

# **FUNCTIONAL SERVICING REPORT**

# Water, Sanitary, and Stormwater Management

# **PROPOSED RESIDENTIAL DEVELOPEMENT**

1667 SUNNINGDALE BEND MISSISSAUGA, ONTARIO

PREPARED FOR UNITED LANDS

OUR FILE: 1407

January 31, 2024

# **REVISION HISTORY**

DATE	REVISION	SUBMISSION
2022-03-08	1	Revised per Region of Peel comments
2023-06-15	2	Revised per City of Mississauga and Peel Region comments
2024-01-31	3	Revised per City of Mississauga and Peel Region comments

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# 1.0 INTRODUCTION

This report is the consolidation of the previously submitted Functional Servicing and Stormwater Management Reports, updated to reflect agency comments. Changes to the body of this report are denoted in italics.

## 1.1 Scope of Functional Servicing Report

This report has been prepared in support of the Re-Zoning Application for a proposed five-lot single family condominium development located at 1667 Sunningdale Bend. This report discusses how the site can be serviced by the existing infrastructure for water, wastewater, and stormwater. This report may be updated and refined as the project moves through the planning process. A copy of the development concept plan is included in Appendix 'A' for reference.

This report should be read in conjunction with architectural plans prepared for the project.

For purposes of this report, north is defined as parallel to Meadow Wood Road.



Figure 1: Location Plan

# 1.2 Existing Condition

The 0.51 ha subject site is located between the rear of 892-870 Meadow Wood Road and the rear of 875, 883 and 891 Sunningdale Bend. Immediately to the north of the subject lands is a tributary of the Sheridan Creek, located behind 898 Meadow Wood Road. Access to the subject lands is from Sunningdale Bend.

The subject lands were once part of a larger residential property, consisting of 890 and 898 Meadow Wood Road. The property at 898 Meadow Wood Road was originally approved to be severed in 1966 and conditions of severance were completed around 2002. The conditions of the severance required the granting of a drainage easement along the channel/sewer alignment. A home was built on this property immediately following the completion of the severance.

In 2010-2011 a second severance of the property was completed. This involved the creation of a single-family lot with frontage on Meadow Wood Road (892 Meadow Wood Road) and a retained parcel at the rear (subject lands, 1667 Sunningdale Bend). As part of the severance, the valley slope within the 890 Meadow Wood Road property was conveyed to the City of Mississauga. A single-family dwelling has been constructed on the lot.

Prior to the 2010-2011 severance, the subject lands contained a small cottage in the north-west corner of the site. A two-storey house was located south of the cottage along the west property line. A stand-alone garage, pool and substantial pool deck was located in the southern part of the property. An asphalt driveway interconnected the garage with the main house and was connected to Meadow Wood Road. As part of the construction of the new house at 892 Meadow Wood Road, the cottage, main house and garage were removed.

# 1.3 Proposed Condition

The proposal for the subject property is the development of a five-lot single-family condominium development. Access to the proposed development will be from Sunningdale Bend and will require the extension of the municipal roadway with a non-standard municipal cul-de-sac. A private roadway will be extended into the development with a tee turnaround, provided for emergency vehicles and garbage trucks.

# 2.0 MUNICIPAL WATER AND WASTEWATER

Existing and proposed servicing is discussed in further detail in the following sections. A copy of the Servicing Plan is included in Appendix 'E' and should be read in conjunction with this report.

# 2.1 Water

There is a 150 mm diameter watermain located along Sunningdale Bend adjacent to the subject lands. The original building on the site was serviced by the existing watermain. The existing watermain tees into the watermains located on two legs of Sunningdale Bend, approximately 45 m west of the subject lands.

## Table 1: Estimated Water Demands (L/min)

Average Daily Demand	6.0
Minimum Hourly Demand	6.0
Maximum Hourly Demand	12.0
Maximum Daily Demand	6.0
Estimated Fire Demand (FUS 1999)	4000
Maximum Daily Plus Fire Demand	4006

A flow test was undertaken (May 18, 2021) along the watermain in Sunningdale Bend adjacent to the site. The results of the flow test are included in Appendix 'B' and are summarized as follows:

Table 2: Fire Flow Test along Sunningdale Bend

Static Pressure	66 psig
Flow 1256 usgpm (79 L/s)	residual 54 psig
Flow 1840 usgpm (116 L/s)	residual 48 psig
Theoretical Flow 3054 usgpm (193 L/s)	residual 20 psig
Estimated Max. Daily Plus Fire Service Pressure	57 psig

The proposal is to run a 150 mm diameter municipal watermain to the south side of the proposed cul-de-sac to provide water to a hydrant on the south side of the cul-de-sac. The hydrant will provide fire protection for the proposed development. *The municipal watermain has been looped as per Public Works Standard Drawing 1-7-4 for a typical 50mm Watermain on Cul-de-Sac.* A 50 mm diameter domestic water connection will be extended into the site to provide domestic water for the five-lot development.

Detailed calculations are provided in Appendix 'B'.

# 2.2 Wastewater

There is an existing 250 mm diameter sewer along Sunningdale Bend near the site. The end of the sanitary sewer is a manhole (Ex. San. MH1A) located approximately 12.5 m west of the west property line of the subject lands.

Crossing through the subject lands is a sanitary forcemain on a private easement. The forcemain services the property at 898 Meadow Wood Road. The forcemain terminates at a manhole located near the west property line of the subject lands. The manhole receives flow from the forcemain and at one time flows from the original house on the property. The manhole is connected to Ex. San. MH1A by a gravity sewer.

A second sanitary forcemain crosses through the subject property and services the house at 890 Meadow Wood Road. The forcemain is located on a private easement. The forcemain terminates at a gravity sanitary sewer lateral near the west property line of the subject property. The gravity sewer lateral connects to Ex. San. MH1A.

The proposal is to construct approximately 44 m of municipal sanitary sewer, from Ex. San MH1A, through the proposed cul-de-sac to the proposed condominium development. The existing forcemain will be connected to the new municipal sewer and the existing gravity lateral to Ex. San. MH1A will be plugged and abandoned.

The sanitary sewer will be extended into the proposed development lands and will be of sufficient depth to provide a gravity sewage connection for each of the proposed single-family dwellings.

The sewer constructed within the proposed cul-de-sac will be per the Regional of Peel requirements. The onsite sanitary sewer will be designed per the requirement of the Ontario Building Code.

Appendix 'B' provides a summary of the estimated sanitary sewer flows.

## 3.0 STORM DRAINAGE AND STORMWATER MANAGEMENT

#### 3.1 Stormwater Management Requirements

The stormwater management requirements are outlined in the City of Mississauga Transportation and Works, Development Requirements Manual. The subject site is in the Sheridan Creek tributary and the stormwater management requirements are outlined as follows:

- Stormwater Quantity Control to reduce post-development 100-yr flows to 2-yr predevelopment flows.
- Stormwater Runoff Volume Reduction of 5 mm to be retained onsite, infiltrated or re-used.
- Water Quality to a minimum of 80% of the TSS.

# 3.2 Existing Storm Drainage

A review of the original topography for the site from 2007, prior to the disturbance from the construction of 892 Mead Wood Road and the removal of the original structures on the property, shows the lands to be divided into two watersheds.

The northern watershed (0.251 ha.) sheet flows to the valley located immediately north of the subject lands. The drainage from the valley is piped across Meadow Wood Road flowing through an open water course and is captured into a sewer system located approximately 70 m east of Meadow Wood Road. The sewer system outlets to the Sheridan Creek from Stonehaven Drive. The northern watershed is 87% pervious (C = 0.25) in the existing condition, with small areas of paved/roof surfaces (C = 0.9). The resulting composite runoff coefficient is C = 0.34.

The southern *watershed* (0.272 ha) sheet flows to *the* south across the rear of the large properties located at 854 and 844 towards Sheridan Creek, which is located approximately 120 m south of the subject lands. The southern watershed is 71% pervious (C = 0.25) in the existing condition, with small areas of paved/roof surfaces (C = 0.9). The resulting runoff coefficient is C = 0.44.

## 3.3 Proposed Drainage System

The implementation of the proposed grading plan will divide the site into four sub-catchments as outlined below. The boundaries of the four sub-catchments can be seen in Figure 3.

- Area A consists of the proposed municipal cul-de-sac, part of the existing Sunningdale Road allowance and a small portion of Lot 1. The area is 63% impervious with some small grass covered areas, around the cul-de-sac and side yard of Lot 1. The area of this subcatchment is 0.071 ha and the composite runoff coefficient is C = 0.66. This area will be captured by the proposed DCB with a CB Shield installed to treat the runoff. The DCB will route flow towards a Stormceptor (ETO4), to further treat the runoff to achieve 80% TSS removal. The flow will then be conveyed to an ACO Stormbrixx located under the cul-desac. The flow from the ACO Stormbrixx will be controlled via a 75 mm orifice tube which connects into STM MH 1 to convey flow to the valley to the north.
- **Area B** includes a portion of the rear yard of Lot 5 and Compensation Area and will sheet flow to the adjacent valley (towards the north). It is not possible to collect this system by the sewer system. The area is 100% pervious with an area of 0.100 ha.
- Area C is the main part of the site and includes the private roadway, all the front yards, the proposed houses, part of Lot 4's rear yard and the rear yard of Unit 1. The area is 69% impervious with a total area of 0.286 ha. In calculating impervious areas for Area C, the impervious area assumed a maximized house occupying the entire possible building envelope. The composite runoff coefficient for this area is C = 0.71. This area will be

captured by the proposed CB's in the Condo Road ROW which will have CB Shields installed to treat the runoff. The site sewers will be sloped at a 0.3% slope to direct all the runoff from Area C to the ACO Stormbrixx infiltration tank. Catch basins located along the driveway and in the rear of Lot 1 and Lot 5 will collect the surface runoff. Rear downspouts from Lots 2, 3, 4 and 5 are directly connected to the tank through the storm sewer system to ensure capture for quantity control. A 75 mm orifice tube will connect into STM MH 3 to control the flow from Area C.

• Area D includes the rear yard of Lot 2, the entire yard of Lot 3, and the rear and side yard of Lot 4. The area is 100% pervious with an area of 0.069 ha. These areas are too low to be collected into the storm sewer system and will sheet flow following the natural drainage path along the rear of 854 and 844 Meadow Wood Road and the Sheridan Creek tributary as in the existing condition.

Due to grading and tree constraints, it will be impractical to address the water quantity control for all the sub-catchments.

- Areas B and D are areas that will sheet flow to the adjacent creeks with no stormwater management control. These areas will primarily be pervious landscaped areas.
- The primary focus of the water quality control will be on the condominium site, Area C, and the cul-de-sac and existing portion of Sunningdale Bend, Area A.

To maximize the area to be controlled by onsite stormwater management works, an onsite sewer system has been designed to collect runoff from the largest potential area. In addition to rear lot catch basins, it is proposed to directly connect the *roof leaders* from all five lots to the storm sewer system. Although, contrary to the City's current policy, it will allow runoff from a greater area to be collected and controlled to the 2-year pre-development flow. Without the direct connection areas, it would contribute the uncontrolled flow in drainage Area B and D.

# 3.4 Stormwater Quantity Control (Peak Flow Control)

As per City of Mississauga Storm Drainage Design Requirements, the development is required to control post-development flows from the 100-year event to the 2-year pre-development event.

The pre-development flows are calculated using the Modified Rational Method and the City of Mississauga IDF data. In accordance with good engineering practice, a frequency adjustment factor of 1.1, 1.2, and 1.25 (for a minimum of C = 0.5 according to section 8.3.3 of the City's Storm Drainage Design Requirements) has been applied to the 25-, 50-, and 100-year events respectively. The pre-development flows for the northern and southern watersheds are provided in the table below.

Return	Intensity (mm/hr)	To North (L/s)	To South (L/s)	Total Flow (L/s)
2-yr	59.9	14	20	34
5-yr	80.5	19	27	46
10-yr	99.2	24	33	57
25-yr	113.9	30	42	72
50-yr	127.1	36	48	84
100-yr	140.7	42	53	95

# Table 3: Pre-Development Flows

Flows for each post-development area were calculated using the Modified Rational Method, with a time of concentration of 15 minutes and the City of Mississauga IDF data. Composite runoff coefficients for each area were calculated using C = 0.25 for pervious areas and C = 0.90 for impervious areas. Result of the calculations and a comparison with the pre-development flows is provided the following tables.

Return	Intensity (mm/hr)	Area A Flows* (L/s)	Area B Flows (L/s)	Area C Flows* (L/s)	Area D Flows (L/s)	Total Flow (L/s)
2-yr	59.9	8	4	33	3	48
5-yr	80.5	10	6	45	4	65
10-yr	99.2	13	7	55	5	80
25-yr	113.9	16	9	69	6	100
50-yr	127.1	20	11	85	7	123
100-yr	140.7	23	12	97	8	140

#### Table 4: Uncontrolled Post-Development Flows

\*SWM Facility in-flow

The allowable release rate to the valley to the north is  $Q = 0.014 \text{ m}^3/\text{s}$ , which is applicable for Areas A and C. Areas B and D will sheet flow uncontrolled to the valley to the north and Sheridan Creek to the south, respectively.

To control the site discharge to the allowable rate, an orifice tube is required on the site discharge sewer and onsite ponding is required. *A 75 mm diameter orifice tube* will be installed to control the flow for Area A and C separately. Orifice tubes will be installed at STM MH2 and STM MH 3, for Area A and C respectively.

The proposed site provides little room to provide surface storage and underground storage will be required. Modeling simulation using the HydroCAD software results in a storage volume of  $10.3 m^3$  and  $104.7 m^3$  being required to control the runoff to the required release rate for Areas A and C, respectively.

Return	Storage (m <sup>3</sup> )	Outflow (L/s)	Allowable Flow (L/s)
2-yr	1.8	3	14
5-yr	3.6	5	14
10-yr	5.6	6	14
25-yr	7.5	7	14
50-yr	9.3	8	14
100-yr	10.3	16	14

## Table 5: Area A – Controlled Outflow and Required Storage Volume

In order to control the post-development flow for Area A to the pre-development flow of  $Q = 0.014 \text{ m}^3/\text{s}$ , approximately 10.3 m<sup>3</sup> of storage is required for the 100-year event. The storage will be provided using an ACO Stormbrixx HD providing 10.8 m<sup>3</sup> of storage.

#### Table 6: Area C – Controlled Outflow and Required Storage Volume

Return	Storage (m <sup>3</sup> )	Outflow (L/s)	Allowable Flow (L/s)
2-yr	25.5	4	14
5-yr	42.7	7	14
10-yr	60.8	9	14
25-yr	75.9	11	14
50-yr	90.1	12	14
100-yr	104.4	13	14

In order to control the post-development flow for Area C to the pre-development flow of  $Q = 0.014 \text{ m}^3/\text{s}$ , approximately 104.7 m<sup>3</sup> of storage is required for the 100-year event. The storage will be provided using an ACO Stormbrixx HD providing 107.0 m<sup>3</sup> of storage.

#### **Table 7: Total Flows with Controlled Site Flows**

Doturn	Area A Flows	Area B Flows	Area C Flows	Area D Flows	Total Flow
Return	(L/S)	(L/S)	(L/S)	(L/S)	(L/S)
2-yr	3	4	4	3	14
5-yr	5	6	7	4	22
10-yr	6	7	9	5	27
25-yr	7	9	11	6	33
50-yr	8	11	12	7	38
100-yr	16	12	13	8	49

Return	Pre-Dev Total (L/s)	Post-Dev Total (L/s)	Percent Change
2-yr	34	14	-59%
5-yr	46	22	-52%
10-yr	57	27	-53%
25-yr	72	33	-54%
50-yr	84	38	-55%
100-yr	95	49	-48%

#### Table 8: Comparison of Pre-development Flow to Controlled Post-Development Flows

A review of the above tables shows that the site flows have been controlled to less than the 2-yr pre-development flow. In addition, the total post-development flow is less than the pre-development flow for the corresponding storm.

The subject site's storm sewer system will connect to the municipal storm sewer installed within the new cul-de-sac bulb.

An outlet sewer will run from the cul-de-sac bulb to the adjacent valley floor. A small channel will be constructed from the end of the outlet to the existing channel. To preserve the trees along the valley slope, the proposed outlet will be installed by directional drilling.

## 3.5 Water Quality Control

The City's Storm Drainage Design Requirements requires the site to provide a minimum treatment of 80% TSS removal to provide enhanced protection.

Water quality for the site will be achieved using CB Shields in each of the catch basins to remove the larger particles and the storage tank operating as an infiltration device. Based on an average drainage area of 0.07 ha to each of the site's catch basins and an impervious ratio of 73%, the TSS removal by the CB Shields will be approximately 73%.

In accordance with Table 3.2 of the MOE Stormwater Management and Design Manual,  $35 \text{ m}^3$ /ha of storage is required in an infiltration system providing 80% TSS removal. The required storage is 0.28 ha x  $35 \text{ m}^3$ /ha = 9.8 m<sup>3</sup>. The required storage is provided.

The combination of CB Shield with the proposed infiltration system will address the site's water quality requirements.

## 3.6 Stormwater Runoff Volume Reduction (Water Balance/Erosion Criteria)

As per City of Mississauga's Storm Drainage Design Requirements, the first 5 mm of runoff shall be retained on-site and managed by way of infiltration and evapotranspiration.

For Area A the estimated impervious area of 0.044 ha, the first 5 mm of runoff results in a volume of 2.22 m<sup>3</sup>. In order to address the erosion control requirement, the approach is to collect the first 5 mm of runoff in the ACO Stormbrixx HD and storm sewers and allow it to infiltrate the surrounding soil. Below the orifice invert of 93.72, the storm drainage system of sewers and ACO Stormbrixx HD has a storage volume of 2.4 m<sup>3</sup>. This exceeds the volume required to retain the first 5 mm of runoff. The geotechnical investigation for the site noted the underlying soils to be sandy and they recommended an infiltration capacity of 60 mm/hr. The proposed storm tank will have a footprint of approximately  $18.0 m^2$ . Based on this area, the 2.22 m<sup>3</sup> of water retained in the system will drain into the ground in approximately 12.85 hours, assuming a factor of safety of 2.5. Supporting calculations of the drawdown time can be found in Appendix 'D'.

For Area C the estimated impervious area of 0.197 ha, the first 5 mm of runoff results in a volume of 9.9  $m^3$ . The same approach will be implemented as in Area A. Below the orifice invert of 93.70, the storm drainage system of sewers and ACO Stormbrixx HD has a storage volume of 14.25  $m^3$ . This exceeds the volume required to retain the first 5 mm of runoff. The proposed storm tank will have a footprint of approximately 75.0  $m^2$ . Based on this area, the 9.9  $m^3$  of water retained in the system will drain into the ground in approximately 13.75 hours, assuming a factor of safety of 2.5. Supporting calculations of the drawdown time can be found in Appendix 'D'.

# 4.0 SITE DESIGN AND GRADING

To service the proposed development, an irregular cul-de-sac bulb will be constructed between the existing roadway and the adjacent valley lands. The face of the east curb line of the cul-de-sac will be located 5.2 m from the surveyed top-of-bank for the adjacent valley.

The existing ground falls in by approximately 2 m between the end of the existing roadway and the top-of-bank. To accommodate the fall in grade, a retaining wall is proposed along the top-of-bank with a 3.0 m level boulevard provided between the wall and the proposed curb line. The level boulevard area will provide an area for snow storage and utilities as well as providing a safety zone from the roadway.

The cul-de-sac bulb will be sloped to a catch basin located near the south side of the cul-de-sac. The private driveway for the residential development will be located on the southern part of the cul-de-sac bulb.

Between the end of the proposed cul-de-sac and the existing ground at the south side of the subject property the ground falls approximately 1.0 m. To minimize the grade differential between the private driveway and the existing grade, a "saw tooth" profile is proposed for the roadway. The south end of the roadway will be approximately 36 cm higher than the elevation at the cul-de-sac bulb.

To facilitate garbage trucks and other large vehicles to turn around on the site, a tee turnaround has been provided.

The proposed development will have five single family houses constructed on the property. Lots 1, 2 and 3 are located on the west side driveway. Lot 4 is located south of the turn around tee and Lot 5 is located north of the tee. North of Lot 5 and adjacent to the valley is the NHS & Buffer Compensation Area.

Tree preservation areas are located around the boundary of the site at the rear of the proposed residential lots. The grades of the rear lot areas will match the existing elevations of the TPZ.

At the end of the private driveway on the south side will be a 1.3 m high retaining wall to compensate for the grade difference between the private driveway and the adjacent tree preservation zone. The grade of the proposed private roadway needs to be raised to provide gravity sanitary services to the units and to direct the emergency overland flow towards the valley located at the north end of the development.

Lot 3 has the potential for a walkout basement with the remaining of the lots being look-out basements to varying degrees.

A copy of the Preliminary Grading Plan is provided in Appendix 'E' and should be read in conjunction with this report.

## 5.0 SUMMARY

- 1. The proposed development will be serviced from the existing 250 mm diameter sanitary sewer and the existing 150 mm watermain located on Sunningdale Bend. These services will be extended as municipal services to the proposed development site.
- 2. Within the proposed development site, sanitary sewers and a domestic watermain will be provided to service the five-lot development.
- 3. To control the 100-year post-development flows to the existing 2-year pre-development rate for Areas A and C, *underground storage tanks with 10.8 m<sup>3</sup> and 107.0 m<sup>3</sup> of storage is required for each area respectively.* An ACO Stormbrixx HD unit will be installed to provide the necessary storage volumes.
- 4. To control the flow to the allowable release rate for Area A and C, 75 mm diameter orifice tubes will be installed.
- 5. The required 5 mm of infiltration will be addressed through the underground storage tank.

- 6. Water quality requirements are addressed through CB Shields installed in the site's catch basins and Stormceptors between CBs and underground storage tank to achieve 80% TSS removal.
- 7. To maximize the capture of site flows, it is proposed that the *roof leaders* from *all lots will* be directly connected to the site's storm sewer system.
- 8. All houses within the development will require sump pumps with backflow preventors.
- 9. An emergency overland flow path is provided to direct flows to the small creek at the north end of the site.
- 10. To preserve trees within the adjacent valley, the outlet sewer will need to be installed using directional drill or other trenchless technology.
- 11. To enable the site to be serviced by a gravity sanitary sewer and to direct overland flows to the creek, the site will need to be raised above the existing grades at the south end of the site. This will require the use of retaining walls and look-out or walk-out basements.

PREPARED BY TRAFALGAR ENGINEERING LTD.

Andy Prej

Andy Prejs, MASc, EIT Intermediate Designer

**J.T. Nelson, P.Eng.** Principal, Design Services



Functional Servicing Report 1667 Sunningdale Bend City of Mississauga

# APPENDIX 'A'

Development Concept Plan, Glen Schnarr & Associates Inc. Topographic Survey 2007, Tarasick McMillan Kubicki Limited Topographic Survey 2020, Tarasick McMillan Kubicki Limited





URBAN DESIGN CONCEPT PLAN OPTION 2

> 1667 SUNNINGDALE BEND PART OF LOTS 8, 9, & 10 REGISTERED PLAN D-13 CITY OF MISSISSAUGA REGION OF PEEL

## **DEVELOPMENT STATISTICS**

SITE AREA:	0.51ha (1.26ac)
TOTAL UNITS:	5 UNITS

# **REQUIRED PARKING SPACES**

RESIDENT (2/Unit):	10
VISITOR (0.25/Unit):	2
ACCESSIBLE:	1
TOTAL REQUIRED PARKING:	13

# **PROVIDED PARKING SPACES**

RESIDENT (2/Unit)	10
(One space located internally and one	driveway space)*
VISITOR (1/UNIT)	5
(Located in driveway)	
ACCESSIBLE:	1
TOTAL PROVIDED PARKING:	16

# Notes

\*Internal driveway space is conceptual only Typical Visitor Parking Space: 2.6m x 5.2m \*Lot 5 Area includes Potential NHS & Buffer Compensation Area





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Functional Servicing Report 1667 Sunningdale Bend City of Mississauga

# APPENDIX 'B'

Estimated Water Demand Estimated Demand Pressure Fire Flow Test Results Estimated Sanitary Flow Connection Single Use Demand Table

#### ESTIMATED WATER DEMAND

Project: Desc:	Welton FSR-rev1									F	Project No.: Prepared By: Checked By:	1407 KZ SP
		Oc	cupancy Data				P	eaking Facto	ors		Demand Flow	
Land Us	e / Occupancy Type	Area (ha)	Population Density (pers/ha)	Eq. Population (cap.)	Per Cap. Demand (L/cap. Day)	Average Daily Demand (L/min)	/ Min. Hour	Peak Hour	Max. Daily	Min. Hour Demand (L/min)	Max. Hour Demand (L/min)	Max. Daily Demand (L/min)
Single F	amily Detached	0.374	50.Ú	19	280	4	1.00	3.00	2.00	4	11	7
*Per Ca	o. Demand based on O.B.C.	Table 8.2.1.3.B	- 5 L/1.0m <sup>2</sup> St	ores								
TOTAL		0		19		4	Ļ			4	11	7
<u>Fire Flor</u> Using Fi 1.	<ul> <li>W</li> <li>Interpretation</li> <li>An estimate of the fire flow of the flow o</li></ul>	thodology: Si w is given by the low in litres per r d to the type of c a in square metr	hortcut metho e formula ninute construction res (including a	d used per note J $F = 220C\sqrt{z}$ all storeys but exc	4 Iuding baseme	<b>4000</b> ents at least 50% b	<b>L/min</b> L/min	67(L/s)		Average Da Minimum Hou Maximum Hou Maximum Da Max. Dai	ily Demand: rly Demand: rly Demand: ily Demand: ily Plus Fire:	0.1 (L/s) 0.1 (L/s) 0.2 (L/s) 0.1 (L/s) 67 (L/s)
	Type of Construction:	Ordinary		Coefficient: 1.0	0	Total Floor Area	0	(m <sup>2</sup> )	Area Note:	For fire resistiv	/e buildings, co	nsider the
	F = 0 (L/mir	ı)		Adequat	ely Protected	Vertical Openings:	Yes	I		two largest adj	joining floors pl	us 50% of
2.	Adjust the value in No. 1 f Occupancy Contents: F = 0 (L/mir	for occupancy su Limited Coml	urcharge/reduc	<b>ction</b> Factor: -15	%			v		openings are ir adequately pro consider only t plus 25% of ea	nadequately pro nadequately pro nected vertical he area of the l och of the two ir	otected. For openings argest floor nmediately
3.	Adjust the value in No. 2 f	or sprinkler			4.	Adjust the value i	n No. 2 for e	xposure		adjoining floor	S	
E	NFPA 13 Sprinkler: Standard Water Supply: Fully Supervised:	No Yes No Tota Sprinkle	Reduction: Reduction: Reduction: Il Reduction: r Reduction:	20% 10% 10% 40% 0 (L/i	min)	Sey North East South West To Expos	oration (m) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Charge 25% 25% 25% 25% 75% 0	(L/min)			
5.	Estimated Fire Flow is val	ue in No. 2 less	Sprinkler Redu	iction plus exposi	ure Charge , ro	ounded to the near	rest 1000					

F = 0 (L/min)

# ESTIMATED DEMAND PRESSURE (AT MAIN)

Project:	Welton				Project No.:	1407
Desc:	Fire Calcs				Prepared By:	ΚZ
					Checked By:	SP
Hydrant	Residual Flow (Refer to Atta	ached Flow	Test Result	ts)		
		_				
Coefficie	nt	C=	0.9			
Port Dian	neter	D=	2.5 (in	nch)		
Pitot Pres	ssure	P <sub>pit</sub> =	56 (p	sig)		
Residual	Flow	$Q_R =$	1256 (u	s gpm)		
Residual	Flow	$Q_R =$	4754 (L	/min)		
Hydrant <sup>·</sup>	Theoretical Flow (Refer to A	Attached Flo	w Test Res	sults)		
Static Pre	essure	P <sub>stat</sub> =	66 (p	sig)		
Residual	Pressure	P <sub>res</sub> =	54 (p	sig)		
Theoretic	al Pressure	P <sub>theo</sub> =	20 (p	sig)		
Theoretic	cal Flow	Q <sub>T</sub> =	2595 (u	s gpm)		
Theoretic	cal Flow	Q <sub>T</sub> =	9822 (L	/min)		
Max. Der	nand Pressure					
Maximun	n Demand	$Q_D =$	4007 (L	/min)		
Maximun	n Demand	$Q_{D} =$	1059 (u	s gpm)		
Calculate	ed Pressure	P=	57 (p	sig)		
Where:						
$Q_{R} = 29$	$.84 \times C \times D^2 \times P_{\text{pit}}^{0.5}$					
0 - 0	v[(P_P)/(P_	P)1 <sup>0.54</sup>				
	$10^{10}$ stat 1 theo $10^{10}$ stat	res /				
$P = P_{stat}$	$-(Q_D/Q_R)^{1.002} \times (P_{stat} - P_{re})^{1.002}$	es)				
Notes: Refer to att 2, 2016.	ached hydrant flow test results for	r 300mm main	on Church St	reet prepared by J	ackson Waterworks da	ted May

https://trafalgareng.sharepoint.com/sites/Production/Active Projects/1407 Welton/Calculations/[2021-06-07 Water and S& VER 1.0

#### AQUACC 0

81 Todd Road Suite 202 Georgetown Ont. L7G 4R8

(o) 905-467-5853 (C) 905-971-9956 (e) mark@aquacom.ca

SITE NAME	SUNNINGDALE BEND
TEST DATE TIME	TUESDAY 18 MAY 2021 @ 11:45
SITE ADDRESS	SUNNINDALE BEND, C OF MISSISSAUGA, R OF PEEL
TECHNICIANS	MARC COULTER & MARK KILBOURNE
COMMENTS	MUNICIPAL HYDRANTS

#### LOCATION OF FLOW HYDRANT

**1730 SUNNINGDALE BEND** 

# LOCATION OF RESIDUAL HYDRANT

845 SUNNINGDALE BEND

# OUTLETS	SIZE INCHES	PITO PSI	FLOW USGPM	RESIDUAL PSI	STATIC PSI	PIPE DIA. MM
ONE	2.50	56	1256	54	66	150MM
TWO	2.50	30	1840	48		
		THEORETICAL	3054	20	TEST #	ONE
NOZZLE COEFF.		.90				

![](_page_23_Figure_9.jpeg)

**FLOW US GPM** 

![](_page_24_Picture_0.jpeg)

**HYDRANT FLOW TEST REPORT** 

81 Todd Road Suite 202 Georgetown Ont. L7G 4R8

( o ) 905-467-5853 ( c ) 905-971-9956 ( e ) mark@aquacom.ca

		HYDRANT	SEC. VALVE	TECH.	TIME	STATIC	PITO 1-2.50"	FLOW 1-2.50"	RESIDUAL 1-2.50"	PITO 2-2.50"	FLOW 2-2.50"	RESIDUAL 2-2.50"	COLOUR
		MAKE	CONDITION			PSI	PSI	US GPM	PSI	PSI	US GPM	PSI	CODE
F1	1730 SUNNINGDALE	CV	OK/OPEN	MC			56	1256		30	1840		BLUE
R1	1731 SUNNINGDALE	CV	OK/OPEN	MK		66			54			48	
F2													
R2													
F3													
R3													
F4													
R4													
F5													
R5													

CUSTOMER

TRAFALGAR ENGINEERING

LOCATION

SUNNINGDALE BEND

C OF MISSISSAUGA, R OF PEEL

CONTACTS ON SITE

RofP OPERATOR

# Google Maps

![](_page_25_Picture_3.jpeg)

Imagery ©2021 First Base Solutions, Maxar Technologies, Map data ©2021 50 m 🗆

#### **ESTIMATED SANITARY FLOW**

Project: Welton Desc: FSR-rev1

**Total Peak Flow:** 

Project No.:1407Prepared By:KZChecked By:SP

Residential					
			Eq.	Per Cap.	Average Daily Dry
		Pop. Density	Population	Demand	Weather Flow
Land Use / Occupancy Type	Units	(per/unit)	(cap.)	(L/cap. Day)	(L/s)
Proposed Development (Singles)	5	4.2	21.0	303	0.07
898 Meadow Wood (Single)	1	4.2	4.2	303	0.01
892 Meadow Wood (Single)	1	4.2	4.2	303	0.01
TOTAL	7		29		0.1
Industrial / Commercial / Institutiona					
		Population	Eq.	Per Cap.	Average Daily Dry
		Density	Population	Demand	Weather Flow
Land Use / Occupancy Type	GFA	(pers/ha)	(cap.)	(L/Ha. Day)	(L/s)
TOTAL	0		0		0.0
Residential Peaking Factor:	4.36				
ICI Peaking Factor:	4.50	_			
Include ICI Peaking?	No				
Tributary Area:	0.37	(ha)			
Infiltration Allowance:	0.20	(L/s ha)			
Foundation Drain Allowance:	0.00	(L/s ha)			
Residential Average Flow:	0.2	(L/s)			
ICI Average Flow:	0.0	(L/s)			
Total Average Flow:	0.2	(L/s)			
Residential Peak Flow:	0.5	(L/s)			
ICI Peak Flow:	0.0	(L/s)			

P:\1407 Welton\Calculations\[2022-03-03 Water and Sanitary Demands.xlsx]SANITARY

0.5 (L/s)

# **Connection Single Use Demand Table**

#### WATER CONNECTION

Connection point <sup>3)</sup>								
Ex. water main at the end of Sunningdale Bend								
Pressure zone of connection point								
Total equivalent population to be se	19							
Total lands to be serviced	0.37 Ha							
Hydrant flow test								
Hydrant flow test location		1730 Sunning	dale Bend					
		_						
	Pressure (kPa)	Flow (in l/s)	Time					
Minimum water pressure	330	116						
Maximum water pressure	455	static						

No	Water demands									
NO.	Demand type	Demand	Units							
1	Average day flow	0.1	l/s							
2	Maximum day flow	0.1	l/s							
3	Peak hour flow	0.2	l/s							
4	Fire flow <sup>2)</sup>	67	l/s							
Analysis										
5	Maximum day plus fire flow	67.1	l/s							

#### WASTEWATER CONNECTION

Total equivalent population to be serviced <sup>1)</sup> 29       Total lands to be serviced     0.37 Ha       6     Wastewater server offluent (in 1/c)     0.5	Con	nection point <sup>4)</sup>	Ex. San. Sur	ningdale Bend
Total lands to be serviced 0.37 Ha	Tota	al equivalent population to be serviced <sup>1)</sup>	29	
6 Wastowater sower offluent (in 1/s)	Tota	al lands to be serviced	0.37 Ha	
	6	Wastewater sewer effluent (in I/s)	0.5	

<sup>1)</sup> The calculations should be based on the development estimated population (employment or residential).

<sup>2)</sup> Please reference the Fire Underwriters Survey Document

<sup>3)</sup> Please specify the connection point ID

<sup>4)</sup> Please specify the connection point (wastewater line or manhole ID) Also, the "total equivalent popopulation to be serviced" and the "total lands to be serviced" should reference the connection point. (The FSR should contain one copy of Site Servicing Plan)

Please include the graphs associated with the hydrant flow test information table Please provide Professional Engineer's signature and stamp on the demand table All required calculations must be submitted with the demand table submission. Functional Servicing Report 1667 Sunningdale Bend City of Mississauga

APPENDIX 'C'

Correspondence with Planning & Development Services

Hi Stephen, I received the FSR submitted for the RZ noted above, which is dated June 10, 2021. Modelling for water and wastewater capacity is required prior to the RZ approval. I require some revisions prior to sending it for modelling.

Firstly, since the road within the development is a condo road, our jurisdiction will end at the end of the municipal ROW, which appears to be the limit of the cul de sac. Therefore, after the municipal ROW the services will be private. The Servicing plan should be adjusted so that the connections for the private road and the transfer of the existing forcemain connections are in accordance with Peel Standards, showing appurtenances at the Right of Way property limit.

Water

- Just a note that the Region does not recommend dead ends on private or public side.
- For appendix A water demands, please fill in the attached demand table. We require the flows to be in L/s for our model.

Wastewater

- Connection from the existing private forcemains to municipal gravity sewer shall transition from forcemain to gravity prior to entering the municipal sanitary sewer. Sewage from private property shall enter the Region's municipal sewer by gravity. Please incorporate this into the design
- For Appendix A sanitary flow, can you please include the flows from 898 and 892 Meadow Wood so we have the total flows.
- Also in appendix A, for the design flow calculations, since this is infill with existing municipal services in the road allowance, please consider the following PPU's, which are found in the Region of Peel 2020 DC Background Study - Singles/Semi – 4.2 persons per unit (this was conveyed with my DARC comments)

When these revisions have been made you can send me the updated report and demand table and I can send it for modelling.

If you have any questions, please let me know. Thank you, **Bernadette Sniatenchuk, B.Sc.** 

Project Manager – Servicing Connections

Planning & Development Services Public Works, Region of Peel 10 Peel Centre Drive, Suite B, 4th Floor Brampton, On L6T 4B9 Mobile: 647-285-5919

![](_page_30_Picture_0.jpeg)

In response to the emergence of the novel coronavirus, the Region of Peel is implementing various measures to protect our customers, employees and workplaces. Development Services will endeavour to maintain the continuity of our business operations, however delays in service may still be experienced. We appreciate your patience during this time.

This e-mail is for the sole use of the intended recipient and may contain confidential or privileged information. Unauthorized use of its contents is prohibited. If you have received this e-mail in error, please notify sender immediately via return e-mail and then delete the original e-mail.

Functional Servicing Report 1667 Sunningdale Bend City of Mississauga

## APPENDIX 'D'

Stormwater Drainage Calculations HydroCAD Results Report Figure 2, Pre-Development Drainage Plan Figure 3, Post-Development Drainage Plan

# **Area Parameters**

Project:	1667 Sunningdale Bend	Project No.:	1407
Desc:	Single Family Condo	Prepared By:	AJP

JN **Checked By:** 

C<sub>per</sub>: 0.25

C<sub>imp</sub>: 0.9

		A	A	<b>A</b>		
Area	Description	Area <sub>imp</sub>	Area <sub>per</sub>	Area <sub>total</sub>	Composite	% Imp
INUITIDEI	Pre-Development	(11d)	(11d)	(11a)	Runon Coer., C	<i>∞</i> imp
Α	North part of Site	0.028	0.215	0.243	0.33	12%
	Ex. Sunningdale Bend	0.005	0.003	0.008	0.64	60%
	To Valley	0.033	0.218	0.251	0.34	13%
		0.000	00	0.201		
в	To South	0.078	0.194	0.272	0.44	29%
						-
	Post Development					
А						
	Sunningdale Bend & Cul-de-					
	sac to Sewer	0.044	0.026	0.071	0.66	63%
		0.407		0.004	0.70	600
С	Site Area to Sewer	0.197	0.089	0.286	0.70	69%
Б	Site Area Direct to Vellov	0	0 000	0.000	0.25	0%
	Cul-de-sac Direct to Valley	0	0.090	0.090	0.25	0% 0%
	Area Direct to Valley	0	0.100	0.100	0.25	0%
		-				
D	Site Area to South	0.000	0.069	0.069	0.25	0%

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# INFILRTATION IN STORAGE TANK FOR AREA A

Based on MOE SWM Design Manual

Project:	1667 Sunning	dale Bend			Pro	ject No.:	1407
Desc:	Single Family	Condo			Prep	oared By:	AJP
					Che	cked By:	JN
<u>Infitratio</u>	n of 5mm Stor	<u>m</u>					
Required	Vol. (V)	2.22 m <sup>3</sup>	Volume bel	ow pipe free ou	utflow		
t=1000V/	/(PnA)		MOE Storm	water Manage	ment Design Manual.		
			P = n = A = FS =	60 mm/hr 0.4 18 m <sup>2</sup> 2.5	Per Geotechnical Engineer		
t=	12.85 hr						

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# INFILRTATION IN STORAGE TANK FOR AREA C

Based on MOE SWM Design Manual

Project:	1667 Sunning	dale Bend			Pr	oject No.:	1407
Desc:	Single Family	Condo			Pre	epared By:	AJP
					Ch	ecked By:	JN
<u>Infitratio</u>	<u>n of 5mm Stor</u>	<u>m</u>					
Required	Vol. (V)	9.9 m <sup>3</sup>	Volume bel	ow pipe free o	utflow		
t=1000V,	/(PnA)		MOE Storm	water Manage	ment Design Manual.		
			P = n = A = FS =	60 mm/hr 0.4 75 m <sup>2</sup> 2.5	Per Geotechnical Enginee	er	
t=	13.75 hr						

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#### AREA A: ORIFICE TUBE SIZING DESIGN SHEET - INLET CONTROL

Project:	1667 Sunningdale Bend	Project No.:	1407
Desc:	2nd Submission RZ	Prepared By:	AJP
		Checked By:	JN

#### **Orifice Tube Geometric Information**

0.74

0.7

Υ

 $K_{s}$ 

Orifice Tube	e Dia.	75	(mm) (Calculation based on Imperial ID)
Pipe Materia	al	Circular	
Inlet Configuration		Beveled	Where Unsubmerged:
К	0.0018		$\frac{HW}{R} = \frac{H_{c}}{R} + K + \left[\frac{K_{u}Q}{R}\right]^{M} + K_{s}S$
М	2.5		D D [AD <sup>0.5</sup> ]
С	0.03		

Where Submerged:

$$\frac{HW}{D} = C \left[ \frac{K_{\rm u}Q}{AD^{0.5}} \right]^2 + Y + K_{\rm s}S$$

#### HDS-5 METHODOLOGY - INLET CONTROL "HAND CALCULATIONS"

Inlet	Tube	Critical	Critical	Specific						Outlet		
Control	Discharge,	Flow Area,	Velocity,	Head,			Unsubm.	Subm.		Control		Governing
Headwater	Q	A	V <sub>c</sub>	H <sub>c</sub>	Unsubm.	Subm.	HW	HW		Headwater	Control	Headwater
Elevation	(cms)	(m <sup>2</sup> )	(m/s)	(m)	HW/D	HW/D	(m)	(m)	Q/AD <sup>0.5</sup>	Elevation	Туре	Elevation
93.79	0.001	0.002	0.507	0.047	0.613	0.816	0.050	0.060	0.794	93.81	Outlet	93.81
93.82	0.002	0.003	0.254	0.052	1.000	1.002	0.080	0.080	1.589	93.84	Outlet	93.84
93.84	0.003	0.004	0.248	0.063	1.260	1.313	0.100	0.100	2.383	93.86	Outlet	93.86
93.87	0.004	0.004	0.232	0.070	1.482	1.747	0.110	0.130	3.177	93.86	Inlet	93.87
93.92	0.005	0.004	0.209	0.074	1.670	2.306	0.130	0.180	3.972	93.89	Inlet	93.92
93.97	0.006	0.005	0.181	0.076	1.852	2.989	0.140	0.230	4.766	93.94	Inlet	93.97
94.03	0.007	0.005	0.152	0.076	2.052	3.796	0.160	0.290	5.561	93.98	Inlet	94.03
94.10	0.008	0.005	0.126	0.076	2.289	4.728	0.170	0.360	6.355	94.03	Inlet	94.10
94.18	0.009	0.005	0.103	0.076	2.570	5.783	0.200	0.440	7.149	94.09	Inlet	94.18
94.72	0.014	0.008	0.085	0.100	5.235	12.923	0.400	0.980	11.121	94.48	Inlet	94.72

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## AREA A: ORIFICE TUBE SIZING DESIGN SHEET - OUTLET CONTROL

Project:	1667 Sunningdale Bend		Project No.:	1407
Desc:	2nd Submission RZ		Prepared By:	AJP
			Checked By:	JN
Orifice Tu	be Geometric Information	Orifice Tube Properties	-	

Orifice Tube Dia.

75 (mm) (Calculation based on Imperial ID) 0.23 (m)

Orifice Tube Length Orifice Tube Slope

Т

0.020 (m/m)

Note: It is recommended that the orifice tube length is between two and three diameters. Based on the selection above, a range of 150mm to 225mm in length is recommended for true orifice flow. Lengths exceeding the recommended range for true orifice flow are culvert flow.

Maximum Allowable Q 0.014 (cms) Tube D/S Invert 93.74 (m)

Entrance Loss Coeff.	0.2	
Exit/Transition Loss Coeff.	1.00	
Orifice Tube Manning's 'n'	0.013	
Gravitational Constant	9.81	(m/s²)

STAGE-I	DISCHARGE	E AND HYDF	PERTIES TAB	<b>SLE - OUTLET</b>	CONTROL	

Outlet Control Headwater Elevation	Tube Discharge, Q (cms)	Flow Area, A (m <sup>2</sup> )	Friction Loss, H <sub>f</sub> (m)	Inlet Velocity, V <sub>1</sub> (m/s)	Outlet Velocity, V <sub>2</sub> (m/s)	Entrance Loss, H <sub>e</sub> (m)	Exit Loss, H <sub>t</sub> (m)	Total Headloss, H <sub>L</sub> (cms)	Critical Depth, d <sub>c</sub> (m)	Tailwater Elevation (D+d <sub>c</sub> )/2 (m)
93.81	0.001	0.001	0.00	0.67	0.26	0.00	0.00	0.01	0.03	93.80
93.84	0.002	0.003	0.00	0.80	0.52	0.01	0.03	0.04	0.05	93.80
93.86	0.003	0.003	0.00	0.87	0.68	0.01	0.04	0.05	0.06	93.81
93.86	0.004	0.005	0.01	0.88	0.91	0.01	0.04	0.05	0.07	93.81
93.89	0.005	0.005	0.01	1.10	1.14	0.01	0.06	0.08	0.07	93.81
93.94	0.006	0.005	0.01	1.32	1.32	0.02	0.09	0.12	0.07	93.82
93.98	0.007	0.005	0.02	1.53	1.54	0.02	0.12	0.16	0.07	93.82
94.03	0.008	0.005	0.02	1.75	1.75	0.03	0.16	0.21	0.08	93.82
94.09	0.009	0.005	0.03	1.97	1.97	0.04	0.20	0.27	0.08	93.82
94.48	0.014	0.005	0.07	3.07	3.07	0.10	0.48	0.65	0.10	93.83

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Т

#### AREA C: ORIFICE TUBE SIZING DESIGN SHEET - INLET CONTROL

Project:	1667 Sunningdale Bend	Project No.:	1407
Desc:	2nd Submission RZ	Prepared By:	AJP
		Checked By:	JN

#### **Orifice Tube Geometric Information**

0.74

0.7

Υ

 $K_{s}$ 

Orifice Tube	e Dia.	75	(mm) (Calculation based on Imperial ID)
Pipe Materia	al	Circular	
Inlet Config	uration	Beveled	Where Unsubmerged:
К	0.0018		$\frac{HW}{D} = \frac{H_{c}}{D} + K + \left[\frac{K_{u}Q}{D}\right]^{M} + K_{s}S$
М	2.5		D D [AD <sup>0.5</sup> ]
С	0.03		

Where Submerged:

$$\frac{HW}{D} = C \left[ \frac{K_{\rm u}Q}{AD^{0.5}} \right]^2 + Y + K_{\rm s}S$$

#### HDS-5 METHODOLOGY - INLET CONTROL "HAND CALCULATIONS"

Inlet	Tube	Critical	Critical	Specific						Outlet		
Control	Discharge,	Flow Area,	Velocity,	Head,			Unsubm.	Subm.		Control		Governing
Headwater	Q	A	V <sub>c</sub>	H <sub>c</sub>	Unsubm.	Subm.	HW	HW		Headwater	Control	Headwater
Elevation	(cms)	(m <sup>2</sup> )	(m/s)	(m)	HW/D	HW/D	(m)	(m)	Q/AD <sup>0.5</sup>	Elevation	Туре	Elevation
93.60	0.001	0.015	0.066	0.087	1.141	0.804	0.090	0.060	0.794	93.60	Outlet	93.60
93.70	0.002	0.025	0.254	0.127	2.488	0.990	0.190	0.080	1.589	93.65	Inlet	93.70
93.61	0.003	0.032	0.248	0.157	3.108	1.301	0.240	0.100	2.383	93.67	Outlet	93.67
93.64	0.004	0.038	0.232	0.181	3.663	1.735	0.280	0.130	3.177	93.69	Outlet	93.69
93.68	0.005	0.043	0.209	0.201	4.174	2.294	0.320	0.170	3.972	93.73	Outlet	93.73
93.74	0.006	0.046	0.181	0.217	4.644	2.977	0.350	0.230	4.766	93.78	Outlet	93.78
93.80	0.007	0.048	0.152	0.229	5.076	3.784	0.390	0.290	5.561	93.82	Outlet	93.82
93.87	0.008	0.049	0.126	0.238	5.478	4.716	0.420	0.360	6.355	93.88	Outlet	93.88
93.95	0.009	0.050	0.103	0.243	5.865	5.771	0.450	0.440	7.149	93.94	Inlet	93.95
94.49	0.014	0.050	0.085	0.247	8.136	12.911	0.620	0.980	11.121	94.32	Inlet	94.49

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## AREA C: ORIFICE TUBE SIZING DESIGN SHEET - OUTLET CONTROL

Project:	1667 Sunningdale Bend		Project No.:	1407
Desc:	2nd Submission RZ		Prepared By:	AJP
			Checked By:	JN
Orifice Tu	be Geometric Information	Orifice Tube Properties		

Orifice Tube Dia.

75 (mm) (Calculation based on Imperial ID) 0.23 (m)

Orifice Tube Length Orifice Tube Slope

0.003 (m/m)

Note: It is recommended that the orifice tube length is between two and three diameters. Based on the selection above, a range of 150mm to 225mm in length is recommended for true orifice flow. Lengths exceeding the recommended range for true orifice flow are culvert flow.

Maximum Allowable Q 0.014 (cms) Tube D/S Invert 93.51 (m)

Entrance Loss Coeff.	0.2	
Exit/Transition Loss Coeff.	1.00	
Orifice Tube Manning's 'n'	0.013	
Gravitational Constant	9.81	(m/s²)

Outlet	Tube							Total		Tailwater
Control	Discharge,	Flow Area,	Friction	Inlet	Outlet	Entrance		Headloss,	Critical	Elevation
Headwater	Q	A	Loss, H <sub>f</sub>	Velocity, V <sub>1</sub>	Velocity, V <sub>2</sub>	Loss, H <sub>e</sub>	Exit Loss, H <sub>t</sub>	$H_L$	Depth, d <sub>c</sub>	(D+d <sub>c</sub> )/2
Elevation	(cms)	(m <sup>2</sup> )	(m)	(m/s)	(m/s)	(m)	(m)	(cms)	(m)	(m)
93.60	0.001	0.001	0.00	0.67	0.22	0.00	0.00	0.01	0.09	93.59
93.65	0.002	0.003	0.00	0.80	0.44	0.01	0.03	0.04	0.12	93.61
93.67	0.003	0.003	0.00	0.87	0.66	0.01	0.04	0.05	0.15	93.62
93.69	0.004	0.005	0.01	0.88	0.88	0.01	0.04	0.05	0.18	93.64
93.73	0.005	0.005	0.01	1.10	1.10	0.01	0.06	0.08	0.20	93.65
93.78	0.006	0.005	0.01	1.32	1.32	0.02	0.09	0.12	0.22	93.66
93.82	0.007	0.005	0.02	1.53	1.54	0.02	0.12	0.16	0.23	93.66
93.88	0.008	0.005	0.02	1.75	1.75	0.03	0.16	0.21	0.24	93.67
93.94	0.009	0.005	0.03	1.97	1.97	0.04	0.20	0.27	0.24	93.67
94.32	0.014	0.005	0.07	3.07	3.07	0.10	0.48	0.65	0.25	93.67

#### STAGE-DISCHARGE AND HYDRAULIC PROPERTIES TABLE - OUTLET CONTROL

P:\1407 Welton\Calculations\submission 3\[1407 Orifice Tube 2024-01-30.xlsm]2.1.2 ORIFICE TUBE Area C

1S     2S       Pre-Valley     Pre-Sheridan Creek	Area A Storage Tank A 4S Area B 5S BP BP
	Area C Storage Tank B
	~

2022-12-19 - AJP	
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	Rainfall Events Listing											
Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (mm)	AMC				
1	2-Year	ON Mississauga 24hr	2-Year	Default	24.00	1	50	2				
2	5-Year	ON Mississauga 24hr	5-Year	Default	24.00	1	67	2				
3	10-Year	ON Mississauga 24hr	10-Year	Default	24.00	1	83	2				
4	25-Year	ON Mississauga 24hr	25-Year	Default	24.00	1	95	2				
5	50-Year	ON Mississauga 24hr	50-Year	Default	24.00	1	106	2				
6	100-Year	ON Mississauga 24hr	100-Year	Default	24.00	1	118	2				

2022-12-19 - AJ	Р		
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		Area Listing (all nodes)	
Area	CN	Description	

_	(hectares)		(subcatchment-numbers)
	0.6985	61	>75% Grass cover, Good, HSG B (1S, 2S, 3S, 4S, 5S, 6S)
	0.2412	98	Paved roads w/curbs & sewers, HSG B (3S, 5S)
	0.1116	98	Unconnected roofs, HSG C (1S, 2S)
	1.0513	73	TOTAL AREA

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#### Project Notes

Copied 6 events from ON Mississauga 24hr storm

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		Soil Listing (	all nodes)				G	round Cove	ers (all node	es)		
Area	Soi	Subcatchment			HSG-A	HSG-B	HSG-C	HSG-D	Other	Tota	Ground	Subcatcl
(hectares)	Group	Numbers			(hectares)	(hectares)	(hectares)	(hectares)	(hectares)	(hectares)	Cover	Numbers
0.0000	HSG A				0.0000	0.6985	0.0000	0.0000	0.0000	0.6985	>75% Grass cover, Good	
0.9397	HSG B	1S, 2S, 3S, 4S, 5S, 6S			0.0000	0.2412	0.0000	0.0000	0.0000	0.2412	Paved roads w/curbs &	
0.1116	HSG C	1S, 2S									sewers	
0.0000	HSG D				0.0000	0.0000	0.1116	0.0000	0.0000	0.1116	Unconnected roofs	
0.0000	Other				0.0000	0.9397	0.1116	0.0000	0.0000	1.0513	TOTAL AREA	
1.0513		TOTAL AREA										

<b>2022-12-19 - AJP</b>	ON Mississauga 24hr 2-Yea	r Rainfall=50 mm	<b>2022-12-19</b> - A
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HwiroCAD® 10 20-21 s/n 13129 @ 2022 Hv	droCAD Software Solutions LLC	Page 7	HydroCAD® 10.2
Time span=0 Runoff by SCS Reach routing by Dyn-Stor-	.00-32.00 hrs, dt=0.05 hrs, 641 points TR-20 method, UH=SCS, Weighted-CN Ind method - Pond routing by Dyn-Stor-Ind me	ethod	Runoff =
Subcatchment 1S: Pre - Valley	Runoff Area=2,538.0 m <sup>2</sup> 13,40% Impervious	Runoff Depth=2 mm	Runoff by SCS
Flow Length=54.7 m Slope=0.0390	m/m Tc=6.0 min UI Adjusted CN=63 Runoff=	0.000 m³/s 0.006 M	ON Mississauga
Subcatchment 2S: Pre-Sheridan Creek	Runoff Area=2,719.0 m <sup>2</sup> 28.54% Impervious	Runoff Depth=4 mm	Area (m²)
Flow Length=73.6 m Slope=0.0340	m/m Tc=7.0 min UI Adjusted CN=66 Runoff=	0.001 m³/s 0.010 MI	340.0
Subcatchment 3S: Area A	Runoff Area=707.0 m² 62.66% Impervious R Tc=15.0 min CN=84 Runoff=	unoff Depth=18 mm 0.004 m³/s 0.013 M	2,198.0 2,538.0 2,198.0
Subcatchment 4S: Area B	Runoff Area=1,000.0 m² 0.00% Impervious	Runoff Depth=2 mm	340.0
	Tc=15.0 min CN=61 Runoff=	0.000 m³/s 0.002 MI	340.0
Subcatchment 5S: Area C	Runoff Area=2,859.0 m² 68,87% Impervious R Tc=15.0 min CN=86 Runoff=	unoff Depth=21 mm 0.021 m³/s 0.060 MI	Tc Leng (min) (mete 6.0 54
Subcatchment 6S: Area D	Runoff Area=690.0 m² 0.00% Impervious Tc=15.0 min CN=61 Runoff≕	Runoff Depth=2 mm 0.000 m³/s 0.001 MI	
Pond 7P: Storage Tank A	Peak Elev=93.828 m Storage=1.8 m <sup>3</sup> Inflow=	0.004 m³/s 0.013 M	0.000
Discarded=0.000 m³/s 0	000 MI Primary=0.003 m <sup>3</sup> /s 0.013 MI Outflow=1	0.003 m³/s 0.013 M	
Pond 8P: Storage Tank B	Peak Elev=93.594 m Storage=24.5 m³ Inflow=	0.021 m³/s 0.060 MI	0.000
Discarded=0.000 m <sup>3</sup> /s 0	009 MI Primary=0.004 m³/s 0.039 MI Outflow=1	0.004 m³/s 0.048 MI	
Link 9L: To Valley	Inflow= Primary=	0.006 m³/s 0.053 MI 0.006 m³/s 0.053 MI	0.000

Inflow=0.000 m³/s 0.001 MI Primary=0.000 m³/s 0.001 MI

Link 10L: Sheridan Creek

Total Runoff Area = 1.0513 ha Runoff Volume = 0.092 MI Average Runoff Depth = 9 mm 66.44% Pervious = 0.6985 ha 33.56% Impervious = 0.3528 ha

2022-12-19 - AJP	ON Mississauga 24hr 2-Year Rainfall=50 mm
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Summan	/ for	Subcatchment	15.	Pro -	Valley
Juillian	/ 101	Subcatoriment	10.	LIC -	valie

Runoff	=	0.000 m³/s @	9.48 hrs, Volume=	0.006 MI, Depth=	2 mm

TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs ja 24hr 2-Year Rainfall=50 mm

Area (m²)	CN	Adj	Description
340.0	98		Unconnected roofs, HSG C
2,198.0	61		>75% Grass cover, Good, HSG B
2,538.0	66	63	Weighted Average, UI Adjusted
2,198.0			86.60% Pervious Area
340.0			13.40% Impervious Area
340.0			100.00% Unconnected
Tc Length	I Slo	pe V	elocity Capacity Description

(min)	(meters)	(m/m)	(m/sec)	(m³/s)	
6.0	54.7	0.0390	0.15		Lag/CN Method,

![](_page_40_Figure_10.jpeg)

![](_page_40_Figure_11.jpeg)

<b>2022-12</b> Prepare	2 <b>-19 -</b> , d by T	<b>AJP</b> rafa <b>l</b> oar Enginee	rina	ON Mississauga 24hr 2	-Year Rainfall=50 mm Printed 2024-01-31		
HydroCAL	⊃® 10.2	20-2f s/n 13129 ©	2022 HydroCAD Softwar	e Solutions LLC	Page 9		
Summary for Subcatchment 2S: Pre-Sheridan Creek							
Runoff	=	0.001 m³/s @	9.35 hrs, Volume=	0.010 MI, Depth=	4 mm		

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs ON Mississauga 24hr 2-Year Rainfall=50 mm

		-					
	A	rea (m²)	CN A	dj Desc	ription		
		776.0	98	Unco	nnected roo	ofs, HSG C	
		1,943.0	61	>75%	Grass cov	er, Good, HSG B	
		2,719.0	72 6	6 Weia	hted Avera	ae. UI Adjusted	
		1,943.0		71.46	% Pervious	Area	
		776.0		28.54	% Impervic	us Area	
		776.0		100.0	0% Unconr	nected	
	Тс	Length	Slope	Velocity	Capacity	Description	
_	(min)	(meters)	(m/m)	(m/sec)	(m³/s)		
	7.0	73.6	0.0340	0.18		Lag/CN Method.	

#### Subcatchment 2S: Pre-Sheridan Creek

![](_page_41_Figure_4.jpeg)

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Summary for Subcat	tchment 3S: Area A

Runoff = 0.004 m³/s @ 9.33 hrs, Volume= 0.013 MI, Depth= 18 mm Routed to Pond 7P : Storage Tank A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs ON Mississauga 24hr 2-Year Rainfall=50 mm

Area (m²)	CN	Description
443.0	98	Paved roads w/curbs & sewers, HSG B
264.0	61	>75% Grass cover, Good, HSG B
707.0	84	Weighted Average
264.0		37.34% Pervious Area
443.0		62.66% Impervious Area

 Tc
 Length
 Slope
 Velocity
 Capacity
 Description

 (min)
 (meters)
 (m/m)
 (m/sec)
 (m³/s)

 15.0
 Direct Entry.

#### Subcatchment 3S: Area A Hydrograph Runoff 0.00 0.00 ON Mississauga 24hr 2-Year Rainfall=50 mm Runoff Area=707.0 m<sup>2</sup> Runoff Volume=0.013 Ml Runoff Depth=18 mm (s/, m) Tc=15.0 min CN=84 Flow 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 Time (hours)

2022-12-19 - AJP	ON Mississauga 24hr 2-Year Rainfall=50 mm
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Summary for Subcatchment 5S: Area C

Runoff = 0.021 m<sup>3</sup>/s @ 9.33 hrs, Volume= 0.060 MI, Depth= 21 mm Routed to Pond 8P : Storage Tank B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs ON Mississauga 24hr 2-Year Rainfall=50 mm

Area (m²)	CN	Description
1,969.0	98	Paved roads w/curbs & sewers, HSG B
890.0	61	>75% Grass cover, Good, HSG B
2,859.0	86	Weighted Average
890.0		31.13% Pervious Area
1,969.0		68.87% Impervious Area

1 C	Length	Slope	velocity	Capacity	Description	
(min)	(meters)	(m/m)	(m/sec)	(m³/s)		
15.0					Direct Entry,	

![](_page_41_Figure_17.jpeg)

# Summary for Subcatchment 4S: Area B Runoff = 0.000 m<sup>3</sup>/s @ 10.03 hrs, Volume= 0.002 MI, Depth= 2 mm Routed to Link 9L: To Valley 0.002 MI, Depth= 2 mm 2 mm Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs ON Mississauga 24hr 2-Year Rainfall=50 mm Area (m²) CN Description 1.000.0 61 >75% Grass cover, Good, HSG B 1,000.0 100.00% Pervious Area

 Tc
 Length
 Slope
 Velocity
 Capacity
 Description

 (min)
 (meters)
 (m/m)
 (m/sec)
 (m³/s)

 15.0
 Direct Entry,

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2022-12-19 - AJP

Subcatchment 4S: Area B

ON Mississauga 24hr 2-Year Rainfall=50 mm

Printed 2024-01-31 Page 11

![](_page_41_Figure_21.jpeg)

![](_page_42_Figure_0.jpeg)

19 20 21 22 23 24 25 26 27 28 29 30 31 32

HydroCAD®	10.20 2f s/i	n 13129 © 2022 ⊢	lydroCAD Softwa	re Solutions L	LC	Page 1
		Summar	y for Pond 7F	P: Storage	Tank A	
Inflow Area Inflow Discarded Primary Routed t Routing by I Peak Elev= Plug-Flow d Center-of-M	= 0.0 = 0.00 = 0.00 = 0.00 = 0.00 to Link 9L : Dyn-Stor-In 93.828 m ( letention tim lass det. tim	707 ha, 62.66% 4 m³/s @ 9.33 3 m³/s @ 9.45 3 m³/s @ 9.45 3 m³/s @ 9.45 To Valley d method, Time S @ 9.45 hrs Surf. ne= 20.9 min calc ne= 20.2 min (73	Impervious, Inf hrs, Volume= hrs, Volume= hrs, Volume= Span= 0.00-32.0 Area= 18.0 m <sup>2</sup> ulated for 0.013 9.6 - 719.4 )	low Depth = 0.013 0.013 0.000 0.013 0 hrs, dt= 0.0 Storage= 1.0 MI (100% of	18 mm MI MI, Atten= MI MI 25 hrs 3 m <sup>3</sup>	for 2-Year event 29%, Lag= 7.2 min
Volume	Invert	Avail.Storage	Storage Descr	iption		
#1 9	93.720 m	10.3 m³	Custom Stage 10.8 m <sup>3</sup> Overa	Data (Conic II x 95.0% V	) Listed bel oids	ow (Recalc)

Elevatio (meter	on Surf Area rs) (sq-meters)		Inc.Store (cubic-meters)	Cum Store (cubic-meters)	Wet Area (sq-meters)	
93.72 94.32	20 20	18.0 18.0	0.0 10.8	0.0 10.8	18.0 27.0	
Device	Routing	Invert	Outlet Devices			
#1	Discarded	93.720 m	60.00 mm/hr E Conductivity to Excluded Wett	xfiltration over We Groundwater Elev ed area = 18.0 m <sup>2</sup>	etted area from station = 91.900 m	93.720 m - 94.060 m
#2	Primary	93.720 m	75 mm Vert. O Limited to weir	rifice/Grate C= C flow at low heads	0.600	

 Primary OutFlow
 Max=0.003 m³/s @ 9.45 hrs
 HW=93.827 m
 TW=0.000 m
 (Dynamic Tailwater)

 \*\*2=Orifice/Grate
 (Orifice Controls 0.003 m³/s @ 0.70 m/s)
 0.70 m/s)
 (Dynamic Tailwater)

2022-12-19 - AJP	ON Mississauga 24hr 2-Year Rainfall=50 mm
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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 Time (hours)

![](_page_42_Figure_6.jpeg)

Pond 7P: Storage Tank A

![](_page_42_Figure_8.jpeg)

 2022-12-19 - AJP
 ON Mississauga 24hr 2-Year
 Rainfall=50 mm

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![](_page_42_Figure_10.jpeg)

2022-12-19 - A Prepared by Tr HydroCAD® 10.2	<b>AJP</b> rafalgar Enginee 20-2f s/n 13129 ©	ring 2022 HydroCAD Softwa	ON Mississauga 24hr 2-Year Rainfall=50 Printed 2024-0 e Solutions LLC Pag	<i>mm</i> 1-31 e 17
	Su	mmary for Pond 8F	: Storage Tank B	
Inflow Area = Inflow = Outflow =	0.2859 ha, 6 0.021 m³/s @ 0.004 m³/s @	8.87% Impervious, Infl 9.33 hrs, Volume= 9.79 hrs, Volume=	ow Depth = 21 mm for 2-Year event 0.060 MI 0.048 MI, Atten= 80%, Lag= 27.6 min	

 Outline
 0.044 m/s @ 9.79 hrs, Volume=
 0.046 m/, Atten= ov

 Discarded
 0.000 m/s @ 9.79 hrs, Volume=
 0.039 MI

 Primary
 0.004 m/s @ 9.79 hrs, Volume=
 0.039 MI

 Routed to Link 9L : To Valley
 Routed to Link 9L : To Valley
 1000 m/s @ 9.79 hrs

 Routing by Dyn-Stor-Ind method, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs
 Peak Elev= 93.594 m @ 9.79 hrs
 Surf.Area= 75.0 m² Storage= 24.5 m³

Plug-Flow detention time= 231.7 min calculated for 0.048 MI (81% of inflow) Center-of-Mass det. time= 133.1 min (843.0 - 709.9 )

				,		
Volume	nvert	Avail.Sto	orage Storage	e Description		
#1	93.250 m	106	.9 m <sup>3</sup> Custor	n Stage Data (Coni	ic) Listed below (Re	calc)
			112.51		Volus	
Elevatior	n Su	rf.Area	Inc.Store	Cum.Store	Wet.Area	
(meters	) (sq-n	neters) (d	cubic-meters)	(cubic-meters)	(sq-meters)	
93,250	)	75.0	0.0	0.0	75.0	
94.750	)	75.0	112.5	112.5	121.0	
Device	Routing	Invert	Outlet Device	es		
#1	Discarded	93.250 m	60.00 mm/hr	Exfiltration over W	letted area from 93	250 m - 94 950 m
			Conductivity	to Groundwater Ele	vation = 91.700 m	
			Excluded We	etted area = 75.0 m <sup>2</sup>	2	
#2	Primary	93.440 m	75 mm Vert	Orifice/Grate C=	0.600	
			Limited to we	eir flow at low heads		

Discarded OutFlow Max=0.000 m³/s @ 9.79 hrs HW=93.594 m (Free Discharge) 1=Exfiltration (Controls 0.000 m³/s)

 Primary OutFlow
 Max=0.004 m<sup>3</sup>/s @ 9.79 hrs
 HW=93.594 m
 TW=0.000 m
 (Dynamic Tailwater)

 \*\*2=Orifice/Grate
 (Orifice Controls 0.004 m<sup>3</sup>/s @ 0.91 m/s)
 0.91 m/s)
 (Dynamic Tailwater)

![](_page_43_Figure_6.jpeg)

022-12-19 - AJP	ON Mississauga 24hr 2-Year Rainfall=50 mm

 2022-12-19 - AJP
 ON Mississauga 24hr 2-Year Rainfall=50 mm

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![](_page_43_Figure_9.jpeg)

2022-12-19 - AJP	ON Mississauga 24hr 2-Year Rainfall=50 mm
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0.003 0.004 0.005 0.006 0.007 0.008 0.009 0.01 0.011 0.012 0.013 0.014 Discharge (m<sup>1</sup>/s)

Summary for Link 9L: To Valley

Inflow Area	=	0.4566 ha. 5	2.83% Impervious.	Inflow Depth =	12 mm	for 2-Year event
Inflow	=	0.006 m³/s @	9.57 hrs, Volume	e= 0.053 M	M	
Primary	=	0.006 m³/s @	9.57 hrs, Volume	= 0.053 M	VII, Atten=	0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs

Link 9L: To Valley Inflow
Primary 0.00 Inflow Area=0.4566 ha 0.007 0.00 0.00 0,005 0.004 Flow (m<sup>3</sup>/s) 0.004 0.003 0.003 0.003 0.000 0.00 0.00 0.000 //77 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 Time (hours) 45678

2022-12-19 - AJP         ON Mississauga 24hr 2-Year         Rainfall=50 mm           Prepared by Trafalgar Engineering         Printed         2024-01-31           HydroCAD® 10.20-21 s/n 13129 © 2022 HydroCAD Software Solutions LLC         Page 21	2022-12-19 - AJP ON Miss Prepared by Trafalgar Engineering HydroCAD® 10.20-21 s/n 13129 @ 2022 HydroCAD Software Solutions
Summary for Link 10L: Sheridan Creek	Time span=0.00-32.00 hrs, dt=0.05 hrs Runoff by SCS TR-20 method, UH≕SCS,
Inflow Area =   0.0690 ha, 0.00% Impervious, Inflow Depth =   2 mm for 2-Year event Inflow =   0.000 m³/s @ 10.03 hrs_Volume=   0.001 MI	Reach routing by Dyn-Stor-Ind method - Pond routin
Primary = 0.000 m <sup>3</sup> /s @ 10.03 hrs, Volume= 0.001 MI, Atten= 0%, Lag= 0.0 min	Subcatchment 1S: Pre - Valley Runoff Area=2,538.0 m <sup>2</sup> Flow Length=54.7 m Slope=0.0390 m/m Tc=6.0 min UI Adju
Primary outflow = Inflow, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs Link 10L: Sheridan Creek	Subcatchment 25: Pre-Sheridan Creek Runoff Area=2,719.0 m <sup>2</sup> Flow Length=73.6 m Slope=0.0340 m/m Tc=7.0 min UI Adju
Hydrograph	Subcatchment 3S: Area A Runoff Area=707.0 m <sup>2</sup>
Inflow Area=0.0690 ha	Subcatchment 4S: Area B Runoff Area=1,000.0 m Tc=15.0 r
	Subcatchment 5S: Area C Runoff Area=2,859.0 m <sup>2</sup> Tc=15.0 r
epine	Subcatchment 6S: Area D Runoff Area=690.0 m Tc=15.0 r
Plant Control of Contr	Pond 7P: Storage Tank A Peak Elev=93.932 m Str Discarded=0.000 m³/s 0.000 MI Primary=0.005 m³/
	Pond 8P: Storage Tank B Peak Elev=93.833 m Stor Discarded=0.000 m³/s 0.011 MI Primary=0.007 m³/
	Link 9L: To Valley
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 Time (hours)	Link 10L: Sheridan Creek

\_

2022-12-19 - AJP Bronarod by Trafalgar Engineering	ON Mississauga 24	4hr 5-Year Rainfall=67 mm
HydroCAD® 10.20-2f s/n 13129 © 2022	2 HydroCAD Software Solutions LLC	Page 22
Time spai Runoff by S Reach routing by Dyn-S	n=0.00-32.00 hrs, dt=0.05 hrs, 641 point CS TR-20 method, UH=SCS, Weighted- tor-Ind method - Pond routing by Dyn-S	s ·CN Stor-Ind method
Subcatchment 1S: Pre - Valley Flow Length=54.7 m Slope=0.0	Runoff Area=2,538.0 m² 13.40% Im 390 m/m Tc=6.0 min UI Adjusted CN=63	npervious Runoff Depth=7 mn 3 Runoff=0.004 m³/s 0.019 M
Subcatchment 2S: Pre-Sheridan Cre Flow Length=73.6 m Slope=0.0	ek Runoff Area=2,719.0 m² 28.54% Imp 340 m/m Tc=7.0 min UI Adjusted CN=66	pervious Runoff Depth=10 mn 5 Runoff=0.008 m³/s 0.027 M
Subcatchment 3S: Area A	Runoff Area=707.0 m² 62.66% Imp Tc=15.0 min CN=84	pervious Runoff Depth=31 mm 4 Runoff=0.008 m³/s 0.022 M
Subcatchment 4S: Area B	Runoff Area=1,000.0 m² 0.00% m Tc=15.0 min CN=6	npervious Runoff Depth=6 mm 1 Runoff=0.001 m³/s 0.006 M
Subcatchment 5S: Area C	Runoff Area=2,859.0 m² 68.87% Imp Tc=15.0 min CN=86	pervious Runoff Depth=35 mm 6 Runoff=0.036 m³/s 0.099 M
Subcatchment 6S: Area D	Runoff Area=690.0 m <sup>2</sup> 0.00% Im Tc=15.0 min CN=6	npervious Runoff Depth=6 mn 1 Runoff=0.001 m³/s 0.004 M
Pond 7P: Storage Tank A Discarded=0.000 m³/	Peak Elev=93.932 m Storage=3.6 n s 0.000 MI Primary=0.005 m³/s 0.022 MI	n <sup>3</sup> Inflow=0.008 m <sup>3</sup> /s 0.022 M Outflow=0.005 m <sup>3</sup> /s 0.022 M
Pond 8P: Storage Tank B Discarded=0.000 m <sup>a</sup> /	Peak Elev=93.833 m Storage=41.5 n s 0.011 MI Primary=0.007 m³/s 0.077 MI	n <sup>a</sup> Inflow=0.036 m <sup>3</sup> /s 0.099 M Outflow=0.007 m <sup>3</sup> /s 0.087 M
Link 9L: To Valley		Inflow=0.012 m³/s 0.104 M Primary=0.012 m³/s 0.104 M
Link 10L: Sheridan Creek		Inflow=0.001 m <sup>3</sup> /s 0.004 M

Total Runoff Area = 1.0513 ha Runoff Volume = 0.177 Mi Average Runoff Depth = 17 mm 66,44% Pervious = 0.6985 ha 33,56% Impervious = 0.3528 ha

'repare	d by Tr D® 10.2	afalgar )-2f s/n	Engine	ering © 2022	HydroCAE	) Softw	are So <b>l</b> u	tions L	LC			F	Printed	2024-01-3 Page 2
			Sum	mary	for Sub	catch	ment 1	IS: P	re -	Vall	ey			
Runoff	=	0.004	m³/s @	9.2	6 hrs, Vol	ume=		0.019	MI,	Dep	th=	7 n	nm	
Runoff b	y SCS T	R-20 m	ethod, l	JH=SC	S, Weight	ted-CN	I, Time	Span=	0.0	0-32.	.00 h	rs, dt=	= 0.05	hrs
ON Miss	issauga	24hr 5-	Year R	ainfall	=67 mm									
Ar	rea (m²)	CN	Adj	Desc	ription									
	340.0	98		Unco	nnected ro	ofs, H	SG C	<b>.</b>						
	∠,198.0 2.538.0	66	63	>/ 5%	bted Avers	ver, G	oou, HS Adjuste	ad De						
	2,198.0	00	00	86.60	1% Perviou	is Area								
	340.0			13.40	% Impervi	ous Ai	rea							
	340.0			100.0	w% Uncor	mecte	u							
Тс	Leng	h Slo	pe Ve	ocity	Capacity	Des	cription							
(min)	(meter	s) (m.	'm) (n	n/sec)	(m³/s)									
		7 0 0'	00	0 1 5		1.00	ON Mar	اممطة						
5.0	54	7 0.03	90	0.15		Lag	/CN Me	thod,						
5.0	54	7 0.03	90	0.15 Su	bcatchm	Lag ent 1	/CN Me S: Pre	thod, - Val	ley					
5.0	54	7 0.03	90	0.15 Su	bcatchm Hydrog	Lag Ient 1 graph	/CN Me S: Pre	thod, - Val	ley					
5.0	54	7 0.03	90	0.15 Su	bcatchm Hydrog	Lag Ient 1 graph	/CN Me S: Pre	thod, - Val	ley		++	++		Punof
0.005	54	7 0.03	90	0.15 Su	bcatchm Hydrog	Lag ent 1 graph	/CN Me <sup>·</sup> S: Pre	thod, - Val	ley					Runoff
0.005 0.005 0.004 0.004	54	7 0.03	90	0.15 Su	bcatchm Hydrog	Lag ient 1 graph	/CN Me S: Pre ON M	thod, - Val fiissi:	ley ssa	uga	24h	r 5-Y	'ear	Runoff
0.000 0.000 0.004 0.004 0.004	54	7 0.03	90	0.15 Su	bcatchm Hydrog	Lag lent 1 graph	/CN Me S: Pre ON M	- Val Iissi	ley ssa	uga Raii	24h 1fall	r 5-Y =67	'ear mm	Runoff
0.005 0.005 0.004 0.004 0.004 0.004	54	7 0.03		0.15 Su	bcatchm Hydrog	Lag rent 1 graph	/CN Me S: Pre	- Val Iissi: Run	ley ssa	uga Raii Area	24h 1fall 1=2,!	r 5-Y =67 538.0	/ear mm ) m <sup>2</sup>	Runoff
0.000	54	7 0.03		0.15 Su	bcatchm Hydrog	Lag Ient 1 graph	/CN Me S: Pre ON N	+ Val Iissi: Run Runo	ley ssa off /	uga Raiı Area olur	24h hfall 1=2,! ne=1	r 5-Y =67 538.0 0.019	'ear mm ) m² ) Mi	Runoff
0.000 0.004 0.004 0.004 0.004 0.004 0.004 0.003 0.003 0.003 0.003	54	7 0.03		0.15 Su	bcatchm Hydrog	Lag	/CN Me S: Pre ON N	thod, - Val lissi: Run Runo	ley ssa off /	uga Raii Area olur off E	24h hfall i=2,! ne=i bept	r 5-Y =67 538.0 0.019 h=7	'ear mm ) m² ) MI mm	Runoff
0.000 0.000 0.004 0.004 0.004 0.004 0.004 0.003 0.003 0.003 0.003 0.003 0.003 0.003 0.003 0.003 0.003 0.004 0.004	54	7 0.03		0.15 Su	bcatchm Hydrog	Lag	/CN Me S: Pre ON N	- Val lissi: Runo Runo F	ley ssa off / ff V tune	uga Rain Area olur off E Ler	24h hfall i=2,4 ne=i Dept hgth	r 5-Y =67 538.0 0.019 h=7 =54.	'ear mm ) m² ) Mi mm 7 m	Runoff
5000 5000 5000 5000 5000 5000 5000 500	54	7 0.03		0.15 Su	bcatchm Hydro Hydro		/CN Me S: Pre ON N	thod, - Val (iissi: Run Runo R	ley ssa off / ff V tune Slc	uga Raiu Area olur off E Ler	24h hfall i=2,! ne=1 Dept hgth :0.0:	r 5-Y =67 538.0 0.019 h=7 =54. 390 n	'ear mm ) m² j Ml mm 7 m n/m	Runoff
5.00 500.0 50.	54	7 0.03		0.15 Su	bcatchm Hydrog	Lag	/CN Me S: Pre	- Val lissi: Runo Cuno F	ley ssa ff V tune Slo	uga Raiu Area olur off E Ler ope=	24h hfall =2,! Dept Dept =0.0: Tc=	r 5-Y =67 538.0 0.019 h=7 =54. 390 n =6.0	'ear mm ) m² 9 MI mm 7 m n/m min	Runoff
200.0 200.00	54			0.15 Su	bcatchm Hydrog		/CN Me S: Pre	thod, - Val lissi: Runo Runo F	ley ssa off und Slo UL/	uga Rain Area olur off E Ler Adju	24h hfall =2,9 he= Dept stea stea	r 5-Y =67 538.0 0.019 h=7 =54. 390 n =6.0 1 CN	′ear mm ) m² ) Mi mm 7 m n/m min =63	Runotf
200.0 200.00	54			0.15 Su	bcatchm Hydror		/CN Me <sup>i</sup> S: Pre ON N	thod, - Val fiissi: Run tuno F	ley ssa off und low Slo	uga Raiu Area olur pe= Adju	24h hfall =2,! Dept ngth =0.03 Tc= stee	r 5-Y =67 538,0 0,019 h=7 =54, 390 n =6,0 1 CN	'ear mm ) m² ) MI mm 7 m 7 m n/m min =63	Runoff
5000 5000 5000 5000 5000 5000 5000 500	54	7 0.03		0.15 Su	bcatchm		/CN Me S: Pre	thod, - Val fiisst: Run Runo R F F	ley ssar off und low Slo	uga Raiu Area olur off E Ler pe=	24h nfall =2,! ne= Dept ngth s0.0: Tc= stee	r 5-Y =67 538,0 0,019 h=7 =54, 390 n =6,0 1 CN	'ear mm ) m² ) MI mm 7 m n/m min =63	C Runoff
5000 5000 5000 5000 5000 5000 5000 500	54				bcatchm Hydros		/CN Me S: Pre	thod, - Val	ley ssa off / tune Slo	uga Raiu Area olur off E Ler pe=	24h hfall =2,! ne=1 Dept ngth =0.03 Tc= stee	r 5-Y =67 538,0 0,019 h=7 =54, 390 n =6,0 1 CN	'ear mm ) m² ) m mm 7 m n/m min =63	Runoff

2022-12-19 - AJP ON Mississau Prepared by Trafalgar Engineering HydroCAD® 10.20-21 s/n 13129 © 2022 HydroCAD Software Solutions LLC ON Mississauga 24hr 5-Year Rainfall=67 mm Printed 2024-01-31 Page 24

Summary for Subcatchment 2S: Pre-Sheridan Creek

Runoff = 0.008 m<sup>3</sup>/s @ 9.26 hrs, Volume= 0.027 MI, Depth= 10 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs ON Mississauga 24hr 5-Year Rainfall=67 mm

Area (m <sup>2</sup>	) CN	Adj	Description	
776.	0 98		Unconnected roofs, HSG C	
1,943.	D 61		>75% Grass cover, Good, HSG B	
2,719.	0 72	66	Weighted Average, UI Adjusted	
1,943.	D		71.46% Pervious Area	
776.	D		28.54% Impervious Area	
776.	0		100.00% Unconnected	
Tc Len	gth Slo	ope V	locity Capacity Description	

(min)	(meters)	(m/m)	(m/sec)	(m³/s)		
7.0	73.6	0.0340	0.18		Lag/CN Method,	

![](_page_44_Figure_11.jpeg)

![](_page_44_Figure_12.jpeg)

Prepared by Tra	algar Engineering		Control		Printed 2024-01-3
NUIDEADS 10.20	Summa	ry for Sul	bcatchment	3S: Area A	Fage 23
Runoff = Routed to Pone	0.008 m³/s @ 9.33 I 7P : Storage Tank A	hrs, Volu	me= 0	.022 MI, Depth=	31 mm
Runoff by SCS TF ON Mississauga 2	-20 method, UH=SC 4hr 5-Year Rainfall=	S, Weighte 67 mm	d-CN, Time S	oan= 0.00-32.00	hrs, dt= 0.05 hrs
Area (m²)	CN Description	w/ourba 8		•	
264.0	61 >75% Grass	cover. God	d. HSG B	Б	
707.0	84 Weighted Av	erage			
264.0	37.34% Perv	ious Area			
443.0	62.66% Impe	rvious Are	a		
Tc Length (min) (meters)	Slope Velocity (m/m) (m/sec)	Capacity (m³/s)	Description		
15.0			Direct Entry,		
	-				
	S	Subcatch	ment 3S: Ar	ea A	
		Hydrogr	aph		
0.009	0.006 m <sup>1</sup> /s	+		+++++	Kanon
0.008	++++++	+	ON Mi	<del>ssissauga 2</del> 4	h <del>r 5 Year</del>
0.007				Rainfa	li=67 mm
				Pupoff Aroa-	707 0 m2

	UN WISSISSAUGA 240f 5+1 ea
0.007	
0.007	
0.006	Runoff Area=707.0 m
0.006	Bunoff Volume=0.022 M
0.005	Dumoff Donth=24 mm
0.005	Kunon Depui-51 mil
0.004	Tc=15.0 mii
0.004	CN=8
0.003	
0.003	
0.002	
0.002	
0.001	
0.000	

2022-12-19 - AJP Prepared by Trafalgar Engineer	ina	Printed 2024-0						
HydroCAD® 10.20 2f s/n 13129 © 2	2022 HydroCAD Software	Solutions LLC		Page 26				
Sun	nmary for Subcatchr	nent 4S: Are	ea B					
Runoff = 0.001 m <sup>3</sup> /s @	9.44 hrs, Volume=	0.006 MI,	Depth=	6 mm				

IN IVIISS	issauga z	4111 J-Tea	Raimai	-67 11111								
Ar	ea (m²)	CN D	escription									
	1,000.0	61 >7	5% Grass	s cover, Go	od, HSG I	3						
	1,000.0	10	00.00% Pe	rvious Area	r i							
Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Descrip	tion						
15.0					Direct E	intry,						
			;	Subcatch	ment 45	: Are	аB					
				Hydrog	raph							
												]
0.001	Y H						++	$\vdash$	$\square$			Runoff
0.001	1/				- o	N Mis	siss	and	a 24	hr 5.	Year	-
0.001	1/								I.I.	11-67		-
0.001	1/					+			unna	11-0/		-
0,001	1/				+ $+$ $+$ $+$ $+$ $+$ $+$ $+$ $+$ $+$		unoi	t Are	∋a≠1	000	.0 m²	-
0.001	1/					Ru	noff	Voli	ime:	<b>‡0</b> ↓0	06 MI	-
0,001	1/						Ru	noff	Dep	th=6	s mm	-
ୁହି 0.000	Y HH								Ter	16 (	min	-
5 0.000	Y HH							$\square$	16-	19.0		-
<u>a</u> 0,000	Y HH				+ $+$ $+$ $+$ $+$ $+$ $+$ $+$ $+$ $+$	++	++	++	++	C	N=61	-
0.000	14						++	$\vdash$	$\square$			_
0,000	14					++		++	++			_
0.000	1 H				+	++	++	++	++			-
0.000	14											_
0.000	Y H			VIII								_
C	14				IIIIII	mm.						_

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 Time (hours)

<b>2022-12-19 - AJ</b> Prepared by Trafa HydroCAD® 10.20-2	P         ON Mississauga 24hr 5-Year         Rainfall=67 mn           algar Engineering         Printed         2024-01-3'           2f s/n 13129         © 2022 HydroCAD Software Solutions LLC         Page 2'	n 1 7
	Summary for Subcatchment 5S: Area C	
Runoff = ( Routed to Pond	0.036 m²/s @ 9.32 hrs, Volume= 0.099 MI, Depth= 35 mm I 8P : Storage Tank B	
Runoff by SCS TR- ON Mississauga 24	-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs 4hr 5-Year Rainfall=67 mm	
Area (m <sup>2</sup> )	CN Description	_
1,969.0	98 Paved roads w/curbs & sewers, HSG B	
890.0	61 >75% Grass cover, Good, HSG B	
2,859.0	86 Weighted Average	
890.0	31.13% Pervious Area	
1,969.0	68.87% Impervious Area	
Tc Length (min) (meters)	Slope Velocity Capacity Description (m/m) (m/sec) (m <sup>3</sup> /s)	
15.0	Direct Entry,	
	Subcatchment 5S: Area C	
	Hydrograph	
0.04		

2022-12-19 - AJP ON Mississau Prepared by Trafalgar Engineering HydroCAD® 10.20-21 s/n 13129 © 2022 HydroCAD Software Solutions LLC ON Mississauga 24hr 5-Year Rainfall=67 mm Printed 2024-01-31 Page 28 Summary for Subcatchment 6S: Area D

Runoff = 0.001 m<sup>3</sup>/s @ 9.44 hrs, Volume= Routed to Link 10L : Sheridan Creek 0.004 MI, Depth= 6 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs ON Mississauga 24hr 5-Year Rainfall=67 mm

_	Ai	rea (m²)	CN	De	scription						
		690.0	61	>7	75% Grass cover, Good, HSG B						
		690.0		10	0.00% Pe	rvious Area	a				
	Tc (min)	Length (meters)	S <b>l</b> op (m/r	n)	Velocity (m/sec)	Capacity (m³/s)	Description				
	15.0						Direct Entry,				

![](_page_45_Figure_10.jpeg)

![](_page_45_Figure_11.jpeg)

![](_page_45_Figure_13.jpeg)

2022-12-19 - A Prepared by Tr <u>HydroCAD® 10.2</u>	<b>∖JP</b> afalgar Enginee 0-2f s/n 13129 ©	ring 2022 HydroCAD Softwa	ON Mississauga	24hr 5-Year Rainfall=67 mm Printed 2024-01-31 Page 29
	Su	mmary for Pond 7	P: Storage Tank /	4
Inflow Area = Inflow = Outflow = Discarded = Primary =	0.0707 ha, 6; 0.008 m³/s @ 0.005 m³/s @ 0.000 m³/s @ 0.005 m³/s @	2.66% Impervious, In 9.33 hrs, Volume= 9.47 hrs, Volume= 9.47 hrs, Volume= 9.47 hrs, Volume=	flow Depth = 31 m 0.022 MI 0.022 MI, Att 0.000 MI 0.022 MI	nm for 5-Year event en= 37%, Lag= 8.6 min

 
 Outmow
 =
 0.005 m³/s @
 9.47 hrs, Volume=

 Discarded
 =
 0.000 m³/s @
 9.47 hrs, Volume=

 Primary
 =
 0.005 m³/s @
 9.47 hrs, Volume=

 Routed to Link 9L : To Valley

 Routing by Dyn-Stor-Ind method, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs Peak Elev= 93.932 m @ 9.47 hrs Surf.Area= 18.0 m<sup>2</sup> Storage= 3.6 m<sup>3</sup>

Plug-Flow detention time= 17.8 min calculated for 0.022 MI (100% of inflow) Center-of-Mass det. time= 17.3 min (719.5 - 702.3 )

			,	,		
Volume	Invert	Avail.Sto	orage Storag	e Description		
#1	93.720 m	10	.3 m <sup>3</sup> Custo	m Stage Data (Con	nic) Listed below (I	Recalc)
			10.8 m	"Overall x 95.0%	voias	
Elevatior	n Su	rf.Area	Inc.Store	Cum.Store	Wet.Area	
(meters	) (sq-n	neters) (d	cubic-meters)	(cubic-meters)	(sq-meters)	
93,720	)	18.0	0.0	0.0	18.0	
94.320	)	18.0	10.8	10.8	27.0	
Device	Routing	nvert	Outlet Devic	es		
#1	Discarded	93.720 m	60.00 mm/hr	Exfiltration over	Netted area from	93.720 m - 94.060 m
			Conductivity	to Groundwater Ele	evation = 91.900 n	n
			Excluded We	etted area = 18.0 m	1 <sup>2</sup>	
#2	Primary	93.720 m	75 mm Vert.	Orifice/Grate C=	• 0.600	
			Limited to we	eir flow at low head	s	

Discarded OutFlow Max=0.000 m³/s @ 9.47 hrs HW=93.930 m (Free Discharge) 1=Exfiltration ( Controls 0.000 m³/s)

![](_page_46_Figure_6.jpeg)

<u> </u>	Orifice	Grate	/				· /	/ /	/ /	/ /	/ /	/ /	′ /	
							_							
0.000 0.00	1 0.001	0.002	0.002	0.003	0.003	0.004	0.004	0.005	0.005	0.006	0.006	0.007	0.007	0.008 0.0
					1	Discha	irge	(m <sup>3</sup> /s)						

93.8 93.8 93.7

2022-12-19 - AJP	ON Mississauga 24hr 5-Year Rainfall=67 mm
Prepared by Trafalgar Engineering	Printed 2024-01-31
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![](_page_46_Figure_9.jpeg)

2022-12-19 - AJP	ON Mississauga 24hr 5-Year Rainfall=67 mm
Prepared by Trafalgar Engineering	Printed 2024-01-31
HydroCAD® 10.20-2f s/n 13129 @ 2022 HydroCAD Softwa	are Solutions LLC Page 32

Summar	/ for	Pond	8P.	Storage	Tank B
Jummar	y 101	FUIIU	ΟΓ.	JUDIAYE	

Inflow Area	ı =	0.2859 ha, 68	87% Impervious,	Inflow Depth =	35 mm	for 5-Year event
Inflow	=	0.036 m³/s @	9.32 hrs, Volume	= 0.099	M	
Outflow	=	0.007 m³/s @	9.75 hrs, Volume	= 0.087	MI, Atten=	80%, Lag= 25.7 min
Discarded	=	0.000 m³/s @	9.75 hrs, Volume	= 0.011	M	
Primary	=	0.007 m³/s @	9.75 hrs, Volume	= 0.077	м	
Routed	to Link	9L : To Valley				

Routing by Dyn-Stor-Ind method, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs Peak Elev= 93.833 m @ 9.75 hrs Surf.Area= 75.0 m<sup>2</sup> Storage= 41.5 m<sup>3</sup>

Plug-Flow detention time= 168.2 min calculated for 0.087 MI (88% of inflow) Center-of-Mass det, time= 98.6 min ( 793.0 - 694.4 )

Volume Invert

Volume	Invert	Avail.Storag	e Storage	Description						
#1	93.250 m	106.9 n	<sup>3</sup> Custom	Stage Data (Conic	) Listed below (Rec	alc)				
			112.511	l Overall X 95.0%	volus					
Elevatio	on Su	rf.Area	Inc.Store	Cum.Store	Wet.Area					
(meter	s) (sq-r	neters) (cubi	c-meters)	(cubic-meters)	(sq-meters)					
93.2	50	75.0	0.0	0.0	75.0					
94.7	50	75.0	112.5	112.5	121.0					
Device	Routing	Invert O	utlet Devices	s						
#1	Discarded	93.250 m 60	.00 mm/hr l	Exfiltration over W	etted area from 93.2	250 m - 94,950 m				
		C	onductivity to	o Groundwater Elev	ation = 91.700 m					
		E:	cluded Wet	ted area = 75.0 m <sup>2</sup>						
#2	Primary	93.440 m 75	imm Vert. C	Drifice/Grate C= 0	.600					
		Li	mited to wei	r flow at low heads						
Discard	Discarded OutFlow Max=0.000 m³/s @ 9.75 hrs HW=93.833 m (Free Discharge) →1=Exfittration (Controls 0.000 m³/s)									

Primary OutFlow Max=0.007 m³/s @ 9.75 hrs HW=93.833 m TW=0.000 m (Dynamic Tailwater) -2=Orifice/Grate (Orifice Controls 0.007 m³/s @ 1.58 m/s)

![](_page_47_Figure_0.jpeg)

0.009 0.01 0.011 0.012 0.013 0.014

2022-12-19 - AJ Prepared by Traf HydroCAD® 10.20-2	<b>P</b> algar Engii 2f s/n 13129	neering © 2022 Hy	droCAD So	ON M	<i>flississauga</i>	24hr 5	-Year Rai Printed	infall=67 mm 1 2024-01-31 Page 34
		Po	nd 8P: S	torage Ta	ink B			
		SI	age-Area-St	orage				
0	10 20	Suri 30 40	ace/Horizontal 50	/Wetted Area (s 60 70	q-meters) 80 90	100	110 120	Surface
Elevation (meters)								Storage

<b>2022-12-19 - AJP</b> Prepared by Trafalgar Engineering	ON Mississauga 24hr 5-Year Rainfall=67 m Printed 2024-01-3
HydroCAD® 10.20-2f s/n 13129 @ 2022 HydroCAD Softwar	e Solutions LLC Page 3
Summary for Link 10L	: Sheridan Creek

Inflow Area =	0.0690 ha,	0.00% Impervious, Inflow Dep	th = 6 mm for 5-Year event
Inflow =	0.001 m³/s @	9.44 hrs, Volume= 0	0.004 MI
Primary =	0.001 m³/s @	9.44 hrs, Volume= 0	0.004 MI, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs

Link 10L: Sheridan Creek Hydrograph Inflow
 Primary 0.00 Inflow Area=0.0690 ha 0.00 0.00 0.000 0.000 0.000 0.000 Llow (m<sub>3</sub>/s) 0.000 0.000 0.00 4 5 6 7 8 9 10 11 12 13 415 16 17 18 920 21 22 23 24 25 26 27 28 29 50 31 32 Time (hours)

Inflov Inflov Prima	v Are v ary	a = = =	(	0.49 0.012 0.012	566 1 m³/ 1 m³/	ha s ( s (	, 5 @@	2.8 ç	;3% 1.54 1.54	6 Im 4 hr: 4 hr:	ipe 5, ' 5, '	rvic Vol Vol	um um	, Ir e= e=	nflo	w I	Dep	oth 0.1 0.1	= 04 04	M	23    , .	3 m Att	ım en	1 = (	for )%	5 , L	-Ye Laç	ear g= (	e 0.0	:vent .0 min	
Prima	ary oi	⊔tflov	v = I	nflow	, Tir	ne	s Sp	ban	= (	0.00	-32	2.00	) hr	s, o	dt=	0.0	05 I	nrs													
											Liı	nk	9L	: т	۰ o	/a	lle	y													
											Hyc	irog	jrap	h																	
				FF	$\square$	+	-	T	F		+	-		$\square$	-	-	-				$\square$	$\square$	_	-	-	-	-	_	_	Inflow	
	0.013			$\vdash$	$\left  \right $	+	0.01	0,012 2 m W	m²/8	+	+	╈	$\vdash$			٦f	h	~	Δ	re		_	n		56	6	h	2	-	Primary	
	0.012			Ħ	Ħ	t					+	+			- 84	۳	μ				-0		"	-	70		-11	a	-		
	0.011			++-	Ħ	t		K			+	+			+	t	+								+	1	+		-		
	0.01			$\vdash$	Ħ	+		K	X	$\square$	+	+			+	+	+								+	+	+		-		
	0.009			+	++	+	+	Y	X		+	+	$\vdash$	$\vdash$	+	+	+	-	-		Η	$\square$	-	+	+	+	+	+	-		
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Ē,	0.007			$\vdash$	++	+					+	+	+	$\vdash$	+	+	+	-	-		Η	$\vdash$	-	-	+	+	+	+	-		
Noli	0.006			++	++	+	+				+	+	+	$\vdash$	+	+	+	-	-	$\square$	Η	Η	-	+	+	+	+	+	-		
-	0.005			$\vdash$	++	+	+			X	+	+	$\square$	$\vdash$	+	+	+	-	-	$\vdash$	$\vdash$	$\vdash$		-	+	+	+	+	-		
	0.004			$\vdash$	+	+	+		ł	X	2	+	$\vdash$		+	+	+	-						-	+	+	+	+	-		

6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 Time (hours)

#### Summary for Link 9L: To Valley 0.4566 ha 52.83% Impervious Inflow Depth = 23 mm for 5-Year event

0.002 0.001

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0.002 0.003 0.004 0.005 0.006 0.007 0.008 Discharge (m<sup>1</sup>/s)

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ON Mississauga 24hr 5-Year Rainfall=67 mm Printed 2024-01-31

<b>2022-12-19 - AJP</b> Prepared by Trafalgar Enginee HydroCAD® 10.20-2f s/n 13129 ©	ON Mississauga 24hr 10-Year Rainfall=83 mm ring Printed 2024-01-31 2022 HydroCAD Software Solutions LLC Page 37	<b>2022-12-19 - AJP</b> Prepared by Trafalgar Engineering <u>HydroCAD® 10.20-2f s/n 13129 © 2022 Hy</u>
Time Runoff I	span=0.00-32.00 hrs, dt=0.05 hrs, 641 points y SCS TR-20 method, UH=SCS, Weighted-CN	Summary fo
Reach routing by Dy	n-Stor-Ind method - Pond routing by Dyn-Stor-Ind method	Runoff = 0.012 m <sup>3</sup> /s @ 9.23 h
Subcatchment 1S: Pre - Valley Flow Length=54.7 m Slope	Runoff Area=2,538.0 m² 13.40% Impervious Runoff Depth=14 mm =0.0390 m/m Tc=6.0 min UI Adjusted CN=63 Runoff=0.012 m³/s 0.035 MI	Runoff by SCS TR-20 method, UH=SCS, ON Mississauga 24hr 10-Year Rainfall=8
Subcatchment 2S: Pre-Sheridan Flow Length=73.6 m Slope	Creek Runoff Area=2,719.0 m² 28.54% Impervious Runoff Depth=17 mm =0.0340 m/m Tc=7.0 min UI Adjusted CN=66 Runoff=0.018 m³/s 0.046 MI	Area (m²) CN Adj Descripti 340.0 98 Unconne
Subcatchment 3S: Area A	Runoff Area=707.0 m² 62.66% Impervious Runoff Depth=44 mm Tc=15.0 min CN=84 Runoff=0.011 m³/s 0.031 MI	2,198.0 61 >75% G 2,538.0 66 63 Weighte 2,198.0 86.60%
Subcatchment 4S: Area B	Runoff Area=1,000,0 m² 0,00% Impervious Runoff Depth=12 mm Tc=15.0 min CN=61 Runoff=0.002 m³/s 0.012 MI	340.0 13.40% 340.0 100.00%
Subcatchment 5S: Area C	Runoff Area=2,859.0 m² 68,87% Impervious Runoff Depth=48 mm Tc=15.0 min CN=86 Runoff=0.051 m³/s 0.137 MI	Tc Length Slope Velocity C (min) (meters) (m/m) (m/sec)
Subcatchment 6S: Area D	Runoff Area=690.0 m² 0.00% Impervious Runoff Depth=12 mm Tc=15.0 min CN=61 Runoff=0.002 m²/s 0.008 MI	6.0 54.7 0.0390 0.15 Subc
Pond 7P: Storage Tank A Discarded=0.000	Peak Elev=94.050 m Storage=5.6 m <sup>3</sup> Inflow=0.011 m <sup>3</sup> /s 0.031 MI m <sup>3</sup> /s 0.000 MI Primary=0.006 m <sup>3</sup> /s 0.031 MI Outflow=0.006 m <sup>3</sup> /s 0.031 MI	0.013
Pond 8P: Storage Tank B Discarded=0.001	Peak Elev=94.090 m Storage=59.8 m³ Inflow=0.051 m³/s 0.137 MI m³/s 0.012 MI Primary=0.009 m³/s 0.113 MI Outflow=0.010 m³/s 0.125 MI	0.012
Link 9L: To Valley	Inflow≔0.017 m³/s 0.155 MI Primary=0.017 m³/s 0.155 MI	0.01
Link 10L: Sheridan Creek	Inflow=0.002 m³/s 0.008 MI Primary=0.002 m³/s 0.008 MI	(s, 0.008-
		흝 0.006卦

ON Mississauga 24hr 10-Year Rainfall=83 mm Printed 2024-01-31

Total Runoff Area = 1.0513 ha Runoff Volume = 0.270 MI Average Runoff Depth = 26 mm 66.44% Pervious = 0.6985 ha 33.56% Impervious = 0.3528 ha

2022-12-19 - AJP	ON Mississauga 24hr 10-Year Rainfall=83	mm
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#### or Subcatchment 1S: Pre - Valley

0.035 MI, Depth= 14 mm rs. Volume=

Weighted-CN, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs

UN	WISS	issauga Z4	+111 10-16	ar Kallia	1-03 11111								
	Ar	ea (m²)	CN A	dj Desc	ription								
		340.0	98	Unco	nnected ro	ofs, HSG	C C						
		2,198.0	61	>75%	Grass co	ver, Goo	1, HS	SG B					
		2,538.0	66	63 Weig	hted Avera	age, UIA	djust	ed					
		2,198.0		13.40	% Perviou	s Area							
		340.0		100.0	0% Uncor	inected							
,	Tc	Length	Slope	Velocity	Capacity	Descri	ption	1					
_(	min)	(meters)	(m/m)	(m/sec)	(m²/s)	Lag/C		thed					
	0.0	54.7	0.0390	0.15		Lag/C	v we	anou,					
				Su	bcatchm	ent 1S:	Pre	- Valle	v				
				•	Hydrov	wanh			.,				
								1 1 1	1.1				7
	0.013												Runoff
	0.012	ИH		0,012 mVs			DN I	Mississ	sauda	24	nr 10-	Year	-
	0.011	$\mathcal{V}$					++	+++	R	ainfa	all=8:	3 mm	-
	0.01	$\downarrow$					++	Rund	off Ar	ea=:	2.538	.0 m²	-
	0.00	++					++	Runof	f Vol	ume	=0.0	35 M	-
	0.005	1.+++					++	Ru	inoff	Dep	th=14	4 mm	-
1.76	0.008	ĭ/+++					$\square$		low L	ena	th=5	4.7 m	-
-	0.007	Ύμμ					$\square$		Slop	e=0.	0390	m/m	_
3	0.006	Y 📖							[].	T	c=6.0	9 min	_
	0,005	YLL							ψLAd	liust	ed C	N=63	
	0.004								11				
	0.003									П			7
	0.002						$\square$			$\square$			1
							++	+++	++-				-

0.001 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 Time (hours) 1 2 3 4 5 6 7 8 9

2022-12-19 - AJP	ON Mississauga 24hr 10-Year Rainfall=83 mn
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#### Summary for Subcatchment 3S: Area A

Runoff = 0.011 m<sup>3</sup>/s @ 9.32 hrs, Volume= Routed to Pond 7P : Storage Tank A 0.031 MI, Depth= 44 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs ON Mississauga 24hr 10-Year Rainfall=83 mm

Area	(m²)	CN	Description
4	143.0	98	Paved roads w/curbs & sewers, HSG B
2	264.0	61	>75% Grass cover, Good, HSG B
	707.0	84	Weighted Average
2	264.0		37.34% Pervious Area
4	43.0		62.66% Impervious Area
 To	Length	SIO	pe Velocity Capacity Description

(min) (meters) (m/m) (m/sec) 15.0 (m<sup>3</sup>/s) Direct Entry,

Subcatchment 3S: Area A

![](_page_48_Figure_15.jpeg)

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Summary for Subcatchment 2S: Pre-Sheridan Creek									
Runoff	=	0.018	m³/s @	9.24 hrs,	Volume=	0.046 MI, Depth= 1	7 mm		
Runoff by ON Missi	/ SCS T ssauga	R-20 m 24hr 10	ethod, U -Year R	H=SCS, We ainfall=83 n	eighted-CN, nm	Time Span= 0.00-32.00 hrs,	dt= 0.05 hrs		
An	ea (m²)	CN	Adi	Description					

2022-12-19 - AJP Prepared by Trafalgar Engineering

	icu (iii )		ιuj	0030	iption			
	776.0	98		Uncor	nnected roo	ofs, HSG C		
	1,943.0	61		>75% Grass cover, Good, HSG B				
	2,719.0	72	66	Weigh	nted Averag	ige, UI Adjusted		
	1,943.0	71.46% Pervious				s Area		
	776.0			28.54	% Impervic	ous Area		
	776.0			100.0	0% Unconr	nected		
_		-						
Тс	Length	Slope	e Ve	ocity	Capacity	Description		
(min)	(meters)	(m/m)	) (m	/sec)	(m³/s)			
7.0	73.6	0.0340	)	0.18		Lag/CN Method,		
	Tc (min) 7.0	776.0 1,943.0 2,719.0 1,943.0 776.0 776.0 Tc Length (min) (meters) 7.0 73.6	776.0         98           1,943.0         61           2,719.0         72           1,943.0         72           1,943.0         776.0           776.0         776.0           776.0         776.0           776.0         776.0           776.0         776.0           776.0         776.0           776.0         776.0           770         73.6         0.0340	776.0 98 1,943.0 61 2,719.0 72 66 1,943.0 77 66 1,943.0 77 66 776.0 776.0 Tc Length Slope Ve (min) (meters) (m/m) (m	Triangle         Triangle         Descent           776.0         98         Uncor           1.943.0         61         >75%           2.719.0         72         66         Weigi           1.943.0         71.46         28.54           776.0         28.54         776.0         100.0           Tc         Length         Slope         Velocity           (min)         (meters)         (m/m)         (m/sec.0)         0.18	Trick         Trick         Secondaria           776.0         98         Unconnected ro           1,943.0         61         >75% Grass co           2,719.0         72         66         Weighted Avera           1,943.0         72         66         Weighted Avera           1,943.0         74.6% Perviso         776.0         28.54% Impervi           776.0         100,00% Uncon         100,00% Uncon         Tc           Tc         Length         Slope         Velocity         Capacity           (min)         (meters)         (mm/m) (m/sec)         (m²/s)           7.0         7.36         0.340         0.18		

73.6 0.0340 0.18 Lag/CN Method,

Subcatchment 2S: Pre-Sheridan Creek

![](_page_48_Figure_20.jpeg)

![](_page_49_Figure_0.jpeg)

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 Time (hours)

Tc=15.0 min CN=61

0.002 0.00 (% 0.002 (% L) 0.001

0.001 0.001 0.00 0.00 0.00

0.00

2022-12-19 - AJP	ON Mississauga 24hr 10-Year Rainfall=83 mm				
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Summary for Subcatchment 5S: Area C					

noff = 0.051 m<sup>3</sup>/s @ 9.32 hrs, Volume= Routed to Pond 8P : Storage Tank B Runoff 0.137 MI, Depth= 48 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs ON Mississauga 24hr 10-Year Rainfall=83 mm

_	Area (m²)	CN D	escription							
	1,969.0	98 P	aved roads	ved roads w/curbs & sewers, HSG B						
	890.0	61 >	75% Grass	cover, Goo	od, HSG B					
	2,859.0	86 V	veighted Average							
	890.0	3	1.13% Per	vious Area						
	1,969.0	6	3.87% Imp	ervious Are	a					
т	c Length	Slope	Velocity	Capacity	Descriptio	n				
(mir	) (meters)	(m/m)	(m/sec)	(m³/s)						
15.	D				Direct En	try,				
			:	Subcatch	ment 5S:	Area C				
				Hydrogr	aph					
										Runoff
0.			0.051 mVs							Kalion
	1.05				ØN	Mississ	auga 2	24hr 10-	Year	
0	045						Rai	nfali=83	mm	
						Runc	off Area	a=2,859	0 m²	
	1.04-					Runof	f Volu	me=0,13	7 MI	
0.	0.035 Runoff Depth=48 mm									
s/a								Tc=15.0	min	
2							+++		v=86	
<b>윤</b> 0.	025-1									

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 Time (hours)

2022-12-19 - AJP         ON Mississauga 24hr 10-Year Rainfall=83 mm           Prepared by Trafalgar Engineering         Printed 2024-01-31           HydroCAD® 10.20-2f s/n 13129 @ 2022 HydroCAD Software Solutions LLC         Page 43	2022-12-19 - AJP         ON Mississauga 24hr 10-Year Rainfall=83 mm           Prepared by Trafalgar Engineering         Printed 2024-01-31           HydroCAD® 10.20-2f s/n 13129 © 2022 HydroCAD Software Solutions LLC         Page 44				
Summary for Subcatchment 6S: Area D	Summary for Pond 7P: Storage Tank A				
Runoff       =       0.002 m³/s @       9.38 hrs, Volume=       0.008 MI, Depth=       12 mm         Routed to Link 10L : Sheridan Creek         Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span=       0.00-32.00 hrs, dt=       0.05 hrs         ON Mississauga 24hr 10-Year Rainfall=83 mm         Area (m²)       CN       Description	Inflow Area =         0.0707 ha, 62.66% Impervious, Inflow Depth =         44 mm         for 10-Year event           Inflow =         0.011 m% @         9.32 hrs, Volume=         0.031 MI           Outflow =         0.006 m% @         9.49 hrs, Volume=         0.031 MI           Discarded =         0.000 m% @         9.49 hrs, Volume=         0.000 MI           Primary =         0.006 m% @         9.49 hrs, Volume=         0.031 MI           Routed to Link 9L : To Valley         To Valley         Posterior         0.031 MI				
690.0 61 >75% Grass cover, Good, HSG B 690.0 100.00% Pervious Area	Routing by Dyn-Stor-Ind method, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs Peak Elev= 94.050 m @ 9.49 hrs Surf.Area= 18.0 m <sup>2</sup> Storage= 5.6 m <sup>3</sup>				
Tc Length Slope Velocity Capacity Description (min) (meters) (m/m) (m/sec) (m²/s) 15.0 Direct Entry,	Plug-Flow detention time= 16,5 min calculated for 0.031 MI (100% of inflow) Center-of-Mass det, time= 16,5 min (708,4 - 692,0)				
Subcatchmont 6S: Area D	#1 93.720 m 10.3 m <sup>3</sup> Custom Stage Data (Conic) Listed below (Recalc)				
Subcatchinent 03. Alea D	10.8 m³ Overall x 95.0% Voids				
Output       ON Mississauga 24thr 10-Year         Name       Rainfall=33 mm         Runoff Area=690.0 m²         Runoff Volume=0.0088.MI         Runoff Volume=0.0088.MI         Runoff Volume=0.0086.MI         Runoff Volum=0.0086.MI         Runoff Vo	Elevation (meters)       Surf Area (sq-meters)       Inc.Store (cubic-meters)       Cum.Store (cubic-meters)       Wet.Area (sq-meters)         93.720       18.0       0.0       0.0       18.0         94.320       18.0       10.8       10.8       27.0         Device Routing Invert Outlet Devices         #1       Discarded       93.720 m       60.00 mm/hr Exfiltration over Wetted area from 93.720 m - 94.060 m Conductivity to Groundvater Elevation = 91.900 m Excluded Wetted area = 18.0 m <sup>2</sup> #2       Primary       93.720 m       75 mm Veri. Orffice/Grate       C= 0.600 Limited to weir flow at low heads         Discarded OutFlow       Max=0.000 m <sup>3</sup> /s @ 9.49 hrs       HW=94.049 m       (Free Discharge)         1=Exfiltration (Controls 0.000 m <sup>3</sup> /s @ 9.49 hrs       HW=94.049 m       TW=0.000 m         Primary OutFlow       Max=0.006 m <sup>2</sup> /s @ 9.49 hrs       HW=94.049 m       TW=0.000 m         Primary OutFlow       Max=0.006 m <sup>3</sup> /s @ 9.49 hrs       HW=94.049 m       (Dynamic Tailwater)         2=Orifice/Grate       (Orifice Controls 0.006 m <sup>3</sup> /s @ 1.43 m/s)       Tai m/s				
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 Time (hours)					

0.01

0.0 0.00

![](_page_50_Figure_0.jpeg)

![](_page_50_Figure_1.jpeg)

2022-12-19 - AJP	ON Mississauga 24hr 10-Year Rai	nfall=83 mm
Prepared by Trafalgar Engineering	Printec	I 2024-01-31
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![](_page_50_Figure_3.jpeg)

2022-12-19 - AJP	ON Mississauga 24hr 10-Year Rainfall=83 mn
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HydroCAD® 10.20-2f s/n 13129 © 2022 Hydr	roCAD Software Solutions LLC Page 4

![](_page_50_Figure_5.jpeg)

![](_page_50_Figure_6.jpeg)

Summary for Pond 8P: Storage Tank B 
 flow Area =
 0.2859 ha, 68.87% Impervious, Inflow Depth =
 48 mm
 for 10-Year event

 flow =
 0.051 m³/s @
 9.32 hrs, Volume=
 0.137 MI

 flow =
 0.010 m³/s @
 9.76 hrs, Volume=
 0.125 MI, Atten= 81%, Lag= 26.1 min

 scarded =
 0.001 m³/s @
 9.76 hrs, Volume=
 0.012 MI

 mary =
 0.009 m³/s @
 9.76 hrs, Volume=
 0.112 MI

 Routed to Link 9L : To Valley
 9.76 hrs, Volume=
 0.113 MI
 Inflow Area = Inflow = Outflow = Discarded = Primary = Routing by Dyn-Stor-Ind method, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs Peak Elev= 94.090 m @ 9.76 hrs Surf.Area= 75.0 m<sup>2</sup> Storage= 59.8 m<sup>3</sup> Plug-Flow detention time= 146.3 min calculated for 0.125 MI (91% of inflow) Center-of-Mass det. time= 92.2 min ( 777.1 - 684.9 ) 
 Avail,Storage
 Storage Description

 106.9 m³
 Custom Stage Data (Conic) Listed below (Recalc) 112.5 m³ Overall x 95.0% Voids
 Volume Invert #1 93.250 m Inc.Store Cum.Store Elevation Surf.Area Wet.Area (meters) 93.250 94.750 (sq-meters) 75.0 75.0 (sq-meters) 75.0 121.0 (cubic-meters) (cubic-meters) 0.0 112.5 0.0 112.5 
 Outlet Devices

 60,00 mm/hr Exfiltration over Wetted area from 93,250 m - 94,950 m

 Conductivity to Groundwater Elevation = 91,700 m

 Excluded Wetted area = 75,0 m²

 75 mm Vert, Orifice/Grate
 C= 0,600

 Limited to weir flow at low heads
 Device Routing #1 Discarded Invert 93.250 m #2 Primary 93.440 m 

ON Mississauga 24hr 10-Year Rainfall=83 mm

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Primary OutFlow Max=0.009 m<sup>3</sup>/s @ 9.76 hrs HW=94.090 m TW=0.000 m (Dynamic Tailwater) -2=Orifice/Grate (Orifice Controls 0.009 m<sup>3</sup>/s @ 2.08 m/s)

Printed 2024-01-31 Page 49

![](_page_51_Figure_4.jpeg)

2022-12-19 - AJP	ON Mississauga 24hr 10-Year Rainfall=83 mn
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#### Summary for Link 9L: To Valley

0.4566 ha, 52.83% Impervious, Inflow Depth = 34 mm for 10-Year event 0.017 m²/s @ 9.51 hrs, Volume= 0.155 MI 0.017 m³/s @ 9.51 hrs, Volume= 0.155 MI, Atten= 0%, Lag= 0.0 min Inflow Area = Inflow = Primary =

Primary outflow = Inflow, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs

![](_page_51_Figure_9.jpeg)

2022-12-19 - A Prepared by Tr HydroCAD® 10.2	AJP ON Mississauga 24hr 10-Year Ra rafalgar Engineering Printe 10-2f s/n 13129 © 2022 HydroCAD Software Solutions LLC	infall=83 mm d 2024-01-31 Page <u>51</u>	2022-12-19 - AJP         ON Mississauga 24hr 25-Year         Rainfall=95 mm           Prepared by Trafalgar Engineering         Printed 2024-01-31           HydroCAD® 10.20-2f s/n 13129 © 2022 HydroCAD Software Solutions LLC         Page 52		
Inflow Area = Inflow = Primary =	Summary for Link 10L: Sheridan Creek           0.0690 ha,         0.00% Impervious, Inflow Depth =         12 mm         for 10-Year           0.002 m²/s @         9.38 hrs, Volume=         0.008 MI         0.008 MI, Atten= 0%, Lag= 0	r event .0 min	Time span=0.00-32.00 hrs, dt=0.05 hrs, 641 points Runoff by SCS TR-20 method, UH=SCS, Weighted-CN Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method Subcatchment 1S: Pre - Valley Runoff Area=2,538.0 m <sup>2</sup> 13,40% Impervious Runoff Depth=20 mm Flow Length=54.7 m Stope=0.0390 m/m Tc=6.0 min UI Adjusted CN=63 Runoff=0.021 m% 0.050 MI		
Primary outflow	Inflow, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs Link 10L: Sheridan Creek		Subcatchment 23: Pre-Sheridan Creek Runoff Area=2,719.0 m <sup>2</sup> 28.54% Impervious Runoff Depth=24 mm Flow Length=73.6 m Stope=0.0340 m/m To=7.0 min UI Adjusted CN=66 Runoff=0.028 m <sup>3</sup> 6 .0.065 MI		
1	Hydrograph	1	Subcatchment 3S: Area A	Runoff Area=707.0 m² 62.66% Impervious Runoff Depth=54 mm Tc=15.0 min CN=84. Runoff=0.014 m³/s 0.039 MI	
0.002	Inflow Area=0.0690 ha	Primary	Subcatchment 4S: Area B	Runoff Area=1,000.0 m² 0.00% Impervious Runoff Depth=17 mm Tc=15.0 min CN=61 Runoff=0.004 m³/s 0.017 MI	
0.002			Subcatchment 5S: Area C	Runoff Area=2,859.0 m² 68.87% Impervious Runoff Depth=59 mm Tc=15.0 min CN=86 Runoff=0.063 m²/s 0.168 MI	
0.001 0.001 (s) 0.001 1 0.001			Subcatchment 6S: Area D	Runoff Area=690.0 m² 0.00% Impervious Runoff Depth=17 mm Tc=15.0 min CN=61 Runoff=0.003 m³/s 0.012 MI	
0.001 0.001 0.001		-	Pond 7P: Storage Tank A Discarded=0.000 m³/s	Peak Elev=94.157 m Storage=7.5 m³ Inflow=0.014 m³/s 0.039 MI 0.001 MI Primary=0.007 m³/s 0.038 MI Outflow=0.008 m³/s 0.038 MI	
0.001			Pond 8P: Storage Tank B Discarded=0.001 m³/s	Peak Elev=94.306 m Storage=75.3 m³ Inflow=0.063 m³/s 0.168 M 0.014 MI Primary=0.011 m³/s 0.142 MI Outflow=0.011 m³/s 0.156 MI	
0.000			Link 9L: To Valley	Inflow=0.021 m <sup>3</sup> /s 0.198 MI Primary=0.021 m <sup>3</sup> /s 0.198 MI	
0 1 2	3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 Time (hours)		Link 10L: Sheridan Creek	Inflow=0.003 m³/s 0.012 MI Primary=0.003 m³/s 0.012 MI	
			T-1-1 D		

Total Runoff Area = 1.0513 ha Runoff Volume = 0.351 MI Average Runoff Depth = 33 mm 66.44% Pervious = 0.6985 ha 33.56% Impervious = 0.3528 ha

2022-12	2-19 -	AJP	c	ON Mississauga 24hr 25-Year Rainfall=95 mm				
Prepare	d by T	rafalgar Enginee	ering		Printed 2024-01-31			
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	Summary for Subcatchment 1S: Pre - Valley							
Runoff	=	0.021 m³/s @	9.22 hrs, Volume=	0.050 MI, Depth=	20 mm			

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs

1		issuugu E-	111 20 1	our run					
	A	rea (m²)	CN /	Adj De	scription				
		340.0	98	Un	Unconnected roofs, HSG C				
		2,198.0	61	>7:	5% Grass co	ver, Good, HSG B			
		2,538.0	66	63 We	eighted Avera	age, UI Adjusted			
		2,198.0		86.	86.60% Pervious Area				
		340.0		13.	13.40% Impervious Area				
		340.0		100	0.00% Uncon	nnected			
	Тс	Length	Slope	Veloci	ty Capacity	/ Description			
	(min)	(meters)	(m/m)	(m/se	c) (m³/s)				
	6.0	54.7	0.0390	0.1	5	Lag/CN Method,			

#### Subcatchment 1S: Pre - Valley

![](_page_52_Figure_4.jpeg)

ON Mississauga 24hr 25-Year Rainfall=95 mm 2022-12-19 - AJP Prepared by Trafalgar Engineering HydroCAD® 10.20-2f s/n 13129 @ 2022 HydroCAD Software Solutions LLC Printed 2024-01-31 Page 54

#### Summary for Subcatchment 2S: Pre-Sheridan Creek

Runoff = 0.028 m³/s @ 9.24 hrs, Volume= 0.065 MI. Depth= 24 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs ON Mississauga 24hr 25-Year Rainfall=95 mm

A	rea (m²)	CN A	dj Descr	iption				
	776.0	98	Uncor	Unconnected roofs, HSG C				
	1,943.0	61	>75%	>75% Grass cover, Good, HSG B				
	2,719.0	72 6	6 Weigl	Weighted Average, UI Adjusted				
	1,943.0		71.46	71 46% Pervious Area				
	776.0		28.54% Impervious Area					
	776.0 100.00% Unconnected							
Тс	Length	Slope	Velocity	Capacity	Description			
(min)	(meters)	(m/m)	(m/sec)	(m³/s)				
7.0	73.6	0.0340	0.18		Lag/CN Method.			

Subcatchment 2S: Pre-Sheridan Creek

![](_page_52_Figure_11.jpeg)

2022-12-19 - AJP Prepared by Trafalgar Engineering HydroCAD® 10.20-2f s/n 13129 © 2022 HydroCAD Softwa	ON Mississauga 24hr 25-Year Rainfall=95 mm Printed 2024-01-31 are Solutions LLC Page 55			
Summary for Subcatchment 3S: Area A				
Runoff = 0.014 m <sup>3</sup> /s @ 9.32 hrs, Volume= Routed to Pond 7P : Storage Tank A	0.039 MI, Depth= 54 mm			
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN ON Mississauga 24hr 25-Year Rainfall=95 mm	l, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs			

 
 CN
 Description

 98
 Paved roads w/curbs & sewers, HSG B

 61
 >75% Grass cover, Good, HSG B
 Area (m²) CN 443.0 264.0 707.0 264.0 443.0 Weighted Average 37.34% Pervious Area 62.66% Impervious Area 84 Тс Length Slope Velocity Capacity Description

(min) (meters) 15.0 (m/m) (m/sec) (m<sup>3</sup>/s) Direct Entry,

![](_page_52_Figure_15.jpeg)

![](_page_52_Figure_16.jpeg)

2022-12-19 - AJP ON Mississauga 24hr 25-Year Rainfall=95 mm 2022-12-19 - AJP Prepared by Trafalgar Engineering HydroCAD® 10.20-2f s/n 13129 © 2022 HydroCAD Software Solutions LLC Printed 2024-01-31 Page 56

Summary for Subcatchment 4S: Area B

Runoff = 0.004 m<sup>3</sup>/s @ 9.36 hrs, Volume= Routed to Link 9L : To Valley 0.017 MI, Depth= 17 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs ON Mississauga 24hr 25-Year Rainfall=95 mm

A	rea (m²)	CN	De	scription		
	1,000.0	61	>7	5% Grass	cover, Goo	od, HSG B
	1,000.0		10	0.00% Pe	rvious Area	1
Tc (min)	Length (meters)	Sloj (m/r	pe m)	Velocity (m/sec)	Capacity (m³/s)	Description
15.0						Direct Entry,

![](_page_52_Figure_22.jpeg)

![](_page_52_Figure_23.jpeg)

Prepared by Tra	falgar 2f.s/n	Engineering 13129 @ 2022 HydroCAD Softw	are Solutions LLC	Printed 2024-01-31 Page 57				
1941007.00 10.20	21 0/11	TO IED O EDEE HIJUIOON D OUT		1 age 57				
		Summary for Subcat	chment 5S: Are	a C				
Runoff = 0.063 m³/s @ 9.32 hrs, Volume= 0.168 MI, Depth= 59 mm Routed to Pond 8P : Storage Tank B								
Runoff by SCS TF ON Mississauga 2	R-20 m 24hr 25	ethod, UH=SCS, Weighted-Ct -Year Rainfall=95 mm	I, Time Span= 0.00	0-32.00 hrs, dt= 0.05 hrs				
Area (m <sup>2</sup> )	CN	Description						
1.969.0 98 Paved roads w/curbs & sewers, HSG B								
890.0 61 >75% Grass cover, Good, HSG B								
2,859.0	86	Weighted Average						
890.0		31.13% Pervious Area						

	1,969.0	60	.87% Imp	ervious Are	ea
Tc	Length	Slope	Velocity	Capacity	Description
(11111)	(meters)	(m/m)	(m/sec)	(11-/5)	
15.0					Direct Entry,
			5	Subcatch	nment 5S: Area C
				Hydrog	graph
0.0	7				Runoff
0.06	15		0.053 m <sup>1</sup> /s		
0.0	16				ON MISSISSauga 24hr 25-Year
0.05	15				Rainrait=95 mm
0.0	15				Runoff Volume=0 169 M
0.04	15				Runoff Depth=59 mm
0.0 چ	14				
E 0.03	15				CN=86
<u>ê</u> 0.0	13				
0.02	15				
0,0	12				
0.01	5				
0.0	1				
0.00	15			Timm	
				<u></u>	
	0 1 2 3	4567	8 9 10 1	1 12 13 14 15 Time	5 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 te (hours)

 ON Mississauga 24hr 25-Year Rainfall=95 mm

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 Summary for Subcatchment 6S: Area D

 Runoff = 0.003 m<sup>3</sup>/s © 9.36 hrs, Volume= 0.012 MI, Depth= 17 mm

 Routed to Link 10L : Sheridan Creek

 Runoff by CSC TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs

Ar	'ea (m²)	CN D	escription		
	690.0	61 >	75% Grass	cover, Goo	od, HSG B
	690.0	1	00.00% Pe	rvious Area	1
Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
15.0					Direct Entry,
				Subcatch	ment 6S: Area D
				Hydrogi	raph
0.003	°ľ⊬++		0.003 m <sup>3</sup> /a		
0,003	YH++				ON Mississauga 24hr 25-Year
0.003	1/				Rainfall=95 mm
0,003	1/+++				Runoff Area=690.0 m <sup>2</sup>
0.002	$\mathcal{U}$				Runoff Volume=0.012 MI
- 0.002					Runoff Depth=17 mm
[s/ 0.002	ИТТ				Tc=15.0 min
≥ 0.002					CN=61
운 <sub>0.001</sub>					
0.001					
0.001	Y H				
0.001	Y H				
0.001	¶/∔				
0.000	1/			Think	
0.000				7444	

 2022-12-19 - AJP
 ON Mississauga 24hr 25-Year
 Rainfall=95 mm

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 2024-01-31

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![](_page_53_Figure_5.jpeg)

Pond 7P: Storage Tank A

![](_page_53_Figure_7.jpeg)

Inflow Area = Inflow = Outflow = Discarded = Primary = 
 flow Area =
 0.0707 ha, 62.66% Impervious, Inflow Depth =
 54 mm
 for 25-Year event

 flow =
 0.014 m³/s @
 9.32 hrs, Volume=
 0.039 MI

 flow =
 0.088 m³/s @
 9.50 hrs, Volume=
 0.038 MI, Atten= 47%, Lag= 10.6 min

 scarded =
 0.000 m³/s @
 9.50 hrs, Volume=
 0.031 MI

 mary =
 0.007 m³/s @
 9.50 hrs, Volume=
 0.038 MI

 Routed to Link 9L : To Valley
 0.014 MI
 0.038 MI
 Routing by Dyn-Stor-Ind method, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs Peak Elev= 94.157 m @ 9.50 hrs Surf.Area= 18.0 m<sup>2</sup> Storage= 7.5 m<sup>3</sup> Plug-Flow detention time= 16.7 min calculated for 0.038 MI (100% of inflow) Center-of-Mass det, time= 16.3 min ( 702.1 - 685.7 ) 
 Avail,Storage
 Storage Description

 10.3 m³
 Custom Stage Data (Conic) Listed below (Recalc) 10.8 m³ Overall x 95.0% Voids
 Volume Invert #1 93.720 m Inc.Store Cum.Store Elevation Surf.Area Wet.Area (meters) 93.720 94.320 (sq-meters) 18.0 18.0 (sq-meters) 18.0 27.0 (cubic-meters) (cubic-meters) 0.0 10.8 0.0 10.8 
 Invert
 Outlet Devices

 93.720 m
 60,00 mm/hr Exfittration over Wetted area from 93,720 m - 94,060 m Conductivity to Groundwater Elevation = 91,900 m Excluded Wetted area = 18,0 m²

 93.720 m
 75 mm Vert. Orifice/Grate

 vert.
 0.600 Limited to weir flow at low heads
 Device Routing #1 Discarded #2 Primary

Summary for Pond 7P: Storage Tank A

ON Mississauga 24hr 25-Year Rainfall=95 mm

Printed 2024-01-31

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Discarded OutFlow Max=0.000 m³/s @ 9.50 hrs HW=94.157 m (Free Discharge) -1=Exfiltration (Controls 0.000 m³/s)

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2022-12-19 - AJP

Primary OutFlow Max=0.007 m<sup>3</sup>/s @ 9.50 hrs HW=94.157 m TW=0.000 m (Dynamic Tailwater) -2=Orifice/Grate (Orifice Controls 0.007 m<sup>3</sup>/s @ 1.68 m/s)

![](_page_54_Figure_2.jpeg)

<b>2022-12-19 - /</b> Prepared by Ti <u>HydroCAD® 10.2</u>	<b>AJP</b> rafalgar Enginee 20-2f s/n 13129 ©	ring 2022 HydroCAD Softv	ON Mississauga 24hr 25-Year Rainfall=5 Printed 2024 ware Solutions LLC P	∂5 <i>mm</i> -01-31 age 62
	Su	mmary for Pond	8P: Storage Tank B	
Inflow Area = Inflow = Outflow = Discarded = Primary =	0.2859 ha, 6 0.063 m³/s @ 0.011 m³/s @ 0.001 m³/s @ 0.011 m³/s @	8.87% Impervious, I 9.32 hrs, Volume= 9.77 hrs, Volume= 9.77 hrs, Volume= 9.77 hrs, Volume=	nflow Depth = 59 mm for 25-Year event 0.168 MI 0.156 MI, Atten= 82%, Lag= 26.7 mi 0.014 MI 0.142 MI	n

utflow	=	0.011 m³/s @	9.77 hrs,	Volume=	0.156 MI,	Atten= 82%,	Lag= 26.7 min
scarded	=	0.001 m³/s @	9.77 hrs,	Volume=	0.014 MI		
imary	=	0.011 m³/s @	9.77 hrs,	Volume=	0.142 MI		
Routed	to Link	91 To Valley					

Routing by Dyn-Stor-Ind method, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs Peak Elev= 94.306 m @ 9.77 hrs Surf.Area= 75.0 m<sup>2</sup> Storage= 75.3 m<sup>3</sup>

Plug-Flow detention time= 137.1 min calculated for 0.156 MI (93% of inflow) Center-of-Mass det. time= 92.2 min (771.4 - 679.1 )

Volume	Invert	Avail.Sto	rage Storage	Description		
#1	93.250 m	106.	9 m <sup>3</sup> Custom 112.5 m	Stage Data (Con <sup>3</sup> Overall x 95.0%	ic) Listed below (Re Voids	calc)
Elevatio (meter	on Su s) (sq-r	rf.Area neters) (o	Inc.Store ubic-meters)	Cum Store (cubic-meters)	Wet Area (sq-meters)	
93.25 94.75	i0 i0	75.0 75.0	0.0 112.5	0.0 112.5	75.0 121.0	
Device	Routing	Invert	Outlet Devices	6		
#1	Discarded	93.250 m	60.00 mm/hr E Conductivity to Excluded Wet	Exfiltration over V o Groundwater Ele ted area = 75.0 m Orifice/Grate	Vetted area from 93, vation = 91.700 m	250 m - 94 <u>.</u> 950 m
#2	Fillialy	93.440 m	Limited to wei	flow at low heads	5	

**Discarded OutFlow** Max=0.001 m³/s @ 9.77 hrs HW=94.306 m (Free Discharge) -1=Exfiltration (Controls 0.001 m³/s)

Primary OutFlow Max=0.011 m³/s @ 9.77 hrs HW=94.306 m TW=0.000 m (Dynamic Tailwater) 2=Orifice/Grate (Orifice Controls 0.011 m³/s @ 2.42 m/s)

2022-12-19 - AJP	ON Mississauga 24hr 25-Year Rainfall=95 mm
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![](_page_54_Figure_11.jpeg)

Pond 8P: Storage Tank B

![](_page_54_Figure_13.jpeg)

2022-12-19 - AJP ON Mississaug Prepared by Trafalgar Engineering HydroCAD® 10.20-2f s/n 13129 © 2022 HydroCAD Software Solutions LLC ON Mississauga 24hr 25-Year Rainfall=95 mm Printed 2024-01-31 Page 64

![](_page_54_Figure_15.jpeg)

![](_page_55_Figure_0.jpeg)

Inflow Area	a =	0.4566 ha, 52	.83% Impervious,	Inflow Depth =	43 mm for	25-Year event
Inflow	=	0.021 m³/s @	9.47 hrs, Volume	= 0.198 MI		
Primary	=	0.021 m³/s @	9.47 hrs, Volume	= 0.198 MI,	Atten= 0%	, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs

![](_page_55_Figure_3.jpeg)

 2022-12-19 - AJP
 ON Mississauga 24hr 25-Year
 Rainfall=95 mm

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 Printed 2024-01-31

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#### Summary for Link 10L: Sheridan Creek

nflow Are	ea =	0.0690 ha,	0.00% Impervious, Inflo	w Depth = 17 mm	for 25-Year event
nflow	=	0.003 m³/s @	9.36 hrs, Volume=	0.012 M	
Primary	=	0.003 m³/s @	9.36 hrs, Volume=	0.012 MI, Atten	= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs

![](_page_55_Figure_8.jpeg)

2022-12-19 - AJP	ON Mississauga 24hr 50-Year Rainfall=106 mm				
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HydroCAD® 10.20-2f s/n 13129 @ 2022 HydroCAD Sc	oftware Solutions LLC Page 68				
Summary for Subcatchment 1S: Pre - Valley					

Runoff	=	0.030 m³/s @	9.22 hrs, Volume=	0.066 MI, Depth=	26 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs ON Mississauga 24hr 50-Year Rainfall=106 mm

A	rea (m²)	CN A	dj Desci	iption		
	340.0	98	Unco	nnected roo	ofs, HSG C	
	2,198.0	61	>75%	Grass cov	er, Good, HSG B	
	2,538.0	66 6	3 Weig	nted Averag	ge, UI Adjusted	
	2,198.0		86.60	% Pervious	Area	
	340.0		13.40	% Impervic	ous Area	
	340.0		100.0	0% Unconi	nected	
Tc (min)	Length (meters)	Slope (m/m)	Ve <b>l</b> ocity (m/sec)	Capacity (m³/s)	Description	
6.0	54.7	0.0390	0.15		Lag/CN Method,	

Subcatchment 1S: Pre - Valley

![](_page_55_Figure_14.jpeg)

2022-12-19 - AJP Prepared by Trafalgar Engineering HydroCAD® 10.20-2f s/n 13129 © 2022	ON Mississauga 24hr 50- HydroCAD Software Solutions LLC	Year Rainfall=106 mm Printed 2024-01-31 Page 67
Time span Runoff by SC Reach routing by Dyn-St	=0.00-32.00 hrs, dt=0.05 hrs, 641 points SS TR-20 method, UH=SCS, Weighted-CN or-Ind method - Pond routing by Dyn-Stor-I	nd method
Subcatchment 1S: Pre - Valley Flow Length=54.7 m Slope=0.03	Runoff Area=2,538.0 m <sup>2</sup> 13,40% Impervio 390 m/m Tc=6.0 min UI Adjusted CN=63 Ru	us Runoff Depth=26 mm noff=0.030 m³/s 0.066 M
Subcatchment 2S: Pre-Sheridan Cree Flow Length=73.6 m Slope=0.03	ek Runoff Area=2,719.0 m² 28.54% Impervio 340 m/m Tc=7.0 min UI Adjusted CN=66 Ru	us Runoff Depth=31 mm noff=0.037 m³/s 0.083 M
Subcatchment 3S: Area A	Runoff Area=707.0 m <sup>2</sup> 62.66% Impervio Tc=15.0 min CN=84 Ru	us Runoff Depth=65 mm noff=0.017 m³/s 0.046 M
Subcatchment 4S: Area B	Runoff Area=1,000.0 m² 0.00% Impervio Tc=15.0 min CN=61 Ru	us Runoff Depth=23 mm noff=0.006 m³/s 0.023 M
Subcatchment 5S: Area C	Runoff Area=2,859.0 m² 68.87% Impervio Tc=15.0 min CN=86 Ru	us Runoff Depth=69 mm noff=0.073 m³/s 0.198 M
Subcatchment 6S: Area D	Runoff Area=690.0 m² 0.00% Impervio Tc=15.0 min CN=61 Ru	us Runoff Depth=23 mm noff=0.004 m³/s 0.016 M
Pond 7P: Storage Tank A Discarded=0.000 m <sup>3</sup> /s	Peak Elev=94.264 m Storage=9.3 m <sup>3</sup> In 0.001 MI Primary=0.008 m <sup>3</sup> /s 0.045 MI Out	flow=0.017 m³/s 0.046 MI flow=0.008 m³/s 0.046 MI
Pond 8P: Storage Tank B Discarded=0.001 m <sup>3</sup> /s	Peak Elev=94.511 m Storage=89.9 m <sup>3</sup> In 0.016 MI Primary=0.012 m <sup>3</sup> /s 0.170 MI Out	flow=0.073 m³/s 0.198 M flow=0.013 m³/s 0.186 MI
Link 9L: To Valley	In Prin	flow=0.024 m³/s 0.238 M nary=0.024 m³/s 0.238 MI
Link 10L: Sheridan Creek	In Prin	flow=0.004 m³/s 0.016 M nary=0.004 m³/s 0.016 M

Total Runoff Area = 1.0513 ha Runoff Volume = 0.431 MI Average Runoff Depth = 41 mm 66.44% Pervious = 0.6985 ha 33.56% Impervious = 0.3528 ha

2022-12-19 - AJP	ON Mississauga 24hr 50-Year Rainfall=106 mm
Prepared by Trafalgar Engineering	Printed 2024-01-31
HydroCAD® 10 20 2f s/n 13129 © 2022 HydroCAD Soft	tware Solutions LLC Page 69
Summary for Subcatchme	ent 2S: Pre-Sheridan Creek

Runoff	=	0.037 m³/s @	9.23 hrs, Volume=	0.083 MI, Depth=	31 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs ON Mississauga 24hr 50-Year Rainfall=106 mm

		-					
	A	rea (m²)	CN A	dj Desc	ription		
		776.0	98	Unco	nnected roo	ofs, HSG C	
		1,943.0	61	>75%	Grass cov	er, Good, HSG B	
		2,719.0	72 6	6 Weid	hted Avera	ae. UI Adjusted	
		1,943.0		71.46	6% Pervious	Area	
		776.0		28.54	% Impervic	us Area	
		776.0		100.0	0% Unconr	nected	
	Тс	Length	Slope	Velocity	Capacity	Description	
_	(min)	(meters)	(m/m)	(m/sec)	(m³/s)		
	7.0	73.6	0.0340	0.18		Lag/CN Method.	

#### Subcatchment 2S: Pre-Sheridan Creek

![](_page_56_Figure_5.jpeg)

2022-12-19 - AJP	ON Mississauga 24hr 50-Year Rainfall=106 mm
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#### Summary for Subcatchment 3S: Area A

Runoff = 0.017 m³/s @ 9.32 hrs, Volume= 0.046 MI, Depth= 65 mm Routed to Pond 7P : Storage Tank A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs ON Mississauga 24hr 50-Year Rainfall=106 mm

А	rea (m²)	CN	Description
	443.0	98	Paved roads w/curbs & sewers, HSG B
	264.0	61	>75% Grass cover, Good, HSG B
	707.0	84	Weighted Average
	264.0		37.34% Pervious Area
	443.0		62.66% Impervious Area

 Tc
 Length
 Slope
 Velocity
 Capacity
 Description

 (min)
 (meters)
 (m/m)
 (m/sec)
 (m³/s)

 15.0
 Direct Entry.

![](_page_56_Figure_12.jpeg)

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Summary for Subcatchment 4S: Area	В
Runoff = 0.006 m³/s @ 9.36 hrs, Volume= 0.023 MI, D Routed to Link 9L : To Valley	epth= 23 mm
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00- ON Mississauga 24hr 50-Year Rainfall=106 mm	32.00 hrs, dt= 0.05 hrs

ON Mississauga 24hr 50-Year Rainfall=106 mm

•			
 Area (m²)	CN	Description	
 1,000.0	61	>75% Grass cover, Good, HSG B	
1,000.0		100.00% Pervious Area	

 Tc
 Length
 Slope
 Velocity
 Capacity
 Description

 (min)
 (meters)
 (m/m)
 (m/sec)
 (m³/s)

 15.0
 Direct Entry,

2022-12-19 - AJP

![](_page_56_Figure_16.jpeg)

![](_page_56_Figure_17.jpeg)

 2022-12-19 - AJP
 ON Mississauga 24hr 50-Year Rainfall=106 mm

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Summary for Subcatchment 5S: Area C

Runoff = 0.073 m<sup>3</sup>/s @ 9.32 hrs, Volume= 0.198 MI, Depth= 69 mm Routed to Pond 8P : Storage Tank B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs ON Mississauga 24hr 50-Year Rainfall=106 mm

A	rea (m²)	CN	Description
	1,969.0	98	Paved roads w/curbs & sewers, HSG B
	890.0	61	>75% Grass cover, Good, HSG B
	2,859.0	86	Weighted Average
	890.0		31.13% Pervious Area
	1,969.0		68.87% Impervious Area
Tc	Length	Slo	pe Velocity Capacity Description

(min) (meters) (m/m) (m/sec) (m³/s) 15.0 Direct Entry,

![](_page_56_Figure_24.jpeg)

![](_page_57_Figure_0.jpeg)

![](_page_57_Figure_1.jpeg)

HydroCA	D® 10.20⊾2£	e/n 13120 @	2022 HydroCAE	Software Solutione I	10	Road
Hyuroc A	00 10.20-21	5/11 13 123 6	2022 Hydrocab	Soltware Solutions	-LO	Faye
		Su	mmary for P	ond 7P: Storage	Tank A	
Inflow Ar	rea = 0	0.0707 ha, 6	2.66% Impervic	us, Inflow Depth =	65 mm for 50-Ye	ar event
nflow	= 0.0	017 m³/s @	9.32 hrs, Vol	ume= 0.046	M	
Outflow	= 0.0	008 m³/s @	9.51 hrs, Vol	ume= 0.046	MI, Atten= 50%, Lag	= 11.2 min
Discarde	ed = 0.0	000 m³/s @	9.51 hrs, Vol	ume= 0.001	M	
Primary	0.0 = 0.0	JU8 m³/s @	9.51 hrs, Vol	ume= 0.045	M	
Route		. To valley				
Pouting	by Dyp-Stor-	Ind method	Time Span= 0.	10-32 = 00  bre  dt = 0	05 brs	
Routing Deals Els	Dy Dyn=3(01-		Curf Area = 19	30-32.00  ms,  ut = 0.	23	
Peak Ele	94.204 11	1@ 9.51 IIIs	Sun Area- 10	s.o m- Storage- 9.	5 111-	
Plug-Flo	w detention f	time= 16.8 n	nin calculated fo	r 0.046 MI (100% or	f inflow)	
Plug-Flo Center-o	w detention f of-Mass det. t	time= 16.8 n time= 16.4 n	nin calculated fo nin (697.4 - 680	r 0.046 MI (100% o 9.9 )	f inflow)	
Plug-Flo Center-o	w detention f of-Mass det. f	time= 16.8 n time= 16.4 n Avail St	nin calculated fo nin ( 697.4 - 680	r 0.046 MI (100% of 9.9 )	f inflow)	
Plug-Flo Center-o Volume #1	w detention to of-Mass det. to Invert	time= 16.8 n time= 16.4 n <u>Avail.Si</u>	nin calculated fo nin (697.4 - 680 corage Storage	r 0.046 MI (100% o 1.9 ) • Description	inflow)	
Plug-Flo Center-o <u>Volume</u> #1	w detention t of-Mass det. t <u>Invert</u> 93.720 m	time= 16.8 n time= 16.4 n <u>Avail.St</u> 10	nin calculated fo nin (697.4 - 680 corage Storage D.3 m <sup>3</sup> Custon 10.8 m <sup>3</sup>	r 0.046 MI (100% o 9.9) • Description • Stage Data (Coni	<sup>:</sup> inflow) c) Listed below (Recald	.)
Plug-Flo Center-o <u>Volume</u> #1	w detention f of-Mass det. f Invert 93.720 m	time= 16.8 n time= 16.4 n <u>Avail.St</u> 11	nin calculated fo nin (697.4 - 680 corage Storage D.3 m <sup>3</sup> Custon 10.8 m <sup>3</sup>	r 0.046 MI (100% of 9.9) 9 Description n Stage Data (Coni 7 Overall x 95.0% V	⁺ inflow) c) Listed below (Recald ioids	:)
Plug-Flo Center-o <u>Volume</u> #1 Elevatio	w detention f of-Mass det. f <u>Invert</u> 93.720 m on Si	time= 16.8 n time= 16.4 n Avail.St 10 11 urf.Area	nin calculated fo nin ( 697.4 - 680 corage Storage 0.3 m <sup>3</sup> Custon 10.8 m <sup>3</sup> Inc.Store	r 0.046 MI (100% or .9) • <u>Description</u> • <b>Stage Data (Coni</b> • Overall x 95.0% V Cum.Store	<sup>r</sup> inflow) c) Listed below (Recald oids Wet.Area	:)
Plug-Flo Center-o <u>Volume</u> #1 Elevatio (meters	w detention t of Mass det. t 93.720 m on St s) (sq-	time= 16.8 n time= 16.4 n Avail.St 10 11 urf.Area meters)	nin calculated fo nin ( 697.4 - 680 corage Storage 0.3 m <sup>3</sup> Custon 10.8 m <sup>3</sup> Inc.Store (cubic-meters)	r 0.046 MI (100% or .9) <u>a Description</u> n Stage Data (Coni <sup>3</sup> Overall x 95.0% V Cum.Store (cubic-meters)	: inflow) c) Listed below (Recald oids Wet.Area (sq-meters)	:)
Plug-Flo Center-o <u>Volume</u> #1 Elevatio (meters 93.72	w detention t of-Mass det. t 93.720 m on Si s) (sq- 20	time= 16.8 n time= 16.4 n <u>Avail.St</u> 10 urf.Area <u>meters)</u> 18.0	nin calculated fo nin ( 697.4 - 680 corage Storage 0.3 m <sup>3</sup> Custon 10.8 m <sup>3</sup> Inc.Store (cubic-meters) 0.0	r 0.046 MI (100% or .9) <u>e Description</u> <b>n Stage Data (Coni</b> <sup>9</sup> Overall x 95.0% V Cum.Store (cubic-meters) 0.0	; inflow) c) Listed below (Recald oids Wet.Area (sq-meters) 18,0	*)
Plug-Flo Center-o #1 Elevatio (meters 93.72 94.32	w detention 1 f-Mass det. 1 93.720 m 93.720 m 5) (sq- 20	time= 16.8 n time= 16.4 n Avail.St 11 urf.Area <u>meters)</u> 18.0 18.0	nin calculated fo nin ( 697.4 - 680 corage Storage 0.3 m <sup>3</sup> Custon 10.8 m <sup>3</sup> Inc.Store (cubic-meters) 0.0 10.8	r 0.046 MI (100% of .9 ) <u>a Description</u> <b>n Stage Data (Coni</b> P Overall x 95.0% V Cum.Store (cubic-meters) 0.0 10.8	r inflow) c) Listed below (Recald oids Wet.Area (sq-meters) 18.0 27.0	;)
Plug-Flo Center-o <u>Volume</u> #1 Elevatio (meters 93.72 94.32	w detention 1 if-Mass det. 1 93.720 m 93.720 m Si (sq. 20 20 Pouting	time= 16.8 n time= 16.4 n Avail.St 10 11 11 11 11 11 11 11 11 11 11 11 11	nin calculated fo nin (697.4 - 680 0.3 m <sup>3</sup> Custon 10.8 m <sup>3</sup> Inc.Store (cubic-meters) 0.0 10.8	r 0.046 MI (100% or .9) <u>2 Description</u> n Stage Data (Conii ° Overall x 95.0% V Cum.Store (cubic-meters) 0.0 10.8	r inflow) c) Listed below (Recald oids Wet.Area (sq-meters) 18,0 27,0	•)
Plug-Flo Center-o <u>Volume</u> #1 Elevatio (meters 93.72 94.32 Device	w detention 1 of-Mass det. 1 93.720 m 93.720 m 5) (sq- 0 20 Routing Discorded	time= 16.8 n time= 16.4 n Avail.St urf.Area meters) 18.0 18.0 Invert	nin calculated fo nin ( 697.4 - 680 0.3 m <sup>3</sup> Custon 10.8 m <sup>3</sup> Inc.Store (cubic-meters) 0.0 10.8 Outlet Device	r 0.046 MI (100% or .9) <u>a Description</u> <b>n Stage Data (Coni</b> 'Overall x 95.0% V Cum.Store (cubic-meters) 0.0 10.8 S Exelitration over W	c) Listed below (Recald oids Wet.Area (so-meters) 18.0 27.0	»)
Plug-Flo Center-o #1 Elevatio (meters 93.72 94.32 Device #1	w detention f Mass det. f 93.720 m 93.720 m Si (sq- 20 Routing Discarded	time= 16.8 n time= 16.4 n Avail.St 11 urf.Area meters) 18.0 18.0 18.0 93.720 m	nin calculated fo nin ( 697.4 - 680 0.3 m <sup>3</sup> Custon 10.8 m <sup>3</sup> Inc.Store (cubic-meters) 0.0 10.8 <u>Outlet Device</u> 60.00 mm/hr.	r 0.046 MI (100% or .9) <u>2 Description</u> n Stage Data (Coni v Overall x 95.0% V Curn.Store (cubic-meters) 0.0 10.8 IS Exfittration over W o Convertues Elo	c) Listed below (Recald oids Wet.Area (sq-meters) 18.0 27.0 etted area from 93,720 withon = 01,000 cm	:) ) m - 94,060
Plug-Flo Center-o #1 Elevatio (meters 93.72 94.32 Device #1	w detention f Mass det. i 93.720 m on Si s) (sq- 20 20 Routing Discarded	time= 16.8 n time= 16.4 n Avail.St urf.Area meters) 18.0 18.0 18.0 93.720 m	Outlet Device           60,00         0.01           0.3         m <sup>2</sup> 0.3         m <sup>2</sup> 0.10         m <sup>2</sup> 0.0         10.8           0.0         10.8           Outlet Device         60,00           60,00         mm/hr           Conductivity         Evel/det/Mark	r 0.046 MI (100% of .9) a <u>Description</u> n Stage Data (Coni 'Overall x 95.0% V Cum.Store (cubic-meters) 0.0 10.8 s Exfiltration over W to Groundwater Ele	: inflow) c) Listed below (Recald olds <u>Wet Area (sq-meters)</u> 18.0 27.0 <b>etted area from 93.720</b> <i>va</i> tion = 91.900 m	>) ) m - 94.060
Plug-Flo Center-o #1 Elevatio (meters 93.72 94.32 Device #1 #2	w detention f Mass det. f 93.720 m 93.720 m S) (sq- 20 0 Routing Discarded	time= 16.8 n time= 16.4 n Avail.St 10 urf.Area <u>meters)</u> 18.0 18.0 <u>Invert</u> 93.720 m	nin calculated for orage Storage 0.3 m <sup>3</sup> Custon 10.8 m <sup>3</sup> Inc.Store (cubic-meters) 0,0 10.8 Outlet Device 60,00 mm/hr Conductivity 1 Excluded We	r 0.046 MI (100% or .9) <u>e Description</u> n Stage Data (Coni <sup>9</sup> Overall x 95.0% V Cum.Store (cubic-meters) 0,0 10,8 IS Exfiltration over W ted area = 18.0 m Ordino/Cathology Contents	c) Listed below (Recald oids Wet.Area (sq-meters) 18.0 27.0 etted area from 93,720 etted area from 93,720 n eco	:) ) m - 94,060
Plug-Flo Center-o Volume #1 Elevatio (meters 93,72 94,32 Device #1 #2	w detention f Mass det. 1 93.720 m 93.720 m Si (so (so (co (co (co (co (co (co (co (co (co (c	time= 16.8 n time= 16.4 n Avail.St urf.Area meters) 18.0 18.0 18.0 93.720 m 93.720 m	Output         Cluster           0.3 m <sup>2</sup> Custon           10.8 m <sup>2</sup> Inc. Store           (cubic-meters)         0.0           0.10.8         0.0           0.0 mm/hr         Conductivity I           Excluded We         75 mm Verta, I           The modulation of the mo	r 0.046 MI (100% of .9) a <u>Description</u> a <u>Stage Data (Coni</u> 'Overall x 95.0% V Cum.Store (cubic-meters) 0,0 10.8 is Exfiltration over W to Groundwater Elle area = 18.0 m <sup>2</sup> Orifice/Grate Ce-	: inflow) c) Listed below (Recald oids Wet.Area (sq-meters) 18.0 27.0 27.0 etted area from 93.720 vation = 91.900 m 0.600	:) ) m - 94.060

Discarded OutFlow Max=0.000 m³/s @ 9.51 hrs HW=94.263 m (Free Discharge) 1=Exfiltration ( Controls 0.000 m³/s)

Primary OutFlow Max=0.008 m<sup>3</sup>/s @ 9.51 hrs HW=94.263 m TW=0.000 m (Dynamic Tailwater) -2=Orifice/Grate (Orifice Controls 0.008 m<sup>3</sup>/s @ 1.89 m/s)

2022-12-19 - AJP	ON Mississauga 24hr 50-Year Rainfall=106 mm
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![](_page_57_Figure_6.jpeg)

Pond 7P: Storage Tank A

![](_page_57_Figure_8.jpeg)

 2022-12-19 - AJP
 ON Mississauga 24hr 50-Year
 Rainfall=106 mm

 Prepared by Trafalgar Engineering
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 2024-01-31

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![](_page_57_Figure_10.jpeg)

<b>2022-12-19 - AJP</b>	Of	<i>Mississauga 24hr 50-Year I</i>	Rainfall=106 mm
Prepared by Trafalgar En	gineering	Pr	inted 2024-01-31
<u>HydroCAD® 10.20-2f s/n 131</u>	29 © 2022 HydroCAD Software	Solutions LLC	Page 77
	Summary for Pond 8P:	Storage Tank B	
Inflow Area = 0.2859 Inflow = 0.073 m <sup>3</sup> , Outflow = 0.013 m <sup>3</sup> , Discarded = 0.001 m <sup>3</sup> , Primary = 0.012 m <sup>3</sup> , Routed to Link 9L : To V	ia, 68.87% Impervious, Inflor © 9.32 hrs, Volume= © 9.78 hrs, Volume= © 9.78 hrs, Volume= © 9.78 hrs, Volume= Illey	w Depth = 69 mm for 50-1 0.198 MI 0.186 MI, Atten=83%, La 0.016 MI 0.170 MI	′ear event ng= 27.3 min
Routing by Dyn-Stor-Ind me	hod, Time Span= 0.00-32.00	hrs, dt= 0.05 hrs	
Peak Elev= 94.511 m @ 9.7	8 hrs Surf Area= 75.0 m² S	torage= 89.9 m³	

Plug-Flow detention time= 132.9 min calculated for 0.185 MI (94% of inflow) Center-of-Mass det. time= 93.8 min (768.4 - 674.7 )

			,	,		
Volume	Invert	Avail.St	orage Storag	e Description		
#1	93.250 m	106	6.9 m³ Custo	m Stage Data (Con	ic) Listed below (Re	ecalc)
			112.5	m <sup>3</sup> Overall x 95.0%	Voids	
Elevatior	n Su	rf.Area	Inc.Store	Cum.Store	Wet.Area	
(meters)	) (sq-n	neters) (	cubic-meters)	(cubic-meters)	(sq-meters)	
93,250	)	75.0	0.0	0.0	75.0	
94.750	)	75.0	112.5	112.5	121.0	
Device	Routing	Invert	Outlet Devic	es		
#1	Discarded	93.250 m	60.00 mm/h	r Exfiltration over V	Vetted area from 9	3.250 m - 94.950 m
			Conductivity	to Groundwater Ele	evation = 91.700 m	
			Excluded W	etted area = 75.0 m	2	
#2	Primary	93.440 m	75 mm Vert	Orifice/Grate C=	0.600	
			Limited to w	eir flow at low heads	6	

Discarded OutFlow Max=0.001 m³/s @ 9.78 hrs HW=94.511 m (Free Discharge) 1=Exfiltration (Controls 0.001 m³/s)

 Primary OutFlow
 Max=0.012 m³/s @ 9.78 hrs
 HW=94.511 m
 TW=0.000 m
 (Dynamic Tailwater)

 \*2=Orifice/Grate
 (Orifice Controls 0.012 m³/s @ 2.70 m/s)
 2.70 m/s)
 (Dynamic Tailwater)

![](_page_58_Figure_5.jpeg)

2022-12-19 - AJP	ON Mississauga 24hr 50-Year Rainfall=106 mm
Prepared by Trafalgar Engineering	Printed 2024-01-31

![](_page_58_Figure_7.jpeg)

2022-12-19 - AJP	ON Mississauga 24hr 50-Year Rainfall=106 mm
Prepared by Trafalgar Engineering	Printed 2024-01-31
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0.003 0.004 0.005 0.006 0.007 0.008 0.009 0.01 0.011 0.012 0.013 0.014 Discharge (m<sup>1</sup>/s)

Summary for Link 9L: To Valley

Inflow Area	=	0.4566 ha, 52	2.83% Impervious, Inflow	Depth = 52 mm	for 50-Year event
Inflow :	=	0.024 m³/s @	9.45 hrs, Volume=	0.238 MI	
Primary	=	0.024 m³/s @	9.45 hrs, Volume=	0.238 MI, Atten=	= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs

![](_page_58_Figure_12.jpeg)

2022-12-19 - AJP         ON Mississauga 24hr 50-Year         Rainfall=106 mm           Prepared by Trafalgar Engineering         Printed         2024-01-31           HydroCAD® 10.20-21 s/n 13129 @ 2022 HydroCAD Software Solutions LLC         Page 81	2022-12-19 - AJP         ON Mississauga 24hr 100-Year Rainfall=118 mm           Prepared by Trafalgar Engineering         Printed 2024-01-31           HydroCAD® 10.20-21 shn 13129 © 2022 HydroCAD Software Solutions LLC         Page 82
Summary for Link 10L: Sheridan Creek Inflow Area = 0.0690 ha, 0.00% Impervious, Inflow Depth = 23 mm for 50-Year event	Time span=0.00-32.00 hrs, dt=0.05 hrs, 641 points Runoff by SCS TR-20 method, UH=SCS, Weighted-CN Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method
Inflow = 0.004 m³/s @ 9.36 hrs, Volume= 0.016 MI Primary = 0.004 m³/s @ 9.36 hrs, Volume= 0.016 MI, Atten= 0%, Lag= 0.0 min	Subcatchment 1S: Pre - Valley Runoff Area=2,538.0 m² 13,40% Impervious Runoff Depth=33 mm Flow Length=54.7 m Slope=0.0390 m/m Tc=6.0 min UI Adjusted CN=63 Runoff=0.040 m³s 0.083 MI
Primary outflow = Inflow, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs Link 10L: Sheridan Creek	Subcatchment 2S: Pre-Sheridan Creek Runoff Area=2,719.0 m² 28.54% Impervious Runoff Depth=38 mm Flow Length=73.6 m Slope=0.0340 m/m Tc=7.0 min UI Adjusted CN=66 Runoff=0.047 m³/s 0.103 MI
Hydrograph	Subcatchment 3S: Area A Runoff Area=707.0 m <sup>2</sup> 62.66% Impervious Runoff Depth=75 mm Tc=15.0 min CN=84 Runoff=0.020 m <sup>2</sup> /s 0.053 MI
0.000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.000000	Subcatchment 4S: Area B Runoff Area=1,000.0 m <sup>2</sup> 0.00% Impervious Runoff Depth=29 mm Tc=15.0 min CN=61 Runoff=0.009 m <sup>3</sup> /s 0.029 MI
	Subcatchment 5S: Area C         Runoff Area=2,859.0 m²         68,87% Impervious         Runoff Depth=80 mm           Tc=15.0 min         CN=86         Runoff=0.084 m³/s         0.228 MI
	Subcatchment 6S: Area D Runoff Area=690.0 m <sup>2</sup> 0.00% Impervious Runoff Depth=29 mm Tc=15.0 min CN=61 Runoff=0.006 m <sup>3</sup> /s 0.020 MI
Figure 1000 1000 1000 1000 1000 1000 1000 10	Pond 7P: Storage Tank A         Peak Elev=95.555 m         Storage=10.3 m³         Inflow=0.020 m³/s         0.053 MI           Discarded=0.000 m³/s         0.001 MI         Primary=0.016 m³/s         0.052 MI         Outflow=0.016 m³/s         0.053 MI
	Pond 8P: Storage Tank B         Peak Elev=94.720 m         Storage=104.7 m³         Inflow=0.084 m³/s         0.228 MI           Discarded=0.001 m³/s         0.018 MI         Primary=0.013 m³/s         0.198 MI         Outflow=0.014 m³/s         0.216 MI
	Link 9L: To Valley Inflow=0,034 m³/s 0,280 MI Primary=0,034 m³/s 0,280 MI
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 6 7 18 19 20 12 22 23 24 25 26 27 28 29 30 31 32 Time (hours)	Link 10L: Sheridan Creek Inflow=0,006 m <sup>9</sup> /s 0,020 Ml Primary=0,006 m <sup>9</sup> /s 0,020 Ml

Total Runoff Area = 1.0513 ha Runoff Volume = 0.516 MI Average Runoff Depth = 49 mm 66.44% Pervious = 0.6985 ha 33.55% Impervious = 0.3528 ha

2022-12-19 - AJP	ON Mississauga 24hr 100-Yea	r Rainfall=118 mm
Prepared by Trafalgar Engineering		Printed 2024-01-31
HydroCAD® 10.20-2f s/n 13129 © 2022 HydroCAD S	oftware Solutions LLC	Page 83
Summary for Subca	tchment 1S: Pre - Valley	

= 0.040 m3/s @ 9.22 hrs, Volume= 0.083 MI, Depth= 33 mm Runoff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs ON Mississauga 24hr 100-Year Rainfall=118 mm

A	rea (m²)	CN A	dj Desci	iption		_		
	340.0	98	Unco	Unconnected roofs, HSG C				
	2,198.0	61	>75%	>75% Grass cover, Good, HSG B				
2,538.0 66 63 Weighted Average, UI Adjusted				age, UI Adjusted				
	2,198.0		86.60	% Pervious	is Area			
	340.0 13.40% Impervious Area							
	340.0 100.00% Unconnected							
_								
TC	Length	Slope	Velocity	Capacity	/ Description			
(min)	(meters)	(m/m)	(m/sec)	(m³/s)		_		
6.0	54.7	0.0390	0.15		Lag/CN Method,			

54.7 0.0390 0.15 Lag/CN Method,

Subcatchment 1S: Pre - Valley

![](_page_59_Figure_8.jpeg)

ON Mississauga 24hr 100-Year Rainfall=118 mm Printed 2024-01-31 2022-12-19 - AJP Prepared by Trafalgar Engineering HydroCAD® 10.20-2f s/n 13129 © 2022 HydroCAD Software Solutions LLC Page 84

Summary for Subcatchment 2S: Pre-Sheridan Creek

Runoff = 0.047 m3/s @ 9.23 hrs, Volume= 0.103 MI, Depth= 38 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs ON Mississauga 24hr 100-Year Rainfall=118 mm

	Are	ea (m²)	CN	Adj	Descriptio	on			
_		776.0	98		Unconnected roofs, HSG C				
	1	,943.0	61		>75% Gra	ass cove	er, Good, HSG B		
	2	,719.0	72	66	Weighted	Averag	e, UI Adjusted		
	1	,943.0			71.46% P	1.46% Pervious Area			
		776.0			28.54% Ir	8.54% Impervious Area			
		776.0			100.00%	Unconn	ected		
	Тс	Length	Slo	pe V	locity Ca	pacity	Description		

(min)	(meters)	(m/m)	(m/sec)	(m³/s)	
7.0	73.6	0.0340	0.18		Lag/CN Method,

![](_page_59_Figure_15.jpeg)

![](_page_60_Figure_0.jpeg)

2022-12-19 - AJP	ON Mississauga 2	ON Mississauga 24hr 100-Year Rainfall=118 mm			
Prepared by Trafalgar Engineering		Printed 2024	<b>-01-31</b>		
HydroCAD® 10.20-2f s/n 13129 @ 2022 H	ydroCAD Software Solutions LLC	P	age 86		
Summar	y for Subcatchment 4S: Ar	ea B			
Runoff = 0.009 m³/s @ 9.35 Routed to Link 9L : To Valley	hrs, Volume= 0.029 MI,	Depth= 29 mm			
Runoff by SCS TR-20 method, UH=SCS ON Mississauga 24hr 100-Year Rainfall	, Weighted-CN, Time Span= 0.0 ⊨118 mm	0-32.00 hrs, dt= 0.05 hrs			

_		1,000.0	61 >7	'5% Grass	s cover, Go	d, HSG B									
		1,000.0	10	0.00% Pe	rvious Area										
(	Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Descriptio	n								
	15.0					Direct En	try,								
				:	Subcatch	nent 4S:	Area	в							
					Hydrog	aph									
	0.00						$\vdash$	+	++	++	+	++	++	-	Runoff
	0.00			0.000 m <sup>3</sup> /s									+		
	0.00						Niss	ssa	uga	24h	ır 1	00+)	′ear	r_	
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	0.00	″V++					Ru	nof	r Vo	lum	e=C	0.02	э м		
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	0.00		to to to to to				11/11/	1111	777	100 h			-hord	_	

Area (m<sup>2</sup>) CN Description

- 0	)	1	2	3	-4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
															. т	ime	(h	our	c)														

2022-12-19 - AJP Prepared by Trafalgar Engineering	ON Mississauga 24hr 100-Y	'ear Rainfall=118 mm Printed 2024-01-31
HydroCAD® 10 20 2f s/n 13129 @ 2022 HydroCAD S	oftware Solutions LLC	Page 87
Summary for Sub	catchment 5S: Area C	

Runoff = 0.084 m<sup>3</sup>/s @ 9.32 hrs, Volume= Routed to Pond 8P : Storage Tank B 0.228 MI, Depth= 80 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs ON Mississauga 24hr 100-Year Rainfall=118 mm

A	rea (m²)	CN	De	scription			
	1,969.0	98	Pa	ved roads	w/curbs &	sewers, HSG B	
	890.0	61	>7	5% Grass	cover, Goo	od, HSG B	
	2,859.0	86	We	eighted Av	rage		
	890.0		31.	13% Perv	vious Area		
	1,969.0		68	87% Impe	ervious Are	а	
Tc (min)	Length (meters)	S <b>l</b> o (m/	pe m)	Velocity (m/sec)	Capacity (m³/s)	Description	
15.0						Direct Entry,	

(m³/s) Direct Entry,

![](_page_60_Figure_9.jpeg)

![](_page_60_Figure_10.jpeg)

2022-12-19 - AJP ON Mississauga 24hr 100-Year Rainfall=118 mm Prepared by Trafalgar Engineering HydroCAD® 10.20-2f s/n 13129 © 2022 HydroCAD Software Solutions LLC Printed 2024-01-31 Page 88

Summary for Subcatchment 6S: Area D

Runoff = 0.006 m<sup>3</sup>/s @ 9.35 hrs, Volume= Routed to Link 10L : Sheridan Creek 0.020 MI, Depth= 29 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs ON Mississauga 24hr 100-Year Rainfall=118 mm

A	rea (m²)	CN E	escription)			
	690.0	61 >	75% Grass	cover, Go	od, HSG B	
	690.0	1	00.00% Pe	rvious Area	3	
Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description	
15.0					Direct Entry,	

![](_page_60_Figure_16.jpeg)

![](_page_60_Figure_17.jpeg)

<b>2022-12-19 - A</b> Prepared by Tr	<b>∖JP</b> afalgar Engine∉	ering	ON Mississau	ga 24hr 10	0-Year Rainfall=118 mm Printed 2024-01-31
HydroCAD® 10.2	0-2f s/n 13129 ©	2022 HydroCAD S	oftware Solutions L	LC.	Page 89
	Su	mmary for Pon	d 7P: Storage	Tank A	
Inflow Area =	0.0707 ha, 6	2.66% Impervious	, Inflow Depth =	75 mm	for 100-Year event
nflow =	0.020 m³/s @	9.32 hrs, Volum	e= 0.053	M	
Outflow =	0.016 m³/s @	9.45 hrs, Volum	e= 0.053	MI, Atten=	19%, Lag= 7.8 min
Discarded =	0.000 m³/s @	9.45 hrs, Volum	e= 0.001	M	
Primary =	0.016 m³/s @	9.45 hrs, Volum	e= 0.052	M	
Routed to Lin	k 9L : To Valley				
Routing by Dyn-3 Peak Elev= 95.5	Stor-Ind method, 55 m @ 9.45 hrs	Time Span= 0.00 Surf Area= 18.0	32.00 hrs, dt= 0.0 m <sup>2</sup> Storage= 10	05 hrs .3 m³	

Plug-Flow detention time= 16.4 min calculated for 0.053 MI (100% of inflow) Center-of-Mass det. time= 16.0 min ( 692.5 - 676.5 )

Volume	nvert	Avail.Sto	orage Storage	e Description		
#1	93.720 m	10	.3 m <sup>3</sup> Custon 10.8 m <sup>3</sup>	n Stage Data (Coni <sup>8</sup> Overall x 95.0% V	c) Listed below (Reca /oids	IC)
Elevati (mete	ion Si rs) (sq-	urf.Area meters) (e	Inc Store cubic-meters)	Cum Store (cubic meters)	Wet.Area (sq-meters)	
93.7 94.3	20 20	18.0 18.0	0.0 10.8	0.0 10.8	18.0 27.0	
Device	Routing	Invert	Outlet Device	s		
#1	Discarded	93.720 m	60.00 mm/hr Conductivity t Excluded We	Exfiltration over W to Groundwater Elected area = 18.0 m <sup>2</sup>	Vetted area from 93.72 vation = 91.900 m	20 m - 94 <u>.</u> 060 m
#2	Primary	93.720 m	75 mm Vert. Limited to we	Orifice/Grate C= ir flow at low heads	0.600	

Discarded OutFlow Max=0.000 m³/s @ 9.45 hrs HW=95.553 m (Free Discharge)

 Primary OutFlow
 Max=0.016 m³/s @ 9.45 hrs
 HW=95.552 m
 TW=0.000 m
 (Dynamic Tailwater)

 \*\*2=Orifice/Grate
 (Orifice Controls 0.016 m³/s @ 3.56 m/s)
 3.56 m/s)
 (Dynamic Tailwater)

![](_page_61_Figure_5.jpeg)

# 2022-12-19 - AJP ON Mississauga 24hr 100-Year Rainfall=118 mm Prepared by Trafalgar Engineering Printed 2024-01-31 HydroCAD® 10.20-2f s/n 13129 © 2022 HydroCAD Software Solutions LLC Page 91

![](_page_61_Figure_7.jpeg)

2022-12-19 - AJP	ON Mississauga 24hr 100-Year Rainfall=118 mm
Prepared by Trafalgar Engineering	Printed 2024-01-31
HydroCAD® 10.20 2f s/n 13129 @ 2022 HydroCAD So	oftware Solutions LLC Page 92

#### Summary for Pond 8P: Storage Tank B

Inflow Area =	-	0.2859 ha, 68	3.87% Imperviou	s, Inflow De	epth =	80 mm	for 1	00-Year event
Inflow =		0.084 m³/s @	9.32 hrs, Volur	ne=	0.228 MI			
Outflow =		0.014 m³/s @	9.79 hrs, Volur	ne=	0.216 MI	Atten=	83%,	Lag= 28.1 min
Discarded =		0.001 m³/s @	9.79 hrs, Volur	ne=	0.018 M			
Primary =		0.013 m³/s @	9.79 hrs, Volur	ne=	0.198 MI			
Routed to	Link	9L : To Valley						

Routing by Dyn-Stor-Ind method, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs Peak Elev= 94.720 m @ 9.79 hrs Surf.Area= 75.0 m<sup>2</sup> Storage= 104.7 m<sup>3</sup>

Plug-Flow detention time= 130.7 min calculated for 0.215 MI (95% of inflow) Center-of-Mass det. time= 96.0 min ( 766.5 - 670.5 )

Volume Invert Avail.Storage Storage Description

Volume	Involt	Avail.otorage	Otorage	Description		
#1	93.250 m	106.9 m	Custom	Stage Data (Conic	) Listed below (Reca	c)
			112.5 m <sup>3</sup>	Overall x 95.0% V	/oids	
Elevatio	on Su	rf.Area	nc.Store	Cum.Store	Wet.Area	
(meter	s) (sq-ı	neters) (cubio	-meters)	(cubic-meters)	(sq-meters)	
93.25	50	75.0	0.0	0.0	75.0	
94.75	50	75.0	112.5	112.5	121.0	
Device	Routing	Invert Ou	tlet Devices			
#1	Discarded	93.250 m 60	00 mm/hr E	xfiltration over We	tted area from 93,2	50 m - 94,950 m
		Co	nductivity to	Groundwater Eleva	ation = 91.700 m	
		Ex	uded Wett	ed area = 75.0 m <sup>2</sup>		
#2	Primary	93.440 m 75	mm Vert. O	rifice/Grate C= 0	.600	
		Lin	nited to weir	flow at low heads		
Discard	ed OutFlow filtration (C	Max=0.001 m³/s ontrols 0.001 m³/	@ 9.79 hrs s)	HW=94.719 m (F	ree Discharge)	

![](_page_62_Figure_0.jpeg)

<b>22-12-19 - A</b> epared by Tra	<b>JP</b> afalgar En ⊧2f s/n 131	gineerir 29 © 20	ig 22 Hvdr	oCAD So	ON Miss	<i>issauga</i> tions LLC	24hr 100-	Year Rain Printed	all=118 mm 2024-01-31 Page 94
			Pone	1 8P: S	torage Ta	ank B			
			Stage	-Area-Sto	orage				
0	10 21	) 30	Surface 40	/Horizontal/ 50	Wetted Area (s 60 70	q-meters) 80	90 100	110 120	III Surface
Elevation (meters)									Vetted Storage

60

40 50 Storage (c 90

80

2022-12-19 - AJP	ON Mississauga 24hr 10	0-Year Rainfall=118 mm
Prepared by Trafalgar Engineering	0	Printed 2024-01-3
HvdroCAD® 10.20.2f s/n 13129 @ 2022 HvdroCAD	Software Solutions LLC	Page 96

Inflow Area =	0.0690 ha,	0.00% Impervious, Inflow I	Depth = 29 mm	for 100-Year event
Inflow =	0.006 m3/s @	9.35 hrs, Volume=	0.020 M	
Primary =	0.006 m³/s @	9.35 hrs, Volume=	0.020 MI, Atten	= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs

Link 10L: Sheridan Creek

![](_page_62_Figure_6.jpeg)

 2022-12-19 - AJP
 ON Mississauga 24hr 100-Year Rainfall=118 mm

 Prepared by Trafalgar Engineering
 Printed 2024-01-31

 HydroCAD® 10.20-21 sin 13129 @ 2022 HydroCAD Software Solutions LLC
 Page 95

 Summary for Link 9L: To Valley

 Inflow Area =
 0.4566 ha, 52.83% Impervious, Inflow Depth =
 61 mm for 100-Year event

0.009 0.01 0.011 0.012 0.013 0.014

Inflow	=	0.034 m³/s @	9.45 hrs, Volume=	0.280 M
Primary	=	0.034 m³/s @	9.45 hrs, Volume=	0.280 MI, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-32.00 hrs, dt= 0.05 hrs

0.003 0.004 0.005 0.006 0.007 0.008 Discharge (m<sup>1</sup>/s)

![](_page_62_Figure_10.jpeg)

![](_page_63_Figure_0.jpeg)

![](_page_64_Figure_0.jpeg)

![](_page_64_Picture_1.jpeg)

![](_page_64_Picture_3.jpeg)

![](_page_64_Figure_4.jpeg)

PROPOSED DRAINAGE AREA

PROPOSED DRAINAGE DIRECTION

STORM AREA IN HECTARES STORM RUN-OFF COEFFICIENT

![](_page_64_Picture_8.jpeg)

#1-481 MORDEN ROAD, OAKVILLE, ON, L6K 3W6 www.trafalgareng.com

GN BY	AJP	SCALE	1:500	DRAWING No.
WN BY	AJP	DATE ,	Jan 31, 2024	rigure J

Functional Servicing Report 1667 Sunningdale Bend City of Mississauga

# APPENDIX 'E'

Grading Plan (G1) Servicing Plan (S1) Cross-section (D1, D2)

![](_page_66_Figure_0.jpeg)

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	PROPERTY PROPOSED	BOUNDARY STORM CON	INECTION		
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	94.00
	93.00
	97.00
	96.00
M	95.00
	94.00
	93.00
TY OF MISSISSAUGA LAND	
	96.00
BANK STAKED OUT BY CVCA OCTOBER 15, RM STABLE TOP OF SLOPE DETERMINED BY EX. GROUND	95.00 2007 PETO MACCALLUM 94.00
R 'A' ED TO M.D.D.	93.00

96.00 95.00

![](_page_69_Figure_0.jpeg)

![](_page_69_Figure_1.jpeg)

![](_page_69_Figure_2.jpeg)

![](_page_69_Figure_3.jpeg)