FUNCTIONAL SERVICING & STORMWATER MANAGEMENT REPORT

RITZ-CARLTON HOTEL, SPA, & RESIDENCES
144 JOHN STREET EAST

Town of Niagara on the Lake

Project: 2026-5625 **April 2026**

Revision	Description	Prepared		Checked	
		By	Date	By	Date
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1.0 INTRODUCTION

1.1 Study Objectives and Location

This report is provided in support of the proposed development of 144 John Street East, a proposed Ritz-Carlton hotel, spa, and residences. This report is intended to facilitate the design of appropriate stormwater management facilities and guide the design of municipal services. The proposed subdivision is part of a residential block located within the Town of Niagara-on-the-Lake, defined as Lots 145 and 156 of the Registrar's Compiled Plan 692, and Lot 14 Plan M-11. The subject development is accessible by Charlotte Street to the northwest and John Street East to the northeast. The site is located southeast of the intersection of Charlotte Street and John Street East and northwest of the intersection of John Street East and Niagara River Parkway. Please refer to **Figure 1.1** for the location plan. **Figure 1.2** illustrates the site's development plan.

This report demonstrates that the proposed sanitary servicing, water supply and stormwater management strategy is designed in accordance with the Town of Niagara-on-the-Lake, Niagara Region, Niagara Peninsula Conservation Authority and MECP guidelines. Low Impact Development (LID) mitigation measures are proposed throughout the site to satisfy water balance requirements.

1.2 Background

A series of background texts were referenced and reviewed to inform the design and in preparation of this report. Relevant excerpts from the reports referenced below are provided in the appendices to establish context and provide background.

- "*Niagara Region Stormwater Management Guidelines*" dated December 2022, by WSP e & I Canada Limited;
- *"Municipal Engineering Standards"* dated November 2020, by the Town of Niagara-on-the-Lake;
- *"Water and Wastewater Master Servicing Plan Update*" dated December 5, 2023 by the Region of Niagara & GM BluePlan Engineering*;*
- *"Development Charges Background Study – Regional Municipality of Niagara*" dated May 30, 2022 by Watson & Associates Economists Ltd.*;*

- *"Stormwater Management Guidelines Report"* dated January 2010 by AECOM, and approved by the NPCA March 17, 2010;
- *"Low Impact Development Stormwater Management Planning and Design Guide"* dated 2017, by TRCA and CVC;
- *"Stormwater Management Planning and Design Manual",* dated March 2003, by MOECC;
- *"Hydrogeological Investigation, 200 John Street and 588 Charlotte Street, Niagara-on-the-Lake, Ontario" Project No. 2018-0419,* dated June 2020, by Cole Engineering Group Ltd;
- *"One Mile Creek Watershed Strategy Final Report",* dated October 2005, prepared for the Niagara Peninsula Conservation Authority, by Aquafor Beech Limited & LURA Consulting Limited;
- *"Design Guidelines for Drinking-Water Systems",* dated January 12, 2016, updated May 11, 2023, by MECP Ontario;
- *"Design Guidelines for Sewage Works",* dated February 5, 2016, updated September 4, 2024, by MECP Ontario;
- "*Water Supply for Public Fire Protection",* dated 2020, by Fire Underwriters Survey.

1.3 Proposed Development

The proposed development consists of a hotel, spa, residences, and other guest attractions. The residences consist of five (5) three-storey buildings totalling 234 units, which are a mix of 1 bedroom, 1 bedroom + den, and 2-bedroom units. The hotel will be 5 floors, containing a total of 111 suites. The hotel will also contain a restaurant, conference rooms, an office and retail sales. A surface-level visitor parking lot is also proposed, located to the southwest of the hotel building. Several other attractions are proposed on-site, which include the spa and an accompanying restaurant. A carriage house is proposed, which will include game rooms, play areas, and an adjacent outdoor pool. The site plan is provided in **Appendix A,** which provides full details on the proposal. Overall, the site will cater to both long-term residents as well as short-term residents (i.e., tourists). Note that a SWM block is proposed on-site, located adjacent to the proposed visitor parking lot. Heritage elements are being preserved, which are also noted on the site plan. Access to the hotel is proposed to be provided from John Street East to the northeast and to the residences by Ritz-Carlton Lane.

1.4 Population Estimate

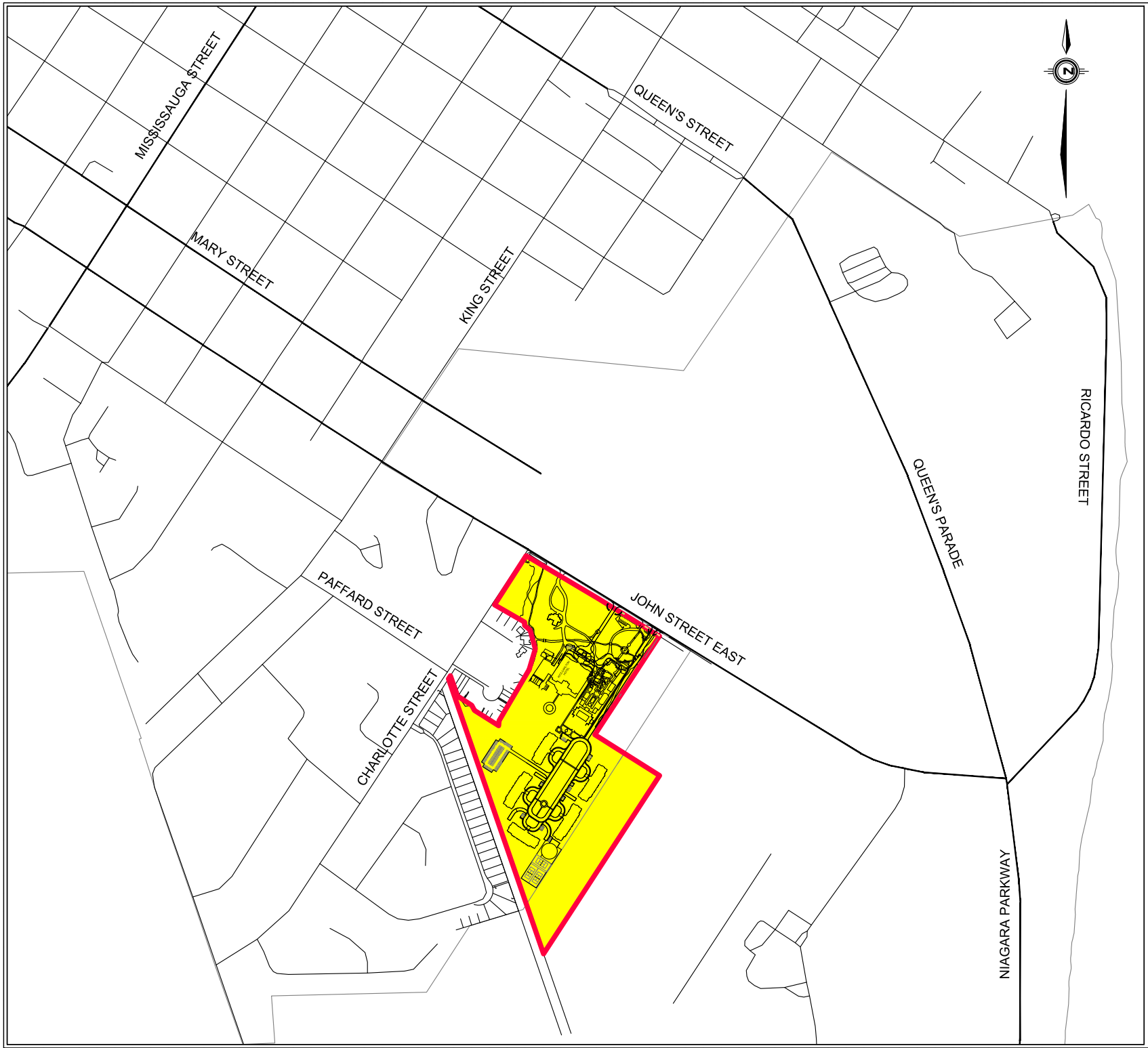
Given the nature of the site, with a possible mix of short and long-term residents and/or visitors, along with consideration of on-site employees, the population estimate is based on available guidelines and key assumptions. These assumptions can be refined as the design process progresses and more information becomes available. The guidelines/assumptions are summarized as follows:

- Population density criteria were based on the Development Charges Background Study (2022) for Niagara Region.
    - 1.991 person/unit was provided for 2-bedroom apartments (applied for 1 bedroom + den units as well)
    - 1.214 person/unit was provided for 1-bedroom apartments
    - 500 sqft/person was provided for commercial development
    - The unit mix was not available for the hotel; therefore, the more conservative value of 1.991 persons/unit was applied to all 111 hotel units.

Table1-1 provides a summary of the population estimate which was determined to be 795 persons.

Table 1-1: Summary of Populations

Type	Units	GFA (ha)	Population Density	Population
Residence Site				
3-Storey Residence – 1B+D, 2B	198	-	1.99 ppu	395
3 Storey Residence – 1B	36	-	1.21 ppu	44
Commercial – Tennis Club & Clubhouse	-	0.09	1 person / 500sqft	20
Ritz-Carlton Hotel / Spa Site				
Hotel Suites - Units	111	-	1.99 ppu	221
Hotel – Commercial (Retail / Restaurant / Office)	-	0.25	1 person/500sqft	55
Commercial - Spa	-	0.27	1 person/500sqft	60
TOTAL	**345**			**795**



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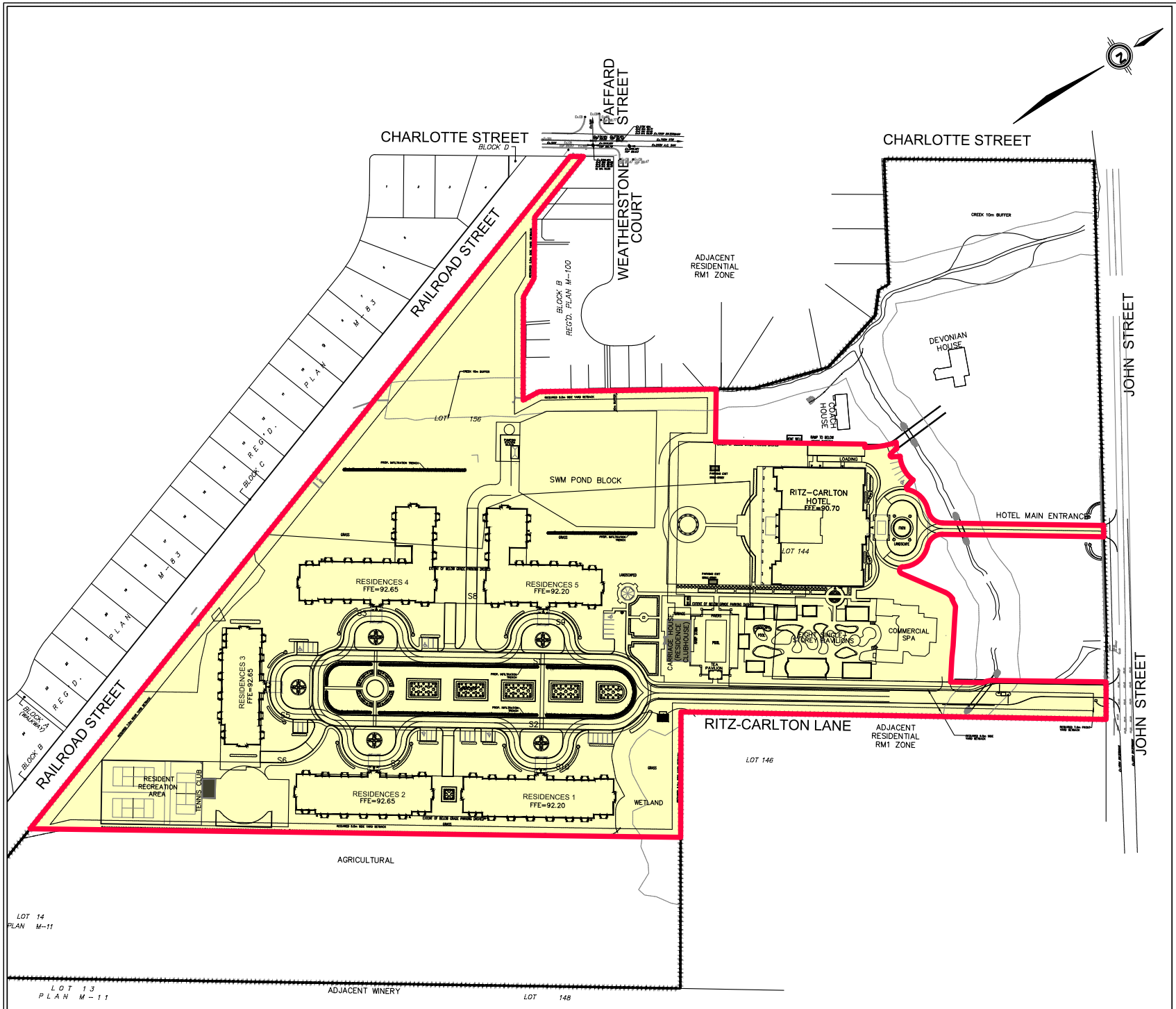
SUBJECT LOCATION

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FIGURE 1.1
LOCATION PLAN

2026-5625	APRIL 2026	SCALE: N.T.S.

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FIGURE 1.2
SITE PLAN

2026-5625	APRIL 2026	SCALE: N.T.S.

2.0 SANITARY SERVICING

2.1 Existing Sanitary Infrastructure

In existing conditions, the site is predominantly undeveloped with no major sanitary servicing connections located on site. The nearest existing sanitary sewer includes a 250mmØ sanitary sewer running south west along Charlotte Street, to Pafford Street, via gravity drainage.

2.2 Sanitary Design Criteria

The following criteria for the design of sanitary sewers have been derived for the site based on the 2020 Niagara-on-the-Lake Municipal Engineering Standards, Regional Municipality of Niagara's Water-Wastewater Project Design Manual (2023), Regional Municipality of Niagara's 2021 Water and Wastewater Master Servicing Plan, as well as MECP's Design Guidelines for Sewage Works.

- Domestic sewage flow rate for residential areas is 255 L/cap/day;
- Domestic sewage flow rate for employment areas is 310 L/cap/day
- Infiltration rate of 0.286 L/s/ha;
- Pipe size determined using Manning's Formula: $Q = (1/n)R^{2/3}S^{1/2}$
- Harmon Peaking Factor, K is $1 + 14/(4 + P^{0.5})$ with values between 2 and 4, and where P is population in thousands;
- Minimum sewer pipe size of 200mmØ at a minimum 0.60% grade (minimum of 1.0% for the first reach of permanent dead-end sewers);
- Minimum sanitary sewer velocity of 0.76m/s, with a maximum of 3.0 m/s under theoretical flows;
- Roughness coefficient of n = 0.013 for all pipes;

2.3 Proposed Sanitary Servicing Strategy

It is proposed to service the proposed subdivision via a single connection to the existing 250mmØ gravity sewer along Charlotte Street. Sanitary flows will be pumped via a force main to the existing sanitary sewage system at Charlotte Street. The pumping station is proposed adjacent to the proposed SWM pond. A summary of the expected sanitary flows from the development are provided in **Table 2-1** and **Table 2-2**. Infiltration flows were based on an approximate

development area of 13.59ha. The full calculation is provided in **Appendix B**.

Table 2-1: Average Sanitary Demands

Type	Population	Generation Rate (L/d/cap)	Average Demand (L/s)
Residence Site			
3-Storey Residence – 1B+D, 2B	395	255	1.17
3 Storey Residence – 1B	44	255	0.13
Commercial – Tennis Club & Clubhouse	20	310	0.07
Ritz-Carlton Hotel / Spa Site			
Hotel Suites - Units	221	310	0.652
Hotel – Commercial	55	310	0.197
Commercial - Spa	60	310	0.215
TOTAL			**2.573**

Table 2-2: Sanitary Peak Flow

Average Demand (L/s)	Population	Peaking Factor	Area (ha)	Infiltration (L/s)	Peak Flow (L/s)
2.573	795	3.86	13.59	3.89	13.82

2.4 Downstream Sanitary Analysis

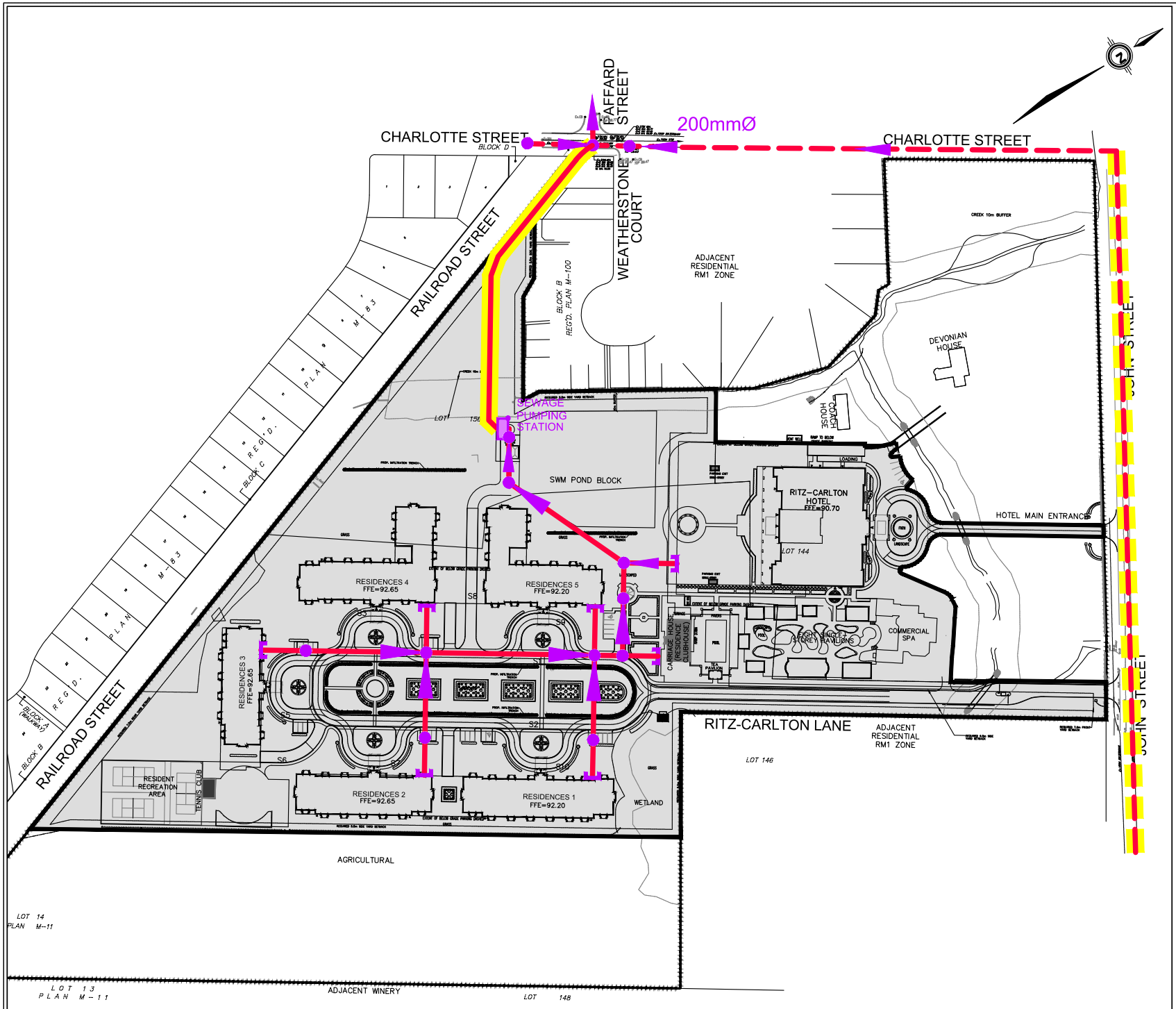
It should be noted that a new WWTP was constructed and was put into operation in August 2019, and is now being operated by the Town. The 2021 Master Servicing Plan for the area indicated that the plant would have sufficient capacity to treat the expected daily flows up to the 2051 growth horizon.

A downstream sanitary analysis was conducted for the site to check that the existing infrastructure can sufficiently convey the proposed site sanitary flows to the William SPS. The impact of post-development sanitary flows on the current Town sanitary sewers was examined using dynamic modelling in InfoWorks ICM, which was developed based on the Region's Calibrated InfoSWMM model. Details of the capacity analysis refer to **Appendix B**.

In accordance with the Niagara Region’s 2023 Water-Wastewater Project Design Manual, the capacity of the gravity sewer is assumed to be overcommitted when it runs surcharged during Design Peak DWF, or when it runs surcharged during Design Peak WWF with a peak HGL less

than 1.8m below ground elevation. The analysis simulated three scenarios: 1) 2041 DWF; 2041 Design RDII WWF and 3) 2041 5-year Storms WWF. The results indicate that the existing downstream sewer could satisfy the Region's performance criteria regarding DWF and WWF conditions after incorporating the sanitary flow from the proposed development. Hence, no upgrades on the existing sewer are required.

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- DEVELOPMENT AREA
- PROPOSED SANITARY SEWER
- EXISTING SANITARY SEWER
- PROPOSED SANITARY FORCEMAIN
- EXISTING SANITARY FORCEMAIN

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FIGURE 2.1
SANITARY SERVICING

2026-5625	APRIL 2026	SCALE: N.T.S.

3.0 WATER SUPPLY SERVICING

3.1 Existing Water Supply Infrastructure

As with the sanitary servicing, the available existing watermains are located along Charlotte Street to the northwest, and John Street East to the northeast. The watermain along Charlotte Street is currently a 150mmØ pipe, located within the eastern boulevard, while along John Street East there is a 200mmØ watermain within the northern boulevard. The subject site is located within the Old Town Pressure Zone as per the Niagara Region 2021 Master Servicing Plan.

3.2 Water Supply Design Criteria

The following design criteria for the design of the site's water supply system is based on the 2020 Niagara-on-the-Lake Municipal Engineering Standards, the 2023 Regional Municipality of Niagara Master Servicing Plan, as well as the MECP's Design Guidelines for Drinking Water Systems.

- The system shall be designed to provide sufficient flow and pressure to meet the greater of the Fire Flow plus Maximum Day Demand, or the Peak Hourly Demand;
- Average Day Demand of 240 L/cap/day for residential uses;
- Average Day Demand of 270 L/cap/day for employment uses;
- Maximum Day Peaking Factor of 2.50 and Max Hour Peaking Factor of 3.75 based on MECP guidelines (Table 3-1);
- Minimum watermain size of 150mmØ;
- Required fire flow calculated based on the Fire Underwriters Survey (FUS) for Water Supply for Public Fire Protection (2020) guidelines;
- Minimum pressure of 20 psi (140 kPa) under max day + fire flow conditions;
- Minimum pressure of 40 psi (275 kPa) under normal operating conditions;
- Maximum sustained operating pressure of 100 psi (700 kPa);
- Hazen-Williams C-factors per the table below.

Pipe Diameter (mm)	C - Factor
50	120
100 to 150	100
200 to 250	110
300 to 600	120
Over 600	130

3.3 Water Supply Design

To service the proposed development and provide sufficient redundancy in the water supply, two separate internal watermain networks are proposed. For the residential component, a 300mmØ connection will be made to the existing watermain along Charlotte Street, along with an additional 300mmØ connection to the existing watermain on John Street East, forming a looped system connected to the existing infrastructure. In addition, a separate 300mmØ connection to the existing watermain on John Street East will be provided to service the proposed hotel and spa.

In the absence of required fire flow demands per the Town's design criteria, FUS guidelines (2020) were used to determine fire flow requirements for each building – hotel, all residences, the carriage house, and the main spa building. While there are other buildings proposed, mainly near the spa area, the fire flow requirements for these structures will be less than the other buildings considered in the calculations due to their small GFAs. As such, fire flows were not calculated for these smaller structures.

As detailed architectural information was not finalized at the time of preparing this report, appropriate assumptions were made regarding the building parameters. Once architectural information is coordinated and finalized, the required fire flow calculations and water supply analysis shall be updated if deemed necessary.

Assumptions for the Hotel:

- Non-combustible – unprotected metal structural components, masonry or metal walls (0.8 construction coefficient)
- Properly protected vertical openings and exterior vertical communications (1 hour rating)
- Limited combustible occupancy/contents
- Sprinkler system in accordance with NFPA 13, standard water supply for both the sprinkler system and fire department hose lines, and fully supervised

Assumptions for the Residences

- Ordinary Construction – Brick or other masonry walls, combustible floor and interior (1.0 construction coefficient)
- Limited combustible occupancy/contents
- Sprinkler system in accordance with NFPA 13, standard water supply for both the sprinkler system and fire department hose lines, not fully supervised

Assumptions for the Carriage House and Spa

- Wood frame construction (1.5 construction coefficient)
- Limited combustible occupancy/contents
- Sprinkler system in accordance with NFPA 13, not fully supervised

The required fire flows are summarized in the following table:

Table 3-1: Fire Flow Requirements

Type	Fire Flow (L/s)
Hotel	133
Residences	217
Carriage House	117
Spa	133

Based on the current development plan, the water supply demands are summarized in **Table 3-2** and **Table 3-3**. Full calculations are provided in **Appendix C**.

Table 3-2: Average Water Supply Demands

Type	Population	Generation Rate (L/d/cap)	Average Demand (L/s)
Residence Site			
3-Storey Residence – 1B+D, 2B	395	240	1.10
3 Storey Residence – 1B	44	240	0.12
Commercial – Tennis Club & Clubhouse	20	270	0.06
Ritz-Carlton Hotel / Spa Site			
Hotel Suites – Units*	221	270	0.69
Hotel – Commercial	55	270	0.17
Commercial - Spa	60	270	0.19
TOTAL			**2.33**

*Flow is conservatively estimated as employment-related for the hotel units.

Table 3-3: Water Supply Demand

Average Day Demand (L/s)	Peak Hour Demand Peaking Factor	Max Hour Demand (L/s)	Max Day Peaking Factor	Max Day Demand (L/s)	Fire Flow (L/s)	Max Day Demand + Fire (L/s)
2.33	4.13	9.63	2.75	6.41	217.00	223.41

A hydrant test was conducted along the nearby John Street East watermain on July 2nd, 2020, and was performed on the hydrants located across from 201 and 200 John Street East. Extrapolating the results of this test, a flow of 163 L/s was available at the minimum allowable operating pressure of 20 psi (140 kPa). Furthermore, an additional hydrant test was conducted along the Charlotte Street Watermain on July 2nd, 2020, and was performed on the hydrants located across from 61 Paffard Street and 609 Charlotte Street. Extrapolating the results of this test, a flow of 365 L/s was available at the minimum allowable operating pressure of 20 psi (140 kPa). As the Maximum Day Demand plus Fire Flow of 223.41 L/s is less than the theoretical available fire flow of 365 L/s but greater than the flow of 163 L/s, additional hydraulic analyses were conducted.

3.4 Hydraulic Analysis

3.4.1 Boundary Conditions

The boundary conditions utilized in the hydraulic model were sourced from two hydrant flow tests completed along each of John Street East and Charlotte Street on July 2, 2020 by Aquacom Contracting. The test along John Street East yielded a static pressure of 50 psi (344.7 kPa), and the test along Charlotte Street yielded a static pressure of 52 psi (358.5 kPa). Based on the hydrant test results, hydrant curves were developed and extrapolated, and subsequently incorporated into the model as equivalent pump curves to define the boundary conditions. Refer to **Appendix C** for the hydrant test results and analyses.

3.4.2 WaterCAD Modelling and Results

A WaterCAD model was prepared per the latest draft plan and grading plan. The proposed water supply system was analyzed under the Minimum Hour Demand (MHD), Average Day Demand (ADD), Maximum Day Demand (MDD), Peak Hour Demand (PHD), and Maximum Day plus Fire Flow Demand (MDD+FF) scenarios. The hydraulic analysis results demonstrate that it is

expected that the subject site can be adequately serviced under all domestic demand scenarios, as well as the fire flow scenario. The pressure ranges for each scenario are summarized in **Table 3-4** below.

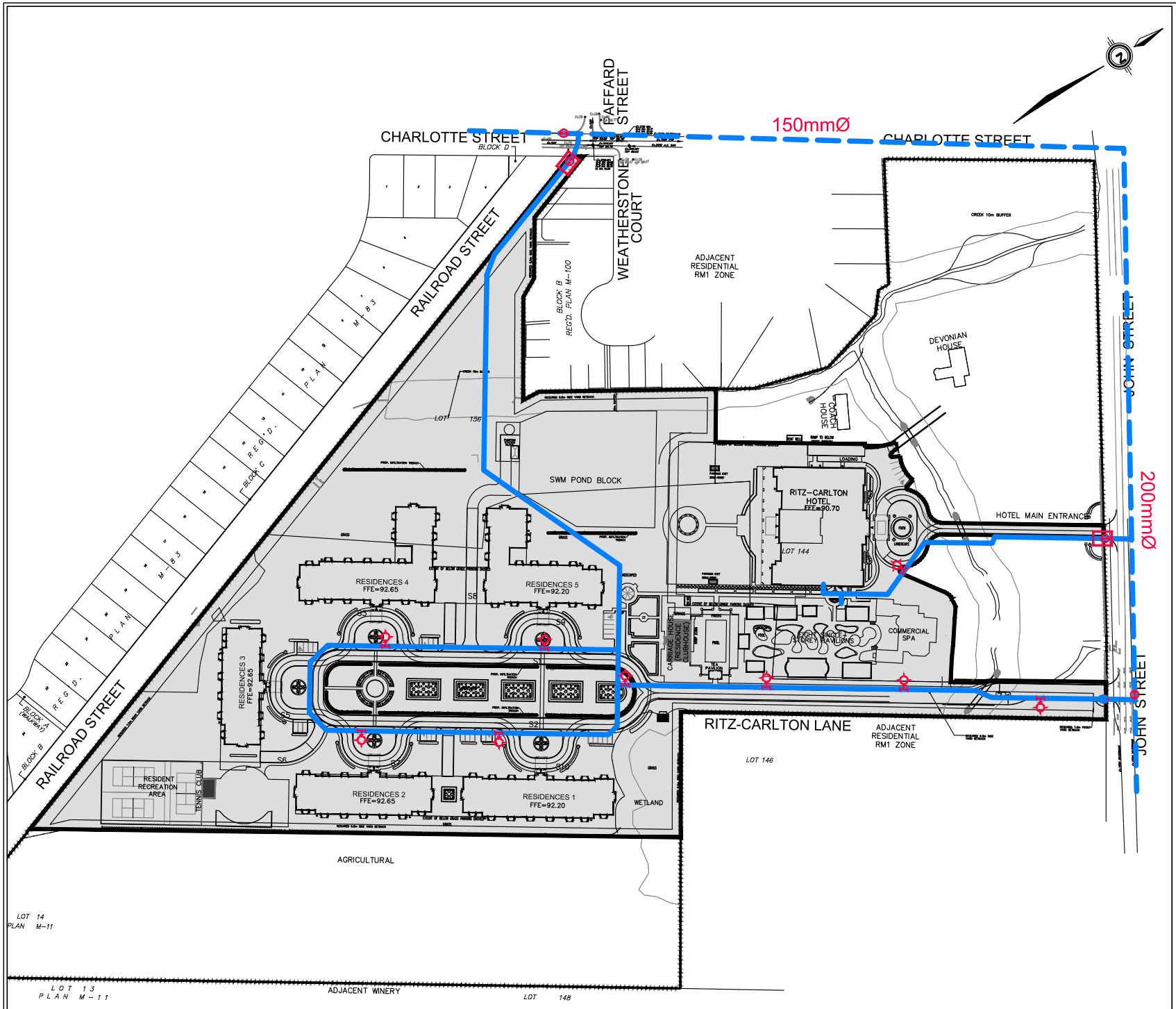
Table 3-4– Summary of Pressure Ranges

Scenario	Pressure Range (kPa)
MHD	329 - 354
ADD	329 - 354
PHD	329 - 354
MDD	329 - 353
MDD+FF	170 - 302

3.5 Water Age Analysis

A water age analysis was performed to ensure the proposed system is compliant with water age guidelines. Water turnover was calculated for the entirety of the proposed development. To be conservative, an occupancy rate of 70% and the minimum consumption rate (40% of the average day demand) were assumed for the purposes of calculating water age. Given these parameters, a water age of 2.50 days for residence site and 0.72 days for Ritz-Carlton Hotel / Spa site was determined. Per "Effects of Water Age on Distribution System Water Quality" (AWWA, 2002), a maximum water turnover rate of 3 days was observed in distribution system, thus confirming that the proposed system is sufficient. Refer to the water age analysis in **Appendix C**.

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- DEVELOPMENT AREA
- PROPOSED WATERMAIN
- EXISTING WATERMAIN

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FIGURE 3.1
WATER SUPPLY SERVICING

2026-5625	MAY 2026	SCALE: N.T.S.

4.0 STORMWATER MANAGEMENT

4.1 Existing Site Conditions

The subject site is presently primarily undeveloped with open grassland, with trees widely scattered across the property. The general drainage direction is northwards and is primarily defined by its shallow grading. The site is tributary to the One Mile Creek, which traverses and outlets northwards towards Lake Ontario. In existing conditions, the majority of the site is tributary to this watercourse, with a localized area of the property draining to the Charlotte Street storm sewer. This area will remain undeveloped and therefore is not included in any further analysis. The pre-development area from the site draining to the watercourse was determined to be 9.35ha, which includes the area of the residential development, the hotel and the spa and the respective entrances. Please refer to **Figure 4.1A** of the predevelopment drainage figure.

Three external drainage areas are located to the south and west of the site. External Areas 1 and 3 include approximately 17.2 ha and 0.67 ha, respectively, of mixed agricultural and forested lands. External Area 2 includes 28.11 ha of predominantly pervious agricultural vineyard land. All areas were determined through LIDAR topography sourced from public domains. In existing conditions, flows from External Areas 1 and 3 are conveyed to One Mile Creek via existing ditches located along Railroad Street (Upper Canada Heritage Trail) and a ditch traversing the subject site to the north. It should be noted Railroad Street contains a stone wall along the southern border. The ditch along Railroad Street continues northward towards Charlotte Street. The external flows enter the existing drainage ditch through a 24” by 12” wall opening under the heritage wall, which has a maximum conveyance capacity of 275 L/s. Flows will then drain through twin culverts that are 450mm in diameter. External Area 2 drains in a northeasterly direction and eventually towards the One Mile Creek. In post-development conditions, this flow will be managed appropriately.

The pre-development drainage plan is depicted on **Figure 4.1A**. The external areas are depicted on **Figure 4.1B**. A confluence node is shown on the figures where flows from the site and external areas combine. This node was chosen as the analysis point for comparing pre and post-development flows where pre-development flows shall not be exceeded during post-development conditions.

A preliminary hydrogeological investigation was conducted by Cole Engineering Ltd., dated June, 2020. Groundwater across the site was considered in the selection of appropriate locations for infiltration-based LID’s, and determining where infiltration would not be possible. Based on the findings of the investigation the native site soils present are of a predominantly low permeability,

consisting of silts, silty sands and silty clay. Hydraulic conductivities of the soils were estimated to be in the range of 10^{-4}cm/s to 10^{-6}cm/s, which equates to a percolation rate roughly between 15 mm/hr to 45 mm/hr (as per TRCA Stormwater Management Criteria, Figure C 11). Borehole examinations of groundwater found that water levels were between 2.0m and 5.0m from surface across the site. Relevant excerpts from the hydrogeological investigation are included in **Appendix A** for reference.

4.2 Design Criteria

SWM Facility

The proposed SWM facility is to be designed following the design criteria outlined in the MOE SWM manual, Town of Niagara-on-the-Lake, and NPCA SWM Guidelines. With regards to the stormwater management approach taken, the *One Mile Creek Watershed Strategy Final Report* (October 2005) was also consulted when choosing appropriate measures to be taken on-site in order to support the conservation of One Mile Creek.

The SWM facility shall be appropriately designed by analyzing the following design storms:

- 3-hour Chicago, 12-hour AES and 24-hour SCS distributions

Major and Minor System Design:

- Storm drainage design is to comprise of both major and minor systems;
- The minor system shall be designed to convey runoff from the 5-year storm without surface ponding;
- The major system shall be designed to safely convey the 100-year design storm within the right of way leading to major outlets. Relief is to be provided in low points to avoid ponding exceeding 0.6m;

In addition to the above, the following criteria shall be used:

- Storm sewers shall be designed using the Rational Method Formula:

  Q = 2.78 AIR/1000

  Q = flow rate in m^3/s;

  A = area in ha;

  I = rainfall intensity in mm/hr;

R = runoff coefficient (dimensionless).

Storm sewer design shall be based on City of St. Catherines Rainfall Intensity Curves with a Time of Concentration of 10 minutes. The formula is expressed as $I = A / (T + C)^B$, where R is rainfall intensity in mm/hr and T is time in hours. The IDF parameters are provided in **Table 4-1**:

Table 4-1: City of St. Catherines Rainfall Intensity Parameters

Coefficient	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
A	567	664	724	821	900	980
B	0.746	0.744	0.739	0.735	0.734	0.732
C	5.2	4.7	4.3	4.0	3.8	3.7

Water Balance:

- Best efforts shall be made to match the pre and post development infiltration volumes to maintain groundwater recharge, in accordance with the MOE 2003 criteria.

Water Quality:

- A minimum level of protection of 70% TSS removal shall be provided according to Niagara Region stormwater management practices. Note that One Mile Creek has also been identified as a Type 3 Fish Habitat as per the NPCA, requiring a minimum 60% TSS removal.

Erosion Control:

- Extended detention of a 25mm, 4-hour Chicago design storm for 24-48 hours to stable watercourses, as per NPCA criteria.

4.3 Proposed Stormwater Management Plan

The stormwater drainage for the subject site is illustrated in **Figure 4.2**, with the servicing plan shown in **Figure 4.3**. Drainage from the majority of the Site (Catchment 201) is proposed to be conveyed to a stormwater management (SWM) pond. The pond is proposed to provide erosion, quality and quantity controls for majority of the developed area. The drainage area to the pond will be 6.54 ha with an imperviousness of 71%. It should be noted that the SWM pond is proposed to service the hotel and spa area drainage as well. The internal pipes of these areas will be connected to the storm sewer that inlet to the SWM pond. The SWM pond is proposed in the northern portion of the site in order to best mimic existing site discharge location. Sizing of the proposed SWM Pond is based on the criteria presented in **Section 4.2**, and is further discussed later in **Section 5.0**.

Stormwater will be conveyed to the pond via the minor (storm sewers) and major (overland flow routes) systems which will be designed in accordance with Town standards.

The proposed SWM pond will be equipped with a control structure to provide erosion control (48-hour extended detention of the 25mm event), as well as quantity control to attenuate post-development flows to match pre-development values. The control structure design will be finalized during the detailed design stage. The pond will discharge flows via an outlet pipe towards One Mile Creek north of the site. Emergency flows will exit the pond via the same outlet pipe, which will be sized accordingly to ensure it has enough conveyance capacity. An engineered channel with sufficient conveyance capacity is proposed to carry flows northwards towards the confluence point along One Mile Creek.

The pond's permanent pool will provide quality control. The permanent pool will be sufficiently sized to provide 80% TSS removal for enhanced protection, exceeding the requirement of 70% TSS removal.

The site contains three areas not being controlled by the pond due to grading constraints (Catchment 202, 204 and 204), depicted in **Figure 4.2**. A portion of the residential area of the site along the western border (205) will not be captured by the storm sewer system due to grading constraints. This area will drain uncontrolled along Railroad Street and towards the ditch to the north. As this area is only landscaped area, it will mimic pre-development flow conditions and will not require additional quality control measures. Catchment 202 and Catchment 203, the site entrance and the hotel entrance, will be conveyed towards One Mile Creek without on-site controls. This is due to grading constraints which prevent these flows from being conveyed to the pond. Furthermore, due to the limited cover, storage facilities nor storage pipes are deemed feasible. As the hotel and spa area are now being directed towards the pond when the natural outlet for these facilities is easterly towards the creek, the uncontrolled flows to the creek from each access road are deemed lower compared to the pre-development conditions (Refer to **Section 6.0**). Furthermore, the proposed site will maintain "Randwood House" near the main entrance to the site. Flows from this property will drain to the creek without controls, similar to existing conditions. Quality control for the site entrances will be provided by OGS units for pre-treatment of flows, further discussed in **Section 6.0**.

As mentioned in **Section 4.1**, External Area 2 will be managed to ensure the flow is conveyed to One Mile Creek. Two inlet structures are proposed to capture this flow and convey it to the proposed bypass storms sewer system. This is shown on **Figure 4.3** which illustrates the storm servicing scheme. It should be noted that this flow will completely bypass the SWM pond. This is

further discussed **Section 5.0**.

The residential subdivision is proposed to contain LID measures on a best-efforts basis to provide groundwater recharge to the greatest extent possible. Due to the proposed grading concept, only passive LIDs are possible. As such, bioswales with infiltration are proposed near the central landscaping area fronting the proposed residences. Similar bioswale features are proposed at strategic locations on site to maximize capture and infiltration of runoff. Due to the underground parking structures, the roof areas in these residences cannot be drained to a shallow trench at grade. As a secondary measure, top soil amendment is pursued through the site. The hotel and spa area cannot infiltrate due to the proposed underground parking and mechanical system underneath the respective areas. As such, it is proposed to drain these areas to a single water re-use tank that will retain 5 mm from these areas. This is further discussed in **Section 7.0.**

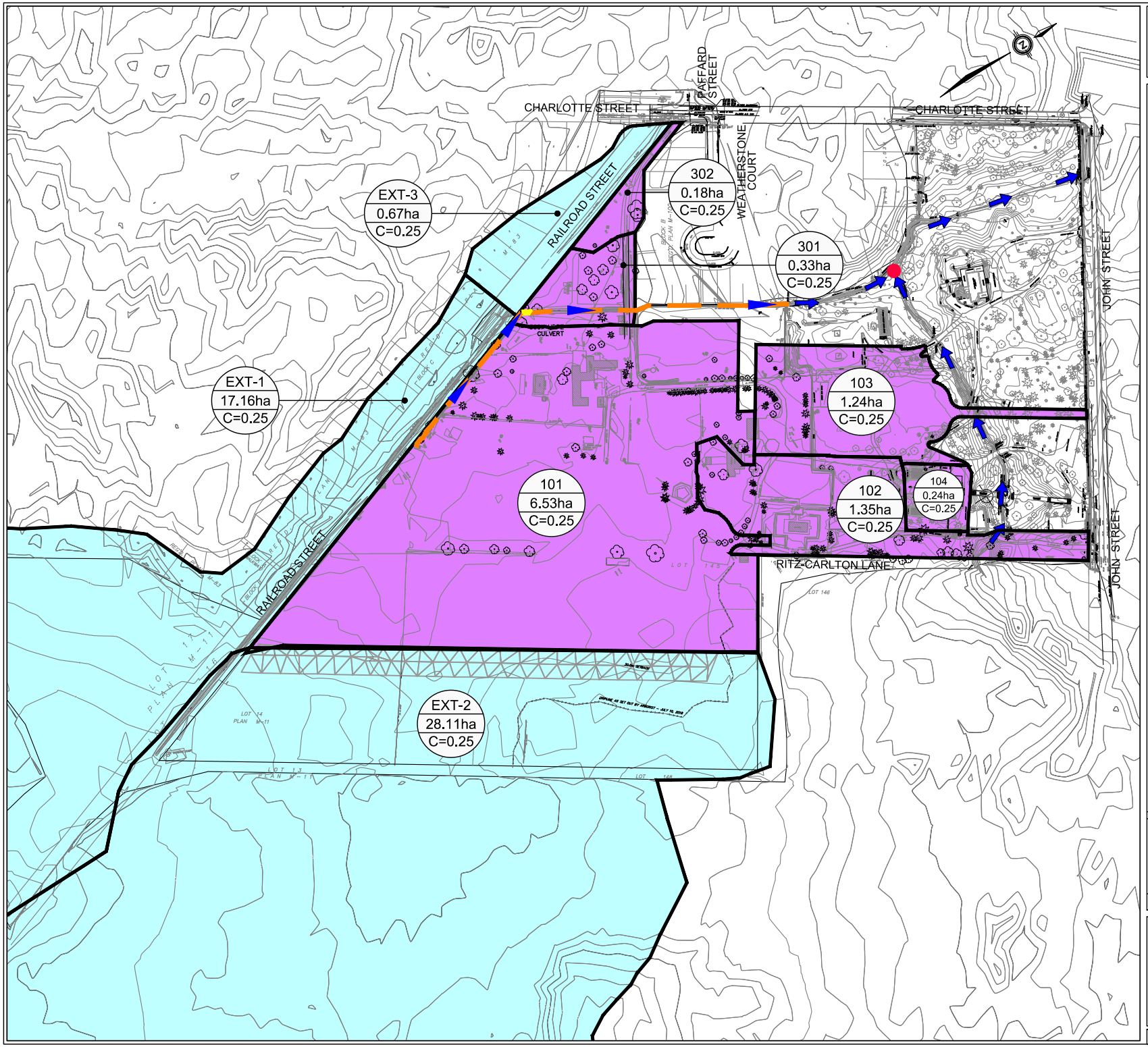
4.4 Floodplain Analysis

Due to the proximity of One Mile Creek to the proposed development, the nearby floodplain has been checked to ensure that development limits remain outside of the 100-year floodplain (regulatory flood). It is confirmed that the proposed grading is above the flood hazard limits. As the site now has multiple entrance points from John Street, each entrance will be equipped with a culvert crossing to ensure there is no overtopping. Culverts are sized to be **2.40m x 1.20m box culverts** to safely convey the regulatory flows. The culverts maintain existing channel hydraulics without creating backwater impacts. Please refer to the Floodplain Analysis Memorandum in **Appendix E** for a detailed understanding of the Floodplain analysis and Culvert sizing.

4.5 External Conveyance Pipe Sizing

As mentioned previously, External Area 2, as shown in **Figure 4.1B**, will bypass the proposed SWM pond and discharge to One Mile Creek. Two inlet structures are proposed to capture this flow (total flow = 1277 L/s) and convey it to the SWM pond, as shown in **Figure 4.2**. Inlet structure 1 is expected to capture a 100-year flow of approximately 902 L/s and has been sized to be 1050mm in diameter with a slope of 0.2% (full capacity = 1274 L/s). Inlet structure 2 is expected to capture a 100-year flow of approximately 387 L/s and has been sized to be 675 mm in diameter with a slope of 2.0% (full capacity = 679 L/s). The design shall be finalized during the detailed design stage. Both inlet systems will convey flows to the proposed bypass sewer, which will also subsequently collect emergency flows from the pond prior to discharge to the creek. VO modelling outputs are attached in **Appendix D**.

Phil Gotfried



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LEGEND

- EXISTING DRAINAGE BOUNDARY
- 102 / 1.42ha / C=0.25 — AREA ID, AREA IN HECTARES, RUNOFF COEFFICIENT
- EXISTING INTERNAL DRAINAGE AREAS
- EXTERNAL EXISTING DRAINAGE AREAS
- EXISTING CONVEYANCE DITCH TO BE MAINTAINED
- EXISTING CREEK DRAINAGE
- CONFLUENCE NODE

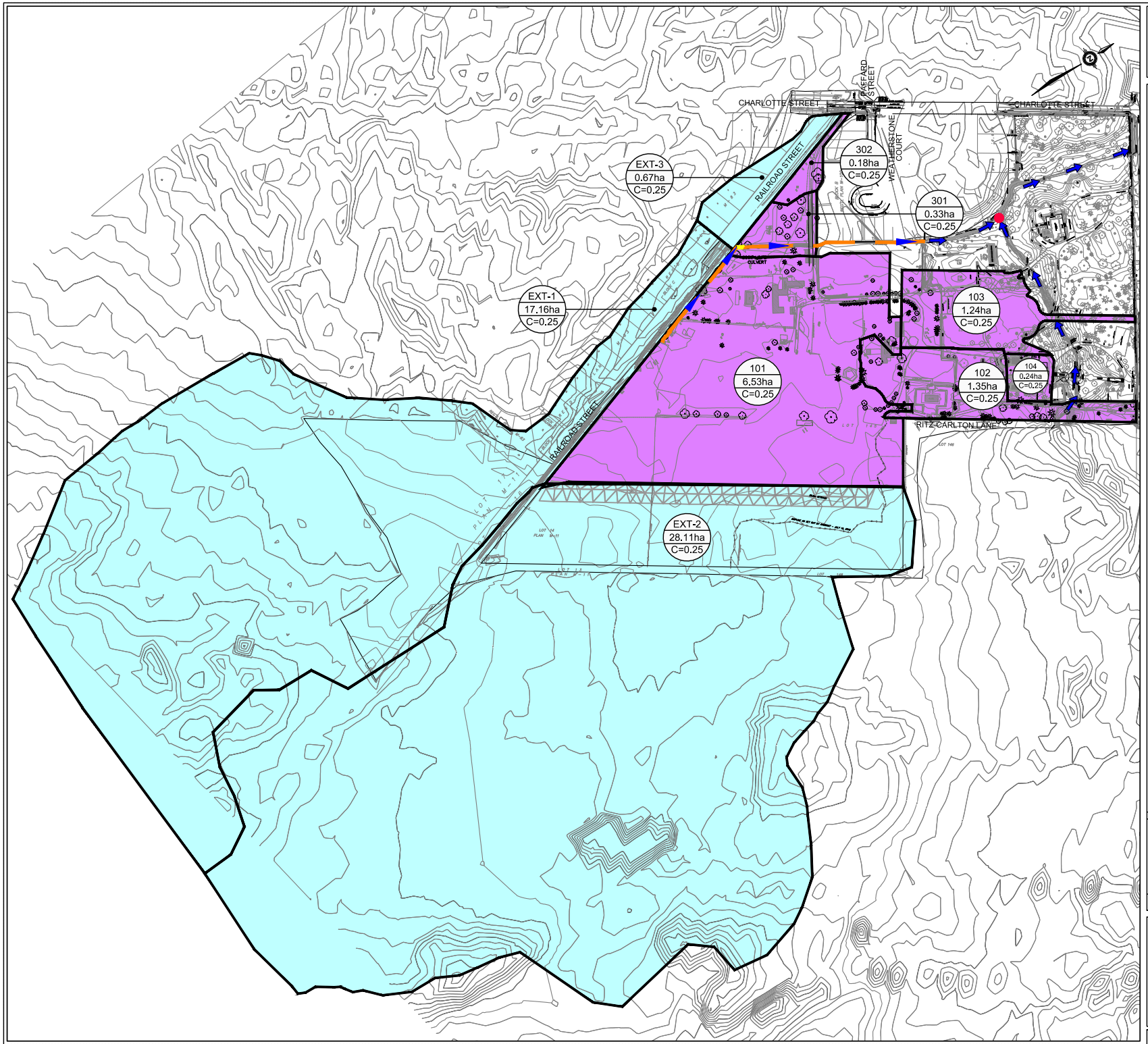
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FIGURE 4.1A
PRE-DEVELOPMENT DRAINAGE PLAN

2026-5625	APRIL 2026	SCALE: N.T.S.

W:\5600's\5625\Drawings\Drainage\2026-04-15-5625-Existing Drainage.dwg

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LEGEND

- EXISTING DRAINAGE BOUNDARY
- 0.03ha / C=0.25 — AREA IN HECTARES / RUNOFF COEFFICIENT
- EXISTING CONVEYANCE DITCH TO BE MAINTAINED
- EXISTING CREEK DRAINAGE
- CONFLUENCE NODE
- EXISTING INTERNAL DRAINAGE AREAS
- EXTERNAL EXISTING DRAINAGE AREAS

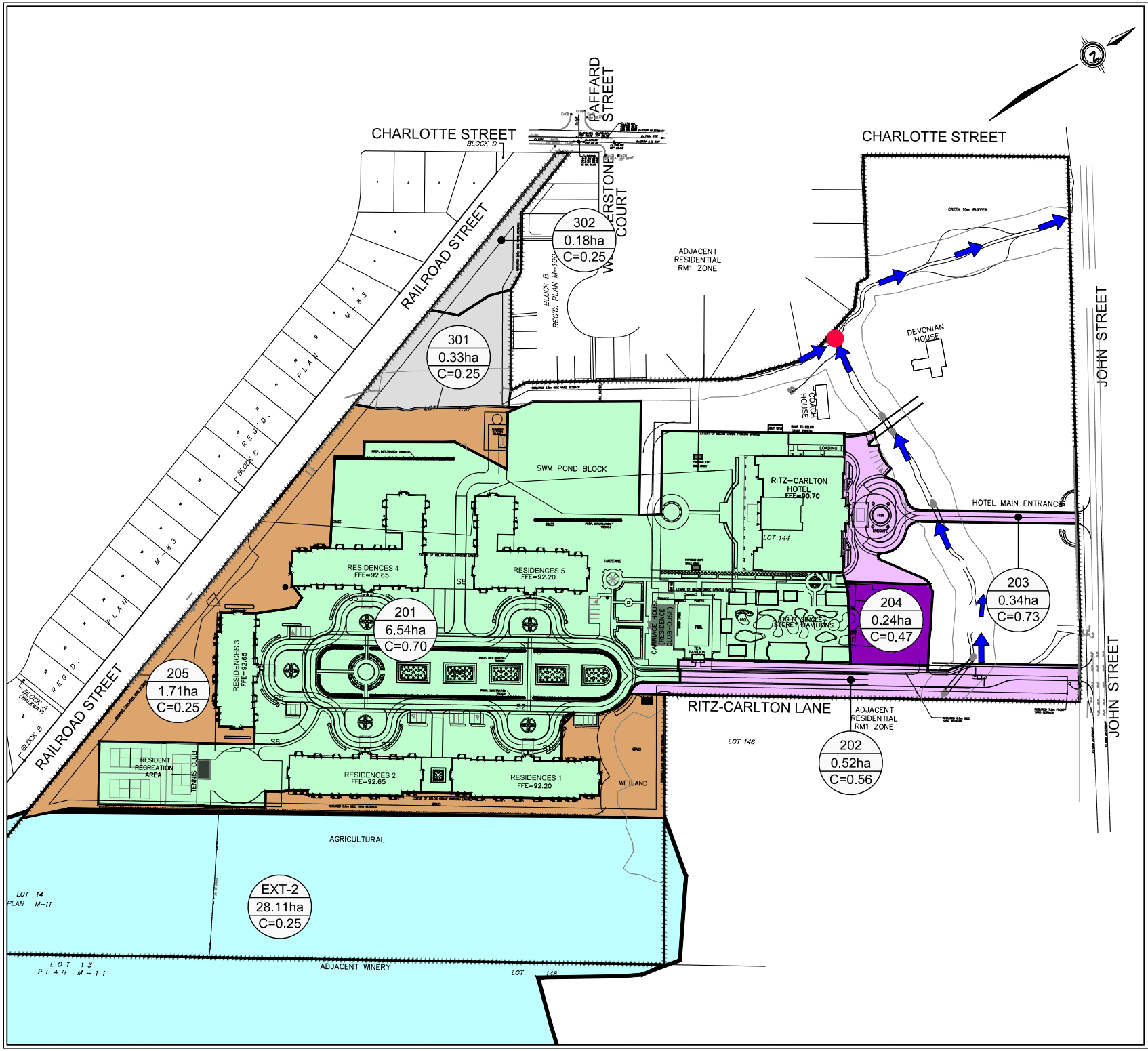
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FIGURE 4.1B
PRE-DEVELOPMENT EXTERNAL
DRAINAGE PLAN

2026-5625	APRIL 2026	SCALE: N.T.S.

W:\5600's\5625\Drawings\Services\2026-04-15-5625-Servicing.dwg

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LEGEND

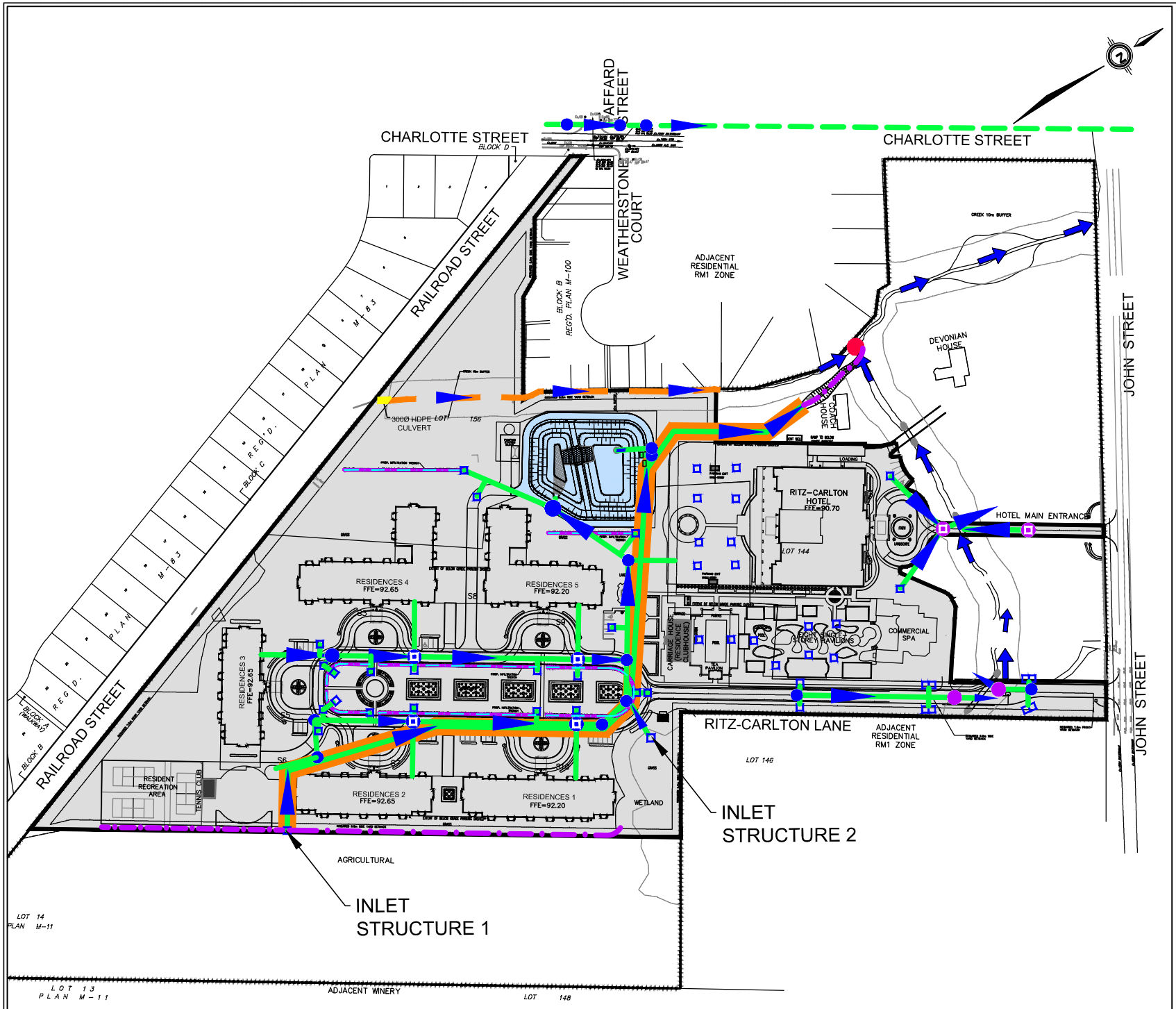
- CONTROLLED DRAINAGE AREA FROM SITE TO SWM POND
- UNCONTROLLED DRAINAGE FROM SITE TO DITCH
- EXISTING DRAINAGE TO ONE MILE CREEK
- UNCONTROLLED DRAINAGE FROM SITE TO ONE MILE CREEK
- EXTERNAL DRAINAGE PIPED TO CHANNEL
- UNDISTURBED DRAINAGE
- 201 / 6.54ha / C=0.59 — AREA ID, AREA IN HECTARES, RUNOFF COEFFICIENT
- EXISTING CREEK DRAINAGE
- CONFLUENCE NODE

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FIGURE 4.2
POST-DEVELOPMENT DRAINAGE PLAN

2026-5625	APRIL 2026	SCALE: N.T.S.

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LEGEND

- DEVELOPMENT AREA
- PROPOSED STORM SEWER
- PROPOSED SUPER PIPE
- EXISTING STORM SEWER
- PROPOSED SWM POND
- PROPOSED INFILTRATION TRENCHES WITH BIOSWALES
- PROPOSED SWALE
- EXISTING CONVEYANCE DITCH TO BE MAINTAINED
- PROPOSED OIL GRIT SEPARATOR
- EXISTING CREEK DRAINAGE
- CONFLUENCE NODE

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FIGURE 4.3
STORM SERVICING

2026-5625	APRIL 2026	SCALE: N.T.S.

5.0 PROPOSED SWM POND DESIGN

5.1 Contributing Drainage Area

The contributing drainage area from the site to the proposed SWM pond is illustrated in **Figure 4.3** is 6.54 ha with an imperviousness of 71%. Imperviousness calculations are presented in **Appendix D**.

5.2 Water Quality

Quality control will be provided by the proposed SWM pond's permanent pool. The permanent pool has been sized to provide 80% TSS removal for an 'enhanced' level of protection as per MOE's SWM manual (2003). **Table 5-2** breaks down the water quality provisions. Detailed calculations are provided within **Appendix D**.

Table 5-1: Permanent Pool Design Summary

Type of Facility	Wet Pond
Level of Protection	Enhanced (80%)
Drainage Area	6.54 ha
Weighted Imperviousness	71%
Permanent Pool Volume Requirement	186m^3/ha
	1,218 m^3
Permanent Pool Provided	**2,000 m^3**

5.3 Erosion Control

The required erosion control release rate and detention volumes for the SWM pond were determined as per NPCA criteria. Runoff from a 25mm 4-hour Chicago storm event is to be detained over a 24-hour period. The table below summarizes design parameters and detention volumes for the SWM pond. It should be noted that a 48-hour detention strategy has been pursued in order to provide additional erosion control. Detailed calculations are provided within **Appendix D**.

Table 5-2: Erosion Control Requirement

Drainage Area	6.54 ha
Average Outflow	0.007 m^3/s
Peak Outflow	0.010 m^3/s
Volume Requirement	1,190 m^3
Provided Erosion Control Storage	1,190 m^3

5.4 Forebay

The forebay has been designed to ensure it has sufficient settling and dispersion lengths as dictated by the MOE SWM manual. As per calculations, the required forebay length was determined to be 10 m. The provided length is 20m. Detailed calculations are provided in **Appendix D.**

5.5 Allowable Release Rate

Based on NPCA SWM design criteria, pre-development flows (2 to 100-year) are not to be exceeded during post-development conditions. To evaluate this, the confluence node, as shown in **Figures 4.1B** was chosen as the analysis point as it accounts for all flows from the subject site during pre-development conditions. However, it should be noted that only the external areas identified in **Figure 4.1B**, and the subject site property area contributing to this confluence point are modelled. Furthermore, it is noted that External Area 1, which is attenuated due to the opening in the stonewall, is excluded from the flow analysis, as the flows are not altered in this area. The total area to One Mile Creek from the south is not considered, as the hydrology model is not a Visual OTTHYMO model, and the conversion of parameters may not yield similar results. .

The three storm distributions checked in this analysis were the 3-hour Chicago, 12-hour AES and 24-hour SCS storm distributions, as per the NPCA SWM design criteria. SWM controls for the proposed SWM pond shall be designed to meet pre-development flows for all three design storms and all return periods at the downstream confluence node. The proposed SWM pond will be sized to provide sufficient storage for all storm cases.

Pre-development flows were determined using Visual OTTHYMO (VO) software. The site was modelled similarly to **Figure 4.1B,** which shows the pre-development drainage areas from the site and external areas. **Table 5-3** shows the pre-development flows at the confluence node for all storm events. These flows are not to be exceeded during post-development conditions. Detailed

calculations as well as VO outputs are provided in **Appendix D**.

Table 5-3: Pre-Development Flows at Node

Design Storm Event	*3HR Chicago*	*12HR AES*	*24 HR SCS*
2-year	0.311	0.334	0.584
5-year	0.433	0.538	0.786
10-year	0.535	0.690	0.963
25-year	0.697	0.894	1.231
50-year	0.827	1.052	1.433
100-year	0.973	1.216	1.664

5.6 Storage-Discharge Relationship

Release rates from the proposed SWM pond were determined to ensure that total flows at the confluence node are not exceeded as compared to pre-development flows, which were summarized in **Table 5-4**. SWM pond release rates have been adjusted to account for uncontrolled flows contributing to the confluence node. **Table 5-4** shows the required 100-year storage for all storm events. The maximum storage requirement was determined to be 3,955 m^3 for the 100-year 24hr SCS event. The pond has been sized to provide 4,940 m^3 of storage, exceeding the requirement. Detailed calculations and VO output results are provided in **Appendix D**.

Table 5-4: Storage Requirements

Design Storm Event	*12hr AES*		*24hr SCS*		*3hr Chicago*	
	Maximum Release (m^3/s)	*Volume (m^3)*	*Maximum Release (m^3/s)*	*Volume (m^3)*	*Maximum Release (m^3/s)*	*Volume (m^3)*
Erosion	0.0103	1190	0.0103	1190	0.0103	1190
2-year	0.0458	1619	0.0819	2055	0.0394	1543
5-year	0.0794	2025	0.1039	2468	0.0603	1795
10-year	0.0964	2329	0.1507	2774	0.0764	1988
25-year	0.1366	2682	0.1711	3280	0.0949	2299
50-year	0.1569	2929	0.1837	3663	0.1141	2535
100-year	0.1691	3230	0.2990	3955	0.1466	2747

5.7 Total Release Rates

The following table provides the total release rate at the confluence node during post-development conditions as compared to pre-development conditions. As can be seen from **Table 5-5**, the

post-development flows remain below pre-development flows for all storm events.

Table 5-5: Flows at Node

Storm	*3HR Chicago*		*12HR AES*		*24HR SCS*	
	Pre	*Post*	*Pre*	*Post*	*Pre*	*Post*
2-year	0.311	0.304	0.334	0.328	0.584	0.304
5-year	0.433	0.425	0.538	0.531	0.786	0.425
10-year	0.535	0.525	0.690	0.672	0.963	0.525
25-year	0.697	0.676	0.894	0.876	1.231	0.676
50-year	0.827	0.798	1.052	1.024	1.433	0.798
100-year	0.973	0.944	1.216	1.168	1.664	0.944

5.8 Emergency Conveyance

Emergency flows from the pond are proposed to be conveyed through the pond's outlet pipe. The outlet pipe has been appropriately sized (1.8 x 0.9m box culvert at 0.2%) to ensure it has sufficient capacity to convey the incoming 100-year flow. An emergency ditch inlet structure will be placed at the 100-year water elevation of the pond so that water exceeding this elevation is conveyed to the outlet pipe. The incoming 100-year flow was determined to be 2.500 m^3/s (24 HR SCS), where the outlet pipe has a capacity of approximately 3.949 m^3/s. The engineered channel downstream has been sized to provide sufficient conveyance. Preliminary sizing calculations, Flowmaster and VO outputs for the emergency outlet have been provided in **Appendix D** and will be confirmed at the detailed design stage.

6.0 UNCONTROLLED AND EXTERNAL DRAINAGE

6.1 Drainage Comparison

The site entrance (Catchment 202) and the hotel entrance (Catchment 203) will be conveyed towards One Mile Creek without on-site controls. The total contributing area is 0.52 ha with an imperviousness of 51% for the site entrance and 0.34 ha with an imperviousness of 75% for the hotel entrance, respectively.

As the hotel and spa areas are now being directed towards the pond when the natural outlet for these facilities is easterly towards the creek, the uncontrolled flows to the creek from each access road are expected to be lower compared to the pre-development flows. An AxC comparison for these areas was conducted. An AxC of 0.65 was calculated for the pre-development areas, and an AxC of 0.54 for the post-development areas. Therefore, no issues are expected by draining the entrances to One Mile Creek. Refer to **Appendix D** for calculations.

Furthermore, the proposed site will maintain "Randwood House" (Catchment 204) near the main entrance to the site. Flows from this property will drain to the creek without controls, as there are no alterations proposed for this location.

6.1.1 Quality Control

Quality control for these catchments (Catchments 202 & 203) will be provided by OGS units prior to entering the creek. Moreover, catchbasins along the site entrances will be equipped with CB shields and will be equipped with an extended sump for greater sediment retention to provide 80% TSS removal for an 'enhanced' level of protection as per MOE's SWM manual (2003). The OGS sizing will be provided during detail design. The combined TSS removal of OGS units (60% TSS) and CB shields (50% TSS) can achieve 80% TSS removal.

6.2 Ditch Drainage

External Drainage Area 1 (EXT-1) is conveyed to One Mile Creek via the existing ditch located along Railroad Street (Upper Canada Heritage Trail) and a ditch traversing the subject site to the north.

In post-development conditions, flows from the residential uncontrolled area (Catchment 205) and flows from landscape areas north of the ditch (Catchment 301) are to be drained through the ditch. A capacity analysis was conducted to ensure the ditch can convey the flows to One Mile Creek.

The total capacity of the ditch was calculated to be 600 L/s. The 100-year flows (24hr SCS storm) calculated were 174 L/s and 65 L/s for Catchment 205 and Catchment 301, respectively. The total flow to the ditch was determined to be 514 L/s when considering the above and the addition of 275 L/s of attenuated flow from EXT-1. Therefore, no capacity constraints are expected.

7.0 WATER BALANCE ANALYSIS

A water balance was prepared for the development area to determine the characteristics of water movement, including runoff and groundwater recharge under existing conditions. The subject development is not located within a Wellhead Protection Area (WHPA) or a significant groundwater recharge area (SGRA). However, the site is located within a highly vulnerable aquifer (HVA). As a result of the above, it is proposed that best efforts are made to match the post-development water balance to pre-development levels as required by the NPCA.

The following water balance analysis takes into account the site precipitation, evapotranspiration, infiltration, soil types, and land use. Through this analysis, we have demonstrated that the annual pre-development infiltration levels can be maintained during post-development conditions.

An annual precipitation of 880 mm/year and evapotranspiration of 640 mm/year were obtained for the site as per Cole Engineering Ltd.'s (Cole) Preliminary Hydrogeological Investigation Report (dated June, 2020) for the proposed development. The analysis made use of the Thornthwaite and Mather method was used alongside climate normals from the St. Catherines/Niagara District Airport Station (ID# 6137287) to estimate monthly potential infiltration.

The results of the following water balance analysis are summarized in **Table 7-1**. The analysis includes three specific scenarios: the pre-development level, the post-development level without mitigation and the post-development level with mitigation measures to promote increased infiltration.

The pre-development scenario is calculated as follows:

P - ET - Surplus = Infiltration + Runoff (Infiltration = Surplus x Infiltration Factor)

The post-development scenario (with mitigation) is calculated as follows:

- 10% of precipitation evaporates from roof (or roof runoff = 90% P) as commonly documented in surface hydrology modelling.
- Topsoil amendment provides 55% runoff reduction
- `le infiltration is calculated based on design capacity of the LID measures, given there is a sufficient amount of runoff being directed towards the LIDs.

Pre-development Water Balance

The pre-development water balance is based on the net developable area of the subject site. The landscape area is estimated to have a pre-development infiltration rate of 144 mm/year based on an infiltration factor of 0.6.

Post-development Water Balance

Furthermore, in the post-development condition an infiltration factor of 0.6 was applied for pervious area. The selected infiltration factors for post and pre-development water budgets are based on MOE's Stormwater Management Planning and Design Manual (MOE, 2003). Furthermore, the infiltration factors used for the analysis are representative of the site topography, underlying soils and land use.

Post-development (with Mitigation) Water Balance

In order to meet pre-development infiltration targets, the following mitigation methods are proposed:

- Additional/amended topsoil for green/landscape areas which are 300 mm in depth;
- Use of bioswales at strategic locations within the site to capture and infiltrate clean runoff;

As previously mentioned, the site has high groundwater and is considered a site with restrictions. The proposed land use also prevents subsurface infiltration due to underground parking and other mechanical systems underground. Hotel and Spa will employ a water retention and reuse strategy for water balance and it is discussed in the sub-section below in greater detail. A best fforts solution is therefore employed to maximize on site infiltration for the residential area. The proposed bioswales will capture runoff from grass areas and infiltrate. Any excess runoff will spill into catchbasins proposed along the swales and will be conveyed back into the catchbasins. The bio-swales will be equipped with a 0.50 m gravel trench underneath them. These gravel layers will be provided to have sufficient separation from the seasonal groundwater level, as well as maintaining a maximum 48-hour drawdown time. Preliminary LID calculations are provided in **Appendix D**.

The analysis reveals that the pre-development infiltration of 13,464 m^3/year can be met during post-development conditions using low impact developments (LIDs). Please refer to the calculations attached in **Appendix D** as well as **Figure 4.3** for the location of the proposed

bioswales.

Table 7-1: Summary of Water Balance

Pre-Development (m^3/year)	Post-Development (m^3/year)	Annual Deficit (m^3/year)	Post-Development Infiltration with LIDs (m^3/year)
13,464	7,667	5,797	10,406

As evident, there is a deficit in infiltration due to restrictions with LID implementation, and high groundwater. Given that the site is not located within a SGRA or a Wellhead Protection Area, this best-efforts solution is deemed reasonable. As no infiltration is feasible within the hotel and spa, a water retention re-use strategy is explored that will have a net benefit to the water balance and erosion control as well. Please note that possible water reuse for irrigation can also increase the overall infiltration on site, however it was not credited in the above calculation. Refer to **Appendix D** for calculations.

7.1 Water Retention and Re-use – Hotel and Spa

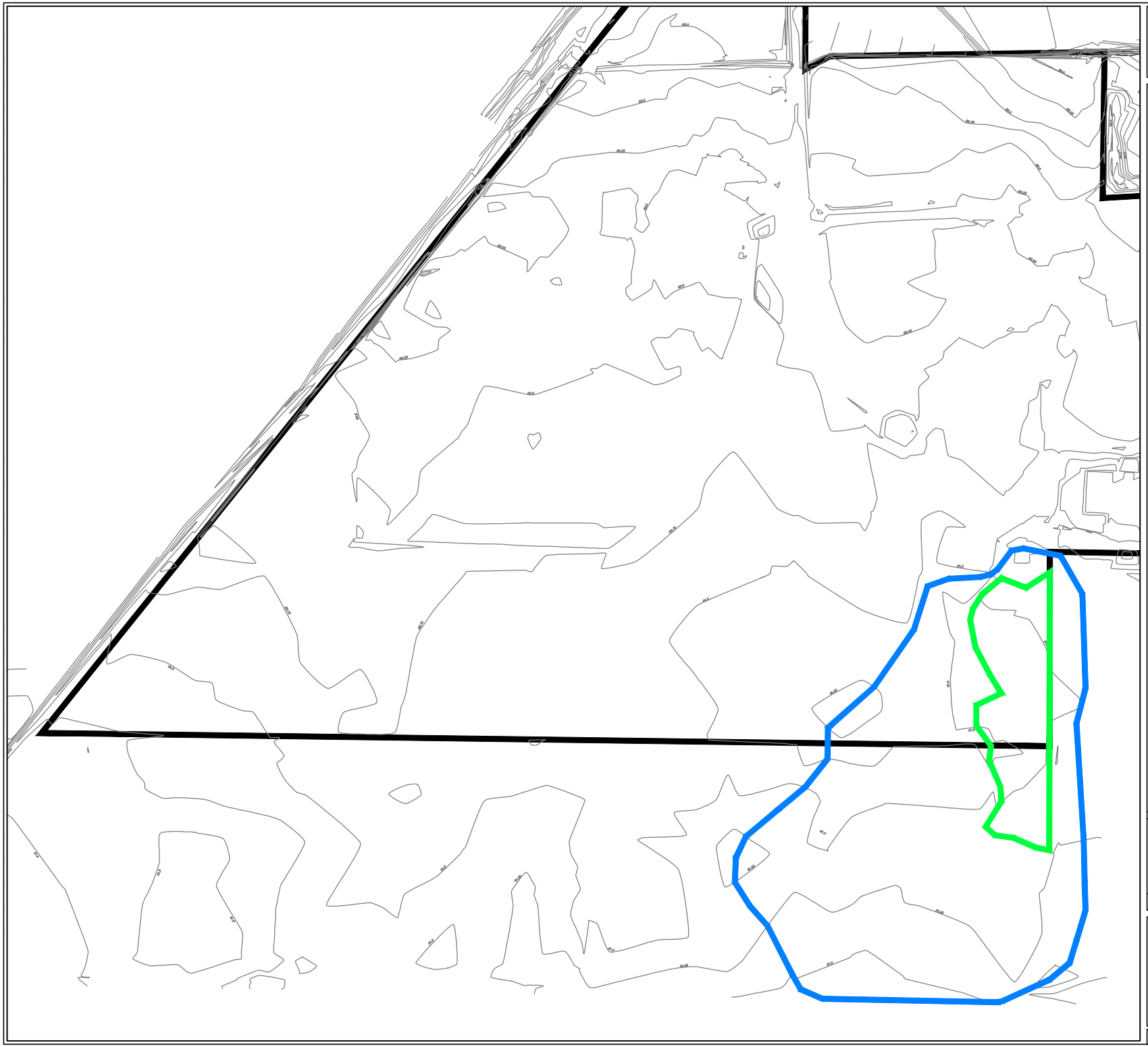
The hotel and spa areas are proposed to have a water retention and re-use tank to be located within the Underground parking structure of the hotel. The 5 mm retention requirement is calculated to 63.75 m^3 when accounting for the initial abstraction of the landscaping features from these areas and evaporation. This tank is proposed to 70 m^3 accounting for the net developable areas of the hotel and spa, including the entrance (1.88 ha x 5 mm x 0.75). At Water from clean water sources will be directed to this tank, so no pre-treatment is necessary. Potential water reuses will include irrigation, grey water, and mechanical cooling. The tank and the water reuse strategy will be detailed at the detailed design stage in coordination with the mechanical consultant, landscaping consultant and the architect.

8.0 EXISTING WETLAND

It has been identified that there is an existing wetland spanning about 0.23 ha in the northeast corner of the subject site. The wetland is not considered a Provincially Significant Wetland (PSW).

Under existing conditions, the wetland drainage area is approximately 1.57 ha, which is reduced to 1.55 ha under proposed conditions. As the areas are only 0.02 ha different, the surface runoff flow draining to the wetland is therefore expected to be similar to that of existing conditions. Refer to **Figure 8.1** and **Figure 8.2** for the wetland drainage delineation.

Raquel Soto



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LEGEND

SUBJECT AREA

EXISTING WETLAND BOUNDARY
AREA = 0.23ha

PROPOSED DRAINAGE AREA
AREA = 1.57ha
RUNOFF COEFFICIENT = 0.25

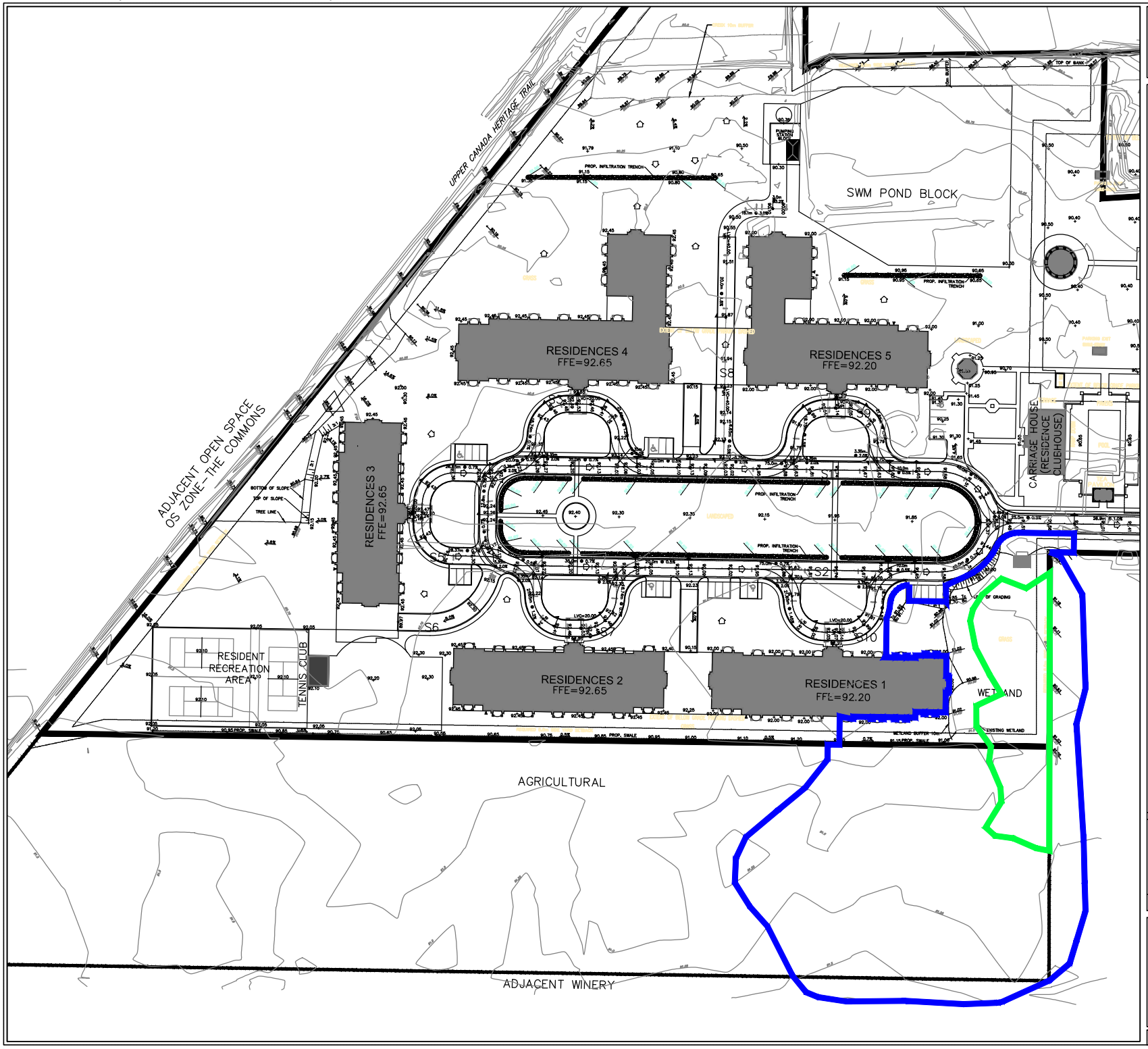
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FIGURE 8.1
EXISTING DRAINAGE TO WETLAND

2026-5625	APRIL 2026	SCALE: N.T.S.

W:\5600's\5625\Drawings\Wetlands\2026-03-24-5625-Wetland Proposed.dwg

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NIAGARA ON THE LAKE, ONTARIO

LEGEND

- SUBJECT AREA
- EXISTING WETLAND BOUNDARY
  AREA = 0.23ha
- PROPOSED DRAINAGE AREA
  AREA = 1.55ha
  RUNOFF COEFFICIENT = 0.25
- 91.08+ PROPOSED ELEVATION

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FIGURE 8.2
PROPOSED DRAINAGE TO WETLAND

2026-5625	APRIL 2026	SCALE: N.T.S.

9.0 CLI-ECA SWM CONSIDERATIONS

As previously noted, the site is constrained by high groundwater levels and low-permeability soils. Water reuse has been proposed within the Hotel and Spa area to help maximize water retention. However, achieving 10 mm or 25 mm retention targets is not considered practical due to limited reuse opportunities.

The residential area is currently incorporating infiltration measures to the greatest extent feasible. As such, a filter-based solution will be evaluated during the detailed design stage to treat water discharging from the proposed SWM pond. Given that the Ministry of the Environment, Conservation and Parks recognizes filter systems for water quality treatment, a filtration unit may be installed at the pond outlet to treat discharge prior to release to the receiving creek.

10.0 SUMMARY AND CLOSING REMARKS

This report has been prepared in support of the proposed subdivision located in the Town of Niagara-on-the-Lake.

Sanitary Servicing:

Sanitary servicing will be provided by a proposed pumping station, which will send flows to Charlotte Street. Sanitary modelling using the Town's existing model has been performed to confirm adequate capacity is available within the existing sanitary sewers along John Street East. Findings of this analysis have been provided in the attached Sanitary Analysis report.

Water Supply Servicing:

Water supply servicing will be provided via the existing infrastructure along Charlotte Street and John Street East. The results of the hydrant tests have been utilized to conduct the internal analysis for the site. It has been concluded that there is sufficient pressure to service the subject site.

Stormwater Management:

The report demonstrates that sufficient quantity, quality and erosion control can be provided by the proposed SWM Pond to service the development. Stormwater will be conveyed to the pond via the minor (storm sewers) and major (overland flow routes) systems. Flows will ultimately be discharged to One Mile Creek. The proposed SWM pond will provide sufficient flow attenuation to ensure flows at the downstream confluence node remain at or below pre-development levels for all storm events. Uncontrolled drainage to the creek will be below pre-development flow, and OGS and CB shields and deep sumps are provided for quality control. Water balance for the subject site is provided by a series of LID measures. Best efforts to maximize infiltration were provided. However, there is a deficit in infiltration due to restrictions on LID implementation and high groundwater. Given that the site is not located within an SGRA or a Wellhead Protection Area, this best-efforts solution is deemed reasonable. Furthermore, it is demonstrated that adequate runoff can be conveyed towards the existing wetland to the south to mimic existing hydrological conditions.

We trust that you will find the contents of this report satisfactory. Please contact the undersigned if you have any questions or concerns.

Respectfully Submitted,

SCHAEFFER & ASSOCIATES LTD.



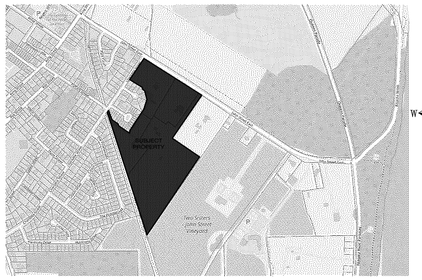
Raquel Jara Soto, EIT
Water Resources Analyst

Sadh Katukurunde, P.Eng.
Junior Associate

APPENDIX A

BACKGROUND

SCHAEFFERS
CONSULTING ENGINEERS



KEY PLAN

SCALE : NOT TO SCALE

LEGEND

ZONING

- GENERAL COMMERCIAL (GC) ZONE
- RESIDENTIAL (RD) ZONE PROPOSED 7.5.2.3.
- OPEN SPACE (OS) ZONE
- GENERAL COMMERCIAL ZONE LEASED
- WETLANDS

SITE WORKS

- PERIMETER OF BUILDING / PERIMETER OF COVERED (DASHED) / STRUCTURE / PERIMETER OF COVERED (DASHED) — BUILDING
- STRUCTURE (UNENCLOSED)
- EXISTING BUILDING
- PAVERS
- ASPHALT
- CONCRETE
- POOL
- CONCRETE CURB

UNHATCHED AREAS TO BE GRASS or LANDSCAPE
ALL SITE WORK NEW UNLESS NOTED OTHERWISE

(##) PARKING SPACES

CHARLOTTE STREET
JOHN STREET
RAILROAD STREET
WEATHERSTONE COURT
REGISTERED BLOCK A
REGISTERED PLAN M-83
PART 1, PLAN 30R-3422
PART 2, PLAN 30R-1792
LOT 1 P.I.N. 46404-0002
LOT 2 P.I.N. 46404-0003
LOT 3 P.I.N. 46404-0004
LOT 4 P.I.N. 46404-0005
LOT 5 P.I.N. 46404-0006
LOT 6 P.I.N. 46404-0007
LOT 7 P.I.N. 46404-0008
LOT 8
LOT 9
CREEK 10m BUFFER
EXISTING 100 YEAR FLOOD LINE
REQUIRED 6.0m SIDE YARD SETBACK
WETLAND 2
CREEK 15m BUFFER
SERVICE ACCESS GRAVEL
PUMPING STATION BLOCK ONE STOREY
STORM WATER DETENTION
PROVIDED SETBACK
RAMP TO BELOW GRADE PARKING
LOADING
ASPHALT
HOTEL FIVE STOREYS
PARKING EXIT SINGLE-STOREY
PAVILION SHELL-STORY
ENTRY FEATURE
LANDSCAPE
EXISTING GAZEBO
COMMERCIAL OUTDOOR SPA EIGHT SINGLE-STOREY PAVILIONS
COMMERCIAL SPA THREE STOREYS
(X)TERRACE
(X)ASPHALT PARKING REMOVED
(X)ASPHALT REPLACED WITH PAVERS
EXISTING HERITAGE RESTAURANT TWO STOREYS
EXISTING GAZEBO TO BE REMOVED
EXISTING BRIDAL SHOP TWO STOREYS
RESIDENCES 4 THREE STOREYS
RESIDENCES 5 THREE STOREYS
RESIDENCES 3 THREE STOREYS
RESIDENCES 2 THREE STOREYS
RESIDENCES 1 THREE STOREYS
CARRIAGE HOUSE (RESIDENCE CLUBHOUSE) TWO STOREYS
RESIDENT RECREATION AREA
TENNIS CLUB (NOT COVERED)
BATH PAVILION
WETLAND 1
WETLAND 3
RITZ-CARLTON LANE
BRICK PAVERS
PORTE-COCHERE
CONCRETE RAMP
EXTENT OF BELOW GRADE PARKING (DASHED)
4.5m WIDE FIRE ACCESS ROUTE
ADJACENT RESIDENTIAL RM1 ZONE
AGRICULTURAL
ADJACENT WINERY
30.0m SETBACK
DRIPLINE AS SET OUT BY ARBORIST – JULY 10, 2018
ADJACENT OS ZONE
WHISTLE STOP
RESIDENTIAL/AGRICULTURAL BOUNDARY
ESTABLISHED PLANTING LIMIT
LIMIT CONFIRMED BY PLAN BA-179
EX. GARBAGE DUMP
LOT 147
LOT 146
LOT 145
LOT 14
P.I.N. 46404 – 0207
P.I.N. 46404 – 0043
P.I.N. 46404 – 0039
P.I.N. 46404 – 0362
P.I.N. 46404 – 0363
P.I.N. 46404 – 0365
P.I.N. 46404 – 0366
P.I.N. 46404 – 0367
P.I.N. 46404 – 0368
P.I.N. 46404 – 0369
P.I.N. 46404 – 0370
P.I.N. 46404 – 0371
P.I.N. 46404 – 0372
P.I.N. 46404 – 0373
P.I.N. 46404 – 0374
P.I.N. 46404 –

KEY PLAN

SCALE : NOT TO SCALE

LEGEND

ZONING

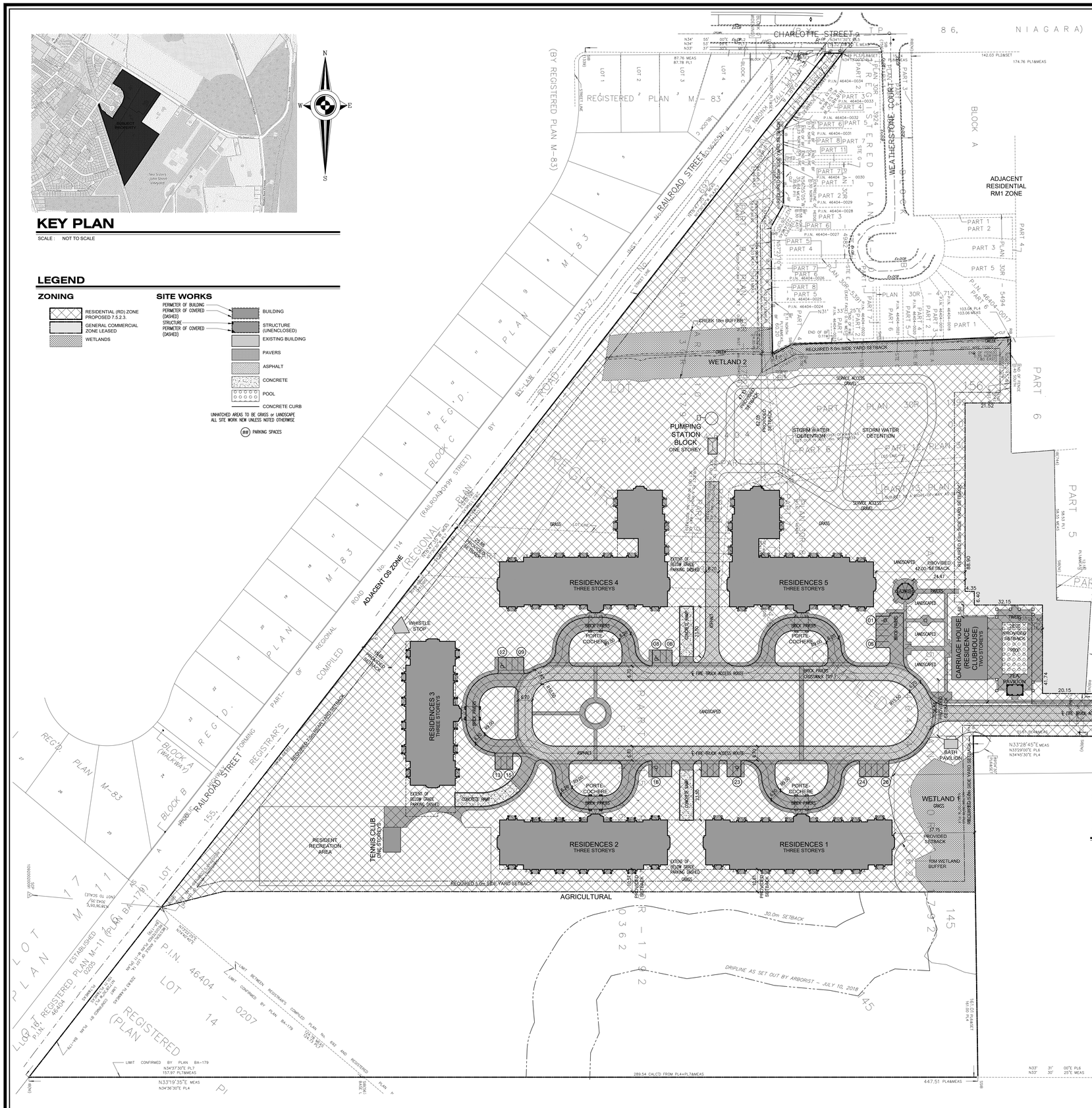
- RESIDENTIAL (RD) ZONE PROPOSED 7.5.2.3.
- GENERAL COMMERCIAL ZONE LEASED
- WETLANDS

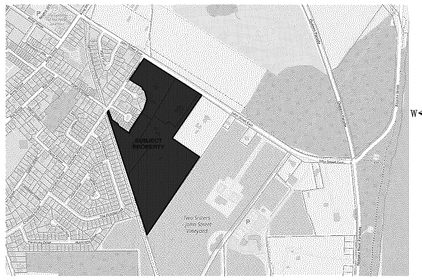
SITE WORKS

- PERIMETER OF BUILDING / PERIMETER OF COVERED (DASHED) STRUCTURE — BUILDING
- PERIMETER OF COVERED (DASHED) — STRUCTURE (UNENCLOSED)
- EXISTING BUILDING
- PAVERS
- ASPHALT
- CONCRETE
- POOL
- CONCRETE CURB

UNHATCHED AREAS TO BE GRASS or LANDSCAPE
ALL SITE WORK NEW UNLESS NOTED OTHERWISE

(##) PARKING SPACES


CHARLOTTE STREET
JOHN STREET
RAILROAD STREET
BY-LAW No. 1717-27
(BY REGISTERED PLAN M-83)
ADJACENT OS ZONE
REGISTERED PLAN M-83
REGISTERED PLAN 30R-1792
REGISTERED PLAN 30R-5494
REGISTERED PLAN 30R-5387
REGISTERED PLAN 30R-4712
REGISTERED PLAN 30R-5387 (EAST PART)
WEATHERSTONE COURT
BLOCK A
ADJACENT RESIDENTIAL RM1 ZONE
CREEK 18m BUFFER
TOP OF BANK
WETLAND 2
REQUIRED 5.0m SIDE YARD SETBACK
SERVICE ACCESS GRAVEL
PUMPING STATION BLOCK ONE STOREY
STORM WATER DETENTION
RESIDENCES 4 THREE STOREYS
RESIDENCES 5 THREE STOREYS
RESIDENCES 3 THREE STOREYS
RESIDENCES 2 THREE STOREYS
RESIDENCES 1 THREE STOREYS
CARRIAGE HOUSE (RESIDENCE CLUBHOUSE) TWO STOREYS
TENNIS CLUB ONE STOREY
RESIDENT RECREATION AREA
WHISTLE STOP
4 FIRE TRUCK ACCESS ROUTES
BRICK PAVER CROSSWALK (TYP.)
LANDSCAPED
PORTE-COCHERE
BRICK PAVERS
CONCRETE RAMP
EXTENT OF BELOW GRADE PARKING (DASHED)
RITZ-CARLTON LANE
BRIDGE
GATE
WETLAND 3
WETLAND 1
30M WETLAND BUFFER
BATH PAVILION
ADJACENT GENERAL COMMERCIAL ZONE 7.14.56
ADJACENT RESIDENTIAL RM1 ZONE
AGRICULTURAL
30.0m SETBACK
DRIPLINE AS SET OUT BY ARBORIST - JULY 10, 2018
REQUIRED 5.0m SIDE YARD SETBACK
REQUIRED 7.5m FRONT YARD SETBACK
EXISTING 100 YEAR FLOOD LINE
CREEK 10m BUFFER
PROVIDED SETBACK
285.05
37.76
P.I.N. 46404 - 0207
P.I.N. 46404 - 0209
LOT 14 REGISTERED PLAN 46404
LOT 17 PLAN M-111 (PLAN BA-179)
LOT 16 REGISTERED PLAN 46404
LIMIT CONFIRMED BY PLAN BA-179
LIMIT BETWEEN REGISTRAR'S COMPILED PLAN No. 692 AND REGISTERED PLAN 'A'
289.54 CALC'D FROM PL4+PL7&MEAS
447.51 PL4&MEAS
247.80 PL6&MEAS
142.03 PL2&SET
174.76 PL1&MEAS
87.76 MEAS
87.78 PL1
LOT 1
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PART 1
PART 2
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PART 11
PART 12
PART 13
PART 14
PART 15
PART 16
PART 17
PART 18
PART 19
PART 20
PART



KEY PLAN

SCALE : NOT TO SCALE

LEGEND

ZONING

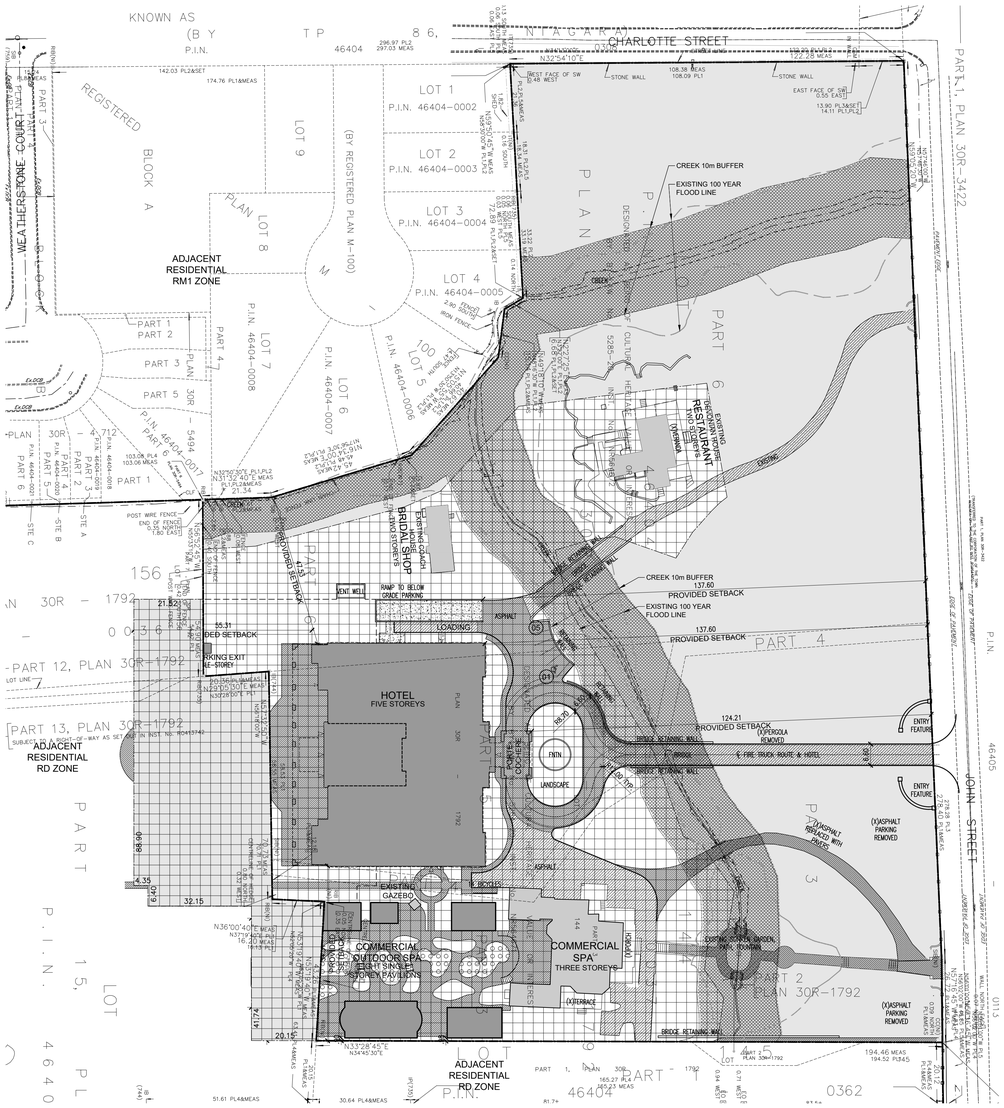
- GENERAL COMMERCIAL (GC) ZONE
- OPEN SPACE (OS) ZONE
- GENERAL COMMERCIAL ZONE LEASED
- WETLANDS

SITE WORKS

- PERIMETER OF BUILDING
- PERIMETER OF COVERED (DASHED)
- STRUCTURE
- PERIMETER OF COVERED (DASHED)
- BUILDING
- STRUCTURE (UNENCLOSED)
- EXISTING BUILDING
- PAVERS
- ASPHALT
- CONCRETE
- POOL
- CONCRETE CURB

UNHATCHED AREAS TO BE GRASS or LANDSCAPE
ALL SITE WORK NEW UNLESS NOTED OTHERWISE

(###) PARKING SPACES



ZONING SITE PLAN - GENERAL COMMERCIAL & OPEN SPACE

SCALE : 1:750

SITE STATISTICS

Ritz Carlton Hotel / Spa Site
144 and 176 John Street

			Proposed
PROPERTY AREA			
Property Area		53,262.42 m²	
Commercial Zoned Area			
Plus	Lease Lands from Ritz Carlton Residences Long Term 583 Charlotte Street and 200 John Street East	+4,751.56 m²	
Minus	Existing Open Space Zone	- 30,564.84 m²	
Total to be Zoned General Commercial Area			27,449.14 m²
BUILDING GROUND COVER			
	Ritz Carlton Hotel	3,587.73 m²	
	Rand Spa	769.57 m²	
	Outdoor Spa Pavilions	938.00 m²	
	Coach House	146.6 m²	
	Devonian House	253.73 m²	
Total Building Ground Cover			5,695.63 m²
BUILDING GROSS AREAS			
Ritz Carlton Hotel	Basement	2,350.71 m²	
	Underground Parking	7,159.17 m²	
	Ground Floor	3,587.73 m²	
	Second Floor	2,880.33 m²	
	Third Floor	2,880.33 m²	
	Fourth Floor	2,880.33 m²	
	Fifth Floor	2,927.77 m²	
	Mechanical Penthouse		
	Total		24,659.43 m²
Rand Spa	Basement	880.56 m²	
Existing Building	Ground Floor	769.57 m²	
	Second Floor	329.7 m²	
	Third Floor	312.85 m²	
	Widow's Walk	27.25 m²	
	Total		2319.93 m²
Outdoor Spa Pavilions		938 m²	
Coach House	Ground Floor	146.6 m²	
Existing Building	Second Floor	102.4 m²	
Total			249 m²
Devonian House	Ground Floor	253.73 m²	
Existing Building	Second Floor	253.73 m	
Total			507.46 m²
Total Gross Building Area			28,680.8 m²

SITE STATISTICS

Full Property	
Gross Building Ground Cover	5,695.63 m²
10.7% of Property	
Landscaped Area	45,085.06 m²
84.6% of Property	
Asphalt Area	2,481.73 m²
4.7% of Property	
Lands Zoned General Commercial	
Gross Building Ground Cover	5,695.63 m²
20.7% of G.C. Zone	
Landscaped Area	20,249.68 m²
73.8% of G.C. Zone	
Asphalt Area	1,503.83 m²
5.5% of G.C. Zone	

PARKING REQUIREMENTS

				VEHICLE PARKING REQUIRED		BICYCLE PARKING REQUIRED	
HOTEL COMPONENTS							
Hotel Rooms			111	1 per guestroom in addition to other uses	111 spaces	No requirements	0 spaces
		Seats	Area				
Restaurants	River View Restaurant	99	288.48 m²				
	Upper Banquet Room	240	336.45 m²				
	Grand Salon	39	169.57 m²				
	Private Lounge	34	40.9 m²				
	Lower Restaurant	118	87.3 m²				
	Lower Banquet Room	266	349.16 m²			Restaurants (375.78 m²)	
	Subtotal	738	1,271.86 m²	1 per 9m² GFLA	141 spaces	2 per 100 m² GFLA	7.52 spaces
Restaurant - Outdoor Patio		Seats					
		104	414.46 m²	1 per 30 m² GFLA of Outdoor Patio Area in addition to the requirements for a restaurant or take-out restaurant.	14 spaces	No requirements	0 spaces
Conference Rooms on Areas Used in Conjunction with Other uses							
	Meeting Room A		94.52 m²				
	Meeting Rooms B, C, D & E		187.99 m²				
	Conference Room		43.46 m²				
	Subtotal		325.97 m²	1 per 18.5 m² GFLA	18 spaces	No requirements	0 spaces
Office	Front Reception		69.26 m²				
	Human Resources		85.19 m²				
	Management and Marketing		231.04 m²				
	Accounting		84.13 m²			Offices	
	Subtotal		469.62 m²	1 per 28 m² GFLA	17 spaces	1 per 250 m² GFLA	1.88 spaces
Retail Sales	Wine Shop		38.20 m²				
	Gift Shop		25.70 m²			Commercial	
	Subtotal		63.9 m²	1 per 18.5 m² GFLA	4 spaces	1 per 200 m² GFLA	0.32 spaces
PROPERTY COMPONENTS							
Existing Rand Mansion - Conversion to Spa	Total GFLA of Mansion		2,086.43 m²				
	Area of to be Used as Spa (Other Areas Unoccupied)		1,260.86 m²	1 per 15 m² GFLA	85 spaces	No requirements	0 spaces
Outdoor Spa Pavilions	Combined Area of Pavilions		980.64 m²	1 per 15 m² GFLA	66 spaces	No requirements	0 spaces
Existing Devonian House						Restaurant	
- Ground Floor Conversion to Restaurant	Dining Area		178.50 m²	1 per 9 m² GFLA	20 spaces	2 per 100 m² GFLA	3.57 spaces
(Remainder Unoccupied)	Outdoor Covered Porch Area		188.27 m²	1 per 30 m² GFLA of Outdoor Patio Area	6 spaces	No requirements	0 spaces
Existing Coach House						Commercial	
- Ground Floor Conversion to Bridal Shop (Remainder Unoccupied)	Ground Floor to be Used Only (Second Storey Unoccupied)		135 m²	1 per 18.5 m² GFLA	8 spaces	1 per 200 m² GFLA	0.68 spaces
TOTAL PARKING REQUIRED					484 spaces		14 spaces
PARKING PROVIDED						**BICYCLE PARKING**	14 Provided
Surface				Barrier Free Standard 2.75x6.0 m	1 spaces		
					4 spaces		
Underground				Barrier Free Standard 2.75x6.0 m	8 spaces		
					209 spaces		
TOTAL PARKING PROVIDED					222 spaces		

EXISTING SITE-SPECIFIC GENERAL COMMERCIAL 7.14.56 ZONING RELIEF TABLE

BY-LAW 7.14.56	BY-LAW REQUIREMENT	PROVIDED	BY-LAW RELIEF REQUESTED
a) Minimum Lot Frontage	300.0 m	305.12	None
b) Minimum Lot Depth	120 m	121 m	None
c) Minimum Landscaped Open Space	50%	73.8 %	None
d) Maximum Lot Coverage	12%	20.7 %	None
e) Minimum main building setbacks in accordance with Figure 7.14.56Fii	93.75 m	137.6 m	None
f) Minimum vehicular access ramp setback	30.48 m	137.6 m	None 8.09 m
g) Maximum building height	17.35 m	24.74 m	
h) Maximum seating capacity for restaurant	200 seats	99 seats River View Restaurant 240 seats Upper Banquet Room 39 seats Grand Salon 34 seats Private Lounge 118 seats Lower Restaurant 266 seats Lower Banquet Room 786 seats Total	600 seats
i) Maximum number of rooms for the hotel	106	111	5 rooms
j) Maximum ground floor area of all buildings in the commercial zone	4,181 m²	5,695.6 m²	1,600 m²
k) Maximum floor area of the spa	185.8 m²	1,707.6 m²	400 m²
l) Maximum ground floor area of Arts & Learning Center	1250 m²	Not Applicable	None
m) Devonian House: No other commercial use shall be permitted except for a maximum of 8 guest rooms associated as part of the hotel use		Restaurant	Restaurant Use to be permitted

Peter J. Lesdow architect
4855 Drummond Road, Unit 11, Niagara Falls, Ontario L2E 6C5
telephone 905.357.0112 e-mail plesdow@cogeco.net
ONTARIO ASSOCIATION OF ARCHITECTS
PETER J. LESDOW LICENCE 3745

ZONING PLAN GENERAL COMMERCIAL & OPEN SPACE
144 & 176 John St

DATE	REVISIONS
Apr. 07/ 36	FOR REZONING

RITZ-CARLTON DEVELOPMENT
144, 176 & 200 John St, 856 Charlotte St
Niagara-on-the-Lake

DATE: Nov. 18/ 22
SCALE: 1:100
DRAWN BY: MRW
CHECK BY: PJL

22 – 13

A103

Town of Niagara-on-the-Lake Correspondence and Population Estimates

Town of Niagara-on-the-Lake Development Charges Background Study

May 17, 2018

Watson & Associates ECONOMISTS LTD.

Plaza Three
101–2000 Argentia Rd.
Mississauga, Ontario
Canada L5N 1V9

Phone: (905) 272-3600

Fax: (905) 272-3602

e-mail: info@watson-econ.ca

www.watson-econ.ca

Planning for growth

3. Planning Period

- Short- and longer-term time horizons are required for the D.C. process. The D.C.A. limits the planning horizon for certain services, such as parks, recreation and libraries, to a 10-year planning horizon. Roads and fire services utilize a long-term forecast period.

4. Population in New Units (Appendix A - Schedules 2 through 9)

- The number of housing units to be constructed in the Town of Niagara-on-the-Lake during the short-term and long-term periods is presented on Figure 3-2. Over the buildout period, the Town is anticipated to average 163 housing units annually.
- Population in new units is derived from Schedules 3, 4a, 4b, 4c, and 5, which incorporate historical development activity, anticipated units (see unit mix discussion) and average persons per unit by dwelling type for new units.
- Schedule 8 summarizes the average number of persons per unit (P.P.U.) for the new permanent residential housing units by age and type of dwelling, based on 2016 custom Census data. P.P.U. data for low dwelling units was derived based on 2016 Census data for Town of Niagara-on-the-Lake as outlined in Schedule 8a. Due to data limitations, medium and high-density P.P.U.s were derived from Niagara Region as outlined in Schedule 8b. The 25-year average P.P.U.'s by dwelling type are as follows:
    - Low density (Town of Niagara-on-the-Lake): 2.632
    - Medium density (Niagara Region): 2.160
    - High density (Niagara Region): 1.705

5. Existing Units and Population Change (Appendix A - Schedules 2 through 5)

- Existing households as of 2018 are based on the 2016 Census households, plus estimated residential units constructed between 2016 and 2018, assuming a 6-month lag between construction and occupancy (see Schedule 3).
- The decline in average occupancy levels for existing housing units is calculated in Schedules 3 through 5, by aging the existing population over the forecast period. The forecast population decline in existing households over the 2018 to buildout forecast period is estimated at approximately 1,750.

management was also enhanced in the policies.

8.2 Design Criteria and Level of Service Objectives

In addition to the above noted policies, this document provides summary detail on the water and wastewater design criteria used under the Master Servicing Plan. The design criteria outlines the methodology and values used to estimate growth related flows as well as the decision making rationale related to infrastructure capacity and the trigger for upgrades. Detailed design criteria is provided in Appendix 2C.

8.2.1 Water Demand Design Criteria

The Master Servicing Plan Update has used the following design criteria to project water demands, determine capacity requirements and establish the water infrastructure program:

- Residential Average Day Demand: 300 Lpcd
- Employment Average Day Demand: 300 Lped

- Maximum Day Factors: based on rolling average for each system from last 5 years
- Residential Peak Hour Factor: 4
- Employment Peak Hour Factor: 2

8.2.2 Wastewater Flows Design Criteria

The Master Servicing Plan Update has used the following design criteria to project wastewater flows, determine capacity requirements and establish the wastewater infrastructure program:

- Residential Average Day Demand: 275 Lpcd
- Employment Average Day Demand: 275 Lped
- Peak Factor based on Harmon formula with values between 2 and 4 with consideration to the catchment area performance
- Utilize an extraneous flow rate of 0.286 L/ha/s as the wet weather level of service for triggering and sizing Regional wastewater infrastructure

Hotel Block Servicing Brief

Functional Servicing Report

Two Sisters Resort /
Randwood Estate Re-development

144 & 176 John Street
Niagara-on the-Lake, Ontario

APPENDIX C

Sanitary Sewage Calculations

Two Sisters Resort / Randwood Estate Redevelopment
144 & 176 John Street, Niagara-on the-Lake

Servicing Brief

Appendix C - Sanitary Sewer Design Calculations

Design Parameters for Sanitary Sewer Servicing

No. of Hotel/Residential Units	145
Design Flow per Room	300 L/day
Conference Centre Occupancy	515
Design Flow per Conference Attendee	30 L/day
Restaurant Occupancy	60 seats
Design Flow per Restaurant Seat	300 L/day
Estimated Day Spa Demand	4,500 L/day
Average Domestic Sewage Flow	**81,450 L/day**
Peaking Factor	4.5
Peak Domestic Sewage Flow	**4.24 L/s**
Infiltration allowance (2 ha @ 0.10 L/s/ha)	**0.20 L/s**
TOTAL PEAK DESIGN FLOW	**4.44 L/s**

Available Grade Confirmation for Contemplated Future Gravity Sewer

Proposed hotel first floor elevation – 90.80 m

Proposed gravity sewer elevation at proposed hotel building – 89.25 m

Length of gravity sewer through proposed residential subdivision and corridor along recreational trail – 575 m

Minimum grade for proposed 200 mm Ø gravity sanitary sewer – 0.35%

Estimated # of maintenance holes – 9, with 0.03 m drop at each MH

Elevation drop through gravity sewer from proposed hotel building to outlet on Charlotte Street at Paffard Street – 2.57 m

Proposed Easterly Sewer Invert Charlotte at Paffard – 86.97 m

Existing West Invert Sanitary Sewer at Paffard – 86.22 m

Thus, there is adequate grade for gravity sewer to service first floor and above of the proposed multi-storey hotel building.

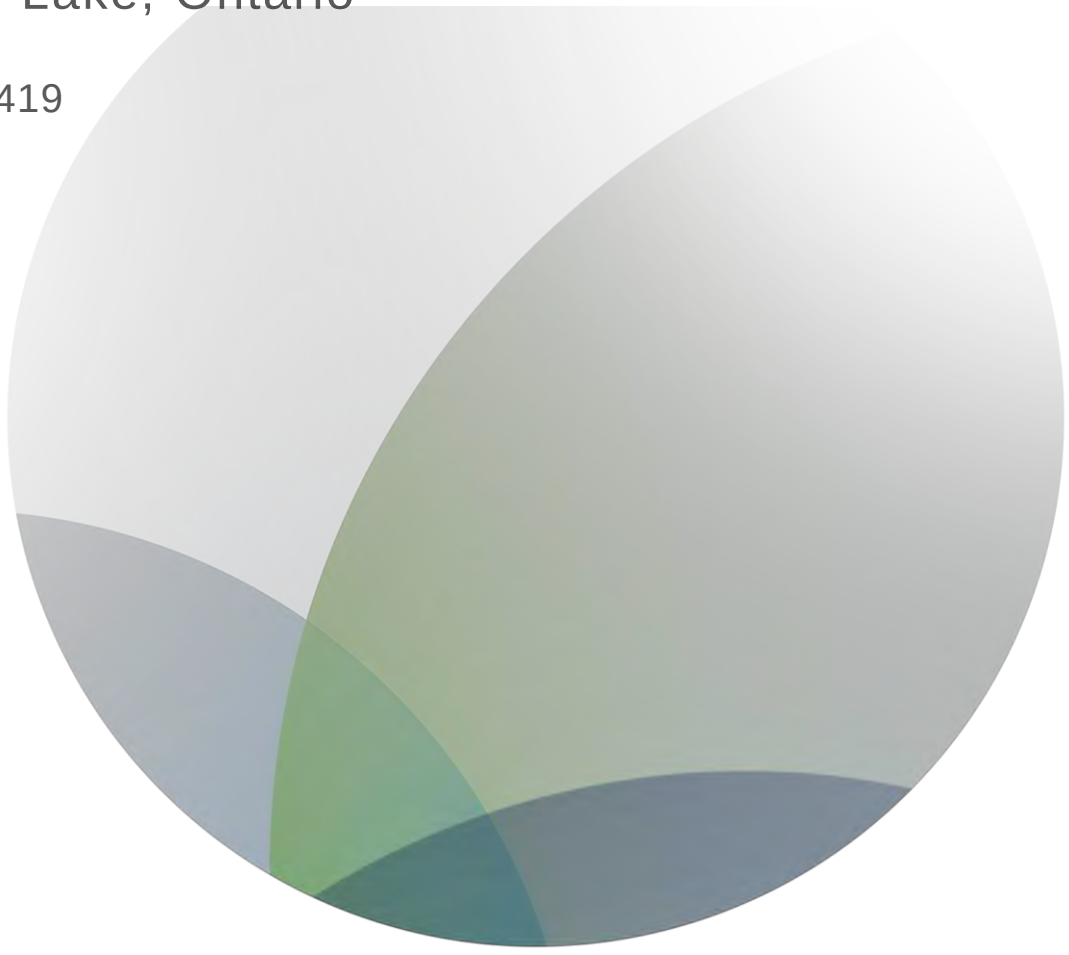
Cole Engineering Hydrogeological Investigation Excerpts

Solmar (Niagara 2) Inc.

HYDROGEOLOGICAL INVESTIGATION

200 John Street and 588 Charlotte Street, Niagara-on-the-Lake, Ontario

Project No. 2018-0419



COLE ENGINEERING GROUP LTD.

HEAD OFFICE
70 Valleywood Drive Markham, ON L3R 4T5
T. 905 940 6161 | 416 987 6161 **F.** 905 940 2064
www.coleengineering.ca

June 2020

June 30, 2020
Reference No. 2018-0419

Luis Correia
Solmar (Niagara 2) Inc.
122 Romina Drive
Concord, ON L4K 4Z7

Attention: Mr. Correia

Hydrogeological Investigation Report
Proposed Development at 200 John Street and 588 Charlott Street,
Niagara-on-the-Lake, ON

Cole Engineering Group Ltd. (COLE) is pleased to submit the enclosed hydrogeological investigation report for the site located at 200 John Street and 588 Charlotte Street, Niagara-on-the-Lake, ON. This investigation includes a review of the hydrogeological information collected from the site, characterization of the geological and hydrogeological setting, assessment of potential impacts due to the proposed development, and proposed mitigation measures.

Should you have any questions or comments, please do not hesitate to contact the undersigned.

Best Regards,
COLE ENGINEERING GROUP LTD.

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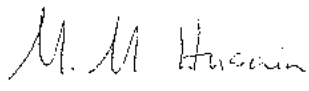
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Issues and Revisions Registry

Identification	Date	Description of issued and/or revision
Draft Report	27 November 2018	For internal review
Draft Report	30 November 2018	For client review
Final Report	4 October 2019	For client review
Final Report (minor site plan updates)	30 June 2020	For client review

Statement of Conditions

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Executive Summary

Cole Engineering Group Ltd. ("COLE") was retained by Solmar (Niagara 2) Inc. to undertake a hydrogeological investigation in support of the proposed residential development 220 John Street and 588 Charlotte Street, Niagara-on-the-Lake, ON (the "Site").

The Site is situated in the Iroquois Plain physiographic region, and falls under the jurisdiction of the Niagara Peninsula Conservation Authority ("NPCA"). Regional mapping indicates that the Site is not located within Wellhead Protection Area ("WHPA") or Significant Recharge Area ("SGRA"). However, the Site is located within a highly vulnerable aquifer ("HVA").

At a regional scale, groundwater flows to the north towards Lake Ontario. Four (4) monitoring events were completed from September 27, 2018 to August 21, 2019 to assess groundwater levels at the Site. Groundwater elevations were generally higher in the southern portion of the Site and at a lower elevation in the northern portion of the Site. Shallow groundwater flow appears to augment the direction of regional groundwater flow and surface topography and flows in a northeasterly direction towards Lake Ontario.

Single-well hydraulic tests were conducted in three (3) on-site monitoring wells to determine the in-situ hydraulic conductivity (K) of the screened overburden materials. The in-situ K values were estimated to range from 1.1×10^{-6} m/s to 2.5×10^{-8} m/s.

Two (2) groundwater samples were collected from two (2) on-site monitoring wells. The results were compared against the Provincial Water Quality Objectives ("PWQO"). Based on the laboratory analysis, the results met the applicable criteria with the exception of minor exceedances of total cobalt and total uranium.

A small tributary has been mapped across the northern portion of the Site. No stream flow was observed at the monitoring station during the four (4) monitoring events. A mini-piezometer nest station was installed to assess potential interaction between the groundwater system and on-site watercourse. The downward vertical hydraulic gradient estimates obtained at mini-piezometer nest indicates that that the stream is not groundwater fed.

Potential impacts to the groundwater system associated with the proposed development include reduction in infiltration, lowering of the groundwater levels in the overburden, and the potential introduction of preferential pathways for contaminants. Based on the results of a preliminary water balance analysis for the Site, an infiltration reduction of 12,075 m^3/year is anticipated as a result of the proposed development without any mitigation.

Low Impact Development ("LID") measures (e.g., underground infiltration trenches, grassed or dry swales, and green roofs) may be proposed and designed at the detailed design stage to address the infiltration deficit and match pre-development infiltration. The use of collars or other methods to restrict preferential movement of groundwater along the subsurface infrastructure corridors are recommended to preserve the existing groundwater flow regime. Furthermore, road salt application at the proposed development should be managed to minimize sodium and/or chloride loading to the shallow groundwater system.

4.2.1 Groundwater Levels

Each monitoring well was developed prior to measuring the water level by removing a minimum of three (3) well volumes of water to clear any silt or drilling debris from the sandpack and well casing. Four (4) monitoring events were conducted from September 27, 2018 to August 21, 2019 to assess groundwater levels at the Site. Monitoring data are presented in **Table 4.1**.

Table 4.1 Water Level Measurements

Well ID	Ground Elevation (masl)	Depth to bottom (mbgs)	27 Sep 18		16 Nov 18		29 March 19		21 Aug 19	
			mbgs	masl	mbgs	masl	mbgs	masl	mbgs	masl
MW1-S	91.50	6.2	2.14	89.36	1.78	89.72	1.27	**90.23**	1.40	90.10
MW1-D	91.50	9.3	2.24	89.26	1.86	89.64	1.33	90.17	1.45	90.05
MW2	91.10	6.3	4.12	**86.98**	3.76	87.34	2.46	88.64	3.06	88.04
MW7	90.50	6.6	2.57	87.93	2.55	87.95	1.81	88.69	2.03	88.47

Notes:
mbgs meters below ground surface
masl meters above sea level

A review of the groundwater level measurements indicates that the groundwater level ranges from 90.23 masl (1.27 mbgs) to 86.98 masl (4.12 mbgs). The highest observed groundwater level (90.23 masl) was measured at MW1-S on March 29, 2019 and the lowest observed water level (86.98 masl) was measured at MW2 on September 27, 2018.

Based on our conceptual understanding of the local hydrogeology, monitoring wells are considered to be screened within the unconfined overburden and the water levels recorded from the monitoring wells are interpreted to be representative of the shallow groundwater table.

4.2.2 Groundwater Flow

At a regional scale, groundwater is expected to flow north or northeast towards Lake Ontario and / or the Niagara River (Waterloo Hydrogeologic, 2005). Based on the groundwater levels collected during the four (4) monitoring events, shallow groundwater flows in a northeast direction and is consistent with the direction of the regional groundwater flow.

The vertical hydraulic gradient was also estimated at a monitoring well nest (MW1D/MW1S). **Table 4.2** below summarizes the calculated vertical hydraulic gradient at the well nest for the water level monitoring events conducted from September 27, 2018 to August 21, 2019.

Table 4.2 Estimated Vertical Hydraulic Gradient at onsite Monitoring Wells

Well Nest	Vertical Hydraulic Gradient (m/m)			
	27-Sep-18	16-Nov-18	29-March-19	21-Aug-19
MW1D/MW1S	0.04	0.03	0.02	0.02

Notes:

Well Nest	Vertical Hydraulic Gradient (m/m)			
	27-Sep-18	16-Nov-18	29-March-19	21-Aug-19

Negative values indicate an upward gradient; positive values indicate a downward gradient.

Based on the available water level measurement collected between September 27, 2018 and August 21, 2019, the vertical hydraulic gradient at the MW1D/MW1S well nest was determined to be neutral to downward.

4.2.3 Hydraulic Conductivity

Single-well hydraulic tests were conducted by COLE on September 27 and 28, 2018 in three (3) monitoring wells. These tests were carried out to estimate the in-situ hydraulic conductivity (K) of the screened overburden materials.

During each hydraulic test, a known volume of water was displaced from the well by either inserting a slug or removing water. The recovery was measured either manually or using a data logger until a minimum of 80% recovery was achieved. Hydraulic conductivity estimates were obtained using the Hvorslev method (1951). Estimated K values are presented in **Table 4.3**. Details of the Hvorslev method and a summary of Hvorslev calculations are presented in **Appendix C.**

Table 4.3 Estimated Hydraulic Conductivity

Well ID	Well Diameter (m)	Screen Length (m)	Screen Unit	K (m/s)
MW1-D	0.05	3	Sandy Silt Till/Shale	1.1×10^{-6}
MW2	0.05	3	Sandy Silt Till	2.5×10^{-8}
MW7	0.05	3	Sandy Silt Till	5.4×10^{-8}

The in-situ K values estimated using the Hvorslev method range from 1.1×10^{-6} m/s to 2.5×10^{-8} m/s. Overall, the estimated hydraulic conductivities are within the range for the types of materials (sandy silt till) in which the shallow monitoring wells were screened (Freeze and Cherry, 1979).

4.2.4 Groundwater Quality

COLE collected two (2) groundwater samples on September 28, 2018 from two (2) on-site monitoring wells (MW1-D and MW2). The collected samples were sent to Maxxam Analytics for analyses of metal and inorganic criteria. Analytical results were compared to Provincial Water Quality Objectives ("PWQO"). Results are summarized in **Table 4.4** below. The laboratory analytical results and Certificate of Analysis are included in **Appendix D**.

Table 4.4 Groundwater Quality Results

Parameter	Units	PWQO Guidelines	MW1-D	MW2
Inorganics				
Total Ammonia	mg/L	20	0.051	0.25

Appendix B

Geotechnical Borehole Logs

JOB NO.: 1807-S136

LOG OF BOREHOLE NO.: 1

FIGURE NO.: 1

PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 200 John Street and 588 Charlotte Street
Town of Niagara-on-the-Lake

DRILLING DATE: August 14. 2018

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
91.5	Ground Surface							
0.0	**18 cm TOPSOIL**	1	DO	6	0		15	
	Brown, firm, weathered **SILTY CLAY**							
90.8 / 0.7	Brown, compact to very dense	2	DO	28	1		12	
		3	DO	65	2		12	
	SANDY SILT	4	DO	50/13			11	
		5	DO	50/8	3		12	
87.5 / 4.0	Brown to reddish-brown, very dense				4			
		6	DO	69	5		9	
	SANDY SILT TILL occ. wet sand and silt seams and layers, cobbles and boulders	7	DO	80	6		12	
83.7		8	DO	50/10	7		9	
7.8	Reddish-brown **SHALE BEDROCK** (weathered)				8			
82.2		9	DO	50/8	9		6	
9.3	**END OF BOREHOLE** Installed 50 mm Ø monitoring wells to 6.1 m and 9.1 m (nest wells) provided with a steel protective casing				10			
					11			
					12			

W.L. @ El. 85.7 m on completion

Soil Engineers Ltd.

JOB NO.: 1807-S136

LOG OF BOREHOLE NO.: 1

FIGURE NO.: 1

PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 200 John Street and 588 Charlotte Street
Town of Niagara-on-the-Lake

DRILLING DATE: August 14, 2018

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) / Shear Strength (kN/m²) / Penetration Resistance (blows/30 cm)	Atterberg Limits PL LL / Moisture Content (%)	WATER LEVEL
91.5	Ground Surface							
0.0	**18 cm TOPSOIL**	1	DO	6	0		15	
90.8	Brown, firm, weathered **SILTY CLAY**							
0.7	Brown, compact to very dense	2	DO	28	1		12	
		3	DO	65	2		12	
	SANDY SILT	4	DO	50/13			11	
		5	DO	50/8	3		12	
87.5								
4.0	Brown to reddish-brown; very dense	6	DO	69	4		9	
	SANDY SILT TILL occ. wet sand and silt seams and layers, cobbles and boulders	7	DO	80	5		12	
83.7		8	DO	50/10	6		9	
7.8	Reddish-brown **SHALE BEDROCK** (weathered)				7			
82.2		9	DO	50/8	8		8	
9.3	**END OF BOREHOLE** Installed 50 mm Ø monitoring wells to 6.1 m and 9.1 m (nest wells) provided with a steel protective casing				9			
					10			
					11			
					12			

W.L. @ El. 85.7 m on completion

Soil Engineers Ltd.

JOB NO.: 1807-S136

LOG OF BOREHOLE NO.: 2

FIGURE NO.: 2

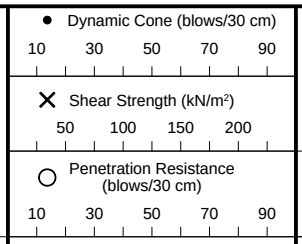
PROJECT DESCRIPTION: Proposed Residential Development

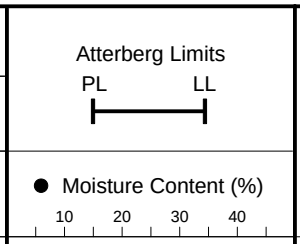
METHOD OF BORING: Flight-Auger

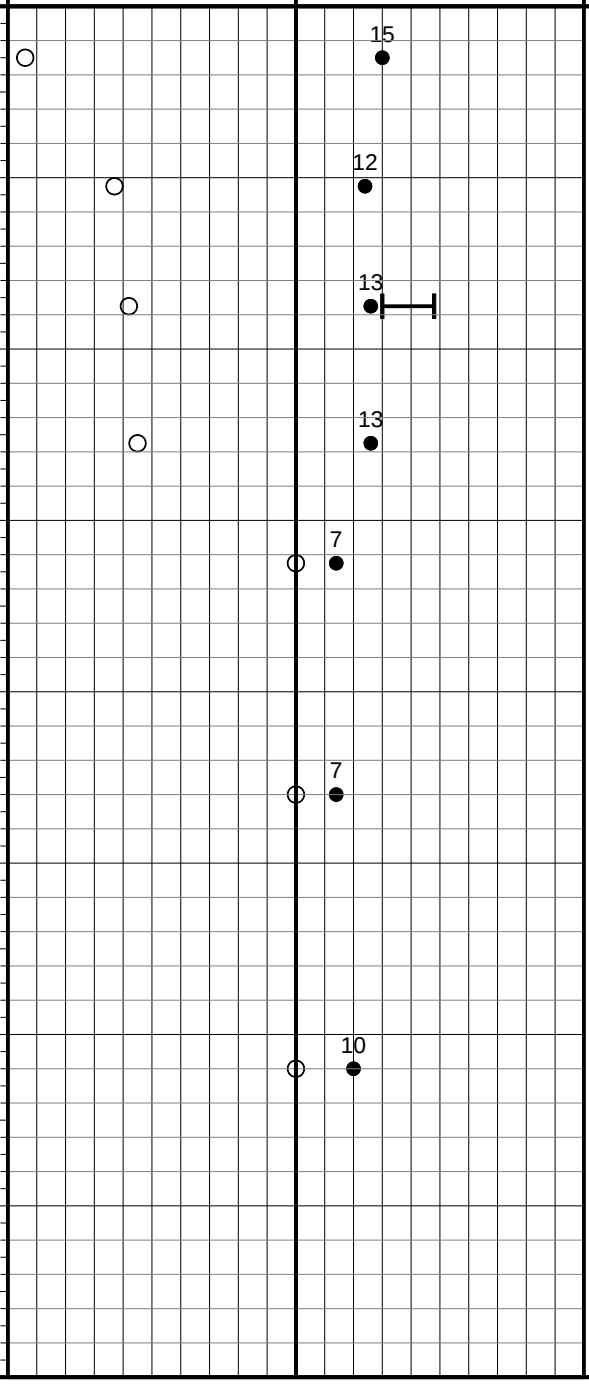
PROJECT LOCATION: 200 John Street and 588 Charlotte Street
Town of Niagara-on-the-Lake

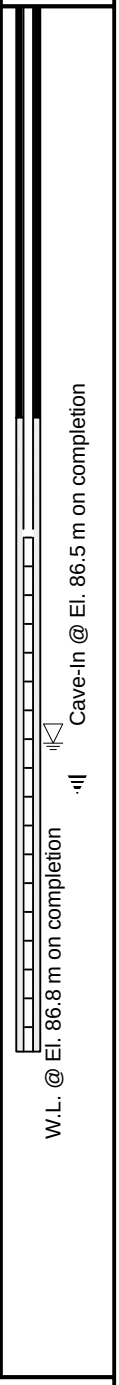
DRILLING DATE: August 14. 2018

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)
91.1	Ground Surface				
0.0	**20 cm TOPSOIL**				0
	Brown, firm, weathered	1	DO	6	
90.4	**SILTY CLAY**				
0.7	Brown, hard	2	DO	37	1
	SILTY CLAY TILL				
	occ. wet sand and silt seams and layers, cobbles and boulders	3	DO	42	2
		4	DO	45	
88.2					
2.9	Reddish-brown, very dense	5	DO	50/13	3
	SANDY SILT TILL				4
	occ. wet sand and silt seams and layers, cobbles and boulders	6	DO	50/15	5
85.3					
5.8	Reddish-brown **SHALE BEDROCK** (weathered)	7	DO	50/8	6
84.8					
6.3	**END OF BOREHOLE**				7
	Installed 50 mm Ø monitoring well to 6.1 m provided with a steel protective casing				8









Soil Engineers Ltd.

JOB NO.: 1807-S136

LOG OF BOREHOLE NO.: 3

FIGURE NO.: 3

PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 200 John Street and 588 Charlotte Street
Town of Niagara-on-the-Lake

DRILLING DATE: August 14. 2018

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
91.0	Ground Surface							
0.0	**23 cm TOPSOIL**				0			Dry on completion
	Brown, stiff, weathered	1	DO	11			12	
90.3	**SILTY CLAY**							
0.7	Brown, very stiff							
	SILTY CLAY TILL	2	DO	24	1		13	
89.6								
1.4	Brown to reddish-brown, dense to very dense	3	DO	58			12	
					2			
		4	DO	50/13			13	
					3			
	SANDY SILT TILL	5	DO	45			12	
	occ. wet sand and silt seams and layers, cobbles and boulders				4			
		6A	DO				10	
		6B	DO	50			8	
					5			
					6			
84.7		7A	DO				11	
6.3	Reddish-brown	7B	DO	50/13			7	
84.4	**SHALE BEDROCK**							
6.6	**END OF BOREHOLE**				7			
					8			

JOB NO.: 1807-S136

LOG OF BOREHOLE NO.: 4

FIGURE NO.: 4

PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 200 John Street and 588 Charlotte Street
Town of Niagara-on-the-Lake

DRILLING DATE: August 16. 2018

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
90.6	Ground Surface							
0.0	**15 cm TOPSOIL**				0			
	Brown, firm, weathered	1	DO	6			16	
	SILTY CLAY	2	DO	7	1		17	
89.2								
1.4	Brown, compact to dense	3	DO	19			14	
	SANDY SILT	4	DO	37	2		20	
87.7								
2.9	Grey, stiff	5	DO	16	3		16	
	SILTY CLAY							
86.6								
4.0	Reddish-brown, dense to very dense	6	DO	35	4		11	
	SANDY SILT TILL				5			
					6			
84.3		7	DO	50/10			10	
6.3	**END OF BOREHOLE**				7			
					8			

W.L. @ El. 87.6 m on completion
Cave-in @ El. 85.4 m on completion

Soil Engineers Ltd.

JOB NO.: 1807-S136

LOG OF BOREHOLE NO.: 5

FIGURE NO.: 5

PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 200 John Street and 588 Charlotte Street
Town of Niagara-on-the-Lake

DRILLING DATE: August 16. 2018

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
90.4	Ground Surface							
0.0	**10 cm TOPSOIL**				0			Dry on completion
	Brown, stiff to very stiff	1	DO	12			12	
	weathered							
	SILTY CLAY	2	DO	21	1		17	
89.0								
1.4	Brown, very dense							
	SANDY SILT	3	DO	50/13	2		11	
88.3								
2.1	Brown, hard							
	SILTY CLAY	4	DO	50/13			10	
	brown / grey							
	occ. wet sand and silt seams and layers	5	DO	50/13	3		10	
86.4								
4.0	Reddish-brown, very dense				4			
	SANDY SILT TILL	6	DO	50/13	5		11	
	occ. wet sand and silt seams and layers, cobbles and boulders							
		7	DO	50/13	6		8	
83.8								
6.6	**END OF BOREHOLE**				7			
					8			

JOB NO.: 1807-S136

LOG OF BOREHOLE NO.: 6

FIGURE NO.: 6

PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 200 John Street and 588 Charlotte Street
Town of Niagara-on-the-Lake

DRILLING DATE: August 15. 2018

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
90.4	Ground Surface							
0.0	**8 cm TOPSOIL**				0			
	Brown, compact to dense	1	DO	16			10	
	SANDY SILT	2	DO	50	1		10	
89.0								
1.4	Brown, very dense	3	DO	62	2		13	
		4	DO	50/10			13	
	SANDY SILT TILL	5	DO	50/13	3		13	
	occ. wet sand and silt seams and layers, cobbles and boulders				4			
		6	DO	50/10			9	
					5			
					6			
		7	DO	70			15	
83.8								
6.6	**END OF BOREHOLE**				7			
					8			

Dry on completion

Soil Engineers Ltd.

JOB NO.: 1807-S136

LOG OF BOREHOLE NO.: 7

FIGURE NO.: 7

PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 200 John Street and 588 Charlotte Street
Town of Niagara-on-the-Lake

DRILLING DATE: August 14. 2018

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
90.5	Ground Surface							
0.0 0.1	**15 cm TOPSOIL** Brown, compact, weathered **SANDY SILT**	1	DO	11	0		8	
89.8 0.7	Compact to very dense	2	DO	17	1		11	
		3	DO	54	2		12	
	SANDY SILT TILL occ. wet sand and silt seams and layers, cobbles and boulders	4	DO	50/15	3		9	Dry on completion
		5	DO	50/13	4		9	
	brown / grey	6	DO	50/13	5		8	
		7	DO	66	6		11	
83.9 6.6	**END OF BOREHOLE** Installed 50 mm Ø monitoring well to 6.1 m provided with a steel protective casing				7 8			

Soil Engineers Ltd.

JOB NO.: 1807-S136

LOG OF BOREHOLE NO.: 8

FIGURE NO.: 8

PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 200 John Street and 588 Charlotte Street
Town of Niagara-on-the-Lake

DRILLING DATE: August 15. 2018

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
90.3	Ground Surface							
0.0	**15 cm TOPSOIL**	1	DO	18	0		8	Dry on completion
	Brown **EARTH FILL** sandy silt with rock fragments and brick debris	2	DO	30	1		10	
88.9 1.4	Brown to reddish-brown, very dense	3	DO	50/15	2		9	
		4	DO	50/13			8	
	SANDY SILT TILL occ. wet sand and silt seams and layers, cobbles and boulders	5	DO	50/15	3		8	
		6	AS	50/15	4 5		11	
84.9 5.4	**END OF BOREHOLE** **Refusal to augering** **Inferred bedrock or boulders**				6 7 8			

Soil Engineers Ltd.

JOB NO.: 1807-S136

LOG OF BOREHOLE NO.: 9

FIGURE NO.: 9

PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 200 John Street and 588 Charlotte Street
Town of Niagara-on-the-Lake

DRILLING DATE: August 16. 2018

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
90.1	Ground Surface							
0.0	**18 cm TOPSOIL**	1	DO	9	0		11	
	Brown, loose to dense weathered							
	SANDY SILT	2	DO	21	1		15	
		3	DO	32			15	
88.0					2			
2.1	Brown, dense **SANDY SILT TILL**	4	DO	36			27	
87.2								
2.9	Grey, hard **SILTY CLAY TILL** occ. wet sand and silt seams and layer, cobbles and boulders	5	DO	73	3		10	
		6	DO	37	4		11	
84.3					5			
5.8	Reddish-brown, very dense **SANDY SILT TILL**	7	DO	50/13	6		9	
83.5								
6.6	**END OF BOREHOLE**				7			
					8			

W.L. @ El. 88.0 m on completion

Soil Engineers Ltd.

Preliminary Erosion Assessment

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WATER RESOURCES ANALYST
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From: Boucher, Noel <nboucher@savanta.ca>
Sent: November 23, 2021 5:09 PM
To: Fedor Tchourkine <ftchourkine2@schaeffers.com>
Cc: Rino Solmar Mostacci <rino@solmar.ca>; Giuseppe Paolicelli <giuseppe@solmar.ca>; Smith, Ian <ismith@geiconsultants.com>; Hubbard, Rick <rhubbard@savanta.ca>; Giancarlo Volpe <GVolpe@schaeffers.com>
Subject: 200 John & 588 Charlotte - One Mile Creek Erosion Threshold Assessment

Hi Fedor,

Our fluvial geomorphologist (Ian Smith, copied on this email) has completed the on-site visit and analysis for the erosion threshold assessment of One Mile Creek to assist in the SWM design.

His observations and recommendations are provided below.

Please don't hesitate to follow up with us if you have any questions regarding this.

Thanks,
Noel

<u>One Mile Creek Channel Reaches on the Subject Property</u>:

- There are three distinct reaches that cross the Solmar properties (144, 176 and 200 John Street and 588 Charlotte Street):
    - Reach 1 - One Mile Creek (approximately 640 metres in length), flowing onto the 200 John Street property from 210 John Street, not flowing at the time of site visit but with some pockets of standing water,
    - Reach 2 - Tributary of One Mile Creek (reach H1-S4 in the EIS) and associated upstream headwater ditches (approximately 260 metres in length total), flowing northerly from the Promenade residential development (thus, may include possible stormwater outlet(s) from The Promenade development), observed to be flowing slightly at the time of the site visit. This channel is very confined by revetement walls at the rear yards of the homes on Weatherstone Court and Christopher Street, and
    - Reach 3 - Primary One Mile Creek channel flowing north (approximately 200 metres in length) to exit the subject property at John Street, downstream from the confluence of the Tributary of One Mile Creek (Reach 2). Flow was observed to be low within the upper end of this channel (stage and velocity) and very slow through a low gradient online wetland feature that forms the northern end of this reach (just upstream from the property boundary at John Street).

- Approximate Drainage Areas for each of the three reaches noted above:
    - Reach 1 (from 210 John Street) = 17.48 ha (NPCA watershed/subwatershed mapping),
    - Reach 2 (Tributary of One Mile Creek and upstream headwater ditch) = 45.52 ha (NPCA), and
    - Reach 3 (primary One Mile Creek channel within Solmar lands) = 1.97 ha (NPCA) + contribution of 63.32 ha from the two reaches noted above. Total contributary drainage area for the channel outlet at John Street is approximately 65.29 ha.

- As the upstream reaches are either poorly defined (Reach 1) or almost entirely confined (Reach 2), a channel characterization was only undertaken for the primary channel of Reach 3. The representative cross section was selected at a location just upstream of the online wetland feature, where the bankfull channel was well defined and flowing freely (Easting = 656,406 m, Northing = 4,789,864 m) and natural processes appear to be giving rise to the channel as it currently exists. Channel morphology metrics at this location are summarized as follows:
    - Bankfull Width (W_{BF}) = 2.95 m,
    - Bankfull Depth (D_{BF}) = 0.24 m,
    - Flood Prone Depth (D_{FP}) = 2 x D_{BF} = 0.48 m,
    - Flood Prone Width (W_{FP}) = 43 m (compared to 'Riverine Floodplain Mapping' from NPCA of 16 m),
    - Entrenchment Ratio = 14.6:1 (very slightly entrenched),
    - Wetted Perimeter at Bankfull Stage (WP_{BF}) = 3.14 m,
    - Cross Sectional Area at bankfull Stage (A_{BF}) = 0.71 m^2,
    - Hydraulic Radius at Bankfull (R_{BF}) = A_{BF}/WP_{BF} = 0.23 m
    - Longitudinal slope = 0.017 m/m or 1.7%
    - Soils within the channel are "Not Mapped" (Ontario Soil Mapping), but adjacent to Tavistock (glaciolacustrine brunisolic luvisol) and Beverley soils (gleyed brunisolic luvisol). In-situ examination of the channel bed indicates that a thin layer of silt lies atop cohesive (sticky) clay soils, likely of the nearby mapped Beverley Soil complex. Manning's n (friction) in the vegetated channel is thus likely n = 0.040, and
    - Preliminary bankfull (aka 'channel forming') velocity estimate via Manning's equation: $v_{BF} = (1/n)(R_{BF}^{2/3})(S^{1/2}) = (1/0.040)(0.23^{2/3})(0.017^{1/2}) = 1.22$ m/s.

<u>One Mile Creek Rapid Geomorphic Assessment (RGA) for the three Reaches</u>:

- Data have been collected for each reach; however, the analysis has not yet been completed; thus, the current regime status has not yet been calculated or evaluated (although, visual inspection suggests that Reach 3 is 'in-regime' at the present time).

<u>One Mile Creek Representative Cross Section Threshold for Erosion (per Fischenich's "Stability Thresholds for Stream Restoration Materials", ERDC TN-EMRRP-SR-29, May 2001)</u>:

- For the thin silt layer atop the clay bed:
    - The 'Permissible Velocity' to avoid erosion is approximately 0.61 m/s, suggesting that the (noncolloidal) silt particles are presently mobilized during bankfull (channel forming) events that exhibit an average channel velocity of 1.22 m/s. Indeed, silt particles are likely regularly being moved through the system at a frequency of less than bankfull (1:1.2-year to 1:2-year recurrence).
    - The channel should not be designed to retain silt at all. This could lead to fouling and eventually cross-sectional instability and long profile decrease in the form of systemic aggradation.
    - Final design should ensure that bankfull velocity remains above 0.61 m/s.

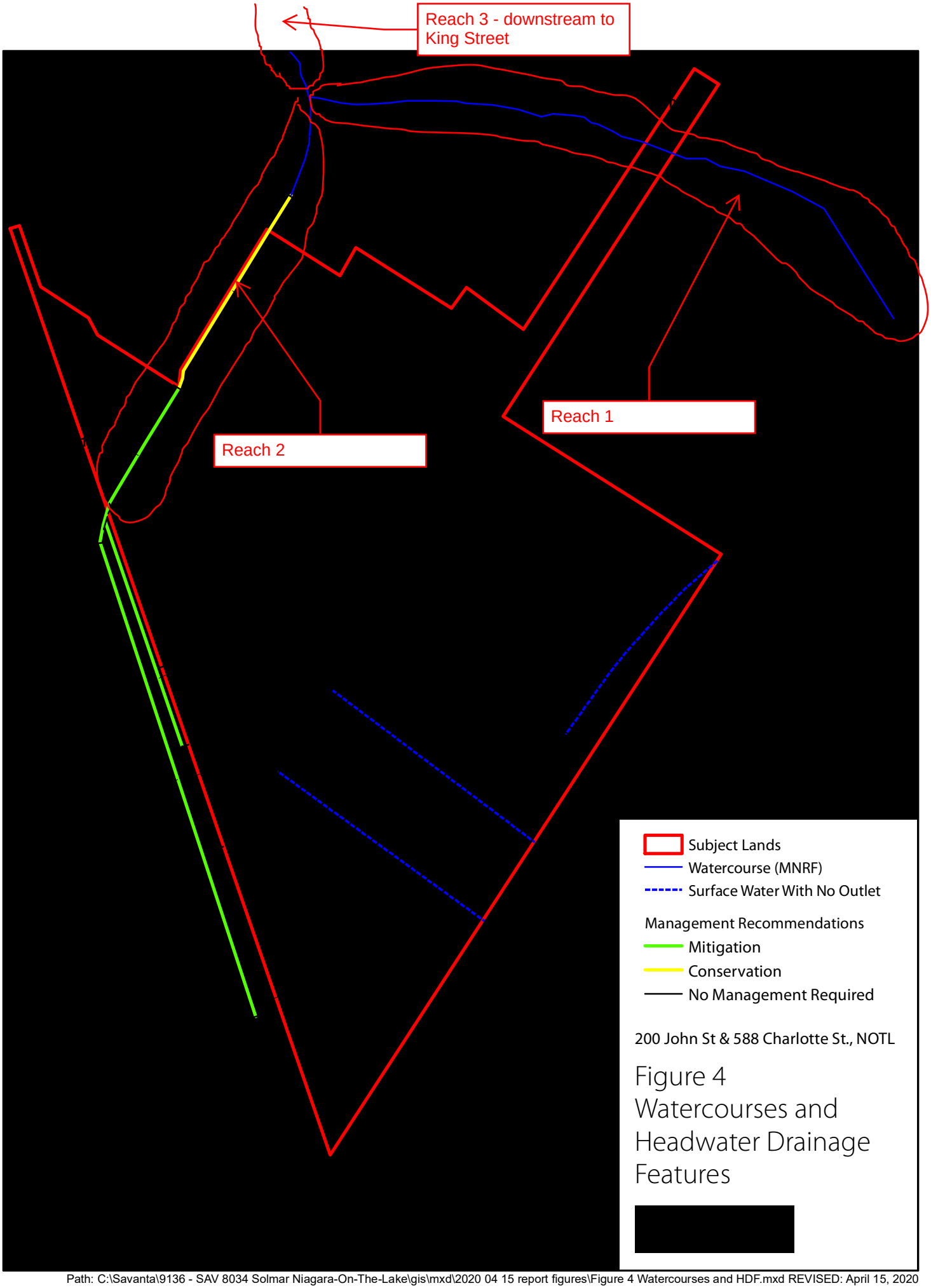
- For the underlying Beverly Soils (cohesive clay soils):
    - The 'Permissible Velocity' to avoid erosion ranges from approximately 0.91 m/s to 1.38 m/s. As the stream is currently only slightly entrenched, it is likely that the higher permissible velocity is appropriate, where the estimated bankfull discharge velocity of 1.22 m/s does not exceed the permissible velocity of 1.38 m/s. This suggest that the stream bed and banks are likely currently stable

at the examined cross section (geomorphically in-regime); however, this will be corroborated with the RGA effort yet to be finalized as noted above.

- To ensure that the clay bed of the channel is not compromised, channel velocity during the bankfull/bank forming event (1:1.2-year to 1:2-year recurrence) must be limited to no more than 1.38 m/s. Ensuring channel velocity does not exceed the existing bankfull estimate of 1.22 m/s will provide a factor of safety (FS = 1.13).

- SWM Outlet(s) to the natural channel of One Mile Creek within the Solmar Property should thus be designed to not exceed a bankfull (1:2-year recurrence) velocity of 1.22 m/s:
  - This can be readily achieved at the SWM Discharge/Channel Confluence interface point by using bio-engineered eco-hydraulics structures such as naturalized plunge pools and stilling basins/constructed wetlands. Careful design of these structures can also provide high quality natural habitat and increase abutting property values.
  - Consideration should also be given for distributing SWM storage through the proposed development by de-centralizing structures such as bioswales and soil/tree gallery systems. This will serve to reduce discharge pressure and thus velocity via distributing storage locations. Such an approach can also provide high quality natural habitat and increase abutting property values at the same time that developable land loss is minimized via a reduction in the areal extents of open water storm water management ponds (SWMPs).

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APPENDIX B

SANTARY SERVICE CALCULATIONS

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SANITARY DEMAND CALCULATIONS - Ritz-Carlton Hotel, SPA, Residences 144 John Street East
Town of Niagara-on-the-Lake

Generation Rate †:

255	L/Day per person	Residential
310	L/Day per person	Employment

Average Demand Calculation

Tenure Type	GFA (ha)	Units	Unit Density (ppu)	Population Density (sqft/person)	Population	Generation Rate (L/cap/d)	Average Demand (L/s)
Residence Site							
Three Storey Residential - 1B+D, 2B	n/a	198	1.99	n/a	395	255	1.166
Three Storey Residential - 1B	n/a	36	1.21	n/a	44	255	0.130
Commercial - Tennis Club & Clubhouse	0.09	n/a	n/a	500	20	310	0.072
Sub-total	**0.09**	**234**			**459**		**1.37**
Ritz Carlton Hotel / Spa Site							
Hotel Suites - Units	n/a	111	1.99	n/a	221	310	0.793
Hotel- Commercial (Restaurant / Retail Sales / Office)	0.25	n/a	n/a	500	55	310	0.197
Spa - Commercial	0.27	n/a	n/a	500	60	310	0.215
Sub-total	**0.53**	**111**			**336**		**1.206**
Total	**0.62**	**345**			**795**		**2.573**

*Flow from hotel suite is estimated as emplyoment-related flow for more conservative.

Design Flow Calculation
Entire Site

Average Demand (L/s)	Total Population	M	Area (ha)	Infiltration* (L/s)	Total Peak Flow (L/s)
2.573	795	3.86	13.59	3.89	**13.82**

* Based on 0.286 L/s/ha of gross area

M = 1 + 14/(4 + (P/1000)0.5)

SANITARY CAPACITY ANALYSIS REPROT

RITZ-CARLTON HOTEL, SPA, & RESIDENCES
144 JOHN STREET EAST

Town of Niagara-on-the-Lake
Project: 2026-5625 **April 2026**

Revision	Description	Prepared		Checked	
		By	Date	By	Date
0.	First Submission	P.W,	Apr 2026	K.S.	Apr 2026

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1.0 INTRODUCTION

Schaeffer and Associates Ltd. (SCE) has been retained to prepare a sanitary capacity analysis report in support of the proposed development at 144 & 176 John Street and 200 John Street & 586 Charlotte Street. The proposed development consists of 5 residence buildings, a Ritz Carlton and a spa. The subject site is located southeast of the intersection of Charlotte Street and John Street East and northwest of the intersection of John Street East and Niagara River Parkway. The location of the subject site is illustrated in **Figure 2.1.**

This report has been prepared to assess the capacity of the existing downstream network and determine if any upgrades are required to support the proposed development. The analysis was completed using Infoworks ICM for dynamic modelling of the sewer network. The Infoworks ICM model was developed based on the calibrated InfoSWMM model prepared by the Nigara Region. The assessment considers both Dry Weather Flow (DWF) and Wet Weather Flow (WWF) conditions for the downstream sanitary system servicing the subject lands. WWF conditions are based on the 5-year return period storm event and Design Rainfall-Derived Inflow and Infiltration (Design RDII) as defined in the Niagara Regional Model.

2.0 SANITARY CAPACITY ANALYSIS

2.1 Sanitary Servicing Design Criteria

The Niagara Region and the Niagara-on-the-Lake Design Parameters have been compared and taken from the following documents:

- NOTL's Municipal Engineering Standards (November 2020);
- Niagara Region's Water-Wastewater Project Design Manual (July 2023);
- Niagara Region's Development Charges Background Study (May 2022);
- Niagara Region's Water and Wastewater Master Servicing Plan (2016);
- Niagara Region's Water and Wastewater Master Servicing Plan (2021); and
- Ontario Ministry of the Environment, Conservation, and Parks (MOECC) Design Guidelines for Sewage Works (2008).

Table 2-1 – Niagara Region and Niagara-on-the-Lake Design Parameters

Parameter	Town of NOTL/ Region of Niagara standards
Population for Low Density*	2.929 person/unit
Population for Medium Density*	2.093 person/unit
Population for High Density – 1Bedroom*	1.214 person/unit
Population for High Density – 2Bedrooms+*	1.991 person/unit
Population for Commercial	1 person / 500sqft
Residential Generation Rate	255 L/c/d
Employment Generation Rate	310 L/c/d
Infiltration Allowance – New Development	0.286 L/ha/s
Peaking Factor M	Harmon Formula
Minimum Freeboard for Hydraulic Grade Line in Wet Weather Flow conditions.	1.8m

*Population density as per Niagara Reion's 2022 Development Charges Background Study

As per the Niagara Region's Water-Wastewater Project Design Manual in 2023, the capacity of the gravity sewer is assumed to be overcommitted when it runs surcharged during Design Peak DWF, or when it runs surcharged during Design Peak WWF with a peak HGL less than 1.8m below ground elevation. In this assessment, the Design RDII as defined in the Region's model and the 5-year Storms have been selected as the WWF events to assess the sewer performance. Details refer to **Section 2.5**.

2.2 Existing Condition

2.2.1 Existing Sanitary Network

The existing sanitary sewer network was characterized from the plan and profiles of the downstream network as well as the previously mentioned InfoSWMM model provided by the Region. There is an existing 250 mm diameter sanitary sewer along Charlotte Street. This sewer drains from the northeast and the southwest towards Paffard Street. The Paffard Street sewer is a 300 mm sewer that drains to the northwest. The sewer proceeds to route northeast along King Street, northwest along Gage Street, southwest along Mississauga Street, and northwest along William Street. The sanitary sewer along William Street discharges into a Sanitary Pumping Station (SPS) known as the William SPS. This sanitary Pumping station directs sanitary flows to the NOTL sanitary Sewerage Treatment Plant. The existing sanitary network including the downstream route of the sanitary sewer to the William SPS is illustrated in **Figure 2.1**. Excerpts from the Master Servicing Plan Update (MSP), provided in **Appendix A,** illustrate the forcemains and pumps that convey the sanitary sewerage from the William SPS to the Wastewater Treatment Plant (WWTP).

2.2.2 Existing Sanitary Demands

The Niagara Region provided an InfoSWMM model, which was considered up to date as of 2016 when it was developed for the 2016 MSP. Dry weather flows (DWF) provided in the model represent the sanitary demands of the existing buildings as of the latest monitoring data. To assess the remaining sanitary servicing capacity in the sewer network, the model was updated to account for new developments since 2016. These new developments were identified through a review of Public Notices, Official Plan Amendments, Zoning information, and aerial imagery.

The identified new developments are illustrated in **Figure 2.1** and detailed population estimates for these developments are provided in **Appendix B.**

N

N.T.S.

Existing Sewer Network

Legend

Conduit

TYPE

- Sanitary Sewers
- Downstream Routing

Pump

TYPE

- Active
- Commercial Dev.
- Residential Developments
- Subject_Site

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2.3 Proposed Development

The proposed development plan consists of 5 residence buildings, a Ritz Carlton hotel and a spa. Based on the architectural drawings received on 8 April 2022 from Peter J. Lesdow Architect, the total estimated population is 795. Detailed population estimate is provided in **Appendix B** and summarised in **Table 2-3**. The relevant architectural drawings are provided in **Appendix A**.

Table 2-2 – Population Estimate

Tenure Type	Unit / GFA (ha)	Population Rate	Population
Residence Site			
Residential – 1Bed+D, 2Bed	198	1.99 person/unit	395
Residential – 1Bed	36	1.21 person/unit	44
Commercial – Tennis Club & Clubhouse	0.09	1 person/500sqft	20
Sub-total			**459**
Ritz Carlton Hotel / Spa Site			
Hotel Suites – Units*	111	1.99 person/unit	221
Hotel - Commercial	0.25	1 person/500sqft	55
Spa - Commercial	0.27	1 person/500sqft	60
Sub-total			**659**
Total			**795**

*Flow from hotel suites will be estimated as employment flow in the following.

Table 2-3 summarises the proposed sanitary demands from the proposed development. Detailed calculations are provided in **Appendix B.** It is proposed that the sanitary flow from the subject site will be conveyed to the existing sewer at the intersection of Charlotte Street and Paffard Street through a pump system. This flow will be represented in the model as a constant discharge at peak demand under post-development conditions.

Table 2-3 – Proposed Santiary Demands

Average Demand (L/s)	Total Population	Harmon Peaking Factor, M	Area (ha)	Infiltration* (L/s)	Total Peak Flow (L/s)
2.573	795	3.86	13.59	3.89	13.82

* Based on 0.286 L/s/ha of gross area for the Subject Site

2.4 Proposed Servicing

Sanitary flow from the subject site is proposed to be conveyed to a pumping station located west of the SWM pond within the site. The pumping station will discharge flows via a proposed force main to the existing manhole at the intersection of Charlotte Street and Paffard Street.

2.5 Method of Analysis

The Region provided an InfoSWMM model representing the sewershed for the Niagara-on-the-Lake Wastewater Treatment Plant. This InfoSWMM model was originally developed for the Niagara Region's 2016 Master Servicing Plan Update. The existing conditions in the InfoSWMM model have been moderately updated to describe some new developments before being released to SCE for this downstream analysis.

For the purpose of this capacity assessment, the InfoSWMM model was imported into InfoWorks ICM. The InfoSWMM model contains many scenarios for existing, and 2041 conditions. For each condition, there are DWF, Design RDII, 2-year, and 5-year scenarios.

As outlined in the Niagara Region's 2021 MSP, the Peak WWF condition should consider two flow scenarios: 1) Design RDII and 2) 5-year storm. Acoordingly, both scenarios were simulated as part of this assessment to assess the sewer performance under WWF conditions. In addition, the sewer shall maintain a minimum 1.8 m HGL freeboard to the ground surface under WWF conditions as discussed in section C.1.2.2.2 of the Niagara Regions Water Wastewater Project Design Manual.

2.5.1 Updates to the Region's Model to Reflect Existing Conditions

To utilize the Region's model to analyze the conditions in the downstream sanitary sewer network, the model must be updated using the best available information for new sewers, developments, and other infrastructure changes. The known and expected changes to sewers, developments, and other infrastructure shall be discussed in the following sections.

2.5.1.1 Sewers

To analyze the sanitary sewer network, the sewers represented in the model must be verified and updated if required. No sewer upgrades were identified in the sewershed draining to the William Street Sanitary Pumping Station. However, a few pipes were identified as having incorrect information and were subsequently corrected.

These pipes were flagged since the pipes did not appear to follow standard design practices. Specifically, one pipe was identified with an unusually flat slope, followed by downstream pipes with decreasing diameters, which is not typical for sewer design. Plan and Profile drawings were obatined to review these inconsistencies and verify the accuracy of the modelled conditions.

The affected sewer segments include the last downstream leg on Paffard Street and the first two legs on King Street, as highlighted in light blue in **Figure 2.2** below.

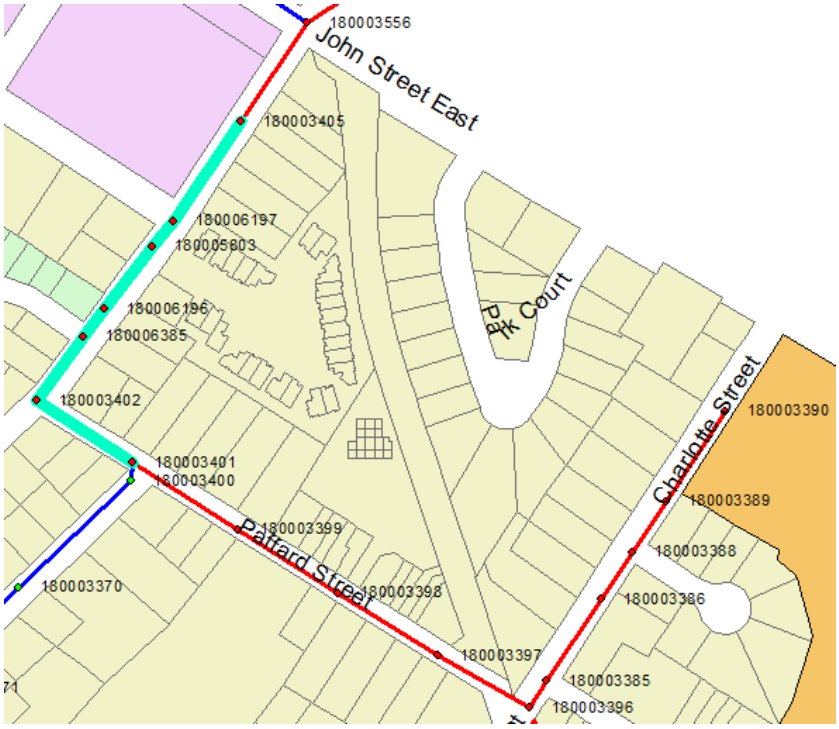


Figure 2.2 - Sanitary Sewers Recharacterized

Through investigation of the available plan and profile drawings, it was determined that the three pipes which were flagged as unusual were in fact, incorrectly defined in the model. Additionally, the next three downstream sewers were identified as having incorrect invert information and were corrected. These other pipes have also been identified in light blue in **Figure 2.2**. **Table 2-4** below outlines the changes to the sewer network.

Table 2-4 – Sanitary Sewer Characteristics Update

Street	Manhole ID		Original			Updated		
			Invert		Dia. (mm)	Invert		Dia. (mm)
	US	DS	US	DS		US	DS	
Paffard Street	180003401	180003402	84.750	84.750	300	84.832	84.610	300
King Street	180003402	180006385	84.750	84.460	250	84.570	84.394	350
King Street	180006385	180006196	84.460	84.414	250	84.394	84.318	350

King Street	180006196	180005803	84.414	84.300	450	84.318	84.197	450
King Street	180005803	180006197	84.300	84.149	450	84.197	84.147	450
King Street	180006197	180003405	84.147	83.981	450	84.147	83.981	450

2.5.1.2 Developments

Since the completion of the model in 2015, and the completion of the MSP report in 2016, the Old Town of NOTL has had a few new subdivisions and Official Plan Amendments. These changes, along with some proposed minor variances, lead to an increased population in existing conditions. These changes have been incorporated into all scenarios to reflect expected existing and expected future conditions. The identified developments are illustrated in **Figure 2.1** and a detailed flow estimate of these developments is provided in **Appendix B**.

2.5.1.3 Generation Rates & Theoretical Trends

The sanitary model provided by the Region was developed as an unsteady model. This model included sanitary generation rates and trends based on monitoring data. The sanitary generation rates and trends identified through flow monitoring do not apply to the new developments in the system. As such, theoretical diurnal generation trends have been created to best account for the unsteady nature of the new developments in the model.

Sanitary generation rates were based on the design criteria of 255 L/c/d for residential and 310 L/c/d for employment developments. The diurnal sanitary generation trends were developed based on a typical generation trend and modified such that the peak flow during the morning peak matches with the Harmon peaking factor associated with the sewershed. A total of two sanitary generation trends were identified to account for the other developments in the sewershed. It should be noted that since the subject site is proposed to be serviced by a pumped solution, the flow into the sewer was estimated using a constant flow.

A diurnal trend with a peaking factor of 3.1 was assigned to each new population. This peaking factor accounts for the full population of the sewershed draining to the William Street Pumping Station. This peaking factor is appropriate for the new developments since the majority of the sanitary flow from these new developments is lateral to the downstream sewer at the intersection of William Street and Dorchester Street which is only a few sewer legs away from the William Street SPS. For each peaking factor, a generation trend was developed for residential as well as non-residential. It is noted that for hotel-type developments, the residential diurnal pattern was applied in conjunction with the employment-based generation rate, as the usage characteristics are

similar to residential and this approach is considered conservative. A summary of these trends has been provided in **Appendix C**.

2.6 Dry Weather Flow (DWF) and Design RDII WWF Analysis

The updated model, as previously described, was run in DWF and Design RDII conditions, considering 2041 growth conditions, and pre-development and post-development conditions. The scenarios that were run are outlined as follows:

- 2041 DWF – Pre-development;
- 2041 DWF – Post-development;
- 2041 Design RDII – Pre-development; and
- 2041 Design RDII – Post-development;

2.6.1 DWF Analysis

Table 2-5 summarises the flow and depth results within the downstream sanitary sewers under the 2041 DWF scenario.

The results indicate that no sewers are expected to surcharge under both pre-development and post-development conditions, satisfying the Region's criteria. Therefore, the existing downstream sewer could adequately support the proposed development during the 2041 DWF condition.

2.6.2 Design RDII WWF Analysis

Table 2-6 and **Table 2-7** summarise the flow and depth and HGL results within the downstream sanitary sewers during the 2041 Design RDII scenarios. Details of the sewer profiles and model outputs are provided in **Appendix D**.

The results indicate that no sewers are expected to be surcharged and a minimum freeboard of 1.8 m is maintained at all nodes under both pre-development and post-development conditions, satisfying the Region's criteria. Therefore, the existing downstream sewer could adequately support the proposed development during 2041 Design RDII conditions

Detailed sewer profiles and model outputs of the analysis are provided in **Appendix D**.

Table 2-5 – 2041 DWF Flow and Depth Result (Pre-development vs Post-development)

								No Highlighting Indicates No Capacity Constraints Yellow Indicates q/Q > 100%, d/D <100% Red Indicates q/Q > 100%, d/D >100%				No Highlighting Indicates No Capacity Constraints Yellow Indicates d/D > 70% Red Indicates d/D > 100%			
Location	Link ID	Manhole		Pipe				Flow (q) (L/s)		Flow Capacity (q/Q_{full})		Depth (d) (m)		Depth Capacity (d/D)	
		U/S	D/S	Size (m)	Length (m)	Slope (%)	Q_{full} (L/s)	Pre dev.	Post dev.	Pre dev.	Post dev.	Pre dev.	Post dev.	Pre dev.	Post dev.
Pafford Street [(1)]	189001794	180003396	180003397	0.300	68.30	0.15	37.6	3.0	16.8	8%	45%	0.06	0.15	20.4%	48.7%
Pafford Street	189001793	180003397	180003398	0.300	76.20	0.29	52.0	3.0	16.9	6%	32%	0.08	0.16	26.8%	54.0%
Pafford Street	189001792	180003398	180003399	0.300	76.50	0.14	36.0	4.2	18.0	12%	50%	0.08	0.16	26.8%	54.0%
Pafford Street	189001791	180003399	180003401	0.300	80.80	0.76	84.5	4.2	18.0	5%	21%	0.05	0.09	15.2%	31.3%
Pafford Street	189001790	180003401	180003402	0.300	74.10	0.30	52.7	6.2	20.6	12%	39%	0.07	0.14	24.3%	45.3%
King Street	189004273	180003402	180006385	0.350	51.50	0.34	85.3	9.5	23.3	11%	27%	0.09	0.13	26.3%	38.5%
King Street	189004218	180006385	180006196	0.350	22.30	0.34	85.2	12.9	26.8	15%	31%	0.09	0.13	26.5%	38.5%
King Street	189004061	180006196	180005803	0.450	51.10	0.24	138.7	12.9	26.8	9%	19%	0.09	0.13	20.7%	30.0%
King Street	189004113	180005803	180006197	0.450	21.10	0.24	138.8	13.0	26.8	9%	19%	0.10	0.14	22.1%	31.6%
King Street	189004053	180006197	180003405	0.450	77.90	0.21	131.6	13.0	26.8	10%	20%	0.10	0.14	22.1%	31.6%
King Street	189001289	180003405	180003556	0.450	76.50	0.34	166.5	13.0	26.9	8%	16%	0.09	0.12	19.1%	27.3%
King Street	189002039	180003556	180003315	0.450	35.40	0.34	165.3	13.1	27.0	8%	16%	0.09	0.12	19.1%	27.3%
King Street	189001290	180003315	180003430	0.450	117.40	0.36	170.5	13.5	27.3	8%	16%	0.09	0.12	19.0%	27.1%
King Street	189002045	180003430	180003431	0.450	66.80	0.36	170.2	13.5	27.3	8%	16%	0.09	0.12	19.2%	27.2%
King Street	189001291	180003431	180003432	0.450	120.50	0.35	168.5	13.5	27.3	8%	16%	0.09	0.13	20.0%	28.3%
King Street	189001292	180003432	180003433	0.450	122.10	0.34	167.2	13.5	27.4	8%	16%	0.09	0.13	20.0%	28.3%
King Street	189001293	180003433	180003438	0.450	19.70	0.36	171.2	16.9	30.7	10%	18%	0.26	0.28	57.2%	62.5%
King Street	189001295	180003438	180003214	0.450	79.20	0.35	168.9	17.1	30.9	10%	18%	0.10	0.13	21.5%	29.0%
Gage Street	189001296	180003214	180003215	0.450	41.30	0.37	172.4	17.4	31.2	10%	18%	0.10	0.13	21.8%	29.2%
Gage Street	189001298	180003215	180003216	0.450	120.30	0.35	168.5	17.5	31.3	10%	19%	0.10	0.13	21.8%	29.2%
Gage Street	189001299	180003216	180003217	0.450	73.40	0.36	170.7	17.5	31.3	10%	18%	0.10	0.13	21.8%	29.2%
Gage Street	189002043	180003217	180003664	0.450	75.70	0.35	168.4	17.5	31.3	10%	19%	0.10	0.13	21.8%	29.2%
Gage Street	189001300	180003664	180003219	0.450	71.70	0.35	169.4	17.5	31.3	10%	19%	0.10	0.13	21.8%	29.2%
Gage Street	189001301	180003219	180003220	0.450	75.30	0.35	168.5	17.6	31.4	10%	19%	0.10	0.13	22.3%	29.7%
Gage Street	189001302	180003220	180003221	0.450	76.40	0.35	168.2	18.4	32.2	11%	19%	0.10	0.13	22.3%	29.7%
Gage Street	189001303	180003221	180003222	0.450	69.90	0.35	169.1	18.4	32.2	11%	19%	0.14	0.17	31.4%	37.2%
Gage Street	189001613	180003222	180003223	0.600	79.30	0.23	293.3	34.6	48.9	12%	17%	0.14	0.17	23.5%	27.9%
Gage Street	189001614	180003223	180003224	0.600	79.50	0.26	310.3	33.8	48.2	11%	16%	0.15	0.18	25.4%	30.2%
Mississagua Street	189001616	180003224	180003202	0.600	66.70	0.16	248.2	33.8	48.2	14%	19%	0.15	0.18	25.4%	30.2%
Mississagua Street	189002015	180003202	180003201	0.600	85.20	0.22	290.7	33.5	47.9	12%	16%	0.14	0.16	23.1%	27.5%
Mississagua Street	189001780	180003201	180003775	0.600	66.70	0.24	300.7	34.0	48.4	11%	16%	0.14	0.16	23.1%	27.5%
Mississagua Street	189001779	180003775	180003889	0.600	82.50	0.33	354.5	33.8	48.1	10%	14%	0.15	0.17	24.7%	29.1%
William Street	189001617	180003889	180003890	0.600	72.90	0.20	276.7	34.9	49.1	13%	18%	0.15	0.17	24.7%	29.1%

								No Highlighting Indicates No Capacity Constraints Yellow Indicates q/Q > 100%, d/D <100% Red Indicates q/Q > 100%, d/D >100%		No Highlighting Indicates No Capacity Constraints Yellow Indicates d/D > 70% Red Indicates d/D > 100%					
Location	Link ID	Manhole		Pipe				Flow (q) (L/s)		Flow Capacity (q/Q_{full})		Depth (d) (m)		Depth Capacity (d/D)	
		U/S	D/S	Size (m)	Length (m)	Slope (%)	Q_{full} (L/s)	Pre dev.	Post dev.	Pre dev.	Post dev.	Pre dev.	Post dev.	Pre dev.	Post dev.
William Street	189001618	180003890	180003891	0.600	76.40	0.36	366.4	34.8	48.9	9%	13%	0.16	0.20	27.4%	32.6%
William Street	189001619	180003891	180003892	0.600	80.90	0.10	197.9	34.8	49.0	18%	25%	0.17	0.21	29.0%	34.2%
William Street	18901620	180003892	180003893	0.600	76.47	0.18	261.8	34.7	48.7	13%	19%	0.20	0.23	33.7%	37.5%
William Street	18901622	180003893	180003894	0.600	81.88	0.17	256.6	61.1	75.2	24%	29%	0.20	0.23	33.7%	37.5%
William Street	18901623	180003894	180003898	0.600	65.32	0.25	308.6	60.9	75.1	20%	24%	0.20	0.22	32.8%	36.4%
William Street	18901624	180003898	180003303	0.600	106.18	0.21	279.5	60.9	75.0	22%	27%	0.20	0.22	32.8%	36.4%
William Street	18901625	180003303	180003302	0.600	28.49	0.34	356.4	60.9	75.0	17%	21%	0.17	0.18	27.7%	30.8%
William Street Sanitary Pumping Station	18902049	180003302	180003301	0.600	22.00	0.64	489.8	62.9	77.0	13%	16%	0.15	0.16	24.2%	26.8%

(1) – Nodes where the site discharges

Table 2-6 – 2041 Design RDII Flow and Depth Result (Pre-development vs Post-development)

								No Highlighting Indicates No Capacity Constraints Yellow Indicates q/Q > 100%, d/D <100% Red Indicates q/Q > 100%, d/D >100%		No Highlighting Indicates No Capacity Constraints Yellow Indicates d/D > 70% Red Indicates d/D > 100%					
Location	Link ID	Manhole		Pipe				Flow (q) (L/s)		Flow Capacity (q/Q_{full})		Depth (d) (m)		Depth Capacity (d/D)	
		U/S	D/S	Size (m)	Length (m)	Slope (%)	Q_{full} (L/s)	Pre dev.	Post dev.	Pre dev.	Post dev.	Pre dev.	Post dev.	Pre dev.	Post dev.
Pafford Street [(1)]	189001794	180003396	180003397	0.300	68.30	0.15	37.6	6.6	20.4	20%	61%	0.09	0.16	29.9%	54.2%
Pafford Street	189001793	180003397	180003398	0.300	76.20	0.29	52.0	6.8	20.6	13%	40%	0.11	0.18	37.3%	60.8%
Pafford Street	189001792	180003398	180003399	0.300	76.50	0.14	36.0	8.6	22.4	24%	62%	0.11	0.18	37.3%	60.8%
Pafford Street	189001791	180003399	180003401	0.300	80.80	0.76	84.5	8.8	22.6	10%	27%	0.07	0.11	21.8%	35.3%
Pafford Street	189001790	180003401	180003402	0.300	74.10	0.30	52.7	29.6	43.4	56%	82%	0.17	0.22	55.6%	71.7%
King Street	189004273	180003402	180006385	0.350	51.50	0.34	85.3	37.7	51.5	44%	60%	0.17	0.20	49.1%	58.3%
King Street	189004218	180006385	180006196	0.350	22.30	0.34	85.2	41.5	55.3	49%	65%	0.17	0.20	49.1%	58.3%
King Street	189004061	180006196	180005803	0.450	51.10	0.24	138.7	41.6	55.4	30%	40%	0.17	0.20	38.2%	44.9%
King Street	189004113	180005803	180006197	0.450	21.10	0.24	138.8	42.0	55.8	30%	40%	0.18	0.21	40.0%	46.6%
King Street	189004053	180006197	180003405	0.450	77.90	0.21	131.6	42.5	56.3	32%	43%	0.18	0.21	40.0%	46.6%
King Street	189001289	180003405	180003556	0.450	76.50	0.34	166.5	42.6	56.4	26%	34%	0.16	0.18	35.0%	40.6%
King Street	189002039	180003556	180003315	0.450	35.40	0.34	165.3	43.4	57.3	26%	35%	0.16	0.18	35.3%	40.7%
King Street	189001290	180003315	180003430	0.450	117.40	0.36	170.5	45.5	59.3	27%	35%	0.16	0.18	35.4%	40.8%
King Street	189002045	180003430	180003431	0.450	66.80	0.36	170.2	45.7	59.5	27%	35%	0.16	0.18	35.6%	41.1%
King Street	189001291	180003431	180003432	0.450	120.50	0.35	168.5	45.9	59.7	27%	35%	0.17	0.19	36.8%	42.3%
King Street	189001292	180003432	180003433	0.450	122.10	0.34	167.2	46.0	59.8	27%	36%	0.17	0.19	36.8%	42.3%

								No Highlighting Indicates No Capacity Constraints Yellow Indicates q/Q > 100%, d/D <100% Red Indicates q/Q > 100%, d/D >100%				No Highlighting Indicates No Capacity Constraints Yellow Indicates d/D > 70% Red Indicates d/D > 100%			
Location	Link ID	Manhole		Pipe				Flow (q) (L/s)		Flow Capacity (q/Q_{full})		Depth (d) (m)		Depth Capacity (d/D)	
		U/S	D/S	Size (m)	Length (m)	Slope (%)	Q_{full} (L/s)	Pre dev.	Post dev.	Pre dev.	Post dev.	Pre dev.	Post dev.	Pre dev.	Post dev.
King Street	189001293	180003433	180003438	0.450	19.70	0.36	171.2	49.7	63.5	29%	37%	0.31	0.32	68.1%	71.7%
King Street	189001295	180003438	180003214	0.450	79.20	0.35	168.9	51.5	65.3	30%	39%	0.17	0.19	38.0%	43.1%
Gage Street	189001296	180003214	180003215	0.450	41.30	0.37	172.4	52.8	66.6	31%	39%	0.17	0.20	38.6%	43.8%
Gage Street	189001298	180003215	180003216	0.450	120.30	0.35	168.5	53.0	66.8	31%	40%	0.17	0.20	38.6%	43.8%
Gage Street	189001299	180003216	180003217	0.450	73.40	0.36	170.7	53.0	66.8	31%	39%	0.17	0.20	38.6%	43.9%
Gage Street	189002043	180003217	180003664	0.450	75.70	0.35	168.4	53.2	67.0	32%	40%	0.17	0.20	38.6%	43.9%
Gage Street	189001300	180003664	180003219	0.450	71.70	0.35	169.4	53.2	67.0	31%	40%	0.17	0.20	38.7%	43.9%
Gage Street	189001301	180003219	180003220	0.450	75.30	0.35	168.5	53.4	67.3	32%	40%	0.18	0.20	39.5%	44.7%
Gage Street	189001302	180003220	180003221	0.450	76.40	0.35	168.2	55.4	69.2	33%	41%	0.18	0.20	39.5%	44.7%
Gage Street	189001303	180003221	180003222	0.450	69.90	0.35	169.1	55.5	69.3	33%	41%	0.24	0.26	53.7%	57.5%
Gage Street	189001613	180003222	180003223	0.600	79.30	0.23	293.3	99.2	112.5	34%	38%	0.24	0.26	40.3%	43.1%
Gage Street	189001614	180003223	180003224	0.600	79.50	0.26	310.3	98.1	111.4	32%	36%	0.26	0.28	43.7%	46.8%
Mississagua Street	189001616	180003224	180003202	0.600	66.70	0.16	248.2	98.5	111.8	40%	45%	0.26	0.28	43.7%	46.8%
Mississagua Street	189002015	180003202	180003201	0.600	85.20	0.22	290.7	98.2	111.5	34%	38%	0.24	0.26	40.1%	43.0%
Mississagua Street	189001780	180003201	180003775	0.600	66.70	0.24	300.7	99.8	113.1	33%	38%	0.24	0.26	39.8%	42.5%
Mississagua Street	189001779	180003775	180003889	0.600	82.50	0.33	354.5	99.4	112.8	28%	32%	0.26	0.27	42.5%	45.4%
William Street	189001617	180003889	180003890	0.600	72.90	0.20	276.7	103.5	116.9	37%	42%	0.26	0.27	42.5%	45.4%
William Street	189001618	180003890	180003891	0.600	76.40	0.36	366.4	103.2	116.6	28%	32%	0.29	0.31	48.6%	52.2%
William Street	189001619	180003891	180003892	0.600	80.90	0.10	197.9	103.6	117.1	52%	59%	0.30	0.32	50.3%	53.9%
William Street	18901620	180003892	180003893	0.600	76.47	0.18	261.8	103.3	116.7	39%	45%	0.34	0.36	57.0%	59.8%
William Street	18901622	180003893	180003894	0.600	81.88	0.17	256.6	160.8	174.3	63%	68%	0.34	0.36	57.0%	59.8%
William Street	18901623	180003894	180003898	0.600	65.32	0.25	308.6	160.7	174.2	52%	56%	0.33	0.35	55.1%	57.8%
William Street	18901624	180003898	180003303	0.600	106.18	0.21	279.5	162.1	175.6	58%	63%	0.33	0.35	55.1%	57.8%
William Street	18901625	180003303	180003302	0.600	28.49	0.34	356.4	162.1	175.6	45%	49%	0.28	0.29	46.0%	48.0%
William Street Sanitary Pumping Station	18902049	180003302	180003301	0.600	22.00	0.64	489.8	173.9	187.5	36%	38%	0.25	0.26	41.2%	42.9%

(1) – Nodes where the site discharges

Table 2-7 – 2041 Design RDII HGL Results (Pre-development vs Post-development)

Green Highlighting Shows HGL Freeboard is greater than 1.8 m
Yellow Highlighting Shows Freeboard is less than 1.8 m, but the flow is contained within Pipe (i.e. no surcharge)
Red Highlighting Shows Freeboard is less than 1.8 m and pipe is surcharging

Location	Conduit (DS)	MH	T/G (m)	Max Allowable HGL (m)	Minimum Obvert	Pre-Development		Post Development	
						Maximum HGL (m)	Freeboard (m)	Maximum HGL (m)	Freeboard (m)
Pafford Street [(1)]	189001794	180003396	89.40	87.60	86.68	86.47	2.93	86.54	2.85
Pafford Street	189001793	180003397	89.67	87.87	86.58	86.35	3.32	86.41	3.26
Pafford Street	189001792	180003398	89.30	87.50	86.36	86.17	3.13	86.24	3.06
Pafford Street	189001791	180003399	89.16	87.36	86.23	86.00	3.16	86.04	3.12
Pafford Street	189001790	180003401	88.63	86.83	85.13	85.00	3.63	85.05	3.58
Pafford Street/King Street	189004273	180003402	88.24	86.44	84.91	84.73	3.51	84.77	3.48
King Street/Evergreen Lane	189004218	180006385	88.16	86.36	84.74	84.57	3.59	84.60	3.56
King Street	189004061	180006196	88.25	86.45	84.67	84.49	3.76	84.52	3.73
King Street	189004113	180005803	88.17	86.37	84.65	84.37	3.80	84.40	3.77
King Street/Anne Street	189004053	180006197	88.00	86.20	84.60	84.33	3.67	84.36	3.64
King Street	189001289	180003405	87.84	86.04	84.43	84.14	3.70	84.16	3.68
King Street/John Street West	189002039	180003556	87.38	85.58	84.17	83.88	3.50	83.90	3.48
King Street	189001290	180003315	86.34	84.54	84.05	83.76	2.58	83.78	2.56
King Street/Mary Street	189002045	180003430	85.99	84.19	83.63	83.34	2.65	83.36	2.62
King Street	189001291	180003431	86.90	85.10	83.39	83.10	3.79	83.13	3.77
King Street	189001292	180003432	86.34	84.54	82.97	82.69	3.65	82.71	3.62
King Street/Centre Street	189001293	180003433	87.59	85.79	82.36	82.22	5.37	82.24	5.35
King Street	189001295	180003438	87.65	85.85	82.29	82.01	5.64	82.04	5.61
King Street/Gage Street	189001296	180003214	87.86	86.06	82.02	81.74	6.13	81.76	6.10
Gage Street	189001298	180003215	87.48	85.68	81.86	81.59	5.89	81.61	5.87
Gage Street/Regent Street	189001299	180003216	86.81	85.01	81.44	81.17	5.65	81.19	5.62
Gage Street	189002043	180003217	86.01	84.21	81.18	80.90	5.10	80.93	5.08
Gage Street/Victoria Street	189001300	180003664	85.15	83.35	80.92	80.64	4.51	80.66	4.49
Gage Street	189001301	180003219	84.35	82.55	80.66	80.39	3.96	80.41	3.94
Gage Street/Gate Street	189001302	180003220	83.48	81.68	80.40	80.13	3.35	80.15	3.32
Gage Street	189001303	180003221	83.09	81.29	80.14	79.86	3.23	79.89	3.20
Gage Street/Simcoe Street	189001613	180003222	84.75	82.95	79.89	79.68	5.07	79.70	5.06
Gage Street	189001614	180003223	84.04	82.24	79.86	79.49	4.55	79.51	4.53
Gage Street/Mississagua Street	189001616	180003224	83.57	81.77	79.66	79.32	4.26	79.34	4.24
Mississagua Street	189002015	180003202	83.82	82.02	79.55	79.19	4.63	79.20	4.62
Mississagua Street/Centre Street	189001780	180003201	84.45	82.65	79.36	78.99	5.45	79.01	5.44
Mississagua Street	189001779	180003775	84.84	83.04	79.20	78.81	6.03	78.83	6.01
Mississagua Street/William Street	189001617	180003889	85.09	83.29	78.92	78.58	6.52	78.59	6.50
William Street	189001618	180003890	83.99	82.19	78.77	78.39	5.60	78.40	5.59
William Street/Butler Street	189001619	180003891	83.79	81.99	78.49	78.19	5.60	78.21	5.57

Green Highlighting Shows HGL Freeboard is greater than 1.8 m
Yellow Highlighting Shows Freeboard is less than 1.8 m, but the flow is contained within Pipe (i.e. no surcharge)
Red Highlighting Shows Freeboard is less than 1.8 m and pipe is surcharging

Location	Conduit (DS)	MH	T/G (m)	Max Allowable HGL (m)	Minimum Obvert	Pre-Development		Post Development	
						Maximum HGL (m)	Freeboard (m)	Maximum HGL (m)	Freeboard (m)
William Street	18901620	180003892	83.38	81.58	78.41	78.07	5.30	78.10	5.28
William Street/Dorchester Street	18901622	180003893	83.25	81.45	78.27	78.01	5.24	78.03	5.23
William Street	18901623	180003894	81.02	79.22	78.12	77.83	3.19	77.85	3.18
William Street/Nassau Street	18901624	180003898	80.86	79.06	77.96	77.69	3.17	77.71	3.15
William Street	18901625	180003303	80.56	78.76	77.66	77.33	3.22	77.35	3.21
William Street	18902049	180003302	81.89	80.09	76.83	76.48	5.41	76.49	5.40
William Street Sanitary Pumping Station		180003301	82.40	80.60	76.69	76.31	6.09	76.32	6.08

(1) – Nodes where the site discharges

2.7 5-Year Storms WWF Analysis

The 2016 MSP identified that the actual 5-year Storms RDII was higher than the design RDII for the Old Town NOTL sewershed that drained to the William Pumping Station. As such, the scenario with the highest flow in the received model was run to determine if conditions during an actual rain event would cause unsafe operation of the sanitary sewer system. The selected scenario was 2041, 5-Year flow model. This model was updated to demonstrate pre-development to post-development conditions.

The flow and depth and HGL results can be found in **Table 2-9 and Table 2-10** below.

The results indicate that the water depth in 10 pipes exceeds the pipe obvert within the downstream network under the pre-development scenario. However, the majority of these pipes operate below 100% of their flow capacity. Only 3 of these 10 pipes exhibit flow capacity over 100%, demonstrating actual surcharge conditions resulting from the capacity deficiency of the sewer. A surcharge condition is considered when both the Flow Capacity (q/Qfull) and Depth Capacity (d/D) are over 100%.

Under post-development conditions, surcharge conditions are shown to increase. A total of 11 pipes exhibit water levels above the pipe obvert, of which four (4) pipes exceed 100% flow capacity, indicating surcharge conditions due to insufficient capacity of the sewer.

Despite these surcharged conditions, all affected pipes maintain a minimum hydraulic grade line (HGL) freeboard of at least 1.8 m below ground surface, satisfying the Region's design criteria. Therefore, it is anticipated that the existing downstream sewer could accommodate the sanitary flow from the proposed development during the 5-year storms WWF condition.

Detailed sewer profiles and model outputs of the analysis are provided in **Appendix D**.

Should the Town of Niagara-on-the-Lake require mitigation, upgrades could be implemented to eliminate conditions where flow capacity exceeds 100%. This would require the four (4) following upgrades outlined in **Table 2-8**. It should be noted that these surcharges are generally considered to be safe in WWF conditions in accordance with the Niagara Region design standards. As such, it is not recommended to perform these upgrades as the additional safety provided is marginal. Therefore, the sewer network has sufficient capacity to accept sanitary flow from the subject development without any network improvements.

Table 2-8 – Potentially Sewer Upgrades

Street Location	Upstream Manhole	Downstream Manhole	Existing Sewer Diameter (mm)	Downstream Sewer Diameter (mm)
Pafford Street	180003401	180003402	300	375
William Street	180003891	180003892	350	450
William Street	180003893	180003894	600	675
William Street	180003898	180003303	600	675

Table 2-9 - 2041 5-Year RDII Flow and Depth Results (Pre-development vs Post-development)

								No Highlighting Indicates No Capacity Constraints Yellow Indicates q/Q > 100%, d/D <100% Red Indicates q/Q > 100%, d/D >100%				No Highlighting Indicates No Capacity Constraints Yellow Indicates d/D > 70% Red Indicates d/D > 100%			
Location	Link ID	Manhole		Pipe				Flow (q) (L/s)		Flow Capacity (q/Q_{full})		Depth (d) (m)		Depth Capacity (d/D)	
		U/S	D/S	Size (m)	Length (m)	Slope (%)	Q_{full} (L/s)	Pre dev.	Post dev.	Pre dev.	Post dev.	Pre dev.	Post dev.	Pre dev.	Post dev.
Pafford Street [(1)]	189001794	180003396	180003397	0.300	68.30	0.15	37.6	11.2	25.1	30%	67%	0.12	0.18	39.1%	61.0%
Pafford Street	189001793	180003397	180003398	0.300	76.20	0.29	52.0	11.6	25.5	22%	49%	0.14	0.21	48.0%	69.3%
Pafford Street	189001792	180003398	180003399	0.300	76.50	0.14	36.0	14.3	28.1	40%	78%	0.14	0.21	48.0%	69.3%
Pafford Street	189001791	180003399	180003401	0.300	80.80	0.76	84.5	14.8	28.6	17%	34%	0.08	0.12	28.3%	40.1%
Pafford Street	189001790	180003401	180003402	0.300	74.10	0.30	52.7	59.9	73.7	114%	140%	0.29	0.42	96.0%	140.5%
King Street	189004273	180003402	180006385	0.350	51.50	0.34	85.3	74.2	88.0	87%	103%	0.26	0.30	73.5%	84.8%
King Street	189004218	180006385	180006196	0.350	22.30	0.34	85.2	78.6	92.4	92%	109%	0.26	0.29	73.5%	83.5%
King Street	189004061	180006196	180005803	0.450	51.10	0.24	138.7	78.8	92.6	57%	67%	0.25	0.28	55.5%	61.5%
King Street	189004113	180005803	180006197	0.450	21.10	0.24	138.8	79.6	93.4	57%	67%	0.26	0.28	57.2%	63.1%
King Street	189004053	180006197	180003405	0.450	77.90	0.21	131.6	80.6	94.5	61%	72%	0.26	0.28	57.2%	63.1%
King Street	189001289	180003405	180003556	0.450	76.50	0.34	166.5	80.9	94.8	49%	57%	0.23	0.25	50.1%	55.0%
King Street	189002039	180003556	180003315	0.450	35.40	0.34	165.3	82.8	96.6	50%	58%	0.23	0.25	50.6%	55.3%
King Street	189001290	180003315	180003430	0.450	117.40	0.36	170.5	87.0	100.9	51%	59%	0.23	0.25	50.8%	55.5%
King Street	189002045	180003430	180003431	0.450	66.80	0.36	170.2	87.4	101.2	51%	59%	0.23	0.25	51.3%	56.0%
King Street	189001291	180003431	180003432	0.450	120.50	0.35	168.5	87.8	101.7	52%	60%	0.24	0.26	52.4%	56.9%
King Street	189001292	180003432	180003433	0.450	122.10	0.34	167.2	88.0	101.8	53%	61%	0.24	0.26	52.4%	56.9%
King Street	189001293	180003433	180003438	0.450	19.70	0.36	171.2	92.3	106.2	54%	62%	0.35	0.37	78.9%	82.2%
King Street	189001295	180003438	180003214	0.450	79.20	0.35	168.9	96.0	109.8	57%	65%	0.24	0.27	54.3%	59.0%
Gage Street	189001296	180003214	180003215	0.450	41.30	0.37	172.4	98.7	112.5	57%	65%	0.25	0.27	55.2%	60.0%
Gage Street	189001298	180003215	180003216	0.450	120.30	0.35	168.5	99.0	112.9	59%	67%	0.25	0.27	55.2%	60.0%
Gage Street	189001299	180003216	180003217	0.450	73.40	0.36	170.7	99.0	112.9	58%	66%	0.25	0.27	55.3%	60.1%
Gage Street	189002043	180003217	180003664	0.450	75.70	0.35	168.4	99.5	113.3	59%	67%	0.25	0.27	55.3%	60.1%
Gage Street	189001300	180003664	180003219	0.450	71.70	0.35	169.4	99.5	113.3	59%	67%	0.25	0.27	55.4%	60.2%
Gage Street	189001301	180003219	180003220	0.450	75.30	0.35	168.5	99.9	113.7	59%	67%	0.26	0.28	56.7%	61.5%
Gage Street	189001302	180003220	180003221	0.450	76.40	0.35	168.2	103.4	117.2	61%	70%	0.26	0.28	56.7%	61.5%
Gage Street	189001303	180003221	180003222	0.450	69.90	0.35	169.1	103.7	117.5	61%	69%	0.34	0.36	76.3%	79.9%
Gage Street	189001613	180003222	180003223	0.600	79.30	0.23	293.3	183.4	197.4	63%	67%	0.34	0.36	57.2%	59.9%
Gage Street	189001614	180003223	180003224	0.600	79.50	0.26	310.3	182.2	196.6	59%	63%	0.37	0.39	62.3%	65.3%
Mississagua Street	189001616	180003224	180003202	0.600	66.70	0.16	248.2	182.8	197.2	74%	79%	0.37	0.39	62.3%	65.3%
Mississagua Street	189002015	180003202	180003201	0.600	85.20	0.22	290.7	182.6	196.8	63%	68%	0.34	0.37	57.5%	60.9%
Mississagua Street	189001780	180003201	180003775	0.600	66.70	0.24	300.7	185.3	197.9	62%	66%	0.34	0.44	56.3%	74.0%
Mississagua Street	189001779	180003775	180003889	0.600	82.50	0.33	354.5	185.0	192.3	52%	54%	0.52	0.66	86.1%	109.8%
William Street	189001617	180003889	180003890	0.600	72.90	0.20	276.7	186.3	198.9	67%	72%	0.61	0.73	102.0%	121.8%

								No Highlighting Indicates No Capacity Constraints Yellow Indicates q/Q > 100%, d/D <100% Red Indicates q/Q > 100%, d/D >100%				No Highlighting Indicates No Capacity Constraints Yellow Indicates d/D > 70% Red Indicates d/D > 100%			
Location	Link ID	Manhole		Pipe				Flow (q) (L/s)		Flow Capacity (q/Q_{full})		Depth (d) (m)		Depth Capacity (d/D)	
		U/S	D/S	Size (m)	Length (m)	Slope (%)	Q_{full} (L/s)	Pre dev.	Post dev.	Pre dev.	Post dev.	Pre dev.	Post dev.	Pre dev.	Post dev.
William Street	189001618	180003890	180003891	0.600	76.40	0.36	366.4	185.0	199.1	50%	54%	0.82	0.92	135.9%	153.8%
William Street	189001619	180003891	180003892	0.600	80.90	0.10	197.9	186.8	201.0	94%	102%	0.84	0.93	139.3%	155.5%
William Street	18901620	180003892	180003893	0.600	76.47	0.18	261.8	187.1	201.2	71%	77%	0.91	0.99	150.8%	164.7%
William Street	18901622	180003893	180003894	0.600	81.88	0.17	256.6	283.1	298.2	110%	116%	0.91	0.99	150.8%	164.7%
William Street	18901623	180003894	180003898	0.600	65.32	0.25	308.6	283.2	298.3	92%	97%	0.90	0.95	150.0%	158.2%
William Street	18901624	180003898	180003303	0.600	106.18	0.21	279.5	287.1	302.1	103%	108%	0.90	0.95	150.0%	158.2%
William Street	18901625	180003303	180003302	0.600	28.49	0.34	356.4	287.1	302.1	81%	85%	1.00	1.02	167.2%	170.0%
William Street Sanitary Pumping Station	18902049	180003302	180003301	0.600	22.00	0.64	489.8	311.7	326.7	64%	67%	1.82	1.83	303.3%	305.2%

(1) – Nodes where the site discharges

Table 2-10 2041 5-Year RDII HGL Results (Pre-development vs Post-development)

								Green Highlighting Shows HGL Freeboard is greater than 1.8 m Yellow Highlighting Shows Freeboard is less than 1.8 m, but the flow is contained within Pipe (i.e. no surcharge) Red Highlighting Shows Freeboard is less than 1.8 m and pipe is surcharging			
Location	Conduit (DS)	MH	T/G (m)	Max Allowable HGL (m)	Minimum Obvert	Pre-Development		Post Development			
						Maximum HGL (m)	Freeboard (m)	Maximum HGL (m)	Freeboard (m)		
Pafford Street [(1)]	189001794	180003396	89.40	87.60	86.68	86.50	2.90	86.56	2.83		
Pafford Street	189001793	180003397	89.67	87.87	86.58	86.38	3.30	86.43	3.25		
Pafford Street	189001792	180003398	89.30	87.50	86.36	86.20	3.10	86.27	3.04		
Pafford Street	189001791	180003399	89.16	87.36	86.23	86.02	3.14	86.05	3.10		
Pafford Street	189001790	180003401	88.63	86.83	85.13	85.12	3.51	85.25	3.38		
Pafford Street/King Street	189004273	180003402	88.24	86.44	84.91	84.82	3.42	84.87	3.38		
King Street/Evergreen Lane	189004218	180006385	88.16	86.36	84.74	84.65	3.51	84.69	3.47		
King Street	189004061	180006196	88.25	86.45	84.67	84.56	3.68	84.59	3.66		
King Street	189004113	180005803	88.17	86.37	84.65	84.45	3.72	84.47	3.70		
King Street/Anne Street	189004053	180006197	88.00	86.20	84.60	84.40	3.60	84.43	3.57		
King Street	189001289	180003405	87.84	86.04	84.43	84.20	3.64	84.22	3.61		
King Street/John Street West	189002039	180003556	87.38	85.58	84.17	83.95	3.43	83.97	3.41		
King Street	189001290	180003315	86.34	84.54	84.05	83.83	2.51	83.85	2.49		
King Street/Mary Street	189002045	180003430	85.99	84.19	83.63	83.41	2.58	83.43	2.56		
King Street	189001291	180003431	86.90	85.10	83.39	83.17	3.72	83.20	3.70		
King Street	189001292	180003432	86.34	84.54	82.97	82.76	3.58	82.78	3.56		
King Street/Centre Street	189001293	180003433	87.59	85.79	82.36	82.27	5.32	82.28	5.31		
King Street	189001295	180003438	87.65	85.85	82.29	82.09	5.57	82.11	5.54		

Green Highlighting Shows HGL Freeboard is greater than 1.8 m
Yellow Highlighting Shows Freeboard is less than 1.8 m, but the flow is contained within Pipe (i.e. no surcharge)
Red Highlighting Shows Freeboard is less than 1.8 m and pipe is surcharging

Location	Conduit (DS)	MH	T/G (m)	Max Allowable HGL (m)	Minimum Obvert	Pre-Development		Post Development	
						Maximum HGL (m)	Freeboard (m)	Maximum HGL (m)	Freeboard (m)
King Street/Gage Street	189001296	180003214	87.86	86.06	82.02	81.81	6.05	81.83	6.03
Gage Street	189001298	180003215	87.48	85.68	81.86	81.66	5.82	81.68	5.80
Gage Street/Regent Street	189001299	180003216	86.81	85.01	81.44	81.24	5.57	81.26	5.55
Gage Street	189002043	180003217	86.01	84.21	81.18	80.98	5.03	81.00	5.01
Gage Street/Victoria Street	189001300	180003664	85.15	83.35	80.92	80.71	4.43	80.74	4.41
Gage Street	189001301	180003219	84.35	82.55	80.66	80.46	3.88	80.48	3.86
Gage Street/Gate Street	189001302	180003220	83.48	81.68	80.40	80.21	3.27	80.23	3.25
Gage Street	189001303	180003221	83.09	81.29	80.14	79.94	3.15	79.96	3.13
Gage Street/Simcoe Street	189001613	180003222	84.75	82.95	79.89	79.78	4.97	79.80	4.95
Gage Street	189001614	180003223	84.04	82.24	79.86	79.59	4.45	79.60	4.43
Gage Street/Mississagua Street	189001616	180003224	83.57	81.77	79.66	79.43	4.14	79.45	4.13
Mississagua Street	189002015	180003202	83.82	82.02	79.55	79.29	4.53	79.31	4.51
Mississagua Street/Centre Street	189001780	180003201	84.45	82.65	79.36	79.09	5.35	79.12	5.33
Mississagua Street	189001779	180003775	84.84	83.04	79.20	78.90	5.94	79.04	5.80
Mississagua Street/William Street	189001617	180003889	85.09	83.29	78.92	78.84	6.26	78.98	6.11
William Street	189001618	180003890	83.99	82.19	78.77	78.78	5.21	78.90	5.09
William Street/Butler Street	189001619	180003891	83.79	81.99	78.49	78.72	5.07	78.82	4.97
William Street	18901620	180003892	83.38	81.58	78.41	78.64	4.74	78.74	4.64
William Street/Dorchester Street	18901622	180003893	83.25	81.45	78.27	78.57	4.68	78.66	4.60
William Street	18901623	180003894	81.02	79.22	78.12	78.40	2.63	78.46	2.56
William Street/Nassau Street	18901624	180003898	80.86	79.06	77.96	78.26	2.60	78.31	2.55
William Street	18901625	180003303	80.56	78.76	77.66	78.03	2.53	78.05	2.51
William Street	18902049	180003302	81.89	80.09	76.83	77.97	3.92	77.98	3.91
William Street Sanitary Pumping Station		180003301	82.40	80.60	76.69	77.91	4.49	77.92	4.48

(1) – Nodes where the site discharges

3.0 CONCLUSIONS

This sanitary analysis report presents the impact of the proposed development on the existing sanitary sewer network under multiple scenarios. The analysis was completed using an Infoworks ICM model, which was developed based on the InfoSWMM model provided by Niagara Region. The model was updated to reflect new developments in the sewershed and correct pipe information as per the plan and profile drawings. The analysis simulated pre-development and post-development scenarios under 2041 DWF, 2041 Design RDII and 2041 5-year Storm conditions as defined in the Region's model. The following is the summary of the assessment:

- The total estimated population of the proposed development is 795 people. Under post-development conditions, a peak constant flow of 13.82 L/s was applied in the model to represent the proposed development, as flows will be discharged to the existing sewer system via a pumping solution.
- The 2041 DWF and 2041 Design RDII results indicated no surcharge conditions along the downstream sewer under pre-development and post-development scenarios. Therefore, it is anticipated that the existing downstream sewer has adequate capacity to support the proposed development during 2041 DWF and 2041 Design RDII conditions.
- The 2041 5-year Storm results indicate that several pipes experience water levels above the pipe obvert under pre-development and post-development scenarios. However, the majority of them operate below 100% of their flow capacity. Only 4 of them exceed 100% flow capacity in the post-development scenario, demonstrating actual surcharge conditions due to the capacity deficiency of the sewer. It is noted that these surcharged sewers could provide a minimum freeboard of 1.8m, satisfying the Region's criteria for WWF conditions. Therefore, it is anticipated that the existing downstream sewer has adequate capacity to support the proposed development during the 2041 5-year Storm WWF condition.
- Potential upgrades can be implemented to eliminate locations where flow capacity exceeds 100%, if requested by the Town. However, these surcharge conditions are generally considered safe under WWF conditions in accordance with Niagara Region design standards. As such, upgrades are not recommended, as the incremental benefit would be

minimal. The potential upgrades are summarized below:

Street Location	Upstream Manhole	Downstream Manhole	Existing Sewer Diameter (mm)	Downstream Sewer Diameter (mm)
Pafford Street	180003401	180003402	300	375
William Street	180003891	180003892	350	450
William Street	180003893	180003894	600	675
William Street	180003898	180003303	600	675

We trust that you will find the contents of this report satisfactory. Should you have any questions or comments, please do not hesitate to contact the undersigned.

Respectfully Submitted,

SCHAEFFER & ASSOCIATES LTD.

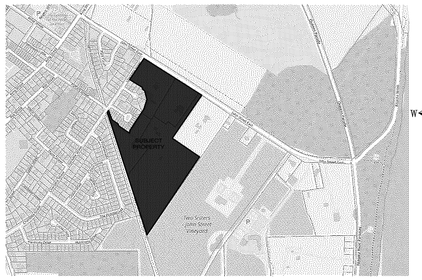


Tsz Pok (Paul) Wong, P.Eng.
Water Resource Engineer

Appendix A

Background Information

A.1 – Architectural Drawings



KEY PLAN

SCALE : NOT TO SCALE

LEGEND

ZONING

- GENERAL COMMERCIAL (GC) ZONE
- RESIDENTIAL (RD) ZONE PROPOSED 7.5.2.3.
- OPEN SPACE (OS) ZONE
- GENERAL COMMERCIAL ZONE LEASED
- WETLANDS

SITE WORKS

- PERIMETER OF BUILDING / PERIMETER OF COVERED (DASHED) / STRUCTURE / PERIMETER OF COVERED (DASHED) — BUILDING
- STRUCTURE (UNENCLOSED)
- EXISTING BUILDING
- PAVERS
- ASPHALT
- CONCRETE
- POOL
- CONCRETE CURB

UNHATCHED AREAS TO BE GRASS or LANDSCAPE
ALL SITE WORK NEW UNLESS NOTED OTHERWISE

(##) PARKING SPACES

CHARLOTTE STREET
JOHN STREET
RAILROAD STREET
WEATHERSTONE COURT
REGISTERED BLOCK A
REGISTERED PLAN M-83
PART 1, PLAN 30R-3422
PART 2, PLAN 30R-1792
LOT 1 P.I.N. 46404-0002
LOT 2 P.I.N. 46404-0003
LOT 3 P.I.N. 46404-0004
LOT 4 P.I.N. 46404-0005
LOT 5 P.I.N. 46404-0006
LOT 6 P.I.N. 46404-0007
LOT 7 P.I.N. 46404-0008
LOT 8
LOT 9
CREEK 10m BUFFER
EXISTING 100 YEAR FLOOD LINE
REQUIRED 6.0m SIDE YARD SETBACK
WETLAND 2
CREEK 15m BUFFER
SERVICE ACCESS GRAVEL
PUMPING STATION BLOCK ONE STOREY
STORM WATER DETENTION
PROVIDED SETBACK
RAMP TO BELOW GRADE PARKING
LOADING
ASPHALT
HOTEL FIVE STOREYS
PARKING EXIT SINGLE-STOREY
PAVILION SHELL-STORY
ENTRY FEATURE
LANDSCAPE
EXISTING GAZEBO
COMMERCIAL OUTDOOR SPA EIGHT SINGLE-STOREY PAVILIONS
COMMERCIAL SPA THREE STOREYS
(X)TERRACE
(X)ASPHALT PARKING REMOVED
(X)ASPHALT REPLACED WITH PAVERS
EXISTING HERITAGE RESTAURANT TWO STOREYS
EXISTING GAZEBO TO BE REMOVED
EXISTING BRIDAL SHOP TWO STOREYS
RESIDENCES 4 THREE STOREYS
RESIDENCES 5 THREE STOREYS
RESIDENCES 3 THREE STOREYS
RESIDENCES 2 THREE STOREYS
RESIDENCES 1 THREE STOREYS
CARRIAGE HOUSE (RESIDENCE CLUBHOUSE) TWO STOREYS
RESIDENT RECREATION AREA
TENNIS CLUB (NOT COVERED)
BATH PAVILION
WETLAND 1
WETLAND 3
RITZ-CARLTON LANE
BRICK PAVERS
PORTE-COCHERE
CONCRETE RAMP
EXTENT OF BELOW GRADE PARKING (DASHED)
4.5m WIDE FIRE ACCESS ROUTE
ADJACENT RESIDENTIAL RM1 ZONE
AGRICULTURAL
ADJACENT WINERY
30.0m SETBACK
DRIPLINE AS SET OUT BY ARBORIST – JULY 10, 2018
ADJACENT OS ZONE
WHISTLE STOP
RESIDENTIAL/AGRICULTURAL BOUNDARY
ESTABLISHED PLANTING LIMIT
LIMIT CONFIRMED BY PLAN BA-179
EX. GARBAGE DUMP
LOT 147
LOT 146
LOT 145
LOT 14
P.I.N. 46404 – 0207
P.I.N. 46404 – 0043
P.I.N. 46404 – 0039
P.I.N. 46404 – 0362
P.I.N. 46404 – 0363
P.I.N. 46404 – 0365
P.I.N. 46404 – 0366
P.I.N. 46404 – 0367
P.I.N. 46404 – 0368
P.I.N. 46404 – 0369
P.I.N. 46404 – 0370
P.I.N. 46404 – 0371
P.I.N. 46404 – 0372
P.I.N. 46404 – 0373
P.I.N. 46404 – 0374
P.I.N. 46404 –

KEY PLAN

SCALE : NOT TO SCALE

LEGEND

ZONING

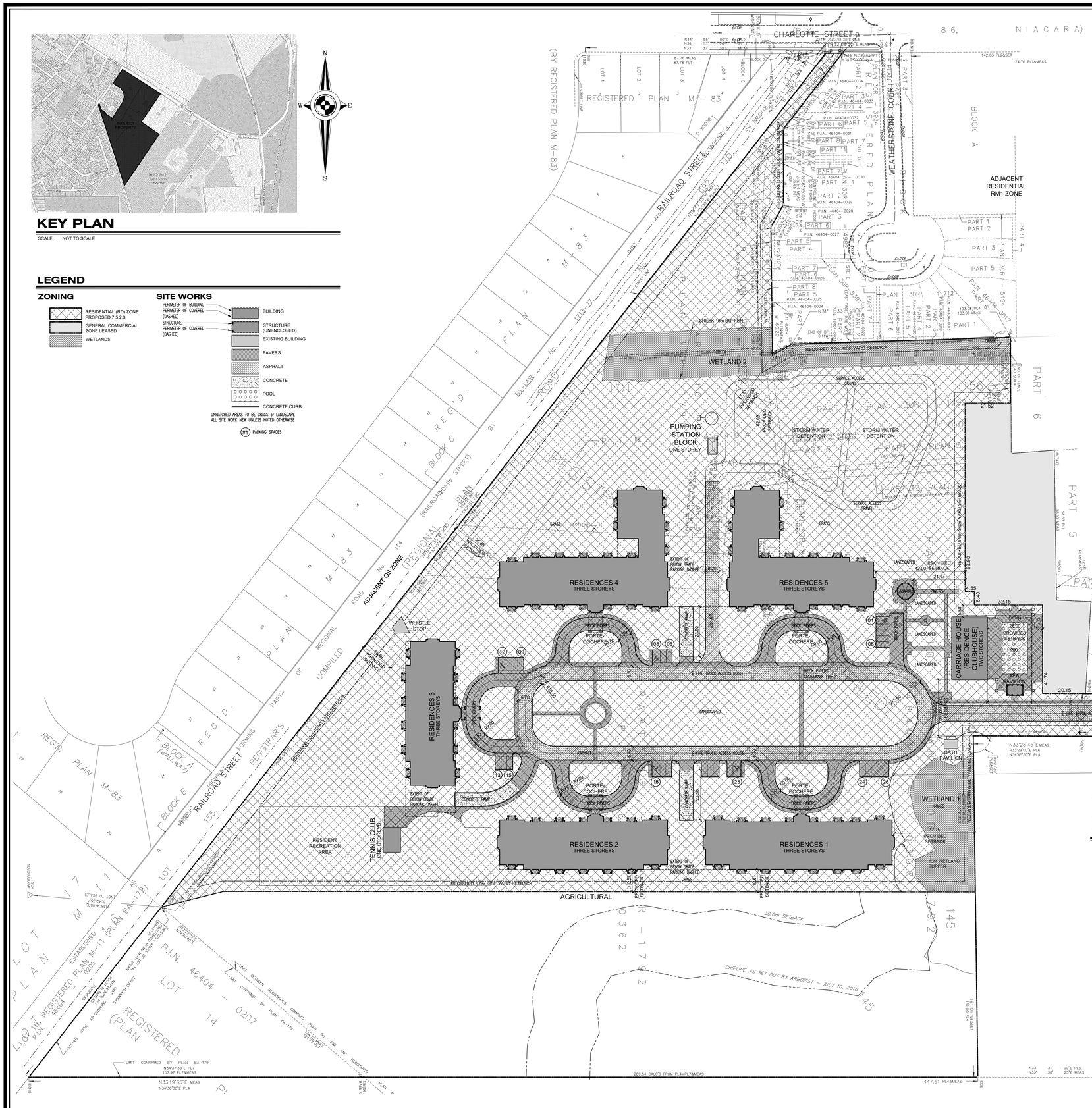
- RESIDENTIAL (RD) ZONE PROPOSED 7.5.2.3.
- GENERAL COMMERCIAL ZONE LEASED
- WETLANDS

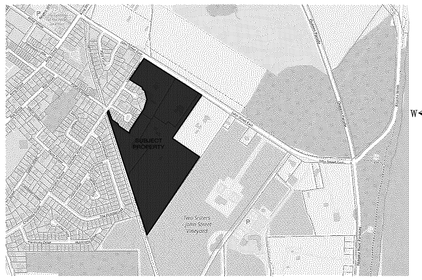
SITE WORKS

- PERIMETER OF BUILDING / PERIMETER OF COVERED (DASHED) STRUCTURE — BUILDING
- PERIMETER OF COVERED (DASHED) — STRUCTURE (UNENCLOSED)
- EXISTING BUILDING
- PAVERS
- ASPHALT
- CONCRETE
- POOL
- CONCRETE CURB

UNHATCHED AREAS TO BE GRASS or LANDSCAPE
ALL SITE WORK NEW UNLESS NOTED OTHERWISE

(##) PARKING SPACES


CHARLOTTE STREET
JOHN STREET
RAILROAD STREET
BY-LAW No. 1717-27
(BY REGISTERED PLAN M-83)
ADJACENT OS ZONE
REGISTERED PLAN M-83
REGISTERED PLAN 30R-1792
REGISTERED PLAN 30R-5494
REGISTERED PLAN 30R-5387
REGISTERED PLAN 30R-4712
REGISTERED PLAN 30R-5387 (EAST PART)
WEATHERSTONE COURT
BLOCK A
ADJACENT RESIDENTIAL RM1 ZONE
CREEK 18m BUFFER
TOP OF BANK
WETLAND 2
REQUIRED 5.0m SIDE YARD SETBACK
SERVICE ACCESS GRAVEL
PUMPING STATION BLOCK ONE STOREY
STORM WATER DETENTION
RESIDENCES 4 THREE STOREYS
RESIDENCES 5 THREE STOREYS
RESIDENCES 3 THREE STOREYS
RESIDENCES 2 THREE STOREYS
RESIDENCES 1 THREE STOREYS
CARRIAGE HOUSE (RESIDENCE CLUBHOUSE) TWO STOREYS
TENNIS CLUB ONE STOREY
RESIDENT RECREATION AREA
WHISTLE STOP
4 FIRE TRUCK ACCESS ROUTES
BRICK PAVER CROSSWALK (TYP.)
LANDSCAPED
PORTE-COCHERE
BRICK PAVERS
CONCRETE RAMP
EXTENT OF BELOW GRADE PARKING (DASHED)
RITZ-CARLTON LANE
BRIDGE
GATE
WETLAND 3
WETLAND 1
30M WETLAND BUFFER
BATH PAVILION
ADJACENT GENERAL COMMERCIAL ZONE 7.14.56
ADJACENT RESIDENTIAL RM1 ZONE
AGRICULTURAL
30.0m SETBACK
DRIPLINE AS SET OUT BY ARBORIST - JULY 10, 2018
REQUIRED 5.0m SIDE YARD SETBACK
REQUIRED 7.5m FRONT YARD SETBACK
EXISTING 100 YEAR FLOOD LINE
CREEK 10m BUFFER
PROVIDED SETBACK
285.05
37.76
P.I.N. 46404 - 0207
P.I.N. 46404 - 0209
LOT 14 REGISTERED PLAN 46404
LOT 17 PLAN M-111 (PLAN BA-179)
LOT 16 REGISTERED PLAN 46404
LIMIT CONFIRMED BY PLAN BA-179
LIMIT BETWEEN REGISTRAR'S COMPILED PLAN No. 692 AND REGISTERED PLAN 'A'
289.54 CALC'D FROM PL4+PL7&MEAS
447.51 PL4&MEAS
247.80 PL6&MEAS
142.03 PL2&SET
174.76 PL1&MEAS
87.76 MEAS
87.78 PL1
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PART 1
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PART 11
PART 12
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PART 14
PART 15
PART 16
PART 17
PART 18
PART 19
PART 20
PART



KEY PLAN

SCALE : NOT TO SCALE

LEGEND

ZONING

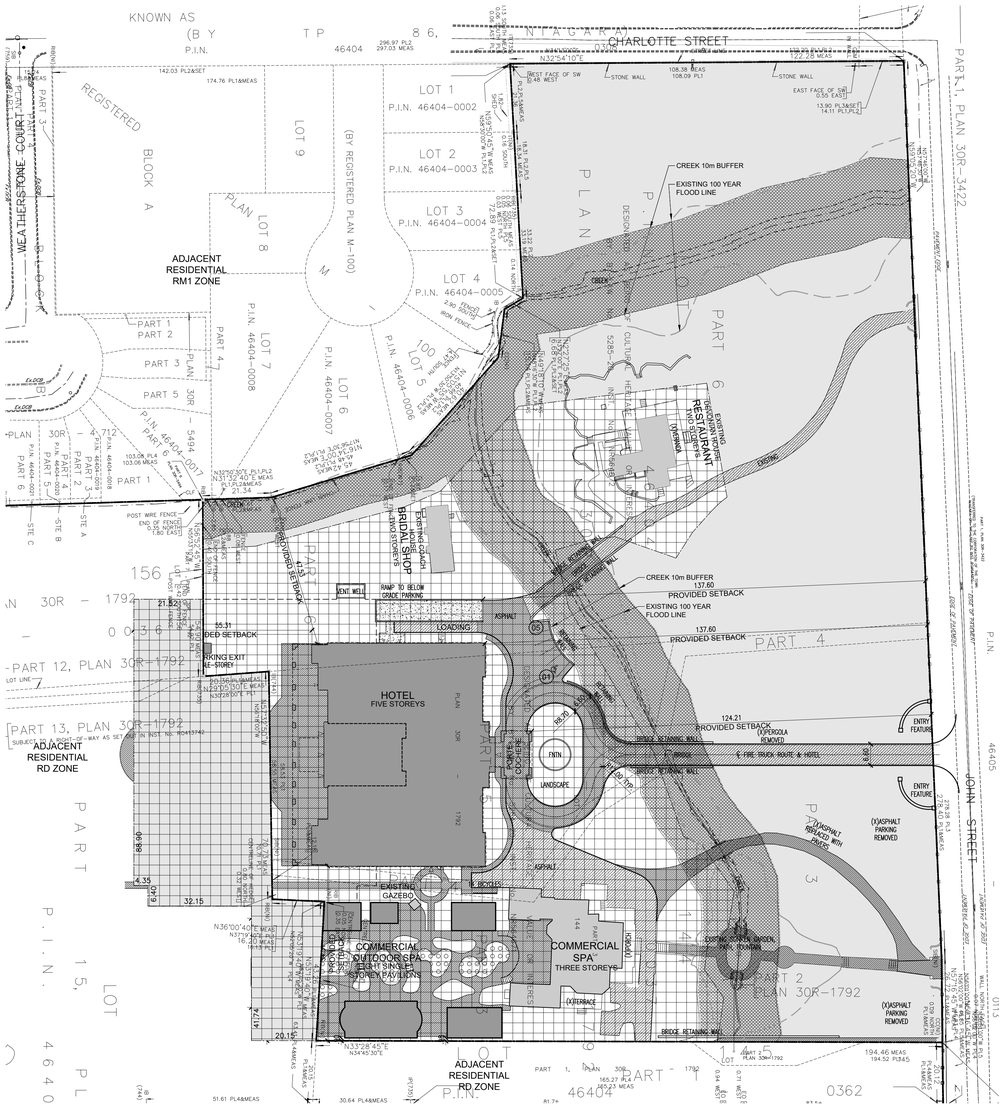
- GENERAL COMMERCIAL (GC) ZONE
- OPEN SPACE (OS) ZONE
- GENERAL COMMERCIAL ZONE LEASED
- WETLANDS

SITE WORKS

- PERIMETER OF BUILDING
- PERIMETER OF COVERED (DASHED)
- STRUCTURE
- PERIMETER OF COVERED (DASHED)
- BUILDING
- STRUCTURE (UNENCLOSED)
- EXISTING BUILDING
- PAVERS
- ASPHALT
- CONCRETE
- POOL
- CONCRETE CURB

UNHATCHED AREAS TO BE GRASS or LANDSCAPE
ALL SITE WORK NEW UNLESS NOTED OTHERWISE

(###) PARKING SPACES



ZONING SITE PLAN - GENERAL COMMERCIAL & OPEN SPACE

SCALE : 1:750

SITE STATISTICS

Ritz Carlton Hotel / Spa Site
144 and 176 John Street

			Proposed
PROPERTY AREA			
Property Area		53,262.42 m²	
Commercial Zoned Area			
Plus	Lease Lands from Ritz Carlton Residences Long Term 583 Charlotte Street and 200 John Street East	+4,751.56 m²	
Minus	Existing Open Space Zone	- 30,564.84 m²	
Total to be Zoned General Commercial Area			27,449.14 m²
BUILDING GROUND COVER			
	Ritz Carlton Hotel	3,587.73 m²	
	Rand Spa	769.57 m²	
	Outdoor Spa Pavilions	938.00 m²	
	Coach House	146.6 m²	
	Devonian House	253.73 m²	
Total Building Ground Cover			5,695.63 m²
BUILDING GROSS AREAS			
Ritz Carlton Hotel	Basement	2,350.71 m²	
	Underground Parking	7,159.17 m²	
	Ground Floor	3,587.73 m²	
	Second Floor	2,880.33 m²	
	Third Floor	2,880.33 m²	
	Fourth Floor	2,880.33 m²	
	Fifth Floor	2,927.77 m²	
	Mechanical Penthouse		
	Total		24,659.43 m²
Rand Spa	Basement	880.56 m²	
Existing Building	Ground Floor	769.57 m²	
	Second Floor	329.7 m²	
	Third Floor	312.85 m²	
	Widow's Walk	27.25 m²	
	Total		2319.93 m²
Outdoor Spa Pavilions		938 m²	
Coach House	Ground Floor	146.6 m²	
Existing Building	Second Floor	102.4 m²	
Total			249 m²
Devonian House	Ground Floor	253.73 m²	
Existing Building	Second Floor	253.73 m	
Total			507.46 m²
Total Gross Building Area			28,680.8 m²

SITE STATISTICS

Full Property	
Gross Building Ground Cover	5,695.63 m²
10.7% of Property	
Landscaped Area	45,085.06 m²
84.6% of Property	
Asphalt Area	2,481.73 m²
4.7% of Property	
Lands Zoned General Commercial	
Gross Building Ground Cover	5,695.63 m²
20.7% of G.C. Zone	
Landscaped Area	20,249.68 m²
73.8% of G.C. Zone	
Asphalt Area	1,503.83 m²
5.5% of G.C. Zone	

PARKING REQUIREMENTS

				VEHICLE PARKING REQUIRED		BICYCLE PARKING REQUIRED	
HOTEL COMPONENTS							
Hotel Rooms			111	1 per guestroom in addition to other uses	111 spaces	No requirements	0 spaces
		Seats	Area				
Restaurants	River View Restaurant	99	288.48 m²				
	Upper Banquet Room	240	336.45 m²				
	Grand Salon	39	169.57 m²				
	Private Lounge	34	40.9 m²				
	Lower Restaurant	118	87.3 m²				
	Lower Banquet Room	266	349.16 m²			Restaurants (375.78 m²)	
	Subtotal	738	1,271.86 m²	1 per 9m² GFLA	141 spaces	2 per 100 m² GFLA	7.52 spaces
Restaurant - Outdoor Patio		Seats					
		104	414.46 m²	1 per 30 m² GFLA of Outdoor Patio Area in addition to the requirements for a restaurant or take-out restaurant.	14 spaces	No requirements	0 spaces
Conference Rooms on Areas Used in Conjunction with Other uses							
	Meeting Room A		94.52 m²				
	Meeting Rooms B, C, D & E		187.99 m²				
	Conference Room		43.46 m²				
	Subtotal		325.97 m²	1 per 18.5 m² GFLA	18 spaces	No requirements	0 spaces
Office	Front Reception		69.26 m²				
	Human Resources		85.19 m²				
	Management and Marketing		231.04 m²				
	Accounting		84.13 m²			Offices	
	Subtotal		469.62 m²	1 per 28 m² GFLA	17 spaces	1 per 250 m² GFLA	1.88 spaces
Retail Sales	Wine Shop		38.20 m²				
	Gift Shop		25.70 m²			Commercial	
	Subtotal		63.9 m²	1 per 18.5 m² GFLA	4 spaces	1 per 200 m² GFLA	0.32 spaces
PROPERTY COMPONENTS							
Existing Rand Mansion - Conversion to Spa	Total GFLA of Mansion		2,086.43 m²				
	Area of to be Used as Spa (Other Areas Unoccupied)		1,260.86 m²	1 per 15 m² GFLA	85 spaces	No requirements	0 spaces
Outdoor Spa Pavilions	Combined Area of Pavilions		980.64 m²	1 per 15 m² GFLA	66 spaces	No requirements	0 spaces
Existing Devonian House						Restaurant	
- Ground Floor Conversion to Restaurant	Dining Area		178.50 m²	1 per 9 m² GFLA	20 spaces	2 per 100 m² GFLA	3.57 spaces
(Remainder Unoccupied)	Outdoor Covered Porch Area		188.27 m²	1 per 30 m² GFLA of Outdoor Patio Area	6 spaces	No requirements	0 spaces
Existing Coach House						Commercial	
- Ground Floor Conversion to Bridal Shop (Remainder Unoccupied)	Ground Floor to be Used Only (Second Storey Unoccupied)		135 m²	1 per 18.5 m² GFLA	8 spaces	1 per 200 m² GFLA	0.68 spaces
TOTAL PARKING REQUIRED					484 spaces		14 spaces
PARKING PROVIDED						**BICYCLE PARKING**	14 Provided
Surface				Barrier Free Standard 2.75x6.0 m	1 spaces		
					4 spaces		
Underground				Barrier Free Standard 2.75x6.0 m	8 spaces		
					209 spaces		
TOTAL PARKING PROVIDED					222 spaces		

EXISTING SITE-SPECIFIC GENERAL COMMERCIAL 7.14.56 ZONING RELIEF TABLE

BY-LAW 7.14.56	BY-LAW REQUIREMENT	PROVIDED	BY-LAW RELIEF REQUESTED
a) Minimum Lot Frontage	300.0 m	305.12	None
b) Minimum Lot Depth	120 m	121 m	None
c) Minimum Landscaped Open Space	50%	73.8 %	None
d) Maximum Lot Coverage	12%	20.7 %	None
e) Minimum main building setbacks in accordance with Figure 7.14.56Fii	93.75 m	137.6 m	None
f) Minimum vehicular access ramp setback	30.48 m	137.6 m	None 8.09 m
g) Maximum building height	17.35 m	24.74 m	
h) Maximum seating capacity for restaurant	200 seats	99 seats River View Restaurant 240 seats Upper Banquet Room 39 seats Grand Salon 34 seats Private Lounge 118 seats Lower Restaurant 266 seats Lower Banquet Room 786 seats Total	600 seats
i) Maximum number of rooms for the hotel	106	111	5 rooms
j) Maximum ground floor area of all buildings in the commercial zone	4,181 m²	5,695.6 m²	1,600 m²
k) Maximum floor area of the spa	185.8 m²	1,707.6 m²	400 m²
l) Maximum ground floor area of Arts & Learning Center	1250 m²	Not Applicable	None
m) Devonian House: No other commercial use shall be permitted except for a maximum of 8 guest rooms associated as part of the hotel use		Restaurant	Restaurant Use to be permitted

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4855 Drummond Road, Unit 11, Niagara Falls, Ontario L2E 6C5
telephone 905.357.0112 e-mail plesdow@cogeco.net
ONTARIO ASSOCIATION OF ARCHITECTS
PETER J. LESDOW LICENCE 3745

ZONING PLAN GENERAL COMMERCIAL & OPEN SPACE
144 & 176 John St

DATE	REVISIONS
Apr. 07/ 36	FOR REZONING

RITZ-CARLTON DEVELOPMENT
144, 176 & 200 John St, 856 Charlotte St
Niagara-on-the-Lake

DATE: Nov. 18/ 22
SCALE: 1:100
DRAWN BY: MRW
CHECK BY: PJL

22 – 13

A103

A.2 – Excerpt from Niagara Region 2016 Master Servicing Plan

Volume 4 – Part D

D. NIAGARA-ON-THE-LAKE WASTEWATER TREATMENT PLANT

D.1 Existing System Overview

The Niagara-on-the-Lake wastewater system services the Old Town and Virgil areas of the Town of Niagara-on-the-Lake. The system services an existing population of 10,297 and 5,990 employees.[1]

The system is serviced by the Niagara-on-the-Lake Wastewater Treatment Plant, located on 1550 Lakeshore Road, Niagara-on-the-Lake. The Niagara-on-the-Lake Wastewater Treatment Plant is a conventional treatment facility with a current rated capacity of 8.0 MLD, a peak flow capacity of 34.7 MLD[2].

Figure 4.D.1 presents an overview of the wastewater system, and Figure 4.D.2 shows a schematic of the wastewater system.

[1] *Hemson Consulting Ltd, 2016. Niagara Region TAZ Forecasts to 2041*

[2] *Ministry of Environment, 10 September 2014. Ammeded Environmental Compliance Approval. Number 8314-9MHHJQ*

Lake Ontario

William Street Pumping Station

Front Street Pumping Station

Niagara-on-the-Lake W.W.T.P.

Lakeshore Road Pumping Station

Ricardo Street Pumping Station

Garrison Village Pumping Station

Niagara Stone Road Pumping Station

Line 2 Pumping Station (Hunter Farm)

Niagara River

N

0 1 2 Kilometers

Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community

Niagara Region

2016 MASTER SERVICING PLAN

Wastewater Facilities

- Wastewater Treatment Plant
- Combined Sewage Detention Facility
- Lagoon
- Odour Control Facility
- Leachate Pumping Station

Pumping Stations

- Regional
- Municipal
- Private

Wastewater Network

- Regional
- Local
- Private
- Forcemain

Wastewater Catchments*

*Catchment limits are shown based on property boundaries and are within 100 m of sewers.

- Front Street
- Garrison Village
- Lakeshore Road
- Line 2 (Hunter Farm)
- Niagara Stone Road
- Ricardo Street
- Romance Cards Inc.
- St. Michaels Catholic Elementary School
- William Street

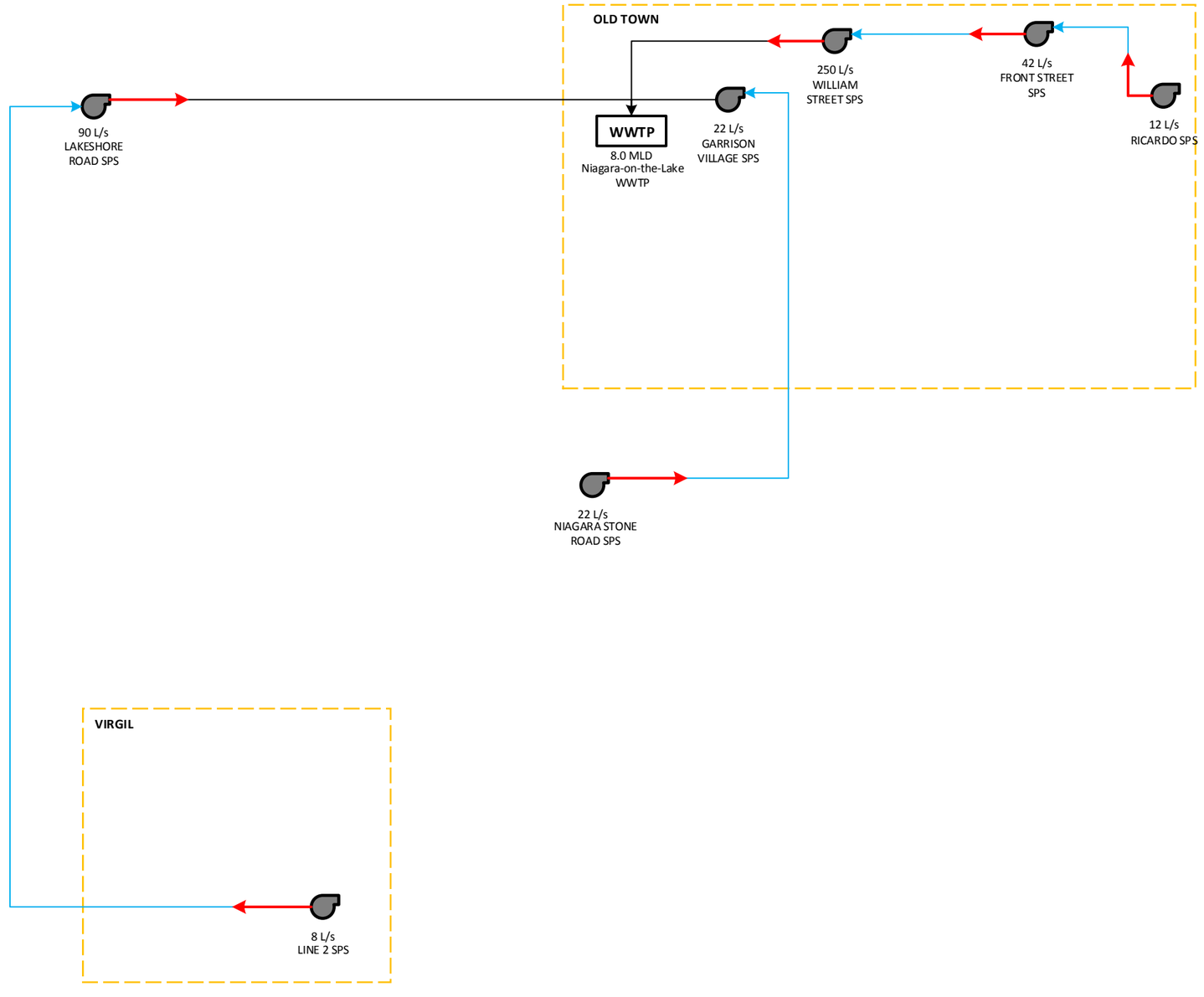
Figure 4.D.1

Existing Wastewater System

Niagara-on-the-Lake WWTP

BluePlan Engineering

June 2017
715023-WW-2-Existing System (NOTL)
NAD 1983 UTM Zone 17N



Niagara Region

2016 Master Servicing Plan

Niagara-on-the-Lake WWTP

EXISTING COLLECTION SCHEMATIC

Legend

- WWTP — RATED CAPACITY: Wastewater Treatment Plant
- FIRM CAPACITY: Sewage Pumping Station
- Forcemain
- Connection from SPS to SPS
- Connection from SPS to WWTP

June 2017
Figure 4.D.2
Not to Scale

BluePlan ENGINEERING

D.1.1 Service Area Overview

Table 4.D.1 provides a list of facility catchments and their areas. Refer to Figure 4.D.1 for the catchment areas of each facility.

Table 4.D.1 Facilities and Catchment Areas

Facility	Catchments	Catchment Area (ha)
Niagara-on-the-Lake Wastewater Treatment Plant (WWTP)	**Niagara-on-the-Lake WWTP** (Including Sub Catchments) Garrison Village SPS Lakeshore Road SPS William Street SPS	785.7
	Niagara-on-the-Lake WWTP (Excluding Sub Catchments)	0.0
Garrison Village Sewage Pumping Station (SPS)	**Garrison Village SPS** (Including Sub Catchments) Niagara Stone Road SPS	112.3
	Garrison Village SPS (Excluding Sub Catchments)	78.9
Niagara Stone Road SPS	Niagara Stone Road SPS	33.4
Lakeshore Road SPS	**Lakeshore Road SPS** (Including Sub Catchments) Line 2 SPS	295.4
	Lakeshore Road SPS (Excluding Sub Catchments)	267.3
Line 2 SPS	Line 2 SPS	28.0
William Street SPS	**William Street SPS** (Including Sub Catchments) Front Street SPS	378.1
	William Street SPS (Excluding Sub Catchments)	321.1
Front Street SPS	**Front Street SPS** (Including Sub Catchments) Ricardo Street SPS	56.9
	Front Street SPS (Excluding Sub Catchments)	20.8
Ricardo Street SPS	Ricardo Street SPS	36.1

D.1.2 Facility Overview

Table 4.D.2 Wastewater Treatment Plant Overview

Plant Name	Niagara-on-the-Lake Wastewater Treatment Plant
Address	1550 Lakeshore Road, Niagara-on-the-Lake
Discharge Water	Lake Ontario
Rated Capacity: Average Daily Flow	8.0 MLD
Rated Capacity: Peak Flow Rate (Dry Weather)	Not Available
Rated Capacity: Peak Flow Rate (Wet Weather)	34.7 MLD
Key Processes	• Mechanical bar screens with air bubble diffuser system • Grit classifier with cyclone separators • Aeration • Final clarification • Sludge thickening • Anaerobic digestion

Table 4.D.3 Wastewater Treatment Plant Effluent Objectives

Effluent Parameter	Objective Concentration[3]
$CBOD_5$	15.0 mg/L
TSS	15.0 mg/L
Total Phosphorus	0.5 mg/L
Total Ammonia Nitrogen *April, May, and October* *June – September* *November – March*	 5 mg/L 2 mg/L 10 mg/L
E. Coli	100 organisms/100 mL
Total Chlorine Residual	0.01 mg/L

[3] *Ministry of Environment, 10 September 2014. Ammeded Environmental Compliance Approval. Number 8314-9MHHJQ*

Table 4.D.4 Pumping Station Overview

Sewage Pumping Station	Location	Number of Pumps	ECA Firm Capacity (L/s)	Operational Firm Capacity (L/s)	Total Dynamic Head (m)
Garrison Village Sewage Pumping Station (SPS)	1788 Lakeshore Road, Niagara-on-the-Lake	2	62.0	21.7	25.0
Niagara Stone Road SPS	1974 Niagara Stone Road, Niagara-on-the-Lake	3	24.0	22.0	20.5
Lakeshore Road SPS	1340 Lakeshore Road, Niagara-on-the-Lake	2	90.0	90.0	31.5
Line 2 SPS	Hunter Farm Subdivision, Line 2 Road, Virgil	2	Unknown	8.0	Unknown
William Street SPS	433 William Street, Niagara-on-the-Lake	3	250.0	250.0	35.0
Front Street SPS	Front Street, Niagara-on-the-Lake	2	41.5	41.5	10.7
Ricardo Street SPS	Ricardo Street, Niagara-on-the-Lake	2	17.6	11.9	14.0

Table 4.D.5 Forcemain Overview

Sewage Pumping Station	Pump Station Operational Capacity (L/s)	Length (m)	Diameter (mm)	Capacity @ 2.5 m/s (L/s)
Garrison Village Sewage Pumping Station (SPS)	21.7	355	200	78.5
Niagara Stone Road SPS	22.0	902	150	44.2
Lakeshore Road SPS	90.0	2,078	300	176.7
Line 2 SPS	8.0	175	100	19.6
William Street SPS	250.0	846	400	436.9
Front Street SPS	41.5	360	200	78.5
Ricardo Street SPS	11.9	624	150	44.2

D.1.3 Flows Overview

Table 4.D.6 shows the historical system flows obtained from wastewater treatment plant production data for 2011 to 2015. Table 4.D.7 shows the existing wastewater system flows by catchment.

Table 4.D.6 Historic Niagara-on-the-Lake Wastewater Treatment Plant Flows

Year	Average Dry Weather Flow		Average Daily Flow		Peak Daily Flow	
	MLD	L/s	MLD	L/s	MLD	L/s
2011	4.8	55.6	5.0	57.9	16.1	186.3
2012	3.9	45.1	4.1	47.5	8.7	100.7
2013	4.8	55.6	4.9	56.7	8.6	99.5
2014	4.1	47.5	4.3	49.8	10.2	118.1
2015	3.9	45.1	4.0	46.3	8.2	94.9
5 Year Average	4.3	49.8	4.4	50.9	10.3	119.2
5 Year Peak	4.8	55.6	5.0	57.9	16.1	186.3

Table 4.D.7 Existing Wastewater System Flows by Catchment

Catchment	Total Service Equivalent Population	Existing Average Dry Weather Flow (L/s)	Existing Design Peak Wet Weather Flow (L/s)	Existing 2-Year Flow (L/s)	Existing 5-Year Flow (L/s)
Niagara-on-the-Lake Wastewater Treatment Plant (WWTP)	16,287	50.9	326.4	276.7	358.8
Niagara-on-the-Lake WWTP	0	0.0	0.0	0.0	0.0
Garrison Village Sewage Pumping Station (SPS)	4,082	7.3	46.7	37.0	50.0
Garrison Village SPS	769	6.5	35.6	27.2	36.7
Niagara Stone Road SPS	3,313	0.8	11.1	9.8	13.3
Lakeshore Road SPS	4,866	12.8	110.1	75.0	101.0
Lakeshore Road SPS	3,533	9.8	96.1	68.1	91.7
Line 2 SPS	1,333	3.0	14.1	6.9	9.3
William Street SPS	7,339	30.7	169.6	180.0	247.1
William Street SPS	7,058	21.2	134.3	156.0	211.0
Front Street SPS	281	9.5	35.3	24.0	36.1
Front Street SPS	211	3.4	12.8	9.4	14.1
Ricardo Street SPS	70	6.1	22.5	14.6	22.0

Note: Flow numbers may not sum due to rounding.

D.2 Growth Projections

D.2.1 Population Projections and Allocations

Table 4.D.8 and Table 4.D.9 outline the existing and projected serviced population and employment by catchment.

Table 4.D.8 Niagara-on-the-Lake Wastewater Treatment Plant Existing and Projected Serviced Population by Catchment

Catchment	2014	2021	2026	2031	2036	2041	Growth 2014 - 41
Front Street Sewage Pumping Station (SPS)	102	106	107	108	111	115	12
Garrison Village SPS	742	870	983	1,071	1,103	1,111	369
Lakeshore Road SPS	2,069	2,448	3,008	3,192	3,257	3,317	1,248
Line 2 SPS	1,333	1,368	1,391	1,414	1,469	1,485	152
Niagara Stone Road SPS	1,776	1,666	1,656	1,768	2,013	2,129	353
Ricardo Street SPS	44	46	46	46	47	48	3
William Street SPS	4,229	4,458	4,492	4,536	4,636	4,748	518
Total	**10,297**	**10,961**	**11,684**	**12,135**	**12,635**	**12,953**	**2,657**

Note: Population numbers may not sum due to rounding.

Table 4.D.9 Niagara-on-the-Lake Wastewater Treatment Plant Existing and Projected Serviced Employment by Catchment

Catchment	2014	2021	2026	2031	2036	2041	Growth 2014 - 41
Front Street Sewage Pumping Station (SPS)	108	115	116	117	117	119	10
Garrison Village SPS	26	56	63	67	81	101	74
Lakeshore Road SPS	1,464	1,637	1,667	1,696	1,728	1,776	312
Line 2 SPS	0	0	0	0	0	0	0
Niagara Stone Road SPS	1,537	1,786	1,859	1,925	2,013	2,133	596
Ricardo Street SPS	26	27	27	27	27	28	2
William Street SPS	2,829	2,960	2,997	3,024	3,061	3,117	288
Total	**5,990**	**6,582**	**6,729**	**6,856**	**7,028**	**7,273**	**1,282**

Note: Population numbers may not sum due to rounding.

D.2.2 Future Flow Projections

Table 4.D.10 and Table 4.D.11 summarize the projected peak dry weather flow and peak wet weather flow by catchment.

Table 4.D.10 Projected Peak Dry Weather Flow by Catchment

Catchment	2021 Design Peak Dry Weather Flow (L/s)	2026 Design Peak Dry Weather Flow (L/s)	2031 Design Peak Dry Weather Flow (L/s)	2036 Design Peak Dry Weather Flow (L/s)	2041 Design Peak Dry Weather Flow (L/s)
Front Street Sewage Pumping Station (SPS)	6.9	7.0	7.0	7.0	7.1
Garrison Village SPS	15.0	16.4	17.5	18.0	18.4
Lakeshore Road SPS	25.4	31.5	33.6	34.6	35.7
Line 2 SPS	6.5	6.7	7.0	7.6	7.8
Niagara Stone Road SPS	3.0	3.7	5.6	9.1	11.5
Ricardo Street SPS	12.2	12.2	12.2	12.2	12.3
William Street SPS	46.0	46.7	47.4	48.7	50.3
Total	**115.1**	**124.2**	**130.3**	**137.3**	**143.1**

The following presents an example calculation of projected peak dry weather flow.

2041 Peak Dry Weather Flow for William Street Sewage Pumping Station:
= (2014 Average Dry Weather Flow × Peaking Factor) +
(2041 Equivalent Population – 2014 Equivalent Population) × 275 L/cap/day ×
1 day/86400 s × Harmon Peaking Factor for Growth Population
= (21.23 L/s × 2.0) + (7,865 – 7,058 people) × 275 L/cap/day × 1 day/86400 s × 3.06
= 50.3 L/s

Table 4.D.11 Projected Peak Wet Weather Flow by Catchment

Catchment	2021 Design Peak Wet Weather Flow (L/s)	2026 Design Peak Wet Weather Flow (L/s)	2031 Design Peak Wet Weather Flow (L/s)	2036 Design Peak Wet Weather Flow (L/s)	2041 Design Peak Wet Weather Flow (L/s)
Front Street Sewage Pumping Station (SPS)	12.9	12.9	12.9	13.0	13.1
Garrison Village SPS	37.6	39.0	40.1	40.6	40.9
Lakeshore Road SPS	101.9	108.0	110.1	111.1	112.1
Line 2 SPS	14.5	14.7	15.0	15.7	15.8
Niagara Stone Road SPS	12.6	13.3	15.1	18.7	21.1
Ricardo Street SPS	22.6	22.6	22.6	22.6	22.6
William Street SPS	137.8	138.5	139.2	140.5	142.1
Total	**339.8**	**348.9**	**355.0**	**362.1**	**367.8**

The following presents an example calculation of projected peak wet weather flow.

2041 Peak Wet Weather Flow for William Street Sewage Pumping Station:
= 2041 Peak Dry Weather Flow + 2041 Design RDII
= 2041 Peak Dry Weather Flow + (2041 Catchment Area × 0.286 L/s/ha)
= 50.3 L/s + (321.1 ha × 0.286 L/s/ha)
= 142.1 L/s

D.3 Assessment of Wastewater Infrastructure (Existing and Future)

D.3.1 Treatment Plant Capacity

Figure 4.D.3 shows the projected future demands at the Niagara-on-the-Lake Wastewater Treatment Plant. The plant has surplus capacity and will not reach 80% capacity within the 2041 time horizon.

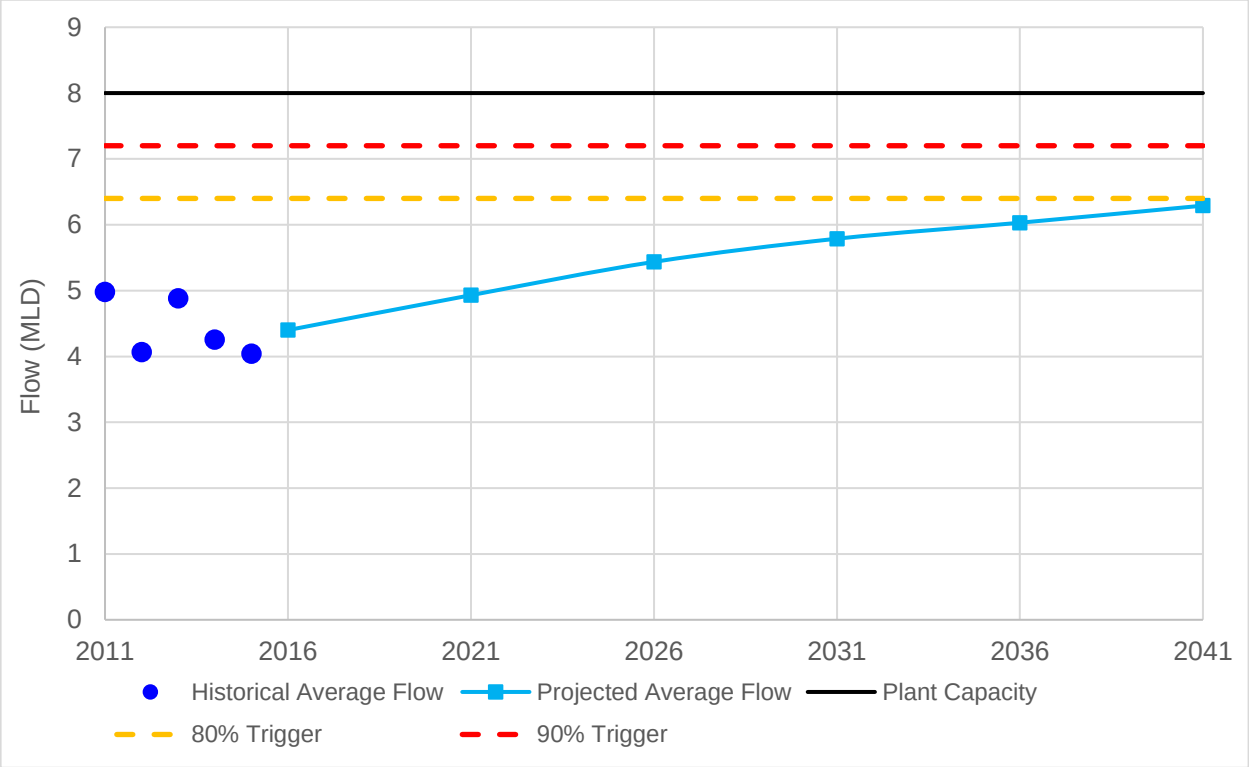


Figure 4.D.3 Projected future demands at Niagara-on-the-Lake Wastewater Treatment Plant

D.3.2 Sewage Pumping Station

Table 4.D.12 highlights the sewage pumping station existing and projected capacity.

Table 4.D.12 System Sewage Pumping Station Performance

Sewage Pumping Station	Contributing Catchments	Facility Operational Capacity (L/s)	Existing Design Peak Wet Weather Flow (L/s)	2041 Design Peak Wet Weather Flow (L/s)	2041 Surplus/ Deficit (L/s)
Garrison Village Sewage Pumping Station (SPS)	Garrison Village SPS Niagara Stone Road SPS	21.7	46.7	60.9	-39.2
Niagara Stone Road SPS	Niagara Stone Road SPS	22.0	11.1	21.1	0.9
Lakeshore Road SPS	Lakeshore Road SPS Line 2 SPS	90.0	110.1	127.2	-37.2
Line 2 SPS	Line 2 SPS	8.0	14.1	15.8	-7.8
William Street SPS	William Street SPS Front Street SPS	250.0	169.6	177.7	72.3
Front Street SPS	Front Street SPS Ricardo Street SPS	41.5	35.3	35.6	5.9
Ricardo Street SPS	Ricardo Street SPS	11.9	22.5	22.6	-10.7

The following sewage pumping stations have projected pumping deficits:

- Garrison Village Sewage Pumping Station
- Lakeshore Road Sewage Pumping Station
- Line 2 Sewage Pumping Station
- Ricardo Street Sewage Pumping Station

D.3.3 Forcemain

Table 4.D.13 highlights the existing and projected forcemain performance.

Table 4.D.13 Forcemain Performance

Sewage Pumping Station	Pump Station Operational Capacity (L/s)	Capacity @ 2.5 m/s (L/s)	Existing Design Peak Wet Weather Flow (L/s)	2041 Design Peak Wet Weather Flow (L/s)	2041 Surplus/ Deficit (L/s)
Garrison Village SPS	21.7	78.5	46.7	60.9	17.6
Niagara Stone Road SPS	22.0	44.2	11.1	21.1	23.1
Lakeshore Road SPS	90.0	176.7	110.1	127.2	49.5
Line 2 SPS	8.0	19.6	14.1	15.8	3.8
William Street SPS	250.0	436.9	169.6	177.7	259.2
Front Street SPS	41.5	78.5	35.3	35.6	42.9
Ricardo Street SPS	11.9	44.2	22.5	22.6	21.6

All forcemains have a projected surplus capacity.

D.3.4 Trunk Sewer

Figure 4.D.4 and Figure 4.D.5 highlight the existing and projected peak wet weather flow, respectively. Trunk sewers in the Garrison Village Sewage Pumping Station and Ricardo Street Sewage Pumping Station catchments are approaching capacity within the 2041 time horizon.

Lake Ontario

William Street Pumping Station

Front Street Pumping Station

Niagara-on-the-Lake W.W.T.P.

Lakeshore Road Pumping Station

Ricardo Street Pumping Station

Garrison Village Pumping Station

Niagara Stone Road Pumping Station

Line 2 Pumping Station (Hunter Farm)

Niagara River

N

0 1 2 Kilometers

Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community

Niagara Region

2016 MASTER SERVICING PLAN

Wastewater Facilities

- Wastewater Treatment Plant
- Combined Sewage Detention Facility
- Lagoon
- Odour Control Facility
- Leachate Pumping Station

Pumping Stations

- Regional
- Municipal
- Private

Wastewater Network

- Sanitary Sewers
- Forcemain

Wastewater Catchments*

*Catchment limits are shown based on property boundaries and are within 100 m of sewers.

- Front Street
- Garrison Village
- Lakeshore Road
- Line 2 (Hunter Farm)
- Niagara Stone Road
- Ricardo Street
- Romance Cards Inc.
- St. Michaels Catholic Elementary School
- William Street

Capacity (d/D)

- < 0.85
- 0.85 - 0.99
- > 1.00

Figure 4.D.4

Existing Peak Wet Weather Flow

Niagara-on-the-Lake WWTP

BluePlan Engineering

June 2017
715023-WW-4-Existing Wet Weather (NOTL)
NAD 1983 UTM Zone 17N

Lake Ontario

Lakeshore Road Pumping Station

Niagara-on-the-Lake W.W.T.P.

William Street Pumping Station

Front Street Pumping Station

Ricardo Street Pumping Station

Garrison Village Pumping Station

Niagara Stone Road Pumping Station

Line 2 Pumping Station (Hunter Farm)

Niagara River

N

0 1 2 Kilometers

Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community

Niagara Region

2016 MASTER SERVICING PLAN

Wastewater Facilities

- Wastewater Treatment Plant
- Combined Sewage Detention Facility
- Lagoon
- Odour Control Facility
- Leachate Pumping Station

Pumping Stations

- Regional
- Municipal
- Private

Wastewater Network

- Sanitary Sewers
- Forcemain

Wastewater Catchments*

*Catchment limits are shown based on property boundaries and are within 100 m of sewers.

- Front Street
- Garrison Village
- Lakeshore Road
- Line 2 (Hunter Farm)
- Niagara Stone Road
- Ricardo Street
- Romance Cards Inc.
- St. Michaels Catholic Elementary School
- William Street

Capacity (d/D)

- < 0.85
- 0.85 - 0.99
- > 1.00

Figure 4.D.5

2041 Peak Wet Weather Flow

Niagara-on-the-Lake WWTP

BluePlan Engineering

June 2017
715023-WW-5-2041 Wet Weather (NOTL)
NAD 1983 UTM Zone 17N

D.4 System Opportunities and Constraints

Figure 4.D.6 highlights the existing opportunities and constraints.

D.4.1 Niagara-on-the-Lake Wastewater Treatment Plant

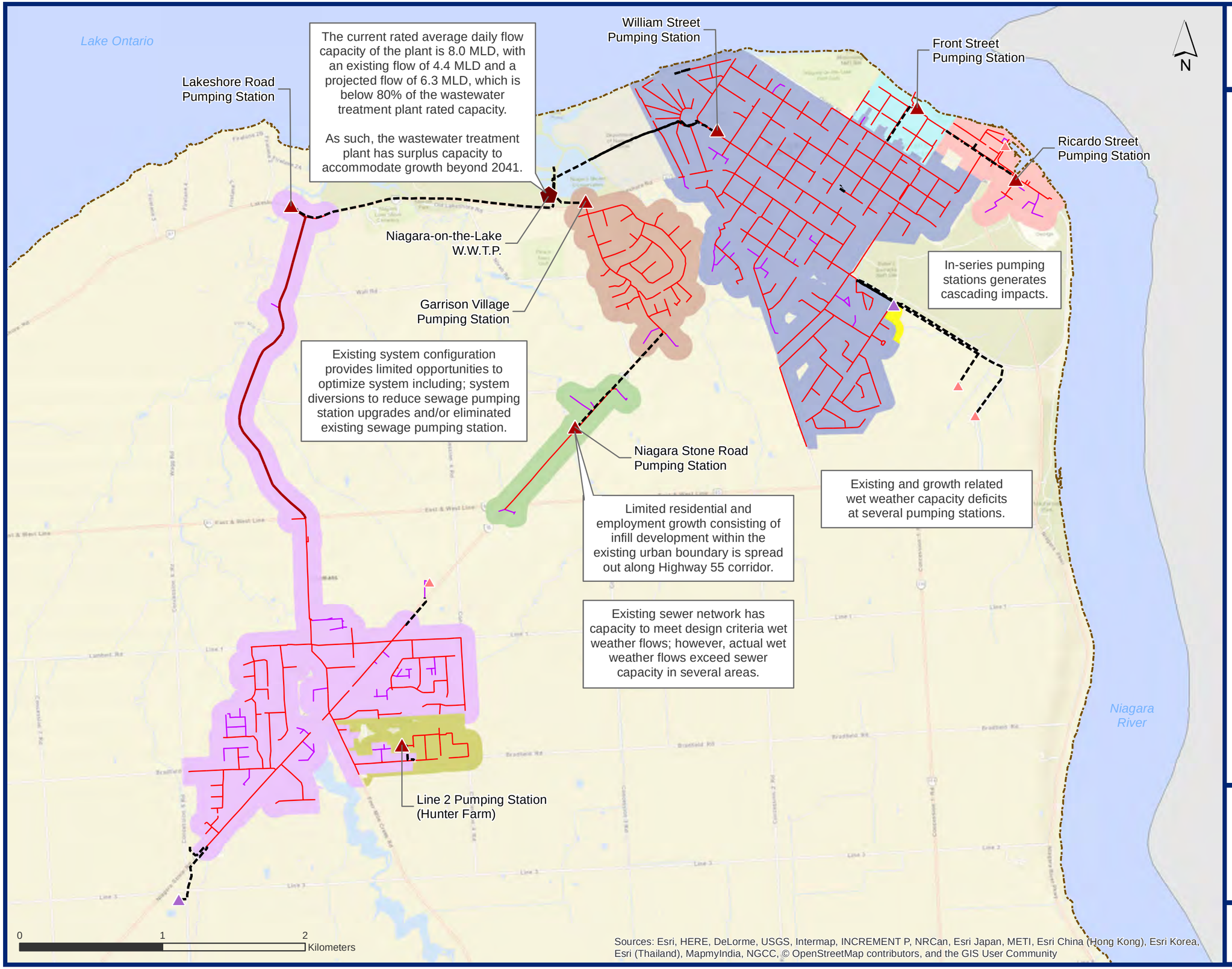
- The current rated average daily flow capacity of the plant is 8.0 MLD, with an existing flow of 4.4 MLD and a projected flow of 6.3 MLD, which is below 80% of the wastewater treatment plant rated capacity. As such, the wastewater treatment plant has surplus capacity to accommodate growth beyond 2041.

D.4.2 Niagara-on-the-Lake

- Limited residential and employment growth consisting of infill development within the existing urban boundary is spread out along the Highway 55 corridor.
- Existing and growth related wet weather capacity deficits at several pumping stations.
- Existing sewer network has capacity to meet design criteria wet weather flows; however, actual wet weather flows exceed sewer capacity in several areas.

D.4.3 System Optimization Opportunities

- In-series pumping stations generates cascading impacts.
- Existing system configuration provides limited opportunities to optimize system, including system diversions to reduce sewage pumping station upgrades and/or eliminate existing sewage pumping stations.



Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community

Niagara Region

2016 MASTER SERVICING PLAN

Wastewater Facilities

- Wastewater Treatment Plant
- Combined Sewage Detention Facility
- Lagoon
- Odour Control Facility
- Leachate Pumping Station

Pumping Stations

- Regional
- Municipal
- Private

Wastewater Network

- Regional
- Local
- Private
- Forcemain

Wastewater Catchments*

*Catchment limits are shown based on property boundaries and are within 100 m of sewers.

- Front Street
- Garrison Village
- Lakeshore Road
- Line 2 (Hunter Farm)
- Niagara Stone Road
- Ricardo Street
- Romance Cards Inc.
- St. Michaels Catholic Elementary School
- William Street

Figure 4.D.6

System Opportunities and Constraints

Niagara-on-the-Lake WWTP

BluePlan Engineering

June 2017
715023-WW-3-Opportunities and Constraints (NOTL)
NAD 1983 UTM Zone 17N

D.5 Assessment of Alternatives

No further alternatives beyond application of the hybrid management strategy below were identified.

- Provide capacity within Regional pumping stations and trunk sewers to convey peak wet weather flows up to the design criteria of 0.286 L/s/ha.
- Provide upstream flow management and peak flow management to address peak flows in systems where peak wet weather flows exceed the design criteria of 0.286 L/s/ha resulting in potential basement flooding and overflow risks.

D.6 Preferred Servicing Strategy

The following is a summary of the Niagara-on-the-Lake wastewater servicing strategy, presented in Figure 4.D.7 and Figure 4.D.8:

- The Niagara-on-the-Lake Wastewater Treatment Plant is a newly constructed facility. The wastewater treatment plant has sufficient capacity to support growth to year 2041.
- The wastewater strategy comprises only of a few sewage pumping station capacity upgrades to address additional flows from growth.

D.6.1 Pumping Stations

The following sewage pumping station upgrades are required:

- Lakeshore Road Sewage Pumping Station pump replacement: Increase capacity from 90 L/s to 142 L/s.
- Niagara Stone Road Sewage Pumping Station pump replacement: Increase capacity from 22 L/s to 27 L/s.
- Line 2 SPS pump replacement: Increase capacity from 8 L/s to 17 L/s.
- Garrison Village SPS pump replacement: Increase capacity from 62 L/s to 68 L/s.
- Ricardo SPS has no flow monitoring data, so flows are based on parcel allocation. Operations staff report no known capacity issues and there is no growth allocated to the catchment. As such, no project has been identified at Ricard SPS.

D.6.2 Wet Weather

A significant element of the Niagara Region wastewater servicing strategy is the wet weather management program. The program is intended to deal with existing capacity constraints, and to provide for growth-related capacity without expanding/upgrading existing trunk infrastructure, or by minimizing the required expansion/upgrade.

The wet weather management program currently identifies overall preliminary priority, staging of location and target amount of inflow and infiltration reduction across all systems. This program provides for a proactive and targeted approach to addressing wet weather impacts. These wet weather management programs will need to be a joint initiative between the Region and local municipalities.

For the Niagara-on-the-Lake system, the following priority areas are identified:

- Virgil area, consisting of the Lakeshore Road Sewage Pumping Station catchment.
- Niagara-on-the-Lake, consisting of the William Street Sewage Pumping Station catchment.

Further flow monitoring and area-specific wet weather flow studies, including Pollution Prevention Control Plan, Inflow and Infiltration Study, Intensification Studies, Preferred Servicing Strategy are needed to identify area specific strategies and projects required to achieve the wet weather flow reduction objectives. Following the outcomes of the further studies, targeted funding can be applied outside the priority areas if the projects are found to address capacity issues and support growth capacity needs.

D.7 Capital Program

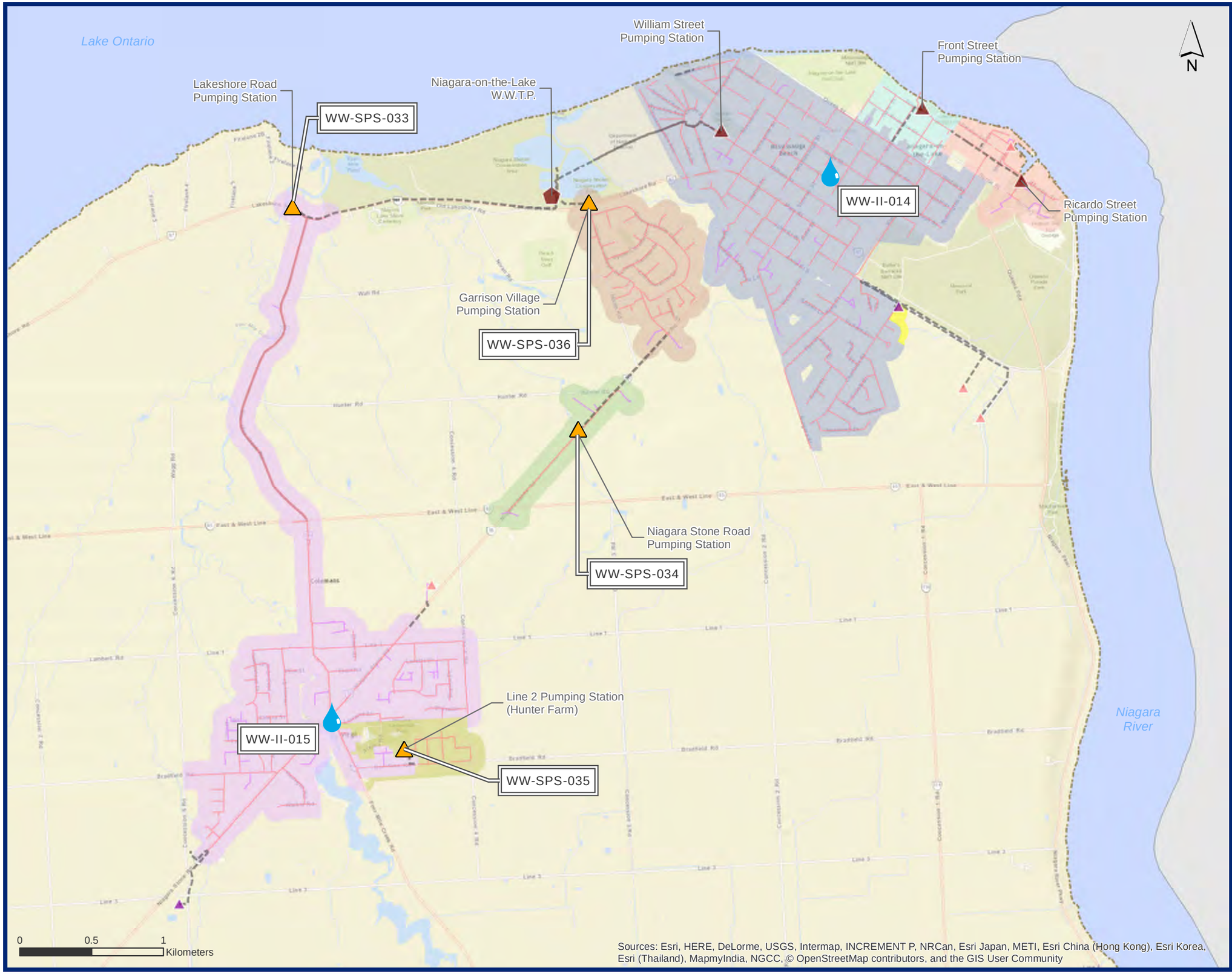
Table 4.D.14 summarizes the recommended project costing, implementation schedule and Class EA requirements.

D.7.1 Schedule B Project Files

No Schedule B projects are anticipated for the Niagara-on-the-Lake Wastewater Treatment Plant system.

Table 4.D.14 Summary of Niagara-on-the-Lake Wastewater Treatment Plant Capital Program

Master Plan ID	Name	Description	Size / Capacity	Year in Service	Municipality	Class EA Schedule	Class EA Status	Project Type	Total Component Estimated Cost
WW-II-014	Wet weather reduction in Northeast Niagara-on-the-Lake	Wet weather reduction in Northeast Niagara-on-the-Lake	5 L/s reduction	2022-2031	Niagara-on-the-Lake	N/A	Dependent on outcome of wet weather flow study	Wet Weather Reduction	$750,000
WW-II-015	Wet weather reduction in Virgil	Wet weather reduction in Virgil – Niagara-on-the-Lake	5 L/s reduction	2022-2031	Niagara-on-the-Lake	N/A	Dependent on outcome of wet weather flow study	Wet Weather Reduction	$750,000
WW-SPS-033	Lakeshore Road Sewage Pumping Station (SPS) Pump Replacement - Niagara-on-the-Lake	Increase station capacity from 90 L/s to 142 L/s	142 L/s	2032-2041	Niagara-on-the-Lake	A+	Satisfied	Pumping	$1,512,000
WW-SPS-034	Niagara Stone Road SPS Pump Replacement - Niagara-on-the-Lake	Increase station capacity from 22 L/s to 27 L/s	27 L/s	2032-2041	Niagara-on-the-Lake	A+	Satisfied	Pumping	$834,000
WW-SPS-035	Line 2 SPS Pump Replacement - Niagara-on-the-Lake	Increase station capacity from 8 L/s to 17 L/s	17 L/s	2017-2021	Niagara-on-the-Lake	A+	Satisfied	Pumping	$665,000
WW-SPS-036	Garrison Village SPS Pump Replacement - Niagara-on-the-Lake	Increase station capacity from 62 L/s to 68 L/s	68 L/s	2032-2041	Niagara-on-the-Lake	A+	Satisfied	Pumping	$1,250,000
Total									**$5,761,000**



Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community

Niagara Region

2016 MASTER SERVICING PLAN

MSP Wastewater Projects

- Treatment Plant
- Pumping Station
- Wet Weather Reduction
- Sanitary Sewer Projects
- Forcemain Projects

Wastewater Facilities

- Wastewater Treatment Plant
- Combined Sewage Detention Facility
- Lagoon
- Odour Control Facility
- Leachate Pumping Station

Pumping Stations
- Regional
- Municipal
- Private

Wastewater Network
- Regional
- Private
- Local
- Forcemain

Wastewater Catchments*

*Catchment limits are shown based on property boundaries and are within 100 m of sewers.

- Front Street
- Garrison Village
- Lakeshore Road
- Line 2 (Hunter Farm)
- Niagara Stone Road
- Ricardo Street
- Romance Cards Inc.
- St. Michaels Catholic Elementary School
- William Street

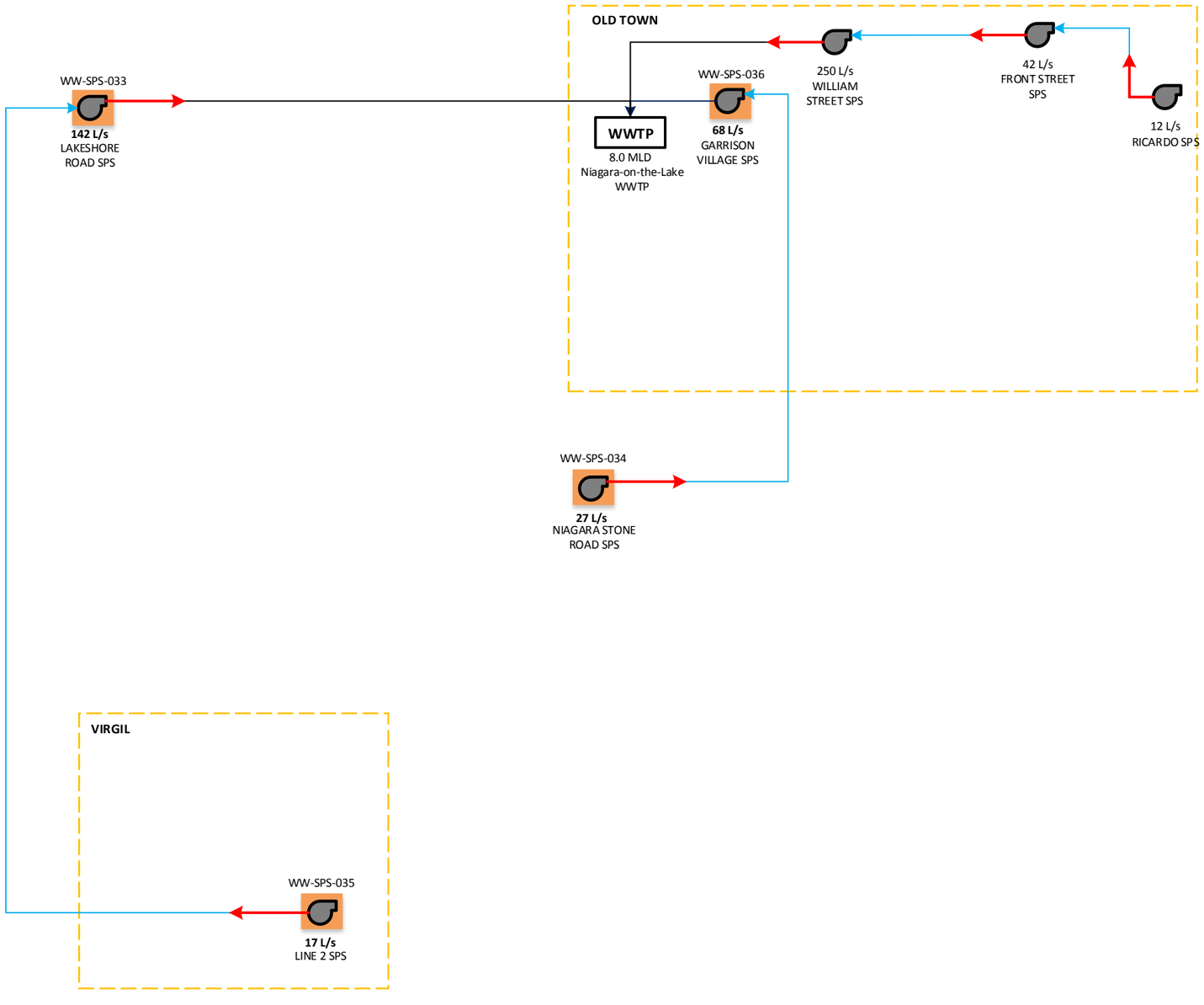
Figure 4.D.7

Preferred Wastewater Strategy

Niagara-on-the-Lake WWTP

BluePlan Engineering Inc

June 2017
715023-WW-6-Capital Projects (NOTL)
NAD 1983 UTM Zone 17N



Niagara Region

2016 Master Servicing Plan

Niagara-on-the-Lake WWTP

2041 COLLECTION SCHEMATIC

WWTP
RATED CAPACITY
Wastewater Treatment Plant

FIRM CAPACITY
Sewage Pumping Station

Forcemain

Connection from SPS to SPS

Connection from SPS to WWTP

Facility Upgrade

Upgrade Forcemain or Sewer

New Forcemain or Sewer

Decommission Project

June 2017
Figure 4.D.8
Not to Scale

BluePlan ENGINEERING

A.3 – Excerpt from Niagara Region 2021 Master Servicing Plan

Volume 4 – Part D

Niagara Region

2021 Water and Wastewater Master Servicing Plan Update

Existing Wastewater Infrastructure

- Wastewater Treatment Plant (WWTP)
- Biosolids Storage Facility
- Odour Control Facility
- Leachate Pumping Station

Sanitary Pumping Stations (SPS)

- Regional
- Municipal
- Private

Wastewater Network

- Force Mains
- Regional Mains
- Local Sewers
- Private Sewers

Wastewater Catchments

- Front Street
- Garrison Village
- Lakeshore Road
- Line 2
- Niagara Stone Road
- Ricardo Street
- William Street

Other Features

- Municipal Boundary
- Waterbodies
- Urban Area Boundary

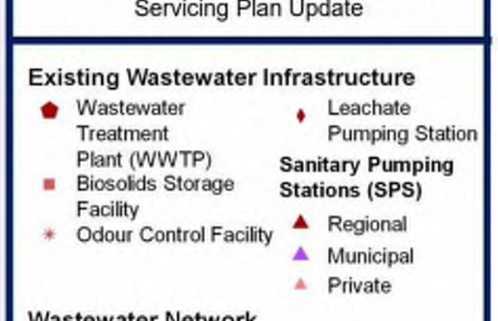
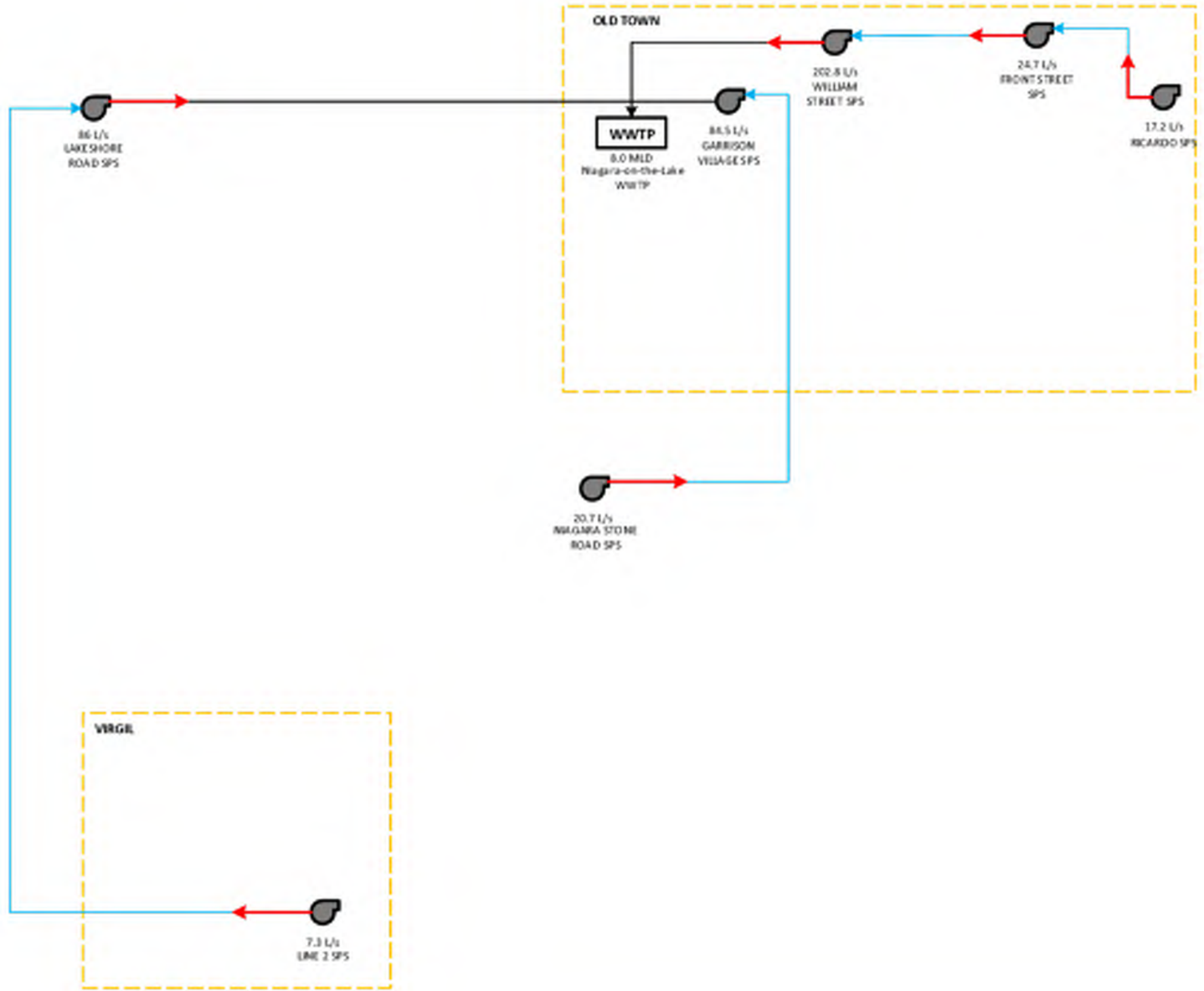


Figure 4.D.1
NOTL WWTP System
Existing Wastewater Infrastructure

BluePlan

March 2023
620126-WW-001
WKID: 26917



Niagara Region

2021 Water and Wastewater Master Servicing Plan Update

WWTP
RATED CAPACITY
Wastewater Treatment Plant

FIRM CAPACITY
Sewage Pumping Station

Forcemain

Connection from SPS to SPS

Connection from SPS to WWTP

Figure 4.D.2
Niagara-on-the-Lake WWTP
Existing Wastewater Infrastructure Schematic

BluePlan

December 2022
621018-W-000
WKID: 26917

D.2.2 Growth Population Projections and Allocations

Table 4.D.6 outlines the existing and projected serviced population and employment by catchment.

Table 4.D.6 NOTL Wastewater Treatment Plant Existing and Projected Serviced Population by Catchment

Sewage Pumping Station (SPS)	Existing Population & Employment			2051 Population & Employment			Post 2051 Population & Employment			2021-2051 Growth		
	Population	Employment	Population & Employment	Population	Employment	Population & Employment	Population	Employment	Population & Employment	Population Growth	Employment Growth	Total Growth
└→Garrison Village SPS	1,268	288	1,555	1,270	341	1,611	1,380	370	1,751	3	53	56
| └→Niagara Stone Road SPS	128	58	187	141	90	231	158	101	259	13	32	45
└→Lakeshore Road SPS	3,642	878	4,520	4,635	1,652	6,287	4,949	1,732	6,682	993	774	1,768
| └→Line 2 SPS	376	113	489	407	158	565	506	163	670	31	45	76
└→William Street SPS	4,202	2,018	6,221	4,778	2,373	7,151	5,065	2,440	7,505	576	355	930
└→Front Street SPS	231	415	646	233	534	767	234	543	776	2	119	121
└→Ricardo Street SPS	211	381	592	214	490	705	216	498	714	4	109	113
TOTAL	**10,058**	**4,152**	**14,210**	**11,678**	**5,639**	**17,318**	**12,509**	**5,848**	**18,356**	**1,621**	**1,487**	**3,108**

Note: Population numbers may not sum due to rounding.

D.3 System Performance

D.3.1 Wastewater Treatment Plant

The starting point flow for the Crystal Beach WWTP was calculated using historic SCADA flow data. Ten years of data (2011 to 2020) was reviewed to provide historical context and assess overall long-term trends; however, the most recent five years of data was used to determine the average daily flow. **Table 4.D.7** shows the historical system flows obtained from wastewater treatment plant production data. Data from 2011-2019 were from the NOTL Lagoon and the 2020 data were from the new NOTL WWTP.

Table 4.D.7 Historic NOTL Wastewater Treatment Plant Flows

Year	Average Daily Flow		Peak Daily Flow	
	(MLD)	(L/s)	(MLD)	(L/s)
2011	5.0	57.6	16.1	186.4
2012	4.1	47.0	8.7	100.5
2013	4.9	56.5	8.6	99.2
2014	4.3	49.3	10.2	117.5
2015	4.0	46.8	0.0	0.0
5 Year Average	**4.4**	**51.4**	**8.7**	**100.7**
5 Year Peak	**5.0**	**57.6**	**16.1**	**186.4**
2016	3.9	45.7	8.0	92.9
2017	4.6	52.8	8.2	94.6
2018	4.7	54.2	8.1	93.6
2019	5.2	60.6	7.8	89.9
2020	5.0	58.3	18.1	209.7
5-Year Average	**4.7**	**54.3**	**10.0**	**116.1**
5-Year Peak	**5.2**	**60.6**	**18.1**	**209.7**
10-Year Average	**4.6**	**52.9**	**9.4**	**108.4**
10-Year Peak	**5.2**	**60.6**	**18.1**	**209.7**

(1) 2020 new NOTL WWTP data

The 10-year trend analysis showed that flows to the NOTL WWTP continue to reflect high flows in wetter years. The 5-year average flow has increased 6% from the 2016 MSP starting point.

The starting point flow used for the NOTL WWTP was 4.7 MLD.

Figure 4.D.3 shows the projected future flows at the NOTL WWTP. The plant has surplus capacity and will not reach 80% capacity within the 2051-time horizon.

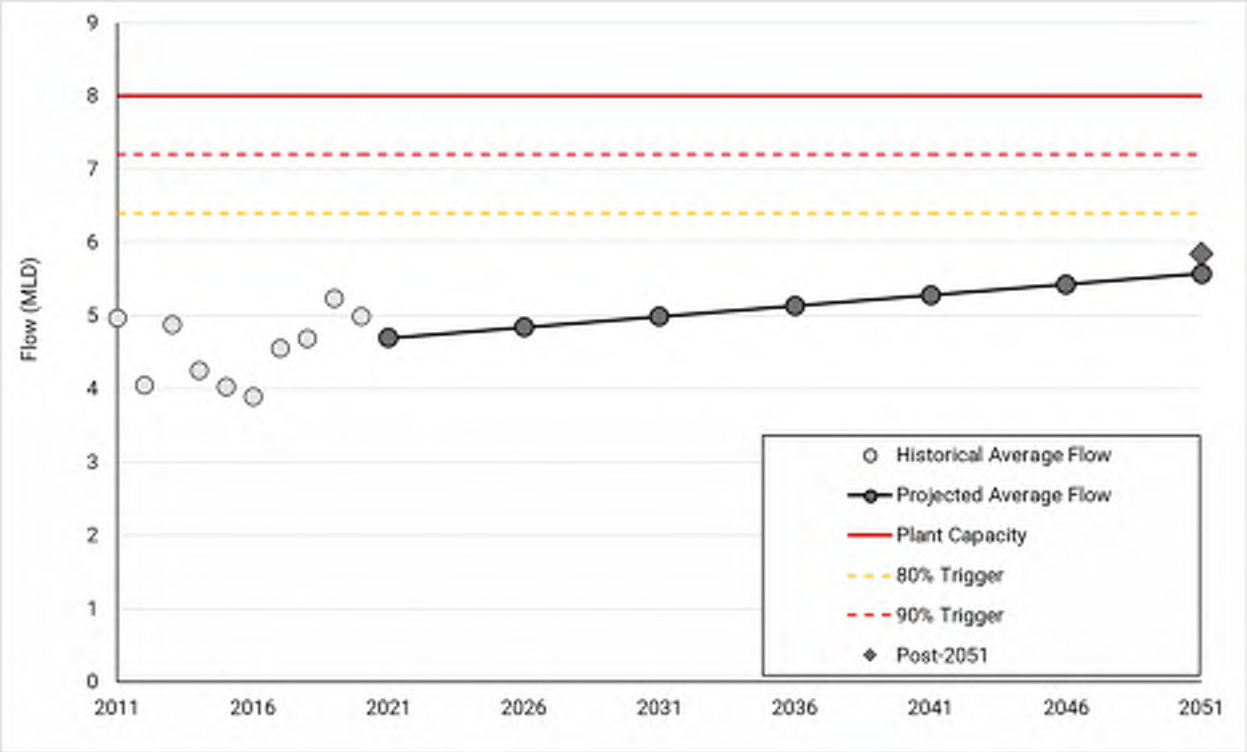


Figure 4.D.3 Projected Sewage Generation at NOTL Wastewater Treatment Plant

D.3.2 Sewage Pumping Station

Table 4.D.8 highlights the sewage pumping station operational firm capacities and the existing and projected flows. The existing average and peak dry weather flows were estimated using the wastewater system model, which was updated using the best available billing, flow monitoring, and SCADA data from 2018 to 2020.

Table 4.D.8 System Sewage Pumping Station Performance

Sewage Pumping System	Station Capacity	2021 Flows				2051 Flows			Post-2051 Flows		
	Operational Firm Capacity	Average Dry Weather Flow	Peak Dry Weather Flow	Design Allowance Peak Wet Weather Flow	5-Year Storm Peak Wet Weather Flow	Peak Dry Weather Flow	Design Allowance Peak Wet Weather Flow	5-Year Storm Peak Wet Weather Flow	Peak Dry Weather Flow	Design Allowance Peak Wet Weather Flow	5-Year Storm Peak Wet Weather Flow
	(L/s)	(L/s)	(L/s)	(L/s)	(L/s)	(L/s)	(L/s)	(L/s)	(L/s)	(L/s)	(L/s)
└→Garrison Village SPS	**84.5**	12.9	14.8	55.2	38.6	16.2	56.7	40.2	18.3	58.8	42.2
| └→Niagara Stone Road SPS	**20.7**	2.3	2.9	14.2	11.2	3.5	14.8	11.8	3.9	15.2	12.2
└→Lakeshore Road SPS	**86.0**	17.1	22.6	133.0	167.7	44.1	162.7	197.3	49.0	167.6	202.3
| └→Line 2 SPS	**7.3**	0.6	0.9	7.8	10.5	2.0	8.8	11.6	3.3	10.1	12.8
└→William Street SPS	**202.8**	67.5	76.5	244.8	158.4	90.8	262.7	176.3	94.7	266.6	180.2
└→Front Street SPS	**24.7**	13.3	25.0	51.7	83.2	28.4	55.2	86.7	28.7	55.4	86.9
└→Ricardo Street SPS	**17.2**	6.2	7.2	23.9	14.5	8.9	25.6	16.2	9.1	25.8	16.3

The following SPS have existing and future deficiencies under both design allowance PWWF and 5-year storm, requiring upgrades to support existing and future flows.

- Lakeshore Road SPS
- Line 2 SPS
- Front Street SPS

The following SPS have existing and future deficiencies under the design allowance PWWF; however, the existing and projected 5-year storm PWWF is withing the station's capacity, as such, the stations capacity is sufficient to support future flows.

- William Street SPS
- Ricardo Street SPS

The following stations have surplus capacity to support future flows.

- Garrison Village SPS
- Niagara Stone Road SPS

Appendix B

Population and Flow Estimate

Changes to Update the Niagara Region Sanitary Model for the Town of Niagara-on-the-Lake

Project: RITZ-CARLTON HOTEL, SPA, & RESIDENCES 144 JOHN STREET EAST
Project Number: 5625
Date: 2026-04-08
Designed By: T.P.Wong, P.Eng.
Checked by: T.P.Wong, P.Eng.

InfoSWMM Model Layout Map ID	Address	Proposed Breakdowns								Node Assigned	Applied Peaking Factor[1]	Area	Infiltration
		Units/GFA (ha)					Population		Average Flow				
		Low density	Medium Density	High Density - 1bed	High Density - 2bed+	Commercial GFA (ha)	Res	Non-Res	[L/s]			[ha]	[L/s]
Variences as identified from the Public Notices													
1	455 William Street	5					15	0	0.0443	180003895	3.1	Infill Development	
2	425 Dorchester Street	2					6	0	0.0177	180003873	3.1	Infill Development	
3	373 Victoria Street	1					3	0	0.0089	180003889	3.1	Infill Development	
4	125 Johnson Street	1					3	0	0.0089	180003220	3.1	Infill Development	
4	129 Johnson Street	1					3	0	0.0089	180003220	3.1	Infill Development	
5	325 King Street[5]				129	0.18	0	296	1.0620	180003433	3.1	Infill Development	
6	409 Mississagua St	1					3	0	0.0089	180003889	3.1	Infill Development	
7	513 Gate Street	2					6	0	0.0177	180003688	3.1	Infill Development	
8	551 Butler Street	2					6	0	0.0177	180003872	3.1	Infill Development	
9	2203 Niagara Stone Road		9				19	0	0.0561	180003935	3.1	Infill Development	
19	25 & 43 Castlereagh St					0.06	0	14	0.0502	180003214	3.1	Infill Development	
20	61 Melville Street		12				26	0	0.0767	180003464	3.1	Infill Development	
21	187 Queen Street	2					6	0	0.0177	180003419	3.1	Infill Development	
22	222 Gate Street[5]				18		0	36	0.1292	180003220	3.1	Infill Development	
23	223-227 Mary Street			24	17		63	0	0.1859	180003689	3.1	Infill Development	
24	228 Queen Street[5]				81	0.08	0	179	0.6422	180003420	3.1	Infill Development	
25	237 Anne Street	1					3	0	0.0089	180003561	3.1	Infill Development	
26	287 King Street	1					3	0	0.0089	180003215	3.1	Infill Development	
27	474 Simcoe Street	1					3	0	0.0089	180003688	3.1	Infill Development	
28	489 Regent Street	1					3	0	0.0089	180003559	3.1	Infill Development	
29	Vacant Northwest Parcel between 727 and 737 King Street				17		34	0	0.1003	180003402	3.1	Infill Development	
30	Royal George Theatre					0.50	0	107	0.3839	180003660	3.1	Infill Development	
New Subdivisions as identified by inspection of historic aerial images and Official Plan Designations													
10	Aberdeen Ln South	42					124	0	0.3660	180003935	3.1	1.68	0.48
11	Windsor Circle	58					170	0	0.5017	180003688	3.1	1.74	0.50
12	George Mannor	120					352	0	1.0389	180003688	3.1	1.65	0.47
13	Shaw's Ln	58					170	0	0.5017	180003402	3.1	4.16	1.19
14	46-100 Anne Street	73					214	0	0.6316	180006385	3.1	1.18	0.34
15	Evergreen Ln	9					27	0	0.0797	180006385	3.1	0.32	0.092
New Commercial Area as identified in the Official Plan													
16	526 Regent Street[3]	0					0	204	0.7327	180003559	3.1	2.27	0.649
Subject development													
17	Residence Site			36	198	0.09	438	20	1.3645	180003396	3.86	13.59	3.89
	Ritz Carlton Hotel / Spa[5]				111	0.52	0	333	1.1948	180003396	3.86		

Notes:

1	Peaking factors assigned to existing new developments set based on total sewershed population. The majority of new sanitary demand flows are lateral to node 180003893 which is at the intersection of Dorchester Street and William Street. This node is near to the William SPS and as such, the peaking factor based on the sewershed is appropriate. It should be note that the peaking factor was based on the total equivalent population in 2021. Using this peaking factor criteria into the future will conservatively estimate peak flows.
2	Peaking factor for subject site set based on population draining to node 180003396 including subject site and neighbouring hotel plan. This allows for conservative estimation of downstream flows.
3	New Commercial Area population calculated based on lot area times 90 pp/ha
4	For details on the population, infiltration rates, and average flows, please refer to the Functional Servicing Report for the Subject Site. Subject lands serviced by pumping station. Flow rate from pumping station set the peak flow from the subject lands.
5	The application is proposed to be developed as a hotel. Population estimated from bed-room types should be considerd as non-residential population. Employment generation rate of 310 L/c/d used to estimate the average flow.
6	Population Density (From Nigara Region's 2022 Development Charge Background Study) Low Density 2.929 ppu Medium Density 2.093 ppu High Density - 1-Bed 1.214 ppu High Density - 2-Bed+ 1.991 ppu Commercial 500 sqft/person Generation Rate (From Nigara Region's 2021 Water Wastewater Master Servicing Plan) Residential 255 L/c/d Employment 310 L/c/d Infiltration Rate (From Nigara Region's 2021 Water Wastewater Master Servicing Plan) New Developments 0.286 L/s/ha

Appendix C

Model Inputs

PROJECT No.: 5625
DATE: 2026-04-10
DESIGNED BY: T.P.Wong
CHECKED BY: T.P.Wong

Updated Sanitary Sewer Information

SCHAEFFERS
Consulting Engineers
SCHAEFFER & ASSOCIATES LTD.
6 Ronrose Dr
Concord, Ontario
L4K 4R3
Phone: (905) 738-6100
Fax: (905) 738-6875
design@schaeffers.com

Pafford Street and King Street Sewer Information from Drawings: NOTLSAN-0044, NOTLSAN-0126, NOTLSAN-0271, NOTLWAT-0212

Location		US Invert (ft)	Length (ft)	US Invert (m)	DS Invert (m)	Length (m)	Grade	Size (in)	Size (mm)
180003401	180003402	278.32	235	84.832	84.610	71.63	0.0031	12	300
180003402	180006385			84.570	84.394	51.50	0.0034	14	350
180006385	180006196			84.394	84.318	22.30	0.0034	14	350
180006196	180005803			84.318	84.197	51.10	0.0024	18	450
180005803	180006197			84.197	84.147	21.10	0.0024	18	450
180006197	180003405			84.147	83.981	77.90	0.0021	18	450

Value Taken Directly From Plan and Profile Drawing
Value Calculated From Measurement

Scaled Peaking Factor Diurnal Profiles

Profile ID	Res-3.1	Non-Res-3.1
population	6300-8000	6300-8000
Peaking factor		
0:00	3.1	3.1
1:00	0.378	0.390
2:00	0.089	0.177
3:00	0.024	0.066
4:00	0.000	0.000
5:00	0.035	0.018
6:00	0.252	0.144
7:00	1.417	0.334
8:00	3.100	1.118
9:00	2.454	1.394
10:00	1.832	2.020
11:00	1.373	3.100
12:00	1.161	2.259
13:00	0.950	1.871
14:00	0.831	1.373
15:00	0.695	1.285
16:00	0.670	1.095
17:00	0.728	1.015
18:00	0.893	1.031
19:00	1.146	1.078
20:00	1.343	1.087
21:00	1.368	1.122
22:00	1.333	0.961
23:00	1.158	0.746
	0.775	0.317
	Residential	Non-Residential

Average	1.000	1.000
Sum	24.002	24.000

Appendix D

Model Outputs

Flow and Depth Results

Printed on: 2026-04-14

2041 Conditions - Dry Weather Flow - Pre-development to Post-Development Comparison

								No Highlighting Indicates No Capacity Constraints Yellow Indicates q/Q > 100%, d/D <100% Red Indicates q/Q > 100%, d/D >100%		No Highlighting Indicates No Capacity Constraints Yellow Indicates d/D > 70% Red Indicates d/D > 100%					
Location	Link ID	Manhole		Pipe				Flow (q) (L/s)		Flow Capacity (q/Q_{full})		Depth (d) (m)		Depth Capacity (d/D)	
		U/S	D/S	Size (m)	Length (m)	Slope (%)	Q_{full} (L/s)	Pre dev.	Post dev.	Pre dev.	Post dev.	Pre dev.	Post dev.	Pre dev.	Post dev.
Pafford Street*	189001794	180003396	180003397	0.300	68.30	0.15	37.6	3.0	16.8	8%	45%	0.06	0.15	20.4%	48.7%
Pafford Street	189001793	180003397	180003398	0.300	76.20	0.29	52.0	3.0	16.9	6%	32%	0.08	0.16	26.8%	54.0%
Pafford Street	189001792	180003398	180003399	0.300	76.50	0.14	36.0	4.2	18.0	12%	50%	0.08	0.16	26.8%	54.0%
Pafford Street	189001791	180003399	180003401	0.300	80.80	0.76	84.5	4.2	18.0	5%	21%	0.05	0.09	15.2%	31.3%
Pafford Street	189001790	180003401	180003402	0.300	74.10	0.30	52.7	6.2	20.6	12%	39%	0.07	0.14	24.3%	45.3%
King Street	189004273	180003402	180006385	0.350	51.50	0.34	85.3	9.5	23.3	11%	27%	0.09	0.13	26.3%	38.5%
King Street	189004218	180006385	180006196	0.350	22.30	0.34	85.2	12.9	26.8	15%	31%	0.09	0.13	26.5%	38.5%
King Street	189004061	180006196	180005803	0.450	51.10	0.24	138.7	12.9	26.8	9%	19%	0.09	0.13	20.7%	30.0%
King Street	189004113	180005803	180006197	0.450	21.10	0.24	138.8	13.0	26.8	9%	19%	0.10	0.14	22.1%	31.6%
King Street	189004053	180006197	180003405	0.450	77.90	0.21	131.6	13.0	26.8	10%	20%	0.10	0.14	22.1%	31.6%
King Street	189001289	180003405	180003556	0.450	76.50	0.34	166.5	13.0	26.9	8%	16%	0.09	0.12	19.1%	27.3%
King Street	189002039	180003556	180003315	0.450	35.40	0.34	165.3	13.1	27.0	8%	16%	0.09	0.12	19.1%	27.3%
King Street	189001290	180003315	180003430	0.450	117.40	0.36	170.5	13.5	27.3	8%	16%	0.09	0.12	19.0%	27.1%
King Street	189002045	180003430	180003431	0.450	66.80	0.36	170.2	13.5	27.3	8%	16%	0.09	0.12	19.2%	27.2%
King Street	189001291	180003431	180003432	0.450	120.50	0.35	168.5	13.5	27.3	8%	16%	0.09	0.13	20.0%	28.3%
King Street	189001292	180003432	180003433	0.450	122.10	0.34	167.2	13.5	27.4	8%	16%	0.09	0.13	20.0%	28.3%
King Street	189001293	180003433	180003438	0.450	19.70	0.36	171.2	16.9	30.7	10%	18%	0.26	0.28	57.2%	62.5%
King Street	189001295	180003438	180003214	0.450	79.20	0.35	168.9	17.1	30.9	10%	18%	0.10	0.13	21.5%	29.0%
Gage Street	189001296	180003214	180003215	0.450	41.30	0.37	172.4	17.4	31.2	10%	18%	0.10	0.13	21.8%	29.2%
Gage Street	189001298	180003215	180003216	0.450	120.30	0.35	168.5	17.5	31.3	10%	19%	0.10	0.13	21.8%	29.2%
Gage Street	189001299	180003216	180003217	0.450	73.40	0.36	170.7	17.5	31.3	10%	18%	0.10	0.13	21.8%	29.2%
Gage Street	189002043	180003217	180003664	0.450	75.70	0.35	168.4	17.5	31.3	10%	19%	0.10	0.13	21.8%	29.2%
Gage Street	189001300	180003664	180003219	0.450	71.70	0.35	169.4	17.5	31.3	10%	19%	0.10	0.13	21.8%	29.2%
Gage Street	189001301	180003219	180003220	0.450	75.30	0.35	168.5	17.6	31.4	10%	19%	0.10	0.13	22.3%	29.7%
Gage Street	189001302	180003220	180003221	0.450	76.40	0.35	168.2	18.4	32.2	11%	19%	0.10	0.13	22.3%	29.7%
Gage Street	189001303	180003221	180003222	0.450	69.90	0.35	169.1	18.4	32.2	11%	19%	0.14	0.17	31.4%	37.2%
Gage Street	189001613	180003222	180003223	0.600	79.30	0.23	293.3	34.6	48.9	12%	17%	0.14	0.17	23.5%	27.9%
Gage Street	189001614	180003223	180003224	0.600	79.50	0.26	310.3	33.8	48.2	11%	16%	0.15	0.18	25.4%	30.2%
Mississagua Street	189001616	180003224	180003202	0.600	66.70	0.16	248.2	33.8	48.2	14%	19%	0.15	0.18	25.4%	30.2%
Mississagua Street	189002015	180003202	180003201	0.600	85.20	0.22	290.7	33.5	47.9	12%	16%	0.14	0.16	23.1%	27.5%
Mississagua Street	189001780	180003201	180003775	0.600	66.70	0.24	300.7	34.0	48.4	11%	16%	0.14	0.16	23.1%	27.5%
Mississagua Street	189001779	180003775	180003889	0.600	82.50	0.33	354.5	33.8	48.1	10%	14%	0.15	0.17	24.7%	29.1%
William Street	189001617	180003889	180003890	0.600	72.90	0.20	276.7	34.9	49.1	13%	18%	0.15	0.17	24.7%	29.1%
William Street	189001618	180003890	180003891	0.600	76.40	0.36	366.4	34.8	48.9	9%	13%	0.16	0.20	27.4%	32.6%
William Street	189001619	180003891	180003892	0.600	80.90	0.10	197.9	34.8	49.0	18%	25%	0.17	0.21	29.0%	34.2%
William Street	18901620	180003892	180003893	0.600	76.47	0.18	261.8	34.7	48.7	13%	19%	0.20	0.23	33.7%	37.5%
William Street	18901622	180003893	180003894	0.600	81.88	0.17	256.6	61.1	75.2	24%	29%	0.20	0.23	33.7%	37.5%
William Street	18901623	180003894	180003898	0.600	65.32	0.25	308.6	60.9	75.1	20%	24%	0.20	0.22	32.8%	36.4%
William Street	18901624	180003898	180003303	0.600	106.18	0.21	279.5	60.9	75.0	22%	27%	0.20	0.22	32.8%	36.4%
William Street	18901625	180003303	180003302	0.600	28.49	0.34	356.4	60.9	75.0	17%	21%	0.17	0.18	27.7%	30.8%
William Street Sanitary Pumping St	18902049	180003302	180003301	0.600	22.00	0.64	489.8	62.9	77.0	13%	16%	0.15	0.16	24.2%	26.8%

Maximum Hydraulic Gradeline (HGL) Results

Printed on: 2026-04-14

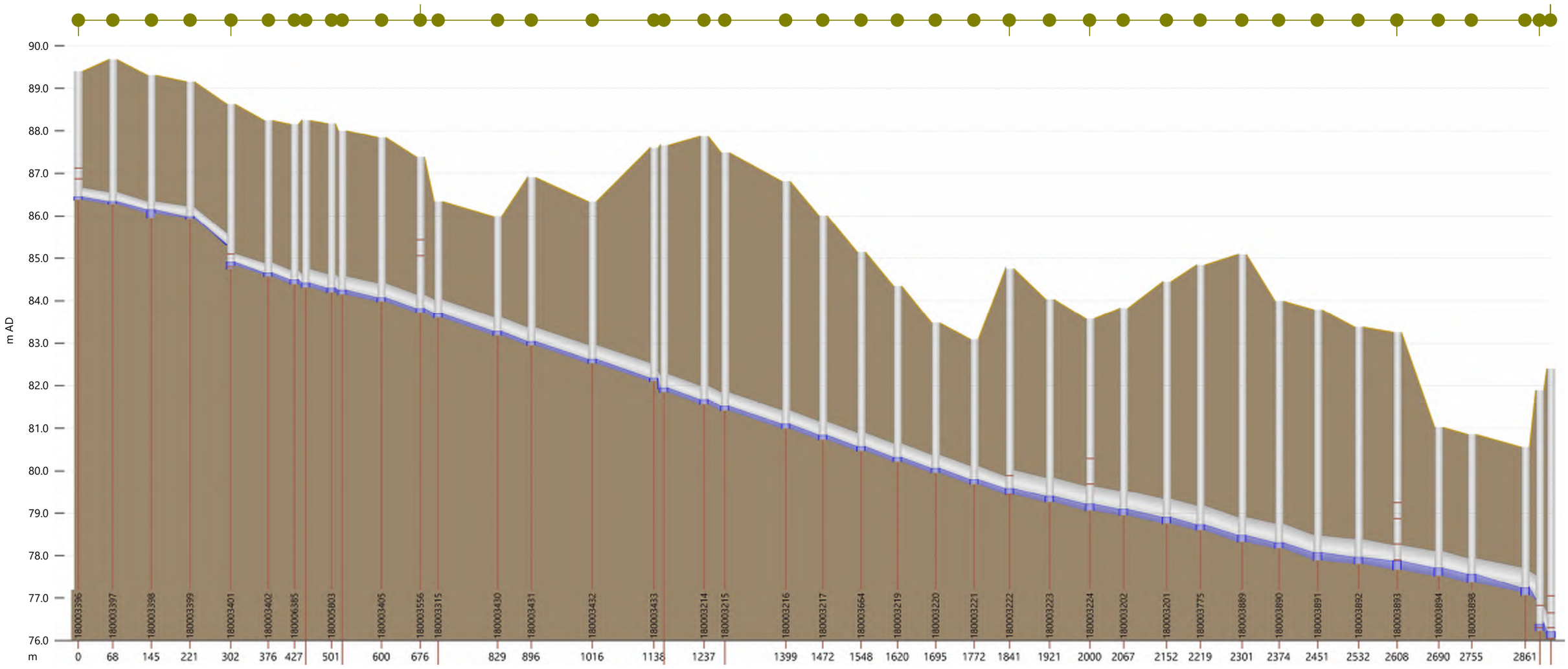
Green Highlighting Shows HGL Freeboard is greater than 1.8 m

Yellow Highlighting Shows Freeboard is less than 1.8 m, but flow is contained within Pipe (i.e. no surcharge)

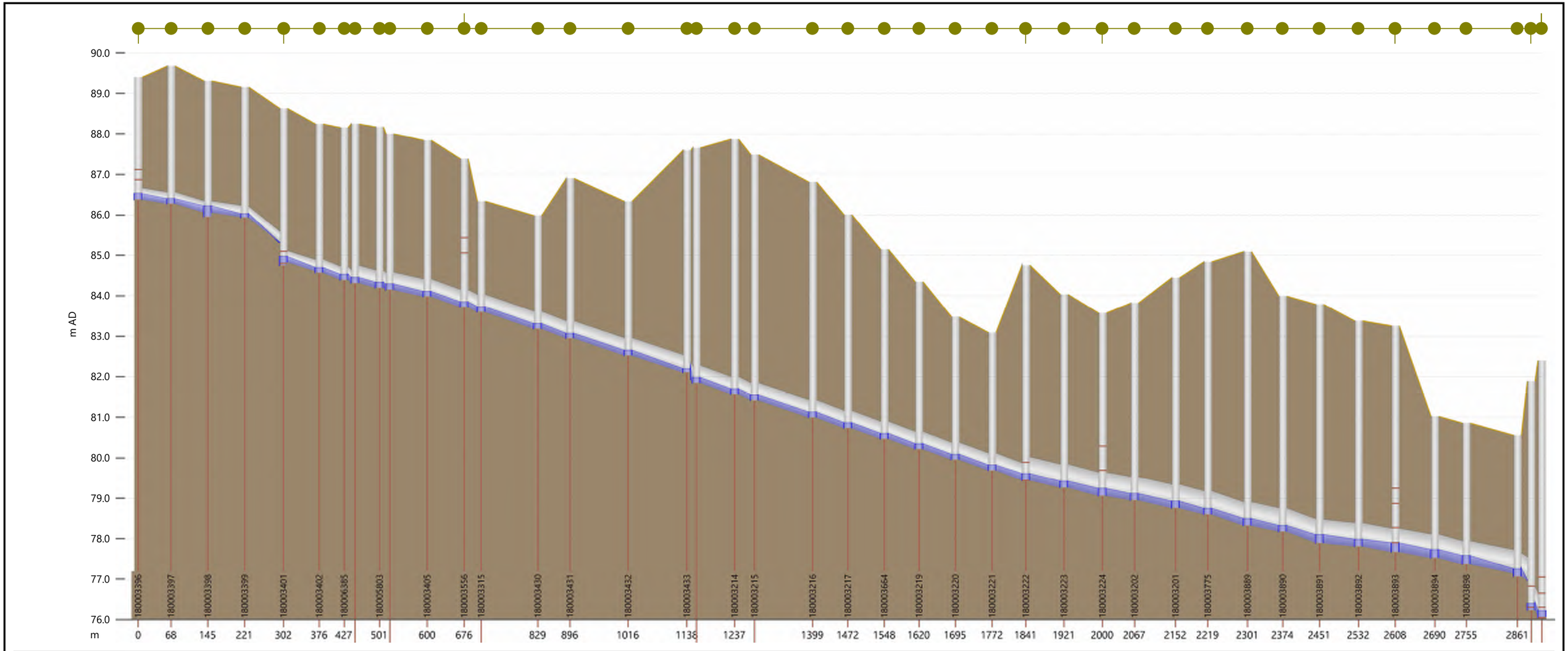
Red Highlighting Shows Freeboard is less than 1.8 m and pipe is surcharging

2041 Conditions - Dry Weather Flow - Pre-development to Post-Development Comparison

Location	Conduit (US)	MH	T/G (m)	Max Allowable HGL (m)	Minimum Obvert	Pre-Development		Post Development	
						Maximum HGL (m)	Freeboard (m)	Maximum HGL (m)	Freeboard (m)
Charlotte Street/Pafford Street*	189001794	180003396	89.40	87.60	86.68	86.44	2.95	86.53	2.87
Pafford Street	189001793	180003397	89.67	87.87	86.58	86.33	3.34	86.40	3.28
Pafford Street	189001792	180003398	89.30	87.50	86.36	86.14	3.16	86.22	3.08
Pafford Street	189001791	180003399	89.16	87.36	86.23	85.98	3.18	86.03	3.13
Pafford Street	189001790	180003401	88.63	86.83	85.13	84.90	3.73	84.97	3.66
Pafford Street/King Street	189004273	180003402	88.24	86.44	84.91	84.65	3.59	84.69	3.55
King Street/Evergreen Lane	189004218	180006385	88.16	86.36	84.74	84.49	3.67	84.53	3.63
King Street	189004061	180006196	88.25	86.45	84.67	84.41	3.83	84.45	3.79
King Street	189004113	180005803	88.17	86.37	84.65	84.29	3.88	84.33	3.84
King Street/Anne Street	189004053	180006197	88.00	86.20	84.60	84.25	3.75	84.29	3.71
King Street	189001289	180003405	87.84	86.04	84.43	84.07	3.77	84.10	3.74
King Street/John Street West	189002039	180003556	87.38	85.58	84.17	83.81	3.57	83.84	3.54
King Street	189001290	180003315	86.34	84.54	84.05	83.69	2.65	83.72	2.62
King Street/Mary Street	189002045	180003430	85.99	84.19	83.63	83.27	2.72	83.30	2.68
King Street	189001291	180003431	86.90	85.10	83.39	83.03	3.87	83.07	3.83
King Street	189001292	180003432	86.34	84.54	82.97	82.61	3.72	82.65	3.69
King Street/Centre Street	189001293	180003433	87.59	85.79	82.36	82.17	5.42	82.20	5.39
King Street	189001295	180003438	87.65	85.85	82.29	81.94	5.71	81.97	5.68
King Street/Gage Street	189001296	180003214	87.86	86.06	82.02	81.66	6.20	81.69	6.17
Gage Street	189001298	180003215	87.48	85.68	81.86	81.51	5.97	81.55	5.94
Gage Street/Regent Street	189001299	180003216	86.81	85.01	81.44	81.09	5.72	81.12	5.69
Gage Street	189002043	180003217	86.01	84.21	81.18	80.83	5.18	80.86	5.14
Gage Street/Victoria Street	189001300	180003664	85.15	83.35	80.92	80.56	4.58	80.60	4.55
Gage Street	189001301	180003219	84.35	82.55	80.66	80.31	4.04	80.35	4.00
Gage Street/Gate Street	189001302	180003220	83.48	81.68	80.40	80.05	3.43	80.08	3.39
Gage Street	189001303	180003221	83.09	81.29	80.14	79.79	3.30	79.82	3.27
Gage Street/Simcoe Street	189001613	180003222	84.75	82.95	79.89	79.58	5.17	79.61	5.15
Gage Street	189001614	180003223	84.04	82.24	79.86	79.39	4.64	79.42	4.62
Gage Street/Mississagua Street	189001616	180003224	83.57	81.77	79.66	79.21	4.36	79.24	4.34
Mississagua Street	189002015	180003202	83.82	82.02	79.55	79.08	4.74	79.11	4.71
Mississagua Street/Centre Street	189001780	180003201	84.45	82.65	79.36	78.89	5.55	78.92	5.53
Mississagua Street	189001779	180003775	84.84	83.04	79.20	78.72	6.12	78.74	6.09
Mississagua Street/William Street	189001617	180003889	85.09	83.29	78.92	78.47	6.63	78.49	6.60
William Street	189001618	180003890	83.99	82.19	78.77	78.30	5.70	78.32	5.67
William Street/Butler Street	189001619	180003891	83.79	81.99	78.49	78.06	5.72	78.10	5.69
William Street	18901620	180003892	83.38	81.58	78.41	77.95	5.42	77.98	5.40
William Street/Dorchester Street	18901622	180003893	83.25	81.45	78.27	77.87	5.38	77.89	5.36
William Street	18901623	180003894	81.02	79.22	78.12	77.70	3.32	77.73	3.30
William Street/Nassau Street	18901624	180003898	80.86	79.06	77.96	77.56	3.30	77.58	3.28
William Street	18901625	180003303	80.56	78.76	77.66	77.23	3.33	77.24	3.32
William Street	18902049	180003302	81.89	80.09	76.83	76.38	5.51	76.39	5.50
William Street Sanitary Pumping Station		180003301	82.40	80.60	76.69	76.20	6.20	76.22	6.18


90.0
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88.0
87.0
86.0
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82.0
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180003396
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Flow and Depth Results

Printed on: 2026-04-14

2041 Conditions - Design RDII WWF - Pre-development to Post-Development Comparison

								No Highlighting Indicates No Capacity Constraints Yellow Indicates q/Q > 100%, d/D <100% Red Indicates q/Q > 100%, d/D >100%				No Highlighting Indicates No Capacity Constraints Yellow Indicates d/D > 70% Red Indicates d/D > 100%			
Location	Link ID	Manhole		Pipe				Flow (q) (L/s)		Flow Capacity (q/Q_{full})		Depth (d) (m)		Depth Capacity (d/D)	
		U/S	D/S	Size (m)	Length (m)	Slope (%)	Q_{full} (L/s)	Pre dev.	Post dev.	Pre dev.	Post dev.	Pre dev.	Post dev.	Pre dev.	Post dev.
Pafford Street*	189001794	180003396	180003397	0.300	86.68	0.12	33.3	6.6	20.4	20%	61%	0.09	0.16	29.9%	54.2%
Pafford Street	189001793	180003397	180003398	0.300	76.20	0.29	52.0	6.8	20.6	13%	40%	0.11	0.18	37.3%	60.8%
Pafford Street	189001792	180003398	180003399	0.300	76.50	0.14	36.0	8.6	22.4	24%	62%	0.11	0.18	37.3%	60.8%
Pafford Street	189001791	180003399	180003401	0.300	80.80	0.76	84.5	8.8	22.6	10%	27%	0.07	0.11	21.8%	35.3%
Pafford Street	189001790	180003401	180003402	0.300	74.10	0.30	52.7	29.6	43.4	56%	82%	0.17	0.22	55.6%	71.7%
King Street	189004273	180003402	180006385	0.350	51.50	0.34	85.3	37.7	51.5	44%	60%	0.17	0.20	49.1%	58.3%
King Street	189004218	180006385	180006196	0.350	22.30	0.34	85.2	41.5	55.3	49%	65%	0.17	0.20	49.1%	58.3%
King Street	189004061	180006196	180005803	0.450	51.10	0.24	138.7	41.6	55.4	30%	40%	0.17	0.20	38.2%	44.9%
King Street	189004113	180005803	180006197	0.450	21.10	0.24	138.8	42.0	55.8	30%	40%	0.18	0.21	40.0%	46.6%
King Street	189004053	180006197	180003405	0.450	77.90	0.21	131.6	42.5	56.3	32%	43%	0.18	0.21	40.0%	46.6%
King Street	189001289	180003405	180003556	0.450	76.50	0.34	166.5	42.6	56.4	26%	34%	0.16	0.18	35.0%	40.6%
King Street	189002039	180003556	180003315	0.450	35.40	0.34	165.3	43.4	57.3	26%	35%	0.16	0.18	35.3%	40.7%
King Street	189001290	180003315	180003430	0.450	117.40	0.36	170.5	45.5	59.3	27%	35%	0.16	0.18	35.4%	40.8%
King Street	189002045	180003430	180003431	0.450	66.80	0.36	170.2	45.7	59.5	27%	35%	0.16	0.18	35.6%	41.1%
King Street	189001291	180003431	180003432	0.450	120.50	0.35	168.5	45.9	59.7	27%	35%	0.17	0.19	36.8%	42.3%
King Street	189001292	180003432	180003433	0.450	122.10	0.34	167.2	46.0	59.8	27%	36%	0.17	0.19	36.8%	42.3%
King Street	189001293	180003433	180003438	0.450	19.70	0.36	171.2	49.7	63.5	29%	37%	0.31	0.32	68.1%	71.7%
King Street	189001295	180003438	180003214	0.450	79.20	0.35	168.9	51.5	65.3	30%	39%	0.17	0.19	38.0%	43.1%
Gage Street	189001296	180003214	180003215	0.450	41.30	0.37	172.4	52.8	66.6	31%	39%	0.17	0.20	38.6%	43.8%
Gage Street	189001298	180003215	180003216	0.450	120.30	0.35	168.5	53.0	66.8	31%	40%	0.17	0.20	38.6%	43.8%
Gage Street	189001299	180003216	180003217	0.450	73.40	0.36	170.7	53.0	66.8	31%	39%	0.17	0.20	38.6%	43.9%
Gage Street	189002043	180003217	180003664	0.450	75.70	0.35	168.4	53.2	67.0	32%	40%	0.17	0.20	38.6%	43.9%
Gage Street	189001300	180003664	180003219	0.450	71.70	0.35	169.4	53.2	67.0	31%	40%	0.17	0.20	38.7%	43.9%
Gage Street	189001301	180003219	180003220	0.450	75.30	0.35	168.5	53.4	67.3	32%	40%	0.18	0.20	39.5%	44.7%
Gage Street	189001302	180003220	180003221	0.450	76.40	0.35	168.2	55.4	69.2	33%	41%	0.18	0.20	39.5%	44.7%
Gage Street	189001303	180003221	180003222	0.450	69.90	0.35	169.1	55.5	69.3	33%	41%	0.24	0.26	53.7%	57.5%
Gage Street	189001613	180003222	180003223	0.600	79.30	0.23	293.3	99.2	112.5	34%	38%	0.24	0.26	40.3%	43.1%
Gage Street	189001614	180003223	180003224	0.600	79.50	0.26	310.3	98.1	111.4	32%	36%	0.26	0.28	43.7%	46.8%
Mississagua Street	189001616	180003224	180003202	0.600	66.70	0.16	248.2	98.5	111.8	40%	45%	0.26	0.28	43.7%	46.8%
Mississagua Street	189002015	180003202	180003201	0.600	85.20	0.22	290.7	98.2	111.5	34%	38%	0.24	0.26	40.1%	43.0%
Mississagua Street	189001780	180003201	180003775	0.600	66.70	0.24	300.7	99.8	113.1	33%	38%	0.24	0.26	39.8%	42.5%
Mississagua Street	189001779	180003775	180003889	0.600	82.50	0.33	354.5	99.4	112.8	28%	32%	0.26	0.27	42.5%	45.4%
William Street	189001617	180003889	180003890	0.600	72.90	0.20	276.7	103.5	116.9	37%	42%	0.26	0.27	42.5%	45.4%
William Street	189001618	180003890	180003891	0.600	76.40	0.36	366.4	103.2	116.6	28%	32%	0.29	0.31	48.6%	52.2%
William Street	189001619	180003891	180003892	0.600	80.90	0.10	197.9	103.6	117.1	52%	59%	0.30	0.32	50.3%	53.9%
William Street	18901620	180003892	180003893	0.600	76.47	0.18	261.8	103.3	116.7	39%	45%	0.34	0.36	57.0%	59.8%
William Street	18901622	180003893	180003894	0.600	81.88	0.17	256.6	160.8	174.3	63%	68%	0.34	0.36	57.0%	59.8%
William Street	18901623	180003894	180003898	0.600	65.32	0.25	308.6	160.7	174.2	52%	56%	0.33	0.35	55.1%	57.8%
William Street	18901624	180003898	180003303	0.600	106.18	0.21	279.5	162.1	175.6	58%	63%	0.33	0.35	55.1%	57.8%
William Street	18901625	180003303	180003302	0.600	28.49	0.34	356.4	162.1	175.6	45%	49%	0.28	0.29	46.0%	48.0%
William Street Sanitary Pumping St	18902049	180003302	180003301	0.600	22.00	0.64	489.8	173.9	187.5	36%	38%	0.25	0.26	41.2%	42.9%

Maximum Hydraulic Gradeline (HGL) Results

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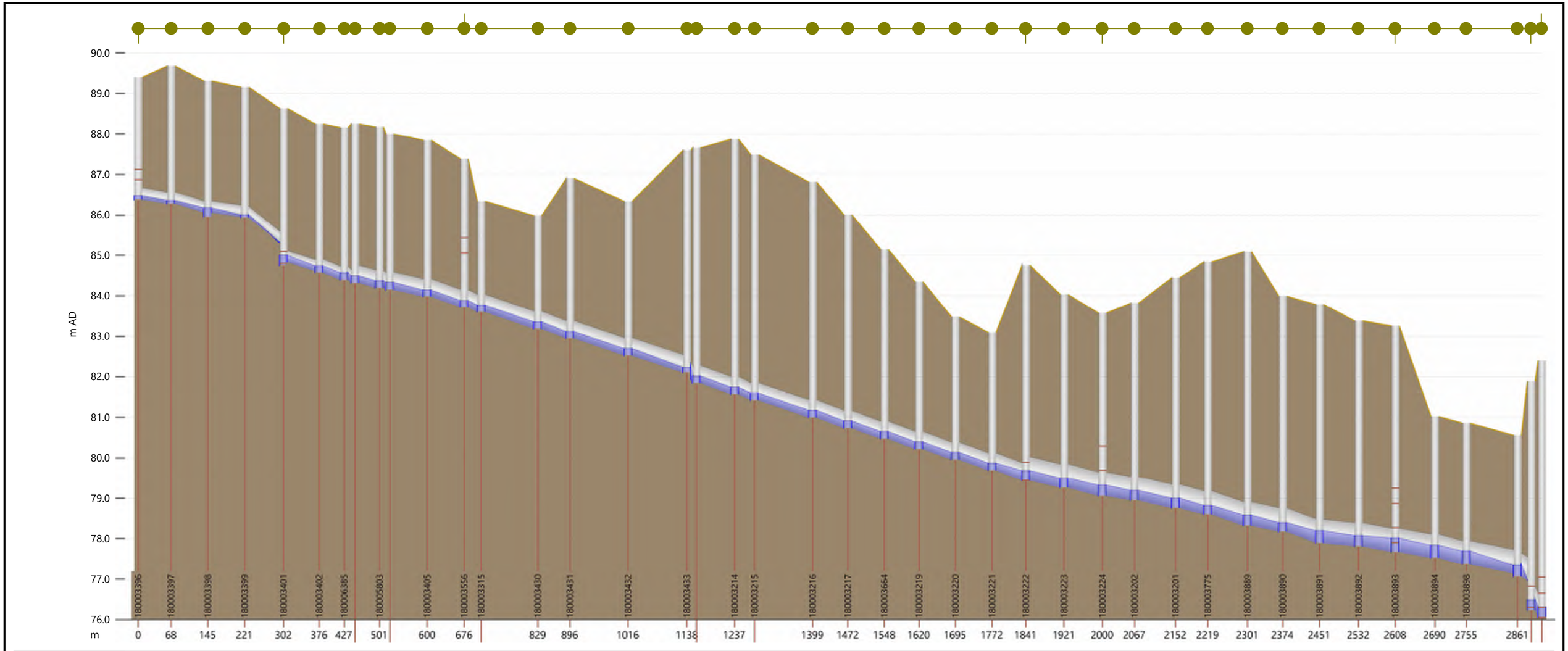
Green Highlighting Shows HGL Freeboard is greater than 1.8 m

Yellow Highlighting Shows Freeboard is less than 1.8 m, but flow is contained within Pipe (i.e. no surcharge)

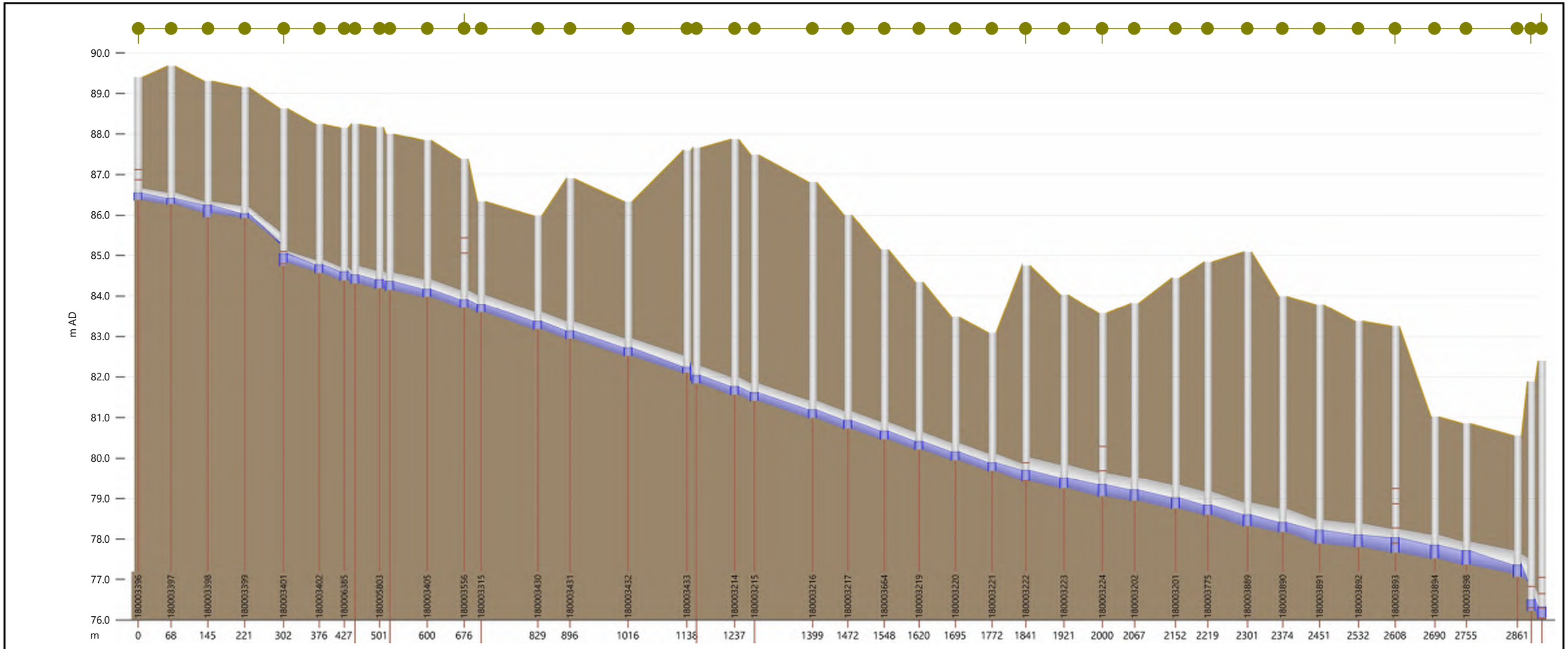
Red Highlighting Shows Freeboard is less than 1.8 m and pipe is surcharging

2041 Conditions - Design RDII WWF - Pre-development to Post-Development Comparison

Location	Conduit (US)	MH	T/G (m)	Max Allowable HGL (m)	Minimum Obvert	Pre-Development		Post Development	
						Maximum HGL (m)	Freeboard (m)	Maximum HGL (m)	Freeboard (m)
Charlotte Street/Pafford Street*	189001794	180003396	89.40	87.60	86.68	86.47	2.93	86.54	2.85
Pafford Street	189001793	180003397	89.67	87.87	86.58	86.35	3.32	86.41	3.26
Pafford Street	189001792	180003398	89.30	87.50	86.36	86.17	3.13	86.24	3.06
Pafford Street	189001791	180003399	89.16	87.36	86.23	86.00	3.16	86.04	3.12
Pafford Street	189001790	180003401	88.63	86.83	85.13	85.00	3.63	85.05	3.58
Pafford Street/King Street	189004273	180003402	88.24	86.44	84.91	84.73	3.51	84.77	3.48
King Street/Evergreen Lane	189004218	180006385	88.16	86.36	84.74	84.57	3.59	84.60	3.56
King Street	189004061	180006196	88.25	86.45	84.67	84.49	3.76	84.52	3.73
King Street	189004113	180005803	88.17	86.37	84.65	84.37	3.80	84.40	3.77
King Street/Anne Street	189004053	180006197	88.00	86.20	84.60	84.33	3.67	84.36	3.64
King Street	189001289	180003405	87.84	86.04	84.43	84.14	3.70	84.16	3.68
King Street/John Street West	189002039	180003556	87.38	85.58	84.17	83.88	3.50	83.90	3.48
King Street	189001290	180003315	86.34	84.54	84.05	83.76	2.58	83.78	2.56
King Street/Mary Street	189002045	180003430	85.99	84.19	83.63	83.34	2.65	83.36	2.62
King Street	189001291	180003431	86.90	85.10	83.39	83.10	3.79	83.13	3.77
King Street	189001292	180003432	86.34	84.54	82.97	82.69	3.65	82.71	3.62
King Street/Centre Street	189001293	180003433	87.59	85.79	82.36	82.22	5.37	82.24	5.35
King Street	189001295	180003438	87.65	85.85	82.29	82.01	5.64	82.04	5.61
King Street/Gage Street	189001296	180003214	87.86	86.06	82.02	81.74	6.13	81.76	6.10
Gage Street	189001298	180003215	87.48	85.68	81.86	81.59	5.89	81.61	5.87
Gage Street/Regent Street	189001299	180003216	86.81	85.01	81.44	81.17	5.65	81.19	5.62
Gage Street	189002043	180003217	86.01	84.21	81.18	80.90	5.10	80.93	5.08
Gage Street/Victoria Street	189001300	180003664	85.15	83.35	80.92	80.64	4.51	80.66	4.49
Gage Street	189001301	180003219	84.35	82.55	80.66	80.39	3.96	80.41	3.94
Gage Street/Gate Street	189001302	180003220	83.48	81.68	80.40	80.13	3.35	80.15	3.32
Gage Street	189001303	180003221	83.09	81.29	80.14	79.86	3.23	79.89	3.20
Gage Street/Simcoe Street	189001613	180003222	84.75	82.95	79.89	79.68	5.07	79.70	5.06
Gage Street	189001614	180003223	84.04	82.24	79.86	79.49	4.55	79.51	4.53
Gage Street/Mississagua Street	189001616	180003224	83.57	81.77	79.66	79.32	4.26	79.34	4.24
Mississagua Street	189002015	180003202	83.82	82.02	79.55	79.19	4.63	79.20	4.62
Mississagua Street/Centre Street	189001780	180003201	84.45	82.65	79.36	78.99	5.45	79.01	5.44
Mississagua Street	189001779	180003775	84.84	83.04	79.20	78.81	6.03	78.83	6.01
Mississagua Street/William Street	189001617	180003889	85.09	83.29	78.92	78.58	6.52	78.59	6.50
William Street	189001618	180003890	83.99	82.19	78.77	78.39	5.60	78.40	5.59
William Street/Butler Street	189001619	180003891	83.79	81.99	78.49	78.19	5.60	78.21	5.57
William Street	18901620	180003892	83.38	81.58	78.41	78.07	5.30	78.10	5.28
William Street/Dorchester Street	18901622	180003893	83.25	81.45	78.27	78.01	5.24	78.03	5.23
William Street	18901623	180003894	81.02	79.22	78.12	77.83	3.19	77.85	3.18
William Street/Nassau Street	18901624	180003898	80.86	79.06	77.96	77.69	3.17	77.71	3.15
William Street	18901625	180003303	80.56	78.76	77.66	77.33	3.22	77.35	3.21
William Street	18902049	180003302	81.89	80.09	76.83	76.48	5.41	76.49	5.40
William Street Sanitary Pumping Station		180003301	82.40	80.60	76.69	76.31	6.09	76.32	6.08


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Flow and Depth Results

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2041 Conditions - 5-year Storms WWF- Pre-development to Post-Development Comparison

No Highlighting Indicates No Capacity Constraints
Yellow Indicates q/Q > 100%, d/D <100%
Red Indicates q/Q > 100%, d/D >100%

No Highlighting Indicates No Capacity Constraints
Yellow Indicates d/D > 70%
Red Indicates d/D > 100%

Location	Link ID	Manhole		Pipe				Flow (q) (L/s)		Flow Capacity (q/Q_{full})		Depth (d) (m)		Depth Capacity (d/D)	
		U/S	D/S	Size (m)	Length (m)	Slope (%)	Q_{full} (L/s)	Pre dev.	Post dev.	Pre dev.	Post dev.	Pre dev.	Post dev.	Pre dev.	Post dev.
Pafford Street*	189001794	180003396	180003397	0.300	68.30	0.15	37.6	11.2	25.1	30%	67%	0.12	0.18	39.1%	61.0%
Pafford Street	189001793	180003397	180003398	0.300	76.20	0.29	52.0	11.6	25.5	22%	49%	0.14	0.21	48.0%	69.3%
Pafford Street	189001792	180003398	180003399	0.300	76.50	0.14	36.0	14.3	28.1	40%	78%	0.14	0.21	48.0%	69.3%
Pafford Street	189001791	180003399	180003401	0.300	80.80	0.76	84.5	14.8	28.6	17%	34%	0.08	0.12	28.3%	40.1%
Pafford Street	189001790	180003401	180003402	0.300	74.10	0.30	52.7	59.9	73.7	114%	140%	0.29	0.42	96.0%	140.5%
King Street	189004273	180003402	180006385	0.350	51.50	0.34	85.3	74.2	88.0	87%	103%	0.26	0.30	73.5%	84.8%
King Street	189004218	180006385	180006196	0.350	22.30	0.34	85.2	78.6	92.4	92%	109%	0.26	0.29	73.5%	83.5%
King Street	189004061	180006196	180005803	0.450	51.10	0.24	138.7	78.8	92.6	57%	67%	0.25	0.28	55.5%	61.5%
King Street	189004113	180005803	180006197	0.450	21.10	0.24	138.8	79.6	93.4	57%	67%	0.26	0.28	57.2%	63.1%
King Street	189004053	180006197	180003405	0.450	77.90	0.21	131.6	80.6	94.5	61%	72%	0.26	0.28	57.2%	63.1%
King Street	189001289	180003405	180003556	0.450	76.50	0.34	166.5	80.9	94.8	49%	57%	0.23	0.25	50.1%	55.0%
King Street	189002039	180003556	180003315	0.450	35.40	0.34	165.3	82.8	96.6	50%	58%	0.23	0.25	50.6%	55.3%
King Street	189001290	180003315	180003430	0.450	117.40	0.36	170.5	87.0	100.9	51%	59%	0.23	0.25	50.8%	55.5%
King Street	189002045	180003430	180003431	0.450	66.80	0.36	170.2	87.4	101.2	51%	59%	0.23	0.25	51.3%	56.0%
King Street	189001291	180003431	180003432	0.450	120.50	0.35	168.5	87.8	101.7	52%	60%	0.24	0.26	52.4%	56.9%
King Street	189001292	180003432	180003433	0.450	122.10	0.34	167.2	88.0	101.8	53%	61%	0.24	0.26	52.4%	56.9%
King Street	189001293	180003433	180003438	0.450	19.70	0.36	171.2	92.3	106.2	54%	62%	0.35	0.37	78.9%	82.2%
King Street	189001295	180003438	180003214	0.450	79.20	0.35	168.9	96.0	109.8	57%	65%	0.24	0.27	54.3%	59.0%
Gage Street	189001296	180003214	180003215	0.450	41.30	0.37	172.4	98.7	112.5	57%	65%	0.25	0.27	55.2%	60.0%
Gage Street	189001298	180003215	180003216	0.450	120.30	0.35	168.5	99.0	112.9	59%	67%	0.25	0.27	55.2%	60.0%
Gage Street	189001299	180003216	180003217	0.450	73.40	0.36	170.7	99.0	112.9	58%	66%	0.25	0.27	55.3%	60.1%
Gage Street	189002043	180003217	180003664	0.450	75.70	0.35	168.4	99.5	113.3	59%	67%	0.25	0.27	55.3%	60.1%
Gage Street	189001300	180003664	180003219	0.450	71.70	0.35	169.4	99.5	113.3	59%	67%	0.25	0.27	55.4%	60.2%
Gage Street	189001301	180003219	180003220	0.450	75.30	0.35	168.5	99.9	113.7	59%	67%	0.26	0.28	56.7%	61.5%
Gage Street	189001302	180003220	180003221	0.450	76.40	0.35	168.2	103.4	117.2	61%	70%	0.26	0.28	56.7%	61.5%
Gage Street	189001303	180003221	180003222	0.450	69.90	0.35	169.1	103.7	117.5	61%	69%	0.34	0.36	76.3%	79.9%
Gage Street	189001613	180003222	180003223	0.600	79.30	0.23	293.3	183.4	197.4	63%	67%	0.34	0.36	57.2%	59.9%
Gage Street	189001614	180003223	180003224	0.600	79.50	0.26	310.3	182.2	196.6	59%	63%	0.37	0.39	62.3%	65.3%
Mississagua Street	189001616	180003224	180003202	0.600	66.70	0.16	248.2	182.8	197.2	74%	79%	0.37	0.39	62.3%	65.3%
Mississagua Street	189002015	180003202	180003201	0.600	85.20	0.22	290.7	182.6	196.8	63%	68%	0.34	0.37	57.5%	60.9%
Mississagua Street	189001780	180003201	180003775	0.600	66.70	0.24	300.7	185.3	197.9	62%	66%	0.34	0.44	56.3%	74.0%
Mississagua Street	189001779	180003775	180003889	0.600	82.50	0.33	354.5	185.0	192.3	52%	54%	0.52	0.66	86.1%	109.8%
William Street	189001617	180003889	180003890	0.600	72.90	0.20	276.7	186.3	198.9	67%	72%	0.61	0.73	102.0%	121.8%
William Street	189001618	180003890	180003891	0.600	76.40	0.36	366.4	185.0	199.1	50%	54%	0.82	0.92	135.9%	153.8%
William Street	189001619	180003891	180003892	0.600	80.90	0.10	197.9	186.8	201.0	94%	102%	0.84	0.93	139.3%	155.5%
William Street	18901620	180003892	180003893	0.600	76.47	0.18	261.8	187.1	201.2	71%	77%	0.91	0.99	150.8%	164.7%
William Street	18901622	180003893	180003894	0.600	81.88	0.17	256.6	283.1	298.2	110%	116%	0.91	0.99	150.8%	164.7%
William Street	18901623	180003894	180003898	0.600	65.32	0.25	308.6	283.2	298.3	92%	97%	0.90	0.95	150.0%	158.2%
William Street	18901624	180003898	180003303	0.600	106.18	0.21	279.5	287.1	302.1	103%	108%	0.90	0.95	150.0%	158.2%
William Street	18901625	180003303	180003302	0.600	28.49	0.34	356.4	287.1	302.1	81%	85%	1.00	1.02	167.2%	170.0%
William Street Sanitary Pumping St	18902049	180003302	180003301	0.600	22.00	0.64	489.8	311.7	326.7	64%	67%	1.82	1.83	303.3%	305.2%

Maximum Hydraulic Gradeline (HGL) Results

Printed on: 2026-04-14

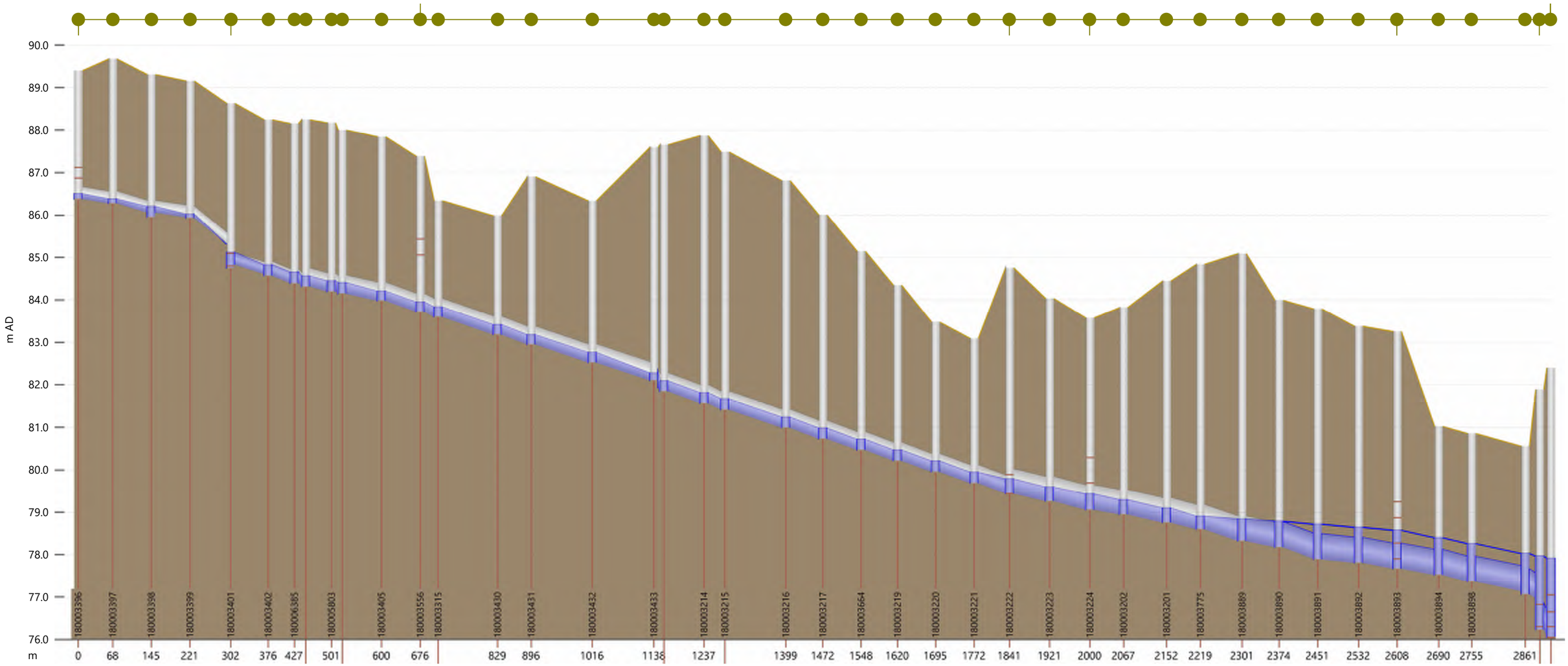
Green Highlighting Shows HGL Freeboard is greater than 1.8 m

Yellow Highlighting Shows Freeboard is less than 1.8 m, but flow is contained within Pipe (i.e. no surcharge)

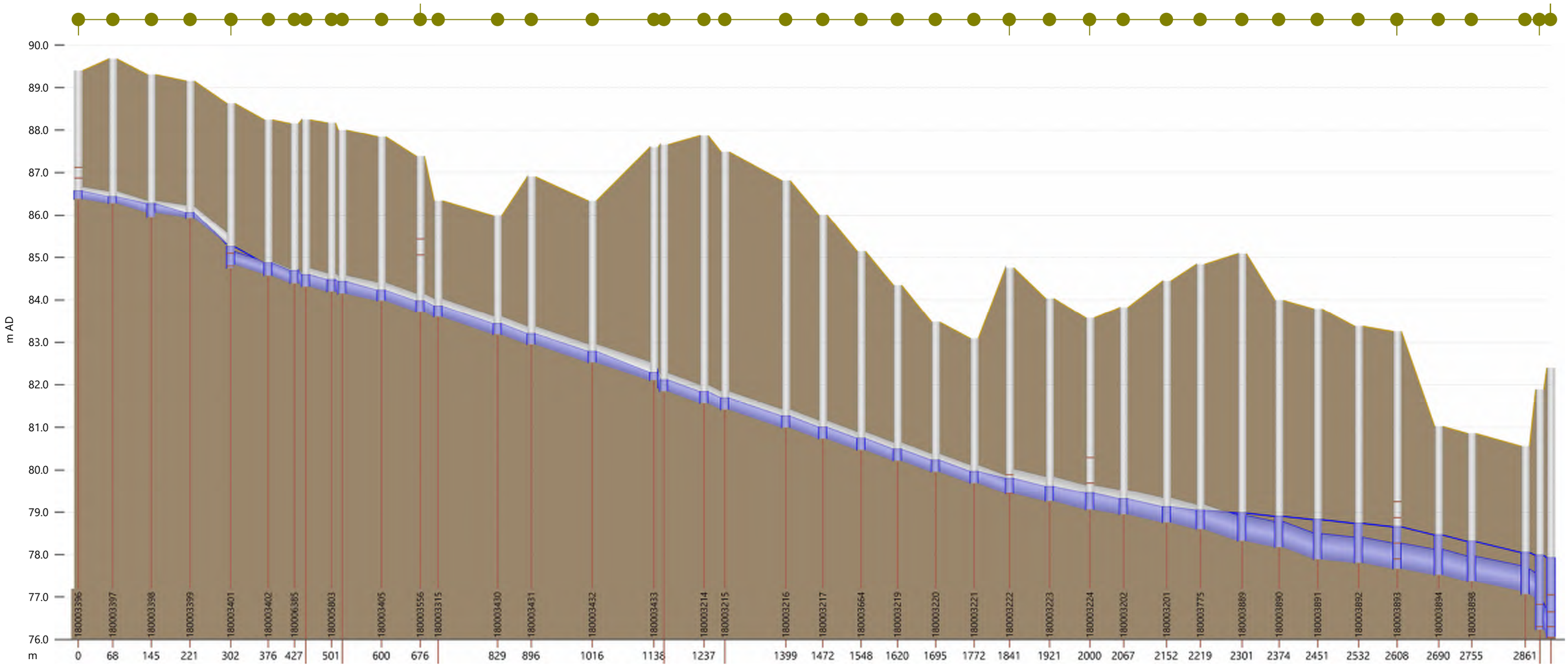
Red Highlighting Shows Freeboard is less than 1.8 m and pipe is surcharging

2041 Conditions - 5-year Storms WWF- Pre-development to Post-Development Comparison

Location	Conduit (US)	MH	T/G (m)	Max Allowable HGL (m)	Minimum Obvert	Pre-Development		Post Development	
						Maximum HGL (m)	Freeboard (m)	Maximum HGL (m)	Freeboard (m)
Charlotte Street/Pafford Street*	189001794	180003396	89.40	87.60	86.68	86.50	2.90	86.56	2.83
Pafford Street	189001793	180003397	89.67	87.87	86.58	86.38	3.30	86.43	3.25
Pafford Street	189001792	180003398	89.30	87.50	86.36	86.20	3.10	86.27	3.04
Pafford Street	189001791	180003399	89.16	87.36	86.23	86.02	3.14	86.05	3.10
Pafford Street	189001790	180003401	88.63	86.83	85.13	85.12	3.51	85.25	3.38
Pafford Street/King Street	189004273	180003402	88.24	86.44	84.91	84.82	3.42	84.87	3.38
King Street/Evergreen Lane	189004218	180006385	88.16	86.36	84.74	84.65	3.51	84.69	3.47
King Street	189004061	180006196	88.25	86.45	84.67	84.56	3.68	84.59	3.66
King Street	189004113	180005803	88.17	86.37	84.65	84.45	3.72	84.47	3.70
King Street/Anne Street	189004053	180006197	88.00	86.20	84.60	84.40	3.60	84.43	3.57
King Street	189001289	180003405	87.84	86.04	84.43	84.20	3.64	84.22	3.61
King Street/John Street West	189002039	180003556	87.38	85.58	84.17	83.95	3.43	83.97	3.41
King Street	189001290	180003315	86.34	84.54	84.05	83.83	2.51	83.85	2.49
King Street/Mary Street	189002045	180003430	85.99	84.19	83.63	83.41	2.58	83.43	2.56
King Street	189001291	180003431	86.90	85.10	83.39	83.17	3.72	83.20	3.70
King Street	189001292	180003432	86.34	84.54	82.97	82.76	3.58	82.78	3.56
King Street/Centre Street	189001293	180003433	87.59	85.79	82.36	82.27	5.32	82.28	5.31
King Street	189001295	180003438	87.65	85.85	82.29	82.09	5.57	82.11	5.54
King Street/Gage Street	189001296	180003214	87.86	86.06	82.02	81.81	6.05	81.83	6.03
Gage Street	189001298	180003215	87.48	85.68	81.86	81.66	5.82	81.68	5.80
Gage Street/Regent Street	189001299	180003216	86.81	85.01	81.44	81.24	5.57	81.26	5.55
Gage Street	189002043	180003217	86.01	84.21	81.18	80.98	5.03	81.00	5.01
Gage Street/Victoria Street	189001300	180003664	85.15	83.35	80.92	80.71	4.43	80.74	4.41
Gage Street	189001301	180003219	84.35	82.55	80.66	80.46	3.88	80.48	3.86
Gage Street/Gate Street	189001302	180003220	83.48	81.68	80.40	80.21	3.27	80.23	3.25
Gage Street	189001303	180003221	83.09	81.29	80.14	79.94	3.15	79.96	3.13
Gage Street/Simcoe Street	189001613	180003222	84.75	82.95	79.89	79.78	4.97	79.80	4.95
Gage Street	189001614	180003223	84.04	82.24	79.86	79.59	4.45	79.60	4.43
Gage Street/Mississagua Street	189001616	180003224	83.57	81.77	79.66	79.43	4.14	79.45	4.13
Mississagua Street	189002015	180003202	83.82	82.02	79.55	79.29	4.53	79.31	4.51
Mississagua Street/Centre Street	189001780	180003201	84.45	82.65	79.36	79.09	5.35	79.12	5.33
Mississagua Street	189001779	180003775	84.84	83.04	79.20	78.90	5.94	79.04	5.80
Mississagua Street/William Street	189001617	180003889	85.09	83.29	78.92	78.84	6.26	78.98	6.11
William Street	189001618	180003890	83.99	82.19	78.77	78.78	5.21	78.90	5.09
William Street/Butler Street	189001619	180003891	83.79	81.99	78.49	78.72	5.07	78.82	4.97
William Street	18901620	180003892	83.38	81.58	78.41	78.64	4.74	78.74	4.64
William Street/Dorchester Street	18901622	180003893	83.25	81.45	78.27	78.57	4.68	78.66	4.60
William Street	18901623	180003894	81.02	79.22	78.12	78.40	2.63	78.46	2.56
William Street/Nassau Street	18901624	180003898	80.86	79.06	77.96	78.26	2.60	78.31	2.55
William Street	18901625	180003303	80.56	78.76	77.66	78.03	2.53	78.05	2.51
William Street	18902049	180003302	81.89	80.09	76.83	77.97	3.92	77.98	3.91
William Street Sanitary Pumping Station		180003301	82.40	80.60	76.69	77.91	4.49	77.92	4.48


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Appendix E

Digital Copy of Model
(Refer to submission package)

APPENDIX C

WATER SERVICING CALCULATIONS

SCHAEFFERS
CONSULTING ENGINEERS

WATER SUPPLY CALCULATIONS - Ritz-Carlton Hotel, SPA, Residences 144 John Street East
Town of Niagara-on-the-Lake

Generation Rate †:

240	L/Day per person	Residential
270	L/Day per person	Employment

Average Demand Calculation

Tenure Type	GFA (ha)	Units	Unit Density (ppu)	Population Density (sqft/person)	Population	Generation Rate (L/cap/d)	Average Demand (L/s)
Residence Site							
Three Storey Residential - 1B+D, 2B	n/a	198	1.99	n/a	395	240	1.097
Three Storey Residential - 1B	n/a	36	1.21	n/a	44	240	0.122
Commercial - Tennis Club & Clubhouse	0.09	n/a	n/a	500	20	270	0.063
Sub-total	**0.09**	**234**			**459**		**1.28**
Ritz Carlton Hotel / Spa Site							
Hotel Suites - Units	n/a	111	1.99	n/a	221	270	0.691
Hotel Suites - Commercial (Restaurant / Retai / Office)	0.25	n/a	n/a	500	55	270	0.172
Spa - Commercial	0.27	n/a	n/a	500	60	270	0.188
Sub-total	**0.53**	**111**			**336**		**1.050**
Total	**0.62**	**345**			**795**		**2.332**

Total Site Demand

	Average Day Demand (L/s)	Max. Hour Demand Peaking Factor ††	Max Hour Demand (L/s)	Max Day Demand Peaking Factor ††	Max Day Demand (L/s)	Fire Flow + Max. Demand (L/s)	Peak day demand + fire flow (L/s)
TOTAL	**2.33**	4.13	**9.63**	2.75	**6.41**	**217.00**	**223.41**

* Fire Flows Based on Table 8 in FUS Guideline (2020)

† Based on Niagara Region's 2021 Water and Wastewater Servicing Plan Update

†† Based on MECP Design Guidelines for Drinking Water Systems (Table 3.1)

81 Todd Road Suite 202 Georgetown Ont. L7G 4R8
(o) 905-467-5853 (c) 905-971-9956 (e) mark@aquacom.ca

July 5, 2020

Luis Correia
SOLMAR Development Corp
122 Romina Drive
Concord, Ontario
L4K 4Z7

Reference: 200 John Street Development
Town of Niagara on The Lake
Hydrant Flow Testing

The flow testing was completed on Thursday July 2nd, 2020 as scheduled.

We advised the Town of Niagara on the Lake water operations staff of this schedule and they provided an operator to assist with the operation of the municipal hydrants and to assist with the test.

Please find the attached summary of test results. For your information;

the hydrant was flowed from one than two nozzles, using flow diffusers

residual pressures were recorded from a second fire hydrant

theoretical flows were produced from the attached chart, using a .90 nozzle coefficient

all discharge water was dechlorinated as per Ministry requirements

the hydrants were not colour coded at the time of the test

If you should require any further information please do not hesitate to contact the undersigned.

Sincerely yours,

Aquacom Contracting
Mark Kilbourne

AQUACOM CONTRACTING
81 Todd Road Suite 202 Georgetown Ont. L7G 4R8
(o) 905-467-5853 (C) 905-971-9956 (e) mark@aquacom.ca

SITE NAME	200 JOHN STREET DEVELOPMENT
TEST DATE TIME	THURSDAY JULY 2ND, 2020 @ 1345
SITE ADDRESS	TOWN OF NIAGARA ON THE LAKE
TECHNICIANS	MARC COULTER & JEFF DAM
COMMENTS	MUNICIPAL HYDRANTS

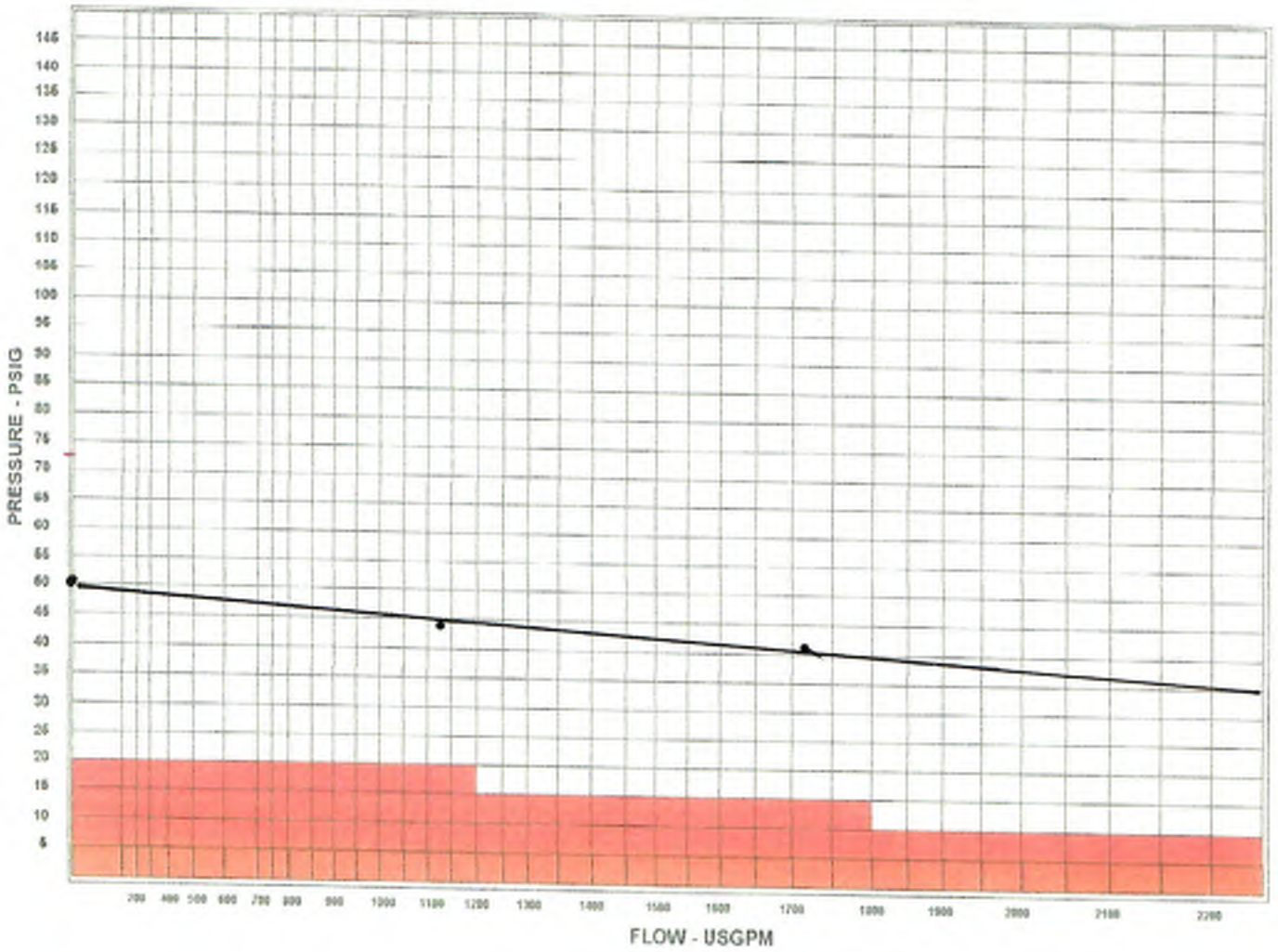
LOCATION OF FLOW HYDRANT

200 JOHN STREET

LOCATION OF RESIDUAL HYDRANT

201 JOHN STREET

# OUTLETS	SIZE INCHES	PITO PSI	FLOW USGPM	RESIDUAL PSI	STATIC PSI	PIPE DIA. MM
ONE	2.50	44	1113	43	50	
TWO	2.50	26	1712	36		200MM
		THEORETICAL	2584	20	TEST #	ONE
NOZZLE COEFF.		.90				



Solmar Niagara 2

Project No. 4696

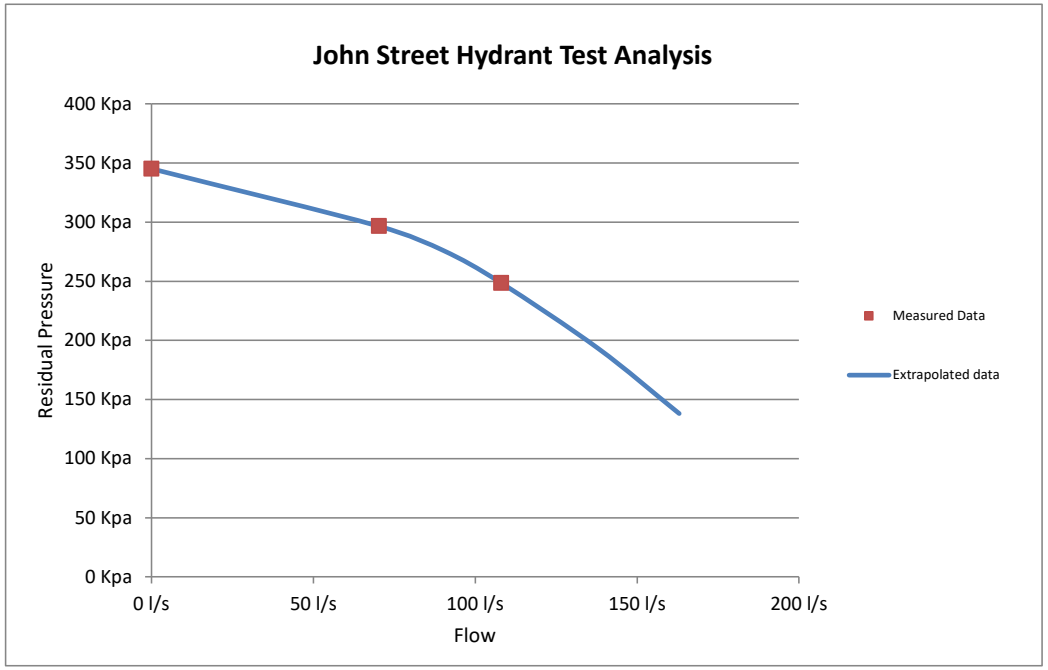
Test 1 - AQUACOM CONTRACTING

Flow Test Results of July 2, 2020

Location: Residual: 201 John Street

Flow: 200 John Street

Test Results			
Flow US. GPM	Residual Pressure psi	Flow L/s	Residual Presure kPa
0	50	0	345
1113	43	70	297
1712	36	108	248



For a residual pressure of **20 psi**
or **140 kPa** the equivalent flow is

163	**L/s**
2584	**USGPM**
2151	**IGPM**

1 USG = 3.785 litres

1 IG = 4.546 litres

1 psi = 6.9 kpa

AQUACOM CONTRACTING
81 Todd Road Suite 202 Georgetown Ont. L7G 4R8
(o) 905-467-5853 (C) 905-971-9956 (e) mark@aquacom.ca

SITE NAME	200 JOHN STREET DEVELOPMENT
TEST DATE TIME	THURSDAY JULY 2ND, 2020 @ 1405
SITE ADDRESS	TOWN OF NIAGARA ON THE LAKE
TECHNICIANS	MARC COULTER & JEFF DAM
COMMENTS	MUNICIPAL HYDRANTS

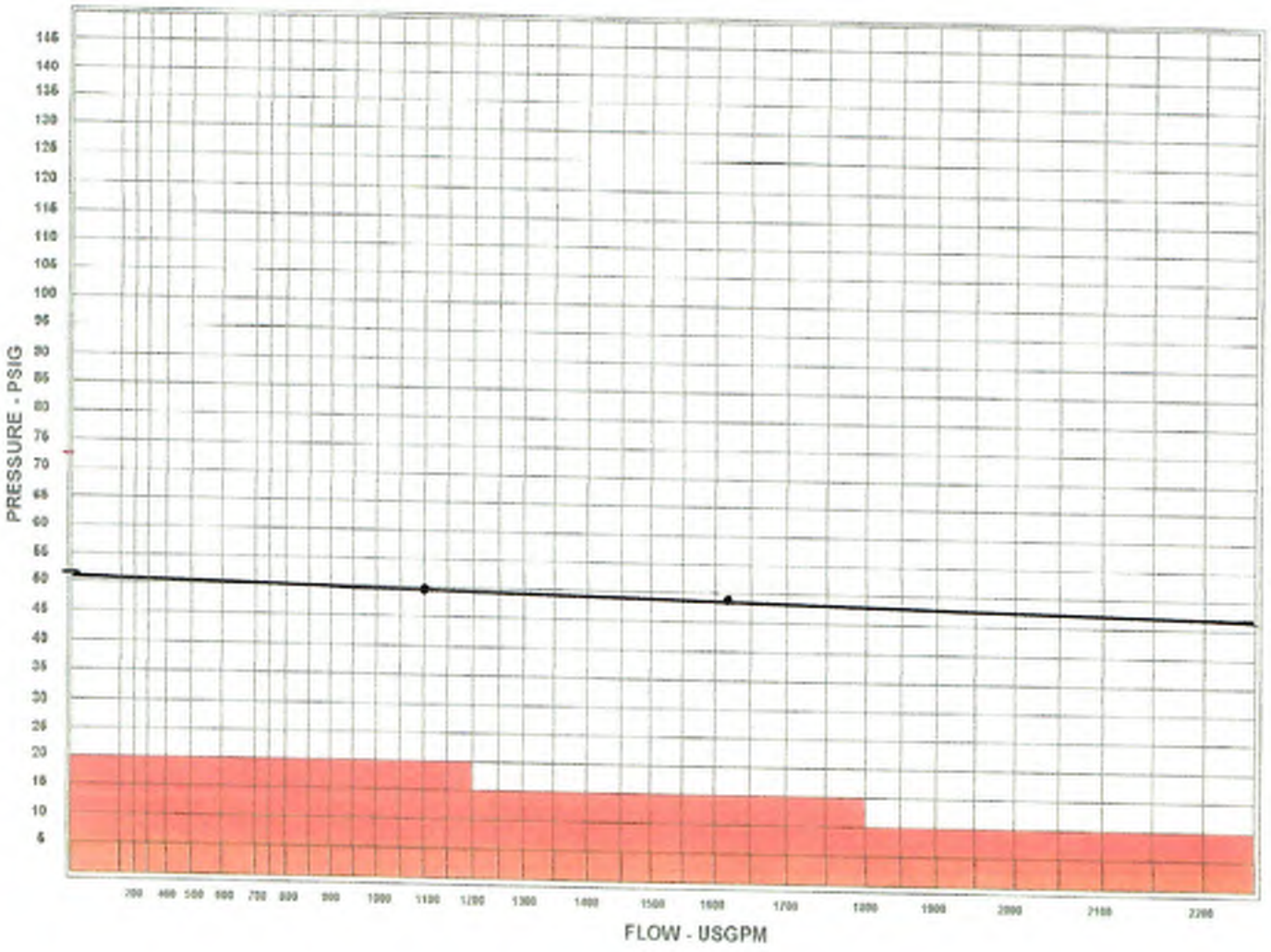
LOCATION OF FLOW HYDRANT

609 CHARLOTTE ST

LOCATION OF RESIDUAL HYDRANT

61 PAFFORD ST

# OUTLETS	SIZE INCHES	PITO PSI	FLOW USGPM	RESIDUAL PSI	STATIC PSI	PIPE DIA. MM
ONE	2.50	43	1100	50	52	
TWO	2.50	23	1612	49		150MM
		THEORETICAL	5788	20	TEST #	TWO
NOZZLE COEFF.		.90				



Solmar Niagara 2

Project No. 4696

Test 1 - AQUACOM CONTRACTING

Flow Test Results of July 2, 2020

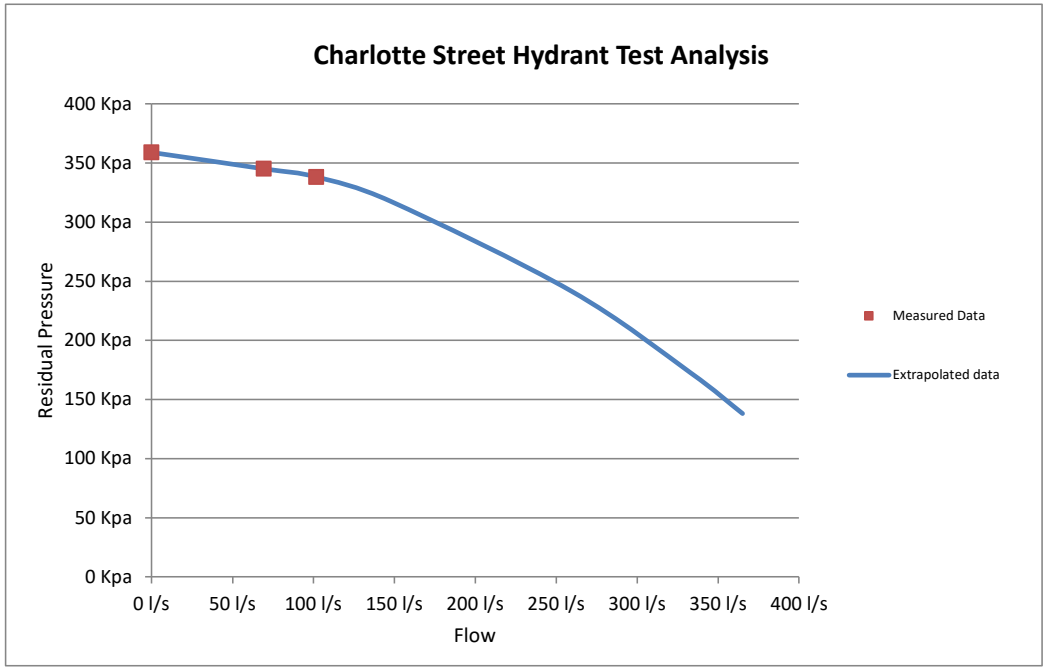
Location: Residual: 61 Pafford Street

Flow: 609 Charlotte Street

Test Results			
Flow US. GPM	Residual Pressure psi	Flow L/s	Residual Presure kPa
0	52	0	359
1100	50	69	345
1612	49	102	338

For a residual pressure of **20 psi** or **140 kPa** the equivalent flow is

365	**L/s**
5786	**USGPM**
4817	**IGPM**



1 USG = 3.785 litres

1 IG = 4.546 litres

1 psi = 6.9 kpa

AQUACOM CONTRACTING

81 Todd Road Suite 202 Georgetown Ont. L7G 4R8

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HYDRANT FLOW TEST REPORT

		HYDRANT MAKE	SEC. VALVE CONDITION	TECH.	TIME	STATIC PSI	PITO 1-2.50" PSI	FLOW 1-2.50" US GPM	RESIDUAL 1-2.50" PSI	PITO 2-2.50" PSI	FLOW 2-2.50" US GPM	RESIDUAL 2-2.50" PSI	COLOUR CODE
F1	200 JOHN ST	McAVITY	OPEN/OK	JD	1345		44	1113		26	1712		
R1	210 JOHN ST	McAVITY	OPEN/OK	MC		50			44			36	
F2	609 CHARLOTTE ST	McAVITY	OPEN/OK	JD	1405		43	1100		23	1612		
R2	61 PAFFORD ST	CV DARLING	OPEN/OK	MC		52			50			49	
F3													
R3													
F4													
R4													
F5													
R5													

CUSTOMER	LOCATION	CONTACTS ON SITE
SOLMAR DEVELOPMENT CORP	JOHN ST/CHARLOTTE ST	
	TOWN OF NIAGARA ON THE LAKE	T OF NOTL STAFF

2.50" hydrant nozzle

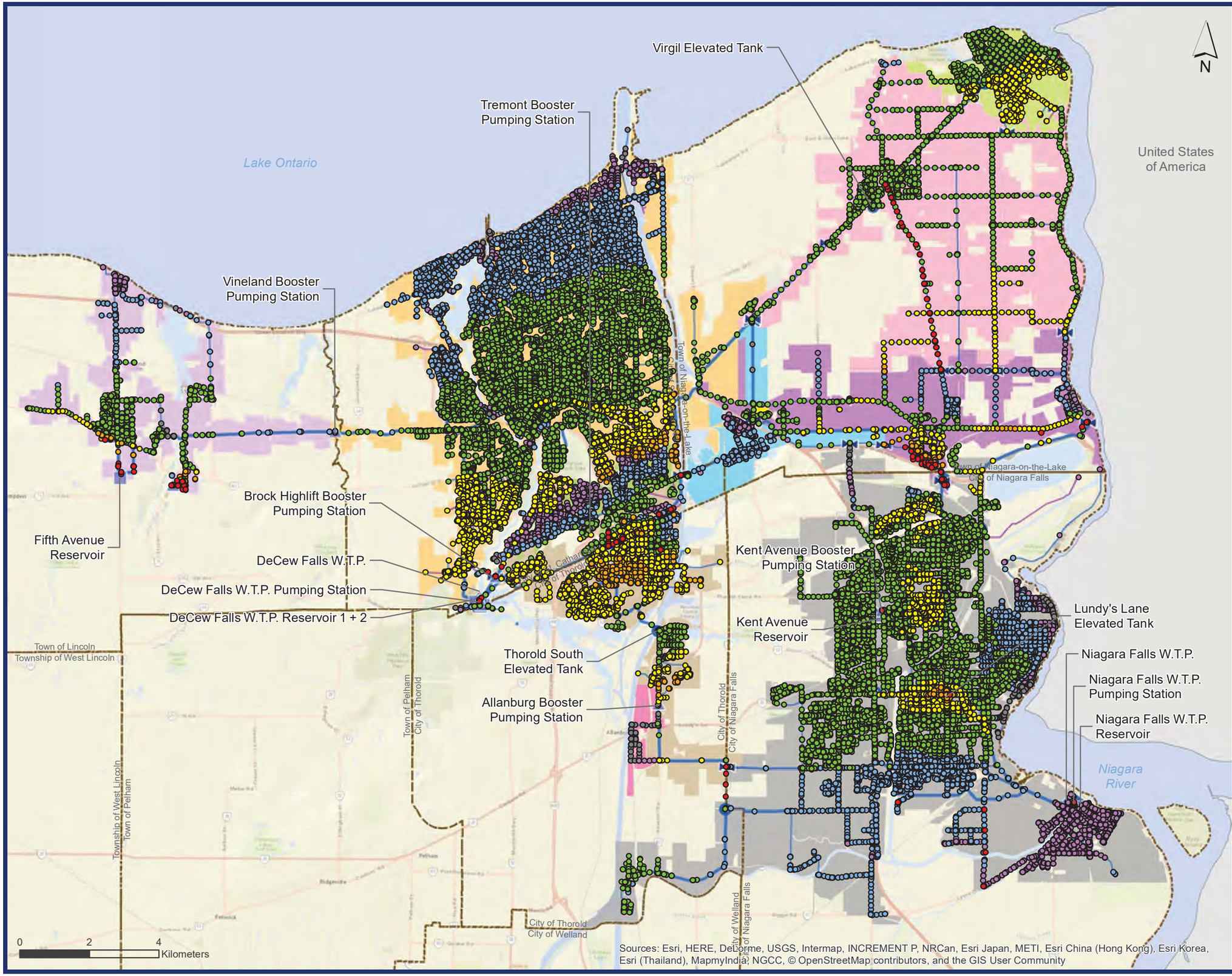
PITO READING PSI	ROUND ENTRANCE COEFF. 90	TWO NOZZLE
1	168	336
2	238	476
3	291	582
4	336	672
5	375	750
6	411	822
7	445	890
8	475	950
9	504	1008
10	531	1062
11	549	1098
12	581	1162
13	606	1212
14	628	1256
15	650	1300
16	671	1342
17	692	1384
18	172	344
19	732	1464
20	751	1502
22	789	1578
24	823	1646
26	856	1712
28	878	1756
30	920	1840
32	950	1900
34	979	1958
36	1007	2014
38	1035	2070
40	1062	2124
42	1088	2176
44	1113	2226
46	1164	2328
48	1164	2328
50	1187	2374
52	1211	2422
54	1234	2468
56	1256	2512
58	1279	2558
60	1301	2602
62	1323	2646
64	1344	2688
66	1364	2728
68	1385	2770
70	1405	2810
72	1425	2850
74	1445	2890
76	1464	2928
78	1483	2966
80	1502	3004

PITO READING PSI	SQUARE ENTRANCE COEFF. 80	TWO NOZZLE
1	150	300
2	211	422
3	258	516
4	298	596
5	334	668
6	366	732
7	395	790
8	422	844
9	448	896
10	472	944
11	483	966
12	517	1034
13	538	1076
14	558	1116
15	578	1156
16	597	1194
17	615	1230
18	633	1266
19	650	1300
20	667	1334
22	700	1400
24	731	1462
26	761	1522
28	790	1580
30	818	1636
32	844	1688
34	870	1740
36	895	1790
38	920	1840
40	944	1888
42	967	1934
44	990	1980
46	1012	2024
48	1034	2068
50	1055	2110
52	1076	2152
54	1097	2194
56	1117	2234
58	1137	2274
60	1156	2312
62	1176	2352
64	1194	2388
66	1213	2426
68	1231	2462
70	1249	2498
72	1266	2532
74	1284	2568
76	1302	2604
78	1318	2636
80	1335	2670

THE FLOWS SHOWN ARE IN US GPM
COEFFICIENT FOR EACH NOZZLE HAS BEEN APPLIED TO CALCULATE THEORETICAL FLOW

Niagara Region

2016 MASTER SERVICING PLAN



Water Facilities

- Water Treatment Plant
- Reservoir
- Elevated Tank
- Standpipe
- Chlorine Facility
- Pressure Reducing Valve

Pumping Station

- Regional
- Municipal

Water Network

- Regional
- Local
- Private

Pressure Zone System*

*Pressure zone limits are shown based on property boundaries.

127	161	180	227
144	164	200	250
154	168	220	257

Minimum Pressure (psi)

- < 40
- 40 - 50
- 50 - 60
- 60 - 80
- 80 - 90
- 90 - 100
- > 100

Figure 3.C.6

Existing Maximum Day Demand Pressure

Decew and Niagara Falls WTP

Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community

BluePlan

May 2017
715023-W-4-Existing Pressure (DCNF)
NAD 1983 UTM Zone 17N

Niagara Region

2016 MASTER SERVICING PLAN

N

Virgil Elevated Tank

Tremont Booster Pumping Station

Lake Ontario

United States of America

Vineland Booster Pumping Station

Brock Highlift Booster Pumping Station

Fifth Avenue Reservoir

DeCew Falls W.T.P.

DeCew Falls W.T.P. Pumping Station

DeCew Falls W.T.P. Reservoir 1 + 2

Town of Lincoln
Township of West Lincoln

Thorold South Elevated Tank

Allanburg Booster Pumping Station

Town of Pelham
City of Thorold

Township of West Lincoln
Town of Pelham

City of Thorold
City of Welland

Town of Niagara-on-the-Lake
City of Niagara Falls

Kent Avenue Booster Pumping Station

Kent Avenue Reservoir

Lundy's Lane Elevated Tank

Niagara Falls W.T.P.

Niagara Falls W.T.P. Pumping Station

Niagara Falls W.T.P. Reservoir

Niagara River

0 2 4 Kilometers

Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community

Water Facilities

- Water Treatment Plant
- Reservoir
- Elevated Tank
- Standpipe
- Chlorine Facility
- Pressure Reducing Valve

Pumping Station

- Regional
- Municipal

Water Network

- Regional
- Local
- Private

Pressure Zone System*

*Pressure zone limits are shown based on property boundaries.

127	161	180	227
144	164	200	250
154	168	220	257

Available Fire Flow (L/s)

- < 50
- 50 - 100
- 100 - 150
- 150 - 200
- 200 - 250
- > 250

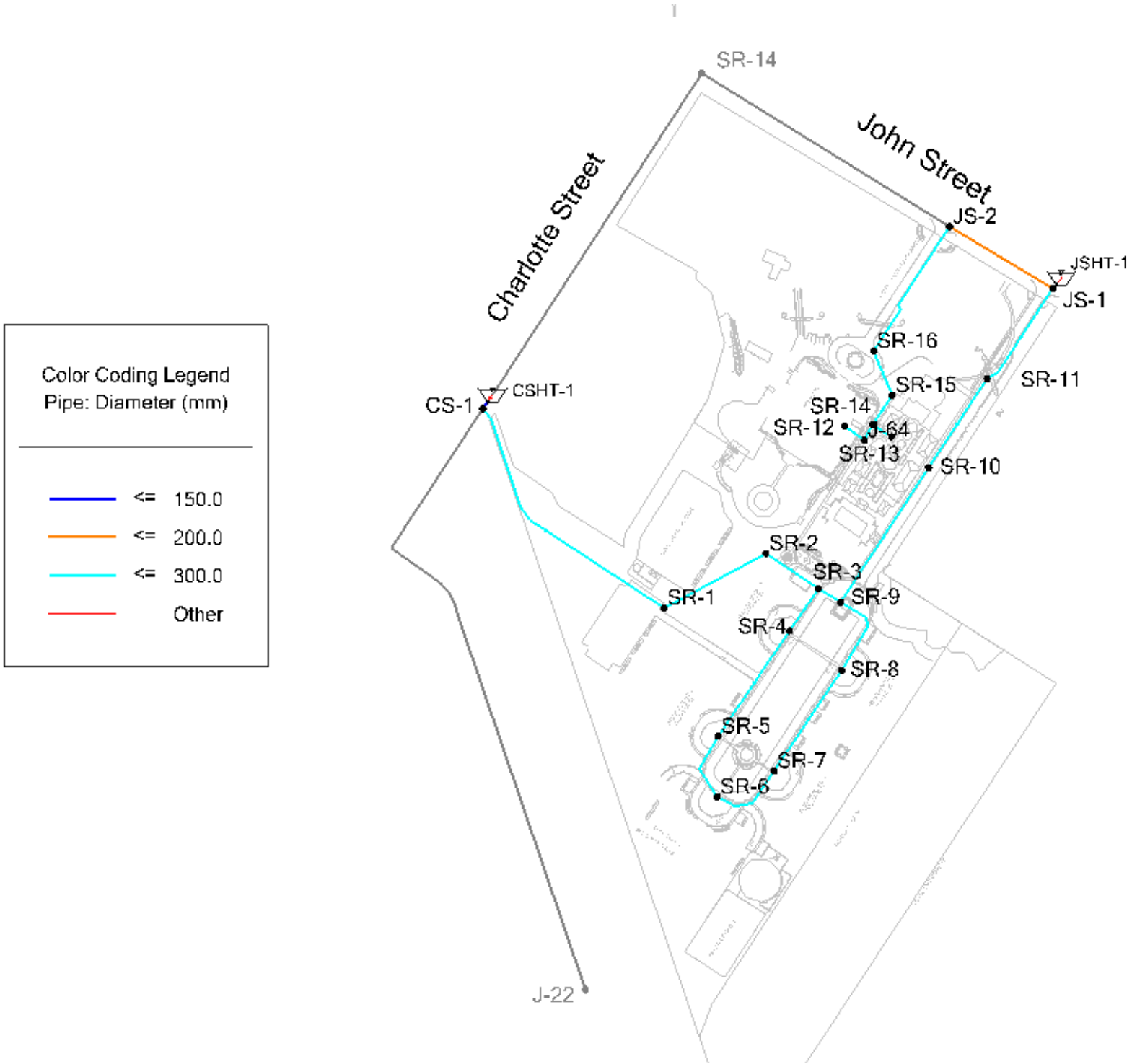
Figure 3.C.7

Existing System Fire Flow

Decew and Niagara Falls WTP

BluePlan

May 2017
715023-W-6-Existing Fire Flow (DCNF)
NAD 1983 UTM Zone 17N



Watermain Layout – Junction ID's

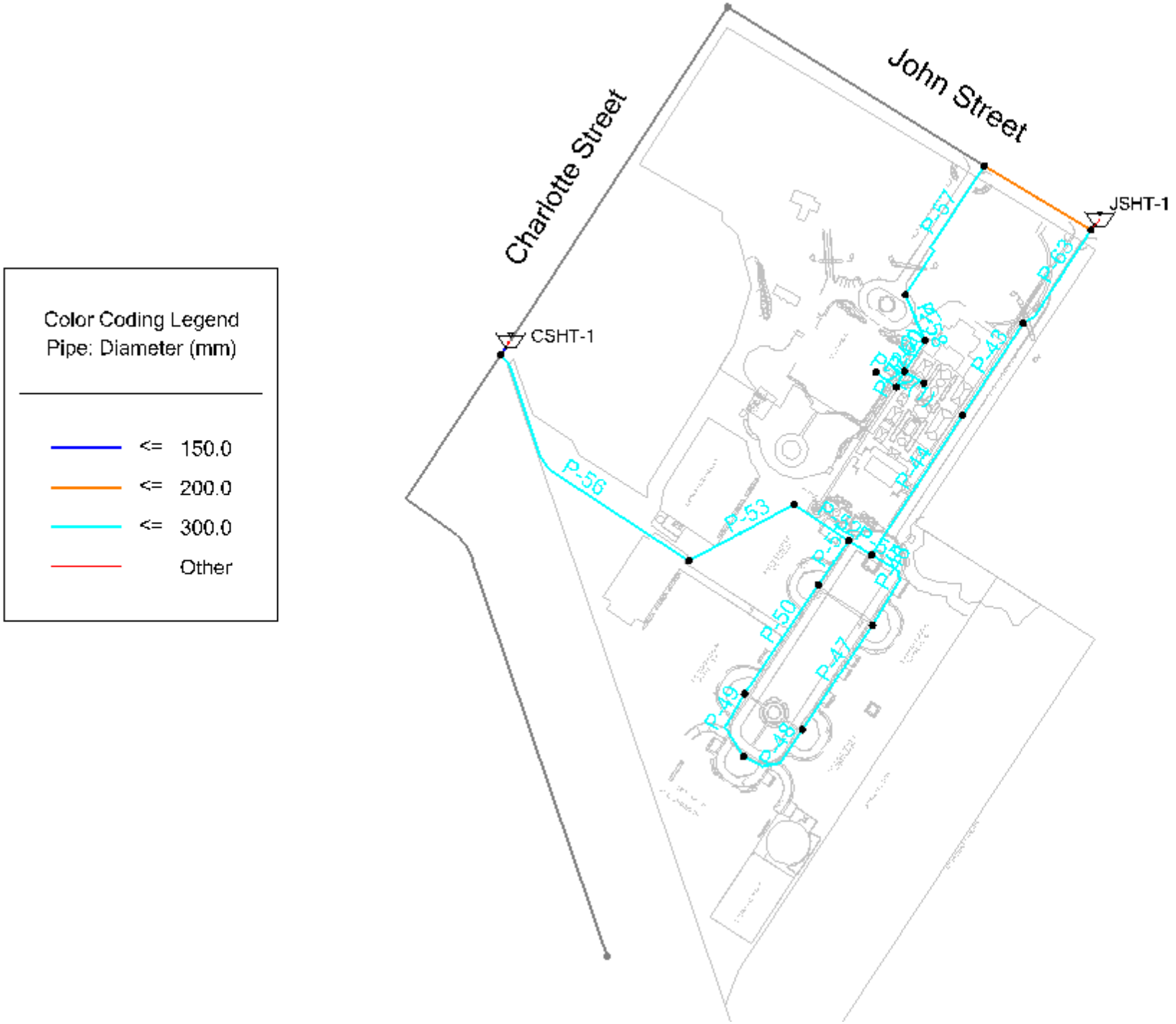
PROJECT NO.: 5625
PROJECT NAME: RITZ-CARLTON HOTEL, SPA, & RESIDENCES- 144 JOHN STREET EAST
LOCATION: NOTL
DATE: Apr-26

Table 2: Watershed Slope Calculations

Catchment	Number of Divisions of Equal Length	Equal Lengths (m)	Upstream Elevation (mAMSL)	Downstream Elevation (mAMSL)	Slope (m/m)	Slope to the power of -0.5 (m/m)	Sum of Length (m)	Sum of Slope to the power of -0.5	Watershed Slope, Sw (%)
103	1	32.0	90.57	90.28	0.009	10.5	160.0	53.5	0.9
	2	32.0	90.28	89.95	0.010	9.8			
	3	32.0	89.95	89.87	0.002	20.0			
	4	32.0	89.87	89.37	0.016	8.0			
	5	32.0	89.37	88.15	0.038	5.1			
102	1	41.2	91.38	90.77	0.015	8.2	206.0	54.4	0.8
	2	41.2	90.77	90.50	0.007	12.4			
	3	41.2	90.50	90.41	0.002	21.4			
	4	41.2	90.41	89.60	0.020	7.1			
	5	41.2	89.60	88.11	0.036	5.3			
Site	1	92.0	91.33	90.75	0.006	12.6	460	112.7	0.2
	2	92.0	90.75	90.60	0.002	24.8			
	3	92.0	90.60	90.57	0.000	55.4			
	4	92.0	90.57	90.05	0.006	13.3			
	5	92.0	90.05	88.00	0.022	6.7			
Ext-2	1	141.8	94.12	92.07	0.014	8.3	709	126.5	0.2
	2	141.8	92.07	91.84	0.002	24.8			
	3	141.8	91.84	91.36	0.003	17.2			
	4	141.8	91.36	90.85	0.004	16.7			
	5	141.8	90.85	90.81	0.000	59.5			

Notes:
1. The watershed slope is calculated using the Equivalent Slope Method using the Ministry of Transportation (MTO, 1997) Drainage Manual guidelines in Chapter 8 (page 27). The Equalivent Slope Method equation is provided below.

References:
1. Ministry of Transportation (MTO). 1997. Drainage Management Manual Part 3. Drainage and Hydrology Section. Transportation Engineering Branch. Quality and Standards Division. Government of Ontario.



Watermain Layout – Pipe ID's

Minimum Hour

Scenario: Minimum Hour
Current Time Step: 0.000 h
FlexTable: Junction Table

ID	Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)
212	J-64	90.66	0.00	126.28	349
136	SR-1	90.50	0.00	126.28	350
137	SR-2	92.00	0.00	126.28	335
138	SR-3	91.58	0.04	126.28	340
140	SR-4	92.20	0.19	126.28	334
141	SR-5	92.65	0.21	126.28	329
142	SR-6	92.65	0.14	126.28	329
143	SR-7	92.65	0.16	126.28	329
144	SR-8	92.20	0.17	126.28	334
139	SR-9	91.51	0.00	126.28	340
145	SR-10	90.67	0.00	126.28	348
146	SR-11	90.15	0.00	126.28	354
147	SR-12	90.68	0.61	126.28	348
148	SR-13	90.65	0.13	126.28	349
184	SR-14	90.65	0.00	126.28	349
149	SR-15	90.40	0.00	126.28	351
150	SR-16	90.22	0.00	126.28	353

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Scenario: Minimum Hour
Current Time Step: 0.000 h
FlexTable: Pipe Table

ID	Label	Length (Scaled) (m)	Start Node	Stop Node	Diameter (mm)	Hazen-Williams C	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/m)
160	P-43	83	SR-11	SR-10	300.0	120.0	-0.74	0.01	0.000
161	P-44	126	SR-10	SR-9	300.0	120.0	-0.74	0.01	0.000
164	P-46	70	SR-9	SR-8	300.0	120.0	0.31	0.00	0.000
165	P-47	95	SR-8	SR-7	300.0	120.0	0.14	0.00	0.000
166	P-48	60	SR-7	SR-6	300.0	120.0	-0.02	0.00	0.000
167	P-49	55	SR-6	SR-5	300.0	120.0	-0.16	0.00	0.000
168	P-50	99	SR-5	SR-4	300.0	120.0	-0.37	0.01	0.000
169	P-51	40	SR-4	SR-3	300.0	120.0	-0.56	0.01	0.000
170	P-52	49	SR-3	SR-2	300.0	120.0	-1.65	0.02	0.000
171	P-53	90	SR-2	SR-1	300.0	120.0	-1.65	0.02	0.000
173	P-55	20	SR-9	SR-3	300.0	120.0	-1.05	0.01	0.000
174	P-56	221	SR-1	CS-1	300.0	120.0	-1.65	0.02	0.000
175	P-57	116	JS-2	SR-16	300.0	120.0	0.74	0.01	0.000
176	P-58	38	SR-16	SR-15	300.0	120.0	0.74	0.01	0.000
185	P-60(1)	28	SR-15	SR-14	300.0	120.0	0.74	0.01	0.000
188	P-63	88	SR-11	JS-1	300.0	120.0	0.74	0.01	0.000
213	P-72(1)	19	SR-12	J-64	300.0	120.0	-0.61	0.01	0.000
214	P-72(2)	14	J-64	SR-14	300.0	120.0	-0.61	0.01	0.000

Average Day

Scenario: Average
Current Time Step: 0.000 h
FlexTable: Junction Table

ID	Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)
212	J-64	90.66	0.00	126.27	349
136	SR-1	90.50	0.00	126.28	350
137	SR-2	92.00	0.00	126.28	335
138	SR-3	91.58	0.06	126.28	340
140	SR-4	92.20	0.27	126.28	333
141	SR-5	92.65	0.30	126.28	329
142	SR-6	92.65	0.20	126.28	329
143	SR-7	92.65	0.23	126.28	329
144	SR-8	92.20	0.24	126.28	333
139	SR-9	91.51	0.00	126.28	340
145	SR-10	90.67	0.00	126.28	348
146	SR-11	90.15	0.00	126.28	354
147	SR-12	90.68	0.87	126.27	348
148	SR-13	90.65	0.19	126.27	349
184	SR-14	90.65	0.00	126.27	349
149	SR-15	90.40	0.00	126.27	351
150	SR-16	90.22	0.00	126.27	353

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Scenario: Average
Current Time Step: 0.000 h
FlexTable: Pipe Table

ID	Label	Length (Scaled) (m)	Start Node	Stop Node	Diameter (mm)	Hazen-Williams C	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/m)
160	P-43	83	SR-11	SR-10	300.0	120.0	-1.06	0.01	0.000
161	P-44	126	SR-10	SR-9	300.0	120.0	-1.06	0.01	0.000
164	P-46	70	SR-9	SR-8	300.0	120.0	0.43	0.01	0.000
165	P-47	95	SR-8	SR-7	300.0	120.0	0.19	0.00	0.000
166	P-48	60	SR-7	SR-6	300.0	120.0	-0.04	0.00	0.000
167	P-49	55	SR-6	SR-5	300.0	120.0	-0.24	0.00	0.000
168	P-50	99	SR-5	SR-4	300.0	120.0	-0.54	0.01	0.000
169	P-51	40	SR-4	SR-3	300.0	120.0	-0.81	0.01	0.000
170	P-52	49	SR-3	SR-2	300.0	120.0	-2.36	0.03	0.000
171	P-53	90	SR-2	SR-1	300.0	120.0	-2.36	0.03	0.000
173	P-55	20	SR-9	SR-3	300.0	120.0	-1.49	0.02	0.000
174	P-56	221	SR-1	CS-1	300.0	120.0	-2.36	0.03	0.000
175	P-57	116	JS-2	SR-16	300.0	120.0	1.06	0.01	0.000
176	P-58	38	SR-16	SR-15	300.0	120.0	1.06	0.01	0.000
185	P-60(1)	28	SR-15	SR-14	300.0	120.0	1.06	0.01	0.000
188	P-63	88	SR-11	JS-1	300.0	120.0	1.06	0.01	0.000
213	P-72(1)	19	SR-12	J-64	300.0	120.0	-0.87	0.01	0.000
214	P-72(2)	14	J-64	SR-14	300.0	120.0	-0.87	0.01	0.000

Peak Hour

Scenario: Peak Hour
Current Time Step: 0.000 h
FlexTable: Junction Table

ID	Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)
212	J-64	90.66	0.00	126.28	349
136	SR-1	90.50	0.00	126.28	350
137	SR-2	92.00	0.00	126.28	336
138	SR-3	91.58	0.02	126.28	340
140	SR-4	92.20	0.11	126.28	334
141	SR-5	92.65	0.12	126.28	329
142	SR-6	92.65	0.08	126.28	329
143	SR-7	92.65	0.09	126.28	329
144	SR-8	92.20	0.10	126.28	334
139	SR-9	91.51	0.00	126.28	340
145	SR-10	90.67	0.00	126.28	349
146	SR-11	90.15	0.00	126.28	354
147	SR-12	90.68	0.35	126.28	348
148	SR-13	90.65	0.08	126.28	349
184	SR-14	90.65	0.00	126.28	349
149	SR-15	90.40	0.00	126.28	351
150	SR-16	90.22	0.00	126.28	353

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Scenario: Peak Hour
Current Time Step: 0.000 h
FlexTable: Pipe Table

ID	Label	Length (Scaled) (m)	Start Node	Stop Node	Diameter (mm)	Hazen-Williams C	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/m)
160	P-43	83	SR-11	SR-10	300.0	120.0	-0.43	0.01	0.000
161	P-44	126	SR-10	SR-9	300.0	120.0	-0.43	0.01	0.000
164	P-46	70	SR-9	SR-8	300.0	120.0	0.17	0.00	0.000
165	P-47	95	SR-8	SR-7	300.0	120.0	0.07	0.00	0.000
166	P-48	60	SR-7	SR-6	300.0	120.0	-0.02	0.00	0.000
167	P-49	55	SR-6	SR-5	300.0	120.0	-0.10	0.00	0.000
168	P-50	99	SR-5	SR-4	300.0	120.0	-0.22	0.00	0.000
169	P-51	40	SR-4	SR-3	300.0	120.0	-0.33	0.00	0.000
170	P-52	49	SR-3	SR-2	300.0	120.0	-0.95	0.01	0.000
171	P-53	90	SR-2	SR-1	300.0	120.0	-0.95	0.01	0.000
173	P-55	20	SR-9	SR-3	300.0	120.0	-0.60	0.01	0.000
174	P-56	221	SR-1	CS-1	300.0	120.0	-0.95	0.01	0.000
175	P-57	116	JS-2	SR-16	300.0	120.0	0.43	0.01	0.000
176	P-58	38	SR-16	SR-15	300.0	120.0	0.43	0.01	0.000
185	P-60(1)	28	SR-15	SR-14	300.0	120.0	0.43	0.01	0.000
188	P-63	88	SR-11	JS-1	300.0	120.0	0.43	0.01	0.000
213	P-72(1)	19	SR-12	J-64	300.0	120.0	-0.35	0.00	0.000
214	P-72(2)	14	J-64	SR-14	300.0	120.0	-0.35	0.00	0.000

Maximum Day + Fire

Scenario: Max Day +FF
Current Time Step: 0.000 h
Fire Flow Node FlexTable: Fire Flow Results Table

Label	Is Fire Flow Run Balanced?	Satisfies Fire Flow Constraints?	Fire Flow (Needed) (L/s)	Flow (Total Needed) (L/s)	Flow (Total Available) (L/s)	Fire Flow (Available) (L/s)	Pressure (Calculated Residual) (kPa)	Pressure (Calculated Residual @ Total Flow Needed) (kPa)	Hydraulic Grade (m)	Velocity of Maximum Pipe (m/s)	Pipe w/ Maximum Velocity
SR-3	True	True	117.00	117.15	303.86	303.71	150	302	126.24	2.49	P-56
SR-4	True	True	217.00	217.74	295.32	294.58	141	221	126.24	3.22	P-51
SR-5	True	True	217.00	217.83	280.01	279.18	140	208	126.24	2.37	P-51
SR-6	True	True	167.00	167.54	277.74	277.20	140	251	126.24	2.28	P-56
SR-7	True	True	200.00	200.62	278.53	277.91	140	223	126.24	2.28	P-56
SR-8	True	True	200.00	200.67	290.43	289.76	140	232	126.24	2.88	P-46
SR-12	True	True	133.00	135.38	147.55	145.17	140	170	126.22	2.09	P-58
SR-13	True	True	117.00	117.52	146.73	146.21	140	208	126.22	2.11	P-58

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Ritz-Carlton Hotel, SPA & Residences 144 John Street East
5625
14-Apr-26

Minimum Consumption for Residence: 0.096 m^3/cap/day
Minimum Consumption for Residence: 0.108 m^3/cap/day

Turnover Rate Calculation

Street/Stage Name	Length	Diameter	Area	Volume (m^3)	70% Population	Current Consumption	Day/turnover
	(m)	(mm)	(m^2)	(m^3)	(-)	(m^3/day)	(Day)
Residence Site	1096	300	0.07	77.47	321.3	30.97	2.50
Ritz-Carlton Hotel / Spa Site	232	300	0.07	16.40	235.2	22.67	0.72

APPENDIX D

STORMWATER MANAGEMENT CALCULATIONS

SCHAEFFERS
CONSULTING ENGINEERS

PROJECT NO.: 5625
PROJECT NAME: RITZ-CARLTON HOTEL, SPA, & RESIDENCES- 144 JOHN STREET EAST
LOCATION: NOTL
DATE: Apr-26

SCHAEFFERS CONSULTING ENGINEERS

Table 1: Existing Catchment Area Drainage Characteristics

Catchment	Area	Soil Conservation Science Curve Number (SCS CN)	Initial Abstraction LSRCA Table 14.0	Watershed Slope, S_w	Overland Flow Length, L	Runoff Coefficient, C	Time of Concentration, t_c (Airport)	Time of Concentration (Bransby)	Time of Concentration (Upland)	Time to Peak, tp = 0.67tc (Airport)	Time to Peak, tp (Bransby)	Time to Peak (Upland)	Time to Peak, tp = 0.67tc (Airport)	Time to Peak, tp = 0.67tc (Bransby)	Time to Peak, tp = 0.67tc (Upland)
	(ha)		*(mm)*	*(%)*	*(m)*		minutes	minutes	minutes	minutes	minutes	minutes	(hrs)	(hrs)	(hrs)
103	1.24	78	5.0	0.9	160.0	0.31	33.93	9.2	28.1	22.7	6.1	18.8	**0.4**	**0.10**	0.31
102	1.35	85	5.00	0.8	206.0	0.36	36.6	11.8	36.1	24.5	7.9	24.2	0.41	0.13	0.40
101	6.53	69	5.0	0.2	460.0	0.65	53.8	30.1	80.7	36.1	20.2	54.1	0.60	0.34	0.90
EXT-2	28.11	81	5.0	0.2	709.0	0.25	136.2	42.0	124.4	91.2	28.1	83.3	1.52	0.47	1.39

Notes:

1. Soil information was extracted from the S

2. Initial Abstraction based on SCS CN as per the Visual Otthymo Reference Manual should be 0.15 times soil storage for SCS CN values of 80 to 90. Soil storage is calculated using the following equation: S = (25400/CN)-254. For this assessment, the 5mm was more conservative and was used in the model.

3. The time of concentration is calculated using the Airport Equation when the runoff coefficient was less than or equal to 0.40 and the Bransby-Williams Equation when the runoff coefficient was more than 0.40. The runoff coefficient for cultivated agricultural land is based on catchment topography and hydrologic soil group; and derived using Design Chart 1.07 Management Manual that the Airport Equation was applicable to all catchments with the with the exception of Catchment 211 which had a runoff coefficient of 0.45. As such, the Bransby-Williams Equation was only applicable to Catchment 211.

land with residue cover of greater than 20% using Table 3-1 (page 3-3) in Chapter 3 of the Technical Release-55 (USDA, 1986).

Airport Equation:

Assumptions: Runoff Coefficient, C, is less than or equal to 0.4

$$t_c = 3.26 * (1.1 - C) * L^{0.5} * S_w^{-0.33}$$

Where:
t_c is the time of concentration (minutes);
C is the runoff coefficient;
L is the watershed length (m); and
S_w is the watershed slope (%).

Bransby Williams Equations:

Assumptions: Runoff Coefficient, C, is greater than 0.4

$$t_c = 0.057 * L * S_w^{-0.2} * A^{-0.1}$$

Where:
t_c is the time of

Velocity for Slope 0.2%= 0.15 m/s (Cultivated Straight ROW)
Velocity for Slope 0.4%= 0.14 m/s (50:50 Woodland + Cultivated Straight ROW)
Velocity for Slope 0.3%= 0.12 m/s (Pasture)

PROJECT NO.: 5625
PROJECT NAME: RITZ-CARLTON HOTEL, SPA, & RESIDENCES- 144 JOHN STREET EAST
LOCATION: NOTL
DATE: Apr-26

Table 2: Watershed Slope Calculations

Catchment	Number of Divisions of Equal Length	Equal Lengths (m)	Upstream Elevation (mAMSL)	Downstream Elevation (mAMSL)	Slope (m/m)	Slope to the power of -0.5 (m/m)	Sum of Length (m)	Sum of Slope to the power of -0.5	Watershed Slope, Sw (%)
103	1	32.0	90.57	90.28	0.009	10.5	160.0	53.5	0.9
	2	32.0	90.28	89.95	0.010	9.8			
	3	32.0	89.95	89.87	0.002	20.0			
	4	32.0	89.87	89.37	0.016	8.0			
	5	32.0	89.37	88.15	0.038	5.1			
102	1	41.2	91.38	90.77	0.015	8.2	206.0	54.4	0.8
	2	41.2	90.77	90.50	0.007	12.4			
	3	41.2	90.50	90.41	0.002	21.4			
	4	41.2	90.41	89.60	0.020	7.1			
	5	41.2	89.60	88.11	0.036	5.3			
Site	1	92.0	91.33	90.75	0.006	12.6	460	112.7	0.2
	2	92.0	90.75	90.60	0.002	24.8			
	3	92.0	90.60	90.57	0.000	55.4			
	4	92.0	90.57	90.05	0.006	13.3			
	5	92.0	90.05	88.00	0.022	6.7			
Ext-2	1	141.8	94.12	92.07	0.014	8.3	709	126.5	0.2
	2	141.8	92.07	91.84	0.002	24.8			
	3	141.8	91.84	91.36	0.003	17.2			
	4	141.8	91.36	90.85	0.004	16.7			
	5	141.8	90.85	90.81	0.000	59.5			

Notes:
1. The watershed slope is calculated using the Equivalent Slope Method using the Ministry of Transportation (MTO, 1997) Drainage Manual guidelines in Chapter 8 (page 27). The Equalivent Slope Method equation is provided below.

References:
1. Ministry of Transportation (MTO). 1997. Drainage Management Manual Part 3. Drainage and Hydrology Section. Transportation Engineering Branch. Quality and Standards Division. Government of Ontario.

RITZ-CARLTON HOTEL, SPA, & RESIDENCES - 144 JOHN STREET EAST

Project: 5625

Runoff Coefficients

SWM Pond - High Level Estimate (201)

Land Use	A	C	AC	TIMP	XIMP	A*TIMP	A*XIMP
Residential Roads and Pervious Area	3.08	0.65	2.002	0.64	0.32	1.980	0.990
Residential Roof	1.03	0.9	0.927	1.00	1.00	1.030	1.030
Tennis Court	0.39	0.9	0.351	1.00	1.00	0.390	0.390
Pond Block	0.50	0.55	0.275	0.50	0.50	0.250	0.250
Hotel Area Roof	0.35	0.9	0.315	1.00	1.00	0.350	0.350
Hotel Area Landscape and Amenities	0.55	0.39	0.215	0.27	0.27	0.149	0.149
Club Spa	0.64	0.73	0.467	0.75	0.75	0.483	0.483
TOTAL	**6.54**	**0.70**	**4.55**	**0.71**	**0.56**	**4.63**	**3.64**

Uncontrolled to One Mile Creek - Site Entrance (202)

Land Use	A	C	AC	TIMP	XIMP	A*TIMP	A*XIMP
Impervious	0.25	0.90	0.221	1.00	1.00	0.245	0.245
Pervious	0.27	0.25	0.068	0.07	0.07	0.019	0.019
TOTAL	**0.52**	**0.56**	**0.29**	**0.51**	**0.51**	**0.26**	**0.26**

Uncontrolled to One Mile Creek - Hotel Entrance (203)

Land Use	A	C	AC	TIMP	XIMP	A*TIMP	A*XIMP
Impervious	0.25	0.90	0.23	1.00	1.00	0.250	0.250
Pervious	0.09	0.25	0.023	0.07	0.07	0.006	0.006
TOTAL	**0.34**	**0.73**	**0.25**	**0.75**	**0.75**	**0.26**	**0.26**

Uncontrolled to One Mile Creek -Existing Club Spa (204)

Existing House	0.08	0.90	0.072	1.00	0.50	0.080	0.040
Existing landscape	0.16	0.25	0.040	0.07	0.07	0.011	0.011
TOTAL	**0.24**	**0.47**	**0.11**	**0.38**	**0.21**	**0.09**	**0.05**

Uncontrolled to One Mile Creek - Residential (205)

Land Use	A	C	AC	TIMP	XIMP	A*TIMP	A*XIMP
Uncontrolled to ditch and One Mile Creek	1.71	0.25	0.428	0.07	0.07	0.122	0.122
TOTAL	**1.71**	**0.25**	**0.43**	**0.07**	**0.07**	**0.12**	**0.12**

SOLMAR SUBDIVISION - NOTL
Erosion Control
SWM Pond

Based on 25mm Storm Event Releasing over 48-Hour Period

Run: 25mm 4hr Chicago Show All Runs

Run	NHYD	FlowType	DT [hr]	AREA [ha]	PKFW [m³/s]	TP [hr]	RV [mm]
25mm 4hr Chicago	88	Outflow	0.083	6.540	0.396	1.500	18.195

Input:

Area =	6.54	ha
R.V =	18.195	mm
Drawdown Time =	48	hrs

Calculations:

Required Storage =	1,190	m^3
Average Outflow =	0.007	m^3/s
Peak Outflow =	0.010	m^3/s (Estimated at 1.5 times Average Outflow)

SOLMAR - Niagara on the Lake
WATER QUALITY REQUIREMENT CALCULATIONS
SWM Pond

Table: Water Quality Storage Requirements Based on Receiving Waters

Protection Level	SWMP Type	Storage Volume (m^3/ha) for Impervious Level					
		0%	35%	55%	70%	85%	100%
Enhanced	Wet Pond	90	140	190	225	250	275

* For wet ponds, all of the storage, except for 40 m^3/ha represents the permanent pool volume.
The 40 m^3/ha represents extended detention storage.

Input:

Estimated Imperviousness =	71%	
Area =	6.54	ha
Level of Protection:	1	
SWMP Type :	Wet Pond	

Calculation:

Total Storage Volume Required =	226	m^3/ha →	1,479	m^3
Permanent Pool Volume =	186	m^3/ha →	**1,218**	m^3
Active Storage Volume =	40	m^3/ha →	262	m^3

PROJECT NO: *5625*
DESCRIPTION: *SWM Pond*
DATE: *Apr-26*

SCHAEFFERS
CONSULTING ENGINEERS

FOREBAY SETTLING LENGTH

ref: SWM Planning & Design Manual (MOE, March 2003)

$Dist = (rQ_p / V_s)^{1/2}$, where

Dist = forebay length (m)
r = Length to width ratio of forebay (>2:1)
Q_p = peak flowrate from the pond during design quality storm (m^3/s)
V_s = settling velocity in the forebay (m/s)

r =	3.00		(2:1)
Q_p =	0.011	m^3/s	(required erosion outflow rate)
V_s =	0.0003	m	(based on 150μm particles)

Dist = 10 metres

DISPERSION LENGTH

ref: SWM Planning & Design Manual (MOE, March 2003)

$D = 8Q / dV_f$, where

D = length of dispersion (m)
Q = 10 year inlet flowrate (m^3/s)
d = depth of permanent pool in forebay (m)
V_f = desired velocity in the forebay (m/s)

Q =	1.130	m^3/s	
d =	1.90	m	
V_f =	0.5	m/s	(MOEE empirical value)

Dist = 10 m

Forebay Length Required: 10 metres
Forebay Length Provided: 20 metres *

* Assuming permanent pool length

Stone Sizing Calculations

Proposed Outlet

Project : **Solmar - Niagara-on-the-Lake**
Job No. : **5625**
Date : **April 2026**

Actual Shear Stress Based on Outflow Velocity

Input:

Nominal Pipe Diameter	=	1.8x0.9	m	
Slope	=	0.005	m/m	
Area	=	1.20	m^2	
Hydraulic Radius, R	=	0.35	m	
Q_{full}	=	2.73	m^3/s	
$Velocity_{full}$	=	2.69	m/s	

Output:

1/R	=	2.88		
Tractive force, T	=	7.50	kg/m^2	(From MTO Design Chart 2.24)

Critical Shear Stress Resistance of Stone

Input:

Stone Size, D_{50}	=	300	mm

Output:

Critical Shear Stress Resistance, T_{cb}	=	0.0642 x D50		(MTO, Equation 5.31)
	=	19.26	kg/m^2	

Conclusion

O.K. - the critical shear stress capacity of the stone is greater than the tractive force of the flow

RITZ-CARLTON HOTEL, SPA, & RESIDENCES - 144 JOHN STREET

Project: 5625

AxC Comparison

Pre-Development

Land Use	A	C	AC	TIMP	XIMP	A*TIMP	A*XIMP
102	1.35	0.25	0.338	0.07	0.04	0.096	0.048
103	1.24	0.25	0.310	0.07	0.07	0.089	0.089
TOTAL	**2.59**	**0.25**	**0.65**	**0.07**	**0.05**	**0.19**	**0.14**

Post-Development

Land Use	A	C	AC	TIMP	XIMP	A*TIMP	A*XIMP
202	0.52	0.56	0.288	0.51	0.26	0.264	0.132
203	0.34	0.73	0.248	0.75	0.75	0.256	0.256
TOTAL	**0.86**	**0.63**	**0.54**	**0.61**	**0.45**	**0.52**	**0.39**

TABLE 1: WATER BUDGET - PRE DEVELOPMENT

WATER BALANCE/WATER BUDGET ASSESSMENT

	Site	
Catchment Designation	Site	Total
Area (m^2)	93500	93500
Pervious Area (m^2)	93500	93500
Impervious Area (m^2)		0
Infiltration Factors		
Topography Infiltration Factor-Rolling Land[1]	0.2	
Soil Infiltration Factor- Medium combinations of clay and loam[1]	0.2	
Land Cover Infiltration Factor- Cultivated[1]	0.2	
MOE Infiltration Factor[1]	0.6	
Inputs (per unit area)		
Precipitation (mm/year)[2]	880	880
Total Inputs (mm/year)	880	880
Outputs (per unit area)		
Precipitation Surplus (mm/year)	240	240
Net Surplus (mm/year)	240	240
Downspout Disconnection Retention	0	0
Evapotranspiration (mm/year)[2]	640	640
Roof Evapotranspiration (mm/year)	0	0
Rooftop Runoff Lawn Evaporation (mm/year)	0	0
Total Evapotranspiration (mm/yr)	**640**	**640**
Infiltration (mm/year)	144	144
Rooftop Infiltration (mm/year)	0	0
Total Infiltration (mm/year)	**144**	**144**
Runoff Pervious Area (mm/year)	96	96
Runoff Impervious Area (mm/year)	0	0
Total Runoff (mm/year)	**96**	**96**
Total Outputs (mm/year)	**880**	**880**
Difference (Inputs - Outputs)	0	0
Input Volumes		
Precipitation (m^3/year)	82280	82280
Total Inputs (m^3/year)	**82280**	**82280**
Outputs (Volumes)		
Precipitation Surplus (m^3/year)	22440	22440
Net Surplus (m^3/year)	22440	22440
Downspout Disconnection Retention (m^3/year)	0	0
Evapotranpiration (m^3/year)	59840	59840
Roof Evapotranspiration (m^3/year)	0	0
Rooftop Runoff Lawn Evaporation (m^3/year)	0	0
Total Evapotranspiration (m^3/year)	**59840**	**59840**
Infiltration (m^3/year)	13464	13464
Rooftop Infiltration (m^3/year)	0	0
Total Infiltration (m^3/year)	**13464**	**13464**
Runoff Pervious Area (m^3/year)	8976	8976
Runoff Impervious Area (m^3/year)	0	0
Total Runoff (m^3/year)	**8976**	**8976**
Total Outputs (m^3/year)	**82280**	**82280**
Difference (Inputs - Outputs)	0	0

1 - Infiltration factors based on MOE 2003 Guidelines

2 - Precipitation and evapotranspiration based on Preliminary Hydrogeological Investigation Report, Proposed Development at 200 John Street and 588 Charlott Street (2018) Cole Engineering Group Ltd.

TABLE 2: WATER BUDGET - POST-DEVELOPMENT WITHOUT MITIGATION

WATER BALANCE/WATER BUDGET ASSESSMENT

	Site																	
Catchment Designation	Uncontrolled Area (Landscape)	Residences Roof (1-5)	Residential Area Road and Landscape (Pervious)	Residential Area Road and Landscape (Impervious)	Spa	Tennis Court	Hotel Roof	Hotel Landscape and Ammenities (Pervious)	Hotel Landscape and Ammenities (Impervious)	Site Entrance (Pervious)	Site Entrance (Impervious)	Hotel Entrance (Pervious)	Hotel Entrance (Impervious)	Existing Club Spa House (Pervious)	Existing Club Spa House (Impervious)	SWM Pond Block (Impervious)	SWM Pond Block (Pervious)	Total
Area (m^2)	16871	10300	21026	9895	6440	3957	3529	4007	1482	2530	2633	854	2562	1497	917	2500	2500	93500
Pervious Area (m^2)	16871	0	21026	0	0	3957	0	4007	0	2530	0	854	0	1497	0	2500	0	53242
Impervious Area (m^2)	0	10300	0	9895	6440	0	3529	0	1482	0	2633	0	2562	0	917	0	2435	40193
Infiltration Factors																		
Topography Infiltration Factor-Rolling Land[1]	0.2	N/A	0.2	N/A	N/A	0.2	N/A	0.2	N/A	0.2	N/A	0.2	N/A	0.2	N/A	N/A	0.2	
Soil Infiltration Factor- Medium combinations of clay and loa	0.2	N/A	0.2	N/A	N/A	0.2	N/A	0.2	N/A	0.2	N/A	0.2	N/A	0.2	N/A	N/A	0.2	
Land Cover Infiltration Factor- Cultivated[1]	0.2	N/A	0.2	N/A	N/A	0.2	N/A	0.2	N/A	0.2	N/A	0.2	N/A	0.2	N/A	N/A	0.2	
MOE Infiltration Factor[1]	0.6	N/A	0.6	N/A	N/A	0.6	N/A	0.6	N/A	0.6	N/A	0.6	N/A	0.6	N/A	N/A	0.6	
Inputs (per unit area)																		
Precipitation (mm/year)[2]	880	880	880	880	880	880	880	880	880	880	880	880	880	880	880	880	880	880
Total Inputs (m^3/year)	880	880	880	880	880	880	880	880	880	880	880	880	880	880	880	880	880	880
Outputs (per unit area)																		
Precipitation Surplus (mm/year)	240	792	240	792	792	240	792	240	792	240	792	240	792	240	792	792	240	478
Net Surplus (mm/year)	240	792	240	792	792	240	792	240	792	240	792	240	792	240	792	792	240	478
Downspout Disconnection Retention	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Evapotranspiration (mm/year)[2,3]	640	0	640	88	88	640	0	640	88	640	88	640	88	640	88	88	640	389
Roof Evapotranspiration (mm/year)[2,3]	0	88	0	0	0	0	88	0	0	0	0	0	0	0	0	0	0	13
Rooftop Runoff Lawn Evaporation (mm/year)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Evapotranspiration (mm/yr)	**640**	**88**	**640**	**88**	**88**	**640**	**88**	**640**	**88**	**640**	**88**	**640**	**88**	**640**	**88**	**88**	**640**	**402**
Infiltration (mm/year)	144	0	144	0	0	144	0	144	0	144	0	144	0	144	0	0	144	82
Rooftop Infiltration (mm/year)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Infiltration (mm/year)	**144**	**0**	**144**	**0**	**0**	**144**	**0**	**144**	**0**	**144**	**0**	**144**	**0**	**144**	**0**	**0**	**144**	**82**
Runoff Pervious Area (mm/year)	96	0	96	0	0	96	0	96	0	96	0	96	0	96	0	0	96	55
Runoff Impervious Area (mm/year)	0	792	0	792	792	0	792	0	792	0	792	0	792	0	792	792	0	341
Total Runoff (mm/year)	**96**	**792**	**96**	**792**	**792**	**96**	**792**	**96**	**792**	**96**	**792**	**96**	**792**	**96**	**792**	**792**	**96**	396
Total Outputs (mm/year)	**880**	**880**	**880**	**880**	**880**	**880**	**880**	**880**	**880**	**880**	**880**	**880**	**880**	**880**	**880**	**880**	**880**	**880**
Difference (Inputs - Outputs)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Input Volumes																		
Precipitation (m^3/year)	14846	9064	18503	8707	5667	3482	3106	3526	1304	2226	2317	752	2255	1317	807	2200	2200	**82280**
Total Inputs (m^3/year)	**14846**	**9064**	**18503**	**8707**	**5667**	**3482**	**3106**	**3526**	**1304**	**2226**	**2317**	**752**	**2255**	**1317**	**807**	**2200**	**2200**	**82280**
Outputs (Volumes)																		
Precipitation Surplus (m^3/year)	4049	8158	5046	7837	5100	950	2795	962	1174	607	2085	205	2029	359	727	1980	600	44663
Net Surplus (m^3/year)	4049	8158	5046	7837	5100	950	2795	962	1174	607	2085	205	2029	359	727	1980	600	44663
Downspout Disconnection Retention (m^3/year)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Evapotranspiration (m^3/year)	10797	0	13457	871	567	2532	0	2564	130	1619	232	547	225	958	81	220	1600	36401
Roof Evapotranspiration (m^3/year)	0	906	0	0	0	0	311	0	0	0	0	0	0	0	0	0	0	1217
Rooftop Runoff Lawn Evaporation (m^3/year)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Evapotranspiration (m^3/year)	**10797**	**906**	**13457**	**871**	**567**	**2532**	**311**	**2564**	**130**	**1619**	**232**	**547**	**225**	**958**	**81**	**220**	**1600**	**37617**
Infiltration (m^3/year)	2429	0	3028	0	0	570	0	577	0	364	0	123	0	216	0	0	360	7667
Rooftop Infiltration (m^3/year)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Infiltration (m^3/year)	**2429**	**0**	**3028**	**0**	**0**	**570**	**0**	**577**	**0**	**364**	**0**	**123**	**0**	**216**	**0**	**0**	**360**	**7667**
Runoff Pervious Area (m^3/year)	1620	0	2019	0	0	380	0	385	0	243	0	82	0	144	0	0	240	5111
Runoff Impervious Area (m^3/year)	0	8158	0	7837	5100	0	2795	0	1174	0	2085	0	2029	0	727	1980	0	31884
Total Runoff (m^3/year)	**1620**	**8158**	**2019**	**7837**	**5100**	**380**	**2795**	**385**	**1174**	**243**	**2085**	**82**	**2029**	**144**	**727**	**1980**	**240**	**36996**
Total Outputs (m^3/year)	**14846**	**9064**	**18503**	**8707**	**5667**	**3482**	**3106**	**3526**	**1304**	**2226**	**2317**	**752**	**2255**	**1317**	**807**	**2200**	**2200**	**82280**
Difference (Inputs - Outputs)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1 - Infiltration factors based on MOE 2003 Guidelines

2 - Precipitation and evapotranspiration based on Preliminary Hydrogeological Investigation Report, Proposed Development at 200 John Street and 588 Charlott Street (2018) Cole Engineering Group Ltd.

3- Assumes 10% Evaporation from Impervious Surfaces

TABLE 2: WATER BUDGET - POST-DEVELOPMENT WITHOUT MITIGATION

WATER BALANCE/WATER BUDGET ASSESSMENT

	Site																		
Catchment Designation	Uncontrolled Area (Landscape)	Residences Roof (1-5)	Residential Area Road and Landscape (Pervious)	Residential Area Road and Landscape (Impervious)	Landscape Area to Infiltration Trenches	Spa	Tennis Court	Hotel Roof	Hotel Landscape and Ammenities (Pervious)	Hotel Landscape and Ammenities (Impervious)	Site Entrance (Pervious)	Site Entrance (Impervious)	Hotel Entrance (Pervious)	Hotel Entrance (Impervious)	Existing Club Spa House (Pervious)	Existing Club Spa House (Impervious)	SWM Pond Block (Impervious)	SWM Pond Block (Pervious)	Total
Area (m^2)	16871	10300	8841	9895	12185	6440	3957	3529	4007	1482	2530	2633	854	2562	1497	917	2500	2500	93500
Pervious Area (m^2)	16871	0	8841	0	12185	0	3957	0	4007	0	2530	0	854	0	1497	0	2500	0	53242
Impervious Area (m^2)	0	10300	0	9895	0	6440	0	3529	0	1482	0	2633	0	2562	0	917	0	2435	40193
Infiltration Factors																			
Topography Infiltration Factor-Rolling Land[1]	0.2	N/A	0.2	N/A	0.2	N/A	0.2	N/A	0.2	N/A	0.2	N/A	0.2	N/A	0.2	N/A	N/A	0.2	
Soil Infiltration Factor- Medium combinations of clay and loa	0.2	N/A	0.2	N/A	0.2	N/A	0.2	N/A	0.2	N/A	0.2	N/A	0.2	N/A	0.2	N/A	N/A	0.2	
Land Cover Infiltration Factor- Cultivated[1]	0.2	N/A	0.2	N/A	0.2	N/A	0.2	N/A	0.2	N/A	0.2	N/A	0.2	N/A	0.2	N/A	N/A	0.2	
MOE Infiltration Factor	0.6	N/A	0.6	N/A	0.6	N/A	0.6	N/A	0.6	N/A	0.6	N/A	0.6	N/A	0.6	N/A	N/A	0.6	
Inputs (per unit area)																			
Precipitation (mm/year)[2]	880	880	880	880	880	880	880	880	880	880	880	880	880	880	880	880	880	880	880
Total Inputs (m^3/year)	880	880	880	880	880	880	880	880	880	880	880	880	880	880	880	880	880	880	880
Outputs (per unit area)																			
Precipitation Surplus (mm/year)	240	792	240	792	240	792	240	792	240	792	240	792	240	792	240	792	792	240	478
Net Surplus (mm/year)	240	792	240	792	240	792	240	792	240	792	240	792	240	792	240	792	792	240	478
Downspout Disconnection Retention	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Evapotranspiration (mm/year)[2,3]	640	0	640	88	640	88	640	0	640	88	640	88	640	88	640	88	88	640	389
Roof Evapotranspiration (mm/year)[2,3]	0	88	0	0	0	0	0	88	0	0	0	0	0	0	0	0	0	0	13
Rooftop Runoff Lawn Evaporation (mm/year)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Evapotranspiration (mm/yr)	**640**	**88**	**640**	**88**	**640**	**88**	**640**	**88**	**640**	**88**	**640**	**88**	**640**	**88**	**640**	**88**	**88**	**640**	**402**
Infiltration (mm/year)	144	0	144	0	144	0	144	0	144	0	144	0	144	0	144	0	0	144	82
Rooftop Infiltration (mm/year)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Topsoil Amendment Mitigation Infiltration (mm/year)	53	0	53	0	53	0	0	0	53	0	0	0	0	0	0	0	0	0	24
Bioswale Infiltration (mm/year)	0	0	0	0	43.2	0	0	0	0	0	0	0	0	0	0	0	0	0	6
Total Infiltration (mm/year)	**197**	**0**	**197**	**0**	**240**	**0**	**144**	**0**	**197**	**0**	**144**	**0**	**144**	**0**	**144**	**0**	0	**144**	**111**
Runoff Pervious Area (mm/year)	43	0	43	0	0	0	96	0	43	0	96	0	96	0	96	0	0	96	25
Runoff Impervious Area (mm/year)	0	792	0	792	0	792	0	792	0	792	0	792	0	792	0	792	792	0	341
Total Runoff (mm/year)	**43**	**792**	**43**	**792**	**0**	**792**	**96**	**792**	**43**	**792**	**96**	**792**	**96**	**792**	**96**	**792**	792	**96**	366
Total Outputs (mm/year)	**880**	**880**	**880**	**880**	**880**	**880**	**880**	**880**	**880**	**880**	**880**	**880**	**880**	**880**	**880**	**880**	880	**880**	**880**
Difference (Inputs - Outputs)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Input Volumes																			
Precipitation (m^3/year)	14846	9064	7780	8707	10723	5667	3482	3106	3526	1304	2226	2317	752	2255	1317	807	2200	2200	**82280**
Total Inputs (m^3/year)	**14846**	**9064**	**7780**	**8707**	**10723**	**5667**	**3482**	**3106**	**3526**	**1304**	**2226**	**2317**	**752**	**2255**	**1317**	**807**	**2200**	**2200**	**82280**
Outputs (Volumes)																			
Precipitation Surplus (m^3/year)	4049	8158	2122	7837	2924	5100	950	2795	962	1174	607	2085	205	2029	359	727	1980	600	44663
Net Surplus (m^3/year)	4049	8158	2122	7837	2924	5100	950	2795	962	1174	607	2085	205	2029	359	727	1980	600	44663
Downspout Disconnection Retention (m^3/year)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Evapotranspiration (m^3/year)	10797	0	5658	871	7798	567	2532	0	2564	130	1619	232	547	225	958	81	220	1600	36401
Roof Evapotranspiration (m^3/year)	0	906	0	0	0	0	0	311	0	0	0	0	0	0	0	0	0	0	1217
Rooftop Runoff Lawn Evaporation (m^3/year)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Evapotranspiration (m^3/year)	**10797**	**906**	**5658**	**871**	**7798**	**567**	**2532**	**311**	**2564**	**130**	**1619**	**232**	**547**	**225**	**958**	**81**	**220**	**1600**	**37617**
Infiltration (m^3/year)	2429	0	1273	0	1755	0	570	0	577	0	364	0	123	0	216	0	0	360	7667
Rooftop Infiltration (m^3/year)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Topsoil Amendment Mitigation Infiltration (m^3/year)	891	0	467	0	643	0	0	0	212	0	0	0	0	0	0	0	0	0	2213
Bioswale Infiltration (m^3/year)	0	0	0	0	526	0	0	0	0	0	0	0	0	0	0	0	0	0	526
Total Infiltration (m^3/year)	**3320**	**0**	**1740**	**0**	**2924**	**0**	**570**	**0**	**789**	**0**	**364**	**0**	**123**	**0**	**216**	**0**	**0**	**360**	**10406**
Runoff Pervious Area (m^3/year)	729	0	382	0	0	0	380	0	173	0	243	0	82	0	144	0	0	240	2372
Runoff Impervious Area (m^3/year)	0	8158	0	7837	0	5100	0	2795	0	1174	0	2085	0	2029	0	727	1980	0	31884
Total Runoff (m^3/year)	**729**	**8158**	**382**	**7837**	**0**	**5100**	**380**	**2795**	**173**	**1174**	**243**	**2085**	**82**	**2029**	**144**	**727**	**1980**	**240**	**34257**
Total Outputs (m^3/year)	**14846**	**9064**	**7780**	**8707**	**10723**	**5667**	**3482**	**3106**	**3526**	**1304**	**2226**	**2317**	**752**	**2255**	**1317**	**807**	**2200**	**2200**	**82280**
Difference (Inputs - Outputs)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1 - Infiltration factors based on MOE 2003 Guidelines

2 - Precipitation and evapotranspiration based on Preliminary Hydrogeological Investigation Report, Proposed Development at 200 John Street and 588 Charlott Street (2018) Cole Engineering Group Ltd.

3- Assumes 10% Evaporation from Impervious Surfaces

TABLE 4: WATER BUDGET - SUMMARY TABLE

Characteristics	Proposed Residential Development				
	Pre-Development	Post-Development	Change (Pre-to-Post)	Post-Development with Mitigation	Change (Pre-to-Post with Mitigation)
Inputs (Volumes)					
Precipitation (m^3/year)	82280	82280	0.0%	82280	0%
Total Inputs (m^3/year)	**82280**	**82280**	0.0%	**82280**	**0%**
Outputs (Volumes)					
Precipitation Surplus (m^3/year)	22440	44663	50%	44663	50%
Net Surplus (m^3/year)	22440	44663	50%	44663	50%
Total Evapotranspiration (m^3/year)	59840	37617	-59%	37617	-59%
Total Infiltration (m^3/year)	**13464**	**7667**	-76%	**10406**	-29%
Total Runoff (m^3/year)	8976	36996	76%	34257	74%
Total Outputs (m^3/year)	**82280**	**82280**	0%	**82280**	0%

Total Infiltration req'd: **5,797** **m3/yr**

to match post to pre

Water Balance Mitigation Calculations

Pre Development Infiltration =	**13,464**	**m^3/y**
Post Development Infiltration =	**7,667**	**m^3/y**
Post to Pre Deficit =	**5,797**	**m^3/y**

Annual Mitigation Volumes		
Topsoil Amendment Infiltration =	**2,213**	**m^3/y**
Bioswale Infiltration Mitigation =	**526**	**m^3/y**
Post-to-Pre Deficit * =	**3,058**	**m^3/y**

Topsoil Amendment Mitigation Measures

4.19 ha x Annual Precipitation Depth = 2,213 m^3/year

Required Annual Precpitation Depth to meet deficit = 53 mm/yr or

Based on this analysis, it is concluded that precipitation events of depth less than or equal to *1.35 mm/event*

will produce an annual amount of precipitation equal to 53 mm/yr 57 m^3 / single event

A precipitation analysis (rainfall & snowfall) was conducted to estimate an event with sufficient precipitation that produces an annual runoff volume of 2213 m^3/year (or a total depth of annual rainfall equal to 1.35 mm)

Bioswale Infiltration Mitigation Measures

Pervious (Grass, Landscape)

1.22 ha x Annual Precipitation Depth = 111 m^3/year

Required Annual Precpitation Depth to meet deficit = 9 mm/yr

Based on this analysis, it is concluded that precipitation events of depth less than or equal to *0.23 mm/event*

will produce an annual amount of precipitation equal to 9 mm/yr 3 m^3 / single event

A precipitation analysis (rainfall & snowfall) was conducted to estimate an event with sufficient precipitation that produces an annual runoff volume of 111 m^3/year (or a total depth of annual rainfall equal to 0.23 mm)

Job: 4696

January 2019

Bioswale Infiltration System

Infiltration Volume	3	m^3	
Maximum Drawdown Time	48	hours	
Infiltration Rate*	18	mm/h	Based on Hydrologeological Investigation by Cole Engineering (June 2020)
Infiltration Rate Safety Factor	2.5		
Design Infiltration Rate	7.20	mm/h	(Infiltration Rate / Safety Factor)
Required Footprint Area	20	m^2	

Rear Lot Trenches on Detached Lots (10.80m)

Proposed Infiltration Details - Bioswale

Length =	488	m	
Width =	1	m	
Storage Depth =	0.50	m	
Drawdown Time =	28	hours	
Total Volume Retained =	98	m^3	Gravel Storage (1.0m Width x 0.50m Depth x 133m Length x 0.4 Porosity)
LID Area =	488	m^2	
(488m x 1m x 0.5 m)			

Total Volume retained = 98 m^3

Therefore the proposed system has the required footprint area to drain within 28 hours and will provide a retention volume that exceeds the required volume for mitigation.

* Soils with Satutrated Hydraulic Conductivity = $2.5(10^{-6})$ cm/s correlates to an infiltration rate of approximately 18mm/h as per Stormwater Management Criteria (TRCA, 2012) Appendix C-15.

WATER BALANCE - WATER RE-USE

Based on Initial Abstraction
Solmar Subdivision - NOTL

Site Features	Area (sq.m)	% of Site Area	Initial Abstraction (mm)	Overall Site Capture (mm)
Hotel Roof	3,500	18.6%	1	0.19
Hotel Amenities	5,500	29.3%	2.5	0.73
Hotel Entrance	3,400	18.1%	1	0.18
Spa	6,400	34.0%	1.5	0.51
Total	18,800	100.0%		1.61

A= Required average annual Precipitation depth to be retained	5	mm
B= Total Capture over entire site through the surface	1.61	mm
Deficit (C= A-B)	3.39	mm

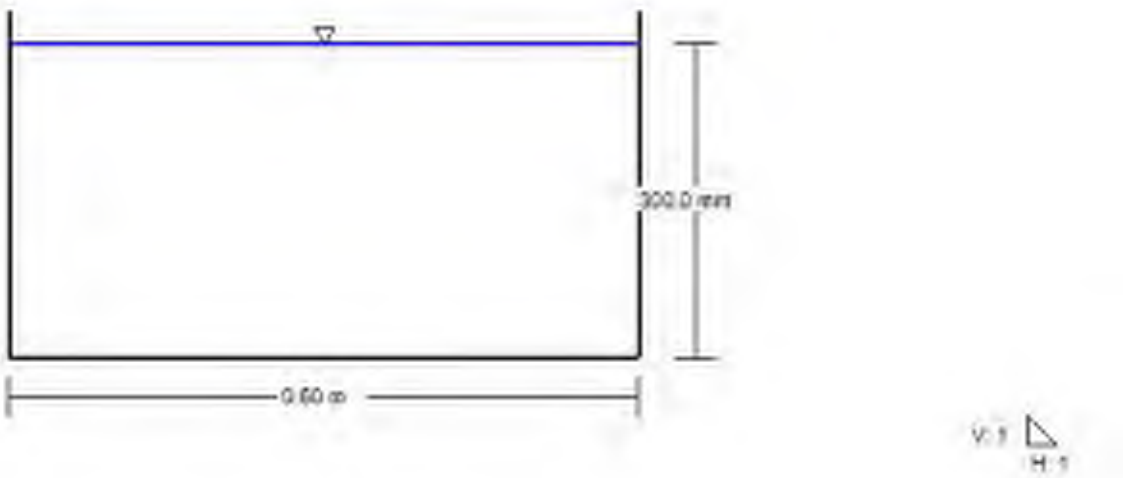
Total required volume for rain harvesting tank:	**63.75**	m^3
Total provided volume:	**70.00**	m^3

Schaeffers Consulting Engineers
Printed: 14-Apr-26

Wall Opening Capacity

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.005	m/m
Normal Depth	300.0	mm
Bottom Width	0.60	m
Discharge	276.40	L/s



Cross Section for SEC 1

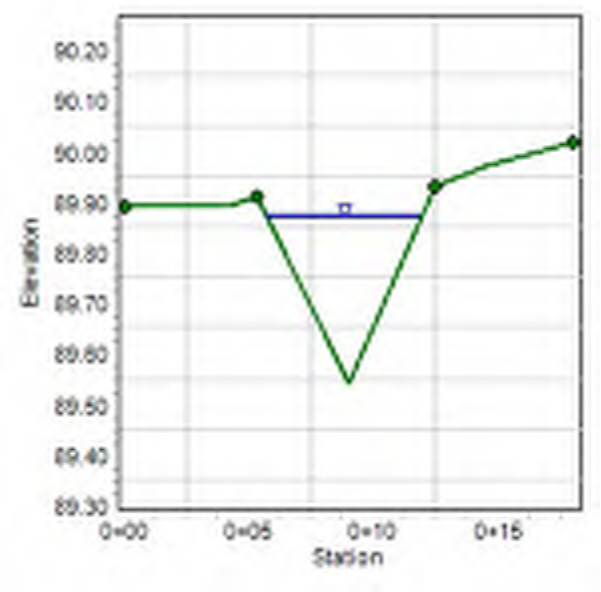
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00500	m/m
Normal Depth	0.33	m
Discharge	0.60	m³/s

Cross Section Image



Worksheet for Box Pipe - 1

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.200	%
Height	0.9	m
Bottom Width	1.80	m
Discharge	2,500.00	L/s

Results		
Normal Depth	737.2	mm
Flow Area	1.3	m²
Wetted Perimeter	3.3	m
Hydraulic Radius	405.3	mm
Top Width	1.80	m
Critical Depth	581.6	mm
Percent Full	81.9	%
Critical Slope	0.386	%
Velocity	1.88	m/s
Velocity Head	0.18	m
Specific Energy	0.92	m
Froude Number	0.701	
Discharge Full	2,497.47	L/s
Slope Full	0.200	%
Flow Type	Subcritical	

GVF Input Data		
Downstream Depth	0.0	mm
Length	0.0	m
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.0	mm
Profile Description	Dry	
Profile Headloss	0.00	m
Average End Depth Over Rise	0.0	%
Normal Depth Over Rise	62.8	%
Downstream Velocity	Infinity	m/s
Upstream Velocity	Infinity	m/s
Normal Depth	737.2	mm
Critical Depth	581.6	mm
Channel Slope	0.200	%
Critical Slope	0.386	%

Worksheet for Trapezoidal Channel - 100yr UNC

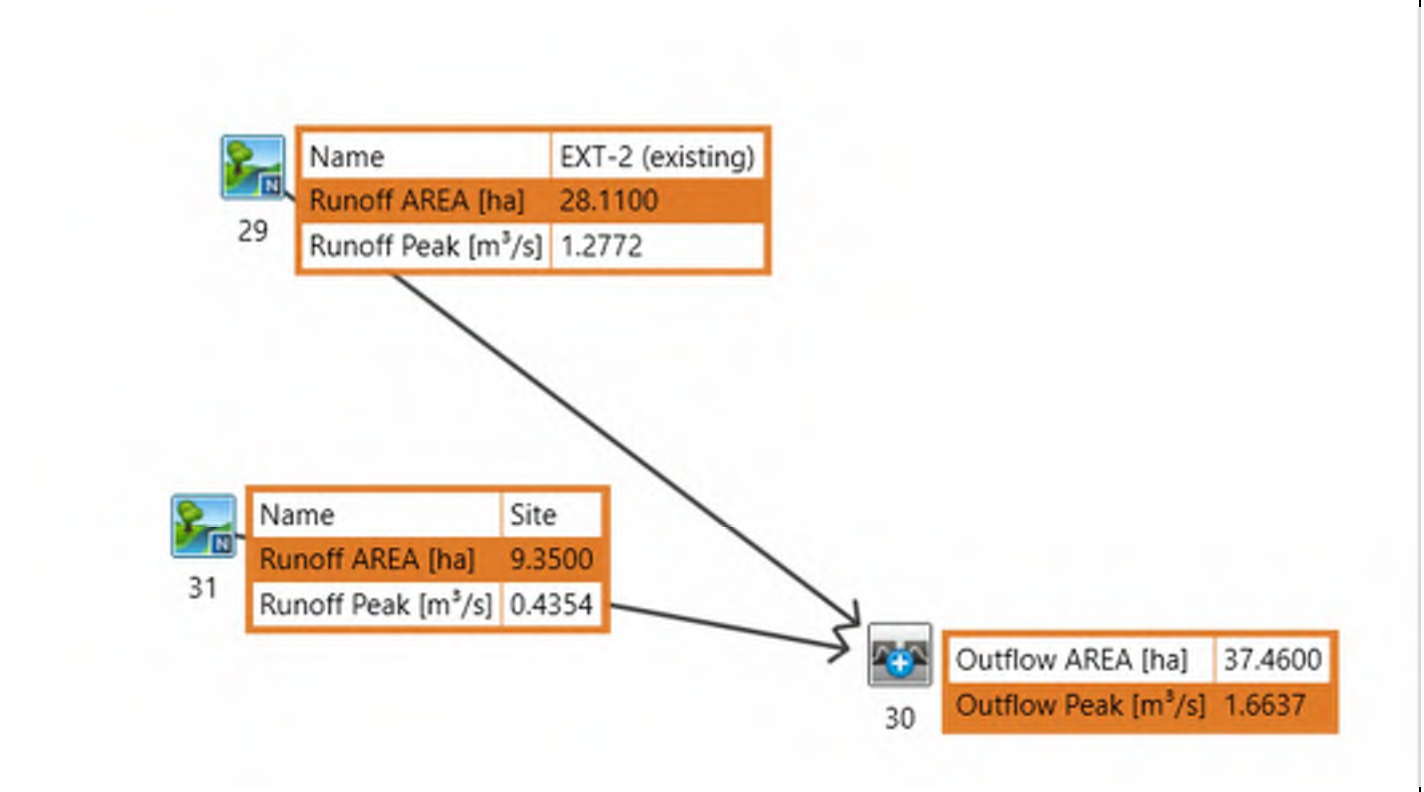
Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.030	
Channel Slope	0.550	%
Left Side Slope	3.000	H:V
Right Side Slope	3.000	H:V
Bottom Width	1.50	m
Discharge	2,500.00	L/s

Results		
Normal Depth	595.4	mm
Flow Area	2.0	m²
Wetted Perimeter	5.3	m
Hydraulic Radius	371.6	mm
Top Width	5.07	m
Critical Depth	479.2	mm
Critical Slope	1.349	%
Velocity	1.28	m/s
Velocity Head	0.08	m
Specific Energy	0.68	m
Froude Number	0.657	
Flow Type	Subcritical	

GVF Input Data		
Downstream Depth	0.0	mm
Length	0.0	m
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.0	mm
Profile Description	N/A	
Profile Headloss	0.00	m
Downstream Velocity	0.00	m/s
Upstream Velocity	0.00	m/s
Normal Depth	595.4	mm
Critical Depth	479.2	mm
Channel Slope	0.550	%
Critical Slope	1.349	%



SCHAEFFERS
CONSULTING ENGINEERS

Visual OTTHYMO™ Schematic
Pre-Development

Project: 2025-5625

Date: April 2026

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        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

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                  *****  D E T A I L E D   O U T P U T *****


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DATE: 04-14-2026                          TIME: 05:26:02

USER:


COMMENTS: _____________________________________________________________


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  ***********************************************
  ** SIMULATION : Run 1- 2yr 3hr 10min Chicago  **
  ***********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 567.000
| Ptotal= 34.59 mm |                          B=   5.200
--------------------                          C=   0.746
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  3.00 hrs
                       Storm time step    = 10.00 min
                       Time to peak ratio =  0.38

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    3.55 |  0.83   20.16 |  1.67    7.29 |  2.50    3.75
                0.17    4.13 |  1.00   74.46 |  1.83    6.05 |  2.67    3.45
                0.33    5.00 |  1.17   24.22 |  2.00    5.21 |  2.83    3.20
                0.50    6.44 |  1.33   13.18 |  2.17    4.60 |
                0.67    9.42 |  1.50    9.29 |  2.33    4.13 |
```

```
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0029)|   Area     (ha)=  28.11   Curve Number    (CN)= 81.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.39

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                                ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    3.55 | 0.833    9.42 | 1.583    9.29 |  2.33    4.60
               0.167    3.55 | 0.917   20.16 | 1.667    9.29 |  2.42    4.13
               0.250    4.13 | 1.000   20.16 | 1.750    7.29 |  2.50    4.13
               0.333    4.13 | 1.083   74.46 | 1.833    7.29 |  2.58    3.75
               0.417    5.00 | 1.167   74.46 | 1.917    6.05 |  2.67    3.75
               0.500    5.00 | 1.250   24.22 | 2.000    6.05 |  2.75    3.45
               0.583    6.44 | 1.333   24.22 | 2.083    5.21 |  2.83    3.45
               0.667    6.44 | 1.417   13.18 | 2.167    5.21 |  2.92    3.20
               0.750    9.42 | 1.500   13.18 | 2.250    4.60 |  3.00    3.20

    Unit Hyd Qpeak  (cms)=   0.772

    PEAK FLOW       (cms)=   0.251 (i)
    TIME TO PEAK    (hrs)=   3.083
    RUNOFF VOLUME    (mm)=   9.819
    TOTAL RAINFALL   (mm)=  34.590
    RUNOFF COEFFICIENT   =   0.284

    (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0031)|   Area     (ha)=   9.35   Curve Number    (CN)= 69.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.90

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                                ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    3.55 | 0.833    9.42 | 1.583    9.29 |  2.33    4.60
               0.167    3.55 | 0.917   20.16 | 1.667    9.29 |  2.42    4.13
               0.250    4.13 | 1.000   20.16 | 1.750    7.29 |  2.50    4.13
               0.333    4.13 | 1.083   74.46 | 1.833    7.29 |  2.58    3.75
               0.417    5.00 | 1.167   74.46 | 1.917    6.05 |  2.67    3.75
               0.500    5.00 | 1.250   24.22 | 2.000    6.05 |  2.75    3.45
               0.583    6.44 | 1.333   24.22 | 2.083    5.21 |  2.83    3.45
               0.667    6.44 | 1.417   13.18 | 2.167    5.21 |  2.92    3.20
               0.750    9.42 | 1.500   13.18 | 2.250    4.60 |  3.00    3.20

    Unit Hyd Qpeak  (cms)=   0.397

    PEAK FLOW       (cms)=   0.068 (i)
```

```
     TIME TO PEAK     (hrs)=   2.417
     RUNOFF VOLUME     (mm)=   6.093
     TOTAL RAINFALL    (mm)=  34.590
     RUNOFF COEFFICIENT   =   0.176

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0030)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0029):    28.11   0.251     3.08      9.82
      + ID2= 2 (  0031):     9.35   0.068     2.42      6.09
        ====================================================
        ID = 3 (  0030):    37.46   0.311     2.92      8.89

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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 FINISH
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        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
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       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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DATE: 04-14-2026                          TIME: 05:26:02

USER:


COMMENTS: _____
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  ***********************************************
  ** SIMULATION : Run 2 - 5yr 3hr 10min Chicago **
  ***********************************************

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| CHICAGO STORM    |    IDF curve parameters: A= 664.000
| Ptotal= 41.02 mm |                          B=   4.700
--------------------                          C=   0.744
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  3.00 hrs
                       Storm time step    = 10.00 min
                       Time to peak ratio =  0.38

     TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
      hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
     0.00    4.21 |  0.83   23.53 |  1.67    8.57 |  2.50    4.45
     0.17    4.89 |  1.00   89.88 |  1.83    7.13 |  2.67    4.09
     0.33    5.90 |  1.17   28.27 |  2.00    6.15 |  2.83    3.79
     0.50    7.59 |  1.33   15.40 |  2.17    5.43 |
     0.67   11.04 |  1.50   10.90 |  2.33    4.88 |

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0029)|   Area     (ha)=  28.11   Curve Number    (CN)= 81.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.39

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.

                          ---- TRANSFORMED HYETOGRAPH ----
     TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
      hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
    0.083    4.21 | 0.833   11.04 | 1.583   10.90 |  2.33    5.43
    0.167    4.21 | 0.917   23.53 | 1.667   10.90 |  2.42    4.88
    0.250    4.89 | 1.000   23.53 | 1.750    8.57 |  2.50    4.88
    0.333    4.89 | 1.083   89.88 | 1.833    8.57 |  2.58    4.45
    0.417    5.90 | 1.167   89.88 | 1.917    7.13 |  2.67    4.45
    0.500    5.90 | 1.250   28.27 | 2.000    7.13 |  2.75    4.09
    0.583    7.59 | 1.333   28.27 | 2.083    6.15 |  2.83    4.09
    0.667    7.59 | 1.417   15.40 | 2.167    6.15 |  2.92    3.79
    0.750   11.04 | 1.500   15.40 | 2.250    5.43 |  3.00    3.79

     Unit Hyd Qpeak  (cms)=   0.772

     PEAK FLOW       (cms)=   0.347 (i)
     TIME TO PEAK    (hrs)=   3.000
     RUNOFF VOLUME    (mm)=  13.569
     TOTAL RAINFALL   (mm)=  41.016
     RUNOFF COEFFICIENT   =   0.331

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
```

```
| CALIB            |
| NASHYD   (  0031)|   Area     (ha)=   9.35   Curve Number    (CN)= 69.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.90

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.21	0.833	11.04	1.583	10.90	2.33	5.43
0.167	4.21	0.917	23.53	1.667	10.90	2.42	4.88
0.250	4.89	1.000	23.53	1.750	8.57	2.50	4.88
0.333	4.89	1.083	89.88	1.833	8.57	2.58	4.45
0.417	5.90	1.167	89.88	1.917	7.13	2.67	4.45
0.500	5.90	1.250	28.27	2.000	7.13	2.75	4.09
0.583	7.59	1.333	28.27	2.083	6.15	2.83	4.09
0.667	7.59	1.417	15.40	2.167	6.15	2.92	3.79
0.750	11.04	1.500	15.40	2.250	5.43	3.00	3.79

```
     Unit Hyd Qpeak  (cms)=   0.397

     PEAK FLOW       (cms)=   0.097 (i)
     TIME TO PEAK    (hrs)=   2.333
     RUNOFF VOLUME    (mm)=   8.640
     TOTAL RAINFALL   (mm)=  41.016
     RUNOFF COEFFICIENT   =   0.211

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0030)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0029):    28.11   0.347     3.00     13.57
     + ID2= 2 (  0031):     9.35   0.097     2.33      8.64
       ================================================
       ID = 3 (  0030):    37.46   0.433     2.83     12.34

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
================================================================================
==========================

       V    V   I    SSSSS  U   U    A    L             (v 6.2.2020)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
```

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***** D E T A I L E D O U T P U T *****

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DATE: 04-14-2026                          TIME: 05:26:02

USER:


COMMENTS: _____________________________________________________________

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  ***********************************************
  ** SIMULATION : Run 3 - 10yr 3hr 10min Chicag **
  ***********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 724.000
| Ptotal= 45.98 mm |                          B=   4.300
--------------------                          C=   0.739
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  3.00 hrs
                       Storm time step    = 10.00 min
                       Time to peak ratio =  0.38
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	4.76	0.83	26.02	1.67	9.61	2.50	5.03
0.17	5.53	1.00	101.38	1.83	8.02	2.67	4.64
0.33	6.65	1.17	31.22	2.00	6.93	2.83	4.30
0.50	8.52	1.33	17.11	2.17	6.13		
0.67	12.33	1.50	12.17	2.33	5.52		

```
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0029)|   Area     (ha)=  28.11   Curve Number    (CN)= 81.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.39

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.76	0.833	12.33	1.583	12.17	2.33	6.13
0.167	4.76	0.917	26.02	1.667	12.17	2.42	5.52
0.250	5.53	1.000	26.02	1.750	9.61	2.50	5.52

```
              0.333    5.53 | 1.083  101.38 | 1.833    9.61 |  2.58    5.03
              0.417    6.65 | 1.167  101.38 | 1.917    8.02 |  2.67    5.03
              0.500    6.65 | 1.250   31.22 | 2.000    8.02 |  2.75    4.64
              0.583    8.52 | 1.333   31.22 | 2.083    6.93 |  2.83    4.64
              0.667    8.52 | 1.417   17.11 | 2.167    6.93 |  2.92    4.30
              0.750   12.33 | 1.500   17.11 | 2.250    6.13 |  3.00    4.30

     Unit Hyd Qpeak  (cms)=   0.772

     PEAK FLOW       (cms)=   0.428 (i)
     TIME TO PEAK    (hrs)=   3.000
     RUNOFF VOLUME    (mm)=  16.698
     TOTAL RAINFALL   (mm)=  45.978
     RUNOFF COEFFICIENT   =   0.363

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0031)|   Area     (ha)=   9.35   Curve Number    (CN)= 69.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.90

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                        ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    4.76 | 0.833   12.33 | 1.583   12.17 |  2.33    6.13
              0.167    4.76 | 0.917   26.02 | 1.667   12.17 |  2.42    5.52
              0.250    5.53 | 1.000   26.02 | 1.750    9.61 |  2.50    5.52
              0.333    5.53 | 1.083  101.38 | 1.833    9.61 |  2.58    5.03
              0.417    6.65 | 1.167  101.38 | 1.917    8.02 |  2.67    5.03
              0.500    6.65 | 1.250   31.22 | 2.000    8.02 |  2.75    4.64
              0.583    8.52 | 1.333   31.22 | 2.083    6.93 |  2.83    4.64
              0.667    8.52 | 1.417   17.11 | 2.167    6.93 |  2.92    4.30
              0.750   12.33 | 1.500   17.11 | 2.250    6.13 |  3.00    4.30

     Unit Hyd Qpeak  (cms)=   0.397

     PEAK FLOW       (cms)=   0.122 (i)
     TIME TO PEAK    (hrs)=   2.333
     RUNOFF VOLUME    (mm)=  10.827
     TOTAL RAINFALL   (mm)=  45.978
     RUNOFF COEFFICIENT   =   0.235

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0030)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0029):    28.11   0.428     3.00     16.70
      + ID2= 2 (  0031):     9.35   0.122     2.33     10.83
        ================================================
        ID = 3 (  0030):    37.46   0.535     2.83     15.23

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
================================================================================
==========================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


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DATE: 04-14-2026                              TIME: 05:26:02

USER:



COMMENTS: _____

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  ***********************************************
  ** SIMULATION : Run 4 - 25yr 3hr 10min Chicag **
  ***********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 821.000
| Ptotal= 53.30 mm |                          B=   4.000
--------------------                          C=   0.735
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  3.00 hrs
                       Storm time step    = 10.00 min
                       Time to peak ratio =  0.38

               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.00    5.57 |  0.83   29.85 |  1.67   11.14 |  2.50    5.88
               0.17    6.45 |  1.00  118.02 |  1.83    9.32 |  2.67    5.42
               0.33    7.75 |  1.17   35.77 |  2.00    8.07 |  2.83    5.04
               0.50    9.90 |  1.33   19.70 |  2.17    7.15 |
```

```
                0.67   14.25 |  1.50   14.07 |  2.33    6.44 |

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0029)|   Area     (ha)=  28.11   Curve Number    (CN)= 81.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.39

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.

                          ---- TRANSFORMED HYETOGRAPH ----
              TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
               hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
             0.083    5.57 | 0.833   14.25 | 1.583   14.07 |  2.33    7.15
             0.167    5.57 | 0.917   29.85 | 1.667   14.07 |  2.42    6.44
             0.250    6.45 | 1.000   29.85 | 1.750   11.14 |  2.50    6.44
             0.333    6.45 | 1.083  118.02 | 1.833   11.14 |  2.58    5.88
             0.417    7.75 | 1.167  118.02 | 1.917    9.32 |  2.67    5.88
             0.500    7.75 | 1.250   35.77 | 2.000    9.32 |  2.75    5.42
             0.583    9.90 | 1.333   35.77 | 2.083    8.07 |  2.83    5.42
             0.667    9.90 | 1.417   19.70 | 2.167    8.07 |  2.92    5.04
             0.750   14.25 | 1.500   19.70 | 2.250    7.15 |  3.00    5.04

    Unit Hyd Qpeak  (cms)=   0.772

    PEAK FLOW       (cms)=   0.554 (i)
    TIME TO PEAK    (hrs)=   3.000
    RUNOFF VOLUME    (mm)=  21.625
    TOTAL RAINFALL   (mm)=  53.301
    RUNOFF COEFFICIENT   =   0.406

    (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0031)|   Area     (ha)=   9.35   Curve Number    (CN)= 69.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.90

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.

                          ---- TRANSFORMED HYETOGRAPH ----
              TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
               hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
             0.083    5.57 | 0.833   14.25 | 1.583   14.07 |  2.33    7.15
             0.167    5.57 | 0.917   29.85 | 1.667   14.07 |  2.42    6.44
             0.250    6.45 | 1.000   29.85 | 1.750   11.14 |  2.50    6.44
             0.333    6.45 | 1.083  118.02 | 1.833   11.14 |  2.58    5.88
             0.417    7.75 | 1.167  118.02 | 1.917    9.32 |  2.67    5.88
             0.500    7.75 | 1.250   35.77 | 2.000    9.32 |  2.75    5.42
             0.583    9.90 | 1.333   35.77 | 2.083    8.07 |  2.83    5.42
             0.667    9.90 | 1.417   19.70 | 2.167    8.07 |  2.92    5.04
             0.750   14.25 | 1.500   19.70 | 2.250    7.15 |  3.00    5.04

    Unit Hyd Qpeak  (cms)=   0.397

    PEAK FLOW       (cms)=   0.163 (i)
    TIME TO PEAK    (hrs)=   2.333
    RUNOFF VOLUME    (mm)=  14.364
    TOTAL RAINFALL   (mm)=  53.301
    RUNOFF COEFFICIENT   =   0.269

    (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0030)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0029):    28.11   0.554     3.00    21.63
     + ID2= 2 (  0031):     9.35   0.163     2.33    14.36
       ================================================
       ID = 3 (  0030):    37.46   0.697     2.83    19.81

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
================================================================================
==========================

      V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
      V    V   I    SS     U   U   A A   L
       V  V    I     SS    U   U  AAAAA  L
       V  V    I      SS   U   U  A   A  L
        VV     I    SSSSS  UUUUU  A   A  LLLLL

       OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
      O   O    T      T    H   H   Y Y   MM MM  O   O
      O   O    T      T    H   H    Y    M   M  O   O
       OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


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DATE: 04-14-2026                          TIME: 05:26:02

USER:



COMMENTS: _____________________________________________________________


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  **********************************************
```

```
 ** SIMULATION : Run 5 - 50yr 3hr 10min Chicag **
 ************************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 900.000
| Ptotal= 58.78 mm |                          B=   3.800
--------------------                          C=   0.734
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  3.00 hrs
                       Storm time step    = 10.00 min
                       Time to peak ratio =  0.38

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    6.15 |  0.83   32.68 |  1.67   12.25 |  2.50    6.49
                0.17    7.11 |  1.00  131.09 |  1.83   10.26 |  2.67    5.98
                0.33    8.54 |  1.17   39.13 |  2.00    8.89 |  2.83    5.56
                0.50   10.89 |  1.33   21.59 |  2.17    7.88 |
                0.67   15.65 |  1.50   15.45 |  2.33    7.10 |


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0029)|   Area    (ha)=  28.11   Curve Number   (CN)= 81.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.39

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.

                              ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    6.15 | 0.833   15.65 | 1.583   15.45 |  2.33    7.88
               0.167    6.15 | 0.917   32.68 | 1.667   15.45 |  2.42    7.10
               0.250    7.11 | 1.000   32.68 | 1.750   12.25 |  2.50    7.10
               0.333    7.11 | 1.083  131.09 | 1.833   12.25 |  2.58    6.49
               0.417    8.54 | 1.167  131.09 | 1.917   10.26 |  2.67    6.49
               0.500    8.54 | 1.250   39.13 | 2.000   10.26 |  2.75    5.98
               0.583   10.89 | 1.333   39.13 | 2.083    8.89 |  2.83    5.98
               0.667   10.89 | 1.417   21.59 | 2.167    8.89 |  2.92    5.56
               0.750   15.65 | 1.500   21.59 | 2.250    7.88 |  3.00    5.56

    Unit Hyd Qpeak  (cms)=   0.772

    PEAK FLOW       (cms)=   0.654 (i)
    TIME TO PEAK    (hrs)=   2.917
    RUNOFF VOLUME    (mm)=  25.516
    TOTAL RAINFALL   (mm)=  58.782
    RUNOFF COEFFICIENT   =   0.434

    (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0031)|   Area    (ha)=   9.35   Curve Number   (CN)= 69.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.90

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.

                              ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    6.15 | 0.833   15.65 | 1.583   15.45 |  2.33    7.88
               0.167    6.15 | 0.917   32.68 | 1.667   15.45 |  2.42    7.10
               0.250    7.11 | 1.000   32.68 | 1.750   12.25 |  2.50    7.10
               0.333    7.11 | 1.083  131.09 | 1.833   12.25 |  2.58    6.49
               0.417    8.54 | 1.167  131.09 | 1.917   10.26 |  2.67    6.49
               0.500    8.54 | 1.250   39.13 | 2.000   10.26 |  2.75    5.98
               0.583   10.89 | 1.333   39.13 | 2.083    8.89 |  2.83    5.98
               0.667   10.89 | 1.417   21.59 | 2.167    8.89 |  2.92    5.56
               0.750   15.65 | 1.500   21.59 | 2.250    7.88 |  3.00    5.56

    Unit Hyd Qpeak  (cms)=   0.397

    PEAK FLOW       (cms)=   0.196 (i)
    TIME TO PEAK    (hrs)=   2.333
    RUNOFF VOLUME    (mm)=  17.228
    TOTAL RAINFALL   (mm)=  58.782
    RUNOFF COEFFICIENT   =   0.293

    (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0030)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0029):    28.11   0.654     2.92    25.52
     + ID2= 2 (  0031):     9.35   0.196     2.33    17.23
       ================================================
       ID = 3 (  0030):    37.46   0.827     2.75    23.45

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
================================================================================
==========================

      V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
      V    V   I    SS     U   U   A A   L
       V  V    I     SS    U   U  AAAAA  L
       V  V    I      SS   U   U  A   A  L
        VV     I    SSSSS  UUUUU  A   A  LLLLL

       OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
      O   O    T      T    H   H   Y Y   MM MM  O   O
      O   O    T      T    H   H    Y    M   M  O   O
       OOO     T      T    H   H    Y    M   M   OOO
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                ***** D E T A I L E D   O U T P U T *****
```

```
  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\393f90d1-7eab-4a25-9211-da4ce348d77a\scenar
  Summary filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\393f90d1-7eab-4a25-9211-da4ce348d77a\scenar


DATE: 04-14-2026                          TIME: 05:26:02

USER:


COMMENTS: _____________________________________________________________

--------------------------------------------------------------------------------
-------------------------
  ***********************************************
  ** SIMULATION : Run 6 - 100yr 3hr 10min Chica **
  ***********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 980.000
| Ptotal= 64.70 mm |                          B=   3.700
--------------------                          C=   0.732
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  3.00 hrs
                       Storm time step    = 10.00 min
                       Time to peak ratio =  0.38

               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.00    6.80 |  0.83   35.84 |  1.67   13.51 |  2.50    7.17
               0.17    7.87 |  1.00  144.26 |  1.83   11.32 |  2.67    6.62
               0.33    9.43 |  1.17   42.89 |  2.00    9.81 |  2.83    6.15
               0.50   12.01 |  1.33   23.73 |  2.17    8.71 |
               0.67   17.23 |  1.50   17.02 |  2.33    7.85 |


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0029)|   Area    (ha)=  28.11   Curve Number    (CN)= 81.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.39

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.80 | 0.833   17.23 | 1.583   17.02 |  2.33    8.71
              0.167    6.80 | 0.917   35.84 | 1.667   17.02 |  2.42    7.85
              0.250    7.87 | 1.000   35.84 | 1.750   13.51 |  2.50    7.85
              0.333    7.87 | 1.083  144.26 | 1.833   13.51 |  2.58    7.17
              0.417    9.43 | 1.167  144.26 | 1.917   11.32 |  2.67    7.17
              0.500    9.43 | 1.250   42.89 | 2.000   11.32 |  2.75    6.62
              0.583   12.01 | 1.333   42.89 | 2.083    9.81 |  2.83    6.62
              0.667   12.01 | 1.417   23.73 | 2.167    9.81 |  2.92    6.15
              0.750   17.23 | 1.500   23.73 | 2.250    8.71 |  3.00    6.15

    Unit Hyd Qpeak  (cms)=   0.772

    PEAK FLOW       (cms)=   0.767 (i)
    TIME TO PEAK    (hrs)=   2.917
    RUNOFF VOLUME    (mm)=  29.883
    TOTAL RAINFALL   (mm)=  64.704
    RUNOFF COEFFICIENT   =   0.462

    (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0031)|   Area    (ha)=   9.35   Curve Number    (CN)= 69.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.90

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.80 | 0.833   17.23 | 1.583   17.02 |  2.33    8.71
              0.167    6.80 | 0.917   35.84 | 1.667   17.02 |  2.42    7.85
              0.250    7.87 | 1.000   35.84 | 1.750   13.51 |  2.50    7.85
              0.333    7.87 | 1.083  144.26 | 1.833   13.51 |  2.58    7.17
              0.417    9.43 | 1.167  144.26 | 1.917   11.32 |  2.67    7.17
              0.500    9.43 | 1.250   42.89 | 2.000   11.32 |  2.75    6.62
              0.583   12.01 | 1.333   42.89 | 2.083    9.81 |  2.83    6.62
              0.667   12.01 | 1.417   23.73 | 2.167    9.81 |  2.92    6.15
              0.750   17.23 | 1.500   23.73 | 2.250    8.71 |  3.00    6.15

    Unit Hyd Qpeak  (cms)=   0.397

    PEAK FLOW       (cms)=   0.233 (i)
    TIME TO PEAK    (hrs)=   2.333
    RUNOFF VOLUME    (mm)=  20.507
    TOTAL RAINFALL   (mm)=  64.704
    RUNOFF COEFFICIENT   =   0.317

    (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0030)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0029):    28.11   0.767     2.92    29.88
     + ID2= 2 (  0031):     9.35   0.233     2.33    20.51
       ================================================
       ID = 3 (  0030):    37.46   0.973     2.75    27.54

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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```

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       V    V   I    SSSSS  U   U    A    L             (v 6.2.2020)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\c3e4eefc-080e-41ff-88a5-a4c8f640f929\scenar
  Summary filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\c3e4eefc-080e-41ff-88a5-a4c8f640f929\scenar


DATE: 04-14-2026                          TIME: 05:28:32

USER:



COMMENTS: ____________________________________________________________

--------------------------------------------------------------------------------
--------------------------
  ***********************************************
  ** SIMULATION : Run 1- 2 Year 12 Hour AES (Bl **
  ***********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\rsoto\AppD
|                  |              ata\Local\Temp\
|                  |              b41386a6-a156-4f43-bf35-1dc02c561e49\b367315e
| Ptotal= 42.00 mm |    Comments: 2 Year 12 Hour AES (Bloor, TRCA)
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    0.00 |  3.25    7.14 |  6.50    2.94 |  9.75    0.42
                0.25    0.42 |  3.50    7.14 |  6.75    2.94 | 10.00    0.42
                0.50    0.42 |  3.75    7.14 |  7.00    2.94 | 10.25    0.42
                0.75    0.42 |  4.00    7.14 |  7.25    1.68 | 10.50    0.42
                1.00    0.42 |  4.25   19.32 |  7.50    1.68 | 10.75    0.42
                1.25    0.42 |  4.50   19.32 |  7.75    1.68 | 11.00    0.42
                1.50    0.42 |  4.75   19.32 |  8.00    1.68 | 11.25    0.42
                1.75    0.42 |  5.00   19.32 |  8.25    0.84 | 11.50    0.42
                2.00    0.42 |  5.25    5.46 |  8.50    0.84 | 11.75    0.42
                2.25    2.52 |  5.50    5.46 |  8.75    0.84 | 12.00    0.42
                2.50    2.52 |  5.75    5.46 |  9.00    0.84 |
                2.75    2.52 |  6.00    5.46 |  9.25    0.42 |
                3.00    2.52 |  6.25    2.94 |  9.50    0.42 |

--------------------------------------------------------------------------------

--------------------
| CALIB            |
| NASHYD   (  0041)|   Area     (ha)=  28.11   Curve Number    (CN)= 81.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.39

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.

                              ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083   0.00 | 3.167    2.52 | 6.250    5.46 |  9.33    0.42
                0.167   0.00 | 3.250    2.52 | 6.333    2.94 |  9.42    0.42
                0.250   0.00 | 3.333    7.14 | 6.417    2.94 |  9.50    0.42
                0.333   0.42 | 3.417    7.14 | 6.500    2.94 |  9.58    0.42
                0.417   0.42 | 3.500    7.14 | 6.583    2.94 |  9.67    0.42
                0.500   0.42 | 3.583    7.14 | 6.667    2.94 |  9.75    0.42
                0.583   0.42 | 3.667    7.14 | 6.750    2.94 |  9.83    0.42
                0.667   0.42 | 3.750    7.14 | 6.833    2.94 |  9.92    0.42
                0.750   0.42 | 3.833    7.14 | 6.917    2.94 | 10.00    0.42
                0.833   0.42 | 3.917    7.14 | 7.000    2.94 | 10.08    0.42
                0.917   0.42 | 4.000    7.14 | 7.083    2.94 | 10.17    0.42
                1.000   0.42 | 4.083    7.14 | 7.167    2.94 | 10.25    0.42
                1.083   0.42 | 4.167    7.14 | 7.250    2.94 | 10.33    0.42
                1.167   0.42 | 4.250    7.14 | 7.333    1.68 | 10.42    0.42
                1.250   0.42 | 4.333   19.32 | 7.417    1.68 | 10.50    0.42
                1.333   0.42 | 4.417   19.32 | 7.500    1.68 | 10.58    0.42
                1.417   0.42 | 4.500   19.32 | 7.583    1.68 | 10.67    0.42
                1.500   0.42 | 4.583   19.32 | 7.667    1.68 | 10.75    0.42
                1.583   0.42 | 4.667   19.32 | 7.750    1.68 | 10.83    0.42
                1.667   0.42 | 4.750   19.32 | 7.833    1.68 | 10.92    0.42
                1.750   0.42 | 4.833   19.32 | 7.917    1.68 | 11.00    0.42
                1.833   0.42 | 4.917   19.32 | 8.000    1.68 | 11.08    0.42
                1.917   0.42 | 5.000   19.32 | 8.083    1.68 | 11.17    0.42
                2.000   0.42 | 5.083   19.32 | 8.167    1.68 | 11.25    0.42
                2.083   0.42 | 5.167   19.32 | 8.250    1.68 | 11.33    0.42
                2.167   0.42 | 5.250   19.32 | 8.333    0.84 | 11.42    0.42
                2.250   0.42 | 5.333    5.46 | 8.417    0.84 | 11.50    0.42
                2.333   2.52 | 5.417    5.46 | 8.500    0.84 | 11.58    0.42
                2.417   2.52 | 5.500    5.46 | 8.583    0.84 | 11.67    0.42
                2.500   2.52 | 5.583    5.46 | 8.667    0.84 | 11.75    0.42
                2.583   2.52 | 5.667    5.46 | 8.750    0.84 | 11.83    0.42
                2.667   2.52 | 5.750    5.46 | 8.833    0.84 | 11.92    0.42
                2.750   2.52 | 5.833    5.46 | 8.917    0.84 | 12.00    0.42
                2.833   2.52 | 5.917    5.46 | 9.000    0.84 | 12.08    0.42
                2.917   2.52 | 6.000    5.46 | 9.083    0.84 | 12.17    0.42
                3.000   2.52 | 6.083    5.46 | 9.167    0.84 | 12.25    0.42
                3.083   2.52 | 6.167    5.46 | 9.250    0.84 |

      Unit Hyd Qpeak  (cms)=   0.772

      PEAK FLOW       (cms)=   0.269 (i)
      TIME TO PEAK    (hrs)=   6.750
```

```
    RUNOFF VOLUME     (mm)=  14.175
    TOTAL RAINFALL    (mm)=  42.000
    RUNOFF COEFFICIENT    =   0.337

    (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
```

```
--------------------
| CALIB            |
| NASHYD   (  0043)|   Area     (ha)=   9.35   Curve Number    (CN)= 69.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.90

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.52	6.250	5.46	9.33	0.42
0.167	0.00	3.250	2.52	6.333	2.94	9.42	0.42
0.250	0.00	3.333	7.14	6.417	2.94	9.50	0.42
0.333	0.42	3.417	7.14	6.500	2.94	9.58	0.42
0.417	0.42	3.500	7.14	6.583	2.94	9.67	0.42
0.500	0.42	3.583	7.14	6.667	2.94	9.75	0.42
0.583	0.42	3.667	7.14	6.750	2.94	9.83	0.42
0.667	0.42	3.750	7.14	6.833	2.94	9.92	0.42
0.750	0.42	3.833	7.14	6.917	2.94	10.00	0.42
0.833	0.42	3.917	7.14	7.000	2.94	10.08	0.42
0.917	0.42	4.000	7.14	7.083	2.94	10.17	0.42
1.000	0.42	4.083	7.14	7.167	2.94	10.25	0.42
1.083	0.42	4.167	7.14	7.250	2.94	10.33	0.42
1.167	0.42	4.250	7.14	7.333	1.68	10.42	0.42
1.250	0.42	4.333	19.32	7.417	1.68	10.50	0.42
1.333	0.42	4.417	19.32	7.500	1.68	10.58	0.42
1.417	0.42	4.500	19.32	7.583	1.68	10.67	0.42
1.500	0.42	4.583	19.32	7.667	1.68	10.75	0.42
1.583	0.42	4.667	19.32	7.750	1.68	10.83	0.42
1.667	0.42	4.750	19.32	7.833	1.68	10.92	0.42
1.750	0.42	4.833	19.32	7.917	1.68	11.00	0.42
1.833	0.42	4.917	19.32	8.000	1.68	11.08	0.42
1.917	0.42	5.000	19.32	8.083	1.68	11.17	0.42
2.000	0.42	5.083	19.32	8.167	1.68	11.25	0.42
2.083	0.42	5.167	19.32	8.250	1.68	11.33	0.42
2.167	0.42	5.250	19.32	8.333	0.84	11.42	0.42
2.250	0.42	5.333	5.46	8.417	0.84	11.50	0.42
2.333	2.52	5.417	5.46	8.500	0.84	11.58	0.42
2.417	2.52	5.500	5.46	8.583	0.84	11.67	0.42
2.500	2.52	5.583	5.46	8.667	0.84	11.75	0.42
2.583	2.52	5.667	5.46	8.750	0.84	11.83	0.42
2.667	2.52	5.750	5.46	8.833	0.84	11.92	0.42
2.750	2.52	5.833	5.46	8.917	0.84	12.00	0.42
2.833	2.52	5.917	5.46	9.000	0.84	12.08	0.42
2.917	2.52	6.000	5.46	9.083	0.84	12.17	0.42
3.000	2.52	6.083	5.46	9.167	0.84	12.25	0.42
3.083	2.52	6.167	5.46	9.250	0.84		

```
    Unit Hyd Qpeak  (cms)=   0.397

    PEAK FLOW       (cms)=   0.071 (i)
    TIME TO PEAK    (hrs)=   6.083

    RUNOFF VOLUME     (mm)=   9.059
    TOTAL RAINFALL    (mm)=  42.000
    RUNOFF COEFFICIENT    =   0.216

    (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
```

```
--------------------
| ADD HYD  (  0040)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0041):    28.11   0.269     6.75    14.17
     + ID2= 2 (  0043):     9.35   0.071     6.08     9.06
       ================================================
       ID = 3 (  0040):    37.46   0.334     6.58    12.90

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
```

```
==============================================================================
==========================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\09197f62-2dc5-42ce-9d50-7da35c425607\scenar
  Summary filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\09197f62-2dc5-42ce-9d50-7da35c425607\scenar


DATE: 04-14-2026                          TIME: 05:28:31

USER:



COMMENTS: _____________________________________________________________
```

```
--------------------------
  ********************************************
  ** SIMULATION : Run 2 - 5 Year 12 Hour AES (B **
  ********************************************
```

```
--------------------
|    READ STORM    |    Filename: C:\Users\rsoto\AppD
|                  |              ata\Local\Temp\
|                  |              b41386a6-a156-4f43-bf35-1dc02c561e49\9003d11c
| Ptotal= 54.38 mm |    Comments: 5 Year 12 Hour AES (Bloor, TRCA)
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	3.25	9.25	6.50	3.81	9.75	0.54
0.25	0.54	3.50	9.25	6.75	3.81	10.00	0.54
0.50	0.54	3.75	9.25	7.00	3.81	10.25	0.54
0.75	0.54	4.00	9.25	7.25	2.18	10.50	0.54
1.00	0.54	4.25	25.02	7.50	2.18	10.75	0.54
1.25	0.54	4.50	25.02	7.75	2.18	11.00	0.54
1.50	0.54	4.75	25.02	8.00	2.18	11.25	0.54
1.75	0.54	5.00	25.02	8.25	1.09	11.50	0.54
2.00	0.54	5.25	7.07	8.50	1.09	11.75	0.54
2.25	3.26	5.50	7.07	8.75	1.09	12.00	0.54
2.50	3.26	5.75	7.07	9.00	1.09		
2.75	3.26	6.00	7.07	9.25	0.54		
3.00	3.26	6.25	3.81	9.50	0.54		

```
--------------------
| CALIB            |
| NASHYD   (  0041)|   Area    (ha)=  28.11   Curve Number    (CN)= 81.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.39
```

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	3.26	6.250	7.07	9.33	0.54
0.167	0.00	3.250	3.26	6.333	3.81	9.42	0.54
0.250	0.00	3.333	9.25	6.417	3.81	9.50	0.54
0.333	0.54	3.417	9.25	6.500	3.81	9.58	0.54
0.417	0.54	3.500	9.25	6.583	3.81	9.67	0.54
0.500	0.54	3.583	9.25	6.667	3.81	9.75	0.54
0.583	0.54	3.667	9.25	6.750	3.81	9.83	0.54
0.667	0.54	3.750	9.25	6.833	3.81	9.92	0.54
0.750	0.54	3.833	9.25	6.917	3.81	10.00	0.54
0.833	0.54	3.917	9.25	7.000	3.81	10.08	0.54
0.917	0.54	4.000	9.25	7.083	3.81	10.17	0.54
1.000	0.54	4.083	9.25	7.167	3.81	10.25	0.54
1.083	0.54	4.167	9.25	7.250	3.81	10.33	0.54
1.167	0.54	4.250	9.25	7.333	2.18	10.42	0.54
1.250	0.54	4.333	25.02	7.417	2.18	10.50	0.54
1.333	0.54	4.417	25.02	7.500	2.18	10.58	0.54
1.417	0.54	4.500	25.02	7.583	2.18	10.67	0.54
1.500	0.54	4.583	25.02	7.667	2.18	10.75	0.54
1.583	0.54	4.667	25.02	7.750	2.18	10.83	0.54
1.667	0.54	4.750	25.02	7.833	2.18	10.92	0.54
1.750	0.54	4.833	25.02	7.917	2.18	11.00	0.54
1.833	0.54	4.917	25.02	8.000	2.18	11.08	0.54
1.917	0.54	5.000	25.02	8.083	2.18	11.17	0.54
2.000	0.54	5.083	25.02	8.167	2.18	11.25	0.54
2.083	0.54	5.167	25.02	8.250	2.18	11.33	0.54
2.167	0.54	5.250	25.02	8.333	1.09	11.42	0.54
2.250	0.54	5.333	7.07	8.417	1.09	11.50	0.54
2.333	3.26	5.417	7.07	8.500	1.09	11.58	0.54
2.417	3.26	5.500	7.07	8.583	1.09	11.67	0.54
2.500	3.26	5.583	7.07	8.667	1.09	11.75	0.54
2.583	3.26	5.667	7.07	8.750	1.09	11.83	0.54
2.667	3.26	5.750	7.07	8.833	1.09	11.92	0.54
2.750	3.26	5.833	7.07	8.917	1.09	12.00	0.54
2.833	3.26	5.917	7.07	9.000	1.09	12.08	0.54
2.917	3.26	6.000	7.07	9.083	1.09	12.17	0.54
3.000	3.26	6.083	7.07	9.167	1.09	12.25	0.54
3.083	3.26	6.167	7.07	9.250	1.09		

```
Unit Hyd Qpeak  (cms)=   0.772

PEAK FLOW       (cms)=   0.430 (i)
TIME TO PEAK    (hrs)=   6.667
RUNOFF VOLUME    (mm)=  22.379
TOTAL RAINFALL   (mm)=  54.380
RUNOFF COEFFICIENT   =   0.412

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
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--------------------
| CALIB            |
| NASHYD   (  0043)|   Area    (ha)=   9.35   Curve Number    (CN)= 69.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.90
```

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	3.26	6.250	7.07	9.33	0.54
0.167	0.00	3.250	3.26	6.333	3.81	9.42	0.54
0.250	0.00	3.333	9.25	6.417	3.81	9.50	0.54
0.333	0.54	3.417	9.25	6.500	3.81	9.58	0.54
0.417	0.54	3.500	9.25	6.583	3.81	9.67	0.54
0.500	0.54	3.583	9.25	6.667	3.81	9.75	0.54
0.583	0.54	3.667	9.25	6.750	3.81	9.83	0.54
0.667	0.54	3.750	9.25	6.833	3.81	9.92	0.54
0.750	0.54	3.833	9.25	6.917	3.81	10.00	0.54
0.833	0.54	3.917	9.25	7.000	3.81	10.08	0.54
0.917	0.54	4.000	9.25	7.083	3.81	10.17	0.54
1.000	0.54	4.083	9.25	7.167	3.81	10.25	0.54
1.083	0.54	4.167	9.25	7.250	3.81	10.33	0.54
1.167	0.54	4.250	9.25	7.333	2.18	10.42	0.54
1.250	0.54	4.333	25.02	7.417	2.18	10.50	0.54
1.333	0.54	4.417	25.02	7.500	2.18	10.58	0.54
1.417	0.54	4.500	25.02	7.583	2.18	10.67	0.54
1.500	0.54	4.583	25.02	7.667	2.18	10.75	0.54
1.583	0.54	4.667	25.02	7.750	2.18	10.83	0.54
1.667	0.54	4.750	25.02	7.833	2.18	10.92	0.54
1.750	0.54	4.833	25.02	7.917	2.18	11.00	0.54
1.833	0.54	4.917	25.02	8.000	2.18	11.08	0.54
1.917	0.54	5.000	25.02	8.083	2.18	11.17	0.54

```
              2.000    0.54 | 5.083   25.02 | 8.167    2.18 | 11.25    0.54
              2.083    0.54 | 5.167   25.02 | 8.250    2.18 | 11.33    0.54
              2.167    0.54 | 5.250   25.02 | 8.333    1.09 | 11.42    0.54
              2.250    0.54 | 5.333    7.07 | 8.417    1.09 | 11.50    0.54
              2.333    3.26 | 5.417    7.07 | 8.500    1.09 | 11.58    0.54
              2.417    3.26 | 5.500    7.07 | 8.583    1.09 | 11.67    0.54
              2.500    3.26 | 5.583    7.07 | 8.667    1.09 | 11.75    0.54
              2.583    3.26 | 5.667    7.07 | 8.750    1.09 | 11.83    0.54
              2.667    3.26 | 5.750    7.07 | 8.833    1.09 | 11.92    0.54
              2.750    3.26 | 5.833    7.07 | 8.917    1.09 | 12.00    0.54
              2.833    3.26 | 5.917    7.07 | 9.000    1.09 | 12.08    0.54
              2.917    3.26 | 6.000    7.07 | 9.083    1.09 | 12.17    0.54
              3.000    3.26 | 6.083    7.07 | 9.167    1.09 | 12.25    0.54
              3.083    3.26 | 6.167    7.07 | 9.250    1.09 |

    Unit Hyd Qpeak  (cms)=   0.397

    PEAK FLOW       (cms)=   0.119 (i)
    TIME TO PEAK    (hrs)=   6.000
    RUNOFF VOLUME    (mm)=  14.914
    TOTAL RAINFALL   (mm)=  54.380
    RUNOFF COEFFICIENT   =   0.274

    (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0040)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0041):    28.11   0.430     6.67    22.38
     + ID2= 2 (  0043):     9.35   0.119     6.00    14.91
       ================================================
       ID = 3 (  0040):    37.46   0.538     6.50    20.52

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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================================================================================
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      V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
      V    V   I    SS     U   U   A A   L
       V  V    I     SS    U   U  AAAAA  L
       V  V    I      SS   U   U  A   A  L
        VV     I    SSSSS  UUUUU  A   A  LLLLL

       OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
      O   O    T      T    H   H   Y Y   MM MM  O   O
      O   O    T      T    H   H    Y    M   M  O   O
       OOO     T      T    H   H    Y    M   M   OOO
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                *****  D E T A I L E D   O U T P U T *****

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\a5fcdeb1-ef77-4c9f-94e4-812a8e9f744c\scenar
  Summary filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\a5fcdeb1-ef77-4c9f-94e4-812a8e9f744c\scenar

DATE: 04-14-2026                          TIME: 05:28:32

USER:


COMMENTS: _____________________________________________________________

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  ***********************************************
  ** SIMULATION : Run 3 - 10 Year 12 Hour AES ( **
  ***********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\rsoto\AppD
|                  |              ata\Local\Temp\
|                  |              b41386a6-a156-4f43-bf35-1dc02c561e49\6351ca2a
| Ptotal= 62.71 mm |    Comments: 10 Year 12 Hour AES (Bloor, TRCA)
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    0.00 |  3.25   10.66 |  6.50    4.39 |  9.75    0.63
                0.25    0.63 |  3.50   10.66 |  6.75    4.39 | 10.00    0.63
                0.50    0.63 |  3.75   10.66 |  7.00    4.39 | 10.25    0.63
                0.75    0.63 |  4.00   10.66 |  7.25    2.51 | 10.50    0.63
                1.00    0.63 |  4.25   28.84 |  7.50    2.51 | 10.75    0.63
                1.25    0.63 |  4.50   28.84 |  7.75    2.51 | 11.00    0.63
                1.50    0.63 |  4.75   28.84 |  8.00    2.51 | 11.25    0.63
                1.75    0.63 |  5.00   28.84 |  8.25    1.25 | 11.50    0.63
                2.00    0.63 |  5.25    8.15 |  8.50    1.25 | 11.75    0.63
                2.25    3.76 |  5.50    8.15 |  8.75    1.25 | 12.00    0.63
                2.50    3.76 |  5.75    8.15 |  9.00    1.25 |
                2.75    3.76 |  6.00    8.15 |  9.25    0.63 |
                3.00    3.76 |  6.25    4.39 |  9.50    0.63 |

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--------------------
| CALIB            |
| NASHYD   (  0041)|   Area     (ha)=  28.11   Curve Number    (CN)= 81.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.39

       NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.

                              ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    0.00 | 3.167    3.76 | 6.250    8.15 |  9.33    0.63
               0.167    0.00 | 3.250    3.76 | 6.333    4.39 |  9.42    0.63
               0.250    0.00 | 3.333   10.66 | 6.417    4.39 |  9.50    0.63
```

0.333	0.63	3.417	10.66	6.500	4.39	9.58	0.63
0.417	0.63	3.500	10.66	6.583	4.39	9.67	0.63
0.500	0.63	3.583	10.66	6.667	4.39	9.75	0.63
0.583	0.63	3.667	10.66	6.750	4.39	9.83	0.63
0.667	0.63	3.750	10.66	6.833	4.39	9.92	0.63
0.750	0.63	3.833	10.66	6.917	4.39	10.00	0.63
0.833	0.63	3.917	10.66	7.000	4.39	10.08	0.63
0.917	0.63	4.000	10.66	7.083	4.39	10.17	0.63
1.000	0.63	4.083	10.66	7.167	4.39	10.25	0.63
1.083	0.63	4.167	10.66	7.250	4.39	10.33	0.63
1.167	0.63	4.250	10.66	7.333	2.51	10.42	0.63
1.250	0.63	4.333	28.84	7.417	2.51	10.50	0.63
1.333	0.63	4.417	28.84	7.500	2.51	10.58	0.63
1.417	0.63	4.500	28.84	7.583	2.51	10.67	0.63
1.500	0.63	4.583	28.84	7.667	2.51	10.75	0.63
1.583	0.63	4.667	28.84	7.750	2.51	10.83	0.63
1.667	0.63	4.750	28.84	7.833	2.51	10.92	0.63
1.750	0.63	4.833	28.84	7.917	2.51	11.00	0.63
1.833	0.63	4.917	28.84	8.000	2.51	11.08	0.63
1.917	0.63	5.000	28.84	8.083	2.51	11.17	0.63
2.000	0.63	5.083	28.84	8.167	2.51	11.25	0.63
2.083	0.63	5.167	28.84	8.250	2.51	11.33	0.63
2.167	0.63	5.250	28.84	8.333	1.25	11.42	0.63
2.250	0.63	5.333	8.15	8.417	1.25	11.50	0.63
2.333	3.76	5.417	8.15	8.500	1.25	11.58	0.63
2.417	3.76	5.500	8.15	8.583	1.25	11.67	0.63
2.500	3.76	5.583	8.15	8.667	1.25	11.75	0.63
2.583	3.76	5.667	8.15	8.750	1.25	11.83	0.63
2.667	3.76	5.750	8.15	8.833	1.25	11.92	0.63
2.750	3.76	5.833	8.15	8.917	1.25	12.00	0.63
2.833	3.76	5.917	8.15	9.000	1.25	12.08	0.63
2.917	3.76	6.000	8.15	9.083	1.25	12.17	0.63
3.000	3.76	6.083	8.15	9.167	1.25	12.25	0.63
3.083	3.76	6.167	8.15	9.250	1.25		

Unit Hyd Qpeak (cms)= 0.772

PEAK FLOW (cms)= 0.549 (i)
TIME TO PEAK (hrs)= 6.583
RUNOFF VOLUME (mm)= 28.395
TOTAL RAINFALL (mm)= 62.710
RUNOFF COEFFICIENT = 0.453

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB					
NASHYD (0043)	Area (ha)=	9.35	Curve Number (CN)=	69.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.90		

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	3.76	6.250	8.15	9.33	0.63
0.167	0.00	3.250	3.76	6.333	4.39	9.42	0.63
0.250	0.00	3.333	10.66	6.417	4.39	9.50	0.63

0.333	0.63	3.417	10.66	6.500	4.39	9.58	0.63
0.417	0.63	3.500	10.66	6.583	4.39	9.67	0.63
0.500	0.63	3.583	10.66	6.667	4.39	9.75	0.63
0.583	0.63	3.667	10.66	6.750	4.39	9.83	0.63
0.667	0.63	3.750	10.66	6.833	4.39	9.92	0.63
0.750	0.63	3.833	10.66	6.917	4.39	10.00	0.63
0.833	0.63	3.917	10.66	7.000	4.39	10.08	0.63
0.917	0.63	4.000	10.66	7.083	4.39	10.17	0.63
1.000	0.63	4.083	10.66	7.167	4.39	10.25	0.63
1.083	0.63	4.167	10.66	7.250	4.39	10.33	0.63
1.167	0.63	4.250	10.66	7.333	2.51	10.42	0.63
1.250	0.63	4.333	28.84	7.417	2.51	10.50	0.63
1.333	0.63	4.417	28.84	7.500	2.51	10.58	0.63
1.417	0.63	4.500	28.84	7.583	2.51	10.67	0.63
1.500	0.63	4.583	28.84	7.667	2.51	10.75	0.63
1.583	0.63	4.667	28.84	7.750	2.51	10.83	0.63
1.667	0.63	4.750	28.84	7.833	2.51	10.92	0.63
1.750	0.63	4.833	28.84	7.917	2.51	11.00	0.63
1.833	0.63	4.917	28.84	8.000	2.51	11.08	0.63
1.917	0.63	5.000	28.84	8.083	2.51	11.17	0.63
2.000	0.63	5.083	28.84	8.167	2.51	11.25	0.63
2.083	0.63	5.167	28.84	8.250	2.51	11.33	0.63
2.167	0.63	5.250	28.84	8.333	1.25	11.42	0.63
2.250	0.63	5.333	8.15	8.417	1.25	11.50	0.63
2.333	3.76	5.417	8.15	8.500	1.25	11.58	0.63
2.417	3.76	5.500	8.15	8.583	1.25	11.67	0.63
2.500	3.76	5.583	8.15	8.667	1.25	11.75	0.63
2.583	3.76	5.667	8.15	8.750	1.25	11.83	0.63
2.667	3.76	5.750	8.15	8.833	1.25	11.92	0.63
2.750	3.76	5.833	8.15	8.917	1.25	12.00	0.63
2.833	3.76	5.917	8.15	9.000	1.25	12.08	0.63
2.917	3.76	6.000	8.15	9.083	1.25	12.17	0.63
3.000	3.76	6.083	8.15	9.167	1.25	12.25	0.63
3.083	3.76	6.167	8.15	9.250	1.25		

Unit Hyd Qpeak (cms)= 0.397

PEAK FLOW (cms)= 0.156 (i)
TIME TO PEAK (hrs)= 6.000
RUNOFF VOLUME (mm)= 19.382
TOTAL RAINFALL (mm)= 62.710
RUNOFF COEFFICIENT = 0.309

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0040)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0041):	28.11	0.549	6.58	28.39
+ ID2= 2 (0043):	9.35	0.156	6.00	19.38
ID = 3 (0040):	37.46	0.690	6.50	26.15

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
      V    V   I    SSSSS  U   U    A    L             (v 6.2.2020)
      V    V   I    SS     U   U   A A   L
       V  V    I     SS    U   U  AAAAA  L
       V  V    I      SS   U   U  A   A  L
        VV     I    SSSSS  UUUUU  A   A  LLLLL

       OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
      O   O    T      T    H   H   Y Y   MM MM  O   O
      O   O    T      T    H   H    Y    M   M  O   O
       OOO     T      T    H   H    Y    M   M   OOO
```

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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-9dcc-f9ab721dcfe2\cef0ac5f-2c9c-4ec2-8c8e-4dc2ae34e089\scenar
Summary filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-9dcc-f9ab721dcfe2\cef0ac5f-2c9c-4ec2-8c8e-4dc2ae34e089\scenar

DATE: 04-14-2026 TIME: 05:28:32

USER:

COMMENTS: _____

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  ************************************************
  ** SIMULATION : Run 4 - 25 Year 12 Hour AES ( **
  ************************************************
```

READ STORM	Filename: C:\Users\rsoto\AppData\Local\Temp\b41386a6-a156-4f43-bf35-1dc02c561e49\bb24e37e
Ptotal= 73.10 mm	Comments: 25 Year 12 Hour AES (Bloor, TRCA)

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	3.25	12.43	6.50	5.12	9.75	0.73
0.25	0.73	3.50	12.43	6.75	5.12	10.00	0.73
0.50	0.73	3.75	12.43	7.00	5.12	10.25	0.73
0.75	0.73	4.00	12.43	7.25	2.92	10.50	0.73
1.00	0.73	4.25	33.63	7.50	2.92	10.75	0.73
1.25	0.73	4.50	33.63	7.75	2.92	11.00	0.73
1.50	0.73	4.75	33.63	8.00	2.92	11.25	0.73
1.75	0.73	5.00	33.63	8.25	1.46	11.50	0.73
2.00	0.73	5.25	9.50	8.50	1.46	11.75	0.73
2.25	4.39	5.50	9.50	8.75	1.46	12.00	0.73
2.50	4.39	5.75	9.50	9.00	1.46		
2.75	4.39	6.00	9.50	9.25	0.73		
3.00	4.39	6.25	5.12	9.50	0.73		

CALIB					
NASHYD (0041)	Area (ha)= 28.11	Curve Number (CN)= 81.0			
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00			
	U.H. Tp(hrs)= 1.39				

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	4.39	6.250	9.50	9.33	0.73
0.167	0.00	3.250	4.39	6.333	5.12	9.42	0.73
0.250	0.00	3.333	12.43	6.417	5.12	9.50	0.73
0.333	0.73	3.417	12.43	6.500	5.12	9.58	0.73
0.417	0.73	3.500	12.43	6.583	5.12	9.67	0.73
0.500	0.73	3.583	12.43	6.667	5.12	9.75	0.73
0.583	0.73	3.667	12.43	6.750	5.12	9.83	0.73
0.667	0.73	3.750	12.43	6.833	5.12	9.92	0.73
0.750	0.73	3.833	12.43	6.917	5.12	10.00	0.73
0.833	0.73	3.917	12.43	7.000	5.12	10.08	0.73
0.917	0.73	4.000	12.43	7.083	5.12	10.17	0.73
1.000	0.73	4.083	12.43	7.167	5.12	10.25	0.73
1.083	0.73	4.167	12.43	7.250	5.12	10.33	0.73
1.167	0.73	4.250	12.43	7.333	2.92	10.42	0.73
1.250	0.73	4.333	33.63	7.417	2.92	10.50	0.73
1.333	0.73	4.417	33.63	7.500	2.92	10.58	0.73
1.417	0.73	4.500	33.63	7.583	2.92	10.67	0.73
1.500	0.73	4.583	33.63	7.667	2.92	10.75	0.73
1.583	0.73	4.667	33.63	7.750	2.92	10.83	0.73
1.667	0.73	4.750	33.63	7.833	2.92	10.92	0.73
1.750	0.73	4.833	33.63	7.917	2.92	11.00	0.73
1.833	0.73	4.917	33.63	8.000	2.92	11.08	0.73
1.917	0.73	5.000	33.63	8.083	2.92	11.17	0.73
2.000	0.73	5.083	33.63	8.167	2.92	11.25	0.73
2.083	0.73	5.167	33.63	8.250	2.92	11.33	0.73
2.167	0.73	5.250	33.63	8.333	1.46	11.42	0.73
2.250	0.73	5.333	9.50	8.417	1.46	11.50	0.73
2.333	4.39	5.417	9.50	8.500	1.46	11.58	0.73
2.417	4.39	5.500	9.50	8.583	1.46	11.67	0.73
2.500	4.39	5.583	9.50	8.667	1.46	11.75	0.73
2.583	4.39	5.667	9.50	8.750	1.46	11.83	0.73
2.667	4.39	5.750	9.50	8.833	1.46	11.92	0.73
2.750	4.39	5.833	9.50	8.917	1.46	12.00	0.73
2.833	4.39	5.917	9.50	9.000	1.46	12.08	0.73
2.917	4.39	6.000	9.50	9.083	1.46	12.17	0.73
3.000	4.39	6.083	9.50	9.167	1.46	12.25	0.73
3.083	4.39	6.167	9.50	9.250	1.46		

Unit Hyd Qpeak (cms)= 0.772

PEAK FLOW (cms)= 0.706 (i)
TIME TO PEAK (hrs)= 6.583
RUNOFF VOLUME (mm)= 36.322
TOTAL RAINFALL (mm)= 73.100
RUNOFF COEFFICIENT = 0.497

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB					
NASHYD (0043)	Area (ha)=	9.35	Curve Number (CN)=	69.0	
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.90			

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	4.39	6.250	9.50	9.33	0.73
0.167	0.00	3.250	4.39	6.333	5.12	9.42	0.73
0.250	0.00	3.333	12.43	6.417	5.12	9.50	0.73
0.333	0.73	3.417	12.43	6.500	5.12	9.58	0.73
0.417	0.73	3.500	12.43	6.583	5.12	9.67	0.73
0.500	0.73	3.583	12.43	6.667	5.12	9.75	0.73
0.583	0.73	3.667	12.43	6.750	5.12	9.83	0.73
0.667	0.73	3.750	12.43	6.833	5.12	9.92	0.73
0.750	0.73	3.833	12.43	6.917	5.12	10.00	0.73
0.833	0.73	3.917	12.43	7.000	5.12	10.08	0.73
0.917	0.73	4.000	12.43	7.083	5.12	10.17	0.73
1.000	0.73	4.083	12.43	7.167	5.12	10.25	0.73
1.083	0.73	4.167	12.43	7.250	5.12	10.33	0.73
1.167	0.73	4.250	12.43	7.333	2.92	10.42	0.73
1.250	0.73	4.333	33.63	7.417	2.92	10.50	0.73
1.333	0.73	4.417	33.63	7.500	2.92	10.58	0.73
1.417	0.73	4.500	33.63	7.583	2.92	10.67	0.73
1.500	0.73	4.583	33.63	7.667	2.92	10.75	0.73
1.583	0.73	4.667	33.63	7.750	2.92	10.83	0.73
1.667	0.73	4.750	33.63	7.833	2.92	10.92	0.73
1.750	0.73	4.833	33.63	7.917	2.92	11.00	0.73
1.833	0.73	4.917	33.63	8.000	2.92	11.08	0.73
1.917	0.73	5.000	33.63	8.083	2.92	11.17	0.73
2.000	0.73	5.083	33.63	8.167	2.92	11.25	0.73
2.083	0.73	5.167	33.63	8.250	2.92	11.33	0.73
2.167	0.73	5.250	33.63	8.333	1.46	11.42	0.73
2.250	0.73	5.333	9.50	8.417	1.46	11.50	0.73
2.333	4.39	5.417	9.50	8.500	1.46	11.58	0.73
2.417	4.39	5.500	9.50	8.583	1.46	11.67	0.73
2.500	4.39	5.583	9.50	8.667	1.46	11.75	0.73
2.583	4.39	5.667	9.50	8.750	1.46	11.83	0.73
2.667	4.39	5.750	9.50	8.833	1.46	11.92	0.73
2.750	4.39	5.833	9.50	8.917	1.46	12.00	0.73
2.833	4.39	5.917	9.50	9.000	1.46	12.08	0.73
2.917	4.39	6.000	9.50	9.083	1.46	12.17	0.73
3.000	4.39	6.083	9.50	9.167	1.46	12.25	0.73
3.083	4.39	6.167	9.50	9.250	1.46		

Unit Hyd Qpeak (cms)= 0.397

PEAK FLOW (cms)= 0.207 (i)
TIME TO PEAK (hrs)= 6.000
RUNOFF VOLUME (mm)= 25.451
TOTAL RAINFALL (mm)= 73.100
RUNOFF COEFFICIENT = 0.348

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0040)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0041):	28.11	0.706	6.58	36.32
	+ ID2= 2 (0043):	9.35	0.207	6.00	25.45
	ID = 3 (0040):	37.46	0.894	6.42	33.61

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

FINISH

V V I SSSSS U U A L (v 6.2.2020)
V V I SS U U A A L
V V I SS U U AAAAA L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL

OOO TTTTT TTTTT H H Y Y M M OOO TM
O O T T H H Y Y MM MM O O
O O T T H H Y M M O O
OOO T T H H Y M M OOO

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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-9dcc-f9ab721dcfe2\9e6fbd6d-4f39-48b7-8581-c3109f2bab0e\scenar
Summary filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-9dcc-f9ab721dcfe2\9e6fbd6d-4f39-48b7-8581-c3109f2bab0e\scenar

DATE: 04-14-2026 TIME: 05:28:32

USER:

COMMENTS: _____

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 ** SIMULATION : Run 5 - 50 Year 12 Hour AES ( **
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|    READ STORM    |    Filename: C:\Users\rsoto\AppD
|                  |              ata\Local\Temp\
|                  |              b41386a6-a156-4f43-bf35-1dc02c561e49\3216eba5
| Ptotal= 80.82 mm |    Comments: 50 Year 12 Hour AES (Bloor, TRCA)
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```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	3.25	13.74	6.50	5.66	9.75	0.81
0.25	0.81	3.50	13.74	6.75	5.66	10.00	0.81
0.50	0.81	3.75	13.74	7.00	5.66	10.25	0.81
0.75	0.81	4.00	13.74	7.25	3.23	10.50	0.81
1.00	0.81	4.25	37.17	7.50	3.23	10.75	0.81
1.25	0.81	4.50	37.17	7.75	3.23	11.00	0.81
1.50	0.81	4.75	37.17	8.00	3.23	11.25	0.81
1.75	0.81	5.00	37.17	8.25	1.62	11.50	0.81
2.00	0.81	5.25	10.50	8.50	1.62	11.75	0.81
2.25	4.85	5.50	10.50	8.75	1.62	12.00	0.81
2.50	4.85	5.75	10.50	9.00	1.62		
2.75	4.85	6.00	10.50	9.25	0.81		
3.00	4.85	6.25	5.66	9.50	0.81		

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| CALIB            |
| NASHYD   (  0041)|   Area    (ha)=  28.11   Curve Number   (CN)= 81.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.39

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	4.85	6.250	10.50	9.33	0.81
0.167	0.00	3.250	4.85	6.333	5.66	9.42	0.81
0.250	0.00	3.333	13.74	6.417	5.66	9.50	0.81
0.333	0.81	3.417	13.74	6.500	5.66	9.58	0.81
0.417	0.81	3.500	13.74	6.583	5.66	9.67	0.81
0.500	0.81	3.583	13.74	6.667	5.66	9.75	0.81
0.583	0.81	3.667	13.74	6.750	5.66	9.83	0.81
0.667	0.81	3.750	13.74	6.833	5.66	9.92	0.81
0.750	0.81	3.833	13.74	6.917	5.66	10.00	0.81
0.833	0.81	3.917	13.74	7.000	5.66	10.08	0.81
0.917	0.81	4.000	13.74	7.083	5.66	10.17	0.81
1.000	0.81	4.083	13.74	7.167	5.66	10.25	0.81
1.083	0.81	4.167	13.74	7.250	5.66	10.33	0.81
1.167	0.81	4.250	13.74	7.333	3.23	10.42	0.81
1.250	0.81	4.333	37.17	7.417	3.23	10.50	0.81
1.333	0.81	4.417	37.17	7.500	3.23	10.58	0.81
1.417	0.81	4.500	37.17	7.583	3.23	10.67	0.81
1.500	0.81	4.583	37.17	7.667	3.23	10.75	0.81
1.583	0.81	4.667	37.17	7.750	3.23	10.83	0.81
1.667	0.81	4.750	37.17	7.833	3.23	10.92	0.81
1.750	0.81	4.833	37.17	7.917	3.23	11.00	0.81
1.833	0.81	4.917	37.17	8.000	3.23	11.08	0.81
1.917	0.81	5.000	37.17	8.083	3.23	11.17	0.81
2.000	0.81	5.083	37.17	8.167	3.23	11.25	0.81
2.083	0.81	5.167	37.17	8.250	3.23	11.33	0.81
2.167	0.81	5.250	37.17	8.333	1.62	11.42	0.81
2.250	0.81	5.333	10.50	8.417	1.62	11.50	0.81
2.333	4.85	5.417	10.50	8.500	1.62	11.58	0.81
2.417	4.85	5.500	10.50	8.583	1.62	11.67	0.81
2.500	4.85	5.583	10.50	8.667	1.62	11.75	0.81
2.583	4.85	5.667	10.50	8.750	1.62	11.83	0.81
2.667	4.85	5.750	10.50	8.833	1.62	11.92	0.81
2.750	4.85	5.833	10.50	8.917	1.62	12.00	0.81
2.833	4.85	5.917	10.50	9.000	1.62	12.08	0.81
2.917	4.85	6.000	10.50	9.083	1.62	12.17	0.81
3.000	4.85	6.083	10.50	9.167	1.62	12.25	0.81
3.083	4.85	6.167	10.50	9.250	1.62		

```
    Unit Hyd Qpeak  (cms)=   0.772

    PEAK FLOW       (cms)=   0.828 (i)
    TIME TO PEAK    (hrs)=   6.583
    RUNOFF VOLUME    (mm)=  42.457
    TOTAL RAINFALL   (mm)=  80.820
    RUNOFF COEFFICIENT   =   0.525

    (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB            |
| NASHYD   (  0043)|   Area    (ha)=   9.35   Curve Number   (CN)= 69.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.90

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	4.85	6.250	10.50	9.33	0.81
0.167	0.00	3.250	4.85	6.333	5.66	9.42	0.81
0.250	0.00	3.333	13.74	6.417	5.66	9.50	0.81
0.333	0.81	3.417	13.74	6.500	5.66	9.58	0.81
0.417	0.81	3.500	13.74	6.583	5.66	9.67	0.81
0.500	0.81	3.583	13.74	6.667	5.66	9.75	0.81
0.583	0.81	3.667	13.74	6.750	5.66	9.83	0.81
0.667	0.81	3.750	13.74	6.833	5.66	9.92	0.81
0.750	0.81	3.833	13.74	6.917	5.66	10.00	0.81
0.833	0.81	3.917	13.74	7.000	5.66	10.08	0.81
0.917	0.81	4.000	13.74	7.083	5.66	10.17	0.81
1.000	0.81	4.083	13.74	7.167	5.66	10.25	0.81
1.083	0.81	4.167	13.74	7.250	5.66	10.33	0.81
1.167	0.81	4.250	13.74	7.333	3.23	10.42	0.81
1.250	0.81	4.333	37.17	7.417	3.23	10.50	0.81
1.333	0.81	4.417	37.17	7.500	3.23	10.58	0.81
1.417	0.81	4.500	37.17	7.583	3.23	10.67	0.81
1.500	0.81	4.583	37.17	7.667	3.23	10.75	0.81
1.583	0.81	4.667	37.17	7.750	3.23	10.83	0.81
1.667	0.81	4.750	37.17	7.833	3.23	10.92	0.81
1.750	0.81	4.833	37.17	7.917	3.23	11.00	0.81

1.833	0.81	4.917	37.17	8.000	3.23	11.08	0.81
1.917	0.81	5.000	37.17	8.083	3.23	11.17	0.81
2.000	0.81	5.083	37.17	8.167	3.23	11.25	0.81
2.083	0.81	5.167	37.17	8.250	3.23	11.33	0.81
2.167	0.81	5.250	37.17	8.333	1.62	11.42	0.81
2.250	0.81	5.333	10.50	8.417	1.62	11.50	0.81
2.333	4.85	5.417	10.50	8.500	1.62	11.58	0.81
2.417	4.85	5.500	10.50	8.583	1.62	11.67	0.81
2.500	4.85	5.583	10.50	8.667	1.62	11.75	0.81
2.583	4.85	5.667	10.50	8.750	1.62	11.83	0.81
2.667	4.85	5.750	10.50	8.833	1.62	11.92	0.81
2.750	4.85	5.833	10.50	8.917	1.62	12.00	0.81
2.833	4.85	5.917	10.50	9.000	1.62	12.08	0.81
2.917	4.85	6.000	10.50	9.083	1.62	12.17	0.81
3.000	4.85	6.083	10.50	9.167	1.62	12.25	0.81
3.083	4.85	6.167	10.50	9.250	1.62		

Unit Hyd Qpeak (cms)= 0.397

PEAK FLOW (cms)= 0.247 (i)
TIME TO PEAK (hrs)= 5.917
RUNOFF VOLUME (mm)= 30.266
TOTAL RAINFALL (mm)= 80.820
RUNOFF COEFFICIENT = 0.374

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0040)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0041):		28.11	0.828	6.58	42.46
+ ID2= 2 (0043):		9.35	0.247	5.92	30.27
ID = 3 (0040):		37.46	1.052	6.42	39.41

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
       V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
```

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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-9dcc-f9ab721dcfe2\8caa6605-746a-4874-98dc-9e2af5aaf6a1\scenar
Summary filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-9dcc-f9ab721dcfe2\8caa6605-746a-4874-98dc-9e2af5aaf6a1\scenar

DATE: 04-14-2026 TIME: 05:28:32

USER:

COMMENTS: _____

```
  ************************************************
  ** SIMULATION : Run 6 - 100 Year 12 Hour AES  **
  ************************************************
```

READ STORM	Filename: C:\Users\rsoto\AppData\Local\Temp\b41386a6-a156-4f43-bf35-1dc02c561e49\7ed6333c
Ptotal= 88.54 mm	Comments: 100 Year 12 Hour AES (Bloor, TRCA)

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	3.25	15.05	6.50	6.20	9.75	0.89
0.25	0.89	3.50	15.05	6.75	6.20	10.00	0.89
0.50	0.89	3.75	15.05	7.00	6.20	10.25	0.89
0.75	0.89	4.00	15.05	7.25	3.54	10.50	0.89
1.00	0.89	4.25	40.71	7.50	3.54	10.75	0.89
1.25	0.89	4.50	40.71	7.75	3.54	11.00	0.89
1.50	0.89	4.75	40.71	8.00	3.54	11.25	0.89
1.75	0.89	5.00	40.71	8.25	1.77	11.50	0.89
2.00	0.89	5.25	11.51	8.50	1.77	11.75	0.89
2.25	5.31	5.50	11.51	8.75	1.77	12.00	0.89
2.50	5.31	5.75	11.51	9.00	1.77		
2.75	5.31	6.00	11.51	9.25	0.89		
3.00	5.31	6.25	6.20	9.50	0.89		

CALIB			
NASHYD (0041)	Area (ha)= 28.11	Curve Number (CN)= 81.0	
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 1.39		

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	5.31	6.250	11.51	9.33	0.89
0.167	0.00	3.250	5.31	6.333	6.20	9.42	0.89

0.250	0.00	3.333	15.05	6.417	6.20	9.50	0.89	0.250	0.00	3.333	15.05	6.417	6.20	9.50	0.89
0.333	0.89	3.417	15.05	6.500	6.20	9.58	0.89	0.333	0.89	3.417	15.05	6.500	6.20	9.58	0.89
0.417	0.89	3.500	15.05	6.583	6.20	9.67	0.89	0.417	0.89	3.500	15.05	6.583	6.20	9.67	0.89
0.500	0.89	3.583	15.05	6.667	6.20	9.75	0.89	0.500	0.89	3.583	15.05	6.667	6.20	9.75	0.89
0.583	0.89	3.667	15.05	6.750	6.20	9.83	0.89	0.583	0.89	3.667	15.05	6.750	6.20	9.83	0.89
0.667	0.89	3.750	15.05	6.833	6.20	9.92	0.89	0.667	0.89	3.750	15.05	6.833	6.20	9.92	0.89
0.750	0.89	3.833	15.05	6.917	6.20	10.00	0.89	0.750	0.89	3.833	15.05	6.917	6.20	10.00	0.89
0.833	0.89	3.917	15.05	7.000	6.20	10.08	0.89	0.833	0.89	3.917	15.05	7.000	6.20	10.08	0.89
0.917	0.89	4.000	15.05	7.083	6.20	10.17	0.89	0.917	0.89	4.000	15.05	7.083	6.20	10.17	0.89
1.000	0.89	4.083	15.05	7.167	6.20	10.25	0.89	1.000	0.89	4.083	15.05	7.167	6.20	10.25	0.89
1.083	0.89	4.167	15.05	7.250	6.20	10.33	0.89	1.083	0.89	4.167	15.05	7.250	6.20	10.33	0.89
1.167	0.89	4.250	15.05	7.333	3.54	10.42	0.89	1.167	0.89	4.250	15.05	7.333	3.54	10.42	0.89
1.250	0.89	4.333	40.71	7.417	3.54	10.50	0.89	1.250	0.89	4.333	40.71	7.417	3.54	10.50	0.89
1.333	0.89	4.417	40.71	7.500	3.54	10.58	0.89	1.333	0.89	4.417	40.71	7.500	3.54	10.58	0.89
1.417	0.89	4.500	40.71	7.583	3.54	10.67	0.89	1.417	0.89	4.500	40.71	7.583	3.54	10.67	0.89
1.500	0.89	4.583	40.71	7.667	3.54	10.75	0.89	1.500	0.89	4.583	40.71	7.667	3.54	10.75	0.89
1.583	0.89	4.667	40.71	7.750	3.54	10.83	0.89	1.583	0.89	4.667	40.71	7.750	3.54	10.83	0.89
1.667	0.89	4.750	40.71	7.833	3.54	10.92	0.89	1.667	0.89	4.750	40.71	7.833	3.54	10.92	0.89
1.750	0.89	4.833	40.71	7.917	3.54	11.00	0.89	1.750	0.89	4.833	40.71	7.917	3.54	11.00	0.89
1.833	0.89	4.917	40.71	8.000	3.54	11.08	0.89	1.833	0.89	4.917	40.71	8.000	3.54	11.08	0.89
1.917	0.89	5.000	40.71	8.083	3.54	11.17	0.89	1.917	0.89	5.000	40.71	8.083	3.54	11.17	0.89
2.000	0.89	5.083	40.71	8.167	3.54	11.25	0.89	2.000	0.89	5.083	40.71	8.167	3.54	11.25	0.89
2.083	0.89	5.167	40.71	8.250	3.54	11.33	0.89	2.083	0.89	5.167	40.71	8.250	3.54	11.33	0.89
2.167	0.89	5.250	40.71	8.333	1.77	11.42	0.89	2.167	0.89	5.250	40.71	8.333	1.77	11.42	0.89
2.250	0.89	5.333	11.51	8.417	1.77	11.50	0.89	2.250	0.89	5.333	11.51	8.417	1.77	11.50	0.89
2.333	5.31	5.417	11.51	8.500	1.77	11.58	0.89	2.333	5.31	5.417	11.51	8.500	1.77	11.58	0.89
2.417	5.31	5.500	11.51	8.583	1.77	11.67	0.89	2.417	5.31	5.500	11.51	8.583	1.77	11.67	0.89
2.500	5.31	5.583	11.51	8.667	1.77	11.75	0.89	2.500	5.31	5.583	11.51	8.667	1.77	11.75	0.89
2.583	5.31	5.667	11.51	8.750	1.77	11.83	0.89	2.583	5.31	5.667	11.51	8.750	1.77	11.83	0.89
2.667	5.31	5.750	11.51	8.833	1.77	11.92	0.89	2.667	5.31	5.750	11.51	8.833	1.77	11.92	0.89
2.750	5.31	5.833	11.51	8.917	1.77	12.00	0.89	2.750	5.31	5.833	11.51	8.917	1.77	12.00	0.89
2.833	5.31	5.917	11.51	9.000	1.77	12.08	0.89	2.833	5.31	5.917	11.51	9.000	1.77	12.08	0.89
2.917	5.31	6.000	11.51	9.083	1.77	12.17	0.89	2.917	5.31	6.000	11.51	9.083	1.77	12.17	0.89
3.000	5.31	6.083	11.51	9.167	1.77	12.25	0.89	3.000	5.31	6.083	11.51	9.167	1.77	12.25	0.89
3.083	5.31	6.167	11.51	9.250	1.77			3.083	5.31	6.167	11.51	9.250	1.77		

Unit Hyd Qpeak (cms)= 0.772

PEAK FLOW (cms)= 0.954 (i)
TIME TO PEAK (hrs)= 6.583
RUNOFF VOLUME (mm)= 48.762
TOTAL RAINFALL (mm)= 88.540
RUNOFF COEFFICIENT = 0.551

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

Unit Hyd Qpeak (cms)= 0.397

PEAK FLOW (cms)= 0.290 (i)
TIME TO PEAK (hrs)= 5.917
RUNOFF VOLUME (mm)= 35.308
TOTAL RAINFALL (mm)= 88.540
RUNOFF COEFFICIENT = 0.399

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB					
NASHYD (0043)	Area (ha)=	9.35	Curve Number (CN)=	69.0	
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.90			

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	5.31	6.250	11.51	9.33	0.89
0.167	0.00	3.250	5.31	6.333	6.20	9.42	0.89

ADD HYD (0040)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0041):	28.11	0.954	6.58	48.76
+ ID2= 2 (0043):	9.35	0.290	5.92	35.31
ID = 3 (0040):	37.46	1.216	6.42	45.40

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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       V    V   I    SSSSS  U   U    A    L             (v 6.2.2020)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\c3e4eefc-080e-41ff-88a5-a4c8f640f929\scenar
  Summary filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\c3e4eefc-080e-41ff-88a5-a4c8f640f929\scenar


DATE: 04-14-2026                          TIME: 05:28:32

USER:



COMMENTS: ____________________________________________________________

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  ************************************************
  ** SIMULATION : Run 1- 2 Year 12 Hour AES (Bl **
  ************************************************


--------------------
|    READ STORM    |    Filename: C:\Users\rsoto\AppD
|                  |              ata\Local\Temp\
|                  |              b41386a6-a156-4f43-bf35-1dc02c561e49\b367315e
| Ptotal= 42.00 mm |    Comments: 2 Year 12 Hour AES (Bloor, TRCA)
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    0.00 |  3.25    7.14 |  6.50    2.94 |  9.75    0.42
                0.25    0.42 |  3.50    7.14 |  6.75    2.94 | 10.00    0.42
                0.50    0.42 |  3.75    7.14 |  7.00    2.94 | 10.25    0.42
                0.75    0.42 |  4.00    7.14 |  7.25    1.68 | 10.50    0.42
                1.00    0.42 |  4.25   19.32 |  7.50    1.68 | 10.75    0.42
                1.25    0.42 |  4.50   19.32 |  7.75    1.68 | 11.00    0.42
                1.50    0.42 |  4.75   19.32 |  8.00    1.68 | 11.25    0.42
                1.75    0.42 |  5.00   19.32 |  8.25    0.84 | 11.50    0.42
                2.00    0.42 |  5.25    5.46 |  8.50    0.84 | 11.75    0.42
                2.25    2.52 |  5.50    5.46 |  8.75    0.84 | 12.00    0.42
                2.50    2.52 |  5.75    5.46 |  9.00    0.84 |
                2.75    2.52 |  6.00    5.46 |  9.25    0.42 |
                3.00    2.52 |  6.25    2.94 |  9.50    0.42 |

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--------------------
| CALIB            |
| NASHYD   (  0041)|   Area     (ha)=  28.11   Curve Number    (CN)= 81.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.39

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.

                              ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    0.00 | 3.167    2.52 | 6.250    5.46 |  9.33    0.42
               0.167    0.00 | 3.250    2.52 | 6.333    2.94 |  9.42    0.42
               0.250    0.00 | 3.333    7.14 | 6.417    2.94 |  9.50    0.42
               0.333    0.42 | 3.417    7.14 | 6.500    2.94 |  9.58    0.42
               0.417    0.42 | 3.500    7.14 | 6.583    2.94 |  9.67    0.42
               0.500    0.42 | 3.583    7.14 | 6.667    2.94 |  9.75    0.42
               0.583    0.42 | 3.667    7.14 | 6.750    2.94 |  9.83    0.42
               0.667    0.42 | 3.750    7.14 | 6.833    2.94 |  9.92    0.42
               0.750    0.42 | 3.833    7.14 | 6.917    2.94 | 10.00    0.42
               0.833    0.42 | 3.917    7.14 | 7.000    2.94 | 10.08    0.42
               0.917    0.42 | 4.000    7.14 | 7.083    2.94 | 10.17    0.42
               1.000    0.42 | 4.083    7.14 | 7.167    2.94 | 10.25    0.42
               1.083    0.42 | 4.167    7.14 | 7.250    2.94 | 10.33    0.42
               1.167    0.42 | 4.250    7.14 | 7.333    1.68 | 10.42    0.42
               1.250    0.42 | 4.333   19.32 | 7.417    1.68 | 10.50    0.42
               1.333    0.42 | 4.417   19.32 | 7.500    1.68 | 10.58    0.42
               1.417    0.42 | 4.500   19.32 | 7.583    1.68 | 10.67    0.42
               1.500    0.42 | 4.583   19.32 | 7.667    1.68 | 10.75    0.42
               1.583    0.42 | 4.667   19.32 | 7.750    1.68 | 10.83    0.42
               1.667    0.42 | 4.750   19.32 | 7.833    1.68 | 10.92    0.42
               1.750    0.42 | 4.833   19.32 | 7.917    1.68 | 11.00    0.42
               1.833    0.42 | 4.917   19.32 | 8.000    1.68 | 11.08    0.42
               1.917    0.42 | 5.000   19.32 | 8.083    1.68 | 11.17    0.42
               2.000    0.42 | 5.083   19.32 | 8.167    1.68 | 11.25    0.42
               2.083    0.42 | 5.167   19.32 | 8.250    1.68 | 11.33    0.42
               2.167    0.42 | 5.250   19.32 | 8.333    0.84 | 11.42    0.42
               2.250    0.42 | 5.333    5.46 | 8.417    0.84 | 11.50    0.42
               2.333    2.52 | 5.417    5.46 | 8.500    0.84 | 11.58    0.42
               2.417    2.52 | 5.500    5.46 | 8.583    0.84 | 11.67    0.42
               2.500    2.52 | 5.583    5.46 | 8.667    0.84 | 11.75    0.42
               2.583    2.52 | 5.667    5.46 | 8.750    0.84 | 11.83    0.42
               2.667    2.52 | 5.750    5.46 | 8.833    0.84 | 11.92    0.42
               2.750    2.52 | 5.833    5.46 | 8.917    0.84 | 12.00    0.42
               2.833    2.52 | 5.917    5.46 | 9.000    0.84 | 12.08    0.42
               2.917    2.52 | 6.000    5.46 | 9.083    0.84 | 12.17    0.42
               3.000    2.52 | 6.083    5.46 | 9.167    0.84 | 12.25    0.42
               3.083    2.52 | 6.167    5.46 | 9.250    0.84 |

     Unit Hyd Qpeak  (cms)=   0.772

     PEAK FLOW       (cms)=   0.269 (i)
```

```
    TIME TO PEAK     (hrs)=   6.750
    RUNOFF VOLUME     (mm)=  14.175
    TOTAL RAINFALL    (mm)=  42.000
    RUNOFF COEFFICIENT    =   0.337

    (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0043)|   Area     (ha)=   9.35   Curve Number    (CN)= 69.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.90

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.

                          ---- TRANSFORMED HYETOGRAPH ----
 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
0.083    0.00 | 3.167    2.52 | 6.250    5.46 |  9.33    0.42
0.167    0.00 | 3.250    2.52 | 6.333    2.94 |  9.42    0.42
0.250    0.00 | 3.333    7.14 | 6.417    2.94 |  9.50    0.42
0.333    0.42 | 3.417    7.14 | 6.500    2.94 |  9.58    0.42
0.417    0.42 | 3.500    7.14 | 6.583    2.94 |  9.67    0.42
0.500    0.42 | 3.583    7.14 | 6.667    2.94 |  9.75    0.42
0.583    0.42 | 3.667    7.14 | 6.750    2.94 |  9.83    0.42
0.667    0.42 | 3.750    7.14 | 6.833    2.94 |  9.92    0.42
0.750    0.42 | 3.833    7.14 | 6.917    2.94 | 10.00    0.42
0.833    0.42 | 3.917    7.14 | 7.000    2.94 | 10.08    0.42
0.917    0.42 | 4.000    7.14 | 7.083    2.94 | 10.17    0.42
1.000    0.42 | 4.083    7.14 | 7.167    2.94 | 10.25    0.42
1.083    0.42 | 4.167    7.14 | 7.250    2.94 | 10.33    0.42
1.167    0.42 | 4.250    7.14 | 7.333    1.68 | 10.42    0.42
1.250    0.42 | 4.333   19.32 | 7.417    1.68 | 10.50    0.42
1.333    0.42 | 4.417   19.32 | 7.500    1.68 | 10.58    0.42
1.417    0.42 | 4.500   19.32 | 7.583    1.68 | 10.67    0.42
1.500    0.42 | 4.583   19.32 | 7.667    1.68 | 10.75    0.42
1.583    0.42 | 4.667   19.32 | 7.750    1.68 | 10.83    0.42
1.667    0.42 | 4.750   19.32 | 7.833    1.68 | 10.92    0.42
1.750    0.42 | 4.833   19.32 | 7.917    1.68 | 11.00    0.42
1.833    0.42 | 4.917   19.32 | 8.000    1.68 | 11.08    0.42
1.917    0.42 | 5.000   19.32 | 8.083    1.68 | 11.17    0.42
2.000    0.42 | 5.083   19.32 | 8.167    1.68 | 11.25    0.42
2.083    0.42 | 5.167   19.32 | 8.250    1.68 | 11.33    0.42
2.167    0.42 | 5.250   19.32 | 8.333    0.84 | 11.42    0.42
2.250    0.42 | 5.333    5.46 | 8.417    0.84 | 11.50    0.42
2.333    2.52 | 5.417    5.46 | 8.500    0.84 | 11.58    0.42
2.417    2.52 | 5.500    5.46 | 8.583    0.84 | 11.67    0.42
2.500    2.52 | 5.583    5.46 | 8.667    0.84 | 11.75    0.42
2.583    2.52 | 5.667    5.46 | 8.750    0.84 | 11.83    0.42
2.667    2.52 | 5.750    5.46 | 8.833    0.84 | 11.92    0.42
2.750    2.52 | 5.833    5.46 | 8.917    0.84 | 12.00    0.42
2.833    2.52 | 5.917    5.46 | 9.000    0.84 | 12.08    0.42
2.917    2.52 | 6.000    5.46 | 9.083    0.84 | 12.17    0.42
3.000    2.52 | 6.083    5.46 | 9.167    0.84 | 12.25    0.42
3.083    2.52 | 6.167    5.46 | 9.250    0.84 |

    Unit Hyd Qpeak  (cms)=   0.397

    PEAK FLOW       (cms)=   0.071 (i)

    TIME TO PEAK     (hrs)=   6.083
    RUNOFF VOLUME     (mm)=   9.059
    TOTAL RAINFALL    (mm)=  42.000
    RUNOFF COEFFICIENT    =   0.216

    (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0040)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0041):    28.11   0.269     6.75    14.17
    + ID2= 2 (  0043):     9.35   0.071     6.08     9.06
      ================================================
      ID = 3 (  0040):    37.46   0.334     6.58    12.90

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
================================================================================
==========================

      V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
      V    V   I    SS     U   U   A A   L
       V  V    I     SS    U   U  AAAAA  L
       V  V    I      SS   U   U  A   A  L
        VV     I    SSSSS  UUUUU  A   A  LLLLL

       OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
      O   O    T      T    H   H   Y Y   MM MM  O   O
      O   O    T      T    H   H    Y    M   M  O   O
       OOO     T      T    H   H    Y    M   M   OOO
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                 *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\09197f62-2dc5-42ce-9d50-7da35c425607\scenar
  Summary filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\09197f62-2dc5-42ce-9d50-7da35c425607\scenar


DATE: 04-14-2026                          TIME: 05:28:31

USER:



COMMENTS: _____________________________________________________________


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  ********************************************
  ** SIMULATION : Run 2 - 5 Year 12 Hour AES (B **
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 ***********************************************


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|    READ STORM    |    Filename: C:\Users\rsoto\AppD
|                  |              ata\Local\Temp\
|                  |              b41386a6-a156-4f43-bf35-1dc02c561e49\9003d11c
| Ptotal= 54.38 mm |    Comments: 5 Year 12 Hour AES (Bloor, TRCA)
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	3.25	9.25	6.50	3.81	9.75	0.54
0.25	0.54	3.50	9.25	6.75	3.81	10.00	0.54
0.50	0.54	3.75	9.25	7.00	3.81	10.25	0.54
0.75	0.54	4.00	9.25	7.25	2.18	10.50	0.54
1.00	0.54	4.25	25.02	7.50	2.18	10.75	0.54
1.25	0.54	4.50	25.02	7.75	2.18	11.00	0.54
1.50	0.54	4.75	25.02	8.00	2.18	11.25	0.54
1.75	0.54	5.00	25.02	8.25	1.09	11.50	0.54
2.00	0.54	5.25	7.07	8.50	1.09	11.75	0.54
2.25	3.26	5.50	7.07	8.75	1.09	12.00	0.54
2.50	3.26	5.75	7.07	9.00	1.09		
2.75	3.26	6.00	7.07	9.25	0.54		
3.00	3.26	6.25	3.81	9.50	0.54		

```
--------------------------------------------------------------------------------

--------------------
| CALIB            |
| NASHYD   (  0041)|   Area    (ha)=  28.11   Curve Number    (CN)= 81.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.39

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	3.26	6.250	7.07	9.33	0.54
0.167	0.00	3.250	3.26	6.333	3.81	9.42	0.54
0.250	0.00	3.333	9.25	6.417	3.81	9.50	0.54
0.333	0.54	3.417	9.25	6.500	3.81	9.58	0.54
0.417	0.54	3.500	9.25	6.583	3.81	9.67	0.54
0.500	0.54	3.583	9.25	6.667	3.81	9.75	0.54
0.583	0.54	3.667	9.25	6.750	3.81	9.83	0.54
0.667	0.54	3.750	9.25	6.833	3.81	9.92	0.54
0.750	0.54	3.833	9.25	6.917	3.81	10.00	0.54
0.833	0.54	3.917	9.25	7.000	3.81	10.08	0.54
0.917	0.54	4.000	9.25	7.083	3.81	10.17	0.54
1.000	0.54	4.083	9.25	7.167	3.81	10.25	0.54
1.083	0.54	4.167	9.25	7.250	3.81	10.33	0.54
1.167	0.54	4.250	9.25	7.333	2.18	10.42	0.54
1.250	0.54	4.333	25.02	7.417	2.18	10.50	0.54
1.333	0.54	4.417	25.02	7.500	2.18	10.58	0.54
1.417	0.54	4.500	25.02	7.583	2.18	10.67	0.54
1.500	0.54	4.583	25.02	7.667	2.18	10.75	0.54
1.583	0.54	4.667	25.02	7.750	2.18	10.83	0.54
1.667	0.54	4.750	25.02	7.833	2.18	10.92	0.54
1.750	0.54	4.833	25.02	7.917	2.18	11.00	0.54
1.833	0.54	4.917	25.02	8.000	2.18	11.08	0.54
1.917	0.54	5.000	25.02	8.083	2.18	11.17	0.54
2.000	0.54	5.083	25.02	8.167	2.18	11.25	0.54
2.083	0.54	5.167	25.02	8.250	2.18	11.33	0.54
2.167	0.54	5.250	25.02	8.333	1.09	11.42	0.54
2.250	0.54	5.333	7.07	8.417	1.09	11.50	0.54
2.333	3.26	5.417	7.07	8.500	1.09	11.58	0.54
2.417	3.26	5.500	7.07	8.583	1.09	11.67	0.54
2.500	3.26	5.583	7.07	8.667	1.09	11.75	0.54
2.583	3.26	5.667	7.07	8.750	1.09	11.83	0.54
2.667	3.26	5.750	7.07	8.833	1.09	11.92	0.54
2.750	3.26	5.833	7.07	8.917	1.09	12.00	0.54
2.833	3.26	5.917	7.07	9.000	1.09	12.08	0.54
2.917	3.26	6.000	7.07	9.083	1.09	12.17	0.54
3.000	3.26	6.083	7.07	9.167	1.09	12.25	0.54
3.083	3.26	6.167	7.07	9.250	1.09		

```
    Unit Hyd Qpeak  (cms)=   0.772

    PEAK FLOW       (cms)=   0.430 (i)
    TIME TO PEAK    (hrs)=   6.667
    RUNOFF VOLUME    (mm)=  22.379
    TOTAL RAINFALL   (mm)=  54.380
    RUNOFF COEFFICIENT   =   0.412

    (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0043)|   Area    (ha)=   9.35   Curve Number    (CN)= 69.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.90

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	3.26	6.250	7.07	9.33	0.54
0.167	0.00	3.250	3.26	6.333	3.81	9.42	0.54
0.250	0.00	3.333	9.25	6.417	3.81	9.50	0.54
0.333	0.54	3.417	9.25	6.500	3.81	9.58	0.54
0.417	0.54	3.500	9.25	6.583	3.81	9.67	0.54
0.500	0.54	3.583	9.25	6.667	3.81	9.75	0.54
0.583	0.54	3.667	9.25	6.750	3.81	9.83	0.54
0.667	0.54	3.750	9.25	6.833	3.81	9.92	0.54
0.750	0.54	3.833	9.25	6.917	3.81	10.00	0.54
0.833	0.54	3.917	9.25	7.000	3.81	10.08	0.54
0.917	0.54	4.000	9.25	7.083	3.81	10.17	0.54
1.000	0.54	4.083	9.25	7.167	3.81	10.25	0.54
1.083	0.54	4.167	9.25	7.250	3.81	10.33	0.54
1.167	0.54	4.250	9.25	7.333	2.18	10.42	0.54
1.250	0.54	4.333	25.02	7.417	2.18	10.50	0.54
1.333	0.54	4.417	25.02	7.500	2.18	10.58	0.54
1.417	0.54	4.500	25.02	7.583	2.18	10.67	0.54
1.500	0.54	4.583	25.02	7.667	2.18	10.75	0.54
1.583	0.54	4.667	25.02	7.750	2.18	10.83	0.54
1.667	0.54	4.750	25.02	7.833	2.18	10.92	0.54
1.750	0.54	4.833	25.02	7.917	2.18	11.00	0.54
1.833	0.54	4.917	25.02	8.000	2.18	11.08	0.54

1.917	0.54	5.000	25.02	8.083	2.18	11.17	0.54
2.000	0.54	5.083	25.02	8.167	2.18	11.25	0.54
2.083	0.54	5.167	25.02	8.250	2.18	11.33	0.54
2.167	0.54	5.250	25.02	8.333	1.09	11.42	0.54
2.250	0.54	5.333	7.07	8.417	1.09	11.50	0.54
2.333	3.26	5.417	7.07	8.500	1.09	11.58	0.54
2.417	3.26	5.500	7.07	8.583	1.09	11.67	0.54
2.500	3.26	5.583	7.07	8.667	1.09	11.75	0.54
2.583	3.26	5.667	7.07	8.750	1.09	11.83	0.54
2.667	3.26	5.750	7.07	8.833	1.09	11.92	0.54
2.750	3.26	5.833	7.07	8.917	1.09	12.00	0.54
2.833	3.26	5.917	7.07	9.000	1.09	12.08	0.54
2.917	3.26	6.000	7.07	9.083	1.09	12.17	0.54
3.000	3.26	6.083	7.07	9.167	1.09	12.25	0.54
3.083	3.26	6.167	7.07	9.250	1.09		

Unit Hyd Qpeak (cms)= 0.397

PEAK FLOW (cms)= 0.119 (i)
TIME TO PEAK (hrs)= 6.000
RUNOFF VOLUME (mm)= 14.914
TOTAL RAINFALL (mm)= 54.380
RUNOFF COEFFICIENT = 0.274

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0040)		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0041):		28.11	0.430	6.67	22.38
+ ID2= 2 (0043):		9.35	0.119	6.00	14.91
ID = 3 (0040):		37.46	0.538	6.50	20.52

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
V    V   I    SS     U   U   A A   L
 V  V    I     SS    U   U  AAAAA  L
 V  V    I      SS   U   U  A   A  L
  VV     I    SSSSS  UUUUU  A   A  LLLLL

 OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
O   O    T      T    H   H   Y Y   MM MM  O   O
O   O    T      T    H   H    Y    M   M  O   O
 OOO     T      T    H   H    Y    M   M   OOO
```

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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-9dcc-f9ab721dcfe2\a5fcdeb1-ef77-4c9f-94e4-812a8e9f744c\scenar
Summary filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-9dcc-f9ab721dcfe2\a5fcdeb1-ef77-4c9f-94e4-812a8e9f744c\scenar

DATE: 04-14-2026 TIME: 05:28:32

USER:

COMMENTS: _____

** SIMULATION : Run 3 - 10 Year 12 Hour AES (**

READ STORM	Filename: C:\Users\rsoto\AppData\Local\Temp\b41386a6-a156-4f43-bf35-1dc02c561e49\6351ca2a
Ptotal= 62.71 mm	Comments: 10 Year 12 Hour AES (Bloor, TRCA)

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	3.25	10.66	6.50	4.39	9.75	0.63
0.25	0.63	3.50	10.66	6.75	4.39	10.00	0.63
0.50	0.63	3.75	10.66	7.00	4.39	10.25	0.63
0.75	0.63	4.00	10.66	7.25	2.51	10.50	0.63
1.00	0.63	4.25	28.84	7.50	2.51	10.75	0.63
1.25	0.63	4.50	28.84	7.75	2.51	11.00	0.63
1.50	0.63	4.75	28.84	8.00	2.51	11.25	0.63
1.75	0.63	5.00	28.84	8.25	1.25	11.50	0.63
2.00	0.63	5.25	8.15	8.50	1.25	11.75	0.63
2.25	3.76	5.50	8.15	8.75	1.25	12.00	0.63
2.50	3.76	5.75	8.15	9.00	1.25		
2.75	3.76	6.00	8.15	9.25	0.63		
3.00	3.76	6.25	4.39	9.50	0.63		

CALIB			
NASHYD (0041)	Area (ha)= 28.11	Curve Number (CN)= 81.0	
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 1.39		

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	3.76	6.250	8.15	9.33	0.63
0.167	0.00	3.250	3.76	6.333	4.39	9.42	0.63
0.250	0.00	3.333	10.66	6.417	4.39	9.50	0.63

0.333	0.63	3.417	10.66	6.500	4.39	9.58	0.63
0.417	0.63	3.500	10.66	6.583	4.39	9.67	0.63
0.500	0.63	3.583	10.66	6.667	4.39	9.75	0.63
0.583	0.63	3.667	10.66	6.750	4.39	9.83	0.63
0.667	0.63	3.750	10.66	6.833	4.39	9.92	0.63
0.750	0.63	3.833	10.66	6.917	4.39	10.00	0.63
0.833	0.63	3.917	10.66	7.000	4.39	10.08	0.63
0.917	0.63	4.000	10.66	7.083	4.39	10.17	0.63
1.000	0.63	4.083	10.66	7.167	4.39	10.25	0.63
1.083	0.63	4.167	10.66	7.250	4.39	10.33	0.63
1.167	0.63	4.250	10.66	7.333	2.51	10.42	0.63
1.250	0.63	4.333	28.84	7.417	2.51	10.50	0.63
1.333	0.63	4.417	28.84	7.500	2.51	10.58	0.63
1.417	0.63	4.500	28.84	7.583	2.51	10.67	0.63
1.500	0.63	4.583	28.84	7.667	2.51	10.75	0.63
1.583	0.63	4.667	28.84	7.750	2.51	10.83	0.63
1.667	0.63	4.750	28.84	7.833	2.51	10.92	0.63
1.750	0.63	4.833	28.84	7.917	2.51	11.00	0.63
1.833	0.63	4.917	28.84	8.000	2.51	11.08	0.63
1.917	0.63	5.000	28.84	8.083	2.51	11.17	0.63
2.000	0.63	5.083	28.84	8.167	2.51	11.25	0.63
2.083	0.63	5.167	28.84	8.250	2.51	11.33	0.63
2.167	0.63	5.250	28.84	8.333	1.25	11.42	0.63
2.250	0.63	5.333	8.15	8.417	1.25	11.50	0.63
2.333	3.76	5.417	8.15	8.500	1.25	11.58	0.63
2.417	3.76	5.500	8.15	8.583	1.25	11.67	0.63
2.500	3.76	5.583	8.15	8.667	1.25	11.75	0.63
2.583	3.76	5.667	8.15	8.750	1.25	11.83	0.63
2.667	3.76	5.750	8.15	8.833	1.25	11.92	0.63
2.750	3.76	5.833	8.15	8.917	1.25	12.00	0.63
2.833	3.76	5.917	8.15	9.000	1.25	12.08	0.63
2.917	3.76	6.000	8.15	9.083	1.25	12.17	0.63
3.000	3.76	6.083	8.15	9.167	1.25	12.25	0.63
3.083	3.76	6.167	8.15	9.250	1.25		

Unit Hyd Qpeak (cms)= 0.772

PEAK FLOW (cms)= 0.549 (i)
TIME TO PEAK (hrs)= 6.583
RUNOFF VOLUME (mm)= 28.395
TOTAL RAINFALL (mm)= 62.710
RUNOFF COEFFICIENT = 0.453

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB					
NASHYD (0043)	Area	(ha)= 9.35	Curve Number	(CN)= 69.0	
ID= 1 DT= 5.0 min	Ia	(mm)= 5.00	# of Linear Res.(N)= 3.00		
	U.H. Tp(hrs)= 0.90				

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	3.76	6.250	8.15	9.33	0.63
0.167	0.00	3.250	3.76	6.333	4.39	9.42	0.63
0.250	0.00	3.333	10.66	6.417	4.39	9.50	0.63

0.333	0.63	3.417	10.66	6.500	4.39	9.58	0.63
0.417	0.63	3.500	10.66	6.583	4.39	9.67	0.63
0.500	0.63	3.583	10.66	6.667	4.39	9.75	0.63
0.583	0.63	3.667	10.66	6.750	4.39	9.83	0.63
0.667	0.63	3.750	10.66	6.833	4.39	9.92	0.63
0.750	0.63	3.833	10.66	6.917	4.39	10.00	0.63
0.833	0.63	3.917	10.66	7.000	4.39	10.08	0.63
0.917	0.63	4.000	10.66	7.083	4.39	10.17	0.63
1.000	0.63	4.083	10.66	7.167	4.39	10.25	0.63
1.083	0.63	4.167	10.66	7.250	4.39	10.33	0.63
1.167	0.63	4.250	10.66	7.333	2.51	10.42	0.63
1.250	0.63	4.333	28.84	7.417	2.51	10.50	0.63
1.333	0.63	4.417	28.84	7.500	2.51	10.58	0.63
1.417	0.63	4.500	28.84	7.583	2.51	10.67	0.63
1.500	0.63	4.583	28.84	7.667	2.51	10.75	0.63
1.583	0.63	4.667	28.84	7.750	2.51	10.83	0.63
1.667	0.63	4.750	28.84	7.833	2.51	10.92	0.63
1.750	0.63	4.833	28.84	7.917	2.51	11.00	0.63
1.833	0.63	4.917	28.84	8.000	2.51	11.08	0.63
1.917	0.63	5.000	28.84	8.083	2.51	11.17	0.63
2.000	0.63	5.083	28.84	8.167	2.51	11.25	0.63
2.083	0.63	5.167	28.84	8.250	2.51	11.33	0.63
2.167	0.63	5.250	28.84	8.333	1.25	11.42	0.63
2.250	0.63	5.333	8.15	8.417	1.25	11.50	0.63
2.333	3.76	5.417	8.15	8.500	1.25	11.58	0.63
2.417	3.76	5.500	8.15	8.583	1.25	11.67	0.63
2.500	3.76	5.583	8.15	8.667	1.25	11.75	0.63
2.583	3.76	5.667	8.15	8.750	1.25	11.83	0.63
2.667	3.76	5.750	8.15	8.833	1.25	11.92	0.63
2.750	3.76	5.833	8.15	8.917	1.25	12.00	0.63
2.833	3.76	5.917	8.15	9.000	1.25	12.08	0.63
2.917	3.76	6.000	8.15	9.083	1.25	12.17	0.63
3.000	3.76	6.083	8.15	9.167	1.25	12.25	0.63
3.083	3.76	6.167	8.15	9.250	1.25		

Unit Hyd Qpeak (cms)= 0.397

PEAK FLOW (cms)= 0.156 (i)
TIME TO PEAK (hrs)= 6.000
RUNOFF VOLUME (mm)= 19.382
TOTAL RAINFALL (mm)= 62.710
RUNOFF COEFFICIENT = 0.309

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0040)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0041):	28.11	0.549	6.58	28.39
	+ ID2= 2 (0043):	9.35	0.156	6.00	19.38
	ID = 3 (0040):	37.46	0.690	6.50	26.15

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
      V    V   I    SSSSS  U   U    A    L             (v 6.2.2020)
      V    V   I    SS     U   U   A A   L
       V  V    I     SS    U   U  AAAAA  L
       V  V    I      SS   U   U  A   A  L
        VV     I    SSSSS  UUUUU  A   A  LLLLL

       OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
      O   O    T      T    H   H   Y Y   MM MM  O   O
      O   O    T      T    H   H    Y    M   M  O   O
       OOO     T      T    H   H    Y    M   M   OOO
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```

***** D E T A I L E D O U T P U T *****

```
  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\cef0ac5f-2c9c-4ec2-8c8e-4dc2ae34e089\scenar
  Summary filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\cef0ac5f-2c9c-4ec2-8c8e-4dc2ae34e089\scenar

DATE: 04-14-2026                          TIME: 05:28:32

USER:


COMMENTS: _____________________________________________________
```

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  ***********************************************
  ** SIMULATION : Run 4 - 25 Year 12 Hour AES ( **
  ***********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\rsoto\AppD
|                  |              ata\Local\Temp\
|                  |              b41386a6-a156-4f43-bf35-1dc02c561e49\bb24e37e
| Ptotal= 73.10 mm |    Comments: 25 Year 12 Hour AES (Bloor, TRCA)
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	3.25	12.43	6.50	5.12	9.75	0.73
0.25	0.73	3.50	12.43	6.75	5.12	10.00	0.73
0.50	0.73	3.75	12.43	7.00	5.12	10.25	0.73
0.75	0.73	4.00	12.43	7.25	2.92	10.50	0.73
1.00	0.73	4.25	33.63	7.50	2.92	10.75	0.73
1.25	0.73	4.50	33.63	7.75	2.92	11.00	0.73
1.50	0.73	4.75	33.63	8.00	2.92	11.25	0.73
1.75	0.73	5.00	33.63	8.25	1.46	11.50	0.73
2.00	0.73	5.25	9.50	8.50	1.46	11.75	0.73
2.25	4.39	5.50	9.50	8.75	1.46	12.00	0.73
2.50	4.39	5.75	9.50	9.00	1.46		
2.75	4.39	6.00	9.50	9.25	0.73		
3.00	4.39	6.25	5.12	9.50	0.73		

```
--------------------------------------------------------------------------------

--------------------
| CALIB            |
| NASHYD   (  0041)|   Area     (ha)=  28.11   Curve Number    (CN)= 81.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.39

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	4.39	6.250	9.50	9.33	0.73
0.167	0.00	3.250	4.39	6.333	5.12	9.42	0.73
0.250	0.00	3.333	12.43	6.417	5.12	9.50	0.73
0.333	0.73	3.417	12.43	6.500	5.12	9.58	0.73
0.417	0.73	3.500	12.43	6.583	5.12	9.67	0.73
0.500	0.73	3.583	12.43	6.667	5.12	9.75	0.73
0.583	0.73	3.667	12.43	6.750	5.12	9.83	0.73
0.667	0.73	3.750	12.43	6.833	5.12	9.92	0.73
0.750	0.73	3.833	12.43	6.917	5.12	10.00	0.73
0.833	0.73	3.917	12.43	7.000	5.12	10.08	0.73
0.917	0.73	4.000	12.43	7.083	5.12	10.17	0.73
1.000	0.73	4.083	12.43	7.167	5.12	10.25	0.73
1.083	0.73	4.167	12.43	7.250	5.12	10.33	0.73
1.167	0.73	4.250	12.43	7.333	2.92	10.42	0.73
1.250	0.73	4.333	33.63	7.417	2.92	10.50	0.73
1.333	0.73	4.417	33.63	7.500	2.92	10.58	0.73
1.417	0.73	4.500	33.63	7.583	2.92	10.67	0.73
1.500	0.73	4.583	33.63	7.667	2.92	10.75	0.73
1.583	0.73	4.667	33.63	7.750	2.92	10.83	0.73
1.667	0.73	4.750	33.63	7.833	2.92	10.92	0.73
1.750	0.73	4.833	33.63	7.917	2.92	11.00	0.73
1.833	0.73	4.917	33.63	8.000	2.92	11.08	0.73
1.917	0.73	5.000	33.63	8.083	2.92	11.17	0.73
2.000	0.73	5.083	33.63	8.167	2.92	11.25	0.73
2.083	0.73	5.167	33.63	8.250	2.92	11.33	0.73
2.167	0.73	5.250	33.63	8.333	1.46	11.42	0.73
2.250	0.73	5.333	9.50	8.417	1.46	11.50	0.73
2.333	4.39	5.417	9.50	8.500	1.46	11.58	0.73
2.417	4.39	5.500	9.50	8.583	1.46	11.67	0.73
2.500	4.39	5.583	9.50	8.667	1.46	11.75	0.73
2.583	4.39	5.667	9.50	8.750	1.46	11.83	0.73
2.667	4.39	5.750	9.50	8.833	1.46	11.92	0.73
2.750	4.39	5.833	9.50	8.917	1.46	12.00	0.73
2.833	4.39	5.917	9.50	9.000	1.46	12.08	0.73
2.917	4.39	6.000	9.50	9.083	1.46	12.17	0.73
3.000	4.39	6.083	9.50	9.167	1.46	12.25	0.73
3.083	4.39	6.167	9.50	9.250	1.46		

```
    Unit Hyd Qpeak  (cms)=   0.772

    PEAK FLOW       (cms)=   0.706 (i)
    TIME TO PEAK    (hrs)=   6.583
    RUNOFF VOLUME    (mm)=  36.322
    TOTAL RAINFALL   (mm)=  73.100
    RUNOFF COEFFICIENT   =   0.497
```

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0043)|   Area    (ha)=   9.35   Curve Number   (CN)= 69.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.90
```

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	4.39	6.250	9.50	9.33	0.73
0.167	0.00	3.250	4.39	6.333	5.12	9.42	0.73
0.250	0.00	3.333	12.43	6.417	5.12	9.50	0.73
0.333	0.73	3.417	12.43	6.500	5.12	9.58	0.73
0.417	0.73	3.500	12.43	6.583	5.12	9.67	0.73
0.500	0.73	3.583	12.43	6.667	5.12	9.75	0.73
0.583	0.73	3.667	12.43	6.750	5.12	9.83	0.73
0.667	0.73	3.750	12.43	6.833	5.12	9.92	0.73
0.750	0.73	3.833	12.43	6.917	5.12	10.00	0.73
0.833	0.73	3.917	12.43	7.000	5.12	10.08	0.73
0.917	0.73	4.000	12.43	7.083	5.12	10.17	0.73
1.000	0.73	4.083	12.43	7.167	5.12	10.25	0.73
1.083	0.73	4.167	12.43	7.250	5.12	10.33	0.73
1.167	0.73	4.250	12.43	7.333	2.92	10.42	0.73
1.250	0.73	4.333	33.63	7.417	2.92	10.50	0.73
1.333	0.73	4.417	33.63	7.500	2.92	10.58	0.73
1.417	0.73	4.500	33.63	7.583	2.92	10.67	0.73
1.500	0.73	4.583	33.63	7.667	2.92	10.75	0.73
1.583	0.73	4.667	33.63	7.750	2.92	10.83	0.73
1.667	0.73	4.750	33.63	7.833	2.92	10.92	0.73
1.750	0.73	4.833	33.63	7.917	2.92	11.00	0.73
1.833	0.73	4.917	33.63	8.000	2.92	11.08	0.73
1.917	0.73	5.000	33.63	8.083	2.92	11.17	0.73
2.000	0.73	5.083	33.63	8.167	2.92	11.25	0.73
2.083	0.73	5.167	33.63	8.250	2.92	11.33	0.73
2.167	0.73	5.250	33.63	8.333	1.46	11.42	0.73
2.250	0.73	5.333	9.50	8.417	1.46	11.50	0.73
2.333	4.39	5.417	9.50	8.500	1.46	11.58	0.73
2.417	4.39	5.500	9.50	8.583	1.46	11.67	0.73
2.500	4.39	5.583	9.50	8.667	1.46	11.75	0.73
2.583	4.39	5.667	9.50	8.750	1.46	11.83	0.73
2.667	4.39	5.750	9.50	8.833	1.46	11.92	0.73
2.750	4.39	5.833	9.50	8.917	1.46	12.00	0.73
2.833	4.39	5.917	9.50	9.000	1.46	12.08	0.73
2.917	4.39	6.000	9.50	9.083	1.46	12.17	0.73
3.000	4.39	6.083	9.50	9.167	1.46	12.25	0.73
3.083	4.39	6.167	9.50	9.250	1.46		

```
Unit Hyd Qpeak  (cms)=   0.397

PEAK FLOW       (cms)=   0.207 (i)
TIME TO PEAK    (hrs)=   6.000
RUNOFF VOLUME    (mm)=  25.451
TOTAL RAINFALL   (mm)=  73.100
RUNOFF COEFFICIENT   =   0.348
```

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
--------------------------------------------------------------------------------
--------------------
| ADD HYD  (  0040)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0041):    28.11   0.706     6.58    36.32
     + ID2= 2 (  0043):     9.35   0.207     6.00    25.45
       ================================================
       ID = 3 (  0040):    37.46   0.894     6.42    33.61
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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 FINISH
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      V    V   I    SSSSS  U   U    A    L             (v 6.2.2020)
      V    V   I    SS     U   U   A A   L
       V  V    I     SS    U   U  AAAAA  L
       V  V    I      SS   U   U  A   A  L
        VV     I    SSSSS  UUUUU  A   A  LLLLL

       OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
      O   O    T      T    H   H   Y Y   MM MM  O   O
      O   O    T      T    H   H    Y    M   M  O   O
       OOO     T      T    H   H    Y    M   M   OOO
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                ***** D E T A I L E D  O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\9e6fbd6d-4f39-48b7-8581-c3109f2bab0e\scenar
  Summary filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\9e6fbd6d-4f39-48b7-8581-c3109f2bab0e\scenar


DATE: 04-14-2026                          TIME: 05:28:32

USER:


COMMENTS: _____________________________________________________________


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```

```
  ** SIMULATION : Run 5 - 50 Year 12 Hour AES ( **
  ************************************************


--------------------
|    READ STORM    |    Filename: C:\Users\rsoto\AppD
|                  |              ata\Local\Temp\
|                  |              b41386a6-a156-4f43-bf35-1dc02c561e49\3216eba5
| Ptotal= 80.82 mm |    Comments: 50 Year 12 Hour AES (Bloor, TRCA)
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	3.25	13.74	6.50	5.66	9.75	0.81
0.25	0.81	3.50	13.74	6.75	5.66	10.00	0.81
0.50	0.81	3.75	13.74	7.00	5.66	10.25	0.81
0.75	0.81	4.00	13.74	7.25	3.23	10.50	0.81
1.00	0.81	4.25	37.17	7.50	3.23	10.75	0.81
1.25	0.81	4.50	37.17	7.75	3.23	11.00	0.81
1.50	0.81	4.75	37.17	8.00	3.23	11.25	0.81
1.75	0.81	5.00	37.17	8.25	1.62	11.50	0.81
2.00	0.81	5.25	10.50	8.50	1.62	11.75	0.81
2.25	4.85	5.50	10.50	8.75	1.62	12.00	0.81
2.50	4.85	5.75	10.50	9.00	1.62		
2.75	4.85	6.00	10.50	9.25	0.81		
3.00	4.85	6.25	5.66	9.50	0.81		

```
--------------------------------------------------------------------------------

--------------------
| CALIB            |
| NASHYD   (  0041)|   Area    (ha)=  28.11   Curve Number    (CN)= 81.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.39

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	4.85	6.250	10.50	9.33	0.81
0.167	0.00	3.250	4.85	6.333	5.66	9.42	0.81
0.250	0.00	3.333	13.74	6.417	5.66	9.50	0.81
0.333	0.81	3.417	13.74	6.500	5.66	9.58	0.81
0.417	0.81	3.500	13.74	6.583	5.66	9.67	0.81
0.500	0.81	3.583	13.74	6.667	5.66	9.75	0.81
0.583	0.81	3.667	13.74	6.750	5.66	9.83	0.81
0.667	0.81	3.750	13.74	6.833	5.66	9.92	0.81
0.750	0.81	3.833	13.74	6.917	5.66	10.00	0.81
0.833	0.81	3.917	13.74	7.000	5.66	10.08	0.81
0.917	0.81	4.000	13.74	7.083	5.66	10.17	0.81
1.000	0.81	4.083	13.74	7.167	5.66	10.25	0.81
1.083	0.81	4.167	13.74	7.250	5.66	10.33	0.81
1.167	0.81	4.250	13.74	7.333	3.23	10.42	0.81
1.250	0.81	4.333	37.17	7.417	3.23	10.50	0.81
1.333	0.81	4.417	37.17	7.500	3.23	10.58	0.81
1.417	0.81	4.500	37.17	7.583	3.23	10.67	0.81
1.500	0.81	4.583	37.17	7.667	3.23	10.75	0.81
1.583	0.81	4.667	37.17	7.750	3.23	10.83	0.81
1.667	0.81	4.750	37.17	7.833	3.23	10.92	0.81
1.750	0.81	4.833	37.17	7.917	3.23	11.00	0.81
1.833	0.81	4.917	37.17	8.000	3.23	11.08	0.81
1.917	0.81	5.000	37.17	8.083	3.23	11.17	0.81
2.000	0.81	5.083	37.17	8.167	3.23	11.25	0.81
2.083	0.81	5.167	37.17	8.250	3.23	11.33	0.81
2.167	0.81	5.250	37.17	8.333	1.62	11.42	0.81
2.250	0.81	5.333	10.50	8.417	1.62	11.50	0.81
2.333	4.85	5.417	10.50	8.500	1.62	11.58	0.81
2.417	4.85	5.500	10.50	8.583	1.62	11.67	0.81
2.500	4.85	5.583	10.50	8.667	1.62	11.75	0.81
2.583	4.85	5.667	10.50	8.750	1.62	11.83	0.81
2.667	4.85	5.750	10.50	8.833	1.62	11.92	0.81
2.750	4.85	5.833	10.50	8.917	1.62	12.00	0.81
2.833	4.85	5.917	10.50	9.000	1.62	12.08	0.81
2.917	4.85	6.000	10.50	9.083	1.62	12.17	0.81
3.000	4.85	6.083	10.50	9.167	1.62	12.25	0.81
3.083	4.85	6.167	10.50	9.250	1.62		

```
    Unit Hyd Qpeak  (cms)=   0.772

    PEAK FLOW       (cms)=   0.828 (i)
    TIME TO PEAK    (hrs)=   6.583
    RUNOFF VOLUME    (mm)=  42.457
    TOTAL RAINFALL   (mm)=  80.820
    RUNOFF COEFFICIENT   =   0.525

    (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0043)|   Area    (ha)=   9.35   Curve Number    (CN)= 69.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.90

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	4.85	6.250	10.50	9.33	0.81
0.167	0.00	3.250	4.85	6.333	5.66	9.42	0.81
0.250	0.00	3.333	13.74	6.417	5.66	9.50	0.81
0.333	0.81	3.417	13.74	6.500	5.66	9.58	0.81
0.417	0.81	3.500	13.74	6.583	5.66	9.67	0.81
0.500	0.81	3.583	13.74	6.667	5.66	9.75	0.81
0.583	0.81	3.667	13.74	6.750	5.66	9.83	0.81
0.667	0.81	3.750	13.74	6.833	5.66	9.92	0.81
0.750	0.81	3.833	13.74	6.917	5.66	10.00	0.81
0.833	0.81	3.917	13.74	7.000	5.66	10.08	0.81
0.917	0.81	4.000	13.74	7.083	5.66	10.17	0.81
1.000	0.81	4.083	13.74	7.167	5.66	10.25	0.81
1.083	0.81	4.167	13.74	7.250	5.66	10.33	0.81
1.167	0.81	4.250	13.74	7.333	3.23	10.42	0.81
1.250	0.81	4.333	37.17	7.417	3.23	10.50	0.81
1.333	0.81	4.417	37.17	7.500	3.23	10.58	0.81
1.417	0.81	4.500	37.17	7.583	3.23	10.67	0.81
1.500	0.81	4.583	37.17	7.667	3.23	10.75	0.81
1.583	0.81	4.667	37.17	7.750	3.23	10.83	0.81
1.667	0.81	4.750	37.17	7.833	3.23	10.92	0.81
1.750	0.81	4.833	37.17	7.917	3.23	11.00	0.81

1.833	0.81	4.917	37.17	8.000	3.23	11.08	0.81
1.917	0.81	5.000	37.17	8.083	3.23	11.17	0.81
2.000	0.81	5.083	37.17	8.167	3.23	11.25	0.81
2.083	0.81	5.167	37.17	8.250	3.23	11.33	0.81
2.167	0.81	5.250	37.17	8.333	1.62	11.42	0.81
2.250	0.81	5.333	10.50	8.417	1.62	11.50	0.81
2.333	4.85	5.417	10.50	8.500	1.62	11.58	0.81
2.417	4.85	5.500	10.50	8.583	1.62	11.67	0.81
2.500	4.85	5.583	10.50	8.667	1.62	11.75	0.81
2.583	4.85	5.667	10.50	8.750	1.62	11.83	0.81
2.667	4.85	5.750	10.50	8.833	1.62	11.92	0.81
2.750	4.85	5.833	10.50	8.917	1.62	12.00	0.81
2.833	4.85	5.917	10.50	9.000	1.62	12.08	0.81
2.917	4.85	6.000	10.50	9.083	1.62	12.17	0.81
3.000	4.85	6.083	10.50	9.167	1.62	12.25	0.81
3.083	4.85	6.167	10.50	9.250	1.62		

```
    Unit Hyd Qpeak  (cms)=   0.397

    PEAK FLOW       (cms)=   0.247 (i)
    TIME TO PEAK    (hrs)=   5.917
    RUNOFF VOLUME    (mm)=  30.266
    TOTAL RAINFALL   (mm)=  80.820
    RUNOFF COEFFICIENT   =   0.374

    (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0040)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0041):    28.11   0.828     6.58    42.46
     + ID2= 2 (  0043):     9.35   0.247     5.92    30.27
       ================================================
       ID = 3 (  0040):    37.46   1.052     6.42    39.41

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
================================================================================
==========================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                 *****  D E T A I L E D   O U T P U T *****

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\8caa6605-746a-4874-98dc-9e2af5aaf6a1\scenar
  Summary filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\8caa6605-746a-4874-98dc-9e2af5aaf6a1\scenar

DATE: 04-14-2026                          TIME: 05:28:32

USER:


COMMENTS: _____________________________________________________________

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  ************************************************
  ** SIMULATION : Run 6 - 100 Year 12 Hour AES  **
  ************************************************


--------------------
|    READ STORM    |    Filename: C:\Users\rsoto\AppD
|                  |              ata\Local\Temp\
|                  |              b41386a6-a156-4f43-bf35-1dc02c561e49\7ed6333c
| Ptotal= 88.54 mm |    Comments: 100 Year 12 Hour AES (Bloor, TRCA)
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	3.25	15.05	6.50	6.20	9.75	0.89
0.25	0.89	3.50	15.05	6.75	6.20	10.00	0.89
0.50	0.89	3.75	15.05	7.00	6.20	10.25	0.89
0.75	0.89	4.00	15.05	7.25	3.54	10.50	0.89
1.00	0.89	4.25	40.71	7.50	3.54	10.75	0.89
1.25	0.89	4.50	40.71	7.75	3.54	11.00	0.89
1.50	0.89	4.75	40.71	8.00	3.54	11.25	0.89
1.75	0.89	5.00	40.71	8.25	1.77	11.50	0.89
2.00	0.89	5.25	11.51	8.50	1.77	11.75	0.89
2.25	5.31	5.50	11.51	8.75	1.77	12.00	0.89
2.50	5.31	5.75	11.51	9.00	1.77		
2.75	5.31	6.00	11.51	9.25	0.89		
3.00	5.31	6.25	6.20	9.50	0.89		

```
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--------------------
| CALIB            |
| NASHYD   (  0041)|   Area     (ha)=  28.11   Curve Number    (CN)= 81.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.39

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	5.31	6.250	11.51	9.33	0.89
0.167	0.00	3.250	5.31	6.333	6.20	9.42	0.89

0.250	0.00	3.333	15.05	6.417	6.20	9.50	0.89
0.333	0.89	3.417	15.05	6.500	6.20	9.58	0.89
0.417	0.89	3.500	15.05	6.583	6.20	9.67	0.89
0.500	0.89	3.583	15.05	6.667	6.20	9.75	0.89
0.583	0.89	3.667	15.05	6.750	6.20	9.83	0.89
0.667	0.89	3.750	15.05	6.833	6.20	9.92	0.89
0.750	0.89	3.833	15.05	6.917	6.20	10.00	0.89
0.833	0.89	3.917	15.05	7.000	6.20	10.08	0.89
0.917	0.89	4.000	15.05	7.083	6.20	10.17	0.89
1.000	0.89	4.083	15.05	7.167	6.20	10.25	0.89
1.083	0.89	4.167	15.05	7.250	6.20	10.33	0.89
1.167	0.89	4.250	15.05	7.333	3.54	10.42	0.89
1.250	0.89	4.333	40.71	7.417	3.54	10.50	0.89
1.333	0.89	4.417	40.71	7.500	3.54	10.58	0.89
1.417	0.89	4.500	40.71	7.583	3.54	10.67	0.89
1.500	0.89	4.583	40.71	7.667	3.54	10.75	0.89
1.583	0.89	4.667	40.71	7.750	3.54	10.83	0.89
1.667	0.89	4.750	40.71	7.833	3.54	10.92	0.89
1.750	0.89	4.833	40.71	7.917	3.54	11.00	0.89
1.833	0.89	4.917	40.71	8.000	3.54	11.08	0.89
1.917	0.89	5.000	40.71	8.083	3.54	11.17	0.89
2.000	0.89	5.083	40.71	8.167	3.54	11.25	0.89
2.083	0.89	5.167	40.71	8.250	3.54	11.33	0.89
2.167	0.89	5.250	40.71	8.333	1.77	11.42	0.89
2.250	0.89	5.333	11.51	8.417	1.77	11.50	0.89
2.333	5.31	5.417	11.51	8.500	1.77	11.58	0.89
2.417	5.31	5.500	11.51	8.583	1.77	11.67	0.89
2.500	5.31	5.583	11.51	8.667	1.77	11.75	0.89
2.583	5.31	5.667	11.51	8.750	1.77	11.83	0.89
2.667	5.31	5.750	11.51	8.833	1.77	11.92	0.89
2.750	5.31	5.833	11.51	8.917	1.77	12.00	0.89
2.833	5.31	5.917	11.51	9.000	1.77	12.08	0.89
2.917	5.31	6.000	11.51	9.083	1.77	12.17	0.89
3.000	5.31	6.083	11.51	9.167	1.77	12.25	0.89
3.083	5.31	6.167	11.51	9.250	1.77		

Unit Hyd Qpeak (cms)= 0.772

PEAK FLOW (cms)= 0.954 (i)
TIME TO PEAK (hrs)= 6.583
RUNOFF VOLUME (mm)= 48.762
TOTAL RAINFALL (mm)= 88.540
RUNOFF COEFFICIENT = 0.551

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB					
NASHYD (0043)	Area (ha)=	9.35	Curve Number (CN)=	69.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.90		

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	5.31	6.250	11.51	9.33	0.89
0.167	0.00	3.250	5.31	6.333	6.20	9.42	0.89

0.250	0.00	3.333	15.05	6.417	6.20	9.50	0.89
0.333	0.89	3.417	15.05	6.500	6.20	9.58	0.89
0.417	0.89	3.500	15.05	6.583	6.20	9.67	0.89
0.500	0.89	3.583	15.05	6.667	6.20	9.75	0.89
0.583	0.89	3.667	15.05	6.750	6.20	9.83	0.89
0.667	0.89	3.750	15.05	6.833	6.20	9.92	0.89
0.750	0.89	3.833	15.05	6.917	6.20	10.00	0.89
0.833	0.89	3.917	15.05	7.000	6.20	10.08	0.89
0.917	0.89	4.000	15.05	7.083	6.20	10.17	0.89
1.000	0.89	4.083	15.05	7.167	6.20	10.25	0.89
1.083	0.89	4.167	15.05	7.250	6.20	10.33	0.89
1.167	0.89	4.250	15.05	7.333	3.54	10.42	0.89
1.250	0.89	4.333	40.71	7.417	3.54	10.50	0.89
1.333	0.89	4.417	40.71	7.500	3.54	10.58	0.89
1.417	0.89	4.500	40.71	7.583	3.54	10.67	0.89
1.500	0.89	4.583	40.71	7.667	3.54	10.75	0.89
1.583	0.89	4.667	40.71	7.750	3.54	10.83	0.89
1.667	0.89	4.750	40.71	7.833	3.54	10.92	0.89
1.750	0.89	4.833	40.71	7.917	3.54	11.00	0.89
1.833	0.89	4.917	40.71	8.000	3.54	11.08	0.89
1.917	0.89	5.000	40.71	8.083	3.54	11.17	0.89
2.000	0.89	5.083	40.71	8.167	3.54	11.25	0.89
2.083	0.89	5.167	40.71	8.250	3.54	11.33	0.89
2.167	0.89	5.250	40.71	8.333	1.77	11.42	0.89
2.250	0.89	5.333	11.51	8.417	1.77	11.50	0.89
2.333	5.31	5.417	11.51	8.500	1.77	11.58	0.89
2.417	5.31	5.500	11.51	8.583	1.77	11.67	0.89
2.500	5.31	5.583	11.51	8.667	1.77	11.75	0.89
2.583	5.31	5.667	11.51	8.750	1.77	11.83	0.89
2.667	5.31	5.750	11.51	8.833	1.77	11.92	0.89
2.750	5.31	5.833	11.51	8.917	1.77	12.00	0.89
2.833	5.31	5.917	11.51	9.000	1.77	12.08	0.89
2.917	5.31	6.000	11.51	9.083	1.77	12.17	0.89
3.000	5.31	6.083	11.51	9.167	1.77	12.25	0.89
3.083	5.31	6.167	11.51	9.250	1.77		

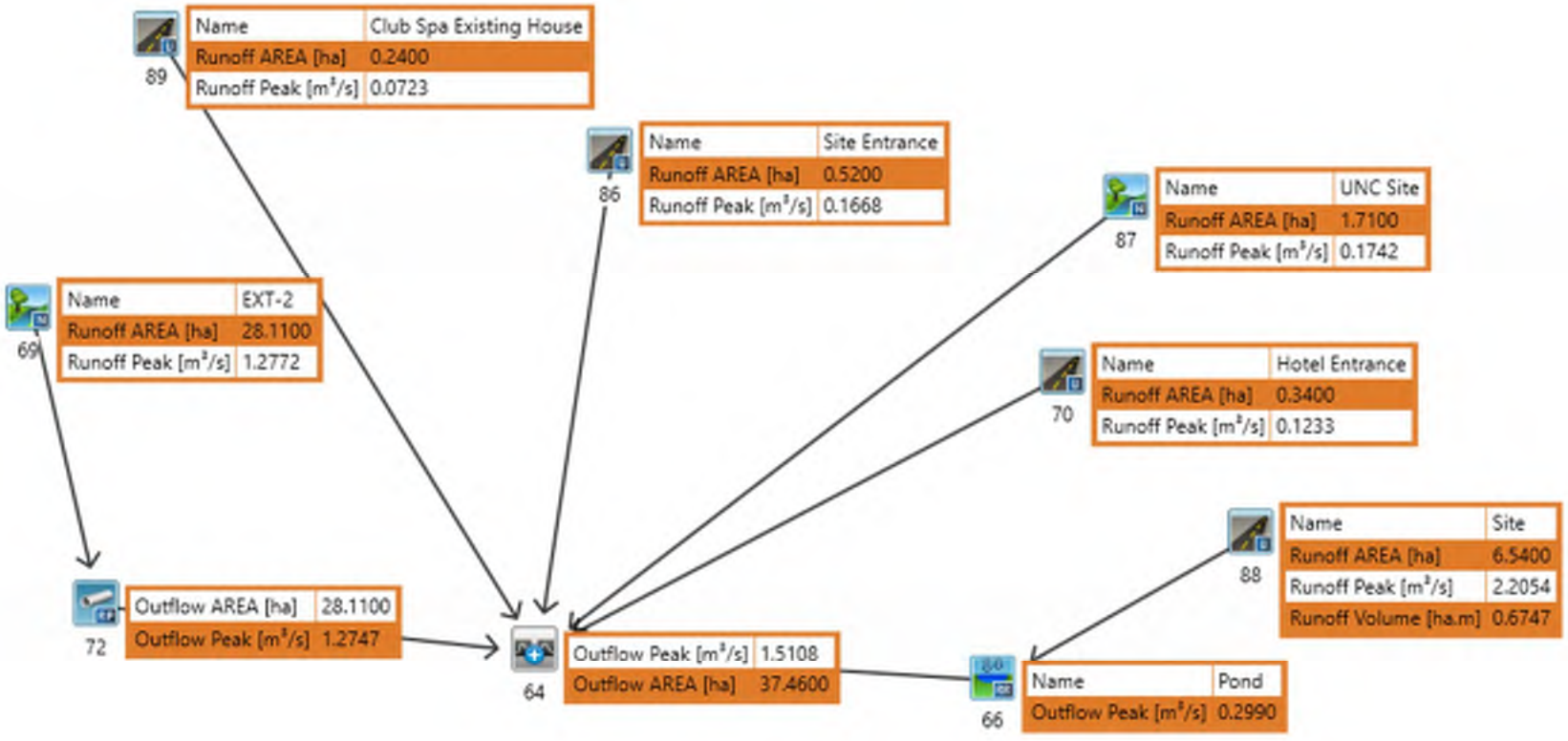
Unit Hyd Qpeak (cms)= 0.397

PEAK FLOW (cms)= 0.290 (i)
TIME TO PEAK (hrs)= 5.917
RUNOFF VOLUME (mm)= 35.308
TOTAL RAINFALL (mm)= 88.540
RUNOFF COEFFICIENT = 0.399

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0040)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0041):	28.11	0.954	6.58	48.76
	+ ID2= 2 (0043):	9.35	0.290	5.92	35.31
	ID = 3 (0040):	37.46	1.216	6.42	45.40

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.



SCHAEFFERS CONSULTING ENGINEERS	Visual OTTHYMO™ Schematic Post-Development	
	Project: 2026-5625	Date: April 2026

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       V    V   I    SSSSS  U   U    A    L             (v 6.2.2020)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\5661bb84-a156-46bd-b43f-21394509d410\scenar
  Summary filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\5661bb84-a156-46bd-b43f-21394509d410\scenar

DATE: 04-14-2026                          TIME: 05:29:39

USER:


COMMENTS: _____________________________________________________________

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--------------------------
  ***********************************************
  ** SIMULATION : Run 1 - 2yr 24hr 15min SCS    **
  ***********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\rsoto\AppD
|                  |              ata\Local\Temp\
|                  |              411e61e3-953c-46be-9e27-afe262f9e8c8\3804ba0c
| Ptotal= 59.77 mm |    Comments: 2yr 24hr 15min SCS
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	1.08	12.50	8.61	18.75	1.08
0.25	0.66	6.50	1.08	12.75	4.42	19.00	1.08
0.50	0.66	6.75	1.08	13.00	4.42	19.25	1.08
0.75	0.66	7.00	1.08	13.25	3.23	19.50	1.08
1.00	0.66	7.25	1.31	13.50	3.23	19.75	1.08
1.25	0.66	7.50	1.31	13.75	2.51	20.00	1.08
1.50	0.66	7.75	1.31	14.00	2.51	20.25	0.72
1.75	0.66	8.00	1.31	14.25	1.79	20.50	0.72
2.00	0.66	8.25	1.55	14.50	1.79	20.75	0.72
2.25	0.78	8.50	1.55	14.75	1.79	21.00	0.72
2.50	0.78	8.75	1.67	15.00	1.79	21.25	0.72
2.75	0.78	9.00	1.67	15.25	1.79	21.50	0.72
3.00	0.78	9.25	1.91	15.50	1.79	21.75	0.72
3.25	0.78	9.50	1.91	15.75	1.79	22.00	0.72
3.50	0.78	9.75	2.15	16.00	1.79	22.25	0.72
3.75	0.78	10.00	2.15	16.25	1.08	22.50	0.72
4.00	0.78	10.25	2.75	16.50	1.08	22.75	0.72
4.25	0.96	10.50	2.75	16.75	1.08	23.00	0.72
4.50	0.96	10.75	3.71	17.00	1.08	23.25	0.72
4.75	0.96	11.00	3.71	17.25	1.08	23.50	0.72
5.00	0.96	11.25	5.74	17.50	1.08	23.75	0.72
5.25	0.96	11.50	5.74	17.75	1.08	24.00	0.72
5.50	0.96	11.75	17.69	18.00	1.08		
5.75	0.96	12.00	73.16	18.25	1.08		
6.00	0.96	12.25	8.61	18.50	1.08		

```
--------------------
| CALIB            |
| NASHYD   (  0029)|   Area    (ha)=  28.11   Curve Number   (CN)= 81.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.39

       NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	0.96	12.250	73.16	18.33	1.08
0.167	0.00	6.250	0.96	12.333	8.61	18.42	1.08
0.250	0.00	6.333	1.08	12.417	8.61	18.50	1.08
0.333	0.66	6.417	1.08	12.500	8.61	18.58	1.08
0.417	0.66	6.500	1.08	12.583	8.61	18.67	1.08
0.500	0.66	6.583	1.08	12.667	8.61	18.75	1.08
0.583	0.66	6.667	1.08	12.750	8.61	18.83	1.08
0.667	0.66	6.750	1.08	12.833	4.42	18.92	1.08
0.750	0.66	6.833	1.08	12.917	4.42	19.00	1.08
0.833	0.66	6.917	1.08	13.000	4.42	19.08	1.08
0.917	0.66	7.000	1.08	13.083	4.42	19.17	1.08
1.000	0.66	7.083	1.08	13.167	4.42	19.25	1.08
1.083	0.66	7.167	1.08	13.250	4.42	19.33	1.08
1.167	0.66	7.250	1.08	13.333	3.23	19.42	1.08
1.250	0.66	7.333	1.31	13.417	3.23	19.50	1.08
1.333	0.66	7.417	1.31	13.500	3.23	19.58	1.08
1.417	0.66	7.500	1.31	13.583	3.23	19.67	1.08
1.500	0.66	7.583	1.31	13.667	3.23	19.75	1.08
1.583	0.66	7.667	1.31	13.750	3.23	19.83	1.08
1.667	0.66	7.750	1.31	13.833	2.51	19.92	1.08
1.750	0.66	7.833	1.31	13.917	2.51	20.00	1.08
1.833	0.66	7.917	1.31	14.000	2.51	20.08	1.08
1.917	0.66	8.000	1.31	14.083	2.51	20.17	1.08
2.000	0.66	8.083	1.31	14.167	2.51	20.25	1.08
2.083	0.66	8.167	1.31	14.250	2.51	20.33	0.72
2.167	0.66	8.250	1.31	14.333	1.79	20.42	0.72
2.250	0.66	8.333	1.55	14.417	1.79	20.50	0.72
2.333	0.78	8.417	1.55	14.500	1.79	20.58	0.72
2.417	0.78	8.500	1.55	14.583	1.79	20.67	0.72

2.500	0.78	8.583	1.55	14.667	1.79	20.75	0.72
2.583	0.78	8.667	1.55	14.750	1.79	20.83	0.72
2.667	0.78	8.750	1.55	14.833	1.79	20.92	0.72
2.750	0.78	8.833	1.67	14.917	1.79	21.00	0.72
2.833	0.78	8.917	1.67	15.000	1.79	21.08	0.72
2.917	0.78	9.000	1.67	15.083	1.79	21.17	0.72
3.000	0.78	9.083	1.67	15.167	1.79	21.25	0.72
3.083	0.78	9.167	1.67	15.250	1.79	21.33	0.72
3.167	0.78	9.250	1.67	15.333	1.79	21.42	0.72
3.250	0.78	9.333	1.91	15.417	1.79	21.50	0.72
3.333	0.78	9.417	1.91	15.500	1.79	21.58	0.72
3.417	0.78	9.500	1.91	15.583	1.79	21.67	0.72
3.500	0.78	9.583	1.91	15.667	1.79	21.75	0.72
3.583	0.78	9.667	1.91	15.750	1.79	21.83	0.72
3.667	0.78	9.750	1.91	15.833	1.79	21.92	0.72
3.750	0.78	9.833	2.15	15.917	1.79	22.00	0.72
3.833	0.78	9.917	2.15	16.000	1.79	22.08	0.72
3.917	0.78	10.000	2.15	16.083	1.79	22.17	0.72
4.000	0.78	10.083	2.15	16.167	1.79	22.25	0.72
4.083	0.78	10.167	2.15	16.250	1.79	22.33	0.72
4.167	0.78	10.250	2.15	16.333	1.08	22.42	0.72
4.250	0.78	10.333	2.75	16.417	1.08	22.50	0.72
4.333	0.96	10.417	2.75	16.500	1.08	22.58	0.72
4.417	0.96	10.500	2.75	16.583	1.08	22.67	0.72
4.500	0.96	10.583	2.75	16.667	1.08	22.75	0.72
4.583	0.96	10.667	2.75	16.750	1.08	22.83	0.72
4.667	0.96	10.750	2.75	16.833	1.08	22.92	0.72
4.750	0.96	10.833	3.71	16.917	1.08	23.00	0.72
4.833	0.96	10.917	3.71	17.000	1.08	23.08	0.72
4.917	0.96	11.000	3.71	17.083	1.08	23.17	0.72
5.000	0.96	11.083	3.71	17.167	1.08	23.25	0.72
5.083	0.96	11.167	3.71	17.250	1.08	23.33	0.72
5.167	0.96	11.250	3.71	17.333	1.08	23.42	0.72
5.250	0.96	11.333	5.74	17.417	1.08	23.50	0.72
5.333	0.96	11.417	5.74	17.500	1.08	23.58	0.72
5.417	0.96	11.500	5.74	17.583	1.08	23.67	0.72
5.500	0.96	11.583	5.74	17.667	1.08	23.75	0.72
5.583	0.96	11.667	5.74	17.750	1.08	23.83	0.72
5.667	0.96	11.750	5.74	17.833	1.08	23.92	0.72
5.750	0.96	11.833	17.69	17.917	1.08	24.00	0.72
5.833	0.96	11.917	17.69	18.000	1.08	24.08	0.72
5.917	0.96	12.000	17.69	18.083	1.08	24.17	0.72
6.000	0.96	12.083	73.15	18.167	1.08	24.25	0.72
6.083	0.96	12.167	73.16	18.250	1.08		

Unit Hyd Qpeak (cms)= 0.772

PEAK FLOW (cms)= 0.462 (i)
TIME TO PEAK (hrs)= 13.667
RUNOFF VOLUME (mm)= 26.233
TOTAL RAINFALL (mm)= 59.770
RUNOFF COEFFICIENT = 0.439

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB		
NASHYD (0031)	Area (ha)= 9.35	Curve Number (CN)= 69.0
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.90	

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	0.96	12.250	73.16	18.33	1.08
0.167	0.00	6.250	0.96	12.333	8.61	18.42	1.08
0.250	0.00	6.333	1.08	12.417	8.61	18.50	1.08
0.333	0.66	6.417	1.08	12.500	8.61	18.58	1.08
0.417	0.66	6.500	1.08	12.583	8.61	18.67	1.08
0.500	0.66	6.583	1.08	12.667	8.61	18.75	1.08
0.583	0.66	6.667	1.08	12.750	8.61	18.83	1.08
0.667	0.66	6.750	1.08	12.833	4.42	18.92	1.08
0.750	0.66	6.833	1.08	12.917	4.42	19.00	1.08
0.833	0.66	6.917	1.08	13.000	4.42	19.08	1.08
0.917	0.66	7.000	1.08	13.083	4.42	19.17	1.08
1.000	0.66	7.083	1.08	13.167	4.42	19.25	1.08
1.083	0.66	7.167	1.08	13.250	4.42	19.33	1.08
1.167	0.66	7.250	1.08	13.333	3.23	19.42	1.08
1.250	0.66	7.333	1.31	13.417	3.23	19.50	1.08
1.333	0.66	7.417	1.31	13.500	3.23	19.58	1.08
1.417	0.66	7.500	1.31	13.583	3.23	19.67	1.08
1.500	0.66	7.583	1.31	13.667	3.23	19.75	1.08
1.583	0.66	7.667	1.31	13.750	3.23	19.83	1.08
1.667	0.66	7.750	1.31	13.833	2.51	19.92	1.08
1.750	0.66	7.833	1.31	13.917	2.51	20.00	1.08
1.833	0.66	7.917	1.31	14.000	2.51	20.08	1.08
1.917	0.66	8.000	1.31	14.083	2.51	20.17	1.08
2.000	0.66	8.083	1.31	14.167	2.51	20.25	1.08
2.083	0.66	8.167	1.31	14.250	2.51	20.33	0.72
2.167	0.66	8.250	1.31	14.333	1.79	20.42	0.72
2.250	0.66	8.333	1.55	14.417	1.79	20.50	0.72
2.333	0.78	8.417	1.55	14.500	1.79	20.58	0.72
2.417	0.78	8.500	1.55	14.583	1.79	20.67	0.72
2.500	0.78	8.583	1.55	14.667	1.79	20.75	0.72
2.583	0.78	8.667	1.55	14.750	1.79	20.83	0.72
2.667	0.78	8.750	1.55	14.833	1.79	20.92	0.72
2.750	0.78	8.833	1.67	14.917	1.79	21.00	0.72
2.833	0.78	8.917	1.67	15.000	1.79	21.08	0.72
2.917	0.78	9.000	1.67	15.083	1.79	21.17	0.72
3.000	0.78	9.083	1.67	15.167	1.79	21.25	0.72
3.083	0.78	9.167	1.67	15.250	1.79	21.33	0.72
3.167	0.78	9.250	1.67	15.333	1.79	21.42	0.72
3.250	0.78	9.333	1.91	15.417	1.79	21.50	0.72
3.333	0.78	9.417	1.91	15.500	1.79	21.58	0.72
3.417	0.78	9.500	1.91	15.583	1.79	21.67	0.72
3.500	0.78	9.583	1.91	15.667	1.79	21.75	0.72
3.583	0.78	9.667	1.91	15.750	1.79	21.83	0.72
3.667	0.78	9.750	1.91	15.833	1.79	21.92	0.72
3.750	0.78	9.833	2.15	15.917	1.79	22.00	0.72
3.833	0.78	9.917	2.15	16.000	1.79	22.08	0.72
3.917	0.78	10.000	2.15	16.083	1.79	22.17	0.72
4.000	0.78	10.083	2.15	16.167	1.79	22.25	0.72
4.083	0.78	10.167	2.15	16.250	1.79	22.33	0.72
4.167	0.78	10.250	2.15	16.333	1.08	22.42	0.72
4.250	0.78	10.333	2.75	16.417	1.08	22.50	0.72
4.333	0.96	10.417	2.75	16.500	1.08	22.58	0.72
4.417	0.96	10.500	2.75	16.583	1.08	22.67	0.72
4.500	0.96	10.583	2.75	16.667	1.08	22.75	0.72

4.583	0.96	10.667	2.75	16.750	1.08	22.83	0.72
4.667	0.96	10.750	2.75	16.833	1.08	22.92	0.72
4.750	0.96	10.833	3.71	16.917	1.08	23.00	0.72
4.833	0.96	10.917	3.71	17.000	1.08	23.08	0.72
4.917	0.96	11.000	3.71	17.083	1.08	23.17	0.72
5.000	0.96	11.083	3.71	17.167	1.08	23.25	0.72
5.083	0.96	11.167	3.71	17.250	1.08	23.33	0.72
5.167	0.96	11.250	3.71	17.333	1.08	23.42	0.72
5.250	0.96	11.333	5.74	17.417	1.08	23.50	0.72
5.333	0.96	11.417	5.74	17.500	1.08	23.58	0.72
5.417	0.96	11.500	5.74	17.583	1.08	23.67	0.72
5.500	0.96	11.583	5.74	17.667	1.08	23.75	0.72
5.583	0.96	11.667	5.74	17.750	1.08	23.83	0.72
5.667	0.96	11.750	5.74	17.833	1.08	23.92	0.72
5.750	0.96	11.833	17.69	17.917	1.08	24.00	0.72
5.833	0.96	11.917	17.69	18.000	1.08	24.08	0.72
5.917	0.96	12.000	17.69	18.083	1.08	24.17	0.72
6.000	0.96	12.083	73.15	18.167	1.08	24.25	0.72
6.083	0.96	12.167	73.16	18.250	1.08		

Unit Hyd Qpeak (cms)= 0.397

PEAK FLOW (cms)= 0.139 (i)
TIME TO PEAK (hrs)= 13.167
RUNOFF VOLUME (mm)= 17.762
TOTAL RAINFALL (mm)= 59.770
RUNOFF COEFFICIENT = 0.297

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0030)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0029):	28.11	0.462	13.67	26.23
+ ID2= 2 (0031):	9.35	0.139	13.17	17.76
ID = 3 (0030):	37.46	0.584	13.50	24.12

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-9dcc-f9ab721dcfe2\ffc7518a-fc57-462e-b701-136e29a55445\scenar
Summary filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-9dcc-f9ab721dcfe2\ffc7518a-fc57-462e-b701-136e29a55445\scenar

DATE: 04-14-2026 TIME: 05:29:40

USER:

COMMENTS: _____

**** SIMULATION : Run 2 - 5yr 24hr 15min SCS ****

READ STORM	Filename: C:\Users\rsoto\AppData\Local\Temp\411e61e3-953c-46be-9e27-afe262f9e8c8\edec878d
Ptotal= 71.04 mm	Comments: 5yr 24hr 15min SCS

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	1.28	12.50	10.23	18.75	1.28
0.25	0.78	6.50	1.28	12.75	5.26	19.00	1.28
0.50	0.78	6.75	1.28	13.00	5.26	19.25	1.28
0.75	0.78	7.00	1.28	13.25	3.84	19.50	1.28
1.00	0.78	7.25	1.56	13.50	3.84	19.75	1.28
1.25	0.78	7.50	1.56	13.75	2.98	20.00	1.28
1.50	0.78	7.75	1.56	14.00	2.98	20.25	0.85
1.75	0.78	8.00	1.56	14.25	2.13	20.50	0.85
2.00	0.78	8.25	1.85	14.50	2.13	20.75	0.85
2.25	0.92	8.50	1.85	14.75	2.13	21.00	0.85
2.50	0.92	8.75	1.99	15.00	2.13	21.25	0.85
2.75	0.92	9.00	1.99	15.25	2.13	21.50	0.85
3.00	0.92	9.25	2.27	15.50	2.13	21.75	0.85
3.25	0.92	9.50	2.27	15.75	2.13	22.00	0.85
3.50	0.92	9.75	2.56	16.00	2.13	22.25	0.85
3.75	0.92	10.00	2.56	16.25	1.28	22.50	0.85
4.00	0.92	10.25	3.27	16.50	1.28	22.75	0.85
4.25	1.14	10.50	3.27	16.75	1.28	23.00	0.85
4.50	1.14	10.75	4.40	17.00	1.28	23.25	0.85
4.75	1.14	11.00	4.40	17.25	1.28	23.50	0.85
5.00	1.14	11.25	6.82	17.50	1.28	23.75	0.85
5.25	1.14	11.50	6.82	17.75	1.28	24.00	0.85
5.50	1.14	11.75	21.03	18.00	1.28		
5.75	1.14	12.00	86.95	18.25	1.28		
6.00	1.14	12.25	10.23	18.50	1.28		

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| CALIB            |
| NASHYD   (  0029)|   Area     (ha)=  28.11   Curve Number    (CN)= 81.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.39

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
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---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.14	12.250	86.95	18.33	1.28
0.167	0.00	6.250	1.14	12.333	10.24	18.42	1.28
0.250	0.00	6.333	1.28	12.417	10.23	18.50	1.28
0.333	0.78	6.417	1.28	12.500	10.23	18.58	1.28
0.417	0.78	6.500	1.28	12.583	10.23	18.67	1.28
0.500	0.78	6.583	1.28	12.667	10.23	18.75	1.28
0.583	0.78	6.667	1.28	12.750	10.23	18.83	1.28
0.667	0.78	6.750	1.28	12.833	5.26	18.92	1.28
0.750	0.78	6.833	1.28	12.917	5.26	19.00	1.28
0.833	0.78	6.917	1.28	13.000	5.26	19.08	1.28
0.917	0.78	7.000	1.28	13.083	5.26	19.17	1.28
1.000	0.78	7.083	1.28	13.167	5.26	19.25	1.28
1.083	0.78	7.167	1.28	13.250	5.26	19.33	1.28
1.167	0.78	7.250	1.28	13.333	3.84	19.42	1.28
1.250	0.78	7.333	1.56	13.417	3.84	19.50	1.28
1.333	0.78	7.417	1.56	13.500	3.84	19.58	1.28
1.417	0.78	7.500	1.56	13.583	3.84	19.67	1.28
1.500	0.78	7.583	1.56	13.667	3.84	19.75	1.28
1.583	0.78	7.667	1.56	13.750	3.84	19.83	1.28
1.667	0.78	7.750	1.56	13.833	2.98	19.92	1.28
1.750	0.78	7.833	1.56	13.917	2.98	20.00	1.28
1.833	0.78	7.917	1.56	14.000	2.98	20.08	1.28
1.917	0.78	8.000	1.56	14.083	2.98	20.17	1.28
2.000	0.78	8.083	1.56	14.167	2.98	20.25	1.28
2.083	0.78	8.167	1.56	14.250	2.98	20.33	0.85
2.167	0.78	8.250	1.56	14.333	2.13	20.42	0.85
2.250	0.78	8.333	1.85	14.417	2.13	20.50	0.85
2.333	0.92	8.417	1.85	14.500	2.13	20.58	0.85
2.417	0.92	8.500	1.85	14.583	2.13	20.67	0.85
2.500	0.92	8.583	1.85	14.667	2.13	20.75	0.85
2.583	0.92	8.667	1.85	14.750	2.13	20.83	0.85
2.667	0.92	8.750	1.85	14.833	2.13	20.92	0.85
2.750	0.92	8.833	1.99	14.917	2.13	21.00	0.85
2.833	0.92	8.917	1.99	15.000	2.13	21.08	0.85
2.917	0.92	9.000	1.99	15.083	2.13	21.17	0.85
3.000	0.92	9.083	1.99	15.167	2.13	21.25	0.85
3.083	0.92	9.167	1.99	15.250	2.13	21.33	0.85
3.167	0.92	9.250	1.99	15.333	2.13	21.42	0.85
3.250	0.92	9.333	2.27	15.417	2.13	21.50	0.85
3.333	0.92	9.417	2.27	15.500	2.13	21.58	0.85
3.417	0.92	9.500	2.27	15.583	2.13	21.67	0.85
3.500	0.92	9.583	2.27	15.667	2.13	21.75	0.85
3.583	0.92	9.667	2.27	15.750	2.13	21.83	0.85
3.667	0.92	9.750	2.27	15.833	2.13	21.92	0.85
3.750	0.92	9.833	2.56	15.917	2.13	22.00	0.85
3.833	0.92	9.917	2.56	16.000	2.13	22.08	0.85
3.917	0.92	10.000	2.56	16.083	2.13	22.17	0.85
4.000	0.92	10.083	2.56	16.167	2.13	22.25	0.85
4.083	0.92	10.167	2.56	16.250	2.13	22.33	0.85
4.167	0.92	10.250	2.56	16.333	1.28	22.42	0.85
4.250	0.92	10.333	3.27	16.417	1.28	22.50	0.85
4.333	1.14	10.417	3.27	16.500	1.28	22.58	0.85
4.417	1.14	10.500	3.27	16.583	1.28	22.67	0.85
4.500	1.14	10.583	3.27	16.667	1.28	22.75	0.85
4.583	1.14	10.667	3.27	16.750	1.28	22.83	0.85
4.667	1.14	10.750	3.27	16.833	1.28	22.92	0.85
4.750	1.14	10.833	4.40	16.917	1.28	23.00	0.85
4.833	1.14	10.917	4.40	17.000	1.28	23.08	0.85
4.917	1.14	11.000	4.40	17.083	1.28	23.17	0.85
5.000	1.14	11.083	4.40	17.167	1.28	23.25	0.85
5.083	1.14	11.167	4.40	17.250	1.28	23.33	0.85
5.167	1.14	11.250	4.40	17.333	1.28	23.42	0.85
5.250	1.14	11.333	6.82	17.417	1.28	23.50	0.85
5.333	1.14	11.417	6.82	17.500	1.28	23.58	0.85
5.417	1.14	11.500	6.82	17.583	1.28	23.67	0.85
5.500	1.14	11.583	6.82	17.667	1.28	23.75	0.85
5.583	1.14	11.667	6.82	17.750	1.28	23.83	0.85
5.667	1.14	11.750	6.82	17.833	1.28	23.92	0.85
5.750	1.14	11.833	21.03	17.917	1.28	24.00	0.85
5.833	1.14	11.917	21.03	18.000	1.28	24.08	0.85
5.917	1.14	12.000	21.03	18.083	1.28	24.17	0.85
6.000	1.14	12.083	86.95	18.167	1.28	24.25	0.85
6.083	1.14	12.167	86.95	18.250	1.28		

```
    Unit Hyd Qpeak  (cms)=   0.772

    PEAK FLOW       (cms)=   0.617 (i)
    TIME TO PEAK    (hrs)=  13.667
    RUNOFF VOLUME    (mm)=  34.718
    TOTAL RAINFALL   (mm)=  71.040
    RUNOFF COEFFICIENT   =   0.489

    (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB            |
| NASHYD   (  0031)|   Area     (ha)=   9.35   Curve Number    (CN)= 69.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.90

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
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---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.14	12.250	86.95	18.33	1.28
0.167	0.00	6.250	1.14	12.333	10.24	18.42	1.28
0.250	0.00	6.333	1.28	12.417	10.23	18.50	1.28
0.333	0.78	6.417	1.28	12.500	10.23	18.58	1.28
0.417	0.78	6.500	1.28	12.583	10.23	18.67	1.28
0.500	0.78	6.583	1.28	12.667	10.23	18.75	1.28
0.583	0.78	6.667	1.28	12.750	10.23	18.83	1.28
0.667	0.78	6.750	1.28	12.833	5.26	18.92	1.28
0.750	0.78	6.833	1.28	12.917	5.26	19.00	1.28
0.833	0.78	6.917	1.28	13.000	5.26	19.08	1.28
0.917	0.78	7.000	1.28	13.083	5.26	19.17	1.28
1.000	0.78	7.083	1.28	13.167	5.26	19.25	1.28

1.083	0.78	7.167	1.28	13.250	5.26	19.33	1.28
1.167	0.78	7.250	1.28	13.333	3.84	19.42	1.28
1.250	0.78	7.333	1.56	13.417	3.84	19.50	1.28
1.333	0.78	7.417	1.56	13.500	3.84	19.58	1.28
1.417	0.78	7.500	1.56	13.583	3.84	19.67	1.28
1.500	0.78	7.583	1.56	13.667	3.84	19.75	1.28
1.583	0.78	7.667	1.56	13.750	3.84	19.83	1.28
1.667	0.78	7.750	1.56	13.833	2.98	19.92	1.28
1.750	0.78	7.833	1.56	13.917	2.98	20.00	1.28
1.833	0.78	7.917	1.56	14.000	2.98	20.08	1.28
1.917	0.78	8.000	1.56	14.083	2.98	20.17	1.28
2.000	0.78	8.083	1.56	14.167	2.98	20.25	1.28
2.083	0.78	8.167	1.56	14.250	2.98	20.33	0.85
2.167	0.78	8.250	1.56	14.333	2.13	20.42	0.85
2.250	0.78	8.333	1.85	14.417	2.13	20.50	0.85
2.333	0.92	8.417	1.85	14.500	2.13	20.58	0.85
2.417	0.92	8.500	1.85	14.583	2.13	20.67	0.85
2.500	0.92	8.583	1.85	14.667	2.13	20.75	0.85
2.583	0.92	8.667	1.85	14.750	2.13	20.83	0.85
2.667	0.92	8.750	1.85	14.833	2.13	20.92	0.85
2.750	0.92	8.833	1.99	14.917	2.13	21.00	0.85
2.833	0.92	8.917	1.99	15.000	2.13	21.08	0.85
2.917	0.92	9.000	1.99	15.083	2.13	21.17	0.85
3.000	0.92	9.083	1.99	15.167	2.13	21.25	0.85
3.083	0.92	9.167	1.99	15.250	2.13	21.33	0.85
3.167	0.92	9.250	1.99	15.333	2.13	21.42	0.85
3.250	0.92	9.333	2.27	15.417	2.13	21.50	0.85
3.333	0.92	9.417	2.27	15.500	2.13	21.58	0.85
3.417	0.92	9.500	2.27	15.583	2.13	21.67	0.85
3.500	0.92	9.583	2.27	15.667	2.13	21.75	0.85
3.583	0.92	9.667	2.27	15.750	2.13	21.83	0.85
3.667	0.92	9.750	2.27	15.833	2.13	21.92	0.85
3.750	0.92	9.833	2.56	15.917	2.13	22.00	0.85
3.833	0.92	9.917	2.56	16.000	2.13	22.08	0.85
3.917	0.92	10.000	2.56	16.083	2.13	22.17	0.85
4.000	0.92	10.083	2.56	16.167	2.13	22.25	0.85
4.083	0.92	10.167	2.56	16.250	2.13	22.33	0.85
4.167	0.92	10.250	2.56	16.333	1.28	22.42	0.85
4.250	0.92	10.333	3.27	16.417	1.28	22.50	0.85
4.333	1.14	10.417	3.27	16.500	1.28	22.58	0.85
4.417	1.14	10.500	3.27	16.583	1.28	22.67	0.85
4.500	1.14	10.583	3.27	16.667	1.28	22.75	0.85
4.583	1.14	10.667	3.27	16.750	1.28	22.83	0.85
4.667	1.14	10.750	3.27	16.833	1.28	22.92	0.85
4.750	1.14	10.833	4.40	16.917	1.28	23.00	0.85
4.833	1.14	10.917	4.40	17.000	1.28	23.08	0.85
4.917	1.14	11.000	4.40	17.083	1.28	23.17	0.85
5.000	1.14	11.083	4.40	17.167	1.28	23.25	0.85
5.083	1.14	11.167	4.40	17.250	1.28	23.33	0.85
5.167	1.14	11.250	4.40	17.333	1.28	23.42	0.85
5.250	1.14	11.333	6.82	17.417	1.28	23.50	0.85
5.333	1.14	11.417	6.82	17.500	1.28	23.58	0.85
5.417	1.14	11.500	6.82	17.583	1.28	23.67	0.85
5.500	1.14	11.583	6.82	17.667	1.28	23.75	0.85
5.583	1.14	11.667	6.82	17.750	1.28	23.83	0.85
5.667	1.14	11.750	6.82	17.833	1.28	23.92	0.85
5.750	1.14	11.833	21.03	17.917	1.28	24.00	0.85
5.833	1.14	11.917	21.03	18.000	1.28	24.08	0.85
5.917	1.14	12.000	21.03	18.083	1.28	24.17	0.85
6.000	1.14	12.083	86.95	18.167	1.28	24.25	0.85
6.083	1.14	12.167	86.95	18.250	1.28		

```
     Unit Hyd Qpeak  (cms)=   0.397

     PEAK FLOW       (cms)=   0.192 (i)
     TIME TO PEAK    (hrs)=  13.083
     RUNOFF VOLUME    (mm)=  24.208
     TOTAL RAINFALL   (mm)=  71.040
     RUNOFF COEFFICIENT   =   0.341

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0030)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0029):    28.11   0.617    13.67    34.72
      + ID2= 2 (  0031):     9.35   0.192    13.08    24.21
        ================================================
        ID = 3 (  0030):    37.46   0.786    13.50    32.09

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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 FINISH
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       V    V   I    SSSSS  U   U    A    L             (v 6.2.2020)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\8f60a4e8-0f4b-41c7-9b2e-16775739cf1e\scenar
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DATE: 04-14-2026                          TIME: 05:29:39

USER:
```

COMMENTS: _____

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  ***********************************************
  ** SIMULATION : Run 3 -10yr 24hr 15min SCS    **
  ***********************************************
```

READ STORM	Filename: C:\Users\rsoto\AppData\Local\Temp\411e61e3-953c-46be-9e27-afe262f9e8c8\452e337d
Ptotal= 80.35 mm	Comments: 10yr 24hr 15min SCS

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	1.45	12.50	11.57	18.75	1.45
0.25	0.88	6.50	1.45	12.75	5.95	19.00	1.45
0.50	0.88	6.75	1.45	13.00	5.95	19.25	1.45
0.75	0.88	7.00	1.45	13.25	4.34	19.50	1.45
1.00	0.88	7.25	1.77	13.50	4.34	19.75	1.45
1.25	0.88	7.50	1.77	13.75	3.37	20.00	1.45
1.50	0.88	7.75	1.77	14.00	3.37	20.25	0.96
1.75	0.88	8.00	1.77	14.25	2.41	20.50	0.96
2.00	0.88	8.25	2.09	14.50	2.41	20.75	0.96
2.25	1.04	8.50	2.09	14.75	2.41	21.00	0.96
2.50	1.04	8.75	2.25	15.00	2.41	21.25	0.96
2.75	1.04	9.00	2.25	15.25	2.41	21.50	0.96
3.00	1.04	9.25	2.57	15.50	2.41	21.75	0.96
3.25	1.04	9.50	2.57	15.75	2.41	22.00	0.96
3.50	1.04	9.75	2.89	16.00	2.41	22.25	0.96
3.75	1.04	10.00	2.89	16.25	1.45	22.50	0.96
4.00	1.04	10.25	3.70	16.50	1.45	22.75	0.96
4.25	1.29	10.50	3.70	16.75	1.45	23.00	0.96
4.50	1.29	10.75	4.98	17.00	1.45	23.25	0.96
4.75	1.29	11.00	4.98	17.25	1.45	23.50	0.96
5.00	1.29	11.25	7.71	17.50	1.45	23.75	0.96
5.25	1.29	11.50	7.71	17.75	1.45	24.00	0.96
5.50	1.29	11.75	23.78	18.00	1.45		
5.75	1.29	12.00	98.35	18.25	1.45		
6.00	1.29	12.25	11.57	18.50	1.45		

CALIB			
NASHYD (0029)	Area (ha)= 28.11	Curve Number (CN)= 81.0	
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 1.39		

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.29	12.250	98.35	18.33	1.45
0.167	0.00	6.250	1.29	12.333	11.58	18.42	1.45
0.250	0.00	6.333	1.45	12.417	11.57	18.50	1.45
0.333	0.88	6.417	1.45	12.500	11.57	18.58	1.45
0.417	0.88	6.500	1.45	12.583	11.57	18.67	1.45
0.500	0.88	6.583	1.45	12.667	11.57	18.75	1.45
0.583	0.88	6.667	1.45	12.750	11.57	18.83	1.45
0.667	0.88	6.750	1.45	12.833	5.95	18.92	1.45
0.750	0.88	6.833	1.45	12.917	5.95	19.00	1.45
0.833	0.88	6.917	1.45	13.000	5.95	19.08	1.45
0.917	0.88	7.000	1.45	13.083	5.95	19.17	1.45
1.000	0.88	7.083	1.45	13.167	5.95	19.25	1.45
1.083	0.88	7.167	1.45	13.250	5.95	19.33	1.45
1.167	0.88	7.250	1.45	13.333	4.34	19.42	1.45
1.250	0.88	7.333	1.77	13.417	4.34	19.50	1.45
1.333	0.88	7.417	1.77	13.500	4.34	19.58	1.45
1.417	0.88	7.500	1.77	13.583	4.34	19.67	1.45
1.500	0.88	7.583	1.77	13.667	4.34	19.75	1.45
1.583	0.88	7.667	1.77	13.750	4.34	19.83	1.45
1.667	0.88	7.750	1.77	13.833	3.37	19.92	1.45
1.750	0.88	7.833	1.77	13.917	3.37	20.00	1.45
1.833	0.88	7.917	1.77	14.000	3.37	20.08	1.45
1.917	0.88	8.000	1.77	14.083	3.37	20.17	1.45
2.000	0.88	8.083	1.77	14.167	3.37	20.25	1.45
2.083	0.88	8.167	1.77	14.250	3.37	20.33	0.96
2.167	0.88	8.250	1.77	14.333	2.41	20.42	0.96
2.250	0.88	8.333	2.09	14.417	2.41	20.50	0.96
2.333	1.04	8.417	2.09	14.500	2.41	20.58	0.96
2.417	1.04	8.500	2.09	14.583	2.41	20.67	0.96
2.500	1.04	8.583	2.09	14.667	2.41	20.75	0.96
2.583	1.04	8.667	2.09	14.750	2.41	20.83	0.96
2.667	1.04	8.750	2.09	14.833	2.41	20.92	0.96
2.750	1.04	8.833	2.25	14.917	2.41	21.00	0.96
2.833	1.04	8.917	2.25	15.000	2.41	21.08	0.96
2.917	1.04	9.000	2.25	15.083	2.41	21.17	0.96
3.000	1.04	9.083	2.25	15.167	2.41	21.25	0.96
3.083	1.04	9.167	2.25	15.250	2.41	21.33	0.96
3.167	1.04	9.250	2.25	15.333	2.41	21.42	0.96
3.250	1.04	9.333	2.57	15.417	2.41	21.50	0.96
3.333	1.04	9.417	2.57	15.500	2.41	21.58	0.96
3.417	1.04	9.500	2.57	15.583	2.41	21.67	0.96
3.500	1.04	9.583	2.57	15.667	2.41	21.75	0.96
3.583	1.04	9.667	2.57	15.750	2.41	21.83	0.96
3.667	1.04	9.750	2.57	15.833	2.41	21.92	0.96
3.750	1.04	9.833	2.89	15.917	2.41	22.00	0.96
3.833	1.04	9.917	2.89	16.000	2.41	22.08	0.96
3.917	1.04	10.000	2.89	16.083	2.41	22.17	0.96
4.000	1.04	10.083	2.89	16.167	2.41	22.25	0.96
4.083	1.04	10.167	2.89	16.250	2.41	22.33	0.96
4.167	1.04	10.250	2.89	16.333	1.45	22.42	0.96
4.250	1.04	10.333	3.70	16.417	1.45	22.50	0.96
4.333	1.29	10.417	3.70	16.500	1.45	22.58	0.96
4.417	1.29	10.500	3.70	16.583	1.45	22.67	0.96
4.500	1.29	10.583	3.70	16.667	1.45	22.75	0.96
4.583	1.29	10.667	3.70	16.750	1.45	22.83	0.96
4.667	1.29	10.750	3.70	16.833	1.45	22.92	0.96
4.750	1.29	10.833	4.98	16.917	1.45	23.00	0.96
4.833	1.29	10.917	4.98	17.000	1.45	23.08	0.96
4.917	1.29	11.000	4.98	17.083	1.45	23.17	0.96
5.000	1.29	11.083	4.98	17.167	1.45	23.25	0.96
5.083	1.29	11.167	4.98	17.250	1.45	23.33	0.96
5.167	1.29	11.250	4.98	17.333	1.45	23.42	0.96

5.250	1.29	11.333	7.71	17.417	1.45	23.50	0.96
5.333	1.29	11.417	7.71	17.500	1.45	23.58	0.96
5.417	1.29	11.500	7.71	17.583	1.45	23.67	0.96
5.500	1.29	11.583	7.71	17.667	1.45	23.75	0.96
5.583	1.29	11.667	7.71	17.750	1.45	23.83	0.96
5.667	1.29	11.750	7.71	17.833	1.45	23.92	0.96
5.750	1.29	11.833	23.78	17.917	1.45	24.00	0.96
5.833	1.29	11.917	23.78	18.000	1.45	24.08	0.96
5.917	1.29	12.000	23.78	18.083	1.45	24.17	0.96
6.000	1.29	12.083	98.34	18.167	1.45	24.25	0.96
6.083	1.29	12.167	98.35	18.250	1.45		

Unit Hyd Qpeak (cms)= 0.772

PEAK FLOW (cms)= 0.751 (i)
TIME TO PEAK (hrs)= 13.667
RUNOFF VOLUME (mm)= 42.078
TOTAL RAINFALL (mm)= 80.350
RUNOFF COEFFICIENT = 0.524

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB					
NASHYD (0031)	Area (ha)=	9.35	Curve Number (CN)=	69.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.90		

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.29	12.250	98.35	18.33	1.45
0.167	0.00	6.250	1.29	12.333	11.58	18.42	1.45
0.250	0.00	6.333	1.45	12.417	11.57	18.50	1.45
0.333	0.88	6.417	1.45	12.500	11.57	18.58	1.45
0.417	0.88	6.500	1.45	12.583	11.57	18.67	1.45
0.500	0.88	6.583	1.45	12.667	11.57	18.75	1.45
0.583	0.88	6.667	1.45	12.750	11.57	18.83	1.45
0.667	0.88	6.750	1.45	12.833	5.95	18.92	1.45
0.750	0.88	6.833	1.45	12.917	5.95	19.00	1.45
0.833	0.88	6.917	1.45	13.000	5.95	19.08	1.45
0.917	0.88	7.000	1.45	13.083	5.95	19.17	1.45
1.000	0.88	7.083	1.45	13.167	5.95	19.25	1.45
1.083	0.88	7.167	1.45	13.250	5.95	19.33	1.45
1.167	0.88	7.250	1.45	13.333	4.34	19.42	1.45
1.250	0.88	7.333	1.77	13.417	4.34	19.50	1.45
1.333	0.88	7.417	1.77	13.500	4.34	19.58	1.45
1.417	0.88	7.500	1.77	13.583	4.34	19.67	1.45
1.500	0.88	7.583	1.77	13.667	4.34	19.75	1.45
1.583	0.88	7.667	1.77	13.750	4.34	19.83	1.45
1.667	0.88	7.750	1.77	13.833	3.37	19.92	1.45
1.750	0.88	7.833	1.77	13.917	3.37	20.00	1.45
1.833	0.88	7.917	1.77	14.000	3.37	20.08	1.45
1.917	0.88	8.000	1.77	14.083	3.37	20.17	1.45
2.000	0.88	8.083	1.77	14.167	3.37	20.25	1.45
2.083	0.88	8.167	1.77	14.250	3.37	20.33	0.96
2.167	0.88	8.250	1.77	14.333	2.41	20.42	0.96
2.250	0.88	8.333	2.09	14.417	2.41	20.50	0.96
2.333	1.04	8.417	2.09	14.500	2.41	20.58	0.96
2.417	1.04	8.500	2.09	14.583	2.41	20.67	0.96
2.500	1.04	8.583	2.09	14.667	2.41	20.75	0.96
2.583	1.04	8.667	2.09	14.750	2.41	20.83	0.96
2.667	1.04	8.750	2.09	14.833	2.41	20.92	0.96
2.750	1.04	8.833	2.25	14.917	2.41	21.00	0.96
2.833	1.04	8.917	2.25	15.000	2.41	21.08	0.96
2.917	1.04	9.000	2.25	15.083	2.41	21.17	0.96
3.000	1.04	9.083	2.25	15.167	2.41	21.25	0.96
3.083	1.04	9.167	2.25	15.250	2.41	21.33	0.96
3.167	1.04	9.250	2.25	15.333	2.41	21.42	0.96
3.250	1.04	9.333	2.57	15.417	2.41	21.50	0.96
3.333	1.04	9.417	2.57	15.500	2.41	21.58	0.96
3.417	1.04	9.500	2.57	15.583	2.41	21.67	0.96
3.500	1.04	9.583	2.57	15.667	2.41	21.75	0.96
3.583	1.04	9.667	2.57	15.750	2.41	21.83	0.96
3.667	1.04	9.750	2.57	15.833	2.41	21.92	0.96
3.750	1.04	9.833	2.89	15.917	2.41	22.00	0.96
3.833	1.04	9.917	2.89	16.000	2.41	22.08	0.96
3.917	1.04	10.000	2.89	16.083	2.41	22.17	0.96
4.000	1.04	10.083	2.89	16.167	2.41	22.25	0.96
4.083	1.04	10.167	2.89	16.250	2.41	22.33	0.96
4.167	1.04	10.250	2.89	16.333	1.45	22.42	0.96
4.250	1.04	10.333	3.70	16.417	1.45	22.50	0.96
4.333	1.29	10.417	3.70	16.500	1.45	22.58	0.96
4.417	1.29	10.500	3.70	16.583	1.45	22.67	0.96
4.500	1.29	10.583	3.70	16.667	1.45	22.75	0.96
4.583	1.29	10.667	3.70	16.750	1.45	22.83	0.96
4.667	1.29	10.750	3.70	16.833	1.45	22.92	0.96
4.750	1.29	10.833	4.98	16.917	1.45	23.00	0.96
4.833	1.29	10.917	4.98	17.000	1.45	23.08	0.96
4.917	1.29	11.000	4.98	17.083	1.45	23.17	0.96
5.000	1.29	11.083	4.98	17.167	1.45	23.25	0.96
5.083	1.29	11.167	4.98	17.250	1.45	23.33	0.96
5.167	1.29	11.250	4.98	17.333	1.45	23.42	0.96
5.250	1.29	11.333	7.71	17.417	1.45	23.50	0.96
5.333	1.29	11.417	7.71	17.500	1.45	23.58	0.96
5.417	1.29	11.500	7.71	17.583	1.45	23.67	0.96
5.500	1.29	11.583	7.71	17.667	1.45	23.75	0.96
5.583	1.29	11.667	7.71	17.750	1.45	23.83	0.96
5.667	1.29	11.750	7.71	17.833	1.45	23.92	0.96
5.750	1.29	11.833	23.78	17.917	1.45	24.00	0.96
5.833	1.29	11.917	23.78	18.000	1.45	24.08	0.96
5.917	1.29	12.000	23.78	18.083	1.45	24.17	0.96
6.000	1.29	12.083	98.34	18.167	1.45	24.25	0.96
6.083	1.29	12.167	98.35	18.250	1.45		

Unit Hyd Qpeak (cms)= 0.397

PEAK FLOW (cms)= 0.239 (i)
TIME TO PEAK (hrs)= 13.083
RUNOFF VOLUME (mm)= 29.966
TOTAL RAINFALL (mm)= 80.350
RUNOFF COEFFICIENT = 0.373

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
| ADD HYD  (  0030)|
|   1 +  2 =  3    |          AREA     QPEAK     TPEAK      R.V.
-------------------           (ha)     (cms)     (hrs)      (mm)
       ID1= 1 (  0029):     28.11    0.751     13.67     42.08
     + ID2= 2 (  0031):      9.35    0.239     13.08     29.97
       ================================================
       ID = 3 (  0030):     37.46    0.963     13.50     39.05

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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================================================================================
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      V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
      V    V   I    SS     U   U   A A   L
       V  V    I     SS    U   U  AAAAA  L
       V  V    I      SS   U   U  A   A  L
        VV     I    SSSSS  UUUUU  A   A  LLLLL

       OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
      O   O    T      T    H   H   Y Y   MM MM  O   O
      O   O    T      T    H   H    Y    M   M  O   O
       OOO     T      T    H   H    Y    M   M   OOO
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                ***** D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\66587fe2-93f6-40ad-8749-6472e61ab3a3\scenar
  Summary filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\66587fe2-93f6-40ad-8749-6472e61ab3a3\scenar


DATE: 04-14-2026                          TIME: 05:29:39

USER:



COMMENTS: _____________________________________________________________


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  ***********************************************
  ** SIMULATION : Run 4 - 25yr 24hr 15min SCS   **
  ***********************************************


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|    READ STORM    |    Filename: C:\Users\rsoto\AppD
|                  |              ata\Local\Temp\
|                  |              411e61e3-953c-46be-9e27-afe262f9e8c8\55fe42eb
| Ptotal= 93.82 mm |    Comments: 25yr 24hr 15min SCS
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TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	1.69	12.50	13.51	18.75	1.69
0.25	1.03	6.50	1.69	12.75	6.94	19.00	1.69
0.50	1.03	6.75	1.69	13.00	6.94	19.25	1.69
0.75	1.03	7.00	1.69	13.25	5.07	19.50	1.69
1.00	1.03	7.25	2.06	13.50	5.07	19.75	1.69
1.25	1.03	7.50	2.06	13.75	3.94	20.00	1.69
1.50	1.03	7.75	2.06	14.00	3.94	20.25	1.13
1.75	1.03	8.00	2.06	14.25	2.81	20.50	1.13
2.00	1.03	8.25	2.44	14.50	2.81	20.75	1.13
2.25	1.22	8.50	2.44	14.75	2.81	21.00	1.13
2.50	1.22	8.75	2.63	15.00	2.81	21.25	1.13
2.75	1.22	9.00	2.63	15.25	2.81	21.50	1.13
3.00	1.22	9.25	3.00	15.50	2.81	21.75	1.13
3.25	1.22	9.50	3.00	15.75	2.81	22.00	1.13
3.50	1.22	9.75	3.38	16.00	2.81	22.25	1.13
3.75	1.22	10.00	3.38	16.25	1.69	22.50	1.13
4.00	1.22	10.25	4.32	16.50	1.69	22.75	1.13
4.25	1.50	10.50	4.32	16.75	1.69	23.00	1.13
4.50	1.50	10.75	5.82	17.00	1.69	23.25	1.13
4.75	1.50	11.00	5.82	17.25	1.69	23.50	1.13
5.00	1.50	11.25	9.01	17.50	1.69	23.75	1.13
5.25	1.50	11.50	9.01	17.75	1.69	24.00	1.13
5.50	1.50	11.75	27.77	18.00	1.69		
5.75	1.50	12.00	114.84	18.25	1.69		
6.00	1.50	12.25	13.51	18.50	1.69		

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| CALIB            |
| NASHYD   (  0029)|   Area     (ha)=  28.11   Curve Number    (CN)= 81.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.39

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
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---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.50	12.250	114.84	18.33	1.69
0.167	0.00	6.250	1.50	12.333	13.52	18.42	1.69
0.250	0.00	6.333	1.69	12.417	13.51	18.50	1.69
0.333	1.03	6.417	1.69	12.500	13.51	18.58	1.69
0.417	1.03	6.500	1.69	12.583	13.51	18.67	1.69
0.500	1.03	6.583	1.69	12.667	13.51	18.75	1.69
0.583	1.03	6.667	1.69	12.750	13.51	18.83	1.69
0.667	1.03	6.750	1.69	12.833	6.94	18.92	1.69
0.750	1.03	6.833	1.69	12.917	6.94	19.00	1.69
0.833	1.03	6.917	1.69	13.000	6.94	19.08	1.69
0.917	1.03	7.000	1.69	13.083	6.94	19.17	1.69
1.000	1.03	7.083	1.69	13.167	6.94	19.25	1.69
1.083	1.03	7.167	1.69	13.250	6.94	19.33	1.69
1.167	1.03	7.250	1.69	13.333	5.07	19.42	1.69
1.250	1.03	7.333	2.06	13.417	5.07	19.50	1.69
1.333	1.03	7.417	2.06	13.500	5.07	19.58	1.69
1.417	1.03	7.500	2.06	13.583	5.07	19.67	1.69
1.500	1.03	7.583	2.06	13.667	5.07	19.75	1.69
1.583	1.03	7.667	2.06	13.750	5.07	19.83	1.69
1.667	1.03	7.750	2.06	13.833	3.94	19.92	1.69

1.750	1.03	7.833	2.06	13.917	3.94	20.00	1.69
1.833	1.03	7.917	2.06	14.000	3.94	20.08	1.69
1.917	1.03	8.000	2.06	14.083	3.94	20.17	1.69
2.000	1.03	8.083	2.06	14.167	3.94	20.25	1.69
2.083	1.03	8.167	2.06	14.250	3.94	20.33	1.13
2.167	1.03	8.250	2.06	14.333	2.81	20.42	1.13
2.250	1.03	8.333	2.44	14.417	2.81	20.50	1.13
2.333	1.22	8.417	2.44	14.500	2.81	20.58	1.13
2.417	1.22	8.500	2.44	14.583	2.81	20.67	1.13
2.500	1.22	8.583	2.44	14.667	2.81	20.75	1.13
2.583	1.22	8.667	2.44	14.750	2.81	20.83	1.13
2.667	1.22	8.750	2.44	14.833	2.81	20.92	1.13
2.750	1.22	8.833	2.63	14.917	2.81	21.00	1.13
2.833	1.22	8.917	2.63	15.000	2.81	21.08	1.13
2.917	1.22	9.000	2.63	15.083	2.81	21.17	1.13
3.000	1.22	9.083	2.63	15.167	2.81	21.25	1.13
3.083	1.22	9.167	2.63	15.250	2.81	21.33	1.13
3.167	1.22	9.250	2.63	15.333	2.81	21.42	1.13
3.250	1.22	9.333	3.00	15.417	2.81	21.50	1.13
3.333	1.22	9.417	3.00	15.500	2.81	21.58	1.13
3.417	1.22	9.500	3.00	15.583	2.81	21.67	1.13
3.500	1.22	9.583	3.00	15.667	2.81	21.75	1.13
3.583	1.22	9.667	3.00	15.750	2.81	21.83	1.13
3.667	1.22	9.750	3.00	15.833	2.81	21.92	1.13
3.750	1.22	9.833	3.38	15.917	2.81	22.00	1.13
3.833	1.22	9.917	3.38	16.000	2.81	22.08	1.13
3.917	1.22	10.000	3.38	16.083	2.81	22.17	1.13
4.000	1.22	10.083	3.38	16.167	2.81	22.25	1.13
4.083	1.22	10.167	3.38	16.250	2.81	22.33	1.13
4.167	1.22	10.250	3.38	16.333	1.69	22.42	1.13
4.250	1.22	10.333	4.32	16.417	1.69	22.50	1.13
4.333	1.50	10.417	4.32	16.500	1.69	22.58	1.13
4.417	1.50	10.500	4.32	16.583	1.69	22.67	1.13
4.500	1.50	10.583	4.32	16.667	1.69	22.75	1.13
4.583	1.50	10.667	4.32	16.750	1.69	22.83	1.13
4.667	1.50	10.750	4.32	16.833	1.69	22.92	1.13
4.750	1.50	10.833	5.82	16.917	1.69	23.00	1.13
4.833	1.50	10.917	5.82	17.000	1.69	23.08	1.13
4.917	1.50	11.000	5.82	17.083	1.69	23.17	1.13
5.000	1.50	11.083	5.82	17.167	1.69	23.25	1.13
5.083	1.50	11.167	5.82	17.250	1.69	23.33	1.13
5.167	1.50	11.250	5.82	17.333	1.69	23.42	1.13
5.250	1.50	11.333	9.01	17.417	1.69	23.50	1.13
5.333	1.50	11.417	9.01	17.500	1.69	23.58	1.13
5.417	1.50	11.500	9.01	17.583	1.69	23.67	1.13
5.500	1.50	11.583	9.01	17.667	1.69	23.75	1.13
5.583	1.50	11.667	9.01	17.750	1.69	23.83	1.13
5.667	1.50	11.750	9.01	17.833	1.69	23.92	1.13
5.750	1.50	11.833	27.77	17.917	1.69	24.00	1.13
5.833	1.50	11.917	27.77	18.000	1.69	24.08	1.13
5.917	1.50	12.000	27.77	18.083	1.69	24.17	1.13
6.000	1.50	12.083	114.83	18.167	1.69	24.25	1.13
6.083	1.50	12.167	114.84	18.250	1.69		

Unit Hyd Qpeak (cms)= 0.772

PEAK FLOW (cms)= 0.954 (i)
TIME TO PEAK (hrs)= 13.667
RUNOFF VOLUME (mm)= 53.160
TOTAL RAINFALL (mm)= 93.820
RUNOFF COEFFICIENT = 0.567

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
NASHYD (0031)	Area (ha)=	9.35	Curve Number (CN)= 69.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.90	

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.50	12.250	114.84	18.33	1.69
0.167	0.00	6.250	1.50	12.333	13.52	18.42	1.69
0.250	0.00	6.333	1.69	12.417	13.51	18.50	1.69
0.333	1.03	6.417	1.69	12.500	13.51	18.58	1.69
0.417	1.03	6.500	1.69	12.583	13.51	18.67	1.69
0.500	1.03	6.583	1.69	12.667	13.51	18.75	1.69
0.583	1.03	6.667	1.69	12.750	13.51	18.83	1.69
0.667	1.03	6.750	1.69	12.833	6.94	18.92	1.69
0.750	1.03	6.833	1.69	12.917	6.94	19.00	1.69
0.833	1.03	6.917	1.69	13.000	6.94	19.08	1.69
0.917	1.03	7.000	1.69	13.083	6.94	19.17	1.69
1.000	1.03	7.083	1.69	13.167	6.94	19.25	1.69
1.083	1.03	7.167	1.69	13.250	6.94	19.33	1.69
1.167	1.03	7.250	1.69	13.333	5.07	19.42	1.69
1.250	1.03	7.333	2.06	13.417	5.07	19.50	1.69
1.333	1.03	7.417	2.06	13.500	5.07	19.58	1.69
1.417	1.03	7.500	2.06	13.583	5.07	19.67	1.69
1.500	1.03	7.583	2.06	13.667	5.07	19.75	1.69
1.583	1.03	7.667	2.06	13.750	5.07	19.83	1.69
1.667	1.03	7.750	2.06	13.833	3.94	19.92	1.69
1.750	1.03	7.833	2.06	13.917	3.94	20.00	1.69
1.833	1.03	7.917	2.06	14.000	3.94	20.08	1.69
1.917	1.03	8.000	2.06	14.083	3.94	20.17	1.69
2.000	1.03	8.083	2.06	14.167	3.94	20.25	1.69
2.083	1.03	8.167	2.06	14.250	3.94	20.33	1.13
2.167	1.03	8.250	2.06	14.333	2.81	20.42	1.13
2.250	1.03	8.333	2.44	14.417	2.81	20.50	1.13
2.333	1.22	8.417	2.44	14.500	2.81	20.58	1.13
2.417	1.22	8.500	2.44	14.583	2.81	20.67	1.13
2.500	1.22	8.583	2.44	14.667	2.81	20.75	1.13
2.583	1.22	8.667	2.44	14.750	2.81	20.83	1.13
2.667	1.22	8.750	2.44	14.833	2.81	20.92	1.13
2.750	1.22	8.833	2.63	14.917	2.81	21.00	1.13
2.833	1.22	8.917	2.63	15.000	2.81	21.08	1.13
2.917	1.22	9.000	2.63	15.083	2.81	21.17	1.13
3.000	1.22	9.083	2.63	15.167	2.81	21.25	1.13
3.083	1.22	9.167	2.63	15.250	2.81	21.33	1.13
3.167	1.22	9.250	2.63	15.333	2.81	21.42	1.13
3.250	1.22	9.333	3.00	15.417	2.81	21.50	1.13
3.333	1.22	9.417	3.00	15.500	2.81	21.58	1.13
3.417	1.22	9.500	3.00	15.583	2.81	21.67	1.13
3.500	1.22	9.583	3.00	15.667	2.81	21.75	1.13
3.583	1.22	9.667	3.00	15.750	2.81	21.83	1.13
3.667	1.22	9.750	3.00	15.833	2.81	21.92	1.13
3.750	1.22	9.833	3.38	15.917	2.81	22.00	1.13

3.833	1.22	9.917	3.38	16.000	2.81	22.08	1.13
3.917	1.22	10.000	3.38	16.083	2.81	22.17	1.13
4.000	1.22	10.083	3.38	16.167	2.81	22.25	1.13
4.083	1.22	10.167	3.38	16.250	2.81	22.33	1.13
4.167	1.22	10.250	3.38	16.333	1.69	22.42	1.13
4.250	1.22	10.333	4.32	16.417	1.69	22.50	1.13
4.333	1.50	10.417	4.32	16.500	1.69	22.58	1.13
4.417	1.50	10.500	4.32	16.583	1.69	22.67	1.13
4.500	1.50	10.583	4.32	16.667	1.69	22.75	1.13
4.583	1.50	10.667	4.32	16.750	1.69	22.83	1.13
4.667	1.50	10.750	4.32	16.833	1.69	22.92	1.13
4.750	1.50	10.833	5.82	16.917	1.69	23.00	1.13
4.833	1.50	10.917	5.82	17.000	1.69	23.08	1.13
4.917	1.50	11.000	5.82	17.083	1.69	23.17	1.13
5.000	1.50	11.083	5.82	17.167	1.69	23.25	1.13
5.083	1.50	11.167	5.82	17.250	1.69	23.33	1.13
5.167	1.50	11.250	5.82	17.333	1.69	23.42	1.13
5.250	1.50	11.333	9.01	17.417	1.69	23.50	1.13
5.333	1.50	11.417	9.01	17.500	1.69	23.58	1.13
5.417	1.50	11.500	9.01	17.583	1.69	23.67	1.13
5.500	1.50	11.583	9.01	17.667	1.69	23.75	1.13
5.583	1.50	11.667	9.01	17.750	1.69	23.83	1.13
5.667	1.50	11.750	9.01	17.833	1.69	23.92	1.13
5.750	1.50	11.833	27.77	17.917	1.69	24.00	1.13
5.833	1.50	11.917	27.77	18.000	1.69	24.08	1.13
5.917	1.50	12.000	27.77	18.083	1.69	24.17	1.13
6.000	1.50	12.083	114.83	18.167	1.69	24.25	1.13
6.083	1.50	12.167	114.84	18.250	1.69		

Unit Hyd Qpeak (cms)= 0.397

PEAK FLOW (cms)= 0.313 (i)
TIME TO PEAK (hrs)= 13.083
RUNOFF VOLUME (mm)= 38.874
TOTAL RAINFALL (mm)= 93.820
RUNOFF COEFFICIENT = 0.414

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0030)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0029):	28.11	0.954	13.67	53.16
	+ ID2= 2 (0031):	9.35	0.313	13.08	38.87
	ID = 3 (0030):	37.46	1.231	13.50	49.59

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
       V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL
```

```
        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
```

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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-9dcc-f9ab721dcfe2\c0b765df-4797-4c0f-b527-a74f320ca97b\scenar
Summary filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-9dcc-f9ab721dcfe2\c0b765df-4797-4c0f-b527-a74f320ca97b\scenar

DATE: 04-14-2026 TIME: 05:29:40

USER:

COMMENTS: _____

** SIMULATION : Run 5 - 50yr 24hr 15min SCS **

READ STORM	Filename: C:\Users\rsoto\AppData\Local\Temp\411e61e3-953c-46be-9e27-afe262f9e8c8\28065a4e
Ptotal=103.60 mm	Comments: 50yr 24hr 15min SCS

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	1.86	12.50	14.92	18.75	1.86
0.25	1.14	6.50	1.86	12.75	7.67	19.00	1.86
0.50	1.14	6.75	1.86	13.00	7.67	19.25	1.86
0.75	1.14	7.00	1.86	13.25	5.59	19.50	1.86
1.00	1.14	7.25	2.28	13.50	5.59	19.75	1.86
1.25	1.14	7.50	2.28	13.75	4.35	20.00	1.86
1.50	1.14	7.75	2.28	14.00	4.35	20.25	1.24
1.75	1.14	8.00	2.28	14.25	3.11	20.50	1.24
2.00	1.14	8.25	2.69	14.50	3.11	20.75	1.24
2.25	1.35	8.50	2.69	14.75	3.11	21.00	1.24
2.50	1.35	8.75	2.90	15.00	3.11	21.25	1.24
2.75	1.35	9.00	2.90	15.25	3.11	21.50	1.24
3.00	1.35	9.25	3.32	15.50	3.11	21.75	1.24
3.25	1.35	9.50	3.32	15.75	3.11	22.00	1.24
3.50	1.35	9.75	3.73	16.00	3.11	22.25	1.24
3.75	1.35	10.00	3.73	16.25	1.86	22.50	1.24
4.00	1.35	10.25	4.77	16.50	1.86	22.75	1.24
4.25	1.66	10.50	4.77	16.75	1.86	23.00	1.24

4.50	1.66	10.75	6.42	17.00	1.86	23.25	1.24
4.75	1.66	11.00	6.42	17.25	1.86	23.50	1.24
5.00	1.66	11.25	9.95	17.50	1.86	23.75	1.24
5.25	1.66	11.50	9.95	17.75	1.86	24.00	1.24
5.50	1.66	11.75	30.67	18.00	1.86		
5.75	1.66	12.00	126.81	18.25	1.86		
6.00	1.66	12.25	14.92	18.50	1.86		

CALIB			
NASHYD (0029)	Area (ha)= 28.11	Curve Number (CN)= 81.0	
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 1.39		

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.66	12.250	126.81	18.33	1.86
0.167	0.00	6.250	1.66	12.333	14.93	18.42	1.86
0.250	0.00	6.333	1.86	12.417	14.92	18.50	1.86
0.333	1.14	6.417	1.86	12.500	14.92	18.58	1.86
0.417	1.14	6.500	1.86	12.583	14.92	18.67	1.86
0.500	1.14	6.583	1.86	12.667	14.92	18.75	1.86
0.583	1.14	6.667	1.86	12.750	14.92	18.83	1.86
0.667	1.14	6.750	1.86	12.833	7.67	18.92	1.86
0.750	1.14	6.833	1.86	12.917	7.67	19.00	1.86
0.833	1.14	6.917	1.86	13.000	7.67	19.08	1.86
0.917	1.14	7.000	1.86	13.083	7.67	19.17	1.86
1.000	1.14	7.083	1.86	13.167	7.67	19.25	1.86
1.083	1.14	7.167	1.86	13.250	7.67	19.33	1.86
1.167	1.14	7.250	1.86	13.333	5.59	19.42	1.86
1.250	1.14	7.333	2.28	13.417	5.59	19.50	1.86
1.333	1.14	7.417	2.28	13.500	5.59	19.58	1.86
1.417	1.14	7.500	2.28	13.583	5.59	19.67	1.86
1.500	1.14	7.583	2.28	13.667	5.59	19.75	1.86
1.583	1.14	7.667	2.28	13.750	5.59	19.83	1.86
1.667	1.14	7.750	2.28	13.833	4.35	19.92	1.86
1.750	1.14	7.833	2.28	13.917	4.35	20.00	1.86
1.833	1.14	7.917	2.28	14.000	4.35	20.08	1.86
1.917	1.14	8.000	2.28	14.083	4.35	20.17	1.86
2.000	1.14	8.083	2.28	14.167	4.35	20.25	1.86
2.083	1.14	8.167	2.28	14.250	4.35	20.33	1.24
2.167	1.14	8.250	2.28	14.333	3.11	20.42	1.24
2.250	1.14	8.333	2.69	14.417	3.11	20.50	1.24
2.333	1.35	8.417	2.69	14.500	3.11	20.58	1.24
2.417	1.35	8.500	2.69	14.583	3.11	20.67	1.24
2.500	1.35	8.583	2.69	14.667	3.11	20.75	1.24
2.583	1.35	8.667	2.69	14.750	3.11	20.83	1.24
2.667	1.35	8.750	2.69	14.833	3.11	20.92	1.24
2.750	1.35	8.833	2.90	14.917	3.11	21.00	1.24
2.833	1.35	8.917	2.90	15.000	3.11	21.08	1.24
2.917	1.35	9.000	2.90	15.083	3.11	21.17	1.24
3.000	1.35	9.083	2.90	15.167	3.11	21.25	1.24
3.083	1.35	9.167	2.90	15.250	3.11	21.33	1.24
3.167	1.35	9.250	2.90	15.333	3.11	21.42	1.24
3.250	1.35	9.333	3.32	15.417	3.11	21.50	1.24
3.333	1.35	9.417	3.32	15.500	3.11	21.58	1.24
3.417	1.35	9.500	3.32	15.583	3.11	21.67	1.24
3.500	1.35	9.583	3.32	15.667	3.11	21.75	1.24
3.583	1.35	9.667	3.32	15.750	3.11	21.83	1.24
3.667	1.35	9.750	3.32	15.833	3.11	21.92	1.24
3.750	1.35	9.833	3.73	15.917	3.11	22.00	1.24
3.833	1.35	9.917	3.73	16.000	3.11	22.08	1.24
3.917	1.35	10.000	3.73	16.083	3.11	22.17	1.24
4.000	1.35	10.083	3.73	16.167	3.11	22.25	1.24
4.083	1.35	10.167	3.73	16.250	3.11	22.33	1.24
4.167	1.35	10.250	3.73	16.333	1.87	22.42	1.24
4.250	1.35	10.333	4.77	16.417	1.86	22.50	1.24
4.333	1.66	10.417	4.77	16.500	1.86	22.58	1.24
4.417	1.66	10.500	4.77	16.583	1.86	22.67	1.24
4.500	1.66	10.583	4.77	16.667	1.86	22.75	1.24
4.583	1.66	10.667	4.77	16.750	1.86	22.83	1.24
4.667	1.66	10.750	4.77	16.833	1.86	22.92	1.24
4.750	1.66	10.833	6.42	16.917	1.86	23.00	1.24
4.833	1.66	10.917	6.42	17.000	1.86	23.08	1.24
4.917	1.66	11.000	6.42	17.083	1.86	23.17	1.24
5.000	1.66	11.083	6.42	17.167	1.86	23.25	1.24
5.083	1.66	11.167	6.42	17.250	1.86	23.33	1.24
5.167	1.66	11.250	6.42	17.333	1.86	23.42	1.24
5.250	1.66	11.333	9.95	17.417	1.86	23.50	1.24
5.333	1.66	11.417	9.95	17.500	1.86	23.58	1.24
5.417	1.66	11.500	9.95	17.583	1.86	23.67	1.24
5.500	1.66	11.583	9.95	17.667	1.86	23.75	1.24
5.583	1.66	11.667	9.95	17.750	1.86	23.83	1.24
5.667	1.66	11.750	9.95	17.833	1.86	23.92	1.24
5.750	1.66	11.833	30.66	17.917	1.86	24.00	1.24
5.833	1.66	11.917	30.67	18.000	1.86	24.08	1.24
5.917	1.66	12.000	30.67	18.083	1.86	24.17	1.24
6.000	1.66	12.083	126.79	18.167	1.86	24.25	1.24
6.083	1.66	12.167	126.81	18.250	1.86		

Unit Hyd Qpeak (cms)= 0.772

PEAK FLOW (cms)= 1.105 (i)
TIME TO PEAK (hrs)= 13.667
RUNOFF VOLUME (mm)= 61.461
TOTAL RAINFALL (mm)= 103.600
RUNOFF COEFFICIENT = 0.593

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
NASHYD (0031)	Area (ha)= 9.35	Curve Number (CN)= 69.0	
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.90		

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.66	12.250	126.81	18.33	1.86
0.167	0.00	6.250	1.66	12.333	14.93	18.42	1.86
0.250	0.00	6.333	1.86	12.417	14.92	18.50	1.86

0.333	1.14	6.417	1.86	12.500	14.92	18.58	1.86
0.417	1.14	6.500	1.86	12.583	14.92	18.67	1.86
0.500	1.14	6.583	1.86	12.667	14.92	18.75	1.86
0.583	1.14	6.667	1.86	12.750	14.92	18.83	1.86
0.667	1.14	6.750	1.86	12.833	7.67	18.92	1.86
0.750	1.14	6.833	1.86	12.917	7.67	19.00	1.86
0.833	1.14	6.917	1.86	13.000	7.67	19.08	1.86
0.917	1.14	7.000	1.86	13.083	7.67	19.17	1.86
1.000	1.14	7.083	1.86	13.167	7.67	19.25	1.86
1.083	1.14	7.167	1.86	13.250	7.67	19.33	1.86
1.167	1.14	7.250	1.86	13.333	5.59	19.42	1.86
1.250	1.14	7.333	2.28	13.417	5.59	19.50	1.86
1.333	1.14	7.417	2.28	13.500	5.59	19.58	1.86
1.417	1.14	7.500	2.28	13.583	5.59	19.67	1.86
1.500	1.14	7.583	2.28	13.667	5.59	19.75	1.86
1.583	1.14	7.667	2.28	13.750	5.59	19.83	1.86
1.667	1.14	7.750	2.28	13.833	4.35	19.92	1.86
1.750	1.14	7.833	2.28	13.917	4.35	20.00	1.86
1.833	1.14	7.917	2.28	14.000	4.35	20.08	1.86
1.917	1.14	8.000	2.28	14.083	4.35	20.17	1.86
2.000	1.14	8.083	2.28	14.167	4.35	20.25	1.86
2.083	1.14	8.167	2.28	14.250	4.35	20.33	1.24
2.167	1.14	8.250	2.28	14.333	3.11	20.42	1.24
2.250	1.14	8.333	2.69	14.417	3.11	20.50	1.24
2.333	1.35	8.417	2.69	14.500	3.11	20.58	1.24
2.417	1.35	8.500	2.69	14.583	3.11	20.67	1.24
2.500	1.35	8.583	2.69	14.667	3.11	20.75	1.24
2.583	1.35	8.667	2.69	14.750	3.11	20.83	1.24
2.667	1.35	8.750	2.69	14.833	3.11	20.92	1.24
2.750	1.35	8.833	2.90	14.917	3.11	21.00	1.24
2.833	1.35	8.917	2.90	15.000	3.11	21.08	1.24
2.917	1.35	9.000	2.90	15.083	3.11	21.17	1.24
3.000	1.35	9.083	2.90	15.167	3.11	21.25	1.24
3.083	1.35	9.167	2.90	15.250	3.11	21.33	1.24
3.167	1.35	9.250	2.90	15.333	3.11	21.42	1.24
3.250	1.35	9.333	3.32	15.417	3.11	21.50	1.24
3.333	1.35	9.417	3.32	15.500	3.11	21.58	1.24
3.417	1.35	9.500	3.32	15.583	3.11	21.67	1.24
3.500	1.35	9.583	3.32	15.667	3.11	21.75	1.24
3.583	1.35	9.667	3.32	15.750	3.11	21.83	1.24
3.667	1.35	9.750	3.32	15.833	3.11	21.92	1.24
3.750	1.35	9.833	3.73	15.917	3.11	22.00	1.24
3.833	1.35	9.917	3.73	16.000	3.11	22.08	1.24
3.917	1.35	10.000	3.73	16.083	3.11	22.17	1.24
4.000	1.35	10.083	3.73	16.167	3.11	22.25	1.24
4.083	1.35	10.167	3.73	16.250	3.11	22.33	1.24
4.167	1.35	10.250	3.73	16.333	1.87	22.42	1.24
4.250	1.35	10.333	4.77	16.417	1.86	22.50	1.24
4.333	1.66	10.417	4.77	16.500	1.86	22.58	1.24
4.417	1.66	10.500	4.77	16.583	1.86	22.67	1.24
4.500	1.66	10.583	4.77	16.667	1.86	22.75	1.24
4.583	1.66	10.667	4.77	16.750	1.86	22.83	1.24
4.667	1.66	10.750	4.77	16.833	1.86	22.92	1.24
4.750	1.66	10.833	6.42	16.917	1.86	23.00	1.24
4.833	1.66	10.917	6.42	17.000	1.86	23.08	1.24
4.917	1.66	11.000	6.42	17.083	1.86	23.17	1.24
5.000	1.66	11.083	6.42	17.167	1.86	23.25	1.24
5.083	1.66	11.167	6.42	17.250	1.86	23.33	1.24
5.167	1.66	11.250	6.42	17.333	1.86	23.42	1.24
5.250	1.66	11.333	9.95	17.417	1.86	23.50	1.24
5.333	1.66	11.417	9.95	17.500	1.86	23.58	1.24
5.417	1.66	11.500	9.95	17.583	1.86	23.67	1.24
5.500	1.66	11.583	9.95	17.667	1.86	23.75	1.24
5.583	1.66	11.667	9.95	17.750	1.86	23.83	1.24
5.667	1.66	11.750	9.95	17.833	1.86	23.92	1.24
5.750	1.66	11.833	30.66	17.917	1.86	24.00	1.24
5.833	1.66	11.917	30.67	18.000	1.86	24.08	1.24
5.917	1.66	12.000	30.67	18.083	1.86	24.17	1.24
6.000	1.66	12.083	126.79	18.167	1.86	24.25	1.24
6.083	1.66	12.167	126.81	18.250	1.86		

```
     Unit Hyd Qpeak  (cms)=   0.397

     PEAK FLOW       (cms)=   0.370 (i)
     TIME TO PEAK    (hrs)=  13.083
     RUNOFF VOLUME    (mm)=  45.704
     TOTAL RAINFALL   (mm)= 103.600
     RUNOFF COEFFICIENT   =   0.441

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

---------------------------------------------------------------------------

--------------------
| ADD HYD  (  0030)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0029):    28.11    1.105    13.67    61.46
      + ID2= 2 (  0031):     9.35    0.370    13.08    45.70
        ================================================
        ID = 3 (  0030):    37.46    1.433    13.50    57.53

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
---------------------------------------------------------------------------
===========================================================================
=========================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\4f47375d-7ce9-4a14-be03-05153baf72d0\scenar
  Summary filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\4f47375d-7ce9-4a14-be03-05153baf72d0\scenar
```

DATE: 04-14-2026 TIME: 05:29:39

USER:

COMMENTS: _____

****
** SIMULATION : Run 6 - 100yr 24hr 15min SCS **
****

READ STORM	Filename: C:\Users\rsoto\AppData\Local\Temp\411e61e3-953c-46be-9e27-afe262f9e8c8\18827168
Ptotal=114.47 mm	Comments: 100yr 24hr 15min SCS

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	2.06	12.50	16.48	18.75	2.06
0.25	1.26	6.50	2.06	12.75	8.47	19.00	2.06
0.50	1.26	6.75	2.06	13.00	8.47	19.25	2.06
0.75	1.26	7.00	2.06	13.25	6.18	19.50	2.06
1.00	1.26	7.25	2.52	13.50	6.18	19.75	2.06
1.25	1.26	7.50	2.52	13.75	4.81	20.00	2.06
1.50	1.26	7.75	2.52	14.00	4.81	20.25	1.37
1.75	1.26	8.00	2.52	14.25	3.43	20.50	1.37
2.00	1.26	8.25	2.98	14.50	3.43	20.75	1.37
2.25	1.49	8.50	2.98	14.75	3.43	21.00	1.37
2.50	1.49	8.75	3.21	15.00	3.43	21.25	1.37
2.75	1.49	9.00	3.21	15.25	3.43	21.50	1.37
3.00	1.49	9.25	3.66	15.50	3.43	21.75	1.37
3.25	1.49	9.50	3.66	15.75	3.43	22.00	1.37
3.50	1.49	9.75	4.12	16.00	3.43	22.25	1.37
3.75	1.49	10.00	4.12	16.25	2.06	22.50	1.37
4.00	1.49	10.25	5.27	16.50	2.06	22.75	1.37
4.25	1.83	10.50	5.27	16.75	2.06	23.00	1.37
4.50	1.83	10.75	7.10	17.00	2.06	23.25	1.37
4.75	1.83	11.00	7.10	17.25	2.06	23.50	1.37
5.00	1.83	11.25	10.99	17.50	2.06	23.75	1.37
5.25	1.83	11.50	10.99	17.75	2.06	24.00	1.37
5.50	1.83	11.75	33.88	18.00	2.06		
5.75	1.83	12.00	140.11	18.25	2.06		
6.00	1.83	12.25	16.48	18.50	2.06		

CALIB			
NASHYD (0029)	Area (ha)= 28.11	Curve Number (CN)= 81.0	
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 1.39		

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.83	12.250	140.11	18.33	2.06
0.167	0.00	6.250	1.83	12.333	16.50	18.42	2.06
0.250	0.00	6.333	2.06	12.417	16.48	18.50	2.06
0.333	1.26	6.417	2.06	12.500	16.48	18.58	2.06
0.417	1.26	6.500	2.06	12.583	16.48	18.67	2.06
0.500	1.26	6.583	2.06	12.667	16.48	18.75	2.06
0.583	1.26	6.667	2.06	12.750	16.48	18.83	2.06
0.667	1.26	6.750	2.06	12.833	8.47	18.92	2.06
0.750	1.26	6.833	2.06	12.917	8.47	19.00	2.06
0.833	1.26	6.917	2.06	13.000	8.47	19.08	2.06
0.917	1.26	7.000	2.06	13.083	8.47	19.17	2.06
1.000	1.26	7.083	2.06	13.167	8.47	19.25	2.06
1.083	1.26	7.167	2.06	13.250	8.47	19.33	2.06
1.167	1.26	7.250	2.06	13.333	6.18	19.42	2.06
1.250	1.26	7.333	2.52	13.417	6.18	19.50	2.06
1.333	1.26	7.417	2.52	13.500	6.18	19.58	2.06
1.417	1.26	7.500	2.52	13.583	6.18	19.67	2.06
1.500	1.26	7.583	2.52	13.667	6.18	19.75	2.06
1.583	1.26	7.667	2.52	13.750	6.18	19.83	2.06
1.667	1.26	7.750	2.52	13.833	4.81	19.92	2.06
1.750	1.26	7.833	2.52	13.917	4.81	20.00	2.06
1.833	1.26	7.917	2.52	14.000	4.81	20.08	2.06
1.917	1.26	8.000	2.52	14.083	4.81	20.17	2.06
2.000	1.26	8.083	2.52	14.167	4.81	20.25	2.06
2.083	1.26	8.167	2.52	14.250	4.81	20.33	1.37
2.167	1.26	8.250	2.52	14.333	3.43	20.42	1.37
2.250	1.26	8.333	2.98	14.417	3.43	20.50	1.37
2.333	1.49	8.417	2.98	14.500	3.43	20.58	1.37
2.417	1.49	8.500	2.98	14.583	3.43	20.67	1.37
2.500	1.49	8.583	2.98	14.667	3.43	20.75	1.37
2.583	1.49	8.667	2.98	14.750	3.43	20.83	1.37
2.667	1.49	8.750	2.98	14.833	3.43	20.92	1.37
2.750	1.49	8.833	3.21	14.917	3.43	21.00	1.37
2.833	1.49	8.917	3.21	15.000	3.43	21.08	1.37
2.917	1.49	9.000	3.21	15.083	3.43	21.17	1.37
3.000	1.49	9.083	3.21	15.167	3.43	21.25	1.37
3.083	1.49	9.167	3.21	15.250	3.43	21.33	1.37
3.167	1.49	9.250	3.21	15.333	3.43	21.42	1.37
3.250	1.49	9.333	3.66	15.417	3.43	21.50	1.37
3.333	1.49	9.417	3.66	15.500	3.43	21.58	1.37
3.417	1.49	9.500	3.66	15.583	3.43	21.67	1.37
3.500	1.49	9.583	3.66	15.667	3.43	21.75	1.37
3.583	1.49	9.667	3.66	15.750	3.43	21.83	1.37
3.667	1.49	9.750	3.66	15.833	3.43	21.92	1.37
3.750	1.49	9.833	4.12	15.917	3.43	22.00	1.37
3.833	1.49	9.917	4.12	16.000	3.43	22.08	1.37
3.917	1.49	10.000	4.12	16.083	3.43	22.17	1.37
4.000	1.49	10.083	4.12	16.167	3.43	22.25	1.37
4.083	1.49	10.167	4.12	16.250	3.43	22.33	1.37
4.167	1.49	10.250	4.12	16.333	2.06	22.42	1.37
4.250	1.49	10.333	5.27	16.417	2.06	22.50	1.37
4.333	1.83	10.417	5.27	16.500	2.06	22.58	1.37
4.417	1.83	10.500	5.27	16.583	2.06	22.67	1.37
4.500	1.83	10.583	5.27	16.667	2.06	22.75	1.37
4.583	1.83	10.667	5.27	16.750	2.06	22.83	1.37
4.667	1.83	10.750	5.27	16.833	2.06	22.92	1.37
4.750	1.83	10.833	7.10	16.917	2.06	23.00	1.37
4.833	1.83	10.917	7.10	17.000	2.06	23.08	1.37

4.917	1.83	11.000	7.10	17.083	2.06	23.17	1.37
5.000	1.83	11.083	7.10	17.167	2.06	23.25	1.37
5.083	1.83	11.167	7.10	17.250	2.06	23.33	1.37
5.167	1.83	11.250	7.10	17.333	2.06	23.42	1.37
5.250	1.83	11.333	10.99	17.417	2.06	23.50	1.37
5.333	1.83	11.417	10.99	17.500	2.06	23.58	1.37
5.417	1.83	11.500	10.99	17.583	2.06	23.67	1.37
5.500	1.83	11.583	10.99	17.667	2.06	23.75	1.37
5.583	1.83	11.667	10.99	17.750	2.06	23.83	1.37
5.667	1.83	11.750	10.99	17.833	2.06	23.92	1.37
5.750	1.83	11.833	33.88	17.917	2.06	24.00	1.37
5.833	1.83	11.917	33.88	18.000	2.06	24.08	1.37
5.917	1.83	12.000	33.88	18.083	2.06	24.17	1.37
6.000	1.83	12.083	140.10	18.167	2.06	24.25	1.37
6.083	1.83	12.167	140.11	18.250	2.06		

Unit Hyd Qpeak (cms)= 0.772

PEAK FLOW (cms)= 1.277 (i)
TIME TO PEAK (hrs)= 13.583
RUNOFF VOLUME (mm)= 70.888
TOTAL RAINFALL (mm)= 114.470
RUNOFF COEFFICIENT = 0.619

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB					
NASHYD (0031)	Area (ha)=	9.35	Curve Number (CN)=	69.0	
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.90			

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.83	12.250	140.11	18.33	2.06
0.167	0.00	6.250	1.83	12.333	16.50	18.42	2.06
0.250	0.00	6.333	2.06	12.417	16.48	18.50	2.06
0.333	1.26	6.417	2.06	12.500	16.48	18.58	2.06
0.417	1.26	6.500	2.06	12.583	16.48	18.67	2.06
0.500	1.26	6.583	2.06	12.667	16.48	18.75	2.06
0.583	1.26	6.667	2.06	12.750	16.48	18.83	2.06
0.667	1.26	6.750	2.06	12.833	8.47	18.92	2.06
0.750	1.26	6.833	2.06	12.917	8.47	19.00	2.06
0.833	1.26	6.917	2.06	13.000	8.47	19.08	2.06
0.917	1.26	7.000	2.06	13.083	8.47	19.17	2.06
1.000	1.26	7.083	2.06	13.167	8.47	19.25	2.06
1.083	1.26	7.167	2.06	13.250	8.47	19.33	2.06
1.167	1.26	7.250	2.06	13.333	6.18	19.42	2.06
1.250	1.26	7.333	2.52	13.417	6.18	19.50	2.06
1.333	1.26	7.417	2.52	13.500	6.18	19.58	2.06
1.417	1.26	7.500	2.52	13.583	6.18	19.67	2.06
1.500	1.26	7.583	2.52	13.667	6.18	19.75	2.06
1.583	1.26	7.667	2.52	13.750	6.18	19.83	2.06
1.667	1.26	7.750	2.52	13.833	4.81	19.92	2.06
1.750	1.26	7.833	2.52	13.917	4.81	20.00	2.06
1.833	1.26	7.917	2.52	14.000	4.81	20.08	2.06
1.917	1.26	8.000	2.52	14.083	4.81	20.17	2.06
2.000	1.26	8.083	2.52	14.167	4.81	20.25	2.06
2.083	1.26	8.167	2.52	14.250	4.81	20.33	1.37
2.167	1.26	8.250	2.52	14.333	3.43	20.42	1.37
2.250	1.26	8.333	2.98	14.417	3.43	20.50	1.37
2.333	1.49	8.417	2.98	14.500	3.43	20.58	1.37
2.417	1.49	8.500	2.98	14.583	3.43	20.67	1.37
2.500	1.49	8.583	2.98	14.667	3.43	20.75	1.37
2.583	1.49	8.667	2.98	14.750	3.43	20.83	1.37
2.667	1.49	8.750	2.98	14.833	3.43	20.92	1.37
2.750	1.49	8.833	3.21	14.917	3.43	21.00	1.37
2.833	1.49	8.917	3.21	15.000	3.43	21.08	1.37
2.917	1.49	9.000	3.21	15.083	3.43	21.17	1.37
3.000	1.49	9.083	3.21	15.167	3.43	21.25	1.37
3.083	1.49	9.167	3.21	15.250	3.43	21.33	1.37
3.167	1.49	9.250	3.21	15.333	3.43	21.42	1.37
3.250	1.49	9.333	3.66	15.417	3.43	21.50	1.37
3.333	1.49	9.417	3.66	15.500	3.43	21.58	1.37
3.417	1.49	9.500	3.66	15.583	3.43	21.67	1.37
3.500	1.49	9.583	3.66	15.667	3.43	21.75	1.37
3.583	1.49	9.667	3.66	15.750	3.43	21.83	1.37
3.667	1.49	9.750	3.66	15.833	3.43	21.92	1.37
3.750	1.49	9.833	4.12	15.917	3.43	22.00	1.37
3.833	1.49	9.917	4.12	16.000	3.43	22.08	1.37
3.917	1.49	10.000	4.12	16.083	3.43	22.17	1.37
4.000	1.49	10.083	4.12	16.167	3.43	22.25	1.37
4.083	1.49	10.167	4.12	16.250	3.43	22.33	1.37
4.167	1.49	10.250	4.12	16.333	2.06	22.42	1.37
4.250	1.49	10.333	5.27	16.417	2.06	22.50	1.37
4.333	1.83	10.417	5.27	16.500	2.06	22.58	1.37
4.417	1.83	10.500	5.27	16.583	2.06	22.67	1.37
4.500	1.83	10.583	5.27	16.667	2.06	22.75	1.37
4.583	1.83	10.667	5.27	16.750	2.06	22.83	1.37
4.667	1.83	10.750	5.27	16.833	2.06	22.92	1.37
4.750	1.83	10.833	7.10	16.917	2.06	23.00	1.37
4.833	1.83	10.917	7.10	17.000	2.06	23.08	1.37
4.917	1.83	11.000	7.10	17.083	2.06	23.17	1.37
5.000	1.83	11.083	7.10	17.167	2.06	23.25	1.37
5.083	1.83	11.167	7.10	17.250	2.06	23.33	1.37
5.167	1.83	11.250	7.10	17.333	2.06	23.42	1.37
5.250	1.83	11.333	10.99	17.417	2.06	23.50	1.37
5.333	1.83	11.417	10.99	17.500	2.06	23.58	1.37
5.417	1.83	11.500	10.99	17.583	2.06	23.67	1.37
5.500	1.83	11.583	10.99	17.667	2.06	23.75	1.37
5.583	1.83	11.667	10.99	17.750	2.06	23.83	1.37
5.667	1.83	11.750	10.99	17.833	2.06	23.92	1.37
5.750	1.83	11.833	33.88	17.917	2.06	24.00	1.37
5.833	1.83	11.917	33.88	18.000	2.06	24.08	1.37
5.917	1.83	12.000	33.88	18.083	2.06	24.17	1.37
6.000	1.83	12.083	140.10	18.167	2.06	24.25	1.37
6.083	1.83	12.167	140.11	18.250	2.06		

Unit Hyd Qpeak (cms)= 0.397

PEAK FLOW (cms)= 0.435 (i)
TIME TO PEAK (hrs)= 13.083
RUNOFF VOLUME (mm)= 53.597
TOTAL RAINFALL (mm)= 114.470
RUNOFF COEFFICIENT = 0.468

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0030)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0029):    28.11   1.277    13.58    70.89
      + ID2= 2 (  0031):     9.35   0.435    13.08    53.60
        ================================================
        ID = 3 (  0030):    37.46   1.664    13.42    66.57

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
```

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================================================================================
==========================

       V    V   I    SSSSS  U   U    A    L             (v 6.2.2020)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\f2a6679e-6fac-4f6e-9808-c02666e47916\scenar
  Summary filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\f2a6679e-6fac-4f6e-9808-c02666e47916\scenar


DATE: 04-14-2026                          TIME: 05:35:15

USER:



COMMENTS: ____________________________________________________________


--------------------------------------------------------------------------------
--------------------------
  ***********************************************
  ** SIMULATION : Run 1 - 2 Year 12 Hour AES (B **
  ***********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\rsoto\AppD
|                  |              ata\Local\Temp\
|                  |              8dfe3181-6515-409d-9f0a-7bb99517af18\b367315e
| Ptotal= 42.00 mm |    Comments: 2 Year 12 Hour AES (Bloor, TRCA)
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	3.25	7.14	6.50	2.94	9.75	0.42
0.25	0.42	3.50	7.14	6.75	2.94	10.00	0.42
0.50	0.42	3.75	7.14	7.00	2.94	10.25	0.42
0.75	0.42	4.00	7.14	7.25	1.68	10.50	0.42
1.00	0.42	4.25	19.32	7.50	1.68	10.75	0.42
1.25	0.42	4.50	19.32	7.75	1.68	11.00	0.42
1.50	0.42	4.75	19.32	8.00	1.68	11.25	0.42
1.75	0.42	5.00	19.32	8.25	0.84	11.50	0.42
2.00	0.42	5.25	5.46	8.50	0.84	11.75	0.42
2.25	2.52	5.50	5.46	8.75	0.84	12.00	0.42
2.50	2.52	5.75	5.46	9.00	0.84		
2.75	2.52	6.00	5.46	9.25	0.42		
3.00	2.52	6.25	2.94	9.50	0.42		

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| CALIB            |
| NASHYD   (  0111)|   Area     (ha)=  28.11   Curve Number    (CN)= 81.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.39

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
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---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.52	6.250	5.46	9.33	0.42
0.167	0.00	3.250	2.52	6.333	2.94	9.42	0.42
0.250	0.00	3.333	7.14	6.417	2.94	9.50	0.42
0.333	0.42	3.417	7.14	6.500	2.94	9.58	0.42
0.417	0.42	3.500	7.14	6.583	2.94	9.67	0.42
0.500	0.42	3.583	7.14	6.667	2.94	9.75	0.42
0.583	0.42	3.667	7.14	6.750	2.94	9.83	0.42
0.667	0.42	3.750	7.14	6.833	2.94	9.92	0.42
0.750	0.42	3.833	7.14	6.917	2.94	10.00	0.42
0.833	0.42	3.917	7.14	7.000	2.94	10.08	0.42
0.917	0.42	4.000	7.14	7.083	2.94	10.17	0.42
1.000	0.42	4.083	7.14	7.167	2.94	10.25	0.42
1.083	0.42	4.167	7.14	7.250	2.94	10.33	0.42
1.167	0.42	4.250	7.14	7.333	1.68	10.42	0.42
1.250	0.42	4.333	19.32	7.417	1.68	10.50	0.42
1.333	0.42	4.417	19.32	7.500	1.68	10.58	0.42
1.417	0.42	4.500	19.32	7.583	1.68	10.67	0.42
1.500	0.42	4.583	19.32	7.667	1.68	10.75	0.42
1.583	0.42	4.667	19.32	7.750	1.68	10.83	0.42
1.667	0.42	4.750	19.32	7.833	1.68	10.92	0.42
1.750	0.42	4.833	19.32	7.917	1.68	11.00	0.42
1.833	0.42	4.917	19.32	8.000	1.68	11.08	0.42
1.917	0.42	5.000	19.32	8.083	1.68	11.17	0.42
2.000	0.42	5.083	19.32	8.167	1.68	11.25	0.42
2.083	0.42	5.167	19.32	8.250	1.68	11.33	0.42
2.167	0.42	5.250	19.32	8.333	0.84	11.42	0.42
2.250	0.42	5.333	5.46	8.417	0.84	11.50	0.42
2.333	2.52	5.417	5.46	8.500	0.84	11.58	0.42
2.417	2.52	5.500	5.46	8.583	0.84	11.67	0.42
2.500	2.52	5.583	5.46	8.667	0.84	11.75	0.42
2.583	2.52	5.667	5.46	8.750	0.84	11.83	0.42
2.667	2.52	5.750	5.46	8.833	0.84	11.92	0.42
2.750	2.52	5.833	5.46	8.917	0.84	12.00	0.42
2.833	2.52	5.917	5.46	9.000	0.84	12.08	0.42
2.917	2.52	6.000	5.46	9.083	0.84	12.17	0.42
3.000	2.52	6.083	5.46	9.167	0.84	12.25	0.42
3.083	2.52	6.167	5.46	9.250	0.84		

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    Unit Hyd Qpeak  (cms)=   0.772

    PEAK FLOW       (cms)=   0.269 (i)
    TIME TO PEAK    (hrs)=   6.750
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     RUNOFF VOLUME     (mm)=  14.175
     TOTAL RAINFALL    (mm)=  42.000
     RUNOFF COEFFICIENT   =   0.337

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| ROUTEPIPE(  0118)|     PIPE Number      =   1.00
| IN= 2---> OUT= 1 |     Diameter     (mm)=1200.00
| DT=  5.0 min     |     Length        (m)= 500.00
--------------------     Slope       (m/m)=  0.002
                         Manning n         =  0.013

     <----------------- TRAVEL TIME TABLE ---------------------->
       DEPTH      VOLUME    FLOW RATE    VELOCITY    TRAV.TIME
        (m)      (cu.m.)      (cms)        (m/s)        min
       0.06     .114E+02       0.0          0.41        20.34
       0.13     .317E+02       0.0          0.64        13.04
       0.19     .573E+02       0.1          0.82        10.13
       0.25     .866E+02       0.2          0.98         8.52
       0.32     .119E+03       0.3          1.11         7.49
       0.38     .153E+03       0.4          1.23         6.77
       0.44     .189E+03       0.5          1.34         6.24
       0.51     .226E+03       0.6          1.43         5.84
       0.57     .264E+03       0.8          1.51         5.53
       0.63     .302E+03       1.0          1.58         5.29
       0.69     .339E+03       1.1          1.63         5.10
       0.76     .376E+03       1.3          1.68         4.95
       0.82     .412E+03       1.4          1.72         4.85
       0.88     .447E+03       1.6          1.74         4.78
       0.95     .479E+03       1.7          1.76         4.74
       1.01     .508E+03       1.8          1.76         4.74
       1.07     .534E+03       1.9          1.74         4.80
       1.14     .554E+03       1.9          1.69         4.92
       1.20     .566E+03       1.7          1.54         5.40
                                   <---- hydrograph ---->   <-pipe / channel->
                              AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                              (ha)    (cms)   (hrs)   (mm)       (m)      (m/s)
   INFLOW : ID= 2 (  0111)   28.11     0.27    6.75  14.17      0.32      1.12
   OUTFLOW: ID= 1 (  0118)   28.11     0.27    6.83  14.17      0.32      1.12


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--------------------
| CALIB             |
| NASHYD   (  0116)|   Area    (ha)=   1.71   Curve Number   (CN)= 69.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.31

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                        ---- TRANSFORMED HYETOGRAPH ----
     TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
      hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
    0.083    0.00 | 3.167    2.52 | 6.250    5.46 |  9.33    0.42
    0.167    0.00 | 3.250    2.52 | 6.333    2.94 |  9.42    0.42
    0.250    0.00 | 3.333    7.14 | 6.417    2.94 |  9.50    0.42
    0.333    0.42 | 3.417    7.14 | 6.500    2.94 |  9.58    0.42
    0.417    0.42 | 3.500    7.14 | 6.583    2.94 |  9.67    0.42
    0.500    0.42 | 3.583    7.14 | 6.667    2.94 |  9.75    0.42
    0.583    0.42 | 3.667    7.14 | 6.750    2.94 |  9.83    0.42
    0.667    0.42 | 3.750    7.14 | 6.833    2.94 |  9.92    0.42
    0.750    0.42 | 3.833    7.14 | 6.917    2.94 | 10.00    0.42
    0.833    0.42 | 3.917    7.14 | 7.000    2.94 | 10.08    0.42
    0.917    0.42 | 4.000    7.14 | 7.083    2.94 | 10.17    0.42
    1.000    0.42 | 4.083    7.14 | 7.167    2.94 | 10.25    0.42
    1.083    0.42 | 4.167    7.14 | 7.250    2.94 | 10.33    0.42
    1.167    0.42 | 4.250    7.14 | 7.333    1.68 | 10.42    0.42
    1.250    0.42 | 4.333   19.32 | 7.417    1.68 | 10.50    0.42
    1.333    0.42 | 4.417   19.32 | 7.500    1.68 | 10.58    0.42
    1.417    0.42 | 4.500   19.32 | 7.583    1.68 | 10.67    0.42
    1.500    0.42 | 4.583   19.32 | 7.667    1.68 | 10.75    0.42
    1.583    0.42 | 4.667   19.32 | 7.750    1.68 | 10.83    0.42
    1.667    0.42 | 4.750   19.32 | 7.833    1.68 | 10.92    0.42
    1.750    0.42 | 4.833   19.32 | 7.917    1.68 | 11.00    0.42
    1.833    0.42 | 4.917   19.32 | 8.000    1.68 | 11.08    0.42
    1.917    0.42 | 5.000   19.32 | 8.083    1.68 | 11.17    0.42
    2.000    0.42 | 5.083   19.32 | 8.167    1.68 | 11.25    0.42
    2.083    0.42 | 5.167   19.32 | 8.250    1.68 | 11.33    0.42
    2.167    0.42 | 5.250   19.32 | 8.333    0.84 | 11.42    0.42
    2.250    0.42 | 5.333    5.46 | 8.417    0.84 | 11.50    0.42
    2.333    2.52 | 5.417    5.46 | 8.500    0.84 | 11.58    0.42
    2.417    2.52 | 5.500    5.46 | 8.583    0.84 | 11.67    0.42
    2.500    2.52 | 5.583    5.46 | 8.667    0.84 | 11.75    0.42
    2.583    2.52 | 5.667    5.46 | 8.750    0.84 | 11.83    0.42
    2.667    2.52 | 5.750    5.46 | 8.833    0.84 | 11.92    0.42
    2.750    2.52 | 5.833    5.46 | 8.917    0.84 | 12.00    0.42
    2.833    2.52 | 5.917    5.46 | 9.000    0.84 | 12.08    0.42
    2.917    2.52 | 6.000    5.46 | 9.083    0.84 | 12.17    0.42
    3.000    2.52 | 6.083    5.46 | 9.167    0.84 | 12.25    0.42
    3.083    2.52 | 6.167    5.46 | 9.250    0.84 |

   Unit Hyd Qpeak  (cms)=   0.211

   PEAK FLOW       (cms)=   0.022 (i)
   TIME TO PEAK    (hrs)=   5.333
   RUNOFF VOLUME    (mm)=   9.056
   TOTAL RAINFALL   (mm)=  42.000
   RUNOFF COEFFICIENT   =   0.216

   (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB             |
| STANDHYD (  0113)|   Area    (ha)=   0.52
|ID= 1 DT= 5.0 min |   Total Imp(%)=  51.00   Dir. Conn.(%)=  51.00
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                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.27         0.25
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      58.88        40.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                             ---- TRANSFORMED HYETOGRAPH ----
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TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.52	6.250	5.46	9.33	0.42
0.167	0.00	3.250	2.52	6.333	2.94	9.42	0.42
0.250	0.00	3.333	7.14	6.417	2.94	9.50	0.42
0.333	0.42	3.417	7.14	6.500	2.94	9.58	0.42
0.417	0.42	3.500	7.14	6.583	2.94	9.67	0.42
0.500	0.42	3.583	7.14	6.667	2.94	9.75	0.42
0.583	0.42	3.667	7.14	6.750	2.94	9.83	0.42
0.667	0.42	3.750	7.14	6.833	2.94	9.92	0.42
0.750	0.42	3.833	7.14	6.917	2.94	10.00	0.42
0.833	0.42	3.917	7.14	7.000	2.94	10.08	0.42
0.917	0.42	4.000	7.14	7.083	2.94	10.17	0.42
1.000	0.42	4.083	7.14	7.167	2.94	10.25	0.42
1.083	0.42	4.167	7.14	7.250	2.94	10.33	0.42
1.167	0.42	4.250	7.14	7.333	1.68	10.42	0.42
1.250	0.42	4.333	19.32	7.417	1.68	10.50	0.42
1.333	0.42	4.417	19.32	7.500	1.68	10.58	0.42
1.417	0.42	4.500	19.32	7.583	1.68	10.67	0.42
1.500	0.42	4.583	19.32	7.667	1.68	10.75	0.42
1.583	0.42	4.667	19.32	7.750	1.68	10.83	0.42
1.667	0.42	4.750	19.32	7.833	1.68	10.92	0.42
1.750	0.42	4.833	19.32	7.917	1.68	11.00	0.42
1.833	0.42	4.917	19.32	8.000	1.68	11.08	0.42
1.917	0.42	5.000	19.32	8.083	1.68	11.17	0.42
2.000	0.42	5.083	19.32	8.167	1.68	11.25	0.42
2.083	0.42	5.167	19.32	8.250	1.68	11.33	0.42
2.167	0.42	5.250	19.32	8.333	0.84	11.42	0.42
2.250	0.42	5.333	5.46	8.417	0.84	11.50	0.42
2.333	2.52	5.417	5.46	8.500	0.84	11.58	0.42
2.417	2.52	5.500	5.46	8.583	0.84	11.67	0.42
2.500	2.52	5.583	5.46	8.667	0.84	11.75	0.42
2.583	2.52	5.667	5.46	8.750	0.84	11.83	0.42
2.667	2.52	5.750	5.46	8.833	0.84	11.92	0.42
2.750	2.52	5.833	5.46	8.917	0.84	12.00	0.42
2.833	2.52	5.917	5.46	9.000	0.84	12.08	0.42
2.917	2.52	6.000	5.46	9.083	0.84	12.17	0.42
3.000	2.52	6.083	5.46	9.167	0.84	12.25	0.42
3.083	2.52	6.167	5.46	9.250	0.84		

			TOTALS
Max.Eff.Inten.(mm/hr)=	19.32	11.36	
over (min)	5.00	25.00	
Storage Coeff. (min)=	3.59 (ii)	20.43 (ii)	
Unit Hyd. Tpeak (min)=	5.00	25.00	
Unit Hyd. peak (cms)=	0.26	0.05	
PEAK FLOW (cms)=	0.01	0.01	0.021 (iii)
TIME TO PEAK (hrs)=	5.08	5.33	5.25
RUNOFF VOLUME (mm)=	41.00	19.22	30.31
TOTAL RAINFALL (mm)=	42.00	42.00	42.00
RUNOFF COEFFICIENT =	0.98	0.46	0.72

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0114)	Area (ha)= 0.34
ID= 1 DT= 5.0 min	Total Imp(%)= 75.00 Dir. Conn.(%)= 75.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.26	0.09
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	47.61	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.52	6.250	5.46	9.33	0.42
0.167	0.00	3.250	2.52	6.333	2.94	9.42	0.42
0.250	0.00	3.333	7.14	6.417	2.94	9.50	0.42
0.333	0.42	3.417	7.14	6.500	2.94	9.58	0.42
0.417	0.42	3.500	7.14	6.583	2.94	9.67	0.42
0.500	0.42	3.583	7.14	6.667	2.94	9.75	0.42
0.583	0.42	3.667	7.14	6.750	2.94	9.83	0.42
0.667	0.42	3.750	7.14	6.833	2.94	9.92	0.42
0.750	0.42	3.833	7.14	6.917	2.94	10.00	0.42
0.833	0.42	3.917	7.14	7.000	2.94	10.08	0.42
0.917	0.42	4.000	7.14	7.083	2.94	10.17	0.42
1.000	0.42	4.083	7.14	7.167	2.94	10.25	0.42
1.083	0.42	4.167	7.14	7.250	2.94	10.33	0.42
1.167	0.42	4.250	7.14	7.333	1.68	10.42	0.42
1.250	0.42	4.333	19.32	7.417	1.68	10.50	0.42
1.333	0.42	4.417	19.32	7.500	1.68	10.58	0.42
1.417	0.42	4.500	19.32	7.583	1.68	10.67	0.42
1.500	0.42	4.583	19.32	7.667	1.68	10.75	0.42
1.583	0.42	4.667	19.32	7.750	1.68	10.83	0.42
1.667	0.42	4.750	19.32	7.833	1.68	10.92	0.42
1.750	0.42	4.833	19.32	7.917	1.68	11.00	0.42
1.833	0.42	4.917	19.32	8.000	1.68	11.08	0.42
1.917	0.42	5.000	19.32	8.083	1.68	11.17	0.42
2.000	0.42	5.083	19.32	8.167	1.68	11.25	0.42
2.083	0.42	5.167	19.32	8.250	1.68	11.33	0.42
2.167	0.42	5.250	19.32	8.333	0.84	11.42	0.42
2.250	0.42	5.333	5.46	8.417	0.84	11.50	0.42
2.333	2.52	5.417	5.46	8.500	0.84	11.58	0.42
2.417	2.52	5.500	5.46	8.583	0.84	11.67	0.42
2.500	2.52	5.583	5.46	8.667	0.84	11.75	0.42
2.583	2.52	5.667	5.46	8.750	0.84	11.83	0.42
2.667	2.52	5.750	5.46	8.833	0.84	11.92	0.42
2.750	2.52	5.833	5.46	8.917	0.84	12.00	0.42
2.833	2.52	5.917	5.46	9.000	0.84	12.08	0.42
2.917	2.52	6.000	5.46	9.083	0.84	12.17	0.42
3.000	2.52	6.083	5.46	9.167	0.84	12.25	0.42
3.083	2.52	6.167	5.46	9.250	0.84		

Max.Eff.Inten.(mm/hr)=	19.32	11.36
over (min)	5.00	25.00
Storage Coeff. (min)=	3.16 (ii)	20.00 (ii)
Unit Hyd. Tpeak (min)=	5.00	25.00
Unit Hyd. peak (cms)=	0.27	0.05

				TOTALS
PEAK FLOW	(cms)=	0.01	0.00	0.016 (iii)
TIME TO PEAK	(hrs)=	5.08	5.33	5.25
RUNOFF VOLUME	(mm)=	41.00	19.22	35.52
TOTAL RAINFALL	(mm)=	42.00	42.00	42.00
RUNOFF COEFFICIENT	=	0.98	0.46	0.85

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0117)	Area (ha)=	6.54	
ID= 1 DT= 5.0 min	Total Imp(%)=	71.00	Dir. Conn.(%)= 56.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	4.64	1.90
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	208.81	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.52	6.250	5.46	9.33	0.42
0.167	0.00	3.250	2.52	6.333	2.94	9.42	0.42
0.250	0.00	3.333	7.14	6.417	2.94	9.50	0.42
0.333	0.42	3.417	7.14	6.500	2.94	9.58	0.42
0.417	0.42	3.500	7.14	6.583	2.94	9.67	0.42
0.500	0.42	3.583	7.14	6.667	2.94	9.75	0.42
0.583	0.42	3.667	7.14	6.750	2.94	9.83	0.42
0.667	0.42	3.750	7.14	6.833	2.94	9.92	0.42
0.750	0.42	3.833	7.14	6.917	2.94	10.00	0.42
0.833	0.42	3.917	7.14	7.000	2.94	10.08	0.42
0.917	0.42	4.000	7.14	7.083	2.94	10.17	0.42
1.000	0.42	4.083	7.14	7.167	2.94	10.25	0.42
1.083	0.42	4.167	7.14	7.250	2.94	10.33	0.42
1.167	0.42	4.250	7.14	7.333	1.68	10.42	0.42
1.250	0.42	4.333	19.32	7.417	1.68	10.50	0.42
1.333	0.42	4.417	19.32	7.500	1.68	10.58	0.42
1.417	0.42	4.500	19.32	7.583	1.68	10.67	0.42
1.500	0.42	4.583	19.32	7.667	1.68	10.75	0.42
1.583	0.42	4.667	19.32	7.750	1.68	10.83	0.42
1.667	0.42	4.750	19.32	7.833	1.68	10.92	0.42
1.750	0.42	4.833	19.32	7.917	1.68	11.00	0.42
1.833	0.42	4.917	19.32	8.000	1.68	11.08	0.42
1.917	0.42	5.000	19.32	8.083	1.68	11.17	0.42
2.000	0.42	5.083	19.32	8.167	1.68	11.25	0.42
2.083	0.42	5.167	19.32	8.250	1.68	11.33	0.42
2.167	0.42	5.250	19.32	8.333	0.84	11.42	0.42
2.250	0.42	5.333	5.46	8.417	0.84	11.50	0.42
2.333	2.52	5.417	5.46	8.500	0.84	11.58	0.42
2.417	2.52	5.500	5.46	8.583	0.84	11.67	0.42
2.500	2.52	5.583	5.46	8.667	0.84	11.75	0.42
2.583	2.52	5.667	5.46	8.750	0.84	11.83	0.42
2.667	2.52	5.750	5.46	8.833	0.84	11.92	0.42
2.750	2.52	5.833	5.46	8.917	0.84	12.00	0.42
2.833	2.52	5.917	5.46	9.000	0.84	12.08	0.42
2.917	2.52	6.000	5.46	9.083	0.84	12.17	0.42
3.000	2.52	6.083	5.46	9.167	0.84	12.25	0.42
3.083	2.52	6.167	5.46	9.250	0.84		

				TOTALS
Max.Eff.Inten.	(mm/hr)=	19.32	21.13	
over	(min)	10.00	25.00	
Storage Coeff.	(min)=	7.67 (ii)	20.81 (ii)	
Unit Hyd. Tpeak	(min)=	10.00	25.00	
Unit Hyd. peak	(cms)=	0.13	0.05	
PEAK FLOW	(cms)=	0.20	0.09	0.287 (iii)
TIME TO PEAK	(hrs)=	5.25	5.33	5.25
RUNOFF VOLUME	(mm)=	41.00	23.84	33.45
TOTAL RAINFALL	(mm)=	42.00	42.00	42.00
RUNOFF COEFFICIENT	=	0.98	0.57	0.80

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(0115)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.1507	0.2774
	0.0103	0.1190	0.1711	0.3280
	0.0819	0.2055	0.1837	0.3663
	0.1039	0.2468	0.3000	0.3955

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0117)	6.540	0.287	5.25	33.45
OUTFLOW: ID= 1 (0115)	6.540	0.046	7.33	33.00

PEAK FLOW REDUCTION [Qout/Qin](%)= 15.95
TIME SHIFT OF PEAK FLOW (min)=125.00
MAXIMUM STORAGE USED (ha.m.)= 0.1619

CALIB			
STANDHYD (0119)	Area (ha)=	0.24	
ID= 1 DT= 5.0 min	Total Imp(%)=	38.00	Dir. Conn.(%)= 21.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.09	0.15
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	40.00	40.00

Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.52	6.250	5.46	9.33	0.42
0.167	0.00	3.250	2.52	6.333	2.94	9.42	0.42
0.250	0.00	3.333	7.14	6.417	2.94	9.50	0.42
0.333	0.42	3.417	7.14	6.500	2.94	9.58	0.42
0.417	0.42	3.500	7.14	6.583	2.94	9.67	0.42
0.500	0.42	3.583	7.14	6.667	2.94	9.75	0.42
0.583	0.42	3.667	7.14	6.750	2.94	9.83	0.42
0.667	0.42	3.750	7.14	6.833	2.94	9.92	0.42
0.750	0.42	3.833	7.14	6.917	2.94	10.00	0.42
0.833	0.42	3.917	7.14	7.000	2.94	10.08	0.42
0.917	0.42	4.000	7.14	7.083	2.94	10.17	0.42
1.000	0.42	4.083	7.14	7.167	2.94	10.25	0.42
1.083	0.42	4.167	7.14	7.250	2.94	10.33	0.42
1.167	0.42	4.250	7.14	7.333	1.68	10.42	0.42
1.250	0.42	4.333	19.32	7.417	1.68	10.50	0.42
1.333	0.42	4.417	19.32	7.500	1.68	10.58	0.42
1.417	0.42	4.500	19.32	7.583	1.68	10.67	0.42
1.500	0.42	4.583	19.32	7.667	1.68	10.75	0.42
1.583	0.42	4.667	19.32	7.750	1.68	10.83	0.42
1.667	0.42	4.750	19.32	7.833	1.68	10.92	0.42
1.750	0.42	4.833	19.32	7.917	1.68	11.00	0.42
1.833	0.42	4.917	19.32	8.000	1.68	11.08	0.42
1.917	0.42	5.000	19.32	8.083	1.68	11.17	0.42
2.000	0.42	5.083	19.32	8.167	1.68	11.25	0.42
2.083	0.42	5.167	19.32	8.250	1.68	11.33	0.42
2.167	0.42	5.250	19.32	8.333	0.84	11.42	0.42
2.250	0.42	5.333	5.46	8.417	0.84	11.50	0.42
2.333	2.52	5.417	5.46	8.500	0.84	11.58	0.42
2.417	2.52	5.500	5.46	8.583	0.84	11.67	0.42
2.500	2.52	5.583	5.46	8.667	0.84	11.75	0.42
2.583	2.52	5.667	5.46	8.750	0.84	11.83	0.42
2.667	2.52	5.750	5.46	8.833	0.84	11.92	0.42
2.750	2.52	5.833	5.46	8.917	0.84	12.00	0.42
2.833	2.52	5.917	5.46	9.000	0.84	12.08	0.42
2.917	2.52	6.000	5.46	9.083	0.84	12.17	0.42
3.000	2.52	6.083	5.46	9.167	0.84	12.25	0.42
3.083	2.52	6.167	5.46	9.250	0.84		

			TOTALS
Max.Eff.Inten.(mm/hr)=	19.32	16.53	
over (min)	5.00	20.00	
Storage Coeff. (min)=	2.85 (ii)	17.35 (ii)	
Unit Hyd. Tpeak (min)=	5.00	20.00	
Unit Hyd. peak (cms)=	0.28	0.06	
PEAK FLOW (cms)=	0.00	0.01	0.009 (iii)
TIME TO PEAK (hrs)=	4.83	5.33	5.25
RUNOFF VOLUME (mm)=	41.00	21.93	25.89
TOTAL RAINFALL (mm)=	42.00	42.00	42.00
RUNOFF COEFFICIENT =	0.98	0.52	0.62

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0112)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0113):	0.52	0.021	5.25	30.31
+ ID2= 2 (0114):	0.34	0.016	5.25	35.52
ID = 3 (0112):	0.86	0.036	5.25	32.37

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0112)				
3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0112):	0.86	0.036	5.25	32.37
+ ID2= 2 (0115):	6.54	0.046	7.33	33.00
ID = 1 (0112):	7.40	0.052	7.25	32.92

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0112)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0112):	7.40	0.052	7.25	32.92
+ ID2= 2 (0116):	1.71	0.022	5.33	9.06
ID = 3 (0112):	9.11	0.068	5.25	28.44

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0112)				
3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0112):	9.11	0.068	5.25	28.44
+ ID2= 2 (0118):	28.11	0.268	6.83	14.17
ID = 1 (0112):	37.22	0.326	6.75	17.67

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0112)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0112):	37.22	0.326	6.75	17.67
+ ID2= 2 (0119):	0.24	0.009	5.25	25.89

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       ======================================================
       ID = 3 (  0112):    37.46   0.328     6.75    17.72

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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 FINISH
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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\8e586ce1-ef2b-4771-8ce0-7b5b6dca950e\scenar
  Summary filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\8e586ce1-ef2b-4771-8ce0-7b5b6dca950e\scenar


DATE: 04-14-2026                          TIME: 05:35:15

USER:



COMMENTS: _____________________________________________________________


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  ***********************************************
  ** SIMULATION : Run 2 - 5 Year 12 Hour AES (B **
  ***********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\rsoto\AppD
|                  |              ata\Local\Temp\
|                  |              8dfe3181-6515-409d-9f0a-7bb99517af18\9003d11c
| Ptotal= 54.38 mm |    Comments: 5 Year 12 Hour AES (Bloor, TRCA)
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    0.00 |  3.25    9.25 |  6.50    3.81 |  9.75    0.54
                0.25    0.54 |  3.50    9.25 |  6.75    3.81 | 10.00    0.54
                0.50    0.54 |  3.75    9.25 |  7.00    3.81 | 10.25    0.54
                0.75    0.54 |  4.00    9.25 |  7.25    2.18 | 10.50    0.54
                1.00    0.54 |  4.25   25.02 |  7.50    2.18 | 10.75    0.54
                1.25    0.54 |  4.50   25.02 |  7.75    2.18 | 11.00    0.54
                1.50    0.54 |  4.75   25.02 |  8.00    2.18 | 11.25    0.54
                1.75    0.54 |  5.00   25.02 |  8.25    1.09 | 11.50    0.54
                2.00    0.54 |  5.25    7.07 |  8.50    1.09 | 11.75    0.54
                2.25    3.26 |  5.50    7.07 |  8.75    1.09 | 12.00    0.54
                2.50    3.26 |  5.75    7.07 |  9.00    1.09 |
                2.75    3.26 |  6.00    7.07 |  9.25    0.54 |
                3.00    3.26 |  6.25    3.81 |  9.50    0.54 |

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| CALIB            |
| NASHYD   (  0111)|   Area     (ha)=  28.11   Curve Number    (CN)= 81.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.39

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    0.00 | 3.167    3.26 | 6.250    7.07 |  9.33    0.54
               0.167    0.00 | 3.250    3.26 | 6.333    3.81 |  9.42    0.54
               0.250    0.00 | 3.333    9.25 | 6.417    3.81 |  9.50    0.54
               0.333    0.54 | 3.417    9.25 | 6.500    3.81 |  9.58    0.54
               0.417    0.54 | 3.500    9.25 | 6.583    3.81 |  9.67    0.54
               0.500    0.54 | 3.583    9.25 | 6.667    3.81 |  9.75    0.54
               0.583    0.54 | 3.667    9.25 | 6.750    3.81 |  9.83    0.54
               0.667    0.54 | 3.750    9.25 | 6.833    3.81 |  9.92    0.54
               0.750    0.54 | 3.833    9.25 | 6.917    3.81 | 10.00    0.54
               0.833    0.54 | 3.917    9.25 | 7.000    3.81 | 10.08    0.54
               0.917    0.54 | 4.000    9.25 | 7.083    3.81 | 10.17    0.54
               1.000    0.54 | 4.083    9.25 | 7.167    3.81 | 10.25    0.54
               1.083    0.54 | 4.167    9.25 | 7.250    3.81 | 10.33    0.54
               1.167    0.54 | 4.250    9.25 | 7.333    2.18 | 10.42    0.54
               1.250    0.54 | 4.333   25.02 | 7.417    2.18 | 10.50    0.54
               1.333    0.54 | 4.417   25.02 | 7.500    2.18 | 10.58    0.54
               1.417    0.54 | 4.500   25.02 | 7.583    2.18 | 10.67    0.54
               1.500    0.54 | 4.583   25.02 | 7.667    2.18 | 10.75    0.54
               1.583    0.54 | 4.667   25.02 | 7.750    2.18 | 10.83    0.54
               1.667    0.54 | 4.750   25.02 | 7.833    2.18 | 10.92    0.54
               1.750    0.54 | 4.833   25.02 | 7.917    2.18 | 11.00    0.54
               1.833    0.54 | 4.917   25.02 | 8.000    2.18 | 11.08    0.54
               1.917    0.54 | 5.000   25.02 | 8.083    2.18 | 11.17    0.54
               2.000    0.54 | 5.083   25.02 | 8.167    2.18 | 11.25    0.54
               2.083    0.54 | 5.167   25.02 | 8.250    2.18 | 11.33    0.54
               2.167    0.54 | 5.250   25.02 | 8.333    1.09 | 11.42    0.54
               2.250    0.54 | 5.333    7.07 | 8.417    1.09 | 11.50    0.54
               2.333    3.26 | 5.417    7.07 | 8.500    1.09 | 11.58    0.54
               2.417    3.26 | 5.500    7.07 | 8.583    1.09 | 11.67    0.54
               2.500    3.26 | 5.583    7.07 | 8.667    1.09 | 11.75    0.54
               2.583    3.26 | 5.667    7.07 | 8.750    1.09 | 11.83    0.54
               2.667    3.26 | 5.750    7.07 | 8.833    1.09 | 11.92    0.54
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2.750	3.26	5.833	7.07	8.917	1.09	12.00	0.54
2.833	3.26	5.917	7.07	9.000	1.09	12.08	0.54
2.917	3.26	6.000	7.07	9.083	1.09	12.17	0.54
3.000	3.26	6.083	7.07	9.167	1.09	12.25	0.54
3.083	3.26	6.167	7.07	9.250	1.09		

Unit Hyd Qpeak (cms)= 0.772

PEAK FLOW (cms)= 0.430 (i)
TIME TO PEAK (hrs)= 6.667
RUNOFF VOLUME (mm)= 22.379
TOTAL RAINFALL (mm)= 54.380
RUNOFF COEFFICIENT = 0.412

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ROUTEPIPE(0118)	PIPE Number = 1.00
IN= 2---> OUT= 1	Diameter (mm)=1200.00
DT= 5.0 min	Length (m)= 500.00
	Slope (m/m)= 0.002
	Manning n = 0.013

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.06	.114E+02	0.0	0.41	20.34
0.13	.317E+02	0.0	0.64	13.04
0.19	.573E+02	0.1	0.82	10.13
0.25	.866E+02	0.2	0.98	8.52
0.32	.119E+03	0.3	1.11	7.49
0.38	.153E+03	0.4	1.23	6.77
0.44	.189E+03	0.5	1.34	6.24
0.51	.226E+03	0.6	1.43	5.84
0.57	.264E+03	0.8	1.51	5.53
0.63	.302E+03	1.0	1.58	5.29
0.69	.339E+03	1.1	1.63	5.10
0.76	.376E+03	1.3	1.68	4.95
0.82	.412E+03	1.4	1.72	4.85
0.88	.447E+03	1.6	1.74	4.78
0.95	.479E+03	1.7	1.76	4.74
1.01	.508E+03	1.8	1.76	4.74
1.07	.534E+03	1.9	1.74	4.80
1.14	.554E+03	1.9	1.69	4.92
1.20	.566E+03	1.7	1.54	5.40

	<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0111)	28.11	0.43	6.67	22.38	0.41	1.27
OUTFLOW: ID= 1 (0118)	28.11	0.43	6.75	22.38	0.40	1.27

CALIB	
NASHYD (0116)	Area (ha)= 1.71 Curve Number (CN)= 69.0
ID= 1 DT= 5.0 min	Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.31

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	3.26	6.250	7.07	9.33	0.54
0.167	0.00	3.250	3.26	6.333	3.81	9.42	0.54
0.250	0.00	3.333	9.25	6.417	3.81	9.50	0.54
0.333	0.54	3.417	9.25	6.500	3.81	9.58	0.54
0.417	0.54	3.500	9.25	6.583	3.81	9.67	0.54
0.500	0.54	3.583	9.25	6.667	3.81	9.75	0.54
0.583	0.54	3.667	9.25	6.750	3.81	9.83	0.54
0.667	0.54	3.750	9.25	6.833	3.81	9.92	0.54
0.750	0.54	3.833	9.25	6.917	3.81	10.00	0.54
0.833	0.54	3.917	9.25	7.000	3.81	10.08	0.54
0.917	0.54	4.000	9.25	7.083	3.81	10.17	0.54
1.000	0.54	4.083	9.25	7.167	3.81	10.25	0.54
1.083	0.54	4.167	9.25	7.250	3.81	10.33	0.54
1.167	0.54	4.250	9.25	7.333	2.18	10.42	0.54
1.250	0.54	4.333	25.02	7.417	2.18	10.50	0.54
1.333	0.54	4.417	25.02	7.500	2.18	10.58	0.54
1.417	0.54	4.500	25.02	7.583	2.18	10.67	0.54
1.500	0.54	4.583	25.02	7.667	2.18	10.75	0.54
1.583	0.54	4.667	25.02	7.750	2.18	10.83	0.54
1.667	0.54	4.750	25.02	7.833	2.18	10.92	0.54
1.750	0.54	4.833	25.02	7.917	2.18	11.00	0.54
1.833	0.54	4.917	25.02	8.000	2.18	11.08	0.54
1.917	0.54	5.000	25.02	8.083	2.18	11.17	0.54
2.000	0.54	5.083	25.02	8.167	2.18	11.25	0.54
2.083	0.54	5.167	25.02	8.250	2.18	11.33	0.54
2.167	0.54	5.250	25.02	8.333	1.09	11.42	0.54
2.250	0.54	5.333	7.07	8.417	1.09	11.50	0.54
2.333	3.26	5.417	7.07	8.500	1.09	11.58	0.54
2.417	3.26	5.500	7.07	8.583	1.09	11.67	0.54
2.500	3.26	5.583	7.07	8.667	1.09	11.75	0.54
2.583	3.26	5.667	7.07	8.750	1.09	11.83	0.54
2.667	3.26	5.750	7.07	8.833	1.09	11.92	0.54
2.750	3.26	5.833	7.07	8.917	1.09	12.00	0.54
2.833	3.26	5.917	7.07	9.000	1.09	12.08	0.54
2.917	3.26	6.000	7.07	9.083	1.09	12.17	0.54
3.000	3.26	6.083	7.07	9.167	1.09	12.25	0.54
3.083	3.26	6.167	7.07	9.250	1.09		

Unit Hyd Qpeak (cms)= 0.211

PEAK FLOW (cms)= 0.037 (i)
TIME TO PEAK (hrs)= 5.333
RUNOFF VOLUME (mm)= 14.909
TOTAL RAINFALL (mm)= 54.380
RUNOFF COEFFICIENT = 0.274

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0113)	Area (ha)= 0.52
ID= 1 DT= 5.0 min	Total Imp(%)= 51.00 Dir. Conn.(%)= 51.00

	IMPERVIOUS	PERVIOUS (i)

Surface Area	(ha)=	0.27	0.25
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	58.88	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	3.26	6.250	7.07	9.33	0.54
0.167	0.00	3.250	3.26	6.333	3.81	9.42	0.54
0.250	0.00	3.333	9.25	6.417	3.81	9.50	0.54
0.333	0.54	3.417	9.25	6.500	3.81	9.58	0.54
0.417	0.54	3.500	9.25	6.583	3.81	9.67	0.54
0.500	0.54	3.583	9.25	6.667	3.81	9.75	0.54
0.583	0.54	3.667	9.25	6.750	3.81	9.83	0.54
0.667	0.54	3.750	9.25	6.833	3.81	9.92	0.54
0.750	0.54	3.833	9.25	6.917	3.81	10.00	0.54
0.833	0.54	3.917	9.25	7.000	3.81	10.08	0.54
0.917	0.54	4.000	9.25	7.083	3.81	10.17	0.54
1.000	0.54	4.083	9.25	7.167	3.81	10.25	0.54
1.083	0.54	4.167	9.25	7.250	3.81	10.33	0.54
1.167	0.54	4.250	9.25	7.333	2.18	10.42	0.54
1.250	0.54	4.333	25.02	7.417	2.18	10.50	0.54
1.333	0.54	4.417	25.02	7.500	2.18	10.58	0.54
1.417	0.54	4.500	25.02	7.583	2.18	10.67	0.54
1.500	0.54	4.583	25.02	7.667	2.18	10.75	0.54
1.583	0.54	4.667	25.02	7.750	2.18	10.83	0.54
1.667	0.54	4.750	25.02	7.833	2.18	10.92	0.54
1.750	0.54	4.833	25.02	7.917	2.18	11.00	0.54
1.833	0.54	4.917	25.02	8.000	2.18	11.08	0.54
1.917	0.54	5.000	25.02	8.083	2.18	11.17	0.54
2.000	0.54	5.083	25.02	8.167	2.18	11.25	0.54
2.083	0.54	5.167	25.02	8.250	2.18	11.33	0.54
2.167	0.54	5.250	25.02	8.333	1.09	11.42	0.54
2.250	0.54	5.333	7.07	8.417	1.09	11.50	0.54
2.333	3.26	5.417	7.07	8.500	1.09	11.58	0.54
2.417	3.26	5.500	7.07	8.583	1.09	11.67	0.54
2.500	3.26	5.583	7.07	8.667	1.09	11.75	0.54
2.583	3.26	5.667	7.07	8.750	1.09	11.83	0.54
2.667	3.26	5.750	7.07	8.833	1.09	11.92	0.54
2.750	3.26	5.833	7.07	8.917	1.09	12.00	0.54
2.833	3.26	5.917	7.07	9.000	1.09	12.08	0.54
2.917	3.26	6.000	7.07	9.083	1.09	12.17	0.54
3.000	3.26	6.083	7.07	9.167	1.09	12.25	0.54
3.083	3.26	6.167	7.07	9.250	1.09		

Max.Eff.Inten.	(mm/hr)=	25.02	16.91	
over	(min)	5.00	20.00	
Storage Coeff.	(min)=	3.24 (ii)	17.60 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	20.00	
Unit Hyd. peak	(cms)=	0.27	0.06	
				TOTALS
PEAK FLOW	(cms)=	0.02	0.01	0.029 (iii)
TIME TO PEAK	(hrs)=	5.08	5.33	5.25
RUNOFF VOLUME	(mm)=	53.38	28.62	41.23
TOTAL RAINFALL	(mm)=	54.38	54.38	54.38
RUNOFF COEFFICIENT	=	0.98	0.53	0.76

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0114)	Area	(ha)=	0.34
ID= 1 DT= 5.0 min	Total Imp	(%)= 75.00	Dir. Conn.(%)= 75.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.26	0.09
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	47.61	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	3.26	6.250	7.07	9.33	0.54
0.167	0.00	3.250	3.26	6.333	3.81	9.42	0.54
0.250	0.00	3.333	9.25	6.417	3.81	9.50	0.54
0.333	0.54	3.417	9.25	6.500	3.81	9.58	0.54
0.417	0.54	3.500	9.25	6.583	3.81	9.67	0.54
0.500	0.54	3.583	9.25	6.667	3.81	9.75	0.54
0.583	0.54	3.667	9.25	6.750	3.81	9.83	0.54
0.667	0.54	3.750	9.25	6.833	3.81	9.92	0.54
0.750	0.54	3.833	9.25	6.917	3.81	10.00	0.54
0.833	0.54	3.917	9.25	7.000	3.81	10.08	0.54
0.917	0.54	4.000	9.25	7.083	3.81	10.17	0.54
1.000	0.54	4.083	9.25	7.167	3.81	10.25	0.54
1.083	0.54	4.167	9.25	7.250	3.81	10.33	0.54
1.167	0.54	4.250	9.25	7.333	2.18	10.42	0.54
1.250	0.54	4.333	25.02	7.417	2.18	10.50	0.54
1.333	0.54	4.417	25.02	7.500	2.18	10.58	0.54
1.417	0.54	4.500	25.02	7.583	2.18	10.67	0.54
1.500	0.54	4.583	25.02	7.667	2.18	10.75	0.54
1.583	0.54	4.667	25.02	7.750	2.18	10.83	0.54
1.667	0.54	4.750	25.02	7.833	2.18	10.92	0.54
1.750	0.54	4.833	25.02	7.917	2.18	11.00	0.54
1.833	0.54	4.917	25.02	8.000	2.18	11.08	0.54
1.917	0.54	5.000	25.02	8.083	2.18	11.17	0.54
2.000	0.54	5.083	25.02	8.167	2.18	11.25	0.54
2.083	0.54	5.167	25.02	8.250	2.18	11.33	0.54
2.167	0.54	5.250	25.02	8.333	1.09	11.42	0.54
2.250	0.54	5.333	7.07	8.417	1.09	11.50	0.54
2.333	3.26	5.417	7.07	8.500	1.09	11.58	0.54
2.417	3.26	5.500	7.07	8.583	1.09	11.67	0.54
2.500	3.26	5.583	7.07	8.667	1.09	11.75	0.54
2.583	3.26	5.667	7.07	8.750	1.09	11.83	0.54
2.667	3.26	5.750	7.07	8.833	1.09	11.92	0.54
2.750	3.26	5.833	7.07	8.917	1.09	12.00	0.54

	2.833	3.26	5.917	7.07	9.000	1.09	12.08	0.54
	2.917	3.26	6.000	7.07	9.083	1.09	12.17	0.54
	3.000	3.26	6.083	7.07	9.167	1.09	12.25	0.54
	3.083	3.26	6.167	7.07	9.250	1.09		

Max.Eff.Inten.(mm/hr)=	25.02	16.91		
over (min)	5.00	20.00		
Storage Coeff. (min)=	2.85 (ii)	17.22 (ii)		
Unit Hyd. Tpeak (min)=	5.00	20.00		
Unit Hyd. peak (cms)=	0.28	0.06		
			TOTALS	
PEAK FLOW (cms)=	0.02	0.00	0.021 (iii)	
TIME TO PEAK (hrs)=	5.08	5.33	5.25	
RUNOFF VOLUME (mm)=	53.38	28.62	47.16	
TOTAL RAINFALL (mm)=	54.38	54.38	54.38	
RUNOFF COEFFICIENT =	0.98	0.53	0.87	

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0117)	Area (ha)=	6.54	
ID= 1 DT= 5.0 min	Total Imp(%)=	71.00	Dir. Conn.(%)= 56.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	4.64	1.90
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	208.81	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	3.26	6.250	7.07	9.33	0.54
0.167	0.00	3.250	3.26	6.333	3.81	9.42	0.54
0.250	0.00	3.333	9.25	6.417	3.81	9.50	0.54
0.333	0.54	3.417	9.25	6.500	3.81	9.58	0.54
0.417	0.54	3.500	9.25	6.583	3.81	9.67	0.54
0.500	0.54	3.583	9.25	6.667	3.81	9.75	0.54
0.583	0.54	3.667	9.25	6.750	3.81	9.83	0.54
0.667	0.54	3.750	9.25	6.833	3.81	9.92	0.54
0.750	0.54	3.833	9.25	6.917	3.81	10.00	0.54
0.833	0.54	3.917	9.25	7.000	3.81	10.08	0.54
0.917	0.54	4.000	9.25	7.083	3.81	10.17	0.54
1.000	0.54	4.083	9.25	7.167	3.81	10.25	0.54
1.083	0.54	4.167	9.25	7.250	3.81	10.33	0.54
1.167	0.54	4.250	9.25	7.333	2.18	10.42	0.54
1.250	0.54	4.333	25.02	7.417	2.18	10.50	0.54
1.333	0.54	4.417	25.02	7.500	2.18	10.58	0.54
1.417	0.54	4.500	25.02	7.583	2.18	10.67	0.54
1.500	0.54	4.583	25.02	7.667	2.18	10.75	0.54
1.583	0.54	4.667	25.02	7.750	2.18	10.83	0.54
1.667	0.54	4.750	25.02	7.833	2.18	10.92	0.54
1.750	0.54	4.833	25.02	7.917	2.18	11.00	0.54
1.833	0.54	4.917	25.02	8.000	2.18	11.08	0.54
1.917	0.54	5.000	25.02	8.083	2.18	11.17	0.54
2.000	0.54	5.083	25.02	8.167	2.18	11.25	0.54
2.083	0.54	5.167	25.02	8.250	2.18	11.33	0.54
2.167	0.54	5.250	25.02	8.333	1.09	11.42	0.54
2.250	0.54	5.333	7.07	8.417	1.09	11.50	0.54
2.333	3.26	5.417	7.07	8.500	1.09	11.58	0.54
2.417	3.26	5.500	7.07	8.583	1.09	11.67	0.54
2.500	3.26	5.583	7.07	8.667	1.09	11.75	0.54
2.583	3.26	5.667	7.07	8.750	1.09	11.83	0.54
2.667	3.26	5.750	7.07	8.833	1.09	11.92	0.54
2.750	3.26	5.833	7.07	8.917	1.09	12.00	0.54
2.833	3.26	5.917	7.07	9.000	1.09	12.08	0.54
2.917	3.26	6.000	7.07	9.083	1.09	12.17	0.54
3.000	3.26	6.083	7.07	9.167	1.09	12.25	0.54
3.083	3.26	6.167	7.07	9.250	1.09		

Max.Eff.Inten.(mm/hr)=	25.02	29.86		
over (min)	5.00	20.00		
Storage Coeff. (min)=	6.92 (ii)	18.36 (ii)		
Unit Hyd. Tpeak (min)=	5.00	20.00		
Unit Hyd. peak (cms)=	0.17	0.06		
			TOTALS	
PEAK FLOW (cms)=	0.25	0.14	0.392 (iii)	
TIME TO PEAK (hrs)=	5.25	5.25	5.25	
RUNOFF VOLUME (mm)=	53.38	34.37	45.01	
TOTAL RAINFALL (mm)=	54.38	54.38	54.38	
RUNOFF COEFFICIENT =	0.98	0.63	0.83	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(0115)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.1507	0.2774
	0.0103	0.1190	0.1711	0.3280
	0.0819	0.2055	0.1837	0.3663
	0.1039	0.2468	0.3000	0.3955

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0117)	6.540	0.392	5.25	45.01
OUTFLOW: ID= 1 (0115)	6.540	0.079	6.58	44.57

PEAK FLOW REDUCTION [Qout/Qin](%)= 20.22
TIME SHIFT OF PEAK FLOW (min)= 80.00
MAXIMUM STORAGE USED (ha.m.)= 0.2025

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| CALIB            |
| STANDHYD (  0119)|   Area    (ha)=   0.24
|ID= 1 DT= 5.0 min |   Total Imp(%)=  38.00   Dir. Conn.(%)=  21.00
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                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      0.09         0.15
     Dep. Storage     (mm)=      1.00         1.50
     Average Slope     (%)=      1.00         2.00
     Length            (m)=     40.00        40.00
     Mannings n           =     0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
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---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	3.26	6.250	7.07	9.33	0.54
0.167	0.00	3.250	3.26	6.333	3.81	9.42	0.54
0.250	0.00	3.333	9.25	6.417	3.81	9.50	0.54
0.333	0.54	3.417	9.25	6.500	3.81	9.58	0.54
0.417	0.54	3.500	9.25	6.583	3.81	9.67	0.54
0.500	0.54	3.583	9.25	6.667	3.81	9.75	0.54
0.583	0.54	3.667	9.25	6.750	3.81	9.83	0.54
0.667	0.54	3.750	9.25	6.833	3.81	9.92	0.54
0.750	0.54	3.833	9.25	6.917	3.81	10.00	0.54
0.833	0.54	3.917	9.25	7.000	3.81	10.08	0.54
0.917	0.54	4.000	9.25	7.083	3.81	10.17	0.54
1.000	0.54	4.083	9.25	7.167	3.81	10.25	0.54
1.083	0.54	4.167	9.25	7.250	3.81	10.33	0.54
1.167	0.54	4.250	9.25	7.333	2.18	10.42	0.54
1.250	0.54	4.333	25.02	7.417	2.18	10.50	0.54
1.333	0.54	4.417	25.02	7.500	2.18	10.58	0.54
1.417	0.54	4.500	25.02	7.583	2.18	10.67	0.54
1.500	0.54	4.583	25.02	7.667	2.18	10.75	0.54
1.583	0.54	4.667	25.02	7.750	2.18	10.83	0.54
1.667	0.54	4.750	25.02	7.833	2.18	10.92	0.54
1.750	0.54	4.833	25.02	7.917	2.18	11.00	0.54
1.833	0.54	4.917	25.02	8.000	2.18	11.08	0.54
1.917	0.54	5.000	25.02	8.083	2.18	11.17	0.54
2.000	0.54	5.083	25.02	8.167	2.18	11.25	0.54
2.083	0.54	5.167	25.02	8.250	2.18	11.33	0.54
2.167	0.54	5.250	25.02	8.333	1.09	11.42	0.54
2.250	0.54	5.333	7.07	8.417	1.09	11.50	0.54
2.333	3.26	5.417	7.07	8.500	1.09	11.58	0.54
2.417	3.26	5.500	7.07	8.583	1.09	11.67	0.54
2.500	3.26	5.583	7.07	8.667	1.09	11.75	0.54
2.583	3.26	5.667	7.07	8.750	1.09	11.83	0.54
2.667	3.26	5.750	7.07	8.833	1.09	11.92	0.54
2.750	3.26	5.833	7.07	8.917	1.09	12.00	0.54
2.833	3.26	5.917	7.07	9.000	1.09	12.08	0.54
2.917	3.26	6.000	7.07	9.083	1.09	12.17	0.54
3.000	3.26	6.083	7.07	9.167	1.09	12.25	0.54
3.083	3.26	6.167	7.07	9.250	1.09		

```
     Max.Eff.Inten.(mm/hr)=      25.02        23.69
               over (min)        5.00        20.00
     Storage Coeff.  (min)=      2.57 (ii)   15.12 (ii)
     Unit Hyd. Tpeak (min)=      5.00        20.00
     Unit Hyd. peak  (cms)=      0.29         0.07
```

```
                                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.00         0.01          0.012 (iii)
     TIME TO PEAK    (hrs)=       4.83         5.25           5.25
     RUNOFF VOLUME    (mm)=      53.38        32.03          36.47
     TOTAL RAINFALL   (mm)=      54.38        54.38          54.38
     RUNOFF COEFFICIENT   =       0.98         0.59           0.67

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0112)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0113):      0.52   0.029     5.25    41.23
     + ID2= 2 (  0114):      0.34   0.021     5.25    47.16
       ================================================
       ID = 3 (  0112):      0.86   0.050     5.25    43.57

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0112)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0112):      0.86   0.050     5.25    43.57
     + ID2= 2 (  0115):      6.54   0.079     6.58    44.57
       ================================================
       ID = 1 (  0112):      7.40   0.093     6.25    44.45

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0112)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0112):      7.40   0.093     6.25    44.45
     + ID2= 2 (  0116):      1.71   0.037     5.33    14.91
       ================================================
       ID = 3 (  0112):      9.11   0.128     5.25    38.90

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0112)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0112):      9.11   0.128     5.25    38.90
     + ID2= 2 (  0118):     28.11   0.429     6.75    22.38
       ================================================
       ID = 1 (  0112):     37.22   0.529     6.67    26.42
```

```
     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0112)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
        ID1= 1 (  0112):    37.22   0.529     6.67    26.42
      + ID2= 2 (  0119):     0.24   0.012     5.25    36.47
        ================================================
        ID = 3 (  0112):    37.46   0.531     6.67    26.49

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\7c16167a-7bd9-4186-a1d6-347fa2d172b3\scenar
  Summary filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\7c16167a-7bd9-4186-a1d6-347fa2d172b3\scenar


DATE: 04-14-2026                          TIME: 05:35:15

USER:



COMMENTS: _____________________________________________________________


--------------------------------------------------------------------------------
--------------------------
  ************************************************
  ** SIMULATION : Run 3 - 10 Year 12 Hour AES ( **
  ************************************************


--------------------
|    READ STORM    |    Filename: C:\Users\rsoto\AppD
|                  |              ata\Local\Temp\
|                  |              8dfe3181-6515-409d-9f0a-7bb99517af18\6351ca2a
| Ptotal= 62.71 mm |    Comments: 10 Year 12 Hour AES (Bloor, TRCA)
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	3.25	10.66	6.50	4.39	9.75	0.63
0.25	0.63	3.50	10.66	6.75	4.39	10.00	0.63
0.50	0.63	3.75	10.66	7.00	4.39	10.25	0.63
0.75	0.63	4.00	10.66	7.25	2.51	10.50	0.63
1.00	0.63	4.25	28.84	7.50	2.51	10.75	0.63
1.25	0.63	4.50	28.84	7.75	2.51	11.00	0.63
1.50	0.63	4.75	28.84	8.00	2.51	11.25	0.63
1.75	0.63	5.00	28.84	8.25	1.25	11.50	0.63
2.00	0.63	5.25	8.15	8.50	1.25	11.75	0.63
2.25	3.76	5.50	8.15	8.75	1.25	12.00	0.63
2.50	3.76	5.75	8.15	9.00	1.25		
2.75	3.76	6.00	8.15	9.25	0.63		
3.00	3.76	6.25	4.39	9.50	0.63		

```
--------------------------------------------------------------------------------

--------------------
| CALIB            |
| NASHYD   (  0111)|   Area    (ha)=  28.11   Curve Number    (CN)= 81.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.39

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	3.76	6.250	8.15	9.33	0.63
0.167	0.00	3.250	3.76	6.333	4.39	9.42	0.63
0.250	0.00	3.333	10.66	6.417	4.39	9.50	0.63
0.333	0.63	3.417	10.66	6.500	4.39	9.58	0.63
0.417	0.63	3.500	10.66	6.583	4.39	9.67	0.63
0.500	0.63	3.583	10.66	6.667	4.39	9.75	0.63
0.583	0.63	3.667	10.66	6.750	4.39	9.83	0.63
0.667	0.63	3.750	10.66	6.833	4.39	9.92	0.63
0.750	0.63	3.833	10.66	6.917	4.39	10.00	0.63
0.833	0.63	3.917	10.66	7.000	4.39	10.08	0.63
0.917	0.63	4.000	10.66	7.083	4.39	10.17	0.63
1.000	0.63	4.083	10.66	7.167	4.39	10.25	0.63
1.083	0.63	4.167	10.66	7.250	4.39	10.33	0.63
1.167	0.63	4.250	10.66	7.333	2.51	10.42	0.63
1.250	0.63	4.333	28.84	7.417	2.51	10.50	0.63
1.333	0.63	4.417	28.84	7.500	2.51	10.58	0.63
1.417	0.63	4.500	28.84	7.583	2.51	10.67	0.63
1.500	0.63	4.583	28.84	7.667	2.51	10.75	0.63
1.583	0.63	4.667	28.84	7.750	2.51	10.83	0.63
1.667	0.63	4.750	28.84	7.833	2.51	10.92	0.63
1.750	0.63	4.833	28.84	7.917	2.51	11.00	0.63
1.833	0.63	4.917	28.84	8.000	2.51	11.08	0.63
1.917	0.63	5.000	28.84	8.083	2.51	11.17	0.63
2.000	0.63	5.083	28.84	8.167	2.51	11.25	0.63
2.083	0.63	5.167	28.84	8.250	2.51	11.33	0.63
2.167	0.63	5.250	28.84	8.333	1.25	11.42	0.63
2.250	0.63	5.333	8.15	8.417	1.25	11.50	0.63

	2.333	3.76	5.417	8.15	8.500	1.25	11.58	0.63
	2.417	3.76	5.500	8.15	8.583	1.25	11.67	0.63
	2.500	3.76	5.583	8.15	8.667	1.25	11.75	0.63
	2.583	3.76	5.667	8.15	8.750	1.25	11.83	0.63
	2.667	3.76	5.750	8.15	8.833	1.25	11.92	0.63
	2.750	3.76	5.833	8.15	8.917	1.25	12.00	0.63
	2.833	3.76	5.917	8.15	9.000	1.25	12.08	0.63
	2.917	3.76	6.000	8.15	9.083	1.25	12.17	0.63
	3.000	3.76	6.083	8.15	9.167	1.25	12.25	0.63
	3.083	3.76	6.167	8.15	9.250	1.25		

Unit Hyd Qpeak (cms)= 0.772

PEAK FLOW (cms)= 0.549 (i)
TIME TO PEAK (hrs)= 6.583
RUNOFF VOLUME (mm)= 28.395
TOTAL RAINFALL (mm)= 62.710
RUNOFF COEFFICIENT = 0.453

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ROUTEPIPE(0118)	PIPE Number = 1.00
IN= 2---> OUT= 1	Diameter (mm)=1200.00
DT= 5.0 min	Length (m)= 500.00
	Slope (m/m)= 0.002
	Manning n = 0.013

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.06	.114E+02	0.0	0.41	20.34
0.13	.317E+02	0.0	0.64	13.04
0.19	.573E+02	0.1	0.82	10.13
0.25	.866E+02	0.2	0.98	8.52
0.32	.119E+03	0.3	1.11	7.49
0.38	.153E+03	0.4	1.23	6.77
0.44	.189E+03	0.5	1.34	6.24
0.51	.226E+03	0.6	1.43	5.84
0.57	.264E+03	0.8	1.51	5.53
0.63	.302E+03	1.0	1.58	5.29
0.69	.339E+03	1.1	1.63	5.10
0.76	.376E+03	1.3	1.68	4.95
0.82	.412E+03	1.4	1.72	4.85
0.88	.447E+03	1.6	1.74	4.78
0.95	.479E+03	1.7	1.76	4.74
1.01	.508E+03	1.8	1.76	4.74
1.07	.534E+03	1.9	1.74	4.80
1.14	.554E+03	1.9	1.69	4.92
1.20	.566E+03	1.7	1.54	5.40

	<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0111)	28.11	0.55	6.58	28.39	0.46	1.36
OUTFLOW: ID= 1 (0118)	28.11	0.55	6.67	28.39	0.46	1.36

CALIB	
NASHYD (0116)	Area (ha)= 1.71 Curve Number (CN)= 69.0
ID= 1 DT= 5.0 min	Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.31

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	3.76	6.250	8.15	9.33	0.63
0.167	0.00	3.250	3.76	6.333	4.39	9.42	0.63
0.250	0.00	3.333	10.66	6.417	4.39	9.50	0.63
0.333	0.63	3.417	10.66	6.500	4.39	9.58	0.63
0.417	0.63	3.500	10.66	6.583	4.39	9.67	0.63
0.500	0.63	3.583	10.66	6.667	4.39	9.75	0.63
0.583	0.63	3.667	10.66	6.750	4.39	9.83	0.63
0.667	0.63	3.750	10.66	6.833	4.39	9.92	0.63
0.750	0.63	3.833	10.66	6.917	4.39	10.00	0.63
0.833	0.63	3.917	10.66	7.000	4.39	10.08	0.63
0.917	0.63	4.000	10.66	7.083	4.39	10.17	0.63
1.000	0.63	4.083	10.66	7.167	4.39	10.25	0.63
1.083	0.63	4.167	10.66	7.250	4.39	10.33	0.63
1.167	0.63	4.250	10.66	7.333	2.51	10.42	0.63
1.250	0.63	4.333	28.84	7.417	2.51	10.50	0.63
1.333	0.63	4.417	28.84	7.500	2.51	10.58	0.63
1.417	0.63	4.500	28.84	7.583	2.51	10.67	0.63
1.500	0.63	4.583	28.84	7.667	2.51	10.75	0.63
1.583	0.63	4.667	28.84	7.750	2.51	10.83	0.63
1.667	0.63	4.750	28.84	7.833	2.51	10.92	0.63
1.750	0.63	4.833	28.84	7.917	2.51	11.00	0.63
1.833	0.63	4.917	28.84	8.000	2.51	11.08	0.63
1.917	0.63	5.000	28.84	8.083	2.51	11.17	0.63
2.000	0.63	5.083	28.84	8.167	2.51	11.25	0.63
2.083	0.63	5.167	28.84	8.250	2.51	11.33	0.63
2.167	0.63	5.250	28.84	8.333	1.25	11.42	0.63
2.250	0.63	5.333	8.15	8.417	1.25	11.50	0.63
2.333	3.76	5.417	8.15	8.500	1.25	11.58	0.63
2.417	3.76	5.500	8.15	8.583	1.25	11.67	0.63
2.500	3.76	5.583	8.15	8.667	1.25	11.75	0.63
2.583	3.76	5.667	8.15	8.750	1.25	11.83	0.63
2.667	3.76	5.750	8.15	8.833	1.25	11.92	0.63
2.750	3.76	5.833	8.15	8.917	1.25	12.00	0.63
2.833	3.76	5.917	8.15	9.000	1.25	12.08	0.63
2.917	3.76	6.000	8.15	9.083	1.25	12.17	0.63
3.000	3.76	6.083	8.15	9.167	1.25	12.25	0.63
3.083	3.76	6.167	8.15	9.250	1.25		

Unit Hyd Qpeak (cms)= 0.211

PEAK FLOW (cms)= 0.048 (i)
TIME TO PEAK (hrs)= 5.333
RUNOFF VOLUME (mm)= 19.376
TOTAL RAINFALL (mm)= 62.710
RUNOFF COEFFICIENT = 0.309

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
| CALIB            |
| STANDHYD (  0113)|   Area    (ha)=   0.52
|ID= 1 DT= 5.0 min |   Total Imp(%)=  51.00   Dir. Conn.(%)=  51.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.27         0.25
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      58.88        40.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	3.76	6.250	8.15	9.33	0.63
0.167	0.00	3.250	3.76	6.333	4.39	9.42	0.63
0.250	0.00	3.333	10.66	6.417	4.39	9.50	0.63
0.333	0.63	3.417	10.66	6.500	4.39	9.58	0.63
0.417	0.63	3.500	10.66	6.583	4.39	9.67	0.63
0.500	0.63	3.583	10.66	6.667	4.39	9.75	0.63
0.583	0.63	3.667	10.66	6.750	4.39	9.83	0.63
0.667	0.63	3.750	10.66	6.833	4.39	9.92	0.63
0.750	0.63	3.833	10.66	6.917	4.39	10.00	0.63
0.833	0.63	3.917	10.66	7.000	4.39	10.08	0.63
0.917	0.63	4.000	10.66	7.083	4.39	10.17	0.63
1.000	0.63	4.083	10.66	7.167	4.39	10.25	0.63
1.083	0.63	4.167	10.66	7.250	4.39	10.33	0.63
1.167	0.63	4.250	10.66	7.333	2.51	10.42	0.63
1.250	0.63	4.333	28.84	7.417	2.51	10.50	0.63
1.333	0.63	4.417	28.84	7.500	2.51	10.58	0.63
1.417	0.63	4.500	28.84	7.583	2.51	10.67	0.63
1.500	0.63	4.583	28.84	7.667	2.51	10.75	0.63
1.583	0.63	4.667	28.84	7.750	2.51	10.83	0.63
1.667	0.63	4.750	28.84	7.833	2.51	10.92	0.63
1.750	0.63	4.833	28.84	7.917	2.51	11.00	0.63
1.833	0.63	4.917	28.84	8.000	2.51	11.08	0.63
1.917	0.63	5.000	28.84	8.083	2.51	11.17	0.63
2.000	0.63	5.083	28.84	8.167	2.51	11.25	0.63
2.083	0.63	5.167	28.84	8.250	2.51	11.33	0.63
2.167	0.63	5.250	28.84	8.333	1.25	11.42	0.63
2.250	0.63	5.333	8.15	8.417	1.25	11.50	0.63
2.333	3.76	5.417	8.15	8.500	1.25	11.58	0.63
2.417	3.76	5.500	8.15	8.583	1.25	11.67	0.63
2.500	3.76	5.583	8.15	8.667	1.25	11.75	0.63
2.583	3.76	5.667	8.15	8.750	1.25	11.83	0.63
2.667	3.76	5.750	8.15	8.833	1.25	11.92	0.63
2.750	3.76	5.833	8.15	8.917	1.25	12.00	0.63
2.833	3.76	5.917	8.15	9.000	1.25	12.08	0.63
2.917	3.76	6.000	8.15	9.083	1.25	12.17	0.63
3.000	3.76	6.083	8.15	9.167	1.25	12.25	0.63
3.083	3.76	6.167	8.15	9.250	1.25		

```
     Max.Eff.Inten.(mm/hr)=      28.84        20.66
               over (min)         5.00        20.00
     Storage Coeff.  (min)=       3.06 (ii)   16.32 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=       0.27         0.06
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.02         0.01          0.034 (iii)
     TIME TO PEAK    (hrs)=       5.08         5.25           5.25
     RUNOFF VOLUME    (mm)=      61.71        35.33          48.77
     TOTAL RAINFALL   (mm)=      62.71        62.71          62.71
     RUNOFF COEFFICIENT   =       0.98         0.56           0.78

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0114)|   Area    (ha)=   0.34
|ID= 1 DT= 5.0 min |   Total Imp(%)=  75.00   Dir. Conn.(%)=  75.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.26         0.09
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      47.61        40.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	3.76	6.250	8.15	9.33	0.63
0.167	0.00	3.250	3.76	6.333	4.39	9.42	0.63
0.250	0.00	3.333	10.66	6.417	4.39	9.50	0.63
0.333	0.63	3.417	10.66	6.500	4.39	9.58	0.63
0.417	0.63	3.500	10.66	6.583	4.39	9.67	0.63
0.500	0.63	3.583	10.66	6.667	4.39	9.75	0.63
0.583	0.63	3.667	10.66	6.750	4.39	9.83	0.63
0.667	0.63	3.750	10.66	6.833	4.39	9.92	0.63
0.750	0.63	3.833	10.66	6.917	4.39	10.00	0.63
0.833	0.63	3.917	10.66	7.000	4.39	10.08	0.63
0.917	0.63	4.000	10.66	7.083	4.39	10.17	0.63
1.000	0.63	4.083	10.66	7.167	4.39	10.25	0.63
1.083	0.63	4.167	10.66	7.250	4.39	10.33	0.63
1.167	0.63	4.250	10.66	7.333	2.51	10.42	0.63
1.250	0.63	4.333	28.84	7.417	2.51	10.50	0.63
1.333	0.63	4.417	28.84	7.500	2.51	10.58	0.63
1.417	0.63	4.500	28.84	7.583	2.51	10.67	0.63
1.500	0.63	4.583	28.84	7.667	2.51	10.75	0.63
1.583	0.63	4.667	28.84	7.750	2.51	10.83	0.63
1.667	0.63	4.750	28.84	7.833	2.51	10.92	0.63
1.750	0.63	4.833	28.84	7.917	2.51	11.00	0.63
1.833	0.63	4.917	28.84	8.000	2.51	11.08	0.63
1.917	0.63	5.000	28.84	8.083	2.51	11.17	0.63
2.000	0.63	5.083	28.84	8.167	2.51	11.25	0.63
2.083	0.63	5.167	28.84	8.250	2.51	11.33	0.63
2.167	0.63	5.250	28.84	8.333	1.25	11.42	0.63
2.250	0.63	5.333	8.15	8.417	1.25	11.50	0.63
2.333	3.76	5.417	8.15	8.500	1.25	11.58	0.63

2.417	3.76	5.500	8.15	8.583	1.25	11.67	0.63
2.500	3.76	5.583	8.15	8.667	1.25	11.75	0.63
2.583	3.76	5.667	8.15	8.750	1.25	11.83	0.63
2.667	3.76	5.750	8.15	8.833	1.25	11.92	0.63
2.750	3.76	5.833	8.15	8.917	1.25	12.00	0.63
2.833	3.76	5.917	8.15	9.000	1.25	12.08	0.63
2.917	3.76	6.000	8.15	9.083	1.25	12.17	0.63
3.000	3.76	6.083	8.15	9.167	1.25	12.25	0.63
3.083	3.76	6.167	8.15	9.250	1.25		

Max.Eff.Inten.(mm/hr)=	28.84	20.66	
over (min)	5.00	20.00	
Storage Coeff. (min)=	2.69 (ii)	15.95 (ii)	
Unit Hyd. Tpeak (min)=	5.00	20.00	
Unit Hyd. peak (cms)=	0.29	0.07	
			TOTALS
PEAK FLOW (cms)=	0.02	0.00	0.025 (iii)
TIME TO PEAK (hrs)=	4.83	5.25	5.25
RUNOFF VOLUME (mm)=	61.71	35.33	55.09
TOTAL RAINFALL (mm)=	62.71	62.71	62.71
RUNOFF COEFFICIENT =	0.98	0.56	0.88

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0117)	Area (ha)= 6.54
ID= 1 DT= 5.0 min	Total Imp(%)= 71.00 Dir. Conn.(%)= 56.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	4.64	1.90
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	208.81	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	3.76	6.250	8.15	9.33	0.63
0.167	0.00	3.250	3.76	6.333	4.39	9.42	0.63
0.250	0.00	3.333	10.66	6.417	4.39	9.50	0.63
0.333	0.63	3.417	10.66	6.500	4.39	9.58	0.63
0.417	0.63	3.500	10.66	6.583	4.39	9.67	0.63
0.500	0.63	3.583	10.66	6.667	4.39	9.75	0.63
0.583	0.63	3.667	10.66	6.750	4.39	9.83	0.63
0.667	0.63	3.750	10.66	6.833	4.39	9.92	0.63
0.750	0.63	3.833	10.66	6.917	4.39	10.00	0.63
0.833	0.63	3.917	10.66	7.000	4.39	10.08	0.63
0.917	0.63	4.000	10.66	7.083	4.39	10.17	0.63
1.000	0.63	4.083	10.66	7.167	4.39	10.25	0.63
1.083	0.63	4.167	10.66	7.250	4.39	10.33	0.63
1.167	0.63	4.250	10.66	7.333	2.51	10.42	0.63
1.250	0.63	4.333	28.84	7.417	2.51	10.50	0.63
1.333	0.63	4.417	28.84	7.500	2.51	10.58	0.63
1.417	0.63	4.500	28.84	7.583	2.51	10.67	0.63
1.500	0.63	4.583	28.84	7.667	2.51	10.75	0.63
1.583	0.63	4.667	28.84	7.750	2.51	10.83	0.63
1.667	0.63	4.750	28.84	7.833	2.51	10.92	0.63
1.750	0.63	4.833	28.84	7.917	2.51	11.00	0.63
1.833	0.63	4.917	28.84	8.000	2.51	11.08	0.63
1.917	0.63	5.000	28.84	8.083	2.51	11.17	0.63
2.000	0.63	5.083	28.84	8.167	2.51	11.25	0.63
2.083	0.63	5.167	28.84	8.250	2.51	11.33	0.63
2.167	0.63	5.250	28.84	8.333	1.25	11.42	0.63
2.250	0.63	5.333	8.15	8.417	1.25	11.50	0.63
2.333	3.76	5.417	8.15	8.500	1.25	11.58	0.63
2.417	3.76	5.500	8.15	8.583	1.25	11.67	0.63
2.500	3.76	5.583	8.15	8.667	1.25	11.75	0.63
2.583	3.76	5.667	8.15	8.750	1.25	11.83	0.63
2.667	3.76	5.750	8.15	8.833	1.25	11.92	0.63
2.750	3.76	5.833	8.15	8.917	1.25	12.00	0.63
2.833	3.76	5.917	8.15	9.000	1.25	12.08	0.63
2.917	3.76	6.000	8.15	9.083	1.25	12.17	0.63
3.000	3.76	6.083	8.15	9.167	1.25	12.25	0.63
3.083	3.76	6.167	8.15	9.250	1.25		

Max.Eff.Inten.(mm/hr)=	28.84	35.82	
over (min)	5.00	20.00	
Storage Coeff. (min)=	6.53 (ii)	17.18 (ii)	
Unit Hyd. Tpeak (min)=	5.00	20.00	
Unit Hyd. peak (cms)=	0.18	0.06	
			TOTALS
PEAK FLOW (cms)=	0.29	0.17	0.462 (iii)
TIME TO PEAK (hrs)=	5.25	5.25	5.25
RUNOFF VOLUME (mm)=	61.71	41.74	52.92
TOTAL RAINFALL (mm)=	62.71	62.71	62.71
RUNOFF COEFFICIENT =	0.98	0.67	0.84

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(0115)	OVERFLOW IS OFF
IN= 2---> OUT= 1	
DT= 5.0 min	

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.1507	0.2774
0.0103	0.1190	0.1711	0.3280
0.0819	0.2055	0.1837	0.3663
0.1039	0.2468	0.3000	0.3955

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0117)	6.540	0.462	5.25	52.92
OUTFLOW: ID= 1 (0115)	6.540	0.096	6.58	52.47

```
                PEAK   FLOW   REDUCTION [Qout/Qin](%)= 20.85
                TIME SHIFT OF PEAK FLOW          (min)= 80.00
                MAXIMUM  STORAGE   USED        (ha.m.)=  0.2329

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0119)|   Area     (ha)=   0.24
|ID= 1 DT= 5.0 min |   Total Imp(%)=  38.00   Dir. Conn.(%)=  21.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.09         0.15
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      40.00        40.00
     Mannings n           =      0.013        0.250

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	3.76	6.250	8.15	9.33	0.63
0.167	0.00	3.250	3.76	6.333	4.39	9.42	0.63
0.250	0.00	3.333	10.66	6.417	4.39	9.50	0.63
0.333	0.63	3.417	10.66	6.500	4.39	9.58	0.63
0.417	0.63	3.500	10.66	6.583	4.39	9.67	0.63
0.500	0.63	3.583	10.66	6.667	4.39	9.75	0.63
0.583	0.63	3.667	10.66	6.750	4.39	9.83	0.63
0.667	0.63	3.750	10.66	6.833	4.39	9.92	0.63
0.750	0.63	3.833	10.66	6.917	4.39	10.00	0.63
0.833	0.63	3.917	10.66	7.000	4.39	10.08	0.63
0.917	0.63	4.000	10.66	7.083	4.39	10.17	0.63
1.000	0.63	4.083	10.66	7.167	4.39	10.25	0.63
1.083	0.63	4.167	10.66	7.250	4.39	10.33	0.63
1.167	0.63	4.250	10.66	7.333	2.51	10.42	0.63
1.250	0.63	4.333	28.84	7.417	2.51	10.50	0.63
1.333	0.63	4.417	28.84	7.500	2.51	10.58	0.63
1.417	0.63	4.500	28.84	7.583	2.51	10.67	0.63
1.500	0.63	4.583	28.84	7.667	2.51	10.75	0.63
1.583	0.63	4.667	28.84	7.750	2.51	10.83	0.63
1.667	0.63	4.750	28.84	7.833	2.51	10.92	0.63
1.750	0.63	4.833	28.84	7.917	2.51	11.00	0.63
1.833	0.63	4.917	28.84	8.000	2.51	11.08	0.63
1.917	0.63	5.000	28.84	8.083	2.51	11.17	0.63
2.000	0.63	5.083	28.84	8.167	2.51	11.25	0.63
2.083	0.63	5.167	28.84	8.250	2.51	11.33	0.63
2.167	0.63	5.250	28.84	8.333	1.25	11.42	0.63
2.250	0.63	5.333	8.15	8.417	1.25	11.50	0.63
2.333	3.76	5.417	8.15	8.500	1.25	11.58	0.63
2.417	3.76	5.500	8.15	8.583	1.25	11.67	0.63
2.500	3.76	5.583	8.15	8.667	1.25	11.75	0.63
2.583	3.76	5.667	8.15	8.750	1.25	11.83	0.63
2.667	3.76	5.750	8.15	8.833	1.25	11.92	0.63
2.750	3.76	5.833	8.15	8.917	1.25	12.00	0.63
2.833	3.76	5.917	8.15	9.000	1.25	12.08	0.63
2.917	3.76	6.000	8.15	9.083	1.25	12.17	0.63
3.000	3.76	6.083	8.15	9.167	1.25	12.25	0.63
3.083	3.76	6.167	8.15	9.250	1.25		

```
     Max.Eff.Inten.(mm/hr)=      28.84        28.63
               over (min)         5.00        15.00
     Storage Coeff.  (min)=       2.42 (ii)   14.06 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.30         0.08
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.00         0.01          0.015 (iii)
     TIME TO PEAK    (hrs)=       4.83         5.25           5.25
     RUNOFF VOLUME    (mm)=      61.71        39.15          43.86
     TOTAL RAINFALL   (mm)=      62.71        62.71          62.71
     RUNOFF COEFFICIENT   =       0.98         0.62           0.70

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0112)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0113):      0.52   0.034     5.25    48.77
     + ID2= 2 (  0114):      0.34   0.025     5.25    55.09
       ================================================
       ID = 3 (  0112):      0.86   0.059     5.25    51.27

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0112)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0112):      0.86   0.059     5.25    51.27
     + ID2= 2 (  0115):      6.54   0.096     6.58    52.47
       ================================================
       ID = 1 (  0112):      7.40   0.124     5.25    52.33

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0112)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0112):      7.40   0.124     5.25    52.33
     + ID2= 2 (  0116):      1.71   0.048     5.33    19.38
       ================================================
       ID = 3 (  0112):      9.11   0.171     5.25    46.15

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0112)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
```

```
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0112):     9.11   0.171     5.25    46.15
     + ID2= 2 (  0118):    28.11   0.548     6.67    28.39
       ================================================
       ID = 1 (  0112):    37.22   0.669     6.67    32.74

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0112)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0112):    37.22   0.669     6.67    32.74
     + ID2= 2 (  0119):     0.24   0.015     5.25    43.86
       ================================================
       ID = 3 (  0112):    37.46   0.672     6.58    32.81

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
================================================================================
=========================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\b77ccfb7-11f1-4d6e-864b-4d232383c961\scenar
  Summary filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\b77ccfb7-11f1-4d6e-864b-4d232383c961\scenar


DATE: 04-14-2026                          TIME: 05:35:15

USER:



COMMENTS: _____________________________________________________________


--------------------------------------------------------------------------------
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  ***********************************************
  ** SIMULATION : Run 4 - 25 Year 12 Hour AES ( **
  ***********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\rsoto\AppD
|                  |              ata\Local\Temp\
|                  |              8dfe3181-6515-409d-9f0a-7bb99517af18\bb24e37e
| Ptotal= 73.10 mm |    Comments: 25 Year 12 Hour AES (Bloor, TRCA)
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	3.25	12.43	6.50	5.12	9.75	0.73
0.25	0.73	3.50	12.43	6.75	5.12	10.00	0.73
0.50	0.73	3.75	12.43	7.00	5.12	10.25	0.73
0.75	0.73	4.00	12.43	7.25	2.92	10.50	0.73
1.00	0.73	4.25	33.63	7.50	2.92	10.75	0.73
1.25	0.73	4.50	33.63	7.75	2.92	11.00	0.73
1.50	0.73	4.75	33.63	8.00	2.92	11.25	0.73
1.75	0.73	5.00	33.63	8.25	1.46	11.50	0.73
2.00	0.73	5.25	9.50	8.50	1.46	11.75	0.73
2.25	4.39	5.50	9.50	8.75	1.46	12.00	0.73
2.50	4.39	5.75	9.50	9.00	1.46		
2.75	4.39	6.00	9.50	9.25	0.73		
3.00	4.39	6.25	5.12	9.50	0.73		

```
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--------------------
| CALIB            |
| NASHYD   (  0111)|   Area     (ha)=  28.11   Curve Number    (CN)= 81.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.39

       NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	4.39	6.250	9.50	9.33	0.73
0.167	0.00	3.250	4.39	6.333	5.12	9.42	0.73
0.250	0.00	3.333	12.43	6.417	5.12	9.50	0.73
0.333	0.73	3.417	12.43	6.500	5.12	9.58	0.73
0.417	0.73	3.500	12.43	6.583	5.12	9.67	0.73
0.500	0.73	3.583	12.43	6.667	5.12	9.75	0.73
0.583	0.73	3.667	12.43	6.750	5.12	9.83	0.73
0.667	0.73	3.750	12.43	6.833	5.12	9.92	0.73
0.750	0.73	3.833	12.43	6.917	5.12	10.00	0.73
0.833	0.73	3.917	12.43	7.000	5.12	10.08	0.73
0.917	0.73	4.000	12.43	7.083	5.12	10.17	0.73
1.000	0.73	4.083	12.43	7.167	5.12	10.25	0.73
1.083	0.73	4.167	12.43	7.250	5.12	10.33	0.73
1.167	0.73	4.250	12.43	7.333	2.92	10.42	0.73
1.250	0.73	4.333	33.63	7.417	2.92	10.50	0.73
1.333	0.73	4.417	33.63	7.500	2.92	10.58	0.73
1.417	0.73	4.500	33.63	7.583	2.92	10.67	0.73
1.500	0.73	4.583	33.63	7.667	2.92	10.75	0.73
1.583	0.73	4.667	33.63	7.750	2.92	10.83	0.73
1.667	0.73	4.750	33.63	7.833	2.92	10.92	0.73
1.750	0.73	4.833	33.63	7.917	2.92	11.00	0.73
1.833	0.73	4.917	33.63	8.000	2.92	11.08	0.73

1.917	0.73	5.000	33.63	8.083	2.92	11.17	0.73
2.000	0.73	5.083	33.63	8.167	2.92	11.25	0.73
2.083	0.73	5.167	33.63	8.250	2.92	11.33	0.73
2.167	0.73	5.250	33.63	8.333	1.46	11.42	0.73
2.250	0.73	5.333	9.50	8.417	1.46	11.50	0.73
2.333	4.39	5.417	9.50	8.500	1.46	11.58	0.73
2.417	4.39	5.500	9.50	8.583	1.46	11.67	0.73
2.500	4.39	5.583	9.50	8.667	1.46	11.75	0.73
2.583	4.39	5.667	9.50	8.750	1.46	11.83	0.73
2.667	4.39	5.750	9.50	8.833	1.46	11.92	0.73
2.750	4.39	5.833	9.50	8.917	1.46	12.00	0.73
2.833	4.39	5.917	9.50	9.000	1.46	12.08	0.73
2.917	4.39	6.000	9.50	9.083	1.46	12.17	0.73
3.000	4.39	6.083	9.50	9.167	1.46	12.25	0.73
3.083	4.39	6.167	9.50	9.250	1.46		

Unit Hyd Qpeak (cms)= 0.772

PEAK FLOW (cms)= 0.706 (i)
TIME TO PEAK (hrs)= 6.583
RUNOFF VOLUME (mm)= 36.322
TOTAL RAINFALL (mm)= 73.100
RUNOFF COEFFICIENT = 0.497

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ROUTEPIPE(0118)	IN= 2---> OUT= 1	DT= 5.0 min

PIPE Number = 1.00
Diameter (mm)=1200.00
Length (m)= 500.00
Slope (m/m)= 0.002
Manning n = 0.013

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.06	.114E+02	0.0	0.41	20.34
0.13	.317E+02	0.0	0.64	13.04
0.19	.573E+02	0.1	0.82	10.13
0.25	.866E+02	0.2	0.98	8.52
0.32	.119E+03	0.3	1.11	7.49
0.38	.153E+03	0.4	1.23	6.77
0.44	.189E+03	0.5	1.34	6.24
0.51	.226E+03	0.6	1.43	5.84
0.57	.264E+03	0.8	1.51	5.53
0.63	.302E+03	1.0	1.58	5.29
0.69	.339E+03	1.1	1.63	5.10
0.76	.376E+03	1.3	1.68	4.95
0.82	.412E+03	1.4	1.72	4.85
0.88	.447E+03	1.6	1.74	4.78
0.95	.479E+03	1.7	1.76	4.74
1.01	.508E+03	1.8	1.76	4.74
1.07	.534E+03	1.9	1.74	4.80
1.14	.554E+03	1.9	1.69	4.92
1.20	.566E+03	1.7	1.54	5.40

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0111)	28.11	0.71	6.58	36.32	0.53	1.46
OUTFLOW: ID= 1 (0118)	28.11	0.71	6.67	36.32	0.53	1.46

CALIB	NASHYD (0116)	ID= 1 DT= 5.0 min

Area (ha)= 1.71 Curve Number (CN)= 69.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.31

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	4.39	6.250	9.50	9.33	0.73
0.167	0.00	3.250	4.39	6.333	5.12	9.42	0.73
0.250	0.00	3.333	12.43	6.417	5.12	9.50	0.73
0.333	0.73	3.417	12.43	6.500	5.12	9.58	0.73
0.417	0.73	3.500	12.43	6.583	5.12	9.67	0.73
0.500	0.73	3.583	12.43	6.667	5.12	9.75	0.73
0.583	0.73	3.667	12.43	6.750	5.12	9.83	0.73
0.667	0.73	3.750	12.43	6.833	5.12	9.92	0.73
0.750	0.73	3.833	12.43	6.917	5.12	10.00	0.73
0.833	0.73	3.917	12.43	7.000	5.12	10.08	0.73
0.917	0.73	4.000	12.43	7.083	5.12	10.17	0.73
1.000	0.73	4.083	12.43	7.167	5.12	10.25	0.73
1.083	0.73	4.167	12.43	7.250	5.12	10.33	0.73
1.167	0.73	4.250	12.43	7.333	2.92	10.42	0.73
1.250	0.73	4.333	33.63	7.417	2.92	10.50	0.73
1.333	0.73	4.417	33.63	7.500	2.92	10.58	0.73
1.417	0.73	4.500	33.63	7.583	2.92	10.67	0.73
1.500	0.73	4.583	33.63	7.667	2.92	10.75	0.73
1.583	0.73	4.667	33.63	7.750	2.92	10.83	0.73
1.667	0.73	4.750	33.63	7.833	2.92	10.92	0.73
1.750	0.73	4.833	33.63	7.917	2.92	11.00	0.73
1.833	0.73	4.917	33.63	8.000	2.92	11.08	0.73
1.917	0.73	5.000	33.63	8.083	2.92	11.17	0.73
2.000	0.73	5.083	33.63	8.167	2.92	11.25	0.73
2.083	0.73	5.167	33.63	8.250	2.92	11.33	0.73
2.167	0.73	5.250	33.63	8.333	1.46	11.42	0.73
2.250	0.73	5.333	9.50	8.417	1.46	11.50	0.73
2.333	4.39	5.417	9.50	8.500	1.46	11.58	0.73
2.417	4.39	5.500	9.50	8.583	1.46	11.67	0.73
2.500	4.39	5.583	9.50	8.667	1.46	11.75	0.73
2.583	4.39	5.667	9.50	8.750	1.46	11.83	0.73
2.667	4.39	5.750	9.50	8.833	1.46	11.92	0.73
2.750	4.39	5.833	9.50	8.917	1.46	12.00	0.73
2.833	4.39	5.917	9.50	9.000	1.46	12.08	0.73
2.917	4.39	6.000	9.50	9.083	1.46	12.17	0.73
3.000	4.39	6.083	9.50	9.167	1.46	12.25	0.73
3.083	4.39	6.167	9.50	9.250	1.46		

Unit Hyd Qpeak (cms)= 0.211

PEAK FLOW (cms)= 0.063 (i)
TIME TO PEAK (hrs)= 5.333
RUNOFF VOLUME (mm)= 25.442
TOTAL RAINFALL (mm)= 73.100
RUNOFF COEFFICIENT = 0.348

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0113)	Area (ha)=	0.52	
ID= 1 DT= 5.0 min	Total Imp(%)=	51.00	Dir. Conn.(%)= 51.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.27	0.25
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	58.88	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	4.39	6.250	9.50	9.33	0.73
0.167	0.00	3.250	4.39	6.333	5.12	9.42	0.73
0.250	0.00	3.333	12.43	6.417	5.12	9.50	0.73
0.333	0.73	3.417	12.43	6.500	5.12	9.58	0.73
0.417	0.73	3.500	12.43	6.583	5.12	9.67	0.73
0.500	0.73	3.583	12.43	6.667	5.12	9.75	0.73
0.583	0.73	3.667	12.43	6.750	5.12	9.83	0.73
0.667	0.73	3.750	12.43	6.833	5.12	9.92	0.73
0.750	0.73	3.833	12.43	6.917	5.12	10.00	0.73
0.833	0.73	3.917	12.43	7.000	5.12	10.08	0.73
0.917	0.73	4.000	12.43	7.083	5.12	10.17	0.73
1.000	0.73	4.083	12.43	7.167	5.12	10.25	0.73
1.083	0.73	4.167	12.43	7.250	5.12	10.33	0.73
1.167	0.73	4.250	12.43	7.333	2.92	10.42	0.73
1.250	0.73	4.333	33.63	7.417	2.92	10.50	0.73
1.333	0.73	4.417	33.63	7.500	2.92	10.58	0.73
1.417	0.73	4.500	33.63	7.583	2.92	10.67	0.73
1.500	0.73	4.583	33.63	7.667	2.92	10.75	0.73
1.583	0.73	4.667	33.63	7.750	2.92	10.83	0.73
1.667	0.73	4.750	33.63	7.833	2.92	10.92	0.73
1.750	0.73	4.833	33.63	7.917	2.92	11.00	0.73
1.833	0.73	4.917	33.63	8.000	2.92	11.08	0.73
1.917	0.73	5.000	33.63	8.083	2.92	11.17	0.73
2.000	0.73	5.083	33.63	8.167	2.92	11.25	0.73
2.083	0.73	5.167	33.63	8.250	2.92	11.33	0.73
2.167	0.73	5.250	33.63	8.333	1.46	11.42	0.73
2.250	0.73	5.333	9.50	8.417	1.46	11.50	0.73
2.333	4.39	5.417	9.50	8.500	1.46	11.58	0.73
2.417	4.39	5.500	9.50	8.583	1.46	11.67	0.73
2.500	4.39	5.583	9.50	8.667	1.46	11.75	0.73
2.583	4.39	5.667	9.50	8.750	1.46	11.83	0.73
2.667	4.39	5.750	9.50	8.833	1.46	11.92	0.73
2.750	4.39	5.833	9.50	8.917	1.46	12.00	0.73
2.833	4.39	5.917	9.50	9.000	1.46	12.08	0.73
2.917	4.39	6.000	9.50	9.083	1.46	12.17	0.73
3.000	4.39	6.083	9.50	9.167	1.46	12.25	0.73
3.083	4.39	6.167	9.50	9.250	1.46		

Max.Eff.Inten.(mm/hr)=	33.63	25.46	
over (min)	5.00	20.00	
Storage Coeff. (min)=	2.87 (ii)	15.07 (ii)	
Unit Hyd. Tpeak (min)=	5.00	20.00	
Unit Hyd. peak (cms)=	0.28	0.07	
			TOTALS
PEAK FLOW (cms)=	0.02	0.02	0.041 (iii)
TIME TO PEAK (hrs)=	5.08	5.25	5.25
RUNOFF VOLUME (mm)=	72.10	44.03	58.33
TOTAL RAINFALL (mm)=	73.10	73.10	73.10
RUNOFF COEFFICIENT =	0.99	0.60	0.80

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0114)	Area (ha)=	0.34	
ID= 1 DT= 5.0 min	Total Imp(%)=	75.00	Dir. Conn.(%)= 75.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.26	0.09
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	47.61	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	4.39	6.250	9.50	9.33	0.73
0.167	0.00	3.250	4.39	6.333	5.12	9.42	0.73
0.250	0.00	3.333	12.43	6.417	5.12	9.50	0.73
0.333	0.73	3.417	12.43	6.500	5.12	9.58	0.73
0.417	0.73	3.500	12.43	6.583	5.12	9.67	0.73
0.500	0.73	3.583	12.43	6.667	5.12	9.75	0.73
0.583	0.73	3.667	12.43	6.750	5.12	9.83	0.73
0.667	0.73	3.750	12.43	6.833	5.12	9.92	0.73
0.750	0.73	3.833	12.43	6.917	5.12	10.00	0.73
0.833	0.73	3.917	12.43	7.000	5.12	10.08	0.73
0.917	0.73	4.000	12.43	7.083	5.12	10.17	0.73
1.000	0.73	4.083	12.43	7.167	5.12	10.25	0.73
1.083	0.73	4.167	12.43	7.250	5.12	10.33	0.73
1.167	0.73	4.250	12.43	7.333	2.92	10.42	0.73
1.250	0.73	4.333	33.63	7.417	2.92	10.50	0.73
1.333	0.73	4.417	33.63	7.500	2.92	10.58	0.73
1.417	0.73	4.500	33.63	7.583	2.92	10.67	0.73
1.500	0.73	4.583	33.63	7.667	2.92	10.75	0.73
1.583	0.73	4.667	33.63	7.750	2.92	10.83	0.73
1.667	0.73	4.750	33.63	7.833	2.92	10.92	0.73
1.750	0.73	4.833	33.63	7.917	2.92	11.00	0.73
1.833	0.73	4.917	33.63	8.000	2.92	11.08	0.73
1.917	0.73	5.000	33.63	8.083	2.92	11.17	0.73

2.000	0.73	5.083	33.63	8.167	2.92	11.25	0.73
2.083	0.73	5.167	33.63	8.250	2.92	11.33	0.73
2.167	0.73	5.250	33.63	8.333	1.46	11.42	0.73
2.250	0.73	5.333	9.50	8.417	1.46	11.50	0.73
2.333	4.39	5.417	9.50	8.500	1.46	11.58	0.73
2.417	4.39	5.500	9.50	8.583	1.46	11.67	0.73
2.500	4.39	5.583	9.50	8.667	1.46	11.75	0.73
2.583	4.39	5.667	9.50	8.750	1.46	11.83	0.73
2.667	4.39	5.750	9.50	8.833	1.46	11.92	0.73
2.750	4.39	5.833	9.50	8.917	1.46	12.00	0.73
2.833	4.39	5.917	9.50	9.000	1.46	12.08	0.73
2.917	4.39	6.000	9.50	9.083	1.46	12.17	0.73
3.000	4.39	6.083	9.50	9.167	1.46	12.25	0.73
3.083	4.39	6.167	9.50	9.250	1.46		

Max.Eff.Inten.(mm/hr)=	33.63	25.46		
over (min)	5.00	15.00		
Storage Coeff. (min)=	2.53 (ii)	14.73 (ii)		
Unit Hyd. Tpeak (min)=	5.00	15.00		
Unit Hyd. peak (cms)=	0.29	0.08		
			TOTALS	
PEAK FLOW (cms)=	0.02	0.01	0.029 (iii)	
TIME TO PEAK (hrs)=	4.83	5.25	5.25	
RUNOFF VOLUME (mm)=	72.10	44.03	65.06	
TOTAL RAINFALL (mm)=	73.10	73.10	73.10	
RUNOFF COEFFICIENT =	0.99	0.60	0.89	

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0117)	Area (ha)= 6.54
ID= 1 DT= 5.0 min	Total Imp(%)= 71.00 Dir. Conn.(%)= 56.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	4.64	1.90
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	208.81	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	4.39	6.250	9.50	9.33	0.73
0.167	0.00	3.250	4.39	6.333	5.12	9.42	0.73
0.250	0.00	3.333	12.43	6.417	5.12	9.50	0.73
0.333	0.73	3.417	12.43	6.500	5.12	9.58	0.73
0.417	0.73	3.500	12.43	6.583	5.12	9.67	0.73
0.500	0.73	3.583	12.43	6.667	5.12	9.75	0.73
0.583	0.73	3.667	12.43	6.750	5.12	9.83	0.73
0.667	0.73	3.750	12.43	6.833	5.12	9.92	0.73
0.750	0.73	3.833	12.43	6.917	5.12	10.00	0.73
0.833	0.73	3.917	12.43	7.000	5.12	10.08	0.73
0.917	0.73	4.000	12.43	7.083	5.12	10.17	0.73
1.000	0.73	4.083	12.43	7.167	5.12	10.25	0.73
1.083	0.73	4.167	12.43	7.250	5.12	10.33	0.73
1.167	0.73	4.250	12.43	7.333	2.92	10.42	0.73
1.250	0.73	4.333	33.63	7.417	2.92	10.50	0.73
1.333	0.73	4.417	33.63	7.500	2.92	10.58	0.73
1.417	0.73	4.500	33.63	7.583	2.92	10.67	0.73
1.500	0.73	4.583	33.63	7.667	2.92	10.75	0.73
1.583	0.73	4.667	33.63	7.750	2.92	10.83	0.73
1.667	0.73	4.750	33.63	7.833	2.92	10.92	0.73
1.750	0.73	4.833	33.63	7.917	2.92	11.00	0.73
1.833	0.73	4.917	33.63	8.000	2.92	11.08	0.73
1.917	0.73	5.000	33.63	8.083	2.92	11.17	0.73
2.000	0.73	5.083	33.63	8.167	2.92	11.25	0.73
2.083	0.73	5.167	33.63	8.250	2.92	11.33	0.73
2.167	0.73	5.250	33.63	8.333	1.46	11.42	0.73
2.250	0.73	5.333	9.50	8.417	1.46	11.50	0.73
2.333	4.39	5.417	9.50	8.500	1.46	11.58	0.73
2.417	4.39	5.500	9.50	8.583	1.46	11.67	0.73
2.500	4.39	5.583	9.50	8.667	1.46	11.75	0.73
2.583	4.39	5.667	9.50	8.750	1.46	11.83	0.73
2.667	4.39	5.750	9.50	8.833	1.46	11.92	0.73
2.750	4.39	5.833	9.50	8.917	1.46	12.00	0.73
2.833	4.39	5.917	9.50	9.000	1.46	12.08	0.73
2.917	4.39	6.000	9.50	9.083	1.46	12.17	0.73
3.000	4.39	6.083	9.50	9.167	1.46	12.25	0.73
3.083	4.39	6.167	9.50	9.250	1.46		

Max.Eff.Inten.(mm/hr)=	33.63	43.63		
over (min)	5.00	20.00		
Storage Coeff. (min)=	6.14 (ii)	15.98 (ii)		
Unit Hyd. Tpeak (min)=	5.00	20.00		
Unit Hyd. peak (cms)=	0.19	0.07		
			TOTALS	
PEAK FLOW (cms)=	0.34	0.21	0.551 (iii)	
TIME TO PEAK (hrs)=	5.25	5.25	5.25	
RUNOFF VOLUME (mm)=	72.10	51.15	62.88	
TOTAL RAINFALL (mm)=	73.10	73.10	73.10	
RUNOFF COEFFICIENT =	0.99	0.70	0.86	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(0115)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.1507	0.2774
	0.0103	0.1190	0.1711	0.3280
	0.0819	0.2055	0.1837	0.3663
	0.1039	0.2468	0.3000	0.3955

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0117)	6.540	0.551	5.25	62.88
OUTFLOW: ID= 1 (0115)	6.540	0.137	6.33	62.43

PEAK FLOW REDUCTION [Qout/Qin](%)= 24.78
TIME SHIFT OF PEAK FLOW (min)= 65.00
MAXIMUM STORAGE USED (ha.m.)= 0.2682

CALIB
STANDHYD (0119)
ID= 1 DT= 5.0 min

Area (ha)= 0.24
Total Imp(%)= 38.00 Dir. Conn.(%)= 21.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.09	0.15
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	40.00	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	4.39	6.250	9.50	9.33	0.73
0.167	0.00	3.250	4.39	6.333	5.12	9.42	0.73
0.250	0.00	3.333	12.43	6.417	5.12	9.50	0.73
0.333	0.73	3.417	12.43	6.500	5.12	9.58	0.73
0.417	0.73	3.500	12.43	6.583	5.12	9.67	0.73
0.500	0.73	3.583	12.43	6.667	5.12	9.75	0.73
0.583	0.73	3.667	12.43	6.750	5.12	9.83	0.73
0.667	0.73	3.750	12.43	6.833	5.12	9.92	0.73
0.750	0.73	3.833	12.43	6.917	5.12	10.00	0.73
0.833	0.73	3.917	12.43	7.000	5.12	10.08	0.73
0.917	0.73	4.000	12.43	7.083	5.12	10.17	0.73
1.000	0.73	4.083	12.43	7.167	5.12	10.25	0.73
1.083	0.73	4.167	12.43	7.250	5.12	10.33	0.73
1.167	0.73	4.250	12.43	7.333	2.92	10.42	0.73
1.250	0.73	4.333	33.63	7.417	2.92	10.50	0.73
1.333	0.73	4.417	33.63	7.500	2.92	10.58	0.73
1.417	0.73	4.500	33.63	7.583	2.92	10.67	0.73
1.500	0.73	4.583	33.63	7.667	2.92	10.75	0.73
1.583	0.73	4.667	33.63	7.750	2.92	10.83	0.73
1.667	0.73	4.750	33.63	7.833	2.92	10.92	0.73
1.750	0.73	4.833	33.63	7.917	2.92	11.00	0.73
1.833	0.73	4.917	33.63	8.000	2.92	11.08	0.73
1.917	0.73	5.000	33.63	8.083	2.92	11.17	0.73
2.000	0.73	5.083	33.63	8.167	2.92	11.25	0.73
2.083	0.73	5.167	33.63	8.250	2.92	11.33	0.73
2.167	0.73	5.250	33.63	8.333	1.46	11.42	0.73
2.250	0.73	5.333	9.50	8.417	1.46	11.50	0.73
2.333	4.39	5.417	9.50	8.500	1.46	11.58	0.73
2.417	4.39	5.500	9.50	8.583	1.46	11.67	0.73
2.500	4.39	5.583	9.50	8.667	1.46	11.75	0.73
2.583	4.39	5.667	9.50	8.750	1.46	11.83	0.73
2.667	4.39	5.750	9.50	8.833	1.46	11.92	0.73
2.750	4.39	5.833	9.50	8.917	1.46	12.00	0.73
2.833	4.39	5.917	9.50	9.000	1.46	12.08	0.73
2.917	4.39	6.000	9.50	9.083	1.46	12.17	0.73
3.000	4.39	6.083	9.50	9.167	1.46	12.25	0.73
3.083	4.39	6.167	9.50	9.250	1.46		

				TOTALS
Max.Eff.Inten.(mm/hr)=	33.63	34.89		
over (min)	5.00	15.00		
Storage Coeff. (min)=	2.28 (ii)	13.03 (ii)		
Unit Hyd. Tpeak (min)=	5.00	15.00		
Unit Hyd. peak (cms)=	0.30	0.08		
PEAK FLOW (cms)=	0.00	0.01		0.018 (iii)
TIME TO PEAK (hrs)=	4.83	5.25		5.25
RUNOFF VOLUME (mm)=	72.10	48.30		53.27
TOTAL RAINFALL (mm)=	73.10	73.10		73.10
RUNOFF COEFFICIENT =	0.99	0.66		0.73

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0112)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0113):	0.52	0.041	5.25	58.33
	+ ID2= 2 (0114):	0.34	0.029	5.25	65.06
	ID = 3 (0112):	0.86	0.070	5.25	60.99

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0112)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
3 + 2 = 1	ID1= 3 (0112):	0.86	0.070	5.25	60.99
	+ ID2= 2 (0115):	6.54	0.137	6.33	62.43
	ID = 1 (0112):	7.40	0.160	5.25	62.27

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0112)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0112):	7.40	0.160	5.25	62.27
	+ ID2= 2 (0116):	1.71	0.063	5.33	25.44
	ID = 3 (0112):	9.11	0.222	5.25	55.35

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD  (  0112)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
        ID1= 3 (  0112):      9.11   0.222     5.25    55.35
      + ID2= 2 (  0118):     28.11   0.705     6.67    36.32
        ====================================================
        ID = 1 (  0112):     37.22   0.872     6.58    40.98

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0112)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
        ID1= 1 (  0112):     37.22   0.872     6.58    40.98
      + ID2= 2 (  0119):      0.24   0.018     5.25    53.27
        ====================================================
        ID = 3 (  0112):     37.46   0.876     6.50    41.06

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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================================================================================
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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\5d1fb1f9-9535-419a-b7f2-45daf8d6af0e\scenar
  Summary filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\5d1fb1f9-9535-419a-b7f2-45daf8d6af0e\scenar


DATE: 04-14-2026                          TIME: 05:35:14

USER:



COMMENTS: _____________________________________________________________
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  ********************************************
  ** SIMULATION : Run 5 - 50 Year 12 Hour AES ( **
  ********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\rsoto\AppD
|                  |              ata\Local\Temp\
|                  |              8dfe3181-6515-409d-9f0a-7bb99517af18\3216eba5
| Ptotal= 80.82 mm |    Comments: 50 Year 12 Hour AES (Bloor, TRCA)
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    0.00 |  3.25   13.74 |  6.50    5.66 |  9.75    0.81
                0.25    0.81 |  3.50   13.74 |  6.75    5.66 | 10.00    0.81
                0.50    0.81 |  3.75   13.74 |  7.00    5.66 | 10.25    0.81
                0.75    0.81 |  4.00   13.74 |  7.25    3.23 | 10.50    0.81
                1.00    0.81 |  4.25   37.17 |  7.50    3.23 | 10.75    0.81
                1.25    0.81 |  4.50   37.17 |  7.75    3.23 | 11.00    0.81
                1.50    0.81 |  4.75   37.17 |  8.00    3.23 | 11.25    0.81
                1.75    0.81 |  5.00   37.17 |  8.25    1.62 | 11.50    0.81
                2.00    0.81 |  5.25   10.50 |  8.50    1.62 | 11.75    0.81
                2.25    4.85 |  5.50   10.50 |  8.75    1.62 | 12.00    0.81
                2.50    4.85 |  5.75   10.50 |  9.00    1.62 |
                2.75    4.85 |  6.00   10.50 |  9.25    0.81 |
                3.00    4.85 |  6.25    5.66 |  9.50    0.81 |

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--------------------
| CALIB            |
| NASHYD   (  0111)|   Area    (ha)=  28.11   Curve Number   (CN)= 81.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.39

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                        ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    0.00 | 3.167    4.85 | 6.250   10.50 |  9.33    0.81
               0.167    0.00 | 3.250    4.85 | 6.333    5.66 |  9.42    0.81
               0.250    0.00 | 3.333   13.74 | 6.417    5.66 |  9.50    0.81
               0.333    0.81 | 3.417   13.74 | 6.500    5.66 |  9.58    0.81
               0.417    0.81 | 3.500   13.74 | 6.583    5.66 |  9.67    0.81
               0.500    0.81 | 3.583   13.74 | 6.667    5.66 |  9.75    0.81
               0.583    0.81 | 3.667   13.74 | 6.750    5.66 |  9.83    0.81
               0.667    0.81 | 3.750   13.74 | 6.833    5.66 |  9.92    0.81
               0.750    0.81 | 3.833   13.74 | 6.917    5.66 | 10.00    0.81
               0.833    0.81 | 3.917   13.74 | 7.000    5.66 | 10.08    0.81
               0.917    0.81 | 4.000   13.74 | 7.083    5.66 | 10.17    0.81
               1.000    0.81 | 4.083   13.74 | 7.167    5.66 | 10.25    0.81
               1.083    0.81 | 4.167   13.74 | 7.250    5.66 | 10.33    0.81
               1.167    0.81 | 4.250   13.74 | 7.333    3.23 | 10.42    0.81
               1.250    0.81 | 4.333   37.17 | 7.417    3.23 | 10.50    0.81
               1.333    0.81 | 4.417   37.17 | 7.500    3.23 | 10.58    0.81
               1.417    0.81 | 4.500   37.17 | 7.583    3.23 | 10.67    0.81
```

1.500	0.81	4.583	37.17	7.667	3.23	10.75	0.81
1.583	0.81	4.667	37.17	7.750	3.23	10.83	0.81
1.667	0.81	4.750	37.17	7.833	3.23	10.92	0.81
1.750	0.81	4.833	37.17	7.917	3.23	11.00	0.81
1.833	0.81	4.917	37.17	8.000	3.23	11.08	0.81
1.917	0.81	5.000	37.17	8.083	3.23	11.17	0.81
2.000	0.81	5.083	37.17	8.167	3.23	11.25	0.81
2.083	0.81	5.167	37.17	8.250	3.23	11.33	0.81
2.167	0.81	5.250	37.17	8.333	1.62	11.42	0.81
2.250	0.81	5.333	10.50	8.417	1.62	11.50	0.81
2.333	4.85	5.417	10.50	8.500	1.62	11.58	0.81
2.417	4.85	5.500	10.50	8.583	1.62	11.67	0.81
2.500	4.85	5.583	10.50	8.667	1.62	11.75	0.81
2.583	4.85	5.667	10.50	8.750	1.62	11.83	0.81
2.667	4.85	5.750	10.50	8.833	1.62	11.92	0.81
2.750	4.85	5.833	10.50	8.917	1.62	12.00	0.81
2.833	4.85	5.917	10.50	9.000	1.62	12.08	0.81
2.917	4.85	6.000	10.50	9.083	1.62	12.17	0.81
3.000	4.85	6.083	10.50	9.167	1.62	12.25	0.81
3.083	4.85	6.167	10.50	9.250	1.62		

Unit Hyd Qpeak (cms)= 0.772

PEAK FLOW (cms)= 0.828 (i)
TIME TO PEAK (hrs)= 6.583
RUNOFF VOLUME (mm)= 42.457
TOTAL RAINFALL (mm)= 80.820
RUNOFF COEFFICIENT = 0.525

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ROUTEPIPE(0118)	IN= 2---> OUT= 1	DT= 5.0 min

PIPE Number = 1.00
Diameter (mm)=1200.00
Length (m)= 500.00
Slope (m/m)= 0.002
Manning n = 0.013

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.06	.114E+02	0.0	0.41	20.34
0.13	.317E+02	0.0	0.64	13.04
0.19	.573E+02	0.1	0.82	10.13
0.25	.866E+02	0.2	0.98	8.52
0.32	.119E+03	0.3	1.11	7.49
0.38	.153E+03	0.4	1.23	6.77
0.44	.189E+03	0.5	1.34	6.24
0.51	.226E+03	0.6	1.43	5.84
0.57	.264E+03	0.8	1.51	5.53
0.63	.302E+03	1.0	1.58	5.29
0.69	.339E+03	1.1	1.63	5.10
0.76	.376E+03	1.3	1.68	4.95
0.82	.412E+03	1.4	1.72	4.85
0.88	.447E+03	1.6	1.74	4.78
0.95	.479E+03	1.7	1.76	4.74
1.01	.508E+03	1.8	1.76	4.74
1.07	.534E+03	1.9	1.74	4.80
1.14	.554E+03	1.9	1.69	4.92
1.20	.566E+03	1.7	1.54	5.40

<---- hydrograph ----> <-pipe / channel->

		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (	0111)	28.11	0.83	6.58	42.46	0.58	1.52
OUTFLOW: ID= 1 (	0118)	28.11	0.83	6.67	42.46	0.58	1.52

CALIB	NASHYD (0116)	ID= 1 DT= 5.0 min

Area (ha)= 1.71 Curve Number (CN)= 69.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.31

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	4.85	6.250	10.50	9.33	0.81
0.167	0.00	3.250	4.85	6.333	5.66	9.42	0.81
0.250	0.00	3.333	13.74	6.417	5.66	9.50	0.81
0.333	0.81	3.417	13.74	6.500	5.66	9.58	0.81
0.417	0.81	3.500	13.74	6.583	5.66	9.67	0.81
0.500	0.81	3.583	13.74	6.667	5.66	9.75	0.81
0.583	0.81	3.667	13.74	6.750	5.66	9.83	0.81
0.667	0.81	3.750	13.74	6.833	5.66	9.92	0.81
0.750	0.81	3.833	13.74	6.917	5.66	10.00	0.81
0.833	0.81	3.917	13.74	7.000	5.66	10.08	0.81
0.917	0.81	4.000	13.74	7.083	5.66	10.17	0.81
1.000	0.81	4.083	13.74	7.167	5.66	10.25	0.81
1.083	0.81	4.167	13.74	7.250	5.66	10.33	0.81
1.167	0.81	4.250	13.74	7.333	3.23	10.42	0.81
1.250	0.81	4.333	37.17	7.417	3.23	10.50	0.81
1.333	0.81	4.417	37.17	7.500	3.23	10.58	0.81
1.417	0.81	4.500	37.17	7.583	3.23	10.67	0.81
1.500	0.81	4.583	37.17	7.667	3.23	10.75	0.81
1.583	0.81	4.667	37.17	7.750	3.23	10.83	0.81
1.667	0.81	4.750	37.17	7.833	3.23	10.92	0.81
1.750	0.81	4.833	37.17	7.917	3.23	11.00	0.81
1.833	0.81	4.917	37.17	8.000	3.23	11.08	0.81
1.917	0.81	5.000	37.17	8.083	3.23	11.17	0.81
2.000	0.81	5.083	37.17	8.167	3.23	11.25	0.81
2.083	0.81	5.167	37.17	8.250	3.23	11.33	0.81
2.167	0.81	5.250	37.17	8.333	1.62	11.42	0.81
2.250	0.81	5.333	10.50	8.417	1.62	11.50	0.81
2.333	4.85	5.417	10.50	8.500	1.62	11.58	0.81
2.417	4.85	5.500	10.50	8.583	1.62	11.67	0.81
2.500	4.85	5.583	10.50	8.667	1.62	11.75	0.81
2.583	4.85	5.667	10.50	8.750	1.62	11.83	0.81
2.667	4.85	5.750	10.50	8.833	1.62	11.92	0.81
2.750	4.85	5.833	10.50	8.917	1.62	12.00	0.81
2.833	4.85	5.917	10.50	9.000	1.62	12.08	0.81
2.917	4.85	6.000	10.50	9.083	1.62	12.17	0.81
3.000	4.85	6.083	10.50	9.167	1.62	12.25	0.81
3.083	4.85	6.167	10.50	9.250	1.62		

Unit Hyd Qpeak (cms)= 0.211

```
     PEAK FLOW       (cms)=   0.075 (i)
     TIME TO PEAK    (hrs)=   5.333
     RUNOFF VOLUME    (mm)=  30.256
     TOTAL RAINFALL   (mm)=  80.820
     RUNOFF COEFFICIENT   =   0.374

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0113)|   Area    (ha)=   0.52
|ID= 1 DT= 5.0 min |   Total Imp(%)=  51.00   Dir. Conn.(%)=  51.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.27         0.25
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      58.88        40.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	4.85	6.250	10.50	9.33	0.81
0.167	0.00	3.250	4.85	6.333	5.66	9.42	0.81
0.250	0.00	3.333	13.74	6.417	5.66	9.50	0.81
0.333	0.81	3.417	13.74	6.500	5.66	9.58	0.81
0.417	0.81	3.500	13.74	6.583	5.66	9.67	0.81
0.500	0.81	3.583	13.74	6.667	5.66	9.75	0.81
0.583	0.81	3.667	13.74	6.750	5.66	9.83	0.81
0.667	0.81	3.750	13.74	6.833	5.66	9.92	0.81
0.750	0.81	3.833	13.74	6.917	5.66	10.00	0.81
0.833	0.81	3.917	13.74	7.000	5.66	10.08	0.81
0.917	0.81	4.000	13.74	7.083	5.66	10.17	0.81
1.000	0.81	4.083	13.74	7.167	5.66	10.25	0.81
1.083	0.81	4.167	13.74	7.250	5.66	10.33	0.81
1.167	0.81	4.250	13.74	7.333	3.23	10.42	0.81
1.250	0.81	4.333	37.17	7.417	3.23	10.50	0.81
1.333	0.81	4.417	37.17	7.500	3.23	10.58	0.81
1.417	0.81	4.500	37.17	7.583	3.23	10.67	0.81
1.500	0.81	4.583	37.17	7.667	3.23	10.75	0.81
1.583	0.81	4.667	37.17	7.750	3.23	10.83	0.81
1.667	0.81	4.750	37.17	7.833	3.23	10.92	0.81
1.750	0.81	4.833	37.17	7.917	3.23	11.00	0.81
1.833	0.81	4.917	37.17	8.000	3.23	11.08	0.81
1.917	0.81	5.000	37.17	8.083	3.23	11.17	0.81
2.000	0.81	5.083	37.17	8.167	3.23	11.25	0.81
2.083	0.81	5.167	37.17	8.250	3.23	11.33	0.81
2.167	0.81	5.250	37.17	8.333	1.62	11.42	0.81
2.250	0.81	5.333	10.50	8.417	1.62	11.50	0.81
2.333	4.85	5.417	10.50	8.500	1.62	11.58	0.81
2.417	4.85	5.500	10.50	8.583	1.62	11.67	0.81
2.500	4.85	5.583	10.50	8.667	1.62	11.75	0.81
2.583	4.85	5.667	10.50	8.750	1.62	11.83	0.81
2.667	4.85	5.750	10.50	8.833	1.62	11.92	0.81
2.750	4.85	5.833	10.50	8.917	1.62	12.00	0.81
2.833	4.85	5.917	10.50	9.000	1.62	12.08	0.81
2.917	4.85	6.000	10.50	9.083	1.62	12.17	0.81
3.000	4.85	6.083	10.50	9.167	1.62	12.25	0.81
3.083	4.85	6.167	10.50	9.250	1.62		

```
     Max.Eff.Inten.(mm/hr)=      37.17        29.06
               over (min)        5.00        15.00
     Storage Coeff.  (min)=       2.76 (ii)   14.33 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.28         0.08
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.03         0.02          0.046 (iii)
     TIME TO PEAK    (hrs)=       5.08         5.25           5.25
     RUNOFF VOLUME    (mm)=      79.82        50.68          65.52
     TOTAL RAINFALL   (mm)=      80.82        80.82          80.82
     RUNOFF COEFFICIENT   =       0.99         0.63           0.81

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0114)|   Area    (ha)=   0.34
|ID= 1 DT= 5.0 min |   Total Imp(%)=  75.00   Dir. Conn.(%)=  75.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.26         0.09
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      47.61        40.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	4.85	6.250	10.50	9.33	0.81
0.167	0.00	3.250	4.85	6.333	5.66	9.42	0.81
0.250	0.00	3.333	13.74	6.417	5.66	9.50	0.81
0.333	0.81	3.417	13.74	6.500	5.66	9.58	0.81
0.417	0.81	3.500	13.74	6.583	5.66	9.67	0.81
0.500	0.81	3.583	13.74	6.667	5.66	9.75	0.81
0.583	0.81	3.667	13.74	6.750	5.66	9.83	0.81
0.667	0.81	3.750	13.74	6.833	5.66	9.92	0.81
0.750	0.81	3.833	13.74	6.917	5.66	10.00	0.81
0.833	0.81	3.917	13.74	7.000	5.66	10.08	0.81
0.917	0.81	4.000	13.74	7.083	5.66	10.17	0.81
1.000	0.81	4.083	13.74	7.167	5.66	10.25	0.81
1.083	0.81	4.167	13.74	7.250	5.66	10.33	0.81
1.167	0.81	4.250	13.74	7.333	3.23	10.42	0.81
1.250	0.81	4.333	37.17	7.417	3.23	10.50	0.81
1.333	0.81	4.417	37.17	7.500	3.23	10.58	0.81
1.417	0.81	4.500	37.17	7.583	3.23	10.67	0.81
1.500	0.81	4.583	37.17	7.667	3.23	10.75	0.81

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               1.583    0.81 | 4.667   37.17 | 7.750    3.23 | 10.83    0.81
               1.667    0.81 | 4.750   37.17 | 7.833    3.23 | 10.92    0.81
               1.750    0.81 | 4.833   37.17 | 7.917    3.23 | 11.00    0.81
               1.833    0.81 | 4.917   37.17 | 8.000    3.23 | 11.08    0.81
               1.917    0.81 | 5.000   37.17 | 8.083    3.23 | 11.17    0.81
               2.000    0.81 | 5.083   37.17 | 8.167    3.23 | 11.25    0.81
               2.083    0.81 | 5.167   37.17 | 8.250    3.23 | 11.33    0.81
               2.167    0.81 | 5.250   37.17 | 8.333    1.62 | 11.42    0.81
               2.250    0.81 | 5.333   10.50 | 8.417    1.62 | 11.50    0.81
               2.333    4.85 | 5.417   10.50 | 8.500    1.62 | 11.58    0.81
               2.417    4.85 | 5.500   10.50 | 8.583    1.62 | 11.67    0.81
               2.500    4.85 | 5.583   10.50 | 8.667    1.62 | 11.75    0.81
               2.583    4.85 | 5.667   10.50 | 8.750    1.62 | 11.83    0.81
               2.667    4.85 | 5.750   10.50 | 8.833    1.62 | 11.92    0.81
               2.750    4.85 | 5.833   10.50 | 8.917    1.62 | 12.00    0.81
               2.833    4.85 | 5.917   10.50 | 9.000    1.62 | 12.08    0.81
               2.917    4.85 | 6.000   10.50 | 9.083    1.62 | 12.17    0.81
               3.000    4.85 | 6.083   10.50 | 9.167    1.62 | 12.25    0.81
               3.083    4.85 | 6.167   10.50 | 9.250    1.62 |

    Max.Eff.Inten.(mm/hr)=      37.17        29.06
                over (min)        5.00        15.00
    Storage Coeff.  (min)=       2.43 (ii)   14.00 (ii)
    Unit Hyd. Tpeak (min)=       5.00        15.00
    Unit Hyd. peak  (cms)=       0.30         0.08
                                                        *TOTALS*
    PEAK FLOW       (cms)=       0.03         0.01        0.033 (iii)
    TIME TO PEAK    (hrs)=       4.83         5.25         5.25
    RUNOFF VOLUME    (mm)=      79.82        50.68        72.51
    TOTAL RAINFALL   (mm)=      80.82        80.82        80.82
    RUNOFF COEFFICIENT   =       0.99         0.63         0.90

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  85.0    Ia = Dep. Storage  (Above)
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB            |
| STANDHYD (  0117)|   Area    (ha)=   6.54
|ID= 1 DT= 5.0 min |   Total Imp(%)=  71.00   Dir. Conn.(%)=  56.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       4.64         1.90
    Dep. Storage     (mm)=       1.00         1.50
    Average Slope     (%)=       1.00         2.00
    Length            (m)=     208.81        40.00
    Mannings n           =      0.013        0.250

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.

                        ---- TRANSFORMED HYETOGRAPH ----
     TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
      hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
    0.083    0.00 | 3.167    4.85 | 6.250   10.50 |  9.33    0.81
    0.167    0.00 | 3.250    4.85 | 6.333    5.66 |  9.42    0.81
    0.250    0.00 | 3.333   13.74 | 6.417    5.66 |  9.50    0.81
    0.333    0.81 | 3.417   13.74 | 6.500    5.66 |  9.58    0.81
    0.417    0.81 | 3.500   13.74 | 6.583    5.66 |  9.67    0.81
    0.500    0.81 | 3.583   13.74 | 6.667    5.66 |  9.75    0.81
    0.583    0.81 | 3.667   13.74 | 6.750    5.66 |  9.83    0.81
    0.667    0.81 | 3.750   13.74 | 6.833    5.66 |  9.92    0.81
    0.750    0.81 | 3.833   13.74 | 6.917    5.66 | 10.00    0.81
    0.833    0.81 | 3.917   13.74 | 7.000    5.66 | 10.08    0.81
    0.917    0.81 | 4.000   13.74 | 7.083    5.66 | 10.17    0.81
    1.000    0.81 | 4.083   13.74 | 7.167    5.66 | 10.25    0.81
    1.083    0.81 | 4.167   13.74 | 7.250    5.66 | 10.33    0.81
    1.167    0.81 | 4.250   13.74 | 7.333    3.23 | 10.42    0.81
    1.250    0.81 | 4.333   37.17 | 7.417    3.23 | 10.50    0.81
    1.333    0.81 | 4.417   37.17 | 7.500    3.23 | 10.58    0.81
    1.417    0.81 | 4.500   37.17 | 7.583    3.23 | 10.67    0.81
    1.500    0.81 | 4.583   37.17 | 7.667    3.23 | 10.75    0.81
    1.583    0.81 | 4.667   37.17 | 7.750    3.23 | 10.83    0.81
    1.667    0.81 | 4.750   37.17 | 7.833    3.23 | 10.92    0.81
    1.750    0.81 | 4.833   37.17 | 7.917    3.23 | 11.00    0.81
    1.833    0.81 | 4.917   37.17 | 8.000    3.23 | 11.08    0.81
    1.917    0.81 | 5.000   37.17 | 8.083    3.23 | 11.17    0.81
    2.000    0.81 | 5.083   37.17 | 8.167    3.23 | 11.25    0.81
    2.083    0.81 | 5.167   37.17 | 8.250    3.23 | 11.33    0.81
    2.167    0.81 | 5.250   37.17 | 8.333    1.62 | 11.42    0.81
    2.250    0.81 | 5.333   10.50 | 8.417    1.62 | 11.50    0.81
    2.333    4.85 | 5.417   10.50 | 8.500    1.62 | 11.58    0.81
    2.417    4.85 | 5.500   10.50 | 8.583    1.62 | 11.67    0.81
    2.500    4.85 | 5.583   10.50 | 8.667    1.62 | 11.75    0.81
    2.583    4.85 | 5.667   10.50 | 8.750    1.62 | 11.83    0.81
    2.667    4.85 | 5.750   10.50 | 8.833    1.62 | 11.92    0.81
    2.750    4.85 | 5.833   10.50 | 8.917    1.62 | 12.00    0.81
    2.833    4.85 | 5.917   10.50 | 9.000    1.62 | 12.08    0.81
    2.917    4.85 | 6.000   10.50 | 9.083    1.62 | 12.17    0.81
    3.000    4.85 | 6.083   10.50 | 9.167    1.62 | 12.25    0.81
    3.083    4.85 | 6.167   10.50 | 9.250    1.62 |

Max.Eff.Inten.(mm/hr)=      37.17        49.21
            over (min)        5.00        20.00
Storage Coeff.  (min)=       5.90 (ii)   15.28 (ii)
Unit Hyd. Tpeak (min)=       5.00        20.00
Unit Hyd. peak  (cms)=       0.19         0.07
                                                    *TOTALS*
PEAK FLOW       (cms)=       0.38         0.24        0.617 (iii)
TIME TO PEAK    (hrs)=       5.25         5.25         5.25
RUNOFF VOLUME    (mm)=      79.82        58.27        70.34
TOTAL RAINFALL   (mm)=      80.82        80.82        80.82
RUNOFF COEFFICIENT   =       0.99         0.72         0.87

  (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
      CN*  =  85.0    Ia = Dep. Storage  (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
      THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| RESERVOIR(  0115)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
```

	0.0000	0.0000	|	0.1507	0.2774		
	0.0103	0.1190	|	0.1711	0.3280		
	0.0819	0.2055	|	0.1837	0.3663		
	0.1039	0.2468	|	0.3000	0.3955		

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0117)	6.540	0.617	5.25	70.34
OUTFLOW: ID= 1 (0115)	6.540	0.157	6.33	69.89

PEAK FLOW REDUCTION [Qout/Qin](%)= 25.45
TIME SHIFT OF PEAK FLOW (min)= 65.00
MAXIMUM STORAGE USED (ha.m.)= 0.2929

CALIB	
STANDHYD (0119)	Area (ha)= 0.24
ID= 1 DT= 5.0 min	Total Imp(%)= 38.00 Dir. Conn.(%)= 21.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.09	0.15
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	40.00	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	4.85	6.250	10.50	9.33	0.81
0.167	0.00	3.250	4.85	6.333	5.66	9.42	0.81
0.250	0.00	3.333	13.74	6.417	5.66	9.50	0.81
0.333	0.81	3.417	13.74	6.500	5.66	9.58	0.81
0.417	0.81	3.500	13.74	6.583	5.66	9.67	0.81
0.500	0.81	3.583	13.74	6.667	5.66	9.75	0.81
0.583	0.81	3.667	13.74	6.750	5.66	9.83	0.81
0.667	0.81	3.750	13.74	6.833	5.66	9.92	0.81
0.750	0.81	3.833	13.74	6.917	5.66	10.00	0.81
0.833	0.81	3.917	13.74	7.000	5.66	10.08	0.81
0.917	0.81	4.000	13.74	7.083	5.66	10.17	0.81
1.000	0.81	4.083	13.74	7.167	5.66	10.25	0.81
1.083	0.81	4.167	13.74	7.250	5.66	10.33	0.81
1.167	0.81	4.250	13.74	7.333	3.23	10.42	0.81
1.250	0.81	4.333	37.17	7.417	3.23	10.50	0.81
1.333	0.81	4.417	37.17	7.500	3.23	10.58	0.81
1.417	0.81	4.500	37.17	7.583	3.23	10.67	0.81
1.500	0.81	4.583	37.17	7.667	3.23	10.75	0.81
1.583	0.81	4.667	37.17	7.750	3.23	10.83	0.81
1.667	0.81	4.750	37.17	7.833	3.23	10.92	0.81
1.750	0.81	4.833	37.17	7.917	3.23	11.00	0.81
1.833	0.81	4.917	37.17	8.000	3.23	11.08	0.81
1.917	0.81	5.000	37.17	8.083	3.23	11.17	0.81
2.000	0.81	5.083	37.17	8.167	3.23	11.25	0.81
2.083	0.81	5.167	37.17	8.250	3.23	11.33	0.81
2.167	0.81	5.250	37.17	8.333	1.62	11.42	0.81
2.250	0.81	5.333	10.50	8.417	1.62	11.50	0.81
2.333	4.85	5.417	10.50	8.500	1.62	11.58	0.81
2.417	4.85	5.500	10.50	8.583	1.62	11.67	0.81
2.500	4.85	5.583	10.50	8.667	1.62	11.75	0.81
2.583	4.85	5.667	10.50	8.750	1.62	11.83	0.81
2.667	4.85	5.750	10.50	8.833	1.62	11.92	0.81
2.750	4.85	5.833	10.50	8.917	1.62	12.00	0.81
2.833	4.85	5.917	10.50	9.000	1.62	12.08	0.81
2.917	4.85	6.000	10.50	9.083	1.62	12.17	0.81
3.000	4.85	6.083	10.50	9.167	1.62	12.25	0.81
3.083	4.85	6.167	10.50	9.250	1.62		

				TOTALS
Max.Eff.Inten.(mm/hr)=	37.17	39.55		
over (min)	5.00	15.00		
Storage Coeff. (min)=	2.19 (ii)	12.42 (ii)		
Unit Hyd. Tpeak (min)=	5.00	15.00		
Unit Hyd. peak (cms)=	0.31	0.08		
PEAK FLOW (cms)=	0.01	0.02		0.021 (iii)
TIME TO PEAK (hrs)=	4.83	5.25		5.25
RUNOFF VOLUME (mm)=	79.82	55.24		60.37
TOTAL RAINFALL (mm)=	80.82	80.82		80.82
RUNOFF COEFFICIENT =	0.99	0.68		0.75

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0112)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0113):	0.52	0.046	5.25	65.52
+ ID2= 2 (0114):	0.34	0.033	5.25	72.51
ID = 3 (0112):	0.86	0.079	5.25	68.28

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0112)				
3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0112):	0.86	0.079	5.25	68.28
+ ID2= 2 (0115):	6.54	0.157	6.33	69.89
ID = 1 (0112):	7.40	0.182	5.25	69.70

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0112)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0112):	7.40	0.182	5.25	69.70

```
      + ID2= 2 (  0116):     1.71   0.075     5.33    30.26
        ==================================================
        ID = 3 (  0112):     9.11   0.256     5.25    62.30

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0112)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0112):     9.11   0.256     5.25    62.30
      + ID2= 2 (  0118):    28.11   0.826     6.67    42.46
        ==================================================
        ID = 1 (  0112):    37.22   1.020     6.58    47.31

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0112)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0112):    37.22   1.020     6.58    47.31
      + ID2= 2 (  0119):     0.24   0.021     5.25    60.37
        ==================================================
        ID = 3 (  0112):    37.46   1.024     6.58    47.40

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
================================================================================
=========================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\5c611a2b-f40d-4b48-9f3f-52eca0b92259\scenar
  Summary filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\5c611a2b-f40d-4b48-9f3f-52eca0b92259\scenar


DATE: 04-14-2026                          TIME: 05:35:14

USER:
```

```
COMMENTS: _____________________________________________________________

--------------------------------------------------------------------------------
-------------------------
  ***********************************************
  ** SIMULATION : Run 6 - 100 Year 12 Hour AES  **
  ***********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\rsoto\AppD
|                  |              ata\Local\Temp\
|                  |              8dfe3181-6515-409d-9f0a-7bb99517af18\7ed6333c
| Ptotal= 88.54 mm |    Comments: 100 Year 12 Hour AES (Bloor, TRCA)
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    0.00 |  3.25   15.05 |  6.50    6.20 |  9.75    0.89
                0.25    0.89 |  3.50   15.05 |  6.75    6.20 | 10.00    0.89
                0.50    0.89 |  3.75   15.05 |  7.00    6.20 | 10.25    0.89
                0.75    0.89 |  4.00   15.05 |  7.25    3.54 | 10.50    0.89
                1.00    0.89 |  4.25   40.71 |  7.50    3.54 | 10.75    0.89
                1.25    0.89 |  4.50   40.71 |  7.75    3.54 | 11.00    0.89
                1.50    0.89 |  4.75   40.71 |  8.00    3.54 | 11.25    0.89
                1.75    0.89 |  5.00   40.71 |  8.25    1.77 | 11.50    0.89
                2.00    0.89 |  5.25   11.51 |  8.50    1.77 | 11.75    0.89
                2.25    5.31 |  5.50   11.51 |  8.75    1.77 | 12.00    0.89
                2.50    5.31 |  5.75   11.51 |  9.00    1.77 |
                2.75    5.31 |  6.00   11.51 |  9.25    0.89 |
                3.00    5.31 |  6.25    6.20 |  9.50    0.89 |

--------------------------------------------------------------------------------

--------------------
| CALIB            |
| NASHYD   (  0111)|   Area     (ha)=  28.11   Curve Number    (CN)= 81.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.39

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.

                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    0.00 | 3.167    5.31 | 6.250   11.51 |  9.33    0.89
               0.167    0.00 | 3.250    5.31 | 6.333    6.20 |  9.42    0.89
               0.250    0.00 | 3.333   15.05 | 6.417    6.20 |  9.50    0.89
               0.333    0.89 | 3.417   15.05 | 6.500    6.20 |  9.58    0.89
               0.417    0.89 | 3.500   15.05 | 6.583    6.20 |  9.67    0.89
               0.500    0.89 | 3.583   15.05 | 6.667    6.20 |  9.75    0.89
               0.583    0.89 | 3.667   15.05 | 6.750    6.20 |  9.83    0.89
               0.667    0.89 | 3.750   15.05 | 6.833    6.20 |  9.92    0.89
               0.750    0.89 | 3.833   15.05 | 6.917    6.20 | 10.00    0.89
               0.833    0.89 | 3.917   15.05 | 7.000    6.20 | 10.08    0.89
               0.917    0.89 | 4.000   15.05 | 7.083    6.20 | 10.17    0.89
               1.000    0.89 | 4.083   15.05 | 7.167    6.20 | 10.25    0.89
```

1.083	0.89	4.167	15.05	7.250	6.20	10.33	0.89
1.167	0.89	4.250	15.05	7.333	3.54	10.42	0.89
1.250	0.89	4.333	40.71	7.417	3.54	10.50	0.89
1.333	0.89	4.417	40.71	7.500	3.54	10.58	0.89
1.417	0.89	4.500	40.71	7.583	3.54	10.67	0.89
1.500	0.89	4.583	40.71	7.667	3.54	10.75	0.89
1.583	0.89	4.667	40.71	7.750	3.54	10.83	0.89
1.667	0.89	4.750	40.71	7.833	3.54	10.92	0.89
1.750	0.89	4.833	40.71	7.917	3.54	11.00	0.89
1.833	0.89	4.917	40.71	8.000	3.54	11.08	0.89
1.917	0.89	5.000	40.71	8.083	3.54	11.17	0.89
2.000	0.89	5.083	40.71	8.167	3.54	11.25	0.89
2.083	0.89	5.167	40.71	8.250	3.54	11.33	0.89
2.167	0.89	5.250	40.71	8.333	1.77	11.42	0.89
2.250	0.89	5.333	11.51	8.417	1.77	11.50	0.89
2.333	5.31	5.417	11.51	8.500	1.77	11.58	0.89
2.417	5.31	5.500	11.51	8.583	1.77	11.67	0.89
2.500	5.31	5.583	11.51	8.667	1.77	11.75	0.89
2.583	5.31	5.667	11.51	8.750	1.77	11.83	0.89
2.667	5.31	5.750	11.51	8.833	1.77	11.92	0.89
2.750	5.31	5.833	11.51	8.917	1.77	12.00	0.89
2.833	5.31	5.917	11.51	9.000	1.77	12.08	0.89
2.917	5.31	6.000	11.51	9.083	1.77	12.17	0.89
3.000	5.31	6.083	11.51	9.167	1.77	12.25	0.89
3.083	5.31	6.167	11.51	9.250	1.77		

Unit Hyd Qpeak (cms)= 0.772

PEAK FLOW (cms)= 0.954 (i)
TIME TO PEAK (hrs)= 6.583
RUNOFF VOLUME (mm)= 48.762
TOTAL RAINFALL (mm)= 88.540
RUNOFF COEFFICIENT = 0.551

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ROUTEPIPE(0118)	IN= 2---> OUT= 1	DT= 5.0 min

PIPE Number = 1.00
Diameter (mm)=1200.00
Length (m)= 500.00
Slope (m/m)= 0.002
Manning n = 0.013

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.06	.114E+02	0.0	0.41	20.34
0.13	.317E+02	0.0	0.64	13.04
0.19	.573E+02	0.1	0.82	10.13
0.25	.866E+02	0.2	0.98	8.52
0.32	.119E+03	0.3	1.11	7.49
0.38	.153E+03	0.4	1.23	6.77
0.44	.189E+03	0.5	1.34	6.24
0.51	.226E+03	0.6	1.43	5.84
0.57	.264E+03	0.8	1.51	5.53
0.63	.302E+03	1.0	1.58	5.29
0.69	.339E+03	1.1	1.63	5.10
0.76	.376E+03	1.3	1.68	4.95
0.82	.412E+03	1.4	1.72	4.85
0.88	.447E+03	1.6	1.74	4.78
0.95	.479E+03	1.7	1.76	4.74
1.01	.508E+03	1.8	1.76	4.74
1.07	.534E+03	1.9	1.74	4.80
1.14	.554E+03	1.9	1.69	4.92
1.20	.566E+03	1.7	1.54	5.40

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0111)	28.11	0.95	6.58	48.76	0.63	1.58
OUTFLOW: ID= 1 (0118)	28.11	0.95	6.58	48.76	0.63	1.58

CALIB	NASHYD (0116)	ID= 1 DT= 5.0 min

Area (ha)= 1.71 Curve Number (CN)= 69.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.31

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	5.31	6.250	11.51	9.33	0.89
0.167	0.00	3.250	5.31	6.333	6.20	9.42	0.89
0.250	0.00	3.333	15.05	6.417	6.20	9.50	0.89
0.333	0.89	3.417	15.05	6.500	6.20	9.58	0.89
0.417	0.89	3.500	15.05	6.583	6.20	9.67	0.89
0.500	0.89	3.583	15.05	6.667	6.20	9.75	0.89
0.583	0.89	3.667	15.05	6.750	6.20	9.83	0.89
0.667	0.89	3.750	15.05	6.833	6.20	9.92	0.89
0.750	0.89	3.833	15.05	6.917	6.20	10.00	0.89
0.833	0.89	3.917	15.05	7.000	6.20	10.08	0.89
0.917	0.89	4.000	15.05	7.083	6.20	10.17	0.89
1.000	0.89	4.083	15.05	7.167	6.20	10.25	0.89
1.083	0.89	4.167	15.05	7.250	6.20	10.33	0.89
1.167	0.89	4.250	15.05	7.333	3.54	10.42	0.89
1.250	0.89	4.333	40.71	7.417	3.54	10.50	0.89
1.333	0.89	4.417	40.71	7.500	3.54	10.58	0.89
1.417	0.89	4.500	40.71	7.583	3.54	10.67	0.89
1.500	0.89	4.583	40.71	7.667	3.54	10.75	0.89
1.583	0.89	4.667	40.71	7.750	3.54	10.83	0.89
1.667	0.89	4.750	40.71	7.833	3.54	10.92	0.89
1.750	0.89	4.833	40.71	7.917	3.54	11.00	0.89
1.833	0.89	4.917	40.71	8.000	3.54	11.08	0.89
1.917	0.89	5.000	40.71	8.083	3.54	11.17	0.89
2.000	0.89	5.083	40.71	8.167	3.54	11.25	0.89
2.083	0.89	5.167	40.71	8.250	3.54	11.33	0.89
2.167	0.89	5.250	40.71	8.333	1.77	11.42	0.89
2.250	0.89	5.333	11.51	8.417	1.77	11.50	0.89
2.333	5.31	5.417	11.51	8.500	1.77	11.58	0.89
2.417	5.31	5.500	11.51	8.583	1.77	11.67	0.89
2.500	5.31	5.583	11.51	8.667	1.77	11.75	0.89
2.583	5.31	5.667	11.51	8.750	1.77	11.83	0.89
2.667	5.31	5.750	11.51	8.833	1.77	11.92	0.89
2.750	5.31	5.833	11.51	8.917	1.77	12.00	0.89
2.833	5.31	5.917	11.51	9.000	1.77	12.08	0.89
2.917	5.31	6.000	11.51	9.083	1.77	12.17	0.89

3.000	5.31	6.083	11.51	9.167	1.77	12.25	0.89
3.083	5.31	6.167	11.51	9.250	1.77		

Unit Hyd Qpeak (cms)= 0.211

PEAK FLOW (cms)= 0.087 (i)
TIME TO PEAK (hrs)= 5.333
RUNOFF VOLUME (mm)= 35.296
TOTAL RAINFALL (mm)= 88.540
RUNOFF COEFFICIENT = 0.399

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB		
STANDHYD (0113)	Area (ha)=	0.52
ID= 1 DT= 5.0 min	Total Imp(%)=	51.00
	Dir. Conn.(%)=	51.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.27	0.25
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	58.88	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	5.31	6.250	11.51	9.33	0.89
0.167	0.00	3.250	5.31	6.333	6.20	9.42	0.89
0.250	0.00	3.333	15.05	6.417	6.20	9.50	0.89
0.333	0.89	3.417	15.05	6.500	6.20	9.58	0.89
0.417	0.89	3.500	15.05	6.583	6.20	9.67	0.89
0.500	0.89	3.583	15.05	6.667	6.20	9.75	0.89
0.583	0.89	3.667	15.05	6.750	6.20	9.83	0.89
0.667	0.89	3.750	15.05	6.833	6.20	9.92	0.89
0.750	0.89	3.833	15.05	6.917	6.20	10.00	0.89
0.833	0.89	3.917	15.05	7.000	6.20	10.08	0.89
0.917	0.89	4.000	15.05	7.083	6.20	10.17	0.89
1.000	0.89	4.083	15.05	7.167	6.20	10.25	0.89
1.083	0.89	4.167	15.05	7.250	6.20	10.33	0.89
1.167	0.89	4.250	15.05	7.333	3.54	10.42	0.89
1.250	0.89	4.333	40.71	7.417	3.54	10.50	0.89
1.333	0.89	4.417	40.71	7.500	3.54	10.58	0.89
1.417	0.89	4.500	40.71	7.583	3.54	10.67	0.89
1.500	0.89	4.583	40.71	7.667	3.54	10.75	0.89
1.583	0.89	4.667	40.71	7.750	3.54	10.83	0.89
1.667	0.89	4.750	40.71	7.833	3.54	10.92	0.89
1.750	0.89	4.833	40.71	7.917	3.54	11.00	0.89
1.833	0.89	4.917	40.71	8.000	3.54	11.08	0.89
1.917	0.89	5.000	40.71	8.083	3.54	11.17	0.89
2.000	0.89	5.083	40.71	8.167	3.54	11.25	0.89
2.083	0.89	5.167	40.71	8.250	3.54	11.33	0.89
2.167	0.89	5.250	40.71	8.333	1.77	11.42	0.89
2.250	0.89	5.333	11.51	8.417	1.77	11.50	0.89
2.333	5.31	5.417	11.51	8.500	1.77	11.58	0.89
2.417	5.31	5.500	11.51	8.583	1.77	11.67	0.89
2.500	5.31	5.583	11.51	8.667	1.77	11.75	0.89
2.583	5.31	5.667	11.51	8.750	1.77	11.83	0.89
2.667	5.31	5.750	11.51	8.833	1.77	11.92	0.89
2.750	5.31	5.833	11.51	8.917	1.77	12.00	0.89
2.833	5.31	5.917	11.51	9.000	1.77	12.08	0.89
2.917	5.31	6.000	11.51	9.083	1.77	12.17	0.89
3.000	5.31	6.083	11.51	9.167	1.77	12.25	0.89
3.083	5.31	6.167	11.51	9.250	1.77		

				TOTALS
Max.Eff.Inten.(mm/hr)=		40.71	32.69	
over (min)		5.00	15.00	
Storage Coeff. (min)=		2.66 (ii)	13.70 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	
Unit Hyd. peak (cms)=		0.29	0.08	
PEAK FLOW	(cms)=	0.03	0.02	0.052 (iii)
TIME TO PEAK	(hrs)=	5.08	5.25	5.25
RUNOFF VOLUME	(mm)=	87.54	57.45	72.78
TOTAL RAINFALL	(mm)=	88.54	88.54	88.54
RUNOFF COEFFICIENT	=	0.99	0.65	0.82

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB		
STANDHYD (0114)	Area (ha)=	0.34
ID= 1 DT= 5.0 min	Total Imp(%)=	75.00
	Dir. Conn.(%)=	75.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.26	0.09
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	47.61	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	5.31	6.250	11.51	9.33	0.89
0.167	0.00	3.250	5.31	6.333	6.20	9.42	0.89
0.250	0.00	3.333	15.05	6.417	6.20	9.50	0.89
0.333	0.89	3.417	15.05	6.500	6.20	9.58	0.89
0.417	0.89	3.500	15.05	6.583	6.20	9.67	0.89
0.500	0.89	3.583	15.05	6.667	6.20	9.75	0.89
0.583	0.89	3.667	15.05	6.750	6.20	9.83	0.89
0.667	0.89	3.750	15.05	6.833	6.20	9.92	0.89
0.750	0.89	3.833	15.05	6.917	6.20	10.00	0.89
0.833	0.89	3.917	15.05	7.000	6.20	10.08	0.89
0.917	0.89	4.000	15.05	7.083	6.20	10.17	0.89
1.000	0.89	4.083	15.05	7.167	6.20	10.25	0.89
1.083	0.89	4.167	15.05	7.250	6.20	10.33	0.89

1.167	0.89	4.250	15.05	7.333	3.54	10.42	0.89
1.250	0.89	4.333	40.71	7.417	3.54	10.50	0.89
1.333	0.89	4.417	40.71	7.500	3.54	10.58	0.89
1.417	0.89	4.500	40.71	7.583	3.54	10.67	0.89
1.500	0.89	4.583	40.71	7.667	3.54	10.75	0.89
1.583	0.89	4.667	40.71	7.750	3.54	10.83	0.89
1.667	0.89	4.750	40.71	7.833	3.54	10.92	0.89
1.750	0.89	4.833	40.71	7.917	3.54	11.00	0.89
1.833	0.89	4.917	40.71	8.000	3.54	11.08	0.89
1.917	0.89	5.000	40.71	8.083	3.54	11.17	0.89
2.000	0.89	5.083	40.71	8.167	3.54	11.25	0.89
2.083	0.89	5.167	40.71	8.250	3.54	11.33	0.89
2.167	0.89	5.250	40.71	8.333	1.77	11.42	0.89
2.250	0.89	5.333	11.51	8.417	1.77	11.50	0.89
2.333	5.31	5.417	11.51	8.500	1.77	11.58	0.89
2.417	5.31	5.500	11.51	8.583	1.77	11.67	0.89
2.500	5.31	5.583	11.51	8.667	1.77	11.75	0.89
2.583	5.31	5.667	11.51	8.750	1.77	11.83	0.89
2.667	5.31	5.750	11.51	8.833	1.77	11.92	0.89
2.750	5.31	5.833	11.51	8.917	1.77	12.00	0.89
2.833	5.31	5.917	11.51	9.000	1.77	12.08	0.89
2.917	5.31	6.000	11.51	9.083	1.77	12.17	0.89
3.000	5.31	6.083	11.51	9.167	1.77	12.25	0.89
3.083	5.31	6.167	11.51	9.250	1.77		

Max.Eff.Inten.(mm/hr)=	40.71	32.69	
over (min)	5.00	15.00	
Storage Coeff. (min)=	2.34 (ii)	13.38 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.30	0.08	
			TOTALS
PEAK FLOW (cms)=	0.03	0.01	0.036 (iii)
TIME TO PEAK (hrs)=	5.08	5.25	5.25
RUNOFF VOLUME (mm)=	87.54	57.45	79.99
TOTAL RAINFALL (mm)=	88.54	88.54	88.54
RUNOFF COEFFICIENT =	0.99	0.65	0.90

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0117)	Area (ha)= 6.54
ID= 1 DT= 5.0 min	Total Imp(%)= 71.00 Dir. Conn.(%)= 56.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	4.64	1.90
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	208.81	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	5.31	6.250	11.51	9.33	0.89
0.167	0.00	3.250	5.31	6.333	6.20	9.42	0.89
0.250	0.00	3.333	15.05	6.417	6.20	9.50	0.89
0.333	0.89	3.417	15.05	6.500	6.20	9.58	0.89
0.417	0.89	3.500	15.05	6.583	6.20	9.67	0.89
0.500	0.89	3.583	15.05	6.667	6.20	9.75	0.89
0.583	0.89	3.667	15.05	6.750	6.20	9.83	0.89
0.667	0.89	3.750	15.05	6.833	6.20	9.92	0.89
0.750	0.89	3.833	15.05	6.917	6.20	10.00	0.89
0.833	0.89	3.917	15.05	7.000	6.20	10.08	0.89
0.917	0.89	4.000	15.05	7.083	6.20	10.17	0.89
1.000	0.89	4.083	15.05	7.167	6.20	10.25	0.89
1.083	0.89	4.167	15.05	7.250	6.20	10.33	0.89
1.167	0.89	4.250	15.05	7.333	3.54	10.42	0.89
1.250	0.89	4.333	40.71	7.417	3.54	10.50	0.89
1.333	0.89	4.417	40.71	7.500	3.54	10.58	0.89
1.417	0.89	4.500	40.71	7.583	3.54	10.67	0.89
1.500	0.89	4.583	40.71	7.667	3.54	10.75	0.89
1.583	0.89	4.667	40.71	7.750	3.54	10.83	0.89
1.667	0.89	4.750	40.71	7.833	3.54	10.92	0.89
1.750	0.89	4.833	40.71	7.917	3.54	11.00	0.89
1.833	0.89	4.917	40.71	8.000	3.54	11.08	0.89
1.917	0.89	5.000	40.71	8.083	3.54	11.17	0.89
2.000	0.89	5.083	40.71	8.167	3.54	11.25	0.89
2.083	0.89	5.167	40.71	8.250	3.54	11.33	0.89
2.167	0.89	5.250	40.71	8.333	1.77	11.42	0.89
2.250	0.89	5.333	11.51	8.417	1.77	11.50	0.89
2.333	5.31	5.417	11.51	8.500	1.77	11.58	0.89
2.417	5.31	5.500	11.51	8.583	1.77	11.67	0.89
2.500	5.31	5.583	11.51	8.667	1.77	11.75	0.89
2.583	5.31	5.667	11.51	8.750	1.77	11.83	0.89
2.667	5.31	5.750	11.51	8.833	1.77	11.92	0.89
2.750	5.31	5.833	11.51	8.917	1.77	12.00	0.89
2.833	5.31	5.917	11.51	9.000	1.77	12.08	0.89
2.917	5.31	6.000	11.51	9.083	1.77	12.17	0.89
3.000	5.31	6.083	11.51	9.167	1.77	12.25	0.89
3.083	5.31	6.167	11.51	9.250	1.77		

Max.Eff.Inten.(mm/hr)=	40.71	54.80	
over (min)	5.00	15.00	
Storage Coeff. (min)=	5.69 (ii)	14.67 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.20	0.08	
			TOTALS
PEAK FLOW (cms)=	0.41	0.27	0.686 (iii)
TIME TO PEAK (hrs)=	5.25	5.25	5.25
RUNOFF VOLUME (mm)=	87.54	65.46	77.82
TOTAL RAINFALL (mm)=	88.54	88.54	88.54
RUNOFF COEFFICIENT =	0.99	0.74	0.88

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
--------------------
| RESERVOIR(  0115)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000      0.0000   |    0.1507      0.2774
                          0.0103      0.1190   |    0.1711      0.3280
                          0.0819      0.2055   |    0.1837      0.3663
                          0.1039      0.2468   |    0.3000      0.3955

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0117)     6.540     0.686      5.25      77.82
   OUTFLOW: ID= 1 (  0115)     6.540     0.169      6.33      77.38

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 24.64
                  TIME SHIFT OF PEAK FLOW          (min)= 65.00
                  MAXIMUM  STORAGE   USED        (ha.m.)=  0.3230

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0119)|   Area    (ha)=   0.24
|ID= 1 DT= 5.0 min |   Total Imp(%)=  38.00   Dir. Conn.(%)=  21.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.09         0.15
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      40.00        40.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	5.31	6.250	11.51	9.33	0.89
0.167	0.00	3.250	5.31	6.333	6.20	9.42	0.89
0.250	0.00	3.333	15.05	6.417	6.20	9.50	0.89
0.333	0.89	3.417	15.05	6.500	6.20	9.58	0.89
0.417	0.89	3.500	15.05	6.583	6.20	9.67	0.89
0.500	0.89	3.583	15.05	6.667	6.20	9.75	0.89
0.583	0.89	3.667	15.05	6.750	6.20	9.83	0.89
0.667	0.89	3.750	15.05	6.833	6.20	9.92	0.89
0.750	0.89	3.833	15.05	6.917	6.20	10.00	0.89
0.833	0.89	3.917	15.05	7.000	6.20	10.08	0.89
0.917	0.89	4.000	15.05	7.083	6.20	10.17	0.89
1.000	0.89	4.083	15.05	7.167	6.20	10.25	0.89
1.083	0.89	4.167	15.05	7.250	6.20	10.33	0.89
1.167	0.89	4.250	15.05	7.333	3.54	10.42	0.89
1.250	0.89	4.333	40.71	7.417	3.54	10.50	0.89
1.333	0.89	4.417	40.71	7.500	3.54	10.58	0.89
1.417	0.89	4.500	40.71	7.583	3.54	10.67	0.89
1.500	0.89	4.583	40.71	7.667	3.54	10.75	0.89
1.583	0.89	4.667	40.71	7.750	3.54	10.83	0.89
1.667	0.89	4.750	40.71	7.833	3.54	10.92	0.89
1.750	0.89	4.833	40.71	7.917	3.54	11.00	0.89
1.833	0.89	4.917	40.71	8.000	3.54	11.08	0.89
1.917	0.89	5.000	40.71	8.083	3.54	11.17	0.89
2.000	0.89	5.083	40.71	8.167	3.54	11.25	0.89
2.083	0.89	5.167	40.71	8.250	3.54	11.33	0.89
2.167	0.89	5.250	40.71	8.333	1.77	11.42	0.89
2.250	0.89	5.333	11.51	8.417	1.77	11.50	0.89
2.333	5.31	5.417	11.51	8.500	1.77	11.58	0.89
2.417	5.31	5.500	11.51	8.583	1.77	11.67	0.89
2.500	5.31	5.583	11.51	8.667	1.77	11.75	0.89
2.583	5.31	5.667	11.51	8.750	1.77	11.83	0.89
2.667	5.31	5.750	11.51	8.833	1.77	11.92	0.89
2.750	5.31	5.833	11.51	8.917	1.77	12.00	0.89
2.833	5.31	5.917	11.51	9.000	1.77	12.08	0.89
2.917	5.31	6.000	11.51	9.083	1.77	12.17	0.89
3.000	5.31	6.083	11.51	9.167	1.77	12.25	0.89
3.083	5.31	6.167	11.51	9.250	1.77		

```
     Max.Eff.Inten.(mm/hr)=      40.71        44.51
               over (min)         5.00        15.00
     Storage Coeff.  (min)=       2.11 (ii)   11.87 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.31         0.09
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.02          0.023 (iii)
     TIME TO PEAK    (hrs)=       4.83         5.25           5.25
     RUNOFF VOLUME    (mm)=      87.54        62.28          67.55
     TOTAL RAINFALL   (mm)=      88.54        88.54          88.54
     RUNOFF COEFFICIENT   =       0.99         0.70           0.76

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0112)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0113):     0.52    0.052     5.25    72.78
      + ID2= 2 (  0114):     0.34    0.036     5.25    79.99
        ==================================================
        ID = 3 (  0112):     0.86    0.088     5.25    75.63

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0112)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0112):     0.86    0.088     5.25    75.63
      + ID2= 2 (  0115):     6.54    0.169     6.33    77.38
        ==================================================
        ID = 1 (  0112):     7.40    0.235     5.25    77.17

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
```

```
--------------------
| ADD HYD  (  0112)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
       ID1= 1 (  0112):      7.40   0.235     5.25    77.17
     + ID2= 2 (  0116):      1.71   0.087     5.33    35.30
       ================================================
       ID = 3 (  0112):      9.11   0.321     5.25    69.31

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0112)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
       ID1= 3 (  0112):      9.11   0.321     5.25    69.31
     + ID2= 2 (  0118):     28.11   0.952     6.58    48.76
       ================================================
       ID = 1 (  0112):     37.22   1.163     6.50    53.79

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0112)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
       ID1= 1 (  0112):     37.22   1.163     6.50    53.79
     + ID2= 2 (  0119):      0.24   0.023     5.25    67.55
       ================================================
       ID = 3 (  0112):     37.46   1.168     6.50    53.88

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
```

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================================================================================
==========================

       V    V   I    SSSSS  U   U    A    L             (v 6.2.2020)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\e460c293-1116-4cf7-869d-67f17c0e7e00\scenar
  Summary filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\e460c293-1116-4cf7-869d-67f17c0e7e00\scenar


DATE: 04-14-2026                          TIME: 05:37:29

USER:



COMMENTS: _____________________________________________________________


--------------------------------------------------------------------------------
--------------------------
  ***********************************************
  ** SIMULATION : Run 1 - 2yr 24hr 15min SCS    **
  ***********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\rsoto\AppD
|                  |              ata\Local\Temp\
|                  |              60e6093c-53c6-44bb-ab2e-a1ff337040a5\3804ba0c
| Ptotal= 59.77 mm |    Comments: 2yr 24hr 15min SCS
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	1.08	12.50	8.61	18.75	1.08
0.25	0.66	6.50	1.08	12.75	4.42	19.00	1.08
0.50	0.66	6.75	1.08	13.00	4.42	19.25	1.08
0.75	0.66	7.00	1.08	13.25	3.23	19.50	1.08
1.00	0.66	7.25	1.31	13.50	3.23	19.75	1.08
1.25	0.66	7.50	1.31	13.75	2.51	20.00	1.08
1.50	0.66	7.75	1.31	14.00	2.51	20.25	0.72
1.75	0.66	8.00	1.31	14.25	1.79	20.50	0.72
2.00	0.66	8.25	1.55	14.50	1.79	20.75	0.72
2.25	0.78	8.50	1.55	14.75	1.79	21.00	0.72
2.50	0.78	8.75	1.67	15.00	1.79	21.25	0.72
2.75	0.78	9.00	1.67	15.25	1.79	21.50	0.72
3.00	0.78	9.25	1.91	15.50	1.79	21.75	0.72
3.25	0.78	9.50	1.91	15.75	1.79	22.00	0.72
3.50	0.78	9.75	2.15	16.00	1.79	22.25	0.72
3.75	0.78	10.00	2.15	16.25	1.08	22.50	0.72
4.00	0.78	10.25	2.75	16.50	1.08	22.75	0.72
4.25	0.96	10.50	2.75	16.75	1.08	23.00	0.72
4.50	0.96	10.75	3.71	17.00	1.08	23.25	0.72
4.75	0.96	11.00	3.71	17.25	1.08	23.50	0.72
5.00	0.96	11.25	5.74	17.50	1.08	23.75	0.72
5.25	0.96	11.50	5.74	17.75	1.08	24.00	0.72
5.50	0.96	11.75	17.69	18.00	1.08		
5.75	0.96	12.00	73.16	18.25	1.08		
6.00	0.96	12.25	8.61	18.50	1.08		

```
--------------------------------------------------------------------------------

--------------------
| CALIB            |
| NASHYD   (  0069)|   Area     (ha)=  28.11   Curve Number    (CN)= 81.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.39

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	0.96	12.250	73.16	18.33	1.08
0.167	0.00	6.250	0.96	12.333	8.61	18.42	1.08
0.250	0.00	6.333	1.08	12.417	8.61	18.50	1.08
0.333	0.66	6.417	1.08	12.500	8.61	18.58	1.08
0.417	0.66	6.500	1.08	12.583	8.61	18.67	1.08
0.500	0.66	6.583	1.08	12.667	8.61	18.75	1.08
0.583	0.66	6.667	1.08	12.750	8.61	18.83	1.08
0.667	0.66	6.750	1.08	12.833	4.42	18.92	1.08
0.750	0.66	6.833	1.08	12.917	4.42	19.00	1.08
0.833	0.66	6.917	1.08	13.000	4.42	19.08	1.08
0.917	0.66	7.000	1.08	13.083	4.42	19.17	1.08
1.000	0.66	7.083	1.08	13.167	4.42	19.25	1.08
1.083	0.66	7.167	1.08	13.250	4.42	19.33	1.08
1.167	0.66	7.250	1.08	13.333	3.23	19.42	1.08
1.250	0.66	7.333	1.31	13.417	3.23	19.50	1.08
1.333	0.66	7.417	1.31	13.500	3.23	19.58	1.08
1.417	0.66	7.500	1.31	13.583	3.23	19.67	1.08
1.500	0.66	7.583	1.31	13.667	3.23	19.75	1.08
1.583	0.66	7.667	1.31	13.750	3.23	19.83	1.08
1.667	0.66	7.750	1.31	13.833	2.51	19.92	1.08
1.750	0.66	7.833	1.31	13.917	2.51	20.00	1.08
1.833	0.66	7.917	1.31	14.000	2.51	20.08	1.08
1.917	0.66	8.000	1.31	14.083	2.51	20.17	1.08
2.000	0.66	8.083	1.31	14.167	2.51	20.25	1.08
2.083	0.66	8.167	1.31	14.250	2.51	20.33	0.72
2.167	0.66	8.250	1.31	14.333	1.79	20.42	0.72
2.250	0.66	8.333	1.55	14.417	1.79	20.50	0.72
2.333	0.78	8.417	1.55	14.500	1.79	20.58	0.72
2.417	0.78	8.500	1.55	14.583	1.79	20.67	0.72
2.500	0.78	8.583	1.55	14.667	1.79	20.75	0.72

2.583	0.78	8.667	1.55	14.750	1.79	20.83	0.72
2.667	0.78	8.750	1.55	14.833	1.79	20.92	0.72
2.750	0.78	8.833	1.67	14.917	1.79	21.00	0.72
2.833	0.78	8.917	1.67	15.000	1.79	21.08	0.72
2.917	0.78	9.000	1.67	15.083	1.79	21.17	0.72
3.000	0.78	9.083	1.67	15.167	1.79	21.25	0.72
3.083	0.78	9.167	1.67	15.250	1.79	21.33	0.72
3.167	0.78	9.250	1.67	15.333	1.79	21.42	0.72
3.250	0.78	9.333	1.91	15.417	1.79	21.50	0.72
3.333	0.78	9.417	1.91	15.500	1.79	21.58	0.72
3.417	0.78	9.500	1.91	15.583	1.79	21.67	0.72
3.500	0.78	9.583	1.91	15.667	1.79	21.75	0.72
3.583	0.78	9.667	1.91	15.750	1.79	21.83	0.72
3.667	0.78	9.750	1.91	15.833	1.79	21.92	0.72
3.750	0.78	9.833	2.15	15.917	1.79	22.00	0.72
3.833	0.78	9.917	2.15	16.000	1.79	22.08	0.72
3.917	0.78	10.000	2.15	16.083	1.79	22.17	0.72
4.000	0.78	10.083	2.15	16.167	1.79	22.25	0.72
4.083	0.78	10.167	2.15	16.250	1.79	22.33	0.72
4.167	0.78	10.250	2.15	16.333	1.08	22.42	0.72
4.250	0.78	10.333	2.75	16.417	1.08	22.50	0.72
4.333	0.96	10.417	2.75	16.500	1.08	22.58	0.72
4.417	0.96	10.500	2.75	16.583	1.08	22.67	0.72
4.500	0.96	10.583	2.75	16.667	1.08	22.75	0.72
4.583	0.96	10.667	2.75	16.750	1.08	22.83	0.72
4.667	0.96	10.750	2.75	16.833	1.08	22.92	0.72
4.750	0.96	10.833	3.71	16.917	1.08	23.00	0.72
4.833	0.96	10.917	3.71	17.000	1.08	23.08	0.72
4.917	0.96	11.000	3.71	17.083	1.08	23.17	0.72
5.000	0.96	11.083	3.71	17.167	1.08	23.25	0.72
5.083	0.96	11.167	3.71	17.250	1.08	23.33	0.72
5.167	0.96	11.250	3.71	17.333	1.08	23.42	0.72
5.250	0.96	11.333	5.74	17.417	1.08	23.50	0.72
5.333	0.96	11.417	5.74	17.500	1.08	23.58	0.72
5.417	0.96	11.500	5.74	17.583	1.08	23.67	0.72
5.500	0.96	11.583	5.74	17.667	1.08	23.75	0.72
5.583	0.96	11.667	5.74	17.750	1.08	23.83	0.72
5.667	0.96	11.750	5.74	17.833	1.08	23.92	0.72
5.750	0.96	11.833	17.69	17.917	1.08	24.00	0.72
5.833	0.96	11.917	17.69	18.000	1.08	24.08	0.72
5.917	0.96	12.000	17.69	18.083	1.08	24.17	0.72
6.000	0.96	12.083	73.15	18.167	1.08	24.25	0.72
6.083	0.96	12.167	73.16	18.250	1.08		

Unit Hyd Qpeak (cms)= 0.772

PEAK FLOW (cms)= 0.462 (i)
TIME TO PEAK (hrs)= 13.667
RUNOFF VOLUME (mm)= 26.233
TOTAL RAINFALL (mm)= 59.770
RUNOFF COEFFICIENT = 0.439

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ROUTEPIPE(0072)	IN= 2---> OUT= 1	DT= 5.0 min

PIPE Number = 1.00
Diameter (mm)=1200.00
Length (m)= 500.00
Slope (m/m)= 0.002
Manning n = 0.013

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.06	.114E+02	0.0	0.41	20.34
0.13	.317E+02	0.0	0.64	13.04
0.19	.573E+02	0.1	0.82	10.13
0.25	.866E+02	0.2	0.98	8.52
0.32	.119E+03	0.3	1.11	7.49
0.38	.153E+03	0.4	1.23	6.77
0.44	.189E+03	0.5	1.34	6.24
0.51	.226E+03	0.6	1.43	5.84
0.57	.264E+03	0.8	1.51	5.53
0.63	.302E+03	1.0	1.58	5.29
0.69	.339E+03	1.1	1.63	5.10
0.76	.376E+03	1.3	1.68	4.95
0.82	.412E+03	1.4	1.72	4.85
0.88	.447E+03	1.6	1.74	4.78
0.95	.479E+03	1.7	1.76	4.74
1.01	.508E+03	1.8	1.76	4.74
1.07	.534E+03	1.9	1.74	4.80
1.14	.554E+03	1.9	1.69	4.92
1.20	.566E+03	1.7	1.54	5.40

		<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2	(0069)	28.11	0.46	13.67	26.23	0.42	1.30
OUTFLOW: ID= 1	(0072)	28.11	0.46	13.75	26.23	0.42	1.30

CALIB	NASHYD (0087)	ID= 1 DT= 5.0 min

Area (ha)= 1.71 Curve Number (CN)= 69.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.31

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	0.96	12.250	73.16	18.33	1.08
0.167	0.00	6.250	0.96	12.333	8.61	18.42	1.08
0.250	0.00	6.333	1.08	12.417	8.61	18.50	1.08
0.333	0.66	6.417	1.08	12.500	8.61	18.58	1.08
0.417	0.66	6.500	1.08	12.583	8.61	18.67	1.08
0.500	0.66	6.583	1.08	12.667	8.61	18.75	1.08
0.583	0.66	6.667	1.08	12.750	8.61	18.83	1.08
0.667	0.66	6.750	1.08	12.833	4.42	18.92	1.08
0.750	0.66	6.833	1.08	12.917	4.42	19.00	1.08
0.833	0.66	6.917	1.08	13.000	4.42	19.08	1.08
0.917	0.66	7.000	1.08	13.083	4.42	19.17	1.08
1.000	0.66	7.083	1.08	13.167	4.42	19.25	1.08
1.083	0.66	7.167	1.08	13.250	4.42	19.33	1.08
1.167	0.66	7.250	1.08	13.333	3.23	19.42	1.08
1.250	0.66	7.333	1.31	13.417	3.23	19.50	1.08
1.333	0.66	7.417	1.31	13.500	3.23	19.58	1.08
1.417	0.66	7.500	1.31	13.583	3.23	19.67	1.08

1.500	0.66	7.583	1.31	13.667	3.23	19.75	1.08
1.583	0.66	7.667	1.31	13.750	3.23	19.83	1.08
1.667	0.66	7.750	1.31	13.833	2.51	19.92	1.08
1.750	0.66	7.833	1.31	13.917	2.51	20.00	1.08
1.833	0.66	7.917	1.31	14.000	2.51	20.08	1.08
1.917	0.66	8.000	1.31	14.083	2.51	20.17	1.08
2.000	0.66	8.083	1.31	14.167	2.51	20.25	1.08
2.083	0.66	8.167	1.31	14.250	2.51	20.33	0.72
2.167	0.66	8.250	1.31	14.333	1.79	20.42	0.72
2.250	0.66	8.333	1.55	14.417	1.79	20.50	0.72
2.333	0.78	8.417	1.55	14.500	1.79	20.58	0.72
2.417	0.78	8.500	1.55	14.583	1.79	20.67	0.72
2.500	0.78	8.583	1.55	14.667	1.79	20.75	0.72
2.583	0.78	8.667	1.55	14.750	1.79	20.83	0.72
2.667	0.78	8.750	1.55	14.833	1.79	20.92	0.72
2.750	0.78	8.833	1.67	14.917	1.79	21.00	0.72
2.833	0.78	8.917	1.67	15.000	1.79	21.08	0.72
2.917	0.78	9.000	1.67	15.083	1.79	21.17	0.72
3.000	0.78	9.083	1.67	15.167	1.79	21.25	0.72
3.083	0.78	9.167	1.67	15.250	1.79	21.33	0.72
3.167	0.78	9.250	1.67	15.333	1.79	21.42	0.72
3.250	0.78	9.333	1.91	15.417	1.79	21.50	0.72
3.333	0.78	9.417	1.91	15.500	1.79	21.58	0.72
3.417	0.78	9.500	1.91	15.583	1.79	21.67	0.72
3.500	0.78	9.583	1.91	15.667	1.79	21.75	0.72
3.583	0.78	9.667	1.91	15.750	1.79	21.83	0.72
3.667	0.78	9.750	1.91	15.833	1.79	21.92	0.72
3.750	0.78	9.833	2.15	15.917	1.79	22.00	0.72
3.833	0.78	9.917	2.15	16.000	1.79	22.08	0.72
3.917	0.78	10.000	2.15	16.083	1.79	22.17	0.72
4.000	0.78	10.083	2.15	16.167	1.79	22.25	0.72
4.083	0.78	10.167	2.15	16.250	1.79	22.33	0.72
4.167	0.78	10.250	2.15	16.333	1.08	22.42	0.72
4.250	0.78	10.333	2.75	16.417	1.08	22.50	0.72
4.333	0.96	10.417	2.75	16.500	1.08	22.58	0.72
4.417	0.96	10.500	2.75	16.583	1.08	22.67	0.72
4.500	0.96	10.583	2.75	16.667	1.08	22.75	0.72
4.583	0.96	10.667	2.75	16.750	1.08	22.83	0.72
4.667	0.96	10.750	2.75	16.833	1.08	22.92	0.72
4.750	0.96	10.833	3.71	16.917	1.08	23.00	0.72
4.833	0.96	10.917	3.71	17.000	1.08	23.08	0.72
4.917	0.96	11.000	3.71	17.083	1.08	23.17	0.72
5.000	0.96	11.083	3.71	17.167	1.08	23.25	0.72
5.083	0.96	11.167	3.71	17.250	1.08	23.33	0.72
5.167	0.96	11.250	3.71	17.333	1.08	23.42	0.72
5.250	0.96	11.333	5.74	17.417	1.08	23.50	0.72
5.333	0.96	11.417	5.74	17.500	1.08	23.58	0.72
5.417	0.96	11.500	5.74	17.583	1.08	23.67	0.72
5.500	0.96	11.583	5.74	17.667	1.08	23.75	0.72
5.583	0.96	11.667	5.74	17.750	1.08	23.83	0.72
5.667	0.96	11.750	5.74	17.833	1.08	23.92	0.72
5.750	0.96	11.833	17.69	17.917	1.08	24.00	0.72
5.833	0.96	11.917	17.69	18.000	1.08	24.08	0.72
5.917	0.96	12.000	17.69	18.083	1.08	24.17	0.72
6.000	0.96	12.083	73.15	18.167	1.08	24.25	0.72
6.083	0.96	12.167	73.16	18.250	1.08		

Unit Hyd Qpeak (cms)= 0.211

PEAK FLOW (cms)= 0.056 (i)
TIME TO PEAK (hrs)= 12.417

RUNOFF VOLUME (mm)= 17.756
TOTAL RAINFALL (mm)= 59.770
RUNOFF COEFFICIENT = 0.297

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0070)	Area (ha)= 0.34
ID= 1 DT= 5.0 min	Total Imp(%)= 75.00 Dir. Conn.(%)= 75.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.26	0.09
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	47.61	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	0.96	12.250	73.16	18.33	1.08
0.167	0.00	6.250	0.96	12.333	8.61	18.42	1.08
0.250	0.00	6.333	1.08	12.417	8.61	18.50	1.08
0.333	0.66	6.417	1.08	12.500	8.61	18.58	1.08
0.417	0.66	6.500	1.08	12.583	8.61	18.67	1.08
0.500	0.66	6.583	1.08	12.667	8.61	18.75	1.08
0.583	0.66	6.667	1.08	12.750	8.61	18.83	1.08
0.667	0.66	6.750	1.08	12.833	4.42	18.92	1.08
0.750	0.66	6.833	1.08	12.917	4.42	19.00	1.08
0.833	0.66	6.917	1.08	13.000	4.42	19.08	1.08
0.917	0.66	7.000	1.08	13.083	4.42	19.17	1.08
1.000	0.66	7.083	1.08	13.167	4.42	19.25	1.08
1.083	0.66	7.167	1.08	13.250	4.42	19.33	1.08
1.167	0.66	7.250	1.08	13.333	3.23	19.42	1.08
1.250	0.66	7.333	1.31	13.417	3.23	19.50	1.08
1.333	0.66	7.417	1.31	13.500	3.23	19.58	1.08
1.417	0.66	7.500	1.31	13.583	3.23	19.67	1.08
1.500	0.66	7.583	1.31	13.667	3.23	19.75	1.08
1.583	0.66	7.667	1.31	13.750	3.23	19.83	1.08
1.667	0.66	7.750	1.31	13.833	2.51	19.92	1.08
1.750	0.66	7.833	1.31	13.917	2.51	20.00	1.08
1.833	0.66	7.917	1.31	14.000	2.51	20.08	1.08
1.917	0.66	8.000	1.31	14.083	2.51	20.17	1.08
2.000	0.66	8.083	1.31	14.167	2.51	20.25	1.08
2.083	0.66	8.167	1.31	14.250	2.51	20.33	0.72
2.167	0.66	8.250	1.31	14.333	1.79	20.42	0.72
2.250	0.66	8.333	1.55	14.417	1.79	20.50	0.72
2.333	0.78	8.417	1.55	14.500	1.79	20.58	0.72
2.417	0.78	8.500	1.55	14.583	1.79	20.67	0.72
2.500	0.78	8.583	1.55	14.667	1.79	20.75	0.72
2.583	0.78	8.667	1.55	14.750	1.79	20.83	0.72
2.667	0.78	8.750	1.55	14.833	1.79	20.92	0.72
2.750	0.78	8.833	1.67	14.917	1.79	21.00	0.72
2.833	0.78	8.917	1.67	15.000	1.79	21.08	0.72
2.917	0.78	9.000	1.67	15.083	1.79	21.17	0.72
3.000	0.78	9.083	1.67	15.167	1.79	21.25	0.72

3.083	0.78	9.167	1.67	15.250	1.79	21.33	0.72
3.167	0.78	9.250	1.67	15.333	1.79	21.42	0.72
3.250	0.78	9.333	1.91	15.417	1.79	21.50	0.72
3.333	0.78	9.417	1.91	15.500	1.79	21.58	0.72
3.417	0.78	9.500	1.91	15.583	1.79	21.67	0.72
3.500	0.78	9.583	1.91	15.667	1.79	21.75	0.72
3.583	0.78	9.667	1.91	15.750	1.79	21.83	0.72
3.667	0.78	9.750	1.91	15.833	1.79	21.92	0.72
3.750	0.78	9.833	2.15	15.917	1.79	22.00	0.72
3.833	0.78	9.917	2.15	16.000	1.79	22.08	0.72
3.917	0.78	10.000	2.15	16.083	1.79	22.17	0.72
4.000	0.78	10.083	2.15	16.167	1.79	22.25	0.72
4.083	0.78	10.167	2.15	16.250	1.79	22.33	0.72
4.167	0.78	10.250	2.15	16.333	1.08	22.42	0.72
4.250	0.78	10.333	2.75	16.417	1.08	22.50	0.72
4.333	0.96	10.417	2.75	16.500	1.08	22.58	0.72
4.417	0.96	10.500	2.75	16.583	1.08	22.67	0.72
4.500	0.96	10.583	2.75	16.667	1.08	22.75	0.72
4.583	0.96	10.667	2.75	16.750	1.08	22.83	0.72
4.667	0.96	10.750	2.75	16.833	1.08	22.92	0.72
4.750	0.96	10.833	3.71	16.917	1.08	23.00	0.72
4.833	0.96	10.917	3.71	17.000	1.08	23.08	0.72
4.917	0.96	11.000	3.71	17.083	1.08	23.17	0.72
5.000	0.96	11.083	3.71	17.167	1.08	23.25	0.72
5.083	0.96	11.167	3.71	17.250	1.08	23.33	0.72
5.167	0.96	11.250	3.71	17.333	1.08	23.42	0.72
5.250	0.96	11.333	5.74	17.417	1.08	23.50	0.72
5.333	0.96	11.417	5.74	17.500	1.08	23.58	0.72
5.417	0.96	11.500	5.74	17.583	1.08	23.67	0.72
5.500	0.96	11.583	5.74	17.667	1.08	23.75	0.72
5.583	0.96	11.667	5.74	17.750	1.08	23.83	0.72
5.667	0.96	11.750	5.74	17.833	1.08	23.92	0.72
5.750	0.96	11.833	17.69	17.917	1.08	24.00	0.72
5.833	0.96	11.917	17.69	18.000	1.08	24.08	0.72
5.917	0.96	12.000	17.69	18.083	1.08	24.17	0.72
6.000	0.96	12.083	73.15	18.167	1.08	24.25	0.72
6.083	0.96	12.167	73.16	18.250	1.08		

Max.Eff.Inten.(mm/hr)=	73.16	48.12	
over (min)	5.00	15.00	
Storage Coeff. (min)=	1.85 (ii)	11.31 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.32	0.09	
			TOTALS
PEAK FLOW (cms)=	0.05	0.01	0.058 (iii)
TIME TO PEAK (hrs)=	12.25	12.33	12.25
RUNOFF VOLUME (mm)=	58.77	32.94	52.30
TOTAL RAINFALL (mm)=	59.77	59.77	59.77
RUNOFF COEFFICIENT =	0.98	0.55	0.87

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB

| STANDHYD (0086)| Area (ha)= 0.52
|ID= 1 DT= 5.0 min | Total Imp(%)= 51.00 Dir. Conn.(%)= 51.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.27	0.25
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	58.88	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	0.96	12.250	73.16	18.33	1.08
0.167	0.00	6.250	0.96	12.333	8.61	18.42	1.08
0.250	0.00	6.333	1.08	12.417	8.61	18.50	1.08
0.333	0.66	6.417	1.08	12.500	8.61	18.58	1.08
0.417	0.66	6.500	1.08	12.583	8.61	18.67	1.08
0.500	0.66	6.583	1.08	12.667	8.61	18.75	1.08
0.583	0.66	6.667	1.08	12.750	8.61	18.83	1.08
0.667	0.66	6.750	1.08	12.833	4.42	18.92	1.08
0.750	0.66	6.833	1.08	12.917	4.42	19.00	1.08
0.833	0.66	6.917	1.08	13.000	4.42	19.08	1.08
0.917	0.66	7.000	1.08	13.083	4.42	19.17	1.08
1.000	0.66	7.083	1.08	13.167	4.42	19.25	1.08
1.083	0.66	7.167	1.08	13.250	4.42	19.33	1.08
1.167	0.66	7.250	1.08	13.333	3.23	19.42	1.08
1.250	0.66	7.333	1.31	13.417	3.23	19.50	1.08
1.333	0.66	7.417	1.31	13.500	3.23	19.58	1.08
1.417	0.66	7.500	1.31	13.583	3.23	19.67	1.08
1.500	0.66	7.583	1.31	13.667	3.23	19.75	1.08
1.583	0.66	7.667	1.31	13.750	3.23	19.83	1.08
1.667	0.66	7.750	1.31	13.833	2.51	19.92	1.08
1.750	0.66	7.833	1.31	13.917	2.51	20.00	1.08
1.833	0.66	7.917	1.31	14.000	2.51	20.08	1.08
1.917	0.66	8.000	1.31	14.083	2.51	20.17	1.08
2.000	0.66	8.083	1.31	14.167	2.51	20.25	1.08
2.083	0.66	8.167	1.31	14.250	2.51	20.33	0.72
2.167	0.66	8.250	1.31	14.333	1.79	20.42	0.72
2.250	0.66	8.333	1.55	14.417	1.79	20.50	0.72
2.333	0.78	8.417	1.55	14.500	1.79	20.58	0.72
2.417	0.78	8.500	1.55	14.583	1.79	20.67	0.72
2.500	0.78	8.583	1.55	14.667	1.79	20.75	0.72
2.583	0.78	8.667	1.55	14.750	1.79	20.83	0.72
2.667	0.78	8.750	1.55	14.833	1.79	20.92	0.72
2.750	0.78	8.833	1.67	14.917	1.79	21.00	0.72
2.833	0.78	8.917	1.67	15.000	1.79	21.08	0.72
2.917	0.78	9.000	1.67	15.083	1.79	21.17	0.72
3.000	0.78	9.083	1.67	15.167	1.79	21.25	0.72
3.083	0.78	9.167	1.67	15.250	1.79	21.33	0.72
3.167	0.78	9.250	1.67	15.333	1.79	21.42	0.72
3.250	0.78	9.333	1.91	15.417	1.79	21.50	0.72
3.333	0.78	9.417	1.91	15.500	1.79	21.58	0.72
3.417	0.78	9.500	1.91	15.583	1.79	21.67	0.72
3.500	0.78	9.583	1.91	15.667	1.79	21.75	0.72
3.583	0.78	9.667	1.91	15.750	1.79	21.83	0.72
3.667	0.78	9.750	1.91	15.833	1.79	21.92	0.72
3.750	0.78	9.833	2.15	15.917	1.79	22.00	0.72

3.833	0.78	9.917	2.15	16.000	1.79	22.08	0.72
3.917	0.78	10.000	2.15	16.083	1.79	22.17	0.72
4.000	0.78	10.083	2.15	16.167	1.79	22.25	0.72
4.083	0.78	10.167	2.15	16.250	1.79	22.33	0.72
4.167	0.78	10.250	2.15	16.333	1.08	22.42	0.72
4.250	0.78	10.333	2.75	16.417	1.08	22.50	0.72
4.333	0.96	10.417	2.75	16.500	1.08	22.58	0.72
4.417	0.96	10.500	2.75	16.583	1.08	22.67	0.72
4.500	0.96	10.583	2.75	16.667	1.08	22.75	0.72
4.583	0.96	10.667	2.75	16.750	1.08	22.83	0.72
4.667	0.96	10.750	2.75	16.833	1.08	22.92	0.72
4.750	0.96	10.833	3.71	16.917	1.08	23.00	0.72
4.833	0.96	10.917	3.71	17.000	1.08	23.08	0.72
4.917	0.96	11.000	3.71	17.083	1.08	23.17	0.72
5.000	0.96	11.083	3.71	17.167	1.08	23.25	0.72
5.083	0.96	11.167	3.71	17.250	1.08	23.33	0.72
5.167	0.96	11.250	3.71	17.333	1.08	23.42	0.72
5.250	0.96	11.333	5.74	17.417	1.08	23.50	0.72
5.333	0.96	11.417	5.74	17.500	1.08	23.58	0.72
5.417	0.96	11.500	5.74	17.583	1.08	23.67	0.72
5.500	0.96	11.583	5.74	17.667	1.08	23.75	0.72
5.583	0.96	11.667	5.74	17.750	1.08	23.83	0.72
5.667	0.96	11.750	5.74	17.833	1.08	23.92	0.72
5.750	0.96	11.833	17.69	17.917	1.08	24.00	0.72
5.833	0.96	11.917	17.69	18.000	1.08	24.08	0.72
5.917	0.96	12.000	17.69	18.083	1.08	24.17	0.72
6.000	0.96	12.083	73.15	18.167	1.08	24.25	0.72
6.083	0.96	12.167	73.16	18.250	1.08		

Max.Eff.Inten.(mm/hr)=	73.16	48.12	
over (min)	5.00	15.00	
Storage Coeff. (min)=	2.11 (ii)	11.56 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.31	0.09	
			TOTALS
PEAK FLOW (cms)=	0.05	0.02	0.073 (iii)
TIME TO PEAK (hrs)=	12.25	12.33	12.25
RUNOFF VOLUME (mm)=	58.77	32.94	46.10
TOTAL RAINFALL (mm)=	59.77	59.77	59.77
RUNOFF COEFFICIENT =	0.98	0.55	0.77

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0088)	Area (ha)= 6.54
ID= 1 DT= 5.0 min	Total Imp(%)= 71.00 Dir. Conn.(%)= 56.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	4.64	1.90
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	208.81	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	0.96	12.250	73.16	18.33	1.08
0.167	0.00	6.250	0.96	12.333	8.61	18.42	1.08
0.250	0.00	6.333	1.08	12.417	8.61	18.50	1.08
0.333	0.66	6.417	1.08	12.500	8.61	18.58	1.08
0.417	0.66	6.500	1.08	12.583	8.61	18.67	1.08
0.500	0.66	6.583	1.08	12.667	8.61	18.75	1.08
0.583	0.66	6.667	1.08	12.750	8.61	18.83	1.08
0.667	0.66	6.750	1.08	12.833	4.42	18.92	1.08
0.750	0.66	6.833	1.08	12.917	4.42	19.00	1.08
0.833	0.66	6.917	1.08	13.000	4.42	19.08	1.08
0.917	0.66	7.000	1.08	13.083	4.42	19.17	1.08
1.000	0.66	7.083	1.08	13.167	4.42	19.25	1.08
1.083	0.66	7.167	1.08	13.250	4.42	19.33	1.08
1.167	0.66	7.250	1.08	13.333	3.23	19.42	1.08
1.250	0.66	7.333	1.31	13.417	3.23	19.50	1.08
1.333	0.66	7.417	1.31	13.500	3.23	19.58	1.08
1.417	0.66	7.500	1.31	13.583	3.23	19.67	1.08
1.500	0.66	7.583	1.31	13.667	3.23	19.75	1.08
1.583	0.66	7.667	1.31	13.750	3.23	19.83	1.08
1.667	0.66	7.750	1.31	13.833	2.51	19.92	1.08
1.750	0.66	7.833	1.31	13.917	2.51	20.00	1.08
1.833	0.66	7.917	1.31	14.000	2.51	20.08	1.08
1.917	0.66	8.000	1.31	14.083	2.51	20.17	1.08
2.000	0.66	8.083	1.31	14.167	2.51	20.25	1.08
2.083	0.66	8.167	1.31	14.250	2.51	20.33	0.72
2.167	0.66	8.250	1.31	14.333	1.79	20.42	0.72
2.250	0.66	8.333	1.55	14.417	1.79	20.50	0.72
2.333	0.78	8.417	1.55	14.500	1.79	20.58	0.72
2.417	0.78	8.500	1.55	14.583	1.79	20.67	0.72
2.500	0.78	8.583	1.55	14.667	1.79	20.75	0.72
2.583	0.78	8.667	1.55	14.750	1.79	20.83	0.72
2.667	0.78	8.750	1.55	14.833	1.79	20.92	0.72
2.750	0.78	8.833	1.67	14.917	1.79	21.00	0.72
2.833	0.78	8.917	1.67	15.000	1.79	21.08	0.72
2.917	0.78	9.000	1.67	15.083	1.79	21.17	0.72
3.000	0.78	9.083	1.67	15.167	1.79	21.25	0.72
3.083	0.78	9.167	1.67	15.250	1.79	21.33	0.72
3.167	0.78	9.250	1.67	15.333	1.79	21.42	0.72
3.250	0.78	9.333	1.91	15.417	1.79	21.50	0.72
3.333	0.78	9.417	1.91	15.500	1.79	21.58	0.72
3.417	0.78	9.500	1.91	15.583	1.79	21.67	0.72
3.500	0.78	9.583	1.91	15.667	1.79	21.75	0.72
3.583	0.78	9.667	1.91	15.750	1.79	21.83	0.72
3.667	0.78	9.750	1.91	15.833	1.79	21.92	0.72
3.750	0.78	9.833	2.15	15.917	1.79	22.00	0.72
3.833	0.78	9.917	2.15	16.000	1.79	22.08	0.72
3.917	0.78	10.000	2.15	16.083	1.79	22.17	0.72
4.000	0.78	10.083	2.15	16.167	1.79	22.25	0.72
4.083	0.78	10.167	2.15	16.250	1.79	22.33	0.72
4.167	0.78	10.250	2.15	16.333	1.08	22.42	0.72
4.250	0.78	10.333	2.75	16.417	1.08	22.50	0.72
4.333	0.96	10.417	2.75	16.500	1.08	22.58	0.72
4.417	0.96	10.500	2.75	16.583	1.08	22.67	0.72
4.500	0.96	10.583	2.75	16.667	1.08	22.75	0.72

4.583	0.96	10.667	2.75	16.750	1.08	22.83	0.72
4.667	0.96	10.750	2.75	16.833	1.08	22.92	0.72
4.750	0.96	10.833	3.71	16.917	1.08	23.00	0.72
4.833	0.96	10.917	3.71	17.000	1.08	23.08	0.72
4.917	0.96	11.000	3.71	17.083	1.08	23.17	0.72
5.000	0.96	11.083	3.71	17.167	1.08	23.25	0.72
5.083	0.96	11.167	3.71	17.250	1.08	23.33	0.72
5.167	0.96	11.250	3.71	17.333	1.08	23.42	0.72
5.250	0.96	11.333	5.74	17.417	1.08	23.50	0.72
5.333	0.96	11.417	5.74	17.500	1.08	23.58	0.72
5.417	0.96	11.500	5.74	17.583	1.08	23.67	0.72
5.500	0.96	11.583	5.74	17.667	1.08	23.75	0.72
5.583	0.96	11.667	5.74	17.750	1.08	23.83	0.72
5.667	0.96	11.750	5.74	17.833	1.08	23.92	0.72
5.750	0.96	11.833	17.69	17.917	1.08	24.00	0.72
5.833	0.96	11.917	17.69	18.000	1.08	24.08	0.72
5.917	0.96	12.000	17.69	18.083	1.08	24.17	0.72
6.000	0.96	12.083	73.15	18.167	1.08	24.25	0.72
6.083	0.96	12.167	73.16	18.250	1.08		

			TOTALS
Max.Eff.Inten.(mm/hr)=	73.16	85.62	
over (min)	5.00	15.00	
Storage Coeff. (min)=	4.50 (ii)	12.01 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.23	0.09	
PEAK FLOW (cms)=	0.72	0.28	0.974 (iii)
TIME TO PEAK (hrs)=	12.25	12.33	12.25
RUNOFF VOLUME (mm)=	58.77	39.12	50.12
TOTAL RAINFALL (mm)=	59.77	59.77	59.77
RUNOFF COEFFICIENT =	0.98	0.65	0.84

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(0066)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.1507	0.2774
	0.0103	0.1190	0.1711	0.3280
	0.0819	0.2055	0.1837	0.3663
	0.1039	0.2468	0.3000	0.3955

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0088)	6.540	0.974	12.25	50.12
OUTFLOW: ID= 1 (0066)	6.540	0.082	13.25	49.67

PEAK FLOW REDUCTION [Qout/Qin](%)= 8.41
TIME SHIFT OF PEAK FLOW (min)= 60.00
MAXIMUM STORAGE USED (ha.m.)= 0.2055

CALIB		
STANDHYD (0089)	Area (ha)= 0.24	
ID= 1 DT= 5.0 min	Total Imp(%)= 38.00	Dir. Conn.(%)= 21.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.09	0.15
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	40.00	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	0.96	12.250	73.16	18.33	1.08
0.167	0.00	6.250	0.96	12.333	8.61	18.42	1.08
0.250	0.00	6.333	1.08	12.417	8.61	18.50	1.08
0.333	0.66	6.417	1.08	12.500	8.61	18.58	1.08
0.417	0.66	6.500	1.08	12.583	8.61	18.67	1.08
0.500	0.66	6.583	1.08	12.667	8.61	18.75	1.08
0.583	0.66	6.667	1.08	12.750	8.61	18.83	1.08
0.667	0.66	6.750	1.08	12.833	4.42	18.92	1.08
0.750	0.66	6.833	1.08	12.917	4.42	19.00	1.08
0.833	0.66	6.917	1.08	13.000	4.42	19.08	1.08
0.917	0.66	7.000	1.08	13.083	4.42	19.17	1.08
1.000	0.66	7.083	1.08	13.167	4.42	19.25	1.08
1.083	0.66	7.167	1.08	13.250	4.42	19.33	1.08
1.167	0.66	7.250	1.08	13.333	3.23	19.42	1.08
1.250	0.66	7.333	1.31	13.417	3.23	19.50	1.08
1.333	0.66	7.417	1.31	13.500	3.23	19.58	1.08
1.417	0.66	7.500	1.31	13.583	3.23	19.67	1.08
1.500	0.66	7.583	1.31	13.667	3.23	19.75	1.08
1.583	0.66	7.667	1.31	13.750	3.23	19.83	1.08
1.667	0.66	7.750	1.31	13.833	2.51	19.92	1.08
1.750	0.66	7.833	1.31	13.917	2.51	20.00	1.08
1.833	0.66	7.917	1.31	14.000	2.51	20.08	1.08
1.917	0.66	8.000	1.31	14.083	2.51	20.17	1.08
2.000	0.66	8.083	1.31	14.167	2.51	20.25	1.08
2.083	0.66	8.167	1.31	14.250	2.51	20.33	0.72
2.167	0.66	8.250	1.31	14.333	1.79	20.42	0.72
2.250	0.66	8.333	1.55	14.417	1.79	20.50	0.72
2.333	0.78	8.417	1.55	14.500	1.79	20.58	0.72
2.417	0.78	8.500	1.55	14.583	1.79	20.67	0.72
2.500	0.78	8.583	1.55	14.667	1.79	20.75	0.72
2.583	0.78	8.667	1.55	14.750	1.79	20.83	0.72
2.667	0.78	8.750	1.55	14.833	1.79	20.92	0.72
2.750	0.78	8.833	1.67	14.917	1.79	21.00	0.72
2.833	0.78	8.917	1.67	15.000	1.79	21.08	0.72
2.917	0.78	9.000	1.67	15.083	1.79	21.17	0.72
3.000	0.78	9.083	1.67	15.167	1.79	21.25	0.72
3.083	0.78	9.167	1.67	15.250	1.79	21.33	0.72
3.167	0.78	9.250	1.67	15.333	1.79	21.42	0.72
3.250	0.78	9.333	1.91	15.417	1.79	21.50	0.72
3.333	0.78	9.417	1.91	15.500	1.79	21.58	0.72
3.417	0.78	9.500	1.91	15.583	1.79	21.67	0.72
3.500	0.78	9.583	1.91	15.667	1.79	21.75	0.72
3.583	0.78	9.667	1.91	15.750	1.79	21.83	0.72

3.667	0.78	9.750	1.91	15.833	1.79	21.92	0.72
3.750	0.78	9.833	2.15	15.917	1.79	22.00	0.72
3.833	0.78	9.917	2.15	16.000	1.79	22.08	0.72
3.917	0.78	10.000	2.15	16.083	1.79	22.17	0.72
4.000	0.78	10.083	2.15	16.167	1.79	22.25	0.72
4.083	0.78	10.167	2.15	16.250	1.79	22.33	0.72
4.167	0.78	10.250	2.15	16.333	1.08	22.42	0.72
4.250	0.78	10.333	2.75	16.417	1.08	22.50	0.72
4.333	0.96	10.417	2.75	16.500	1.08	22.58	0.72
4.417	0.96	10.500	2.75	16.583	1.08	22.67	0.72
4.500	0.96	10.583	2.75	16.667	1.08	22.75	0.72
4.583	0.96	10.667	2.75	16.750	1.08	22.83	0.72
4.667	0.96	10.750	2.75	16.833	1.08	22.92	0.72
4.750	0.96	10.833	3.71	16.917	1.08	23.00	0.72
4.833	0.96	10.917	3.71	17.000	1.08	23.08	0.72
4.917	0.96	11.000	3.71	17.083	1.08	23.17	0.72
5.000	0.96	11.083	3.71	17.167	1.08	23.25	0.72
5.083	0.96	11.167	3.71	17.250	1.08	23.33	0.72
5.167	0.96	11.250	3.71	17.333	1.08	23.42	0.72
5.250	0.96	11.333	5.74	17.417	1.08	23.50	0.72
5.333	0.96	11.417	5.74	17.500	1.08	23.58	0.72
5.417	0.96	11.500	5.74	17.583	1.08	23.67	0.72
5.500	0.96	11.583	5.74	17.667	1.08	23.75	0.72
5.583	0.96	11.667	5.74	17.750	1.08	23.83	0.72
5.667	0.96	11.750	5.74	17.833	1.08	23.92	0.72
5.750	0.96	11.833	17.69	17.917	1.08	24.00	0.72
5.833	0.96	11.917	17.69	18.000	1.08	24.08	0.72
5.917	0.96	12.000	17.69	18.083	1.08	24.17	0.72
6.000	0.96	12.083	73.15	18.167	1.08	24.25	0.72
6.083	0.96	12.167	73.16	18.250	1.08		

			TOTALS
Max.Eff.Inten.(mm/hr)=	73.16	67.72	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.67 (ii)	9.92 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.32	0.11	
PEAK FLOW (cms)=	0.01	0.02	0.030 (iii)
TIME TO PEAK (hrs)=	12.25	12.25	12.25
RUNOFF VOLUME (mm)=	58.77	36.61	41.23
TOTAL RAINFALL (mm)=	59.77	59.77	59.77
RUNOFF COEFFICIENT =	0.98	0.61	0.69

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0064)| | 1 + 2 = 3 |	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0066):	6.54	0.082	13.25	49.67
+ ID2= 2 (0070):	0.34	0.058	12.25	52.30
ID = 3 (0064):	6.88	0.087	12.25	49.80

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0064)| | 3 + 2 = 1 |	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0064):	6.88	0.087	12.25	49.80
+ ID2= 2 (0072):	28.11	0.460	13.75	26.23
ID = 1 (0064):	34.99	0.543	13.75	30.87

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0064)| | 1 + 2 = 3 |	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0064):	34.99	0.543	13.75	30.87
+ ID2= 2 (0086):	0.52	0.073	12.25	46.10
ID = 3 (0064):	35.51	0.547	13.75	31.09

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0064)| | 3 + 2 = 1 |	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0064):	35.51	0.547	13.75	31.09
+ ID2= 2 (0087):	1.71	0.056	12.42	17.76
ID = 1 (0064):	37.22	0.555	13.75	30.48

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0064)| | 1 + 2 = 3 |	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0064):	37.22	0.555	13.75	30.48
+ ID2= 2 (0089):	0.24	0.030	12.25	41.23
ID = 3 (0064):	37.46	0.557	13.75	30.55

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

FINISH

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      V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
      V    V   I    SS     U   U   A A   L
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       V  V    I     SS    U   U  AAAAA  L
       V  V    I      SS   U   U  A   A  L
        VV     I    SSSSS  UUUUU  A   A  LLLLL

       OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
      O   O    T      T    H   H   Y Y   MM MM  O   O
      O   O    T      T    H   H    Y    M   M  O   O
       OOO     T      T    H   H    Y    M   M   OOO
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***** D E T A I L E D O U T P U T *****

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  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\0090d50b-fc9a-4d42-b35b-fc5b4838c37c\scenar
  Summary filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
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DATE: 04-14-2026                          TIME: 05:37:28

USER:


COMMENTS: _____________________________________________________________

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  ************************************************
  ** SIMULATION : Run 2 - 5yr 24hr 15min SCS    **
  ************************************************


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|    READ STORM    |    Filename: C:\Users\rsoto\AppD
|                  |              ata\Local\Temp\
|                  |              60e6093c-53c6-44bb-ab2e-a1ff337040a5\edec878d
| Ptotal= 71.04 mm |    Comments: 5yr 24hr 15min SCS
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	1.28	12.50	10.23	18.75	1.28
0.25	0.78	6.50	1.28	12.75	5.26	19.00	1.28
0.50	0.78	6.75	1.28	13.00	5.26	19.25	1.28
0.75	0.78	7.00	1.28	13.25	3.84	19.50	1.28
1.00	0.78	7.25	1.56	13.50	3.84	19.75	1.28
1.25	0.78	7.50	1.56	13.75	2.98	20.00	1.28
1.50	0.78	7.75	1.56	14.00	2.98	20.25	0.85
1.75	0.78	8.00	1.56	14.25	2.13	20.50	0.85
2.00	0.78	8.25	1.85	14.50	2.13	20.75	0.85
2.25	0.92	8.50	1.85	14.75	2.13	21.00	0.85
2.50	0.92	8.75	1.99	15.00	2.13	21.25	0.85
2.75	0.92	9.00	1.99	15.25	2.13	21.50	0.85
3.00	0.92	9.25	2.27	15.50	2.13	21.75	0.85
3.25	0.92	9.50	2.27	15.75	2.13	22.00	0.85
3.50	0.92	9.75	2.56	16.00	2.13	22.25	0.85
3.75	0.92	10.00	2.56	16.25	1.28	22.50	0.85
4.00	0.92	10.25	3.27	16.50	1.28	22.75	0.85
4.25	1.14	10.50	3.27	16.75	1.28	23.00	0.85
4.50	1.14	10.75	4.40	17.00	1.28	23.25	0.85
4.75	1.14	11.00	4.40	17.25	1.28	23.50	0.85
5.00	1.14	11.25	6.82	17.50	1.28	23.75	0.85
5.25	1.14	11.50	6.82	17.75	1.28	24.00	0.85
5.50	1.14	11.75	21.03	18.00	1.28		
5.75	1.14	12.00	86.95	18.25	1.28		
6.00	1.14	12.25	10.23	18.50	1.28		

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| CALIB            |
| NASHYD   (  0069)|   Area    (ha)=  28.11   Curve Number    (CN)= 81.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.39

       NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
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---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.14	12.250	86.95	18.33	1.28
0.167	0.00	6.250	1.14	12.333	10.24	18.42	1.28
0.250	0.00	6.333	1.28	12.417	10.23	18.50	1.28
0.333	0.78	6.417	1.28	12.500	10.23	18.58	1.28
0.417	0.78	6.500	1.28	12.583	10.23	18.67	1.28
0.500	0.78	6.583	1.28	12.667	10.23	18.75	1.28
0.583	0.78	6.667	1.28	12.750	10.23	18.83	1.28
0.667	0.78	6.750	1.28	12.833	5.26	18.92	1.28
0.750	0.78	6.833	1.28	12.917	5.26	19.00	1.28
0.833	0.78	6.917	1.28	13.000	5.26	19.08	1.28
0.917	0.78	7.000	1.28	13.083	5.26	19.17	1.28
1.000	0.78	7.083	1.28	13.167	5.26	19.25	1.28
1.083	0.78	7.167	1.28	13.250	5.26	19.33	1.28
1.167	0.78	7.250	1.28	13.333	3.84	19.42	1.28
1.250	0.78	7.333	1.56	13.417	3.84	19.50	1.28
1.333	0.78	7.417	1.56	13.500	3.84	19.58	1.28
1.417	0.78	7.500	1.56	13.583	3.84	19.67	1.28
1.500	0.78	7.583	1.56	13.667	3.84	19.75	1.28
1.583	0.78	7.667	1.56	13.750	3.84	19.83	1.28
1.667	0.78	7.750	1.56	13.833	2.98	19.92	1.28
1.750	0.78	7.833	1.56	13.917	2.98	20.00	1.28
1.833	0.78	7.917	1.56	14.000	2.98	20.08	1.28
1.917	0.78	8.000	1.56	14.083	2.98	20.17	1.28
2.000	0.78	8.083	1.56	14.167	2.98	20.25	1.28
2.083	0.78	8.167	1.56	14.250	2.98	20.33	0.85
2.167	0.78	8.250	1.56	14.333	2.13	20.42	0.85
2.250	0.78	8.333	1.85	14.417	2.13	20.50	0.85
2.333	0.92	8.417	1.85	14.500	2.13	20.58	0.85
2.417	0.92	8.500	1.85	14.583	2.13	20.67	0.85
2.500	0.92	8.583	1.85	14.667	2.13	20.75	0.85
2.583	0.92	8.667	1.85	14.750	2.13	20.83	0.85
2.667	0.92	8.750	1.85	14.833	2.13	20.92	0.85
2.750	0.92	8.833	1.99	14.917	2.13	21.00	0.85
2.833	0.92	8.917	1.99	15.000	2.13	21.08	0.85
2.917	0.92	9.000	1.99	15.083	2.13	21.17	0.85

3.000	0.92	9.083	1.99	15.167	2.13	21.25	0.85
3.083	0.92	9.167	1.99	15.250	2.13	21.33	0.85
3.167	0.92	9.250	1.99	15.333	2.13	21.42	0.85
3.250	0.92	9.333	2.27	15.417	2.13	21.50	0.85
3.333	0.92	9.417	2.27	15.500	2.13	21.58	0.85
3.417	0.92	9.500	2.27	15.583	2.13	21.67	0.85
3.500	0.92	9.583	2.27	15.667	2.13	21.75	0.85
3.583	0.92	9.667	2.27	15.750	2.13	21.83	0.85
3.667	0.92	9.750	2.27	15.833	2.13	21.92	0.85
3.750	0.92	9.833	2.56	15.917	2.13	22.00	0.85
3.833	0.92	9.917	2.56	16.000	2.13	22.08	0.85
3.917	0.92	10.000	2.56	16.083	2.13	22.17	0.85
4.000	0.92	10.083	2.56	16.167	2.13	22.25	0.85
4.083	0.92	10.167	2.56	16.250	2.13	22.33	0.85
4.167	0.92	10.250	2.56	16.333	1.28	22.42	0.85
4.250	0.92	10.333	3.27	16.417	1.28	22.50	0.85
4.333	1.14	10.417	3.27	16.500	1.28	22.58	0.85
4.417	1.14	10.500	3.27	16.583	1.28	22.67	0.85
4.500	1.14	10.583	3.27	16.667	1.28	22.75	0.85
4.583	1.14	10.667	3.27	16.750	1.28	22.83	0.85
4.667	1.14	10.750	3.27	16.833	1.28	22.92	0.85
4.750	1.14	10.833	4.40	16.917	1.28	23.00	0.85
4.833	1.14	10.917	4.40	17.000	1.28	23.08	0.85
4.917	1.14	11.000	4.40	17.083	1.28	23.17	0.85
5.000	1.14	11.083	4.40	17.167	1.28	23.25	0.85
5.083	1.14	11.167	4.40	17.250	1.28	23.33	0.85
5.167	1.14	11.250	4.40	17.333	1.28	23.42	0.85
5.250	1.14	11.333	6.82	17.417	1.28	23.50	0.85
5.333	1.14	11.417	6.82	17.500	1.28	23.58	0.85
5.417	1.14	11.500	6.82	17.583	1.28	23.67	0.85
5.500	1.14	11.583	6.82	17.667	1.28	23.75	0.85
5.583	1.14	11.667	6.82	17.750	1.28	23.83	0.85
5.667	1.14	11.750	6.82	17.833	1.28	23.92	0.85
5.750	1.14	11.833	21.03	17.917	1.28	24.00	0.85
5.833	1.14	11.917	21.03	18.000	1.28	24.08	0.85
5.917	1.14	12.000	21.03	18.083	1.28	24.17	0.85
6.000	1.14	12.083	86.95	18.167	1.28	24.25	0.85
6.083	1.14	12.167	86.95	18.250	1.28		

Unit Hyd Qpeak (cms)= 0.772

PEAK FLOW (cms)= 0.617 (i)
TIME TO PEAK (hrs)= 13.667
RUNOFF VOLUME (mm)= 34.718
TOTAL RAINFALL (mm)= 71.040
RUNOFF COEFFICIENT = 0.489

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ROUTEPIPE(0072)	IN= 2---> OUT= 1	DT= 5.0 min

PIPE Number = 1.00
Diameter (mm)=1200.00
Length (m)= 500.00
Slope (m/m)= 0.002
Manning n = 0.013

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.06	.114E+02	0.0	0.41	20.34
0.13	.317E+02	0.0	0.64	13.04
0.19	.573E+02	0.1	0.82	10.13
0.25	.866E+02	0.2	0.98	8.52
0.32	.119E+03	0.3	1.11	7.49
0.38	.153E+03	0.4	1.23	6.77
0.44	.189E+03	0.5	1.34	6.24
0.51	.226E+03	0.6	1.43	5.84
0.57	.264E+03	0.8	1.51	5.53
0.63	.302E+03	1.0	1.58	5.29
0.69	.339E+03	1.1	1.63	5.10
0.76	.376E+03	1.3	1.68	4.95
0.82	.412E+03	1.4	1.72	4.85
0.88	.447E+03	1.6	1.74	4.78
0.95	.479E+03	1.7	1.76	4.74
1.01	.508E+03	1.8	1.76	4.74
1.07	.534E+03	1.9	1.74	4.80
1.14	.554E+03	1.9	1.69	4.92
1.20	.566E+03	1.7	1.54	5.40

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0069)	28.11	0.62	13.67	34.72	0.49	1.41
OUTFLOW: ID= 1 (0072)	28.11	0.62	13.75	34.72	0.49	1.40

CALIB	NASHYD (0087)	ID= 1 DT= 5.0 min

Area (ha)= 1.71 Curve Number (CN)= 69.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.31

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.14	12.250	86.95	18.33	1.28
0.167	0.00	6.250	1.14	12.333	10.24	18.42	1.28
0.250	0.00	6.333	1.28	12.417	10.23	18.50	1.28
0.333	0.78	6.417	1.28	12.500	10.23	18.58	1.28
0.417	0.78	6.500	1.28	12.583	10.23	18.67	1.28
0.500	0.78	6.583	1.28	12.667	10.23	18.75	1.28
0.583	0.78	6.667	1.28	12.750	10.23	18.83	1.28
0.667	0.78	6.750	1.28	12.833	5.26	18.92	1.28
0.750	0.78	6.833	1.28	12.917	5.26	19.00	1.28
0.833	0.78	6.917	1.28	13.000	5.26	19.08	1.28
0.917	0.78	7.000	1.28	13.083	5.26	19.17	1.28
1.000	0.78	7.083	1.28	13.167	5.26	19.25	1.28
1.083	0.78	7.167	1.28	13.250	5.26	19.33	1.28
1.167	0.78	7.250	1.28	13.333	3.84	19.42	1.28
1.250	0.78	7.333	1.56	13.417	3.84	19.50	1.28
1.333	0.78	7.417	1.56	13.500	3.84	19.58	1.28
1.417	0.78	7.500	1.56	13.583	3.84	19.67	1.28
1.500	0.78	7.583	1.56	13.667	3.84	19.75	1.28
1.583	0.78	7.667	1.56	13.750	3.84	19.83	1.28
1.667	0.78	7.750	1.56	13.833	2.98	19.92	1.28
1.750	0.78	7.833	1.56	13.917	2.98	20.00	1.28
1.833	0.78	7.917	1.56	14.000	2.98	20.08	1.28

1.917	0.78	8.000	1.56	14.083	2.98	20.17	1.28
2.000	0.78	8.083	1.56	14.167	2.98	20.25	1.28
2.083	0.78	8.167	1.56	14.250	2.98	20.33	0.85
2.167	0.78	8.250	1.56	14.333	2.13	20.42	0.85
2.250	0.78	8.333	1.85	14.417	2.13	20.50	0.85
2.333	0.92	8.417	1.85	14.500	2.13	20.58	0.85
2.417	0.92	8.500	1.85	14.583	2.13	20.67	0.85
2.500	0.92	8.583	1.85	14.667	2.13	20.75	0.85
2.583	0.92	8.667	1.85	14.750	2.13	20.83	0.85
2.667	0.92	8.750	1.85	14.833	2.13	20.92	0.85
2.750	0.92	8.833	1.99	14.917	2.13	21.00	0.85
2.833	0.92	8.917	1.99	15.000	2.13	21.08	0.85
2.917	0.92	9.000	1.99	15.083	2.13	21.17	0.85
3.000	0.92	9.083	1.99	15.167	2.13	21.25	0.85
3.083	0.92	9.167	1.99	15.250	2.13	21.33	0.85
3.167	0.92	9.250	1.99	15.333	2.13	21.42	0.85
3.250	0.92	9.333	2.27	15.417	2.13	21.50	0.85
3.333	0.92	9.417	2.27	15.500	2.13	21.58	0.85
3.417	0.92	9.500	2.27	15.583	2.13	21.67	0.85
3.500	0.92	9.583	2.27	15.667	2.13	21.75	0.85
3.583	0.92	9.667	2.27	15.750	2.13	21.83	0.85
3.667	0.92	9.750	2.27	15.833	2.13	21.92	0.85
3.750	0.92	9.833	2.56	15.917	2.13	22.00	0.85
3.833	0.92	9.917	2.56	16.000	2.13	22.08	0.85
3.917	0.92	10.000	2.56	16.083	2.13	22.17	0.85
4.000	0.92	10.083	2.56	16.167	2.13	22.25	0.85
4.083	0.92	10.167	2.56	16.250	2.13	22.33	0.85
4.167	0.92	10.250	2.56	16.333	1.28	22.42	0.85
4.250	0.92	10.333	3.27	16.417	1.28	22.50	0.85
4.333	1.14	10.417	3.27	16.500	1.28	22.58	0.85
4.417	1.14	10.500	3.27	16.583	1.28	22.67	0.85
4.500	1.14	10.583	3.27	16.667	1.28	22.75	0.85
4.583	1.14	10.667	3.27	16.750	1.28	22.83	0.85
4.667	1.14	10.750	3.27	16.833	1.28	22.92	0.85
4.750	1.14	10.833	4.40	16.917	1.28	23.00	0.85
4.833	1.14	10.917	4.40	17.000	1.28	23.08	0.85
4.917	1.14	11.000	4.40	17.083	1.28	23.17	0.85
5.000	1.14	11.083	4.40	17.167	1.28	23.25	0.85
5.083	1.14	11.167	4.40	17.250	1.28	23.33	0.85
5.167	1.14	11.250	4.40	17.333	1.28	23.42	0.85
5.250	1.14	11.333	6.82	17.417	1.28	23.50	0.85
5.333	1.14	11.417	6.82	17.500	1.28	23.58	0.85
5.417	1.14	11.500	6.82	17.583	1.28	23.67	0.85
5.500	1.14	11.583	6.82	17.667	1.28	23.75	0.85
5.583	1.14	11.667	6.82	17.750	1.28	23.83	0.85
5.667	1.14	11.750	6.82	17.833	1.28	23.92	0.85
5.750	1.14	11.833	21.03	17.917	1.28	24.00	0.85
5.833	1.14	11.917	21.03	18.000	1.28	24.08	0.85
5.917	1.14	12.000	21.03	18.083	1.28	24.17	0.85
6.000	1.14	12.083	86.95	18.167	1.28	24.25	0.85
6.083	1.14	12.167	86.95	18.250	1.28		

Unit Hyd Qpeak (cms)= 0.211

PEAK FLOW (cms)= 0.077 (i)
TIME TO PEAK (hrs)= 12.417
RUNOFF VOLUME (mm)= 24.200
TOTAL RAINFALL (mm)= 71.040
RUNOFF COEFFICIENT = 0.341

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0070)	Area (ha)= 0.34
ID= 1 DT= 5.0 min	Total Imp(%)= 75.00 Dir. Conn.(%)= 75.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.26	0.09
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	47.61	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.14	12.250	86.95	18.33	1.28
0.167	0.00	6.250	1.14	12.333	10.24	18.42	1.28
0.250	0.00	6.333	1.28	12.417	10.23	18.50	1.28
0.333	0.78	6.417	1.28	12.500	10.23	18.58	1.28
0.417	0.78	6.500	1.28	12.583	10.23	18.67	1.28
0.500	0.78	6.583	1.28	12.667	10.23	18.75	1.28
0.583	0.78	6.667	1.28	12.750	10.23	18.83	1.28
0.667	0.78	6.750	1.28	12.833	5.26	18.92	1.28
0.750	0.78	6.833	1.28	12.917	5.26	19.00	1.28
0.833	0.78	6.917	1.28	13.000	5.26	19.08	1.28
0.917	0.78	7.000	1.28	13.083	5.26	19.17	1.28
1.000	0.78	7.083	1.28	13.167	5.26	19.25	1.28
1.083	0.78	7.167	1.28	13.250	5.26	19.33	1.28
1.167	0.78	7.250	1.28	13.333	3.84	19.42	1.28
1.250	0.78	7.333	1.56	13.417	3.84	19.50	1.28
1.333	0.78	7.417	1.56	13.500	3.84	19.58	1.28
1.417	0.78	7.500	1.56	13.583	3.84	19.67	1.28
1.500	0.78	7.583	1.56	13.667	3.84	19.75	1.28
1.583	0.78	7.667	1.56	13.750	3.84	19.83	1.28
1.667	0.78	7.750	1.56	13.833	2.98	19.92	1.28
1.750	0.78	7.833	1.56	13.917	2.98	20.00	1.28
1.833	0.78	7.917	1.56	14.000	2.98	20.08	1.28
1.917	0.78	8.000	1.56	14.083	2.98	20.17	1.28
2.000	0.78	8.083	1.56	14.167	2.98	20.25	1.28
2.083	0.78	8.167	1.56	14.250	2.98	20.33	0.85
2.167	0.78	8.250	1.56	14.333	2.13	20.42	0.85
2.250	0.78	8.333	1.85	14.417	2.13	20.50	0.85
2.333	0.92	8.417	1.85	14.500	2.13	20.58	0.85
2.417	0.92	8.500	1.85	14.583	2.13	20.67	0.85
2.500	0.92	8.583	1.85	14.667	2.13	20.75	0.85
2.583	0.92	8.667	1.85	14.750	2.13	20.83	0.85
2.667	0.92	8.750	1.85	14.833	2.13	20.92	0.85
2.750	0.92	8.833	1.99	14.917	2.13	21.00	0.85
2.833	0.92	8.917	1.99	15.000	2.13	21.08	0.85
2.917	0.92	9.000	1.99	15.083	2.13	21.17	0.85
3.000	0.92	9.083	1.99	15.167	2.13	21.25	0.85
3.083	0.92	9.167	1.99	15.250	2.13	21.33	0.85
3.167	0.92	9.250	1.99	15.333	2.13	21.42	0.85
3.250	0.92	9.333	2.27	15.417	2.13	21.50	0.85
3.333	0.92	9.417	2.27	15.500	2.13	21.58	0.85
3.417	0.92	9.500	2.27	15.583	2.13	21.67	0.85

3.500	0.92	9.583	2.27	15.667	2.13	21.75	0.85
3.583	0.92	9.667	2.27	15.750	2.13	21.83	0.85
3.667	0.92	9.750	2.27	15.833	2.13	21.92	0.85
3.750	0.92	9.833	2.56	15.917	2.13	22.00	0.85
3.833	0.92	9.917	2.56	16.000	2.13	22.08	0.85
3.917	0.92	10.000	2.56	16.083	2.13	22.17	0.85
4.000	0.92	10.083	2.56	16.167	2.13	22.25	0.85
4.083	0.92	10.167	2.56	16.250	2.13	22.33	0.85
4.167	0.92	10.250	2.56	16.333	1.28	22.42	0.85
4.250	0.92	10.333	3.27	16.417	1.28	22.50	0.85
4.333	1.14	10.417	3.27	16.500	1.28	22.58	0.85
4.417	1.14	10.500	3.27	16.583	1.28	22.67	0.85
4.500	1.14	10.583	3.27	16.667	1.28	22.75	0.85
4.583	1.14	10.667	3.27	16.750	1.28	22.83	0.85
4.667	1.14	10.750	3.27	16.833	1.28	22.92	0.85
4.750	1.14	10.833	4.40	16.917	1.28	23.00	0.85
4.833	1.14	10.917	4.40	17.000	1.28	23.08	0.85
4.917	1.14	11.000	4.40	17.083	1.28	23.17	0.85
5.000	1.14	11.083	4.40	17.167	1.28	23.25	0.85
5.083	1.14	11.167	4.40	17.250	1.28	23.33	0.85
5.167	1.14	11.250	4.40	17.333	1.28	23.42	0.85
5.250	1.14	11.333	6.82	17.417	1.28	23.50	0.85
5.333	1.14	11.417	6.82	17.500	1.28	23.58	0.85
5.417	1.14	11.500	6.82	17.583	1.28	23.67	0.85
5.500	1.14	11.583	6.82	17.667	1.28	23.75	0.85
5.583	1.14	11.667	6.82	17.750	1.28	23.83	0.85
5.667	1.14	11.750	6.82	17.833	1.28	23.92	0.85
5.750	1.14	11.833	21.03	17.917	1.28	24.00	0.85
5.833	1.14	11.917	21.03	18.000	1.28	24.08	0.85
5.917	1.14	12.000	21.03	18.083	1.28	24.17	0.85
6.000	1.14	12.083	86.95	18.167	1.28	24.25	0.85
6.083	1.14	12.167	86.95	18.250	1.28		

Max.Eff.Inten.(mm/hr)=	86.95	61.51	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.73 (ii)	6.54 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.32	0.14	
			TOTALS
PEAK FLOW (cms)=	0.06	0.01	0.074 (iii)
TIME TO PEAK (hrs)=	12.25	12.25	12.25
RUNOFF VOLUME (mm)=	70.04	42.28	63.09
TOTAL RAINFALL (mm)=	71.04	71.04	71.04
RUNOFF COEFFICIENT =	0.99	0.60	0.89

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0086)	Area (ha)=	0.52	
ID= 1 DT= 5.0 min	Total Imp(%)=	51.00	Dir. Conn.(%)= 51.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.27	0.25
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	58.88	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.14	12.250	86.95	18.33	1.28
0.167	0.00	6.250	1.14	12.333	10.24	18.42	1.28
0.250	0.00	6.333	1.28	12.417	10.23	18.50	1.28
0.333	0.78	6.417	1.28	12.500	10.23	18.58	1.28
0.417	0.78	6.500	1.28	12.583	10.23	18.67	1.28
0.500	0.78	6.583	1.28	12.667	10.23	18.75	1.28
0.583	0.78	6.667	1.28	12.750	10.23	18.83	1.28
0.667	0.78	6.750	1.28	12.833	5.26	18.92	1.28
0.750	0.78	6.833	1.28	12.917	5.26	19.00	1.28
0.833	0.78	6.917	1.28	13.000	5.26	19.08	1.28
0.917	0.78	7.000	1.28	13.083	5.26	19.17	1.28
1.000	0.78	7.083	1.28	13.167	5.26	19.25	1.28
1.083	0.78	7.167	1.28	13.250	5.26	19.33	1.28
1.167	0.78	7.250	1.28	13.333	3.84	19.42	1.28
1.250	0.78	7.333	1.56	13.417	3.84	19.50	1.28
1.333	0.78	7.417	1.56	13.500	3.84	19.58	1.28
1.417	0.78	7.500	1.56	13.583	3.84	19.67	1.28
1.500	0.78	7.583	1.56	13.667	3.84	19.75	1.28
1.583	0.78	7.667	1.56	13.750	3.84	19.83	1.28
1.667	0.78	7.750	1.56	13.833	2.98	19.92	1.28
1.750	0.78	7.833	1.56	13.917	2.98	20.00	1.28
1.833	0.78	7.917	1.56	14.000	2.98	20.08	1.28
1.917	0.78	8.000	1.56	14.083	2.98	20.17	1.28
2.000	0.78	8.083	1.56	14.167	2.98	20.25	1.28
2.083	0.78	8.167	1.56	14.250	2.98	20.33	0.85
2.167	0.78	8.250	1.56	14.333	2.13	20.42	0.85
2.250	0.78	8.333	1.85	14.417	2.13	20.50	0.85
2.333	0.92	8.417	1.85	14.500	2.13	20.58	0.85
2.417	0.92	8.500	1.85	14.583	2.13	20.67	0.85
2.500	0.92	8.583	1.85	14.667	2.13	20.75	0.85
2.583	0.92	8.667	1.85	14.750	2.13	20.83	0.85
2.667	0.92	8.750	1.85	14.833	2.13	20.92	0.85
2.750	0.92	8.833	1.99	14.917	2.13	21.00	0.85
2.833	0.92	8.917	1.99	15.000	2.13	21.08	0.85
2.917	0.92	9.000	1.99	15.083	2.13	21.17	0.85
3.000	0.92	9.083	1.99	15.167	2.13	21.25	0.85
3.083	0.92	9.167	1.99	15.250	2.13	21.33	0.85
3.167	0.92	9.250	1.99	15.333	2.13	21.42	0.85
3.250	0.92	9.333	2.27	15.417	2.13	21.50	0.85
3.333	0.92	9.417	2.27	15.500	2.13	21.58	0.85
3.417	0.92	9.500	2.27	15.583	2.13	21.67	0.85
3.500	0.92	9.583	2.27	15.667	2.13	21.75	0.85
3.583	0.92	9.667	2.27	15.750	2.13	21.83	0.85
3.667	0.92	9.750	2.27	15.833	2.13	21.92	0.85
3.750	0.92	9.833	2.56	15.917	2.13	22.00	0.85
3.833	0.92	9.917	2.56	16.000	2.13	22.08	0.85
3.917	0.92	10.000	2.56	16.083	2.13	22.17	0.85
4.000	0.92	10.083	2.56	16.167	2.13	22.25	0.85
4.083	0.92	10.167	2.56	16.250	2.13	22.33	0.85
4.167	0.92	10.250	2.56	16.333	1.28	22.42	0.85

4.250	0.92	10.333	3.27	16.417	1.28	22.50	0.85
4.333	1.14	10.417	3.27	16.500	1.28	22.58	0.85
4.417	1.14	10.500	3.27	16.583	1.28	22.67	0.85
4.500	1.14	10.583	3.27	16.667	1.28	22.75	0.85
4.583	1.14	10.667	3.27	16.750	1.28	22.83	0.85
4.667	1.14	10.750	3.27	16.833	1.28	22.92	0.85
4.750	1.14	10.833	4.40	16.917	1.28	23.00	0.85
4.833	1.14	10.917	4.40	17.000	1.28	23.08	0.85
4.917	1.14	11.000	4.40	17.083	1.28	23.17	0.85
5.000	1.14	11.083	4.40	17.167	1.28	23.25	0.85
5.083	1.14	11.167	4.40	17.250	1.28	23.33	0.85
5.167	1.14	11.250	4.40	17.333	1.28	23.42	0.85
5.250	1.14	11.333	6.82	17.417	1.28	23.50	0.85
5.333	1.14	11.417	6.82	17.500	1.28	23.58	0.85
5.417	1.14	11.500	6.82	17.583	1.28	23.67	0.85
5.500	1.14	11.583	6.82	17.667	1.28	23.75	0.85
5.583	1.14	11.667	6.82	17.750	1.28	23.83	0.85
5.667	1.14	11.750	6.82	17.833	1.28	23.92	0.85
5.750	1.14	11.833	21.03	17.917	1.28	24.00	0.85
5.833	1.14	11.917	21.03	18.000	1.28	24.08	0.85
5.917	1.14	12.000	21.03	18.083	1.28	24.17	0.85
6.000	1.14	12.083	86.95	18.167	1.28	24.25	0.85
6.083	1.14	12.167	86.95	18.250	1.28		

			TOTALS
Max.Eff.Inten.(mm/hr)=	86.95	61.51	
over (min)	5.00	15.00	
Storage Coeff. (min)=	1.97 (ii)	10.54 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.31	0.09	
PEAK FLOW (cms)=	0.06	0.03	0.089 (iii)
TIME TO PEAK (hrs)=	12.25	12.33	12.25
RUNOFF VOLUME (mm)=	70.04	42.28	56.43
TOTAL RAINFALL (mm)=	71.04	71.04	71.04
RUNOFF COEFFICIENT =	0.99	0.60	0.79

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0088)	Area (ha)=	6.54	
ID= 1 DT= 5.0 min	Total Imp(%)=	71.00	Dir. Conn.(%)= 56.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	4.64	1.90
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	208.81	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	6.167	1.14	12.250	86.95	18.33	1.28
0.167	0.00	6.250	1.14	12.333	10.24	18.42	1.28
0.250	0.00	6.333	1.28	12.417	10.23	18.50	1.28
0.333	0.78	6.417	1.28	12.500	10.23	18.58	1.28
0.417	0.78	6.500	1.28	12.583	10.23	18.67	1.28
0.500	0.78	6.583	1.28	12.667	10.23	18.75	1.28
0.583	0.78	6.667	1.28	12.750	10.23	18.83	1.28
0.667	0.78	6.750	1.28	12.833	5.26	18.92	1.28
0.750	0.78	6.833	1.28	12.917	5.26	19.00	1.28
0.833	0.78	6.917	1.28	13.000	5.26	19.08	1.28
0.917	0.78	7.000	1.28	13.083	5.26	19.17	1.28
1.000	0.78	7.083	1.28	13.167	5.26	19.25	1.28
1.083	0.78	7.167	1.28	13.250	5.26	19.33	1.28
1.167	0.78	7.250	1.28	13.333	3.84	19.42	1.28
1.250	0.78	7.333	1.56	13.417	3.84	19.50	1.28
1.333	0.78	7.417	1.56	13.500	3.84	19.58	1.28
1.417	0.78	7.500	1.56	13.583	3.84	19.67	1.28
1.500	0.78	7.583	1.56	13.667	3.84	19.75	1.28
1.583	0.78	7.667	1.56	13.750	3.84	19.83	1.28
1.667	0.78	7.750	1.56	13.833	2.98	19.92	1.28
1.750	0.78	7.833	1.56	13.917	2.98	20.00	1.28
1.833	0.78	7.917	1.56	14.000	2.98	20.08	1.28
1.917	0.78	8.000	1.56	14.083	2.98	20.17	1.28
2.000	0.78	8.083	1.56	14.167	2.98	20.25	1.28
2.083	0.78	8.167	1.56	14.250	2.98	20.33	0.85
2.167	0.78	8.250	1.56	14.333	2.13	20.42	0.85
2.250	0.78	8.333	1.85	14.417	2.13	20.50	0.85
2.333	0.92	8.417	1.85	14.500	2.13	20.58	0.85
2.417	0.92	8.500	1.85	14.583	2.13	20.67	0.85
2.500	0.92	8.583	1.85	14.667	2.13	20.75	0.85
2.583	0.92	8.667	1.85	14.750	2.13	20.83	0.85
2.667	0.92	8.750	1.85	14.833	2.13	20.92	0.85
2.750	0.92	8.833	1.99	14.917	2.13	21.00	0.85
2.833	0.92	8.917	1.99	15.000	2.13	21.08	0.85
2.917	0.92	9.000	1.99	15.083	2.13	21.17	0.85
3.000	0.92	9.083	1.99	15.167	2.13	21.25	0.85
3.083	0.92	9.167	1.99	15.250	2.13	21.33	0.85
3.167	0.92	9.250	1.99	15.333	2.13	21.42	0.85
3.250	0.92	9.333	2.27	15.417	2.13	21.50	0.85
3.333	0.92	9.417	2.27	15.500	2.13	21.58	0.85
3.417	0.92	9.500	2.27	15.583	2.13	21.67	0.85
3.500	0.92	9.583	2.27	15.667	2.13	21.75	0.85
3.583	0.92	9.667	2.27	15.750	2.13	21.83	0.85
3.667	0.92	9.750	2.27	15.833	2.13	21.92	0.85
3.750	0.92	9.833	2.56	15.917	2.13	22.00	0.85
3.833	0.92	9.917	2.56	16.000	2.13	22.08	0.85
3.917	0.92	10.000	2.56	16.083	2.13	22.17	0.85
4.000	0.92	10.083	2.56	16.167	2.13	22.25	0.85
4.083	0.92	10.167	2.56	16.250	2.13	22.33	0.85
4.167	0.92	10.250	2.56	16.333	1.28	22.42	0.85
4.250	0.92	10.333	3.27	16.417	1.28	22.50	0.85
4.333	1.14	10.417	3.27	16.500	1.28	22.58	0.85
4.417	1.14	10.500	3.27	16.583	1.28	22.67	0.85
4.500	1.14	10.583	3.27	16.667	1.28	22.75	0.85
4.583	1.14	10.667	3.27	16.750	1.28	22.83	0.85
4.667	1.14	10.750	3.27	16.833	1.28	22.92	0.85
4.750	1.14	10.833	4.40	16.917	1.28	23.00	0.85
4.833	1.14	10.917	4.40	17.000	1.28	23.08	0.85
4.917	1.14	11.000	4.40	17.083	1.28	23.17	0.85

	5.000	1.14	11.083	4.40	17.167	1.28	23.25	0.85
	5.083	1.14	11.167	4.40	17.250	1.28	23.33	0.85
	5.167	1.14	11.250	4.40	17.333	1.28	23.42	0.85
	5.250	1.14	11.333	6.82	17.417	1.28	23.50	0.85
	5.333	1.14	11.417	6.82	17.500	1.28	23.58	0.85
	5.417	1.14	11.500	6.82	17.583	1.28	23.67	0.85
	5.500	1.14	11.583	6.82	17.667	1.28	23.75	0.85
	5.583	1.14	11.667	6.82	17.750	1.28	23.83	0.85
	5.667	1.14	11.750	6.82	17.833	1.28	23.92	0.85
	5.750	1.14	11.833	21.03	17.917	1.28	24.00	0.85
	5.833	1.14	11.917	21.03	18.000	1.28	24.08	0.85
	5.917	1.14	12.000	21.03	18.083	1.28	24.17	0.85
	6.000	1.14	12.083	86.95	18.167	1.28	24.25	0.85
	6.083	1.14	12.167	86.95	18.250	1.28		

Max.Eff.Inten.(mm/hr)=		86.95	107.04	
over (min)		5.00	15.00	
Storage Coeff. (min)=		4.20 (ii)	11.07 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	
Unit Hyd. peak (cms)=		0.24	0.09	
				TOTALS
PEAK FLOW	(cms)=	0.87	0.37	1.194 (iii)
TIME TO PEAK	(hrs)=	12.25	12.33	12.25
RUNOFF VOLUME	(mm)=	70.04	49.27	60.90
TOTAL RAINFALL	(mm)=	71.04	71.04	71.04
RUNOFF COEFFICIENT	=	0.99	0.69	0.86

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(0066)| IN= 2---> OUT= 1 | DT= 5.0 min	OVERFLOW IS OFF			
	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.1507	0.2774
	0.0103	0.1190	0.1711	0.3280
	0.0819	0.2055	0.1837	0.3663
	0.1039	0.2468	0.3000	0.3955

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0088)	6.540	1.194	12.25	60.90
OUTFLOW: ID= 1 (0066)	6.540	0.104	13.17	60.45

PEAK FLOW REDUCTION [Qout/Qin](%)= 8.70
TIME SHIFT OF PEAK FLOW (min)= 55.00
MAXIMUM STORAGE USED (ha.m.)= 0.2468

CALIB | STANDHYD (0089)| ID= 1 DT= 5.0 min	Area (ha)= 0.24			
	Total Imp(%)= 38.00	Dir. Conn.(%)= 21.00		

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.09	0.15
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	40.00	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.14	12.250	86.95	18.33	1.28
0.167	0.00	6.250	1.14	12.333	10.24	18.42	1.28
0.250	0.00	6.333	1.28	12.417	10.23	18.50	1.28
0.333	0.78	6.417	1.28	12.500	10.23	18.58	1.28
0.417	0.78	6.500	1.28	12.583	10.23	18.67	1.28
0.500	0.78	6.583	1.28	12.667	10.23	18.75	1.28
0.583	0.78	6.667	1.28	12.750	10.23	18.83	1.28
0.667	0.78	6.750	1.28	12.833	5.26	18.92	1.28
0.750	0.78	6.833	1.28	12.917	5.26	19.00	1.28
0.833	0.78	6.917	1.28	13.000	5.26	19.08	1.28
0.917	0.78	7.000	1.28	13.083	5.26	19.17	1.28
1.000	0.78	7.083	1.28	13.167	5.26	19.25	1.28
1.083	0.78	7.167	1.28	13.250	5.26	19.33	1.28
1.167	0.78	7.250	1.28	13.333	3.84	19.42	1.28
1.250	0.78	7.333	1.56	13.417	3.84	19.50	1.28
1.333	0.78	7.417	1.56	13.500	3.84	19.58	1.28
1.417	0.78	7.500	1.56	13.583	3.84	19.67	1.28
1.500	0.78	7.583	1.56	13.667	3.84	19.75	1.28
1.583	0.78	7.667	1.56	13.750	3.84	19.83	1.28
1.667	0.78	7.750	1.56	13.833	2.98	19.92	1.28
1.750	0.78	7.833	1.56	13.917	2.98	20.00	1.28
1.833	0.78	7.917	1.56	14.000	2.98	20.08	1.28
1.917	0.78	8.000	1.56	14.083	2.98	20.17	1.28
2.000	0.78	8.083	1.56	14.167	2.98	20.25	1.28
2.083	0.78	8.167	1.56	14.250	2.98	20.33	0.85
2.167	0.78	8.250	1.56	14.333	2.13	20.42	0.85
2.250	0.78	8.333	1.85	14.417	2.13	20.50	0.85
2.333	0.92	8.417	1.85	14.500	2.13	20.58	0.85
2.417	0.92	8.500	1.85	14.583	2.13	20.67	0.85
2.500	0.92	8.583	1.85	14.667	2.13	20.75	0.85
2.583	0.92	8.667	1.85	14.750	2.13	20.83	0.85
2.667	0.92	8.750	1.85	14.833	2.13	20.92	0.85
2.750	0.92	8.833	1.99	14.917	2.13	21.00	0.85
2.833	0.92	8.917	1.99	15.000	2.13	21.08	0.85
2.917	0.92	9.000	1.99	15.083	2.13	21.17	0.85
3.000	0.92	9.083	1.99	15.167	2.13	21.25	0.85
3.083	0.92	9.167	1.99	15.250	2.13	21.33	0.85
3.167	0.92	9.250	1.99	15.333	2.13	21.42	0.85
3.250	0.92	9.333	2.27	15.417	2.13	21.50	0.85
3.333	0.92	9.417	2.27	15.500	2.13	21.58	0.85
3.417	0.92	9.500	2.27	15.583	2.13	21.67	0.85
3.500	0.92	9.583	2.27	15.667	2.13	21.75	0.85
3.583	0.92	9.667	2.27	15.750	2.13	21.83	0.85
3.667	0.92	9.750	2.27	15.833	2.13	21.92	0.85
3.750	0.92	9.833	2.56	15.917	2.13	22.00	0.85
3.833	0.92	9.917	2.56	16.000	2.13	22.08	0.85
3.917	0.92	10.000	2.56	16.083	2.13	22.17	0.85
4.000	0.92	10.083	2.56	16.167	2.13	22.25	0.85

4.083	0.92	10.167	2.56	16.250	2.13	22.33	0.85
4.167	0.92	10.250	2.56	16.333	1.28	22.42	0.85
4.250	0.92	10.333	3.27	16.417	1.28	22.50	0.85
4.333	1.14	10.417	3.27	16.500	1.28	22.58	0.85
4.417	1.14	10.500	3.27	16.583	1.28	22.67	0.85
4.500	1.14	10.583	3.27	16.667	1.28	22.75	0.85
4.583	1.14	10.667	3.27	16.750	1.28	22.83	0.85
4.667	1.14	10.750	3.27	16.833	1.28	22.92	0.85
4.750	1.14	10.833	4.40	16.917	1.28	23.00	0.85
4.833	1.14	10.917	4.40	17.000	1.28	23.08	0.85
4.917	1.14	11.000	4.40	17.083	1.28	23.17	0.85
5.000	1.14	11.083	4.40	17.167	1.28	23.25	0.85
5.083	1.14	11.167	4.40	17.250	1.28	23.33	0.85
5.167	1.14	11.250	4.40	17.333	1.28	23.42	0.85
5.250	1.14	11.333	6.82	17.417	1.28	23.50	0.85
5.333	1.14	11.417	6.82	17.500	1.28	23.58	0.85
5.417	1.14	11.500	6.82	17.583	1.28	23.67	0.85
5.500	1.14	11.583	6.82	17.667	1.28	23.75	0.85
5.583	1.14	11.667	6.82	17.750	1.28	23.83	0.85
5.667	1.14	11.750	6.82	17.833	1.28	23.92	0.85
5.750	1.14	11.833	21.03	17.917	1.28	24.00	0.85
5.833	1.14	11.917	21.03	18.000	1.28	24.08	0.85
5.917	1.14	12.000	21.03	18.083	1.28	24.17	0.85
6.000	1.14	12.083	86.95	18.167	1.28	24.25	0.85
6.083	1.14	12.167	86.95	18.250	1.28		

Max.Eff.Inten.(mm/hr)=	86.95	85.41	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.56 (ii)	9.08 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.33	0.12	
			TOTALS
PEAK FLOW (cms)=	0.01	0.03	0.038 (iii)
TIME TO PEAK (hrs)=	12.25	12.25	12.25
RUNOFF VOLUME (mm)=	70.04	46.47	51.40
TOTAL RAINFALL (mm)=	71.04	71.04	71.04
RUNOFF COEFFICIENT =	0.99	0.65	0.72

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0064)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0066):	6.54	0.104	13.17	60.45
+ ID2= 2 (0070):	0.34	0.074	12.25	63.09
ID = 3 (0064):	6.88	0.128	12.25	60.58

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0064)				
3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0064):	6.88	0.128	12.25	60.58
+ ID2= 2 (0072):	28.11	0.615	13.75	34.72
ID = 1 (0064):	34.99	0.720	13.75	39.80

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0064)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0064):	34.99	0.720	13.75	39.80
+ ID2= 2 (0086):	0.52	0.089	12.25	56.43
ID = 3 (0064):	35.51	0.725	13.75	40.05

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0064)				
3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0064):	35.51	0.725	13.75	40.05
+ ID2= 2 (0087):	1.71	0.077	12.42	24.20
ID = 1 (0064):	37.22	0.736	13.67	39.32

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0064)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0064):	37.22	0.736	13.67	39.32
+ ID2= 2 (0089):	0.24	0.038	12.25	51.40
ID = 3 (0064):	37.46	0.738	13.67	39.40

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
      V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
      V    V   I    SS     U   U   A A   L
       V  V    I     SS    U   U  AAAAA  L
       V  V    I      SS   U   U  A   A  L
        VV     I    SSSSS  UUUUU  A   A  LLLLL

       OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
      O   O    T      T    H   H   Y Y   MM MM  O   O
      O   O    T      T    H   H    Y    M   M  O   O
       OOO     T      T    H   H    Y    M   M   OOO
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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-9dcc-f9ab721dcfe2\bf3c178a-77e6-45d4-9115-71ecdcd9fc3c\scenar
Summary filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-9dcc-f9ab721dcfe2\bf3c178a-77e6-45d4-9115-71ecdcd9fc3c\scenar

DATE: 04-14-2026 TIME: 05:37:29

USER:

COMMENTS: _____

** SIMULATION : Run 3 - 10yr 24hr 15min SCS **

READ STORM	Filename: C:\Users\rsoto\AppData\Local\Temp\60e6093c-53c6-44bb-ab2e-a1ff337040a5\452e337d
Ptotal= 80.35 mm	Comments: 10yr 24hr 15min SCS

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	1.45	12.50	11.57	18.75	1.45
0.25	0.88	6.50	1.45	12.75	5.95	19.00	1.45
0.50	0.88	6.75	1.45	13.00	5.95	19.25	1.45
0.75	0.88	7.00	1.45	13.25	4.34	19.50	1.45
1.00	0.88	7.25	1.77	13.50	4.34	19.75	1.45
1.25	0.88	7.50	1.77	13.75	3.37	20.00	1.45
1.50	0.88	7.75	1.77	14.00	3.37	20.25	0.96
1.75	0.88	8.00	1.77	14.25	2.41	20.50	0.96
2.00	0.88	8.25	2.09	14.50	2.41	20.75	0.96
2.25	1.04	8.50	2.09	14.75	2.41	21.00	0.96
2.50	1.04	8.75	2.25	15.00	2.41	21.25	0.96
2.75	1.04	9.00	2.25	15.25	2.41	21.50	0.96
3.00	1.04	9.25	2.57	15.50	2.41	21.75	0.96
3.25	1.04	9.50	2.57	15.75	2.41	22.00	0.96
3.50	1.04	9.75	2.89	16.00	2.41	22.25	0.96
3.75	1.04	10.00	2.89	16.25	1.45	22.50	0.96
4.00	1.04	10.25	3.70	16.50	1.45	22.75	0.96
4.25	1.29	10.50	3.70	16.75	1.45	23.00	0.96
4.50	1.29	10.75	4.98	17.00	1.45	23.25	0.96
4.75	1.29	11.00	4.98	17.25	1.45	23.50	0.96
5.00	1.29	11.25	7.71	17.50	1.45	23.75	0.96
5.25	1.29	11.50	7.71	17.75	1.45	24.00	0.96
5.50	1.29	11.75	23.78	18.00	1.45		
5.75	1.29	12.00	98.35	18.25	1.45		
6.00	1.29	12.25	11.57	18.50	1.45		

CALIB	NASHYD (0069)	ID= 1 DT= 5.0 min

Area (ha)= 28.11 Curve Number (CN)= 81.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.39

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.29	12.250	98.35	18.33	1.45
0.167	0.00	6.250	1.29	12.333	11.58	18.42	1.45
0.250	0.00	6.333	1.45	12.417	11.57	18.50	1.45
0.333	0.88	6.417	1.45	12.500	11.57	18.58	1.45
0.417	0.88	6.500	1.45	12.583	11.57	18.67	1.45
0.500	0.88	6.583	1.45	12.667	11.57	18.75	1.45
0.583	0.88	6.667	1.45	12.750	11.57	18.83	1.45
0.667	0.88	6.750	1.45	12.833	5.95	18.92	1.45
0.750	0.88	6.833	1.45	12.917	5.95	19.00	1.45
0.833	0.88	6.917	1.45	13.000	5.95	19.08	1.45
0.917	0.88	7.000	1.45	13.083	5.95	19.17	1.45
1.000	0.88	7.083	1.45	13.167	5.95	19.25	1.45
1.083	0.88	7.167	1.45	13.250	5.95	19.33	1.45
1.167	0.88	7.250	1.45	13.333	4.34	19.42	1.45
1.250	0.88	7.333	1.77	13.417	4.34	19.50	1.45
1.333	0.88	7.417	1.77	13.500	4.34	19.58	1.45
1.417	0.88	7.500	1.77	13.583	4.34	19.67	1.45
1.500	0.88	7.583	1.77	13.667	4.34	19.75	1.45
1.583	0.88	7.667	1.77	13.750	4.34	19.83	1.45
1.667	0.88	7.750	1.77	13.833	3.37	19.92	1.45
1.750	0.88	7.833	1.77	13.917	3.37	20.00	1.45
1.833	0.88	7.917	1.77	14.000	3.37	20.08	1.45
1.917	0.88	8.000	1.77	14.083	3.37	20.17	1.45
2.000	0.88	8.083	1.77	14.167	3.37	20.25	1.45
2.083	0.88	8.167	1.77	14.250	3.37	20.33	0.96
2.167	0.88	8.250	1.77	14.333	2.41	20.42	0.96
2.250	0.88	8.333	2.09	14.417	2.41	20.50	0.96
2.333	1.04	8.417	2.09	14.500	2.41	20.58	0.96
2.417	1.04	8.500	2.09	14.583	2.41	20.67	0.96
2.500	1.04	8.583	2.09	14.667	2.41	20.75	0.96
2.583	1.04	8.667	2.09	14.750	2.41	20.83	0.96
2.667	1.04	8.750	2.09	14.833	2.41	20.92	0.96
2.750	1.04	8.833	2.25	14.917	2.41	21.00	0.96
2.833	1.04	8.917	2.25	15.000	2.41	21.08	0.96
2.917	1.04	9.000	2.25	15.083	2.41	21.17	0.96
3.000	1.04	9.083	2.25	15.167	2.41	21.25	0.96
3.083	1.04	9.167	2.25	15.250	2.41	21.33	0.96
3.167	1.04	9.250	2.25	15.333	2.41	21.42	0.96
3.250	1.04	9.333	2.57	15.417	2.41	21.50	0.96
3.333	1.04	9.417	2.57	15.500	2.41	21.58	0.96
3.417	1.04	9.500	2.57	15.583	2.41	21.67	0.96
3.500	1.04	9.583	2.57	15.667	2.41	21.75	0.96
3.583	1.04	9.667	2.57	15.750	2.41	21.83	0.96
3.667	1.04	9.750	2.57	15.833	2.41	21.92	0.96
3.750	1.04	9.833	2.89	15.917	2.41	22.00	0.96

3.833	1.04	9.917	2.89	16.000	2.41	22.08	0.96
3.917	1.04	10.000	2.89	16.083	2.41	22.17	0.96
4.000	1.04	10.083	2.89	16.167	2.41	22.25	0.96
4.083	1.04	10.167	2.89	16.250	2.41	22.33	0.96
4.167	1.04	10.250	2.89	16.333	1.45	22.42	0.96
4.250	1.04	10.333	3.70	16.417	1.45	22.50	0.96
4.333	1.29	10.417	3.70	16.500	1.45	22.58	0.96
4.417	1.29	10.500	3.70	16.583	1.45	22.67	0.96
4.500	1.29	10.583	3.70	16.667	1.45	22.75	0.96
4.583	1.29	10.667	3.70	16.750	1.45	22.83	0.96
4.667	1.29	10.750	3.70	16.833	1.45	22.92	0.96
4.750	1.29	10.833	4.98	16.917	1.45	23.00	0.96
4.833	1.29	10.917	4.98	17.000	1.45	23.08	0.96
4.917	1.29	11.000	4.98	17.083	1.45	23.17	0.96
5.000	1.29	11.083	4.98	17.167	1.45	23.25	0.96
5.083	1.29	11.167	4.98	17.250	1.45	23.33	0.96
5.167	1.29	11.250	4.98	17.333	1.45	23.42	0.96
5.250	1.29	11.333	7.71	17.417	1.45	23.50	0.96
5.333	1.29	11.417	7.71	17.500	1.45	23.58	0.96
5.417	1.29	11.500	7.71	17.583	1.45	23.67	0.96
5.500	1.29	11.583	7.71	17.667	1.45	23.75	0.96
5.583	1.29	11.667	7.71	17.750	1.45	23.83	0.96
5.667	1.29	11.750	7.71	17.833	1.45	23.92	0.96
5.750	1.29	11.833	23.78	17.917	1.45	24.00	0.96
5.833	1.29	11.917	23.78	18.000	1.45	24.08	0.96
5.917	1.29	12.000	23.78	18.083	1.45	24.17	0.96
6.000	1.29	12.083	98.34	18.167	1.45	24.25	0.96
6.083	1.29	12.167	98.35	18.250	1.45		

Unit Hyd Qpeak (cms)= 0.772

PEAK FLOW (cms)= 0.751 (i)
TIME TO PEAK (hrs)= 13.667
RUNOFF VOLUME (mm)= 42.078
TOTAL RAINFALL (mm)= 80.350
RUNOFF COEFFICIENT = 0.524

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ROUTEPIPE(0072)	PIPE Number = 1.00
IN= 2---> OUT= 1	Diameter (mm)=1200.00
DT= 5.0 min	Length (m)= 500.00
	Slope (m/m)= 0.002
	Manning n = 0.013

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.06	.114E+02	0.0	0.41	20.34
0.13	.317E+02	0.0	0.64	13.04
0.19	.573E+02	0.1	0.82	10.13
0.25	.866E+02	0.2	0.98	8.52
0.32	.119E+03	0.3	1.11	7.49
0.38	.153E+03	0.4	1.23	6.77
0.44	.189E+03	0.5	1.34	6.24
0.51	.226E+03	0.6	1.43	5.84
0.57	.264E+03	0.8	1.51	5.53
0.63	.302E+03	1.0	1.58	5.29
0.69	.339E+03	1.1	1.63	5.10
0.76	.376E+03	1.3	1.68	4.95
0.82	.412E+03	1.4	1.72	4.85
0.88	.447E+03	1.6	1.74	4.78
0.95	.479E+03	1.7	1.76	4.74
1.01	.508E+03	1.8	1.76	4.74
1.07	.534E+03	1.9	1.74	4.80
1.14	.554E+03	1.9	1.69	4.92
1.20	.566E+03	1.7	1.54	5.40

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0069)	28.11	0.75	13.67	42.08	0.55	1.48
OUTFLOW: ID= 1 (0072)	28.11	0.75	13.75	42.08	0.55	1.48

CALIB			
NASHYD (0087)	Area (ha)= 1.71	Curve Number (CN)= 69.0	
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.31		

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.29	12.250	98.35	18.33	1.45
0.167	0.00	6.250	1.29	12.333	11.58	18.42	1.45
0.250	0.00	6.333	1.45	12.417	11.57	18.50	1.45
0.333	0.88	6.417	1.45	12.500	11.57	18.58	1.45
0.417	0.88	6.500	1.45	12.583	11.57	18.67	1.45
0.500	0.88	6.583	1.45	12.667	11.57	18.75	1.45
0.583	0.88	6.667	1.45	12.750	11.57	18.83	1.45
0.667	0.88	6.750	1.45	12.833	5.95	18.92	1.45
0.750	0.88	6.833	1.45	12.917	5.95	19.00	1.45
0.833	0.88	6.917	1.45	13.000	5.95	19.08	1.45
0.917	0.88	7.000	1.45	13.083	5.95	19.17	1.45
1.000	0.88	7.083	1.45	13.167	5.95	19.25	1.45
1.083	0.88	7.167	1.45	13.250	5.95	19.33	1.45
1.167	0.88	7.250	1.45	13.333	4.34	19.42	1.45
1.250	0.88	7.333	1.77	13.417	4.34	19.50	1.45
1.333	0.88	7.417	1.77	13.500	4.34	19.58	1.45
1.417	0.88	7.500	1.77	13.583	4.34	19.67	1.45
1.500	0.88	7.583	1.77	13.667	4.34	19.75	1.45
1.583	0.88	7.667	1.77	13.750	4.34	19.83	1.45
1.667	0.88	7.750	1.77	13.833	3.37	19.92	1.45
1.750	0.88	7.833	1.77	13.917	3.37	20.00	1.45
1.833	0.88	7.917	1.77	14.000	3.37	20.08	1.45
1.917	0.88	8.000	1.77	14.083	3.37	20.17	1.45
2.000	0.88	8.083	1.77	14.167	3.37	20.25	1.45
2.083	0.88	8.167	1.77	14.250	3.37	20.33	0.96
2.167	0.88	8.250	1.77	14.333	2.41	20.42	0.96
2.250	0.88	8.333	2.09	14.417	2.41	20.50	0.96
2.333	1.04	8.417	2.09	14.500	2.41	20.58	0.96
2.417	1.04	8.500	2.09	14.583	2.41	20.67	0.96
2.500	1.04	8.583	2.09	14.667	2.41	20.75	0.96
2.583	1.04	8.667	2.09	14.750	2.41	20.83	0.96
2.667	1.04	8.750	2.09	14.833	2.41	20.92	0.96

2.750	1.04	8.833	2.25	14.917	2.41	21.00	0.96
2.833	1.04	8.917	2.25	15.000	2.41	21.08	0.96
2.917	1.04	9.000	2.25	15.083	2.41	21.17	0.96
3.000	1.04	9.083	2.25	15.167	2.41	21.25	0.96
3.083	1.04	9.167	2.25	15.250	2.41	21.33	0.96
3.167	1.04	9.250	2.25	15.333	2.41	21.42	0.96
3.250	1.04	9.333	2.57	15.417	2.41	21.50	0.96
3.333	1.04	9.417	2.57	15.500	2.41	21.58	0.96
3.417	1.04	9.500	2.57	15.583	2.41	21.67	0.96
3.500	1.04	9.583	2.57	15.667	2.41	21.75	0.96
3.583	1.04	9.667	2.57	15.750	2.41	21.83	0.96
3.667	1.04	9.750	2.57	15.833	2.41	21.92	0.96
3.750	1.04	9.833	2.89	15.917	2.41	22.00	0.96
3.833	1.04	9.917	2.89	16.000	2.41	22.08	0.96
3.917	1.04	10.000	2.89	16.083	2.41	22.17	0.96
4.000	1.04	10.083	2.89	16.167	2.41	22.25	0.96
4.083	1.04	10.167	2.89	16.250	2.41	22.33	0.96
4.167	1.04	10.250	2.89	16.333	1.45	22.42	0.96
4.250	1.04	10.333	3.70	16.417	1.45	22.50	0.96
4.333	1.29	10.417	3.70	16.500	1.45	22.58	0.96
4.417	1.29	10.500	3.70	16.583	1.45	22.67	0.96
4.500	1.29	10.583	3.70	16.667	1.45	22.75	0.96
4.583	1.29	10.667	3.70	16.750	1.45	22.83	0.96
4.667	1.29	10.750	3.70	16.833	1.45	22.92	0.96
4.750	1.29	10.833	4.98	16.917	1.45	23.00	0.96
4.833	1.29	10.917	4.98	17.000	1.45	23.08	0.96
4.917	1.29	11.000	4.98	17.083	1.45	23.17	0.96
5.000	1.29	11.083	4.98	17.167	1.45	23.25	0.96
5.083	1.29	11.167	4.98	17.250	1.45	23.33	0.96
5.167	1.29	11.250	4.98	17.333	1.45	23.42	0.96
5.250	1.29	11.333	7.71	17.417	1.45	23.50	0.96
5.333	1.29	11.417	7.71	17.500	1.45	23.58	0.96
5.417	1.29	11.500	7.71	17.583	1.45	23.67	0.96
5.500	1.29	11.583	7.71	17.667	1.45	23.75	0.96
5.583	1.29	11.667	7.71	17.750	1.45	23.83	0.96
5.667	1.29	11.750	7.71	17.833	1.45	23.92	0.96
5.750	1.29	11.833	23.78	17.917	1.45	24.00	0.96
5.833	1.29	11.917	23.78	18.000	1.45	24.08	0.96
5.917	1.29	12.000	23.78	18.083	1.45	24.17	0.96
6.000	1.29	12.083	98.34	18.167	1.45	24.25	0.96
6.083	1.29	12.167	98.35	18.250	1.45		

Unit Hyd Qpeak (cms)= 0.211

PEAK FLOW (cms)= 0.096 (i)
TIME TO PEAK (hrs)= 12.417
RUNOFF VOLUME (mm)= 29.956
TOTAL RAINFALL (mm)= 80.350
RUNOFF COEFFICIENT = 0.373

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0070)	Area (ha)= 0.34
ID= 1 DT= 5.0 min	Total Imp(%)= 75.00 Dir. Conn.(%)= 75.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.26	0.09
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	47.61	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.29	12.250	98.35	18.33	1.45
0.167	0.00	6.250	1.29	12.333	11.58	18.42	1.45
0.250	0.00	6.333	1.45	12.417	11.57	18.50	1.45
0.333	0.88	6.417	1.45	12.500	11.57	18.58	1.45
0.417	0.88	6.500	1.45	12.583	11.57	18.67	1.45
0.500	0.88	6.583	1.45	12.667	11.57	18.75	1.45
0.583	0.88	6.667	1.45	12.750	11.57	18.83	1.45
0.667	0.88	6.750	1.45	12.833	5.95	18.92	1.45
0.750	0.88	6.833	1.45	12.917	5.95	19.00	1.45
0.833	0.88	6.917	1.45	13.000	5.95	19.08	1.45
0.917	0.88	7.000	1.45	13.083	5.95	19.17	1.45
1.000	0.88	7.083	1.45	13.167	5.95	19.25	1.45
1.083	0.88	7.167	1.45	13.250	5.95	19.33	1.45
1.167	0.88	7.250	1.45	13.333	4.34	19.42	1.45
1.250	0.88	7.333	1.77	13.417	4.34	19.50	1.45
1.333	0.88	7.417	1.77	13.500	4.34	19.58	1.45
1.417	0.88	7.500	1.77	13.583	4.34	19.67	1.45
1.500	0.88	7.583	1.77	13.667	4.34	19.75	1.45
1.583	0.88	7.667	1.77	13.750	4.34	19.83	1.45
1.667	0.88	7.750	1.77	13.833	3.37	19.92	1.45
1.750	0.88	7.833	1.77	13.917	3.37	20.00	1.45
1.833	0.88	7.917	1.77	14.000	3.37	20.08	1.45
1.917	0.88	8.000	1.77	14.083	3.37	20.17	1.45
2.000	0.88	8.083	1.77	14.167	3.37	20.25	1.45
2.083	0.88	8.167	1.77	14.250	3.37	20.33	0.96
2.167	0.88	8.250	1.77	14.333	2.41	20.42	0.96
2.250	0.88	8.333	2.09	14.417	2.41	20.50	0.96
2.333	1.04	8.417	2.09	14.500	2.41	20.58	0.96
2.417	1.04	8.500	2.09	14.583	2.41	20.67	0.96
2.500	1.04	8.583	2.09	14.667	2.41	20.75	0.96
2.583	1.04	8.667	2.09	14.750	2.41	20.83	0.96
2.667	1.04	8.750	2.09	14.833	2.41	20.92	0.96
2.750	1.04	8.833	2.25	14.917	2.41	21.00	0.96
2.833	1.04	8.917	2.25	15.000	2.41	21.08	0.96
2.917	1.04	9.000	2.25	15.083	2.41	21.17	0.96
3.000	1.04	9.083	2.25	15.167	2.41	21.25	0.96
3.083	1.04	9.167	2.25	15.250	2.41	21.33	0.96
3.167	1.04	9.250	2.25	15.333	2.41	21.42	0.96
3.250	1.04	9.333	2.57	15.417	2.41	21.50	0.96
3.333	1.04	9.417	2.57	15.500	2.41	21.58	0.96
3.417	1.04	9.500	2.57	15.583	2.41	21.67	0.96
3.500	1.04	9.583	2.57	15.667	2.41	21.75	0.96
3.583	1.04	9.667	2.57	15.750	2.41	21.83	0.96
3.667	1.04	9.750	2.57	15.833	2.41	21.92	0.96
3.750	1.04	9.833	2.89	15.917	2.41	22.00	0.96
3.833	1.04	9.917	2.89	16.000	2.41	22.08	0.96
3.917	1.04	10.000	2.89	16.083	2.41	22.17	0.96
4.000	1.04	10.083	2.89	16.167	2.41	22.25	0.96
4.083	1.04	10.167	2.89	16.250	2.41	22.33	0.96
4.167	1.04	10.250	2.89	16.333	1.45	22.42	0.96
4.250	1.04	10.333	3.70	16.417	1.45	22.50	0.96

4.333	1.29	10.417	3.70	16.500	1.45	22.58	0.96	0.083	0.00	6.167	1.29
4.417	1.29	10.500	3.70	16.583	1.45	22.67	0.96	0.167	0.00	6.250	1.29
4.500	1.29	10.583	3.70	16.667	1.45	22.75	0.96	0.250	0.00	6.333	1.45
4.583	1.29	10.667	3.70	16.750	1.45	22.83	0.96	0.333	0.88	6.417	1.45
4.667	1.29	10.750	3.70	16.833	1.45	22.92	0.96	0.417	0.88	6.500	1.45
4.750	1.29	10.833	4.98	16.917	1.45	23.00	0.96	0.500	0.88	6.583	1.45
4.833	1.29	10.917	4.98	17.000	1.45	23.08	0.96	0.583	0.88	6.667	1.45
4.917	1.29	11.000	4.98	17.083	1.45	23.17	0.96	0.667	0.88	6.750	1.45
5.000	1.29	11.083	4.98	17.167	1.45	23.25	0.96	0.750	0.88	6.833	1.45
5.083	1.29	11.167	4.98	17.250	1.45	23.33	0.96	0.833	0.88	6.917	1.45
5.167	1.29	11.250	4.98	17.333	1.45	23.42	0.96	0.917	0.88	7.000	1.45
5.250	1.29	11.333	7.71	17.417	1.45	23.50	0.96	1.000	0.88	7.083	1.45
5.333	1.29	11.417	7.71	17.500	1.45	23.58	0.96	1.083	0.88	7.167	1.45
5.417	1.29	11.500	7.71	17.583	1.45	23.67	0.96	1.167	0.88	7.250	1.45
5.500	1.29	11.583	7.71	17.667	1.45	23.75	0.96	1.250	0.88	7.333	1.77
5.583	1.29	11.667	7.71	17.750	1.45	23.83	0.96	1.333	0.88	7.417	1.77
5.667	1.29	11.750	7.71	17.833	1.45	23.92	0.96	1.417	0.88	7.500	1.77
5.750	1.29	11.833	23.78	17.917	1.45	24.00	0.96	1.500	0.88	7.583	1.77
5.833	1.29	11.917	23.78	18.000	1.45	24.08	0.96	1.583	0.88	7.667	1.77
5.917	1.29	12.000	23.78	18.083	1.45	24.17	0.96	1.667	0.88	7.750	1.77
6.000	1.29	12.083	98.34	18.167	1.45	24.25	0.96	1.750	0.88	7.833	1.77
6.083	1.29	12.167	98.35	18.250	1.45			1.833	0.88	7.917	1.77
								1.917	0.88	8.000	1.77
								2.000	0.88	8.083	1.77
								2.083	0.88	8.167	1.77
								2.167	0.88	8.250	1.77
								2.250	0.88	8.333	2.09
								2.333	1.04	8.417	2.09
								2.417	1.04	8.500	2.09
								2.500	1.04	8.583	2.09
								2.583	1.04	8.667	2.09
								2.667	1.04	8.750	2.09
								2.750	1.04	8.833	2.25
								2.833	1.04	8.917	2.25
								2.917	1.04	9.000	2.25
								3.000	1.04	9.083	2.25
								3.083	1.04	9.167	2.25
								3.167	1.04	9.250	2.25
								3.250	1.04	9.333	2.57
								3.333	1.04	9.417	2.57
								3.417	1.04	9.500	2.57
								3.500	1.04	9.583	2.57
								3.583	1.04	9.667	2.57
								3.667	1.04	9.750	2.57
								3.750	1.04	9.833	2.89
								3.833	1.04	9.917	2.89
								3.917	1.04	10.000	2.89
								4.000	1.04	10.083	2.89
								4.083	1.04	10.167	2.89
								4.167	1.04	10.250	2.89
								4.250	1.04	10.333	3.70
								4.333	1.29	10.417	3.70
								4.417	1.29	10.500	3.70
								4.500	1.29	10.583	3.70
								4.583	1.29	10.667	3.70
								4.667	1.29	10.750	3.70
								4.750	1.29	10.833	4.98
								4.833	1.29	10.917	4.98
								4.917	1.29	11.000	4.98
								5.000	1.29	11.083	4.98

6.167	1.29	12.250	98.35	18.33	1.45						
6.250	1.29	12.333	11.58	18.42	1.45						
6.333	1.45	12.417	11.57	18.50	1.45						
6.417	1.45	12.500	11.57	18.58	1.45						
6.500	1.45	12.583	11.57	18.67	1.45						
6.583	1.45	12.667	11.57	18.75	1.45						
6.667	1.45	12.750	11.57	18.83	1.45						
6.750	1.45	12.833	5.95	18.92	1.45						
6.833	1.45	12.917	5.95	19.00	1.45						
6.917	1.45	13.000	5.95	19.08	1.45						
7.000	1.45	13.083	5.95	19.17	1.45						
7.083	1.45	13.167	5.95	19.25	1.45						
7.167	1.45	13.250	5.95	19.33	1.45						
7.250	1.45	13.333	4.34	19.42	1.45						
7.333	1.77	13.417	4.34	19.50	1.45						
7.417	1.77	13.500	4.34	19.58	1.45						
7.500	1.77	13.583	4.34	19.67	1.45						
7.583	1.77	13.667	4.34	19.75	1.45						
7.667	1.77	13.750	4.34	19.83	1.45						
7.750	1.77	13.833	3.37	19.92	1.45						
7.833	1.77	13.917	3.37	20.00	1.45						
7.917	1.77	14.000	3.37	20.08	1.45						
8.000	1.77	14.083	3.37	20.17	1.45						
8.083	1.77	14.167	3.37	20.25	1.45						
8.167	1.77	14.250	3.37	20.33	0.96						
8.250	1.77	14.333	2.41	20.42	0.96						
8.333	2.09	14.417	2.41	20.50	0.96						
8.417	2.09	14.500	2.41	20.58	0.96						
8.500	2.09	14.583	2.41	20.67	0.96						
8.583	2.09	14.667	2.41	20.75	0.96						
8.667	2.09	14.750	2.41	20.83	0.96						
8.750	2.09	14.833	2.41	20.92	0.96						
8.833	2.25	14.917	2.41	21.00	0.96						
8.917	2.25	15.000	2.41	21.08	0.96						
9.000	2.25	15.083	2.41	21.17	0.96						
9.083	2.25	15.167	2.41	21.25	0.96						
9.167	2.25	15.250	2.41	21.33	0.96						
9.250	2.25	15.333	2.41	21.42	0.96						
9.333	2.57	15.417	2.41	21.50	0.96						
9.417	2.57	15.500	2.41	21.58	0.96						
9.500	2.57	15.583	2.41	21.67	0.96						
9.583	2.57	15.667	2.41	21.75	0.96						
9.667	2.57	15.750	2.41	21.83	0.96						
9.750	2.57	15.833	2.41	21.92	0.96						
9.833	2.89	15.917	2.41	22.00	0.96						
9.917	2.89	16.000	2.41	22.08	0.96						
10.000	2.89	16.083	2.41	22.17	0.96						
10.083	2.89	16.167	2.41	22.25	0.96						
10.167	2.89	16.250	2.41	22.33	0.96						
10.250	2.89	16.333	1.45	22.42	0.96						
10.333	3.70	16.417	1.45	22.50	0.96						
10.417	3.70	16.500	1.45	22.58	0.96						
10.500	3.70	16.583	1.45	22.67	0.96						
10.583	3.70	16.667	1.45	22.75	0.96						
10.667	3.70	16.750	1.45	22.83	0.96						
10.750	3.70	16.833	1.45	22.92	0.96						
10.833	4.98	16.917	1.45	23.00	0.96						
10.917	4.98	17.000	1.45	23.08	0.96						
11.000	4.98	17.083	1.45	23.17	0.96						
11.083	4.98	17.167	1.45	23.25	0.96						

Max.Eff.Inten.(mm/hr)=	98.35	72.84	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.65 (ii)	6.23 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.32	0.15	
			TOTALS
PEAK FLOW (cms)=	0.07	0.01	0.084 (iii)
TIME TO PEAK (hrs)=	12.25	12.25	12.25
RUNOFF VOLUME (mm)=	79.35	50.27	72.07
TOTAL RAINFALL (mm)=	80.35	80.35	80.35
RUNOFF COEFFICIENT =	0.99	0.63	0.90

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0086)	Area (ha)=	0.52	
ID= 1 DT= 5.0 min	Total Imp(%)=	51.00	Dir. Conn.(%)= 51.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.27	0.25
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	58.88	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

5.083	1.29	11.167	4.98	17.250	1.45	23.33	0.96	0.750	0.88	6.833	1.45	12.917	5.95	19.00	1.45
5.167	1.29	11.250	4.98	17.333	1.45	23.42	0.96	0.833	0.88	6.917	1.45	13.000	5.95	19.08	1.45
5.250	1.29	11.333	7.71	17.417	1.45	23.50	0.96	0.917	0.88	7.000	1.45	13.083	5.95	19.17	1.45
5.333	1.29	11.417	7.71	17.500	1.45	23.58	0.96	1.000	0.88	7.083	1.45	13.167	5.95	19.25	1.45
5.417	1.29	11.500	7.71	17.583	1.45	23.67	0.96	1.083	0.88	7.167	1.45	13.250	5.95	19.33	1.45
5.500	1.29	11.583	7.71	17.667	1.45	23.75	0.96	1.167	0.88	7.250	1.45	13.333	4.34	19.42	1.45
5.583	1.29	11.667	7.71	17.750	1.45	23.83	0.96	1.250	0.88	7.333	1.77	13.417	4.34	19.50	1.45
5.667	1.29	11.750	7.71	17.833	1.45	23.92	0.96	1.333	0.88	7.417	1.77	13.500	4.34	19.58	1.45
5.750	1.29	11.833	23.78	17.917	1.45	24.00	0.96	1.417	0.88	7.500	1.77	13.583	4.34	19.67	1.45
5.833	1.29	11.917	23.78	18.000	1.45	24.08	0.96	1.500	0.88	7.583	1.77	13.667	4.34	19.75	1.45
5.917	1.29	12.000	23.78	18.083	1.45	24.17	0.96	1.583	0.88	7.667	1.77	13.750	4.34	19.83	1.45
6.000	1.29	12.083	98.34	18.167	1.45	24.25	0.96	1.667	0.88	7.750	1.77	13.833	3.37	19.92	1.45
6.083	1.29	12.167	98.35	18.250	1.45			1.750	0.88	7.833	1.77	13.917	3.37	20.00	1.45
								1.833	0.88	7.917	1.77	14.000	3.37	20.08	1.45
								1.917	0.88	8.000	1.77	14.083	3.37	20.17	1.45
								2.000	0.88	8.083	1.77	14.167	3.37	20.25	1.45
								2.083	0.88	8.167	1.77	14.250	3.37	20.33	0.96
								2.167	0.88	8.250	1.77	14.333	2.41	20.42	0.96
								2.250	0.88	8.333	2.09	14.417	2.41	20.50	0.96
								2.333	1.04	8.417	2.09	14.500	2.41	20.58	0.96
								2.417	1.04	8.500	2.09	14.583	2.41	20.67	0.96
								2.500	1.04	8.583	2.09	14.667	2.41	20.75	0.96
								2.583	1.04	8.667	2.09	14.750	2.41	20.83	0.96
								2.667	1.04	8.750	2.09	14.833	2.41	20.92	0.96
								2.750	1.04	8.833	2.25	14.917	2.41	21.00	0.96
								2.833	1.04	8.917	2.25	15.000	2.41	21.08	0.96
								2.917	1.04	9.000	2.25	15.083	2.41	21.17	0.96
								3.000	1.04	9.083	2.25	15.167	2.41	21.25	0.96
								3.083	1.04	9.167	2.25	15.250	2.41	21.33	0.96
								3.167	1.04	9.250	2.25	15.333	2.41	21.42	0.96
								3.250	1.04	9.333	2.57	15.417	2.41	21.50	0.96
								3.333	1.04	9.417	2.57	15.500	2.41	21.58	0.96
								3.417	1.04	9.500	2.57	15.583	2.41	21.67	0.96
								3.500	1.04	9.583	2.57	15.667	2.41	21.75	0.96
								3.583	1.04	9.667	2.57	15.750	2.41	21.83	0.96
								3.667	1.04	9.750	2.57	15.833	2.41	21.92	0.96
								3.750	1.04	9.833	2.89	15.917	2.41	22.00	0.96
								3.833	1.04	9.917	2.89	16.000	2.41	22.08	0.96
								3.917	1.04	10.000	2.89	16.083	2.41	22.17	0.96
								4.000	1.04	10.083	2.89	16.167	2.41	22.25	0.96
								4.083	1.04	10.167	2.89	16.250	2.41	22.33	0.96
								4.167	1.04	10.250	2.89	16.333	1.45	22.42	0.96
								4.250	1.04	10.333	3.70	16.417	1.45	22.50	0.96
								4.333	1.29	10.417	3.70	16.500	1.45	22.58	0.96
								4.417	1.29	10.500	3.70	16.583	1.45	22.67	0.96
								4.500	1.29	10.583	3.70	16.667	1.45	22.75	0.96
								4.583	1.29	10.667	3.70	16.750	1.45	22.83	0.96
								4.667	1.29	10.750	3.70	16.833	1.45	22.92	0.96
								4.750	1.29	10.833	4.98	16.917	1.45	23.00	0.96
								4.833	1.29	10.917	4.98	17.000	1.45	23.08	0.96
								4.917	1.29	11.000	4.98	17.083	1.45	23.17	0.96
								5.000	1.29	11.083	4.98	17.167	1.45	23.25	0.96
								5.083	1.29	11.167	4.98	17.250	1.45	23.33	0.96
								5.167	1.29	11.250	4.98	17.333	1.45	23.42	0.96
								5.250	1.29	11.333	7.71	17.417	1.45	23.50	0.96
								5.333	1.29	11.417	7.71	17.500	1.45	23.58	0.96
								5.417	1.29	11.500	7.71	17.583	1.45	23.67	0.96
								5.500	1.29	11.583	7.71	17.667	1.45	23.75	0.96
								5.583	1.29	11.667	7.71	17.750	1.45	23.83	0.96
								5.667	1.29	11.750	7.71	17.833	1.45	23.92	0.96
								5.750	1.29	11.833	23.78	17.917	1.45	24.00	0.96

Max.Eff.Inten.(mm/hr)=	98.35	72.84	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.87 (ii)	9.88 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.32	0.11	
			TOTALS
PEAK FLOW (cms)=	0.07	0.04	0.109 (iii)
TIME TO PEAK (hrs)=	12.25	12.25	12.25
RUNOFF VOLUME (mm)=	79.35	50.27	65.09
TOTAL RAINFALL (mm)=	80.35	80.35	80.35
RUNOFF COEFFICIENT =	0.99	0.63	0.81

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0088)	Area (ha)=	6.54	
ID= 1 DT= 5.0 min	Total Imp(%)=	71.00	Dir. Conn.(%)= 56.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	4.64	1.90
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	208.81	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.29	12.250	98.35	18.33	1.45
0.167	0.00	6.250	1.29	12.333	11.58	18.42	1.45
0.250	0.00	6.333	1.45	12.417	11.57	18.50	1.45
0.333	0.88	6.417	1.45	12.500	11.57	18.58	1.45
0.417	0.88	6.500	1.45	12.583	11.57	18.67	1.45
0.500	0.88	6.583	1.45	12.667	11.57	18.75	1.45
0.583	0.88	6.667	1.45	12.750	11.57	18.83	1.45
0.667	0.88	6.750	1.45	12.833	5.95	18.92	1.45

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               5.833    1.29 |11.917   23.78 |18.000    1.45 | 24.08    0.96
               5.917    1.29 |12.000   23.78 |18.083    1.45 | 24.17    0.96
               6.000    1.29 |12.083   98.34 |18.167    1.45 | 24.25    0.96
               6.083    1.29 |12.167   98.35 |18.250    1.45 |

     Max.Eff.Inten.(mm/hr)=      98.35       124.89
                 over (min)        5.00        15.00
     Storage Coeff.  (min)=       4.00 (ii)   10.46 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.24         0.09
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.98         0.44          1.379 (iii)
     TIME TO PEAK    (hrs)=      12.25        12.33         12.25
     RUNOFF VOLUME    (mm)=      79.35        57.83         69.88
     TOTAL RAINFALL   (mm)=      80.35        80.35         80.35
     RUNOFF COEFFICIENT   =       0.99         0.72          0.87

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| RESERVOIR(  0066)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |    (cms)     (ha.m.)
                          0.0000      0.0000   |    0.1507      0.2774
                          0.0103      0.1190   |    0.1711      0.3280
                          0.0819      0.2055   |    0.1837      0.3663
                          0.1039      0.2468   |    0.3000      0.3955

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0088)     6.540     1.379     12.25      69.88
   OUTFLOW: ID= 1 (  0066)     6.540     0.151     12.92      69.43

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 10.93
                  TIME SHIFT OF PEAK FLOW         (min)= 40.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.2774

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--------------------
| CALIB            |
| STANDHYD (  0089)|   Area    (ha)=   0.24
|ID= 1 DT= 5.0 min |   Total Imp(%)=  38.00   Dir. Conn.(%)=  21.00
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                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.09         0.15
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      40.00        40.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
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                    ---- TRANSFORMED HYETOGRAPH ----
 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
0.083    0.00 | 6.167    1.29 |12.250   98.35 | 18.33    1.45
0.167    0.00 | 6.250    1.29 |12.333   11.58 | 18.42    1.45
0.250    0.00 | 6.333    1.45 |12.417   11.57 | 18.50    1.45
0.333    0.88 | 6.417    1.45 |12.500   11.57 | 18.58    1.45
0.417    0.88 | 6.500    1.45 |12.583   11.57 | 18.67    1.45
0.500    0.88 | 6.583    1.45 |12.667   11.57 | 18.75    1.45
0.583    0.88 | 6.667    1.45 |12.750   11.57 | 18.83    1.45
0.667    0.88 | 6.750    1.45 |12.833    5.95 | 18.92    1.45
0.750    0.88 | 6.833    1.45 |12.917    5.95 | 19.00    1.45
0.833    0.88 | 6.917    1.45 |13.000    5.95 | 19.08    1.45
0.917    0.88 | 7.000    1.45 |13.083    5.95 | 19.17    1.45
1.000    0.88 | 7.083    1.45 |13.167    5.95 | 19.25    1.45
1.083    0.88 | 7.167    1.45 |13.250    5.95 | 19.33    1.45
1.167    0.88 | 7.250    1.45 |13.333    4.34 | 19.42    1.45
1.250    0.88 | 7.333    1.77 |13.417    4.34 | 19.50    1.45
1.333    0.88 | 7.417    1.77 |13.500    4.34 | 19.58    1.45
1.417    0.88 | 7.500    1.77 |13.583    4.34 | 19.67    1.45
1.500    0.88 | 7.583    1.77 |13.667    4.34 | 19.75    1.45
1.583    0.88 | 7.667    1.77 |13.750    4.34 | 19.83    1.45
1.667    0.88 | 7.750    1.77 |13.833    3.37 | 19.92    1.45
1.750    0.88 | 7.833    1.77 |13.917    3.37 | 20.00    1.45
1.833    0.88 | 7.917    1.77 |14.000    3.37 | 20.08    1.45
1.917    0.88 | 8.000    1.77 |14.083    3.37 | 20.17    1.45
2.000    0.88 | 8.083    1.77 |14.167    3.37 | 20.25    1.45
2.083    0.88 | 8.167    1.77 |14.250    3.37 | 20.33    0.96
2.167    0.88 | 8.250    1.77 |14.333    2.41 | 20.42    0.96
2.250    0.88 | 8.333    2.09 |14.417    2.41 | 20.50    0.96
2.333    1.04 | 8.417    2.09 |14.500    2.41 | 20.58    0.96
2.417    1.04 | 8.500    2.09 |14.583    2.41 | 20.67    0.96
2.500    1.04 | 8.583    2.09 |14.667    2.41 | 20.75    0.96
2.583    1.04 | 8.667    2.09 |14.750    2.41 | 20.83    0.96
2.667    1.04 | 8.750    2.09 |14.833    2.41 | 20.92    0.96
2.750    1.04 | 8.833    2.25 |14.917    2.41 | 21.00    0.96
2.833    1.04 | 8.917    2.25 |15.000    2.41 | 21.08    0.96
2.917    1.04 | 9.000    2.25 |15.083    2.41 | 21.17    0.96
3.000    1.04 | 9.083    2.25 |15.167    2.41 | 21.25    0.96
3.083    1.04 | 9.167    2.25 |15.250    2.41 | 21.33    0.96
3.167    1.04 | 9.250    2.25 |15.333    2.41 | 21.42    0.96
3.250    1.04 | 9.333    2.57 |15.417    2.41 | 21.50    0.96
3.333    1.04 | 9.417    2.57 |15.500    2.41 | 21.58    0.96
3.417    1.04 | 9.500    2.57 |15.583    2.41 | 21.67    0.96
3.500    1.04 | 9.583    2.57 |15.667    2.41 | 21.75    0.96
3.583    1.04 | 9.667    2.57 |15.750    2.41 | 21.83    0.96
3.667    1.04 | 9.750    2.57 |15.833    2.41 | 21.92    0.96
3.750    1.04 | 9.833    2.89 |15.917    2.41 | 22.00    0.96
3.833    1.04 | 9.917    2.89 |16.000    2.41 | 22.08    0.96
3.917    1.04 |10.000    2.89 |16.083    2.41 | 22.17    0.96
4.000    1.04 |10.083    2.89 |16.167    2.41 | 22.25    0.96
4.083    1.04 |10.167    2.89 |16.250    2.41 | 22.33    0.96
4.167    1.04 |10.250    2.89 |16.333    1.45 | 22.42    0.96
4.250    1.04 |10.333    3.70 |16.417    1.45 | 22.50    0.96
4.333    1.29 |10.417    3.70 |16.500    1.45 | 22.58    0.96
4.417    1.29 |10.500    3.70 |16.583    1.45 | 22.67    0.96
4.500    1.29 |10.583    3.70 |16.667    1.45 | 22.75    0.96
4.583    1.29 |10.667    3.70 |16.750    1.45 | 22.83    0.96
4.667    1.29 |10.750    3.70 |16.833    1.45 | 22.92    0.96
4.750    1.29 |10.833    4.98 |16.917    1.45 | 23.00    0.96
4.833    1.29 |10.917    4.98 |17.000    1.45 | 23.08    0.96
```

```
              4.917    1.29 |11.000    4.98 |17.083    1.45 | 23.17    0.96
              5.000    1.29 |11.083    4.98 |17.167    1.45 | 23.25    0.96
              5.083    1.29 |11.167    4.98 |17.250    1.45 | 23.33    0.96
              5.167    1.29 |11.250    4.98 |17.333    1.45 | 23.42    0.96
              5.250    1.29 |11.333    7.71 |17.417    1.45 | 23.50    0.96
              5.333    1.29 |11.417    7.71 |17.500    1.45 | 23.58    0.96
              5.417    1.29 |11.500    7.71 |17.583    1.45 | 23.67    0.96
              5.500    1.29 |11.583    7.71 |17.667    1.45 | 23.75    0.96
              5.583    1.29 |11.667    7.71 |17.750    1.45 | 23.83    0.96
              5.667    1.29 |11.750    7.71 |17.833    1.45 | 23.92    0.96
              5.750    1.29 |11.833   23.78 |17.917    1.45 | 24.00    0.96
              5.833    1.29 |11.917   23.78 |18.000    1.45 | 24.08    0.96
              5.917    1.29 |12.000   23.78 |18.083    1.45 | 24.17    0.96
              6.000    1.29 |12.083   98.34 |18.167    1.45 | 24.25    0.96
              6.083    1.29 |12.167   98.35 |18.250    1.45 |

    Max.Eff.Inten.(mm/hr)=      98.35       100.25
                 over (min)        5.00        10.00
    Storage Coeff.  (min)=       1.48 (ii)    8.53 (ii)
    Unit Hyd. Tpeak (min)=       5.00        10.00
    Unit Hyd. peak  (cms)=       0.33         0.12
                                                      *TOTALS*
    PEAK FLOW       (cms)=       0.01         0.03          0.046 (iii)
    TIME TO PEAK    (hrs)=      12.25        12.25          12.25
    RUNOFF VOLUME    (mm)=      79.35        54.82          59.95
    TOTAL RAINFALL   (mm)=      80.35        80.35          80.35
    RUNOFF COEFFICIENT   =       0.99         0.68           0.75

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0064)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0066):     6.54   0.151    12.92    69.43
     + ID2= 2 (  0070):     0.34   0.084    12.25    72.07
       ================================================
       ID = 3 (  0064):     6.88   0.161    12.25    69.56

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0064)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0064):     6.88   0.161    12.25    69.56
     + ID2= 2 (  0072):    28.11   0.749    13.75    42.08
       ================================================
       ID = 1 (  0064):    34.99   0.886    13.67    47.48

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0064)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0064):    34.99   0.886    13.67    47.48
     + ID2= 2 (  0086):     0.52   0.109    12.25    65.09
       ================================================
       ID = 3 (  0064):    35.51   0.892    13.67    47.74

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0064)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0064):    35.51   0.892    13.67    47.74
     + ID2= 2 (  0087):     1.71   0.096    12.42    29.96
       ================================================
       ID = 1 (  0064):    37.22   0.907    13.67    46.92

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0064)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0064):    37.22   0.907    13.67    46.92
     + ID2= 2 (  0089):     0.24   0.046    12.25    59.95
       ================================================
       ID = 3 (  0064):    37.46   0.909    13.67    47.01

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
================================================================================
==========================

      V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
      V    V   I    SS     U   U   A A   L
       V  V    I     SS    U   U  AAAAA  L
       V  V    I      SS   U   U  A   A  L
        VV     I    SSSSS  UUUUU  A   A  LLLLL

       OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
      O   O    T      T    H   H   Y Y   MM MM  O   O
      O   O    T      T    H   H    Y    M   M  O   O
       OOO     T      T    H   H    Y    M   M   OOO
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                ***** D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\2c273ae3-a4b8-4be9-a82b-18ca90869ea3\scenar
```

Summary filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-9dcc-f9ab721dcfe2\2c273ae3-a4b8-4be9-a82b-18ca90869ea3\scenar

DATE: 04-14-2026 TIME: 05:37:29

USER:

COMMENTS: _____

****
** SIMULATION : Run 4 - 25yr 24hr 15min SCS **
****

READ STORM	Filename: C:\Users\rsoto\AppData\Local\Temp\60e6093c-53c6-44bb-ab2e-a1ff337040a5\55fe42eb
Ptotal= 93.82 mm	Comments: 25yr 24hr 15min SCS

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	1.69	12.50	13.51	18.75	1.69
0.25	1.03	6.50	1.69	12.75	6.94	19.00	1.69
0.50	1.03	6.75	1.69	13.00	6.94	19.25	1.69
0.75	1.03	7.00	1.69	13.25	5.07	19.50	1.69
1.00	1.03	7.25	2.06	13.50	5.07	19.75	1.69
1.25	1.03	7.50	2.06	13.75	3.94	20.00	1.69
1.50	1.03	7.75	2.06	14.00	3.94	20.25	1.13
1.75	1.03	8.00	2.06	14.25	2.81	20.50	1.13
2.00	1.03	8.25	2.44	14.50	2.81	20.75	1.13
2.25	1.22	8.50	2.44	14.75	2.81	21.00	1.13
2.50	1.22	8.75	2.63	15.00	2.81	21.25	1.13
2.75	1.22	9.00	2.63	15.25	2.81	21.50	1.13
3.00	1.22	9.25	3.00	15.50	2.81	21.75	1.13
3.25	1.22	9.50	3.00	15.75	2.81	22.00	1.13
3.50	1.22	9.75	3.38	16.00	2.81	22.25	1.13
3.75	1.22	10.00	3.38	16.25	1.69	22.50	1.13
4.00	1.22	10.25	4.32	16.50	1.69	22.75	1.13
4.25	1.50	10.50	4.32	16.75	1.69	23.00	1.13
4.50	1.50	10.75	5.82	17.00	1.69	23.25	1.13
4.75	1.50	11.00	5.82	17.25	1.69	23.50	1.13
5.00	1.50	11.25	9.01	17.50	1.69	23.75	1.13
5.25	1.50	11.50	9.01	17.75	1.69	24.00	1.13
5.50	1.50	11.75	27.77	18.00	1.69		
5.75	1.50	12.00	114.84	18.25	1.69		
6.00	1.50	12.25	13.51	18.50	1.69		

CALIB			
NASHYD (0069)	Area (ha)= 28.11	Curve Number (CN)= 81.0	
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 1.39		

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.50	12.250	114.84	18.33	1.69
0.167	0.00	6.250	1.50	12.333	13.52	18.42	1.69
0.250	0.00	6.333	1.69	12.417	13.51	18.50	1.69
0.333	1.03	6.417	1.69	12.500	13.51	18.58	1.69
0.417	1.03	6.500	1.69	12.583	13.51	18.67	1.69
0.500	1.03	6.583	1.69	12.667	13.51	18.75	1.69
0.583	1.03	6.667	1.69	12.750	13.51	18.83	1.69
0.667	1.03	6.750	1.69	12.833	6.94	18.92	1.69
0.750	1.03	6.833	1.69	12.917	6.94	19.00	1.69
0.833	1.03	6.917	1.69	13.000	6.94	19.08	1.69
0.917	1.03	7.000	1.69	13.083	6.94	19.17	1.69
1.000	1.03	7.083	1.69	13.167	6.94	19.25	1.69
1.083	1.03	7.167	1.69	13.250	6.94	19.33	1.69
1.167	1.03	7.250	1.69	13.333	5.07	19.42	1.69
1.250	1.03	7.333	2.06	13.417	5.07	19.50	1.69
1.333	1.03	7.417	2.06	13.500	5.07	19.58	1.69
1.417	1.03	7.500	2.06	13.583	5.07	19.67	1.69
1.500	1.03	7.583	2.06	13.667	5.07	19.75	1.69
1.583	1.03	7.667	2.06	13.750	5.07	19.83	1.69
1.667	1.03	7.750	2.06	13.833	3.94	19.92	1.69
1.750	1.03	7.833	2.06	13.917	3.94	20.00	1.69
1.833	1.03	7.917	2.06	14.000	3.94	20.08	1.69
1.917	1.03	8.000	2.06	14.083	3.94	20.17	1.69
2.000	1.03	8.083	2.06	14.167	3.94	20.25	1.69
2.083	1.03	8.167	2.06	14.250	3.94	20.33	1.13
2.167	1.03	8.250	2.06	14.333	2.81	20.42	1.13
2.250	1.03	8.333	2.44	14.417	2.81	20.50	1.13
2.333	1.22	8.417	2.44	14.500	2.81	20.58	1.13
2.417	1.22	8.500	2.44	14.583	2.81	20.67	1.13
2.500	1.22	8.583	2.44	14.667	2.81	20.75	1.13
2.583	1.22	8.667	2.44	14.750	2.81	20.83	1.13
2.667	1.22	8.750	2.44	14.833	2.81	20.92	1.13
2.750	1.22	8.833	2.63	14.917	2.81	21.00	1.13
2.833	1.22	8.917	2.63	15.000	2.81	21.08	1.13
2.917	1.22	9.000	2.63	15.083	2.81	21.17	1.13
3.000	1.22	9.083	2.63	15.167	2.81	21.25	1.13
3.083	1.22	9.167	2.63	15.250	2.81	21.33	1.13
3.167	1.22	9.250	2.63	15.333	2.81	21.42	1.13
3.250	1.22	9.333	3.00	15.417	2.81	21.50	1.13
3.333	1.22	9.417	3.00	15.500	2.81	21.58	1.13
3.417	1.22	9.500	3.00	15.583	2.81	21.67	1.13
3.500	1.22	9.583	3.00	15.667	2.81	21.75	1.13
3.583	1.22	9.667	3.00	15.750	2.81	21.83	1.13
3.667	1.22	9.750	3.00	15.833	2.81	21.92	1.13
3.750	1.22	9.833	3.38	15.917	2.81	22.00	1.13
3.833	1.22	9.917	3.38	16.000	2.81	22.08	1.13
3.917	1.22	10.000	3.38	16.083	2.81	22.17	1.13
4.000	1.22	10.083	3.38	16.167	2.81	22.25	1.13
4.083	1.22	10.167	3.38	16.250	2.81	22.33	1.13
4.167	1.22	10.250	3.38	16.333	1.69	22.42	1.13
4.250	1.22	10.333	4.32	16.417	1.69	22.50	1.13
4.333	1.50	10.417	4.32	16.500	1.69	22.58	1.13
4.417	1.50	10.500	4.32	16.583	1.69	22.67	1.13
4.500	1.50	10.583	4.32	16.667	1.69	22.75	1.13

	4.583	1.50	10.667	4.32	16.750	1.69	22.83	1.13
	4.667	1.50	10.750	4.32	16.833	1.69	22.92	1.13
	4.750	1.50	10.833	5.82	16.917	1.69	23.00	1.13
	4.833	1.50	10.917	5.82	17.000	1.69	23.08	1.13
	4.917	1.50	11.000	5.82	17.083	1.69	23.17	1.13
	5.000	1.50	11.083	5.82	17.167	1.69	23.25	1.13
	5.083	1.50	11.167	5.82	17.250	1.69	23.33	1.13
	5.167	1.50	11.250	5.82	17.333	1.69	23.42	1.13
	5.250	1.50	11.333	9.01	17.417	1.69	23.50	1.13
	5.333	1.50	11.417	9.01	17.500	1.69	23.58	1.13
	5.417	1.50	11.500	9.01	17.583	1.69	23.67	1.13
	5.500	1.50	11.583	9.01	17.667	1.69	23.75	1.13
	5.583	1.50	11.667	9.01	17.750	1.69	23.83	1.13
	5.667	1.50	11.750	9.01	17.833	1.69	23.92	1.13
	5.750	1.50	11.833	27.77	17.917	1.69	24.00	1.13
	5.833	1.50	11.917	27.77	18.000	1.69	24.08	1.13
	5.917	1.50	12.000	27.77	18.083	1.69	24.17	1.13
	6.000	1.50	12.083	114.83	18.167	1.69	24.25	1.13
	6.083	1.50	12.167	114.84	18.250	1.69		

Unit Hyd Qpeak (cms)= 0.772

PEAK FLOW (cms)= 0.954 (i)
TIME TO PEAK (hrs)= 13.667
RUNOFF VOLUME (mm)= 53.160
TOTAL RAINFALL (mm)= 93.820
RUNOFF COEFFICIENT = 0.567

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ROUTEPIPE(0072)	IN= 2---> OUT= 1	DT= 5.0 min

PIPE Number = 1.00
Diameter (mm)=1200.00
Length (m)= 500.00
Slope (m/m)= 0.002
Manning n = 0.013

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.06	.114E+02	0.0	0.41	20.34
0.13	.317E+02	0.0	0.64	13.04
0.19	.573E+02	0.1	0.82	10.13
0.25	.866E+02	0.2	0.98	8.52
0.32	.119E+03	0.3	1.11	7.49
0.38	.153E+03	0.4	1.23	6.77
0.44	.189E+03	0.5	1.34	6.24
0.51	.226E+03	0.6	1.43	5.84
0.57	.264E+03	0.8	1.51	5.53
0.63	.302E+03	1.0	1.58	5.29
0.69	.339E+03	1.1	1.63	5.10
0.76	.376E+03	1.3	1.68	4.95
0.82	.412E+03	1.4	1.72	4.85
0.88	.447E+03	1.6	1.74	4.78
0.95	.479E+03	1.7	1.76	4.74
1.01	.508E+03	1.8	1.76	4.74
1.07	.534E+03	1.9	1.74	4.80
1.14	.554E+03	1.9	1.69	4.92
1.20	.566E+03	1.7	1.54	5.40

<---- hydrograph ----> <-pipe / channel->

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0069)	28.11	0.95	13.67	53.16	0.63	1.58
OUTFLOW: ID= 1 (0072)	28.11	0.95	13.75	53.16	0.63	1.57

CALIB	NASHYD (0087)	ID= 1 DT= 5.0 min

Area (ha)= 1.71 Curve Number (CN)= 69.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.31

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.50	12.250	114.84	18.33	1.69
0.167	0.00	6.250	1.50	12.333	13.52	18.42	1.69
0.250	0.00	6.333	1.69	12.417	13.51	18.50	1.69
0.333	1.03	6.417	1.69	12.500	13.51	18.58	1.69
0.417	1.03	6.500	1.69	12.583	13.51	18.67	1.69
0.500	1.03	6.583	1.69	12.667	13.51	18.75	1.69
0.583	1.03	6.667	1.69	12.750	13.51	18.83	1.69
0.667	1.03	6.750	1.69	12.833	6.94	18.92	1.69
0.750	1.03	6.833	1.69	12.917	6.94	19.00	1.69
0.833	1.03	6.917	1.69	13.000	6.94	19.08	1.69
0.917	1.03	7.000	1.69	13.083	6.94	19.17	1.69
1.000	1.03	7.083	1.69	13.167	6.94	19.25	1.69
1.083	1.03	7.167	1.69	13.250	6.94	19.33	1.69
1.167	1.03	7.250	1.69	13.333	5.07	19.42	1.69
1.250	1.03	7.333	2.06	13.417	5.07	19.50	1.69
1.333	1.03	7.417	2.06	13.500	5.07	19.58	1.69
1.417	1.03	7.500	2.06	13.583	5.07	19.67	1.69
1.500	1.03	7.583	2.06	13.667	5.07	19.75	1.69
1.583	1.03	7.667	2.06	13.750	5.07	19.83	1.69
1.667	1.03	7.750	2.06	13.833	3.94	19.92	1.69
1.750	1.03	7.833	2.06	13.917	3.94	20.00	1.69
1.833	1.03	7.917	2.06	14.000	3.94	20.08	1.69
1.917	1.03	8.000	2.06	14.083	3.94	20.17	1.69
2.000	1.03	8.083	2.06	14.167	3.94	20.25	1.69
2.083	1.03	8.167	2.06	14.250	3.94	20.33	1.13
2.167	1.03	8.250	2.06	14.333	2.81	20.42	1.13
2.250	1.03	8.333	2.44	14.417	2.81	20.50	1.13
2.333	1.22	8.417	2.44	14.500	2.81	20.58	1.13
2.417	1.22	8.500	2.44	14.583	2.81	20.67	1.13
2.500	1.22	8.583	2.44	14.667	2.81	20.75	1.13
2.583	1.22	8.667	2.44	14.750	2.81	20.83	1.13
2.667	1.22	8.750	2.44	14.833	2.81	20.92	1.13
2.750	1.22	8.833	2.63	14.917	2.81	21.00	1.13
2.833	1.22	8.917	2.63	15.000	2.81	21.08	1.13
2.917	1.22	9.000	2.63	15.083	2.81	21.17	1.13
3.000	1.22	9.083	2.63	15.167	2.81	21.25	1.13
3.083	1.22	9.167	2.63	15.250	2.81	21.33	1.13
3.167	1.22	9.250	2.63	15.333	2.81	21.42	1.13
3.250	1.22	9.333	3.00	15.417	2.81	21.50	1.13
3.333	1.22	9.417	3.00	15.500	2.81	21.58	1.13
3.417	1.22	9.500	3.00	15.583	2.81	21.67	1.13

3.500	1.22	9.583	3.00	15.667	2.81	21.75	1.13	0.083	0.00	6.167	1.50
3.583	1.22	9.667	3.00	15.750	2.81	21.83	1.13	0.167	0.00	6.250	1.50
3.667	1.22	9.750	3.00	15.833	2.81	21.92	1.13	0.250	0.00	6.333	1.69
3.750	1.22	9.833	3.38	15.917	2.81	22.00	1.13	0.333	1.03	6.417	1.69
3.833	1.22	9.917	3.38	16.000	2.81	22.08	1.13	0.417	1.03	6.500	1.69
3.917	1.22	10.000	3.38	16.083	2.81	22.17	1.13	0.500	1.03	6.583	1.69
4.000	1.22	10.083	3.38	16.167	2.81	22.25	1.13	0.583	1.03	6.667	1.69
4.083	1.22	10.167	3.38	16.250	2.81	22.33	1.13	0.667	1.03	6.750	1.69
4.167	1.22	10.250	3.38	16.333	1.69	22.42	1.13	0.750	1.03	6.833	1.69
4.250	1.22	10.333	4.32	16.417	1.69	22.50	1.13	0.833	1.03	6.917	1.69
4.333	1.50	10.417	4.32	16.500	1.69	22.58	1.13	0.917	1.03	7.000	1.69
4.417	1.50	10.500	4.32	16.583	1.69	22.67	1.13	1.000	1.03	7.083	1.69
4.500	1.50	10.583	4.32	16.667	1.69	22.75	1.13	1.083	1.03	7.167	1.69
4.583	1.50	10.667	4.32	16.750	1.69	22.83	1.13	1.167	1.03	7.250	1.69
4.667	1.50	10.750	4.32	16.833	1.69	22.92	1.13	1.250	1.03	7.333	2.06
4.750	1.50	10.833	5.82	16.917	1.69	23.00	1.13	1.333	1.03	7.417	2.06
4.833	1.50	10.917	5.82	17.000	1.69	23.08	1.13	1.417	1.03	7.500	2.06
4.917	1.50	11.000	5.82	17.083	1.69	23.17	1.13	1.500	1.03	7.583	2.06
5.000	1.50	11.083	5.82	17.167	1.69	23.25	1.13	1.583	1.03	7.667	2.06
5.083	1.50	11.167	5.82	17.250	1.69	23.33	1.13	1.667	1.03	7.750	2.06
5.167	1.50	11.250	5.82	17.333	1.69	23.42	1.13	1.750	1.03	7.833	2.06
5.250	1.50	11.333	9.01	17.417	1.69	23.50	1.13	1.833	1.03	7.917	2.06
5.333	1.50	11.417	9.01	17.500	1.69	23.58	1.13	1.917	1.03	8.000	2.06
5.417	1.50	11.500	9.01	17.583	1.69	23.67	1.13	2.000	1.03	8.083	2.06
5.500	1.50	11.583	9.01	17.667	1.69	23.75	1.13	2.083	1.03	8.167	2.06
5.583	1.50	11.667	9.01	17.750	1.69	23.83	1.13	2.167	1.03	8.250	2.06
5.667	1.50	11.750	9.01	17.833	1.69	23.92	1.13	2.250	1.03	8.333	2.44
5.750	1.50	11.833	27.77	17.917	1.69	24.00	1.13	2.333	1.22	8.417	2.44
5.833	1.50	11.917	27.77	18.000	1.69	24.08	1.13	2.417	1.22	8.500	2.44
5.917	1.50	12.000	27.77	18.083	1.69	24.17	1.13	2.500	1.22	8.583	2.44
6.000	1.50	12.083	114.83	18.167	1.69	24.25	1.13	2.583	1.22	8.667	2.44
6.083	1.50	12.167	114.84	18.250	1.69			2.667	1.22	8.750	2.44
								2.750	1.22	8.833	2.63
								2.833	1.22	8.917	2.63
								2.917	1.22	9.000	2.63
								3.000	1.22	9.083	2.63
								3.083	1.22	9.167	2.63
								3.167	1.22	9.250	2.63
								3.250	1.22	9.333	3.00
								3.333	1.22	9.417	3.00
								3.417	1.22	9.500	3.00
								3.500	1.22	9.583	3.00
								3.583	1.22	9.667	3.00
								3.667	1.22	9.750	3.00
								3.750	1.22	9.833	3.38
								3.833	1.22	9.917	3.38
								3.917	1.22	10.000	3.38
								4.000	1.22	10.083	3.38
								4.083	1.22	10.167	3.38
								4.167	1.22	10.250	3.38
								4.250	1.22	10.333	4.32
								4.333	1.50	10.417	4.32
								4.417	1.50	10.500	4.32
								4.500	1.50	10.583	4.32
								4.583	1.50	10.667	4.32
								4.667	1.50	10.750	4.32
								4.750	1.50	10.833	5.82
								4.833	1.50	10.917	5.82
								4.917	1.50	11.000	5.82
								5.000	1.50	11.083	5.82

6.167	1.50	12.250	114.84	18.333	1.69						
6.250	1.50	12.333	13.52	18.42	1.69						
6.333	1.69	12.417	13.51	18.50	1.69						
6.417	1.69	12.500	13.51	18.58	1.69						
6.500	1.69	12.583	13.51	18.67	1.69						
6.583	1.69	12.667	13.51	18.75	1.69						
6.667	1.69	12.750	13.51	18.83	1.69						
6.750	1.69	12.833	6.94	18.92	1.69						
6.833	1.69	12.917	6.94	19.00	1.69						
6.917	1.69	13.000	6.94	19.08	1.69						
7.000	1.69	13.083	6.94	19.17	1.69						
7.083	1.69	13.167	6.94	19.25	1.69						
7.167	1.69	13.250	6.94	19.33	1.69						
7.250	1.69	13.333	5.07	19.42	1.69						
7.333	2.06	13.417	5.07	19.50	1.69						
7.417	2.06	13.500	5.07	19.58	1.69						
7.500	2.06	13.583	5.07	19.67	1.69						
7.583	2.06	13.667	5.07	19.75	1.69						
7.667	2.06	13.750	5.07	19.83	1.69						
7.750	2.06	13.833	3.94	19.92	1.69						
7.833	2.06	13.917	3.94	20.00	1.69						
7.917	2.06	14.000	3.94	20.08	1.69						
8.000	2.06	14.083	3.94	20.17	1.69						
8.083	2.06	14.167	3.94	20.25	1.69						
8.167	2.06	14.250	3.94	20.33	1.13						
8.250	2.06	14.333	2.81	20.42	1.13						
8.333	2.44	14.417	2.81	20.50	1.13						
8.417	2.44	14.500	2.81	20.58	1.13						
8.500	2.44	14.583	2.81	20.67	1.13						
8.583	2.44	14.667	2.81	20.75	1.13						
8.667	2.44	14.750	2.81	20.83	1.13						
8.750	2.44	14.833	2.81	20.92	1.13						
8.833	2.63	14.917	2.81	21.00	1.13						
8.917	2.63	15.000	2.81	21.08	1.13						
9.000	2.63	15.083	2.81	21.17	1.13						
9.083	2.63	15.167	2.81	21.25	1.13						
9.167	2.63	15.250	2.81	21.33	1.13						
9.250	2.63	15.333	2.81	21.42	1.13						
9.333	3.00	15.417	2.81	21.50	1.13						
9.417	3.00	15.500	2.81	21.58	1.13						
9.500	3.00	15.583	2.81	21.67	1.13						
9.583	3.00	15.667	2.81	21.75	1.13						
9.667	3.00	15.750	2.81	21.83	1.13						
9.750	3.00	15.833	2.81	21.92	1.13						
9.833	3.38	15.917	2.81	22.00	1.13						
9.917	3.38	16.000	2.81	22.08	1.13						
10.000	3.38	16.083	2.81	22.17	1.13						
10.083	3.38	16.167	2.81	22.25	1.13						
10.167	3.38	16.250	2.81	22.33	1.13						
10.250	3.38	16.333	1.69	22.42	1.13						
10.333	4.32	16.417	1.69	22.50	1.13						
10.417	4.32	16.500	1.69	22.58	1.13						
10.500	4.32	16.583	1.69	22.67	1.13						
10.583	4.32	16.667	1.69	22.75	1.13						
10.667	4.32	16.750	1.69	22.83	1.13						
10.750	4.32	16.833	1.69	22.92	1.13						
10.833	5.82	16.917	1.69	23.00	1.13						
10.917	5.82	17.000	1.69	23.08	1.13						
11.000	5.82	17.083	1.69	23.17	1.13						
11.083	5.82	17.167	1.69	23.25	1.13						

Unit Hyd Qpeak (cms)= 0.211

PEAK FLOW (cms)= 0.125 (i)
TIME TO PEAK (hrs)= 12.417
RUNOFF VOLUME (mm)= 38.861
TOTAL RAINFALL (mm)= 93.820
RUNOFF COEFFICIENT = 0.414

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0070)	Area (ha)= 0.34
ID= 1 DT= 5.0 min	Total Imp(%)= 75.00 Dir. Conn.(%)= 75.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.26	0.09
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	47.61	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

5.083	1.50	11.167	5.82	17.250	1.69	23.33	1.13	0.750	1.03	6.833	1.69	12.917	6.94	19.00	1.69
5.167	1.50	11.250	5.82	17.333	1.69	23.42	1.13	0.833	1.03	6.917	1.69	13.000	6.94	19.08	1.69
5.250	1.50	11.333	9.01	17.417	1.69	23.50	1.13	0.917	1.03	7.000	1.69	13.083	6.94	19.17	1.69
5.333	1.50	11.417	9.01	17.500	1.69	23.58	1.13	1.000	1.03	7.083	1.69	13.167	6.94	19.25	1.69
5.417	1.50	11.500	9.01	17.583	1.69	23.67	1.13	1.083	1.03	7.167	1.69	13.250	6.94	19.33	1.69
5.500	1.50	11.583	9.01	17.667	1.69	23.75	1.13	1.167	1.03	7.250	1.69	13.333	5.07	19.42	1.69
5.583	1.50	11.667	9.01	17.750	1.69	23.83	1.13	1.250	1.03	7.333	2.06	13.417	5.07	19.50	1.69
5.667	1.50	11.750	9.01	17.833	1.69	23.92	1.13	1.333	1.03	7.417	2.06	13.500	5.07	19.58	1.69
5.750	1.50	11.833	27.77	17.917	1.69	24.00	1.13	1.417	1.03	7.500	2.06	13.583	5.07	19.67	1.69
5.833	1.50	11.917	27.77	18.000	1.69	24.08	1.13	1.500	1.03	7.583	2.06	13.667	5.07	19.75	1.69
5.917	1.50	12.000	27.77	18.083	1.69	24.17	1.13	1.583	1.03	7.667	2.06	13.750	5.07	19.83	1.69
6.000	1.50	12.083	114.83	18.167	1.69	24.25	1.13	1.667	1.03	7.750	2.06	13.833	3.94	19.92	1.69
6.083	1.50	12.167	114.84	18.250	1.69			1.750	1.03	7.833	2.06	13.917	3.94	20.00	1.69
								1.833	1.03	7.917	2.06	14.000	3.94	20.08	1.69
								1.917	1.03	8.000	2.06	14.083	3.94	20.17	1.69
								2.000	1.03	8.083	2.06	14.167	3.94	20.25	1.69
								2.083	1.03	8.167	2.06	14.250	3.94	20.33	1.13
								2.167	1.03	8.250	2.06	14.333	2.81	20.42	1.13
								2.250	1.03	8.333	2.44	14.417	2.81	20.50	1.13
								2.333	1.22	8.417	2.44	14.500	2.81	20.58	1.13
								2.417	1.22	8.500	2.44	14.583	2.81	20.67	1.13
								2.500	1.22	8.583	2.44	14.667	2.81	20.75	1.13
								2.583	1.22	8.667	2.44	14.750	2.81	20.83	1.13
								2.667	1.22	8.750	2.44	14.833	2.81	20.92	1.13
								2.750	1.22	8.833	2.63	14.917	2.81	21.00	1.13
								2.833	1.22	8.917	2.63	15.000	2.81	21.08	1.13
								2.917	1.22	9.000	2.63	15.083	2.81	21.17	1.13
								3.000	1.22	9.083	2.63	15.167	2.81	21.25	1.13
								3.083	1.22	9.167	2.63	15.250	2.81	21.33	1.13
								3.167	1.22	9.250	2.63	15.333	2.81	21.42	1.13
								3.250	1.22	9.333	3.00	15.417	2.81	21.50	1.13
								3.333	1.22	9.417	3.00	15.500	2.81	21.58	1.13
								3.417	1.22	9.500	3.00	15.583	2.81	21.67	1.13
								3.500	1.22	9.583	3.00	15.667	2.81	21.75	1.13
								3.583	1.22	9.667	3.00	15.750	2.81	21.83	1.13
								3.667	1.22	9.750	3.00	15.833	2.81	21.92	1.13
								3.750	1.22	9.833	3.38	15.917	2.81	22.00	1.13
								3.833	1.22	9.917	3.38	16.000	2.81	22.08	1.13
								3.917	1.22	10.000	3.38	16.083	2.81	22.17	1.13
								4.000	1.22	10.083	3.38	16.167	2.81	22.25	1.13
								4.083	1.22	10.167	3.38	16.250	2.81	22.33	1.13
								4.167	1.22	10.250	3.38	16.333	1.69	22.42	1.13
								4.250	1.22	10.333	4.32	16.417	1.69	22.50	1.13
								4.333	1.50	10.417	4.32	16.500	1.69	22.58	1.13
								4.417	1.50	10.500	4.32	16.583	1.69	22.67	1.13
								4.500	1.50	10.583	4.32	16.667	1.69	22.75	1.13
								4.583	1.50	10.667	4.32	16.750	1.69	22.83	1.13
								4.667	1.50	10.750	4.32	16.833	1.69	22.92	1.13
								4.750	1.50	10.833	5.82	16.917	1.69	23.00	1.13
								4.833	1.50	10.917	5.82	17.000	1.69	23.08	1.13
								4.917	1.50	11.000	5.82	17.083	1.69	23.17	1.13
								5.000	1.50	11.083	5.82	17.167	1.69	23.25	1.13
								5.083	1.50	11.167	5.82	17.250	1.69	23.33	1.13
								5.167	1.50	11.250	5.82	17.333	1.69	23.42	1.13
								5.250	1.50	11.333	9.01	17.417	1.69	23.50	1.13
								5.333	1.50	11.417	9.01	17.500	1.69	23.58	1.13
								5.417	1.50	11.500	9.01	17.583	1.69	23.67	1.13
								5.500	1.50	11.583	9.01	17.667	1.69	23.75	1.13
								5.583	1.50	11.667	9.01	17.750	1.69	23.83	1.13
								5.667	1.50	11.750	9.01	17.833	1.69	23.92	1.13
								5.750	1.50	11.833	27.77	17.917	1.69	24.00	1.13

Max.Eff.Inten.(mm/hr)=	114.84	89.53	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.55 (ii)	5.85 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.33	0.15	
			TOTALS
PEAK FLOW (cms)=	0.08	0.02	0.100 (iii)
TIME TO PEAK (hrs)=	12.25	12.25	12.25
RUNOFF VOLUME (mm)=	92.82	62.15	85.14
TOTAL RAINFALL (mm)=	93.82	93.82	93.82
RUNOFF COEFFICIENT =	0.99	0.66	0.91

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0086)	Area (ha)= 0.52
ID= 1 DT= 5.0 min	Total Imp(%)= 51.00 Dir. Conn.(%)= 51.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.27	0.25
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	58.88	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.50	12.250	114.84	18.33	1.69
0.167	0.00	6.250	1.50	12.333	13.52	18.42	1.69
0.250	0.00	6.333	1.69	12.417	13.51	18.50	1.69
0.333	1.03	6.417	1.69	12.500	13.51	18.58	1.69
0.417	1.03	6.500	1.69	12.583	13.51	18.67	1.69
0.500	1.03	6.583	1.69	12.667	13.51	18.75	1.69
0.583	1.03	6.667	1.69	12.750	13.51	18.83	1.69
0.667	1.03	6.750	1.69	12.833	6.94	18.92	1.69

5.833	1.50	11.917	27.77	18.000	1.69	24.08	1.13
5.917	1.50	12.000	27.77	18.083	1.69	24.17	1.13
6.000	1.50	12.083	114.83	18.167	1.69	24.25	1.13
6.083	1.50	12.167	114.84	18.250	1.69		

Max.Eff.Inten.(mm/hr)=	114.84	89.53	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.76 (ii)	9.14 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.32	0.12	
			TOTALS
PEAK FLOW (cms)=	0.08	0.05	0.132 (iii)
TIME TO PEAK (hrs)=	12.25	12.25	12.25
RUNOFF VOLUME (mm)=	92.82	62.15	77.78
TOTAL RAINFALL (mm)=	93.82	93.82	93.82
RUNOFF COEFFICIENT =	0.99	0.66	0.83

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB		
STANDHYD (0088)	Area (ha)=	6.54
ID= 1 DT= 5.0 min	Total Imp(%)=	71.00 Dir. Conn.(%)= 56.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	4.64	1.90
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	208.81	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.50	12.250	114.84	18.33	1.69
0.167	0.00	6.250	1.50	12.333	13.52	18.42	1.69
0.250	0.00	6.333	1.69	12.417	13.51	18.50	1.69
0.333	1.03	6.417	1.69	12.500	13.51	18.58	1.69
0.417	1.03	6.500	1.69	12.583	13.51	18.67	1.69
0.500	1.03	6.583	1.69	12.667	13.51	18.75	1.69
0.583	1.03	6.667	1.69	12.750	13.51	18.83	1.69
0.667	1.03	6.750	1.69	12.833	6.94	18.92	1.69
0.750	1.03	6.833	1.69	12.917	6.94	19.00	1.69
0.833	1.03	6.917	1.69	13.000	6.94	19.08	1.69
0.917	1.03	7.000	1.69	13.083	6.94	19.17	1.69
1.000	1.03	7.083	1.69	13.167	6.94	19.25	1.69
1.083	1.03	7.167	1.69	13.250	6.94	19.33	1.69
1.167	1.03	7.250	1.69	13.333	5.07	19.42	1.69
1.250	1.03	7.333	2.06	13.417	5.07	19.50	1.69
1.333	1.03	7.417	2.06	13.500	5.07	19.58	1.69
1.417	1.03	7.500	2.06	13.583	5.07	19.67	1.69
1.500	1.03	7.583	2.06	13.667	5.07	19.75	1.69
1.583	1.03	7.667	2.06	13.750	5.07	19.83	1.69
1.667	1.03	7.750	2.06	13.833	3.94	19.92	1.69
1.750	1.03	7.833	2.06	13.917	3.94	20.00	1.69
1.833	1.03	7.917	2.06	14.000	3.94	20.08	1.69
1.917	1.03	8.000	2.06	14.083	3.94	20.17	1.69
2.000	1.03	8.083	2.06	14.167	3.94	20.25	1.69
2.083	1.03	8.167	2.06	14.250	3.94	20.33	1.13
2.167	1.03	8.250	2.06	14.333	2.81	20.42	1.13
2.250	1.03	8.333	2.44	14.417	2.81	20.50	1.13
2.333	1.22	8.417	2.44	14.500	2.81	20.58	1.13
2.417	1.22	8.500	2.44	14.583	2.81	20.67	1.13
2.500	1.22	8.583	2.44	14.667	2.81	20.75	1.13
2.583	1.22	8.667	2.44	14.750	2.81	20.83	1.13
2.667	1.22	8.750	2.44	14.833	2.81	20.92	1.13
2.750	1.22	8.833	2.63	14.917	2.81	21.00	1.13
2.833	1.22	8.917	2.63	15.000	2.81	21.08	1.13
2.917	1.22	9.000	2.63	15.083	2.81	21.17	1.13
3.000	1.22	9.083	2.63	15.167	2.81	21.25	1.13
3.083	1.22	9.167	2.63	15.250	2.81	21.33	1.13
3.167	1.22	9.250	2.63	15.333	2.81	21.42	1.13
3.250	1.22	9.333	3.00	15.417	2.81	21.50	1.13
3.333	1.22	9.417	3.00	15.500	2.81	21.58	1.13
3.417	1.22	9.500	3.00	15.583	2.81	21.67	1.13
3.500	1.22	9.583	3.00	15.667	2.81	21.75	1.13
3.583	1.22	9.667	3.00	15.750	2.81	21.83	1.13
3.667	1.22	9.750	3.00	15.833	2.81	21.92	1.13
3.750	1.22	9.833	3.38	15.917	2.81	22.00	1.13
3.833	1.22	9.917	3.38	16.000	2.81	22.08	1.13
3.917	1.22	10.000	3.38	16.083	2.81	22.17	1.13
4.000	1.22	10.083	3.38	16.167	2.81	22.25	1.13
4.083	1.22	10.167	3.38	16.250	2.81	22.33	1.13
4.167	1.22	10.250	3.38	16.333	1.69	22.42	1.13
4.250	1.22	10.333	4.32	16.417	1.69	22.50	1.13
4.333	1.50	10.417	4.32	16.500	1.69	22.58	1.13
4.417	1.50	10.500	4.32	16.583	1.69	22.67	1.13
4.500	1.50	10.583	4.32	16.667	1.69	22.75	1.13
4.583	1.50	10.667	4.32	16.750	1.69	22.83	1.13
4.667	1.50	10.750	4.32	16.833	1.69	22.92	1.13
4.750	1.50	10.833	5.82	16.917	1.69	23.00	1.13
4.833	1.50	10.917	5.82	17.000	1.69	23.08	1.13
4.917	1.50	11.000	5.82	17.083	1.69	23.17	1.13
5.000	1.50	11.083	5.82	17.167	1.69	23.25	1.13
5.083	1.50	11.167	5.82	17.250	1.69	23.33	1.13
5.167	1.50	11.250	5.82	17.333	1.69	23.42	1.13
5.250	1.50	11.333	9.01	17.417	1.69	23.50	1.13
5.333	1.50	11.417	9.01	17.500	1.69	23.58	1.13
5.417	1.50	11.500	9.01	17.583	1.69	23.67	1.13
5.500	1.50	11.583	9.01	17.667	1.69	23.75	1.13
5.583	1.50	11.667	9.01	17.750	1.69	23.83	1.13
5.667	1.50	11.750	9.01	17.833	1.69	23.92	1.13
5.750	1.50	11.833	27.77	17.917	1.69	24.00	1.13
5.833	1.50	11.917	27.77	18.000	1.69	24.08	1.13
5.917	1.50	12.000	27.77	18.083	1.69	24.17	1.13
6.000	1.50	12.083	114.83	18.167	1.69	24.25	1.13
6.083	1.50	12.167	114.84	18.250	1.69		

Max.Eff.Inten.(mm/hr)=	114.84	150.84
over (min)	5.00	10.00
Storage Coeff. (min)=	3.76 (ii)	9.75 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00

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     Unit Hyd. peak  (cms)=       0.25         0.11
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.15         0.59          1.738 (iii)
     TIME TO PEAK    (hrs)=      12.25        12.25          12.25
     RUNOFF VOLUME    (mm)=      92.82        70.42          82.96
     TOTAL RAINFALL   (mm)=      93.82        93.82          93.82
     RUNOFF COEFFICIENT   =       0.99         0.75           0.88

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| RESERVOIR(  0066)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |    (cms)     (ha.m.)
                           0.0000      0.0000   |    0.1507      0.2774
                           0.0103      0.1190   |    0.1711      0.3280
                           0.0819      0.2055   |    0.1837      0.3663
                           0.1039      0.2468   |    0.3000      0.3955

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0088)      6.540     1.738     12.25      82.96
   OUTFLOW: ID= 1 (  0066)      6.540     0.171     12.92      82.51

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  9.84
                  TIME SHIFT OF PEAK FLOW          (min)= 40.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.3280

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| CALIB            |
| STANDHYD (  0089)|   Area    (ha)=   0.24
|ID= 1 DT= 5.0 min |   Total Imp(%)=  38.00   Dir. Conn.(%)=  21.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.09         0.15
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      40.00        40.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
 0.083    0.00 | 6.167    1.50 |12.250  114.84 | 18.33    1.69
 0.167    0.00 | 6.250    1.50 |12.333   13.52 | 18.42    1.69
 0.250    0.00 | 6.333    1.69 |12.417   13.51 | 18.50    1.69
 0.333    1.03 | 6.417    1.69 |12.500   13.51 | 18.58    1.69
 0.417    1.03 | 6.500    1.69 |12.583   13.51 | 18.67    1.69
 0.500    1.03 | 6.583    1.69 |12.667   13.51 | 18.75    1.69
 0.583    1.03 | 6.667    1.69 |12.750   13.51 | 18.83    1.69
 0.667    1.03 | 6.750    1.69 |12.833    6.94 | 18.92    1.69
 0.750    1.03 | 6.833    1.69 |12.917    6.94 | 19.00    1.69
 0.833    1.03 | 6.917    1.69 |13.000    6.94 | 19.08    1.69
 0.917    1.03 | 7.000    1.69 |13.083    6.94 | 19.17    1.69
 1.000    1.03 | 7.083    1.69 |13.167    6.94 | 19.25    1.69
 1.083    1.03 | 7.167    1.69 |13.250    6.94 | 19.33    1.69
 1.167    1.03 | 7.250    1.69 |13.333    5.07 | 19.42    1.69
 1.250    1.03 | 7.333    2.06 |13.417    5.07 | 19.50    1.69
 1.333    1.03 | 7.417    2.06 |13.500    5.07 | 19.58    1.69
 1.417    1.03 | 7.500    2.06 |13.583    5.07 | 19.67    1.69
 1.500    1.03 | 7.583    2.06 |13.667    5.07 | 19.75    1.69
 1.583    1.03 | 7.667    2.06 |13.750    5.07 | 19.83    1.69
 1.667    1.03 | 7.750    2.06 |13.833    3.94 | 19.92    1.69
 1.750    1.03 | 7.833    2.06 |13.917    3.94 | 20.00    1.69
 1.833    1.03 | 7.917    2.06 |14.000    3.94 | 20.08    1.69
 1.917    1.03 | 8.000    2.06 |14.083    3.94 | 20.17    1.69
 2.000    1.03 | 8.083    2.06 |14.167    3.94 | 20.25    1.69
 2.083    1.03 | 8.167    2.06 |14.250    3.94 | 20.33    1.13
 2.167    1.03 | 8.250    2.06 |14.333    2.81 | 20.42    1.13
 2.250    1.03 | 8.333    2.44 |14.417    2.81 | 20.50    1.13
 2.333    1.22 | 8.417    2.44 |14.500    2.81 | 20.58    1.13
 2.417    1.22 | 8.500    2.44 |14.583    2.81 | 20.67    1.13
 2.500    1.22 | 8.583    2.44 |14.667    2.81 | 20.75    1.13
 2.583    1.22 | 8.667    2.44 |14.750    2.81 | 20.83    1.13
 2.667    1.22 | 8.750    2.44 |14.833    2.81 | 20.92    1.13
 2.750    1.22 | 8.833    2.63 |14.917    2.81 | 21.00    1.13
 2.833    1.22 | 8.917    2.63 |15.000    2.81 | 21.08    1.13
 2.917    1.22 | 9.000    2.63 |15.083    2.81 | 21.17    1.13
 3.000    1.22 | 9.083    2.63 |15.167    2.81 | 21.25    1.13
 3.083    1.22 | 9.167    2.63 |15.250    2.81 | 21.33    1.13
 3.167    1.22 | 9.250    2.63 |15.333    2.81 | 21.42    1.13
 3.250    1.22 | 9.333    3.00 |15.417    2.81 | 21.50    1.13
 3.333    1.22 | 9.417    3.00 |15.500    2.81 | 21.58    1.13
 3.417    1.22 | 9.500    3.00 |15.583    2.81 | 21.67    1.13
 3.500    1.22 | 9.583    3.00 |15.667    2.81 | 21.75    1.13
 3.583    1.22 | 9.667    3.00 |15.750    2.81 | 21.83    1.13
 3.667    1.22 | 9.750    3.00 |15.833    2.81 | 21.92    1.13
 3.750    1.22 | 9.833    3.38 |15.917    2.81 | 22.00    1.13
 3.833    1.22 | 9.917    3.38 |16.000    2.81 | 22.08    1.13
 3.917    1.22 |10.000    3.38 |16.083    2.81 | 22.17    1.13
 4.000    1.22 |10.083    3.38 |16.167    2.81 | 22.25    1.13
 4.083    1.22 |10.167    3.38 |16.250    2.81 | 22.33    1.13
 4.167    1.22 |10.250    3.38 |16.333    1.69 | 22.42    1.13
 4.250    1.22 |10.333    4.32 |16.417    1.69 | 22.50    1.13
 4.333    1.50 |10.417    4.32 |16.500    1.69 | 22.58    1.13
 4.417    1.50 |10.500    4.32 |16.583    1.69 | 22.67    1.13
 4.500    1.50 |10.583    4.32 |16.667    1.69 | 22.75    1.13
 4.583    1.50 |10.667    4.32 |16.750    1.69 | 22.83    1.13
 4.667    1.50 |10.750    4.32 |16.833    1.69 | 22.92    1.13
 4.750    1.50 |10.833    5.82 |16.917    1.69 | 23.00    1.13
 4.833    1.50 |10.917    5.82 |17.000    1.69 | 23.08    1.13
 4.917    1.50 |11.000    5.82 |17.083    1.69 | 23.17    1.13
 5.000    1.50 |11.083    5.82 |17.167    1.69 | 23.25    1.13
 5.083    1.50 |11.167    5.82 |17.250    1.69 | 23.33    1.13
 5.167    1.50 |11.250    5.82 |17.333    1.69 | 23.42    1.13
 5.250    1.50 |11.333    9.01 |17.417    1.69 | 23.50    1.13
 5.333    1.50 |11.417    9.01 |17.500    1.69 | 23.58    1.13
 5.417    1.50 |11.500    9.01 |17.583    1.69 | 23.67    1.13
 5.500    1.50 |11.583    9.01 |17.667    1.69 | 23.75    1.13
 5.583    1.50 |11.667    9.01 |17.750    1.69 | 23.83    1.13
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              5.667    1.50 |11.750    9.01 |17.833    1.69 | 23.92    1.13
              5.750    1.50 |11.833   27.77 |17.917    1.69 | 24.00    1.13
              5.833    1.50 |11.917   27.77 |18.000    1.69 | 24.08    1.13
              5.917    1.50 |12.000   27.77 |18.083    1.69 | 24.17    1.13
              6.000    1.50 |12.083  114.83 |18.167    1.69 | 24.25    1.13
              6.083    1.50 |12.167  114.84 |18.250    1.69 |

    Max.Eff.Inten.(mm/hr)=     114.84       121.90
              over (min)         5.00        10.00
    Storage Coeff.  (min)=       1.39 (ii)    7.92 (ii)
    Unit Hyd. Tpeak (min)=       5.00        10.00
    Unit Hyd. peak  (cms)=       0.33         0.13
                                                      *TOTALS*
    PEAK FLOW       (cms)=       0.02         0.04         0.056 (iii)
    TIME TO PEAK    (hrs)=      12.25        12.25         12.25
    RUNOFF VOLUME    (mm)=      92.82        67.15         72.52
    TOTAL RAINFALL   (mm)=      93.82        93.82         93.82
    RUNOFF COEFFICIENT   =       0.99         0.72          0.77

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  85.0    Ia = Dep. Storage  (Above)
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| ADD HYD  (  0064)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0066):     6.54   0.171    12.92    82.51
     + ID2= 2 (  0070):     0.34   0.100    12.25    85.14
       ================================================
       ID = 3 (  0064):     6.88   0.203    12.25    82.64

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0064)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0064):     6.88   0.203    12.25    82.64
     + ID2= 2 (  0072):    28.11   0.951    13.75    53.16
       ================================================
       ID = 1 (  0064):    34.99   1.121    13.67    58.96

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0064)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0064):    34.99   1.121    13.67    58.96
     + ID2= 2 (  0086):     0.52   0.132    12.25    77.78
       ================================================
       ID = 3 (  0064):    35.51   1.128    13.67    59.23

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0064)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0064):    35.51   1.128    13.67    59.23
     + ID2= 2 (  0087):     1.71   0.125    12.42    38.86
       ================================================
       ID = 1 (  0064):    37.22   1.147    13.67    58.30

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0064)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0064):    37.22   1.147    13.67    58.30
     + ID2= 2 (  0089):     0.24   0.056    12.25    72.52
       ================================================
       ID = 3 (  0064):    37.46   1.150    13.67    58.39

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
================================================================================
=========================

      V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
      V    V   I    SS     U   U   A A   L
       V  V    I     SS    U   U  AAAAA  L
       V  V    I      SS   U   U  A   A  L
        VV     I    SSSSS  UUUUU  A   A  LLLLL

       OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
      O   O    T      T    H   H   Y Y   MM MM  O   O
      O   O    T      T    H   H    Y    M   M  O   O
       OOO     T      T    H   H    Y    M   M   OOO
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                 *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\1532e949-5b53-4cc5-a56c-f942dbd0ec83\scenar
  Summary filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\1532e949-5b53-4cc5-a56c-f942dbd0ec83\scenar


DATE: 04-14-2026                          TIME: 05:37:29

USER:
```

COMMENTS: _____

```
  **********************************************
  ** SIMULATION : Run 5 - 50yr 24hr 15min SCS   **
  **********************************************
```

READ STORM	Filename: C:\Users\rsoto\AppData\Local\Temp\60e6093c-53c6-44bb-ab2e-a1ff337040a5\28065a4e
Ptotal=103.60 mm	Comments: 50yr 24hr 15min SCS

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	1.86	12.50	14.92	18.75	1.86
0.25	1.14	6.50	1.86	12.75	7.67	19.00	1.86
0.50	1.14	6.75	1.86	13.00	7.67	19.25	1.86
0.75	1.14	7.00	1.86	13.25	5.59	19.50	1.86
1.00	1.14	7.25	2.28	13.50	5.59	19.75	1.86
1.25	1.14	7.50	2.28	13.75	4.35	20.00	1.86
1.50	1.14	7.75	2.28	14.00	4.35	20.25	1.24
1.75	1.14	8.00	2.28	14.25	3.11	20.50	1.24
2.00	1.14	8.25	2.69	14.50	3.11	20.75	1.24
2.25	1.35	8.50	2.69	14.75	3.11	21.00	1.24
2.50	1.35	8.75	2.90	15.00	3.11	21.25	1.24
2.75	1.35	9.00	2.90	15.25	3.11	21.50	1.24
3.00	1.35	9.25	3.32	15.50	3.11	21.75	1.24
3.25	1.35	9.50	3.32	15.75	3.11	22.00	1.24
3.50	1.35	9.75	3.73	16.00	3.11	22.25	1.24
3.75	1.35	10.00	3.73	16.25	1.86	22.50	1.24
4.00	1.35	10.25	4.77	16.50	1.86	22.75	1.24
4.25	1.66	10.50	4.77	16.75	1.86	23.00	1.24
4.50	1.66	10.75	6.42	17.00	1.86	23.25	1.24
4.75	1.66	11.00	6.42	17.25	1.86	23.50	1.24
5.00	1.66	11.25	9.95	17.50	1.86	23.75	1.24
5.25	1.66	11.50	9.95	17.75	1.86	24.00	1.24
5.50	1.66	11.75	30.67	18.00	1.86		
5.75	1.66	12.00	126.81	18.25	1.86		
6.00	1.66	12.25	14.92	18.50	1.86		

CALIB			
NASHYD (0069)	Area (ha)= 28.11	Curve Number (CN)= 81.0	
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 1.39		

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.66	12.250	126.81	18.33	1.86
0.167	0.00	6.250	1.66	12.333	14.93	18.42	1.86
0.250	0.00	6.333	1.86	12.417	14.92	18.50	1.86
0.333	1.14	6.417	1.86	12.500	14.92	18.58	1.86
0.417	1.14	6.500	1.86	12.583	14.92	18.67	1.86
0.500	1.14	6.583	1.86	12.667	14.92	18.75	1.86
0.583	1.14	6.667	1.86	12.750	14.92	18.83	1.86
0.667	1.14	6.750	1.86	12.833	7.67	18.92	1.86
0.750	1.14	6.833	1.86	12.917	7.67	19.00	1.86
0.833	1.14	6.917	1.86	13.000	7.67	19.08	1.86
0.917	1.14	7.000	1.86	13.083	7.67	19.17	1.86
1.000	1.14	7.083	1.86	13.167	7.67	19.25	1.86
1.083	1.14	7.167	1.86	13.250	7.67	19.33	1.86
1.167	1.14	7.250	1.86	13.333	5.59	19.42	1.86
1.250	1.14	7.333	2.28	13.417	5.59	19.50	1.86
1.333	1.14	7.417	2.28	13.500	5.59	19.58	1.86
1.417	1.14	7.500	2.28	13.583	5.59	19.67	1.86
1.500	1.14	7.583	2.28	13.667	5.59	19.75	1.86
1.583	1.14	7.667	2.28	13.750	5.59	19.83	1.86
1.667	1.14	7.750	2.28	13.833	4.35	19.92	1.86
1.750	1.14	7.833	2.28	13.917	4.35	20.00	1.86
1.833	1.14	7.917	2.28	14.000	4.35	20.08	1.86
1.917	1.14	8.000	2.28	14.083	4.35	20.17	1.86
2.000	1.14	8.083	2.28	14.167	4.35	20.25	1.86
2.083	1.14	8.167	2.28	14.250	4.35	20.33	1.24
2.167	1.14	8.250	2.28	14.333	3.11	20.42	1.24
2.250	1.14	8.333	2.69	14.417	3.11	20.50	1.24
2.333	1.35	8.417	2.69	14.500	3.11	20.58	1.24
2.417	1.35	8.500	2.69	14.583	3.11	20.67	1.24
2.500	1.35	8.583	2.69	14.667	3.11	20.75	1.24
2.583	1.35	8.667	2.69	14.750	3.11	20.83	1.24
2.667	1.35	8.750	2.69	14.833	3.11	20.92	1.24
2.750	1.35	8.833	2.90	14.917	3.11	21.00	1.24
2.833	1.35	8.917	2.90	15.000	3.11	21.08	1.24
2.917	1.35	9.000	2.90	15.083	3.11	21.17	1.24
3.000	1.35	9.083	2.90	15.167	3.11	21.25	1.24
3.083	1.35	9.167	2.90	15.250	3.11	21.33	1.24
3.167	1.35	9.250	2.90	15.333	3.11	21.42	1.24
3.250	1.35	9.333	3.32	15.417	3.11	21.50	1.24
3.333	1.35	9.417	3.32	15.500	3.11	21.58	1.24
3.417	1.35	9.500	3.32	15.583	3.11	21.67	1.24
3.500	1.35	9.583	3.32	15.667	3.11	21.75	1.24
3.583	1.35	9.667	3.32	15.750	3.11	21.83	1.24
3.667	1.35	9.750	3.32	15.833	3.11	21.92	1.24
3.750	1.35	9.833	3.73	15.917	3.11	22.00	1.24
3.833	1.35	9.917	3.73	16.000	3.11	22.08	1.24
3.917	1.35	10.000	3.73	16.083	3.11	22.17	1.24
4.000	1.35	10.083	3.73	16.167	3.11	22.25	1.24
4.083	1.35	10.167	3.73	16.250	3.11	22.33	1.24
4.167	1.35	10.250	3.73	16.333	1.87	22.42	1.24
4.250	1.35	10.333	4.77	16.417	1.86	22.50	1.24
4.333	1.66	10.417	4.77	16.500	1.86	22.58	1.24
4.417	1.66	10.500	4.77	16.583	1.86	22.67	1.24
4.500	1.66	10.583	4.77	16.667	1.86	22.75	1.24
4.583	1.66	10.667	4.77	16.750	1.86	22.83	1.24
4.667	1.66	10.750	4.77	16.833	1.86	22.92	1.24
4.750	1.66	10.833	6.42	16.917	1.86	23.00	1.24
4.833	1.66	10.917	6.42	17.000	1.86	23.08	1.24
4.917	1.66	11.000	6.42	17.083	1.86	23.17	1.24
5.000	1.66	11.083	6.42	17.167	1.86	23.25	1.24
5.083	1.66	11.167	6.42	17.250	1.86	23.33	1.24
5.167	1.66	11.250	6.42	17.333	1.86	23.42	1.24
5.250	1.66	11.333	9.95	17.417	1.86	23.50	1.24
5.333	1.66	11.417	9.95	17.500	1.86	23.58	1.24

5.417	1.66	11.500	9.95	17.583	1.86	23.67	1.24
5.500	1.66	11.583	9.95	17.667	1.86	23.75	1.24
5.583	1.66	11.667	9.95	17.750	1.86	23.83	1.24
5.667	1.66	11.750	9.95	17.833	1.86	23.92	1.24
5.750	1.66	11.833	30.66	17.917	1.86	24.00	1.24
5.833	1.66	11.917	30.67	18.000	1.86	24.08	1.24
5.917	1.66	12.000	30.67	18.083	1.86	24.17	1.24
6.000	1.66	12.083	126.79	18.167	1.86	24.25	1.24
6.083	1.66	12.167	126.81	18.250	1.86		

Unit Hyd Qpeak (cms)= 0.772

PEAK FLOW (cms)= 1.105 (i)
TIME TO PEAK (hrs)= 13.667
RUNOFF VOLUME (mm)= 61.461
TOTAL RAINFALL (mm)= 103.600
RUNOFF COEFFICIENT = 0.593

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| ROUTEPIPE(0072)| IN= 2---> OUT= 1 | DT= 5.0 min |

PIPE Number = 1.00
Diameter (mm)=1200.00
Length (m)= 500.00
Slope (m/m)= 0.002
Manning n = 0.013

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.06	.114E+02	0.0	0.41	20.34
0.13	.317E+02	0.0	0.64	13.04
0.19	.573E+02	0.1	0.82	10.13
0.25	.866E+02	0.2	0.98	8.52
0.32	.119E+03	0.3	1.11	7.49
0.38	.153E+03	0.4	1.23	6.77
0.44	.189E+03	0.5	1.34	6.24
0.51	.226E+03	0.6	1.43	5.84
0.57	.264E+03	0.8	1.51	5.53
0.63	.302E+03	1.0	1.58	5.29
0.69	.339E+03	1.1	1.63	5.10
0.76	.376E+03	1.3	1.68	4.95
0.82	.412E+03	1.4	1.72	4.85
0.88	.447E+03	1.6	1.74	4.78
0.95	.479E+03	1.7	1.76	4.74
1.01	.508E+03	1.8	1.76	4.74
1.07	.534E+03	1.9	1.74	4.80
1.14	.554E+03	1.9	1.69	4.92
1.20	.566E+03	1.7	1.54	5.40

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0069)	28.11	1.11	13.67	61.46	0.69	1.63
OUTFLOW: ID= 1 (0072)	28.11	1.10	13.67	61.46	0.69	1.63

| CALIB |

| NASHYD (0087)| ID= 1 DT= 5.0 min |

Area (ha)= 1.71 Curve Number (CN)= 69.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.31

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.66	12.250	126.81	18.33	1.86
0.167	0.00	6.250	1.66	12.333	14.93	18.42	1.86
0.250	0.00	6.333	1.86	12.417	14.92	18.50	1.86
0.333	1.14	6.417	1.86	12.500	14.92	18.58	1.86
0.417	1.14	6.500	1.86	12.583	14.92	18.67	1.86
0.500	1.14	6.583	1.86	12.667	14.92	18.75	1.86
0.583	1.14	6.667	1.86	12.750	14.92	18.83	1.86
0.667	1.14	6.750	1.86	12.833	7.67	18.92	1.86
0.750	1.14	6.833	1.86	12.917	7.67	19.00	1.86
0.833	1.14	6.917	1.86	13.000	7.67	19.08	1.86
0.917	1.14	7.000	1.86	13.083	7.67	19.17	1.86
1.000	1.14	7.083	1.86	13.167	7.67	19.25	1.86
1.083	1.14	7.167	1.86	13.250	7.67	19.33	1.86
1.167	1.14	7.250	1.86	13.333	5.59	19.42	1.86
1.250	1.14	7.333	2.28	13.417	5.59	19.50	1.86
1.333	1.14	7.417	2.28	13.500	5.59	19.58	1.86
1.417	1.14	7.500	2.28	13.583	5.59	19.67	1.86
1.500	1.14	7.583	2.28	13.667	5.59	19.75	1.86
1.583	1.14	7.667	2.28	13.750	5.59	19.83	1.86
1.667	1.14	7.750	2.28	13.833	4.35	19.92	1.86
1.750	1.14	7.833	2.28	13.917	4.35	20.00	1.86
1.833	1.14	7.917	2.28	14.000	4.35	20.08	1.86
1.917	1.14	8.000	2.28	14.083	4.35	20.17	1.86
2.000	1.14	8.083	2.28	14.167	4.35	20.25	1.86
2.083	1.14	8.167	2.28	14.250	4.35	20.33	1.24
2.167	1.14	8.250	2.28	14.333	3.11	20.42	1.24
2.250	1.14	8.333	2.69	14.417	3.11	20.50	1.24
2.333	1.35	8.417	2.69	14.500	3.11	20.58	1.24
2.417	1.35	8.500	2.69	14.583	3.11	20.67	1.24
2.500	1.35	8.583	2.69	14.667	3.11	20.75	1.24
2.583	1.35	8.667	2.69	14.750	3.11	20.83	1.24
2.667	1.35	8.750	2.69	14.833	3.11	20.92	1.24
2.750	1.35	8.833	2.90	14.917	3.11	21.00	1.24
2.833	1.35	8.917	2.90	15.000	3.11	21.08	1.24
2.917	1.35	9.000	2.90	15.083	3.11	21.17	1.24
3.000	1.35	9.083	2.90	15.167	3.11	21.25	1.24
3.083	1.35	9.167	2.90	15.250	3.11	21.33	1.24
3.167	1.35	9.250	2.90	15.333	3.11	21.42	1.24
3.250	1.35	9.333	3.32	15.417	3.11	21.50	1.24
3.333	1.35	9.417	3.32	15.500	3.11	21.58	1.24
3.417	1.35	9.500	3.32	15.583	3.11	21.67	1.24
3.500	1.35	9.583	3.32	15.667	3.11	21.75	1.24
3.583	1.35	9.667	3.32	15.750	3.11	21.83	1.24
3.667	1.35	9.750	3.32	15.833	3.11	21.92	1.24
3.750	1.35	9.833	3.73	15.917	3.11	22.00	1.24
3.833	1.35	9.917	3.73	16.000	3.11	22.08	1.24
3.917	1.35	10.000	3.73	16.083	3.11	22.17	1.24
4.000	1.35	10.083	3.73	16.167	3.11	22.25	1.24
4.083	1.35	10.167	3.73	16.250	3.11	22.33	1.24
4.167	1.35	10.250	3.73	16.333	1.87	22.42	1.24
4.250	1.35	10.333	4.77	16.417	1.86	22.50	1.24

4.333	1.66	10.417	4.77	16.500	1.86	22.58	1.24	0.833	1.14	6.917	1.86
4.417	1.66	10.500	4.77	16.583	1.86	22.67	1.24	0.917	1.14	7.000	1.86
4.500	1.66	10.583	4.77	16.667	1.86	22.75	1.24	1.000	1.14	7.083	1.86
4.583	1.66	10.667	4.77	16.750	1.86	22.83	1.24	1.083	1.14	7.167	1.86
4.667	1.66	10.750	4.77	16.833	1.86	22.92	1.24	1.167	1.14	7.250	1.86
4.750	1.66	10.833	6.42	16.917	1.86	23.00	1.24	1.250	1.14	7.333	2.28
4.833	1.66	10.917	6.42	17.000	1.86	23.08	1.24	1.333	1.14	7.417	2.28
4.917	1.66	11.000	6.42	17.083	1.86	23.17	1.24	1.417	1.14	7.500	2.28
5.000	1.66	11.083	6.42	17.167	1.86	23.25	1.24	1.500	1.14	7.583	2.28
5.083	1.66	11.167	6.42	17.250	1.86	23.33	1.24	1.583	1.14	7.667	2.28
5.167	1.66	11.250	6.42	17.333	1.86	23.42	1.24	1.667	1.14	7.750	2.28
5.250	1.66	11.333	9.95	17.417	1.86	23.50	1.24	1.750	1.14	7.833	2.28
5.333	1.66	11.417	9.95	17.500	1.86	23.58	1.24	1.833	1.14	7.917	2.28
5.417	1.66	11.500	9.95	17.583	1.86	23.67	1.24	1.917	1.14	8.000	2.28
5.500	1.66	11.583	9.95	17.667	1.86	23.75	1.24	2.000	1.14	8.083	2.28
5.583	1.66	11.667	9.95	17.750	1.86	23.83	1.24	2.083	1.14	8.167	2.28
5.667	1.66	11.750	9.95	17.833	1.86	23.92	1.24	2.167	1.14	8.250	2.28
5.750	1.66	11.833	30.66	17.917	1.86	24.00	1.24	2.250	1.14	8.333	2.69
5.833	1.66	11.917	30.67	18.000	1.86	24.08	1.24	2.333	1.35	8.417	2.69
5.917	1.66	12.000	30.67	18.083	1.86	24.17	1.24	2.417	1.35	8.500	2.69
6.000	1.66	12.083	126.79	18.167	1.86	24.25	1.24	2.500	1.35	8.583	2.69
6.083	1.66	12.167	126.81	18.250	1.86			2.583	1.35	8.667	2.69
								2.667	1.35	8.750	2.69
								2.750	1.35	8.833	2.90
								2.833	1.35	8.917	2.90
								2.917	1.35	9.000	2.90
								3.000	1.35	9.083	2.90
								3.083	1.35	9.167	2.90
								3.167	1.35	9.250	2.90
								3.250	1.35	9.333	3.32
								3.333	1.35	9.417	3.32
								3.417	1.35	9.500	3.32
								3.500	1.35	9.583	3.32
								3.583	1.35	9.667	3.32
								3.667	1.35	9.750	3.32
								3.750	1.35	9.833	3.73
								3.833	1.35	9.917	3.73
								3.917	1.35	10.000	3.73
								4.000	1.35	10.083	3.73
								4.083	1.35	10.167	3.73
								4.167	1.35	10.250	3.73
								4.250	1.35	10.333	4.77
								4.333	1.66	10.417	4.77
								4.417	1.66	10.500	4.77
								4.500	1.66	10.583	4.77
								4.583	1.66	10.667	4.77
								4.667	1.66	10.750	4.77
								4.750	1.66	10.833	6.42
								4.833	1.66	10.917	6.42
								4.917	1.66	11.000	6.42
								5.000	1.66	11.083	6.42
								5.083	1.66	11.167	6.42
								5.167	1.66	11.250	6.42
								5.250	1.66	11.333	9.95
								5.333	1.66	11.417	9.95
								5.417	1.66	11.500	9.95
								5.500	1.66	11.583	9.95
								5.583	1.66	11.667	9.95
								5.667	1.66	11.750	9.95
								5.750	1.66	11.833	30.66
								5.833	1.66	11.917	30.67

0.833	1.14	6.917	1.86	13.000	7.67	19.08	1.86				
0.917	1.14	7.000	1.86	13.083	7.67	19.17	1.86				
1.000	1.14	7.083	1.86	13.167	7.67	19.25	1.86				
1.083	1.14	7.167	1.86	13.250	7.67	19.33	1.86				
1.167	1.14	7.250	1.86	13.333	5.59	19.42	1.86				
1.250	1.14	7.333	2.28	13.417	5.59	19.50	1.86				
1.333	1.14	7.417	2.28	13.500	5.59	19.58	1.86				
1.417	1.14	7.500	2.28	13.583	5.59	19.67	1.86				
1.500	1.14	7.583	2.28	13.667	5.59	19.75	1.86				
1.583	1.14	7.667	2.28	13.750	5.59	19.83	1.86				
1.667	1.14	7.750	2.28	13.833	4.35	19.92	1.86				
1.750	1.14	7.833	2.28	13.917	4.35	20.00	1.86				
1.833	1.14	7.917	2.28	14.000	4.35	20.08	1.86				
1.917	1.14	8.000	2.28	14.083	4.35	20.17	1.86				
2.000	1.14	8.083	2.28	14.167	4.35	20.25	1.86				
2.083	1.14	8.167	2.28	14.250	4.35	20.33	1.24				
2.167	1.14	8.250	2.28	14.333	3.11	20.42	1.24				
2.250	1.14	8.333	2.69	14.417	3.11	20.50	1.24				
2.333	1.35	8.417	2.69	14.500	3.11	20.58	1.24				
2.417	1.35	8.500	2.69	14.583	3.11	20.67	1.24				
2.500	1.35	8.583	2.69	14.667	3.11	20.75	1.24				
2.583	1.35	8.667	2.69	14.750	3.11	20.83	1.24				
2.667	1.35	8.750	2.69	14.833	3.11	20.92	1.24				
2.750	1.35	8.833	2.90	14.917	3.11	21.00	1.24				
2.833	1.35	8.917	2.90	15.000	3.11	21.08	1.24				
2.917	1.35	9.000	2.90	15.083	3.11	21.17	1.24				
3.000	1.35	9.083	2.90	15.167	3.11	21.25	1.24				
3.083	1.35	9.167	2.90	15.250	3.11	21.33	1.24				
3.167	1.35	9.250	2.90	15.333	3.11	21.42	1.24				
3.250	1.35	9.333	3.32	15.417	3.11	21.50	1.24				
3.333	1.35	9.417	3.32	15.500	3.11	21.58	1.24				
3.417	1.35	9.500	3.32	15.583	3.11	21.67	1.24				
3.500	1.35	9.583	3.32	15.667	3.11	21.75	1.24				
3.583	1.35	9.667	3.32	15.750	3.11	21.83	1.24				
3.667	1.35	9.750	3.32	15.833	3.11	21.92	1.24				
3.750	1.35	9.833	3.73	15.917	3.11	22.00	1.24				
3.833	1.35	9.917	3.73	16.000	3.11	22.08	1.24				
3.917	1.35	10.000	3.73	16.083	3.11	22.17	1.24				
4.000	1.35	10.083	3.73	16.167	3.11	22.25	1.24				
4.083	1.35	10.167	3.73	16.250	3.11	22.33	1.24				
4.167	1.35	10.250	3.73	16.333	1.87	22.42	1.24				
4.250	1.35	10.333	4.77	16.417	1.86	22.50	1.24				
4.333	1.66	10.417	4.77	16.500	1.86	22.58	1.24				
4.417	1.66	10.500	4.77	16.583	1.86	22.67	1.24				
4.500	1.66	10.583	4.77	16.667	1.86	22.75	1.24				
4.583	1.66	10.667	4.77	16.750	1.86	22.83	1.24				
4.667	1.66	10.750	4.77	16.833	1.86	22.92	1.24				
4.750	1.66	10.833	6.42	16.917	1.86	23.00	1.24				
4.833	1.66	10.917	6.42	17.000	1.86	23.08	1.24				
4.917	1.66	11.000	6.42	17.083	1.86	23.17	1.24				
5.000	1.66	11.083	6.42	17.167	1.86	23.25	1.24				
5.083	1.66	11.167	6.42	17.250	1.86	23.33	1.24				
5.167	1.66	11.250	6.42	17.333	1.86	23.42	1.24				
5.250	1.66	11.333	9.95	17.417	1.86	23.50	1.24				
5.333	1.66	11.417	9.95	17.500	1.86	23.58	1.24				
5.417	1.66	11.500	9.95	17.583	1.86	23.67	1.24				
5.500	1.66	11.583	9.95	17.667	1.86	23.75	1.24				
5.583	1.66	11.667	9.95	17.750	1.86	23.83	1.24				
5.667	1.66	11.750	9.95	17.833	1.86	23.92	1.24				
5.750	1.66	11.833	30.66	17.917	1.86	24.00	1.24				
5.833	1.66	11.917	30.67	18.000	1.86	24.08	1.24				

Unit Hyd Qpeak (cms)= 0.211

PEAK FLOW (cms)= 0.148 (i)
TIME TO PEAK (hrs)= 12.417
RUNOFF VOLUME (mm)= 45.688
TOTAL RAINFALL (mm)= 103.600
RUNOFF COEFFICIENT = 0.441

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0070)	Area (ha)= 0.34
ID= 1 DT= 5.0 min	Total Imp(%)= 75.00 Dir. Conn.(%)= 75.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.26	0.09
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	47.61	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.66	12.250	126.81	18.33	1.86
0.167	0.00	6.250	1.66	12.333	14.93	18.42	1.86
0.250	0.00	6.333	1.86	12.417	14.92	18.50	1.86
0.333	1.14	6.417	1.86	12.500	14.92	18.58	1.86
0.417	1.14	6.500	1.86	12.583	14.92	18.67	1.86
0.500	1.14	6.583	1.86	12.667	14.92	18.75	1.86
0.583	1.14	6.667	1.86	12.750	14.92	18.83	1.86
0.667	1.14	6.750	1.86	12.833	7.67	18.92	1.86
0.750	1.14	6.833	1.86	12.917	7.67	19.00	1.86

	5.917	1.66	12.000	30.67	18.083	1.86	24.17	1.24
	6.000	1.66	12.083	126.79	18.167	1.86	24.25	1.24
	6.083	1.66	12.167	126.81	18.250	1.86		

Max.Eff.Inten.(mm/hr)=	126.81	101.78	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.49 (ii)	5.62 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.33	0.15	
			TOTALS
PEAK FLOW (cms)=	0.09	0.02	0.111 (iii)
TIME TO PEAK (hrs)=	12.25	12.25	12.25
RUNOFF VOLUME (mm)=	102.60	70.95	94.68
TOTAL RAINFALL (mm)=	103.60	103.60	103.60
RUNOFF COEFFICIENT =	0.99	0.68	0.91

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0086) | Area (ha)= 0.52
ID= 1 DT= 5.0 min | Total Imp(%)= 51.00 Dir. Conn.(%)= 51.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.27	0.25
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	58.88	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.66	12.250	126.81	18.33	1.86
0.167	0.00	6.250	1.66	12.333	14.93	18.42	1.86
0.250	0.00	6.333	1.86	12.417	14.92	18.50	1.86
0.333	1.14	6.417	1.86	12.500	14.92	18.58	1.86
0.417	1.14	6.500	1.86	12.583	14.92	18.67	1.86
0.500	1.14	6.583	1.86	12.667	14.92	18.75	1.86
0.583	1.14	6.667	1.86	12.750	14.92	18.83	1.86
0.667	1.14	6.750	1.86	12.833	7.67	18.92	1.86
0.750	1.14	6.833	1.86	12.917	7.67	19.00	1.86
0.833	1.14	6.917	1.86	13.000	7.67	19.08	1.86
0.917	1.14	7.000	1.86	13.083	7.67	19.17	1.86
1.000	1.14	7.083	1.86	13.167	7.67	19.25	1.86
1.083	1.14	7.167	1.86	13.250	7.67	19.33	1.86
1.167	1.14	7.250	1.86	13.333	5.59	19.42	1.86
1.250	1.14	7.333	2.28	13.417	5.59	19.50	1.86
1.333	1.14	7.417	2.28	13.500	5.59	19.58	1.86
1.417	1.14	7.500	2.28	13.583	5.59	19.67	1.86
1.500	1.14	7.583	2.28	13.667	5.59	19.75	1.86
1.583	1.14	7.667	2.28	13.750	5.59	19.83	1.86
1.667	1.14	7.750	2.28	13.833	4.35	19.92	1.86
1.750	1.14	7.833	2.28	13.917	4.35	20.00	1.86
1.833	1.14	7.917	2.28	14.000	4.35	20.08	1.86
1.917	1.14	8.000	2.28	14.083	4.35	20.17	1.86
2.000	1.14	8.083	2.28	14.167	4.35	20.25	1.86
2.083	1.14	8.167	2.28	14.250	4.35	20.33	1.24
2.167	1.14	8.250	2.28	14.333	3.11	20.42	1.24
2.250	1.14	8.333	2.69	14.417	3.11	20.50	1.24
2.333	1.35	8.417	2.69	14.500	3.11	20.58	1.24
2.417	1.35	8.500	2.69	14.583	3.11	20.67	1.24
2.500	1.35	8.583	2.69	14.667	3.11	20.75	1.24
2.583	1.35	8.667	2.69	14.750	3.11	20.83	1.24
2.667	1.35	8.750	2.69	14.833	3.11	20.92	1.24
2.750	1.35	8.833	2.90	14.917	3.11	21.00	1.24
2.833	1.35	8.917	2.90	15.000	3.11	21.08	1.24
2.917	1.35	9.000	2.90	15.083	3.11	21.17	1.24
3.000	1.35	9.083	2.90	15.167	3.11	21.25	1.24
3.083	1.35	9.167	2.90	15.250	3.11	21.33	1.24
3.167	1.35	9.250	2.90	15.333	3.11	21.42	1.24
3.250	1.35	9.333	3.32	15.417	3.11	21.50	1.24
3.333	1.35	9.417	3.32	15.500	3.11	21.58	1.24
3.417	1.35	9.500	3.32	15.583	3.11	21.67	1.24
3.500	1.35	9.583	3.32	15.667	3.11	21.75	1.24
3.583	1.35	9.667	3.32	15.750	3.11	21.83	1.24
3.667	1.35	9.750	3.32	15.833	3.11	21.92	1.24
3.750	1.35	9.833	3.73	15.917	3.11	22.00	1.24
3.833	1.35	9.917	3.73	16.000	3.11	22.08	1.24
3.917	1.35	10.000	3.73	16.083	3.11	22.17	1.24
4.000	1.35	10.083	3.73	16.167	3.11	22.25	1.24
4.083	1.35	10.167	3.73	16.250	3.11	22.33	1.24
4.167	1.35	10.250	3.73	16.333	1.87	22.42	1.24
4.250	1.35	10.333	4.77	16.417	1.86	22.50	1.24
4.333	1.66	10.417	4.77	16.500	1.86	22.58	1.24
4.417	1.66	10.500	4.77	16.583	1.86	22.67	1.24
4.500	1.66	10.583	4.77	16.667	1.86	22.75	1.24
4.583	1.66	10.667	4.77	16.750	1.86	22.83	1.24
4.667	1.66	10.750	4.77	16.833	1.86	22.92	1.24
4.750	1.66	10.833	6.42	16.917	1.86	23.00	1.24
4.833	1.66	10.917	6.42	17.000	1.86	23.08	1.24
4.917	1.66	11.000	6.42	17.083	1.86	23.17	1.24
5.000	1.66	11.083	6.42	17.167	1.86	23.25	1.24
5.083	1.66	11.167	6.42	17.250	1.86	23.33	1.24
5.167	1.66	11.250	6.42	17.333	1.86	23.42	1.24
5.250	1.66	11.333	9.95	17.417	1.86	23.50	1.24
5.333	1.66	11.417	9.95	17.500	1.86	23.58	1.24
5.417	1.66	11.500	9.95	17.583	1.86	23.67	1.24
5.500	1.66	11.583	9.95	17.667	1.86	23.75	1.24
5.583	1.66	11.667	9.95	17.750	1.86	23.83	1.24
5.667	1.66	11.750	9.95	17.833	1.86	23.92	1.24
5.750	1.66	11.833	30.66	17.917	1.86	24.00	1.24
5.833	1.66	11.917	30.67	18.000	1.86	24.08	1.24
5.917	1.66	12.000	30.67	18.083	1.86	24.17	1.24
6.000	1.66	12.083	126.79	18.167	1.86	24.25	1.24
6.083	1.66	12.167	126.81	18.250	1.86		

Max.Eff.Inten.(mm/hr)=	126.81	101.78	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.69 (ii)	8.70 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.32	0.12	

				TOTALS
PEAK FLOW	(cms)=	0.09	0.05	0.148 (iii)
TIME TO PEAK	(hrs)=	12.25	12.25	12.25
RUNOFF VOLUME	(mm)=	102.60	70.95	87.08
TOTAL RAINFALL	(mm)=	103.60	103.60	103.60
RUNOFF COEFFICIENT	=	0.99	0.68	0.84

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0088)	Area (ha)= 6.54
ID= 1 DT= 5.0 min	Total Imp(%)= 71.00 Dir. Conn.(%)= 56.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	4.64	1.90
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	208.81	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.66	12.250	126.81	18.33	1.86
0.167	0.00	6.250	1.66	12.333	14.93	18.42	1.86
0.250	0.00	6.333	1.86	12.417	14.92	18.50	1.86
0.333	1.14	6.417	1.86	12.500	14.92	18.58	1.86
0.417	1.14	6.500	1.86	12.583	14.92	18.67	1.86
0.500	1.14	6.583	1.86	12.667	14.92	18.75	1.86
0.583	1.14	6.667	1.86	12.750	14.92	18.83	1.86
0.667	1.14	6.750	1.86	12.833	7.67	18.92	1.86
0.750	1.14	6.833	1.86	12.917	7.67	19.00	1.86
0.833	1.14	6.917	1.86	13.000	7.67	19.08	1.86
0.917	1.14	7.000	1.86	13.083	7.67	19.17	1.86
1.000	1.14	7.083	1.86	13.167	7.67	19.25	1.86
1.083	1.14	7.167	1.86	13.250	7.67	19.33	1.86
1.167	1.14	7.250	1.86	13.333	5.59	19.42	1.86
1.250	1.14	7.333	2.28	13.417	5.59	19.50	1.86
1.333	1.14	7.417	2.28	13.500	5.59	19.58	1.86
1.417	1.14	7.500	2.28	13.583	5.59	19.67	1.86
1.500	1.14	7.583	2.28	13.667	5.59	19.75	1.86
1.583	1.14	7.667	2.28	13.750	5.59	19.83	1.86
1.667	1.14	7.750	2.28	13.833	4.35	19.92	1.86
1.750	1.14	7.833	2.28	13.917	4.35	20.00	1.86
1.833	1.14	7.917	2.28	14.000	4.35	20.08	1.86
1.917	1.14	8.000	2.28	14.083	4.35	20.17	1.86
2.000	1.14	8.083	2.28	14.167	4.35	20.25	1.86
2.083	1.14	8.167	2.28	14.250	4.35	20.33	1.24
2.167	1.14	8.250	2.28	14.333	3.11	20.42	1.24
2.250	1.14	8.333	2.69	14.417	3.11	20.50	1.24
2.333	1.35	8.417	2.69	14.500	3.11	20.58	1.24
2.417	1.35	8.500	2.69	14.583	3.11	20.67	1.24
2.500	1.35	8.583	2.69	14.667	3.11	20.75	1.24
2.583	1.35	8.667	2.69	14.750	3.11	20.83	1.24
2.667	1.35	8.750	2.69	14.833	3.11	20.92	1.24
2.750	1.35	8.833	2.90	14.917	3.11	21.00	1.24
2.833	1.35	8.917	2.90	15.000	3.11	21.08	1.24
2.917	1.35	9.000	2.90	15.083	3.11	21.17	1.24
3.000	1.35	9.083	2.90	15.167	3.11	21.25	1.24
3.083	1.35	9.167	2.90	15.250	3.11	21.33	1.24
3.167	1.35	9.250	2.90	15.333	3.11	21.42	1.24
3.250	1.35	9.333	3.32	15.417	3.11	21.50	1.24
3.333	1.35	9.417	3.32	15.500	3.11	21.58	1.24
3.417	1.35	9.500	3.32	15.583	3.11	21.67	1.24
3.500	1.35	9.583	3.32	15.667	3.11	21.75	1.24
3.583	1.35	9.667	3.32	15.750	3.11	21.83	1.24
3.667	1.35	9.750	3.32	15.833	3.11	21.92	1.24
3.750	1.35	9.833	3.73	15.917	3.11	22.00	1.24
3.833	1.35	9.917	3.73	16.000	3.11	22.08	1.24
3.917	1.35	10.000	3.73	16.083	3.11	22.17	1.24
4.000	1.35	10.083	3.73	16.167	3.11	22.25	1.24
4.083	1.35	10.167	3.73	16.250	3.11	22.33	1.24
4.167	1.35	10.250	3.73	16.333	1.87	22.42	1.24
4.250	1.35	10.333	4.77	16.417	1.86	22.50	1.24
4.333	1.66	10.417	4.77	16.500	1.86	22.58	1.24
4.417	1.66	10.500	4.77	16.583	1.86	22.67	1.24
4.500	1.66	10.583	4.77	16.667	1.86	22.75	1.24
4.583	1.66	10.667	4.77	16.750	1.86	22.83	1.24
4.667	1.66	10.750	4.77	16.833	1.86	22.92	1.24
4.750	1.66	10.833	6.42	16.917	1.86	23.00	1.24
4.833	1.66	10.917	6.42	17.000	1.86	23.08	1.24
4.917	1.66	11.000	6.42	17.083	1.86	23.17	1.24
5.000	1.66	11.083	6.42	17.167	1.86	23.25	1.24
5.083	1.66	11.167	6.42	17.250	1.86	23.33	1.24
5.167	1.66	11.250	6.42	17.333	1.86	23.42	1.24
5.250	1.66	11.333	9.95	17.417	1.86	23.50	1.24
5.333	1.66	11.417	9.95	17.500	1.86	23.58	1.24
5.417	1.66	11.500	9.95	17.583	1.86	23.67	1.24
5.500	1.66	11.583	9.95	17.667	1.86	23.75	1.24
5.583	1.66	11.667	9.95	17.750	1.86	23.83	1.24
5.667	1.66	11.750	9.95	17.833	1.86	23.92	1.24
5.750	1.66	11.833	30.66	17.917	1.86	24.00	1.24
5.833	1.66	11.917	30.67	18.000	1.86	24.08	1.24
5.917	1.66	12.000	30.67	18.083	1.86	24.17	1.24
6.000	1.66	12.083	126.79	18.167	1.86	24.25	1.24
6.083	1.66	12.167	126.81	18.250	1.86		

				TOTALS
Max.Eff.Inten.	(mm/hr)=	126.81	169.71	
over	(min)	5.00	10.00	
Storage Coeff.	(min)=	3.61 (ii)	8.55 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	10.00	
Unit Hyd. peak	(cms)=	0.25	0.12	
PEAK FLOW	(cms)=	1.27	0.70	1.970 (iii)
TIME TO PEAK	(hrs)=	12.25	12.25	12.25
RUNOFF VOLUME	(mm)=	102.60	79.67	92.51
TOTAL RAINFALL	(mm)=	103.60	103.60	103.60
RUNOFF COEFFICIENT	=	0.99	0.77	0.89

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

```
      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  85.0    Ia = Dep. Storage  (Above)
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0066)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000      0.0000   |    0.1507      0.2774
                          0.0103      0.1190   |    0.1711      0.3280
                          0.0819      0.2055   |    0.1837      0.3663
                          0.1039      0.2468   |    0.3000      0.3955

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0088)     6.540     1.970     12.25      92.51
   OUTFLOW: ID= 1 (  0066)     6.540     0.184     12.92      92.06

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  9.32
                  TIME SHIFT OF PEAK FLOW          (min)= 40.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.3663

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0089)|   Area    (ha)=   0.24
|ID= 1 DT= 5.0 min |   Total Imp(%)=  38.00   Dir. Conn.(%)=  21.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.09         0.15
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      40.00        40.00
     Mannings n            =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
 0.083    0.00 | 6.167    1.66 |12.250  126.81 | 18.33    1.86
 0.167    0.00 | 6.250    1.66 |12.333   14.93 | 18.42    1.86
 0.250    0.00 | 6.333    1.86 |12.417   14.92 | 18.50    1.86
 0.333    1.14 | 6.417    1.86 |12.500   14.92 | 18.58    1.86
 0.417    1.14 | 6.500    1.86 |12.583   14.92 | 18.67    1.86
 0.500    1.14 | 6.583    1.86 |12.667   14.92 | 18.75    1.86
 0.583    1.14 | 6.667    1.86 |12.750   14.92 | 18.83    1.86
 0.667    1.14 | 6.750    1.86 |12.833    7.67 | 18.92    1.86
 0.750    1.14 | 6.833    1.86 |12.917    7.67 | 19.00    1.86
 0.833    1.14 | 6.917    1.86 |13.000    7.67 | 19.08    1.86
 0.917    1.14 | 7.000    1.86 |13.083    7.67 | 19.17    1.86
 1.000    1.14 | 7.083    1.86 |13.167    7.67 | 19.25    1.86
 1.083    1.14 | 7.167    1.86 |13.250    7.67 | 19.33    1.86
 1.167    1.14 | 7.250    1.86 |13.333    5.59 | 19.42    1.86
 1.250    1.14 | 7.333    2.28 |13.417    5.59 | 19.50    1.86
 1.333    1.14 | 7.417    2.28 |13.500    5.59 | 19.58    1.86
 1.417    1.14 | 7.500    2.28 |13.583    5.59 | 19.67    1.86
 1.500    1.14 | 7.583    2.28 |13.667    5.59 | 19.75    1.86
 1.583    1.14 | 7.667    2.28 |13.750    5.59 | 19.83    1.86
 1.667    1.14 | 7.750    2.28 |13.833    4.35 | 19.92    1.86
 1.750    1.14 | 7.833    2.28 |13.917    4.35 | 20.00    1.86
 1.833    1.14 | 7.917    2.28 |14.000    4.35 | 20.08    1.86
 1.917    1.14 | 8.000    2.28 |14.083    4.35 | 20.17    1.86
 2.000    1.14 | 8.083    2.28 |14.167    4.35 | 20.25    1.86
 2.083    1.14 | 8.167    2.28 |14.250    4.35 | 20.33    1.24
 2.167    1.14 | 8.250    2.28 |14.333    3.11 | 20.42    1.24
 2.250    1.14 | 8.333    2.69 |14.417    3.11 | 20.50    1.24
 2.333    1.35 | 8.417    2.69 |14.500    3.11 | 20.58    1.24
 2.417    1.35 | 8.500    2.69 |14.583    3.11 | 20.67    1.24
 2.500    1.35 | 8.583    2.69 |14.667    3.11 | 20.75    1.24
 2.583    1.35 | 8.667    2.69 |14.750    3.11 | 20.83    1.24
 2.667    1.35 | 8.750    2.69 |14.833    3.11 | 20.92    1.24
 2.750    1.35 | 8.833    2.90 |14.917    3.11 | 21.00    1.24
 2.833    1.35 | 8.917    2.90 |15.000    3.11 | 21.08    1.24
 2.917    1.35 | 9.000    2.90 |15.083    3.11 | 21.17    1.24
 3.000    1.35 | 9.083    2.90 |15.167    3.11 | 21.25    1.24
 3.083    1.35 | 9.167    2.90 |15.250    3.11 | 21.33    1.24
 3.167    1.35 | 9.250    2.90 |15.333    3.11 | 21.42    1.24
 3.250    1.35 | 9.333    3.32 |15.417    3.11 | 21.50    1.24
 3.333    1.35 | 9.417    3.32 |15.500    3.11 | 21.58    1.24
 3.417    1.35 | 9.500    3.32 |15.583    3.11 | 21.67    1.24
 3.500    1.35 | 9.583    3.32 |15.667    3.11 | 21.75    1.24
 3.583    1.35 | 9.667    3.32 |15.750    3.11 | 21.83    1.24
 3.667    1.35 | 9.750    3.32 |15.833    3.11 | 21.92    1.24
 3.750    1.35 | 9.833    3.73 |15.917    3.11 | 22.00    1.24
 3.833    1.35 | 9.917    3.73 |16.000    3.11 | 22.08    1.24
 3.917    1.35 |10.000    3.73 |16.083    3.11 | 22.17    1.24
 4.000    1.35 |10.083    3.73 |16.167    3.11 | 22.25    1.24
 4.083    1.35 |10.167    3.73 |16.250    3.11 | 22.33    1.24
 4.167    1.35 |10.250    3.73 |16.333    1.87 | 22.42    1.24
 4.250    1.35 |10.333    4.77 |16.417    1.86 | 22.50    1.24
 4.333    1.66 |10.417    4.77 |16.500    1.86 | 22.58    1.24
 4.417    1.66 |10.500    4.77 |16.583    1.86 | 22.67    1.24
 4.500    1.66 |10.583    4.77 |16.667    1.86 | 22.75    1.24
 4.583    1.66 |10.667    4.77 |16.750    1.86 | 22.83    1.24
 4.667    1.66 |10.750    4.77 |16.833    1.86 | 22.92    1.24
 4.750    1.66 |10.833    6.42 |16.917    1.86 | 23.00    1.24
 4.833    1.66 |10.917    6.42 |17.000    1.86 | 23.08    1.24
 4.917    1.66 |11.000    6.42 |17.083    1.86 | 23.17    1.24
 5.000    1.66 |11.083    6.42 |17.167    1.86 | 23.25    1.24
 5.083    1.66 |11.167    6.42 |17.250    1.86 | 23.33    1.24
 5.167    1.66 |11.250    6.42 |17.333    1.86 | 23.42    1.24
 5.250    1.66 |11.333    9.95 |17.417    1.86 | 23.50    1.24
 5.333    1.66 |11.417    9.95 |17.500    1.86 | 23.58    1.24
 5.417    1.66 |11.500    9.95 |17.583    1.86 | 23.67    1.24
 5.500    1.66 |11.583    9.95 |17.667    1.86 | 23.75    1.24
 5.583    1.66 |11.667    9.95 |17.750    1.86 | 23.83    1.24
 5.667    1.66 |11.750    9.95 |17.833    1.86 | 23.92    1.24
 5.750    1.66 |11.833   30.66 |17.917    1.86 | 24.00    1.24
 5.833    1.66 |11.917   30.67 |18.000    1.86 | 24.08    1.24
 5.917    1.66 |12.000   30.67 |18.083    1.86 | 24.17    1.24
 6.000    1.66 |12.083  126.79 |18.167    1.86 | 24.25    1.24
 6.083    1.66 |12.167  126.81 |18.250    1.86 |

Max.Eff.Inten.(mm/hr)=     126.81       137.70
           over (min)         5.00        10.00
Storage Coeff.  (min)=       1.34 (ii)    7.55 (ii)
```

```
    Unit Hyd. Tpeak (min)=       5.00        10.00
    Unit Hyd. peak  (cms)=       0.33         0.13
                                                      *TOTALS*
    PEAK FLOW       (cms)=       0.02         0.05          0.064 (iii)
    TIME TO PEAK    (hrs)=      12.25        12.25          12.25
    RUNOFF VOLUME    (mm)=     102.60        76.24          81.76
    TOTAL RAINFALL   (mm)=     103.60       103.60         103.60
    RUNOFF COEFFICIENT   =       0.99         0.74           0.79

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0064)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)      (mm)
        ID1= 1 (  0066):     6.54   0.184    12.92    92.06
      + ID2= 2 (  0070):     0.34   0.111    12.25    94.68
        ====================================================
        ID = 3 (  0064):     6.88   0.260    12.25    92.19

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0064)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)      (mm)
        ID1= 3 (  0064):     6.88   0.260    12.25    92.19
      + ID2= 2 (  0072):    28.11   1.103    13.67    61.46
        ====================================================
        ID = 1 (  0064):    34.99   1.287    13.67    67.50

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0064)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)      (mm)
        ID1= 1 (  0064):    34.99   1.287    13.67    67.50
      + ID2= 2 (  0086):     0.52   0.148    12.25    87.08
        ====================================================
        ID = 3 (  0064):    35.51   1.295    13.67    67.79

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0064)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)      (mm)
        ID1= 3 (  0064):    35.51   1.295    13.67    67.79
      + ID2= 2 (  0087):     1.71   0.148    12.42    45.69
        ====================================================
        ID = 1 (  0064):    37.22   1.316    13.67    66.77

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0064)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)      (mm)
        ID1= 1 (  0064):    37.22   1.316    13.67    66.77
      + ID2= 2 (  0089):     0.24   0.064    12.25    81.76
        ====================================================
        ID = 3 (  0064):    37.46   1.320    13.67    66.87

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
================================================================================
=========================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\d33ee5be-5a77-414b-935f-0a584e9543c0\scenar
  Summary filename: C:\Users\rsoto\AppData\Local\Civica\VH5\7243b168-d2e8-4d39-
9dcc-f9ab721dcfe2\d33ee5be-5a77-414b-935f-0a584e9543c0\scenar


DATE: 04-14-2026                          TIME: 05:37:29

USER:


COMMENTS: _____________________________________________________________


--------------------------------------------------------------------------------
--------------------------
  ********************************************
  ** SIMULATION : Run 6 - 100yr 24hr 15min SCS  **
  ********************************************
```

```
--------------------
|    READ STORM    |    Filename: C:\Users\rsoto\AppD
|                  |              ata\Local\Temp\
|                  |              60e6093c-53c6-44bb-ab2e-a1ff337040a5\18827168
| Ptotal=114.47 mm |    Comments: 100yr 24hr 15min SCS
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	2.06	12.50	16.48	18.75	2.06
0.25	1.26	6.50	2.06	12.75	8.47	19.00	2.06
0.50	1.26	6.75	2.06	13.00	8.47	19.25	2.06
0.75	1.26	7.00	2.06	13.25	6.18	19.50	2.06
1.00	1.26	7.25	2.52	13.50	6.18	19.75	2.06
1.25	1.26	7.50	2.52	13.75	4.81	20.00	2.06
1.50	1.26	7.75	2.52	14.00	4.81	20.25	1.37
1.75	1.26	8.00	2.52	14.25	3.43	20.50	1.37
2.00	1.26	8.25	2.98	14.50	3.43	20.75	1.37
2.25	1.49	8.50	2.98	14.75	3.43	21.00	1.37
2.50	1.49	8.75	3.21	15.00	3.43	21.25	1.37
2.75	1.49	9.00	3.21	15.25	3.43	21.50	1.37
3.00	1.49	9.25	3.66	15.50	3.43	21.75	1.37
3.25	1.49	9.50	3.66	15.75	3.43	22.00	1.37
3.50	1.49	9.75	4.12	16.00	3.43	22.25	1.37
3.75	1.49	10.00	4.12	16.25	2.06	22.50	1.37
4.00	1.49	10.25	5.27	16.50	2.06	22.75	1.37
4.25	1.83	10.50	5.27	16.75	2.06	23.00	1.37
4.50	1.83	10.75	7.10	17.00	2.06	23.25	1.37
4.75	1.83	11.00	7.10	17.25	2.06	23.50	1.37
5.00	1.83	11.25	10.99	17.50	2.06	23.75	1.37
5.25	1.83	11.50	10.99	17.75	2.06	24.00	1.37
5.50	1.83	11.75	33.88	18.00	2.06		
5.75	1.83	12.00	140.11	18.25	2.06		
6.00	1.83	12.25	16.48	18.50	2.06		

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--------------------
| CALIB            |
| NASHYD   (  0069)|   Area    (ha)=  28.11   Curve Number   (CN)= 81.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.39

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
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---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.83	12.250	140.11	18.33	2.06
0.167	0.00	6.250	1.83	12.333	16.50	18.42	2.06
0.250	0.00	6.333	2.06	12.417	16.48	18.50	2.06
0.333	1.26	6.417	2.06	12.500	16.48	18.58	2.06
0.417	1.26	6.500	2.06	12.583	16.48	18.67	2.06
0.500	1.26	6.583	2.06	12.667	16.48	18.75	2.06
0.583	1.26	6.667	2.06	12.750	16.48	18.83	2.06
0.667	1.26	6.750	2.06	12.833	8.47	18.92	2.06
0.750	1.26	6.833	2.06	12.917	8.47	19.00	2.06
0.833	1.26	6.917	2.06	13.000	8.47	19.08	2.06
0.917	1.26	7.000	2.06	13.083	8.47	19.17	2.06
1.000	1.26	7.083	2.06	13.167	8.47	19.25	2.06
1.083	1.26	7.167	2.06	13.250	8.47	19.33	2.06
1.167	1.26	7.250	2.06	13.333	6.18	19.42	2.06
1.250	1.26	7.333	2.52	13.417	6.18	19.50	2.06
1.333	1.26	7.417	2.52	13.500	6.18	19.58	2.06
1.417	1.26	7.500	2.52	13.583	6.18	19.67	2.06
1.500	1.26	7.583	2.52	13.667	6.18	19.75	2.06
1.583	1.26	7.667	2.52	13.750	6.18	19.83	2.06
1.667	1.26	7.750	2.52	13.833	4.81	19.92	2.06
1.750	1.26	7.833	2.52	13.917	4.81	20.00	2.06
1.833	1.26	7.917	2.52	14.000	4.81	20.08	2.06
1.917	1.26	8.000	2.52	14.083	4.81	20.17	2.06
2.000	1.26	8.083	2.52	14.167	4.81	20.25	2.06
2.083	1.26	8.167	2.52	14.250	4.81	20.33	1.37
2.167	1.26	8.250	2.52	14.333	3.43	20.42	1.37
2.250	1.26	8.333	2.98	14.417	3.43	20.50	1.37
2.333	1.49	8.417	2.98	14.500	3.43	20.58	1.37
2.417	1.49	8.500	2.98	14.583	3.43	20.67	1.37
2.500	1.49	8.583	2.98	14.667	3.43	20.75	1.37
2.583	1.49	8.667	2.98	14.750	3.43	20.83	1.37
2.667	1.49	8.750	2.98	14.833	3.43	20.92	1.37
2.750	1.49	8.833	3.21	14.917	3.43	21.00	1.37
2.833	1.49	8.917	3.21	15.000	3.43	21.08	1.37
2.917	1.49	9.000	3.21	15.083	3.43	21.17	1.37
3.000	1.49	9.083	3.21	15.167	3.43	21.25	1.37
3.083	1.49	9.167	3.21	15.250	3.43	21.33	1.37
3.167	1.49	9.250	3.21	15.333	3.43	21.42	1.37
3.250	1.49	9.333	3.66	15.417	3.43	21.50	1.37
3.333	1.49	9.417	3.66	15.500	3.43	21.58	1.37
3.417	1.49	9.500	3.66	15.583	3.43	21.67	1.37
3.500	1.49	9.583	3.66	15.667	3.43	21.75	1.37
3.583	1.49	9.667	3.66	15.750	3.43	21.83	1.37
3.667	1.49	9.750	3.66	15.833	3.43	21.92	1.37
3.750	1.49	9.833	4.12	15.917	3.43	22.00	1.37
3.833	1.49	9.917	4.12	16.000	3.43	22.08	1.37
3.917	1.49	10.000	4.12	16.083	3.43	22.17	1.37
4.000	1.49	10.083	4.12	16.167	3.43	22.25	1.37
4.083	1.49	10.167	4.12	16.250	3.43	22.33	1.37
4.167	1.49	10.250	4.12	16.333	2.06	22.42	1.37
4.250	1.49	10.333	5.27	16.417	2.06	22.50	1.37
4.333	1.83	10.417	5.27	16.500	2.06	22.58	1.37
4.417	1.83	10.500	5.27	16.583	2.06	22.67	1.37
4.500	1.83	10.583	5.27	16.667	2.06	22.75	1.37
4.583	1.83	10.667	5.27	16.750	2.06	22.83	1.37
4.667	1.83	10.750	5.27	16.833	2.06	22.92	1.37
4.750	1.83	10.833	7.10	16.917	2.06	23.00	1.37
4.833	1.83	10.917	7.10	17.000	2.06	23.08	1.37
4.917	1.83	11.000	7.10	17.083	2.06	23.17	1.37
5.000	1.83	11.083	7.10	17.167	2.06	23.25	1.37
5.083	1.83	11.167	7.10	17.250	2.06	23.33	1.37
5.167	1.83	11.250	7.10	17.333	2.06	23.42	1.37
5.250	1.83	11.333	10.99	17.417	2.06	23.50	1.37
5.333	1.83	11.417	10.99	17.500	2.06	23.58	1.37
5.417	1.83	11.500	10.99	17.583	2.06	23.67	1.37
5.500	1.83	11.583	10.99	17.667	2.06	23.75	1.37
5.583	1.83	11.667	10.99	17.750	2.06	23.83	1.37
5.667	1.83	11.750	10.99	17.833	2.06	23.92	1.37
5.750	1.83	11.833	33.88	17.917	2.06	24.00	1.37
5.833	1.83	11.917	33.88	18.000	2.06	24.08	1.37
5.917	1.83	12.000	33.88	18.083	2.06	24.17	1.37
6.000	1.83	12.083	140.10	18.167	2.06	24.25	1.37
6.083	1.83	12.167	140.11	18.250	2.06		

```
     Unit Hyd Qpeak  (cms)=   0.772

     PEAK FLOW       (cms)=   1.277 (i)
     TIME TO PEAK    (hrs)=  13.583
     RUNOFF VOLUME    (mm)=  70.888
     TOTAL RAINFALL   (mm)= 114.470
     RUNOFF COEFFICIENT   =   0.619

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ROUTEPIPE(  0072)|     PIPE Number     =   1.00
| IN= 2---> OUT= 1 |     Diameter    (mm)=1200.00
| DT=  5.0 min     |     Length       (m)= 500.00
--------------------     Slope      (m/m)=  0.002
                         Manning n        =  0.013

     <----------------- TRAVEL TIME TABLE ---------------------->
       DEPTH      VOLUME    FLOW RATE    VELOCITY    TRAV.TIME
         (m)      (cu.m.)      (cms)        (m/s)        min
        0.06     .114E+02       0.0         0.41        20.34
        0.13     .317E+02       0.0         0.64        13.04
        0.19     .573E+02       0.1         0.82        10.13
        0.25     .866E+02       0.2         0.98         8.52
        0.32     .119E+03       0.3         1.11         7.49
        0.38     .153E+03       0.4         1.23         6.77
        0.44     .189E+03       0.5         1.34         6.24
        0.51     .226E+03       0.6         1.43         5.84
        0.57     .264E+03       0.8         1.51         5.53
        0.63     .302E+03       1.0         1.58         5.29
        0.69     .339E+03       1.1         1.63         5.10
        0.76     .376E+03       1.3         1.68         4.95
        0.82     .412E+03       1.4         1.72         4.85
        0.88     .447E+03       1.6         1.74         4.78
        0.95     .479E+03       1.7         1.76         4.74
        1.01     .508E+03       1.8         1.76         4.74
        1.07     .534E+03       1.9         1.74         4.80
        1.14     .554E+03       1.9         1.69         4.92
        1.20     .566E+03       1.7         1.54         5.40
                                     <---- hydrograph ---->   <-pipe / channel->
                              AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                              (ha)    (cms)   (hrs)   (mm)       (m)       (m/s)
   INFLOW : ID= 2 (  0069)   28.11     1.28   13.58  70.89      0.76      1.68
   OUTFLOW: ID= 1 (  0072)   28.11     1.27   13.67  70.89      0.76      1.68



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| CALIB            |
| NASHYD   (  0087)|   Area    (ha)=   1.71   Curve Number   (CN)= 69.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.31

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.

                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
    0.083    0.00 | 6.167    1.83 |12.250  140.11 | 18.33    2.06
    0.167    0.00 | 6.250    1.83 |12.333   16.50 | 18.42    2.06
    0.250    0.00 | 6.333    2.06 |12.417   16.48 | 18.50    2.06
    0.333    1.26 | 6.417    2.06 |12.500   16.48 | 18.58    2.06
    0.417    1.26 | 6.500    2.06 |12.583   16.48 | 18.67    2.06
    0.500    1.26 | 6.583    2.06 |12.667   16.48 | 18.75    2.06
    0.583    1.26 | 6.667    2.06 |12.750   16.48 | 18.83    2.06
    0.667    1.26 | 6.750    2.06 |12.833    8.47 | 18.92    2.06
    0.750    1.26 | 6.833    2.06 |12.917    8.47 | 19.00    2.06
    0.833    1.26 | 6.917    2.06 |13.000    8.47 | 19.08    2.06
    0.917    1.26 | 7.000    2.06 |13.083    8.47 | 19.17    2.06
    1.000    1.26 | 7.083    2.06 |13.167    8.47 | 19.25    2.06
    1.083    1.26 | 7.167    2.06 |13.250    8.47 | 19.33    2.06
    1.167    1.26 | 7.250    2.06 |13.333    6.18 | 19.42    2.06
    1.250    1.26 | 7.333    2.52 |13.417    6.18 | 19.50    2.06
    1.333    1.26 | 7.417    2.52 |13.500    6.18 | 19.58    2.06
    1.417    1.26 | 7.500    2.52 |13.583    6.18 | 19.67    2.06
    1.500    1.26 | 7.583    2.52 |13.667    6.18 | 19.75    2.06
    1.583    1.26 | 7.667    2.52 |13.750    6.18 | 19.83    2.06
    1.667    1.26 | 7.750    2.52 |13.833    4.81 | 19.92    2.06
    1.750    1.26 | 7.833    2.52 |13.917    4.81 | 20.00    2.06
    1.833    1.26 | 7.917    2.52 |14.000    4.81 | 20.08    2.06
    1.917    1.26 | 8.000    2.52 |14.083    4.81 | 20.17    2.06
    2.000    1.26 | 8.083    2.52 |14.167    4.81 | 20.25    2.06
    2.083    1.26 | 8.167    2.52 |14.250    4.81 | 20.33    1.37
    2.167    1.26 | 8.250    2.52 |14.333    3.43 | 20.42    1.37
    2.250    1.26 | 8.333    2.98 |14.417    3.43 | 20.50    1.37
    2.333    1.49 | 8.417    2.98 |14.500    3.43 | 20.58    1.37
    2.417    1.49 | 8.500    2.98 |14.583    3.43 | 20.67    1.37
    2.500    1.49 | 8.583    2.98 |14.667    3.43 | 20.75    1.37
    2.583    1.49 | 8.667    2.98 |14.750    3.43 | 20.83    1.37
    2.667    1.49 | 8.750    2.98 |14.833    3.43 | 20.92    1.37
    2.750    1.49 | 8.833    3.21 |14.917    3.43 | 21.00    1.37
    2.833    1.49 | 8.917    3.21 |15.000    3.43 | 21.08    1.37
    2.917    1.49 | 9.000    3.21 |15.083    3.43 | 21.17    1.37
    3.000    1.49 | 9.083    3.21 |15.167    3.43 | 21.25    1.37
    3.083    1.49 | 9.167    3.21 |15.250    3.43 | 21.33    1.37
    3.167    1.49 | 9.250    3.21 |15.333    3.43 | 21.42    1.37
    3.250    1.49 | 9.333    3.66 |15.417    3.43 | 21.50    1.37
    3.333    1.49 | 9.417    3.66 |15.500    3.43 | 21.58    1.37
    3.417    1.49 | 9.500    3.66 |15.583    3.43 | 21.67    1.37
    3.500    1.49 | 9.583    3.66 |15.667    3.43 | 21.75    1.37
    3.583    1.49 | 9.667    3.66 |15.750    3.43 | 21.83    1.37
    3.667    1.49 | 9.750    3.66 |15.833    3.43 | 21.92    1.37
    3.750    1.49 | 9.833    4.12 |15.917    3.43 | 22.00    1.37
    3.833    1.49 | 9.917    4.12 |16.000    3.43 | 22.08    1.37
    3.917    1.49 |10.000    4.12 |16.083    3.43 | 22.17    1.37
    4.000    1.49 |10.083    4.12 |16.167    3.43 | 22.25    1.37
    4.083    1.49 |10.167    4.12 |16.250    3.43 | 22.33    1.37
    4.167    1.49 |10.250    4.12 |16.333    2.06 | 22.42    1.37
    4.250    1.49 |10.333    5.27 |16.417    2.06 | 22.50    1.37
    4.333    1.83 |10.417    5.27 |16.500    2.06 | 22.58    1.37
    4.417    1.83 |10.500    5.27 |16.583    2.06 | 22.67    1.37
    4.500    1.83 |10.583    5.27 |16.667    2.06 | 22.75    1.37
    4.583    1.83 |10.667    5.27 |16.750    2.06 | 22.83    1.37
    4.667    1.83 |10.750    5.27 |16.833    2.06 | 22.92    1.37
    4.750    1.83 |10.833    7.10 |16.917    2.06 | 23.00    1.37
    4.833    1.83 |10.917    7.10 |17.000    2.06 | 23.08    1.37
    4.917    1.83 |11.000    7.10 |17.083    2.06 | 23.17    1.37
    5.000    1.83 |11.083    7.10 |17.167    2.06 | 23.25    1.37
    5.083    1.83 |11.167    7.10 |17.250    2.06 | 23.33    1.37
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5.167	1.83	11.250	7.10	17.333	2.06	23.42	1.37
5.250	1.83	11.333	10.99	17.417	2.06	23.50	1.37
5.333	1.83	11.417	10.99	17.500	2.06	23.58	1.37
5.417	1.83	11.500	10.99	17.583	2.06	23.67	1.37
5.500	1.83	11.583	10.99	17.667	2.06	23.75	1.37
5.583	1.83	11.667	10.99	17.750	2.06	23.83	1.37
5.667	1.83	11.750	10.99	17.833	2.06	23.92	1.37
5.750	1.83	11.833	33.88	17.917	2.06	24.00	1.37
5.833	1.83	11.917	33.88	18.000	2.06	24.08	1.37
5.917	1.83	12.000	33.88	18.083	2.06	24.17	1.37
6.000	1.83	12.083	140.10	18.167	2.06	24.25	1.37
6.083	1.83	12.167	140.11	18.250	2.06		

Unit Hyd Qpeak (cms)= 0.211

PEAK FLOW (cms)= 0.174 (i)
TIME TO PEAK (hrs)= 12.417
RUNOFF VOLUME (mm)= 53.579
TOTAL RAINFALL (mm)= 114.470
RUNOFF COEFFICIENT = 0.468

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0070)	Area (ha)= 0.34		
ID= 1 DT= 5.0 min	Total Imp(%)= 75.00	Dir. Conn.(%)= 75.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.26	0.09
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	47.61	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.83	12.250	140.11	18.33	2.06
0.167	0.00	6.250	1.83	12.333	16.50	18.42	2.06
0.250	0.00	6.333	2.06	12.417	16.48	18.50	2.06
0.333	1.26	6.417	2.06	12.500	16.48	18.58	2.06
0.417	1.26	6.500	2.06	12.583	16.48	18.67	2.06
0.500	1.26	6.583	2.06	12.667	16.48	18.75	2.06
0.583	1.26	6.667	2.06	12.750	16.48	18.83	2.06
0.667	1.26	6.750	2.06	12.833	8.47	18.92	2.06
0.750	1.26	6.833	2.06	12.917	8.47	19.00	2.06
0.833	1.26	6.917	2.06	13.000	8.47	19.08	2.06
0.917	1.26	7.000	2.06	13.083	8.47	19.17	2.06
1.000	1.26	7.083	2.06	13.167	8.47	19.25	2.06
1.083	1.26	7.167	2.06	13.250	8.47	19.33	2.06
1.167	1.26	7.250	2.06	13.333	6.18	19.42	2.06
1.250	1.26	7.333	2.52	13.417	6.18	19.50	2.06
1.333	1.26	7.417	2.52	13.500	6.18	19.58	2.06
1.417	1.26	7.500	2.52	13.583	6.18	19.67	2.06
1.500	1.26	7.583	2.52	13.667	6.18	19.75	2.06
1.583	1.26	7.667	2.52	13.750	6.18	19.83	2.06
1.667	1.26	7.750	2.52	13.833	4.81	19.92	2.06
1.750	1.26	7.833	2.52	13.917	4.81	20.00	2.06
1.833	1.26	7.917	2.52	14.000	4.81	20.08	2.06
1.917	1.26	8.000	2.52	14.083	4.81	20.17	2.06
2.000	1.26	8.083	2.52	14.167	4.81	20.25	2.06
2.083	1.26	8.167	2.52	14.250	4.81	20.33	1.37
2.167	1.26	8.250	2.52	14.333	3.43	20.42	1.37
2.250	1.26	8.333	2.98	14.417	3.43	20.50	1.37
2.333	1.49	8.417	2.98	14.500	3.43	20.58	1.37
2.417	1.49	8.500	2.98	14.583	3.43	20.67	1.37
2.500	1.49	8.583	2.98	14.667	3.43	20.75	1.37
2.583	1.49	8.667	2.98	14.750	3.43	20.83	1.37
2.667	1.49	8.750	2.98	14.833	3.43	20.92	1.37
2.750	1.49	8.833	3.21	14.917	3.43	21.00	1.37
2.833	1.49	8.917	3.21	15.000	3.43	21.08	1.37
2.917	1.49	9.000	3.21	15.083	3.43	21.17	1.37
3.000	1.49	9.083	3.21	15.167	3.43	21.25	1.37
3.083	1.49	9.167	3.21	15.250	3.43	21.33	1.37
3.167	1.49	9.250	3.21	15.333	3.43	21.42	1.37
3.250	1.49	9.333	3.66	15.417	3.43	21.50	1.37
3.333	1.49	9.417	3.66	15.500	3.43	21.58	1.37
3.417	1.49	9.500	3.66	15.583	3.43	21.67	1.37
3.500	1.49	9.583	3.66	15.667	3.43	21.75	1.37
3.583	1.49	9.667	3.66	15.750	3.43	21.83	1.37
3.667	1.49	9.750	3.66	15.833	3.43	21.92	1.37
3.750	1.49	9.833	4.12	15.917	3.43	22.00	1.37
3.833	1.49	9.917	4.12	16.000	3.43	22.08	1.37
3.917	1.49	10.000	4.12	16.083	3.43	22.17	1.37
4.000	1.49	10.083	4.12	16.167	3.43	22.25	1.37
4.083	1.49	10.167	4.12	16.250	3.43	22.33	1.37
4.167	1.49	10.250	4.12	16.333	2.06	22.42	1.37
4.250	1.49	10.333	5.27	16.417	2.06	22.50	1.37
4.333	1.83	10.417	5.27	16.500	2.06	22.58	1.37
4.417	1.83	10.500	5.27	16.583	2.06	22.67	1.37
4.500	1.83	10.583	5.27	16.667	2.06	22.75	1.37
4.583	1.83	10.667	5.27	16.750	2.06	22.83	1.37
4.667	1.83	10.750	5.27	16.833	2.06	22.92	1.37
4.750	1.83	10.833	7.10	16.917	2.06	23.00	1.37
4.833	1.83	10.917	7.10	17.000	2.06	23.08	1.37
4.917	1.83	11.000	7.10	17.083	2.06	23.17	1.37
5.000	1.83	11.083	7.10	17.167	2.06	23.25	1.37
5.083	1.83	11.167	7.10	17.250	2.06	23.33	1.37
5.167	1.83	11.250	7.10	17.333	2.06	23.42	1.37
5.250	1.83	11.333	10.99	17.417	2.06	23.50	1.37
5.333	1.83	11.417	10.99	17.500	2.06	23.58	1.37
5.417	1.83	11.500	10.99	17.583	2.06	23.67	1.37
5.500	1.83	11.583	10.99	17.667	2.06	23.75	1.37
5.583	1.83	11.667	10.99	17.750	2.06	23.83	1.37
5.667	1.83	11.750	10.99	17.833	2.06	23.92	1.37
5.750	1.83	11.833	33.88	17.917	2.06	24.00	1.37
5.833	1.83	11.917	33.88	18.000	2.06	24.08	1.37
5.917	1.83	12.000	33.88	18.083	2.06	24.17	1.37
6.000	1.83	12.083	140.10	18.167	2.06	24.25	1.37
6.083	1.83	12.167	140.11	18.250	2.06		

Max.Eff.Inten.(mm/hr)=	140.11	115.48	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.43 (ii)	5.40 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.33	0.16	
			TOTALS

```
     PEAK FLOW       (cms)=       0.10         0.02          0.123 (iii)
     TIME TO PEAK    (hrs)=      12.25        12.25          12.25
     RUNOFF VOLUME    (mm)=     113.47        80.88         105.31
     TOTAL RAINFALL   (mm)=     114.47       114.47         114.47
     RUNOFF COEFFICIENT   =       0.99         0.71           0.92

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB            |
| STANDHYD (  0086)|   Area    (ha)=   0.52
|ID= 1 DT= 5.0 min |   Total Imp(%)=  51.00   Dir. Conn.(%)=  51.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.27         0.25
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      58.88        40.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                        ---- TRANSFORMED HYETOGRAPH ----
  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
 0.083    0.00 | 6.167    1.83 |12.250  140.11 | 18.33    2.06
 0.167    0.00 | 6.250    1.83 |12.333   16.50 | 18.42    2.06
 0.250    0.00 | 6.333    2.06 |12.417   16.48 | 18.50    2.06
 0.333    1.26 | 6.417    2.06 |12.500   16.48 | 18.58    2.06
 0.417    1.26 | 6.500    2.06 |12.583   16.48 | 18.67    2.06
 0.500    1.26 | 6.583    2.06 |12.667   16.48 | 18.75    2.06
 0.583    1.26 | 6.667    2.06 |12.750   16.48 | 18.83    2.06
 0.667    1.26 | 6.750    2.06 |12.833    8.47 | 18.92    2.06
 0.750    1.26 | 6.833    2.06 |12.917    8.47 | 19.00    2.06
 0.833    1.26 | 6.917    2.06 |13.000    8.47 | 19.08    2.06
 0.917    1.26 | 7.000    2.06 |13.083    8.47 | 19.17    2.06
 1.000    1.26 | 7.083    2.06 |13.167    8.47 | 19.25    2.06
 1.083    1.26 | 7.167    2.06 |13.250    8.47 | 19.33    2.06
 1.167    1.26 | 7.250    2.06 |13.333    6.18 | 19.42    2.06
 1.250    1.26 | 7.333    2.52 |13.417    6.18 | 19.50    2.06
 1.333    1.26 | 7.417    2.52 |13.500    6.18 | 19.58    2.06
 1.417    1.26 | 7.500    2.52 |13.583    6.18 | 19.67    2.06
 1.500    1.26 | 7.583    2.52 |13.667    6.18 | 19.75    2.06
 1.583    1.26 | 7.667    2.52 |13.750    6.18 | 19.83    2.06
 1.667    1.26 | 7.750    2.52 |13.833    4.81 | 19.92    2.06
 1.750    1.26 | 7.833    2.52 |13.917    4.81 | 20.00    2.06
 1.833    1.26 | 7.917    2.52 |14.000    4.81 | 20.08    2.06
 1.917    1.26 | 8.000    2.52 |14.083    4.81 | 20.17    2.06
 2.000    1.26 | 8.083    2.52 |14.167    4.81 | 20.25    2.06
 2.083    1.26 | 8.167    2.52 |14.250    4.81 | 20.33    1.37
 2.167    1.26 | 8.250    2.52 |14.333    3.43 | 20.42    1.37
 2.250    1.26 | 8.333    2.98 |14.417    3.43 | 20.50    1.37
 2.333    1.49 | 8.417    2.98 |14.500    3.43 | 20.58    1.37
 2.417    1.49 | 8.500    2.98 |14.583    3.43 | 20.67    1.37
 2.500    1.49 | 8.583    2.98 |14.667    3.43 | 20.75    1.37
 2.583    1.49 | 8.667    2.98 |14.750    3.43 | 20.83    1.37
 2.667    1.49 | 8.750    2.98 |14.833    3.43 | 20.92    1.37
 2.750    1.49 | 8.833    3.21 |14.917    3.43 | 21.00    1.37
 2.833    1.49 | 8.917    3.21 |15.000    3.43 | 21.08    1.37
 2.917    1.49 | 9.000    3.21 |15.083    3.43 | 21.17    1.37
 3.000    1.49 | 9.083    3.21 |15.167    3.43 | 21.25    1.37
 3.083    1.49 | 9.167    3.21 |15.250    3.43 | 21.33    1.37
 3.167    1.49 | 9.250    3.21 |15.333    3.43 | 21.42    1.37
 3.250    1.49 | 9.333    3.66 |15.417    3.43 | 21.50    1.37
 3.333    1.49 | 9.417    3.66 |15.500    3.43 | 21.58    1.37
 3.417    1.49 | 9.500    3.66 |15.583    3.43 | 21.67    1.37
 3.500    1.49 | 9.583    3.66 |15.667    3.43 | 21.75    1.37
 3.583    1.49 | 9.667    3.66 |15.750    3.43 | 21.83    1.37
 3.667    1.49 | 9.750    3.66 |15.833    3.43 | 21.92    1.37
 3.750    1.49 | 9.833    4.12 |15.917    3.43 | 22.00    1.37
 3.833    1.49 | 9.917    4.12 |16.000    3.43 | 22.08    1.37
 3.917    1.49 |10.000    4.12 |16.083    3.43 | 22.17    1.37
 4.000    1.49 |10.083    4.12 |16.167    3.43 | 22.25    1.37
 4.083    1.49 |10.167    4.12 |16.250    3.43 | 22.33    1.37
 4.167    1.49 |10.250    4.12 |16.333    2.06 | 22.42    1.37
 4.250    1.49 |10.333    5.27 |16.417    2.06 | 22.50    1.37
 4.333    1.83 |10.417    5.27 |16.500    2.06 | 22.58    1.37
 4.417    1.83 |10.500    5.27 |16.583    2.06 | 22.67    1.37
 4.500    1.83 |10.583    5.27 |16.667    2.06 | 22.75    1.37
 4.583    1.83 |10.667    5.27 |16.750    2.06 | 22.83    1.37
 4.667    1.83 |10.750    5.27 |16.833    2.06 | 22.92    1.37
 4.750    1.83 |10.833    7.10 |16.917    2.06 | 23.00    1.37
 4.833    1.83 |10.917    7.10 |17.000    2.06 | 23.08    1.37
 4.917    1.83 |11.000    7.10 |17.083    2.06 | 23.17    1.37
 5.000    1.83 |11.083    7.10 |17.167    2.06 | 23.25    1.37
 5.083    1.83 |11.167    7.10 |17.250    2.06 | 23.33    1.37
 5.167    1.83 |11.250    7.10 |17.333    2.06 | 23.42    1.37
 5.250    1.83 |11.333   10.99 |17.417    2.06 | 23.50    1.37
 5.333    1.83 |11.417   10.99 |17.500    2.06 | 23.58    1.37
 5.417    1.83 |11.500   10.99 |17.583    2.06 | 23.67    1.37
 5.500    1.83 |11.583   10.99 |17.667    2.06 | 23.75    1.37
 5.583    1.83 |11.667   10.99 |17.750    2.06 | 23.83    1.37
 5.667    1.83 |11.750   10.99 |17.833    2.06 | 23.92    1.37
 5.750    1.83 |11.833   33.88 |17.917    2.06 | 24.00    1.37
 5.833    1.83 |11.917   33.88 |18.000    2.06 | 24.08    1.37
 5.917    1.83 |12.000   33.88 |18.083    2.06 | 24.17    1.37
 6.000    1.83 |12.083  140.10 |18.167    2.06 | 24.25    1.37
 6.083    1.83 |12.167  140.11 |18.250    2.06 |

     Max.Eff.Inten.(mm/hr)=     140.11       115.48
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       1.62 (ii)    8.29 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.32         0.13
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.10         0.06          0.167 (iii)
     TIME TO PEAK    (hrs)=      12.25        12.25          12.25
     RUNOFF VOLUME    (mm)=     113.47        80.88          97.49
     TOTAL RAINFALL   (mm)=     114.47       114.47         114.47
     RUNOFF COEFFICIENT   =       0.99         0.71           0.85

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
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          CN*  =  85.0    Ia = Dep. Storage  (Above)
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB            |
| STANDHYD (  0088)|   Area    (ha)=   6.54
|ID= 1 DT= 5.0 min |   Total Imp(%)=  71.00   Dir. Conn.(%)=  56.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.64         1.90
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     208.81        40.00
     Mannings n             =     0.013        0.250

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
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---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.83	12.250	140.11	18.33	2.06
0.167	0.00	6.250	1.83	12.333	16.50	18.42	2.06
0.250	0.00	6.333	2.06	12.417	16.48	18.50	2.06
0.333	1.26	6.417	2.06	12.500	16.48	18.58	2.06
0.417	1.26	6.500	2.06	12.583	16.48	18.67	2.06
0.500	1.26	6.583	2.06	12.667	16.48	18.75	2.06
0.583	1.26	6.667	2.06	12.750	16.48	18.83	2.06
0.667	1.26	6.750	2.06	12.833	8.47	18.92	2.06
0.750	1.26	6.833	2.06	12.917	8.47	19.00	2.06
0.833	1.26	6.917	2.06	13.000	8.47	19.08	2.06
0.917	1.26	7.000	2.06	13.083	8.47	19.17	2.06
1.000	1.26	7.083	2.06	13.167	8.47	19.25	2.06
1.083	1.26	7.167	2.06	13.250	8.47	19.33	2.06
1.167	1.26	7.250	2.06	13.333	6.18	19.42	2.06
1.250	1.26	7.333	2.52	13.417	6.18	19.50	2.06
1.333	1.26	7.417	2.52	13.500	6.18	19.58	2.06
1.417	1.26	7.500	2.52	13.583	6.18	19.67	2.06
1.500	1.26	7.583	2.52	13.667	6.18	19.75	2.06
1.583	1.26	7.667	2.52	13.750	6.18	19.83	2.06
1.667	1.26	7.750	2.52	13.833	4.81	19.92	2.06
1.750	1.26	7.833	2.52	13.917	4.81	20.00	2.06
1.833	1.26	7.917	2.52	14.000	4.81	20.08	2.06
1.917	1.26	8.000	2.52	14.083	4.81	20.17	2.06
2.000	1.26	8.083	2.52	14.167	4.81	20.25	2.06
2.083	1.26	8.167	2.52	14.250	4.81	20.33	1.37
2.167	1.26	8.250	2.52	14.333	3.43	20.42	1.37
2.250	1.26	8.333	2.98	14.417	3.43	20.50	1.37
2.333	1.49	8.417	2.98	14.500	3.43	20.58	1.37
2.417	1.49	8.500	2.98	14.583	3.43	20.67	1.37
2.500	1.49	8.583	2.98	14.667	3.43	20.75	1.37
2.583	1.49	8.667	2.98	14.750	3.43	20.83	1.37
2.667	1.49	8.750	2.98	14.833	3.43	20.92	1.37
2.750	1.49	8.833	3.21	14.917	3.43	21.00	1.37
2.833	1.49	8.917	3.21	15.000	3.43	21.08	1.37
2.917	1.49	9.000	3.21	15.083	3.43	21.17	1.37
3.000	1.49	9.083	3.21	15.167	3.43	21.25	1.37
3.083	1.49	9.167	3.21	15.250	3.43	21.33	1.37
3.167	1.49	9.250	3.21	15.333	3.43	21.42	1.37
3.250	1.49	9.333	3.66	15.417	3.43	21.50	1.37
3.333	1.49	9.417	3.66	15.500	3.43	21.58	1.37
3.417	1.49	9.500	3.66	15.583	3.43	21.67	1.37
3.500	1.49	9.583	3.66	15.667	3.43	21.75	1.37
3.583	1.49	9.667	3.66	15.750	3.43	21.83	1.37
3.667	1.49	9.750	3.66	15.833	3.43	21.92	1.37
3.750	1.49	9.833	4.12	15.917	3.43	22.00	1.37
3.833	1.49	9.917	4.12	16.000	3.43	22.08	1.37
3.917	1.49	10.000	4.12	16.083	3.43	22.17	1.37
4.000	1.49	10.083	4.12	16.167	3.43	22.25	1.37
4.083	1.49	10.167	4.12	16.250	3.43	22.33	1.37
4.167	1.49	10.250	4.12	16.333	2.06	22.42	1.37
4.250	1.49	10.333	5.27	16.417	2.06	22.50	1.37
4.333	1.83	10.417	5.27	16.500	2.06	22.58	1.37
4.417	1.83	10.500	5.27	16.583	2.06	22.67	1.37
4.500	1.83	10.583	5.27	16.667	2.06	22.75	1.37
4.583	1.83	10.667	5.27	16.750	2.06	22.83	1.37
4.667	1.83	10.750	5.27	16.833	2.06	22.92	1.37
4.750	1.83	10.833	7.10	16.917	2.06	23.00	1.37
4.833	1.83	10.917	7.10	17.000	2.06	23.08	1.37
4.917	1.83	11.000	7.10	17.083	2.06	23.17	1.37
5.000	1.83	11.083	7.10	17.167	2.06	23.25	1.37
5.083	1.83	11.167	7.10	17.250	2.06	23.33	1.37
5.167	1.83	11.250	7.10	17.333	2.06	23.42	1.37
5.250	1.83	11.333	10.99	17.417	2.06	23.50	1.37
5.333	1.83	11.417	10.99	17.500	2.06	23.58	1.37
5.417	1.83	11.500	10.99	17.583	2.06	23.67	1.37
5.500	1.83	11.583	10.99	17.667	2.06	23.75	1.37
5.583	1.83	11.667	10.99	17.750	2.06	23.83	1.37
5.667	1.83	11.750	10.99	17.833	2.06	23.92	1.37
5.750	1.83	11.833	33.88	17.917	2.06	24.00	1.37
5.833	1.83	11.917	33.88	18.000	2.06	24.08	1.37
5.917	1.83	12.000	33.88	18.083	2.06	24.17	1.37
6.000	1.83	12.083	140.10	18.167	2.06	24.25	1.37
6.083	1.83	12.167	140.11	18.250	2.06		

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     Max.Eff.Inten.(mm/hr)=     140.11       190.68
                over (min)        5.00        10.00
     Storage Coeff.  (min)=       3.47 (ii)    8.21 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.26         0.13
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.41         0.79          2.205 (iii)
     TIME TO PEAK    (hrs)=      12.25        12.25         12.25
     RUNOFF VOLUME    (mm)=     113.47        90.04        103.16
     TOTAL RAINFALL   (mm)=     114.47       114.47        114.47
     RUNOFF COEFFICIENT   =       0.99         0.79          0.90

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| RESERVOIR(  0066)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
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DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.1507	0.2774
	0.0103	0.1190	0.1711	0.3280
	0.0819	0.2055	0.1837	0.3663
	0.1039	0.2468	0.3000	0.3955

		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW :	ID= 2 (0088)	6.540	2.205	12.25	103.16
OUTFLOW:	ID= 1 (0066)	6.540	0.299	12.75	102.71

PEAK FLOW REDUCTION [Qout/Qin](%)= 13.56
TIME SHIFT OF PEAK FLOW (min)= 30.00
MAXIMUM STORAGE USED (ha.m.)= 0.3955

CALIB
STANDHYD (0089)
ID= 1 DT= 5.0 min

Area (ha)= 0.24
Total Imp(%)= 38.00 Dir. Conn.(%)= 21.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.09	0.15
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	40.00	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.83	12.250	140.11	18.33	2.06
0.167	0.00	6.250	1.83	12.333	16.50	18.42	2.06
0.250	0.00	6.333	2.06	12.417	16.48	18.50	2.06
0.333	1.26	6.417	2.06	12.500	16.48	18.58	2.06
0.417	1.26	6.500	2.06	12.583	16.48	18.67	2.06
0.500	1.26	6.583	2.06	12.667	16.48	18.75	2.06
0.583	1.26	6.667	2.06	12.750	16.48	18.83	2.06
0.667	1.26	6.750	2.06	12.833	8.47	18.92	2.06
0.750	1.26	6.833	2.06	12.917	8.47	19.00	2.06
0.833	1.26	6.917	2.06	13.000	8.47	19.08	2.06
0.917	1.26	7.000	2.06	13.083	8.47	19.17	2.06
1.000	1.26	7.083	2.06	13.167	8.47	19.25	2.06
1.083	1.26	7.167	2.06	13.250	8.47	19.33	2.06
1.167	1.26	7.250	2.06	13.333	6.18	19.42	2.06
1.250	1.26	7.333	2.52	13.417	6.18	19.50	2.06
1.333	1.26	7.417	2.52	13.500	6.18	19.58	2.06
1.417	1.26	7.500	2.52	13.583	6.18	19.67	2.06
1.500	1.26	7.583	2.52	13.667	6.18	19.75	2.06
1.583	1.26	7.667	2.52	13.750	6.18	19.83	2.06
1.667	1.26	7.750	2.52	13.833	4.81	19.92	2.06
1.750	1.26	7.833	2.52	13.917	4.81	20.00	2.06
1.833	1.26	7.917	2.52	14.000	4.81	20.08	2.06
1.917	1.26	8.000	2.52	14.083	4.81	20.17	2.06
2.000	1.26	8.083	2.52	14.167	4.81	20.25	2.06
2.083	1.26	8.167	2.52	14.250	4.81	20.33	1.37
2.167	1.26	8.250	2.52	14.333	3.43	20.42	1.37
2.250	1.26	8.333	2.98	14.417	3.43	20.50	1.37
2.333	1.49	8.417	2.98	14.500	3.43	20.58	1.37
2.417	1.49	8.500	2.98	14.583	3.43	20.67	1.37
2.500	1.49	8.583	2.98	14.667	3.43	20.75	1.37
2.583	1.49	8.667	2.98	14.750	3.43	20.83	1.37
2.667	1.49	8.750	2.98	14.833	3.43	20.92	1.37
2.750	1.49	8.833	3.21	14.917	3.43	21.00	1.37
2.833	1.49	8.917	3.21	15.000	3.43	21.08	1.37
2.917	1.49	9.000	3.21	15.083	3.43	21.17	1.37
3.000	1.49	9.083	3.21	15.167	3.43	21.25	1.37
3.083	1.49	9.167	3.21	15.250	3.43	21.33	1.37
3.167	1.49	9.250	3.21	15.333	3.43	21.42	1.37
3.250	1.49	9.333	3.66	15.417	3.43	21.50	1.37
3.333	1.49	9.417	3.66	15.500	3.43	21.58	1.37
3.417	1.49	9.500	3.66	15.583	3.43	21.67	1.37
3.500	1.49	9.583	3.66	15.667	3.43	21.75	1.37
3.583	1.49	9.667	3.66	15.750	3.43	21.83	1.37
3.667	1.49	9.750	3.66	15.833	3.43	21.92	1.37
3.750	1.49	9.833	4.12	15.917	3.43	22.00	1.37
3.833	1.49	9.917	4.12	16.000	3.43	22.08	1.37
3.917	1.49	10.000	4.12	16.083	3.43	22.17	1.37
4.000	1.49	10.083	4.12	16.167	3.43	22.25	1.37
4.083	1.49	10.167	4.12	16.250	3.43	22.33	1.37
4.167	1.49	10.250	4.12	16.333	2.06	22.42	1.37
4.250	1.49	10.333	5.27	16.417	2.06	22.50	1.37
4.333	1.83	10.417	5.27	16.500	2.06	22.58	1.37
4.417	1.83	10.500	5.27	16.583	2.06	22.67	1.37
4.500	1.83	10.583	5.27	16.667	2.06	22.75	1.37
4.583	1.83	10.667	5.27	16.750	2.06	22.83	1.37
4.667	1.83	10.750	5.27	16.833	2.06	22.92	1.37
4.750	1.83	10.833	7.10	16.917	2.06	23.00	1.37
4.833	1.83	10.917	7.10	17.000	2.06	23.08	1.37
4.917	1.83	11.000	7.10	17.083	2.06	23.17	1.37
5.000	1.83	11.083	7.10	17.167	2.06	23.25	1.37
5.083	1.83	11.167	7.10	17.250	2.06	23.33	1.37
5.167	1.83	11.250	7.10	17.333	2.06	23.42	1.37
5.250	1.83	11.333	10.99	17.417	2.06	23.50	1.37
5.333	1.83	11.417	10.99	17.500	2.06	23.58	1.37
5.417	1.83	11.500	10.99	17.583	2.06	23.67	1.37
5.500	1.83	11.583	10.99	17.667	2.06	23.75	1.37
5.583	1.83	11.667	10.99	17.750	2.06	23.83	1.37
5.667	1.83	11.750	10.99	17.833	2.06	23.92	1.37
5.750	1.83	11.833	33.88	17.917	2.06	24.00	1.37
5.833	1.83	11.917	33.88	18.000	2.06	24.08	1.37
5.917	1.83	12.000	33.88	18.083	2.06	24.17	1.37
6.000	1.83	12.083	140.10	18.167	2.06	24.25	1.37
6.083	1.83	12.167	140.11	18.250	2.06		

				TOTALS
Max.Eff.Inten.(mm/hr)=	140.11	155.30		
over (min)	5.00	10.00		
Storage Coeff. (min)=	1.29 (ii)	7.21 (ii)		
Unit Hyd. Tpeak (min)=	5.00	10.00		
Unit Hyd. peak (cms)=	0.33	0.14		
PEAK FLOW (cms)=	0.02	0.05	0.072 (iii)	
TIME TO PEAK (hrs)=	12.25	12.25	12.25	
RUNOFF VOLUME (mm)=	113.47	86.45	92.11	
TOTAL RAINFALL (mm)=	114.47	114.47	114.47	
RUNOFF COEFFICIENT =	0.99	0.76	0.80	

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

```
      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  85.0    Ia = Dep. Storage  (Above)
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
```

```
--------------------
| ADD HYD  (  0064)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
       ID1= 1 (  0066):      6.54   0.299    12.75   102.71
     + ID2= 2 (  0070):      0.34   0.123    12.25   105.31
       ================================================
       ID = 3 (  0064):      6.88   0.314    12.75   102.84

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
```

```
--------------------
| ADD HYD  (  0064)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
       ID1= 3 (  0064):      6.88   0.314    12.75   102.84
     + ID2= 2 (  0072):     28.11   1.275    13.67    70.89
       ================================================
       ID = 1 (  0064):     34.99   1.471    13.58    77.17

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
```

```
--------------------
| ADD HYD  (  0064)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
       ID1= 1 (  0064):     34.99   1.471    13.58    77.17
     + ID2= 2 (  0086):      0.52   0.167    12.25    97.49
       ================================================
       ID = 3 (  0064):     35.51   1.479    13.58    77.47

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
```

```
--------------------
| ADD HYD  (  0064)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
       ID1= 3 (  0064):     35.51   1.479    13.58    77.47
     + ID2= 2 (  0087):      1.71   0.174    12.42    53.58
       ================================================
       ID = 1 (  0064):     37.22   1.507    13.50    76.37

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
```

```
--------------------
| ADD HYD  (  0064)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
       ID1= 1 (  0064):     37.22   1.507    13.50    76.37
     + ID2= 2 (  0089):      0.24   0.072    12.25    92.11
       ================================================
       ID = 3 (  0064):     37.46   1.511    13.50    76.47

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
```

APPENDIX E

FLOODPLAIN ANALYSIS

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MEMORANDUM

To: **Town of Niagara on the Lake/NPCA/ Other Reviewing Agencies**

From: **Debebe Yilak, M.Sc., P.Eng**
Koryun Shahbikian, P.Eng., M.Eng., LLM

Date: **April 2026**

Our File: **2026-5625**

Subject: **Floodplain Analysis and Culvert Sizing**
Solmar Development Corp. Residential Subdivision
Rand and Randwood Development 176 John Street East, Niagara-on-the-Lake, ON

Introduction

Schaeffer & Associates Ltd. known by its business name Schaeffers Consulting Engineers (SCE) has been retained to prepare a Functional Servicing Report (FSR) for the proposed development located at 200 John Street East and 588 Charlotte Street, Niagra on the Lake, ON. The proposed development contains Ritz – Carlton Hotel, Spa, and residence. Upgrading of existing three culverts (Culvert # 1, #2, and #3) is part of the proposed development tasks. The proposed subdivision is part of a residential block located within the Town of Niagara-on-the-Lake, defined as Lots 145 and 156 of the Registrar's Compiled Plan 692, and Lot 14 Plan M-11. The subject development is accessible by Charlotte Street to the northwest and John Street East to the northeast. The site is located southeast of the intersection of Charlotte Street and John Street East and northwest of the intersection of John Street East and Niagara River Parkway. Please refer to **Figure 1.1** for the location plan. **Figure 1.2** illustrates the site's development plan.

As part of the FSR, a floodplain analysis has been conducted to estimate the flood line and culvert sizing at the places where One Mile Creek crosses the access road from John

street to the proposed development area. The current memorandum summarizes the floodplain analysis and culvert sizing analysis results.

Methodology

The following background report, hydraulic and hydrology models were received from Niagara Peninsula Conservation Authority (NPCA) in January 2022 and reviewed to prepare the current floodplain report.

- NPCA Floodplain Mapping, One Mile Creek, Town of Niagara – on the Lake; dated July 2004;
- NPCA Hydraulic Model called "OneMileCreek HEC-RAS Model", dated January 2019;
- NPCA Hydrology Model, called "One Mile Creek HEC-HMS Model", dated August 2018.

The floodplain analysis was conducted based on the Niagara Peninsula Conservation Authority (NPCA) approved "One Mile Creek Hydraulic (HEC-RAS) Model". In the current HEC-RAS model, the watercourse at the subject site is identified as "One Mile Creek, Main Branch." Several local roads provide access between the site and John Street East. The first is Ritz-Carlton Lane, located at the northeast corner of the site. The second is the hotel entrance access road, which branches off John Street East and connects directly to the site. The third access road diverges from John Street East near the southeast intersection with Charlotte Street and extends to the site. One Mile Creek crosses each of these access roads, and box culverts have been proposed at all crossing locations. Please refer to **Table 2** for the detailed culvert information.

Detailed topographic field data and aerial topographic data (where the detailed survey was not available) were used to produce a high-resolution Triangulated Irregular Network (TIN) for generating digital terrain layers and generating floodplain maps. Topographic survey data was collected at different times by different Ontario Licensed Surveyors (OLS). REP Surveying Limited (Dated; December 15th 2021, August 26th 2021, October 26th 2021, September 19th 2023, November 22nd 2023, November 24th 2023, and January 31st 2024). Please refer to **Appendix D** for the topographic survey maps.

SCE reviewed the NPCA Floodplain Mapping report (titled *"NPCA Floodplain Mapping, One Mile Creek, Town of Niagara-on-the-Lake,"* dated July 2004), along with the associated hydraulic and hydrologic models provided by NPCA. Relevant excerpts from the report are included in **Appendix A**. Based on this review, SCE understands that the floodplain associated with the 100-year storm event is used as the regulatory limit for development. Supporting background documents are also provided in **Appendix A**. Hence, SCE performed hydraulic analysis and estimated water elevations corresponding to the 100-year flows at different cross-sections along the watercourse. The impact of the proposed culverts on the hydraulic parameters has been analyzed.

Hydraulic parameters, including Manning's *n* values and boundary conditions, were reviewed and adopted in accordance with the NPCA-approved hydraulic model. Accordingly, Manning's *n* values of 0.038 for channel flow and 0.10 for overbank flow areas have been applied. Contraction and expansion coefficients of 0.3 and 0.5, respectively, have been used at the locations where box culverts are proposed.

The current hydraulic model was developed using Geo HEC-RAS (version 5.1.0.2164), with model files saved in HEC-RAS (Version 6.2). SCE utilized the original NPCA-approved HEC-RAS model—identified by the scenario name "Fused-Bridges"—as the basis for this analysis. This scenario represents the One Mile Creek watercourse, including diversion flows from Epps Creek during the 100-year storm event.

SCE developed the "SCE Existing Condition HEC-RAS Model" by refining the original NPCA-approved HEC-RAS model using detailed topographic survey data and updated hydrological information. For the existing conditions, several HEC-RAS cross-sections were regenerated based on the enhanced topographic data, and additional cross-sections were introduced to improve the accuracy of floodplain modeling.

Peak flows have also been recalculated to account for the existing drainage characteristics of the area. In the original NPCA hydrology model, One Mile Creek was assigned to the OMC-8 catchment up to Hydrological Node Junction #7. However, detailed topographic data indicates that a portion of the OMC-7 catchment drains into the creek upstream of Junction #7. Accordingly, peak flows have been revised to reflect the updated catchment

configuration. Refer to **Table 1** for a summary of the revisions used to develop the SCE Existing Hydraulic Model.

Table 1: Summary of Modifications Applied to Establish SCE Modified Existing HEC-RAS Model (One Mile Creek, Main Branch)

Description	Changes Made	NPCA Original Model	SCE Existing Revised Model
HEC-RAS Cross-Sections Regenerated	Regenerated based on the latest detailed topographic information	N/A	HEC-RAS Cross-Section # 3413.053, # 3457.613, # 3515.641, # 3563.998, and # 3600.767
New HEC-RAS Cross-Section Added	New HEC-RAS Cross-sections defined for better Modelling.	N/A	HEC-RAS Cross-Section #3458.613, #3516.2, #3516.641, #3517.641, #3564, 3564.8, #3564.998, #3601.767, #3647.63, and # 3752.359
HEC-RAS Removed	HEC-RAS cross-realigned too much with the proposed culvert arrangement		HEC-RAS Cross-Section # 3759.561, #3774.079, and #3795.061.
Peakflows	Peakflows updated based on the drainage area arrangement	N/A	Peak flow of 0.94m^3/s was assumed in the NPCA model from the upstream station to Junction 7. However, in the SCE revised model, the peak flows are prorated based on catchment OMC 8 and OMC7, as well as overflow from OMC 4.

SCE developed the "Proposed Condition HEC-RAS Model" (i.e., SCE Proposed) to determine the sizing of the proposed culverts where the creek intersects the access roads connecting the subject site to John Street East. As noted previously, three culverts are proposed at separate locations. Detailed drawings of the proposed culverts are provided in Appendix D, and a summary of the proposed crossings is presented in **Table 2.**

Table 2: Details of the Proposed Culverts

Street Name	U/S & D/S HEC-RAS Cross Section	Type of Culvert	Culvert Dimensions (m)		Invert Elevation (m)		CulvID*
			Depth x Span	Length	U/S	D/S	
Ritz-Carlton Lane	3774.079 / 3759.561	Concrete Box Culvert	2.40m x 1.20m	23.0	88.14	88.01	3
Hotel Main Entrance	3669.178 / 3647.63	>>	2.40m x 1.20m	11.70	87.49	87.40	2
Asphalt Driveway, Northwest corner of site.	3600.767 / 3564.998	>>	2.40m x 1.20m	7.40	87.17	87.08	1

*Note * Refer to **Appendix D** (Grading Plan) for the Culvert Locations.*

Hydrology

A. Drainage Area

SCE reviewed the NPCA hydrology report and associated HEC-HMS model. Of the various sub-basins identified in the NPCA model, the One Mile Creek watershed is best represented by the "One Mile Fused" sub-basin, as it accounts for overflow contributions from the Epps Creek watercourse. One Mile Creek is characterized by subwatershed ID "OMC-8," which covers an area of approximately 30.02 ha. Refer to the "NPCA Floodplain Mapping, One Mile Creek, Town of Niagara-on-the-Lake; dated July 2004" included in **Appendix A**.

SCE reviewed the existing NPCA hydrology model using the latest topographic survey and watershed grading information and determined that there are no significant changes to the OMC-8 watershed up to the proposed culvert locations. However, based on the updated topographic data, an additional portion of the OMC-7 drainage area is expected to contribute flow to One Mile Creek downstream of the proposed culvert sites.

The NVCA hydrology (HEC-HMS) model is based on the NVCA drainage area mapping. According to this map, drainage areas OMC-8 and OMC-7 converge at Junction Node 07. As noted previously, SCE has refined the drainage area delineation using detailed topographic survey data. The revised SCE drainage map indicates that a portion of OMC-7 actually drains to One Mile Creek upstream of Junction 07. Please refer to **Figure 1** for the updated SCE drainage map combined with the original NVCA drainage map.

The NVCA drainage area OMC-7 and OMC-8 have been further divided into subcatchments for a better estimation of the peak flows at different places. As shown in the drainage area breakdown map, three outlets are defined (i.e., outlet A, B, and C). The analysis is further explained in **Table 3**.

- **Catchment Outlet A**: Defined to estimate peak flow originating from the headwaters of the OMC-8 drainage area up to the location of proposed Culvert 2. This portion is designated as "OMC 8 – Ext A," as illustrated in Figure 1, and encompasses 13.2 ha of the total drainage area**.**
- **Catchment Outlet B**: Used to estimate peak flow within the watercourse generated

from both "OMC 8 – Ext A" and "OMC 8 – Ext B" drainage areas. Under proposed conditions, the site has been designed with the drainage outfall located downstream of Outlet B. Refer to the Grading Plan for additional details.

- **Catchment Outlet C**: Defined to estimate peak flow within One Mile Creek downstream of Outlet B. In this reach, flows from the subject site (i.e., "OMC 8 – Site" and "OMC 7 – Site"), along with external drainage areas associated with OMC 7 (i.e., "OMC 7 – Ext 1," "OMC 7 – Ext 2," "OMC 7 – Ext 3," "OMC 7 – Ext 104," and "OMC 7 – Ext 105"), are anticipated to discharge into the natural watercourse south of Outlet B.

Table 3: Details of Drainage Area Breakdown for Peak flow Calculations

Catchment ID	Area (ha)	Sub Area (ha)	Descriptoion
OMC 8_Ext A	13.2		Estimated Portion of OMC 8 drainage area from headwater to Outlet 'A'.
Catchment Outlet # A		**13.2**	**Total drainage area at outlet 'A'**
OMC 8_Ext B	3		Estimated portion of OMC 8 between outlet 'A' and 'B'.
Catchment Outlet # B		**16.2**	**Total Drainage Area at Outlet 'B'**
OMC 8_Ext C	11.54		Portion of OMC 8 downstream of Outlet 'B'
OMC 8_Site	2.35		Estimated portion of OMC 8 within the proposed site and drains to the watercourse downstream of outlet 'B'
OMC 7_Site	6.76		Estimated portion of OMC 7 covered by the subject site drains to the watercourse downstream of outlet 'B'
OMC 7_Ext2	28.11		OMC 7 External area south of subject site to be piped across the site and drains to the watercourse downstream of outlet 'B'
OMC 7_Ext1	17.16		OMC 7 External area east of subject site to drain along local ditch and drains to the watercourse downstream of outlet 'B'
OMC 7_Ext3	0.67		OMC 7 External area, located between the site and Charlotte Street. Drainage joins the watercourse south of Charlotte Street.
OMC7_Ext (105)	0.18		
OMC7_Ext (104)	0.33		
Catchment Outlet # C		**83.3**	**Total Drainage Area from OMC 8 and some portion of OMC 7 at Outlet 'C'**
OMC 7_Ext (Juncion @ 7)	38.57		The remaining portion of OMC 7 External area, joining the Creek at Junction '7'
Total OMC 8 + OMC 7 at Junction 7	**121.87**	**121.87**	**Total OMC 8 + OMC 7 Drainage area**

B. Peak Flow Analysis

i. HECHMS Modeling Results

As mentioned before, SCE adopted the existing NPCA hydrology model to estimate the peak flow. Flows are estimated at different nodes and applied to size culvert dimensions and to generate a floodplain map.

During the 100 year flow events, the One Mile Creek watercourse conveys flow from the OMC-8 subwatershed and the diverted flow from the Epps watercourse. As it is shown in **Figure 1**, One Mile Creek is connected to Epps watercourse by a broken line, which represents diverted flows from the Epps Creek joining the One Mile Creek during 100 year storm events. The rating curve for the diversion flow has been adopted as it was described in the NPCA HEC-HMS Model. It should be noted that the diversion from the Epps Creek to the One Mile Creek has been defined as "John St. Diversion" in the current hydrology model. Please see **Figure 2** and also the attached digital HEC-HMS Model (**Appendix D**).

Meteorological data were obtained from the City of St. Catharines Intensity-Duration-Frequency (IDF) Curves for the 100 Year Storm Event. Visual OTTHYMO (VO5) hydrological software was used to convert and generate AES 1 hour, 12 hours, and SCS type II 24 hour rainfall distribution storms. The 100 year storm event corresponding to the SCS Type II 24 hour rainfall distribution has been considered for the peak flow computation of the current analysis, consistent with the NPCA hydrology model. Hydrological analysis was computed by using HEC-HMS Model (Version 4.9) model. The peak flow was computed for catchment OMC-8, OMC-7, and Juctions as needed. It should be noted that to be conservative, SCE adopted the proposed condition drainage plan to estimate peakflows. Please refer to **Figure 1** for the Drainage area map and **Table 4** for the HECHMS Modeling outputs.

FIGURE 1

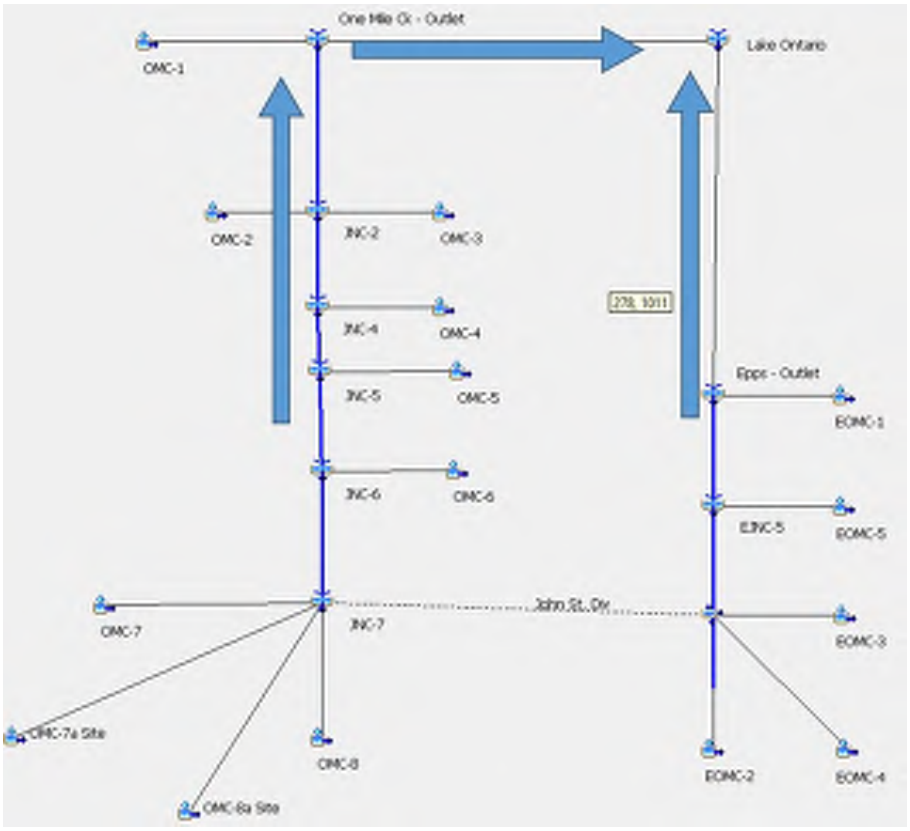


Figure 2: HEC-HMS Subwatershed Arrangement (OneMile Fused)

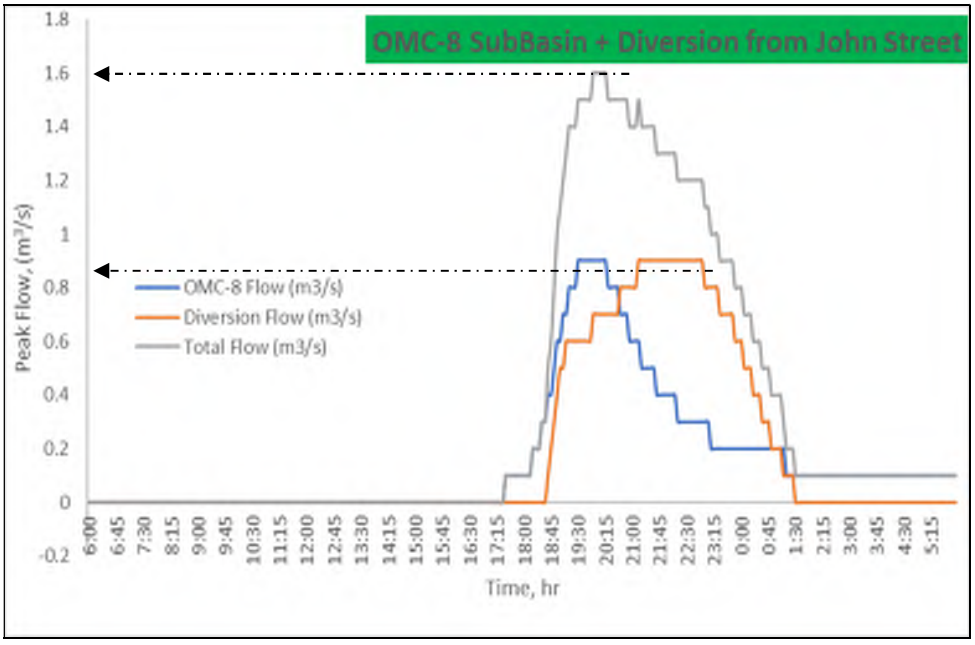


Figure 3: Peakflows from the OMC-8 Subcatchment, John Street Diversion, and Total flows at the the outlet of OMC-8 Subcatchment.

Table 4: SCS 24hr 100 year Peak Flow (m3/s) - One Mile Creek HEC-HMS Model Outputs

	Original NPCA Model		SCE Revised Modelling		
HEC HMS Element	NPCA - 1	HECRAS Relation	SCE PreDev - 2	SCE PostDev - 3	HECRAS Relation
OMC-7	3.581		3.2	3.317	
OMC-8	0.917		0.9	0.825	
Total Site Area	-		0.3	-	
Site Area (OMC7)	-		-	0.676	
Site Area (OMC8)	-		-	0.452	
	0.94	4320.036		1.38*	4320.036
				1.46*	3646.630
				4.65*	3516.641
Junction 7	5.144	3021.52	5.1	4.982	3021.52
Junction 6	7.137	2606.753	7.1	7.184	2606.753
Junction 5	8.291	2271.884	8.4	8.836	2271.884
Junction 4	8.94	1602.851	9.0	9.892	1602.851
	10.75	1403.154			1403.154
Junction 2	14.106	732.8784	14.2	15.055	732.8784
One Mile Ck - Outlet	18.313	437.2105	18.4	19.256	437.2105
Lake Ontario	20.665	HECRAS Relation	20.8	21.608	HECRAS Relation

Note:
HECRAS Relation: HEC-RAS Cross-Section # corresponding to the Flow Changing Node in the HEC-RAS Model.
NPCA – 1: Peakflows defined in the original NPCA HEC-RAS Model and NPCA HECHMS Model output
SCE PreDev - 2: SCE revised HECHMS modelling results for Predevelopment drainage area arrangement.
SCE PostDev-3: SCE revised HECHMS modelling results for the post development condition
**Peak flows estimated using MTO flow proration Equation.*

ii. Peak Flow Proration

As outlined in the previous sections, peak flows were calculated using HEC-HMS software at the outlets of the larger catchment areas (i.e., OMC 8, OMC 7, and Junction 7). To improve representation of flow conditions at key locations along the watercourse, SCE established three outlet points—A, B, and C. The contributing drainage areas for each outlet are summarized in **Table 3**.

The total area of the OMC-8 sub watershed is approximately 27.1 ha (excluding the Drainage area 'OMC 8-Site'). The peak flow at the OMC-8 outlet is estimated at 0.825 m^3/s (refer to **Table 4**). This flow was then prorated to Catchment Outlet Nodes A and B. As indicated in Table 3, the contributing drainage areas for Nodes A and B are 13.2 ha and 16.2 ha, respectively. The peak flow at the OMC-8 outlet was distributed to these

nodes using the Ontario Ministry of Transportation (MTO) equation. An excerpt from the MTO Manual is provided in **Appendix A.**

As it is shown in **Figure 3**, the peak flow generated from "John Street Diversion " is approximated as 0.90m^3/s. Similarly, the peak flow generated from the "OMC-8" sub-catchment is 0.825m^3/s. The combined total peak flow at the outlet of the OMC-8 sub-catchment is approximated to be 1.70m^3/s. Since the peak flow from the John street diversion is not a function of the sub catchment OMC-8, we can not prorate the diversion flow based on the area proportion of the OMC-8 sub-catchment. Hence, only the peak flow generated from sub-catchment OMC-8 has been prorated based on the MTO equation to the upstream sub-catchments. Hence, the peak flow for sub-catchment outlet 'A' was estimated as;

$$Q_2 = Q_1\left(\frac{A_2}{A_1}\right)^{0.75}$$

Q_1 = Known peak flow corresponding to OMC-8 (m^3/s) = 0.825

A_2 = Unknown basin area (ha) = 13.2ha

A_1 = Known basin area (ha) = 27.1ha

Q_2 = Unknown peak flow (m^3/s) = $Q_2 = 0.825\left(\frac{13.2}{27.1}\right)^{0.75}$ = 0.48m^3/s

Since the peak flow from the John Street Diversion is 0.9 m³/s, the total peak flow at the outlet of Sub-catchment A is calculated as the sum of the diversion flow and the prorated OMC-8 flow (i.e., 0.48 + 0.90 = 1.38 m³/s). Using the same approach, the peak flow at Outlet 'B' is estimated to be 1.46 m³/s, which also includes the John Street diversion flow.

The peak flow at Outlet 'C' was prorated based on the flow computed using the HEC-HMS model at Junction 7 (i.e., 4.982 m³/s), as presented in **Table 4**. The total drainage area at Junction 7 is 121.87 ha, while the contributing drainage area upstream of Outlet C is 83.3 ha, as indicated in **Table 4**. Applying the same MTO-based prorating method, the flow at Outlet 'C' is estimated to be 3.75 m³/s. Including the 0.9 m³/s diversion flow from John Street, the total peak flow at Outlet 'C' is therefore 4.65 m³/s. The results are summarized in the following table.

The following summary table depicts the peak flow calculation at the outlet of Outlets 'A', 'B', and 'C'. It should be noted that the calculated peak flows are adapted to the current Hydraulic Model (SCE HEC-RAS). The flows are applied at the flow-changing nodes as mentioned below.

Table 5: Peak Flow Calculation Using MTO Equation Summary Table

Sub Basin	Area (ha)		Prorate Flow(m^3/s)		Diversion Flow	Combined Total Flow* (m^3/s)	Remark	Flow Changing Node HEC-RAS Cross-Section
	A1	A2	Q1	Q2	(m^3/s)			
Outlet 'A'	27.1	13.2	0.825	0.48	0.9	1.38	HEC-HMS	4320.036
Outlet 'B'	27.1	16.2	0.825	0.56	0.90	1.46	MTO Eqn	3646.630
Outlet 'C'	121.87	83.3	4.982	3.75	0.90	4.65	MTO Eqn	3516.641

**Combined total peak flow = Prorated + Diversion Flow.*

Hydraulic Analysis

SCE performed the current hydraulic analysis after reviewing and updating hydraulic and hydrological information of the original NPCA hydraulic model of the subject area. Hence, SCE existing and SCE proposed condition HEC-RAS models are established. Hydraulic analysis was performed, and the results are presented in tabular forms (**Appendix B**) and floodplain mapping (**Appendix C**). Digital copies of HEC-RAS and HEC-HMS models are provided in **Appendix D**.

Based on information available regarding the watercourse and the floodplain analysis, the proposed grading is above the 100-year flood elevation. Please refer to the Floodplain Maps (**Appendix C**) and the hydraulic modeling analysis results summary tables (**Appendix B**). The site has been graded such that lot elevations remain above the 100-year flood elevation, as is shown in the site grading plans, SG-1 through SG-3. Refer to the Engineering drawing package for the grading plan.

As noted previously, three culverts are proposed at separate locations. Detailed drawings of the proposed culverts are provided in **Appendix D**, and a summary of the proposed crossings is presented in **Table 2.**

The proposed three new culverts (summarized in **Table 2**) at the access road that connects the subject area to John Street E have been sized to be 2.4x1.2 m box culverts each. These culverts are designed to convey the regulatory (100 year return period flow)

sufficiently without creating a backwater effect and avoiding overtopping of the proposed access roads. The water elevation and velocity changes due to the proposed crossing structures were analyzed. Please see the following summary table to understand the impact of the proposed culverts on the existing water level. For detailed information on the proposed culverts, please refer to the Engineering Drawings in Appendix **C**.

The following Summary **Table 6, 7, and 8** shows the HEC-RAS modelling results corresponding to the Original NVCA HEC-RAS Model, SCE revised Existing Model, and SCE revised Proposed condition Modelling results, respectively. It should be noted that the SCE revised existing and proposed models attain the same flows (proposed condition flows) and the same HEC-RAS cross-Sections. The only difference is that the proposed condition model reflects the proposed three culverts.

The SCE existing and proposed condition water elevations are adopted to generate the Floodplain map in **Appendix C**. The digital copy of the HEC-RAS and HECHMS models is presented in **Appendix D**. Details of HEC-RAS results are summarized in **Appendix B**.

Table 6: Original HEC-RAS Modelling Results Summary Table

Reach	River Sta	Profile	Q Total (m^3/s)	Min Ch El (m)	W.S. Elev (m)
Main Branch	4160.767	PF 1	0.94	89.67	89.64
Main Branch	4123.219	PF 1	0.94	89.21	89.63
Main Branch	4089.79	PF 1	0.94	89.25	89.63
Main Branch	4047.695	PF 1	0.94	89.31	89.63
Main Branch	3994.202	PF 1	0.94	89.49	89.6
Main Branch	3965.177	PF 1	0.94	89.34	89.54
Main Branch	3938.205	PF 1	0.94	89.62	89.39
Main Branch	3905.673	PF 1	0.94	88.87	89.24
Main Branch	3885.796	PF 1	0.94	88.85	89.21
Main Branch	3869.557	PF 1	0.94	88.8	89.02
Main Branch	3849.76	PF 1	0.94	88.56	88.89
Main Branch	3795.061	PF 1	0.94	88.36	88.77
Main Branch	3774.079	PF 1	0.94	88.29	88.64
Main Branch	3759.561	PF 1	0.94	88.14	88.57
Main Branch	3737.17	PF 1	0.94	87.74	88.57
Main Branch	3716.047	PF 1	0.94	88.04	88.57



Reach	River Sta	Profile	Q Total (m^3/s)	Min Ch El (m)	W.S. Elev (m)
Main Branch	3708.046	PF 1	0.94	88.03	88.56
Main Branch	3693.366	PF 1	0.94	87.92	88.51
Main Branch	3690.253	PF 1	0.94	87.92	88.5
Main Branch	3683.188	PF 1	0.94	87.89	88.48
Main Branch	3674.391	PF 1	0.94	87.85	88.47
Main Branch	3669.178	PF 1	0.94	87.85	88.43
Main Branch	3646.63	PF 1	0.94	87.58	88.14
Main Branch	3640.382	PF 1	0.94	87.48	88.02
Main Branch	3600.767	PF 1	0.94	87.61	87.99
Main Branch	3563.998	PF 1	0.94	87.48	87.88
Main Branch	3515.641	PF 1	0.94	87.25	87.51
Main Branch	3457.613	PF 1	0.94	86.88	87.24
Main Branch	3413.053	PF 1	0.94	86.66	87.12
Main Branch	3355.139	PF 1	0.94	86.57	86.96
Main Branch	3339.915	PF 1	0.94	86.48	86.92
Main Branch	3333.782	PF 1	0.94	86.47	86.89
Main Branch	3323.242	0	Culvert	Charlette St	
Main Branch	3312.704	PF 1	0.94	86.37	86.79

Table 7: SCE Revised Existing Condition HEC-RAS Modelling Results Summary Table

Reach	River Sta	Profile	Q Total (m^3/s)	Min Ch El (m)	W.S. Elev (m)
Main Branch	4160.767	PF 1	1.38	89.67	89.68
Main Branch	4123.219	PF 1	1.38	89.21	89.67
Main Branch	4089.79	PF 1	1.38	89.25	89.67
Main Branch	4047.695	PF 1	1.38	89.31	89.67
Main Branch	3994.202	PF 1	1.38	89.49	89.64
Main Branch	3965.177	PF 1	1.38	89.34	89.57
Main Branch	3938.205	PF 1	1.38	89.62	89.41
Main Branch	3905.673	PF 1	1.38	88.87	89.3
Main Branch	3885.796	PF 1	1.38	88.85	89.27
Main Branch	3869.557	PF 1	1.38	88.8	89.06
Main Branch	3849.76	PF 1	1.38	88.56	88.93
Main Branch	3795.061	PF 1	1.38	88.34	88.81
Main Branch	3774.079	PF 1	1.38	87.97	88.78
Main Branch	3759.561	PF 1	1.38	88.19	88.63
Main Branch	3752.359	PF 1	1.38	88.1	88.62
Main Branch	3737.17	PF 1	1.38	87.74	88.63

Reach	River Sta	Profile	Q Total (m^3/s)	Min Ch El (m)	W.S. Elev (m)
Main Branch	3716.047	PF 1	1.38	88.04	88.62
Main Branch	3708.046	PF 1	1.38	88.03	88.6
Main Branch	3693.366	PF 1	1.38	87.92	88.52
Main Branch	3690.253	PF 1	1.38	87.92	88.5
Main Branch	3683.188	PF 1	1.38	87.89	88.45
Main Branch	3674.391	PF 1	1.38	87.85	88.29
Main Branch	3669.178	PF 1	1.38	87.49	88.18
Main Branch	3647.63	PF 1	1.38	87.43	88.06
Main Branch	3646.63	PF 1	1.46	87.42	88.01
Main Branch	3640.382	PF 1	1.46	87.3	87.98
Main Branch	3601.767	PF 1	1.46	87.13	87.98
Main Branch	3600.767	PF 1	1.46	87.07	87.97
Main Branch	3564.998	PF 1	1.46	87.12	87.97
Main Branch	3564.8	PF 1	1.46	87.08	87.97
Main Branch	3564	PF 1	1.46	86.9	87.97
Main Branch	3563.998	PF 1	1.46	87.61	87.89
Main Branch	3517.641	PF 1	1.46	86.8	87.69
Main Branch	3516.641	PF 1	4.65	86.85	87.66
Main Branch	3516.2	PF 1	4.65	86.65	87.58
Main Branch	3515.641	PF 1	4.65	86.61	87.54
Main Branch	3458.613	PF 1	4.65	86.57	87.32
Main Branch	3457.613	PF 1	4.65	86.44	87.27
Main Branch	3413.053	PF 1	4.65	86.28	87.26
Main Branch	3355.139	PF 1	4.65	86.57	87.2
Main Branch	3339.915	PF 1	4.65	86.48	87.13
Main Branch	3333.782	PF 1	4.65	86.47	87.05
Main Branch	3323.242	0	Culvert	Charlette St	
Main Branch	3312.704	PF 1	4.65	86.37	87.08

Table 8: SCE Revised Proposed Condition HEC-RAS Modelling Results Summary Table

Reach	River Sta	Profile	Q Total (m^3/s)	Min Ch El (m)	W.S. Elev (m)
Main Branch	4160.767	PF 1	1.38	89.67	89.68
Main Branch	4123.219	PF 1	1.38	89.21	89.67
Main Branch	4089.79	PF 1	1.38	89.25	89.67
Main Branch	4047.695	PF 1	1.38	89.31	89.67
Main Branch	3994.202	PF 1	1.38	89.49	89.64
Main Branch	3965.177	PF 1	1.38	89.34	89.57

Reach	River Sta	Profile	Q Total (m^3/s)	Min Ch El (m)	W.S. Elev (m)
Main Branch	3938.205	PF 1	1.38	89.62	89.41
Main Branch	3905.673	PF 1	1.38	88.87	89.3
Main Branch	3885.796	PF 1	1.38	88.85	89.27
Main Branch	3869.557	PF 1	1.38	88.8	89.06
Main Branch	3849.76	PF 1	1.38	88.56	88.93
Main Branch	3795.061	PF 1	1.38	88.34	88.78
Main Branch	3774.079	PF 1	1.38	87.97	88.74
Main Branch	3760.255		Culvert	Proposed Culvert 3	
Main Branch	3759.561	PF 1	1.38	88.19	88.63
Main Branch	3752.359	PF 1	1.38	88.1	88.62
Main Branch	3737.17	PF 1	1.38	87.74	88.63
Main Branch	3716.047	PF 1	1.38	88.04	88.62
Main Branch	3708.046	PF 1	1.38	88.03	88.6
Main Branch	3693.366	PF 1	1.38	87.92	88.52
Main Branch	3690.253	PF 1	1.38	87.92	88.5
Main Branch	3683.188	PF 1	1.38	87.89	88.45
Main Branch	3674.391	PF 1	1.38	87.85	88.29
Main Branch	3669.178	PF 1	1.38	87.49	88.13
Main Branch	3663.843		Culvert	Proposed Culvert 2	
Main Branch	3647.63	PF 1	1.38	87.43	88.08
Main Branch	3646.63	PF 1	1.46	87.42	88.03
Main Branch	3640.382	PF 1	1.46	87.3	88.01
Main Branch	3601.767	PF 1	1.46	87.13	88
Main Branch	3600.767	PF 1	1.46	87.07	88
Main Branch	3582.228		Culvert	Proposed culvert 1	
Main Branch	3564.998	PF 1	1.46	87.12	87.96
Main Branch	3564.8	PF 1	1.46	87.08	87.97
Main Branch	3564	PF 1	1.46	86.9	87.97
Main Branch	3563.998	PF 1	1.46	87.61	87.89
Main Branch	3517.641	PF 1	1.46	86.8	87.69
Main Branch	3516.641	PF 1	4.65	86.85	87.66
Main Branch	3516.2	PF 1	4.65	86.65	87.58
Main Branch	3515.641	PF 1	4.65	86.61	87.54
Main Branch	3458.613	PF 1	4.65	86.57	87.32
Main Branch	3457.613	PF 1	4.65	86.44	87.27
Main Branch	3413.053	PF 1	4.65	86.28	87.26
Main Branch	3355.139	PF 1	4.65	86.57	87.2
Main Branch	3339.915	PF 1	4.65	86.48	87.13
Main Branch	3333.782	PF 1	4.65	86.47	87.05



Reach	River Sta	Profile	Q Total (m^3/s)	Min Ch El (m)	W.S. Elev (m)
Main Branch	3323.242		Culvert	Charlette St	
Main Branch	3312.704	PF 1	4.65	86.37	87.08

The hydraulic modelling results are summarized in the tables below. **Table 9** presents a comparison between SCE's revised existing conditions and the original NVCA hydraulic modelling results. As previously noted, SCE updated the flow estimates based on a detailed drainage area analysis (see **Table 2**). In addition, new HEC-RAS cross-sections were introduced, and existing cross-sections were regenerated using refined topographic data. It should be noted that SCE's revisions to the HEC-RAS cross-section geometry are limited to the vicinity of the subject area, specifically between Station # 3795.06 and Station # 3413.053. Hence, any water level change beyond these cross-sections is only due to the changes in the peak flows.

As a result of the revisions, peak flow increased in a range of $0.44m^3/s$ (upstream reaches) to $3.71m^3/s$ (downstream reaches). The channel bed level is mostly reduced based on the channel geometry regenerations, based on detailed topographic information. Due to the combined effect of channel geometry and flow changes, the water level rises a maximum of 0.14m (Station # 3774.079 and Station # 3413.053), and a maximum water level drop of 25cm at Station # 3669.178 was observed.

As mentioned before, the water level changes downstream of the SCE revised HEC-RAS geometry areas (i.e., downstream of Station # 3413.053) are only due to the changes in flows. Our analysis will be focused on the changes and floodplain impacts within and around the study area.

Table 9: Comparison of the SCE Existing and NVCA HEC-RAS Modelling Results

NVCA Original Model				SCE Existing Model			Difference (SCE Existing - NVCA Model)		
River Sta	Q Total	Min Ch El	W.S. Elev	Q Total	Min Ch El	W.S. Elev	Q Total	Min Ch El	W.S. Elev
	(m^3/s)	(m)	(m)	(m^3/s)	(m)	(m)	(m^3/s)	(m)	(m)
4160.767	0.94	89.67	89.64	1.38	89.67	89.68	0.44	0	0.04
4123.219	0.94	89.21	89.63	1.38	89.21	89.67	0.44	0	0.04
4089.79	0.94	89.25	89.63	1.38	89.25	89.67	0.44	0	0.04
4047.695	0.94	89.31	89.63	1.38	89.31	89.67	0.44	0	0.04
3994.202	0.94	89.49	89.6	1.38	89.49	89.64	0.44	0	0.04
3965.177	0.94	89.34	89.54	1.38	89.34	89.57	0.44	0	0.03
3938.205	0.94	89.62	89.39	1.38	89.62	89.41	0.44	0	0.02
3905.673	0.94	88.87	89.24	1.38	88.87	89.3	0.44	0	0.06
3885.796	0.94	88.85	89.21	1.38	88.85	89.27	0.44	0	0.06
3869.557	0.94	88.8	89.02	1.38	88.8	89.06	0.44	0	0.04
3849.76	0.94	88.56	88.89	1.38	88.56	88.93	0.44	0	0.04
3795.061	0.94	88.36	88.77	1.38	88.34	88.81	0.44	-0.02	0.04
3774.079	0.94	88.29	88.64	1.38	87.97	88.78	0.44	-0.32	0.14
3759.561	0.94	88.14	88.57	1.38	88.19	88.63	0.44	0.05	0.06
3752.359				1.38	88.1	88.62	N/A	N/A	N/A
3737.17	0.94	87.74	88.57	1.38	87.74	88.63	0.44	0	0.06
3716.047	0.94	88.04	88.57	1.38	88.04	88.62	0.44	0	0.05
3708.046	0.94	88.03	88.56	1.38	88.03	88.6	0.44	0	0.04
3693.366	0.94	87.92	88.51	1.38	87.92	88.52	0.44	0	0.01
3690.253	0.94	87.92	88.5	1.38	87.92	88.5	0.44	0	0
3683.188	0.94	87.89	88.48	1.38	87.89	88.45	0.44	0	-0.03
3674.391	0.94	87.85	88.47	1.38	87.85	88.29	0.44	0	-0.18
3669.178	0.94	87.85	88.43	1.38	87.49	88.18	0.44	-0.36	-0.25
3647.63				1.38	87.43	88.06	N/A	N/A	N/A
3646.63	0.94	87.58	88.14	1.46	87.42	88.01	0.52	-0.16	-0.13
3640.382	0.94	87.48	88.02	1.46	87.3	87.98	0.52	-0.18	-0.04
3601.767				1.46	87.13	87.98	N/A	N/A	N/A
3600.767	0.94	87.61	87.99	1.46	87.07	87.97	0.52	-0.54	-0.02
3564.998				1.46	87.12	87.97	N/A	N/A	N/A
3564.8				1.46	87.08	87.97	N/A	N/A	N/A
3564				1.46	86.9	87.97	N/A	N/A	N/A
3563.998	0.94	87.48	87.88	1.46	87.61	87.89	0.52	0.13	0.01
3517.641				1.46	86.8	87.69	N/A	N/A	N/A
3516.641				4.65	86.85	87.66	N/A	N/A	N/A
3516.2				4.65	86.65	87.58	N/A	N/A	N/A
3515.641	0.94	87.25	87.51	4.65	86.61	87.54	3.71	-0.64	0.03

NVCA Original Model				SCE Existing Model			Difference (SCE Existing - NVCA Model)		
River Sta	Q Total	Min Ch El	W.S. Elev	Q Total	Min Ch El	W.S. Elev	Q Total	Min Ch El	W.S. Elev
	(m^3/s)	(m)	(m)	(m^3/s)	(m)	(m)	(m^3/s)	(m)	(m)
3458.613				4.65	86.57	87.32	N/A	N/A	N/A
3457.613	0.94	86.88	87.24	4.65	86.44	87.27	3.71	-0.44	0.03
3413.053	0.94	86.66	87.12	4.65	86.28	87.26	3.71	-0.38	0.14
3355.139	0.94	86.57	86.96	4.65	86.57	87.2	3.71	0	0.24
3339.915	0.94	86.48	86.92	4.65	86.48	87.13	3.71	0	0.21
3333.782	0.94	86.47	86.89	4.65	86.47	87.05	3.71	0	0.16
3323.242	Culvert			Culvert			Culvert	Charlotte St	
3312.704	0.94	86.37	86.79	4.65	86.37	87.08	3.71	0	0.29

The following table (**Table 10**) summarizes the comparison of SCE revised Existing condition and SCE proposed condition modelling results. As mentioned before, the difference between the SCE existing and proposed condition modelling results is that the proposed condition model reflects the proposed three culverts in the model.

The result depicts that there is no change in channel bed level and flows. To be conservative, SCE adopted the same flows (proposed condition flows) in the model. Channel geometries are already defined based on detailed topographic information, as discussed before. As a result of the proposed three culverts, there is no significant water level change observed. A maximum of 0.03m water level is observed.

Table 10: Comparison of the SCE revised Existing and Proposed Condition HEC-RAS Modelling Results

SCE Existing Model				SCE Proposed Model			Difference SCE (Proposed - Existing)		
River Sta	Q Total	Min Ch El	W.S. Elev	Q Total	Min Ch El	W.S. Elev	Q Total	Min Ch El	W.S. Elev
	(m^3/s)	(m)	(m)	(m^3/s)	(m)	(m)	(m^3/s)	(m)	(m)
4160.767	1.38	89.67	89.68	1.38	89.67	89.68	0	0	0
4123.219	1.38	89.21	89.67	1.38	89.21	89.67	0	0	0
4089.79	1.38	89.25	89.67	1.38	89.25	89.67	0	0	0
4047.695	1.38	89.31	89.67	1.38	89.31	89.67	0	0	0
3994.202	1.38	89.49	89.64	1.38	89.49	89.64	0	0	0
3965.177	1.38	89.34	89.57	1.38	89.34	89.57	0	0	0



SCE Existing Model				SCE Proposed Model			Difference SCE (Proposed - Existing)		
River Sta	Q Total	Min Ch El	W.S. Elev	Q Total	Min Ch El	W.S. Elev	Q Total	Min Ch El	W.S. Elev
	(m^3/s)	(m)	(m)	(m^3/s)	(m)	(m)	(m^3/s)	(m)	(m)
3938.205	1.38	89.62	89.41	1.38	89.62	89.41	0	0	0
3905.673	1.38	88.87	89.3	1.38	88.87	89.3	0	0	0
3885.796	1.38	88.85	89.27	1.38	88.85	89.27	0	0	0
3869.557	1.38	88.8	89.06	1.38	88.8	89.06	0	0	0
3849.76	1.38	88.56	88.93	1.38	88.56	88.93	0	0	0
3795.061	1.38	88.34	88.81	1.38	88.34	88.78	0	0	-0.03
3774.079	1.38	87.97	88.78	1.38	87.97	88.74	0	0	-0.04
				Culvert			Culvert	Proposed Culvert 3	
3759.561	1.38	88.19	88.63	1.38	88.19	88.63	0	0	0
3752.359	1.38	88.1	88.62	1.38	88.1	88.62	0	0	0
3737.17	1.38	87.74	88.63	1.38	87.74	88.63	0	0	0
3716.047	1.38	88.04	88.62	1.38	88.04	88.62	0	0	0
3708.046	1.38	88.03	88.6	1.38	88.03	88.6	0	0	0
3693.366	1.38	87.92	88.52	1.38	87.92	88.52	0	0	0
3690.253	1.38	87.92	88.5	1.38	87.92	88.5	0	0	0
3683.188	1.38	87.89	88.45	1.38	87.89	88.45	0	0	0
3674.391	1.38	87.85	88.29	1.38	87.85	88.29	0	0	0
3669.178	1.38	87.49	88.18	1.38	87.49	88.13	0	0	-0.05
3647.63	1.38	87.43	88.06	Culvert			Culvert	Proposed Culvert 2	
				1.38	87.43	88.08	N/A	N/A	N/A
3646.63	1.46	87.42	88.01	1.46	87.42	88.03	0	0	0.02
3640.382	1.46	87.3	87.98	1.46	87.3	88.01	0	0	0.03
3601.767	1.46	87.13	87.98	1.46	87.13	88	0	0	0.02
3600.767	1.46	87.07	87.97	1.46	87.07	88	0	0	0.03
				Culvert			Culvert	Proposed Culvert 1	
3564.998	1.46	87.12	87.97	1.46	87.12	87.96	0	0	-0.01
3564.8	1.46	87.08	87.97	1.46	87.08	87.97	0	0	0
3564	1.46	86.9	87.97	1.46	86.9	87.97	0	0	0
3563.998	1.46	87.61	87.89	1.46	87.61	87.89	0	0	0
3517.641	1.46	86.8	87.69	1.46	86.8	87.69	0	0	0
3516.641	4.65	86.85	87.66	4.65	86.85	87.66	0	0	0
3516.2	4.65	86.65	87.58	4.65	86.65	87.58	0	0	0
3515.641	4.65	86.61	87.54	4.65	86.61	87.54	0	0	0
3458.613	4.65	86.57	87.32	4.65	86.57	87.32	0	0	0
3457.613	4.65	86.44	87.27	4.65	86.44	87.27	0	0	0
3413.053	4.65	86.28	87.26	4.65	86.28	87.26	0	0	0
3355.139	4.65	86.57	87.2	4.65	86.57	87.2	0	0	0



SCE Existing Model				SCE Proposed Model			Difference SCE (Proposed - Existing)		
River Sta	Q Total	Min Ch El	W.S. Elev	Q Total	Min Ch El	W.S. Elev	Q Total	Min Ch El	W.S. Elev
	(m^3/s)	(m)	(m)	(m^3/s)	(m)	(m)	(m^3/s)	(m)	(m)
3339.915	4.65	86.48	87.13	4.65	86.48	87.13	0	0	0
3333.782	4.65	86.47	87.05	4.65	86.47	87.05	0	0	0
3323.242	Culvert			Culvert			Culvert	Charlotte St	
3312.704	4.65	86.37	87.08	4.65	86.37	87.08	0	0	0

Summary and Conclusion

This Memorandum presents hydraulic modeling and calculated water surface elevations and associated floodplain mapping for the One Mile Creek watercourse in relation to the proposed development at the 200 John Street East and 588 Charlotte Street, Niagra on the Lake, ON. The results of the hydraulic modeling and floodplain mapping can be summarized as follows:

- Topographic data from the detailed topographic survey and aerial topographic data (where the detailed survey was not available) were used to generate digital terrain layers for hydraulic modeling and floodplain mapping of the subject area;
- Regulatory Floodplain (i.e., corresponding to the 100-year storm event) generated on the floodplain map drawing;
- Three proposed box culverts, each (2.4x1.2m), are proposed and reflected in the HEC-RAS modelling at the place where One Mile Creek crosses the access roads from John Street E to the subject area;
- The impact of the proposed culverts on the existing watercourse and hydraulic parameters has been evaluated, and concluded that there is no significant impact on the existing condition of the water level and velocity of the channel.

We trust that you will find this analysis satisfactory. If you have any questions or comments with respect to hydraulic analysis, please do not hesitate to contact us.

Respectfully Submitted,

SCHAEFFER & ASSOCIATES LTD.



Debebe Yilak, MSc., P.Eng
Water Resources Engineer

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Appendix B: Hydraulic Analysis Results and

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List of Appendices

Appendix A: Background Documents

Appendix B: Hydraulic Analysis Results and

Appendix C: Floodplain Mapping and Engineering Drawing

Appendix D: Digital Copy of HEC-RAS Model and HEC-HMS Model

APPENDICES

Appendix - A

Background Documents

NIAGARA PENINSULA CONSERVATION AUTHORITY

FLOODPLAIN MAPPING

ONE MILE CREEK

TOWN OF NIAGARA-ON-THE-LAKE

JULY, 2004

NIAGARA PENINSULA CONSERVATION AUTHORITY

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1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE OF STUDY

In May of 2004 the Niagara Peninsula Conservation Authority (NPCA) undertook a project to update the regulatory 100 year floodplain mapping for the One Mile Creek and the Epps Drain Watersheds in the Old Town Section of Niagara-on-the-Lake. The floodplain mapping extends from the 125 hectare flow accumulation point in the headwaters of both watersheds to the outlet of One Mile Creek at Lake Ontario, and the outlet of Epps Drain at the Niagara River. The project used the most current data and techniques available to generate the 100 Year Flood Profile which will be used by the Niagara Peninsula Conservation Authority to regulate development within the 100 year floodplain, as mandated by the Conservation Authority's Act.

1.2 STUDY AREA

The study location is shown in Figure 1 and the scope of the study is detailed in Figure 2. One Mile Creek flows from south to north through the Old Town District of Niagara-on-the-Lake and outlets into Lake Ontario. Historically Epps Drain was part of the headwaters of One Mile Creek. The headwaters of One Mile Creek had been diverted through Epps Drain in 1977 in an effort to reduce nuisance flooding in the Old Town. Epps Drain discharges into the Niagara River east of Fort George. During the 100 Year Storm Event, part of the flow from Epps Drain spills into One Mile Creek. Consequently, the total of the subwatershed areas as modelled is approximately 5.4 square kilometres. The length of the main channel of One Mile Creek is approximately 4.3 kilometres. The length of the main channel of Epps Drain is approximately 1.7 kilometres.

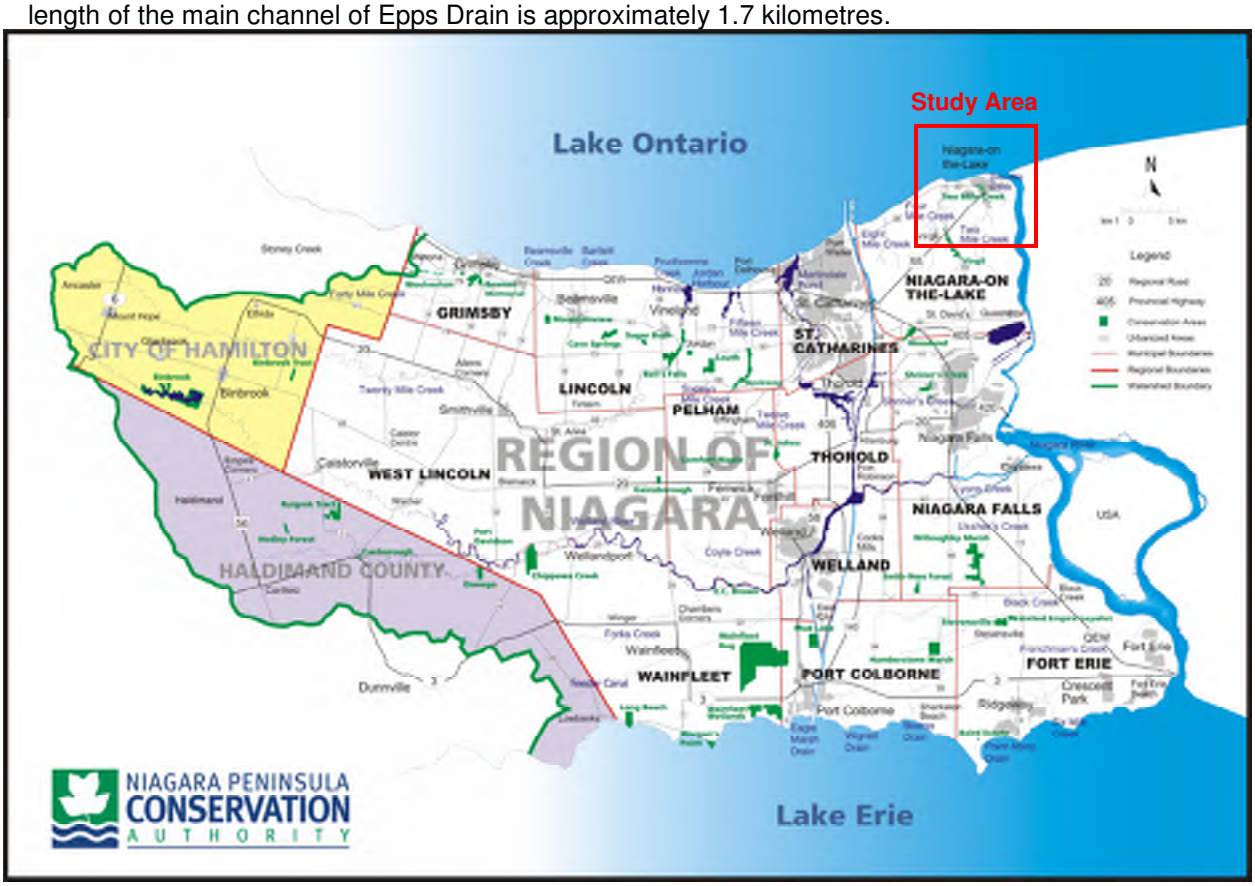


Figure 1: Key Plan

Site Map

The present population of the 'Old Town' district of Niagara-on-the-Lake is approximately 14000 persons. The 'Old Town' is primarily residential with some commercial services. The headwaters of One Mile Creek flow through rural tender fruit agricultural fields and green space. The subwatersheds of One Mile Creek have low gradient slopes of approximately 3.09% and the soils of the subwatersheds are predominantly silty loams falling in the B hydrologic group. The outlet of One Mile Creek is a drowned river mouth at Lake Ontario.

The headwaters of Epps Drain also flow through rural tender fruit agricultural fields and green space. The spill point of Epps Drain into One Mile Creek is just upstream of John Street, west of Ricardo Street. Downstream of John Street, Epps Drain is trapezoidal channel, deepened and widened to convey major storm water flows efficiently. The subwatersheds of Epps Drain have low gradient slopes of approximately 2.87% and the soils of the subwatersheds are predominantly loams falling in the A hydrologic group. The outlet Epps Drain is an elevated culvert that falls into the Niagara River.

2.0 STUDY METHODOLOGY

To satisfy the floodplain mapping requirements as outlined by the Ontario Ministry of Natural Resources (OMNR), the Niagara Peninsula Conservation Authority completed the following primary work activities:

- Data Collection and Review of Previous Studies
- Generation of Detailed Hydrography
- Field Verification
- Hydrologic Model Generation
- Hydraulic Model Generation
- Plotting the Flood Surface Profile
- Report Preparation

The primary work activities were completed in the sequence outlined and many activities were undertaken concurrently. These activities are further described below.

2.1 DATA COLLECTION AND REVIEW OF PREVIOUS STUDIES

Background data collected included: current NPCA digital elevation data and current NPCA orthographic image data, historic aerial photography, existing soils data, existing landuse data, previously undertaken models and reports, and data available within the OMNR Natural Resources Value Information System (NRVIS).

In the spring of 2002 orthographic images were flown for the entire jurisdiction of the NPCA; these images were then rendered stereoscopically and digital elevation data was created. Existing aerial photography held by the NPCA was reviewed. Soils data was obtained from the Ontario Ministry of Agriculture and Food (OMAF) and landuse data was based on satellite imagery taken in 1992. The soils and landuse maps are detailed in Figures 3 and 4. Previous models and reports consulted

Soils

Landuse

included 'The Watershed Hydrology Study' by Marshall, Macklin, Monaghan Limited (1989) and 'The Watershed Flood Damage Assessment Study' by Cumming Cockburn Limited (1988).

2.2 Generation of Detailed Hydrography

Detailed hydrography of the study area was generated with ArcGIS software, a Geographic Information System software, produced by ESRI, used to store, manipulate, and display spatial data and related datasets. The development of the detailed hydrography was performed by the NPCA GIS Specialist using the ArcHydro Data Model incorporating the Digital Elevation Model (DEM) and Colour Orthographic Images.

The development of detailed hydrography builds a hydrologic flow network from the DEM using the contributing water related breaklines; and then further linework is added to ensure connectivity. This process is integral to the final 100 Year Flood Profile product, as the detailed hydrography is used to delineate subwatersheds, derive physical watershed parameters, and develop hydrologic and hydraulic modelling parameters (Table 1).

Table 1: Subwatershed Physical Characteristics

Subwatershed ID	Area (m^2)	Area (km^2)	Average Slope (%)	Length (m)
OMC-1	390,000	0.390	3.75	1487
OMC-2	216,000	0.216	1.90	1279
OMC-3	209,000	0.209	6.54	886
OMC-4	111,000	0.111	3.94	711
OMC-5	308,000	0.308	2.78	1013
OMC-6	372,000	0.372	1.89	1366
OMC-7	918,000	0.918	1.52	2174
OMC-8	301,000	0.301	2.45	1566
EOMC-1	145,000	0.145	4.25	1163
EOMC-2	1,238,000	1.238	1.63	3357
EOMC-3	280,000	0.280	2.49	1181
EOMC-4	157,000	0.157	2.09	563
EOMC-5	800,000	0.800	3.93	783

2.3 Field Verification

The DEM used to generate the hydrography was verified in the field to ensure accuracy. All bridges, culverts, weirs, etc. that cross One Mile Creek and Epps Drain were surveyed to confirm their physical and hydraulic parameters (Appendix D). These parameters were used in the generation of the 100 year floodplain profile.

2.4 Hydrologic Model Generation

Meteorological data was obtained from the City of St. Catharines Intensity-Duration-Frequency (IDF) Curves for the 100 Year Storm Event (Appendix A). The curve number parameters were

entered into the Storms 2000 Software. This software was developed by J.F. Sabourin and Associates and manipulates rainfall data for modelling purposes.

The Storms 2000 Software utilized the Chicago Storm method to generate 1 Hour, 12 Hour, and 24 Hour rainfall totals in millimetres for the 100 Year Event. Again using the Storms 2000 Software, the appropriate total rainfall depths were fitted to the AES 1 Hour, AES 12 Hour, and SCS II 24 Hour rainfall distribution hyetographs (Appendix A). The OMNR recommends the AES 1 Hour storm be utilized for urban catchments, and the AES 12 Hour storm for rural catchments. SCS II 24 Hour storm is included because not all subwatersheds are uniform in landuse. These hyetographs were then entered as rain gauges in the Hydraulic Engineering Corps-Hydrologic Modelling System (HEC-HMS) hydrologic modelling program. HEC-HMS was developed by the United States Army Corps of Engineers and is used to generate runoff from single and continuous rainfall events.

Following the entry of the meteorological data, the physical basin schematic was created within HEC-HMS. The HEC-HMS model was then run for both the AES and SCS storm types. Each storm generated unique peak flows. Following the hydrologic model simulation, the SCS II 24 Hour storm was selected for the hydraulic model because the difference in landuse cover between One Mile Creek and Epps subwatersheds was too extreme to apply either the AES 1 Hour or AES 12 Hour effectively. The SCS II 24 Hour Storm also was found to generate the most conservative peak flows. The physical basin schematic is detailed in Figure 5 and the physical parameters used in the model simulation are outlined in Table 3 – Hydrologic Parameters.

The SCS II 24 Hour 100 Year peak flow was compared against flows generated in the Marshall, Macklin, and Monahan Study (1989) and the Cumming Cockburn Limited (1988) to ensure suitability (Table 2).

Table 2: 100 Year Flow Comparison (m^3s^{-1})

Study	Outlet	Dorchester St.	John St.
Marshal, Macklin and Monaghan	17.30	16.70	4.95
Cumming Cockburn Limited	17.20	13.40	6.40
NPCA	18.28	14.08	5.12

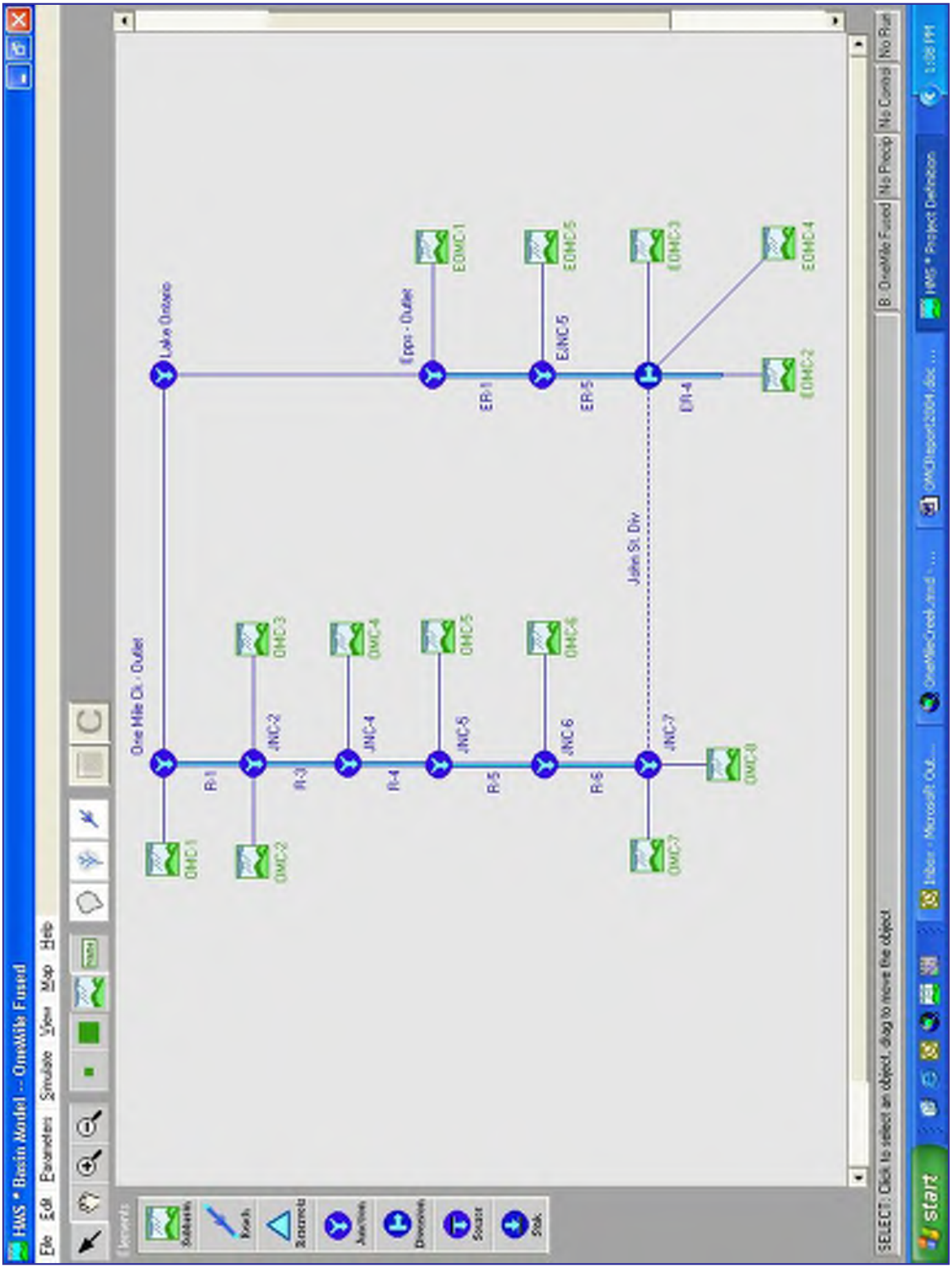


Figure 5: Hydrologic Basin Schematic

Table 3: Hydrologic Parameters

Sbwtrshd	IA (mm)	CN	T_c(h)	Lag (h)	Lag (min)	Slope (%)	Length (m)	Area (km^2)
OMC-1	8.24	86	1.33	0.79	47.65	3.75	1487	0.390
OMC-2	6.15	89	1.47	0.88	52.70	1.90	1279	0.216
OMC-3	6.40	88	0.84	0.50	30.01	3.36	886	0.209
OMC-4	5.84	89	0.62	0.37	22.42	3.94	711	0.111
OMC-5	5.74	89	0.98	0.59	35.17	2.78	1013	0.308
OMC-6	10.96	82	1.99	1.19	71.34	1.89	1366	0.372
OMC-7	14.42	77	3.68	2.20	132.26	1.52	2174	0.918
OMC-8	24.75	67	3.00	1.80	107.94	2.45	1566	0.301
EOMC-1	24.87	67	1.80	1.08	64.83	4.25	1163	0.145
EOMC-2	25.41	66	6.89	4.13	247.63	1.63	3357	1.238
EOMC-3	27.17	65	2.52	1.51	90.38	2.49	1181	0.280
EOMC-4	28.25	64	1.55	0.93	55.73	2.09	563	0.157
EOMC-5	52.35	49	2.16	1.29	77.51	3.93	783	0.800

2.5 HYDRAULIC MODEL GENERATION

The spatial data required for hydraulic analysis included cross-sections, overbank stations, stream centreline, roughness coefficients, inline structure hydraulic parameters, and channel bathymetry. ArcGIS software and the NPCA digital elevation model were used to delineate cross-sections, overbank stations, and the stream centreline. This data was then imported into the Hydraulic Engineering Corps-River Analysis System (HEC-RAS). HEC-RAS is used to generate and flooding and hydraulic conditions within river systems. Within HEC-RAS flow geometry data such as channel bathymetry, roughness values, and bridge parameters were added (Appendix C).

Simulated flow data from HEC-HMS was populated in the HEC-RAS hydraulic model. Flow change locations in the watercourses were entered in the HEC-RAS model and correspond to junctions and the schematic of the HEC-HMS model. A steady-state backwater analysis was then undertaken, (Appendix C). The starting water elevation used for the backwater calculation was 76.15 masl. This elevation represents the Lake Ontario 100 Year Flood Limit and was obtained from the '1993 Lake Ontario Canada-Ontario Flood Damage Reduction Study' by Dillon.

2.6 PLOTTING THE FLOOD SURFACE PROFILE

The 100 Year Floodplain Profile (Appendix D) was imported into ArcGIS using the HEC-GeoRAS Extension. The 100 Year Flood Profile was spatially rendered, plotted, and then intersected with the Digital Elevation Model. A resulting flood surface polygon was obtained. These flood conditions were then plotted on cartographic maps (Enclosure).

3.0 RESULTS AND DISCUSSION

There was a close correlation between the various hydrologic models that were generated for One Mile Creek. The NPCA hydrology for One Mile Creek (18.283 m^3s^{-1}) was very consistent with the 1988 Cumming Cockburn Limited results (17.2m^3s^{-1}) and 1989 Marshall, Macklin, & Monahan

hydrology model results (17.30m^3s^{-1}); all three models having very similar discharges at the outlet. This result lent a strong degree of credibility to the accuracy of the NPCA model being developed.

Several issues were raised regarding the hydraulic modelling. The digital elevation model does not include the bathymetry of the creek bottom because the aerial equipment is unable to penetrate the water surface. Consequently bathymetry was surveyed and added at inundated areas (lakes, ponds, significant rivers, etc.). Bathymetry however, was not added at stream sections were a channel was strongly defined due to low water levels in the stream channel during the time that the watershed was flown. It should be noted that the actual presence of water in these channels may result in the hydraulic model underestimating channel conveyance. However the actual increase in the flood profile was found to be negligible as a result of the presence of low flows within the channel. Culvert obverts and inverts were input relative to the road elevations within the Digital Elevation Model.

The quantity of stormwater spilling from Epps Drain into One Mile Creek during the 100 Year Storm Event at the John Street Culvert was examined. It was determined that John Street, and its associated culvert, has the capacity to discharge 1.37m^3s^{-1}. The peak amount of stormwater spilling into One Mile Creek during the 100 Year Storm Event, as modelled, was 0.94m^3s^{-1}.

Of note, the hydraulic model identified municipal crossings where severely undersized culverts reduced flood conveyance and aggravated flooding. The crossings are detailed in Figure 6. On One Mile Creek major barriers to flood flows are at: Niagara St., Nassau St., the intersection of Johnson and Gate Streets, Centre Street, and Regent Street. On Epps Drain crossings that are a barrier to flood conveyance identified at: Ricardo Street, the Niagara Parkway Bicycle Path, and Queen's Parade.

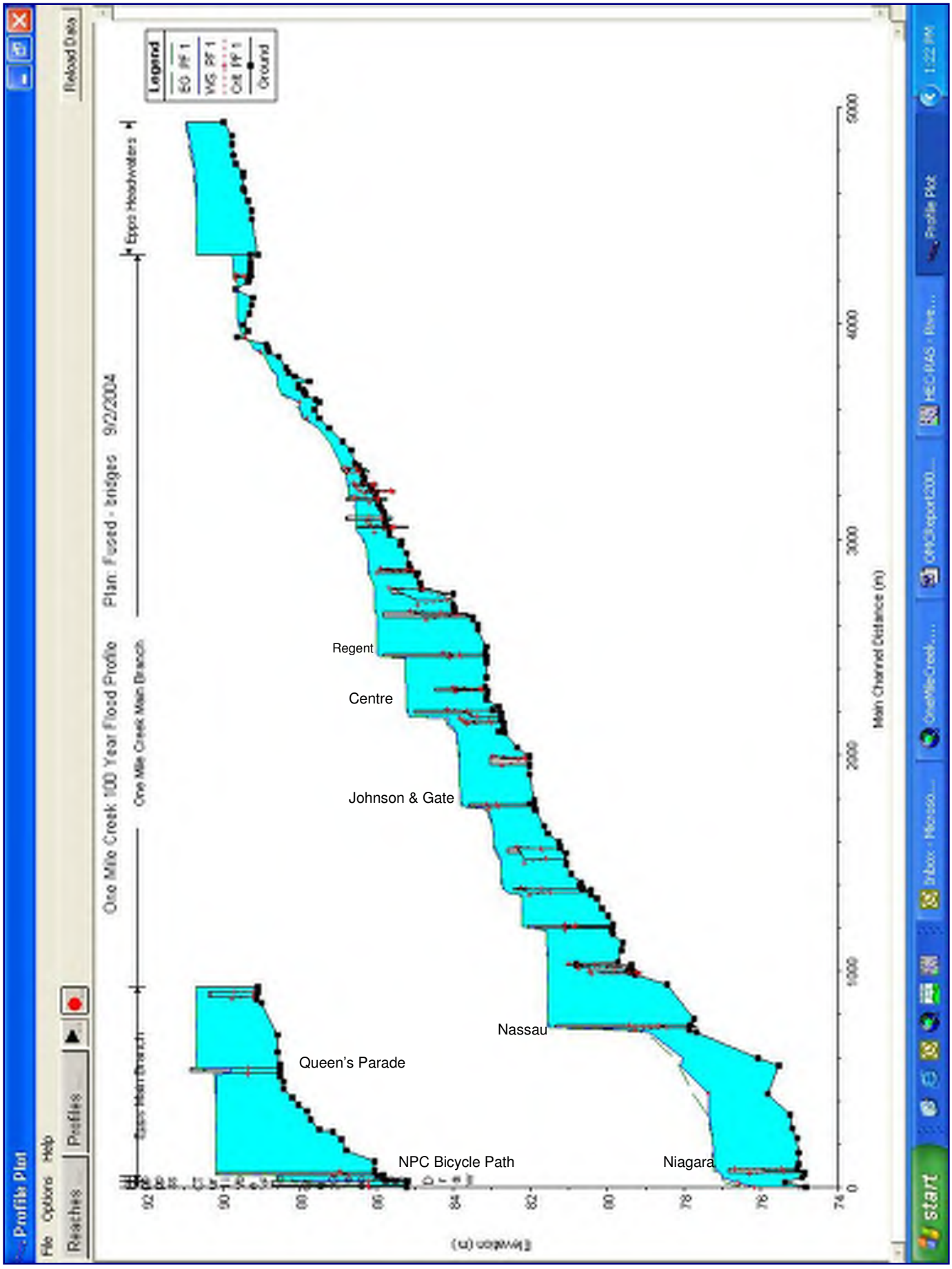


Figure 6: HEC-RAS Crossing Profile

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 CONCLUSIONS

Based on the foregoing it was concluded that:

1. The hydrologic and hydraulic models created by the NPCA were in good agreement with previous work done by Cumming and Cockburn Limited and Marshall, Macklin, and Monaghan.
2. The NPCA Digital Elevation Model was found to accurately replicate the in-situ conditions based upon verification in the field.
3. The capacity of the Epps Drain was exceeded during the 100 Year Storm Event and contributed to flows in One Mile Creek.
4. Undersized culverts, particularly in the downstream portion of One Mile Creek serve to aggravate the extent of flooding during the 100 Year Storm Event.
5. Urban development adjacent to One Mile Creek has served to encroach upon the floodplain.

4.2 RECOMMENDATIONS

In view of the preceding it is recommended that:

1. That this report and the resultant 100 Year Regulatory Flood Elevations be utilized in order to regulate development with the intent of preventing loss of life and destruction of property as mandated by the Conservation Authorities Act.
2. The municipality undertake to replace all undersized culverts in order to reduce the extent of flooding during the 100 Year Storm Event.
3. The capacity of Epps Drain be increased in order to prevent the discharge of floodwaters into One Mile Creek during the 100 Year Storm Event.

All of which respectfully submitted;

Steve Miller, P. Eng	Al Vieira, B. Sc.
NPCA Water Resources	NPCA Watershed
Engineering Coordinator	Engineering Technician

APPENDIX A

-One Mile Creek-
Rainfall Input Data

APPENDIX B

-One Mile Creek-
Hydrologic Model Output

APPENDIX C

-One Mile Creek-
Hydraulic Model Output

APPENDIX D

-One Mile Creek-
Floodplain Structure Inventory

ENCLOSURES

-One Mile Creek-

Floodplain Maps