STORMWATER MANAGEMENT

FOR

PROPOSED
RESIDENTIAL DEVELOPMENT
OFF
BANCROFT DRIVE

Michael McDowell Holdings Inc.

Sudbury, Ontario

SEPTEMBER 2022

S. A. Kirchhefer Limited

CONSULTING ENGINEER AND PLANNER Sudbury Ontario

Stormwater Management Report

for

Proposed Residential Development off Bancroft Drive

for

Michael McDowell Holdings Inc.

Sudbury, ON

September 22, 2022

Prepared by

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Generally, it is the objective of the present report to meet the stormwater management requirements which are outlined in the Pre-Consultation Understanding.

1.0 Introduction

Historically, the site has been used for farming for many years. A change in land use was proposed first in the late 1990s. According to a draft plan of subdivision, a residential development was proposed. It called for 43 lots. More recently, the current owner intends to subdivide the 6.0 ha large site into 5 residential lots. The significant reduction in the number of lots is predominantly due to both environmental and drainage constraints. Moreover, in considering the constraints carefully, the physical development of – or the impact on - the site is curtailed considerably. Only the northeasterly part of

the site would be subject to a change in land use and, consequentially, a change in drainage conditions.

Therefore, the present stormwater management report deals only with the area of property which will experience a change in land use (1.6 ha). However, external inflows are included in the hydraulic evaluation, as well.

The location of the site is indicated in **Figure 1**. Legally, the site is described as follows:
PIN 73575-0407 (LT)
Plan53R-14917
Parts 1,2,3 and 4
Being part of
LOTS 9 & 10, Concession 3,
Township of Neelon
City of Greater Sudbury.

Figure 1: Location Plan

2.0 Stormwater Management

Stormwater management typically involves myriad issues. They might entail:

a) The maintaining – or mimicking – of the natural hydrologic cycle,
b) The increasing in Flood Risk Off-site,
c) The conveying of Runoff On-site, and
d) The protecting of Water Quality.

In the present report, issue a) is addressed by promoting infiltration in non-impervious areas. Simply, it is achieved by means of creating temporary storage of runoff in depressed, grassed areas. On the other hand, dealing with the remaining issues is usually not as straight forward and a thorough analysis is typically required.

2.1 Increase in Flood Risk Off-site

It is well understood that, adherent to development, an increase in impervious area, typically due to roofs of buildings or pavement, has a profound impact on the hydrological cycle. In short, impervious areas wrought intensified surface runoff conditions while reducing desirable infiltration. Often, this phenomenon leads to an increase in flood risk off-site. To evaluate the risk with confidence, specifically developed runoff model are used. The present analysis employs the PCSWMM model[1]. The required input parameters include drainage basin data and hydro-meteorological data. Concerning the latter data, four rainfalls were selected:

a) The 2-year rainfall event, 11.9 mm,
b) The 5-year rainfall event, 16.8 mm,
c) The 100-year (10 min.) rainfall event, 28.3 mm, and
d) The Timmins Storm, 193 mm.

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1 PCSWMM 2020, Computational Hydraulics International, Guelph, ON

According to the source of the meteorological data, Environment Canada (Sudbury Airport), the four selected rainfalls, which vary in severity, have a statistical return period of 2, 5 & 100 years.

The selected rainfalls have a duration of 10 minutes. The rainfall distribution over the duration of rainfall is typically not constant. Literature mentions several types of temporal distribution. In the present case, the development of a synthetic distribution is guided by the Atmospheric Environmental Services (AES) type 2 "one-hour storm distribution" which is published for Northern Ontario.

While short-duration rainfalls traditionally cause peak flow rates which are suitable input parameters for the design of storm sewers, the runoff quantity is often of a lesser significance. On the other hand, if a storm sewer system is comprised of storage units as well, the runoff quantity becomes a dominant design parameter, too. Along those thoughts, the hydrologic/hydraulic analysis includes a 100-year storm which has an arbitrarily selected duration of 30 minutes.

In addition to the statistically derived rainfalls, the Timmins Storm, which is a historical rainfall of 193 mm, is included in the present stormwater management analysis, as well. The storm occurred near the Northern Ontario town of Timmins in 1961.

In any event, for each storm, first the existing runoff conditions are analyzed. Thereafter, the post-development runoff conditions are determined to allow for a proper assessment of the development's impact both on the off-site and the on-site drainage conditions.

2.1.1 Pre - Development Runoff Conditions

To assist the reader in understanding the local drainage conditions, a brief description might be helpful.

First, the prevailing drainage system consists primarily of overland flow. There is, however, a drainage ditch which runs, for the most part, along the easterly limit of the site. The ditch conveys the runoff from the storm sewer system on Bancroft Drive.

Secondly, the topography is relatively flat. The site descends in a southeasterly direction at a slope of approximately 3%.

Lastly, the geology is described best as silty sand to silt overburden. An inspection of the site did not reveal any bedrock outcroppings.

The site conditions, as well as the above-mentioned storms, are included in the input data required by the runoff analysis. The results of the analysis are presented in table format. Of particular interest are the peak flow rates, which are itemized in **Table 1.**

Further details on the existing runoff conditions are provided in **Appendix A-1**.

2.1.2 Post-Development Runoff Conditions

The post-development runoff is subject to certain flow control measures. Lest the proposed development might wrought eroding conditions in the receiving drainage course, alleviating measures need to be applied.

The extent to which alleviating measures are necessary depends largely on the requirements indicated in the Pre-Consultation Understanding. As is stated, in the present case the post-development peak flow rates are expected to be at least 20% lower than the pre-development peak flow rates. Compliance with the requirement obviously necessitates quantitative management of the runoff on site.

Effective means commonly sought for the purpose of reducing peak flow rates include the provision of temporary storage of runoff. Generally, temporary storage may be made available by utilizing flat roofs, depressed grassed areas, open ditches, or concrete curbs at the inlet of storm sewer structures.

For the present development, temporary storage of runoff is provided primarily by a stormwater retention pond. The pond is a vital component of the proposed stormwater treatment system, as is discussed below, in Section 2.3.

The results of the post-development analysis are shown in **Table 1,** as well. The table permits a comparative review of the pre- and post-development peak flow rates. As is shown, the post-development peak flow rates reveal a significant reduction (>20%) for all design storms bar the Timmins Storm. A further interpretation of the table reveals that the determined reduction for Outlet 1 is primarily due to a reduction in the contributing drainage area. On the other hand, for Outlet 2 & 3, the temporary storage capacity of both the open ditches and the treatment ponds proves to be beneficial. Further details on the hydraulic evaluation are given in **Appendix A– 2**.

	SITE CONDITIONS - PEAK FLOW RATES, L/s							REDUCTION IN PEAK FLOW RATE, %		
	PRE-DEVELOPMENT			POST-DEVELOPMENT				(REDUCED BY:)		
DRAINAGE AREA, ha	0.8853 OUTLET 1	1.3589 OUTLET 2	2.2442 SYSTEM	0.5463 OUTLET 1	0.6196 OUTLET 2	1.0783 OUTLET 3	2.2442 SYSTEM	OUTLET 1	OUTLET 2 & 3	SYSTEM
STORM										
2-YEAR	32.83	35.699	123.3	19.26	0.6379	13.02	291.3	41	62	**52**
5-YEAR	51.17	63.73	188.6	34.97	0.792	25.63	445.8	32	59	**47**
100-YEAR	101.5	151.2	362.2	83.15	1.011	58.80	852.5	18	60	**43**
100-YEAR (30 min.)	100.1	169.3	280.5	99.37	27.2100	73.86	89.11	1	40	**26**
TIMMINS	102.2	158.8	261.9	66.29	75.08	92.75	271.4	35	-6	**10**

Table 1: Pre- and Post-Development Peak Flow Rates

2.2 Conveyance of Runoff on Site

Generally, the means of conveying runoff on site depend on several design parameters. Foremost, there is the typical division of the site into internal sub-drainage basins. Second, the selected drainage system plays a role.

In terms of dividing the total drainage area, an additional design parameter is added. It takes into account the quality of runoff and, thus, it affects the selection of internal sub-drainage basins. Similarly, due to considering the runoff quality, the standard design practice of internal conveyance systems needs adjustment.

While the pre-development drainage system consists exclusively of overland flow, the proposed drainage system of the post-development site conditions is more elaborate. Case in point is the selection of two separate drainage systems. One system conveys the perceived uncontaminated runoff from roofs and backyards, while the other system collects the contaminated runoff from roads and driveways.

Concerning the former system, most of the overland runoff is received by an open ditch which connects to an existing drainage ditch. An exception applies to the southerly part of the site where the runoff is leaving freely towards a natural drainage course.

Concerning the latter system, appropriate structures such as catch basins and manholes collect the runoff, and a storm sewer conveys the contaminated flows to a treatment facility. Further information on the design of the post-development drainage system is given on **Sheet 1 of 4** and **Sheet 3 of 4** (separate submission). Conclusively, they confirm the capability of the designed conveyance system to handle the flows resulting from the various design storms.

2.3 Protection of Water Quality

Clean water is one of myriad environmental concerns prevalent to day. As these concerns apply to the quality of urban runoff as well, all sustainable efforts should be

undertaken to mitigate the qualitative impact of development on natural drainage courses.

Along those thoughts, the "Pre-Consultation Understanding" stipulates that an appropriate treatment method should be chosen, which is capable of achieving "Enhanced Stormwater Quality Control".

Obviously, there are numerous treatment options outlined in relevant literature. The selection of the right option is governed by a number of variables, including treatment efficiency, the physical space available for installing the system, the anticipated maximum flow rate of runoff to be treated (the loading of the facility), maintenance requirements, and costs.

In the present case a combination of a pre-treatment dry pond and a sand filter is envisaged. The treatment system is considered to be a state-of-the-art system, and its selection is especially appropriate given the relatively short reach of the receiving, natural drainage course to Ramsey Lake. Details on the system, including horizontal dimensions and elevations, are presented on **Sheet 4 of 4**.

Based on the physical dimensions of the treatment system, its performance is assessed by means of a hydraulic evaluation. A thourough evaluation typically highlights myriad parameters of interest. Those of special interest include:

a) The flood elevation,
b) The system's limitation (by-passing of flows), and
c) The hydraulic residence time, HRT.

Concerning a) flood elevations are shown on the above-noted sheet, and they are also itemized in **Table 2**.
Concerning b) the onset of weir flow (by-pass) essentially signals exceedance of the system's capacity.
Concerning c) the achievable HRT lies, on average, well within recommended limits of 24 to 36 hours.

	HYDRAULIC EVALUATION						
	DRY POND				SAND FILTER		
STORM	Flooding		Weir Flow	HRT	Flooding		Weir Flow
	Depth, m	Elevation, m	Peak L/s	hrs	Depth, m	Elevation, m	Peak L/s
2-YEAR	0.26	259.76	0.00	18	0.79	259.29	0.00
5-YEAR	0.38	259.88	0.00	24	0.80	259.30	0.00
100-YEAR (10 min.)	0.64	260.14	0.00	36	0.81	259.31	0.00
100-YEAR (30 min.)	0.70	260.20	35.75	38	0.94	259.44	29.93
TIMMINS	0.73	260.23	74.74	50	0.98	259.48	73.25

Table 2: Hydraulic Evaluation of Treatment System

3.0 Maintenance Schedule

For a stormwater management system to work in accordance with the design, continuous maintenance is an imperative requirement. It applies to all components of a drainage system, as well as to all components of the treatment system.

Regarding the drainage system, the removal of litter, in general, and the removal of "winter" sand in paved areas, is important. In addition, in grassed areas the cutting of grass needs to be done as often as is seasonally required.

For the treatment system a higher level of maintenance is mandatory. First, referring to the dry pond, the concern is that floating debris in the retention pond could easily plug the outlet (orifice). Equivalently important is the removal of sediment deposits in the retention pond. Unattended accumulation of deposits will, over time, not only reduce the storage capacity of the pond, but it will also have a deteriorating environmental effect (odour).

Second, regarding the sand filter, the maintenance requirements are clearly identified in relevant literature. Principally, all efforts shall be made to ensure an optimal operation of the sand filter. They include, in addition to the routinely removal of litter, a close observation of potential matting. Typically, matting develops at the surface of a sand

filter over time. At the initial stage, the development of matting is not objectionable, as it enhances the treatment capability of the sand filter. However, as time passes on, the thickness of the matting increases to a point (± 5 years) at which a breaking up (raking) will be necessary. Eventually, after another few years of operation, the matting will likely require removal.

A maintenance schedule, which itemizes the various tasks to be performed, is given in **Table 3**.

Maintenance Schedule 16-Sep-22

Component	Interval of Maintenance
A) Drainage System	
ROAD AREAS	1) REMOVAL OF "WINTER" SAND IN THE SPRING
	2) REMOVAL OF LITTER, WEEKLY
	3) INSPECTION OF CATCH BASIN INLETS WEEKLY
LANDSCAPED AREAS	4) REMOVAL OF LITTER, WEEKLY
	5) CUTTING OF GRASS AS SEASONALLY REQUIRED
DRY POND	6) REMOVAL OF LITTER, WEEKLY
B) Treatment System SAND FILTER	7) REMOVAL OF LITTER, WEEKLY
	8) KEEPING PIPE INLETS AND WEIRS FREE OF LITTER AND DEBRIS, FORTNIGHT INTERVALS
	9) OBSERVING THE FORMATION OF MATTING, ANNUALLY
	10) IF OBSERVATIOS REVEAL A SLOWDOWN IN INFILTRATION RATE, A BREAKING UP OF THE MATTING BECOMES DUE, RAKING OR REMOVAL OF MATTING AS NECESSAY.

Table 3: Maintenance Schedule

4.0 Recommendation

In conclusion, it is the writer's opinion that the proposed stormwater management is in full compliance with the conditions documented in the Pre-Consultation Understanding. The achieved reduction in peak flow rate exceeds the requirement of a 20% reduction for all storm events bar the Timmins Storm.

The stormwater management deals with two clearly distinguishable runoff conditions in terms of water quality. For instance, there is the presumably uncontaminated runoff from the roofs of buildings and from landscaped areas such as backyards. By contrast, there is the knowingly contaminated runoff from road and driveway paved surfaces. While the quality of the former runoff is deemed to be acceptable for being released directly into the environment, the quality of the latter runoff certainly demands treatment prior to being released.

Advanced treatment of the runoff is absolutely mandatory given the proximity of Ramsey Lake, a source of drinking water. In recognizing the special need, it is proposed that the treatment process consists of two phases. First, pre-treatment is provided by a dry pond. Thereafter, the water quality of the pond's discharge is further polished by a sand filter.

Therefore, it is recommended that the report be accepted in support of the current application for Rezoning.

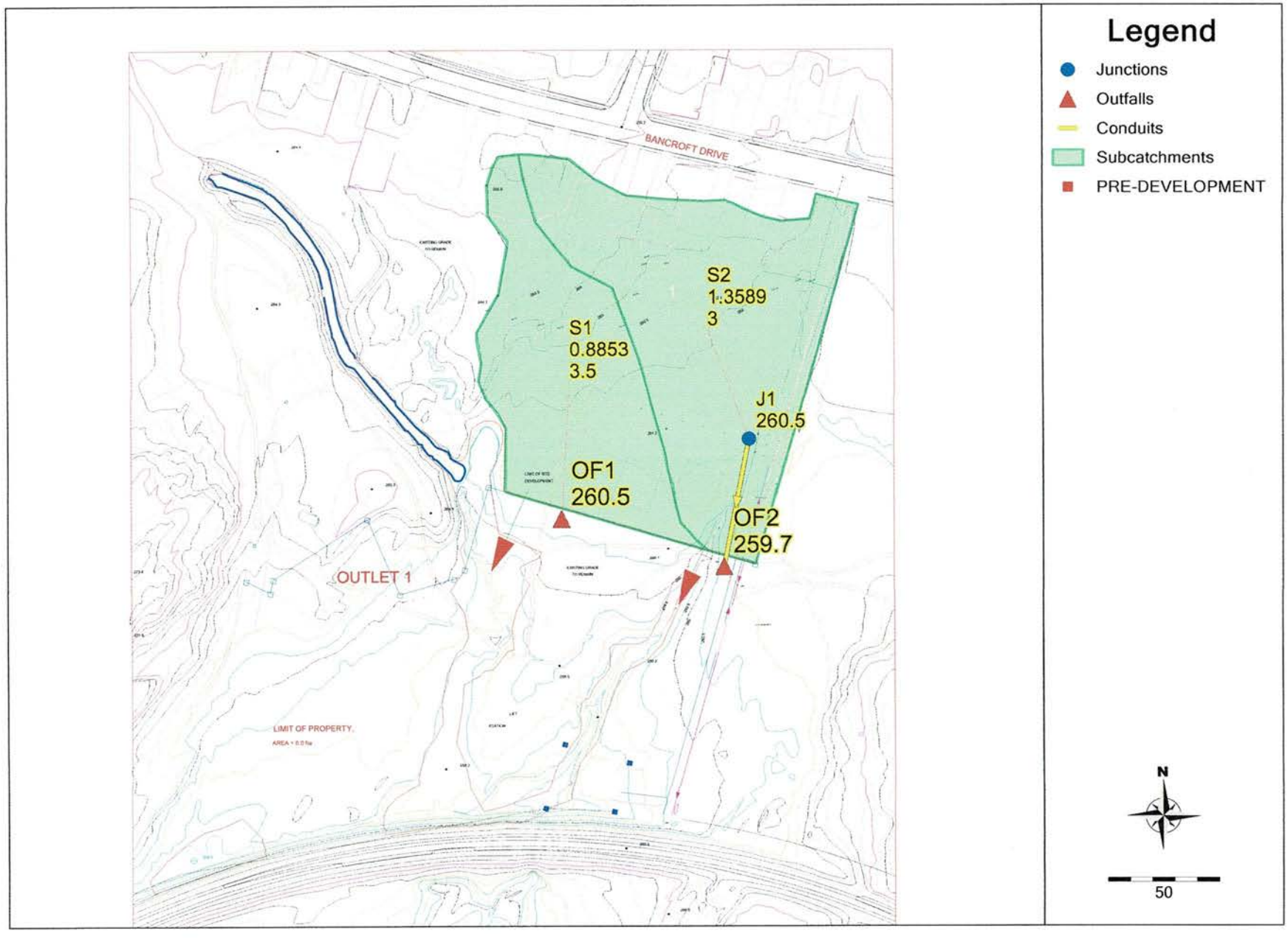
S. A. Kirchhefer Limited

S. A. Kirchhefer, Ph.D., P. Eng.

APPENDIX A-1

HYDRAULIC ANALYSIS

PRE-DEVELOPMENT


BANCROFT DRIVE
S2
1.3589
3
S1
0.8853
3.5
J1
260.5
OF1
260.5
OF2
259.7
OUTLET 1
LIMIT OF PROPERTY
AREA = 6.0 ha
Legend
Junctions
Outfalls
Conduits
Subcatchments
PRE-DEVELOPMENT
N
50

2-year

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

STORMWATER MANAGEMNT RE. RESIDENTIAL DEVELOPMENT

****
Element Count
****
Number of rain gages 5
Number of subcatchments ... 2
Number of nodes 3
Number of links 1
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
100YEAR	Timeseries100Y	VOLUME	1 min.
100year30	100year30	VOLUME	3 min.
2YAER	Timeseries2Y	VOLUME	1 min.
5YEAR	Timeseries5Y	VOLUME	1 min.
Timmins_Storm_(0-25)	Timmins_Storm_(0-25)	INTENSITY	60 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S1	0.89	80.00	5.00	3.5000	2YAER	OF1
S2	1.36	150.00	10.00	3.0000	2YAER	J1

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	260.50	1.00	0.0	
OF1	OUTFALL	260.50	0.00	0.0	
OF2	OUTFALL	259.70	1.00	0.0	

****
Link Summary

```
  ************
  Name             From Node        To Node          Type            Length    %
Slope Roughness
  ---------------------------------------------------------------------------
------------
  C1               J1               OF2              CONDUIT           59.3
1.3489    0.2500


  *********************
  Cross Section Summary
  *********************
                                        Full      Full      Hyd.      Max.   No. of
Full
  Conduit          Shape                Depth     Area      Rad.      Width  Barrels
Flow
  ---------------------------------------------------------------------------
------
  C1               TRAPEZOIDAL          1.00      2.15      0.47      4.15        1
599.66


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

  ****************
  Analysis Options
  ****************
  Flow Units ..............  LPS
  Process Models:
    Rainfall/Runoff ........  YES
    RDII ...................  NO
    Snowmelt ...............  NO
    Groundwater ............  NO
    Flow Routing ...........  YES
    Ponding Allowed ........  NO
    Water Quality ..........  NO
  Infiltration Method ......  HORTON
  Flow Routing Method ......  DYNWAVE
  Surcharge Method .........  EXTRAN
  Starting Date ............  08/17/2022 00:00:00
  Ending Date ..............  08/18/2022 01:00:00
  Antecedent Dry Days ......  0.0
  Report Time Step .........  00:00:01
  Wet Time Step ............  00:00:01
  Dry Time Step ............  00:00:03
  Routing Time Step ........  1.00 sec
  Variable Time Step .......  YES
  Maximum Trials ...........  8
  Number of Threads ........  1
  Head Tolerance ...........  0.001500 m

  *************************        Volume         Depth
```

Runoff Quantity Continuity	hectare-m	mm
Total Precipitation	0.027	11.900
Evaporation Loss	0.000	0.000
Infiltration Loss	0.011	4.819
Surface Runoff	0.016	7.080
Final Storage	0.000	0.001
Continuity Error (%)	0.000	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.016	0.159
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.016	0.159
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

Time-Step Critical Elements

None

Highest Flow Instability Indexes

All links are stable.

Routing Time Step Summary

Minimum Time Step	:	0.50 sec
Average Time Step	:	1.00 sec
Maximum Time Step	:	1.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	2.00
Percent Not Converging	:	0.00
Time Step Frequencies	:	
1.000 - 0.871 sec	:	100.00 %
0.871 - 0.758 sec	:	0.00 %
0.758 - 0.660 sec	:	0.00 %
0.660 - 0.574 sec	:	0.00 %
0.574 - 0.500 sec	:	0.00 %

Subcatchment Runoff Summary

Subcatchment	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Total Precip mm	Peak Runoff LPS	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Runoff Coeff
S1	6.20	6.80	0.06	11.90	32.90	0.00	0.00	5.10	0.59	0.571
S2	6.07	7.26	0.10	11.90	90.40	0.00	0.00	4.64	1.19	0.610

Node Depth Summary

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.04	0.49	260.99	0 00:11	0.49
OF1	OUTFALL	0.00	0.00	260.50	0 00:00	0.00
OF2	OUTFALL	0.01	0.11	259.81	0 00:11	0.11

Node Inflow Summary

Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
J1	JUNCTION	90.40	90.40	0 00:06	0.0987	0.0987	-0.002
OF1	OUTFALL	32.90	32.90	0 00:06	0.0602	0.0602	0.000
OF2	OUTFALL	0.00	35.69	0 00:11	0	0.0987	0.000

Node Surcharge Summary
****

No nodes were surcharged.

****
Node Flooding Summary
****

No nodes were flooded.

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
OF1	20.38	3.28	32.90	0.060
OF2	21.75	5.04	35.69	0.099
System	21.07	8.32	55.55	0.159

****
Link Flow Summary
****

Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	35.69	0 00:11	0.16	0.06	0.30

****
Flow Classification Summary
****

Inlet Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Ctrl
C1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Tue Sep 20 17:55:43 2022
Analysis ended on: Tue Sep 20 17:55:44 2022
Total elapsed time: 00:00:01

5-year

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

STORMWATER MANAGEMNT RE. RESIDENTIAL DEVELOPMENT

****
Element Count
****
Number of rain gages 5
Number of subcatchments ... 2
Number of nodes 3
Number of links 1
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
100YEAR	Timeseries100Y	VOLUME	1 min.
100year30	100year30	VOLUME	3 min.
2YAER	Timeseries2Y	VOLUME	1 min.
5YEAR	Timeseries5Y	VOLUME	1 min.
Timmins_Storm_(0-25)	Timmins_Storm_(0-25)	INTENSITY	60 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S1	0.89	80.00	5.00	3.5000	5YEAR	OF1
S2	1.36	150.00	10.00	3.0000	5YEAR	J1

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	260.50	1.00	0.0	
OF1	OUTFALL	260.50	0.00	0.0	
OF2	OUTFALL	259.70	1.00	0.0	

****
Link Summary

```
  ************
  Name             From Node        To Node          Type            Length    %
Slope Roughness
  ---------------------------------------------------------------------------
------------
  C1               J1               OF2              CONDUIT           59.3
1.3489    0.2500


  *********************
  Cross Section Summary
  *********************
                                      Full      Full      Hyd.      Max.   No. of
Full
  Conduit          Shape              Depth     Area      Rad.      Width  Barrels
Flow
  ---------------------------------------------------------------------------
------
  C1               TRAPEZOIDAL         1.00      2.15      0.47      4.15        1
599.66


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

  ****************
  Analysis Options
  ****************
  Flow Units ..............  LPS
  Process Models:
    Rainfall/Runoff ........  YES
    RDII ...................  NO
    Snowmelt ...............  NO
    Groundwater ............  NO
    Flow Routing ...........  YES
    Ponding Allowed ........  NO
    Water Quality ..........  NO
  Infiltration Method ......  HORTON
  Flow Routing Method ......  DYNWAVE
  Surcharge Method .........  EXTRAN
  Starting Date ............  08/17/2022 00:00:00
  Ending Date ..............  08/18/2022 01:00:00
  Antecedent Dry Days ......  0.0
  Report Time Step .........  00:00:01
  Wet Time Step ............  00:00:01
  Dry Time Step ............  00:00:03
  Routing Time Step ........  1.00 sec
  Variable Time Step .......  YES
  Maximum Trials ...........  8
  Number of Threads ........  1
  Head Tolerance ...........  0.001500 m

  *************************        Volume         Depth
```

Runoff Quantity Continuity	hectare-m	mm
Total Precipitation	0.038	16.800
Evaporation Loss	0.000	0.000
Infiltration Loss	0.011	5.004
Surface Runoff	0.026	11.795
Final Storage	0.000	0.001
Continuity Error (%)	0.000	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.026	0.265
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.026	0.265
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

Time-Step Critical Elements

None

Highest Flow Instability Indexes

All links are stable.

Routing Time Step Summary

Minimum Time Step	:	0.50 sec
Average Time Step	:	1.00 sec
Maximum Time Step	:	1.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	2.00
Percent Not Converging	:	0.00
Time Step Frequencies	:	
1.000 - 0.871 sec	:	100.00 %
0.871 - 0.758 sec	:	0.00 %
0.758 - 0.660 sec	:	0.00 %
0.660 - 0.574 sec	:	0.00 %
0.574 - 0.500 sec	:	0.00 %

Subcatchment Runoff Summary

Subcatchment	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Total Precip mm	Total Runon mm	Peak Runoff LPS	Total Evap mm	Total Infil mm	Imperv Runoff mm	Runoff Coeff
S1	10.65	11.49	0.10	16.80	0.00	51.30	0.00	5.31	0.84	0.684
S2	10.32	11.99	0.16	16.80	0.00	137.30	0.00	4.80	1.68	0.714

Node Depth Summary

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.05	0.60	261.10	0 00:11	0.60
OF1	OUTFALL	0.00	0.00	260.50	0 00:00	0.00
OF2	OUTFALL	0.01	0.15	259.85	0 00:11	0.15

Node Inflow Summary

Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
J1	JUNCTION	137.30	137.30	0 00:06	0.163	0.163	-0.002
OF1	OUTFALL	51.30	51.30	0 00:06	0.102	0.102	0.000
OF2	OUTFALL	0.00	63.73	0 00:11	0	0.163	0.000

Node Surcharge Summary
****

No nodes were surcharged.

****
Node Flooding Summary
****

No nodes were flooded.

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
OF1	22.16	5.10	51.30	0.102
OF2	23.27	7.78	63.73	0.163
System	22.71	12.88	100.03	0.265

****
Link Flow Summary
****

Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	63.73	0 00:11	0.19	0.11	0.38

****
Flow Classification Summary
****

Inlet Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Ctrl
C1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Tue Oct 11 16:56:30 2022
Analysis ended on: Tue Oct 11 16:56:31 2022
Total elapsed time: 00:00:01

100-year

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

STORMWATER MANAGEMNT RE. RESIDENTIAL DEVELOPMENT

****
Element Count
****
Number of rain gages 5
Number of subcatchments ... 2
Number of nodes 3
Number of links 1
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
100YEAR	Timeseries100Y	VOLUME	1 min.
100year30	100year30	VOLUME	3 min.
2YAER	Timeseries2Y	VOLUME	1 min.
5YEAR	Timeseries5Y	VOLUME	1 min.
Timmins_Storm_(0-25)	Timmins_Storm_(0-25)	INTENSITY	60 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S1	0.89	80.00	5.00	3.5000	100YEAR	OF1
S2	1.36	150.00	10.00	3.0000	100YEAR	J1

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	260.50	1.00	0.0	
OF1	OUTFALL	260.50	0.00	0.0	
OF2	OUTFALL	259.70	1.00	0.0	

****
Link Summary

```
  ************
  Name             From Node        To Node          Type            Length    %
Slope Roughness
  ---------------------------------------------------------------------------
------------
  C1               J1               OF2              CONDUIT           59.3
1.3489    0.2500


  *********************
  Cross Section Summary
  *********************
                                        Full     Full     Hyd.     Max.   No. of
Full
  Conduit          Shape                Depth    Area     Rad.     Width  Barrels
Flow
  ---------------------------------------------------------------------------
------
  C1               TRAPEZOIDAL          1.00     2.15     0.47     4.15        1
599.66


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

  ****************
  Analysis Options
  ****************
  Flow Units ..............  LPS
  Process Models:
    Rainfall/Runoff ........ YES
    RDII ................... NO
    Snowmelt ............... NO
    Groundwater ............ NO
    Flow Routing ........... YES
    Ponding Allowed ........ NO
    Water Quality .......... NO
  Infiltration Method ......  HORTON
  Flow Routing Method ......  DYNWAVE
  Surcharge Method .........  EXTRAN
  Starting Date ............  08/17/2022 00:00:00
  Ending Date ..............  08/18/2022 01:00:00
  Antecedent Dry Days ......  0.0
  Report Time Step .........  00:00:01
  Wet Time Step ............  00:00:01
  Dry Time Step ............  00:00:03
  Routing Time Step ........  1.00 sec
  Variable Time Step .......  YES
  Maximum Trials ...........  8
  Number of Threads ........  1
  Head Tolerance ...........  0.001500 m

  *************************        Volume         Depth
```

Runoff Quantity Continuity	hectare-m	mm
Total Precipitation	0.063	28.290
Evaporation Loss	0.000	0.000
Infiltration Loss	0.012	5.192
Surface Runoff	0.052	23.096
Final Storage	0.000	0.001
Continuity Error (%)	0.000	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.052	0.518
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.052	0.518
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

Time-Step Critical Elements

None

Highest Flow Instability Indexes

All links are stable.

Routing Time Step Summary

Minimum Time Step	:	0.50 sec
Average Time Step	:	1.00 sec
Maximum Time Step	:	1.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	2.00
Percent Not Converging	:	0.00
Time Step Frequencies	:	
1.000 - 0.871 sec	:	100.00 %
0.871 - 0.758 sec	:	0.00 %
0.758 - 0.660 sec	:	0.00 %
0.660 - 0.574 sec	:	0.00 %
0.574 - 0.500 sec	:	0.00 %

Subcatchment Runoff Summary

Subcatchment	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Total Precip mm	Total Runon mm	Peak Runoff LPS	Total Evap mm	Total Infil mm	Imperv Runoff mm	Runoff Coeff
S1	21.35	22.76	0.20	28.29	0.00	101.78	0.00	5.53	1.41	0.805
S2	20.49	23.31	0.32	28.29	0.00	260.38	0.00	4.97	2.83	0.824

Node Depth Summary

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.06	0.82	261.32	0 00:11	0.82
OF1	OUTFALL	0.00	0.00	260.50	0 00:00	0.00
OF2	OUTFALL	0.01	0.22	259.92	0 00:11	0.22

Node Inflow Summary

Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
J1	JUNCTION	260.38	260.38	0 00:06	0.317	0.317	-0.003
OF1	OUTFALL	101.78	101.78	0 00:06	0.202	0.202	0.000
OF2	OUTFALL	0.00	151.16	0 00:11	0	0.317	0.000

Node Surcharge Summary
****

No nodes were surcharged.

****
Node Flooding Summary
****

No nodes were flooded.

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
OF1	23.97	9.34	101.78	0.202
OF2	24.80	14.19	151.16	0.317
System	24.39	23.53	238.88	0.518

****
Link Flow Summary
****

Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	151.16	0 00:11	0.24	0.25	0.52

****
Flow Classification Summary
****

Inlet Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Ctrl
C1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Tue Oct 11 16:58:33 2022
Analysis ended on: Tue Oct 11 16:58:34 2022
Total elapsed time: 00:00:01

100year - 30 Min.

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

STORMWATER MANAGEMNT RE. RESIDENTIAL DEVELOPMENT

****
Element Count
****
Number of rain gages 5
Number of subcatchments ... 2
Number of nodes 3
Number of links 1
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
100YEAR	Timeseries100Y	VOLUME	1 min.
100year30	100year30	VOLUME	3 min.
2YAER	Timeseries2Y	VOLUME	1 min.
5YEAR	Timeseries5Y	VOLUME	1 min.
Timmins_Storm_(0-25)	Timmins_Storm_(0-25)	INTENSITY	60 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S1	0.89	80.00	5.00	3.5000	100year30	OF1
S2	1.36	150.00	10.00	3.0000	100year30	J1

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	260.50	1.00	0.0	
OF1	OUTFALL	260.50	0.00	0.0	
OF2	OUTFALL	259.70	1.00	0.0	

****
Link Summary

```
  ************
  Name             From Node        To Node          Type            Length    %
Slope Roughness
  ---------------------------------------------------------------------------
------------
  C1               J1               OF2              CONDUIT           59.3
1.3489    0.2500


  *********************
  Cross Section Summary
  *********************
                                        Full      Full      Hyd.      Max.   No. of
Full
  Conduit          Shape                Depth     Area      Rad.      Width  Barrels
Flow
  ---------------------------------------------------------------------------
------
  C1               TRAPEZOIDAL          1.00      2.15      0.47      4.15        1
599.66


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

  ****************
  Analysis Options
  ****************
  Flow Units ..............  LPS
  Process Models:
    Rainfall/Runoff .......  YES
    RDII ..................  NO
    Snowmelt ..............  NO
    Groundwater ...........  NO
    Flow Routing ..........  YES
    Ponding Allowed .......  NO
    Water Quality .........  NO
  Infiltration Method ......  HORTON
  Flow Routing Method ......  DYNWAVE
  Surcharge Method .........  EXTRAN
  Starting Date ............  08/17/2022 00:00:00
  Ending Date ..............  08/18/2022 01:00:00
  Antecedent Dry Days ......  0.0
  Report Time Step .........  00:00:01
  Wet Time Step ............  00:00:01
  Dry Time Step ............  00:00:03
  Routing Time Step ........  1.00 sec
  Variable Time Step .......  YES
  Maximum Trials ...........  8
  Number of Threads ........  1
  Head Tolerance ...........  0.001500 m

  *************************        Volume         Depth
```

Runoff Quantity Continuity	hectare-m	mm
Total Precipitation	0.083	37.000
Evaporation Loss	0.000	0.000
Infiltration Loss	0.012	5.358
Surface Runoff	0.071	31.641
Final Storage	0.000	0.001
Continuity Error (%)	0.000	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.071	0.710
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.071	0.710
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

Time-Step Critical Elements

None

Highest Flow Instability Indexes

All links are stable.

Routing Time Step Summary

Minimum Time Step	:	0.50 sec
Average Time Step	:	1.00 sec
Maximum Time Step	:	1.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	2.00
Percent Not Converging	:	0.00
Time Step Frequencies	:	
1.000 - 0.871 sec	:	100.00 %
0.871 - 0.758 sec	:	0.00 %
0.758 - 0.660 sec	:	0.00 %
0.660 - 0.574 sec	:	0.00 %
0.574 - 0.500 sec	:	0.00 %

Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff LPS	Runoff Coeff
S1	37.00	0.00	0.00	5.70	1.85	29.45	31.30	0.28	100.16	0.846
S2	37.00	0.00	0.00	5.13	3.70	28.17	31.87	0.43	181.27	0.861

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.06	0.85	261.35	0 00:27	0.85
OF1	OUTFALL	0.00	0.00	260.50	0 00:00	0.00
OF2	OUTFALL	0.01	0.24	259.94	0 00:27	0.24

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
J1	JUNCTION	181.27	181.27	0 00:18	0.433	0.433	-0.001
OF1	OUTFALL	100.16	100.16	0 00:24	0.277	0.277	0.000
OF2	OUTFALL	0.00	169.34	0 00:27	0	0.433	0.000

****

Node Surcharge Summary
****

No nodes were surcharged.

****
Node Flooding Summary
****

No nodes were flooded.

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
OF1	25.46	12.09	100.16	0.277
OF2	26.13	18.41	169.34	0.433
System	25.79	30.50	269.20	0.710

****
Link Flow Summary
****

Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	169.34	0 00:27	0.25	0.28	0.54

****
Flow Classification Summary
****

Inlet Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Ctrl
C1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00

```
*************************
Conduit Surcharge Summary
*************************

No conduits were surcharged.


Analysis begun on:  Tue Oct 11 17:00:00 2022
Analysis ended on:  Tue Oct 11 17:00:01 2022
Total elapsed time: 00:00:01
```

Timmins

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

STORMWATER MANAGEMNT RE. RESIDENTIAL DEVELOPMENT

****
Element Count
****
Number of rain gages 5
Number of subcatchments ... 2
Number of nodes 3
Number of links 1
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
100YEAR	Timeseries100Y	VOLUME	1 min.
100year30	100year30	VOLUME	3 min.
2YAER	Timeseries2Y	VOLUME	1 min.
5YEAR	Timeseries5Y	VOLUME	1 min.
Timmins_Storm_(0-25)	Timmins_Storm_(0-25)	INTENSITY	60 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S1	0.89	80.00	5.00	3.5000	Timmins_Storm_(0-25)	OF1
S2	1.36	150.00	10.00	3.0000	Timmins_Storm_(0-25)	J1

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	260.50	1.00	0.0	
OF1	OUTFALL	260.50	0.00	0.0	
OF2	OUTFALL	259.70	1.00	0.0	

****
Link Summary

```
  ************
  Name             From Node        To Node          Type            Length    %
Slope Roughness
  ---------------------------------------------------------------------------
------------
  C1               J1               OF2              CONDUIT           59.3
1.3489     0.2500


  **********************
  Cross Section Summary
  **********************
                                       Full      Full      Hyd.      Max.    No. of
Full
  Conduit          Shape               Depth     Area      Rad.      Width   Barrels
Flow
  ---------------------------------------------------------------------------
------
  C1               TRAPEZOIDAL          1.00      2.15      0.47      4.15         1
599.66


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

  ****************
  Analysis Options
  ****************
  Flow Units ..............  LPS
  Process Models:
    Rainfall/Runoff ........  YES
    RDII ...................  NO
    Snowmelt ...............  NO
    Groundwater ............  NO
    Flow Routing ...........  YES
    Ponding Allowed ........  NO
    Water Quality ..........  NO
  Infiltration Method ......  HORTON
  Flow Routing Method ......  DYNWAVE
  Surcharge Method .........  EXTRAN
  Starting Date ............  08/17/2022 00:00:00
  Ending Date ..............  08/18/2022 01:00:00
  Antecedent Dry Days ......  0.0
  Report Time Step .........  00:00:01
  Wet Time Step ............  00:00:01
  Dry Time Step ............  00:00:03
  Routing Time Step ........  1.00 sec
  Variable Time Step .......  YES
  Maximum Trials ...........  8
  Number of Threads ........  1
  Head Tolerance ...........  0.001500 m

  *************************        Volume         Depth
```

Runoff Quantity Continuity	hectare-m	mm
Total Precipitation	0.433	192.996
Evaporation Loss	0.000	0.000
Infiltration Loss	0.023	10.306
Surface Runoff	0.410	182.689
Final Storage	0.000	0.001
Continuity Error (%)	0.000	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.410	4.100
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.410	4.100
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

Time-Step Critical Elements

None

Highest Flow Instability Indexes

All links are stable.

Routing Time Step Summary

Minimum Time Step	:	0.50 sec
Average Time Step	:	1.00 sec
Maximum Time Step	:	1.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	2.00
Percent Not Converging	:	0.00
Time Step Frequencies	:	
1.000 - 0.871 sec	:	100.00 %
0.871 - 0.758 sec	:	0.00 %
0.758 - 0.660 sec	:	0.00 %
0.660 - 0.574 sec	:	0.00 %
0.574 - 0.500 sec	:	0.00 %

Subcatchment Runoff Summary

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff LPS	Runoff Coeff
S1	193.00	0.00	0.00	10.80	9.65	172.54	182.19	1.61	102.15	0.944
S2	193.00	0.00	0.00	9.98	19.30	163.72	183.01	2.49	159.74	0.948

Node Depth Summary

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.30	0.83	261.33	0 07:00	0.83
OF1	OUTFALL	0.00	0.00	260.50	0 00:00	0.00
OF2	OUTFALL	0.07	0.23	259.93	0 07:00	0.23

Node Inflow Summary

Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
J1	JUNCTION	159.74	159.74	0 07:00	2.49	2.49	0.000
OF1	OUTFALL	102.15	102.15	0 07:00	1.61	1.61	0.000
OF2	OUTFALL	0.00	158.83	0 07:00	0	2.49	0.000

Node Surcharge Summary
****

No nodes were surcharged.

****
Node Flooding Summary
****

No nodes were flooded.

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
OF1	68.42	26.19	102.15	1.613
OF2	69.29	39.88	158.83	2.487
System	68.86	66.07	260.98	4.100

****
Link Flow Summary
****

Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	158.83	0 07:00	0.25	0.26	0.53

****
Flow Classification Summary
****

Inlet Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Ctrl
C1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00

****
Conduit Surcharge Summary
****

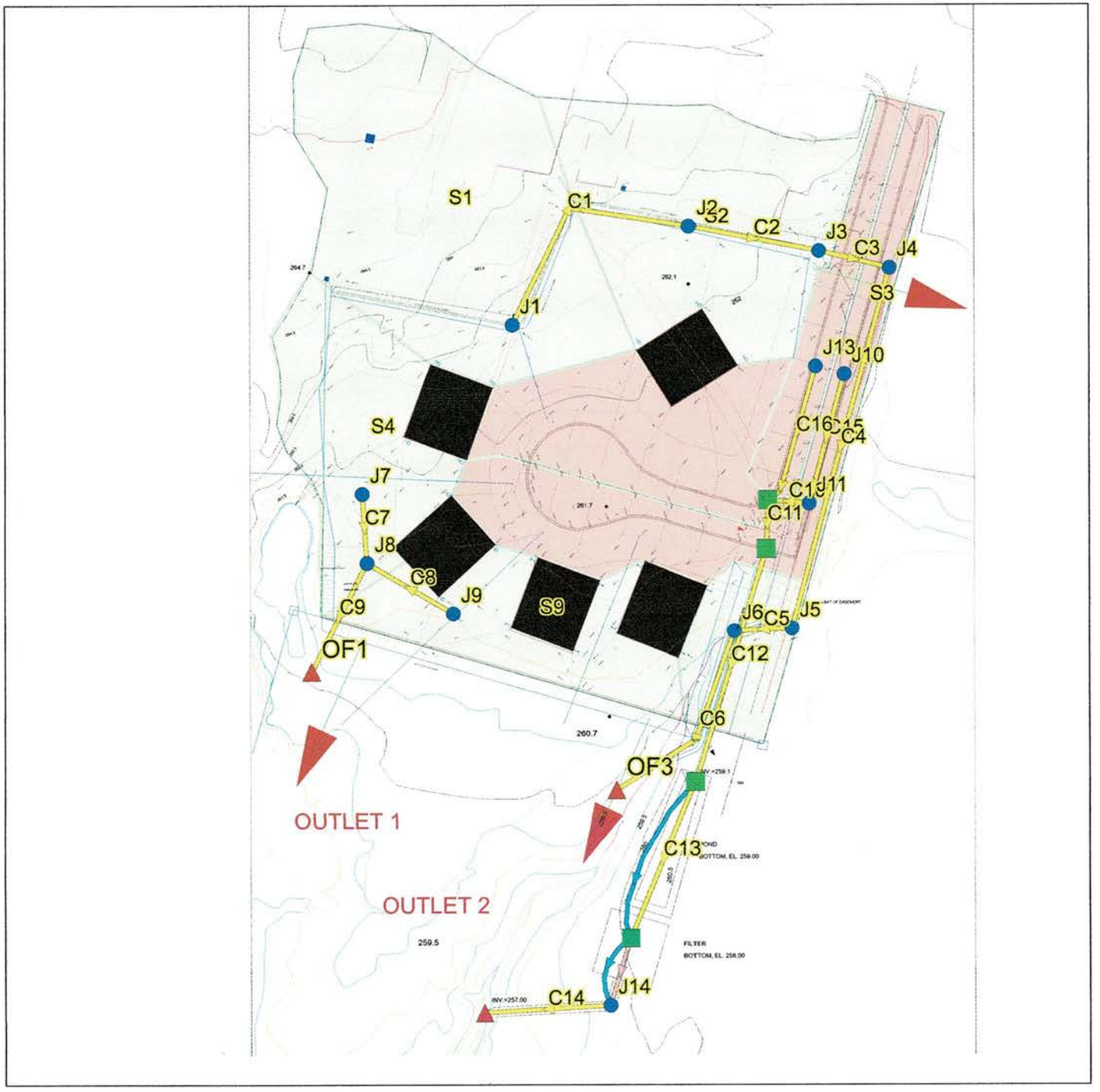
No conduits were surcharged.

Analysis begun on: Tue Oct 11 17:01:47 2022
Analysis ended on: Tue Oct 11 17:01:48 2022
Total elapsed time: 00:00:01

APPENDIX A-2

HYDRAULIC ANALYSIS

POST-DEVELOPMENT CONDITIONS


S1
C1
J2
C2
J3
C3
J4
S3
J1
J13
J10
S4
C16
C15
C4
J7
C7
J8
C8
J9
S9
C9
OF1
J6
C5
J5
C12
C6
OF3
OUTLET 1
C13
OUTLET 2
259.5
FILTER
BOTTOM, EL. 258.00
INV.=257.00
C14
J14
Legend
Junctions
Outfalls
Storages
Conduits
Orifices
Weirs
Subcatchments
Other
Other
CONTAMINATED
POST-DEVELOPMENT
N
45

2-year

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

POST-DEVELOPMENT DRAINAGE CONDITIONS & TREATMENT

****
Element Count
****
Number of rain gages 5
Number of subcatchments ... 9
Number of nodes 20
Number of links 19
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
100YEARSTORM	Timeseries100	VOLUME	1 min.
100yearstorm30	100year30	VOLUME	1 min.
2YEARSTORM	Timeseries2	VOLUME	1 min.
5YEARSTORM	Timeseries5	VOLUME	1 min.
Timmins_Storm_(0-25)	Timmins_Storm_(0-25)	INTENSITY	60 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S1	0.55	70.00	5.00	3.5000	2YEARSTORM	J1
S2	0.42	80.00	5.00	3.0000	2YEARSTORM	J2
S3	0.10	100.00	50.00	1.0000	2YEARSTORM	J10
S4	0.29	60.00	20.00	3.5000	2YEARSTORM	J7
S5	0.11	30.00	5.00	2.0000	2YEARSTORM	J6

S6	0.11	100.00	50.00	1.0000	2YEARSTORM	J12
S7	0.18	70.00	32.00	4.0000	2YEARSTORM	J16
S8	0.23	70.00	25.00	4.0000	2YEARSTORM	J12
S9	0.26	80.00	35.00	3.5000	2YEARSTORM	J9

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	262.15	1.00	0.0	
J10	JUNCTION	262.80	0.15	0.0	
J11	JUNCTION	260.60	2.00	0.0	
J13	JUNCTION	262.80	0.15	0.0	
J14	JUNCTION	258.45	0.75	0.0	
J2	JUNCTION	261.89	1.00	0.0	
J3	JUNCTION	261.80	1.25	0.0	
J4	JUNCTION	261.65	1.00	0.0	
J5	JUNCTION	260.69	1.00	0.0	
J6	JUNCTION	260.66	1.00	0.0	
J7	JUNCTION	262.50	1.00	0.0	
J8	JUNCTION	262.00	1.00	0.0	
J9	JUNCTION	262.75	1.00	0.0	
OF1	OUTFALL	260.00	2.25	0.0	
OF2	OUTFALL	257.00	0.50	0.0	
OF3	OUTFALL	260.00	0.70	0.0	
J12	STORAGE	260.45	2.01	0.0	
J16	STORAGE	260.25	1.94	0.0	
J17	STORAGE	259.50	0.75	0.0	
J18	STORAGE	258.50	1.00	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	J2	CONDUIT	65.2	0.3985	0.3500
C10	J11	J12	CONDUIT	10.7	0.9346	0.0130

C11	J12	J16	CONDUIT	12.7	1.1791	0.0130
C12	J16	J17	CONDUIT	63.2	0.9817	0.0130
C13	J17	J18	CONDUIT	44.1	0.6798	0.0130
C14	J14	OF2	CONDUIT	32.7	4.4328	0.3500
C15	J10	J11	CONDUIT	34.8	1.0921	0.0120
C16	J13	J12	CONDUIT	37.6	1.3030	0.0120
C2	J2	J3	CONDUIT	34.1	0.2636	0.3500
C3	J3	J4	CONDUIT	20.0	0.5000	0.0350
C4	J4	J5	CONDUIT	97.1	0.9892	0.3500
C5	J5	J6	CONDUIT	14.9	0.2009	0.0150
C6	J6	OF3	CONDUIT	40.3	1.1417	0.3500
C7	J7	J8	CONDUIT	18.0	2.7767	0.3500
C8	J9	J8	CONDUIT	26.0	2.8882	0.3500
C9	J8	OF1	CONDUIT	31.7	2.3651	0.3500
OR1	J18	J14	ORIFICE			
W1	J18	J14	WEIR			
W2	J17	J18	WEIR			

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	TRAPEZOIDAL	1.00	3.00	0.51	5.50	1	344.80
C10	CIRCULAR	0.30	0.07	0.07	0.30	1	93.49
C11	CIRCULAR	0.30	0.07	0.07	0.30	1	105.01
C12	CIRCULAR	0.38	0.11	0.09	0.38	1	173.73
C13	CIRCULAR	0.05	0.00	0.01	0.05	1	0.67
C14	TRAPEZOIDAL	0.50	0.75	0.27	2.50	1	190.39
C15	TRAPEZOIDAL	0.15	0.15	0.08	1.85	1	248.81
C16	TRAPEZOIDAL	0.15	0.15	0.08	1.85	1	271.77
C2	TRAPEZOIDAL	1.00	3.00	0.51	5.50	1	280.41
C3	CIRCULAR	0.45	0.16	0.11	0.45	1	74.89
C4	TRAPEZOIDAL	1.00	2.75	0.53	4.75	1	509.62
C5	CIRCULAR	0.75	0.44	0.19	0.75	1	432.44
C6	TRAPEZOIDAL	0.50	0.75	0.27	2.50	1	96.62
C7	TRIANGULAR	0.50	1.25	0.25	5.00	1	233.12
C8	TRAPEZOIDAL	0.75	1.50	0.39	3.50	1	388.27
C9	TRIANGULAR	1.00	5.00	0.49	10.00	1	1366.12

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

****************
Analysis Options
****************
Flow Units ............... LPS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Infiltration Method ...... HORTON
Flow Routing Method ...... DYNWAVE
Surcharge Method ......... EXTRAN
Starting Date ............ 08/18/2022 00:00:00
Ending Date .............. 08/21/2022 00:30:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:00:01
Wet Time Step ............ 00:01:00
Dry Time Step ............ 00:02:00
Routing Time Step ........ 1.00 sec
Variable Time Step ....... YES
Maximum Trials ........... 8
Number of Threads ........ 1
Head Tolerance ........... 0.001500 m

**************************        Volume         Depth
Runoff Quantity Continuity     hectare-m            mm
**************************     ---------       -------
Total Precipitation ......         0.027        11.900
```

Evaporation Loss	0.000	0.000
Infiltration Loss	0.008	3.569
Surface Runoff	0.019	8.362
Final Storage	0.000	0.003
Continuity Error (%)	-0.282	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.019	0.188
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.014	0.144
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.004	0.039
Final Stored Volume	0.008	0.084
Continuity Error (%)	-0.785	

Highest Continuity Errors

Node J8 (4.44%)

Time-Step Critical Elements

None

Highest Flow Instability Indexes

All links are stable.

****
Routing Time Step Summary
****

Minimum Time Step	:	0.50 sec
Average Time Step	:	1.00 sec
Maximum Time Step	:	1.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	2.00
Percent Not Converging	:	0.00
Time Step Frequencies	:	
1.000 - 0.871 sec	:	100.00 %
0.871 - 0.758 sec	:	0.00 %
0.758 - 0.660 sec	:	0.00 %
0.660 - 0.574 sec	:	0.00 %
0.574 - 0.500 sec	:	0.00 %

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff LPS	Runoff Coeff
S1	11.90	0.00	0.00	4.71	0.60	6.60	7.20	0.04	22.15	0.605
S2	11.90	0.00	0.00	4.38	0.60	6.93	7.53	0.03	18.37	0.633
S3	11.90	0.00	0.00	1.71	6.00	4.26	10.27	0.01	34.14	0.863
S4	11.90	0.00	0.00	3.43	2.40	6.10	8.50	0.02	38.12	0.714
S5	11.90	0.00	0.00	4.22	0.60	7.10	7.69	0.01	4.99	0.646

S6		11.90	0.00	0.00	1.71	6.01	4.26	10.26	0.01
34.77	0.862								
S7		11.90	0.00	0.00	2.51	3.84	5.60	9.44	0.02
39.92	0.793								
S8		11.90	0.00	0.00	2.93	3.00	6.01	9.01	0.02
40.00	0.757								
S9		11.90	0.00	0.00	2.50	4.20	5.24	9.45	0.02
58.81	0.794								

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days	hr:min	Reported Max Depth Meters
J1	JUNCTION	0.01	0.21	262.36	0	00:19	0.21
J10	JUNCTION	0.00	0.06	262.86	0	00:06	0.06
J11	JUNCTION	0.00	0.12	260.72	0	00:06	0.12
J13	JUNCTION	0.00	0.00	262.80	0	00:00	0.00
J14	JUNCTION	0.01	0.04	258.49	0	03:01	0.04
J2	JUNCTION	0.01	0.30	262.19	0	00:32	0.30
J3	JUNCTION	0.01	0.16	261.96	0	00:30	0.16
J4	JUNCTION	0.01	0.22	261.87	0	00:46	0.22
J5	JUNCTION	0.01	0.16	260.85	0	01:08	0.16
J6	JUNCTION	0.01	0.19	260.85	0	01:09	0.19
J7	JUNCTION	0.00	0.29	262.79	0	00:07	0.29
J8	JUNCTION	0.01	0.31	262.31	0	00:16	0.31
J9	JUNCTION	0.00	0.35	263.10	0	00:07	0.35
OF1	OUTFALL	0.00	0.00	260.00	0	00:00	0.00
OF2	OUTFALL	0.00	0.01	257.01	0	03:01	0.01
OF3	OUTFALL	0.50	0.50	260.50	0	00:00	0.50
J12	STORAGE	0.00	0.23	260.68	0	00:06	0.23
J16	STORAGE	0.00	0.24	260.49	0	00:06	0.24
J17	STORAGE	0.21	0.26	259.76	0	01:14	0.26
J18	STORAGE	0.76	0.79	259.29	0	02:53	0.79

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days	hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent	
J1	JUNCTION	22.15	22.15	0	00:06	0.0397	0.0397	-2.212	
J10	JUNCTION	34.14	34.14	0	00:06	0.0106	0.0106	-0.068	
J11	JUNCTION	0.00	29.82	0	00:06	0	0.0106	-0.283	
J13	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
J14	JUNCTION	0.00	0.62	0	02:53	0	0.0157	0.070	
J2	JUNCTION	18.37	22.43	0	00:11	0.0315	0.0722	0.940	
J3	JUNCTION	0.00	15.22	0	00:30	0	0.0715	0.697	
J4	JUNCTION	0.00	16.51	0	00:33	0	0.071	-0.957	
J5	JUNCTION	0.00	14.41	0	00:54	0	0.0729	0.812	
J6	JUNCTION	4.99	13.18	0	01:04	0.00827	0.0806	-0.014	
J7	JUNCTION	38.12	38.12	0	00:06	0.0243	0.0243	-4.886	
J8	JUNCTION	0.00	73.53	0	00:08	0	0.0512	4.649	
J9	JUNCTION	58.81	58.81	0	00:06	0.0247	0.0247	-3.895	
OF1	OUTFALL	0.00	19.27	0	00:16	0	0.0489	0.000	
OF2	OUTFALL	0.00	0.62	0	03:01	0	0.0157	0.000	
OF3	OUTFALL	0.00	13.02	0	01:09	0	0.0794	0.000	
J12	STORAGE	74.77	98.35	0	00:06	0.0316	0.0422	0.097	
J16	STORAGE	39.92	133.86	0	00:06	0.017	0.0592	0.680	
J17	STORAGE	0.00	126.46	0	00:06	0	0.0588	-0.076	
J18	STORAGE	0.00	0.68	0	01:14	0	0.0495	0.000	

****
Node Surcharge Summary
****

No nodes were surcharged.

****
Node Flooding Summary

****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow LPS
J12	0.000	0	0	0	0.000	4	0 00:06	97.54
J16	0.000	0	0	0	0.000	12	0 00:06	126.46
J17	0.044	24	0	0	0.055	30	0 01:14	0.68
J18	0.034	68	0	0	0.036	72	0 02:53	0.62

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
OF1	7.93	2.35	19.27	0.049
OF2	26.36	0.21	0.62	0.016
OF3	15.10	2.00	13.02	0.079
System	16.46	4.56	21.07	0.144

****
Link Flow Summary
****

Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days	hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	10.52	0	00:19	0.05	0.03	0.25
C10	CONDUIT	29.88	0	00:06	0.94	0.32	0.49
C11	CONDUIT	97.54	0	00:06	1.69	0.93	0.76
C12	CONDUIT	126.46	0	00:06	1.73	0.73	0.63
C13	CONDUIT	0.68	0	01:14	0.40	1.02	0.82
C14	CONDUIT	0.62	0	03:01	0.05	0.00	0.05
C15	CONDUIT	29.82	0	00:06	0.95	0.12	0.40
C16	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C2	CONDUIT	15.22	0	00:30	0.06	0.05	0.23
C3	CONDUIT	16.51	0	00:33	0.43	0.22	0.33
C4	CONDUIT	14.41	0	00:54	0.07	0.03	0.18
C5	CONDUIT	12.62	0	01:05	0.20	0.03	0.24
C6	CONDUIT	13.02	0	01:09	0.05	0.13	0.49
C7	CONDUIT	31.96	0	00:08	0.12	0.14	0.47
C8	CONDUIT	41.59	0	00:08	0.16	0.11	0.35
C9	CONDUIT	19.27	0	00:16	0.10	0.01	0.19
OR1	ORIFICE	0.62	0	02:53			0.78
W1	WEIR	0.00	0	00:00			0.00
W2	WEIR	0.00	0	00:00			0.00

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
C1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00
C10	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C11	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C12	1.00	0.00	0.90	0.00	0.10	0.00	0.00	0.00	1.00	0.00
C13	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C14	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C15	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00

C16	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.90	0.00
C3	1.00	0.00	0.00	0.00	0.02	0.00	0.00	0.98	0.01	0.00
C4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.12	0.00
C5	1.00	0.00	0.02	0.00	0.98	0.00	0.00	0.00	0.95	0.00
C6	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00
C7	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00
C8	1.00	0.00	0.69	0.00	0.31	0.00	0.00	0.00	1.00	0.00
C9	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00

****
Conduit Surcharge Summary
****

Conduit	Hours Full: Both Ends	Hours Full: Upstream	Hours Full: Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
C13	0.01	1.34	0.01	1.59	0.01

Analysis begun on: Tue Oct 11 17:16:04 2022
Analysis ended on: Tue Oct 11 17:16:10 2022
Total elapsed time: 00:00:06

5-year

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

POST-DEVELOPMENT DRAINAGE CONDITIONS & TREATMENT

****
Element Count
****
Number of rain gages 5
Number of subcatchments ... 9
Number of nodes 20
Number of links 19
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
100YEARSTORM	Timeseries100	VOLUME	1 min.
100yearstorm30	100year30	VOLUME	1 min.
2YEARSTORM	Timeseries2	VOLUME	1 min.
5YEARSTORM	Timeseries5	VOLUME	1 min.
Timmins_Storm_(0-25)	Timmins_Storm_(0-25)	INTENSITY	60 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S1	0.55	70.00	5.00	3.5000	5YEARSTORM	J1
S2	0.42	80.00	5.00	3.0000	5YEARSTORM	J2
S3	0.10	100.00	50.00	1.0000	5YEARSTORM	J10
S4	0.29	60.00	20.00	3.5000	5YEARSTORM	J7
S5	0.11	30.00	5.00	2.0000	5YEARSTORM	J6

S6	0.11	100.00	50.00	1.0000	5YEARSTORM	J12
S7	0.18	70.00	32.00	4.0000	5YEARSTORM	J16
S8	0.23	70.00	25.00	4.0000	5YEARSTORM	J12
S9	0.26	80.00	35.00	3.5000	5YEARSTORM	J9

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	262.15	1.00	0.0	
J10	JUNCTION	262.80	0.15	0.0	
J11	JUNCTION	260.60	2.00	0.0	
J13	JUNCTION	262.80	0.15	0.0	
J14	JUNCTION	258.45	0.75	0.0	
J2	JUNCTION	261.89	1.00	0.0	
J3	JUNCTION	261.80	1.25	0.0	
J4	JUNCTION	261.65	1.00	0.0	
J5	JUNCTION	260.69	1.00	0.0	
J6	JUNCTION	260.66	1.00	0.0	
J7	JUNCTION	262.50	1.00	0.0	
J8	JUNCTION	262.00	1.00	0.0	
J9	JUNCTION	262.75	1.00	0.0	
OF1	OUTFALL	260.00	2.25	0.0	
OF2	OUTFALL	257.00	0.50	0.0	
OF3	OUTFALL	260.00	0.70	0.0	
J12	STORAGE	260.45	2.01	0.0	
J16	STORAGE	260.25	1.94	0.0	
J17	STORAGE	259.50	0.75	0.0	
J18	STORAGE	258.50	1.00	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	J2	CONDUIT	65.2	0.3985	0.3500
C10	J11	J12	CONDUIT	10.7	0.9346	0.0130

C11	J12	J16	CONDUIT	12.7	1.1791	0.0130
C12	J16	J17	CONDUIT	63.2	0.9817	0.0130
C13	J17	J18	CONDUIT	44.1	0.6798	0.0130
C14	J14	OF2	CONDUIT	32.7	4.4328	0.3500
C15	J10	J11	CONDUIT	34.8	1.0921	0.0120
C16	J13	J12	CONDUIT	37.6	1.3030	0.0120
C2	J2	J3	CONDUIT	34.1	0.2636	0.3500
C3	J3	J4	CONDUIT	20.0	0.5000	0.0350
C4	J4	J5	CONDUIT	97.1	0.9892	0.3500
C5	J5	J6	CONDUIT	14.9	0.2009	0.0150
C6	J6	OF3	CONDUIT	40.3	1.1417	0.3500
C7	J7	J8	CONDUIT	18.0	2.7767	0.3500
C8	J9	J8	CONDUIT	26.0	2.8882	0.3500
C9	J8	OF1	CONDUIT	31.7	2.3651	0.3500
OR1	J18	J14	ORIFICE			
W1	J18	J14	WEIR			
W2	J17	J18	WEIR			

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	TRAPEZOIDAL	1.00	3.00	0.51	5.50	1	344.80
C10	CIRCULAR	0.30	0.07	0.07	0.30	1	93.49
C11	CIRCULAR	0.30	0.07	0.07	0.30	1	105.01
C12	CIRCULAR	0.38	0.11	0.09	0.38	1	173.73
C13	CIRCULAR	0.05	0.00	0.01	0.05	1	0.67
C14	TRAPEZOIDAL	0.50	0.75	0.27	2.50	1	190.39
C15	TRAPEZOIDAL	0.15	0.15	0.08	1.85	1	248.81
C16	TRAPEZOIDAL	0.15	0.15	0.08	1.85	1	271.77
C2	TRAPEZOIDAL	1.00	3.00	0.51	5.50	1	280.41
C3	CIRCULAR	0.45	0.16	0.11	0.45	1	74.89
C4	TRAPEZOIDAL	1.00	2.75	0.53	4.75	1	509.62
C5	CIRCULAR	0.75	0.44	0.19	0.75	1	432.44
C6	TRAPEZOIDAL	0.50	0.75	0.27	2.50	1	96.62
C7	TRIANGULAR	0.50	1.25	0.25	5.00	1	233.12
C8	TRAPEZOIDAL	0.75	1.50	0.39	3.50	1	388.27
C9	TRIANGULAR	1.00	5.00	0.49	10.00	1	1366.12

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

****************
Analysis Options
****************
Flow Units ..... LPS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Infiltration Method ..... HORTON
Flow Routing Method ..... DYNWAVE
Surcharge Method ..... EXTRAN
Starting Date ..... 08/18/2022 00:00:00
Ending Date ..... 08/21/2022 00:30:00
Antecedent Dry Days ..... 0.0
Report Time Step ..... 00:00:01
Wet Time Step ..... 00:01:00
Dry Time Step ..... 00:02:00
Routing Time Step ..... 1.00 sec
Variable Time Step ..... YES
Maximum Trials ..... 8
Number of Threads ..... 1
Head Tolerance ..... 0.001500 m

**************************        Volume         Depth
Runoff Quantity Continuity     hectare-m            mm
**************************     ---------       -------
Total Precipitation ......         0.038        16.800
```

Evaporation Loss	0.000	0.000
Infiltration Loss	0.008	3.652
Surface Runoff	0.030	13.193
Final Storage	0.000	0.003
Continuity Error (%)	-0.279	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.030	0.296
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.025	0.252
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.004	0.039
Final Stored Volume	0.008	0.084
Continuity Error (%)	-0.492	

Highest Continuity Errors

Node J8 (4.13%)
Node J4 (-1.09%)
Node J16 (1.08%)

Time-Step Critical Elements

None

Highest Flow Instability Indexes

All links are stable.

****
Routing Time Step Summary
****

Minimum Time Step	:	0.50 sec
Average Time Step	:	1.00 sec
Maximum Time Step	:	1.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	2.00
Percent Not Converging	:	0.00
Time Step Frequencies	:	
1.000 - 0.871 sec	:	100.00 %
0.871 - 0.758 sec	:	0.00 %
0.758 - 0.660 sec	:	0.00 %
0.660 - 0.574 sec	:	0.00 %
0.574 - 0.500 sec	:	0.00 %

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff LPS	Runoff Coeff
S1	16.80	0.00	0.00	4.87	0.84	11.10	11.95	0.07	35.38	0.711
S2	16.80	0.00	0.00	4.49	0.84	11.48	12.33	0.05	30.22	0.734
S3	16.80	0.00	0.00	1.72	8.47	6.71	15.19	0.02	51.35	0.904
S4	16.80	0.00	0.00	3.50	3.39	9.95	13.34	0.04	57.84	0.794

S5		16.80	0.00	0.00	4.31	0.84	11.66	12.51	0.01
8.80	0.744								
S6		16.80	0.00	0.00	1.73	8.47	6.71	15.18	0.02
52.28	0.904								
S7		16.80	0.00	0.00	2.54	5.42	8.92	14.33	0.03
60.72	0.853								
S8		16.80	0.00	0.00	2.97	4.23	9.65	13.88	0.03
60.98	0.826								
S9		16.80	0.00	0.00	2.54	5.93	8.41	14.34	0.04
88.70	0.854								

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.01	0.29	262.44	0 00:18	0.29
J10	JUNCTION	0.00	0.07	262.87	0 00:06	0.07
J11	JUNCTION	0.00	0.29	260.89	0 00:06	0.29
J13	JUNCTION	0.00	0.00	262.80	0 00:00	0.00
J14	JUNCTION	0.01	0.05	258.50	0 03:55	0.05
J2	JUNCTION	0.01	0.39	262.28	0 00:27	0.39
J3	JUNCTION	0.01	0.21	262.01	0 00:25	0.21
J4	JUNCTION	0.01	0.30	261.95	0 00:39	0.30
J5	JUNCTION	0.01	0.24	260.93	0 00:57	0.24
J6	JUNCTION	0.01	0.27	260.93	0 00:57	0.27
J7	JUNCTION	0.00	0.34	262.84	0 00:06	0.34
J8	JUNCTION	0.02	0.38	262.38	0 00:15	0.38
J9	JUNCTION	0.00	0.43	263.18	0 00:07	0.43
OF1	OUTFALL	0.00	0.00	260.00	0 00:00	0.00
OF2	OUTFALL	0.00	0.01	257.01	0 03:55	0.01
OF3	OUTFALL	0.50	0.50	260.50	0 00:00	0.50
J12	STORAGE	0.00	0.42	260.87	0 00:06	0.42
J16	STORAGE	0.00	0.34	260.59	0 00:06	0.34
J17	STORAGE	0.23	0.37	259.87	0 01:16	0.37
J18	STORAGE	0.76	0.80	259.30	0 03:48	0.80

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days	hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent	
J1	JUNCTION	35.38	35.38	0	00:06	0.066	0.066	-2.159	
J10	JUNCTION	51.35	51.35	0	00:06	0.0157	0.0157	-0.072	
J11	JUNCTION	0.00	45.88	0	00:06	0	0.0157	-0.074	
J13	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
J14	JUNCTION	0.00	0.78	0	03:48	0	0.0459	0.029	
J2	JUNCTION	30.22	43.30	0	00:11	0.0516	0.119	0.907	
J3	JUNCTION	0.00	29.73	0	00:26	0	0.118	0.733	
J4	JUNCTION	0.00	31.32	0	00:27	0	0.117	-1.079	
J5	JUNCTION	0.00	28.26	0	00:46	0	0.121	0.861	
J6	JUNCTION	8.80	25.94	0	00:54	0.0134	0.133	-0.014	
J7	JUNCTION	57.84	57.84	0	00:06	0.0381	0.0381	-4.353	
J8	JUNCTION	0.00	117.73	0	00:08	0	0.0787	4.303	
J9	JUNCTION	88.70	88.70	0	00:06	0.0374	0.0374	-3.826	
OF1	OUTFALL	0.00	35.00	0	00:15	0	0.0755	0.000	
OF2	OUTFALL	0.00	0.78	0	03:55	0	0.0459	0.000	
OF3	OUTFALL	0.00	25.64	0	00:57	0	0.131	0.000	
J12	STORAGE	113.26	150.70	0	00:06	0.048	0.0637	0.195	
J16	STORAGE	60.72	197.77	0	00:06	0.0258	0.0894	1.096	
J17	STORAGE	0.00	184.59	0	00:06	0	0.0885	-0.706	
J18	STORAGE	0.00	0.81	0	01:16	0	0.0797	0.000	

****
Node Surcharge Summary
****

No nodes were surcharged.

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days	hr:min	Maximum Outflow LPS
J12	0.000	0	0	0	0.000	7	0	00:06	145.39
J16	0.000	0	0	0	0.000	17	0	00:06	184.59
J17	0.049	26	0	0	0.083	44	0	01:16	0.81
J18	0.035	69	0	0	0.037	73	0	03:48	0.78

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
OF1	8.15	3.53	35.00	0.075
OF2	41.64	0.41	0.78	0.046
OF3	15.54	3.21	25.64	0.131
System	21.78	7.16	37.88	0.252

****
Link Flow Summary
****

Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days	hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	20.20	0	00:18	0.05	0.06	0.34
C10	CONDUIT	49.84	0	00:06	0.87	0.53	0.98
C11	CONDUIT	145.39	0	00:06	2.08	1.38	0.98
C12	CONDUIT	184.59	0	00:06	1.84	1.06	0.87
C13	CONDUIT	0.81	0	01:16	0.46	1.20	0.85
C14	CONDUIT	0.78	0	03:55	0.05	0.00	0.05
C15	CONDUIT	45.88	0	00:06	1.06	0.18	0.48
C16	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C2	CONDUIT	29.73	0	00:26	0.08	0.11	0.30
C3	CONDUIT	31.32	0	00:27	0.53	0.42	0.49
C4	CONDUIT	28.26	0	00:46	0.09	0.06	0.25
C5	CONDUIT	24.85	0	00:55	0.30	0.06	0.34
C6	CONDUIT	25.64	0	00:57	0.08	0.27	0.57
C7	CONDUIT	51.59	0	00:08	0.14	0.22	0.58
C8	CONDUIT	66.16	0	00:08	0.18	0.17	0.44
C9	CONDUIT	35.00	0	00:15	0.12	0.03	0.24
OR1	ORIFICE	0.78	0	03:48			0.92
W1	WEIR	0.00	0	00:00			0.00
W2	WEIR	0.00	0	00:00			0.00

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
C1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00
C10	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C11	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C12	1.00	0.00	0.90	0.00	0.10	0.00	0.00	0.00	1.00	0.00
C13	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00

C14	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C15	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C16	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.89	0.00
C3	1.00	0.00	0.00	0.00	0.03	0.00	0.00	0.97	0.01	0.00
C4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.12	0.00
C5	1.00	0.00	0.02	0.00	0.98	0.00	0.00	0.00	0.94	0.00
C6	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00
C7	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00
C8	1.00	0.00	0.69	0.00	0.31	0.00	0.00	0.00	1.00	0.00
C9	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00

****
Conduit Surcharge Summary
****

Conduit	Hours Full: Both Ends	Hours Full: Upstream	Hours Full: Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
C10	0.01	0.01	0.01	0.01	0.01
C11	0.01	0.02	0.01	0.04	0.01
C12	0.01	0.01	0.01	0.02	0.01
C13	0.01	12.75	0.01	12.93	0.01

Analysis begun on: Tue Oct 11 17:14:03 2022
Analysis ended on: Tue Oct 11 17:14:09 2022
Total elapsed time: 00:00:06

100-year

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

POST-DEVELOPMENT DRAINAGE CONDITIONS & TREATMENT

****
Element Count
****
Number of rain gages 5
Number of subcatchments ... 9
Number of nodes 20
Number of links 19
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
100YEARSTORM	Timeseries100	VOLUME	1 min.
100yearstorm30	100year30	VOLUME	1 min.
2YEARSTORM	Timeseries2	VOLUME	1 min.
5YEARSTORM	Timeseries5	VOLUME	1 min.
Timmins_Storm_(0-25)	Timmins_Storm_(0-25)	INTENSITY	60 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S1	0.55	70.00	5.00	3.5000	100YEARSTORM	J1
S2	0.42	80.00	5.00	3.0000	100YEARSTORM	J2
S3	0.10	100.00	50.00	1.0000	100YEARSTORM	J10
S4	0.29	60.00	20.00	3.5000	100YEARSTORM	J7
S5	0.11	30.00	5.00	2.0000	100YEARSTORM	J6

S6	0.11	100.00	50.00	1.0000	100YEARSTORM	J12
S7	0.18	70.00	32.00	4.0000	100YEARSTORM	J16
S8	0.23	70.00	25.00	4.0000	100YEARSTORM	J12
S9	0.26	80.00	35.00	3.5000	100YEARSTORM	J9

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	262.15	1.00	0.0	
J10	JUNCTION	262.80	0.15	0.0	
J11	JUNCTION	260.60	2.00	0.0	
J13	JUNCTION	262.80	0.15	0.0	
J14	JUNCTION	258.45	0.75	0.0	
J2	JUNCTION	261.89	1.00	0.0	
J3	JUNCTION	261.80	1.25	0.0	
J4	JUNCTION	261.65	1.00	0.0	
J5	JUNCTION	260.69	1.00	0.0	
J6	JUNCTION	260.66	1.00	0.0	
J7	JUNCTION	262.50	1.00	0.0	
J8	JUNCTION	262.00	1.00	0.0	
J9	JUNCTION	262.75	1.00	0.0	
OF1	OUTFALL	260.00	2.25	0.0	
OF2	OUTFALL	257.00	0.50	0.0	
OF3	OUTFALL	260.00	0.70	0.0	
J12	STORAGE	260.45	2.01	0.0	
J16	STORAGE	260.25	1.94	0.0	
J17	STORAGE	259.50	0.75	0.0	
J18	STORAGE	258.50	1.00	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	J2	CONDUIT	65.2	0.3985	0.3500
C10	J11	J12	CONDUIT	10.7	0.9346	0.0130

C11	J12	J16	CONDUIT	12.7	1.1791	0.0130
C12	J16	J17	CONDUIT	63.2	0.9817	0.0130
C13	J17	J18	CONDUIT	44.1	0.6798	0.0130
C14	J14	OF2	CONDUIT	32.7	4.4328	0.3500
C15	J10	J11	CONDUIT	34.8	1.0921	0.0120
C16	J13	J12	CONDUIT	37.6	1.3030	0.0120
C2	J2	J3	CONDUIT	34.1	0.2636	0.3500
C3	J3	J4	CONDUIT	20.0	0.5000	0.0350
C4	J4	J5	CONDUIT	97.1	0.9892	0.3500
C5	J5	J6	CONDUIT	14.9	0.2009	0.0150
C6	J6	OF3	CONDUIT	40.3	1.1417	0.3500
C7	J7	J8	CONDUIT	18.0	2.7767	0.3500
C8	J9	J8	CONDUIT	26.0	2.8882	0.3500
C9	J8	OF1	CONDUIT	31.7	2.3651	0.3500
OR1	J18	J14	ORIFICE			
W1	J18	J14	WEIR			
W2	J17	J18	WEIR			

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	TRAPEZOIDAL	1.00	3.00	0.51	5.50	1	344.80
C10	CIRCULAR	0.30	0.07	0.07	0.30	1	93.49
C11	CIRCULAR	0.30	0.07	0.07	0.30	1	105.01
C12	CIRCULAR	0.38	0.11	0.09	0.38	1	173.73
C13	CIRCULAR	0.05	0.00	0.01	0.05	1	0.67
C14	TRAPEZOIDAL	0.50	0.75	0.27	2.50	1	190.39
C15	TRAPEZOIDAL	0.15	0.15	0.08	1.85	1	248.81
C16	TRAPEZOIDAL	0.15	0.15	0.08	1.85	1	271.77
C2	TRAPEZOIDAL	1.00	3.00	0.51	5.50	1	280.41
C3	CIRCULAR	0.45	0.16	0.11	0.45	1	74.89
C4	TRAPEZOIDAL	1.00	2.75	0.53	4.75	1	509.62
C5	CIRCULAR	0.75	0.44	0.19	0.75	1	432.44
C6	TRAPEZOIDAL	0.50	0.75	0.27	2.50	1	96.62
C7	TRIANGULAR	0.50	1.25	0.25	5.00	1	233.12
C8	TRAPEZOIDAL	0.75	1.50	0.39	3.50	1	388.27
C9	TRIANGULAR	1.00	5.00	0.49	10.00	1	1366.12

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

****************
Analysis Options
****************
Flow Units ..... LPS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Infiltration Method ..... HORTON
Flow Routing Method ..... DYNWAVE
Surcharge Method ..... EXTRAN
Starting Date ..... 08/18/2022 00:00:00
Ending Date ..... 08/21/2022 00:30:00
Antecedent Dry Days ..... 0.0
Report Time Step ..... 00:00:01
Wet Time Step ..... 00:01:00
Dry Time Step ..... 00:02:00
Routing Time Step ..... 1.00 sec
Variable Time Step ..... YES
Maximum Trials ..... 8
Number of Threads ..... 1
Head Tolerance ..... 0.001500 m

**************************        Volume         Depth
Runoff Quantity Continuity     hectare-m            mm
**************************     ---------       -------
Total Precipitation ......         0.063        28.290
```

Evaporation Loss	0.000	0.000
Infiltration Loss	0.008	3.735
Surface Runoff	0.055	24.636
Final Storage	0.000	0.003
Continuity Error (%)	-0.296	

********** Flow Routing Continuity **********	Volume hectare-m ---------	Volume 10^6 ltr ---------
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.055	0.553
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.051	0.508
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.004	0.039
Final Stored Volume	0.008	0.084
Continuity Error (%)	-0.156	

****
Highest Continuity Errors
****
Node J8 (3.82%)
Node J16 (2.10%)
Node J17 (-1.68%)
Node J4 (-1.37%)
Node J5 (1.04%)

****
Time-Step Critical Elements
****
None

****

Highest Flow Instability Indexes
****
All links are stable.

****
Routing Time Step Summary
****

Minimum Time Step	:	0.56 sec
Average Time Step	:	1.00 sec
Maximum Time Step	:	1.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	2.00
Percent Not Converging	:	0.00
Time Step Frequencies	:	
1.000 - 0.871 sec	:	100.00 %
0.871 - 0.758 sec	:	0.00 %
0.758 - 0.660 sec	:	0.00 %
0.660 - 0.574 sec	:	0.00 %
0.574 - 0.500 sec	:	0.00 %

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff LPS	Runoff Coeff
S1	28.29	0.00	0.00	5.02	1.42	21.88	23.30	0.13	73.84	0.824
S2	28.29	0.00	0.00	4.60	1.42	22.31	23.73	0.10	71.64	0.839
S3	28.29	0.00	0.00	1.73	14.26	12.49	26.74	0.03	94.97	0.945

S4	28.29	0.00	0.00	3.57	5.70	19.10	24.80	0.07
109.33 0.877								
S5	28.29	0.00	0.00	4.41	1.42	22.51	23.92	0.03
20.88 0.846								
S6	28.29	0.00	0.00	1.74	14.26	12.48	26.74	0.03
96.66 0.945								
S7	28.29	0.00	0.00	2.56	9.11	16.74	25.86	0.05
114.92 0.914								
S8	28.29	0.00	0.00	3.01	7.12	18.26	25.38	0.06
116.11 0.897								
S9	28.29	0.00	0.00	2.57	9.99	15.87	25.86	0.07
165.30 0.914								

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.01	0.44	262.59	0 00:16	0.44
J10	JUNCTION	0.00	0.10	262.90	0 00:06	0.10
J11	JUNCTION	0.00	1.50	262.10	0 00:06	1.50
J13	JUNCTION	0.00	0.00	262.80	0 00:00	0.00
J14	JUNCTION	0.03	0.06	258.51	0 04:40	0.06
J2	JUNCTION	0.02	0.56	262.45	0 00:21	0.56
J3	JUNCTION	0.01	0.37	262.17	0 00:30	0.37
J4	JUNCTION	0.01	0.45	262.10	0 00:32	0.45
J5	JUNCTION	0.01	0.42	261.11	0 00:46	0.42
J6	JUNCTION	0.01	0.45	261.11	0 00:46	0.45
J7	JUNCTION	0.00	0.43	262.93	0 00:06	0.43
J8	JUNCTION	0.02	0.51	262.51	0 00:13	0.51
J9	JUNCTION	0.00	0.58	263.33	0 00:06	0.58
OF1	OUTFALL	0.00	0.00	260.00	0 00:00	0.00
OF2	OUTFALL	0.00	0.01	257.01	0 04:40	0.01
OF3	OUTFALL	0.50	0.50	260.50	0 00:00	0.50
J12	STORAGE	0.00	1.59	262.04	0 00:07	1.59
J16	STORAGE	0.00	1.22	261.47	0 00:07	1.22
J17	STORAGE	0.31	0.62	260.12	0 01:15	0.62

J18	STORAGE	0.78	0.81	259.31	0	04:34	0.81	

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days	hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent	
J1	JUNCTION	73.84	73.84	0	00:09	0.129	0.129	-2.019	
J10	JUNCTION	94.97	94.97	0	00:06	0.0276	0.0276	-0.083	
J11	JUNCTION	0.00	87.47	0	00:06	0	0.0276	-0.040	
J13	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
J14	JUNCTION	0.00	1.00	0	04:34	0	0.116	0.020	
J2	JUNCTION	71.64	108.32	0	00:11	0.0993	0.231	0.704	
J3	JUNCTION	0.00	77.14	0	00:22	0	0.229	0.879	
J4	JUNCTION	0.00	74.62	0	00:21	0	0.227	-1.348	
J5	JUNCTION	0.00	71.84	0	00:37	0	0.235	1.055	
J6	JUNCTION	20.88	60.65	0	00:41	0.0257	0.258	-0.014	
J7	JUNCTION	109.33	109.33	0	00:06	0.0708	0.0708	-3.839	
J8	JUNCTION	0.00	238.18	0	00:07	0	0.144	3.977	
J9	JUNCTION	165.30	165.30	0	00:06	0.0675	0.0675	-3.768	
OF1	OUTFALL	0.00	83.15	0	00:13	0	0.138	0.000	
OF2	OUTFALL	0.00	1.00	0	04:40	0	0.116	0.000	
OF3	OUTFALL	0.00	58.80	0	00:46	0	0.253	0.000	
J12	STORAGE	212.77	267.79	0	00:06	0.0868	0.114	0.356	
J16	STORAGE	114.92	340.14	0	00:06	0.0466	0.161	2.145	
J17	STORAGE	0.00	273.54	0	00:08	0	0.157	-1.649	
J18	STORAGE	0.00	1.03	0	01:15	0	0.15	0.000	

****
Node Surcharge Summary
****

No nodes were surcharged.

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow LPS
J12	0.000	0	0	0	0.001	26	0 00:07	238.12
J16	0.000	0	0	0	0.000	63	0 00:07	273.54
J17	0.071	38	0	0	0.150	80	0 01:15	1.03
J18	0.035	71	0	0	0.037	74	0 04:34	1.00

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
OF1	8.38	6.31	83.15	0.138
OF2	70.64	0.63	1.00	0.116
OF3	15.99	6.06	58.80	0.253
System	31.67	12.99	89.17	0.508

****
Link Flow Summary

****

Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days	hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	50.40	0	00:16	0.07	0.15	0.49
C10	CONDUIT	78.31	0	00:06	1.11	0.84	1.00
C11	CONDUIT	238.12	0	00:06	3.37	2.27	1.00
C12	CONDUIT	273.54	0	00:08	2.50	1.57	0.97
C13	CONDUIT	1.03	0	01:15	0.56	1.53	0.89
C14	CONDUIT	1.00	0	04:40	0.06	0.01	0.06
C15	CONDUIT	87.47	0	00:06	1.25	0.35	0.64
C16	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C2	CONDUIT	77.14	0	00:22	0.11	0.28	0.45
C3	CONDUIT	74.62	0	00:21	0.70	1.00	0.86
C4	CONDUIT	71.84	0	00:37	0.12	0.14	0.40
C5	CONDUIT	57.88	0	00:41	0.47	0.13	0.58
C6	CONDUIT	58.80	0	00:46	0.13	0.61	0.75
C7	CONDUIT	105.11	0	00:08	0.17	0.45	0.79
C8	CONDUIT	133.08	0	00:07	0.22	0.34	0.60
C9	CONDUIT	83.15	0	00:13	0.16	0.06	0.33
OR1	ORIFICE	1.00	0	04:34			1.00
W1	WEIR	0.00	0	00:00			0.00
W2	WEIR	0.00	0	00:00			0.00

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
C1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.99	0.00
C10	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C11	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C12	1.00	0.00	0.89	0.00	0.10	0.00	0.00	0.00	1.00	0.00

C13	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C14	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C15	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C16	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.89	0.00
C3	1.00	0.00	0.00	0.00	0.03	0.00	0.00	0.97	0.01	0.00
C4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.13	0.00
C5	1.00	0.00	0.02	0.00	0.98	0.00	0.00	0.00	0.94	0.00
C6	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.99	0.00
C7	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00
C8	1.00	0.00	0.68	0.00	0.32	0.00	0.00	0.00	1.00	0.00
C9	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00

****
Conduit Surcharge Summary
****

Conduit	Hours Full: Both Ends	Hours Full: Upstream	Hours Full: Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
C10	0.10	0.10	0.11	0.01	0.01
C11	0.11	0.11	0.11	0.11	0.10
C12	0.01	0.10	10.71	0.11	0.01
C13	0.01	33.75	0.01	33.93	0.01
C7	0.01	0.01	0.07	0.01	0.01

Analysis begun on: Tue Oct 11 17:12:20 2022
Analysis ended on: Tue Oct 11 17:12:26 2022
Total elapsed time: 00:00:06

100year - 30Min.

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

POST-DEVELOPMENT DRAINAGE CONDITIONS & TREATMENT

WARNING 09: time series interval greater than recording interval for Rain Gage 100yearstorm30

****
Element Count
****
Number of rain gages 5
Number of subcatchments ... 9
Number of nodes 20
Number of links 19
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
100YEARSTORM	Timeseries100	VOLUME	1 min.
100yearstorm30	100year30	VOLUME	1 min.
2YEARSTORM	Timeseries2	VOLUME	1 min.
5YEARSTORM	Timeseries5	VOLUME	1 min.
Timmins_Storm_(0-25)	Timmins_Storm_(0-25)	INTENSITY	60 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S1	0.55	70.00	5.00	3.5000	100yearstorm30	J1
S2	0.42	80.00	5.00	3.0000	100yearstorm30	J2
S3	0.10	100.00	50.00	1.0000	100yearstorm30	J10
S4	0.29	60.00	20.00	3.5000	100yearstorm30	J7

S5	0.11	30.00	5.00	2.0000	100yearstorm30	J6
S6	0.11	100.00	50.00	1.0000	100yearstorm30	J12
S7	0.18	70.00	32.00	4.0000	100yearstorm30	J16
S8	0.23	70.00	25.00	4.0000	100yearstorm30	J12
S9	0.26	80.00	35.00	3.5000	100yearstorm30	J9

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	262.15	1.00	0.0	
J10	JUNCTION	262.80	0.15	0.0	
J11	JUNCTION	260.60	2.00	0.0	
J13	JUNCTION	262.80	0.15	0.0	
J14	JUNCTION	258.45	0.75	0.0	
J2	JUNCTION	261.89	1.00	0.0	
J3	JUNCTION	261.80	1.25	0.0	
J4	JUNCTION	261.65	1.00	0.0	
J5	JUNCTION	260.69	1.00	0.0	
J6	JUNCTION	260.66	1.00	0.0	
J7	JUNCTION	262.50	1.00	0.0	
J8	JUNCTION	262.00	1.00	0.0	
J9	JUNCTION	262.75	1.00	0.0	
OF1	OUTFALL	260.00	2.25	0.0	
OF2	OUTFALL	257.00	0.50	0.0	
OF3	OUTFALL	260.00	0.70	0.0	
J12	STORAGE	260.45	2.01	0.0	
J16	STORAGE	260.25	1.94	0.0	
J17	STORAGE	259.50	0.75	0.0	
J18	STORAGE	258.50	1.00	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	J2	CONDUIT	65.2	0.3985	0.3500

C10	J11	J12	CONDUIT	10.7	0.9346	0.0130
C11	J12	J16	CONDUIT	12.7	1.1791	0.0130
C12	J16	J17	CONDUIT	63.2	0.9817	0.0130
C13	J17	J18	CONDUIT	44.1	0.6798	0.0130
C14	J14	OF2	CONDUIT	32.7	4.4328	0.3500
C15	J10	J11	CONDUIT	34.8	1.0921	0.0120
C16	J13	J12	CONDUIT	37.6	1.3030	0.0120
C2	J2	J3	CONDUIT	34.1	0.2636	0.3500
C3	J3	J4	CONDUIT	20.0	0.5000	0.0350
C4	J4	J5	CONDUIT	97.1	0.9892	0.3500
C5	J5	J6	CONDUIT	14.9	0.2009	0.0150
C6	J6	OF3	CONDUIT	40.3	1.1417	0.3500
C7	J7	J8	CONDUIT	18.0	2.7767	0.3500
C8	J9	J8	CONDUIT	26.0	2.8882	0.3500
C9	J8	OF1	CONDUIT	31.7	2.3651	0.3500
OR1	J18	J14	ORIFICE			
W1	J18	J14	WEIR			
W2	J17	J18	WEIR			

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	TRAPEZOIDAL	1.00	3.00	0.51	5.50	1	344.80
C10	CIRCULAR	0.30	0.07	0.07	0.30	1	93.49
C11	CIRCULAR	0.30	0.07	0.07	0.30	1	105.01
C12	CIRCULAR	0.38	0.11	0.09	0.38	1	173.73
C13	CIRCULAR	0.05	0.00	0.01	0.05	1	0.67
C14	TRAPEZOIDAL	0.50	0.75	0.27	2.50	1	190.39
C15	TRAPEZOIDAL	0.15	0.15	0.08	1.85	1	248.81
C16	TRAPEZOIDAL	0.15	0.15	0.08	1.85	1	271.77
C2	TRAPEZOIDAL	1.00	3.00	0.51	5.50	1	280.41
C3	CIRCULAR	0.45	0.16	0.11	0.45	1	74.89
C4	TRAPEZOIDAL	1.00	2.75	0.53	4.75	1	509.62
C5	CIRCULAR	0.75	0.44	0.19	0.75	1	432.44
C6	TRAPEZOIDAL	0.50	0.75	0.27	2.50	1	96.62
C7	TRIANGULAR	0.50	1.25	0.25	5.00	1	233.12
C8	TRAPEZOIDAL	0.75	1.50	0.39	3.50	1	388.27

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C9              TRIANGULAR          1.00      5.00      0.49      10.00         1  1366.12


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

****************
Analysis Options
****************
Flow Units ............... LPS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Infiltration Method ...... HORTON
Flow Routing Method ...... DYNWAVE
Surcharge Method ......... EXTRAN
Starting Date ............ 08/18/2022 00:00:00
Ending Date .............. 08/21/2022 00:30:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:00:01
Wet Time Step ............ 00:01:00
Dry Time Step ............ 00:02:00
Routing Time Step ........ 1.00 sec
Variable Time Step ....... YES
Maximum Trials ........... 8
Number of Threads ........ 1
Head Tolerance ........... 0.001500 m

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

Total Precipitation	0.080	35.520
Evaporation Loss	0.000	0.000
Infiltration Loss	0.009	3.837
Surface Runoff	0.072	32.248
Final Storage	0.000	0.003
Continuity Error (%)	-1.600	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.072	0.724
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.068	0.679
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.004	0.039
Final Stored Volume	0.008	0.085
Continuity Error (%)	-0.101	

Highest Continuity Errors

Node J8 (2.07%)
Node J16 (1.71%)
Node J17 (-1.52%)
Node J4 (-1.48%)
Node J5 (1.20%)

Time-Step Critical Elements

None

****
Highest Flow Instability Indexes
****
All links are stable.

****
Routing Time Step Summary
****

Minimum Time Step	:	0.50 sec
Average Time Step	:	1.00 sec
Maximum Time Step	:	1.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	2.00
Percent Not Converging	:	0.00
Time Step Frequencies	:	
1.000 - 0.871 sec	:	99.99 %
0.871 - 0.758 sec	:	0.00 %
0.758 - 0.660 sec	:	0.00 %
0.660 - 0.574 sec	:	0.00 %
0.574 - 0.500 sec	:	0.01 %

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff LPS	Runoff Coeff	
S1	35.52	0.00	0.00	5.15	1.88	28.63	30.51	0.17	102.04	0.859	
S2	35.52	0.00	0.00	4.72	1.86	29.07	30.93	0.13	91.01	0.871	
S3	35.52	0.00	0.00	1.80	19.14	16.11	35.25	0.04			1

S4		35.52	0.00	0.00	3.66	7.66	24.81	32.47	0.09
146.14	0.914								
S5		35.52	0.00	0.00	4.52	1.85	29.28	31.13	0.03
25.66	0.876								
S6		35.52	0.00	0.00	1.80	19.14	16.10	35.24	0.04
125.17	0.992								
S7		35.52	0.00	0.00	2.64	12.23	21.63	33.86	0.06
152.24	0.953								
S8		35.52	0.00	0.00	3.10	9.55	23.63	33.19	0.08
155.22	0.934								
S9		35.52	0.00	0.00	2.64	13.40	20.53	33.93	0.09
216.34	0.955								

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.01	0.50	262.65	0 00:29	0.50
J10	JUNCTION	0.00	0.11	262.91	0 00:16	0.11
J11	JUNCTION	0.00	1.63	262.23	0 00:16	1.63
J13	JUNCTION	0.00	0.00	262.80	0 00:00	0.00
J14	JUNCTION	0.03	0.30	258.75	0 00:43	0.30
J2	JUNCTION	0.02	0.62	262.51	0 00:32	0.62
J3	JUNCTION	0.01	0.51	262.31	0 00:41	0.51
J4	JUNCTION	0.01	0.51	262.16	0 00:41	0.51
J5	JUNCTION	0.01	0.53	261.22	0 00:58	0.53
J6	JUNCTION	0.02	0.56	261.22	0 00:58	0.56
J7	JUNCTION	0.01	0.37	262.87	0 00:16	0.37
J8	JUNCTION	0.02	0.54	262.54	0 00:26	0.54
J9	JUNCTION	0.00	0.52	263.27	0 00:16	0.52
OF1	OUTFALL	0.00	0.00	260.00	0 00:00	0.00
OF2	OUTFALL	0.00	0.06	257.06	0 00:43	0.06
OF3	OUTFALL	0.50	0.50	260.50	0 00:00	0.50
J12	STORAGE	0.00	1.67	262.12	0 00:16	1.67
J16	STORAGE	0.00	1.10	261.35	0 00:16	1.10
J17	STORAGE	0.33	0.69	260.19	0 00:34	0.69

J18	STORAGE	0.78	0.94	259.44	0	00:39	0.94	

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days	hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent	
J1	JUNCTION	102.04	102.04	0	00:16	0.168	0.168	-1.545	
J10	JUNCTION	123.00	123.00	0	00:16	0.0364	0.0364	-0.312	
J11	JUNCTION	0.00	104.17	0	00:16	0	0.0365	-0.228	
J13	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
J14	JUNCTION	0.00	27.79	0	00:39	0	0.166	0.015	
J2	JUNCTION	91.01	137.94	0	00:25	0.129	0.301	0.449	
J3	JUNCTION	0.00	107.89	0	00:33	0	0.299	0.812	
J4	JUNCTION	0.00	95.92	0	00:32	0	0.297	-1.455	
J5	JUNCTION	0.00	100.10	0	00:48	0	0.307	1.214	
J6	JUNCTION	25.66	80.64	0	00:48	0.0335	0.337	-0.010	
J7	JUNCTION	146.14	146.14	0	00:16	0.0927	0.0927	-1.979	
J8	JUNCTION	0.00	213.61	0	00:16	0	0.185	2.118	
J9	JUNCTION	216.34	216.34	0	00:16	0.0885	0.0885	-2.083	
OF1	OUTFALL	0.00	99.37	0	00:26	0	0.181	0.000	
OF2	OUTFALL	0.00	23.45	0	00:43	0	0.166	0.000	
OF3	OUTFALL	0.00	73.86	0	00:58	0	0.331	0.000	
J12	STORAGE	280.38	318.52	0	00:16	0.114	0.15	0.569	
J16	STORAGE	152.24	385.81	0	00:16	0.061	0.21	1.745	
J17	STORAGE	0.00	261.77	0	00:17	0	0.207	-1.502	
J18	STORAGE	0.00	32.21	0	00:34	0	0.2	0.000	

****
Node Surcharge Summary
****

No nodes were surcharged.

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days	hr:min	Maximum Outflow LPS
J12	0.000	0	0	0	0.001	27	0	00:16	266.38
J16	0.000	0	0	0	0.000	57	0	00:16	261.77
J17	0.075	40	0	0	0.171	91	0	00:34	32.21
J18	0.036	72	0	0	0.046	92	0	00:39	27.79

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
OF1	8.65	8.04	99.37	0.181
OF2	74.33	0.85	23.45	0.166
OF3	16.29	7.79	73.86	0.331
System	33.09	16.68	125.29	0.679

****
Link Flow Summary

****

Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days	hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	64.87	0	00:28	0.07	0.19	0.56
C10	CONDUIT	99.28	0	00:16	1.40	1.06	1.00
C11	CONDUIT	266.38	0	00:16	3.77	2.54	1.00
C12	CONDUIT	261.77	0	00:17	2.39	1.51	1.00
C13	CONDUIT	1.09	0	00:34	0.58	1.62	0.90
C14	CONDUIT	23.45	0	00:43	0.16	0.12	0.35
C15	CONDUIT	104.17	0	00:16	1.31	0.42	0.70
C16	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C2	CONDUIT	107.89	0	00:33	0.12	0.38	0.55
C3	CONDUIT	95.92	0	00:32	0.74	1.28	1.00
C4	CONDUIT	100.10	0	00:48	0.13	0.20	0.48
C5	CONDUIT	76.20	0	00:48	0.45	0.18	0.73
C6	CONDUIT	73.86	0	00:58	0.14	0.76	0.80
C7	CONDUIT	92.55	0	00:16	0.15	0.40	0.82
C8	CONDUIT	121.06	0	00:16	0.21	0.31	0.59
C9	CONDUIT	99.37	0	00:26	0.17	0.07	0.35
OR1	ORIFICE	2.29	0	00:39			1.00
W1	WEIR	25.50	0	00:39			0.19
W2	WEIR	31.12	0	00:34			0.30

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
C1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.99	0.00
C10	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00
C11	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C12	1.00	0.00	0.89	0.00	0.11	0.00	0.00	0.00	0.99	0.00

C13	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C14	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C15	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C16	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.88	0.00
C3	1.00	0.00	0.00	0.00	0.04	0.00	0.00	0.96	0.01	0.00
C4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.13	0.00
C5	1.00	0.00	0.02	0.00	0.98	0.00	0.00	0.00	0.93	0.00
C6	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.98	0.00
C7	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00
C8	1.00	0.00	0.68	0.00	0.32	0.00	0.00	0.00	1.00	0.00
C9	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00

****
Conduit Surcharge Summary
****

	Hours Full			Hours Above Full	Hours Capacity
Conduit	Both Ends	Upstream	Dnstream	Normal Flow	Limited
C10	0.10	0.10	0.12	0.01	0.01
C11	0.11	0.13	0.11	0.15	0.10
C12	0.01	0.10	13.32	0.12	0.01
C13	0.01	36.35	0.01	36.53	0.01
C3	0.10	0.22	0.10	0.40	0.10
C6	0.01	0.40	0.01	0.01	0.01
C7	0.01	0.01	0.20	0.01	0.01

Analysis begun on: Tue Oct 11 17:09:48 2022
Analysis ended on: Tue Oct 11 17:09:54 2022
Total elapsed time: 00:00:06

Timmins

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

POST-DEVELOPMENT DRAINAGE CONDITIONS & TREATMENT

****
Element Count
****
Number of rain gages 5
Number of subcatchments ... 9
Number of nodes 20
Number of links 19
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
100YEARSTORM	Timeseries100	VOLUME	1 min.
100yearstorm30	100year30	VOLUME	1 min.
2YEARSTORM	Timeseries2	VOLUME	1 min.
5YEARSTORM	Timeseries5	VOLUME	1 min.
Timmins_Storm_(0-25)	Timmins_Storm_(0-25)	INTENSITY	60 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S1	0.55	70.00	5.00	3.5000	Timmins_Storm_(0-25)	J1
S2	0.42	80.00	5.00	3.0000	Timmins_Storm_(0-25)	J2
S3	0.10	100.00	50.00	1.0000	Timmins_Storm_(0-25)	J10
S4	0.29	60.00	20.00	3.5000	Timmins_Storm_(0-25)	J7
S5	0.11	30.00	5.00	2.0000	Timmins_Storm_(0-25)	J6

S6	0.11	100.00	50.00	1.0000	Timmins_Storm_(0-25)	J12
S7	0.18	70.00	32.00	4.0000	Timmins_Storm_(0-25)	J16
S8	0.23	70.00	25.00	4.0000	Timmins_Storm_(0-25)	J12
S9	0.26	80.00	35.00	3.5000	Timmins_Storm_(0-25)	J9

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	262.15	1.00	0.0	
J10	JUNCTION	262.80	0.15	0.0	
J11	JUNCTION	260.60	2.00	0.0	
J13	JUNCTION	262.80	0.15	0.0	
J14	JUNCTION	258.45	0.75	0.0	
J2	JUNCTION	261.89	1.00	0.0	
J3	JUNCTION	261.80	1.25	0.0	
J4	JUNCTION	261.65	1.00	0.0	
J5	JUNCTION	260.69	1.00	0.0	
J6	JUNCTION	260.66	1.00	0.0	
J7	JUNCTION	262.50	1.00	0.0	
J8	JUNCTION	262.00	1.00	0.0	
J9	JUNCTION	262.75	1.00	0.0	
OF1	OUTFALL	260.00	2.25	0.0	
OF2	OUTFALL	257.00	0.50	0.0	
OF3	OUTFALL	260.00	0.70	0.0	
J12	STORAGE	260.45	2.01	0.0	
J16	STORAGE	260.25	1.94	0.0	
J17	STORAGE	259.50	0.75	0.0	
J18	STORAGE	258.50	1.00	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	J2	CONDUIT	65.2	0.3985	0.3500
C10	J11	J12	CONDUIT	10.7	0.9346	0.0130

C11	J12	J16	CONDUIT	12.7	1.1791	0.0130
C12	J16	J17	CONDUIT	63.2	0.9817	0.0130
C13	J17	J18	CONDUIT	44.1	0.6798	0.0130
C14	J14	OF2	CONDUIT	32.7	4.4328	0.3500
C15	J10	J11	CONDUIT	34.8	1.0921	0.0120
C16	J13	J12	CONDUIT	37.6	1.3030	0.0120
C2	J2	J3	CONDUIT	34.1	0.2636	0.3500
C3	J3	J4	CONDUIT	20.0	0.5000	0.0350
C4	J4	J5	CONDUIT	97.1	0.9892	0.3500
C5	J5	J6	CONDUIT	14.9	0.2009	0.0150
C6	J6	OF3	CONDUIT	40.3	1.1417	0.3500
C7	J7	J8	CONDUIT	18.0	2.7767	0.3500
C8	J9	J8	CONDUIT	26.0	2.8882	0.3500
C9	J8	OF1	CONDUIT	31.7	2.3651	0.3500
OR1	J18	J14	ORIFICE			
W1	J18	J14	WEIR			
W2	J17	J18	WEIR			

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	TRAPEZOIDAL	1.00	3.00	0.51	5.50	1	344.80
C10	CIRCULAR	0.30	0.07	0.07	0.30	1	93.49
C11	CIRCULAR	0.30	0.07	0.07	0.30	1	105.01
C12	CIRCULAR	0.38	0.11	0.09	0.38	1	173.73
C13	CIRCULAR	0.05	0.00	0.01	0.05	1	0.67
C14	TRAPEZOIDAL	0.50	0.75	0.27	2.50	1	190.39
C15	TRAPEZOIDAL	0.15	0.15	0.08	1.85	1	248.81
C16	TRAPEZOIDAL	0.15	0.15	0.08	1.85	1	271.77
C2	TRAPEZOIDAL	1.00	3.00	0.51	5.50	1	280.41
C3	CIRCULAR	0.45	0.16	0.11	0.45	1	74.89
C4	TRAPEZOIDAL	1.00	2.75	0.53	4.75	1	509.62
C5	CIRCULAR	0.75	0.44	0.19	0.75	1	432.44
C6	TRAPEZOIDAL	0.50	0.75	0.27	2.50	1	96.62
C7	TRIANGULAR	0.50	1.25	0.25	5.00	1	233.12
C8	TRAPEZOIDAL	0.75	1.50	0.39	3.50	1	388.27
C9	TRIANGULAR	1.00	5.00	0.49	10.00	1	1366.12

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

****************
Analysis Options
****************
Flow Units ..... LPS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Infiltration Method ..... HORTON
Flow Routing Method ..... DYNWAVE
Surcharge Method ..... EXTRAN
Starting Date ..... 08/18/2022 00:00:00
Ending Date ..... 08/21/2022 00:30:00
Antecedent Dry Days ..... 0.0
Report Time Step ..... 00:00:01
Wet Time Step ..... 00:01:00
Dry Time Step ..... 00:02:00
Routing Time Step ..... 1.00 sec
Variable Time Step ..... YES
Maximum Trials ..... 8
Number of Threads ..... 1
Head Tolerance ..... 0.001500 m

**************************        Volume         Depth
Runoff Quantity Continuity     hectare-m            mm
**************************     ---------       -------
Total Precipitation ......         0.433       193.000
```

Evaporation Loss	0.000	0.000
Infiltration Loss	0.019	8.312
Surface Runoff	0.414	184.695
Final Storage	0.000	0.003
Continuity Error (%)	-0.005	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.414	4.145
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.410	4.101
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.004	0.039
Final Stored Volume	0.008	0.085
Continuity Error (%)	-0.060	

Time-Step Critical Elements

None

Highest Flow Instability Indexes

All links are stable.

Routing Time Step Summary

Minimum Time Step	:	0.65 sec
Average Time Step	:	1.00 sec

Maximum Time Step	:	1.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	2.00
Percent Not Converging	:	0.00
Time Step Frequencies	:	
1.000 - 0.871 sec	:	99.99 %
0.871 - 0.758 sec	:	0.01 %
0.758 - 0.660 sec	:	0.00 %
0.660 - 0.574 sec	:	0.00 %
0.574 - 0.500 sec	:	0.00 %

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff LPS	Runoff Coeff
S1	193.00	0.00	0.00	10.31	9.65	173.04	182.69	1.01	65.48	0.947
S2	193.00	0.00	0.00	9.92	9.65	173.43	183.08	0.77	50.39	0.949
S3	193.00	0.00	0.00	4.63	96.51	91.87	188.38	0.19	12.65	0.976
S4	193.00	0.00	0.00	8.08	38.60	146.32	184.93	0.53	34.73	0.958
S5	193.00	0.00	0.00	9.75	9.65	173.61	183.26	0.20	13.01	0.950
S6	193.00	0.00	0.00	4.64	96.51	91.86	188.38	0.20	12.94	0.976
S7	193.00	0.00	0.00	6.47	61.77	124.78	186.55	0.34	22.05	0.967
S8	193.00	0.00	0.00	7.29	48.26	137.47	185.72	0.43	28.19	0.962

S9	193.00	0.00	0.00	6.28	67.56	119.17	186.73	0.49
31.92	0.968							

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.05	0.51	262.66	0 07:00	0.51
J10	JUNCTION	0.00	0.04	262.84	0 07:00	0.04
J11	JUNCTION	0.01	0.07	260.67	0 07:00	0.07
J13	JUNCTION	0.00	0.00	262.80	0 00:00	0.00
J14	JUNCTION	0.07	0.56	259.01	0 07:01	0.56
J2	JUNCTION	0.08	0.63	262.52	0 07:00	0.63
J3	JUNCTION	0.05	0.55	262.35	0 07:04	0.55
J4	JUNCTION	0.05	0.50	262.15	0 07:06	0.50
J5	JUNCTION	0.07	0.95	261.64	0 07:31	0.95
J6	JUNCTION	0.07	0.98	261.64	0 07:31	0.98
J7	JUNCTION	0.03	0.24	262.74	0 07:00	0.24
J8	JUNCTION	0.06	0.47	262.47	0 07:00	0.47
J9	JUNCTION	0.02	0.24	262.99	0 07:00	0.24
OF1	OUTFALL	0.00	0.00	260.00	0 00:00	0.00
OF2	OUTFALL	0.01	0.11	257.11	0 07:01	0.11
OF3	OUTFALL	0.50	0.50	260.50	0 00:00	0.50
J12	STORAGE	0.01	0.15	260.60	0 07:00	0.15
J16	STORAGE	0.02	0.17	260.42	0 07:00	0.17
J17	STORAGE	0.40	0.73	260.23	0 07:00	0.73
J18	STORAGE	0.81	0.98	259.48	0 07:00	0.98

****
Node Inflow Summary
****

	Maximum	Maximum		Lateral	Total	Flow

Node	Type	Lateral Inflow LPS	Total Inflow LPS	Time of Max Occurrence days hr:min	Inflow Volume 10^6 ltr	Inflow Volume 10^6 ltr	Balance Error Percent
J1	JUNCTION	65.48	65.48	0 07:00	1.01	1.01	-0.086
J10	JUNCTION	12.65	12.65	0 07:00	0.194	0.194	-0.000
J11	JUNCTION	0.00	12.65	0 07:00	0	0.194	0.000
J13	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr
J14	JUNCTION	0.00	75.80	0 07:00	0	1.11	0.004
J2	JUNCTION	50.39	114.66	0 07:00	0.766	1.78	0.026
J3	JUNCTION	0.00	111.79	0 07:00	0	1.78	0.036
J4	JUNCTION	0.00	109.08	0 07:02	0	1.77	-0.287
J5	JUNCTION	0.00	108.07	0 07:06	0	1.78	0.248
J6	JUNCTION	13.01	92.75	0 07:31	0.197	1.97	-0.000
J7	JUNCTION	34.73	34.73	0 07:00	0.528	0.528	-0.105
J8	JUNCTION	0.00	66.63	0 07:00	0	1.02	0.103
J9	JUNCTION	31.92	31.92	0 07:00	0.487	0.487	-0.095
OF1	OUTFALL	0.00	66.29	0 07:00	0	1.01	0.000
OF2	OUTFALL	0.00	75.08	0 07:01	0	1.11	0.000
OF3	OUTFALL	0.00	92.75	0 07:31	0	1.97	0.000
J12	STORAGE	41.12	53.78	0 07:00	0.627	0.822	-0.000
J16	STORAGE	22.05	75.82	0 07:00	0.336	1.16	0.041
J17	STORAGE	0.00	75.82	0 07:00	0	1.16	-0.017
J18	STORAGE	0.00	75.81	0 07:00	0	1.15	0.000

****
Node Surcharge Summary
****

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

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
J6	JUNCTION	1.28	0.225	0.025

****
Node Flooding Summary

****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow LPS
J12	0.000	0	0	0	0.000	2	0 07:00	53.78
J16	0.000	1	0	0	0.000	9	0 07:00	75.82
J17	0.092	49	0	0	0.181	97	0 07:00	75.81
J18	0.037	75	0	0	0.049	97	0 07:00	75.80

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
OF1	23.90	16.27	66.29	1.015
OF2	88.77	4.81	75.08	1.114
OF3	31.24	24.19	92.75	1.973
System	47.97	45.27	225.81	4.101

****
Link Flow Summary
****

Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days	hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	64.28	0	07:00	0.06	0.19	0.57
C10	CONDUIT	12.65	0	07:00	0.77	0.14	0.29
C11	CONDUIT	53.78	0	07:00	1.50	0.51	0.51
C12	CONDUIT	75.82	0	07:00	1.11	0.44	0.73
C13	CONDUIT	1.13	0	06:03	0.58	1.68	1.00
C14	CONDUIT	75.08	0	07:01	0.22	0.39	0.61
C15	CONDUIT	12.65	0	07:00	0.75	0.05	0.27
C16	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C2	CONDUIT	111.79	0	07:00	0.11	0.40	0.59
C3	CONDUIT	109.08	0	07:02	0.69	1.46	1.00
C4	CONDUIT	108.07	0	07:06	0.11	0.21	0.70
C5	CONDUIT	86.26	0	07:34	0.21	0.20	1.00
C6	CONDUIT	92.75	0	07:31	0.18	0.96	0.80
C7	CONDUIT	34.71	0	07:00	0.07	0.15	0.72
C8	CONDUIT	31.92	0	07:00	0.08	0.08	0.47
C9	CONDUIT	66.29	0	07:00	0.15	0.05	0.30
OR1	ORIFICE	2.55	0	07:00			1.00
W1	WEIR	73.25	0	07:00			0.39
W2	WEIR	74.75	0	07:00			0.53

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Flow Classification Summary
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Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
C1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.97	0.00
C10	1.00	0.00	0.00	0.00	0.01	0.02	0.00	0.97	0.03	0.00
C11	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C12	1.00	0.00	0.73	0.00	0.25	0.00	0.00	0.01	0.99	0.00
C13	1.00	0.01	0.00	0.00	0.05	0.00	0.00	0.94	0.00	0.00
C14	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00
C15	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00

C16	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.73	0.00
C3	1.00	0.00	0.00	0.00	0.18	0.00	0.00	0.82	0.03	0.00
C4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.26	0.00
C5	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.78	0.00
C6	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.89	0.00
C7	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00
C8	1.00	0.00	0.53	0.00	0.47	0.00	0.00	0.00	1.00	0.00
C9	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00

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Conduit Surcharge Summary
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	Hours Full			Hours Above Full	Hours Capacity
Conduit	Both Ends	Upstream	Dnstream	Normal Flow	Limited
C12	0.01	0.01	23.30	0.01	0.01
C13	1.25	46.88	1.25	47.07	1.25
C14	0.01	0.61	0.01	0.01	0.01
C3	0.01	0.74	0.01	1.18	0.01
C5	1.16	1.16	1.28	0.01	0.01
C6	0.01	2.86	0.01	0.01	0.01

Analysis begun on: Wed Sep 21 09:16:11 2022
Analysis ended on: Wed Sep 21 09:16:17 2022
Total elapsed time: 00:00:06