Functional Servicing and Stormwater Management Report

Brock Zents Townhomes

March 2024 — Project No. 18138
The Brock-Zents Partnership

Jack Greenberg
Law Offices of Jack Greenberg
Barristers & Solicitors
Suite # 204
181 Eglinton Ave East
Toronto, Ontario
M4P 1J4
TEL: 416-485-8833
FAX: 416-485-3246
E-MAIL: jackgreenberg@greenberglawyers.ca

TYLin

Contents

Figures

Appendices

1. Introduction

TYLin has been retained by The Brock-Zents Partnership to prepare a detailed Functional Servicing and Stormwater Management Report along with a corresponding grading and servicing design in support of the Official Plan Amendment and Zoning By-law Amendment. The subject property is located at the southwest corner of Brock Road and Zents Drive at municipal addresses 2660, 2670, and 2680 Brock Road North in the City of Pickering (refer to **Figure 1.1**).

This report will:

- Provide background information regarding the subject property;
- Summarize the existing site conditions;
- Provide information regarding the proposed development conditions;
- Outline the proposed grading for the development; and
- Outline the existing and proposed municipal servicing.

The recommended servicing has been developed in accordance with the applicable design criteria and requirements of the City of Pickering (the City), the Region of Durham (the Region) and the Toronto Region Conservation Authority (TRCA).

Figure 1-1 Location Plan

1.1. PROJECT BACKGROUND

The total property is approximately 2.63ha in area and sees the amalgamation of three existing properties at municipal addresses 2660, 2670, and 2680 Brock Road in the City of Pickering. The site is currently occupied by single unit dwellings on each property that backs into a woodlot.

The subject site is bound by Zents Drive to the north, Brock Road North to the east, a woodlot to the west, and vacant land to the south. Four Seasons Lane is a future north-south collector road that is currently being planned along the west side of the property and will span between Zents Drive and Dersan Street (by TYLin and GHD).

The existing topography of the site slopes from west to east and north to south, towards the ditch located along the west side of the Brock Road sidewalk, and with elevation differences of up to 4.0m across the length of the site.

1.2. PROPOSED DEVELOPMENT

The proposed development of the site includes the construction of eight 3-storey rear lane stacked townhouse blocks and five 4-storey stacked townhouse blocks with a total of 274 units. An underground parking garage is available below the 4-storey stacked blocks that front Brock Road and Zents Drive. Each townhouse is provided 1-2 resident parking spaces, totaling 386 parking units, and 64 visitor parking units are also proposed. Private roads are proposed within the site interior to provide vehicular access to the residential units.

Refer to **Figure 1-1** for the proposed development plan.

1.3. SITE ACCESS

The site's main vehicular access will be made off the future north-south collector road Four Seasons Lane that spans between Brock Road and Dersan Street. A right-in/right-out entrance is also proposed off this road and is located towards the north, near Zents Drive.

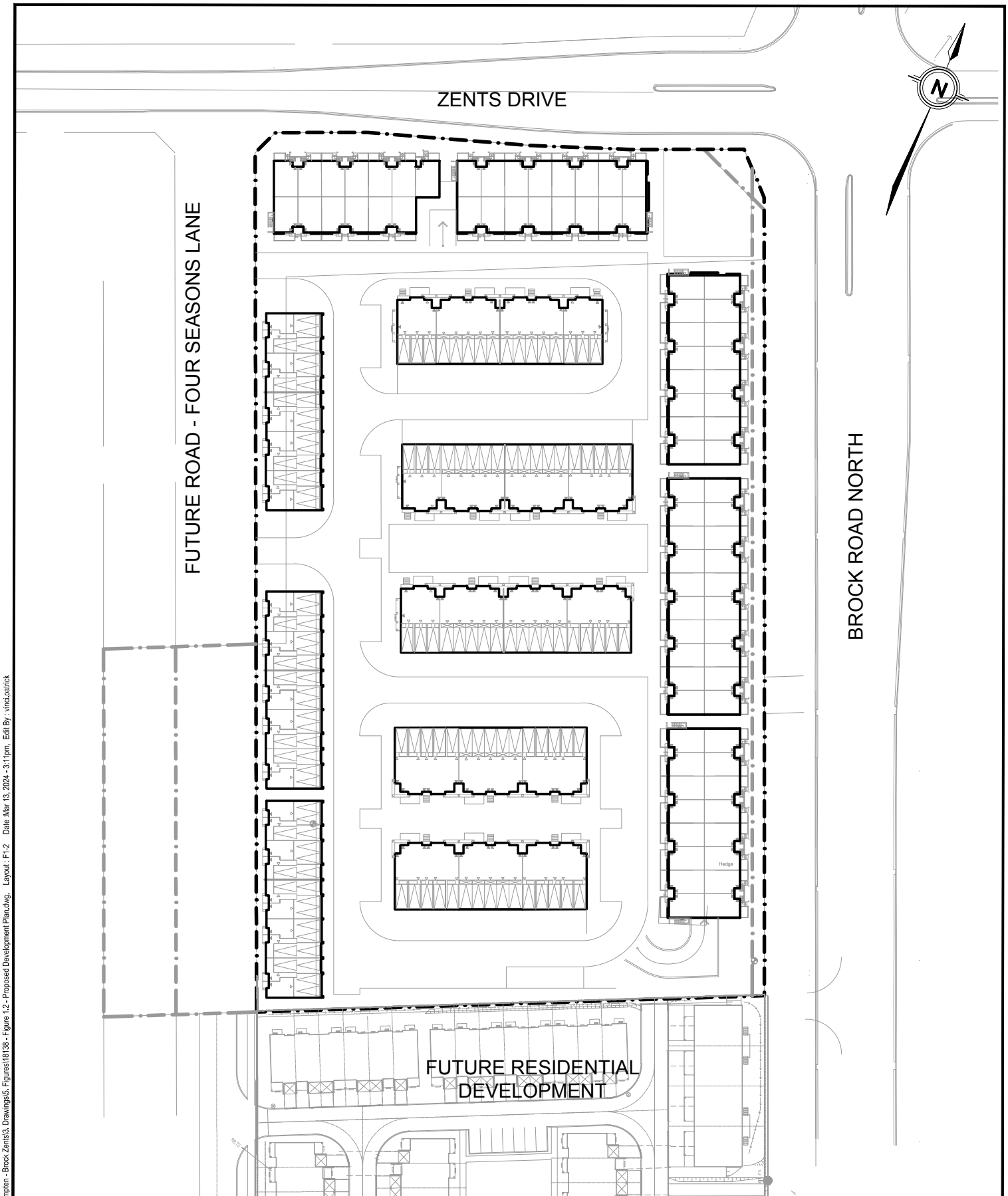
1.4. UTILITIES

As the proposed development is currently occupied by residential dwellings, all utilities including telephone, cable, electricity, and gas are readily available to service the subject property from Zents Drive and Brock Road North. The future north-south collector road may also extend new utilities which may service the subject property as well.

At the time of this report, it is understood that:

- A clean water collector pipe is currently under construction by the City of Pickering on Brock Road;
- Sanitary sewers have been proposed for Four Seasons Lane (extended from Dersan Street) by the southern neighbour applicant, of which serves the basis of the sanitary sewers proposed in this application.
- A future 400mm watermain has been planned for Brock Road and is required to be built by the applicant.

Further details and discussion can be found in the respective sections below.



File : G:\Projects\2018\18138 - Complete - Brock Zents\3. Drawings\5. Figures\18138 - Figure 1.2 - Proposed Development Plan.dwg, Layout : F1-2 Date :Mar 13, 2024 - 3:11pm, Edit By : vinci.patrick

TYLin

8800 Dufferin Street,
Suite 200
Vaughan, ON
L4K 0C5

p: 905.738.5700
f: 905.738.0065

BROCK ZENTS TOWNHOMES
2660-2680 BROCK ROAD NORTH
PROPOSED DEVELOPMENT PLAN

SCALE:	N.T.S.
DATE:	AUGUST 2022
DESIGNED BY:	V.P.
CHECKED BY:	L.P.

PROJECT No. 18138

FIGURE No. 1-2

2. Stormwater Management

2.1. Existing Stormwater Management

The existing topography of the site slopes from west to east, and north to south, with low points at the ditch located along Brock Road along the east property limit.

The following documents were obtained from the City and relate to the stormwater management requirements and existing conditions for the subject site:

- Duffin Heights Environmental Servicing Plan (ESP), Appendix H Master Drainage Study by Sernas Associates, dated April 2010, herein referred to as "ESP";
- Duffin Heights Stormwater Management Facility Design Brief (SWMF#4) by Sernas Associates, dated August 2012, herein referred to as "SWMF#4 brief";
- Brock Road Clean Water Collector Sewer, Drawing 101 by Stantec, dated November 2021

The existing site servicing details obtained from the City of Pickering indicate the following storm sewer infrastructure within the vicinity of the site:

- A 300mm City PVC clean water collector (CWC) pipe at 0.50% slope, flowing southerly and located along the Brock Road property line frontages;
- A 900mm Regional concrete storm sewer pipe at 0.50% slope, flowing southerly and located along the west gutter of Brock Road;
- Three 300mm PVC CWC plugged service connections at 0.50% slope are made to the subject property at each existing municipal address (2660, 2670, 2680 Brock Road).

As per Section 3.2.2.2 of the ESP, the 2-year storm drainage from the subject site will be collected and conveyed via a clean water collector pipe (CWC) and released into West Tributary Branch 1 (WTB1) at a unit flow rate of **6.91L/s/ha**, based on Figure 6.3 of the ESP.

Minor storm events above the 2-year and up to the 10-year storm event is to be discharged into the 900mm Regional storm sewer on Brock Road with an imperviousness of 79%, and major storm events above the 10-year storm up to and including the 100-year storm event is to be controlled to the 10-year allowable flow rate. Flows above the 100-year storm event will drain overland to Brock Road where they will be conveyed overland to SWMF#4. Refer to **Figure 2-1** for the Existing Drainage Area Plan.

2.2. PROPOSED STORMWATER MANAGEMENT

The proposed stormwater management design is based on the MECP 2003 Stormwater Management Planning & Design (SWMPD), the City of Pickering Stormwater Management Design Guidelines (July 2019), the Toronto Region Conservation Authority "Stormwater Management Criteria" (August 2012). Further criterion has been established in the Duffin Heights Environmental Servicing Plan (DH ESP), Design Brief for the SWMF#4, and discussion with the City. Key excerpts from these reports can be found in **Appendix D**.

2.2.1. Stormwater Management Design Criteria

Based on the review of these documents the site will be required to adhere to the following criteria:

Stormwater Quantity Control

- Control the 2-year post-development storm flows to 6.91L/s/ha to the clean water collector pipe on Brock Road.
- Storm events above the 2-year event up to the 10-year event is to discharge into the Brock Road regional storm sewer
- All storm events above the 10-year storm up to the 100-year storm event will be controlled to the 10 year post development flows with an imperviousness of 79% and directed to the Brock Road regional storm sewer which eventually drains to SWMF#4
- All storm event above the 100-year storm event will spill overland to Brock Road and ultimately conveyed to SWMF #4

Stormwater Quality Control

- As per the DH ESP, stormwater directed to the clean water collection pipe shall be treated to 80% TSS removal.
- SWMF#4 will provide the remaining water quality control for the site

Stormwater Water Balance

- As per Appendix G of the Water Balance Study for the DH ESP, no infiltration has been assumed for the mixed-use corridors north of Dersan and west of Brock as the sites are required to meet a unit flow rate of 6.91L/s/ha to maintain base flows into the West Tributary Branch 1 of Urfe Creek. However as such;
- Due to high groundwater conditions throughout the site, underground infiltration galleries are not feasible to maintain a 1.0m separation buffer from the bottom of the infiltration practice. Post-development infiltration shall be adopted for the site through a best-efforts approach to reduce direct runoff and promote groundwater recharge through surface level LID methodologies.

2.2.2. Proposed Stormwater Outlet Connection

The proposed storm connection will be made to the existing 300mm diameter CWC and to the 900mm diameter Regional storm sewer by the use of a flow-splitter manhole. Due to the required quantity control criteria for the site, it is required to have two outfalls to these respective sewers for the varying storm events as noted in Section 2.2.1. In doing so, a flow-splitter manhole is proposed at the southeast corner which contains a weir wall. This flow-splitter manhole is designed to have a two-stage orifice

design meeting the outflow criteria to achieve quantity control objectives. Due to the small allowable release rate to the CWC, a Hydrobrake is proposed to be installed at the manhole outlet to the CWC to control the 2-year post-development flows to allowable levels. The Hydrobrake will achieve this flow rate up to the design head at which the storage criteria is met (calculated by the VO2 model discussed in subsequent sections below). A hole cutout in the weir wall (i.e. an orifice plate) will be installed into the weir wall at an invert that matches the elevation at which the 2-year head is achieved. This orifice is sized to the 10-year allowable release rate to the downstream Brock Regional storm sewer and will allow minor drainage above the 2-year storm up to the 10-year storm to discharge to the downstream Regional storm sewer. Storms above the 10-year and up to the 100-year storm will be attenuated up to a design head at which the storage criteria is met for this criteria (calculated by the VO2 model).

2.2.3. Stormwater Quantity Control

The proposed development has been modelled using Visual OTTHYMO (VO) and the output is provided in **Appendix A**. The VO model was built upon the model provided by the City which was used to size SWMF#4. The proposed drainage areas are as summarized in **Table 2-1** and illustrated on **Figure 2-1**.

Table 2-1 – Proposed Drainage Areas

Drainage Area Description	Drainage Area (ha)	Runoff Coefficient	Level of Control
Uncontrolled to Zents Drive	0.06	0.43	Uncontrolled
Uncontrolled to Brock Road North	0.07	0.57	Uncontrolled
Controlled flow to Brock Road North	2.50	0.83	Less than and equal to 2 year: Control to 17.3L/s (2.50ha x 6.91L/s/ha) discharge to 300mm diameter CWC along Brock Road North Greater than 2 year up to 100 year: Control to 174 L/s* (10 year post development flow at 79% imperviousness) discharge to 900mm diameter storm sewer along Brock Road North eventually to SWMP#4 Greater than 100 year: Uncontrolled to Brock Road North
Total Drainage Area	2.63	0.82	

* Based on VO output, see **Appendix A** for details. 174L/s excludes all uncontrolled flow. Total 10 year flow from drainage area of 2.63ha with an imperviousness of 79% is 181L/s and the uncontrolled 10 year from 0.13ha is 7L/s.

In post-development conditions, the site has been designed to allow some area along the north and east property to flow unrestricted offsite to Zents Drive and Brock Road North, respectively. Refer to **Figure 2-1** for Post-Development Drainage Area Plan.

The flows are proposed to be controlled through a control manhole with a weir wall located at MH101

which is located at the southeast corner of the site. **Table 2-2** provides a summary of the controls provided within the manhole. Calculations are provided within **Appendix A** and details of the control manhole are included in **Drawings D1**.

Storage is provided within Cultec 902HD units under the private road right-of-way. The storage required based on VO modeling and provided storage is summarized in **Table 2-2**. The Cultec system is sized to the total storage volume requirement of both controls listed in **Table 2-2**, where the storage volume targets are achieved at specific stage elevations. Due to high groundwater in this vicinity, this Cultec system is proposed to be a closed bottom system to prevent groundwater seepage into the system.

Table 2-2: Summary of Control Maintenance Hole Devices

ID #	Storm Frequency	Level of Control	Device Used	Inv. Elev. (m)	Head (m)	Storage Required (m^3)*	Storage Provided (m^3)
Control #1	<=2 year	Controlled to 17.3L/s	Hydrobrake control flow to 17.3L/s	126.13	1.91	640	661
Control #2	>2 year to 100 year	Controlled to 173 L/s	Orifice plate 320 mm	128.04	0.61	364	396 (1057 minus 661)

* Storage required based on VO output (see **Appendix A**)

The head of the Control #1 is set at 1.91m, at which the storage volume of 661m^3 is achieved (based on the stage-storage sheet for the Cultec 902HD chamber) and similarly for Control #2 the head is set at 0.61m, at which the storage volume of 396m^3 is achieved (a total of 1,057m^3 achieved from both controls during the 100-year event). The invert of the Control #1 sits at the bottom of the MH and the invert of Control #2 is set at the same elevation at which the storage required for Control #1.

As shown in **Table 2-2**, the storage provided is greater than the storage required. Therefore, sufficient storage is provided.

The outflow from SWMP#4 is also compared with the original VO model and the updated VO model based on the proposed development. The outflows are summarized in **Table 2-3**.

Table 2-3: SWMP#4 Outflow Comparison

Storm Frequency	Outflow from SWMP#4 (m^3/s)	
	Original Model	TYLin Model
2 year	0.09	0.09
5 year	0.11	0.11
10 year	0.13	0.12
25 year	0.24	0.24
50 year	0.30	0.30
100 year	0.35	0.34

Since the outflows from the updated model is less than or equal to the original model, as shown in **Table 2-3**, sufficient flow controls have been provided for the site.

2.2.4. Stormwater Quality Control

As mentioned in **Section 2.2.1**, the quality controls for the site is provided within SWMF#4, except for the flows being directed to the CWC, which will be required to be treated to 80% TSS removal.

A Jellyfish filter is proposed to treat the 2 year flow prior to discharging to the CWC. Flows greater than the 2 year flow will bypass the Jellyfish system and flow to the Brock Road Regional storm sewer, at which will eventually reach SWMF#4 for further quality controls designed for the site.

Refer to **Appendix A** for the stormwater management calculations and the Servicing Plan (**Drawing S1)** for the location of the proposed storm sewer infrastructure. Specifications for the specific Jellyfish unit will be provided at a later stage during detailed design.

2.2.5. Water Balance

The Water Balance Study (Appendix G of the Duffin Heights Environmental Servicing Plan) by Sernas Associates has identified two criteria as it relates to site water balance:

1. Runoff from the site shall maintain a unit flow rate of 6.91L/s/ha into the clean water collector pipe, to maintain base flows to the West Tributary Branch 1 (WTB1) of Urfe Creek.
2. A best efforts approach shall be conducted as it relates to post-development infiltration to promote groundwater recharge due to the increase of direct runoff and reduction of infiltration in the Urfe Creek watershed as a result of urbanization.

As discussed in Section 2.2.3 of this FSR, stormwater quantity controls will be designed to control the minor 2-year storm to 6.91L/s/ha into the clean water collector pipe on Brock Road. This ensures that base flows are maintained into the clean water collector pipe and ultimately to WTB1.

As per the hydrogeological report by Terrapex, dated May 26, 2022, and a subsequent supplemental hydrological assessment by Palmer, dated March 20, 2024, groundwater elevations observed through the monitoring wells advanced within the subject site range from 123.6masl to 131.0masl, with an average groundwater elevation of 127.56masl, which is well above the proposed storm sewer inverts and stone base of the proposed underground tank. For adequate underground infiltration to occur, a 1.0m vertical buffer is required above the high groundwater elevation. Therefore, underground infiltration is not feasible for this site.

Opportunities for surface level infiltration using Low Impact Development (LID) systems will be explored at the detailed design stage to achieve best efforts in promoting site infiltration. These can be in the forms of, but not limited to:

1. **Permeable Pavement** in driveways, visitor parking spaces, amenity spaces, and portions of the private laneways;
2. **Rain Gardens** in common element spaces, to receive surface runoff and roof drainage;
3. **Bioswales** between townhouse blocks;
4. **Stormwater Planters and/or Stormwater Tree Trenches** in common element spaces, traffic/parking medians and islands;

The details, suitability, and benefits of these LID techniques will be provided at a later stage during the detailed design of the subject site. Excerpts from the Water Balance Study of the DH ESP can be found in **Appendix D**.

2.2.6. Construction Erosion and Sediment Control

Details for erosion and sedimentation control during construction will be subject to the City of Pickering approval prior to issuance of Building Permit. During the site grading and servicing works, there is potential for sediment-laden runoff to be directed toward the adjoining properties, municipal streets, and existing storm infrastructure. Therefore, prior to any grading activity, sediment control fencing must be installed along the site perimeter. Additional measures will include construction of an entrance "mud-mat' on the access to be used during construction to minimize mud tracking offsite. Material stockpiles are to be located in appropriate locations. Inlet sediment control devices are to be used on existing catchbasins in municipal right-of-ways that may be affected by the construction of this site and on any inlets that are constructed throughout the duration of construction. The sequencing of the implementation of the above and additional erosion and sediment control measures is summarized in the following table.

Table 1: Erosion Control Sequencing

Activity	**Erosion Control Practice**
Phase 1: **Area Grading**	• Construct and maintain entrance "mud-mat". • Construct and maintain sediment control fencing around the downstream perimeter of the site. • Protect existing catchbasin inlets with Terrafix Silt Sacks • Locate stockpiles away from sensitive areas. • Install cut-off swales, and sediment traps with a perforated vertical riser.
Phase 2 & 3: **Servicing, Asphalt Works, Building Construction**	• Limit open trench lengths to minimize erosion potential of excavated material. • Prevent erosion of material stockpiles. • During work stoppages or inclement weather, plug ends of open sewers to prevent downstream sedimentation. • Protect newly constructed catchbasin inlets with Terrafix Silt Sacks.
Maintenance	• Remove accumulated sediments when depth exceeds 0.30 m. • Maintain and repair sediment control fencing as required. • Maintain and repair catchbasin sediment controls as required.

2.2.7. Four Season Lane

The extension of Four Seasons Lane (FSL) is proposed along the western frontage of the Site including a connection to Zents Drive with a 3-way intersection. FSL is proposed as a modified version of City of Pickering detail P-701, with 20m total right-of-way width with a 9.75m wide travelled road. A 3.0m multi-use trail is proposed in the western boulevard and a 1.8m concrete sidewalk is proposed in the eastern boulevard.

Water quantity, quality and erosion control for the FSL right-of-way will be provided in SWM Facility #2 in accordance with the Duffins Heights ESP (DHESP) as illustrated on the DHESP **Figure 5.2**, refer to **Appendix D**. The minor 5-yr and major 100-yr storm flows will be collected and conveyed via a 300mm and 375mm PVC storm sewers and roadside catchbasins to SWM Facility #2 to the south. The major storm flows will be captured via roadside inlets. The detailed inlet capacity calculations will be performed at the detailed design stage of the approval process. Storm flows from the woodlot to the east are being directed south to a future DICB and conveyed to Urfe Creek via a clean water pipe. This DICB and clean-water pipe are located south of this draft plan limits, refer to City of Pickering file number D-4100 for details on the FSL right-of-way to the south.

The sanitary sewer is proposed to be extended within FSL up to the southern entrance to the Site. This sanitary sewer connection will receive the full sanitary flows from the Site.

To facilitate the FSL road connection to Zents Drive, FSL will be approximately 2m higher than the existing grades. This causes an elevation difference from the western edge of right-of-way to the existing woodlot to the west. A section of 3:1 sloping is proposed along the western length of FSL within this woodlot block to make of the elevation difference. This is consistent with the FSL design to the south.

2.2.8. Dewatering Requirements

The proposed site plan involves two parking garages below the two 4-storey stacked townhouse blocks located along the Zents Drive and Brock Road frontages.

A Hydrogeological Assessment completed by Palmer Environmental (PECG), dated March 2024, anticipates the following dewatering rates:

Short Term Dewatering

- Zents Parking Garage = 5,000L/day
- Brock Parking Garage = 292,191L/day
- Total Short Term Dewatering = 297,191L/day (3.44L/s)

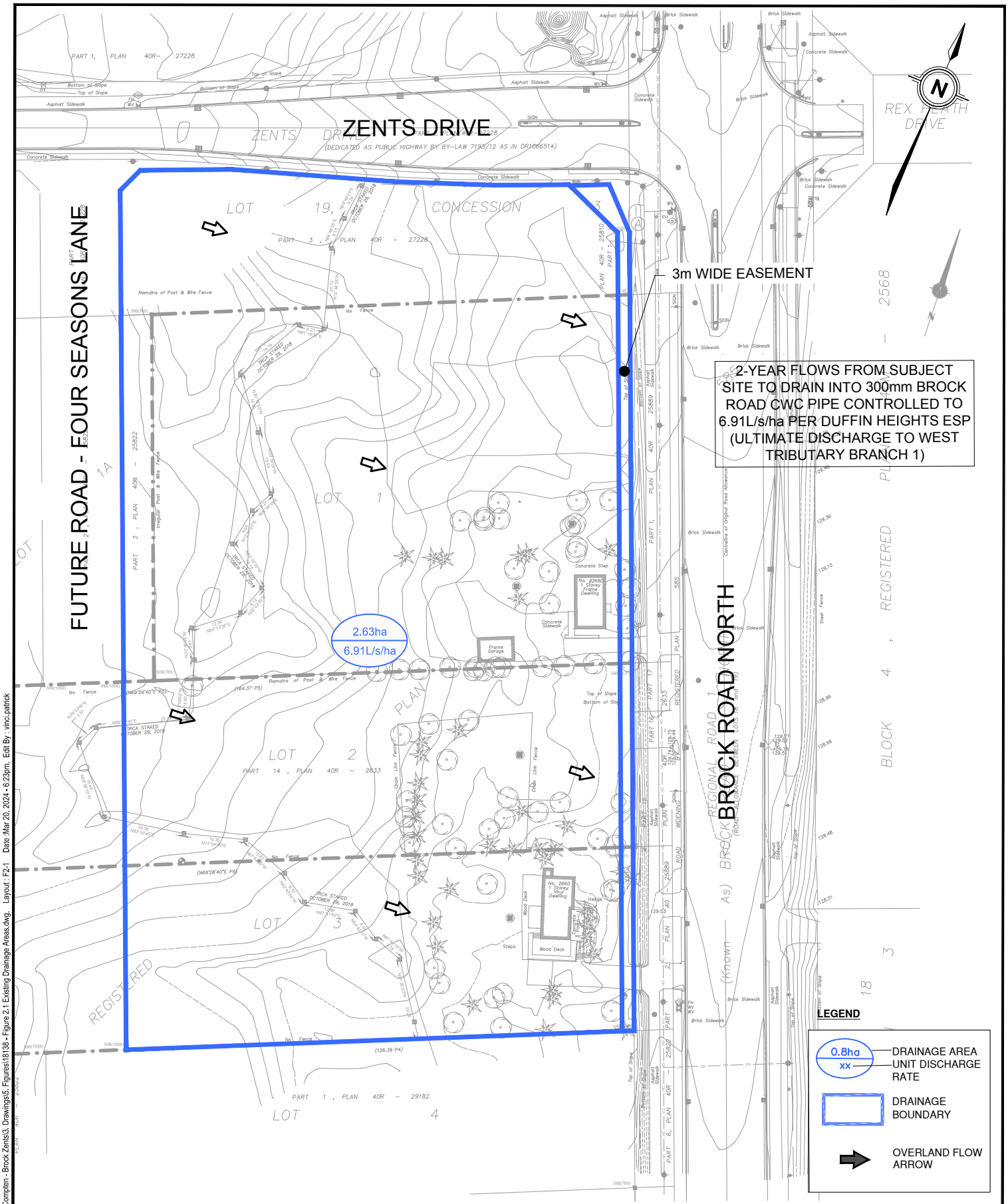
Long Term Dewatering

- Zents Parking Garage = 976L/day
- Brock Parking Garage = 4,028L/day
- Total Long Term Dewatering = 5,004L/day (0.058L/s)

As per correspondences with the City of Pickering, no dewatering activity on the subject site is allowed to discharge into the clean water collector pipe. Correspondences with the Region of Durham indicate that foundation drainage (long term dewatering) could be discharged to the Regional storm sewer on Brock Road with the following stipulations:

- A hydrogeological report detailing the daily flow rate from the site (as summarized above) as well as laboratory quality tests showing that the foundation drainage meets the Region's sewer use by-law for chemical and TSS quality requirements.
- Should the groundwater laboratory results show that the water does not meet the Region's quality requirements, a mechanical private foundation drainage water purification system will be required to be specified showing that the discharge will be cleaned prior to discharge from the site.
- Should the foundation drainage need to be pumped to connect into the Regional sewer by a gravity service connection, this will need to be done fully on private property and be demonstrated that the Regional sewer has capacity to receive the flows.

As per the Hydrogeological Report by Terrapex, dated May 26, 2022, the groundwater quality is considered suitable for discharge to storm sewers with the exception of TSS. An Oil-Grit Separator (OGS) is proposed upstream of the groundwater sampling manhole located at the foundation drainage outfall for each parking structure to provide TSS treatment. All internal plumbing drains for the foundation drainage system will be designed by a mechanical engineer and connect to the inlet of this OGS before it is released to the respective downstream Regional storm sewers.



File: G:\Projects\2018\18138 - Compton - Brock Zents\3. Drawings\5. Figures\18138 - Figure 2.1 Existing Drainage Areas.dwg, Layout: F2-1 Date: Mar 20, 2024 - 6:23pm, Edit By: vinci.patrick

TYLin

8800 Dufferin Street,
Suite 200
Vaughan, ON
L4K 0C5

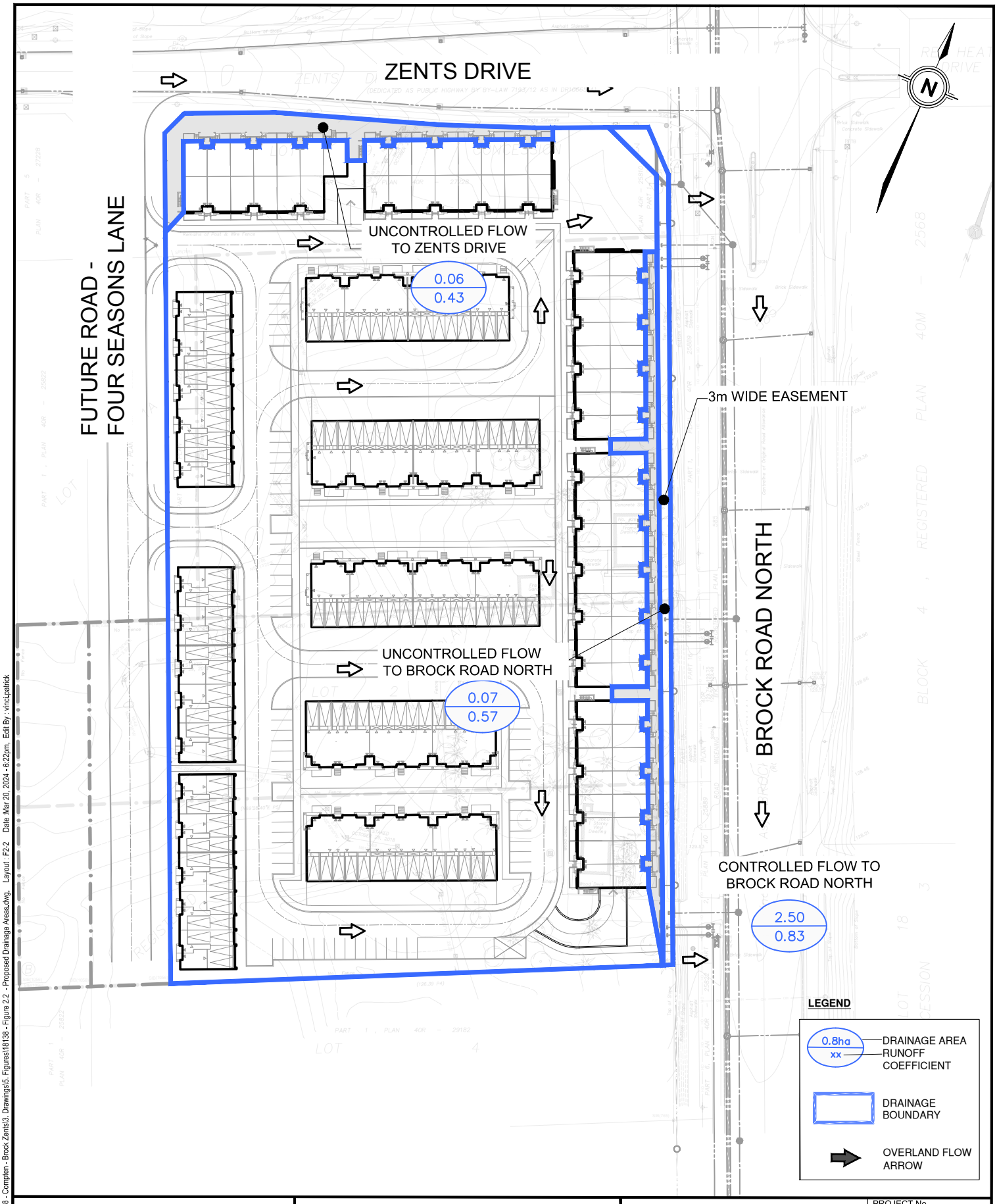
p: 905.738.5700
f: 905.738.0065

BROCK ZENTS TOWNHOMES
2660-2680 BROCK ROAD NORTH
EXISTING DRAINAGE AREA PLAN

SCALE:	N.T.S.
DATE:	AUGUST 2022
DESIGNED BY:	V.P.
CHECKED BY:	L.P.

PROJECT No. 18138

FIGURE No. 2-1



TYLin
8800 Dufferin Street, Suite 200
Vaughan, ON
L4K 0C5
p: 905.738.5700
f: 905.738.0065

BROCK ZENTS TOWNHOMES
2660-2680 BROCK ROAD NORTH
PROPOSED DRAINAGE AREA PLAN

SCALE:	N.T.S.
DATE:	AUGUST 2022
DESIGNED BY:	V.P.
CHECKED BY:	L.P.

PROJECT No. 18138

FIGURE No. 2-2

3. Sanitary Servicing

3.1. Existing Sanitary Servicing

The existing site servicing details obtained from The Region of Durham engineering plan and profiles and a topographical survey completed of the area indicate that there is sanitary sewer infrastructure in the vicinity of the site. The following sanitary infrastructure is adjacent to the subject site:

- A 250mm sanitary stub provided to the subject site located along the northeast property line that connects into;
- A 250mm sanitary sewer located within the Brock Road North right-of-way that flows south.

The site is currently vacant and was previously occupied by two single family residential buildings. Based on the Region of Durham design flow rate of 364L/d/person and a population density of 3.5 persons/unit, the total peak sanitary flow for the two single dwellings (including infiltration allowance) has been calculated as 0.78L/s.

Refer to the **Servicing Drawing (S1)** for the existing sanitary sewer infrastructure and proposed sanitary service design.

3.2. Future Sanitary Servicing

Four Seasons Lane is a future north-south collector road that is currently being planned along the west side of the property and will span between Zents Drive and Dersan Street. The construction of Four Seasons Lane is set to be completed prior to the construction of the subject site.

The servicing plans prepared by TYLin and GHD indicate there will be the following sanitary infrastructure adjacent to the subject site in the future;

- A 300mm sanitary stub provided to the subject site located within the private laneway at the northwest corner of the site that connects into;
- A 300mm sanitary sewer located within the Four Seasons Lane right-of-way that flows south to FUT MH108A (By TYLin) that then connects into;
- A 300mm sanitary sewer located within the Four Seasons Lane right-of-way that flows south to Dersan Street (by GHD)

Refer to the **Servicing Drawing (S1)** for the future sanitary sewer infrastructure and proposed sanitary service design.

3.3. Proposed Sanitary Servicing

A comparative analysis was undertaken to determine peak flows under the existing conditions in A comparative analysis was undertaken to determine peak flows under the existing conditions in comparison with projected peak flows based on the proposed re-development of the site. Design flows for the proposed development has been calculated using the Region of Peel Durham Design Specification for Sanitary Sewers, with a design flow rate of 364L/d/person and a population density of 3 persons/unit for townhouses and stacked townhouses.

Sanitary servicing for the proposed development will consist of a 200mm diameter connection into the future 300mm sanitary sewer located within the Four Seasons Lane right-of-way. The total peak sanitary flow (including the infiltration allowance) for the site has been calculated a **13.85L/s** this

represents 14.3% of the total usage of the future 300mm sanitary sewer. The sanitary demand calculations completed by GHD indicate that the future sanitary sewer was designed to accommodate a total area of 2.25ha with a population of 704 people resulting in a total flow rate of 11.9L/s. The proposed design for the development has advanced since that time and additional details and information have been determined. The updated population and floor areas have resulted in the increased peak sanitary flow rate. The estimated peak increase of 2.0L/s from the allocated flow rate represents a usage increase of 2.1% to downstream sanitary sewer. This amount is expected to have negligible impact to the Four Seasons Lane sanitary sewer.

Refer to **Appendix B** for details of the calculations.

4. Water Servicing

4.1. Existing Water Servicing

The existing site servicing details obtained from the Region of Durham engineering plan and profiles and a topographical survey completed of the area indicate that there is future watermain infrastructure in the vicinity of the site. It is understood that the 400mm watermain on Brock Road is stubbed at either ends of the Brock Zents property (at the corner of Brock and Zents, and the northern end of the Lebovic lands). Through discussions with the Region, the applicant is required to carry out the design and construction for the completion of this watermain which the development will connect to.

Refer to the Servicing Drawing (S1) for the location of the existing watermain infrastructure.

4.2. Proposed Water Servicing

The proposed water service connections will be made to the future 400mm diameter watermain located within the Brock Road North right-of-way. The connection will consist of a designated meter building (designed by others) which holds the bulk water meter and backflow assemblies as per Region Std S-240.041. Each townhouse unit will have a 13mm service connection from this main, and a fire service made to each mechanical room of the midrise blocks will be made to feed the buildings sprinkler system.

Based on the Fire Underwriters Survey and under proposed conditions the development is anticipated to have a maximum required fire flow demand of **200L/s** for the largest townhouse block within the subject site. The average day, peak hour, and maximum day domestic flows for the development under proposed conditions has been calculated as **3.72L/s, 14.12L/s, and 5.57L/s,** respectively. The maximum day + fire flow demand is thus **214.12L/s**.

A fire hydrant flow test will be completed during detailed design stage in order to further size the internal watermain network and verify that the existing 400mm watermain can meet the flow demands of the subject site while maintaining the minimum pressure requirements for all demand scenarios.

The water demand calculations are shown in **Appendix C** and the proposed and existing watermain infrastructure are shown on the Servicing Drawing (S1).

4.3. Fire Hydrant Coverage

There are two existing fire hydrants and two future fire hydrants located on the west side of Brock Road North located adjacent to the subject site. The proposed development will also have several hydrants located within the site to satisfy Ontario Building Code requirements.

5. Conclusion

The proposed development will see the construction of 17 townhouse blocks with a total of 195 3-storey townhouses at 2680 Brock Road North in the City of Pickering. The proposed development can be serviced utilizing the existing and proposed infrastructure outlined in the **Servicing Drawing (S1)**. Our conclusions and recommendations for servicing of the proposed development is summarized as follows:

Stormwater Servicing

- The proposed development will control the 2-year post-development storm flows to 6.91L/s/ha to the clean water collector pipe on Brock Road by the use of a Hydrobrake Flow control device.
- All storm events above the 2-year storm and up to the 10-year storm will spill over a weir wall/orifice and discharge into the Regional storm sewer on Brock Road and ultimately conveyed to SWM Facility #4.
- Storm events above the 10-year storm up to and including the 100-year storm will be controlled to 10-year levels to the Regional storm sewer.
- Stormwater quality will be achieved primarily through a Jellyfish system located near the outfall of the site.
- Under post-development conditions it is expected that stormwater runoff will have had an improvement in quality and quantity as compared with predevelopment condition.

Sanitary Servicing

- The anticipated peak sanitary peak flow for the proposed development to Four Seasons Lane is 13.85L/s.
- The sanitary demand calculations completed by GHD indicate that the future sanitary sewer was designed to accommodate a total flow rate of 11.9L/s.
- It is expected that this additional flow to the Four Seasons Lane sanitary sewer can be accommodated within the existing sanitary sewer without the need for external upgrades.

Water Servicing

- The average day, peak hour, and maximum day domestic flows for the development under proposed conditions has been calculated as 3.72L/s, 14.12L/s, and 5.57L/s, respectively.
- The calculated total fire flow demand was calculated as 200L/s for the largest townhouse block on the subject site using the Fire Underwriters Survey.
- A fire hydrant flow test will be scheduled during detailed design stage in order to verify that the existing 400mm watermain can meet the flow demands of the subject site while maintaining the minimum pressure requirements
- Additional confirmation of the fire and domestic branch sizing and fire flow requirements should be provided by the Mechanical Consultant at the Building Permit stage of approval.

Recommendations

The following recommendations are presented:

- The contractor shall locate and verify all dimensions, levels, inverts, and datums onsite and report any discrepancies or omissions to the engineer prior to construction.

In summary, the site can be adequately serviced in respect to water supply, sanitary drainage, stormwater drainage, and stormwater management.

Accordingly, we hereby recommend the adoption of this report as it relates to the provision of servicing works, and for the purposes of site plan application, and building permit application approvals. We trust that this Functional Servicing and Stormwater Management Report is sufficient for your purposes. If you have any questions or comments, please do not hesitate to contact the undersigned.

Sincerely,

TYLin

Prepared By:

Vinci Patrick,

E.I.T, Urban Development

Reviewed By:

Luan Phan, P.Eng.

Project Engineer, Urban Development

Appendix A

STORMWATER CALCULATIONS

STORM SEWER DESIGN SHEET

VO2 MODELLING OUTPUT

HYDRO-BRAKE OPTIMUM DESIGN

TYLin	Project:	**Brock Zents Townhomes**	Prepared by:	**V.P. / L.P.**
	Task:	**Runoff Coefficients**	Checked by:	**L.P. / B.D.**
	Date:	**March 21, 2024**	Project no.:	**18138**

Post-Development Site Statistics

Controlled to Brock Road North Clean Water Collector Pipe

	Area (m^2)	Runoff C
Landscape	2555	0.25
Impervious	12256	0.90
Roof	10222	0.90
Total	25033	

Total Combined Runoff C = 0.83
% Imperviousness = 90%

Uncontrolled to Brock Road North

	Area (m^2)	Runoff C
Landscape	340	0.25
Impervious	324	0.90
Roof	0	0.90
Total	664	

Total Combined Runoff C = 0.57
% Imperviousness = 49%

Uncontrolled to Zents Drive

	Area (m^2)	Runoff C
Landscape	468	0.25
Impervious	180	0.90
Roof	0	0.90
Total	648	

Total Combined Runoff C = 0.43
% Imperviousness = 28%

TYLin	Project: **Brock Zents Townhomes**	Prepared by: **V.P. / L.P.**
	Task: **Orifice Sizing Calculations**	Checked by: **L.P. / B.D.**
	Date: **April 19, 2022**	Project no.: **18138**

2-year post controlled to 6.91L/s/ha to CWC - Flow Regulator Design Parameters

Flow Regulator Invert =	126.13	masl	
Design Flow =	**17.30**	**L/s**	*controlled area x 6.91L/s/ha*
Storage Requirement =	660.0	m^3	
Stage Elevation =	128.04	masl	*from Cultec stage-storage sheet*
Design Head =	**1.91**	**m**	
Storage Achieved =	**661.0**	**m^3**	*at Stage Elevation, from Cultec sheet*

Notes:

Weir wall height / 10-year orifice to be set above the Design Head of the Flow Regulator
Refer to Hydrobrake design calculations in this Appendix for further details

100-year post controlled to 10-year pre to Regional STM - Orifice

Orifice Equation: $$Q = C \times A \times \sqrt{2gh}$$

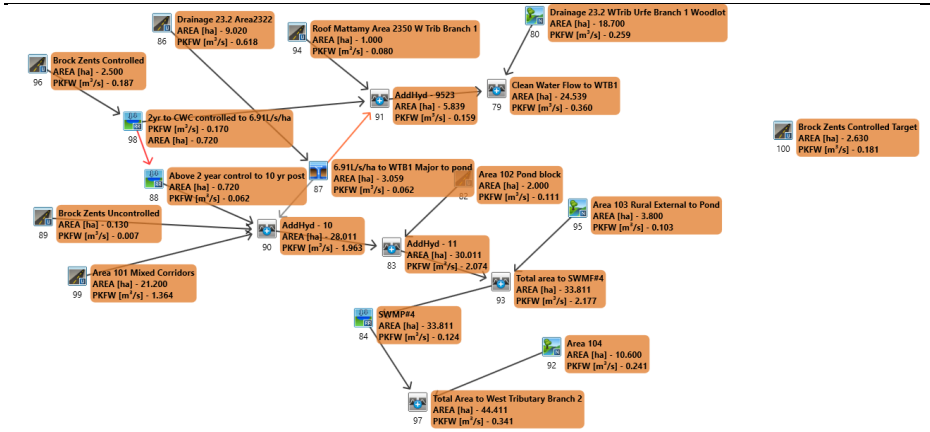
HWL =	128.81	*top of stone elevation*
Pipe Invert =	128.04	*stage elevation at which 2-year storage achieved*
Orifice Size =	320	mm
Orifice Area =	0.0804	m^2
Allowable Release Rate =	174.00	L/s
Discharge Coefficient =	0.62	
Head =	**0.61**	**m**
Orifice Flow =	0.173	m3/s
	172.50	**L/s**
Storage Achieved =	**395.7**	**m^3**
Total Storage Achieved =	**1056.7**	**m^3**

TYLin	Project:	**Brock Zents Townhomes**	Prepared by:	**V.P. / L.P.**
	Task:	**TSS / Quality Control Calculations**	Checked by:	**L.P. / B.D.**
	Date:	**March 21, 2024**	Project no.:	**18138**

Jellyfish TSS Removal (B) = 80%

Land Type	Treated / Untreated	Area (m^2)	TSS Rem. (A)	TSS Rem. with Oil Grit Separator (R)
Roof	Treated	10,222	100%	100%
Landscape	Treated	2,555	100%	100%
Impervious	Treated	12,256	0%	80%
Landscape	Untreated	808	100%	100%
Impervious	Untreated	504	0%	0%
TOTAL		26,346	**52%**	**89%**

NJDEP Calculation for TSS removal rates for BMP in Series:
R = A + B - [(AxB)/100]
A = TSS Removal rate from First (Upstream BMP)
B = TSS Removal rate from Second (Downstream BMP)



Run	NHYD	FlowType	DT [hr]	AREA [ha]	PKFW [m³/s]	TP [hr]	RV [mm]	DWF [m³/s]	Max. Used Vol [ha.m]
002 Year 12 Hour AES (Bloor, TRCA)	84	Outflow	0.250	32.097	0.089	8.500	27.998	0.000	0.734
005 Year 12 Hour AES (Bloor, TRCA)	84	Outflow	0.083	33.250	0.110	8.500	38.587	0.000	1.072
010 Year 12 Hour AES (Bloor, TRCA)	84	Outflow	0.083	33.811	0.124	8.500	45.950	0.000	1.312
025 Year 12 Hour AES (Bloor, TRCA)	84	Outflow	0.083	34.414	0.238	7.917	55.318	0.000	1.561
050 Year 12 Hour AES (Bloor, TRCA)	84	Outflow	0.083	34.759	0.297	7.750	62.368	0.000	1.743
100 Year 12 Hour AES (Bloor, TRCA)	84	Outflow	0.083	35.050	0.344	7.667	69.491	0.000	1.937

==========

V V I SSSSS U U A L (v 6.2.2015)
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

***** DETAILED OUTPUT *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\RCHUNG\AppData\Local\Civica\VH5\e784fed7-830f-4189-bdd3-6ad20df6e9b1\00e887a4-5f08-4539-bced-83d3127825bc\scena
Summary filename: C:\Users\RCHUNG\AppData\Local\Civica\VH5\e784fed7-830f-4189-bdd3-6ad20df6e9b1\00e887a4-5f08-4539-bced-83d3127825bc\scena

DATE: 03/21/2024 TIME: 10:50:45

USER:

COMMENTS: _____

****
** SIMULATION : 002 Year 12 Hour AES (Bloor, **
****

| READ STORM | Filename: C:\Users\RCHUNG\AppD
| | ata\Local\Temp\
| | df6539ff-395a-486e-bee4-a56417bf9b9d\f991e21f
| Ptotal= 42.00 mm | Comments:

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		

| CALIB |
| NASHYD (0062)| Area (ha)= 10.60 Curve Number (CN)= 74.0
|ID= 1 DT=15.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 2.00
U.H. Tp(hrs)= 0.44

Unit Hyd Qpeak (cms)= 0.620

PEAK FLOW (cms)= 0.112 (i)
TIME TO PEAK (hrs)= 5.500
RUNOFF VOLUME (mm)= 10.562
TOTAL RAINFALL (mm)= 42.000
RUNOFF COEFFICIENT = 0.251

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD  ( 0072)|  Area    (ha)=  3.80  Curve Number  (CN)= 74.0
|ID= 1 DT=15.0 min |  Ia      (mm)=  5.00  # of Linear Res.(N)= 2.00
--------------------  U.H. Tp(hrs)=  0.33

   Unit Hyd Qpeak  (cms)=  0.301

   PEAK FLOW      (cms)=  0.048 (i)
   TIME TO PEAK   (hrs)=  5.250
   RUNOFF VOLUME  (mm)=  10.334
   TOTAL RAINFALL (mm)=  42.000
   RUNOFF COEFFICIENT  =  0.246

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0057)|  Area    (ha)=  2.38
|ID= 1 DT=15.0 min |  Total Imp(%)= 91.00  Dir. Conn.(%)= 83.00
--------------------
                      IMPERVIOUS    PERVIOUS (i)
   Surface Area    (ha)=      2.17        0.21
   Dep. Storage    (mm)=      2.00        5.00
   Average Slope   (%)=       1.00        1.00
   Length          (m)=     125.96       40.00
   Mannings n          =      0.013       0.250

   Max.Eff.Inten.(mm/hr)=     19.32       21.95
         over (min)       15.00       30.00
   Storage Coeff.  (min)=     5.66 (ii)   21.60 (ii)
   Unit Hyd. Tpeak (min)=     15.00       30.00
   Unit Hyd. peak  (cms)=     0.11        0.05
                                    *TOTALS*
   PEAK FLOW      (cms)=      0.11        0.01        0.117 (iii)
   TIME TO PEAK   (hrs)=      5.25        5.25        5.25
   RUNOFF VOLUME  (mm)=      40.00       20.04       36.60
   TOTAL RAINFALL (mm)=      42.00       42.00       42.00
   RUNOFF COEFFICIENT  =      0.95        0.48        0.87

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

    (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
        CN*  =  78.0    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 (  0077)|  Area    (ha)=  0.16
|ID= 1 DT=15.0 min |  Total Imp(%)= 68.00  Dir. Conn.(%)= 55.00
--------------------
                      IMPERVIOUS    PERVIOUS (i)
   Surface Area    (ha)=      0.11        0.05
   Dep. Storage    (mm)=      2.00        5.00
   Average Slope   (%)=       1.00        1.00
   Length          (m)=      32.66       40.00
   Mannings n          =      0.013       0.250

   Max.Eff.Inten.(mm/hr)=     19.32       13.65
         over (min)       15.00       30.00
   Storage Coeff.  (min)=     2.52 (ii)   21.79 (ii)
   Unit Hyd. Tpeak (min)=     15.00       30.00
   Unit Hyd. peak  (cms)=     0.11        0.05
                                    *TOTALS*
   PEAK FLOW      (cms)=      0.00        0.00        0.006 (iii)
   TIME TO PEAK   (hrs)=      5.00        5.25        5.25
   RUNOFF VOLUME  (mm)=      40.00       16.53       29.39
   TOTAL RAINFALL (mm)=      42.00       42.00       42.00
   RUNOFF COEFFICIENT  =      0.95        0.39        0.70

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

    (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
        CN*  =  78.0    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  ( 0075)|
|  1 +  2 =  3    |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 1 ( 0057):    2.38   0.117     5.25    36.60
   + ID2= 2 ( 0077):    0.16   0.006     5.25    29.39
     ================================================
     ID = 3 ( 0075):    2.54   0.123     5.25    36.15

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0059)|    OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |    OUTFLOW    STORAGE   | OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |  (cms)     (ha.m.)
                       0.0000    0.0000    |  0.0176    0.0661

                          AREA     QPEAK     TPEAK      R.V.
```

```
                    (ha)    (cms)    (hrs)      (mm)
  INFLOW : ID= 2 (  0075)     2.540     0.123     5.25     36.15
  OUTFLOW: ID= 1 (  0059)     2.540     0.017     7.33     35.77
  OVERFLOW:ID= 3 (  0003)     0.000     0.000     0.00      0.00

            TOTAL NUMBER OF SIMULATION OVERFLOW  =    0
            CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
            PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

            PEAK   FLOW   REDUCTION [Qout/Qin](%)= 14.19
            TIME SHIFT OF PEAK FLOW       (min)=125.00
            MAXIMUM  STORAGE   USED      (ha.m.)=  0.0656

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0064)|    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   |   0.1800     0.1000
                  0.1776    0.0396   |   0.0000     0.0000

                     AREA     QPEAK     TPEAK      R.V.
                     (ha)     (cms)     (hrs)      (mm)
  INFLOW : ID= 2 (  0059)     0.000     0.000     0.00      0.00
  OUTFLOW: ID= 1 (  0064)     0.000     0.000     0.00       NaN

            PEAK   FLOW   REDUCTION [Qout/Qin](%)=   NaN
            TIME SHIFT OF PEAK FLOW       (min)=  0.00
            MAXIMUM  STORAGE   USED      (ha.m.)=  0.0000
            MAXIMUM  STORAGE   USED      (cu.m.)=  0.000000

    **** WARNING : HYDROGRAPH PEAK WAS NOT REDUCED.
                CHECK OUTFLOW/STORAGE TABLE  OR REDUCE DT.
--------------------------------------------------------------------------------
--------------------
| CALIB           |
| STANDHYD (  0065)|   Area    (ha)=   8.95
|ID= 1 DT=15.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=  63.00
--------------------
                       IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      7.07        1.88
    Dep. Storage     (mm)=      2.00        5.00
    Average Slope    (%)=       1.00        1.00
    Length           (m)=     244.27       40.00
    Mannings n           =      0.013       0.250

    Max.Eff.Inten.(mm/hr)=      19.32       19.69
           over (min)       15.00       30.00
    Storage Coeff.  (min)=      8.43 (ii)   25.07 (ii)
    Unit Hyd. Tpeak (min)=      15.00       30.00
    Unit Hyd. peak  (cms)=      0.09        0.04
                                   *TOTALS*
    PEAK FLOW      (cms)=       0.30        0.08        0.383 (iii)
    TIME TO PEAK   (hrs)=       5.25        5.25        5.25
    RUNOFF VOLUME  (mm)=       40.00       19.21       32.31
    TOTAL RAINFALL (mm)=       42.00       42.00       42.00
    RUNOFF COEFFICIENT  =       0.95        0.46        0.77

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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.

--------------------------------------------------------------------------------
--------------------
| DUHYD    (  0061)|
| Inlet Cap.= 0.062|
| #of Inlets=    1|
| Total(cms)=  0.1|     AREA     QPEAK     TPEAK     R.V.
--------------------      (ha)     (cms)     (hrs)     (mm)
    TOTAL HYD.(ID= 1):   8.95      0.38      5.25   32.31
    ================================================
    MAJOR SYS.(ID= 2):   4.91      0.32      5.25   32.31
    MINOR SYS.(ID= 3):   4.04      0.06      3.50   32.31

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB           |
| STANDHYD (  0068)|   Area    (ha)=   0.16
|ID= 1 DT=15.0 min |   Total Imp(%)=  35.00   Dir. Conn.(%)=  30.00
--------------------
                       IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      0.06        0.10
    Dep. Storage     (mm)=      2.00        5.00
    Average Slope    (%)=       1.00        1.00
    Length           (m)=      32.66       40.00
    Mannings n           =      0.013       0.250

    Max.Eff.Inten.(mm/hr)=      19.32        8.57
           over (min)       15.00       30.00
    Storage Coeff.  (min)=      2.52 (ii)   25.74 (ii)
    Unit Hyd. Tpeak (min)=      15.00       30.00
    Unit Hyd. peak  (cms)=      0.11        0.04
                                   *TOTALS*
    PEAK FLOW      (cms)=       0.00        0.00        0.004 (iii)
    TIME TO PEAK   (hrs)=       5.00        5.50        5.25
    RUNOFF VOLUME  (mm)=       40.00       13.43       21.32
    TOTAL RAINFALL (mm)=       42.00       42.00       42.00
    RUNOFF COEFFICIENT  =       0.95        0.32        0.51
```

```
***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  78.0    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 (  0071)|   Area    (ha)=  21.20
|ID= 1 DT=15.0 min |   Total Imp(%)=  71.00   Dir. Conn.(%)=  60.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=     15.05        6.15
    Dep. Storage     (mm)=      2.00        5.00
    Average Slope    (%)=      1.00        1.00
    Length           (m)=    375.94       40.00
    Mannings n           =     0.013       0.250

    Max.Eff.Inten.(mm/hr)=     19.32       13.21
            over (min)      15.00       45.00
    Storage Coeff.  (min)=     10.91 (ii)  30.44 (ii)
    Unit Hyd. Tpeak (min)=     15.00       45.00
    Unit Hyd. peak  (cms)=      0.08        0.03
                                    *TOTALS*
    PEAK FLOW      (cms)=      0.68        0.16         0.819 (iii)
    TIME TO PEAK   (hrs)=      5.25        5.50         5.25
    RUNOFF VOLUME  (mm)=      40.00       16.31        30.52
    TOTAL RAINFALL (mm)=      42.00       42.00        42.00
    RUNOFF COEFFICIENT  =      0.95        0.39         0.73

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  78.0    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  (  0058)|
|  1 +  2 =  3     |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0064 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0003 = HYDROGRAPH 0001
      ID1= 1 (  0061):    4.91   0.322     5.25    32.31
    + ID2= 2 (  0064):    0.00   0.000     0.00      NaN
      ==================================================
      ID = 3 (  0058):    4.91   0.322     5.25    32.31

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


--------------------
| ADD HYD  (  0058)|
|  3 +  2 =  1     |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
      ID1= 3 (  0058):    4.91   0.322     5.25    32.31
    + ID2= 2 (  0068):    0.16   0.004     5.25    21.32
      ==================================================
      ID = 1 (  0058):    5.07   0.326     5.25    31.96

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


--------------------
| ADD HYD  (  0058)|
|  1 +  2 =  3     |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0058):    5.07   0.326     5.25    31.96
    + ID2= 2 (  0071):   21.20   0.819     5.25    30.52
      ==================================================
      ID = 3 (  0058):   26.27   1.145     5.25    30.80

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0069)|   Area    (ha)=   2.00
|ID= 1 DT=15.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  40.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      1.00        1.00
    Dep. Storage     (mm)=      2.00        5.00
    Average Slope    (%)=      1.00        1.00
    Length           (m)=    115.47       40.00
    Mannings n           =     0.013       0.250

    Max.Eff.Inten.(mm/hr)=     19.32       10.39
            over (min)      15.00       30.00
    Storage Coeff.  (min)=      5.38 (ii)  26.87 (ii)
    Unit Hyd. Tpeak (min)=     15.00       30.00
    Unit Hyd. peak  (cms)=      0.11        0.04
                                    *TOTALS*
    PEAK FLOW      (cms)=      0.04        0.02         0.064 (iii)
    TIME TO PEAK   (hrs)=      5.25        5.50         5.25
    RUNOFF VOLUME  (mm)=      40.00       14.68        24.80
    TOTAL RAINFALL (mm)=      42.00       42.00        42.00
    RUNOFF COEFFICIENT  =      0.95        0.35         0.59

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
```

```
     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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  (  0063)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0058):   26.27   1.145     5.25    30.80
    + ID2= 2 (  0069):    2.00   0.064     5.25    24.80
      ================================================
      ID = 3 (  0063):   28.27   1.209     5.25    30.37

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


--------------------
| ADD HYD  (  0066)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0063):   28.27   1.209     5.25    30.37
    + ID2= 2 (  0072):    3.80   0.048     5.25    10.33
      ================================================
      ID = 3 (  0066):   32.07   1.257     5.25    28.00

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


--------------------
| RESERVOIR(  0073)|    OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 15.0 min     |    OUTFLOW    STORAGE   | OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)  |  (cms)     (ha.m.)
                    0.0000    0.0000   |  0.1220     1.3034
                    0.0820    0.6331   |  0.1550     1.4219
                    0.0900    0.7399   |  0.2320     1.5425
                    0.0970    0.8486   |  0.2750     1.6649
                    0.1040    0.9594   |  0.3100     1.7894
                    0.1100    1.0721   |  0.3400     1.9160
                    0.1160    1.1867   |  0.3670     2.0441

                        AREA     QPEAK     TPEAK      R.V.
                        (ha)     (cms)     (hrs)      (mm)
  INFLOW : ID= 2 (  0066)    32.067     1.257     5.25      28.00
  OUTFLOW: ID= 1 (  0073)    32.067     0.089     8.50      27.98

            PEAK   FLOW   REDUCTION [Qout/Qin](%)=  7.11
            TIME SHIFT OF PEAK FLOW        (min)=195.00
            MAXIMUM  STORAGE   USED       (ha.m.)=  0.7324

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


--------------------
| ADD HYD  (  0056)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0062):   10.60   0.112     5.50    10.56
    + ID2= 2 (  0073):   32.07   0.089     8.50    27.98
      ================================================
      ID = 3 (  0056):   42.67   0.181     5.50    23.65

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


--------------------
| CALIB            |
| NASHYD  (  0060)|  Area    (ha)=  18.70   Curve Number   (CN)= 74.0
|ID= 1 DT=15.0 min |  Ia      (mm)=   5.00   # of Linear Res.(N)= 2.00
--------------------  U.H. Tp(hrs)=   1.05

   Unit Hyd Qpeak  (cms)=   0.461

   PEAK FLOW      (cms)=   0.122 (i)
   TIME TO PEAK   (hrs)=   6.500
   RUNOFF VOLUME  (mm)=  10.793
   TOTAL RAINFALL  (mm)=  42.000
   RUNOFF COEFFICIENT  =   0.257

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

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


--------------------
| CALIB            |
| STANDHYD (  0067)|  Area    (ha)=   1.00
|ID= 1 DT=15.0 min |  Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
   Surface Area    (ha)=      0.99         0.01
   Dep. Storage    (mm)=      2.00         1.50
   Average Slope   (%)=       1.00         1.00
   Length          (m)=      81.65        40.00
   Mannings n          =      0.013        0.250

   Max.Eff.Inten.(mm/hr)=     19.32         8.33
           over (min)        15.00        30.00
   Storage Coeff.  (min)=     4.37 (ii)   27.84 (ii)
   Unit Hyd. Tpeak (min)=     15.00        30.00
   Unit Hyd. peak  (cms)=      0.11         0.04
                                *TOTALS*
   PEAK FLOW      (cms)=      0.05         0.00         0.053 (iii)
   TIME TO PEAK   (hrs)=      5.25         5.50          5.25
   RUNOFF VOLUME  (mm)=      40.00        14.63         39.74
   TOTAL RAINFALL  (mm)=     42.00        42.00         42.00
   RUNOFF COEFFICIENT  =      0.95         0.35          0.95
```

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 78.0 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 (0070)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
---------- (ha) (cms) (hrs) (mm)
ID1= 1 (0059): 2.54 0.017 7.33 35.77
+ ID2= 2 (0061): 4.04 0.062 3.50 32.31
==========
ID = 3 (0070): 6.58 0.079 7.25 33.64

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (0070)|
| 3 + 2 = 1 | AREA QPEAK TPEAK R.V.
---------- (ha) (cms) (hrs) (mm)
ID1= 3 (0070): 6.58 0.079 7.25 33.64
+ ID2= 2 (0067): 1.00 0.053 5.25 39.74
==========
ID = 1 (0070): 7.58 0.129 5.25 34.44

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (0074)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
---------- (ha) (cms) (hrs) (mm)
ID1= 1 (0060): 18.70 0.122 6.50 10.79
+ ID2= 2 (0070): 7.58 0.129 5.25 34.44
==========
ID = 3 (0074): 26.28 0.215 6.25 17.62

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB |
| STANDHYD (0078)| Area (ha)= 2.70
|ID= 1 DT=15.0 min | Total Imp(%)= 79.00 Dir. Conn.(%)= 63.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 2.13 0.57
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.00 1.00
Length (m)= 134.16 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 19.32 19.69
over (min) 15.00 30.00
Storage Coeff. (min)= 5.88 (ii) 22.53 (ii)
Unit Hyd. Tpeak (min)= 15.00 30.00
Unit Hyd. peak (cms)= 0.10 0.04
TOTALS
PEAK FLOW (cms)= 0.09 0.03 0.117 (iii)
TIME TO PEAK (hrs)= 5.25 5.25 5.25
RUNOFF VOLUME (mm)= 40.00 19.21 32.30
TOTAL RAINFALL (mm)= 42.00 42.00 42.00
RUNOFF COEFFICIENT = 0.95 0.46 0.77

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 78.0 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 |
| NASHYD (0080)| Area (ha)= 18.70 Curve Number (CN)= 74.0
|ID= 1 DT=15.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 2.00
---------- U.H. Tp(hrs)= 1.05

Unit Hyd Qpeak (cms)= 0.461

PEAK FLOW (cms)= 0.122 (i)
TIME TO PEAK (hrs)= 6.500
RUNOFF VOLUME (mm)= 10.793
TOTAL RAINFALL (mm)= 42.000
RUNOFF COEFFICIENT = 0.257

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

| CALIB |
| STANDHYD (0096)| Area (ha)= 2.50
|ID= 1 DT=15.0 min | Total Imp(%)= 90.00 Dir. Conn.(%)= 72.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 2.25 0.25
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.00 1.00
Length (m)= 129.10 40.00

```
   Mannings n          =     0.013       0.250

   Max.Eff.Inten.(mm/hr)=     19.32       40.56
         over (min)      15.00       30.00
   Storage Coeff.  (min)=     5.75 (ii)   18.21 (ii)
   Unit Hyd. Tpeak (min)=     15.00       30.00
   Unit Hyd. peak  (cms)=     0.10        0.05
                                    *TOTALS*
   PEAK FLOW      (cms)=      0.10        0.02        0.121 (iii)
   TIME TO PEAK   (hrs)=      5.25        5.25        5.25
   RUNOFF VOLUME  (mm)=      40.00       24.58       35.68
   TOTAL RAINFALL (mm)=      42.00       42.00       42.00
   RUNOFF COEFFICIENT  =      0.95        0.59        0.85

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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(  0098)|    OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |    OUTFLOW    STORAGE   | OUTFLOW    STORAGE
--------------------      (cms)    (ha.m.)   |  (cms)     (ha.m.)
                       0.0000     0.0000    |  0.0172     0.0661

                          AREA     QPEAK     TPEAK       R.V.
                          (ha)     (cms)     (hrs)       (mm)
  INFLOW : ID= 2 (  0096)     2.500     0.121     5.25      35.68
  OUTFLOW: ID= 1 (  0098)     2.500     0.017     7.33      35.29
  OVERFLOW:ID= 3 (  0003)     0.000     0.000     0.00       0.00

            TOTAL NUMBER OF SIMULATION OVERFLOW  =    0
            CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
            PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

            PEAK   FLOW   REDUCTION [Qout/Qin](%)= 13.81
            TIME SHIFT OF PEAK FLOW        (min)=125.00
            MAXIMUM  STORAGE   USED      (ha.m.)=  0.0640

--------------------------------------------------------------------------------
--------------------
| CALIB           |
| STANDHYD (  0086)|   Area    (ha)=   9.02
|ID= 1 DT=15.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=  63.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
   Surface Area     (ha)=       7.13        1.89
   Dep. Storage     (mm)=       2.00        5.00
   Average Slope    (%)=        1.00        1.00
   Length           (m)=      245.22       40.00
   Mannings n          =      0.013       0.250

   Max.Eff.Inten.(mm/hr)=     19.32       19.69
         over (min)      15.00       30.00
   Storage Coeff.  (min)=     8.45 (ii)   25.09 (ii)
   Unit Hyd. Tpeak (min)=     15.00       30.00
   Unit Hyd. peak  (cms)=     0.09        0.04
                                    *TOTALS*
   PEAK FLOW      (cms)=      0.30        0.08        0.386 (iii)
   TIME TO PEAK   (hrs)=      5.25        5.25        5.25
   RUNOFF VOLUME  (mm)=      40.00       19.21       32.31
   TOTAL RAINFALL (mm)=      42.00       42.00       42.00
   RUNOFF COEFFICIENT  =      0.95        0.46        0.77

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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.

--------------------------------------------------------------------------------
--------------------
| DUHYD    (  0087)|
| Inlet Cap.= 0.062|
| #of Inlets=    1|
| Total(cms)=  0.1|     AREA     QPEAK     TPEAK     R.V.
--------------------      (ha)     (cms)     (hrs)     (mm)
   TOTAL HYD.(ID= 1):  9.02     0.39      5.25   32.31
   ==================================================
   MAJOR SYS.(ID= 2):  4.97     0.32      5.25   32.31
   MINOR SYS.(ID= 3):  4.05     0.06      3.50   32.31

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB           |
| STANDHYD (  0094)|   Area    (ha)=   1.00
|ID= 1 DT=15.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
   Surface Area     (ha)=       0.99        0.01
   Dep. Storage     (mm)=       2.00        1.50
   Average Slope    (%)=        1.00        1.00
   Length           (m)=       81.65       40.00
   Mannings n          =      0.013       0.250

   Max.Eff.Inten.(mm/hr)=     19.32        8.33
         over (min)      15.00       30.00
```

```
   Storage Coeff. (min)=      4.37 (ii)   27.84 (ii)
   Unit Hyd. Tpeak (min)=     15.00       30.00
   Unit Hyd. peak  (cms)=      0.11        0.04
                               *TOTALS*
   PEAK FLOW      (cms)=      0.05        0.00        0.053 (iii)
   TIME TO PEAK   (hrs)=      5.25        5.50        5.25
   RUNOFF VOLUME  (mm)=      40.00       14.63       39.74
   TOTAL RAINFALL (mm)=      42.00       42.00       42.00
   RUNOFF COEFFICIENT =       0.95        0.35        0.95

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0   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  (  0091)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 1 (  0087):    4.05   0.062    3.50    32.31
   + ID2= 2 (  0094):    1.00   0.053    5.25    39.74
     ================================================
     ID = 3 (  0091):    5.05   0.115    5.25    33.78

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

--------------------
| ADD HYD  (  0091)|
|  3 +  2 =  1   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 3 (  0091):    5.05   0.115    5.25    33.78
   + ID2= 2 (  0098):    2.50   0.017    7.33    35.29
     ================================================
     ID = 1 (  0091):    7.55   0.127    5.25    34.28

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

--------------------
| ADD HYD  (  0079)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 1 (  0080):   18.70   0.122    6.50    10.79
   + ID2= 2 (  0091):    7.55   0.127    5.25    34.28
     ================================================
     ID = 3 (  0079):   26.25   0.214    6.25    17.55

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

--------------------
| CALIB          |
| NASHYD  (  0092)|  Area   (ha)=  10.60  Curve Number  (CN)= 74.0
|ID= 1 DT=15.0 min |  Ia     (mm)=  5.00  # of Linear Res.(N)= 2.00
--------------------  U.H. Tp(hrs)=  0.44

   Unit Hyd Qpeak  (cms)=  0.620

   PEAK FLOW      (cms)=  0.112 (i)
   TIME TO PEAK   (hrs)=  5.500
   RUNOFF VOLUME  (mm)=  10.562
   TOTAL RAINFALL (mm)=  42.000
   RUNOFF COEFFICIENT  =  0.251

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

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

--------------------
| CALIB          |
| NASHYD  (  0095)|  Area   (ha)=  3.80  Curve Number  (CN)= 74.0
|ID= 1 DT=15.0 min |  Ia     (mm)=  5.00  # of Linear Res.(N)= 2.00
--------------------  U.H. Tp(hrs)=  0.33

   Unit Hyd Qpeak  (cms)=  0.301

   PEAK FLOW      (cms)=  0.048 (i)
   TIME TO PEAK   (hrs)=  5.250
   RUNOFF VOLUME  (mm)=  10.334
   TOTAL RAINFALL (mm)=  42.000
   RUNOFF COEFFICIENT  =  0.246

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

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

--------------------
| RESERVOIR(  0088)|    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   |  0.1800    0.1000
                      0.1725    0.0396   |  0.0000    0.0000

                          AREA    QPEAK    TPEAK      R.V.
                          (ha)    (cms)    (hrs)      (mm)
  INFLOW : ID= 2 (  0098)    0.000    0.000     0.00      0.00
  OUTFLOW: ID= 1 (  0088)    0.000    0.000     0.00       NaN

            PEAK  FLOW  REDUCTION [Qout/Qin](%)=   NaN
            TIME SHIFT OF PEAK FLOW        (min)=  0.00
            MAXIMUM  STORAGE  USED      (ha.m.)=  0.0000
            MAXIMUM  STORAGE  USED      (cu.m.)=  0.000000
```

```
    **** WARNING : HYDROGRAPH PEAK WAS NOT REDUCED.
                CHECK OUTFLOW/STORAGE TABLE  OR REDUCE DT.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0089)|   Area    (ha)=  0.13
|ID= 1 DT=15.0 min |   Total Imp(%)=  41.00   Dir. Conn.(%)=  30.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      0.05        0.08
    Dep. Storage     (mm)=      2.00        5.00
    Average Slope    (%)=       1.00        1.00
    Length           (m)=      29.44       40.00
    Mannings n           =      0.013       0.250

    Max.Eff.Inten.(mm/hr)=      19.32       10.19
            over (min)       15.00       30.00
    Storage Coeff.  (min)=      2.37 (ii)   24.03 (ii)
    Unit Hyd. Tpeak (min)=      15.00       30.00
    Unit Hyd. peak  (cms)=      0.11        0.04
                                    *TOTALS*
    PEAK FLOW      (cms)=       0.00        0.00         0.004 (iii)
    TIME TO PEAK   (hrs)=       5.00        5.50         5.25
    RUNOFF VOLUME  (mm)=       40.00       14.54        22.10
    TOTAL RAINFALL (mm)=       42.00       42.00        42.00
    RUNOFF COEFFICIENT  =      0.95        0.35         0.53

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  78.0    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 (  0099)|   Area    (ha)=  21.20
|ID= 1 DT=15.0 min |   Total Imp(%)=  71.00   Dir. Conn.(%)=  60.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      15.05        6.15
    Dep. Storage     (mm)=      2.00        5.00
    Average Slope    (%)=       1.00        1.00
    Length           (m)=     375.94       40.00
    Mannings n           =      0.013       0.250

    Max.Eff.Inten.(mm/hr)=      19.32       13.21
            over (min)       15.00       45.00
    Storage Coeff.  (min)=      10.91 (ii)  30.44 (ii)
    Unit Hyd. Tpeak (min)=      15.00       45.00
    Unit Hyd. peak  (cms)=      0.08        0.03
                                    *TOTALS*
    PEAK FLOW      (cms)=       0.68        0.16         0.819 (iii)
    TIME TO PEAK   (hrs)=       5.25        5.50         5.25
    RUNOFF VOLUME  (mm)=       40.00       16.31        30.52
    TOTAL RAINFALL (mm)=       42.00       42.00        42.00
    RUNOFF COEFFICIENT  =      0.95        0.39         0.73

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  78.0    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  (  0090)|
|  1 +  2 =  3     |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0088 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0003 = HYDROGRAPH 0001
       ID1= 1 (  0087):    4.97   0.325     5.25    32.31
     + ID2= 2 (  0088):    0.00   0.000     0.00      NaN
       ================================================
       ID = 3 (  0090):    4.97   0.325     5.25    32.31

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

--------------------
| ADD HYD  (  0090)|
|  3 +  2 =  1     |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0090):    4.97   0.325     5.25    32.31
     + ID2= 2 (  0089):    0.13   0.004     5.25    22.10
       ================================================
       ID = 1 (  0090):    5.10   0.328     5.25    32.05

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

--------------------
| ADD HYD  (  0090)|
|  1 +  2 =  3     |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0090):    5.10   0.328     5.25    32.05
     + ID2= 2 (  0099):   21.20   0.819     5.25    30.52
       ================================================
       ID = 3 (  0090):   26.30   1.147     5.25    30.82
```

```
   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0082)|   Area    (ha)=   2.00
|ID= 1 DT=15.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  40.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
   Surface Area     (ha)=      1.00        1.00
   Dep. Storage     (mm)=      2.00        5.00
   Average Slope    (%)=       1.00        1.00
   Length           (m)=     115.47       40.00
   Mannings n       =        0.013       0.250

   Max.Eff.Inten.(mm/hr)=     19.32       10.39
           over (min)        15.00       30.00
   Storage Coeff.  (min)=     5.38 (ii)   26.87 (ii)
   Unit Hyd. Tpeak (min)=     15.00       30.00
   Unit Hyd. peak  (cms)=     0.11        0.04
                              *TOTALS*
   PEAK FLOW      (cms)=      0.04        0.02        0.064 (iii)
   TIME TO PEAK   (hrs)=      5.25        5.50        5.25
   RUNOFF VOLUME  (mm)=      40.00       14.68       24.80
   TOTAL RAINFALL (mm)=      42.00       42.00       42.00
   RUNOFF COEFFICIENT =      0.95        0.35        0.59

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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  (  0083)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
--------------------      (ha)    (cms)    (hrs)     (mm)
     ID1= 1 (  0082):    2.00   0.064     5.25    24.80
   + ID2= 2 (  0090):   26.30   1.147     5.25    30.82
     ================================================
     ID = 3 (  0083):   28.30   1.211     5.25    30.39

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


--------------------
| ADD HYD  (  0093)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
--------------------      (ha)    (cms)    (hrs)     (mm)
     ID1= 1 (  0083):   28.30   1.211     5.25    30.39
   + ID2= 2 (  0095):    3.80   0.048     5.25    10.33
     ================================================
     ID = 3 (  0093):   32.10   1.260     5.25    28.02

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0084)|    OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 15.0 min     |    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |  (cms)      (ha.m.)
                        0.0000    0.0000    |  0.1220     1.3034
                        0.0820    0.6331    |  0.1550     1.4219
                        0.0900    0.7399    |  0.2320     1.5425
                        0.0970    0.8486    |  0.2750     1.6649
                        0.1040    0.9594    |  0.3100     1.7894
                        0.1100    1.0721    |  0.3400     1.9160
                        0.1160    1.1867    |  0.3670     2.0441

                            AREA     QPEAK     TPEAK      R.V.
                            (ha)     (cms)     (hrs)      (mm)
  INFLOW : ID= 2 (  0093)    32.097     1.260      5.25      28.02
  OUTFLOW: ID= 1 (  0084)    32.097     0.089      8.50      28.00

            PEAK   FLOW   REDUCTION [Qout/Qin](%)=  7.11
            TIME SHIFT OF PEAK FLOW        (min)=195.00
            MAXIMUM  STORAGE   USED       (ha.m.)=  0.7336

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


--------------------
| ADD HYD  (  0097)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
--------------------      (ha)    (cms)    (hrs)     (mm)
     ID1= 1 (  0084):   32.10   0.089     8.50    28.00
   + ID2= 2 (  0092):   10.60   0.112     5.50    10.56
     ================================================
     ID = 3 (  0097):   42.70   0.181     5.50    23.67

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0100)|   Area    (ha)=   2.63
|ID= 1 DT=15.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=  63.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
   Surface Area     (ha)=      2.08        0.55
   Dep. Storage     (mm)=      2.00        5.00
   Average Slope    (%)=       1.00        1.00
   Length           (m)=     132.41       40.00
   Mannings n       =        0.013       0.250
```

```
   Max.Eff.Inten.(mm/hr)=     19.32       19.69
         over (min)      15.00       30.00
   Storage Coeff. (min)=      5.84 (ii)   22.48 (ii)
   Unit Hyd. Tpeak (min)=     15.00       30.00
   Unit Hyd. peak (cms)=      0.10        0.04
                              *TOTALS*
   PEAK FLOW      (cms)=      0.09        0.02        0.114 (iii)
   TIME TO PEAK   (hrs)=      5.25        5.25         5.25
   RUNOFF VOLUME  (mm)=      40.00       19.21        32.30
   TOTAL RAINFALL (mm)=      42.00       42.00        42.00
   RUNOFF COEFFICIENT =       0.95        0.46         0.77

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

    (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
        CN*  =  78.0   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.

--------------------------------------------------------------------------------
================================================================================
======================

    V   V  I   SSSSS  U   U   A   L          (v 6.2.2015)
    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 M  O   O
     OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2022 Smart City Water Inc
All rights reserved.


          ***** 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\RCHUNG\AppData\Local\Civica\VH5\e784fed7-830f-4189-bdd3-
6ad20df6e9b1\3c7a3c36-5d69-41e4-845d-391ba05e2ca9\scena
  Summary filename: C:\Users\RCHUNG\AppData\Local\Civica\VH5\e784fed7-830f-4189-bdd3-
6ad20df6e9b1\3c7a3c36-5d69-41e4-845d-391ba05e2ca9\scena


DATE: 03/21/2024                  TIME: 10:50:47

USER:

COMMENTS: _____

--------------------------------------------------------------------------------------------------
 ************************************************
 ** SIMULATION : 005 Year 12 Hour AES (Bloor,  **
 ************************************************


--------------------
|   READ STORM    |    Filename: C:\Users\RCHUNG\AppD
|                 |           ata\Local\Temp\
|                 |           df6539ff-395a-486e-bee4-a56417bf9b9d\3ac6b67c
| Ptotal= 54.38 mm |    Comments:
--------------------
          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 |

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

--------------------
| CALIB           |
| NASHYD  (  0062)|   Area    (ha)=  10.60   Curve Number   (CN)= 74.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 2.00
--------------------  U.H. Tp(hrs)=   0.44

   Unit Hyd Qpeak  (cms)=   0.620

   PEAK FLOW      (cms)=   0.184 (i)
   TIME TO PEAK   (hrs)=   5.250
   RUNOFF VOLUME  (mm)=  17.132
   TOTAL RAINFALL (mm)=  54.380
   RUNOFF COEFFICIENT  =   0.315

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

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

```
| CALIB          |
| NASHYD  ( 0072)|  Area   (ha)=  3.80  Curve Number  (CN)= 74.0
|ID= 1 DT=15.0 min |  Ia     (mm)=  5.00  # of Linear Res.(N)= 2.00
--------------------  U.H. Tp(hrs)=  0.33

   Unit Hyd Qpeak  (cms)=  0.301

   PEAK FLOW      (cms)=  0.079 (i)
   TIME TO PEAK   (hrs)=  5.250
   RUNOFF VOLUME  (mm)=  16.762
   TOTAL RAINFALL  (mm)=  54.380
   RUNOFF COEFFICIENT  =  0.308

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

--------------------------------------------------------------------------------
--------------------
| CALIB          |
| STANDHYD (  0057)|  Area   (ha)=  2.38
|ID= 1 DT=15.0 min |  Total Imp(%)= 91.00  Dir. Conn.(%)= 83.00
--------------------
                     IMPERVIOUS    PERVIOUS (i)
   Surface Area    (ha)=      2.17        0.21
   Dep. Storage    (mm)=      2.00        5.00
   Average Slope   (%)=       1.00        1.00
   Length          (m)=     125.96       40.00
   Mannings n      =        0.013       0.250

   Max.Eff.Inten.(mm/hr)=     25.02       33.66
         over (min)      15.00       30.00
   Storage Coeff.  (min)=     5.11 (ii)   18.54 (ii)
   Unit Hyd. Tpeak (min)=     15.00       30.00
   Unit Hyd. peak  (cms)=     0.11        0.05
                              *TOTALS*
   PEAK FLOW      (cms)=      0.14        0.02        0.154 (iii)
   TIME TO PEAK   (hrs)=      5.25        5.25        5.25
   RUNOFF VOLUME  (mm)=      52.38       29.85       48.54
   TOTAL RAINFALL  (mm)=     54.38       54.38       54.38
   RUNOFF COEFFICIENT  =     0.96        0.55        0.89

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

    (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
        CN*  =  78.0   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 (  0077)|  Area   (ha)=  0.16
|ID= 1 DT=15.0 min |  Total Imp(%)= 68.00  Dir. Conn.(%)= 55.00
--------------------
                     IMPERVIOUS    PERVIOUS (i)
   Surface Area    (ha)=      0.11        0.05
   Dep. Storage    (mm)=      2.00        5.00
   Average Slope   (%)=       1.00        1.00
   Length          (m)=      32.66       40.00
   Mannings n      =        0.013       0.250

   Max.Eff.Inten.(mm/hr)=     25.02       20.74
         over (min)      15.00       30.00
   Storage Coeff.  (min)=     2.27 (ii)   18.58 (ii)
   Unit Hyd. Tpeak (min)=     15.00       30.00
   Unit Hyd. peak  (cms)=     0.11        0.05
                              *TOTALS*
   PEAK FLOW      (cms)=      0.01        0.00        0.009 (iii)
   TIME TO PEAK   (hrs)=      5.00        5.25        5.25
   RUNOFF VOLUME  (mm)=      52.38       25.38       40.17
   TOTAL RAINFALL  (mm)=     54.38       54.38       54.38
   RUNOFF COEFFICIENT  =     0.96        0.47        0.74

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

    (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
        CN*  =  78.0   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  ( 0075)|
|  1 +  2 =  3    |      AREA    QPEAK    TPEAK     R.V.
--------------------      (ha)    (cms)    (hrs)     (mm)
     ID1= 1 (  0057):    2.38   0.154     5.25    48.54
   + ID2= 2 (  0077):    0.16   0.009     5.25    40.17
     ================================================
     ID = 3 (  0075):    2.54   0.163     5.25    48.02

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0059)|    OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |  (cms)     (ha.m.)
                        0.0000     0.0000    |  0.0176     0.0661

                          AREA     QPEAK     TPEAK      R.V.
                          (ha)     (cms)     (hrs)      (mm)
  INFLOW : ID= 2 (  0075)     2.540     0.163     5.25     48.02
  OUTFLOW: ID= 1 (  0059)     2.025     0.018     5.25     47.64
  OVERFLOW:ID= 3 (  0003)     0.515     0.145     5.25     47.64
```

```
            TOTAL NUMBER OF SIMULATION OVERFLOW  =    24
            CUMULATIVE TIME OF OVERFLOW  (HOURS) =  2.00
            PERCENTAGE OF TIME OVERFLOWING   (%) =  3.72

            PEAK   FLOW   REDUCTION [Qout/Qin](%)= 10.81
            TIME SHIFT OF PEAK FLOW        (min)=  0.00
            MAXIMUM  STORAGE   USED      (ha.m.)=  0.0659

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0064)|    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   |  0.1800     0.1000
                    0.1776    0.0396   |  0.0000     0.0000

                        AREA     QPEAK     TPEAK      R.V.
                        (ha)     (cms)     (hrs)      (mm)
  INFLOW : ID= 2 (  0059)     0.515     0.145     5.25     47.64
  OUTFLOW: ID= 1 (  0064)     0.515     0.038     5.67     47.64

            PEAK   FLOW   REDUCTION [Qout/Qin](%)= 26.31
            TIME SHIFT OF PEAK FLOW        (min)= 25.00
            MAXIMUM  STORAGE   USED      (ha.m.)=  0.0085

--------------------------------------------------------------------------------
--------------------
| CALIB           |
| STANDHYD (  0065)|   Area    (ha)=   8.95
|ID= 1 DT=15.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=  63.00
--------------------
                       IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      7.07        1.88
    Dep. Storage     (mm)=      2.00        5.00
    Average Slope    (%)=       1.00        1.00
    Length           (m)=     244.27       40.00
    Mannings n           =      0.013       0.250

    Max.Eff.Inten.(mm/hr)=     25.02       30.50
           over (min)       15.00       30.00
    Storage Coeff.  (min)=      7.60 (ii)   21.57 (ii)
    Unit Hyd. Tpeak (min)=     15.00       30.00
    Unit Hyd. peak  (cms)=      0.10        0.05
                                   *TOTALS*
    PEAK FLOW       (cms)=      0.39        0.13         0.520 (iii)
    TIME TO PEAK    (hrs)=      5.25        5.25         5.25
    RUNOFF VOLUME    (mm)=     52.38       28.81        43.66
    TOTAL RAINFALL   (mm)=     54.38       54.38        54.38
    RUNOFF COEFFICIENT   =      0.96        0.53         0.80

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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.

--------------------------------------------------------------------------------
--------------------
| DUHYD    (  0061)|
| Inlet Cap.= 0.062|
| #of Inlets=     1|
| Total(cms)=  0.1|     AREA     QPEAK     TPEAK     R.V.
--------------------      (ha)     (cms)     (hrs)     (mm)
    TOTAL HYD.(ID= 1):  8.95      0.52      5.25   43.66
    ================================================
    MAJOR SYS.(ID= 2):  5.59      0.46      5.25   43.66
    MINOR SYS.(ID= 3):  3.36      0.06      3.50   43.66

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB           |
| STANDHYD (  0068)|   Area    (ha)=   0.16
|ID= 1 DT=15.0 min |   Total Imp(%)=  35.00   Dir. Conn.(%)=  30.00
--------------------
                       IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      0.06        0.10
    Dep. Storage     (mm)=      2.00        5.00
    Average Slope    (%)=       1.00        1.00
    Length           (m)=      32.66       40.00
    Mannings n           =      0.013       0.250

    Max.Eff.Inten.(mm/hr)=     25.02       13.46
           over (min)       15.00       30.00
    Storage Coeff.  (min)=      2.27 (ii)   21.65 (ii)
    Unit Hyd. Tpeak (min)=     15.00       30.00
    Unit Hyd. peak  (cms)=      0.11        0.05
                                   *TOTALS*
    PEAK FLOW       (cms)=      0.00        0.00         0.006 (iii)
    TIME TO PEAK    (hrs)=      5.00        5.25         5.25
    RUNOFF VOLUME    (mm)=     52.38       21.28        30.51
    TOTAL RAINFALL   (mm)=     54.38       54.38        54.38
    RUNOFF COEFFICIENT   =      0.96        0.39         0.56

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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 (  0071)|   Area    (ha)=  21.20
|ID= 1 DT=15.0 min |   Total Imp(%)=  71.00   Dir. Conn.(%)=  60.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=     15.05        6.15
    Dep. Storage     (mm)=      2.00        5.00
    Average Slope    (%)=      1.00        1.00
    Length           (m)=    375.94       40.00
    Mannings n       =       0.013       0.250

    Max.Eff.Inten.(mm/hr)=     25.02       20.12
            over (min)      15.00       30.00
    Storage Coeff.  (min)=     9.84 (ii)   26.34 (ii)
    Unit Hyd. Tpeak (min)=     15.00       30.00
    Unit Hyd. peak  (cms)=     0.09        0.04
                                  *TOTALS*
    PEAK FLOW      (cms)=      0.88        0.27         1.149 (iii)
    TIME TO PEAK   (hrs)=      5.25        5.25         5.25
    RUNOFF VOLUME  (mm)=      52.38       25.08        41.46
    TOTAL RAINFALL (mm)=      54.38       54.38        54.38
    RUNOFF COEFFICIENT  =      0.96        0.46         0.76

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  78.0    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  (  0058)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0061):    5.59   0.458     5.25    43.66
    + ID2= 2 (  0064):    0.52   0.038     5.67    47.64
      ================================================
      ID = 3 (  0058):    6.10   0.467     5.25    43.99

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

--------------------
| ADD HYD  (  0058)|
|  3 +  2 =  1   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
      ID1= 3 (  0058):    6.10   0.467     5.25    43.99
    + ID2= 2 (  0068):    0.16   0.006     5.25    30.51
      ================================================
      ID = 1 (  0058):    6.26   0.474     5.25    43.65

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

--------------------
| ADD HYD  (  0058)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0058):    6.26   0.474     5.25    43.65
    + ID2= 2 (  0071):   21.20   1.149     5.25    41.46
      ================================================
      ID = 3 (  0058):   27.46   1.623     5.25    41.96

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0069)|   Area    (ha)=   2.00
|ID= 1 DT=15.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  40.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      1.00        1.00
    Dep. Storage     (mm)=      2.00        5.00
    Average Slope    (%)=      1.00        1.00
    Length           (m)=    115.47       40.00
    Mannings n       =       0.013       0.250

    Max.Eff.Inten.(mm/hr)=     25.02       16.10
            over (min)      15.00       30.00
    Storage Coeff.  (min)=     4.85 (ii)   22.89 (ii)
    Unit Hyd. Tpeak (min)=     15.00       30.00
    Unit Hyd. peak  (cms)=     0.11        0.04
                                  *TOTALS*
    PEAK FLOW      (cms)=      0.06        0.04         0.091 (iii)
    TIME TO PEAK   (hrs)=      5.25        5.25         5.25
    RUNOFF VOLUME  (mm)=      52.38       22.94        34.71
    TOTAL RAINFALL (mm)=      54.38       54.38        54.38
    RUNOFF COEFFICIENT  =      0.96        0.42         0.64

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  78.0    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  (  0063)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
-------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 1 (  0058):    27.46   1.623     5.25    41.96
   + ID2= 2 (  0069):     2.00   0.091     5.25    34.71
     ================================================
     ID = 3 (  0063):    29.46   1.715     5.25    41.47

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


--------------------
| ADD HYD  (  0066)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
-------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 1 (  0063):    29.46   1.715     5.25    41.47
   + ID2= 2 (  0072):     3.80   0.079     5.25    16.76
     ================================================
     ID = 3 (  0066):    33.26   1.794     5.25    38.65

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0073)|    OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 15.0 min     |    OUTFLOW    STORAGE   | OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |  (cms)     (ha.m.)
                  0.0000    0.0000   |  0.1220     1.3034
                  0.0820    0.6331   |  0.1550     1.4219
                  0.0900    0.7399   |  0.2320     1.5425
                  0.0970    0.8486   |  0.2750     1.6649
                  0.1040    0.9594   |  0.3100     1.7894
                  0.1100    1.0721   |  0.3400     1.9160
                  0.1160    1.1867   |  0.3670     2.0441

                       AREA     QPEAK     TPEAK      R.V.
                       (ha)     (cms)     (hrs)      (mm)
  INFLOW : ID= 2 (  0066)     33.264     1.794      5.25      38.65
  OUTFLOW: ID= 1 (  0073)     33.264     0.110      8.50      38.59

            PEAK   FLOW   REDUCTION [Qout/Qin](%)=  6.13
            TIME SHIFT OF PEAK FLOW        (min)=195.00
            MAXIMUM  STORAGE   USED       (ha.m.)=  1.0725

    **** WARNING : SELECTED ROUTING TIME STEP DENIED.
--------------------------------------------------------------------------------


--------------------
| ADD HYD  (  0056)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
-------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 1 (  0062):    10.60   0.184     5.25    17.13
   + ID2= 2 (  0073):    33.26   0.110     8.50    38.59
     ================================================
     ID = 3 (  0056):    43.86   0.276     5.50    33.40

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD  (  0060)|   Area    (ha)=  18.70   Curve Number   (CN)= 74.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 2.00
-------------------  U.H. Tp(hrs)=   1.05

   Unit Hyd Qpeak  (cms)=   0.461

   PEAK FLOW      (cms)=   0.200 (i)
   TIME TO PEAK   (hrs)=   6.500
   RUNOFF VOLUME  (mm)=  17.508
   TOTAL RAINFALL (mm)=  54.380
   RUNOFF COEFFICIENT  =   0.322

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0067)|   Area    (ha)=   1.00
|ID= 1 DT=15.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
-------------------
                      IMPERVIOUS    PERVIOUS (i)
   Surface Area    (ha)=      0.99        0.01
   Dep. Storage    (mm)=      2.00        1.50
   Average Slope   (%)=      1.00        1.00
   Length          (m)=     81.65       40.00
   Mannings n          =     0.013       0.250

   Max.Eff.Inten.(mm/hr)=     25.02       12.75
           over (min)      15.00       30.00
   Storage Coeff.  (min)=     3.94 (ii)   23.74 (ii)
   Unit Hyd. Tpeak (min)=     15.00       30.00
   Unit Hyd. peak  (cms)=     0.11        0.04
                                  *TOTALS*
   PEAK FLOW      (cms)=      0.07        0.00         0.069 (iii)
   TIME TO PEAK   (hrs)=      5.25        5.25         5.25
   RUNOFF VOLUME  (mm)=     52.38       22.46        52.08
   TOTAL RAINFALL (mm)=     54.38       54.38        54.38
   RUNOFF COEFFICIENT  =     0.96        0.41         0.96

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

    (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
        CN*  =  78.0   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  (  0070)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 1 (  0059):    2.02   0.018    5.25    47.64
   + ID2= 2 (  0061):    3.36   0.062    3.50    43.66
     ==================================================
     ID = 3 (  0070):    5.39   0.079    5.25    45.15

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

--------------------
| ADD HYD  (  0070)|
|  3 +  2 =  1   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 3 (  0070):    5.39   0.079    5.25    45.15
   + ID2= 2 (  0067):    1.00   0.069    5.25    52.08
     ==================================================
     ID = 1 (  0070):    6.39   0.148    5.25    46.23

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

--------------------
| ADD HYD  (  0074)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 1 (  0060):   18.70   0.200    6.50    17.51
   + ID2= 2 (  0070):    6.39   0.148    5.25    46.23
     ==================================================
     ID = 3 (  0074):   25.09   0.298    6.25    24.82

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB           |
| STANDHYD (  0078)|   Area    (ha)=   2.70
|ID= 1 DT=15.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=  63.00
--------------------
                       IMPERVIOUS    PERVIOUS (i)
   Surface Area     (ha)=      2.13        0.57
   Dep. Storage     (mm)=      2.00        5.00
   Average Slope    (%)=       1.00        1.00
   Length           (m)=     134.16       40.00
   Mannings n          =       0.013       0.250

   Max.Eff.Inten.(mm/hr)=     25.02       30.50
           over (min)       15.00       30.00
   Storage Coeff.  (min)=      5.30 (ii)   19.28 (ii)
   Unit Hyd. Tpeak (min)=     15.00       30.00
   Unit Hyd. peak  (cms)=      0.11        0.05
                                *TOTALS*
   PEAK FLOW      (cms)=       0.12        0.04         0.158 (iii)
   TIME TO PEAK   (hrs)=       5.25        5.25          5.25
   RUNOFF VOLUME  (mm)=       52.38       28.81         43.65
   TOTAL RAINFALL (mm)=       54.38       54.38         54.38
   RUNOFF COEFFICIENT  =       0.96        0.53          0.80

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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           |
| NASHYD  (  0080)|   Area    (ha)=  18.70   Curve Number   (CN)= 74.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 2.00
--------------------  U.H. Tp(hrs)=   1.05

   Unit Hyd Qpeak  (cms)=   0.461

   PEAK FLOW      (cms)=   0.200 (i)
   TIME TO PEAK   (hrs)=   6.500
   RUNOFF VOLUME  (mm)=  17.508
   TOTAL RAINFALL (mm)=  54.380
   RUNOFF COEFFICIENT  =   0.322

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

--------------------------------------------------------------------------------
--------------------
| CALIB           |
| STANDHYD (  0096)|   Area    (ha)=   2.50
|ID= 1 DT=15.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  72.00
--------------------
                       IMPERVIOUS    PERVIOUS (i)
   Surface Area     (ha)=      2.25        0.25
   Dep. Storage     (mm)=      2.00        5.00
   Average Slope    (%)=       1.00        1.00
   Length           (m)=     129.10       40.00
   Mannings n          =       0.013       0.250

   Max.Eff.Inten.(mm/hr)=     25.02       56.97
           over (min)       15.00       30.00
   Storage Coeff.  (min)=      5.18 (ii)   16.07 (ii)
   Unit Hyd. Tpeak (min)=     15.00       30.00
   Unit Hyd. peak  (cms)=      0.11        0.05
                                *TOTALS*
```

```
    PEAK FLOW      (cms)=      0.13        0.04        0.160 (iii)
    TIME TO PEAK   (hrs)=      5.25        5.25         5.25
    RUNOFF VOLUME  (mm)=      52.38       35.38        47.62
    TOTAL RAINFALL (mm)=      54.38       54.38        54.38
    RUNOFF COEFFICIENT =      0.96        0.65         0.88

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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(  0098)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   | OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |  (cms)     (ha.m.)
                     0.0000    0.0000    |   0.0172     0.0661

                          AREA     QPEAK     TPEAK      R.V.
                          (ha)     (cms)     (hrs)      (mm)
  INFLOW : ID= 2 (  0096)     2.500     0.160     5.25     47.62
  OUTFLOW: ID= 1 (  0098)     2.029     0.017     5.33     47.08
  OVERFLOW:ID= 3 (  0003)     0.471     0.114     5.33     47.08

            TOTAL NUMBER OF SIMULATION OVERFLOW  =   24
            CUMULATIVE TIME OF OVERFLOW  (HOURS) =  2.00
            PERCENTAGE OF TIME OVERFLOWING   (%) =  3.66

            PEAK   FLOW   REDUCTION [Qout/Qin](%)= 10.73
            TIME SHIFT OF PEAK FLOW        (min)=  5.00
            MAXIMUM  STORAGE   USED      (ha.m.)=  0.0661

--------------------------------------------------------------------------------
--------------------
| CALIB          |
| STANDHYD (  0086)|   Area   (ha)=   9.02
|ID= 1 DT=15.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=  63.00
--------------------
                       IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      7.13        1.89
    Dep. Storage     (mm)=      2.00        5.00
    Average Slope    (%)=       1.00        1.00
    Length           (m)=     245.22       40.00
    Mannings n         =      0.013       0.250

    Max.Eff.Inten.(mm/hr)=     25.02       30.50
            over (min)      15.00       30.00
    Storage Coeff.  (min)=     7.62 (ii)   21.59 (ii)
    Unit Hyd. Tpeak (min)=     15.00       30.00
    Unit Hyd. peak  (cms)=     0.10        0.05
                                  *TOTALS*
    PEAK FLOW      (cms)=      0.39        0.13         0.524 (iii)
    TIME TO PEAK   (hrs)=      5.25        5.25         5.25
    RUNOFF VOLUME  (mm)=      52.38       28.81        43.66
    TOTAL RAINFALL (mm)=      54.38       54.38        54.38
    RUNOFF COEFFICIENT =      0.96        0.53         0.80

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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.

--------------------------------------------------------------------------------
--------------------
| DUHYD    (  0087)|
| Inlet Cap.= 0.062|
| #of Inlets=    1|
| Total(cms)=  0.1|     AREA     QPEAK     TPEAK     R.V.
--------------------       (ha)     (cms)     (hrs)     (mm)
    TOTAL HYD.(ID= 1):   9.02      0.52      5.25   43.66
    ==================================================
    MAJOR SYS.(ID= 2):   5.65      0.46      5.25   43.66
    MINOR SYS.(ID= 3):   3.37      0.06      3.50   43.66

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB          |
| STANDHYD (  0094)|   Area   (ha)=   1.00
|ID= 1 DT=15.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                       IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      0.99        0.01
    Dep. Storage     (mm)=      2.00        1.50
    Average Slope    (%)=       1.00        1.00
    Length           (m)=      81.65       40.00
    Mannings n         =      0.013       0.250

    Max.Eff.Inten.(mm/hr)=     25.02       12.75
            over (min)      15.00       30.00
    Storage Coeff.  (min)=     3.94 (ii)   23.74 (ii)
    Unit Hyd. Tpeak (min)=     15.00       30.00
    Unit Hyd. peak  (cms)=     0.11        0.04
                                  *TOTALS*
    PEAK FLOW      (cms)=      0.07        0.00         0.069 (iii)
    TIME TO PEAK   (hrs)=      5.25        5.25         5.25
    RUNOFF VOLUME  (mm)=      52.38       22.46        52.08
    TOTAL RAINFALL (mm)=      54.38       54.38        54.38
```

```
    RUNOFF COEFFICIENT  =     0.96       0.41       0.96

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  78.0    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  (  0091)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK    R.V.
--------------------       (ha)   (cms)   (hrs)    (mm)
      ID1= 1 (  0087):    3.37   0.062    3.50   43.66
    + ID2= 2 (  0094):    1.00   0.069    5.25   52.08
      ================================================
      ID = 3 (  0091):    4.37   0.131    5.25   45.58

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

--------------------
| ADD HYD  (  0091)|
|  3 +  2 =  1   |       AREA    QPEAK    TPEAK    R.V.
--------------------       (ha)   (cms)   (hrs)    (mm)
      ID1= 3 (  0091):    4.37   0.131    5.25   45.58
    + ID2= 2 (  0098):    2.03   0.017    5.33   47.08
      ================================================
      ID = 1 (  0091):    6.40   0.148    5.25   46.06

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

--------------------
| ADD HYD  (  0079)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK    R.V.
--------------------       (ha)   (cms)   (hrs)    (mm)
      ID1= 1 (  0080):   18.70   0.200    6.50   17.51
    + ID2= 2 (  0091):    6.40   0.148    5.25   46.06
      ================================================
      ID = 3 (  0079):   25.10   0.298    6.25   24.79

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB          |
| NASHYD  (  0092)|  Area   (ha)=  10.60  Curve Number  (CN)= 74.0
|ID= 1 DT=15.0 min |  Ia     (mm)=  5.00  # of Linear Res.(N)= 2.00
--------------------  U.H. Tp(hrs)=  0.44

    Unit Hyd Qpeak  (cms)=   0.620

    PEAK FLOW      (cms)=   0.184 (i)
    TIME TO PEAK   (hrs)=   5.250
    RUNOFF VOLUME   (mm)=  17.132
    TOTAL RAINFALL  (mm)=  54.380
    RUNOFF COEFFICIENT  =   0.315

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

--------------------------------------------------------------------------------
--------------------
| CALIB          |
| NASHYD  (  0095)|  Area   (ha)=   3.80  Curve Number  (CN)= 74.0
|ID= 1 DT=15.0 min |  Ia     (mm)=  5.00  # of Linear Res.(N)= 2.00
--------------------  U.H. Tp(hrs)=  0.33

    Unit Hyd Qpeak  (cms)=   0.301

    PEAK FLOW      (cms)=   0.079 (i)
    TIME TO PEAK   (hrs)=   5.250
    RUNOFF VOLUME   (mm)=  16.762
    TOTAL RAINFALL  (mm)=  54.380
    RUNOFF COEFFICIENT  =   0.308

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

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0088)|    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   |  0.1800    0.1000
                    0.1725    0.0396   |  0.0000    0.0000

                        AREA    QPEAK    TPEAK      R.V.
                        (ha)    (cms)    (hrs)      (mm)
  INFLOW : ID= 2 (  0098)     0.471     0.114     5.33     47.08
  OUTFLOW: ID= 1 (  0088)     0.471     0.033     6.00     47.08

            PEAK   FLOW   REDUCTION [Qout/Qin](%)= 29.02
            TIME SHIFT OF PEAK FLOW        (min)= 40.00
            MAXIMUM  STORAGE   USED      (ha.m.)=  0.0076

--------------------------------------------------------------------------------
--------------------
| CALIB          |
| STANDHYD (  0089)|  Area   (ha)=   0.13
|ID= 1 DT=15.0 min |  Total Imp(%)=  41.00  Dir. Conn.(%)=  30.00
--------------------
                       IMPERVIOUS    PERVIOUS (i)
    Surface Area    (ha)=      0.05       0.08
```

```
   Dep. Storage    (mm)=      2.00        5.00
   Average Slope   (%)=      1.00        1.00
   Length          (m)=     29.44       40.00
   Mannings n      =        0.013       0.250

   Max.Eff.Inten.(mm/hr)=     25.02       15.80
         over (min)      15.00       30.00
   Storage Coeff.  (min)=     2.13 (ii)   20.31 (ii)
   Unit Hyd. Tpeak (min)=     15.00       30.00
   Unit Hyd. peak  (cms)=     0.11        0.05
                                *TOTALS*
   PEAK FLOW      (cms)=      0.00        0.00        0.006 (iii)
   TIME TO PEAK   (hrs)=      5.00        5.25        5.25
   RUNOFF VOLUME  (mm)=      52.38       22.76       31.55
   TOTAL RAINFALL (mm)=      54.38       54.38       54.38
   RUNOFF COEFFICIENT =      0.96        0.42        0.58

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

    (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
        CN*  =  78.0    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 (  0099)|   Area    (ha)=  21.20
|ID= 1 DT=15.0 min |   Total Imp(%)=  71.00   Dir. Conn.(%)=  60.00
--------------------
                      IMPERVIOUS    PERVIOUS (i)
   Surface Area    (ha)=     15.05        6.15
   Dep. Storage    (mm)=      2.00        5.00
   Average Slope   (%)=      1.00        1.00
   Length          (m)=    375.94       40.00
   Mannings n      =         0.013       0.250

   Max.Eff.Inten.(mm/hr)=     25.02       20.12
         over (min)      15.00       30.00
   Storage Coeff.  (min)=     9.84 (ii)   26.34 (ii)
   Unit Hyd. Tpeak (min)=     15.00       30.00
   Unit Hyd. peak  (cms)=     0.09        0.04
                                *TOTALS*
   PEAK FLOW      (cms)=      0.88        0.27        1.149 (iii)
   TIME TO PEAK   (hrs)=      5.25        5.25        5.25
   RUNOFF VOLUME  (mm)=      52.38       25.08       41.46
   TOTAL RAINFALL (mm)=      54.38       54.38       54.38
   RUNOFF COEFFICIENT =      0.96        0.46        0.76

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

    (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
        CN*  =  78.0    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  (  0090)|
|  1 +  2 =  3     |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 1 (  0087):     5.65   0.462     5.25    43.66
   + ID2= 2 (  0088):     0.47   0.033     6.00    47.08
     ==================================================
     ID = 3 (  0090):     6.12   0.463     5.25    43.92

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

--------------------
| ADD HYD  (  0090)|
|  3 +  2 =  1     |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 3 (  0090):     6.12   0.463     5.25    43.92
   + ID2= 2 (  0089):     0.13   0.006     5.25    31.55
     ==================================================
     ID = 1 (  0090):     6.25   0.468     5.25    43.66

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

--------------------
| ADD HYD  (  0090)|
|  1 +  2 =  3     |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 1 (  0090):     6.25   0.468     5.25    43.66
   + ID2= 2 (  0099):    21.20   1.149     5.25    41.46
     ==================================================
     ID = 3 (  0090):    27.45   1.618     5.25    41.96

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0082)|   Area    (ha)=   2.00
|ID= 1 DT=15.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  40.00
--------------------
                      IMPERVIOUS    PERVIOUS (i)
   Surface Area    (ha)=      1.00        1.00
   Dep. Storage    (mm)=      2.00        5.00
   Average Slope   (%)=      1.00        1.00
   Length          (m)=    115.47       40.00
   Mannings n      =         0.013       0.250
```

```
   Max.Eff.Inten.(mm/hr)=     25.02       16.10
         over (min)      15.00       30.00
   Storage Coeff.  (min)=     4.85 (ii)   22.89 (ii)
   Unit Hyd. Tpeak (min)=     15.00       30.00
   Unit Hyd. peak  (cms)=      0.11        0.04
                               *TOTALS*
   PEAK FLOW      (cms)=      0.06        0.04        0.091 (iii)
   TIME TO PEAK   (hrs)=      5.25        5.25         5.25
   RUNOFF VOLUME  (mm)=      52.38       22.94        34.71
   TOTAL RAINFALL (mm)=      54.38       54.38        54.38
   RUNOFF COEFFICIENT  =      0.96        0.42         0.64

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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  (  0083)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK    R.V.
--------------------       (ha)    (cms)    (hrs)    (mm)
      ID1= 1 (  0082):    2.00   0.091    5.25    34.71
    + ID2= 2 (  0090):   27.45   1.618    5.25    41.96
      ================================================
      ID = 3 (  0083):   29.45   1.709    5.25    41.47

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


--------------------
| ADD HYD  (  0093)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK    R.V.
--------------------       (ha)    (cms)    (hrs)    (mm)
      ID1= 1 (  0083):   29.45   1.709    5.25    41.47
    + ID2= 2 (  0095):    3.80   0.079    5.25    16.76
      ================================================
      ID = 3 (  0093):   33.25   1.788    5.25    38.65

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0084)|    OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 15.0 min    |    OUTFLOW    STORAGE   | OUTFLOW    STORAGE
--------------------      (cms)    (ha.m.)  |  (cms)    (ha.m.)
                  0.0000    0.0000   |  0.1220     1.3034
                  0.0820    0.6331   |  0.1550     1.4219
                  0.0900    0.7399   |  0.2320     1.5425
                  0.0970    0.8486   |  0.2750     1.6649
                  0.1040    0.9594   |  0.3100     1.7894
                  0.1100    1.0721   |  0.3400     1.9160
                  0.1160    1.1867   |  0.3670     2.0441

                       AREA    QPEAK    TPEAK      R.V.
                       (ha)    (cms)    (hrs)      (mm)
 INFLOW : ID= 2 (  0093)    33.250     1.788     5.25     38.65
 OUTFLOW: ID= 1 (  0084)    33.250     0.110     8.50     38.59

          PEAK   FLOW   REDUCTION [Qout/Qin](%)=  6.15
          TIME SHIFT OF PEAK FLOW        (min)=195.00
          MAXIMUM  STORAGE   USED      (ha.m.)=  1.0719

    **** WARNING : SELECTED ROUTING TIME STEP DENIED.
--------------------------------------------------------------------------------


--------------------
| ADD HYD  (  0097)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK    R.V.
--------------------       (ha)    (cms)    (hrs)    (mm)
      ID1= 1 (  0084):   33.25   0.110    8.50    38.59
    + ID2= 2 (  0092):   10.60   0.184    5.25    17.13
      ================================================
      ID = 3 (  0097):   43.85   0.276    5.50    33.40

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB           |
| STANDHYD (  0100)|   Area   (ha)=   2.63
|ID= 1 DT=15.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=  63.00
--------------------
                       IMPERVIOUS    PERVIOUS (i)
   Surface Area    (ha)=      2.08        0.55
   Dep. Storage    (mm)=      2.00        5.00
   Average Slope    (%)=      1.00        1.00
   Length          (m)=    132.41       40.00
   Mannings n          =     0.013       0.250

   Max.Eff.Inten.(mm/hr)=     25.02       30.50
         over (min)      15.00       30.00
   Storage Coeff.  (min)=     5.26 (ii)   19.24 (ii)
   Unit Hyd. Tpeak (min)=     15.00       30.00
   Unit Hyd. peak  (cms)=      0.11        0.05
                               *TOTALS*
   PEAK FLOW      (cms)=      0.12        0.04        0.154 (iii)
   TIME TO PEAK   (hrs)=      5.25        5.25         5.25
   RUNOFF VOLUME  (mm)=      52.38       28.81        43.65
   TOTAL RAINFALL (mm)=      54.38       54.38        54.38
   RUNOFF COEFFICIENT  =      0.96        0.53         0.80
```

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 78.0 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.

==========

V V I SSSSS U U A L (v 6.2.2015)
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

***** 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\RCHUNG\AppData\Local\Civica\VH5\e784fed7-830f-4189-bdd3-6ad20df6e9b1\6fd225fb-7bfc-40d7-900a-60a2275b16fa\scena
Summary filename: C:\Users\RCHUNG\AppData\Local\Civica\VH5\e784fed7-830f-4189-bdd3-6ad20df6e9b1\6fd225fb-7bfc-40d7-900a-60a2275b16fa\scena

DATE: 03/21/2024 TIME: 10:50:48

USER:

COMMENTS: _____

****
** SIMULATION : 010 Year 12 Hour AES (Bloor, **
****

| READ STORM | Filename: C:\Users\RCHUNG\AppD
| | ata\Local\Temp\
| | df6539ff-395a-486e-bee4-a56417bf9b9d\8da1e577
| Ptotal= 62.71 mm | Comments:

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 (0062)| Area (ha)= 10.60 Curve Number (CN)= 74.0
|ID= 1 DT=15.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 2.00
--- U.H. Tp(hrs)= 0.44

Unit Hyd Qpeak (cms)= 0.620

PEAK FLOW (cms)= 0.241 (i)
TIME TO PEAK (hrs)= 5.250
RUNOFF VOLUME (mm)= 22.074
TOTAL RAINFALL (mm)= 62.710
RUNOFF COEFFICIENT = 0.352

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

| CALIB |
| NASHYD (0072)| Area (ha)= 3.80 Curve Number (CN)= 74.0
|ID= 1 DT=15.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 2.00
--- U.H. Tp(hrs)= 0.33

Unit Hyd Qpeak (cms)= 0.301

PEAK FLOW (cms)= 0.103 (i)
TIME TO PEAK (hrs)= 5.250
RUNOFF VOLUME (mm)= 21.597
TOTAL RAINFALL (mm)= 62.710
RUNOFF COEFFICIENT = 0.344

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

---------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0057)|   Area    (ha)=   2.38
|ID= 1 DT=15.0 min |   Total Imp(%)=  91.00   Dir. Conn.(%)=  83.00
--------------------
                       IMPERVIOUS    PERVIOUS (i)
   Surface Area     (ha)=      2.17        0.21
   Dep. Storage     (mm)=      2.00        5.00
   Average Slope    (%)=       1.00        1.00
   Length           (m)=     125.96       40.00
   Mannings n       =        0.013       0.250

   Max.Eff.Inten.(mm/hr)=      28.84       40.95
         over (min)       15.00       30.00
   Storage Coeff.  (min)=      4.82 (ii)   17.24 (ii)
   Unit Hyd. Tpeak (min)=      15.00       30.00
   Unit Hyd. peak  (cms)=      0.11        0.05
                                    *TOTALS*
   PEAK FLOW      (cms)=       0.16        0.02         0.179 (iii)
   TIME TO PEAK   (hrs)=       5.25        5.25         5.25
   RUNOFF VOLUME  (mm)=       60.71       36.82        56.64
   TOTAL RAINFALL (mm)=       62.71       62.71        62.71
   RUNOFF COEFFICIENT  =      0.97        0.59         0.90

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

    (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
        CN*  =  78.0    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 (  0077)|   Area    (ha)=   0.16
|ID= 1 DT=15.0 min |   Total Imp(%)=  68.00   Dir. Conn.(%)=  55.00
--------------------
                       IMPERVIOUS    PERVIOUS (i)
   Surface Area     (ha)=      0.11        0.05
   Dep. Storage     (mm)=      2.00        5.00
   Average Slope    (%)=       1.00        1.00
   Length           (m)=      32.66       40.00
   Mannings n       =        0.013       0.250

   Max.Eff.Inten.(mm/hr)=      28.84       27.03
         over (min)       15.00       30.00
   Storage Coeff.  (min)=      2.15 (ii)   16.81 (ii)
   Unit Hyd. Tpeak (min)=      15.00       30.00
   Unit Hyd. peak  (cms)=      0.11        0.05
                                    *TOTALS*
   PEAK FLOW      (cms)=       0.01        0.00         0.010 (iii)
   TIME TO PEAK   (hrs)=       5.00        5.25         5.25
   RUNOFF VOLUME  (mm)=       60.71       31.78        47.62
   TOTAL RAINFALL (mm)=       62.71       62.71        62.71
   RUNOFF COEFFICIENT  =      0.97        0.51         0.76

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

    (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
        CN*  =  78.0    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  (  0075)|
|   1 +  2 =  3    |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0057):    2.38   0.179    5.25    56.64
    + ID2= 2 (  0077):    0.16   0.010    5.25    47.62
      ================================================
      ID = 3 (  0075):    2.54   0.190    5.25    56.07

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
---------------------------------------------------------------------------
--------------------
| RESERVOIR(  0059)|    OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |    OUTFLOW    STORAGE   | OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |  (cms)     (ha.m.)
                      0.0000    0.0000    |   0.0176     0.0661

                           AREA     QPEAK     TPEAK      R.V.
                           (ha)     (cms)     (hrs)      (mm)
  INFLOW : ID= 2 (  0075)     2.540     0.190     5.25      56.07
  OUTFLOW: ID= 1 (  0059)     1.780     0.018     5.08      55.60
  OVERFLOW:ID= 3 (  0003)     0.760     0.172     5.25      55.60

            TOTAL NUMBER OF SIMULATION OVERFLOW  =   29
            CUMULATIVE TIME OF OVERFLOW  (HOURS) =  2.42
            PERCENTAGE OF TIME OVERFLOWING   (%) =  4.47

            PEAK   FLOW   REDUCTION [Qout/Qin](%)=  9.28
            TIME SHIFT OF PEAK FLOW        (min)=-10.00
            MAXIMUM  STORAGE   USED      (ha.m.)=  0.0661

---------------------------------------------------------------------------
--------------------
| RESERVOIR(  0064)|    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   |  0.1800     0.1000
                    0.1776    0.0396   |  0.0000     0.0000

                        AREA     QPEAK     TPEAK      R.V.
                        (ha)     (cms)     (hrs)      (mm)
  INFLOW : ID= 2 (  0059)     0.760     0.172     5.25      55.60
  OUTFLOW: ID= 1 (  0064)     0.760     0.070     5.50      55.60

            PEAK   FLOW   REDUCTION [Qout/Qin](%)= 40.95
            TIME SHIFT OF PEAK FLOW        (min)= 15.00
            MAXIMUM  STORAGE   USED      (ha.m.)=  0.0159

--------------------------------------------------------------------------------
--------------------
| CALIB          |
| STANDHYD (  0065)|  Area    (ha)=   8.95
|ID= 1 DT=15.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=  63.00
--------------------
                       IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      7.07        1.88
    Dep. Storage     (mm)=      2.00        5.00
    Average Slope    (%)=       1.00        1.00
    Length           (m)=     244.27       40.00
    Mannings n           =      0.013       0.250

    Max.Eff.Inten.(mm/hr)=     28.84       37.23
            over (min)       15.00       30.00
    Storage Coeff.  (min)=     7.18 (ii)   20.08 (ii)
    Unit Hyd. Tpeak (min)=     15.00       30.00
    Unit Hyd. peak  (cms)=     0.10        0.05
                                  *TOTALS*
    PEAK FLOW      (cms)=      0.45        0.16        0.613 (iii)
    TIME TO PEAK   (hrs)=      5.25        5.25        5.25
    RUNOFF VOLUME  (mm)=      60.71       35.66       51.44
    TOTAL RAINFALL (mm)=      62.71       62.71       62.71
    RUNOFF COEFFICIENT  =      0.97        0.57        0.82

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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.

--------------------------------------------------------------------------------
--------------------
| DUHYD    (  0061)|
| Inlet Cap.= 0.062|
| #of Inlets=    1|
| Total(cms)=  0.1|     AREA     QPEAK     TPEAK     R.V.
--------------------      (ha)     (cms)     (hrs)     (mm)
   TOTAL HYD.(ID= 1):  8.95      0.61      5.25   51.44
   ================================================
   MAJOR SYS.(ID= 2):  5.90      0.55      5.25   51.44
   MINOR SYS.(ID= 3):  3.05      0.06      3.50   51.44

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB          |
| STANDHYD (  0068)|  Area    (ha)=   0.16
|ID= 1 DT=15.0 min |   Total Imp(%)=  35.00   Dir. Conn.(%)=  30.00
--------------------
                       IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      0.06        0.10
    Dep. Storage     (mm)=      2.00        5.00
    Average Slope    (%)=       1.00        1.00
    Length           (m)=      32.66       40.00
    Mannings n           =      0.013       0.250

    Max.Eff.Inten.(mm/hr)=     28.84       17.01
            over (min)       15.00       30.00
    Storage Coeff.  (min)=     2.15 (ii)   19.79 (ii)
    Unit Hyd. Tpeak (min)=     15.00       30.00
    Unit Hyd. peak  (cms)=     0.11        0.05
                                  *TOTALS*
    PEAK FLOW      (cms)=      0.00        0.00        0.008 (iii)
    TIME TO PEAK   (hrs)=      5.00        5.25        5.25
    RUNOFF VOLUME  (mm)=      60.71       27.06       37.10
    TOTAL RAINFALL (mm)=      62.71       62.71       62.71
    RUNOFF COEFFICIENT  =      0.97        0.43        0.59

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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 (  0071)|  Area    (ha)=  21.20
|ID= 1 DT=15.0 min |   Total Imp(%)=  71.00   Dir. Conn.(%)=  60.00
--------------------
                       IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=     15.05        6.15
    Dep. Storage     (mm)=      2.00        5.00
    Average Slope    (%)=       1.00        1.00
    Length           (m)=     375.94       40.00
```

```
   Mannings n          =     0.013       0.250

   Max.Eff.Inten.(mm/hr)=      28.84       26.28
           over (min)      15.00       30.00
   Storage Coeff.  (min)=      9.30 (ii)   24.13 (ii)
   Unit Hyd. Tpeak (min)=     15.00       30.00
   Unit Hyd. peak  (cms)=      0.09        0.04
                                    *TOTALS*
   PEAK FLOW      (cms)=      1.02        0.35        1.364 (iii)
   TIME TO PEAK   (hrs)=      5.25        5.25        5.25
   RUNOFF VOLUME  (mm)=      60.71       31.44       49.00
   TOTAL RAINFALL (mm)=      62.71       62.71       62.71
   RUNOFF COEFFICIENT  =      0.97        0.50        0.78

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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  (  0058)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK    R.V.
--------------------       (ha)   (cms)   (hrs)    (mm)
     ID1= 1 (  0061):    5.90   0.551    5.25    51.44
    + ID2= 2 (  0064):    0.76   0.070    5.50    55.60
     ================================================
     ID = 3 (  0058):    6.66   0.602    5.25    51.91

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

--------------------
| ADD HYD  (  0058)|
|  3 +  2 =  1   |       AREA    QPEAK    TPEAK    R.V.
--------------------       (ha)   (cms)   (hrs)    (mm)
     ID1= 3 (  0058):    6.66   0.602    5.25    51.91
    + ID2= 2 (  0068):    0.16   0.008    5.25    37.10
     ================================================
     ID = 1 (  0058):    6.82   0.610    5.25    51.56

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

--------------------
| ADD HYD  (  0058)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK    R.V.
--------------------       (ha)   (cms)   (hrs)    (mm)
     ID1= 1 (  0058):    6.82   0.610    5.25    51.56
    + ID2= 2 (  0071):   21.20   1.364    5.25    49.00
     ================================================
     ID = 3 (  0058):   28.02   1.973    5.25    49.63

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

--------------------
| CALIB           |
| STANDHYD (  0069)|  Area    (ha)=   2.00
|ID= 1 DT=15.0 min |  Total Imp(%)=  50.00   Dir. Conn.(%)=  40.00
--------------------
                      IMPERVIOUS    PERVIOUS (i)
   Surface Area     (ha)=      1.00        1.00
   Dep. Storage     (mm)=      2.00        5.00
   Average Slope    (%)=       1.00        1.00
   Length           (m)=     115.47       40.00
   Mannings n          =      0.013       0.250

   Max.Eff.Inten.(mm/hr)=      28.84       20.21
           over (min)      15.00       30.00
   Storage Coeff.  (min)=      4.58 (ii)   21.05 (ii)
   Unit Hyd. Tpeak (min)=     15.00       30.00
   Unit Hyd. peak  (cms)=      0.11        0.05
                                    *TOTALS*
   PEAK FLOW      (cms)=      0.06        0.05        0.111 (iii)
   TIME TO PEAK   (hrs)=      5.25        5.25        5.25
   RUNOFF VOLUME  (mm)=      60.71       28.99       41.67
   TOTAL RAINFALL (mm)=      62.71       62.71       62.71
   RUNOFF COEFFICIENT  =      0.97        0.46        0.66

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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  (  0063)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK    R.V.
--------------------       (ha)   (cms)   (hrs)    (mm)
     ID1= 1 (  0058):   28.02   1.973    5.25    49.63
    + ID2= 2 (  0069):    2.00   0.111    5.25    41.67
     ================================================
     ID = 3 (  0063):   30.02   2.084    5.25    49.10

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

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

```
| ADD HYD  (  0066)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 1 (  0063):    30.02   2.084     5.25    49.10
   + ID2= 2 (  0072):     3.80   0.103     5.25    21.60
     ================================================
     ID = 3 (  0066):    33.82   2.187     5.25    46.01

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0073)|    OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 15.0 min     |    OUTFLOW    STORAGE   | OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)  |  (cms)     (ha.m.)
                    0.0000    0.0000   |  0.1220     1.3034
                    0.0820    0.6331   |  0.1550     1.4219
                    0.0900    0.7399   |  0.2320     1.5425
                    0.0970    0.8486   |  0.2750     1.6649
                    0.1040    0.9594   |  0.3100     1.7894
                    0.1100    1.0721   |  0.3400     1.9160
                    0.1160    1.1867   |  0.3670     2.0441

                        AREA     QPEAK     TPEAK      R.V.
                        (ha)     (cms)     (hrs)      (mm)
  INFLOW : ID= 2 (  0066)     33.819      2.187      5.25      46.01
  OUTFLOW: ID= 1 (  0073)     33.819      0.124      8.50      45.95

            PEAK   FLOW   REDUCTION [Qout/Qin](%)=  5.69
            TIME SHIFT OF PEAK FLOW        (min)=195.00
            MAXIMUM  STORAGE   USED      (ha.m.)=  1.3122

   **** WARNING : SELECTED ROUTING TIME STEP DENIED.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0056)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 1 (  0062):    10.60   0.241     5.25    22.07
   + ID2= 2 (  0073):    33.82   0.124     8.50    45.95
     ================================================
     ID = 3 (  0056):    44.42   0.341     5.50    40.25

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD  (  0060)|   Area    (ha)=  18.70   Curve Number   (CN)= 74.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 2.00
--------------------   U.H. Tp(hrs)=   1.05

   Unit Hyd Qpeak  (cms)=   0.461

   PEAK FLOW      (cms)=   0.259 (i)
   TIME TO PEAK   (hrs)=   6.250
   RUNOFF VOLUME    (mm)=  22.557
   TOTAL RAINFALL   (mm)=  62.710
   RUNOFF COEFFICIENT   =   0.360

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0067)|   Area    (ha)=   1.00
|ID= 1 DT=15.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
   Surface Area     (ha)=      0.99        0.01
   Dep. Storage     (mm)=      2.00        1.50
   Average Slope     (%)=      1.00        1.00
   Length           (m)=     81.65       40.00
   Mannings n          =     0.013       0.250

   Max.Eff.Inten.(mm/hr)=     28.84       15.96
           over (min)       15.00       30.00
   Storage Coeff.  (min)=     3.72 (ii)   21.82 (ii)
   Unit Hyd. Tpeak (min)=     15.00       30.00
   Unit Hyd. peak  (cms)=     0.11        0.05
                                  *TOTALS*
   PEAK FLOW      (cms)=      0.08        0.00        0.080 (iii)
   TIME TO PEAK   (hrs)=      5.25        5.25        5.25
   RUNOFF VOLUME    (mm)=     60.71       28.20       60.38
   TOTAL RAINFALL   (mm)=     62.71       62.71       62.71
   RUNOFF COEFFICIENT   =     0.97        0.45        0.96

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

    (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
        CN*  =  78.0    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  (  0070)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 1 (  0059):     1.78   0.018     5.08    55.60
   + ID2= 2 (  0061):     3.05   0.062     3.50    51.44
     ================================================
     ID = 3 (  0070):     4.83   0.079     5.08    52.97
```

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


--------------------
| ADD HYD  (  0070)|
|  3 +  2 =  1   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 3 (  0070):    4.83   0.079     5.08    52.97
   + ID2= 2 (  0067):    1.00   0.080     5.25    60.38
     ==================================================
     ID = 1 (  0070):    5.83   0.159     5.25    54.23

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


--------------------
| ADD HYD  (  0074)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 1 (  0060):   18.70   0.259     6.25    22.56
   + ID2= 2 (  0070):    5.83   0.159     5.25    54.23
     ==================================================
     ID = 3 (  0074):   24.53   0.361     6.25    30.09

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB           |
| STANDHYD (  0078)|   Area    (ha)=   2.70
|ID= 1 DT=15.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=  63.00
--------------------
                      IMPERVIOUS    PERVIOUS (i)
   Surface Area     (ha)=      2.13        0.57
   Dep. Storage     (mm)=      2.00        5.00
   Average Slope    (%)=       1.00        1.00
   Length           (m)=     134.16       40.00
   Mannings n           =      0.013       0.250

   Max.Eff.Inten.(mm/hr)=     28.84       37.23
           over (min)       15.00       30.00
   Storage Coeff.  (min)=      5.01 (ii)   17.91 (ii)
   Unit Hyd. Tpeak (min)=     15.00       30.00
   Unit Hyd. peak  (cms)=      0.11        0.05
                                    *TOTALS*
   PEAK FLOW      (cms)=      0.14        0.05         0.186 (iii)
   TIME TO PEAK   (hrs)=      5.25        5.25         5.25
   RUNOFF VOLUME    (mm)=     60.71       35.66        51.43
   TOTAL RAINFALL   (mm)=     62.71       62.71        62.71
   RUNOFF COEFFICIENT   =      0.97        0.57         0.82

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  78.0    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           |
| NASHYD  (  0080)|   Area    (ha)=  18.70   Curve Number   (CN)= 74.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 2.00
--------------------  U.H. Tp(hrs)=   1.05

   Unit Hyd Qpeak  (cms)=   0.461

   PEAK FLOW      (cms)=   0.259 (i)
   TIME TO PEAK   (hrs)=   6.250
   RUNOFF VOLUME    (mm)=  22.557
   TOTAL RAINFALL   (mm)=  62.710
   RUNOFF COEFFICIENT   =   0.360

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

--------------------------------------------------------------------------------
--------------------
| CALIB           |
| STANDHYD (  0096)|   Area    (ha)=   2.50
|ID= 1 DT=15.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  72.00
--------------------
                      IMPERVIOUS    PERVIOUS (i)
   Surface Area     (ha)=      2.25        0.25
   Dep. Storage     (mm)=      2.00        5.00
   Average Slope    (%)=       1.00        1.00
   Length           (m)=     129.10       40.00
   Mannings n           =      0.013       0.250

   Max.Eff.Inten.(mm/hr)=     28.84       68.09
           over (min)       15.00       30.00
   Storage Coeff.  (min)=      4.90 (ii)   15.03 (ii)
   Unit Hyd. Tpeak (min)=     15.00       30.00
   Unit Hyd. peak  (cms)=      0.11        0.05
                                    *TOTALS*
   PEAK FLOW      (cms)=      0.14        0.04         0.187 (iii)
   TIME TO PEAK   (hrs)=      5.25        5.25         5.25
   RUNOFF VOLUME    (mm)=     60.71       42.91        55.72
   TOTAL RAINFALL   (mm)=     62.71       62.71        62.71
   RUNOFF COEFFICIENT   =      0.97        0.68         0.89

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  78.0    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(0098)| OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT= 5.0 min | OUTFLOW STORAGE | OUTFLOW STORAGE
(cms) (ha.m.) | (cms) (ha.m.)
0.0000 0.0000 | 0.0172 0.0661

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
INFLOW : ID= 2 (0096)	2.500	0.187	5.25	55.72
OUTFLOW: ID= 1 (0098)	1.780	0.017	5.17	55.17
OVERFLOW:ID= 3 (0003)	0.720	0.170	5.25	55.17

TOTAL NUMBER OF SIMULATION OVERFLOW = 28
CUMULATIVE TIME OF OVERFLOW (HOURS) = 2.33
PERCENTAGE OF TIME OVERFLOWING (%) = 4.25

PEAK FLOW REDUCTION [Qout/Qin](%)= 9.19
TIME SHIFT OF PEAK FLOW (min)= -5.00
MAXIMUM STORAGE USED (ha.m.)= 0.0661

| CALIB |
| STANDHYD (0086)| Area (ha)= 9.02
|ID= 1 DT=15.0 min | Total Imp(%)= 79.00 Dir. Conn.(%)= 63.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	7.13	1.89
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	1.00
Length (m)=	245.22	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	28.84	37.23	
over (min)	15.00	30.00	
Storage Coeff. (min)=	7.20 (ii)	20.10 (ii)	
Unit Hyd. Tpeak (min)=	15.00	30.00	
Unit Hyd. peak (cms)=	0.10	0.05	
		TOTALS	
PEAK FLOW (cms)=	0.46	0.16	0.618 (iii)
TIME TO PEAK (hrs)=	5.25	5.25	5.25
RUNOFF VOLUME (mm)=	60.71	35.66	51.44
TOTAL RAINFALL (mm)=	62.71	62.71	62.71
RUNOFF COEFFICIENT =	0.97	0.57	0.82

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 78.0 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.

| DUHYD (0087)|
| Inlet Cap.= 0.062|
| #of Inlets= 1|
| Total(cms)= 0.1| AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)

TOTAL HYD.(ID= 1):	9.02	0.62	5.25	51.44
MAJOR SYS.(ID= 2):	5.96	0.56	5.25	51.44
MINOR SYS.(ID= 3):	3.06	0.06	3.50	51.44

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB |
| STANDHYD (0094)| Area (ha)= 1.00
|ID= 1 DT=15.0 min | Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.99	0.01
Dep. Storage (mm)=	2.00	1.50
Average Slope (%)=	1.00	1.00
Length (m)=	81.65	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	28.84	15.96	
over (min)	15.00	30.00	
Storage Coeff. (min)=	3.72 (ii)	21.82 (ii)	
Unit Hyd. Tpeak (min)=	15.00	30.00	
Unit Hyd. peak (cms)=	0.11	0.05	
		TOTALS	
PEAK FLOW (cms)=	0.08	0.00	0.080 (iii)
TIME TO PEAK (hrs)=	5.25	5.25	5.25
RUNOFF VOLUME (mm)=	60.71	28.20	60.38
TOTAL RAINFALL (mm)=	62.71	62.71	62.71
RUNOFF COEFFICIENT =	0.97	0.45	0.96

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 78.0 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  (  0091)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
---------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 1 (  0087):    3.06   0.062    3.50    51.44
   + ID2= 2 (  0094):    1.00   0.080    5.25    60.38
     ================================================
     ID = 3 (  0091):    4.06   0.141    5.25    53.64

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

---------------------
| ADD HYD  (  0091)|
|  3 +  2 =  1   |       AREA    QPEAK    TPEAK     R.V.
---------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 3 (  0091):    4.06   0.141    5.25    53.64
   + ID2= 2 (  0098):    1.78   0.017    5.17    55.17
     ================================================
     ID = 1 (  0091):    5.84   0.159    5.25    54.11

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

---------------------
| ADD HYD  (  0079)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
---------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 1 (  0080):   18.70   0.259    6.25    22.56
   + ID2= 2 (  0091):    5.84   0.159    5.25    54.11
     ================================================
     ID = 3 (  0079):   24.54   0.360    6.25    30.06

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------
---------------------
| CALIB           |
| NASHYD  (  0092)|  Area    (ha)=  10.60  Curve Number   (CN)= 74.0
|ID= 1 DT=15.0 min |  Ia      (mm)=  5.00  # of Linear Res.(N)= 2.00
---------------------  U.H. Tp(hrs)=  0.44

   Unit Hyd Qpeak  (cms)=  0.620

   PEAK FLOW      (cms)=  0.241 (i)
   TIME TO PEAK   (hrs)=  5.250
   RUNOFF VOLUME  (mm)=  22.074
   TOTAL RAINFALL  (mm)=  62.710
   RUNOFF COEFFICIENT  =  0.352

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

-------------------------------------------------------------------------------
---------------------
| CALIB           |
| NASHYD  (  0095)|  Area    (ha)=  3.80  Curve Number   (CN)= 74.0
|ID= 1 DT=15.0 min |  Ia      (mm)=  5.00  # of Linear Res.(N)= 2.00
---------------------  U.H. Tp(hrs)=  0.33

   Unit Hyd Qpeak  (cms)=  0.301

   PEAK FLOW      (cms)=  0.103 (i)
   TIME TO PEAK   (hrs)=  5.250
   RUNOFF VOLUME  (mm)=  21.597
   TOTAL RAINFALL  (mm)=  62.710
   RUNOFF COEFFICIENT  =  0.344

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

-------------------------------------------------------------------------------
---------------------
| RESERVOIR(  0088)|    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   |  0.1800    0.1000
                      0.1725    0.0396   |  0.0000    0.0000

                          AREA     QPEAK     TPEAK      R.V.
                          (ha)     (cms)     (hrs)      (mm)
  INFLOW : ID= 2 (  0098)     0.720     0.170     5.25      55.17
  OUTFLOW: ID= 1 (  0088)     0.720     0.062     5.58      55.17

            PEAK   FLOW   REDUCTION [Qout/Qin](%)= 36.51
            TIME SHIFT OF PEAK FLOW        (min)= 20.00
            MAXIMUM  STORAGE  USED      (ha.m.)=  0.0143

-------------------------------------------------------------------------------
---------------------
| CALIB           |
| STANDHYD (  0089)|  Area    (ha)=  0.13
|ID= 1 DT=15.0 min |  Total Imp(%)=  41.00  Dir. Conn.(%)=  30.00
---------------------
                        IMPERVIOUS    PERVIOUS (i)
   Surface Area     (ha)=      0.05        0.08
   Dep. Storage     (mm)=      2.00        5.00
   Average Slope    (%)=       1.00        1.00
   Length           (m)=      29.44       40.00
   Mannings n          =      0.013       0.250

   Max.Eff.Inten.(mm/hr)=     28.84       19.85
           over (min)        15.00       30.00
   Storage Coeff.  (min)=     2.02 (ii)   18.61 (ii)
   Unit Hyd. Tpeak (min)=     15.00       30.00
   Unit Hyd. peak  (cms)=     0.11        0.05
                                    *TOTALS*
   PEAK FLOW      (cms)=      0.00        0.00        0.007 (iii)
```

```
    TIME TO PEAK    (hrs)=      5.00        5.25         5.25
    RUNOFF VOLUME    (mm)=     60.71       28.78        38.25
    TOTAL RAINFALL   (mm)=     62.71       62.71        62.71
    RUNOFF COEFFICIENT  =      0.97        0.46         0.61

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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 (  0099)|   Area    (ha)=  21.20
|ID= 1 DT=15.0 min |   Total Imp(%)=  71.00   Dir. Conn.(%)=  60.00
--------------------
                       IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=     15.05        6.15
    Dep. Storage     (mm)=      2.00        5.00
    Average Slope    (%)=       1.00        1.00
    Length           (m)=     375.94       40.00
    Mannings n           =      0.013       0.250

    Max.Eff.Inten.(mm/hr)=     28.84       26.28
          over (min)       15.00       30.00
    Storage Coeff.  (min)=      9.30 (ii)   24.13 (ii)
    Unit Hyd. Tpeak (min)=     15.00       30.00
    Unit Hyd. peak  (cms)=      0.09        0.04
                                  *TOTALS*
    PEAK FLOW      (cms)=      1.02        0.35         1.364 (iii)
    TIME TO PEAK    (hrs)=     5.25        5.25         5.25
    RUNOFF VOLUME    (mm)=     60.71       31.44        49.00
    TOTAL RAINFALL   (mm)=     62.71       62.71        62.71
    RUNOFF COEFFICIENT  =      0.97        0.50         0.78

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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  (  0090)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 1 (  0087):    5.96   0.556     5.25    51.44
   + ID2= 2 (  0088):    0.72   0.062     5.58    55.17
     ==================================================
     ID = 3 (  0090):    6.68   0.593     5.25    51.84

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

--------------------
| ADD HYD  (  0090)|
|  3 +  2 =  1   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 3 (  0090):    6.68   0.593     5.25    51.84
   + ID2= 2 (  0089):    0.13   0.007     5.25    38.25
     ==================================================
     ID = 1 (  0090):    6.81   0.599     5.25    51.58

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

--------------------
| ADD HYD  (  0090)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 1 (  0090):    6.81   0.599     5.25    51.58
   + ID2= 2 (  0099):   21.20   1.364     5.25    49.00
     ==================================================
     ID = 3 (  0090):   28.01   1.963     5.25    49.63

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0082)|   Area    (ha)=   2.00
|ID= 1 DT=15.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  40.00
--------------------
                       IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      1.00        1.00
    Dep. Storage     (mm)=      2.00        5.00
    Average Slope    (%)=       1.00        1.00
    Length           (m)=     115.47       40.00
    Mannings n           =      0.013       0.250

    Max.Eff.Inten.(mm/hr)=     28.84       20.21
          over (min)       15.00       30.00
    Storage Coeff.  (min)=      4.58 (ii)   21.05 (ii)
    Unit Hyd. Tpeak (min)=     15.00       30.00
    Unit Hyd. peak  (cms)=      0.11        0.05
                                  *TOTALS*
    PEAK FLOW      (cms)=      0.06        0.05         0.111 (iii)
    TIME TO PEAK    (hrs)=     5.25        5.25         5.25
    RUNOFF VOLUME    (mm)=     60.71       28.99        41.67
    TOTAL RAINFALL   (mm)=     62.71       62.71        62.71
    RUNOFF COEFFICIENT  =      0.97        0.46         0.66
```

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 78.0 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 (0083)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
---------- (ha) (cms) (hrs) (mm)
ID1= 1 (0082): 2.00 0.111 5.25 41.67
+ ID2= 2 (0090): 28.01 1.963 5.25 49.63
==========
ID = 3 (0083): 30.01 2.074 5.25 49.10

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (0093)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
---------- (ha) (cms) (hrs) (mm)
ID1= 1 (0083): 30.01 2.074 5.25 49.10
+ ID2= 2 (0095): 3.80 0.103 5.25 21.60
==========
ID = 3 (0093): 33.81 2.177 5.25 46.01

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| RESERVOIR(0084)| OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 15.0 min | OUTFLOW STORAGE | OUTFLOW STORAGE
---------- (cms) (ha.m.) | (cms) (ha.m.)
0.0000 0.0000 | 0.1220 1.3034
0.0820 0.6331 | 0.1550 1.4219
0.0900 0.7399 | 0.2320 1.5425
0.0970 0.8486 | 0.2750 1.6649
0.1040 0.9594 | 0.3100 1.7894
0.1100 1.0721 | 0.3400 1.9160
0.1160 1.1867 | 0.3670 2.0441

AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW : ID= 2 (0093) 33.811 2.177 5.25 46.01
OUTFLOW: ID= 1 (0084) 33.811 0.124 8.50 45.95

PEAK FLOW REDUCTION [Qout/Qin](%)= 5.71
TIME SHIFT OF PEAK FLOW (min)=195.00
MAXIMUM STORAGE USED (ha.m.)= 1.3119

**** WARNING : SELECTED ROUTING TIME STEP DENIED.

| ADD HYD (0097)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
---------- (ha) (cms) (hrs) (mm)
ID1= 1 (0084): 33.81 0.124 8.50 45.95
+ ID2= 2 (0092): 10.60 0.241 5.25 22.07
==========
ID = 3 (0097): 44.41 0.341 5.50 40.25

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB |
| STANDHYD (0100)| Area (ha)= 2.63
|ID= 1 DT=15.0 min | Total Imp(%)= 79.00 Dir. Conn.(%)= 63.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 2.08 0.55
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.00 1.00
Length (m)= 132.41 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 28.84 37.23
over (min) 15.00 30.00
Storage Coeff. (min)= 4.97 (ii) 17.87 (ii)
Unit Hyd. Tpeak (min)= 15.00 30.00
Unit Hyd. peak (cms)= 0.11 0.05
TOTALS
PEAK FLOW (cms)= 0.13 0.05 0.181 (iii)
TIME TO PEAK (hrs)= 5.25 5.25 5.25
RUNOFF VOLUME (mm)= 60.71 35.66 51.43
TOTAL RAINFALL (mm)= 62.71 62.71 62.71
RUNOFF COEFFICIENT = 0.97 0.57 0.82

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 78.0 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.

==========
==========

```
     V   V  I   SSSSS  U   U    A    L          (v 6.2.2015)
     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
```


***** 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\RCHUNG\AppData\Local\Civica\VH5\e784fed7-830f-4189-bdd3-6ad20df6e9b1\f72e88e7-0fe1-486f-9ed8-24140c06ce01\scena
Summary filename: C:\Users\RCHUNG\AppData\Local\Civica\VH5\e784fed7-830f-4189-bdd3-6ad20df6e9b1\f72e88e7-0fe1-486f-9ed8-24140c06ce01\scena

DATE: 03/21/2024 TIME: 10:50:49

USER:

COMMENTS: _____

```
 ************************************************
 ** SIMULATION : 025 Year 12 Hour AES (Bloor,  **
 ************************************************
```

```
|   READ STORM    |   Filename: C:\Users\RCHUNG\AppD
|                 |           ata\Local\Temp\
|                 |           df6539ff-395a-486e-bee4-a56417bf9b9d\7d3b17ba
| Ptotal= 73.10 mm |   Comments:
```

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  (  0062)|  Area   (ha)=  10.60  Curve Number  (CN)= 74.0
|ID= 1 DT=15.0 min |  Ia     (mm)=  5.00  # of Linear Res.(N)= 2.00
---------------------  U.H. Tp(hrs)=  0.44

   Unit Hyd Qpeak  (cms)=  0.620

   PEAK FLOW      (cms)=  0.317 (i)
   TIME TO PEAK   (hrs)=  5.250
   RUNOFF VOLUME   (mm)=  28.708
   TOTAL RAINFALL  (mm)=  73.100
   RUNOFF COEFFICIENT  =  0.393

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

---------------------------------------------------------------------------
---------------------
| CALIB             |
| NASHYD  (  0072)|  Area   (ha)=  3.80  Curve Number  (CN)= 74.0
|ID= 1 DT=15.0 min |  Ia     (mm)=  5.00  # of Linear Res.(N)= 2.00
---------------------  U.H. Tp(hrs)=  0.33

   Unit Hyd Qpeak  (cms)=  0.301

   PEAK FLOW      (cms)=  0.135 (i)
   TIME TO PEAK   (hrs)=  5.250
   RUNOFF VOLUME   (mm)=  28.088
   TOTAL RAINFALL  (mm)=  73.100
   RUNOFF COEFFICIENT  =  0.384

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

---------------------------------------------------------------------------
---------------------
| CALIB             |
| STANDHYD (  0057)|  Area   (ha)=  2.38
|ID= 1 DT=15.0 min |  Total Imp(%)=  91.00  Dir. Conn.(%)=  83.00
---------------------
                        IMPERVIOUS    PERVIOUS (i)
   Surface Area    (ha)=      2.17        0.21
   Dep. Storage    (mm)=      2.00        5.00
```

```
   Average Slope    (%)=      1.00       1.00
   Length           (m)=    125.96      40.00
   Mannings n         =     0.013      0.250

   Max.Eff.Inten.(mm/hr)=     33.63      50.22
           over (min)      15.00      30.00
   Storage Coeff.  (min)=     4.54 (ii)  15.98 (ii)
   Unit Hyd. Tpeak (min)=     15.00      30.00
   Unit Hyd. peak  (cms)=     0.11       0.05
                                *TOTALS*
   PEAK FLOW      (cms)=      0.18       0.03       0.211 (iii)
   TIME TO PEAK   (hrs)=      5.25       5.25       5.25
   RUNOFF VOLUME  (mm)=      71.10      45.80      66.79
   TOTAL RAINFALL (mm)=      73.10      73.10      73.10
   RUNOFF COEFFICIENT  =      0.97       0.63       0.91

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

    (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
        CN*  =  78.0    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 (  0077)|   Area   (ha)=   0.16
|ID= 1 DT=15.0 min |   Total Imp(%)=  68.00   Dir. Conn.(%)=  55.00
--------------------
                     IMPERVIOUS    PERVIOUS (i)
   Surface Area     (ha)=      0.11       0.05
   Dep. Storage     (mm)=      2.00       5.00
   Average Slope    (%)=      1.00       1.00
   Length           (m)=     32.66      40.00
   Mannings n         =     0.013      0.250

   Max.Eff.Inten.(mm/hr)=     33.63      33.69
           over (min)      15.00      30.00
   Storage Coeff.  (min)=     2.02 (ii)  15.45 (ii)
   Unit Hyd. Tpeak (min)=     15.00      30.00
   Unit Hyd. peak  (cms)=     0.11       0.05
                                *TOTALS*
   PEAK FLOW      (cms)=      0.01       0.00       0.012 (iii)
   TIME TO PEAK   (hrs)=      5.00       5.25       5.25
   RUNOFF VOLUME  (mm)=      71.10      40.14      57.09
   TOTAL RAINFALL (mm)=      73.10      73.10      73.10
   RUNOFF COEFFICIENT  =      0.97       0.55       0.78

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

    (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
        CN*  =  78.0    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  (  0075)|
|  1 +  2 =  3     |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 1 (  0057):    2.38   0.211     5.25    66.79
   + ID2= 2 (  0077):    0.16   0.012     5.25    57.09
     ================================================
     ID = 3 (  0075):    2.54   0.223     5.25    66.18

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0059)|    OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |    OUTFLOW    STORAGE   | OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)  |  (cms)     (ha.m.)
                        0.0000     0.0000    |  0.0176     0.0661

                             AREA     QPEAK     TPEAK      R.V.
                             (ha)     (cms)     (hrs)      (mm)
  INFLOW : ID= 2 (  0075)     2.540     0.223     5.25     66.18
  OUTFLOW: ID= 1 (  0059)     1.546     0.018     4.92     65.51
  OVERFLOW:ID= 3 (  0003)     0.994     0.206     5.25     65.51

          TOTAL NUMBER OF SIMULATION OVERFLOW  =  35
          CUMULATIVE TIME OF OVERFLOW  (HOURS) =  2.92
          PERCENTAGE OF TIME OVERFLOWING   (%) =  5.37

          PEAK   FLOW   REDUCTION [Qout/Qin](%)=  7.88
          TIME SHIFT OF PEAK FLOW        (min)=-20.00
          MAXIMUM  STORAGE   USED      (ha.m.)=  0.0661

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0064)|    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    |  0.1800     0.1000
                        0.1776     0.0396    |  0.0000     0.0000

                             AREA     QPEAK     TPEAK      R.V.
                             (ha)     (cms)     (hrs)      (mm)
  INFLOW : ID= 2 (  0059)     0.994     0.206     5.25     65.51
  OUTFLOW: ID= 1 (  0064)     0.994     0.110     5.42     65.51

          PEAK   FLOW   REDUCTION [Qout/Qin](%)= 53.34
```

```
           TIME SHIFT OF PEAK FLOW        (min)= 10.00
           MAXIMUM  STORAGE   USED      (ha.m.)=  0.0245

--------------------------------------------------------------------------------
--------------------
| CALIB           |
| STANDHYD (  0065)|   Area    (ha)=   8.95
|ID= 1 DT=15.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=  63.00
--------------------
                      IMPERVIOUS    PERVIOUS (i)
   Surface Area     (ha)=      7.07        1.88
   Dep. Storage     (mm)=      2.00        5.00
   Average Slope    (%)=       1.00        1.00
   Length           (m)=     244.27       40.00
   Mannings n           =      0.013       0.250

   Max.Eff.Inten.(mm/hr)=      33.63       45.83
           over (min)       15.00       30.00
   Storage Coeff.  (min)=      6.75 (ii)   18.62 (ii)
   Unit Hyd. Tpeak (min)=      15.00       30.00
   Unit Hyd. peak  (cms)=      0.10        0.05
                                    *TOTALS*
   PEAK FLOW       (cms)=      0.53        0.20         0.732 (iii)
   TIME TO PEAK    (hrs)=      5.25        5.25         5.25
   RUNOFF VOLUME   (mm)=      71.10       44.51        61.26
   TOTAL RAINFALL  (mm)=      73.10       73.10        73.10
   RUNOFF COEFFICIENT   =      0.97        0.61         0.84

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

    (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
        CN*  =  78.0    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.

--------------------------------------------------------------------------------
--------------------
| DUHYD    (  0061)|
| Inlet Cap.= 0.062|
| #of Inlets=     1|
| Total(cms)=  0.1|     AREA     QPEAK     TPEAK    R.V.
--------------------       (ha)     (cms)     (hrs)    (mm)
   TOTAL HYD.(ID= 1):   8.95      0.73      5.25   61.26
   ==================================================
   MAJOR SYS.(ID= 2):   6.25      0.67      5.25   61.26
   MINOR SYS.(ID= 3):   2.70      0.06      2.75   61.26

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB           |
| STANDHYD (  0068)|   Area    (ha)=   0.16
|ID= 1 DT=15.0 min |   Total Imp(%)=  35.00   Dir. Conn.(%)=  30.00
--------------------
                      IMPERVIOUS    PERVIOUS (i)
   Surface Area     (ha)=      0.06        0.10
   Dep. Storage     (mm)=      2.00        5.00
   Average Slope    (%)=       1.00        1.00
   Length           (m)=      32.66       40.00
   Mannings n           =      0.013       0.250

   Max.Eff.Inten.(mm/hr)=      33.63       21.69
           over (min)       15.00       30.00
   Storage Coeff.  (min)=      2.02 (ii)   18.03 (ii)
   Unit Hyd. Tpeak (min)=      15.00       30.00
   Unit Hyd. peak  (cms)=      0.11        0.05
                                    *TOTALS*
   PEAK FLOW       (cms)=      0.00        0.01         0.010 (iii)
   TIME TO PEAK    (hrs)=      5.00        5.25         5.25
   RUNOFF VOLUME   (mm)=      71.10       34.72        45.58
   TOTAL RAINFALL  (mm)=      73.10       73.10        73.10
   RUNOFF COEFFICIENT   =      0.97        0.47         0.62

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

    (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
        CN*  =  78.0    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 (  0071)|   Area    (ha)=  21.20
|ID= 1 DT=15.0 min |   Total Imp(%)=  71.00   Dir. Conn.(%)=  60.00
--------------------
                      IMPERVIOUS    PERVIOUS (i)
   Surface Area     (ha)=     15.05        6.15
   Dep. Storage     (mm)=      2.00        5.00
   Average Slope    (%)=       1.00        1.00
   Length           (m)=     375.94       40.00
   Mannings n           =      0.013       0.250

   Max.Eff.Inten.(mm/hr)=      33.63       32.79
           over (min)       15.00       30.00
   Storage Coeff.  (min)=      8.74 (ii)   22.32 (ii)
   Unit Hyd. Tpeak (min)=      15.00       30.00
   Unit Hyd. peak  (cms)=      0.09        0.04
                                    *TOTALS*
   PEAK FLOW       (cms)=      1.19        0.45         1.636 (iii)
   TIME TO PEAK    (hrs)=      5.25        5.25         5.25
   RUNOFF VOLUME   (mm)=      71.10       39.75        58.56
   TOTAL RAINFALL  (mm)=      73.10       73.10        73.10
```

```
    RUNOFF COEFFICIENT  =     0.97       0.54        0.80

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  78.0    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  (  0058)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK    R.V.
--------------------       (ha)   (cms)   (hrs)    (mm)
      ID1= 1 (  0061):    6.25  0.670    5.25   61.26
     + ID2= 2 (  0064):    0.99  0.110    5.42   65.51
      ==================================================
      ID = 3 (  0058):    7.25  0.764    5.25   61.84

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

--------------------
| ADD HYD  (  0058)|
|  3 +  2 =  1   |       AREA    QPEAK    TPEAK    R.V.
--------------------       (ha)   (cms)   (hrs)    (mm)
      ID1= 3 (  0058):    7.25  0.764    5.25   61.84
     + ID2= 2 (  0068):    0.16  0.010    5.25   45.58
      ==================================================
      ID = 1 (  0058):    7.41  0.774    5.25   61.49

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

--------------------
| ADD HYD  (  0058)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK    R.V.
--------------------       (ha)   (cms)   (hrs)    (mm)
      ID1= 1 (  0058):    7.41  0.774    5.25   61.49
     + ID2= 2 (  0071):   21.20  1.636    5.25   58.56
      ==================================================
      ID = 3 (  0058):   28.61  2.411    5.25   59.32

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB           |
| STANDHYD (  0069)|   Area    (ha)=   2.00
|ID= 1 DT=15.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  40.00
--------------------
                      IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      1.00        1.00
    Dep. Storage     (mm)=      2.00        5.00
    Average Slope    (%)=       1.00        1.00
    Length           (m)=     115.47       40.00
    Mannings n           =      0.013       0.250

    Max.Eff.Inten.(mm/hr)=     33.63       26.84
            over (min)       15.00       30.00
    Storage Coeff.  (min)=     4.31 (ii)   19.01 (ii)
    Unit Hyd. Tpeak (min)=     15.00       30.00
    Unit Hyd. peak  (cms)=      0.11        0.05
                                  *TOTALS*
    PEAK FLOW       (cms)=      0.07        0.06         0.136 (iii)
    TIME TO PEAK    (hrs)=      5.25        5.25         5.25
    RUNOFF VOLUME   (mm)=      71.10       36.94        50.60
    TOTAL RAINFALL  (mm)=      73.10       73.10        73.10
    RUNOFF COEFFICIENT  =      0.97        0.51         0.69

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  78.0    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  (  0063)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK    R.V.
--------------------       (ha)   (cms)   (hrs)    (mm)
      ID1= 1 (  0058):   28.61  2.411    5.25   59.32
     + ID2= 2 (  0069):    2.00  0.136    5.25   50.60
      ==================================================
      ID = 3 (  0063):   30.61  2.546    5.25   58.75

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

--------------------
| ADD HYD  (  0066)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK    R.V.
--------------------       (ha)   (cms)   (hrs)    (mm)
      ID1= 1 (  0063):   30.61  2.546    5.25   58.75
     + ID2= 2 (  0072):    3.80  0.135    5.25   28.09
      ==================================================
      ID = 3 (  0066):   34.41  2.681    5.25   55.36

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0073)|    OVERFLOW IS OFF
```

```
| IN= 2---> OUT= 1 |
| DT= 15.0 min    |    OUTFLOW    STORAGE   | OUTFLOW    STORAGE
--------------------     (cms)     (ha.m.)  |  (cms)     (ha.m.)
                    0.0000    0.0000   |  0.1220     1.3034
                    0.0820    0.6331   |  0.1550     1.4219
                    0.0900    0.7399   |  0.2320     1.5425
                    0.0970    0.8486   |  0.2750     1.6649
                    0.1040    0.9594   |  0.3100     1.7894
                    0.1100    1.0721   |  0.3400     1.9160
                    0.1160    1.1867   |  0.3670     2.0441

                        AREA     QPEAK     TPEAK      R.V.
                        (ha)     (cms)     (hrs)      (mm)
  INFLOW : ID= 2 (  0066)    34.407     2.681     5.25      55.36
  OUTFLOW: ID= 1 (  0073)    34.407     0.238     7.92      55.31

            PEAK   FLOW   REDUCTION [Qout/Qin](%)=  8.88
            TIME SHIFT OF PEAK FLOW        (min)=160.00
            MAXIMUM  STORAGE   USED       (ha.m.)=  1.5602

    **** WARNING : SELECTED ROUTING TIME STEP DENIED.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0056)|
|   1 +  2 =  3    |       AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0062):    10.60   0.317     5.25     28.71
    + ID2= 2 (  0073):    34.41   0.238     7.92     55.31
      ==================================================
      ID = 3 (  0056):    45.01   0.427     5.50     49.04

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB           |
| NASHYD   (  0060)|   Area    (ha)=  18.70   Curve Number   (CN)= 74.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 2.00
--------------------   U.H. Tp(hrs)=   1.05

    Unit Hyd Qpeak  (cms)=   0.461

    PEAK FLOW       (cms)=   0.339 (i)
    TIME TO PEAK    (hrs)=   6.250
    RUNOFF VOLUME    (mm)=  29.336
    TOTAL RAINFALL   (mm)=  73.100
    RUNOFF COEFFICIENT   =   0.401

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

--------------------------------------------------------------------------------
--------------------
| CALIB           |
| STANDHYD (  0067)|   Area    (ha)=   1.00
|ID= 1 DT=15.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      0.99        0.01
    Dep. Storage     (mm)=      2.00        1.50
    Average Slope    (%)=       1.00        1.00
    Length           (m)=      81.65       40.00
    Mannings n           =      0.013       0.250

    Max.Eff.Inten.(mm/hr)=     33.63       20.19
            over (min)       15.00       30.00
    Storage Coeff.  (min)=     3.50 (ii)   19.98 (ii)
    Unit Hyd. Tpeak (min)=     15.00       30.00
    Unit Hyd. peak  (cms)=     0.11        0.05
                                    *TOTALS*
    PEAK FLOW       (cms)=     0.09        0.00        0.093 (iii)
    TIME TO PEAK    (hrs)=     5.25        5.25        5.25
    RUNOFF VOLUME    (mm)=     71.10       35.79       70.74
    TOTAL RAINFALL   (mm)=     73.10       73.10       73.10
    RUNOFF COEFFICIENT   =     0.97        0.49        0.97

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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  (  0070)|
|   1 +  2 =  3    |       AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0059):     1.55   0.018     4.92     65.51
    + ID2= 2 (  0061):     2.70   0.062     2.75     61.26
      ==================================================
      ID = 3 (  0070):     4.24   0.079     4.92     62.81

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

--------------------
| ADD HYD  (  0070)|
|   3 +  2 =  1    |       AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
      ID1= 3 (  0070):     4.24   0.079     4.92     62.81
    + ID2= 2 (  0067):     1.00   0.093     5.25     70.74
      ==================================================
      ID = 1 (  0070):     5.24   0.172     5.25     64.31
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0074)					
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0060):	18.70	0.339	6.25	29.34
+ ID2= 2 (0070):	5.24	0.172	5.25	64.31
ID = 3 (0074):	23.94	0.445	6.25	36.99

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0078)	Area (ha)= 2.70		
ID= 1 DT=15.0 min	Total Imp(%)= 79.00	Dir. Conn.(%)= 63.00	

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	2.13	0.57
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	1.00
Length (m)=	134.16	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	33.63	45.83	
over (min)	15.00	30.00	
Storage Coeff. (min)=	4.71 (ii)	16.58 (ii)	
Unit Hyd. Tpeak (min)=	15.00	30.00	
Unit Hyd. peak (cms)=	0.11	0.05	
		TOTALS	
PEAK FLOW (cms)=	0.16	0.06	0.222 (iii)
TIME TO PEAK (hrs)=	5.25	5.25	5.25
RUNOFF VOLUME (mm)=	71.10	44.51	61.26
TOTAL RAINFALL (mm)=	73.10	73.10	73.10
RUNOFF COEFFICIENT =	0.97	0.61	0.84

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 78.0 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			
NASHYD (0080)	Area (ha)= 18.70	Curve Number (CN)= 74.0	
ID= 1 DT=15.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 2.00	
	U.H. Tp(hrs)= 1.05		

Unit Hyd Qpeak (cms)= 0.461

PEAK FLOW (cms)= 0.339 (i)
TIME TO PEAK (hrs)= 6.250
RUNOFF VOLUME (mm)= 29.336
TOTAL RAINFALL (mm)= 73.100
RUNOFF COEFFICIENT = 0.401

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

CALIB			
STANDHYD (0096)	Area (ha)= 2.50		
ID= 1 DT=15.0 min	Total Imp(%)= 90.00	Dir. Conn.(%)= 72.00	

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	2.25	0.25
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	1.00
Length (m)=	129.10	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	33.63	82.07	
over (min)	15.00	15.00	
Storage Coeff. (min)=	4.60 (ii)	14.01 (ii)	
Unit Hyd. Tpeak (min)=	15.00	15.00	
Unit Hyd. peak (cms)=	0.11	0.07	
		TOTALS	
PEAK FLOW (cms)=	0.17	0.06	0.223 (iii)
TIME TO PEAK (hrs)=	5.25	5.25	5.25
RUNOFF VOLUME (mm)=	71.10	52.48	65.88
TOTAL RAINFALL (mm)=	73.10	73.10	73.10
RUNOFF COEFFICIENT =	0.97	0.72	0.90

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 78.0 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(0098)	OVERFLOW IS ON			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0172	0.0661

AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)

```
  INFLOW : ID= 2 (  0096)     2.500     0.223     5.25     65.88
  OUTFLOW: ID= 1 (  0098)     1.534     0.017     4.92     65.33
  OVERFLOW:ID= 3 (  0003)     0.966     0.206     5.25     65.33

          TOTAL NUMBER OF SIMULATION OVERFLOW  =   35
          CUMULATIVE TIME OF OVERFLOW  (HOURS) =  2.92
          PERCENTAGE OF TIME OVERFLOWING   (%) =  5.30

          PEAK   FLOW   REDUCTION [Qout/Qin](%)=  7.71
          TIME SHIFT OF PEAK FLOW        (min)=-20.00
          MAXIMUM  STORAGE   USED      (ha.m.)=  0.0661

--------------------------------------------------------------------------------
--------------------
| CALIB           |
| STANDHYD (  0086)|   Area    (ha)=   9.02
|ID= 1 DT=15.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=  63.00
--------------------
                      IMPERVIOUS    PERVIOUS (i)
   Surface Area     (ha)=      7.13        1.89
   Dep. Storage     (mm)=      2.00        5.00
   Average Slope    (%)=       1.00        1.00
   Length           (m)=     245.22       40.00
   Mannings n          =       0.013       0.250

   Max.Eff.Inten.(mm/hr)=     33.63       45.83
          over (min)       15.00       30.00
   Storage Coeff.  (min)=      6.77 (ii)   18.64 (ii)
   Unit Hyd. Tpeak (min)=     15.00       30.00
   Unit Hyd. peak  (cms)=      0.10        0.05
                                  *TOTALS*
   PEAK FLOW       (cms)=      0.53        0.21        0.737 (iii)
   TIME TO PEAK    (hrs)=      5.25        5.25         5.25
   RUNOFF VOLUME    (mm)=     71.10       44.51        61.26
   TOTAL RAINFALL   (mm)=     73.10       73.10        73.10
   RUNOFF COEFFICIENT   =      0.97        0.61         0.84

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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.

--------------------------------------------------------------------------------
--------------------
| DUHYD    (  0087)|
| Inlet Cap.= 0.062|
| #of Inlets=    1|
| Total(cms)=  0.1|     AREA     QPEAK     TPEAK    R.V.
--------------------      (ha)     (cms)     (hrs)    (mm)
   TOTAL HYD.(ID= 1):   9.02      0.74      5.25   61.26
   ================================================
   MAJOR SYS.(ID= 2):   6.32      0.68      5.25   61.26
   MINOR SYS.(ID= 3):   2.70      0.06      2.75   61.26

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB           |
| STANDHYD (  0094)|   Area    (ha)=   1.00
|ID= 1 DT=15.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                      IMPERVIOUS    PERVIOUS (i)
   Surface Area     (ha)=      0.99        0.01
   Dep. Storage     (mm)=      2.00        1.50
   Average Slope    (%)=       1.00        1.00
   Length           (m)=      81.65       40.00
   Mannings n          =       0.013       0.250

   Max.Eff.Inten.(mm/hr)=     33.63       20.19
          over (min)       15.00       30.00
   Storage Coeff.  (min)=      3.50 (ii)   19.98 (ii)
   Unit Hyd. Tpeak (min)=     15.00       30.00
   Unit Hyd. peak  (cms)=      0.11        0.05
                                  *TOTALS*
   PEAK FLOW       (cms)=      0.09        0.00        0.093 (iii)
   TIME TO PEAK    (hrs)=      5.25        5.25         5.25
   RUNOFF VOLUME    (mm)=     71.10       35.79        70.74
   TOTAL RAINFALL   (mm)=     73.10       73.10        73.10
   RUNOFF COEFFICIENT   =      0.97        0.49         0.97

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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  (  0091)|
|  1 +  2 =  3    |       AREA    QPEAK    TPEAK    R.V.
--------------------       (ha)    (cms)    (hrs)    (mm)
     ID1= 1 (  0087):    2.70   0.062     2.75   61.26
   + ID2= 2 (  0094):    1.00   0.093     5.25   70.74
     ================================================
     ID = 3 (  0091):    3.70   0.155     5.25   63.82

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

```
--------------------
| ADD HYD  (  0091)|
|  3 +  2 =  1   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 3 (  0091):    3.70   0.155     5.25    63.82
    + ID2= 2 (  0098):    1.53   0.017     4.92    65.33
     ================================================
     ID = 1 (  0091):    5.24   0.172     5.25    64.26

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

--------------------
| ADD HYD  (  0079)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 1 (  0080):   18.70   0.339     6.25    29.34
    + ID2= 2 (  0091):    5.24   0.172     5.25    64.26
     ================================================
     ID = 3 (  0079):   23.94   0.444     6.25    36.98

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------
--------------------
| CALIB           |
| NASHYD   (  0092)|  Area    (ha)=  10.60   Curve Number   (CN)= 74.0
|ID= 1 DT=15.0 min |  Ia      (mm)=   5.00   # of Linear Res.(N)= 2.00
--------------------  U.H. Tp(hrs)=   0.44

   Unit Hyd Qpeak  (cms)=   0.620

   PEAK FLOW      (cms)=   0.317 (i)
   TIME TO PEAK   (hrs)=   5.250
   RUNOFF VOLUME   (mm)=  28.708
   TOTAL RAINFALL  (mm)=  73.100
   RUNOFF COEFFICIENT   =   0.393

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

-------------------------------------------------------------------------------
--------------------
| CALIB           |
| NASHYD   (  0095)|  Area    (ha)=   3.80   Curve Number   (CN)= 74.0
|ID= 1 DT=15.0 min |  Ia      (mm)=   5.00   # of Linear Res.(N)= 2.00
--------------------  U.H. Tp(hrs)=   0.33

   Unit Hyd Qpeak  (cms)=   0.301

   PEAK FLOW      (cms)=   0.135 (i)
   TIME TO PEAK   (hrs)=   5.250
   RUNOFF VOLUME   (mm)=  28.088
   TOTAL RAINFALL  (mm)=  73.100
   RUNOFF COEFFICIENT   =   0.384

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

-------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0088)|    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   |   0.1800     0.1000
                        0.1725    0.0396   |   0.0000     0.0000

                           AREA     QPEAK     TPEAK      R.V.
                           (ha)     (cms)     (hrs)      (mm)
  INFLOW : ID= 2 (  0098)     0.966     0.206     5.25      65.33
  OUTFLOW: ID= 1 (  0088)     0.966     0.106     5.42      65.33

            PEAK   FLOW   REDUCTION [Qout/Qin](%)= 51.35
            TIME SHIFT OF PEAK FLOW        (min)= 10.00
            MAXIMUM  STORAGE   USED       (ha.m.)=  0.0244

-------------------------------------------------------------------------------
--------------------
| CALIB           |
| STANDHYD (  0089)|  Area    (ha)=   0.13
|ID= 1 DT=15.0 min |  Total Imp(%)=  41.00   Dir. Conn.(%)=  30.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      0.05        0.08
    Dep. Storage     (mm)=      2.00        5.00
    Average Slope     (%)=      1.00        1.00
    Length           (m)=     29.44       40.00
    Mannings n          =     0.013       0.250

    Max.Eff.Inten.(mm/hr)=     33.63       26.40
          over (min)      15.00       30.00
    Storage Coeff.  (min)=      1.90 (ii)   16.70 (ii)
    Unit Hyd. Tpeak (min)=     15.00       30.00
    Unit Hyd. peak  (cms)=      0.11        0.05
                                    *TOTALS*
    PEAK FLOW      (cms)=      0.00        0.00         0.008 (iii)
    TIME TO PEAK   (hrs)=      5.00        5.25         5.25
    RUNOFF VOLUME   (mm)=     71.10       36.71        46.97
    TOTAL RAINFALL  (mm)=     73.10       73.10        73.10
    RUNOFF COEFFICIENT   =     0.97        0.50         0.64

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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 (  0099)|   Area    (ha)=  21.20
|ID= 1 DT=15.0 min |   Total Imp(%)=  71.00   Dir. Conn.(%)=  60.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=     15.05        6.15
    Dep. Storage     (mm)=      2.00        5.00
    Average Slope    (%)=      1.00        1.00
    Length           (m)=    375.94       40.00
    Mannings n           =     0.013       0.250

    Max.Eff.Inten.(mm/hr)=     33.63       32.79
            over (min)      15.00       30.00
    Storage Coeff.  (min)=     8.74 (ii)   22.32 (ii)
    Unit Hyd. Tpeak (min)=     15.00       30.00
    Unit Hyd. peak  (cms)=     0.09        0.04
                                   *TOTALS*
    PEAK FLOW      (cms)=      1.19        0.45         1.636 (iii)
    TIME TO PEAK   (hrs)=      5.25        5.25         5.25
    RUNOFF VOLUME  (mm)=      71.10       39.75        58.56
    TOTAL RAINFALL (mm)=      73.10       73.10        73.10
    RUNOFF COEFFICIENT  =      0.97        0.54         0.80

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  78.0    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  (  0090)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0087):    6.32   0.676     5.25    61.26
    + ID2= 2 (  0088):    0.97   0.106     5.42    65.33
      ================================================
      ID = 3 (  0090):    7.28   0.766     5.25    61.80

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

--------------------
| ADD HYD  (  0090)|
|  3 +  2 =  1   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
      ID1= 3 (  0090):    7.28   0.766     5.25    61.80
    + ID2= 2 (  0089):    0.13   0.008     5.25    46.97
      ================================================
      ID = 1 (  0090):    7.41   0.774     5.25    61.54

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

--------------------
| ADD HYD  (  0090)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0090):    7.41   0.774     5.25    61.54
    + ID2= 2 (  0099):   21.20   1.636     5.25    58.56
      ================================================
      ID = 3 (  0090):   28.61   2.410     5.25    59.33

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0082)|   Area    (ha)=   2.00
|ID= 1 DT=15.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  40.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      1.00        1.00
    Dep. Storage     (mm)=      2.00        5.00
    Average Slope    (%)=      1.00        1.00
    Length           (m)=    115.47       40.00
    Mannings n           =     0.013       0.250

    Max.Eff.Inten.(mm/hr)=     33.63       26.84
            over (min)      15.00       30.00
    Storage Coeff.  (min)=     4.31 (ii)   19.01 (ii)
    Unit Hyd. Tpeak (min)=     15.00       30.00
    Unit Hyd. peak  (cms)=     0.11        0.05
                                   *TOTALS*
    PEAK FLOW      (cms)=      0.07        0.06         0.136 (iii)
    TIME TO PEAK   (hrs)=      5.25        5.25         5.25
    RUNOFF VOLUME  (mm)=      71.10       36.94        50.60
    TOTAL RAINFALL (mm)=      73.10       73.10        73.10
    RUNOFF COEFFICIENT  =      0.97        0.51         0.69

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  78.0    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  (  0083)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
-------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 1 (  0082):    2.00   0.136     5.25    50.60
   + ID2= 2 (  0090):   28.61   2.410     5.25    59.33
     ================================================
     ID = 3 (  0083):   30.61   2.546     5.25    58.76

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


--------------------
| ADD HYD  (  0093)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
-------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 1 (  0083):   30.61   2.546     5.25    58.76
   + ID2= 2 (  0095):    3.80   0.135     5.25    28.09
     ================================================
     ID = 3 (  0093):   34.41   2.681     5.25    55.37

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0084)|    OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 15.0 min     |    OUTFLOW    STORAGE   | OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |  (cms)     (ha.m.)
                  0.0000    0.0000   |  0.1220     1.3034
                  0.0820    0.6331   |  0.1550     1.4219
                  0.0900    0.7399   |  0.2320     1.5425
                  0.0970    0.8486   |  0.2750     1.6649
                  0.1040    0.9594   |  0.3100     1.7894
                  0.1100    1.0721   |  0.3400     1.9160
                  0.1160    1.1867   |  0.3670     2.0441

                      AREA     QPEAK     TPEAK      R.V.
                      (ha)     (cms)     (hrs)      (mm)
  INFLOW : ID= 2 (  0093)    34.414     2.681     5.25     55.37
  OUTFLOW: ID= 1 (  0084)    34.414     0.238     7.92     55.32

            PEAK   FLOW   REDUCTION [Qout/Qin](%)=  8.89
            TIME SHIFT OF PEAK FLOW        (min)=160.00
            MAXIMUM  STORAGE   USED      (ha.m.)=  1.5607

    **** WARNING : SELECTED ROUTING TIME STEP DENIED.
--------------------------------------------------------------------------------


--------------------
| ADD HYD  (  0097)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
-------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 1 (  0084):   34.41   0.238     7.92    55.32
   + ID2= 2 (  0092):   10.60   0.317     5.25    28.71
     ================================================
     ID = 3 (  0097):   45.01   0.427     5.50    49.05

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0100)|   Area    (ha)=   2.63
|ID= 1 DT=15.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=  63.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
   Surface Area     (ha)=      2.08        0.55
   Dep. Storage     (mm)=      2.00        5.00
   Average Slope    (%)=       1.00        1.00
   Length           (m)=     132.41       40.00
   Mannings n           =      0.013       0.250

   Max.Eff.Inten.(mm/hr)=     33.63       45.83
           over (min)        15.00       30.00
   Storage Coeff.  (min)=     4.68 (ii)   16.55 (ii)
   Unit Hyd. Tpeak (min)=     15.00       30.00
   Unit Hyd. peak  (cms)=      0.11        0.05
                                    *TOTALS*
   PEAK FLOW      (cms)=      0.15        0.06         0.216 (iii)
   TIME TO PEAK   (hrs)=      5.25        5.25          5.25
   RUNOFF VOLUME  (mm)=      71.10       44.51         61.26
   TOTAL RAINFALL (mm)=      73.10       73.10         73.10
   RUNOFF COEFFICIENT  =      0.97        0.61          0.84

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

    (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
        CN*  =  78.0    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.

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


 FINISH
================================================================================
======================


================================================================================
======================

     V   V  I   SSSSS  U   U   A   L          (v 6.2.2015)
     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
```


***** 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\RCHUNG\AppData\Local\Civica\VH5\e784fed7-830f-4189-bdd3-6ad20df6e9b1\06960e04-2c7d-4984-aed2-ec11011a8c9e\scena
Summary filename: C:\Users\RCHUNG\AppData\Local\Civica\VH5\e784fed7-830f-4189-bdd3-6ad20df6e9b1\06960e04-2c7d-4984-aed2-ec11011a8c9e\scena

DATE: 03/21/2024 TIME: 10:50:46

USER:

COMMENTS: _____

****
** SIMULATION : 050 Year 12 Hour AES (Bloor, **
****

| READ STORM | Filename: C:\Users\RCHUNG\AppD
| | ata\Local\Temp\
| | df6539ff-395a-486e-bee4-a56417bf9b9d\6befa1ad
| Ptotal= 80.82 mm | Comments:

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 (0062)| Area (ha)= 10.60 Curve Number (CN)= 74.0
|ID= 1 DT=15.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 2.00
--- U.H. Tp(hrs)= 0.44

Unit Hyd Qpeak (cms)= 0.620

PEAK FLOW (cms)= 0.377 (i)
TIME TO PEAK (hrs)= 5.250
RUNOFF VOLUME (mm)= 33.921
TOTAL RAINFALL (mm)= 80.820
RUNOFF COEFFICIENT = 0.420

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

| CALIB |
| NASHYD (0072)| Area (ha)= 3.80 Curve Number (CN)= 74.0
|ID= 1 DT=15.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 2.00
--- U.H. Tp(hrs)= 0.33

Unit Hyd Qpeak (cms)= 0.301

PEAK FLOW (cms)= 0.160 (i)
TIME TO PEAK (hrs)= 5.250
RUNOFF VOLUME (mm)= 33.188
TOTAL RAINFALL (mm)= 80.820
RUNOFF COEFFICIENT = 0.411

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

| CALIB |
| STANDHYD (0057)| Area (ha)= 2.38
|ID= 1 DT=15.0 min | Total Imp(%)= 91.00 Dir. Conn.(%)= 83.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	2.17	0.21
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	1.00
Length (m)=	125.96	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)= 37.17 57.14
over (min) 15.00 30.00
Storage Coeff. (min)= 4.36 (ii) 15.23 (ii)

```
   Unit Hyd. Tpeak (min)=     15.00       30.00
   Unit Hyd. peak  (cms)=      0.11        0.05
                                *TOTALS*
   PEAK FLOW      (cms)=      0.20        0.03        0.235 (iii)
   TIME TO PEAK   (hrs)=      5.25        5.25         5.25
   RUNOFF VOLUME  (mm)=      78.82       52.64        74.36
   TOTAL RAINFALL (mm)=      80.82       80.82        80.82
   RUNOFF COEFFICIENT =       0.98        0.65         0.92

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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 (  0077)|   Area    (ha)=   0.16
|ID= 1 DT=15.0 min |   Total Imp(%)=  68.00   Dir. Conn.(%)=  55.00
--------------------
                      IMPERVIOUS    PERVIOUS (i)
   Surface Area     (ha)=      0.11        0.05
   Dep. Storage     (mm)=      2.00        5.00
   Average Slope    (%)=       1.00        1.00
   Length           (m)=      32.66       40.00
   Mannings n           =      0.013       0.250

   Max.Eff.Inten.(mm/hr)=     37.17       38.71
           over (min)        15.00       15.00
   Storage Coeff.  (min)=     1.94 (ii)   14.64 (ii)
   Unit Hyd. Tpeak (min)=     15.00       15.00
   Unit Hyd. peak  (cms)=      0.11        0.07
                                *TOTALS*
   PEAK FLOW      (cms)=      0.01        0.01        0.014 (iii)
   TIME TO PEAK   (hrs)=      5.00        5.25         5.25
   RUNOFF VOLUME  (mm)=      78.82       46.56        64.26
   TOTAL RAINFALL (mm)=      80.82       80.82        80.82
   RUNOFF COEFFICIENT =       0.98        0.58         0.80

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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  (  0075)|
|   1 +  2 =  3    |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0057):    2.38   0.235     5.25    74.36
    + ID2= 2 (  0077):    0.16   0.014     5.25    64.26
      ================================================
      ID = 3 (  0075):    2.54   0.249     5.25    73.73

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0059)|    OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |    OUTFLOW    STORAGE   | OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)  |  (cms)     (ha.m.)
                        0.0000     0.0000    |  0.0176     0.0661

                           AREA     QPEAK     TPEAK      R.V.
                           (ha)     (cms)     (hrs)      (mm)
  INFLOW : ID= 2 (  0075)     2.540     0.249      5.25      73.73
  OUTFLOW: ID= 1 (  0059)     1.409     0.018      4.83      73.04
  OVERFLOW:ID= 3 (  0003)     1.131     0.231      5.25      73.04

          TOTAL NUMBER OF SIMULATION OVERFLOW  =   39
          CUMULATIVE TIME OF OVERFLOW  (HOURS) =  3.25
          PERCENTAGE OF TIME OVERFLOWING   (%) =  5.96

          PEAK   FLOW   REDUCTION [Qout/Qin](%)=  7.07
          TIME SHIFT OF PEAK FLOW        (min)=-25.00
          MAXIMUM  STORAGE   USED      (ha.m.)=  0.0661

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0064)|    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    |  0.1800     0.1000
                        0.1776     0.0396    |  0.0000     0.0000

                           AREA     QPEAK     TPEAK      R.V.
                           (ha)     (cms)     (hrs)      (mm)
  INFLOW : ID= 2 (  0059)     1.131     0.231      5.25      73.04
  OUTFLOW: ID= 1 (  0064)     1.131     0.137      5.42      73.04

          PEAK   FLOW   REDUCTION [Qout/Qin](%)= 59.21
          TIME SHIFT OF PEAK FLOW        (min)= 10.00
          MAXIMUM  STORAGE   USED      (ha.m.)=  0.0306

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0065)|   Area    (ha)=   8.95
```

```
|ID= 1 DT=15.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=  63.00
--------------------
                      IMPERVIOUS    PERVIOUS (i)
   Surface Area     (ha)=      7.07        1.88
   Dep. Storage     (mm)=      2.00        5.00
   Average Slope    (%)=       1.00        1.00
   Length           (m)=     244.27       40.00
   Mannings n           =      0.013       0.250

   Max.Eff.Inten.(mm/hr)=     37.17       52.25
           over (min)       15.00       30.00
   Storage Coeff.  (min)=      6.49 (ii)   17.75 (ii)
   Unit Hyd. Tpeak (min)=     15.00       30.00
   Unit Hyd. peak  (cms)=      0.10        0.05
                                    *TOTALS*
   PEAK FLOW      (cms)=      0.58        0.24         0.820 (iii)
   TIME TO PEAK   (hrs)=      5.25        5.25         5.25
   RUNOFF VOLUME    (mm)=     78.82       51.26        68.62
   TOTAL RAINFALL   (mm)=     80.82       80.82        80.82
   RUNOFF COEFFICIENT   =      0.98        0.63         0.85

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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.

--------------------------------------------------------------------------------
--------------------
| DUHYD    (  0061)|
| Inlet Cap.= 0.062|
| #of Inlets=    1|
| Total(cms)=   0.1|     AREA     QPEAK     TPEAK    R.V.
--------------------      (ha)     (cms)     (hrs)    (mm)
   TOTAL HYD.(ID= 1):   8.95      0.82      5.25   68.62
   ==================================================
   MAJOR SYS.(ID= 2):   6.46      0.76      5.25   68.62
   MINOR SYS.(ID= 3):   2.49      0.06      2.75   68.62

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB           |
| STANDHYD (  0068)|   Area    (ha)=   0.16
|ID= 1 DT=15.0 min |   Total Imp(%)=  35.00   Dir. Conn.(%)=  30.00
--------------------
                      IMPERVIOUS    PERVIOUS (i)
   Surface Area     (ha)=      0.06        0.10
   Dep. Storage     (mm)=      2.00        5.00
   Average Slope    (%)=       1.00        1.00
   Length           (m)=      32.66       40.00
   Mannings n           =      0.013       0.250

   Max.Eff.Inten.(mm/hr)=     37.17       26.52
           over (min)       15.00       30.00
   Storage Coeff.  (min)=      1.94 (ii)   16.71 (ii)
   Unit Hyd. Tpeak (min)=     15.00       30.00
   Unit Hyd. peak  (cms)=      0.11        0.05
                                    *TOTALS*
   PEAK FLOW      (cms)=      0.00        0.01         0.011 (iii)
   TIME TO PEAK   (hrs)=      5.00        5.25         5.25
   RUNOFF VOLUME    (mm)=     78.82       40.67        52.05
   TOTAL RAINFALL   (mm)=     80.82       80.82        80.82
   RUNOFF COEFFICIENT   =      0.98        0.50         0.64

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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 (  0071)|   Area    (ha)=  21.20
|ID= 1 DT=15.0 min |   Total Imp(%)=  71.00   Dir. Conn.(%)=  60.00
--------------------
                      IMPERVIOUS    PERVIOUS (i)
   Surface Area     (ha)=     15.05        6.15
   Dep. Storage     (mm)=      2.00        5.00
   Average Slope    (%)=       1.00        1.00
   Length           (m)=     375.94       40.00
   Mannings n           =      0.013       0.250

   Max.Eff.Inten.(mm/hr)=     37.17       37.69
           over (min)       15.00       30.00
   Storage Coeff.  (min)=      8.40 (ii)   21.24 (ii)
   Unit Hyd. Tpeak (min)=     15.00       30.00
   Unit Hyd. peak  (cms)=      0.09        0.05
                                    *TOTALS*
   PEAK FLOW      (cms)=      1.31        0.53         1.841 (iii)
   TIME TO PEAK   (hrs)=      5.25        5.25         5.25
   RUNOFF VOLUME    (mm)=     78.82       46.15        65.75
   TOTAL RAINFALL   (mm)=     80.82       80.82        80.82
   RUNOFF COEFFICIENT   =      0.98        0.57         0.81

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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  (  0058)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0061):    6.46   0.758     5.25    68.62
     + ID2= 2 (  0064):    1.13   0.137     5.42    73.04
      ================================================
      ID = 3 (  0058):    7.60   0.882     5.25    69.28

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

--------------------
| ADD HYD  (  0058)|
|  3 +  2 =  1   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
      ID1= 3 (  0058):    7.60   0.882     5.25    69.28
     + ID2= 2 (  0068):    0.16   0.011     5.25    52.05
      ================================================
      ID = 1 (  0058):    7.76   0.894     5.25    68.92

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

--------------------
| ADD HYD  (  0058)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0058):    7.76   0.894     5.25    68.92
     + ID2= 2 (  0071):   21.20   1.841     5.25    65.75
      ================================================
      ID = 3 (  0058):   28.96   2.735     5.25    66.60

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
---------------------------------------------------------------------------
--------------------
| CALIB           |
| STANDHYD (  0069)|   Area    (ha)=   2.00
|ID= 1 DT=15.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  40.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      1.00        1.00
    Dep. Storage     (mm)=      2.00        5.00
    Average Slope    (%)=       1.00        1.00
    Length           (m)=     115.47       40.00
    Mannings n           =      0.013       0.250

    Max.Eff.Inten.(mm/hr)=     37.17       31.02
          over (min)       15.00       30.00
    Storage Coeff.  (min)=      4.14 (ii)   18.02 (ii)
    Unit Hyd. Tpeak (min)=     15.00       30.00
    Unit Hyd. peak  (cms)=      0.11        0.05
                               *TOTALS*
    PEAK FLOW      (cms)=      0.08        0.07         0.155 (iii)
    TIME TO PEAK   (hrs)=      5.25        5.25         5.25
    RUNOFF VOLUME  (mm)=      78.82       43.09        57.38
    TOTAL RAINFALL (mm)=      80.82       80.82        80.82
    RUNOFF COEFFICIENT  =      0.98        0.53         0.71

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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  (  0063)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0058):   28.96   2.735     5.25    66.60
     + ID2= 2 (  0069):    2.00   0.155     5.25    57.38
      ================================================
      ID = 3 (  0063):   30.96   2.889     5.25    66.00

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

--------------------
| ADD HYD  (  0066)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0063):   30.96   2.889     5.25    66.00
     + ID2= 2 (  0072):    3.80   0.160     5.25    33.19
      ================================================
      ID = 3 (  0066):   34.76   3.049     5.25    62.42

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
---------------------------------------------------------------------------
--------------------
| RESERVOIR(  0073)|    OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 15.0 min     |    OUTFLOW    STORAGE   | OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |  (cms)     (ha.m.)
                     0.0000    0.0000   |  0.1220    1.3034
                     0.0820    0.6331   |  0.1550    1.4219
                     0.0900    0.7399   |  0.2320    1.5425
                     0.0970    0.8486   |  0.2750    1.6649
```

```
                0.1040    0.9594  |  0.3100    1.7894
                0.1100    1.0721  |  0.3400    1.9160
                0.1160    1.1867  |  0.3670    2.0441

                     AREA     QPEAK     TPEAK      R.V.
                     (ha)     (cms)     (hrs)      (mm)
  INFLOW : ID= 2 (  0066)    34.756     3.049     5.25     62.42
  OUTFLOW: ID= 1 (  0073)    34.756     0.297     7.75     62.36

          PEAK   FLOW   REDUCTION [Qout/Qin](%)=  9.74
          TIME SHIFT OF PEAK FLOW       (min)=150.00
          MAXIMUM  STORAGE   USED      (ha.m.)=  1.7430

   **** WARNING : SELECTED ROUTING TIME STEP DENIED.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0056)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 1 (  0062):    10.60   0.377     5.25    33.92
   + ID2= 2 (  0073):    34.76   0.297     7.75    62.36
     ================================================
     ID = 3 (  0056):    45.36   0.520     6.08    55.71

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB          |
| NASHYD  (  0060)|  Area    (ha)=  18.70   Curve Number   (CN)= 74.0
|ID= 1 DT=15.0 min |  Ia      (mm)=   5.00   # of Linear Res.(N)= 2.00
--------------------  U.H. Tp(hrs)=   1.05

   Unit Hyd Qpeak  (cms)=   0.461

   PEAK FLOW      (cms)=   0.402 (i)
   TIME TO PEAK   (hrs)=   6.250
   RUNOFF VOLUME  (mm)=  34.664
   TOTAL RAINFALL  (mm)=  80.820
   RUNOFF COEFFICIENT  =   0.429

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

--------------------------------------------------------------------------------
--------------------
| CALIB          |
| STANDHYD (  0067)|  Area    (ha)=   1.00
|ID= 1 DT=15.0 min |  Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                     IMPERVIOUS    PERVIOUS (i)
   Surface Area    (ha)=      0.99        0.01
   Dep. Storage    (mm)=      2.00        1.50
   Average Slope   (%)=      1.00        1.00
   Length          (m)=     81.65       40.00
   Mannings n      =      0.013       0.250

   Max.Eff.Inten.(mm/hr)=     37.17       23.44
         over (min)      15.00       30.00
   Storage Coeff.  (min)=      3.36 (ii)   18.89 (ii)
   Unit Hyd. Tpeak (min)=     15.00       30.00
   Unit Hyd. peak  (cms)=      0.11        0.05
                                *TOTALS*
   PEAK FLOW      (cms)=      0.10        0.00         0.103 (iii)
   TIME TO PEAK   (hrs)=      5.25        5.25         5.25
   RUNOFF VOLUME  (mm)=     78.82       41.68        78.44
   TOTAL RAINFALL  (mm)=     80.82       80.82        80.82
   RUNOFF COEFFICIENT  =      0.98        0.52         0.97

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

    (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
        CN*  =  78.0   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  (  0070)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 1 (  0059):     1.41   0.018     4.83    73.04
   + ID2= 2 (  0061):     2.49   0.062     2.75    68.62
     ================================================
     ID = 3 (  0070):     3.89   0.079     4.83    70.22

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

--------------------
| ADD HYD  (  0070)|
|  3 +  2 =  1   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 3 (  0070):     3.89   0.079     4.83    70.22
   + ID2= 2 (  0067):     1.00   0.103     5.25    78.44
     ================================================
     ID = 1 (  0070):     4.89   0.182     5.25    71.88

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

--------------------
| ADD HYD  (  0074)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
```

```
      ID1= 1 (  0060):   18.70  0.402    6.25   34.66
    + ID2= 2 (  0070):    4.89  0.182    5.25   71.88
      ==================================================
      ID = 3 (  0074):   23.59  0.511    6.25   42.38

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0078)|   Area    (ha)=   2.70
|ID= 1 DT=15.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=  63.00
--------------------
                       IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      2.13        0.57
    Dep. Storage     (mm)=      2.00        5.00
    Average Slope    (%)=       1.00        1.00
    Length           (m)=     134.16       40.00
    Mannings n       =          0.013       0.250

    Max.Eff.Inten.(mm/hr)=     37.17       52.25
           over (min)          15.00       30.00
    Storage Coeff.  (min)=     4.53 (ii)   15.79 (ii)
    Unit Hyd. Tpeak (min)=     15.00       30.00
    Unit Hyd. peak  (cms)=     0.11        0.05
                                    *TOTALS*
    PEAK FLOW      (cms)=      0.18        0.07         0.249 (iii)
    TIME TO PEAK   (hrs)=      5.25        5.25         5.25
    RUNOFF VOLUME  (mm)=      78.82       51.26        68.62
    TOTAL RAINFALL (mm)=      80.82       80.82        80.82
    RUNOFF COEFFICIENT =      0.98        0.63         0.85

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  78.0    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            |
| NASHYD   (  0080)|   Area    (ha)=  18.70   Curve Number   (CN)= 74.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 2.00
--------------------  U.H. Tp(hrs)=   1.05

    Unit Hyd Qpeak  (cms)=   0.461

    PEAK FLOW      (cms)=   0.402 (i)
    TIME TO PEAK   (hrs)=   6.250
    RUNOFF VOLUME  (mm)=   34.664
    TOTAL RAINFALL (mm)=   80.820
    RUNOFF COEFFICIENT  =   0.429

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0096)|   Area    (ha)=   2.50
|ID= 1 DT=15.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  72.00
--------------------
                       IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      2.25        0.25
    Dep. Storage     (mm)=      2.00        5.00
    Average Slope    (%)=       1.00        1.00
    Length           (m)=     129.10       40.00
    Mannings n       =          0.013       0.250

    Max.Eff.Inten.(mm/hr)=     37.17       92.40
           over (min)          15.00       15.00
    Storage Coeff.  (min)=     4.42 (ii)   13.39 (ii)
    Unit Hyd. Tpeak (min)=     15.00       15.00
    Unit Hyd. peak  (cms)=     0.11        0.08
                                    *TOTALS*
    PEAK FLOW      (cms)=      0.19        0.06         0.248 (iii)
    TIME TO PEAK   (hrs)=      5.25        5.25         5.25
    RUNOFF VOLUME  (mm)=      78.82       59.70        73.46
    TOTAL RAINFALL (mm)=      80.82       80.82        80.82
    RUNOFF COEFFICIENT  =     0.98        0.74         0.91

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  78.0    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(  0098)|    OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |    OUTFLOW    STORAGE   | OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |  (cms)     (ha.m.)
                       0.0000    0.0000    |   0.0172     0.0661

                          AREA     QPEAK     TPEAK      R.V.
                          (ha)     (cms)     (hrs)      (mm)
  INFLOW : ID= 2 (  0096)     2.500     0.248      5.25      73.46
  OUTFLOW: ID= 1 (  0098)     1.401     0.017      4.83      72.80
  OVERFLOW:ID= 3 (  0003)     1.099     0.231      5.25      72.80

              TOTAL NUMBER OF SIMULATION OVERFLOW  =   38
              CUMULATIVE TIME OF OVERFLOW  (HOURS) =  3.17
              PERCENTAGE OF TIME OVERFLOWING   (%) =  5.73
```

```
            PEAK   FLOW   REDUCTION [Qout/Qin](%)=  6.93
            TIME SHIFT OF PEAK FLOW        (min)=-25.00
            MAXIMUM  STORAGE   USED      (ha.m.)=  0.0661

--------------------------------------------------------------------------------
--------------------
| CALIB           |
| STANDHYD (  0086)|   Area    (ha)=   9.02
|ID= 1 DT=15.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=  63.00
--------------------
                      IMPERVIOUS    PERVIOUS (i)
   Surface Area     (ha)=      7.13        1.89
   Dep. Storage     (mm)=      2.00        5.00
   Average Slope    (%)=      1.00        1.00
   Length           (m)=    245.22       40.00
   Mannings n          =     0.013       0.250

   Max.Eff.Inten.(mm/hr)=     37.17       52.25
           over (min)      15.00       30.00
   Storage Coeff.  (min)=     6.50 (ii)   17.77 (ii)
   Unit Hyd. Tpeak (min)=     15.00       30.00
   Unit Hyd. peak  (cms)=     0.10        0.05
                                    *TOTALS*
   PEAK FLOW      (cms)=      0.59        0.24         0.826 (iii)
   TIME TO PEAK   (hrs)=      5.25        5.25         5.25
   RUNOFF VOLUME  (mm)=      78.82       51.26        68.62
   TOTAL RAINFALL (mm)=      80.82       80.82        80.82
   RUNOFF COEFFICIENT  =      0.98        0.63         0.85

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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.

--------------------------------------------------------------------------------
--------------------
| DUHYD   (  0087)|
| Inlet Cap.= 0.062|
| #of Inlets=    1|
| Total(cms)=  0.1|     AREA     QPEAK     TPEAK    R.V.
--------------------      (ha)     (cms)     (hrs)    (mm)
   TOTAL HYD.(ID= 1):  9.02     0.83     5.25   68.62
   ==================================================
   MAJOR SYS.(ID= 2):  6.53     0.76     5.25   68.62
   MINOR SYS.(ID= 3):  2.49     0.06     2.75   68.62

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB           |
| STANDHYD (  0094)|   Area    (ha)=   1.00
|ID= 1 DT=15.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                      IMPERVIOUS    PERVIOUS (i)
   Surface Area     (ha)=      0.99        0.01
   Dep. Storage     (mm)=      2.00        1.50
   Average Slope    (%)=      1.00        1.00
   Length           (m)=     81.65       40.00
   Mannings n          =     0.013       0.250

   Max.Eff.Inten.(mm/hr)=     37.17       23.44
           over (min)      15.00       30.00
   Storage Coeff.  (min)=     3.36 (ii)   18.89 (ii)
   Unit Hyd. Tpeak (min)=     15.00       30.00
   Unit Hyd. peak  (cms)=     0.11        0.05
                                    *TOTALS*
   PEAK FLOW      (cms)=      0.10        0.00         0.103 (iii)
   TIME TO PEAK   (hrs)=      5.25        5.25         5.25
   RUNOFF VOLUME  (mm)=      78.82       41.68        78.44
   TOTAL RAINFALL (mm)=      80.82       80.82        80.82
   RUNOFF COEFFICIENT  =      0.98        0.52         0.97

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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  (  0091)|
|  1 +  2 =  3    |      AREA    QPEAK    TPEAK     R.V.
--------------------      (ha)    (cms)    (hrs)     (mm)
     ID1= 1 (  0087):    2.49   0.062     2.75    68.62
   + ID2= 2 (  0094):    1.00   0.103     5.25    78.44
     ==================================================
     ID = 3 (  0091):    3.49   0.165     5.25    71.44

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

--------------------
| ADD HYD  (  0091)|
|  3 +  2 =  1    |      AREA    QPEAK    TPEAK     R.V.
--------------------      (ha)    (cms)    (hrs)     (mm)
     ID1= 3 (  0091):    3.49   0.165     5.25    71.44
   + ID2= 2 (  0098):    1.40   0.017     4.83    72.80
     ==================================================
```

```
      ID = 1 (  0091):    4.89   0.182    5.25    71.83

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

--------------------
| ADD HYD  (  0079)|
|   1 +  2 =  3    |       AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0080):   18.70   0.402    6.25    34.66
     + ID2= 2 (  0091):    4.89   0.182    5.25    71.83
      ================================================
      ID = 3 (  0079):   23.59   0.510    6.25    42.37

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0092)|   Area    (ha)=  10.60   Curve Number   (CN)= 74.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 2.00
--------------------  U.H. Tp(hrs)=   0.44

   Unit Hyd Qpeak  (cms)=   0.620

   PEAK FLOW      (cms)=   0.377 (i)
   TIME TO PEAK   (hrs)=   5.250
   RUNOFF VOLUME   (mm)=  33.921
   TOTAL RAINFALL  (mm)=  80.820
   RUNOFF COEFFICIENT   =   0.420

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0095)|   Area    (ha)=   3.80   Curve Number   (CN)= 74.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 2.00
--------------------  U.H. Tp(hrs)=   0.33

   Unit Hyd Qpeak  (cms)=   0.301

   PEAK FLOW      (cms)=   0.160 (i)
   TIME TO PEAK   (hrs)=   5.250
   RUNOFF VOLUME   (mm)=  33.188
   TOTAL RAINFALL  (mm)=  80.820
   RUNOFF COEFFICIENT   =   0.411

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

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0088)|    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    |  0.1800    0.1000
                      0.1725    0.0396    |  0.0000    0.0000

                          AREA     QPEAK     TPEAK      R.V.
                          (ha)     (cms)     (hrs)      (mm)
  INFLOW : ID= 2 (  0098)     1.099     0.231     5.25      72.80
  OUTFLOW: ID= 1 (  0088)     1.099     0.132     5.42      72.80

            PEAK   FLOW   REDUCTION [Qout/Qin](%)= 57.19
            TIME SHIFT OF PEAK FLOW        (min)= 10.00
            MAXIMUM  STORAGE   USED       (ha.m.)=  0.0304

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0089)|   Area    (ha)=   0.13
|ID= 1 DT=15.0 min |   Total Imp(%)=  41.00   Dir. Conn.(%)=  30.00
--------------------
                         IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      0.05        0.08
    Dep. Storage     (mm)=      2.00        5.00
    Average Slope    (%)=       1.00        1.00
    Length           (m)=      29.44       40.00
    Mannings n           =      0.013       0.250

    Max.Eff.Inten.(mm/hr)=     37.17       30.52
           over (min)       15.00       30.00
    Storage Coeff.  (min)=     1.82 (ii)   15.79 (ii)
    Unit Hyd. Tpeak (min)=     15.00       30.00
    Unit Hyd. peak  (cms)=     0.11        0.05
                                  *TOTALS*
    PEAK FLOW      (cms)=      0.00        0.01         0.010 (iii)
    TIME TO PEAK   (hrs)=      4.75        5.25         5.25
    RUNOFF VOLUME   (mm)=     78.82       42.84         53.58
    TOTAL RAINFALL  (mm)=     80.82       80.82         80.82
    RUNOFF COEFFICIENT   =     0.98        0.53         0.66

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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 (  0099)|   Area    (ha)=  21.20
|ID= 1 DT=15.0 min |   Total Imp(%)=  71.00   Dir. Conn.(%)=  60.00
--------------------
```

```
                    IMPERVIOUS    PERVIOUS (i)
   Surface Area     (ha)=     15.05        6.15
   Dep. Storage     (mm)=      2.00        5.00
   Average Slope    (%)=       1.00        1.00
   Length           (m)=     375.94       40.00
   Mannings n       =          0.013       0.250

   Max.Eff.Inten.(mm/hr)=     37.17       37.69
           over (min)        15.00       30.00
   Storage Coeff.  (min)=     8.40 (ii)   21.24 (ii)
   Unit Hyd. Tpeak (min)=     15.00       30.00
   Unit Hyd. peak  (cms)=     0.09        0.05
                                *TOTALS*
   PEAK FLOW      (cms)=      1.31        0.53         1.841 (iii)
   TIME TO PEAK   (hrs)=      5.25        5.25         5.25
   RUNOFF VOLUME  (mm)=      78.82       46.15        65.75
   TOTAL RAINFALL (mm)=      80.82       80.82        80.82
   RUNOFF COEFFICIENT  =     0.98        0.57         0.81

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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  (  0090)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 1 (  0087):    6.53   0.765     5.25    68.62
   + ID2= 2 (  0088):    1.10   0.132     5.42    72.80
     ================================================
     ID = 3 (  0090):    7.63   0.883     5.25    69.22

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

--------------------
| ADD HYD  (  0090)|
|  3 +  2 =  1   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 3 (  0090):    7.63   0.883     5.25    69.22
   + ID2= 2 (  0089):    0.13   0.010     5.25    53.58
     ================================================
     ID = 1 (  0090):    7.76   0.893     5.25    68.96

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

--------------------
| ADD HYD  (  0090)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 1 (  0090):    7.76   0.893     5.25    68.96
   + ID2= 2 (  0099):   21.20   1.841     5.25    65.75
     ================================================
     ID = 3 (  0090):   28.96   2.734     5.25    66.61

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

--------------------
| CALIB          |
| STANDHYD (  0082)|  Area    (ha)=   2.00
|ID= 1 DT=15.0 min |  Total Imp(%)=  50.00   Dir. Conn.(%)=  40.00
--------------------
                    IMPERVIOUS    PERVIOUS (i)
   Surface Area     (ha)=      1.00        1.00
   Dep. Storage     (mm)=      2.00        5.00
   Average Slope    (%)=       1.00        1.00
   Length           (m)=     115.47       40.00
   Mannings n       =          0.013       0.250

   Max.Eff.Inten.(mm/hr)=     37.17       31.02
           over (min)        15.00       30.00
   Storage Coeff.  (min)=     4.14 (ii)   18.02 (ii)
   Unit Hyd. Tpeak (min)=     15.00       30.00
   Unit Hyd. peak  (cms)=     0.11        0.05
                                *TOTALS*
   PEAK FLOW      (cms)=      0.08        0.07         0.155 (iii)
   TIME TO PEAK   (hrs)=      5.25        5.25         5.25
   RUNOFF VOLUME  (mm)=      78.82       43.09        57.38
   TOTAL RAINFALL (mm)=      80.82       80.82        80.82
   RUNOFF COEFFICIENT  =     0.98        0.53         0.71

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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  (  0083)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 1 (  0082):    2.00   0.155     5.25    57.38
   + ID2= 2 (  0090):   28.96   2.734     5.25    66.61
     ================================================
     ID = 3 (  0083):   30.96   2.889     5.25    66.01
```

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

--------------------
| ADD HYD  (  0093)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)   (cms)   (hrs)    (mm)
     ID1= 1 (  0083):   30.96   2.889    5.25    66.01
   + ID2= 2 (  0095):    3.80   0.160    5.25    33.19
     ==================================================
     ID = 3 (  0093):   34.76   3.049    5.25    62.42

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
---------------------------------------------------------------------------
--------------------
| RESERVOIR(  0084)|    OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 15.0 min     |    OUTFLOW    STORAGE   | OUTFLOW    STORAGE
--------------------      (cms)    (ha.m.)  |  (cms)    (ha.m.)
                   0.0000    0.0000  |  0.1220    1.3034
                   0.0820    0.6331  |  0.1550    1.4219
                   0.0900    0.7399  |  0.2320    1.5425
                   0.0970    0.8486  |  0.2750    1.6649
                   0.1040    0.9594  |  0.3100    1.7894
                   0.1100    1.0721  |  0.3400    1.9160
                   0.1160    1.1867  |  0.3670    2.0441

                       AREA     QPEAK     TPEAK      R.V.
                       (ha)     (cms)     (hrs)      (mm)
  INFLOW : ID= 2 (  0093)    34.759     3.049     5.25     62.42
  OUTFLOW: ID= 1 (  0084)    34.759     0.297     7.75     62.37

            PEAK   FLOW   REDUCTION [Qout/Qin](%)=  9.74
            TIME SHIFT OF PEAK FLOW        (min)=150.00
            MAXIMUM  STORAGE   USED      (ha.m.)=  1.7433

    **** WARNING : SELECTED ROUTING TIME STEP DENIED.
---------------------------------------------------------------------------

--------------------
| ADD HYD  (  0097)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)   (cms)   (hrs)    (mm)
     ID1= 1 (  0084):   34.76   0.297    7.75    62.37
   + ID2= 2 (  0092):   10.60   0.377    5.25    33.92
     ==================================================
     ID = 3 (  0097):   45.36   0.520    6.08    55.72

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
---------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0100)|   Area    (ha)=   2.63
|ID= 1 DT=15.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=  63.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
   Surface Area     (ha)=      2.08        0.55
   Dep. Storage     (mm)=      2.00        5.00
   Average Slope    (%)=       1.00        1.00
   Length           (m)=     132.41       40.00
   Mannings n           =      0.013       0.250

   Max.Eff.Inten.(mm/hr)=     37.17       52.25
           over (min)       15.00       30.00
   Storage Coeff.  (min)=     4.49 (ii)   15.76 (ii)
   Unit Hyd. Tpeak (min)=     15.00       30.00
   Unit Hyd. peak  (cms)=      0.11        0.05
                                  *TOTALS*
   PEAK FLOW      (cms)=      0.17        0.07        0.242 (iii)
   TIME TO PEAK   (hrs)=      5.25        5.25        5.25
   RUNOFF VOLUME  (mm)=      78.82       51.26       68.62
   TOTAL RAINFALL (mm)=      80.82       80.82       80.82
   RUNOFF COEFFICIENT  =      0.98        0.63        0.85

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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.

---------------------------------------------------------------------------
===========================================================================================
======================

     V   V  I   SSSSS  U   U    A    L          (v 6.2.2015)
     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
Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2022 Smart City Water Inc
All rights reserved.


            *****  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\RCHUNG\AppData\Local\Civica\VH5\e784fed7-830f-4189-bdd3-6ad20df6e9b1\1df5465b-6592-4fcc-8fd9-043444bfc3f6\scena
Summary filename: C:\Users\RCHUNG\AppData\Local\Civica\VH5\e784fed7-830f-4189-bdd3-6ad20df6e9b1\1df5465b-6592-4fcc-8fd9-043444bfc3f6\scena

DATE: 03/21/2024 TIME: 10:50:47

USER:

COMMENTS: _____

****
** SIMULATION : 100 Year 12 Hour AES (Bloor, **
****

| READ STORM | Filename: C:\Users\RCHUNG\AppD
| | ata\Local\Temp\
| | df6539ff-395a-486e-bee4-a56417bf9b9d\8648c790
| Ptotal= 88.54 mm | Comments:

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 (0062)| Area (ha)= 10.60 Curve Number (CN)= 74.0
|ID= 1 DT=15.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 2.00
---------- U.H. Tp(hrs)= 0.44

Unit Hyd Qpeak (cms)= 0.620

PEAK FLOW (cms)= 0.440 (i)
TIME TO PEAK (hrs)= 5.250
RUNOFF VOLUME (mm)= 39.341
TOTAL RAINFALL (mm)= 88.540
RUNOFF COEFFICIENT = 0.444

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

| CALIB |
| NASHYD (0072)| Area (ha)= 3.80 Curve Number (CN)= 74.0
|ID= 1 DT=15.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 2.00
---------- U.H. Tp(hrs)= 0.33

Unit Hyd Qpeak (cms)= 0.301

PEAK FLOW (cms)= 0.186 (i)
TIME TO PEAK (hrs)= 5.250
RUNOFF VOLUME (mm)= 38.491
TOTAL RAINFALL (mm)= 88.540
RUNOFF COEFFICIENT = 0.435

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

| CALIB |
| STANDHYD (0057)| Area (ha)= 2.38
|ID= 1 DT=15.0 min | Total Imp(%)= 91.00 Dir. Conn.(%)= 83.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	2.17	0.21
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	1.00
Length (m)=	125.96	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	40.71	64.08
over (min)	15.00	15.00
Storage Coeff. (min)=	4.20 (ii)	14.59 (ii)
Unit Hyd. Tpeak (min)=	15.00	15.00
Unit Hyd. peak (cms)=	0.11	0.07

			TOTALS
PEAK FLOW (cms)=	0.22	0.04	0.260 (iii)
TIME TO PEAK (hrs)=	5.25	5.25	5.25
RUNOFF VOLUME (mm)=	86.54	59.58	81.95
TOTAL RAINFALL (mm)=	88.54	88.54	88.54
RUNOFF COEFFICIENT =	0.98	0.67	0.93

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:

```
        CN*  =  78.0    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 (  0077)|   Area    (ha)=   0.16
|ID= 1 DT=15.0 min |   Total Imp(%)=  68.00   Dir. Conn.(%)=  55.00
--------------------
                       IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      0.11        0.05
    Dep. Storage     (mm)=      2.00        5.00
    Average Slope    (%)=       1.00        1.00
    Length           (m)=      32.66       40.00
    Mannings n       =          0.013       0.250

    Max.Eff.Inten.(mm/hr)=      40.71       43.78
          over (min)            15.00       15.00
    Storage Coeff.  (min)=      1.87 (ii)   13.96 (ii)
    Unit Hyd. Tpeak (min)=      15.00       15.00
    Unit Hyd. peak  (cms)=      0.11        0.07
                                   *TOTALS*
    PEAK FLOW      (cms)=       0.01        0.01        0.016 (iii)
    TIME TO PEAK   (hrs)=       5.00        5.25        5.25
    RUNOFF VOLUME  (mm)=       86.54       53.13       71.46
    TOTAL RAINFALL (mm)=       88.54       88.54       88.54
    RUNOFF COEFFICIENT  =      0.98        0.60        0.81

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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  (  0075)|
|   1 +  2 =  3    |        AREA    QPEAK    TPEAK    R.V.
--------------------        (ha)    (cms)    (hrs)    (mm)
      ID1= 1 (  0057):     2.38   0.260     5.25    81.95
    + ID2= 2 (  0077):     0.16   0.016     5.25    71.46
      ==================================================
      ID = 3 (  0075):     2.54   0.276     5.25    81.29

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0059)|    OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |    OUTFLOW    STORAGE   | OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |  (cms)     (ha.m.)
                        0.0000     0.0000    |  0.0176     0.0661

                          AREA     QPEAK     TPEAK      R.V.
                          (ha)     (cms)     (hrs)      (mm)
  INFLOW : ID= 2 (  0075)     2.540     0.276     5.25     81.29
  OUTFLOW: ID= 1 (  0059)     1.256     0.018     4.67     83.07
  OVERFLOW:ID= 3 (  0003)     1.284     0.341     4.67     83.07

          TOTAL NUMBER OF SIMULATION OVERFLOW  =   42
          CUMULATIVE TIME OF OVERFLOW  (HOURS) =  3.50
          PERCENTAGE OF TIME OVERFLOWING   (%) =  6.41

          PEAK   FLOW   REDUCTION [Qout/Qin](%)=  6.38
          TIME SHIFT OF PEAK FLOW       (min)=-35.00
          MAXIMUM  STORAGE   USED      (ha.m.)=  0.0661

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0064)|    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    |  0.1800     0.1000
                        0.1776     0.0396    |  0.0000     0.0000

                          AREA     QPEAK     TPEAK      R.V.
                          (ha)     (cms)     (hrs)      (mm)
  INFLOW : ID= 2 (  0059)     1.284     0.341     4.67     83.07
  OUTFLOW: ID= 1 (  0064)     1.284     0.174     5.33     83.07

          PEAK   FLOW   REDUCTION [Qout/Qin](%)= 51.00
          TIME SHIFT OF PEAK FLOW       (min)= 40.00
          MAXIMUM  STORAGE   USED      (ha.m.)=  0.0391

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0065)|   Area    (ha)=   8.95
|ID= 1 DT=15.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=  63.00
--------------------
                       IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      7.07        1.88
    Dep. Storage     (mm)=      2.00        5.00
    Average Slope    (%)=       1.00        1.00
    Length           (m)=     244.27       40.00
    Mannings n       =          0.013       0.250

    Max.Eff.Inten.(mm/hr)=      40.71       58.71
          over (min)            15.00       30.00
    Storage Coeff.  (min)=      6.25 (ii)   17.01 (ii)
```

```
   Unit Hyd. Tpeak (min)=     15.00       30.00
   Unit Hyd. peak  (cms)=      0.10        0.05
                                *TOTALS*
   PEAK FLOW      (cms)=      0.64        0.27        0.909 (iii)
   TIME TO PEAK   (hrs)=      5.25        5.25         5.25
   RUNOFF VOLUME  (mm)=     86.54       58.12        76.03
   TOTAL RAINFALL (mm)=     88.54       88.54        88.54
   RUNOFF COEFFICIENT =      0.98        0.66         0.86

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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.

--------------------------------------------------------------------------------
--------------------
| DUHYD   (  0061)|
| Inlet Cap.= 0.062|
| #of Inlets=    1|
| Total(cms)=  0.1|     AREA     QPEAK     TPEAK    R.V.
--------------------      (ha)     (cms)     (hrs)    (mm)
   TOTAL HYD.(ID= 1):  8.95      0.91      5.25   76.03
   ==================================================
   MAJOR SYS.(ID= 2):  6.64      0.85      5.25   76.03
   MINOR SYS.(ID= 3):  2.31      0.06      2.50   76.03

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB           |
| STANDHYD (  0068)|   Area    (ha)=  0.16
|ID= 1 DT=15.0 min |   Total Imp(%)=  35.00   Dir. Conn.(%)=  30.00
--------------------
                       IMPERVIOUS    PERVIOUS (i)
   Surface Area     (ha)=      0.06        0.10
   Dep. Storage     (mm)=      2.00        5.00
   Average Slope    (%)=       1.00        1.00
   Length           (m)=      32.66       40.00
   Mannings n           =      0.013       0.250

   Max.Eff.Inten.(mm/hr)=     40.71       30.26
           over (min)       15.00       30.00
   Storage Coeff.  (min)=     1.87 (ii)   15.89 (ii)
   Unit Hyd. Tpeak (min)=     15.00       30.00
   Unit Hyd. peak  (cms)=      0.11        0.05
                                *TOTALS*
   PEAK FLOW      (cms)=      0.01        0.01        0.013 (iii)
   TIME TO PEAK   (hrs)=      5.00        5.25         5.25
   RUNOFF VOLUME  (mm)=     86.54       46.79        58.66
   TOTAL RAINFALL (mm)=     88.54       88.54        88.54
   RUNOFF COEFFICIENT =      0.98        0.53         0.66

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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 (  0071)|   Area    (ha)=  21.20
|ID= 1 DT=15.0 min |   Total Imp(%)=  71.00   Dir. Conn.(%)=  60.00
--------------------
                       IMPERVIOUS    PERVIOUS (i)
   Surface Area     (ha)=     15.05        6.15
   Dep. Storage     (mm)=      2.00        5.00
   Average Slope    (%)=       1.00        1.00
   Length           (m)=     375.94       40.00
   Mannings n           =      0.013       0.250

   Max.Eff.Inten.(mm/hr)=     40.71       42.66
           over (min)       15.00       30.00
   Storage Coeff.  (min)=     8.10 (ii)   20.32 (ii)
   Unit Hyd. Tpeak (min)=     15.00       30.00
   Unit Hyd. peak  (cms)=      0.10        0.05
                                *TOTALS*
   PEAK FLOW      (cms)=      1.44        0.61        2.047 (iii)
   TIME TO PEAK   (hrs)=      5.25        5.25         5.25
   RUNOFF VOLUME  (mm)=     86.54       52.69        73.00
   TOTAL RAINFALL (mm)=     88.54       88.54        88.54
   RUNOFF COEFFICIENT =      0.98        0.60         0.82

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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  (  0058)|
|  1 +  2 =  3    |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 1 (  0061):    6.64   0.847     5.25    76.03
   + ID2= 2 (  0064):    1.28   0.174     5.33    83.07
     ==================================================
```

```
      ID = 3 (  0058):    7.92   1.013    5.25   77.17

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

---------------------
| ADD HYD  (  0058)|
|  3 +  2 =  1   |       AREA    QPEAK    TPEAK     R.V.
---------------------       (ha)    (cms)    (hrs)     (mm)
      ID1= 3 (  0058):    7.92   1.013    5.25   77.17
     + ID2= 2 (  0068):    0.16   0.013    5.25   58.66
      ================================================
      ID = 1 (  0058):    8.08   1.026    5.25   76.80

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

---------------------
| ADD HYD  (  0058)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
---------------------       (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0058):    8.08   1.026    5.25   76.80
     + ID2= 2 (  0071):   21.20   2.047    5.25   73.00
      ================================================
      ID = 3 (  0058):   29.28   3.074    5.25   74.05

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
---------------------------------------------------------------------------------
---------------------
| CALIB           |
| STANDHYD (  0069)|  Area    (ha)=   2.00
|ID= 1 DT=15.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  40.00
---------------------
                       IMPERVIOUS    PERVIOUS (i)
   Surface Area     (ha)=      1.00        1.00
   Dep. Storage     (mm)=      2.00        5.00
   Average Slope    (%)=       1.00        1.00
   Length           (m)=     115.47       40.00
   Mannings n       =        0.013       0.250

   Max.Eff.Inten.(mm/hr)=     40.71       35.26
         over (min)       15.00       30.00
   Storage Coeff.  (min)=     3.99 (ii)   17.17 (ii)
   Unit Hyd. Tpeak (min)=     15.00       30.00
   Unit Hyd. peak  (cms)=     0.11        0.05
                                  *TOTALS*
   PEAK FLOW      (cms)=      0.09        0.08        0.174 (iii)
   TIME TO PEAK   (hrs)=      5.25        5.25         5.25
   RUNOFF VOLUME  (mm)=      86.54       49.41        64.26
   TOTAL RAINFALL (mm)=      88.54       88.54        88.54
   RUNOFF COEFFICIENT =       0.98        0.56         0.73

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  78.0   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  (  0063)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
---------------------       (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0058):   29.28   3.074    5.25   74.05
     + ID2= 2 (  0069):    2.00   0.174    5.25   64.26
      ================================================
      ID = 3 (  0063):   31.28   3.248    5.25   73.42

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

---------------------
| ADD HYD  (  0066)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
---------------------       (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0063):   31.28   3.248    5.25   73.42
     + ID2= 2 (  0072):    3.80   0.186    5.25   38.49
      ================================================
      ID = 3 (  0066):   35.08   3.434    5.25   69.64

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
---------------------------------------------------------------------------------
---------------------
| RESERVOIR(  0073)|    OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 15.0 min     |    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
---------------------       (cms)     (ha.m.)  |  (cms)     (ha.m.)
                    0.0000    0.0000   |  0.1220    1.3034
                    0.0820    0.6331   |  0.1550    1.4219
                    0.0900    0.7399   |  0.2320    1.5425
                    0.0970    0.8486   |  0.2750    1.6649
                    0.1040    0.9594   |  0.3100    1.7894
                    0.1100    1.0721   |  0.3400    1.9160
                    0.1160    1.1867   |  0.3670    2.0441

                         AREA     QPEAK     TPEAK      R.V.
                         (ha)     (cms)     (hrs)      (mm)
  INFLOW : ID= 2 (  0066)    35.084     3.434     5.25      69.64
  OUTFLOW: ID= 1 (  0073)    35.084     0.345     7.67      69.58

            PEAK   FLOW   REDUCTION [Qout/Qin](%)= 10.06
            TIME SHIFT OF PEAK FLOW        (min)=145.00
            MAXIMUM  STORAGE   USED      (ha.m.)=  1.9418
```

```
    **** WARNING : SELECTED ROUTING TIME STEP DENIED.
--------------------------------------------------------------------------------


--------------------
| ADD HYD  (  0056)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0062):   10.60   0.440     5.25    39.34
    + ID2= 2 (  0073):   35.08   0.345     7.67    69.58
      ================================================
      ID = 3 (  0056):   45.68   0.645     5.67    62.57

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB           |
| NASHYD  (  0060)|  Area    (ha)=  18.70   Curve Number   (CN)= 74.0
|ID= 1 DT=15.0 min |  Ia      (mm)=   5.00   # of Linear Res.(N)= 2.00
--------------------  U.H. Tp(hrs)=   1.05

    Unit Hyd Qpeak  (cms)=   0.461

    PEAK FLOW      (cms)=   0.468 (i)
    TIME TO PEAK   (hrs)=   6.250
    RUNOFF VOLUME  (mm)=  40.202
    TOTAL RAINFALL  (mm)=  88.540
    RUNOFF COEFFICIENT  =   0.454

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

--------------------------------------------------------------------------------
--------------------
| CALIB           |
| STANDHYD (  0067)|  Area    (ha)=   1.00
|ID= 1 DT=15.0 min |  Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area    (ha)=      0.99        0.01
    Dep. Storage    (mm)=      2.00        1.50
    Average Slope   (%)=      1.00        1.00
    Length          (m)=     81.65       40.00
    Mannings n          =     0.013       0.250

    Max.Eff.Inten.(mm/hr)=     40.71       27.92
          over (min)      15.00       30.00
    Storage Coeff.  (min)=     3.24 (ii)   17.72 (ii)
    Unit Hyd. Tpeak (min)=     15.00       30.00
    Unit Hyd. peak  (cms)=      0.11        0.05
                                   *TOTALS*
    PEAK FLOW      (cms)=      0.11        0.00        0.113 (iii)
    TIME TO PEAK   (hrs)=      5.25        5.25         5.25
    RUNOFF VOLUME  (mm)=     86.54       47.74        86.15
    TOTAL RAINFALL  (mm)=     88.54       88.54        88.54
    RUNOFF COEFFICIENT  =      0.98        0.54         0.97

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0   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  (  0070)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0059):    1.26   0.018     4.67    83.07
    + ID2= 2 (  0061):    2.31   0.062     2.50    76.03
      ================================================
      ID = 3 (  0070):    3.57   0.079     4.67    78.50

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


--------------------
| ADD HYD  (  0070)|
|  3 +  2 =  1   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
      ID1= 3 (  0070):    3.57   0.079     4.67    78.50
    + ID2= 2 (  0067):    1.00   0.113     5.25    86.15
      ================================================
      ID = 1 (  0070):    4.57   0.192     5.25    80.16

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


--------------------
| ADD HYD  (  0074)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0060):   18.70   0.468     6.25    40.20
    + ID2= 2 (  0070):    4.57   0.192     5.25    80.16
      ================================================
      ID = 3 (  0074):   23.27   0.579     6.25    48.04

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB           |
| STANDHYD (  0078)|  Area    (ha)=   2.70
|ID= 1 DT=15.0 min |  Total Imp(%)=  79.00   Dir. Conn.(%)=  63.00
--------------------
```

```
                    IMPERVIOUS    PERVIOUS (i)
  Surface Area    (ha)=      2.13        0.57
  Dep. Storage    (mm)=      2.00        5.00
  Average Slope   (%)=      1.00        1.00
  Length          (m)=    134.16       40.00
  Mannings n      =       0.013       0.250

  Max.Eff.Inten.(mm/hr)=     40.71       58.71
        over (min)      15.00       30.00
  Storage Coeff.  (min)=     4.37 (ii)   15.12 (ii)
  Unit Hyd. Tpeak (min)=     15.00       30.00
  Unit Hyd. peak  (cms)=     0.11        0.05
                                *TOTALS*
  PEAK FLOW       (cms)=     0.19        0.08        0.276 (iii)
  TIME TO PEAK    (hrs)=     5.25        5.25        5.25
  RUNOFF VOLUME   (mm)=     86.54       58.12       76.02
  TOTAL RAINFALL  (mm)=     88.54       88.54       88.54
  RUNOFF COEFFICIENT  =      0.98        0.66        0.86

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

    (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
        CN*  =  78.0    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           |
| NASHYD  (  0080)|  Area   (ha)=  18.70  Curve Number   (CN)= 74.0
|ID= 1 DT=15.0 min |  Ia     (mm)=   5.00  # of Linear Res.(N)= 2.00
--------------------  U.H. Tp(hrs)=   1.05

  Unit Hyd Qpeak  (cms)=   0.461

  PEAK FLOW       (cms)=   0.468 (i)
  TIME TO PEAK    (hrs)=   6.250
  RUNOFF VOLUME   (mm)=   40.202
  TOTAL RAINFALL  (mm)=   88.540
  RUNOFF COEFFICIENT  =    0.454

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

--------------------------------------------------------------------------------
--------------------
| CALIB           |
| STANDHYD (  0096)|  Area   (ha)=   2.50
|ID= 1 DT=15.0 min |  Total Imp(%)=  90.00  Dir. Conn.(%)=  72.00
--------------------
                    IMPERVIOUS    PERVIOUS (i)
  Surface Area    (ha)=      2.25        0.25
  Dep. Storage    (mm)=      2.00        5.00
  Average Slope   (%)=      1.00        1.00
  Length          (m)=    129.10       40.00
  Mannings n      =       0.013       0.250

  Max.Eff.Inten.(mm/hr)=     40.71      102.73
        over (min)      15.00       15.00
  Storage Coeff.  (min)=     4.27 (ii)   12.86 (ii)
  Unit Hyd. Tpeak (min)=     15.00       15.00
  Unit Hyd. peak  (cms)=     0.11        0.08
                                *TOTALS*
  PEAK FLOW       (cms)=     0.20        0.07        0.273 (iii)
  TIME TO PEAK    (hrs)=     5.25        5.25        5.25
  RUNOFF VOLUME   (mm)=     86.54       67.00       81.06
  TOTAL RAINFALL  (mm)=     88.54       88.54       88.54
  RUNOFF COEFFICIENT  =      0.98        0.76        0.92

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

    (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
        CN*  =  78.0    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(  0098)|    OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |    OUTFLOW    STORAGE   | OUTFLOW    STORAGE
--------------------      (cms)    (ha.m.)  |  (cms)     (ha.m.)
                      0.0000     0.0000   |  0.0172      0.0661

                          AREA     QPEAK     TPEAK      R.V.
                          (ha)     (cms)     (hrs)      (mm)
  INFLOW : ID= 2 (  0096)     2.500      0.273      5.25      81.06
  OUTFLOW: ID= 1 (  0098)     1.286      0.017      4.75      80.42
  OVERFLOW:ID= 3 (  0003)     1.214      0.256      5.25      80.42

            TOTAL NUMBER OF SIMULATION OVERFLOW  =   41
            CUMULATIVE TIME OF OVERFLOW  (HOURS) =  3.42
            PERCENTAGE OF TIME OVERFLOWING   (%) =  6.17

            PEAK   FLOW   REDUCTION [Qout/Qin](%)=  6.30
            TIME SHIFT OF PEAK FLOW        (min)=-30.00
            MAXIMUM  STORAGE   USED      (ha.m.)=  0.0661

--------------------------------------------------------------------------------
--------------------
| CALIB           |
| STANDHYD (  0086)|  Area   (ha)=   9.02
|ID= 1 DT=15.0 min |  Total Imp(%)=  79.00  Dir. Conn.(%)=  63.00
--------------------
                    IMPERVIOUS    PERVIOUS (i)
```

```
   Surface Area    (ha)=      7.13        1.89
   Dep. Storage    (mm)=      2.00        5.00
   Average Slope   (%)=       1.00        1.00
   Length          (m)=     245.22       40.00
   Mannings n      =          0.013       0.250

   Max.Eff.Inten.(mm/hr)=     40.71       58.71
         over (min)           15.00       30.00
   Storage Coeff.  (min)=     6.27 (ii)   17.02 (ii)
   Unit Hyd. Tpeak (min)=     15.00       30.00
   Unit Hyd. peak  (cms)=     0.10        0.05
                              *TOTALS*
   PEAK FLOW       (cms)=     0.64        0.27        0.916 (iii)
   TIME TO PEAK    (hrs)=     5.25        5.25        5.25
   RUNOFF VOLUME   (mm)=      86.54       58.12       76.03
   TOTAL RAINFALL  (mm)=      88.54       88.54       88.54
   RUNOFF COEFFICIENT  =      0.98        0.66        0.86

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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.

--------------------------------------------------------------------------------
--------------------
| DUHYD   (  0087)|
| Inlet Cap.= 0.062|
| #of Inlets=    1|
| Total(cms)=  0.1|     AREA     QPEAK     TPEAK    R.V.
--------------------      (ha)     (cms)     (hrs)    (mm)
   TOTAL HYD.(ID= 1):  9.02      0.92      5.25   76.03
   ================================================
   MAJOR SYS.(ID= 2):  6.71      0.85      5.25   76.03
   MINOR SYS.(ID= 3):  2.31      0.06      2.50   76.03

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB           |
| STANDHYD (  0094)|   Area    (ha)=   1.00
|ID= 1 DT=15.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                       IMPERVIOUS    PERVIOUS (i)
   Surface Area    (ha)=      0.99        0.01
   Dep. Storage    (mm)=      2.00        1.50
   Average Slope   (%)=       1.00        1.00
   Length          (m)=      81.65       40.00
   Mannings n      =          0.013       0.250

   Max.Eff.Inten.(mm/hr)=     40.71       27.92
         over (min)           15.00       30.00
   Storage Coeff.  (min)=     3.24 (ii)   17.72 (ii)
   Unit Hyd. Tpeak (min)=     15.00       30.00
   Unit Hyd. peak  (cms)=     0.11        0.05
                              *TOTALS*
   PEAK FLOW       (cms)=     0.11        0.00        0.113 (iii)
   TIME TO PEAK    (hrs)=     5.25        5.25        5.25
   RUNOFF VOLUME   (mm)=      86.54       47.74       86.15
   TOTAL RAINFALL  (mm)=      88.54       88.54       88.54
   RUNOFF COEFFICIENT  =      0.98        0.54        0.97

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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  (  0091)|
|  1 +  2 =  3    |      AREA    QPEAK    TPEAK    R.V.
--------------------      (ha)    (cms)    (hrs)    (mm)
     ID1= 1 (  0087):    2.31   0.062     2.50    76.03
   + ID2= 2 (  0094):    1.00   0.113     5.25    86.15
     ================================================
     ID = 3 (  0091):    3.31   0.174     5.25    79.08

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

--------------------
| ADD HYD  (  0091)|
|  3 +  2 =  1    |      AREA    QPEAK    TPEAK    R.V.
--------------------      (ha)    (cms)    (hrs)    (mm)
     ID1= 3 (  0091):    3.31   0.174     5.25    79.08
   + ID2= 2 (  0098):    1.29   0.017     4.75    80.42
     ================================================
     ID = 1 (  0091):    4.60   0.192     5.25    79.45

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

--------------------
| ADD HYD  (  0079)|
|  1 +  2 =  3    |      AREA    QPEAK    TPEAK    R.V.
--------------------      (ha)    (cms)    (hrs)    (mm)
     ID1= 1 (  0080):   18.70   0.468     6.25    40.20
   + ID2= 2 (  0091):    4.60   0.192     5.25    79.45
     ================================================
```

```
      ID = 3 (  0079):   23.30  0.579    6.25   47.95

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
---------------------------------------------------------------------------------
--------------------
| CALIB           |
| NASHYD   (  0092)|   Area    (ha)=  10.60   Curve Number   (CN)= 74.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 2.00
--------------------  U.H. Tp(hrs)=   0.44

    Unit Hyd Qpeak  (cms)=   0.620

    PEAK FLOW       (cms)=   0.440 (i)
    TIME TO PEAK    (hrs)=   5.250
    RUNOFF VOLUME    (mm)=  39.341
    TOTAL RAINFALL   (mm)=  88.540
    RUNOFF COEFFICIENT   =   0.444

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

---------------------------------------------------------------------------------
--------------------
| CALIB           |
| NASHYD   (  0095)|   Area    (ha)=   3.80   Curve Number   (CN)= 74.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 2.00
--------------------  U.H. Tp(hrs)=   0.33

    Unit Hyd Qpeak  (cms)=   0.301

    PEAK FLOW       (cms)=   0.186 (i)
    TIME TO PEAK    (hrs)=   5.250
    RUNOFF VOLUME    (mm)=  38.491
    TOTAL RAINFALL   (mm)=  88.540
    RUNOFF COEFFICIENT   =   0.435

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

---------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0088)|    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   |  0.1800     0.1000
                    0.1725    0.0396   |  0.0000     0.0000

                         AREA     QPEAK     TPEAK      R.V.
                         (ha)     (cms)     (hrs)      (mm)
  INFLOW : ID= 2 (  0098)     1.214     0.256     5.25     80.42
  OUTFLOW: ID= 1 (  0088)     1.214     0.158     5.42     80.42

             PEAK   FLOW   REDUCTION [Qout/Qin](%)= 61.57
             TIME SHIFT OF PEAK FLOW        (min)= 10.00
                    MAXIMUM  STORAGE   USED      (ha.m.)=  0.0364

---------------------------------------------------------------------------------
--------------------
| CALIB           |
| STANDHYD (  0089)|   Area    (ha)=   0.13
|ID= 1 DT=15.0 min |   Total Imp(%)=  41.00   Dir. Conn.(%)=  30.00
--------------------
                         IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      0.05        0.08
    Dep. Storage     (mm)=      2.00        5.00
    Average Slope    (%)=       1.00        1.00
    Length           (m)=      29.44       40.00
    Mannings n          =      0.013       0.250

    Max.Eff.Inten.(mm/hr)=     40.71       34.71
           over (min)          15.00       30.00
    Storage Coeff.  (min)=      1.76 (ii)   15.03 (ii)
    Unit Hyd. Tpeak (min)=     15.00       30.00
    Unit Hyd. peak  (cms)=      0.11        0.05
                                   *TOTALS*
    PEAK FLOW       (cms)=      0.00        0.01         0.011 (iii)
    TIME TO PEAK    (hrs)=      4.75        5.25         5.25
    RUNOFF VOLUME    (mm)=     86.54       49.14         60.30
    TOTAL RAINFALL   (mm)=     88.54       88.54         88.54
    RUNOFF COEFFICIENT   =      0.98        0.55         0.68

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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 (  0099)|   Area    (ha)=  21.20
|ID= 1 DT=15.0 min |   Total Imp(%)=  71.00   Dir. Conn.(%)=  60.00
--------------------
                         IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=     15.05        6.15
    Dep. Storage     (mm)=      2.00        5.00
    Average Slope    (%)=       1.00        1.00
    Length           (m)=     375.94       40.00
    Mannings n          =      0.013       0.250

    Max.Eff.Inten.(mm/hr)=     40.71       42.66
           over (min)          15.00       30.00
    Storage Coeff.  (min)=      8.10 (ii)   20.32 (ii)
    Unit Hyd. Tpeak (min)=     15.00       30.00
    Unit Hyd. peak  (cms)=      0.10        0.05
```

```
                                  *TOTALS*
   PEAK FLOW      (cms)=      1.44        0.61        2.047 (iii)
   TIME TO PEAK   (hrs)=      5.25        5.25         5.25
   RUNOFF VOLUME   (mm)=     86.54       52.69        73.00
   TOTAL RAINFALL  (mm)=     88.54       88.54        88.54
   RUNOFF COEFFICIENT  =      0.98        0.60         0.82

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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  (  0090)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 1 (  0087):    6.71   0.854     5.25    76.03
   + ID2= 2 (  0088):    1.21   0.158     5.42    80.42
     ================================================
     ID = 3 (  0090):    7.92   1.000     5.25    76.70

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

--------------------
| ADD HYD  (  0090)|
|  3 +  2 =  1   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 3 (  0090):    7.92   1.000     5.25    76.70
   + ID2= 2 (  0089):    0.13   0.011     5.25    60.30
     ================================================
     ID = 1 (  0090):    8.05   1.011     5.25    76.43

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

--------------------
| ADD HYD  (  0090)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 1 (  0090):    8.05   1.011     5.25    76.43
   + ID2= 2 (  0099):   21.20   2.047     5.25    73.00
     ================================================
     ID = 3 (  0090):   29.25   3.059     5.25    73.94

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB          |
| STANDHYD (  0082)|  Area    (ha)=   2.00
|ID= 1 DT=15.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  40.00
--------------------
                      IMPERVIOUS    PERVIOUS (i)
   Surface Area     (ha)=      1.00        1.00
   Dep. Storage     (mm)=      2.00        5.00
   Average Slope     (%)=      1.00        1.00
   Length           (m)=    115.47       40.00
   Mannings n          =     0.013       0.250

   Max.Eff.Inten.(mm/hr)=     40.71       35.26
           over (min)      15.00       30.00
   Storage Coeff.  (min)=     3.99 (ii)   17.17 (ii)
   Unit Hyd. Tpeak (min)=     15.00       30.00
   Unit Hyd. peak  (cms)=      0.11        0.05
                                  *TOTALS*
   PEAK FLOW      (cms)=      0.09        0.08        0.174 (iii)
   TIME TO PEAK   (hrs)=      5.25        5.25         5.25
   RUNOFF VOLUME   (mm)=     86.54       49.41        64.26
   TOTAL RAINFALL  (mm)=     88.54       88.54        88.54
   RUNOFF COEFFICIENT  =      0.98        0.56         0.73

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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  (  0083)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 1 (  0082):    2.00   0.174     5.25    64.26
   + ID2= 2 (  0090):   29.25   3.059     5.25    73.94
     ================================================
     ID = 3 (  0083):   31.25   3.233     5.25    73.32

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

--------------------
| ADD HYD  (  0093)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
     ID1= 1 (  0083):   31.25   3.233     5.25    73.32
   + ID2= 2 (  0095):    3.80   0.186     5.25    38.49
     ================================================
     ID = 3 (  0093):   35.05   3.419     5.25    69.55
```

```
   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
---------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0084)|    OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 15.0 min     |    OUTFLOW    STORAGE   | OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)  |  (cms)     (ha.m.)
                    0.0000    0.0000   |  0.1220     1.3034
                    0.0820    0.6331   |  0.1550     1.4219
                    0.0900    0.7399   |  0.2320     1.5425
                    0.0970    0.8486   |  0.2750     1.6649
                    0.1040    0.9594   |  0.3100     1.7894
                    0.1100    1.0721   |  0.3400     1.9160
                    0.1160    1.1867   |  0.3670     2.0441

                        AREA     QPEAK     TPEAK      R.V.
                        (ha)     (cms)     (hrs)      (mm)
  INFLOW : ID= 2 (  0093)     35.050      3.419      5.25      69.55
  OUTFLOW: ID= 1 (  0084)     35.050      0.344      7.67      69.49

            PEAK   FLOW   REDUCTION [Qout/Qin](%)= 10.07
            TIME SHIFT OF PEAK FLOW        (min)=145.00
            MAXIMUM  STORAGE   USED      (ha.m.)=  1.9371

    **** WARNING : SELECTED ROUTING TIME STEP DENIED.
---------------------------------------------------------------------------------


--------------------
| ADD HYD  (  0097)|
|   1 +  2 =  3    |        AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0084):    35.05   0.344     7.67     69.49
     + ID2= 2 (  0092):    10.60   0.440     5.25     39.34
      ================================================
      ID = 3 (  0097):    45.65   0.643     5.67     62.49

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
---------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0100)|   Area    (ha)=   2.63
|ID= 1 DT=15.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=  63.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      2.08        0.55
    Dep. Storage     (mm)=      2.00        5.00
    Average Slope    (%)=       1.00        1.00
    Length           (m)=     132.41       40.00
    Mannings n          =       0.013       0.250

    Max.Eff.Inten.(mm/hr)=     40.71       58.71
           over (min)          15.00       30.00
    Storage Coeff.  (min)=      4.33 (ii)   15.08 (ii)
    Unit Hyd. Tpeak (min)=      15.00       30.00
    Unit Hyd. peak  (cms)=      0.11        0.05
                                *TOTALS*
    PEAK FLOW      (cms)=       0.19        0.08        0.269 (iii)
    TIME TO PEAK   (hrs)=       5.25        5.25        5.25
    RUNOFF VOLUME  (mm)=       86.54       58.12       76.02
    TOTAL RAINFALL (mm)=       88.54       88.54       88.54
    RUNOFF COEFFICIENT =       0.98        0.66        0.86

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  78.0    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.

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

TYLin

Project Name: Brock Zents Townhomes
Project #: 18138
Date: 3/20/2024

Prepared by: XW
Checked by: LP

LOCATION: PICKERING
STORM SEWER DESIGN SHEET
STORM EVENT (yr) 100

a = 2096.425
b = 6.485
c = 0.863

$i = a(T+b)^{-c}$, where i (mm/h) ; T (min)
Q = A(i)C/3600 + C. FLOW x (42), where A (m^2) ; i (mm/h)
AC = AREA x RUNOFF COEFFICIENT
C. FLOW = CONTROLLED FLOW

STREET	UPSTREAM STRUCTURE	DOWNSTREAM STRUCTURE	AREA (m^2) C=0.90	AC (m^2)	CUMULATIVE AC (m^2)	ToC (min)	C. FLOW @42L/s/ha (m^2)	CUMULATIVE C. FLOW (m^2)	OVERRIDE STORM EVENT (years)	i (mm/h)	Q (L/s)	PIPE SIZE (mm)	GRADE (%)	CAPACITY (L/s)	VELOCITY (m/s)	LENGTH (m)	TIME IN PIPE (min)	TOTAL TIME (min)	% CAPACITY
	STUB 1	MH 15	1603	1442	1442	10.00		0		186.69	74.8	300	1.00	96.7	1.4	10.4	0.13	10.13	77%
	CB 33	MH 15	808	727	727	10.00		0		186.69	37.7	250	1.00	59.5	1.2	9.9	0.14	10.14	63%
	CB 34	MH 15	221	199	199	10.00		0		186.69	10.3	150	1.00	15.2	0.9	7.9	0.15	10.15	68%
	MH 15	CBMH 18	0	0	2368	10.15		0		185.21	121.8	375	1.00	175.3	1.6	14.4	0.15	10.30	69%
	CBMH 18	CBMH 17	483	435	2803	10.30		0		183.77	143.1	375	1.00	175.3	1.6	40.0	0.42	10.72	82%
	CB 30	CBMH 17	639	575	575	10.00		0		186.69	29.8	200	2.00	46.4	1.5	4.9	0.06	10.06	64%
	CB 35	CBMH 17	539	485	485	10.00		0		186.69	25.2	200	1.00	32.8	1.0	24.8	0.40	10.40	77%
	CBMH 17	MH 9	636	573	4436	10.72		0		179.90	221.7	450	1.00	285.1	1.8	45.1	0.42	11.14	78%
	CB 29	MH 9	461	415	415	10.00		0		186.69	21.5	200	1.00	32.8	1.0	5.0	0.08	10.08	66%
	CB 28	MH 9	543	489	489	10.00		0		186.69	25.3	200	1.00	32.8	1.0	5.0	0.08	10.08	77%
	MH 9	MH 6	0	0	5340	11.14		0		176.20	261.3	525	1.00	430.1	2.0	60.2	0.51	11.65	61%
	MH 6	CULTEC	0	0	5340	11.65		0		171.95	255.0	525	1.00	430.1	2.0	5.0	0.04	11.69	59%
	CB 21	MH 16	1726	1554	1554	10.00		0		186.69	80.6	300	1.00	96.7	1.4	14.5	0.18	10.18	83%
	CB 22	MH 16	842	758	758	10.00		0		186.69	39.3	300	0.50	68.4	1.0	35.6	0.61	10.61	58%
	MH 16	DCBMH 23	0	0	2312	10.61		0		180.90	116.2	450	0.50	201.6	1.3	27.2	0.36	10.97	58%
	DCBMH 23	DCBMH 24	2966	2669	4981	10.97		0		177.70	245.9	525	0.50	304.1	1.4	28.0	0.33	11.30	81%
	DCBMH 24	DCBMH 31	2228	2006	6987	11.30		0		174.83	339.3	600	0.50	434.2	1.5	36.5	0.40	11.70	78%
	STUB 2	DCBMH 31	2862	2575	2575	10.00		0		186.69	133.6	375	2.00	248.0	2.2	3.8	0.03	10.03	54%
	DCBMH 31	MH 5	3052	2747	12309	11.70		0		171.54	586.5	750	0.50	787.2	1.8	31.9	0.30	12.00	75%
	CB 25	MH 5	1740	1566	1566	10.00		0		186.69	81.2	300	1.00	96.7	1.4	8.3	0.10	10.10	84%
	CB 26	MH 5	457	411	411	10.00		0		186.69	21.3	200	1.00	32.8	1.0	8.3	0.13	10.13	65%
	MH 5	MH 4	0	0	14287	12.00		0		169.15	671.3	825	0.50	1015.0	1.9	26.3	0.23	12.23	66%
	MH 4	MH 3	0	0	14287	12.23		0		167.34	664.1	825	0.50	1015.0	1.9	7.6	0.07	12.30	65%
	MH 3	CULTEC	0	0	14287	12.30		0		166.83	662.1	825	0.50	1015.0	1.9	1.6	0.01	12.31	65%
	DCB 27	CULTEC	2692	2423	2423	10.00		0		186.69	125.6	450	0.50	201.6	1.3	1.0	0.01	10.01	62%
	CB 36	CULTEC	991	892	892	10.00		0		186.69	46.3	250	1.00	59.5	1.2	23.9	0.33	10.33	78%
	CB 32	CULTEC	472	425	425	10.00		0		186.69	22.0	200	1.00	32.8	1.0	6.4	0.10	10.10	67%
	CULTEC	MH 2	0	0	23366	12.31		0		166.72	1082.1	900	0.50	1280.1	2.0	29.3	0.24	12.55	85%
	MH 2	MH 1	0	0	23366	12.55		0		164.89	1070.2	900	0.50	1280.1	2.0		0.00	12.55	84%

TYLin

Project Name: Brock Zents Townhomes
Project #: 18138
Date: 3/20/2024

Prepared by: XW
Checked by: LP

LOCATION: PICKERING
STORM SEWER DESIGN SHEET
STORM EVENT (yr) 100

a = 2096.425
b = 6.485
c = 0.863

$i = a(T+b)^{-c}$, where i (mm/h) ; T (min)
$Q = A(i)C/3600 + C.\ FLOW \times (42)$, where A ($m^2$) ; i (mm/h)
AC = AREA x RUNOFF COEFFICIENT
C. FLOW = CONTROLLED FLOW

STREET	UPSTREAM STRUCTURE	DOWNSTREAM STRUCTURE	AREA (m^2) C=0.90	AC (m^2)	CUMULATIVE AC (m^2)	ToC (min)	C. FLOW @42L/s/ha (m^2)	CUMULATIVE C. FLOW (m^2)	OVERRIDE STORM EVENT (years)	i (mm/h)	Q (L/s)	PIPE SIZE (mm)	GRADE (%)	CAPACITY (L/s)	VELOCITY (m/s)	LENGTH (m)	TIME IN PIPE (min)	TOTAL TIME (min)	% CAPACITY

Technical Specification

Control Point	Head (m)	Flow (l/s)
Primary Design	1.910	17.300
Flush-Flo™	0.396	17.252
Kick-Flo®	0.553	9.602
Mean Flow		12.903

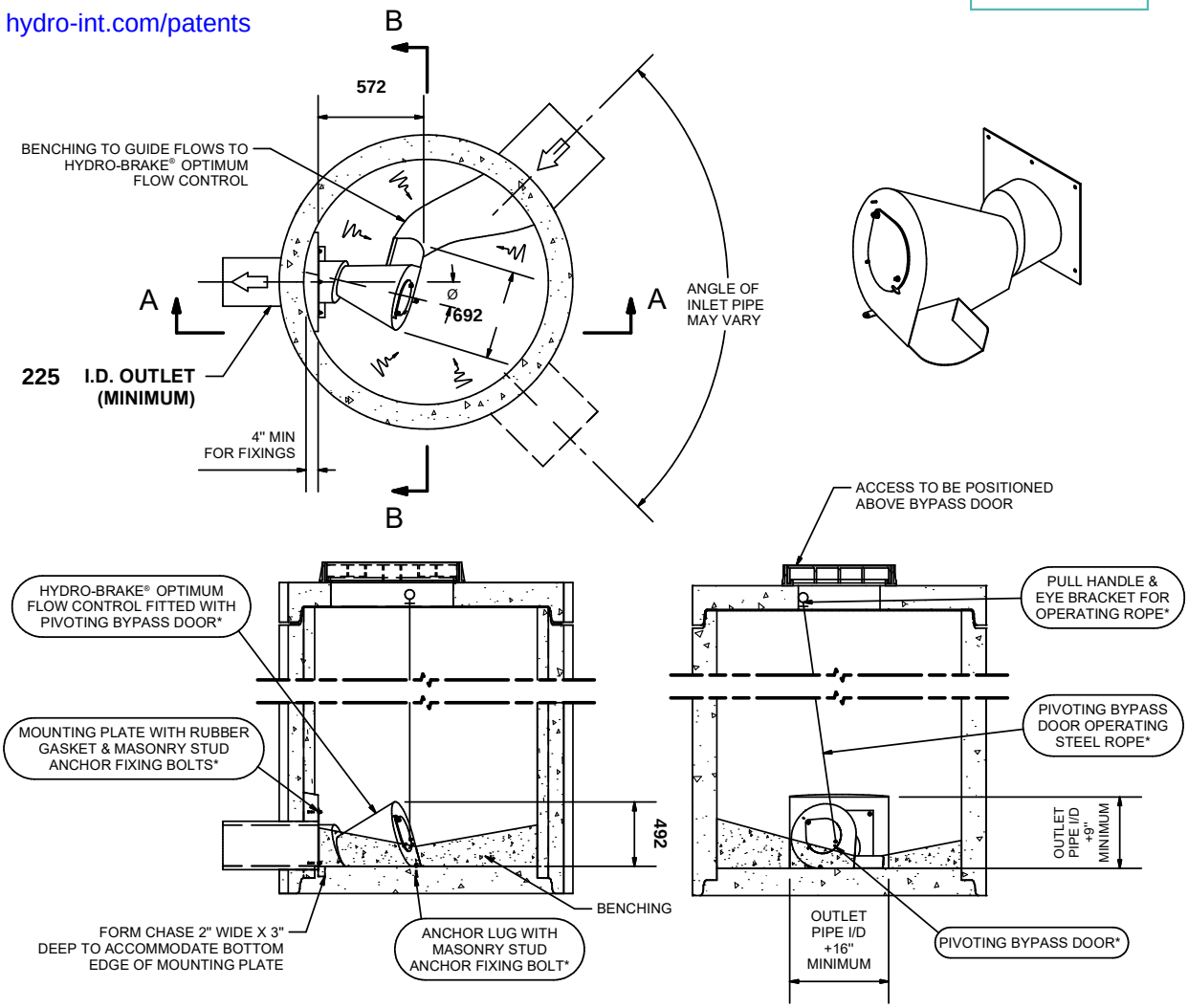
Hydro-Brake® Optimum Flow Control including:

- **3 mm** grade 304L stainless steel
- Integral stainless steel pivoting by-pass door allowing clear line of sight through to outlet, c/w stainless steel operating rope
- Beed blasted finish to maximise corrosion resistance
- Stainless steel fixings
- Rubber gasket to seal outlet
- Indicative Weight: 40 kg

BBA APPROVAL INSPECTION TESTING CERTIFICATION CERTIFICATE 08/4596

wrc approved PT/503/0422 Valid: 01/04/2022 - 31/03/2027

hydro-int.com/patents



SECTION A-A SECTION B-B

IMPORTANT: ⬭ LIMIT OF HYDRO INTERNATIONAL SUPPLY
THE DEVICE WILL BE HANDED TO SUIT SITE CONDITIONS
FOR SITE SPECIFIC DETAILS AND MINIMUM CHAMBER SIZE REFER TO HYDRO INTERNATIONAL
ALL CIVIL AND INSTALLATION WORK BY OTHERS
* WHERE SUPPLIED
HYDRO-BRAKE® FLOW CONTROL & HYDRO-BRAKE® OPTIMUM FLOW CONTROL ARE REGISTERED TRADEMARKS FOR FLOW CONTROLS DESIGNED AND MANUFACTURED EXCLUSIVELY BY HYDRO INTERNATIONAL

THIS DESIGN LAYOUT IS FOR ILLUSTRATIVE PURPOSES ONLY. NOT TO SCALE.

DESIGN ADVICE

The head/flow characteristics of this CHE-0162-1730-1910-1730 Hydro-Brake® Optimum Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.
The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.

Hydro International
A CRH COMPANY

DATE	3/21/2024 4:37 PM
SITE	Brock Zents
DESIGNER	Lu Phan
REF	MH101

CHE-0162-1730-1910-1730
Hydro-Brake® Optimum

 Hydro International Ltd, 94 Hutchins Drive, Portland, Maine, 04102-1930. Tel; +1 (207) 756 6200 Fax; +1 (207) 756 6212 Web; www.hydro-int.com Email; enquiries@hydro-int.com

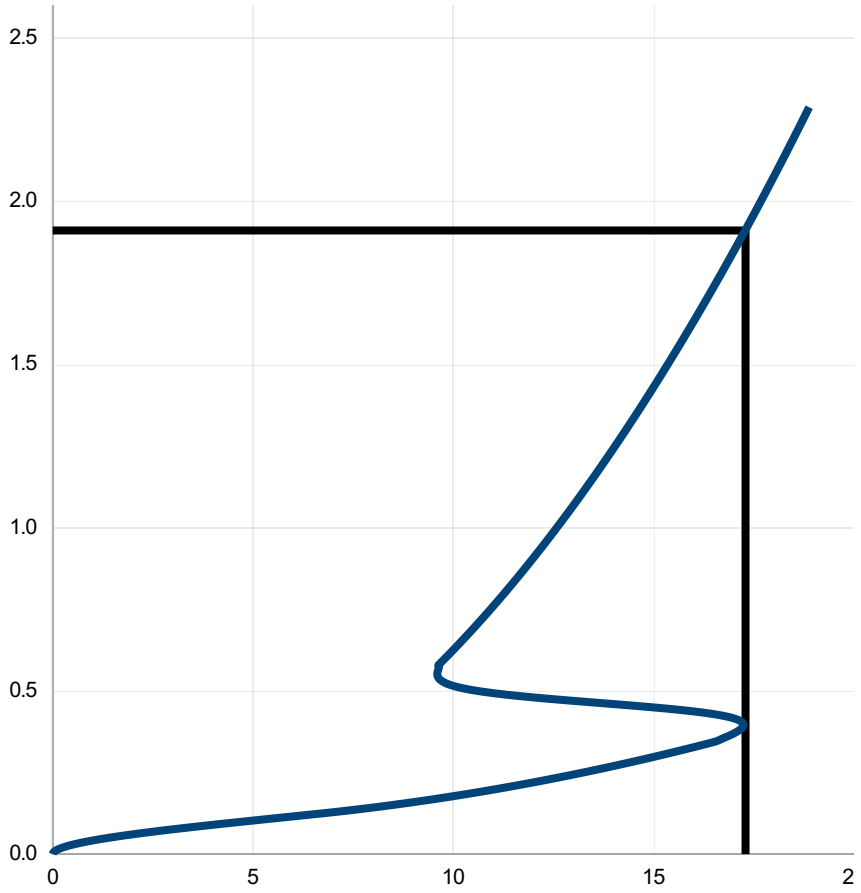
luantruongphan@gmail.com

Technical Specification		
Control Point	Head (m)	Flow (l/s)
Primary Design	1.910	17.300
Flush-Flo™	0.396	17.252
Kick-Flo®	0.553	9.602
Mean Flow		12.903

BBA APPROVAL INSPECTION TESTING CERTIFICATION
CERTIFICATE No 08/4596

wrc approved™
PT/503/0422
Valid: 01/04/2022 - 31/03/2027

hydro-int.com/patents



Head (m)	Flow (l/s)
0.000	0.000
0.066	2.321
0.132	7.248
0.198	11.001
0.263	13.767
0.329	16.063
0.395	17.252
0.461	13.856
0.527	9.757
0.593	9.743
0.659	10.259
0.724	10.750
0.790	11.218
0.856	11.667
0.922	12.099
0.988	12.515
1.054	12.917
1.120	13.307
1.186	13.685
1.251	14.052
1.317	14.410
1.383	14.759
1.449	15.100
1.515	15.432
1.581	15.758
1.647	16.076
1.712	16.389
1.778	16.695
1.844	16.995
1.910	17.290

DESIGN ADVICE

The head/flow characteristics of this CHE-0162-1730-1910-1730 Hydro-Brake® Optimum Flow Control are unique. Dynamic hydraulic modeling evaluates the full head/flow characteristic curve.

! **The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.**

Hydro International
A CRH COMPANY

DATE	3/21/2024 4:37 PM
Site	Brock Zents
DESIGNER	Lu Phan
Ref	MH101

CHE-0162-1730-1910-1730

Hydro-Brake® Optimum

Appendix B

SANITARY CALCULATIONS

Project Name : **Brock Zents Townhomes**
Project # : **18138**
Sanitary Servicing Analysis

TYLin

Prepared by: LP
Checked by: BD
Date: March 20, 2024

Standards = The Regional Municipality of Durham

Formulas

Peaking Factor (Harmon) = $1+14/[4+(P/1000)^{1/2}]$

Peak Flow = p(q)M(unit conversion) + infiltration

ALLOCATED

Land Type	Area (m^2)	# of Units /Floor Area	Density	Population (p)	Average Flow (q)	Peaking Factor (M)	Peak Flow (Q) (L/s)
Infiltration Allowance	22500				22.5 m3/ha/day		0.6
Single Family Dwelling		235 Units	3 Persons/unit	704	364 L/day/person	3.80	11.3
Total							**11.9**

Proposed Sanitary Design Flow

Land Type	Area (m^2)	# of Units /Floor Area	Density	Population (p)	Average Flow (q)	Peaking Factor (M)	Peak Flow (Q) (L/s)
Infiltration Allowance	26346				22.5 m3/ha/day		0.69
Townhouses/Stacked Townhouses		274 Units	3 Persons/unit	822	364 L/day/person	3.80	13.16
Total							**13.85**

Summary

ALLOCATED	=	11.85 L/s
Proposed Sanitary Design Flow	=	13.85 L/s
Increased Flow	=	2.00 L/s

Service Connection	Diameter (m)	Slope (%)	Velocity (m/s)	Full Flow Capacity (L/s)	Spare Capacity (L/s)	Usage Increased (%)	Total Usage (%)
Residential	200	0.3	0.57	17.96	4.11	-	77.1%
Service Connectic	300	1.0	1.37	96.70	82.85	2.1%	14.3%

Notes

1. The proposed development is an increase of 2 L/s of peak sanitary flow to the downstream sanitary sewer system.
2. This increase is equal to 2.1% of the total pipe capacity of the minimum municipal sanitary sewer.
3. This flow is equal to 77.1% of the total pipe capacity of a 200mm diameter service connection.

Appendix C

WATER DEMAND CALCULATIONS

TYLin

Brock Zents
18138
Required Fire Flow

Prepared by: **V.P.**
Checked by: **L.P.**
Date: **March 13, 2024**

as per Fire Underwriters Survey Water Supply for Public Fire Protection, 2020

1. Initial Required Fire Flow (Step A, B, C)

Construction Type =	Type II Noncombustible	Construction
Construction Coefficient, C =	0.8	
Total Effective Area, A =	3016.14	m^2
Required Fire Flow, RFF =	9665.8	LPM
RFF, rounded =	**10000**	**LPM**

2. Occupancy and Contents Adjustment Factor (Step D)

Contents =	Noncombustible contents	
Adjustment Factor =	-25%	
RFF =	**7500**	**LPM**

3. Automatic Sprinkler Protection (Step E)

Sprinkler Design	**Designed**	**Building Coverage**	**Credit**
Automatic sprinkler protection designed and installed in accordance with NFPA 13	No	100%	0%
Water supply is standard for both the system and Fire Department hose lines	No	100%	0%
Fully supervised system	No	100%	0%
	Total Sprinkler Credit =		0%

Reduction = 0 LPM

4. Exposure Adjustment Charge (Step F)

Direction	Distance	Charge
North	3.1m to 10m	20%
South	3.1m to 10m	20%
East	Greater than 30m	0%
West	3.1m to 10m	20%

Total Charge = 60%

Charge = 4500 LPM

5. Final Required Fire Flow (Step G)

RFF =	7500	LPM
Reduction =	0	LPM
Charge =	4500	LPM
RFF =	12000	LPM

Final RFF, rounded =	**12000**	**LPM**
	3170	**GPM**
	200	**L/s**

TYLin

Brock Zents Prepared by: **V.P.**

18138 Checked by: **L.P.**

Domestic Demand Date: **March 13, 2024**

as per Region of Durham Design Guidelines

Population =	882	
Per Capita Demand =	364	L/cap/day
Average Daily Demand =	321048	L/day
	3.72	L/s

	Average Day	Peak Hour	Maximum Day	
Peaking Factor	n/a	3.80	1.50	
Demand	**3.72**	**14.12**	**5.57**	**L/s**
	58.90	223.81	88.35	GPM

Appendix D

SUPPORTING DOCUMENTATION

1.3 WATER BALANCE ANALYSIS

The water balance calculations presented in Tables 1.1 through 1.4 demonstrate that, without mitigation, urbanization has the potential to increase direct runoff by 269% and reduce infiltration by 22% within the Ganatsekiagon Creek subwatershed, and by 172% and 21% respectively within the Urfe Creek subwatershed.

The pre-development infiltration throughout much of the proposed development area is naturally low due to the soil conditions, and most of the recharge that contributes to baseflow in the study area occurs in areas that will not be developed (e.g. off-site or locally along protected valley features). As such, the potential 22% reduction in infiltration volumes in the proposed development areas is not expected to negatively affect the aquatic conditions in the watercourses. Nevertheless, where feasible, measures to balance, or at least in part, make up the post-development infiltration deficit and reduce post-development runoff volumes will be incorporated into the development design.

A Best Management approach for stormwater management, designed to reduce direct runoff and increase the post-development infiltration within each subwatershed should be adopted. Recharge targets are discussed below along with a proposed mitigation strategy. Post-development water balance calculations, with mitigation, are then presented in Tables 1.5 and 1.6 to demonstrate the effectiveness of this approach.

1.3.1 RECHARGE TARGETS

The difference in the pre- to post-development infiltration volumes provides recharge targets to maintain the water balance and groundwater flow conditions on a subwatershed basis. Based on the water balance analysis presented in Tables 1.1 through 1.4, the recharge difference is 19,359 m^3/a for Ganatsekiagon Creek and 72,611 m^3/a for Urfe Creek.

1.3.2 MITIGATION STRATEGY

Constructed infiltration facilities such as basins, galleries or trenches are suitable for the areas of relatively permeable soils such as the surficial sands found in the northern portions of the Duffin Heights lands (refer to Figure WB-1). For the remaining areas to the south, the soils are less permeable as they have a higher clay content. The percolation rate in the till is expected to be less than 12 mm/hour (> 50 min/cm), which is below the MOE minimum guideline for measures such as infiltration trenches of 15 mm/hour (< 40 min/cm). These areas are not conducive for the use of large engineered infiltration facilities. There are, however, as outlined in the MOE Stormwater Management Planning and Design Manual (March 2003), a number of other mitigation techniques that can be used to increase the potential for post-development infiltration.

Techniques such as directing roof runoff to pervious surfaces and swales promote the retention of natural infiltration, provide additional water volumes for infiltration to pervious areas and reduce the volume of runoff directed to stormwater management facilities. This is particularly effective in the summer months, when natural infiltration would not generally occur because the additional water overcomes the natural soil moisture deficit. Other practices that may be considered to reduce runoff in the proposed development areas include, but are not limited to: use of vegetated buffer strips, rain gardens, cisterns, rain barrels, etc. and construction of bioretention cells particularly in parking lot areas.

Water balance calculations have been completed for post-development conditions incorporating potential proposed mitigation measures to reduce runoff volumes and increase infiltration. The amount of roof runoff being infiltrated for several of the development parcels has been based on preliminary infiltration designs for these parcels as submitted in the current Functional Servicing and Stormwater Reports (FSSRs). This includes Mattamy (Brock Road) Developments Ltd., Lebovic – Bradshaw property, Lebovic West Lands and

the Cougs (Tillings) Subdivision. For the remaining development parcels, including the City of Pickering lands west of Tillings Road, the Mixed Use Corridor west of Brock Road and south of Dersan Street, and the medium density lands north of Old Taunton Road assumptions have been made with respect to the percentage of the drainage area that can potentially be infiltrated either through the use of Low Impact Development measures (LIDs), or at an infiltration facility. No infiltration has been assumed for the Mixed Use Corridor north of Dersan Street and west of Brock as these flows must be conveyed to the west Tributary Branch 2 of Urfe Creek to maintain base flows. The drainage areas and assumptions for infiltration are presented on figure WB-3 and in Appendix A.

In this post development scenario with mitigation measures, soil moisture balance calculations were completed to assess how much water could potentially infiltrate in areas where extra runoff water is directed to vegetated areas, for example, where roof water is directed to grass. Tables A.6 and A.7 have factored in a change in slope for the lawns; shorter rooting depth; addition of roof captured rainwater (minus evaporation from roof); and 10% reduction in infiltration from compaction. The resultant infiltration and runoff factors have been applied in the post-development water balance with mitigation analysis presented in Tables 1.5 and 1.6.

As shown on Tables 1.5 and 1.6, post-development water balance calculations using selected mitigation techniques demonstrate that it is possible to exceed recharge targets in Ganatsekiagon Creek and maintain 92% of the pre-development infiltration in Urfe Creek. Site specific soil and water table conditions should be assessed at the draft plan of subdivision stage to evaluate the feasibility of, and opportunities for, augmenting groundwater infiltration and reducing runoff to determine the type, location and size of such measures. Again, it should be noted that existing infiltration volumes are over estimated here due to the assumption of almost 100% pervious surfaces under existing conditions.

Additionally, it is interesting to note that there is a 10 ha decrease in surface drainage area in Urfe Creek subwatershed and a corresponding 10 ha increase in Ganatsekiagon Creek under post development conditions. Although it has been assumed that the groundwater system follows the surface water system and there is a divide between Ganatsekiagon and Urfe Creeks, if infiltration is looked at comprehensively for all of Duffin Heights, there is only a 5% decrease in infiltration between post and pre.

quantity, quality and erosion control for these lands by the two proposed SWM facilities (SWM facility #3 and SWM facility #4).

Due to the diversion of drainage and in the absence of an end-of-pipe facility for the drainage area to West Tributary Branch 1, special consideration is required to ensure that water quality is not compromised, post-development flows do not exceed pre-development peak flows, and a surface water balance is maintained. Lot-level and conveyance type controls are therefore required to provide the necessary stormwater management controls for sub-catchment 2322, as outlined below.

4.2.1.1 QUALITY CONTROL

Quality control measures will be required for the proposed impervious surfaces in the Mixed Use Corridor located north of Dersan Street and west of Brock Road (sub-catchment 2322) prior to the "dirty" flows combining with the "clean water" from the woodlot (sub-catchment 2324) and roof and foundation drains (portion of sub-catchment 2350). As agreed upon by both the City of Pickering and TRCA, an oil/grit separator is to be located on the west side of Brock Road, north of Dersan Street within the right-of-way (refer to Figure 6.2) and will be designed to provide a minimum 75% removal of total suspended solids from the runoff. The unit is to be installed and maintained by the City of Pickering.

To provide additional quality control for the Mixed Use Corridor north of Dersan Street and west of Brock Road and provide a "treatment train" approach for those lands draining to Urfe Creek West Tributary Branch 1, an enhanced grassed swale is required at the outfall to the watercourse. The swale is to be located on the lands owned by Mattamy (Brock Road) Limited, immediately north of the cemetery. The swale shall be designed to accommodate the drainage from the woodlot, the "clean" controlled flows from the Mixed Use Corridor west of Brock Road and the 1 ha of roof drainage from the Mixed Use Corridor east of Brock Road. The swale must be designed to provide an "Enhanced" level of quality control (80% TSS removal). Adaptive management principles are to be utilized in the design of the swale to ensure that, as with the end-of-pipe SWM facilities, the design can be modified to allow for future modifications.

4.2.1.2 EROSION CONTROL

In the absence of an end-of-pipe SWM facility to provide erosion control, it must be shown that the proposed drainage plan and SWM strategy will not cause erosion on Urfe Creek West Tributary Branch 1. As outlined in the Terms of Reference (refer to Appendix A), the erosion criteria is to be based on the field assessment of the affected streams to establish the critical sections and thresholds at which erosion will take place. The field assessment for West Tributary Branch 1 was completed by Geomorphic Solutions and the results are presented in the Erosion Analysis Report (Appendix J of the ESP). A continuous model was developed to show that the proposed SWM strategy does not cause an increase in downstream erosion based on the erosion thresholds determined through the field assessment. The continuous modelling and analysis of the erosion thresholds for Urfe Creek West Tributary Branch 1 are presented in the Erosion Analysis Report (Appendix J of the ESP).

The proposed SWM strategy for West Tributary Branch 1, as outlined above in Section 4.2.1, will result in a decrease in both the duration and incidence of erosive flows within the reaches studied. Any potential impacts of the proposed development on the affected reaches of Urfe Creek will therefore be mitigated.

4.2.1.3 QUANTITY CONTROL

On-site detention is required for quantity control of the drainage from the proposed development in the Mixed Use Corridor located north of Dersan Street and west of Brock Road (refer to Figure 6.2). The 2 year post-development flows from this area must be controlled to unit release rates to ensure that the pre-

3.2.2.1 MAIN BRANCH

Under preferred land use conditions, the total drainage area from the study area to the Main Branch of Urfe Creek will be 39.0 ha (sub-catchment 2350 on Drawing DA-3). This corresponds to a diversion of approximately 15.4 ha from Branch 1 of the West Tributary to the Main Branch. A SWM facility will be located adjacent to Urfe Creek, east of Brock Road and north of Dersan Street to service this area (refer to SWMF #3 on Figure 6.1).

As indicated in Stantec's preliminary proposed drainage plan (refer to Appendix B), approximately 15.4 ha will drain to a SWM facility located north of Rossland Road, east of the Main Branch. There is also a small area shown on this plan that will drain uncontrolled. For the purposes of the Duffin Heights model, the total area from Ajax A9 draining to the Main Branch of Urfe Creek has been assumed to be 16.4 ha. This facility is located outside of the study area and will discharge to the Main Branch downstream of Rossland Road. This area has been identified as Subcatchment 2341 and will correspond to a diversion of approximately 4.3 ha from Duffins Creek to Urfe Creek.

3.2.2.2 WEST TRIBUTARY

Under existing conditions there are two branches of the West Tributary denoted as Branch 1 (Catchment 23.2) and Branch 2 (Catchment 23.3), (refer to Drawing DA-2). Under the preferred land use conditions the storm drainage plan for the DH lands within the West Tributary is as follows:

- The existing woodlot located north of Dersan Street and east of Tillings Road, which is approximately 18.7 ha in size (not including the proposed roads), will drain east, as it does under existing conditions, towards the proposed north-south road west of Brock Road. These flows will be captured and conveyed via a "cleanwater" storm sewer pipe south along the proposed road, then east along Dersan Street towards Brock Road (refer to Figure 6.2). The flows will then be conveyed east along the northern limits of the cemetery, ultimately discharging to the existing watercourse on the east side of Brock Road within the cemetery lands. This drainage will be separate from the road drainage (i.e. new road proposed east of the woodlot, Dersan Street and Brock Road). As outlined in the Duffin Meadows Cemetery Stormwater Management Master Plan (Stantec, 2001), the downstream infrastructure (culverts and SWM facilities) has been designed to accommodate a pre-development drainage area of 47 ha. Refer to Section 4.2.1.4 for additional details.
- All drainage from Brock Road, the Mixed Use Corridor on the west side of Brock Road south of Dersan Street and the property located on the east side of Brock Road south of the cemetery (approximately 26.1 ha) will be conveyed via municipal infrastructure south along Brock Road to a proposed SWM Facility to be located south of the Hydro Corridor, discharging to Branch 2 of the West Tributary (SWMF #4). This corresponds to a diversion of approximately 16.0 ha from Branch 1 to Branch 2 during frequent storm events (less than the 2 year) (refer to Figure 6.3).
- Minor system drainage (2 year storm) from the Mixed Use Corridor on the west side of Brock Road north of Dersan Street will be collected via storm sewer and conveyed south within the Brock Road right-of-way towards Dersan Street. Quality and quantity controls will be required as outlined in Sections 4.2.1.1 and 4.2.1.3, respectively. The flows will combine with the "clean water" pipe and be conveyed east along the northern limits of the cemetery to West Tributary Branch 1. This drainage will be conveyed by a separate storm sewer from the Brock Road drainage. Major system flows (up to and including the 100 year storm event) from this area will be conveyed overland to Brock Road and conveyed south along the right-of-way discharging to SWM facility #4 (refer to Figure 6.3).
- Until such time as the Mixed Use Corridor north of Dersan Street and west of Brock Road develops, the flows from the woodlot and Mixed Use Corridor will continue to drain east overland towards Brock Road. Under existing conditions, these flows are conveyed south via the roadside ditch and then east under Brock Road via an existing culvert to West Tributary Branch 1. The Brock Road reconstruction

development flows to the West Tributary Branch 1 are not exceeded under post-development conditions. The following table, Table 4.3, provides a summary of the unit release rates and storage required to control post- development flows to the Aquafor Beech unit release rates for this drainage area. This is to be accomplished on a site by site basis by providing on-site detention for the 2 year storm in the form of underground (tank or pipe), surface (parking lot or swales) or rooftop storage. All flows above the 2 year storm can spill to Brock Road. These flows will be conveyed overland south along Brock Road to SWM Facility #4. Details of the site specific stormwater management controls will be required as part of the FSSR for each development application.

TABLE 4.3: DRAINAGE AREA 2325 QUANTITY RELEASE RATES AND STORAGE REQUIREMENTS

Area (ha)	Return Period (Year)	Unit Discharge (l/s/ha)	Storage Required (m^3/ha)
13.6	2	6.9	185

4.2.1.4 WATER BALANCE

In order to maintain flows to Urfe Creek West Tributary Branch 1, it is proposed to have "clean water" pipes to convey flows from sub-catchments 2324, 2322 and 9518 (a portion of sub-catchment 2350) to the water course, immediately north of the existing Cemetery. Section 3.2.2.2 outlines the proposed drainage to the "clean water" pipes, which are illustrated on Figure 6.2.

As requested by TRCA and the City of Pickering, a continuous surface water balance was completed for West Tributary Branch 1 to ensure that the proposed SWM plan will not impact the volume of stormwater contributing flow to this watercourse. The Total Water Surplus (or total runoff volume) was calculated on a daily, monthly and yearly basis for post-development conditions based on the proposed drainage area plan, for a dry, wet and average year (utilizing Oshawa precipitation data). The results are presented in Appendix F and on the enclosed CD.

Based on the proposed strategy, with the minor system drainage from the Mixed Use Corridor north of Dersan Street and west of Brock Road, along with the "clean water" from east of Brock Road and the woodlot being directed to Branch 1, there is on average a 1.5% decrease in monthly surface runoff volume to Branch 1. It can therefore be concluded that the diversion of 35.7 ha away from the West Tributary Branch 1 will not impact the aquatic environment with respect to surface runoff volume.

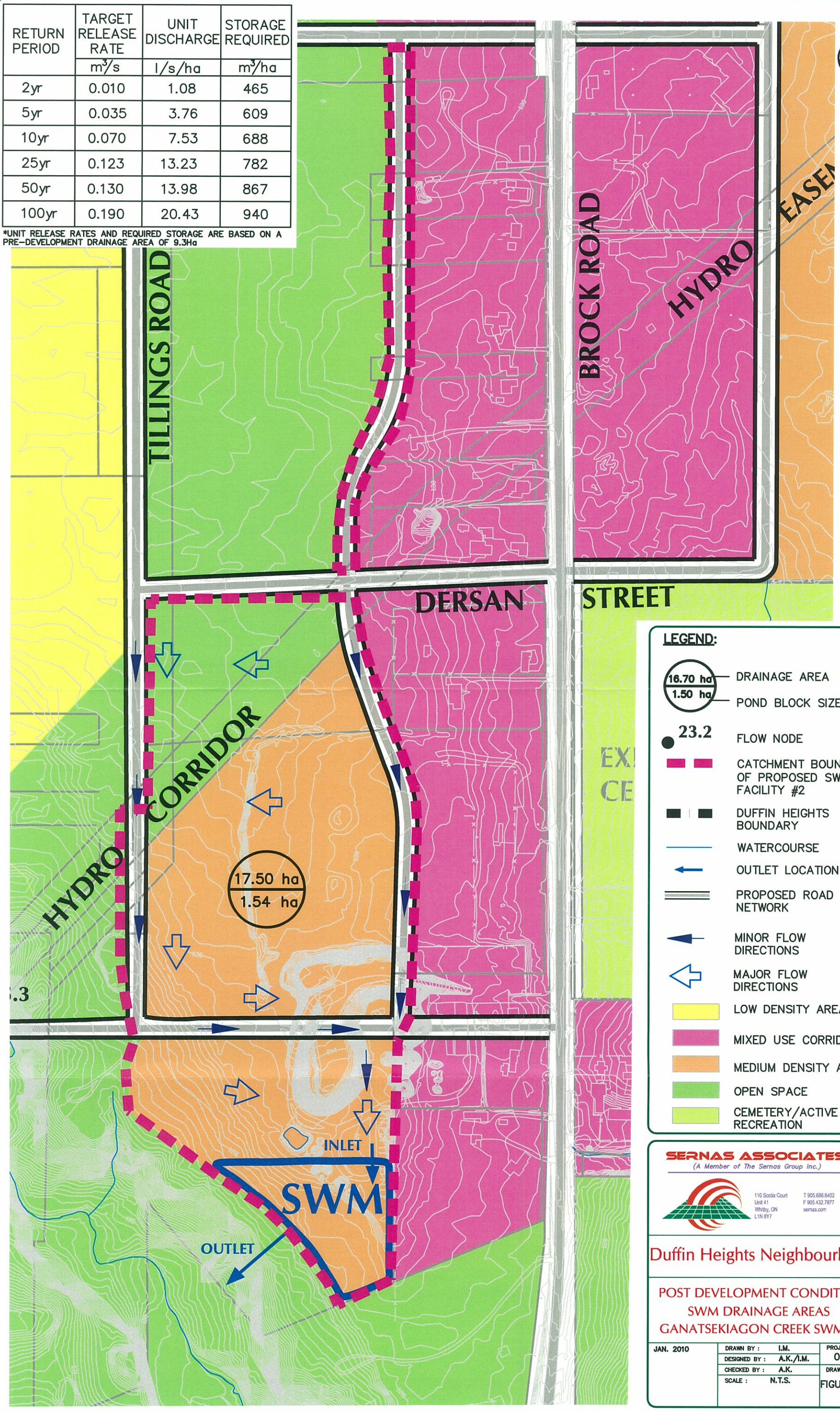
4.2.2 URFE CREEK EAST TRIBUTARY BRANCH 2 (SUBCATCHMENT 2371)

The area along the northern boundary of the Duffin Heights Neighbourhood, including Drainage Area 2371, has been identified in the Hydrogeological Study prepared by Beatty & Associates Limited as "the southern toe of the Iroquois shoreline deposit, a hydrologically sensitive area." Special consideration is therefore required for the development lands located in this area and more specifically, in the northeast corner of the Duffin Heights Neighbourhood, (Drainage Area 2371). Drainage Area 2371 consists of a 2.8ha parcel designated for medium density development.

End-of-pipe controls are not a viable SWM solution for these lands due to the fact that the amount of developable area within each drainage area is limited and also due to the location of these lands with respect to the watercourse. Lot level and conveyance controls are therefore very important for management of both surface water and groundwater resources based on this and the fact that this area has been identified as the Iroquois shoreline. A "treatment train" approach including on-site detention for quantity controls and infiltration measures for the water balance are required for the development of the lands within Drainage Area 2371.

RETURN PERIOD	TARGET RELEASE RATE	UNIT DISCHARGE	STORAGE REQUIRED
	m^3/s	l/s/ha	m^3/ha
2yr	0.010	1.08	465
5yr	0.035	3.76	609
10yr	0.070	7.53	688
25yr	0.123	13.23	782
50yr	0.130	13.98	867
100yr	0.190	20.43	940

*UNIT RELEASE RATES AND REQUIRED STORAGE ARE BASED ON A PRE-DEVELOPMENT DRAINAGE AREA OF 9.3Ha



LEGEND:

- 16.70 ha / 1.50 ha — DRAINAGE AREA / POND BLOCK SIZE
- 23.2 — FLOW NODE
- CATCHMENT BOUNDARY OF PROPOSED SWM FACILITY #2
- DUFFIN HEIGHTS BOUNDARY
- WATERCOURSE
- OUTLET LOCATION
- PROPOSED ROAD NETWORK
- MINOR FLOW DIRECTIONS
- MAJOR FLOW DIRECTIONS
- LOW DENSITY AREAS
- MIXED USE CORRIDORS
- MEDIUM DENSITY AREAS
- OPEN SPACE
- CEMETERY/ACTIVE RECREATION

SERNAS ASSOCIATES
(A Member of The Sernas Group Inc.)
110 Scotia Court
Unit 41
Whitby, ON
L1N 8Y7
T 905.686.6402
F 905.432.7877
sernas.com

Duffin Heights Neighbourhood

POST DEVELOPMENT CONDITIONS SWM DRAINAGE AREAS GANATSEKIAGON CREEK SWM #2

JAN. 2010	DRAWN BY : I.M.	PROJECT No. 06154
	DESIGNED BY : A.K./I.M.	
	CHECKED BY : A.K.	DRAWING No. FIGURE 5.2
	SCALE : N.T.S.	

R/P Date - APR. 16, 2010 File: 06154 FIGURES

RETURN PERIOD	TARGET RELEASE RATE	UNIT DISCHARGE	STORAGE REQUIRED
	m^3/s	l/s/ha	m^3/ha
2yr	0.094	6.91	185

*UNIT RELEASE RATES AND REQUIRED STORAGE ARE BASED ON A PRE-DEVELOPMENT DRAINAGE AREA OF 13.6Ha

ON SITE DETENTION REQUIRED AS PER TABLE

CLEAN WATER PIPE TO CONVEY 100 YEAR PRE-DEVELOPMENT FLOWS FROM WOODLOT

CLEAN WATER PIPE TO CONVEY 2 YEAR CONTROLLED POST-DEVELOPMENT FLOW FROM MIXED USE CORRIDOR WEST OF BROCK ROAD

CLEAN WATER PIPE TO CONVEY 100 YEAR POST-DEVELOPMENT FLOW FROM 1.0 HA OF ROOF AREA REMAINING DRAINAGE TO SWM#3

MAJOR SYSTEM FLOWS TO SWM#4

OLD TAUNTON ROAD

URFE CREEK EAST TRIBUTARY

URFE CREEK

EASEMENT

HYDRO

TILLINGS ROAD

BROCK ROAD

DERSAN

STREET

2324
18.70 ha
WOODLOT

2322
11.50 ha

ROOF AREA
9518
1.0 ha

SWMF#3

23.5

URFE CREEK
WEST TRIBUTARY BRANCH 1

EAST TRIBUTARY BRANCH 2

LEGEND:

- 201 / 1.50 ha — NHYD # / DRAINAGE AREA
- 23.2 — FLOW NODE
- DRAINAGE BOUNDARY
- ROOF DRAINAGE BOUNDARY
- DUFFIN HEIGHTS BOUNDARY
- WATERCOURSE
- PROPOSED ROAD NETWORK
- CLEANWATER PIPE
- MAJOR FLOW DIRECTIONS
- LOW DENSITY AREAS
- MIXED USE CORRIDORS
- MEDIUM DENSITY AREAS
- OPEN SPACE
- CEMETERY/ACTIVE RECREATION

SERNAS ASSOCIATES
(A Member of The Sernas Group Inc.)
110 Scotia Court
Unit 41
Whitby, ON
L1N 8Y7
T 905.686.6402
F 905.432.7877
sernas.com

Duffin Heights Neighbourhood

POST DEVELOPMENT CONDITIONS
SWM DRAINAGE STRATEGY
URFE CREEK
WEST TRIBUTARY BRANCH 1

JAN. 2010	DRAWN BY : I.M.	PROJECT No. 06154
	DESIGNED BY : A.K./I.M.	
	CHECKED BY : A.K.	DRAWING No. Figure 6.2
	SCALE : N.T.S.	

R/P Date – APR. 16, 2010 File: 06154 FIGURES

ON SITE DETENTION

RETURN PERIOD	TARGET RELEASE RATE	UNIT DISCHARGE	STORAGE REQUIRED
	m^3/s	l/s/ha	m^3/ha
2yr	0.094	6.91	185

*UNIT RELEASE RATES AND REQUIRED STORAGE ARE BASED ON A PRE-DEVELOPMENT DRAINAGE AREA OF 13.6Ha

RETURN PERIOD	TARGET RELEASE RATE	UNIT DISCHARGE	STORAGE REQUIRED
	m^3/s	l/s/ha	m^3/ha
2yr	0.091	6.95	425
5yr	0.148	11.30	592
10yr	0.187	14.27	708
25yr	0.243	18.55	859
50yr	0.293	22.37	972
100yr	0.339	25.88	1088

*UNIT RELEASE RATES AND REQUIRED STORAGE ARE BASED ON A PRE-DEVELOPMENT DRAINAGE AREA OF 13.1Ha

ON SITE DETENTION REQUIRED AS PER TABLE

CLEAN WATER PIPE TO CONVEY 100 YEAR PRE-DEVELOPMENT FLOWS FROM WOODLOT

CLEAN WATER PIPE TO CONVEY 2 YEAR CONTROLLED POST-DEVELOPMENT FLOW FROM MIXED USE CORRIDOR WEST OF BROCK ROAD

CLEAN WATER PIPE TO CONVEY 100 YEAR POST-DEVELOPMENT FLOW FROM 1.0 HA OF ROOF AREA REMAINING DRAINAGE TO SWM#3

MAJOR SYSTEM FLOWS TO SWM#4

OIL/GRIT SEPARATOR

URFE CREEK EAST TRIBUTAR

URFE CREEK

TILLINGS ROAD

WOODLOT

11.50 ha

BROCK ROAD

HYDRO EASEMENT

DERSAN STREET

CORRIDOR

26.10 ha
1.97 ha

URFE CREEK WEST TRIBUTARY BRANCH

EXISTING CEMETERY

WEST TRIBUTARY BRANCH 1

WEST TRIBUTARY BRANCH 2

INLET

OUTLET

OUTLET

SWM

25.2

ROSSLAND ROAD

LEGEND:

- 16.70 ha / 1.50 ha — DRAINAGE AREA / POND BLOCK SIZE
- 23.2 — FLOW NODE
- CATCHMENT BOUNDARY OF PROPOSED SWM FACILITY #4
- MAJOR SYSTEM ONLY (72YR STORM)
- DUFFIN HEIGHTS BOUNDARY
- WATERCOURSE
- OUTLET LOCATION
- PROPOSED ROAD NETWORK
- CLEANWATER PIPE
- MINOR FLOW DIRECTIONS
- MAJOR FLOW DIRECTIONS
- LOW DENSITY AREAS
- MIXED USE CORRIDORS
- MEDIUM DENSITY AREAS
- OPEN SPACE
- CEMETERY/ACTIVE RECREATION

SERNAS ASSOCIATES
(A Member of The Sernas Group Inc.)
110 Scotia Court
Unit 41
Whitby, ON
L1N 8Y7
T 905.686.6402
F 905.432.7877
sernas.com

Duffin Heights Neighbourhood

POST DEVELOPMENT CONDITIONS SWM DRAINAGE AREAS URFE CREEK SWM #4

JAN. 2010	DRAWN BY : I.M.	PROJECT No. 06154
	DESIGNED BY : A.K./I.M.	
	CHECKED BY : A.K.	DRAWING No. FIGURE 6.3
	SCALE : N.T.S.	

R/P Data - APR. 16, 2010 File: 06154 FIGURES