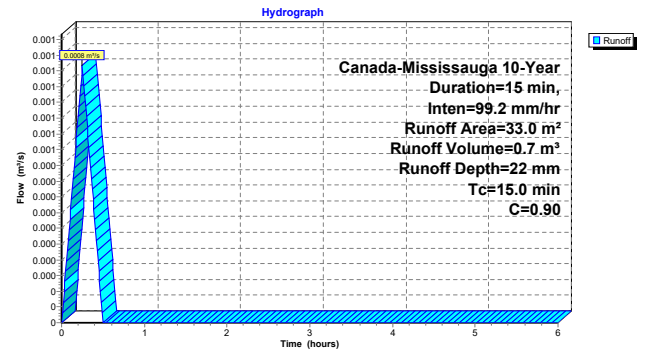
Runoff = 0.0008 m³/s @ 0.25 hrs, Volume= 0.7 m³, Depth= 22 mm
Routed to Link 4L : Park Street E (Allowable: 8.03 L/s)

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Canada-Mississauga 10-Year Duration=15 min, Inten=99.2 mm/hr

Area (m²)	C	Description
21.0	0.90	Uncontrolled to Elizabeth Street N
12.0	0.90	Conveyed Lands
33.0	0.90	Weighted Average
33.0		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
15.0					Direct Entry,

Subcatchment 6S: Uncontrolled



Summary for Pond 3P: Cistern

Inflow Area = 2,055.0 m², 0.00% Impervious, Inflow Depth = 18 mm for 10-Year event
Inflow = 0.0409 m³/s @ 0.25 hrs, Volume= 36.8 m³
Outflow = 0.0055 m³/s @ 0.06 hrs, Volume= 36.8 m³, Atten= 87%, Lag= 0.0 min
Primary = 0.0055 m³/s @ 0.06 hrs, Volume= 36.8 m³
Routed to Link 4L : Park Street E (Allowable: 8.03 L/s)

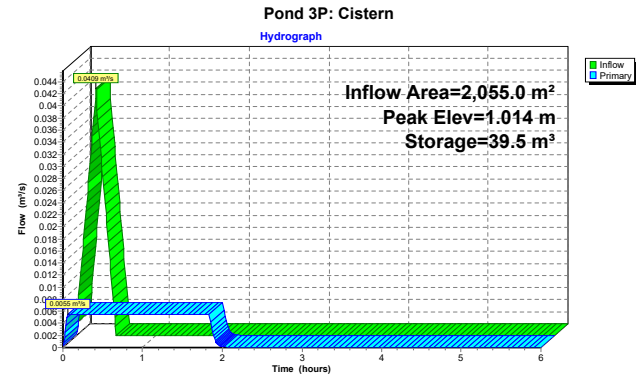
Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Starting Elev= 0.300 m Surf.Area= 39.0 m² Storage= 11.7 m³
Peak Elev= 1.014 m @ 0.46 hrs Surf.Area= 39.0 m² Storage= 39.5 m³ (27.8 m³ above start)

Plug-Flow detention time= 64.3 min calculated for 25.1 m³ (68% of inflow)
Center-of-Mass det. time= 43.0 min (57.6 - 14.6)

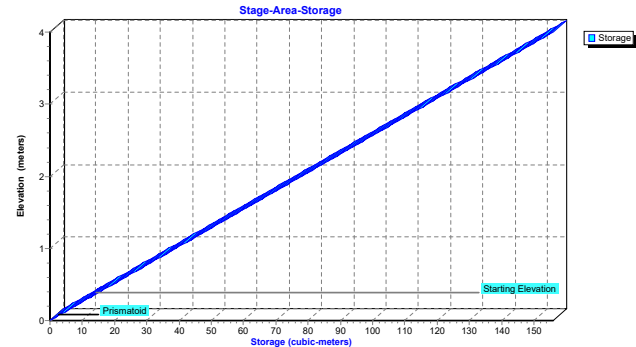
Volume	Invert	Avail. Storage	Storage Description
#1	0.000 m	156.0 m³	1.00 mW x 39.00 mL x 4.00 mH Prismatoid

Device	Routing	Invert	Outlet Devices
#1	Primary	0.300 m	Pump Discharges@0.000 m Flow (l/min)= 329.9 330.0 Head (meters)= 4.000 0.000

Primary OutFlow Max=0.0055 m³/s @ 0.06 hrs HW=0.323 m (Free Discharge)
1=Pump (Pump Controls 0.0055 m³/s)



Pond 3P: Cistern



Stage-Area-Storage for Pond 3P: Cistern

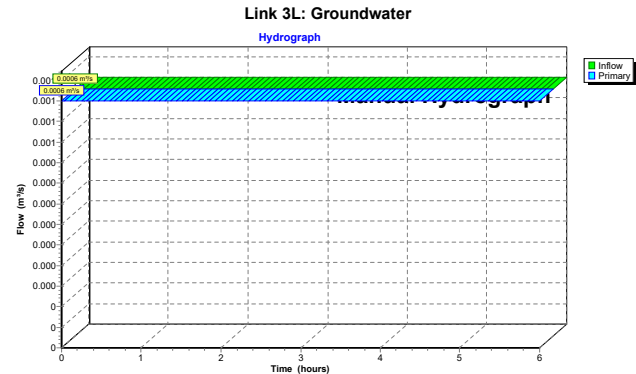
Elevation (meters)	Storage (cubic-meters)	Elevation (meters)	Storage (cubic-meters)
0.000	0.0	2.600	101.4
0.050	2.0	2.650	103.3
0.100	3.9	2.700	105.3
0.150	5.8	2.750	107.3
0.200	7.8	2.800	109.2
0.250	9.8	2.850	111.2
0.300	11.7	2.900	113.1
0.350	13.7	2.950	115.1
0.400	15.6	3.000	117.0
0.450	17.6	3.050	119.0
0.500	19.5	3.100	120.9
0.550	21.5	3.150	122.8
0.600	23.4	3.200	124.8
0.650	25.4	3.250	126.8
0.700	27.3	3.300	128.7
0.750	29.3	3.350	130.7
0.800	31.2	3.400	132.6
0.850	33.1	3.450	134.6
0.900	35.1	3.500	136.5
0.950	37.1	3.550	138.5
1.000	39.0	3.600	140.4
1.050	41.0	3.650	142.3
1.100	42.9	3.700	144.3
1.150	44.9	3.750	146.3
1.200	46.8	3.800	148.2
1.250	48.8	3.850	150.2
1.300	50.7	3.900	152.1
1.350	52.7	3.950	154.1
1.400	54.6	4.000	156.0
1.450	56.5		
1.500	58.5		
1.550	60.5		
1.600	62.4		
1.650	64.4		
1.700	66.3		
1.750	68.3		
1.800	70.2		
1.850	72.2		
1.900	74.1		
1.950	76.0		
2.000	78.0		
2.050	79.9		
2.100	81.9		
2.150	83.8		
2.200	85.8		
2.250	87.8		
2.300	89.7		
2.350	91.7		
2.400	93.6		
2.450	95.6		
2.500	97.5		
2.550	99.5		

Summary for Link 3L: Groundwater

Inflow = 0.0006 m³/s @ 0.00 hrs, Volume= 13.0 m³
Primary = 0.0006 m³/s @ 0.00 hrs, Volume= 13.0 m³, Atten= 0%, Lag= 0.0 min
Routed to Link 4L : Park Street E (Allowable: 8.03 L/s)

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

7 Point manual hydrograph, To= 0.00 hrs, dt= 1.00 hrs, m³/s =
0.0006 0.0006 0.0006 0.0006 0.0006 0.0006 0.0006

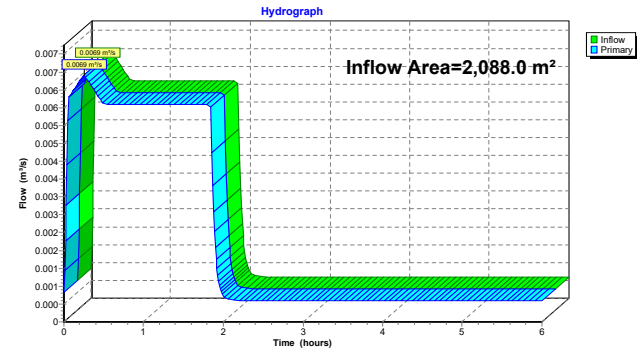


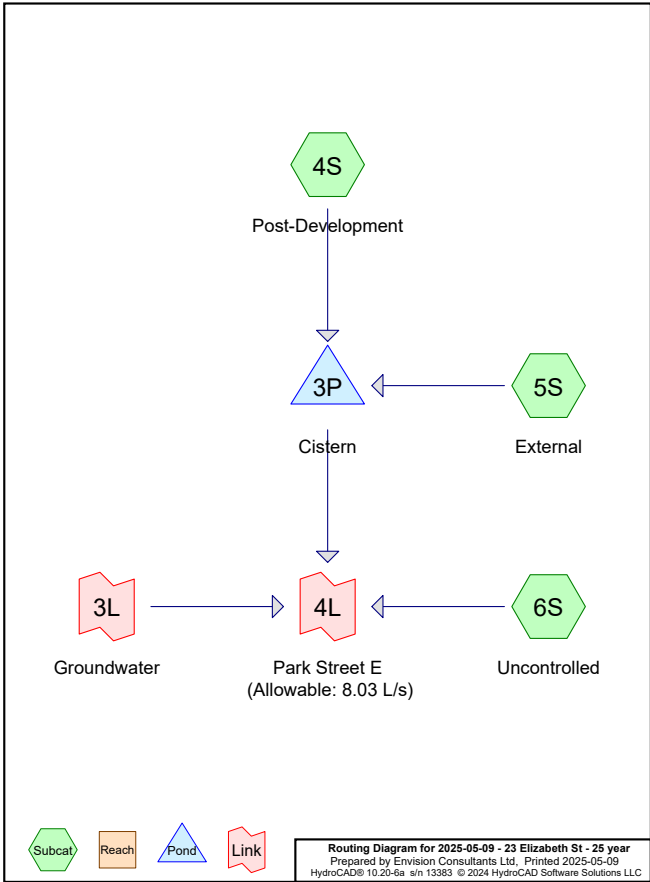
Summary for Link 4L: Park Street E (Allowable: 8.03 L/s)

Inflow Area = 2,088.0 m², 0.00% Impervious, Inflow Depth > 24 mm for 10-Year event
Inflow = 0.0069 m³/s @ 0.25 hrs, Volume= 50.5 m³
Primary = 0.0069 m³/s @ 0.25 hrs, Volume= 50.5 m³, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

Link 4L: Park Street E (Allowable: 8.03 L/s)





Area Listing (all nodes)		
Area (sq-meters)	C	Description (subcatchment-numbers)
481.0	0.99	Amenity (Impervious) (4S)
93.0	0.28	Amenity (Softscape) (4S)
12.0	0.99	Conveyed Lands (6S)
296.0	0.28	External flow from adjacent property (5S)
80.0	0.99	Impervious At-Grade (4S)
915.0	0.99	Roof Area (4S)
190.0	0.28	Softscape At-Grade (4S)
21.0	0.99	Uncontrolled (6S)
2,088.0	0.79	TOTAL AREA

Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 4S: Post-Development Runoff Area=1,759.0 m² 83.91% Impervious Runoff Depth=25 mm
Tc=15.0 min C=0.88 Runoff=0.0490 m³/s 44.1 m³

Subcatchment 5S: External Runoff Area=296.0 m² 0.00% Impervious Runoff Depth=8 mm
Tc=0.0 min C=0.28 Runoff=0.0026 m³/s 2.5 m³

Subcatchment 6S: Uncontrolled Runoff Area=33.0 m² 100.00% Impervious Runoff Depth=28 mm
Tc=15.0 min C=0.99 Runoff=0.0010 m³/s 0.9 m³

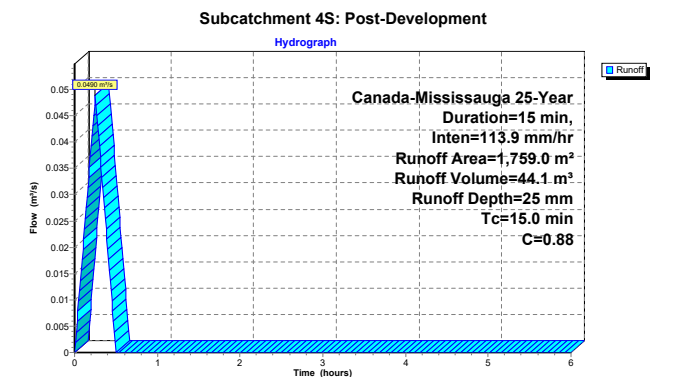
Pond 3P: Cistern Peak Elev=1.259 m Storage=49.1 m³ Inflow=0.0517 m³/s 46.5 m³
Outflow=0.0055 m³/s 46.5 m³

Link 3L: Groundwater Manual Hydrograph Inflow=0.0006 m³/s 13.0 m³
Primary=0.0006 m³/s 13.0 m³

Link 4L: Park Street E (Allowable: 8.03 L/s) Inflow=0.0071 m³/s 60.4 m³
Primary=0.0071 m³/s 60.4 m³

Total Runoff Area = 2,088.0 m² Runoff Volume = 47.5 m³ Average Runoff Depth = 23 mm
27.73% Pervious = 579.0 m² 72.27% Impervious = 1,509.0 m²

Summary for Subcatchment 4S: Post-Development				
Runoff	=	0.0490 m ³ /s @ 0.25 hrs, Volume=	44.1 m ³ , Depth=	25 mm
Routed to Pond 3P : Cistern				
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs Canada-Mississauga 25-Year Duration=15 min, Inten=113.9 mm/hr				
Area (m ²)	C	Description		
915.0	0.99	Roof Area		
481.0	0.99	Amenity (Impervious)		
93.0	0.28	Amenity (Softscape)		
80.0	0.99	Impervious At-Grade		
190.0	0.28	Softscape At-Grade		
1,759.0	0.88	Weighted Average		
283.0		16.09% Pervious Area		
1,476.0		83.91% Impervious Area		
Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m ³ /s)
15.0				



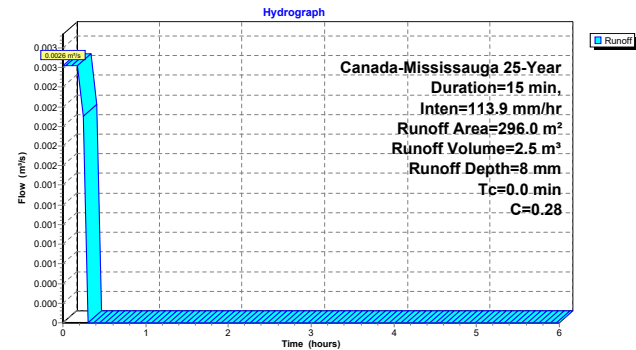
Summary for Subcatchment 5S: External

Runoff = 0.0026 m³/s @ 0.00 hrs, Volume= 2.5 m³, Depth= 8 mm
Routed to Pond 3P : Cistern

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Canada-Mississauga 25-Year Duration=15 min, Inten=113.9 mm/hr

Area (m²)	C	Description
296.0	0.28	External flow from adjacent property
296.0	100.00%	Pervious Area

Subcatchment 5S: External



Summary for Subcatchment 6S: Uncontrolled

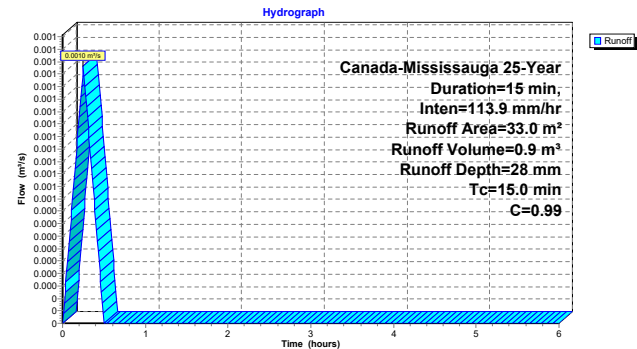
Runoff = 0.0010 m³/s @ 0.25 hrs, Volume= 0.9 m³, Depth= 28 mm
Routed to Link 4L : Park Street E (Allowable: 8.03 L/s)

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Canada-Mississauga 25-Year Duration=15 min, Inten=113.9 mm/hr

Area (m²)	C	Description
21.0	0.99	Uncontrolled
12.0	0.99	Conveyed Lands
33.0	0.99	Weighted Average
33.0	100.00%	Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
15.0					Direct Entry,

Subcatchment 6S: Uncontrolled



Summary for Pond 3P: Cistern

Inflow Area = 2,055.0 m², 71.82% Impervious, Inflow Depth = 23 mm for 25-Year event
Inflow = 0.0517 m³/s @ 0.25 hrs, Volume= 46.5 m³
Outflow = 0.0055 m³/s @ 0.05 hrs, Volume= 46.5 m³, Atten= 89%, Lag= 0.0 min
Primary = 0.0055 m³/s @ 0.05 hrs, Volume= 46.5 m³
Routed to Link 4L : Park Street E (Allowable: 8.03 L/s)

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Starting Elev= 0.300 m Surf.Area= 39.0 m² Storage= 11.7 m³
Peak Elev= 1.259 m @ 0.47 hrs Surf.Area= 39.0 m² Storage= 49.1 m³ (37.4 m³ above start)

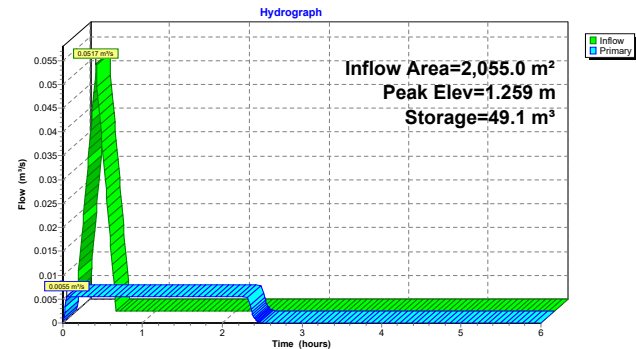
Plug-Flow detention time= 78.0 min calculated for 34.8 m³ (75% of inflow)
Center-of-Mass det. time= 57.4 min (72.0 - 14.6)

Volume	Invert	Avail. Storage	Storage Description
#1	0.000 m	156.0 m³	1.00 mW x 39.00 mL x 4.00 mH Prismatoid

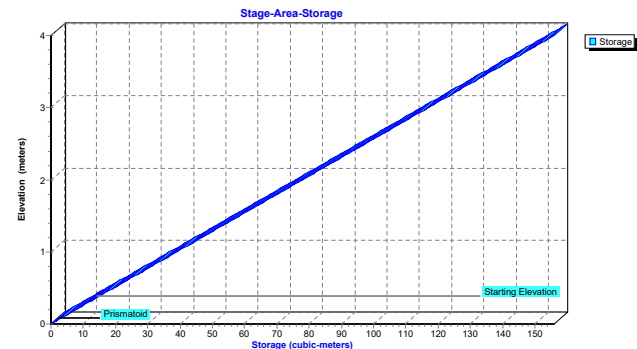
Device	Routing	Invert	Outlet Devices
#1	Primary	0.300 m	Pump Discharges@0.000 m Flow (l/min)= 329.9 330.0 Head (meters)= 4.000 0.000

Primary OutFlow Max=0.0055 m³/s @ 0.05 hrs HW=0.323 m (Free Discharge)
1=Pump (Pump Controls 0.0055 m³/s)

Pond 3P: Cistern



Pond 3P: Cistern

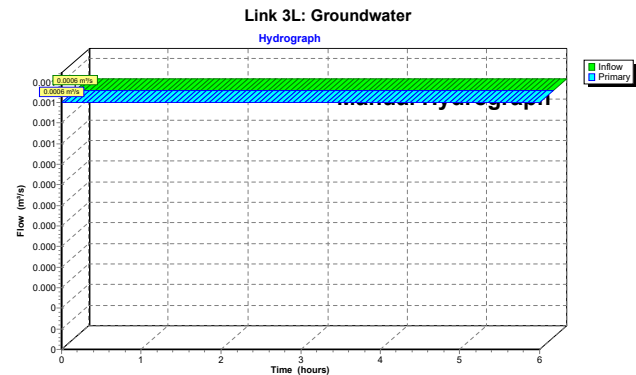


Stage-Area-Storage for Pond 3P: Cistern

Elevation (meters)	Storage (cubic-meters)	Elevation (meters)	Storage (cubic-meters)
0.000	0.0	2.600	101.4
0.050	2.0	2.650	103.3
0.100	3.9	2.700	105.3
0.150	5.8	2.750	107.3
0.200	7.8	2.800	109.2
0.250	9.8	2.850	111.2
0.300	11.7	2.900	113.1
0.350	13.7	2.950	115.1
0.400	15.6	3.000	117.0
0.450	17.6	3.050	119.0
0.500	19.5	3.100	120.9
0.550	21.5	3.150	122.8
0.600	23.4	3.200	124.8
0.650	25.4	3.250	126.8
0.700	27.3	3.300	128.7
0.750	29.3	3.350	130.7
0.800	31.2	3.400	132.6
0.850	33.1	3.450	134.6
0.900	35.1	3.500	136.5
0.950	37.1	3.550	138.5
1.000	39.0	3.600	140.4
1.050	41.0	3.650	142.3
1.100	42.9	3.700	144.3
1.150	44.9	3.750	146.3
1.200	46.8	3.800	148.2
1.250	48.8	3.850	150.2
1.300	50.7	3.900	152.1
1.350	52.7	3.950	154.1
1.400	54.6	4.000	156.0
1.450	56.5		
1.500	58.5		
1.550	60.5		
1.600	62.4		
1.650	64.4		
1.700	66.3		
1.750	68.3		
1.800	70.2		
1.850	72.2		
1.900	74.1		
1.950	76.0		
2.000	78.0		
2.050	79.9		
2.100	81.9		
2.150	83.8		
2.200	85.8		
2.250	87.8		
2.300	89.7		
2.350	91.7		
2.400	93.6		
2.450	95.6		
2.500	97.5		
2.550	99.5		

Summary for Link 3L: Groundwater

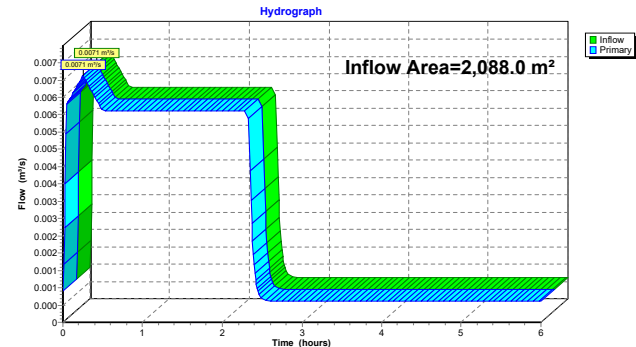
Inflow = 0.0006 m³/s @ 0.00 hrs, Volume= 13.0 m³
Primary = 0.0006 m³/s @ 0.00 hrs, Volume= 13.0 m³, Atten= 0%, Lag= 0.0 min
Routed to Link 4L : Park Street E (Allowable: 8.03 L/s)
Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
7 Point manual hydrograph, To= 0.00 hrs, dt= 1.00 hrs, m³/s =
0.0006 0.0006 0.0006 0.0006 0.0006 0.0006 0.0006

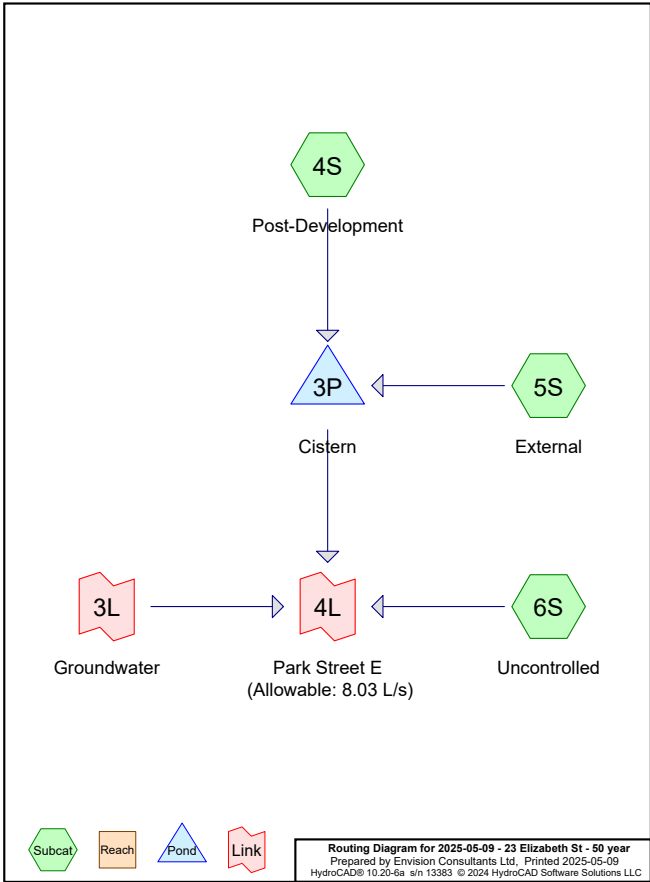


Summary for Link 4L: Park Street E (Allowable: 8.03 L/s)

Inflow Area = 2,088.0 m², 72.27% Impervious, Inflow Depth > 29 mm for 25-Year event
Inflow = 0.0071 m³/s @ 0.25 hrs, Volume= 60.4 m³
Primary = 0.0071 m³/s @ 0.25 hrs, Volume= 60.4 m³, Atten= 0%, Lag= 0.0 min
Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

Link 4L: Park Street E (Allowable: 8.03 L/s)





2025-05-09 - 23 Elizabeth St Canada-Mississauga 50-Year Duration=75 min, Inten=42.7 mm/hr
Prepared by Envision Consultants Ltd Printed 2025-05-09
HydroCAD® 10.20-6a s/n 13383 © 2024 HydroCAD Software Solutions LLC Page 3

Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 4S: Post-Development Runoff Area=1,759.0 m² 83.91% Impervious Runoff Depth=48 mm
Tc=15.0 min C=0.89 Runoff=0.0186 m³/s 83.6 m³

Subcatchment 5S: External Runoff Area=296.0 m² 0.00% Impervious Runoff Depth=16 mm
Tc=0.0 min C=0.30 Runoff=0.0011 m³/s 4.8 m³

Subcatchment 6S: Uncontrolled Runoff Area=33.0 m² 100.00% Impervious Runoff Depth=53 mm
Tc=15.0 min C=1.00 Runoff=0.0004 m³/s 1.8 m³

Pond 3P: Cistern Peak Elev=1.851 m Storage=72.2 m³ Inflow=0.0196 m³/s 88.4 m³
Outflow=0.0055 m³/s 88.4 m³

Link 3L: Groundwater Manual Hydrograph Inflow=0.0006 m³/s 13.0 m³
Primary=0.0006 m³/s 13.0 m³

Link 4L: Park Street E (Allowable: 8.03 L/s) Inflow=0.0065 m³/s 103.2 m³
Primary=0.0065 m³/s 103.2 m³

Total Runoff Area = 2,088.0 m² Runoff Volume = 90.2 m³ Average Runoff Depth = 43 mm
27.73% Pervious = 579.0 m² 72.27% Impervious = 1,509.0 m²

2025-05-09 - 23 Elizabeth St - 50 year

Prepared by Envision Consultants Ltd
HydroCAD® 10.20-6a s/n 13383 © 2024 HydroCAD Software Solutions LLC

Printed 2025-05-09
Page 2

Area Listing (all nodes)

Area (sq-meters)	C	Description (subcatchment-numbers)
481.0	1.00	Amenity (Impervious) (4S)
93.0	0.30	Amenity (Softscape) (4S)
12.0	1.00	Conveyed Lands (6S)
296.0	0.30	External flow from adjacent property (5S)
71.0	1.00	Impervious At-Grade (4S)
915.0	1.00	Roof Area (4S)
190.0	0.30	Softscape At-Grade (4S)
21.0	1.00	Uncontrolled (6S)
9.0	1.00	Vehicular Surface (4S)
2,088.0	0.81	TOTAL AREA

2025-05-09 - 23 Elizabeth St Canada-Mississauga 50-Year Duration=75 min, Inten=42.7 mm/hr
Prepared by Envision Consultants Ltd Printed 2025-05-09
HydroCAD® 10.20-6a s/n 13383 © 2024 HydroCAD Software Solutions LLC Page 4

Summary for Subcatchment 4S: Post-Development

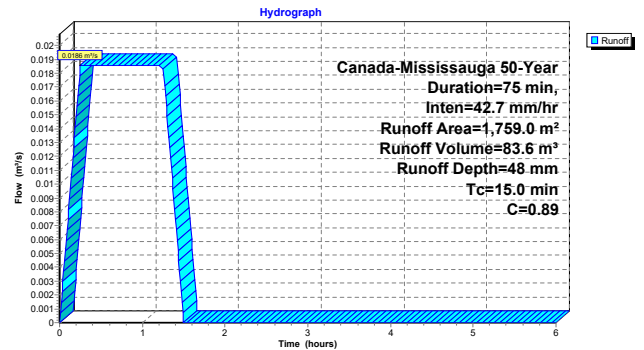
Runoff = 0.0186 m³/s @ 0.25 hrs, Volume= 83.6 m³, Depth= 48 mm
Routed to Pond 3P : Cistern

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Canada-Mississauga 50-Year Duration=75 min, Inten=42.7 mm/hr

Area (m ²)	C	Description
915.0	1.00	Roof Area
481.0	1.00	Amenity (Impervious)
93.0	0.30	Amenity (Softscape)
9.0	1.00	Vehicular Surface
71.0	1.00	Impervious At-Grade
190.0	0.30	Softscape At-Grade
1,759.0	0.89	Weighted Average
283.0		16.09% Pervious Area
1,476.0		83.91% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m ³ /s)	Description
15.0					Direct Entry,

Subcatchment 4S: Post-Development



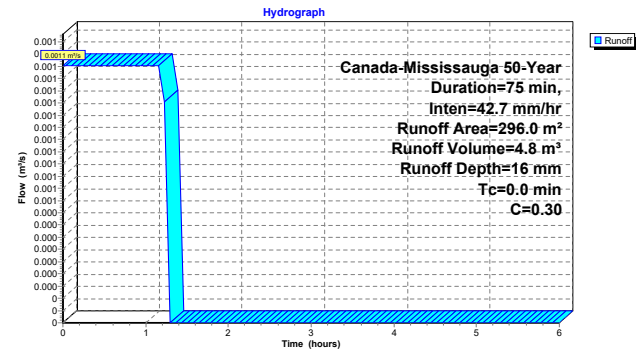
Summary for Subcatchment 5S: External

Runoff = 0.0011 m³/s @ 0.00 hrs, Volume= 4.8 m³, Depth= 16 mm
Routed to Pond 3P : Cistern

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Canada-Mississauga 50-Year Duration=75 min, Inten=42.7 mm/hr

Area (m²)	C	Description
296.0	0.30	External flow from adjacent property
296.0	100.00%	Pervious Area

Subcatchment 5S: External



Summary for Subcatchment 6S: Uncontrolled

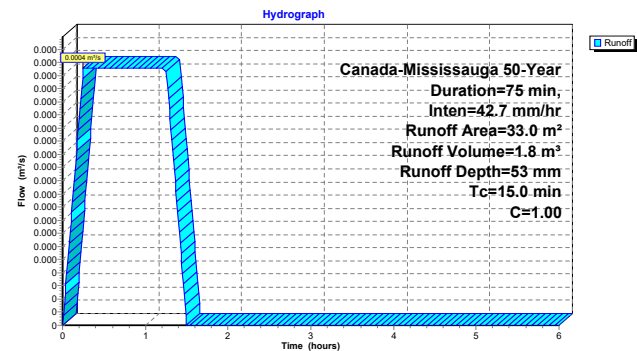
Runoff = 0.0004 m³/s @ 0.25 hrs, Volume= 1.8 m³, Depth= 53 mm
Routed to Link 4L : Park Street E (Allowable: 8.03 L/s)

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Canada-Mississauga 50-Year Duration=75 min, Inten=42.7 mm/hr

Area (m²)	C	Description
21.0	1.00	Uncontrolled
12.0	1.00	Conveyed Lands
33.0	1.00	Weighted Average
33.0	100.00%	Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
15.0					Direct Entry,

Subcatchment 6S: Uncontrolled



Summary for Pond 3P: Cistern

Inflow Area = 2,055.0 m², 71.82% Impervious, Inflow Depth = 43 mm for 50-Year event
Inflow = 0.0196 m³/s @ 0.25 hrs, Volume= 88.4 m³
Outflow = 0.0055 m³/s @ 0.10 hrs, Volume= 88.4 m³, Atten= 72%, Lag= 0.0 min
Primary = 0.0055 m³/s @ 0.10 hrs, Volume= 88.4 m³
Routed to Link 4L : Park Street E (Allowable: 8.03 L/s)

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Starting Elev= 0.300 m Surf.Area= 39.0 m² Storage= 11.7 m³
Peak Elev= 1.851 m @ 1.43 hrs Surf.Area= 39.0 m² Storage= 72.2 m³ (60.5 m³ above start)

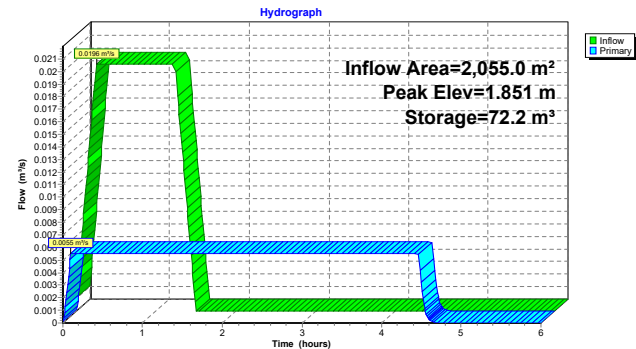
Plug-Flow detention time= 115.3 min calculated for 76.6 m³ (87% of inflow)
Center-of-Mass det. time= 92.6 min (137.2 - 44.6)

Volume	Invert	Avail. Storage	Storage Description
#1	0.000 m	156.0 m³	1.00 mW x 39.00 mL x 4.00 mH Prismatoid

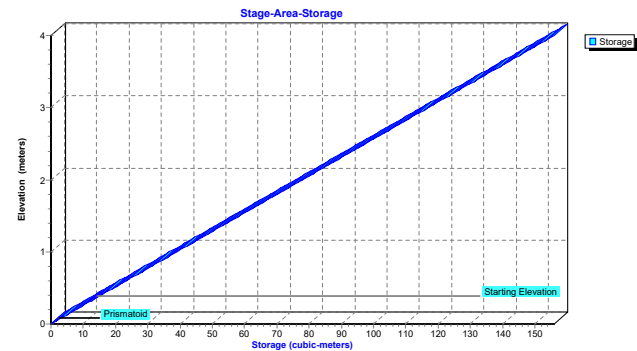
Device	Routing	Invert	Outlet Devices
#1	Primary	0.300 m	Pump Discharges@0.000 m Flow (l/min)= 329.9 330.0 Head (meters)= 4.000 0.000

Primary OutFlow Max=0.0055 m³/s @ 0.10 hrs HW=0.321 m (Free Discharge)
1=Pump (Pump Controls 0.0055 m³/s)

Pond 3P: Cistern



Pond 3P: Cistern

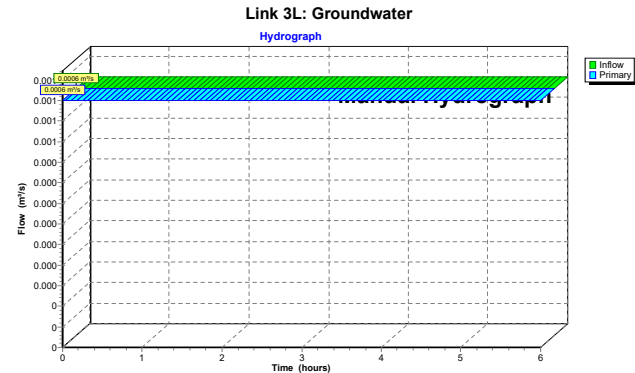


Stage-Area-Storage for Pond 3P: Cistern

Elevation (meters)	Storage (cubic-meters)	Elevation (meters)	Storage (cubic-meters)
0.000	0.0	2.600	101.4
0.050	2.0	2.650	103.3
0.100	3.9	2.700	105.3
0.150	5.8	2.750	107.3
0.200	7.8	2.800	109.2
0.250	9.8	2.850	111.2
0.300	11.7	2.900	113.1
0.350	13.7	2.950	115.1
0.400	15.6	3.000	117.0
0.450	17.6	3.050	119.0
0.500	19.5	3.100	120.9
0.550	21.5	3.150	122.8
0.600	23.4	3.200	124.8
0.650	25.4	3.250	126.8
0.700	27.3	3.300	128.7
0.750	29.3	3.350	130.7
0.800	31.2	3.400	132.6
0.850	33.1	3.450	134.6
0.900	35.1	3.500	136.5
0.950	37.1	3.550	138.5
1.000	39.0	3.600	140.4
1.050	41.0	3.650	142.3
1.100	42.9	3.700	144.3
1.150	44.9	3.750	146.3
1.200	46.8	3.800	148.2
1.250	48.8	3.850	150.2
1.300	50.7	3.900	152.1
1.350	52.7	3.950	154.1
1.400	54.6	4.000	156.0
1.450	56.5		
1.500	58.5		
1.550	60.5		
1.600	62.4		
1.650	64.4		
1.700	66.3		
1.750	68.3		
1.800	70.2		
1.850	72.2		
1.900	74.1		
1.950	76.0		
2.000	78.0		
2.050	79.9		
2.100	81.9		
2.150	83.8		
2.200	85.8		
2.250	87.8		
2.300	89.7		
2.350	91.7		
2.400	93.6		
2.450	95.6		
2.500	97.5		
2.550	99.5		

Summary for Link 3L: Groundwater

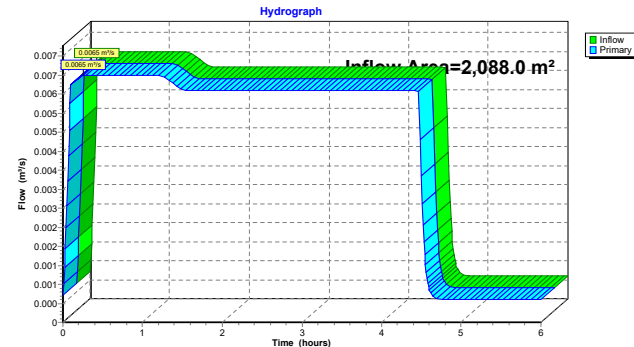
Inflow = 0.0006 m³/s @ 0.00 hrs, Volume= 13.0 m³
Primary = 0.0006 m³/s @ 0.00 hrs, Volume= 13.0 m³, Atten= 0%, Lag= 0.0 min
Routed to Link 4L : Park Street E (Allowable: 8.03 L/s)
Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
7 Point manual hydrograph, To= 0.00 hrs, dt= 1.00 hrs, m³/s =
0.0006 0.0006 0.0006 0.0006 0.0006 0.0006 0.0006

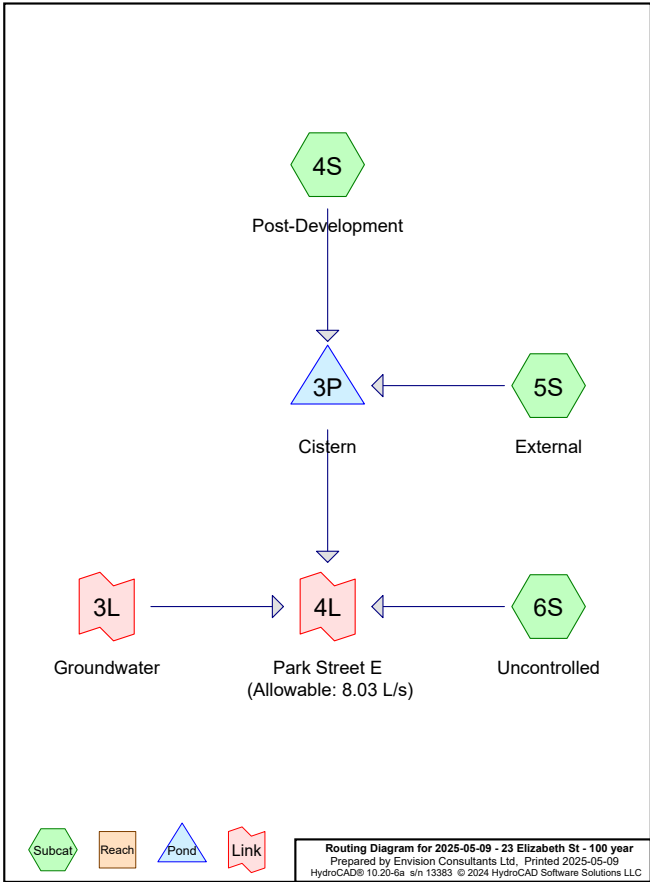


Summary for Link 4L: Park Street E (Allowable: 8.03 L/s)

Inflow Area = 2,088.0 m², 72.27% Impervious, Inflow Depth > 49 mm for 50-Year event
Inflow = 0.0065 m³/s @ 0.25 hrs, Volume= 103.2 m³
Primary = 0.0065 m³/s @ 0.25 hrs, Volume= 103.2 m³, Atten= 0%, Lag= 0.0 min
Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

Link 4L: Park Street E (Allowable: 8.03 L/s)





Area Listing (all nodes)

Area (sq-meters)	C	Description (subcatchment-numbers)
481.0	1.00	Amenity (Impervious) (4S)
93.0	0.33	Amenity (Softscape) (4S)
12.0	1.00	Conveyed Lands (6S)
296.0	0.33	External flow from adjacent property (5S)
71.0	1.00	Impervious At-Grade (4S)
915.0	1.00	Roof Area (4S)
190.0	0.33	Softscape At-Grade (4S)
21.0	1.00	Uncontrolled Area (6S)
9.0	1.00	Vehicular Surface (4S)
2,088.0	0.81	TOTAL AREA

Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 4S: Post-Development Runoff Area=1,759.0 m² 83.91% Impervious Runoff Depth=31 mm
Tc=15.0 min C=0.89 Runoff=0.0612 m³/s 55.1 m³

Subcatchment 5S: External Runoff Area=296.0 m² 0.00% Impervious Runoff Depth=12 mm
Tc=0.0 min C=0.33 Runoff=0.0038 m³/s 3.6 m³

Subcatchment 6S: Uncontrolled Runoff Area=33.0 m² 100.00% Impervious Runoff Depth=35 mm
Tc=15.0 min C=1.00 Runoff=0.0013 m³/s 1.2 m³

Pond 3P: Cistern Peak Elev=1.565 m Storage=61.0 m³ Inflow=0.0652 m³/s 58.6 m³
Outflow=0.0055 m³/s 58.6 m³

Link 3L: Groundwater Manual Hydrograph Inflow=0.0006 m³/s 13.0 m³
Primary=0.0006 m³/s 13.0 m³

Link 4L: Park Street E (Allowable: 8.03 L/s) Inflow=0.0074 m³/s 72.8 m³
Primary=0.0074 m³/s 72.8 m³

Total Runoff Area = 2,088.0 m² Runoff Volume = 59.8 m³ Average Runoff Depth = 29 mm
27.73% Pervious = 579.0 m² 72.27% Impervious = 1,509.0 m²

Summary for Subcatchment 4S: Post-Development

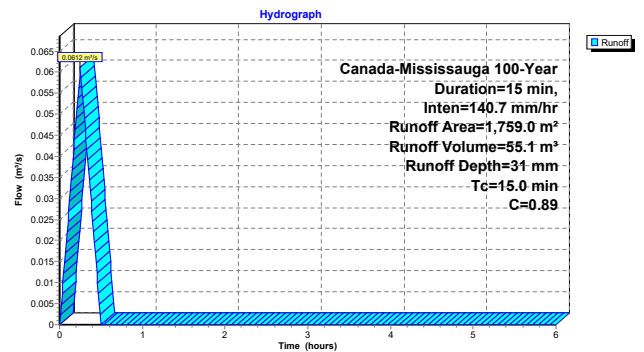
Runoff = 0.0612 m³/s @ 0.25 hrs, Volume= 55.1 m³, Depth= 31 mm
Routed to Pond 3P: Cistern

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Canada-Mississauga 100-Year Duration=15 min, Inten=140.7 mm/hr

Area (m²)	C	Description
915.0	1.00	Roof Area
481.0	1.00	Amenity (Impervious)
93.0	0.33	Amenity (Softscape)
9.0	1.00	Vehicular Surface
71.0	1.00	Impervious At-Grade
190.0	0.33	Softscape At-Grade
1,759.0	0.89	Weighted Average
283.0		16.09% Pervious Area
1,476.0		83.91% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
15.0					Direct Entry,

Subcatchment 4S: Post-Development



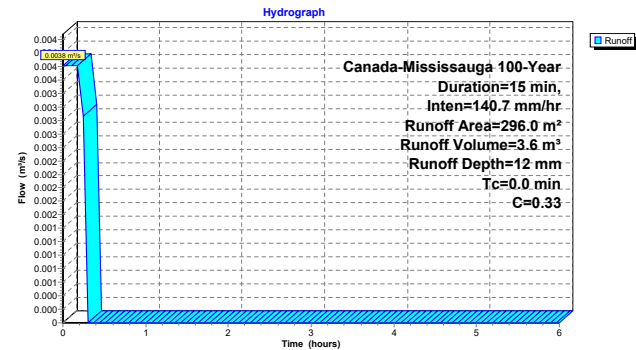
Summary for Subcatchment 5S: External

Runoff = 0.0038 m³/s @ 0.00 hrs, Volume= 3.6 m³, Depth= 12 mm
Routed to Pond 3P : Cistern

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Canada-Mississauga 100-Year Duration=15 min, Inten=140.7 mm/hr

Area (m²)	C	Description
296.0	0.33	External flow from adjacent property
296.0	100.00%	Pervious Area

Subcatchment 5S: External



Summary for Subcatchment 6S: Uncontrolled

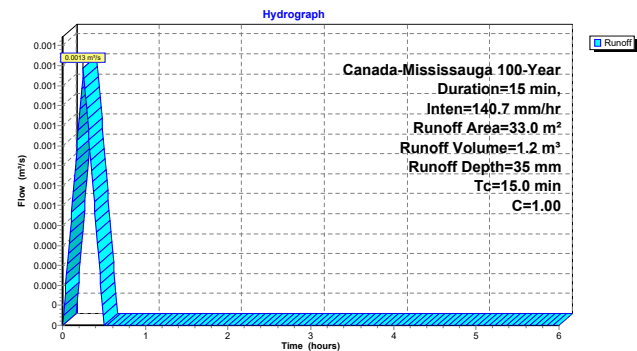
Runoff = 0.0013 m³/s @ 0.25 hrs, Volume= 1.2 m³, Depth= 35 mm
Routed to Link 4L : Park Street E (Allowable: 8.03 L/s)

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Canada-Mississauga 100-Year Duration=15 min, Inten=140.7 mm/hr

Area (m²)	C	Description
21.0	1.00	Uncontrolled Area
12.0	1.00	Conveyed Lands
33.0	1.00	Weighted Average
33.0	100.00%	Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
15.0					Direct Entry,

Subcatchment 6S: Uncontrolled



Summary for Pond 3P: Cistern

Inflow Area = 2,055.0 m², 71.82% Impervious, Inflow Depth = 29 mm for 100-Year event
Inflow = 0.0652 m³/s @ 0.25 hrs, Volume= 58.6 m³
Outflow = 0.0055 m³/s @ 0.04 hrs, Volume= 58.6 m³, Atten= 92%, Lag= 0.0 min
Primary = 0.0055 m³/s @ 0.04 hrs, Volume= 58.6 m³
Routed to Link 4L : Park Street E (Allowable: 8.03 L/s)

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Starting Elev= 0.300 m Surf.Area= 39.0 m² Storage= 11.7 m³
Peak Elev= 1.565 m @ 0.48 hrs Surf.Area= 39.0 m² Storage= 61.0 m³ (49.3 m³ above start)

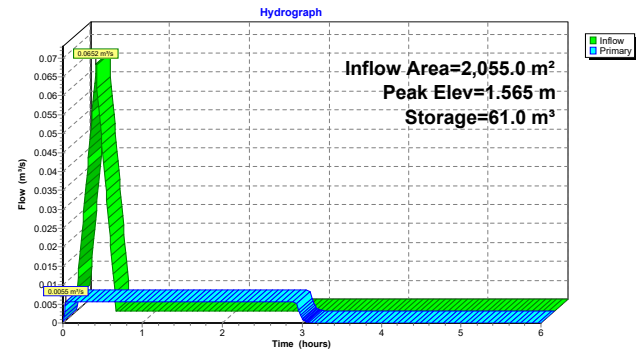
Plug-Flow detention time= 95.5 min calculated for 46.9 m³ (80% of inflow)
Center-of-Mass det. time= 75.4 min (90.0 - 14.5)

Volume	Invert	Avail. Storage	Storage Description
#1	0.000 m	156.0 m³	1.00 mW x 39.00 m L x 4.00 m H Prismatoid

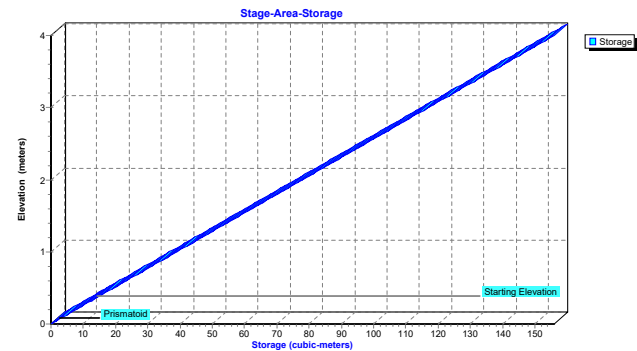
Device	Routing	Invert	Outlet Devices
#1	Primary	0.300 m	Pump Discharges@0.000 m Flow (l/min)= 329.9 330.0 Head (meters)= 4.000 0.000

Primary OutFlow Max=0.0055 m³/s @ 0.04 hrs HW=0.323 m (Free Discharge)
1=Pump (Pump Controls 0.0055 m³/s)

Pond 3P: Cistern



Pond 3P: Cistern

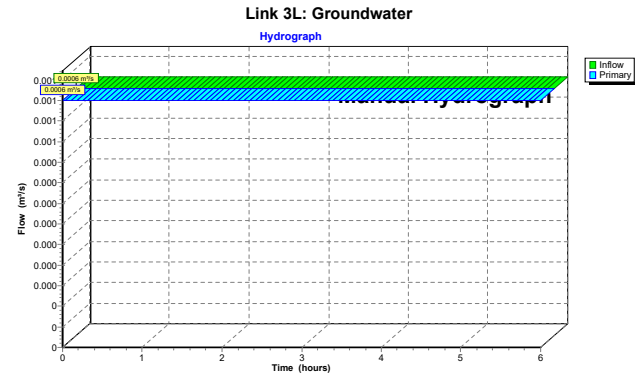


Stage-Area-Storage for Pond 3P: Cistern

Elevation (meters)	Storage (cubic-meters)	Elevation (meters)	Storage (cubic-meters)
0.000	0.0	2.600	101.4
0.050	2.0	2.650	103.3
0.100	3.9	2.700	105.3
0.150	5.8	2.750	107.3
0.200	7.8	2.800	109.2
0.250	9.8	2.850	111.2
0.300	11.7	2.900	113.1
0.350	13.7	2.950	115.1
0.400	15.6	3.000	117.0
0.450	17.6	3.050	119.0
0.500	19.5	3.100	120.9
0.550	21.5	3.150	122.8
0.600	23.4	3.200	124.8
0.650	25.4	3.250	126.8
0.700	27.3	3.300	128.7
0.750	29.3	3.350	130.7
0.800	31.2	3.400	132.6
0.850	33.1	3.450	134.6
0.900	35.1	3.500	136.5
0.950	37.1	3.550	138.5
1.000	39.0	3.600	140.4
1.050	41.0	3.650	142.3
1.100	42.9	3.700	144.3
1.150	44.9	3.750	146.3
1.200	46.8	3.800	148.2
1.250	48.8	3.850	150.2
1.300	50.7	3.900	152.1
1.350	52.7	3.950	154.1
1.400	54.6	4.000	156.0
1.450	56.5		
1.500	58.5		
1.550	60.5		
1.600	62.4		
1.650	64.4		
1.700	66.3		
1.750	68.3		
1.800	70.2		
1.850	72.2		
1.900	74.1		
1.950	76.0		
2.000	78.0		
2.050	79.9		
2.100	81.9		
2.150	83.8		
2.200	85.8		
2.250	87.8		
2.300	89.7		
2.350	91.7		
2.400	93.6		
2.450	95.6		
2.500	97.5		
2.550	99.5		

Summary for Link 3L: Groundwater

Inflow = 0.0006 m³/s @ 0.00 hrs, Volume= 13.0 m³
Primary = 0.0006 m³/s @ 0.00 hrs, Volume= 13.0 m³, Atten= 0%, Lag= 0.0 min
Routed to Link 4L : Park Street E (Allowable: 8.03 L/s)
Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
7 Point manual hydrograph, To= 0.00 hrs, dt= 1.00 hrs, m³/s =
0.0006 0.0006 0.0006 0.0006 0.0006 0.0006 0.0006



Summary for Link 4L: Park Street E (Allowable: 8.03 L/s)

Inflow Area = 2,088.0 m², 72.27% Impervious, Inflow Depth > 35 mm for 100-Year event
Inflow = 0.0074 m³/s @ 0.25 hrs, Volume= 72.8 m³
Primary = 0.0074 m³/s @ 0.25 hrs, Volume= 72.8 m³, Atten= 0%, Lag= 0.0 min
Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

Link 4L: Park Street E (Allowable: 8.03 L/s)

